INNOVATE

Metropolitan | 2021

INTEGRATION

of smart water management into our infrastructure

INCLUSION

of all voices to create our water future together

INNOVATION

to ensure we are looking at different and creative ways to solve the challenges of managing our precious water resources

WELCOME

Welcome to Metropolitan's inaugural Innovation Report. We are excited to share this first-of-its-kind report with you on our highlights, advancements and achievements.

Innovation is not new to Metropolitan. It's part of our legacy. Nearly 90 years ago, facing a growing population and a lack of water, cities across the region united in a level of unprecedented cooperation to create The Metropolitan Water District of Southern California. In the decades since, Metropolitan has risen as a leader in the water industry, not just for the size and scale of its endeavors, but for the innovative solutions and creative thinking that drive our ability to overcome challenges and deliver water from the source to the tap.

This legacy of innovation continues today as Metropolitan meets the challenge of continuing business during extraordinary times punctuated by the COVID-19 pandemic and historically dry conditions, working in creative ways to ensure water reliability for Southern California.

In fact, innovation is one of three pillars that provide our foundation for success, along with integration and inclusion. These "three I's" focus on integration of smart water management into our infrastructure, inclusion of all voices to create our water future together, and innovation to ensure we are looking at different and creative ways to solve the challenges of managing our precious water resources.

Whether our resources are potable water, groundwater, stormwater, wastewater, or recycled water, fit all the pieces together and it's all **"One Water."** Looking collectively through the lens of innovation is the key to exploring and finding the One Water we need for our future.

At its core, the "One" in One Water is about people united. That's why our innovation program to advance the organization and its core business of delivering water brings people together and supports a culture of innovation amongst our employees and member agencies.

In this annual report, you'll see how this culture of innovation embraces partnerships, pilots, trials, new technologies, the exchange of thoughts and ideas, and most importantly, our Metropolitan employees and partners, the heart of innovation.

Adel Hagekhalil, Chief Executive and General Manager
The Metropolitan Water District of Southern California

01.

INNOVATE TO PROVIDE A RELIABLE WATER SUPPLY

Preparing for the future, Metropolitan is continuously exploring creative ways to save, develop and reliably deliver safe and affordable water supplies in the short and long term. This focus on forward-thinking solutions has led to several groundbreaking milestones to provide a reliable water supply for our region that include: (1) development of new local water supplies, (2) innovative regional conservation efforts, and (3) operational and planning initiatives.

NEW WATER SOURCES

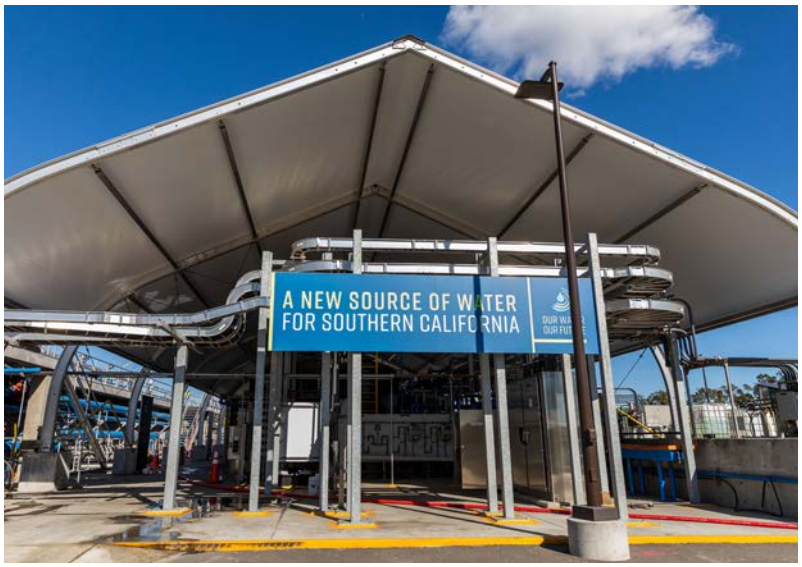
In a region grappling with drought and limited water supplies, the need for new water sources is critical. Metropolitan advanced several initiatives that help develop local, in-region water supplies for the Southland.

//REGIONAL RECYCLED WATER PROGRAM

For the first time in its history, Metropolitan, in partnership with the Los Angeles County Sanitation Districts, is pursuing the development of its own in-region water supply. The Regional Recycled Water Program is designed to produce and deliver up to 150 million gallons per day or approximately 168,000 acre-feet per year of purified water.

