THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Pure Water Southern California

Addendum to White Paper No. 2

Planning, Financial Considerations, and Agreements

September 19, 2023

Introduction

This Addendum updates White Paper No. 2 (Planning, Financial Considerations, and Agreements) for the Pure Water Southern California Program (Program).

Purpose

The purpose of this Addendum is to update White Paper No. 2 to address:

- Changed conditions and updates to the Program description since White Paper No. 2 was published
- Updated Program needs assessment based on scenario planning in the 2020 Integrated Resources Plan (IRP) Needs Assessment.
- Enhanced regional benefits evaluation based on scenario planning in the 2020 IRP update

Summary of White Paper No. 2

White Paper No. 2 provided an update regarding Pure Water Southern California's role in Metropolitan's regional resource planning and included information regarding certain financial and other considerations related to the Program. It was intended that the information provided in it would assist the Board in decision-making—whether to move forward with environmental review and associated work on the Program.

White Paper No. 2 included the following topics:

- Analysis of the Program's role in regional resource planning from the 2015 IRP
- Documentation of the regional benefits of the Program
- Identification of cost recovery approaches for the Program
- Evaluation of institutional arrangements and agreements that would be required from Program participants

This Addendum was discussed at an Engineering & Operations Committee workshop on October 12, 2020.

Overview of Pure Water Southern California

Pure Water Southern California will produce 150 million gallons per day (mgd) or approximately 155,000 acre-feet per year (AFY) of purified water from a new advanced water purification (AWP) facility located at the Sanitation Districts of Los Angeles County (LACSD or Sanitation Districts) Joint Water Pollution Control Plant (JWPCP) site. In Phase 1, the Pure Water Southern California Program will also feature a new regional conveyance system that would deliver a reliable source of water for non-potable needs (NPR) and to recharge four regional groundwater basins for indirect potable reuse or IPR: Central, West Coast, Main San Gabriel, and Orange County. It will also include up to 25 mgd of purified water for direct potable reuse (DPR), through raw water augmentation (RWA) at Metropolitan's Weymouth and Diemer Water Treatment Plants (WTPs) for a total of 115 mgd in Phase 1. In Phase 2, an additional 35 mgd of purified water from the AWP plant will also be conveyed to the Weymouth and Diemer WTPs for RWA. The purified water would then be blended with raw water from the State Water Project (SWP) or the Colorado River Aqueduct (CRA) and undergo additional treatment before entry into

Metropolitan's treated drinking water distribution system. As the Weymouth and Diemer WTPs are two of the three treatment plants that supply treated water to the majority of Los Angeles and Orange Counties, introduction of the purified water to these two treatment plants would augment a significant portion (approximately 2/3 of the area) of Metropolitan's treated water distribution system, further enhancing water supply reliability and system flexibility for Metropolitan's service area.

The amount of purified water that can be used for RWA will depend on the DPR regulations, which will be finalized by 2023. The blend ratio of purified water to surface water will likely be in the range of 10 to 25 percent based on the regulations and the anticipated water qualities.

With a service area spanning 5,200 square miles in six counties, the current annual total retail demand within Metropolitan's service area is projected to range from 3.4 to 4.8 million AFY. Total retail demand includes:

- Municipal and industrial (M&I) demand (post conservation),
- Agricultural demand,
- Seawater barrier demand, and
- Replenishment demand.

At a production rate and delivery rate of approximately 155,000 AFY, Pure Water Southern California will provide 3.2 to 4.6 percent of the total retail demand within the service area through 2045.

A summary of demands in Metropolitan's Service Area is shown in **Table 1**.

Table 1: Summary of Demands in Metropolitan's Service Area Served by Pure Water

Type	2045
Total Retail Demand in Metropolitan service area	3.4-4.8 MAFY
Pure Water Southern California Planned Production and Delivery	0.155 MAFY
Percent of Total Retail Demand in Metropolitan Service Area Served by Pure Water Southern California	3.2-4.6%

Changed Conditions Since 2020

Many things have changed since publishing White Paper No. 2 in 2020. Higher temperatures in the Southwest have led to a dramatic reduction in Colorado River runoff. Variable weather in Northern California and stressed ecosystems have resulted in unprecedented low imports from the SWP. Due to drought conditions on both the SWP and the Colorado River in recent years, member agencies have had to face changes in how they receive water from Metropolitan. Likewise, in Southern California, less stormwater is percolating into groundwater basins, from too much rain at times or not enough rain at others. In 2023, hydrologic conditions have improved, but the need for climate resilience remains the same. Preparation now for the next drought cycle is imperative. Therefore, the Program is more important than ever as the region struggles with the impacts of climate change and declining storage.

Since White Paper No. 2 was published, other significant changes to the Program include:

- Board adoption of the Regional Needs Assessment of the 2020 IRP,
- Development of the Climate Adaptation Master Plan for Water (CAMP4Water)
- the State Water Board's Division of Drinking Water (DDW) has progressed in the development of criteria for direct potable reuse (DPR),
- the Colorado River partners (Southern Nevada Water Authority, Central Arizona Project (CAP), Arizona Department of Water Resources) as well as SWP contractor San Gabriel Valley MWD (SGVMWD) have expressed interest in the Program and formalized Letters of Intent (LOIs), and
- enhancements to the project including refining the member agency demands, evaluating opportunities to start the Program earlier, eliminating the direct to Orange County line, and updates to the treatment process and nitrogen limits.

The impacts to the Program from each of these changes are discussed below.

2020 IRP Regional Needs Assessment

The One Water approach to water supply reliability and resilience brings together all Southern California's interests in managing finite water resources for community and ecosystem needs. It goes beyond identifying the region's future water portfolio and embraces collaboration, diverse communities, and a unified approach to problem-solving. This 2020 IRP looks at multiple futures and builds a One Water foundation by understanding the potential needs of Southern California in the next quarter-century. Metropolitan's stated goal is 100 percent reliability for all its member agencies. The first step toward achieving this goal is identifying potential shortcomings, which speaks to the wisdom of analyzing different plausible futures.

The 2020 IRP is divided into the Regional Needs Assessment and the Implementation phase. The CAMP4Water addresses the Implementation phase. The Regional Needs Assessment was adopted by the Board in April 2022. The One Water Implementation phase is expected to be completed in 2024.

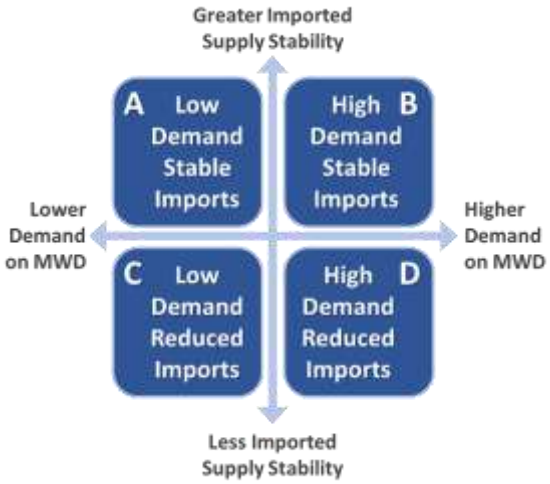
The 2020 IRP Regional Needs Assessment was an extensive process that identified and quantified vulnerabilities to water supply reliability in Metropolitan's service area. Working with its Board, member agencies, expert consultants and public stakeholders, Metropolitan identified future uncertainty in major drivers such as demographic and economic change, water use efficiency ethic and regulation, climate change, regulatory environment, and local supply development. The Regional Needs Assessment employed scenario planning to explore the water supply reliability outcomes under different planning scenarios each of which quantified the impacts of projected outcomes for water supply reliability.

The 2020 IRP Regional Needs Assessment also provided a high-level evaluation of the types of resource development that would improve water supply reliability in four scenarios (Scenarios A, B, C, and D): Each of the four scenarios is characterized by different assumptions related to imported supply stability and water demands on Metropolitan as shown in **Figure 1** and discussed below:

- **Scenario A:** This scenario is driven by a combination of plentiful regional and local supplies, a struggling economy, low population growth, and a continuing water use ethic across the state
- **Scenario B:** This scenario reflects increasing retail demands across the region resulting from population growth and a strong economy. Fortunately, climate change impacts have been manageable and imported supplies have remained stable. Increased reliance on Metropolitan resulting from groundwater contamination, has also increased demand for imported water.

- **Scenario C:** This scenario combines slow population growth and a weak economy with successful efforts among member agencies to manage water use behavior and drought-proof their local supplies. It couples a struggling economy with the rapid onset of climate change impacts that have affected imported supplies more drastically than less-vulnerable local system.
- **Scenario D:** This scenario is driven by severe climate change impacts to both imported and local supplies during a period of population and economic growth. Demands on Metropolitan are increasing due to rapidly increasing demands and diminishing yield from local supplies. Efforts to develop new local supplies to mitigate losses underperform. Losses of regional imported supplies are equally dramatic.