In addition, Metropolitan began the environmental planning phase of the program, a significant milestone that will ultimately result in a major policy decision.

Membrane bioreactors at the Regional Recycled Water Advanced Purification Center



Regional Recycled Water Advanced Purification Center, Carson

The Regional Recycled Water Advanced Purification Center is a 500,000-gallon-per-day demonstration facility and a hub for research and innovation on water reuse. Metropolitan's scientists and engineers are testing an innovative purification process to reuse water for groundwater replenishment. In addition, Metropolitan has developed novel methods for microbial testing.

GEORGE DI GIOVANNI

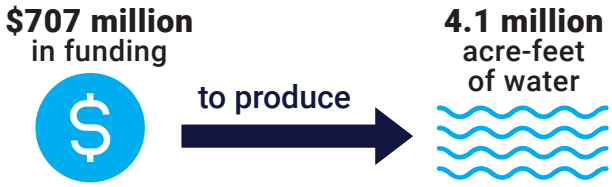
Watch George's video

//LOCAL RESOURCES PROGRAM

Since 1982, Metropolitan has provided financial incentives to help local and member agencies develop water recycling, groundwater recovery and seawater desalination projects through the LRP. Local projects funded under the LRP have helped sustain the region with production of more than 4.1 million acre-feet of water to date. Since the inception of the LRP, Metropolitan has provided nearly $707 million in funding.

In 2021, Metropolitan added three new local resource projects to the LRP, bringing the total number of projects to 116. The three new projects include the city of Santa Monica's plan to implement a recycled water and groundwater recovery project, and two water recycling projects planned in San Diego County – the East County Advanced Water Purification Project and the Escondido Filtration Reverse Osmosis Facility.

SINCE THE INCEPTION OF THE LRP, METROPOLITAN HAS PROVIDED NEARLY



//STORMWATER

Metropolitan implemented stormwater pilot programs to provide vital data on the supply potential for stormwater capture. The $12.5-million pilot program helps fund the construction of new groundwater recharge projects and direct-use stormwater capture projects, as well as the installation of monitoring equipment on existing projects. As an example, Metropolitan recently supported a pilot project with the Inland Empire Utilities Agency for the construction and monitoring of the Montclair Basins Improvement Project.

Installation of recycled water irrigation lines with support from the Local Resources Program

CONSERVATION

With Southern California's warm and dry climate, conservation remains a critical part of Metropolitan's water supply reliability portfolio. Over the past 40 years, we've invested in catalysts to lower our region's water demands and reduce per capita water usage by 40 percent.

Conservation highlights include:

//INNOVATIVE CONSERVATION PROGRAM

The Innovative Conservation Program resulted in funding for novel water-saving devices and strategies. The program provides funding in cooperation with the Southern California Gas Company for research that will document water savings and the reliability of innovative methodologies. **To date, the program has funded nearly 80 projects, including:**

Advanced Metering Infrastructure

Use AMI to determine best practices to harness data obtained through this technology to detect leaks

Leak Detection and Water Consumption Monitoring in Multi-Family Properties

Test flow monitoring/leak detection technology designed specifically for multi-family and commercial properties to determine water savings/leak detection potential

Defroster Water Savings

Design and study a product that reduces the amount of water used to defrost frozen foods in a commercial kitchen setting

High-Efficiency Sprinkler Nozzles

Create a test method that will provide the basis for standardizing the efficiency of sprinkler nozzles

Responsive Drip Irrigation

Develop a drip irrigation technology equipped with irrigation valves that indicate when water is needed

Improved Agriculture Water-Use Efficiency

Test multiple technologies at a vineyard to improve water efficiencies in agricultural settings. The technologies include soil moisture sensors, weather station data, and remote sensing

Lauren Steely in the Palo Verde Valley

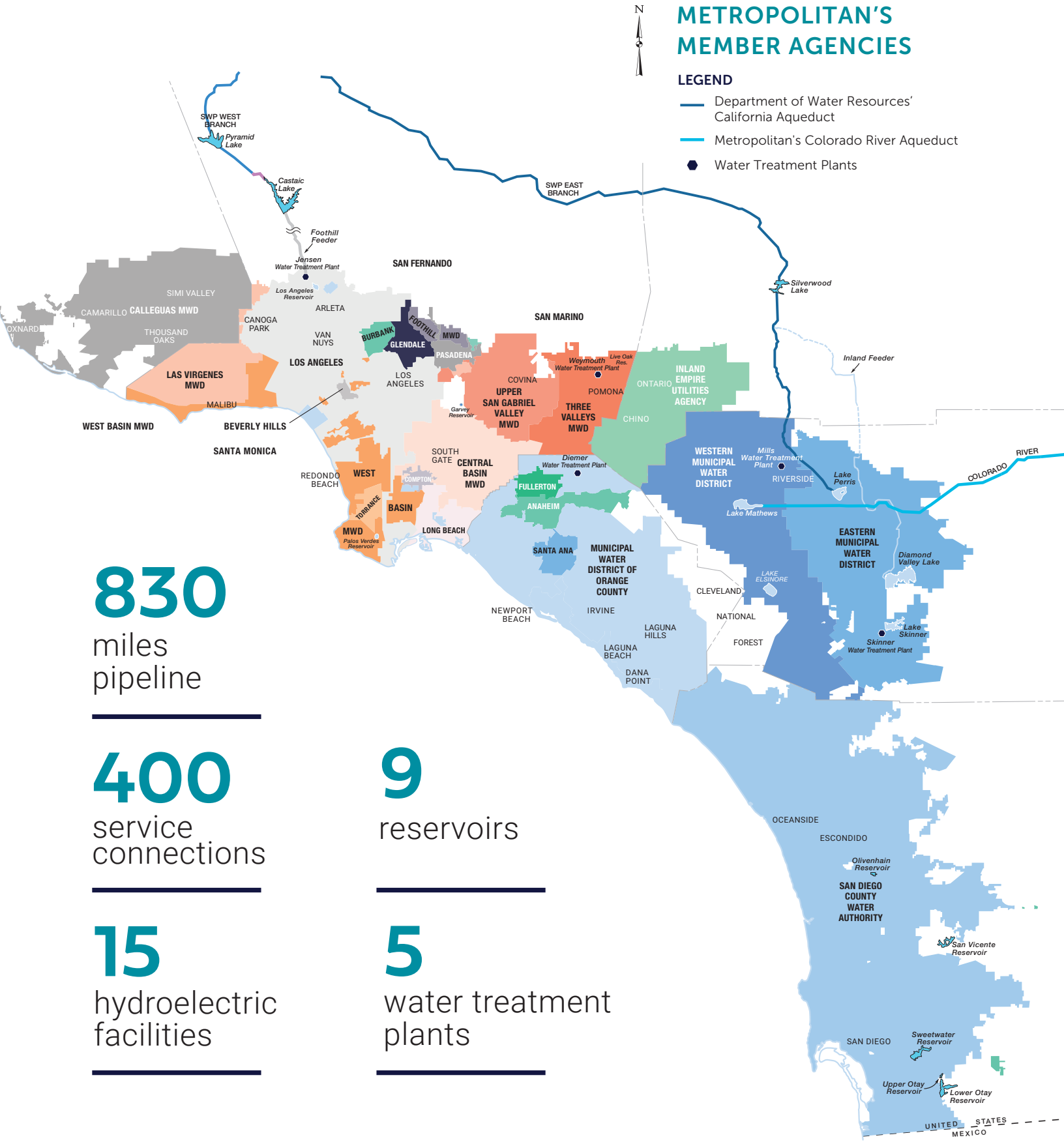
//URBAN-AGRICULTURE PARTNERSHIPS

Urban-agriculture partnerships are important to securing and maintaining Colorado River supplies. Metropolitan expanded its long-standing relationships with the Palo Verde Irrigation District and the Bard Water District to pay farmers to fallow land and make the saved water available for urban uses. This action supports the agricultural economy, conserves water resources from the Colorado River, and stores water in Lake Mead, which is at a critically low level. Metropolitan also began a five-year research program with Chico State University to increase knowledge of regenerative agriculture in the Palo Verde Valley, especially on fallowed land. In addition, Metropolitan studied remote sensing on farmland to identify the relationship between crops and water use to better understand sustainable agricultural practices.

//CONSERVATION CAMPAIGN

A multilingual conservation campaign was launched to celebrate the diversity of our identities and experiences in responding to drought conditions. Featuring California Friendly® plants and created entirely in-house from concept development to animation to production, this campaign recognizes that drought is a part of the fabric of Southern California, just like its diverse cultures and identities. The campaign reached millions and was promoted in digital advertising on YouTube, Metropolitan's social media platforms, and on Metropolitan's online conservation hub, **bewaterwise.com**.

METROPOLITAN'S MEMBER AGENCIES



830
miles pipeline

400
service connections

9
reservoirs

15
hydroelectric facilities

5
water treatment plants

OPERATIONS AND PLANNING INITIATIVES

Delivering water to our 5,200-square-mile service area involves operating a complex system. It takes both long-range planning and out-of-the-box thinking to provide a high quality, reliable water supply for our region, especially as we face limited water resources due to drought, climate change and other issues.