Figure 1 - Scenarios Identified in the 2020 IRP Regional Needs Assessment



No scenario should be regarded as "most likely" or "preferred" as each scenario has entirely plausible outcomes relative to each other. It is important to note that current water supply conditions are like those envisioned under Scenario D. These scenarios shed light on what could happen between now and 2045. They also signal the need for future "signposts" to indicate emerging needs that may require the re-prioritization of future investments and other adaptive actions. The IRP Regional Needs Assessment identifies significant threats facing Southern California's water supply reliability through successive qualitative and quantitative analysis steps. The assessment sizes up the scope of reliability challenges and the management solutions that could be in store for the region by the year 2045 under a wide range of conditions.

Completing this assessment launched the CAMP4Water, which will involve extensive collaboration among Metropolitan's Board, member agencies, and other interested parties to develop an adaptive management strategy. It will also establish a process for monitoring key reliability indicators and find joint approaches to the regional problems and resource needs identified in this assessment. The Board will decide on policy direction for future resource development (i.e., local vs. imported supply development) and on specific projects or implementation programs.

CAMP4Water

On February 13 and 14, 2023, the Board held a retreat to discuss the impacts of climate change on Metropolitan's water resources. From that retreat, Metropolitan developed the framework for the

Climate Adaptation Master plan for Water (CAMP4Water). Metropolitan's CAMP4Water integrates current climate, water resources, hazard mitigation, and financial planning efforts to prepare the region for the extremes of climate change. In collaboration with the member agencies, the Board, and members of the community, the CAMP4Water will address Metropolitan's future concerning resilience, reliability, affordability, and financial sustainability. The CAMP4Water process is expected to be completed by the end of 2023. Because Pure Water is a climate-resilient project, it will be integral to the success of the CAMP4Water process.

Program Description Enhancements

Program description enhancements include:

- Inclusion of DPR into the Program
- refinement of the member agency demands,
- elimination of the direct to Orange County pipeline
- evaluation of opportunities to make early deliveries from the Program, and
- Colorado River partners and SWP agreements.

Each topic is discussed below.

Updated Member Agency Demands

Pure Water Southern California would produce and deliver up to 150 mgd of purified water to serve industrial users, groundwater replenishment, and RWA. **Table 2** summarizes the average expected demands by use type in Phase 1 and Phase 2.

Table 2: Pure Water Southern California – Average Demand by Phase

Demand	Type	Average Demand (mgd)	Phase
Harbor Area	Non-Potable Reuse	24	Phase 1
West Coast Basin	Groundwater Replenishment	2	
Central Basin	Groundwater Replenishment	9	
Main San Gabriel	Groundwater Replenishment	55	
DPR	RWA	25	
DPR	RWA	35	Phase 2
Total	--	**150**	--

The most significant change in the Program description is including DPR in the first phase. Previously, the Program only included IPR uses for the water. Because DDW has progressed in developing criteria for DPR, Metropolitan decided to include RWA at 25 mgd (see Table 2) in Phase 1. This would allow Metropolitan to serve most of Los Angeles and Orange counties with the program.

Note that Table 2 no longer includes deliveries directly to Orange County. If Orange County decides to take deliveries from the Program, they could take delivery via the existing Yorba Linda Feeder and the Orange County Feeder No. 1. Because direct Orange County replenishment was removed from the

Program, the 3.5 mg/L nitrate (as N) Basin Plan Objective for Orange County Basin was no longer a target for the AWP. An updated target would be a maximum of 4 mg/L nitrate (as N) for Phase 1.

It is not anticipated that Senate Bill 1157 (Hertzberg), which lowers indoor water use standards to 47 gallons per person per day (gpcd) starting in 2025 and 42 gpcd in 2030, would impact the ability of the project to serve demands. Currently, the JWPCP produces about 260 mgd. It is projected that, by 2030, the JWPCP flows could be as low as 180 mgd even with stagnant population growth of Scenarios A and C. Despite this reduction, Pure Water could still produce 150 mgd.

Metropolitan is also exploring how the Pure Water Program can integrate with other Metropolitan efforts to enhance Metropolitan's system and improve water supply resilience across the entire service area, including:

- A Pure Water connection to the Los Angeles Department of Water and Power's (LADWP) Operation Next,
- An extension of Pure Water to the east to serve Inland Empire Utilities Agency (IEUA) and Three Valleys Municipal Water District (Three Valleys) to help with SWP-dependent areas on the east side of Metropolitan's system, and
- A conceptual plan to connect Metropolitan's Weymouth WTP to the Jensen WTP via a new east-west conveyance to help the SWP dependent areas on the west side of Metropolitan's system, which could extend the reach of Pure Water supplies.

Potential to Make Deliveries Early

Since White Paper No. 2 was initially published, Metropolitan has begun consideration of ways to start the Program before the full program is implemented. The following aspects of the program may be completed potentially as early as 2030.

- Up to 30 mgd AWP treatment and associated facilities
- Up to 6.5 miles of the backbone conveyance system through the City of Carson (Reach 1 of the conveyance pipeline)
- Early delivery service connections in the West Coast Basin and harbor area (see **Table 2**). The service connections would include connections to the Sanitation Districts, Los Angeles Department of Water and Power (LADWP), West Basin MWD, and the Water Replenishment District of Southern California (WRD) through Metropolitan member agencies in WRD's service area
- Early start of preliminary design for preparation of the future AWP site, the tunneling sections of the conveyance pipeline, and areas near the Santa Fe Dam that will require additional time due to coordination with the Army Corps of Engineers. Preliminary design began on Reaches 1 and 2 (from the JWPCP through the City of Lakewood) of the conveyance pipeline in 2023.

A map showing the locations of early potential portions of the conveyance pipeline that would need to start early is provided in **Figure 2**. Again, the early start projects should not be considered a separate phase but may achieve some early milestones for the Program.

Figure 2 - Early Start Phase Map

Colorado River and SWP partner agreements

Since White Paper No. 2 was originally published, Metropolitan executed LOI (LOIs) with

- Southern Nevada Water Authority (SNWA),
- Central Arizona Project (CAP), Arizona Department of Water Resources (AZDWR), and
- San Gabriel Valley Municipal Water District (SGVMWD)

These agreements allow Pure Water Southern California to coordinate with our partners on the Colorado River and on the SWP. Benefits of these LOIs have included:

- **Sharing of experience:** SNWA and Metropolitan have worked together on collaborative delivery**.** SNWA has extensive design-build/collaborative delivery experience **–** they have been able to work with Metropolitan staff during the development of the Program.
- **Sharing of facilities** SGVMWD and Metropolitan have worked together to evaluate the feasibility of using the Azusa Pipeline for DPR deliveries to Weymouth.
- **Coordination on Colorado River agreements**: SNWA, CAP, AZDWR, and Metropolitan have worked together on the development of a long-term strategy on the Colorado River. The partnership developed in the Program has helped agencies work better together.
- **Financial contributions**: SNWA, CAP, and AZDWR provided Metropolitan with $12 million for the environmental planning phase of the Program.

The significance of these additional partnerships demonstrates that Pure Water Southern California is more important than ever as climate change continues its grip on the Southwest. These relationships will be even more critical as this Program progresses.

Need for Pure Water Southern California

Pure Water Southern California is needed to help the region achieve 100 percent reliability by shoring up core supplies and reducing chances of shortage in the future. Specifically, the Program will help address the following threats to Metropolitan's water supply:

- Risk of shortage, especially in the SWP-dependent areas (shown in **Figure 3**) and SWP-fed reservoirs such as Diamond Valley Lake (DVL)
- Risk of regional storage below 1 million AF that could result in significant reliability issues for the region
- Potential loss of groundwater production capabilities
- Potential inability to meet local supply targets

During wet years in which imported supplies are available in quantities over and above what is needed for regional demands and groundwater replenishment, surplus water supplies are stored in Metropolitan storage programs. Conversely, in dry years where available imported supplies are below what is needed for regional demands and groundwater recharge, water supplies must be withdrawn from Metropolitan storage programs to meet those demands. If conditions are severe enough that water supply is insufficient from both imported sources and Metropolitan storage programs, then replenishment water cannot be delivered to the local agency groundwater basins and those basins may reach levels that result in the reduction of groundwater pumping available to meet regional demands. These challenging supply conditions are also likely to coincide with years of lower natural groundwater replenishment from precipitation, further affecting local agency groundwater basin levels.

For those cases in which supplies are inadequate to meet demands, additional water must be withdrawn from Metropolitan's storage programs. As these programs are depleted, the risk of shortages and unreliability for the entire region increases.