Through these challenges, Metropolitan continues to innovate to operate our water system with these operational highlights:

//DROUGHT MANAGEMENT

Reacting creatively to another dry year and the lowest water allocation from the State Water Project in history, Metropolitan transformed the operation of its water system and increased water supply by operating its Colorado River Aqueduct on an eight-pump flow for the first time since 2015.

Moving to this maximum flow required teamwork, demanding close coordination across the district's Water System Operations and Engineering Services groups to ensure safe operations.

Whitsett Intake Pumping Plant

Colorado River Aqueduct

Greg Avenue Pump Station

//DROUGHT MANAGEMENT

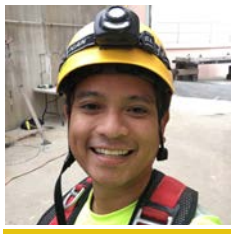
Other innovative actions to manage the drought included reengineering the Lakeview Pipeline and Lake Perris area facilities to allow water to flow from Diamond Valley Lake to the Riverside-based Henry J. Mills Water Treatment Plant. This change provided more system flexibility with an additional source of supply to the Mills plant. In addition, a major upgrade of Metropolitan's Greg Avenue Pump Station near Burbank Airport allows Colorado River water to be pumped to areas that typically receive State Water Project supplies, as far west as Ventura County.

//NEW TECHNOLOGIES

New technologies and methods to better monitor and understand Metropolitan's operational system were implemented, including:

ULTRASOUND and a remotely operated underwater vehicle to inspect pipelines, saving time and reducing the need for extensive dewatering and shutdowns.

Watch Jay's video



JAY PASTOR

REALITY MODELS which take photos and survey points of Metropolitan facilities and build them into 3D digital models. The models provide a real-world context for design, construction and operational decisions, improving infrastructure reliability.

Watch Paul's video

PAUL TUCKER

CONDITION-BASED MEASUREMENTS to test the condition of pumps on the Colorado River Aqueduct. Metropolitan applied sensors to measure vibration and pressure, providing valuable pump efficiency data.

Watch David's video

DAVID SADAMOTO

SOPHISTICATED HYDRAULIC MODELS to accurately predict flow and conditions throughout the water system during situations that may arise due to operational changes and delivery needs.

Learn More

SAURABH SHEKHAR

//ENERGY RESILIENCE

Four new battery energy storage systems will manage operational costs by optimizing solar power and reducing peak load at Metropolitan facilities. The energy storage systems will be built with a microgrid configuration to connect to the larger electricity grid or function independently to continue powering the facilities during an outage. They support Metropolitan's Energy Sustainability Plan.

Solar panels at Metropolitan's Skinner Water Treatment Plant

//CLEAN AIR VEHICLES

Metropolitan transitioned to clean air vehicles by shifting its traditional diesel and gasoline fleet toward zero emission vehicles. At Lake Mathews, Metropolitan successfully piloted use of renewable diesel vehicles. Natural gas vehicles also are in the Metropolitan fleet and other options such as electric-battery and fuel cells are being evaluated.

//COVID-19 RESPONSE

During the pandemic, Metropolitan innovated to create a safe workspace with the concept of microteams. Working in teams of two or three minimized the sharing of workspace and equipment and increased social distancing. In addition, Metropolitan developed customized COVID-19 prevention plans throughout the organization to protect employees. These measures and others allowed us to continue the essential work of delivering water to the region through the pandemic.

02.

INNOVATE THROUGH PARTNERSHIPS

Recognizing that working together is critical to lead innovation, Metropolitan collaborates with many partners to exchange ideas, support innovators, and share information.

We are proud of our many partnerships, including:

WaterStart

A nonprofit collective of globally recognized leaders who adapt to change by scaling up new solutions to water challenges. Driven by the needs of water agencies and large consumers, WaterStart provides a channel for pooling resources to accelerate the development and adoption of innovative water technologies by funding pilots.

Peer-to-Peer Collaborations

Includes sharing best practices and information with 14 global and local utilities. Examples include seismic resilience strategies with Mekorot in Israel; dam safety and water quality with Singapore Public Utilities Board; hybrid workforce development and capital investment prioritization with Tucson Water; and a first-ever university water industry webinar with the Los Angeles Department of Water and Power.