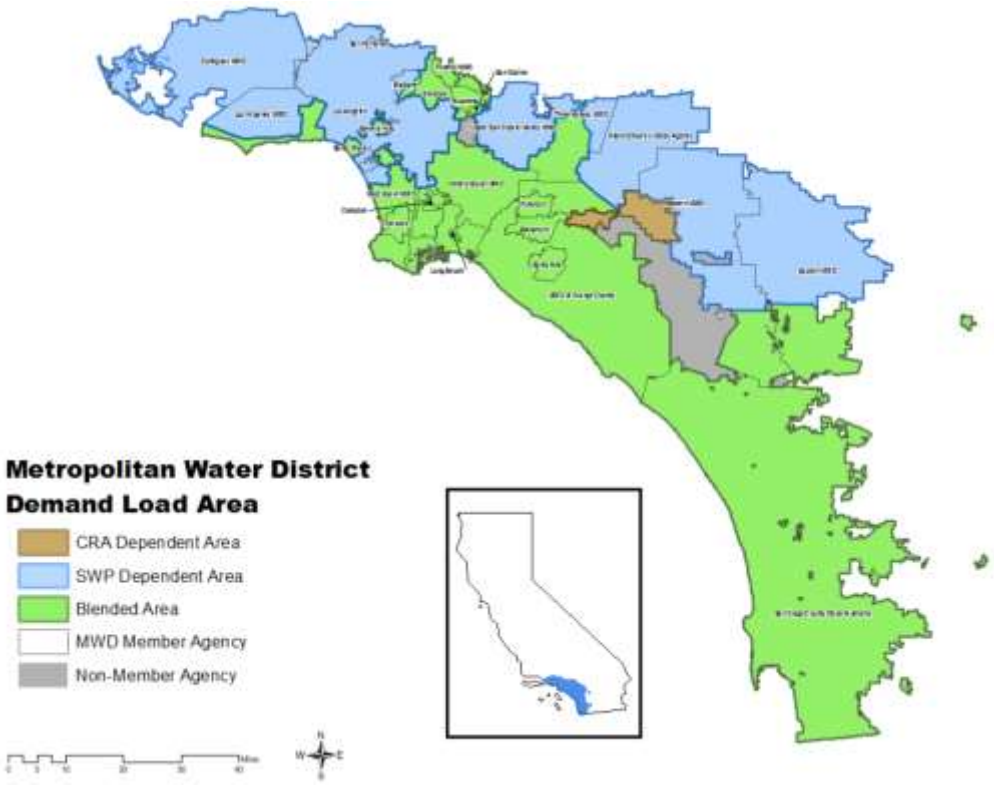
Projected Risk of Shortages up to 1.22 MAF

The Program is one alternative that would help achieve 100 percent reliability by shoring up core supplies and reducing the chances of future shortages. The figures below show the magnitude and frequency of forecasted shortages, the frequency and timing of net shortages, how much additional supply is needed, and a summary of the needs for each of the four IRP scenarios

Figure 4 shows the magnitude and frequency of a net shortage in the forecast year 2045 based on Regional Needs Assessment of the 2020 IRP under each of the four scenarios. A net shortage occurs anytime that demands exceed supplies. Storage programs and regional storage may be available. As shown in this figure, a net shortage may occur up to 66 percent of the time with a maximum magnitude of 1.22 MAF.

Figure 5 shows the frequency and timing of net shortage conditions (blue) and all other conditions (orange). Net shortages are defined when all available supplies, including accessible storage, are depleted and there remains an unmet demand. All other conditions are defined when storage is withdrawn to satisfy a demand, and/or when water is available and stored to manage supplies not needed to meet a demand. The frequency of net shortage would be up to 66 percent of the time (Scenario D).

Figure 3: Demand Load Areas



The 2020 IRP identified three categories of resource management actions:

- **Core Supplies.** Resource management actions that augment supply or reduce Metropolitan demand and remain available each year. Because Pure Water Southern California would be integrated into Metropolitan's system like the SWP and CRA, it would be considered a core supply.
- **Flexible Supplies**. resource management actions that produce on an as needed basis
- **Storage.** resource management actions that have the capability to save water supply to meet demands later.

Figure 6 shows how much additional annual core supply would be needed under each of the scenarios in 2045.

Under Scenario A, no water is needed. For Scenarios B, C, and D, from 100 TAF to 650 TAF will be needed. The needs for Scenarios B and C are primarily in SWP-dependent areas and needs for Scenario D are also in the Colorado River dependent areas.

Figure 7 provides a summary of the needs for each of the four scenarios developed in the Regional Needs Assessment of 2020 IRP. As shown below, up to 650 TAFY of new annual core supply would be needed. If the new core supply is not developed, through projects such as Pure Water Southern California, regional reliability targets for the region would not be met, which would increase pressure on imported water supplies and increase the likelihood on future net shortages.

Figure 4: Maximum Magnitude and Frequency of a Net Shortage in Forecast Year 2045

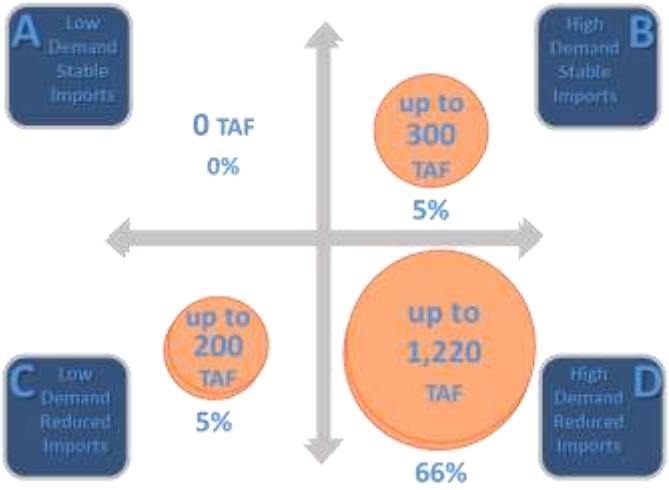
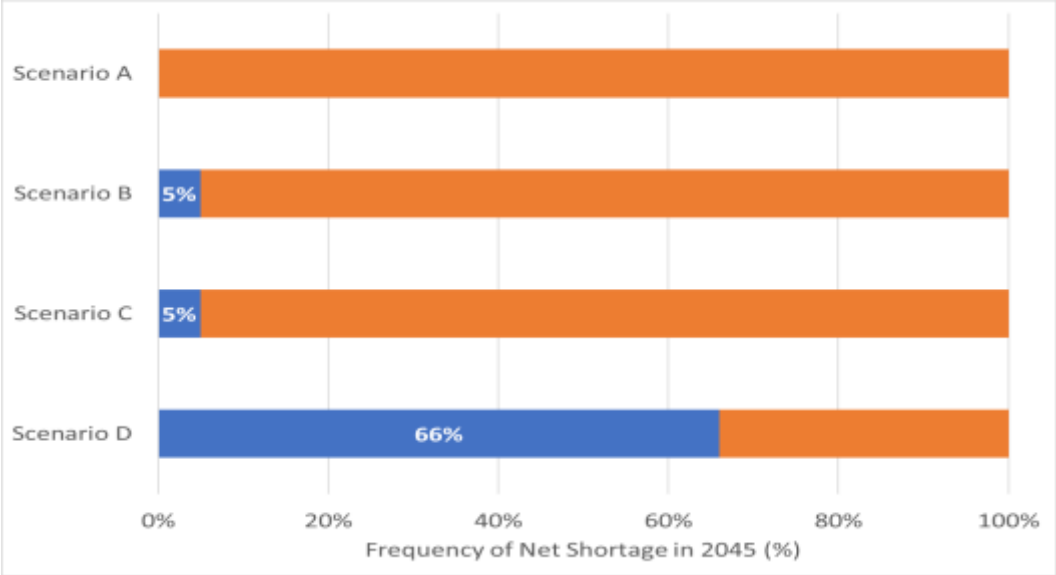


Figure 5: Frequency of Net Shortage by 2045



Projected Risk of Regional Storage Levels falling below 1 million Acre-feet

Metropolitan regional storage levels of less than 1 million AF are assumed to be a threshold level for the significant impacts to regional reliability. Based upon the results of Regional Needs Assessment of the 2020 IRP, there is up to a 2 percent chance that storage would go below 1 million AF as shown in **Figure 8**. Even a 2 percent chance (shown in blue in **Figure 8**) of low regional storage does not meet Metropolitan's reliability goals. The orange bars on **Figure 8** indicate conditions above the 1 million AF threshold in regional storage.

Low storage levels during a drought or emergency would significantly impact Metropolitan's member agencies and overall reliability of the region. In addition, these challenging supply conditions are also

likely to coincide with years of lower natural groundwater replenishment from precipitation, further affecting local agency groundwater basin levels. For those cases in which supplies are inadequate to meet demands, additional water must be withdrawn from Metropolitan storage programs. As these programs are depleted, the risk of net shortages and unreliability for the entire region increases.

It is also important to note that significant reliability issues are not limited to conditions when the storage levels are low. As stated above, there is a net shortage up to 66 percent of the time. There can be reliability issues even when regional storage reserves are full. There may be operational or contractual limits on how much of the regional storage portfolio can be available to meet demands. Examples include: SWP or CRA limitations, groundwater storage contract annual extraction limits, or constraints within Metropolitan's system.

Figure 6: Additional Annual Core Supply Needed in 2045

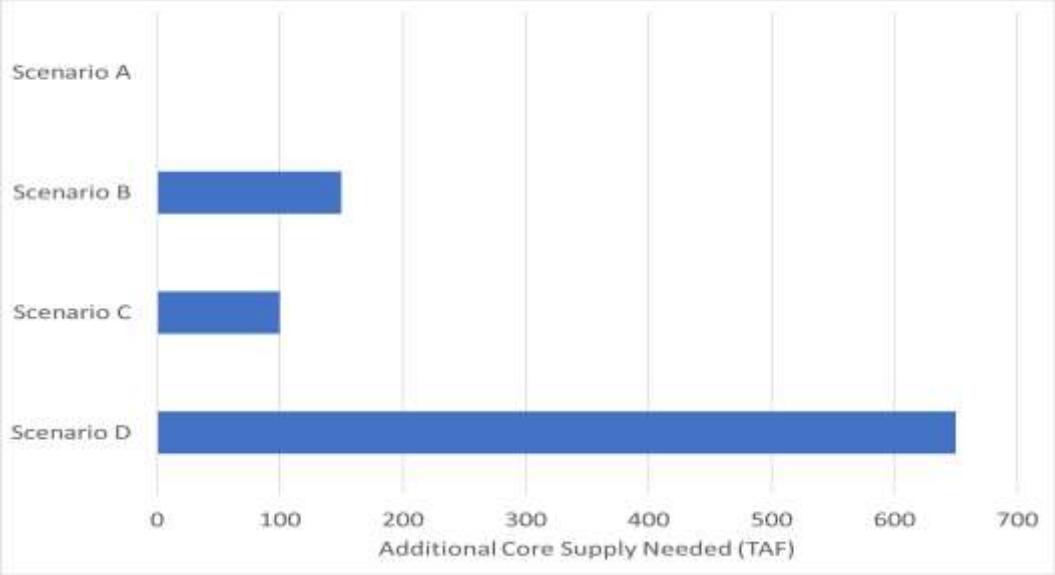
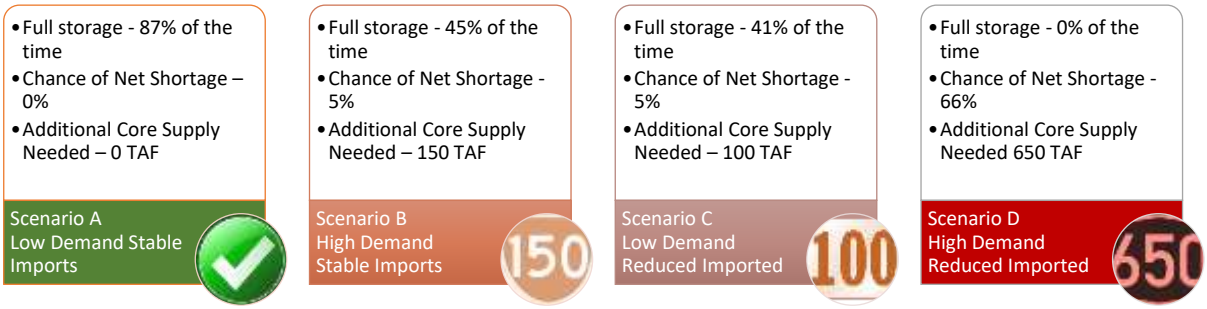
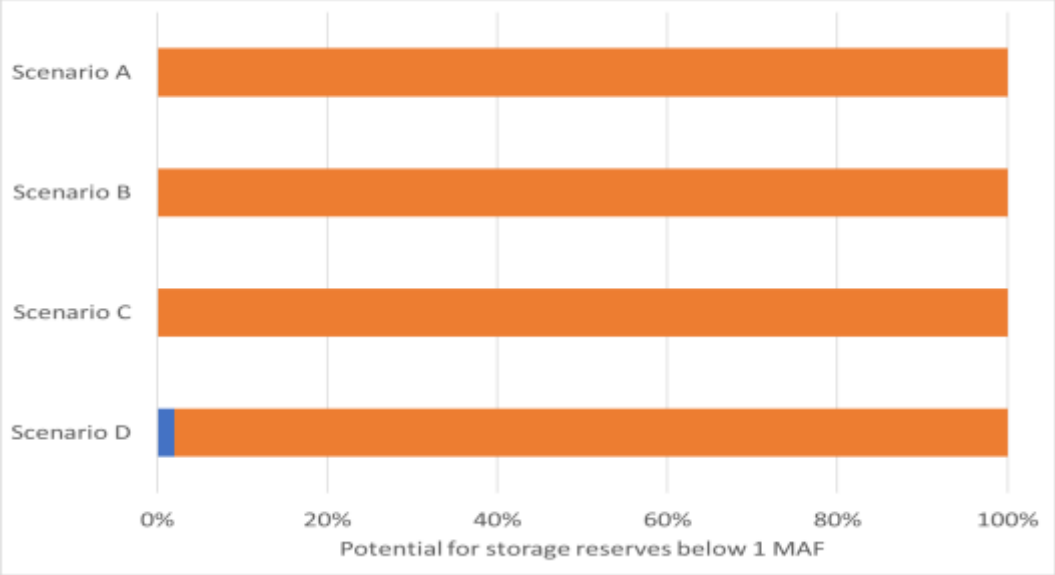


Figure 7: Additional Annual Supply Needed and Frequency of Net Shortage in 2045



For example, at the beginning of 2023, 2.3 MAF of regional storage (above the 1 MAF threshold) is theoretically available to meet demands. However, only 830 TAF (about 36 percent) of that regional storage is operationally available this year, potentially creating a significant reliability issue even though storage levels are above the 1 MAF threshold.

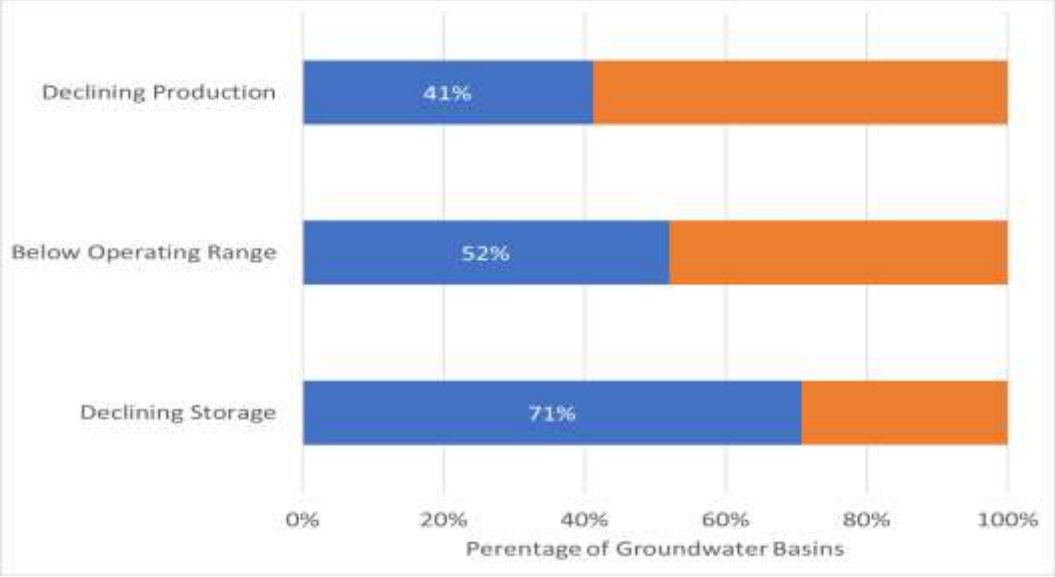
Figure 8: Potential for Storage Levels Less than 1 MAF



Projected Loss of Groundwater Production Capability

More than 1/3 of Metropolitan's regional demand is met by groundwater pumped from local groundwater basins in Metropolitan's service area. Current groundwater production is about 1.1 million AF (excluding groundwater recovery). As shown in **Figure 9,** more than 70 percent of groundwater basins are experiencing declines in storage and approximately 52 percent are below their established operating ranges.