Regional Agency Innovation Council

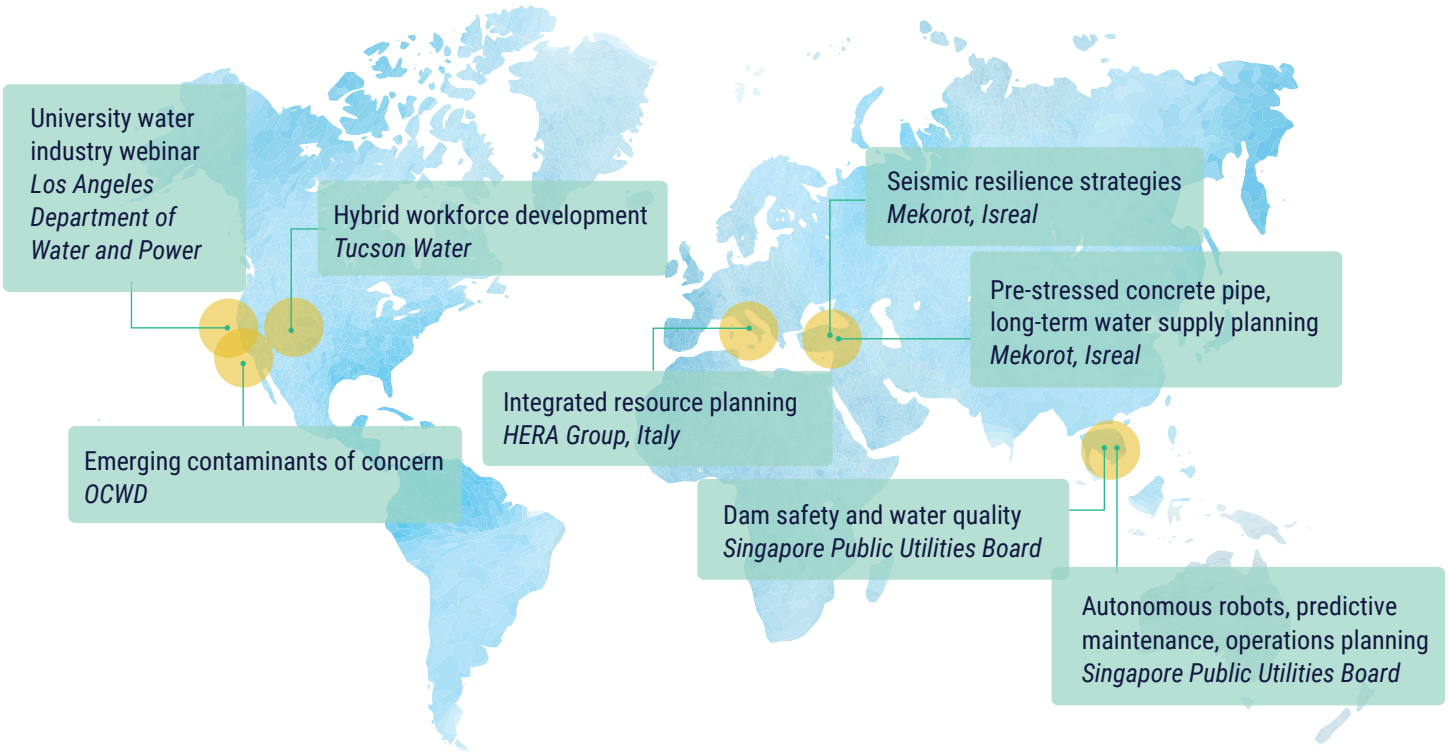
A regional initiative of water agencies led by Metropolitan and designed to encourage peer-to-peer sharing to promote innovation and emerging technologies.

California Water Data Consortium

A consortium with a vision of a resilient and equitable water future where open and accessible data informs all water management decisions in California.

Technology Accelerators

Helps entrepreneurs throughout Metropolitan's service area to move innovation to market. These partnerships provide mentoring, business plan coaching, and technology deployment. Metropolitan is proud to partner with technology accelerators such as CONNECT in San Diego, Larta Institute in Los Angeles, Braid Theory in the Los Angeles harbor area, Sustain OC and Octane in Orange County, and Imagine H2O in San Francisco.



03.

INNOVATE WITH TECHNOLOGIES, PILOTS AND RESEARCH

New technologies and cutting-edge research are fundamental to innovate and create efficiencies, cost savings, and improvements to the way we deliver water.

Metropolitan's many innovation initiatives help evaluate new technologies, implement pilot projects and conduct research.