Figure 9: Current Groundwater Conditions



Maintaining groundwater storage levels within the basin's operating range is key to sustainability of our groundwater supplies and preventing loss of groundwater pumping capability. Figure 8 also shows that 41 percent of the groundwater basins in the service area have already seen declining production since

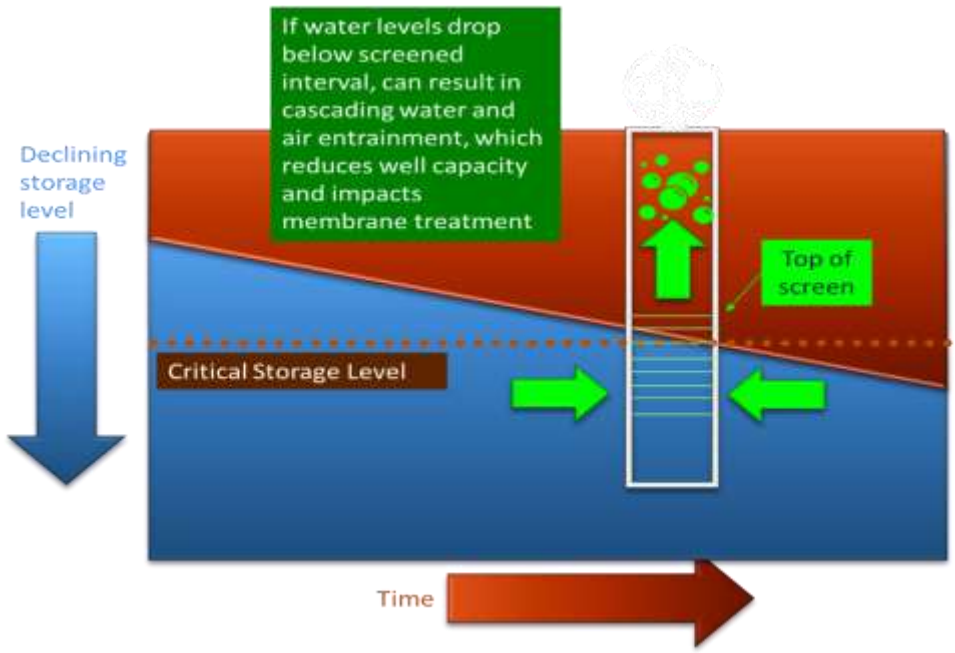
2000 resulting from the declining aquifer levels and storage volumes. By 2045, groundwater production is expected to range from 1 million AF to 1.3 million AF. Increasing groundwater production will only put additional pressure on the groundwater basins and Metropolitan's imported system to provide replenishment water to support production.

If water levels drop too low (to a critical storage level), then drinking water production capability from local groundwater aquifers may be impacted. As shown in **Figure 10**, if storage level drops below the critical storage level, then the well begins to experience turbulent flow, which reduces the capacity of the well. Reduced well capacity because of declining groundwater levels results in member agencies increasing their demand on Metropolitan's regional service. This increase in demand on Metropolitan's service may impact Metropolitan's reliability as well, especially during times of drought and allocations when additional groundwater production is needed the most.

Need for Additional Local Supply Development

Metropolitan's IRP strategy relies on maintaining local supply production into the future, the development of additional local supplies for future demands, and protection against reduction of imported water.

Figure 10: Critical Storage Level Reduces Production Capacity



The average local supply production over the past 10 years has been about 2.0 million acre-feet per year (AFY). These sources constitute about 42 percent of the total supplies needed to balance regional demands for water supply. Local supply forecasts in 2045 for each of the four scenarios analyzed in the 2020 IRP Regional Needs Assessment ranged from 2.1 to 2.7 million AFY. Metropolitan would need to develop an additional 0.1 to 0.6 million AFY of new supply to meet those forecasts. If additional supplies do not develop, the deficit would increase imported water demands on Metropolitan's member agencies.

The 2015 IRP target for local supplies was 2.4 million AFY by 2040. Currently, there is a 400,000 AFY shortfall from the 2040 target. The local supply target will be reevaluated through the CAMP4W process.

Regional Benefits of Pure Water Southern California

White Paper No. 2 discussed regional benefits to all member agencies. This section now provides a more detailed discussion of the relationship of the Pure Water Southern California Program to Metropolitan's regional service.

Pure Water Southern California offers potential significant regional benefits for Metropolitan and its service area. The production of up to 150 mgd of purified water would:

- Help to maintain local groundwater supplies to improve resilience to climate change;
- Prevent a strain on regional water supply reserves;
- Complement other Metropolitan initiatives, such as the Delta Conveyance Project; and
- Be integrated into the existing regional system and become part of Metropolitan's network of facilities.

Pure Water Southern California will provide these regional benefits to all member agencies, not just those directly receiving the purified water. While Pure Water Southern California would provide water directly to certain member agencies for industrial uses and groundwater replenishment through IPR, these deliveries would replace portions of current and future imported deliveries and increase Metropolitan's storage, increasing reliability for everyone. In addition, because deliveries to Weymouth WTP and Diemer WTP via DPR would deliver Pure Water to most Los Angeles and Orange Counties, there is also a benefit to everyone. These benefits can be grouped into three categories:

1. Supporting sustainable groundwater production and improving resilience to climate change
2. Reducing reliance on imported water
3. Improving regional reliability in the service area

Each of these benefits are described below.

Maintaining Local Supplies and Improving Resilience to Climate Change

The Pure Water Southern California Program would provide direct benefits to all Metropolitan member agencies by supporting sustainable groundwater production and improving resilience to climate change, both of which would alleviate pressure on Metropolitan's existing water supplies and facilities.

Support Sustainable Groundwater Production

Pure Water Southern California will help support groundwater aquifers in Los Angeles and Orange counties by sustaining groundwater levels, maintaining groundwater as a significant local source of potable water, and reducing the pressure on Metropolitan's service due to declining groundwater production.

Over the past 30 years, Metropolitan has delivered an average of 213,000 AFY of imported water for groundwater replenishment. Unfortunately, replenishment deliveries into the groundwater basins have not been sufficient to maintain the groundwater levels. Several factors have contributed to this deficit, including inadequate water supply availability due to drought, regulatory restrictions, and replenishment purchase patterns. Due to drought conditions in the service area, groundwater demand

has increased, groundwater replenishment has decreased, and groundwater storage has dropped by about 1.5 million AF since 2000. More than 72 percent of the groundwater basins in the service area are in decline.

Without continued replenishment of the groundwater basins, groundwater storage is expected to continue to decline due to increased demand and limitations on other sources for natural and incidental recharge. For the basins to continue providing benefits for regional reliability, they require reliable water deliveries for replenishment. The Program can provide stable year-to-year deliveries of a new supply for groundwater replenishment to improve the supply reliability conditions for the region by reducing demand for imported water. With Pure Water Southern California, imported supplies from the SWP and CRA that would have gone toward meeting local agency groundwater recharge demands would instead be available to meet other regional and environmental demands or go into Metropolitan storage programs.

One of the main drivers to implement Pure Water Southern California is to provide purified water for groundwater augmentation to sustain groundwater production, consistent with the legislative findings and directive codified at Section 130.5 of the MWD Act. Table 2 above summarizes the Program flows identified up 90 mgd of potential industrial and replenishment flows, including the following specifically for groundwater augmentation:

- An average of 5 mgd for replenishment in the West Coast Basin for WRD;
- 10 mgd in the Central Basin for the City of Long Beach, WRD, and the Central Basin MWD; and,
- approximately 55 mgd for the San Gabriel agencies including the USGVMWD, Three Valleys MWD and the San Gabriel Valley MWD

Because of this replenishment, additional agencies in the West Coast Basin will begin to use groundwater instead of surface water while storage in the Main San Gabriel Basin is projected to increase by over 50 feet, increasing basin and Metropolitan sustainability and ensuring a long-term supply of groundwater and reducing the risk of Metropolitan having to supply imported water for replenishment.

Improve Resilience to Climate Change and Drought

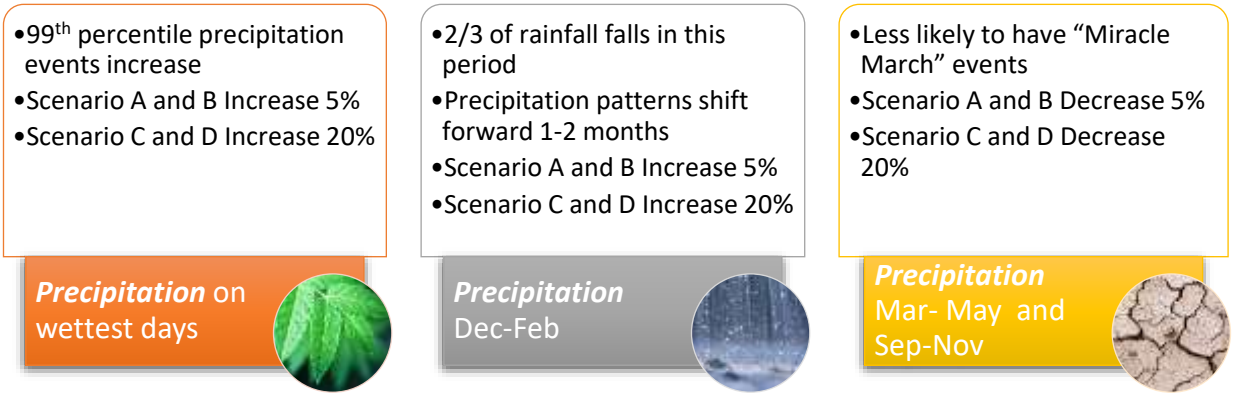
Climate change forecasts prepared for the 2020 IRP include a gradual climate change scenario (based upon RCP 4.5 for IRP Scenarios A and B) and an extreme climate change scenario (based upon RCP 8.5 for IRP Scenarios C and D) by 2100. **Figure 11** illustrates the climate change assumptions for precipitation used in the 2020 IRP.

Based upon the climate change assumptions presented in **Figure 11**, annual precipitation in the Metropolitan service area is forecasted to increase from 5 to 13 percent by the end of the century due to climate change. Other changes because of climate change include:

- Evapotranspiration (ET) will increase due to higher temperatures. The recently observed declines in runoff efficiency would continue for the Colorado River and the SWP;
- Stormwater flows are forecasted to change based upon changes in precipitation
    - Storm flows are expected to be flashier due to climate change. However, stormwater recharge would not increase during wet precipitation days as storm flows currently bypass the spreading grounds on those days and are predicted to continue to do so.

- As with precipitation, stormwater recharge is expected to increase up to 20 percent in December to February, decrease up to 20 percent from March to May and September to November.
- Therefore, stormwater recharge in our service area is predicted to decline from 3 to 8 percent by 2100, leading to total groundwater recharge declines by as much as 1.1 percent by the end of the century. Long-term-drought may occur more often, leading to reliability issues in our service area.

Figure 11: Description of Climate Change Assumptions by 2100



Compared to alternative supplies such as stormwater or imported water, the Program is more drought-resilient because it is not dependent upon rainfall runoff, nor is it at risk from changes in climate or hydrology. The new purified water supply is separate from the hydrologic cycle – therefore, the Program can deliver under all weather conditions and produce water supplies outside of critical habitat that could be adversely affected by climate change. Protections against drought and climate change introduce a water security benefit not available with other Metropolitan sources.

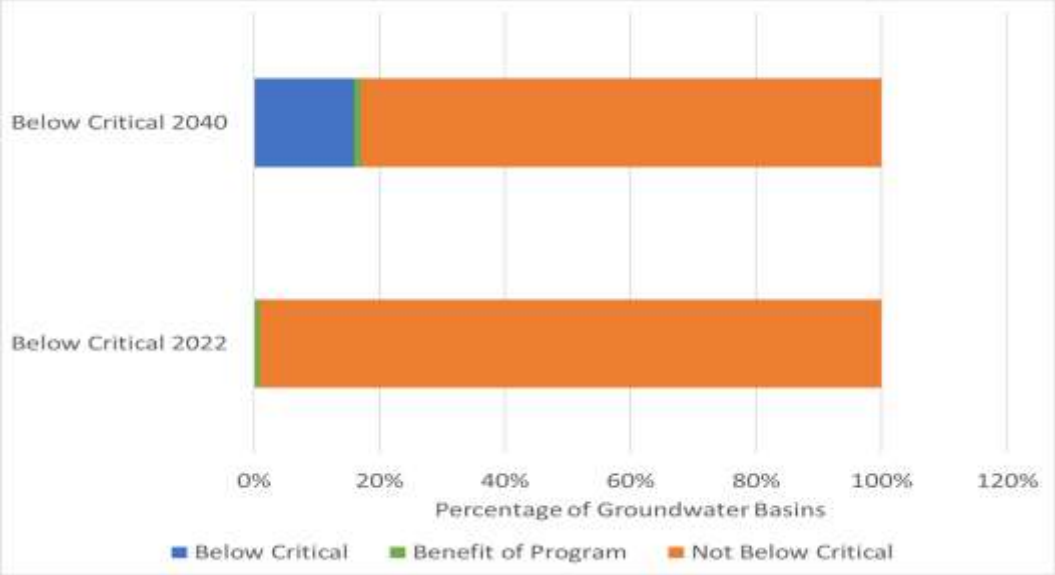
Climate change has resulted in higher temperatures in the Southwest that have led to a dramatic reduction in Colorado River runoff this century. Variable weather in Northern California and stressed ecosystems have resulted in unprecedented low imports from the SWP. Likewise, in Southern California itself, less stormwater is percolating into groundwater basins, both from too much rain at times or not enough. Groundwater basin levels in Southern California and reservoir levels in Northern California and in the Colorado River basin are at historic lows and conditions are only going to get worse. See the next section for a discussion of climate change impacts on reservoir levels and imported water deliveries.

As shown in **Figure 12**, about 1 percent of the groundwater basins in Southern California are currently below the critical level (the point at which production capability drops due to declining water levels).

By 2040, the percentage of groundwater basins below the critical level could exceed 17 percent. About 700,000 people currently live in a basin that is below the critical level. By 2040, more than 5 million people (or about 25 percent of the entire population of Metropolitan's service area) could be relying on a basin that is below critical levels. Pure Water Southern California would reduce the risk of the groundwater basins reaching critical levels by providing a drought-resilient supply to recharge the four

groundwater basins. The Program would reduce the number of people impacted by declining water levels by as much as 2 million people

Figure 12: Current and Projected Critical Level Conditions in Southern California Groundwater Basins

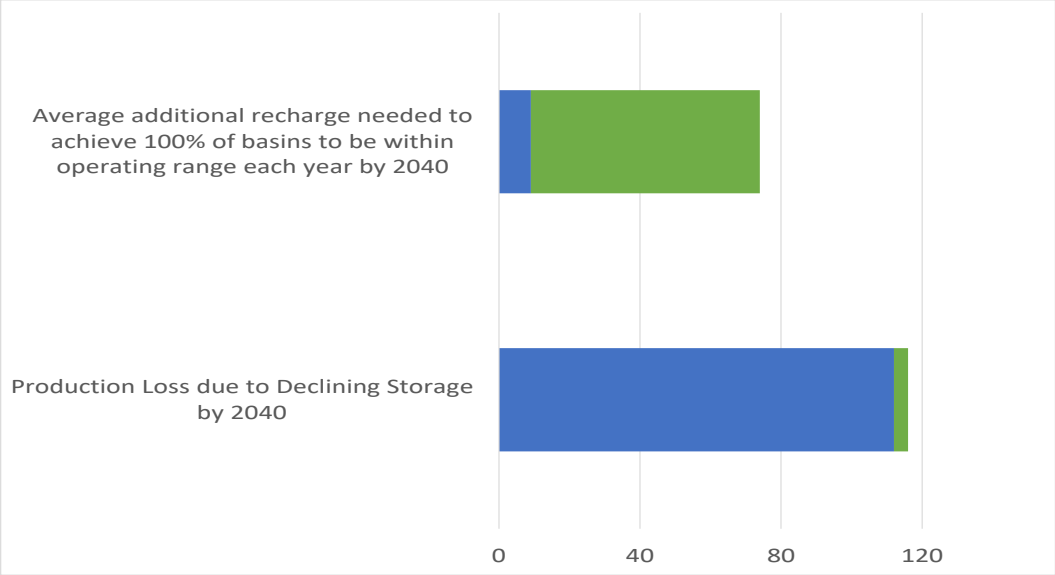


As shown in **Figure 13**, Pure Water Southern California would also reduce the need for additional recharge supplies from Metropolitan's integrated system. About 74 TAF would be needed each year to achieve the target of 100 percent of the groundwater basins in Southern California within their established operating ranges. Pure Water Southern California would help basins reach this goal and prevent future basins from reaching the critical level.

By 2040, groundwater production could decline by as much as 116 TAF (about 10 percent of current groundwater levels). As shown in Figure 14, this Program will reduce the risk of groundwater agencies increasing their Metropolitan demand, which puts pressure on Metropolitan's integrated system, in the future by stabilizing groundwater basin levels in the service area.

The changing climate has impacted the use of groundwater by reducing the amount of natural recharge as well as impacting the availability of imported replenishment water. These two circumstances combine to increase the risk of the groundwater basins falling below the critical level, reducing storage and resulting in production loss. A purified water supply is drought resilient because its source is wastewater, and the climate doesn't influence the wastewater influent flows. Because Pure Water Southern California flows won't be reduced because of drought or climate change, the Program will benefit all of the service area by maintaining local groundwater production and reducing the risk of groundwater agencies increasing their Metropolitan demand and the integrated system as the climate changes.