//TECHNOLOGY EVALUATION

Metropolitan uses many avenues to assess new technologies, support entrepreneurs, and provide a path for technology adoption in the water sector.

Feedback Forum

This program provides an opportunity for entrepreneurs to bring ideas to Metropolitan. In return, we guide them on the needs and business practices of the water sector.

Technology Approval Group

This global forum accelerates the market uptake of "step-change" technologies by engaging the water utility industry during early stages of development.

2020-21

MORE THAN **30** **technologies** were introduced to Metropolitan

OVER **40** **other utilities** in the group

6 **technologies** were considered for trials and deployment in Metropolitan systems

//PILOTS AND TRIALS

Metropolitan launched several pilot projects and trials to evaluate the use of new technologies within the organization and the water industry.

Modeling

Sophisticated modeling was used to assess current mixing conditions and evaluate options to enhance mixing characteristics in the finished water reservoirs at Metropolitan's Jensen and Mills water treatment plants. This new approach saved costs and enhanced water treatment and quality.

Laser Technology

In partnership with Southern Nevada Water Authority and Utah State University, laser technology to optimize performance of flowmeters is being tested in the field to explore time and resource savings.

Software

Software that streamlines operational data for accurate planning, forecasting, reporting and investments through Metropolitan's Capital Investment Plan is being piloted.

Remote Sensors

Remote sensors to monitor the condition of earthen levees in the Sacramento-San Joaquin Delta were installed to study the integrity of the levees and ensure the sustainability of this critical ecosystem and water resource.

Planning/Permitting Application

An application that aids in facilitating the environmental planning permitting process for projects is being trialed to improve collaboration and efficiency.

//RESEARCH

Metropolitan invests in cutting edge research to improve water supply reliability, water quality methods, and operations.

More than **20 studies** are underway to accelerate local supplies

Future Supply Actions Program

This program is one of Metropolitan's primary vehicles for promoting innovative and sustainable approaches to local supply development. The program co-funds low-cost, low-risk investments to address barriers to new supplies. This year, more than 20 studies are underway to help accelerate new local supplies in the future. Studies funded by the program represent a total investment of $4 million, leveraging an additional $7.9 million in partner funding.

Studies funded represent:

$4 MILLION
TOTAL METROPOLITAN INVESTMENT

$7.9 MILLION
ADDITIONAL PARTNER FUNDING

Sacramento-San Joaquin Delta

Metropolitan scientists measure pathogen removal for the Regional Recycled Water Program

Sacramento-San Joaquin Delta

Through collaborative science and research, Metropolitan invests in studies in the Sacramento-San Joaquin Delta to maintain seismic and climate resiliency, including the impacts of the State Water Project operations on Delta smelt and other native species. In addition, Metropolitan is advancing methods for carbon sequestration and regenerative agriculture as a vehicle for reversing subsidence and improving water supply and levee resiliency.

Water Quality

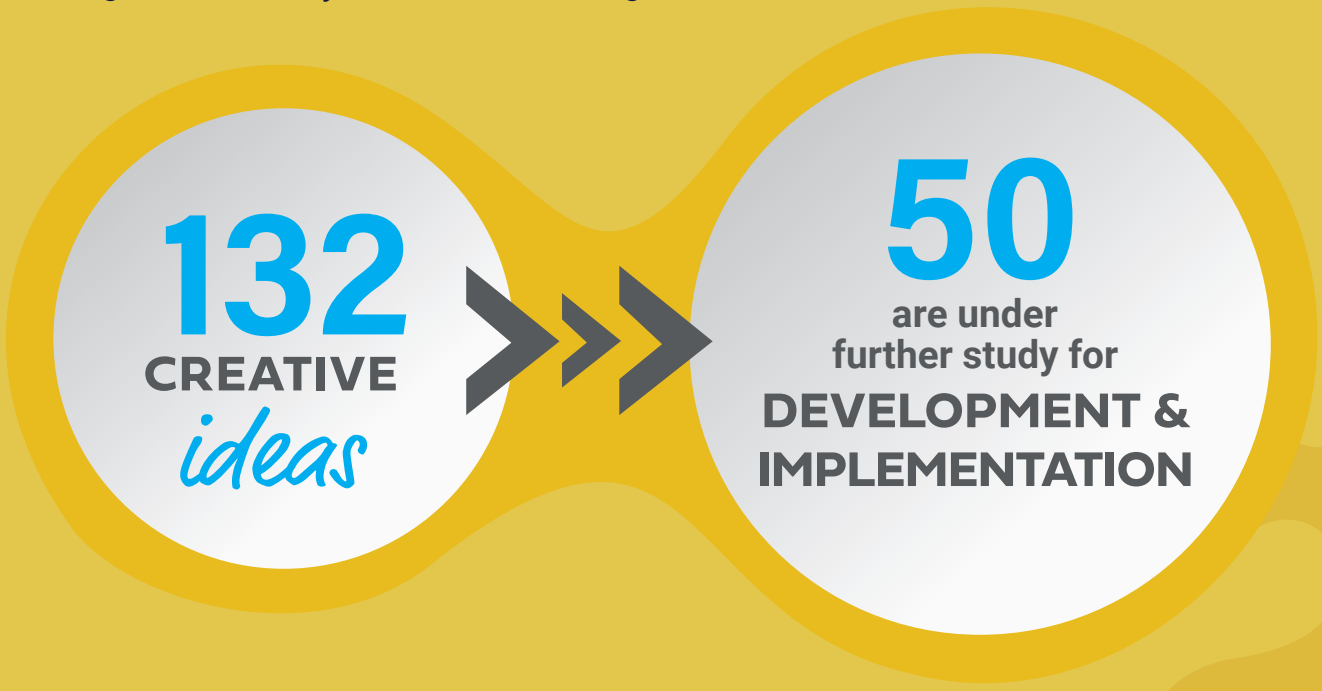
As a leader in water quality research and methods, Metropolitan is proud of our team of scientists and engineers who continue to advance research and apply new technologies. One new area is satellite monitoring of reservoirs and other water resources. Our water quality laboratory continues to keep an eye to the future using the best available science and cost-effective solutions to meet emerging regulations and safeguard the public's drinking water.