Figure 13: Recharge Benefits of Pure Water Southern California



Reducing Reliance Upon Imported Water

Metropolitan currently provides wholesale water services to its 26 member agencies, relying on a combination of water resources from the Colorado River and State Water Project, reduction in demand through local resources and conservation, and an integrated conveyance and distribution system. Metropolitan faces many challenges to meet the anticipated demands of its member agencies, including long-term drought in both the Northern California and Colorado River watersheds, climate change, regulatory and environmental restrictions, changing hydrological and biological conditions in the Bay-Delta, and unresolved issues with the development of a Delta Conveyance initiative. These challenges can result in variable and severe water delivery restrictions.

Pure Water Southern California will help ensure a reliable water supply in the face of these ongoing and increasing uncertainties because it will be part of Metropolitan's integrated core supply in the same way that SWP and CRA are part of Metropolitan's service. Therefore, the Program offers significant regional benefits for Metropolitan and all the Southwest. While the production of purified water can help to maintain groundwater production as detailed above, it can help to prevent a strain on regional water supply reserves as well as complementing other Metropolitan initiatives such as the Delta Conveyance Project by providing reliable replenishment supplies that free up imported water for the environment or to be placed in storage as a drought buffer. Metropolitan leverages non-purified water supplies such as imported water supplies by storing available water for use when it is scarce. Imported supplies historically provide water for the region's storage portfolio and reliable imported supplies maximize regional investments in Metropolitan's storage capabilities. The Pure Water Southern California Program would give Metropolitan the added flexibility for capturing more available water during wet years. It would allow Metropolitan's existing systems to import water for additional storage both within and outside of Metropolitan's service area.

Figure 14 shows how Metropolitan's infrastructure uniquely connects two of the most critical watersheds in the Western U.S.: the Colorado River watershed fed by the Rocky Mountains and the Sacramento-San Joaquin River watershed fed by the Western Sierra Nevada Mountains. Pure Water

Southern California has emerged as a template for this next generation of water management solutions. Because Metropolitan's existing infrastructure connects the watersheds of the Colorado River and the Delta, large-scale recycling in Southern California can return benefits to both watersheds. Recycling water in Southern California can advance water supply reliability locally and in far-away communities such as Las Vegas, Phoenix, and Tucson through partnerships and exchanges. Full implementation of Pure Water Southern California would free up to 150 mgd of capacity in the existing conveyance and distribution systems. It would allow Metropolitan the flexibility to capture additional opportunities for imported water from the Colorado River and the SWP, either through transfers, exchanges, or other agreements.

Figure 14: Metropolitan's Conveyance System and the Regional Purified Water Program Connect Two Critical Watersheds

Pure Water Southern California will also help Metropolitan reduce its reliance upon imported water by alleviating pressure on Metropolitan's existing water supplies and facilities while also becoming a new source of potable water through DPR. The Program will be integrated into the existing regional system and become part of Metropolitan's network of facilities. Using the purified water to supplement Metropolitan's existing supply of imported water will free up capacity in Metropolitan's existing facilities to meet demands by member agencies and allow more flexibility on directing the water to where it is needed the most. It will also help Metropolitan reduce its reliance upon imported water by alleviating pressure on Metropolitan's existing water supplies and facilities while also becoming a new source of potable water through DPR.

The paragraphs below describe how the Pure Water Southern California Program reduces reliance on the Colorado River and the SWP, as well as detailing the specific benefits achieved by incorporating DPR into Metropolitan's water portfolio.

Reduced Reliance on the Colorado River

Metropolitan's entitlement to Colorado River water and its partnerships with California's other rights holders gives Southern California a strong, long-term, and reliable source of supply. The Pure Water Southern California Program will reduce Metropolitan's and Southern California's reliance on the Colorado River. Metropolitan currently receives about 20 percent of its supply from the Colorado River through the CRA. About 60 mgd (62,000 AFY) of purified water from the Pure Water Southern California Program (about 40% of the total Program's yield) will reduce reliance on the CRA supply by up to 13 percent as shown in **Table 3**.

Table 3: Summary of CRA and SWP Offsets due to Pure Water

Source of Offsets	% Of the 150 mgd that reduces the demand	Total offset (mgd)	Total offset (AFY)
CRA Offset	40%	60	62,000
SWP Dependent Area Offsets	43%	65	67,000
SWP Offset (not in dependent area)	17%	25	26,000
Total	**100.0%**	**150**	**155,000**

The partnership for this Program with Southern Nevada (Southern Nevada Water Authority/SNWA) and Arizona (Central Arizona Project, Arizona Department of Water Resources/Arizona Parties) provides a much-needed incentive for all Lower Basin partners to find common ground and make historically tough choices to continue managing the Colorado River in a future with less available water. For the current Environmental Planning Phase, both SNWA and the Arizona Parties have agreed to contribute funds to help cover the Program up to a total of $6M each. The agencies also help facilitate technical issues, such as SNWA sharing their experience with Project Labor Agreements and implementing projects using alternative delivery methods that are being pursued by Metropolitan. Coordination with the agencies will also help with future negotiations on the use of Colorado River water.

Through existing and new agreements on the Colorado River, the three states can improve their reliability through a single project. As Southern Nevada and Arizona invest in a portion of Metropolitan's recycling program, Metropolitan can leave that amount of its own Colorado supply in Lake Mead behind Hoover Dam. From there, Southern Nevada and Arizona could withdraw a similar amount for their use. With this exchange, the two states do not have to build lengthy new pipelines or infrastructure to access Southern California's purified water. Therefore, the implementation of this Program helps all seven states in the United States that depend on the Colorado River, as well as two states within the Republic of Mexico.

Reduced Reliance on the State Water Project

Like the Colorado River, the Pure Water Southern California Program can help manage climate and drought risks to the region in the Sacramento-San Joaquin River watersheds as well. The Program will reduce Southern California's reliance on the SWP and make Metropolitan's regional storage portfolio more resilient. About 60 percent, or about 90 mgd of the 150 mgd total Program yield will reduce demands from the SWP (see **Table 3**), most of which supports the SWP-constrained areas. Metropolitan

currently receives about 30 percent of its supply from the SWP, Pure Water Southern California could replace up to 12 percent of the total SWP supply. The Program will also help maintain a healthier ecosystem in the Delta and make more water available for all Californians.

The Program would initially help communities in Southern California that rely heavily on imported supplies from Northern California and the Delta via the SWP. Pure Water Southern California would directly augment the groundwater supply in areas of the San Gabriel Valley which are heavily dependent on the SWP supply. Once Pure Water Southern California is developed, the reliance on SWP deliveries will immediately be reduced, allowing those SWP supplies to be used in other areas. This includes potential supply exchanges with other contractors on the SWP system. The imported water could also be freed up to go into storage for future emergency or drought needs for Southern California. Advancing this recycling program in Southern California has a direct positive impact on our ability to successfully manage the Delta moving forward and to reduce the region's reliance on that source.

Portions of Metropolitan's service area are more susceptible to reductions in SWP supplies. This is a risk to the region's reliability. Whenever shortages occur, they often involve the "SWP Dependent Areas." For example, the Main San Gabriel Basin, a partner in the Program, relies entirely on the SWP for supplemental water and is susceptible to reliability issues. SGVMWD, an SWP contractor, has executed an LOI to collaborate with Metropolitan on Pure Water Southern California and may share some of their existing facilities to reduce the new construction required to implement the Program. The Program will help Metropolitan's service to this area become more resilient and sustainable in the future by providing a steady source for groundwater replenishment.

Benefit of DPR via Raw Water Augmentation

Pure Water Southern California would also deliver water to Metropolitan's Weymouth and Diemer plants via raw water augmentation for DPR. This DPR approach would directly serve many member agencies as treated water from Weymouth and Diemer is delivered to most of Los Angeles and Orange Counties. As an increased source within Metropolitan's distribution system, other imported sources can be made available for use in the rest of Metropolitan's service areas and for additional storage.

Up to 155,000 AF of annual deliveries of purified water to groundwater basins for IPR (groundwater augmentation/groundwater replenishment) and to Metropolitan's treatment plants for DPR would make an equivalent amount of Metropolitan's imported water supplies available for Metropolitan's regional wholesale water service to all its 26 member agencies. The imported water freed up because of Pure Water Southern California would also be available for dry-year and emergency storage for use by Metropolitan for all its member agencies. Additionally, the production of purified water within Metropolitan's service area would reduce the use of, and increase capacity in, the integrated conveyance system that delivers water into Metropolitan's service area. This additional supply could be used for exchanges with SNWA, the Arizona Parties, or other partners.

The location of two of Metropolitan's water treatment plants to the proposed Pure Water Southern California facilities allows purified water to supplement raw water supplies to a drinking water treatment plant. The combined median daily average flow at the Diemer and Weymouth treatment plants over 10 years (2011 through 2020) ranged from 265 to 536 mgd. As the Weymouth and Diemer plants are two of the three treatment plants that supply treated water to a large part of the service area, the introduction of purified water to these two treatment plants would augment a significant

portion of Metropolitan's treated water distribution system, further enhancing water supply reliability and system flexibility for Metropolitan's service area.