04.

INNOVATE WITH EMPLOYEES

Employees are at the heart of innovation and continuously improve and discover new approaches and innovative ways to increase efficiencies and effectiveness.

Supporting this spirit of innovation, our employees have generated ideas to ensure Metropolitan maintains a high level of reliability against multi-year, severe droughts.



//CULTURE ASSESSMENT/INNOVATION COUNCIL

As part of an assessment, approximately 885 staff members across Metropolitan participated in a survey with the results confirming that innovation is critical to the future of the organization. Based on the assessment, an Employee Innovation Council was formed to develop best practices and strategies for growing and nurturing a culture of innovation. The employee-driven council consists of a cross-section of 49 diverse employees, all committed as innovation champions to promote and strengthen innovation as a core pillar of the organization. Council members are responsible for developing a framework for Metropolitan's innovation program, which includes setting a vision, objectives and a mission statement. Council activities include presentations, workshops, discussions, review of the district's procurement practices, and development of an ideation software to encourage and implement new ideas.

Employee Innovation Council Members

Administrative Services Section
Joe Chavez
Anthea Lee
John Poli

Bay-Delta Initiatives
Shawn Acuna
Marty Meisler
Randall Neudeck
Russ Ryan

Board Administration
Brian Tubbs

Engineering Services
Javier Bautista
Mark Bushyeager
David Clark
Michael Thomas

Environmental Planning
Lilia Martinez

Ethics Office
Hilda Rodriguez
Peter Von Haam

External Affairs
John Arena
Wigs Mendoza
Rupam Soni
Peggy Vogt

Human Resources
Carmondy Breaux-Burns
Man Wa Ao

Information Technology
Steve Ma
Samir Sachdev
Cello Vitasovic

Office of Chief Financial Officer
Drew Boronkay
Jill Frater
Bernadette Robertson

Office of General Auditor
John Tonsick

Office of General Counsel
Betty Kuo
Stef Morris
Mark Parsons

Real Property
Tony Reyes
Karen Robles
Jennifer Ryan

Security Management
Tomer Benito

Water Resource Management
Don Bentley
Elise Goldman
Lindsay McPhail
Areeba Syed
Warren Teitz

Water System Operations
Laura Ceballos
Fred Crawford
George Di Giovanni
Alicia Escovedo
Carol Kaufman
Scott McMullen
Miluska Propersi
JR Rhoads
Dave Sadamoto

//METROPOLITAN "INTRAPRENEURS"

As Metropolitan staff began working remotely in response to the pandemic, a group of Metropolitan employees banded their talents together and volunteered to find ways to prepare for the full reopening of job sites. In the spirit of innovation and helping others, these "Intrapreneurs" donated ear-fatigue relievers for masks and UV-C light sanitizer boxes, providing extra care and comfort to their colleagues and community.

//INNOVATION CAMPAIGNS

To further the innovation culture, a new campaign, **"Innovation: Ideas for an Even Better Metropolitan,"** was launched highlighting 60 employees and their innovative ideas on social media platforms, newsletters, website, publications, conferences and more. An "Innovation Hour" series was created to share creative ideas and provide innovation inspiration, with seven webinars held during the year.

INNOVATION:
Ideas for an *even better* Metropolitan

//INNOVATION IN ACTION

Metropolitan staff is continuously improving and finding new approaches to work. Here's how we increase effectiveness in all parts of our organization:

Board Support Team

This team created tools to facilitate communications with our Board of Directors, including a mobile friendly, interactive tool that provides board members and key Metropolitan staff with a directory and shortcuts to board information.

Watch video

Security Team

To ensure the safety of employees working in remote locations, our Security Team implemented a lone-worker safety monitoring device. The device senses its holder's activities and can send an exact location via cellular or satellite to assist an employee if needed.

Digital Applications

A collaboration between Metropolitan's IT and Water System Operations staff, these online, interactive platforms facilitate important work in the field. A water quality application aids employees collecting water samples and a water ordering app benefits water delivery to member agencies. A Water Quality portal provides a convenient resource hub for employees. The applications provide a user-friendly interface and accurate and secure storage of information.

Watch video

Unmanned Aerial Vehicle Team

Employees across the district employed Metropolitan's UAV team to acquire aerial drone footage of our infrastructure. This led to investigations of dams, levees, properties surrounding our facilities, and other facilities to support our operations.

Welcome Aboard

To help welcome and onboard new employees, Human Resources and External Affairs created new videos to educate employees about their benefits options.

Watch video

Virtual Welders

The apprenticeship program provides virtual welding tools to give participants an opportunity to practice their skills in any environment. Virtual welders provide apprentices the extensive experience they need to master this challenging skill.

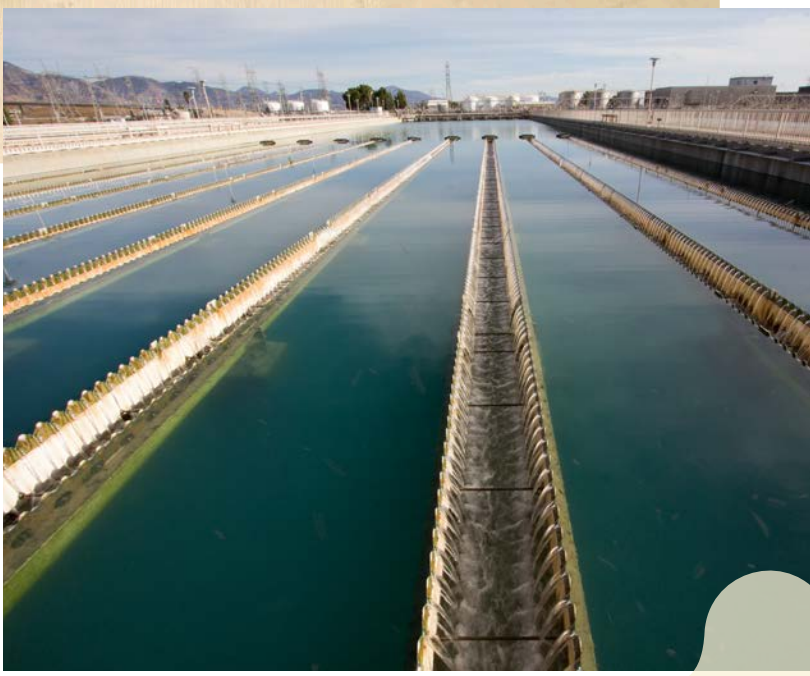
Apprentice uses virtual welding equipment

Water quality sampling cart

Inventions

Throughout the district, employees invent tools to improve our operations. For example, a cart was built to enhance water quality sampling at the Jensen Water Treatment Plant.

Watch video



Jensen Water Treatment Plant

05.

CONCLUSION

We invite you to learn more about Metropolitan and our culture of innovation by checking out the resources below. We welcome your feedback as we all work together creatively to transform the shape of water in Southern California.

- Visit **mwdh2o.com** and **mwdinnovates.com**.

- Contact us at **h2otechhub@mwdh2o.com**.

Diamond Valley Lake

MWD INNOVATION & TECHNOLOGY

DISCOVER • CONNECT • IGNITE

Metropolitan Innovation & Technology
H2OTechHub@mwdh2o.com
213.217.7620

@mwdh2o

On the cover: Colorado River Aqueduct