Raw water augmentation could replace deliveries of imported supplies and allow for additional storage of those supplies in groundwater basins or Metropolitan reservoirs. In addition, as described previously, Metropolitan is also exploring how the Pure Water Program can integrate with other Metropolitan efforts to enhance Metropolitan's system and improve water supply resilience across the entire service area, including a connection to Operation Next, an extension of Pure Water eastward to Three Valleys and IEUA, and a conceptual east-west conveyance to connect Weymouth and Jensen plants. These alternatives extend the potential reach of Pure Water to provide additional water supply reliability for the SWP-dependent areas and improve system flexibility of Metropolitan's entire service area.

If for any reason, the full amount of purified water cannot be delivered to the groundwater basins for IPR, it may also be possible to deliver this extra purified water for raw water augmentation instead, allowing the AWP to operate most efficiently in continuous production. Considering rapid developments related to the promulgation of DPR regulations, DPR is a primary objective of Pure Water Southern California. **Figure 15** shows a schematic of the proposed Pure Water Southern California facilities for the DPR option.

Figure 15: Proposed Regional Purified Water Program DPR Options

As appropriate regulations are codified, and DPR through raw water augmentation is permitted, purified water could be added to Metropolitan's treated water supplies as is imported surface water, available to deliver to all member agencies. The benefits for Metropolitan and the member agencies, when raw water augmentation becomes available, include:

- increasing the number of available raw water sources,
- increased drought resilience as purified water is largely independent of rainfall,
- the ability to serve purified water to additional member agencies,

- ability to transfer existing imported supplies from northern California to SWP only areas as other areas are supplemented with purified water, and
- improved water quality from lower TDS concentrations as compared to Colorado River water.

Improving Regional Reliability in the Service Area

Improved reliability is the cornerstone of Pure Water Southern California's benefit to the region. The following section discusses how Pure Water Southern California improves reliability for all member agencies. Topics include:

- Lower risk of a net shortage,
- Increased reliability during a seismic event, and
- Operational Flexibility

Lower Risk of a Net Shortage

Pure Water Southern California will reduce the frequency of net shortages as shown in **Figure 16.** The orange bars indicate a situation with no projected net shortage, the green bars indicate the reduced frequency of net shortages, and the blue bars indicate a net shortage risk even after the Program is implemented. In Scenario A from the 2020 IRP Regional Needs Assessment, no net shortage is projected. In Scenarios B and C, the Pure Water Southern California Program would eliminate the net shortage entirely. In Scenario D, Pure Water Southern California would reduce the frequency of net shortages – some increase in core supplies or storage would still be required to meet reliability goals.

In **Figure 17**, the green bars indicate the reduced need for additional annual core supply because of the Program, and the blue bars indicate additional annual core supply needed after the program's implementation. Except for Scenario D, the Pure Water Southern California Program would also reduce or eliminate the need for additional core supplies as shown in **Figure 17**.

Without Pure Water Southern California, Scenarios A, B, and C do not result in storage below 1 MAF. The orange bars indicate no risk of storage below 1 MAF, the green bars indicate the benefit of the Program, and the blue bars are the remaining storage risk below 1 MAF even after the Program was implemented. Pure Water Southern California would reduce the risk of going below 1 MAF of total storage under Scenario D, as shown in **Figure 18.**

Pure Water Southern California will eliminate or reduce the risk of regional net shortage, especially in the SWP-dependent area (Scenarios B and C), eliminate or reduce the need for additional core supplies or storage to meet long-term demands (especially in Scenarios B and C), and reduce the probability of a region-wide storage below 1 MAF under Scenario D.

After analyzing these futures, a potential for net shortages emerged. The planning revealed that a large portion of Metropolitan's service area is vulnerable to Northern California drought and regulatory restrictions. Metropolitan has limited capacity to move Colorado River water to the northern portions of the district's service area served by the SWP. Additionally, the Colorado River is also facing unprecedented drought conditions. Pure Water Southern California plays an important role in Metropolitan's future, response to a net shortage, and integration into Metropolitan's regional system.

Increased Reliability during Seismic Event

Pure Water Southern California would also benefit the Metropolitan service area in the event of a catastrophic earthquake by increasing the opportunities to ensure that supplies are maintained within the region. As result of a strong earthquake (e.g., M 7.8 ShakeOut Scenario) on the southern San Andreas Fault system, the CRA, the SWP, and the Los Angeles Aqueduct (LAA) which cross the San Andreas Fault could be severely damaged. The extent of damage from this type of event could potentially cause protracted outages of the facilities halting the flow of imported water. These outages could range from several months to extended periods of time on one or more of the aqueducts.

Figure 16: Benefit of Pure Water Southern California to Frequency of Net Shortage in 2045

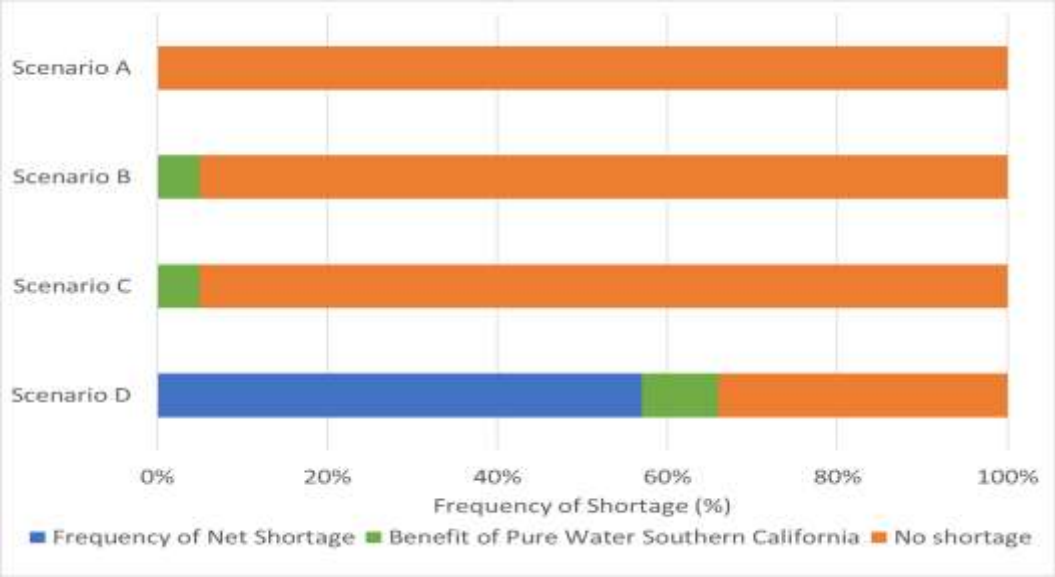


Figure 17: Benefit of Pure Water Southern California to Amount of Core Supply Needed

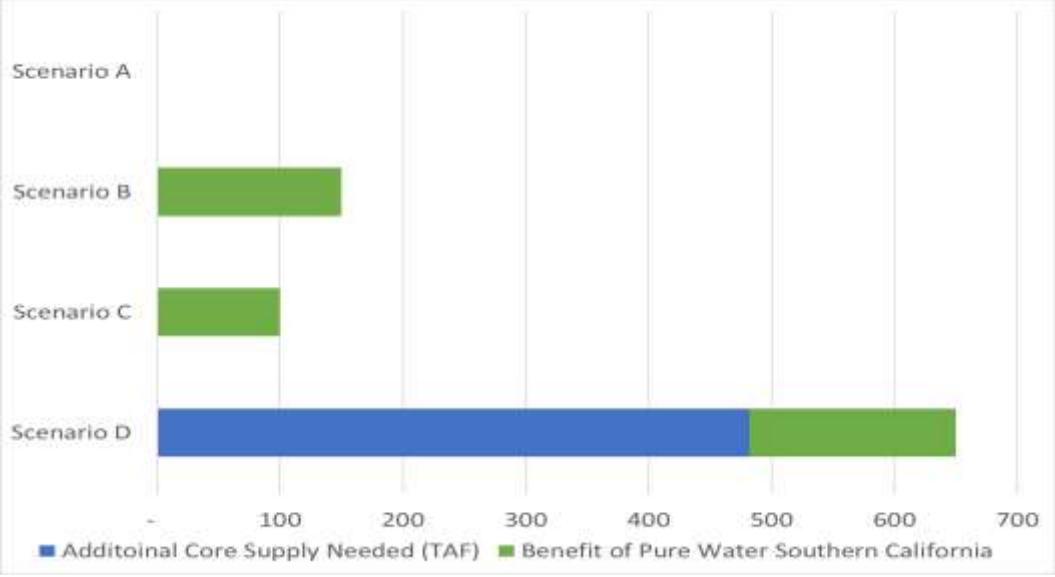
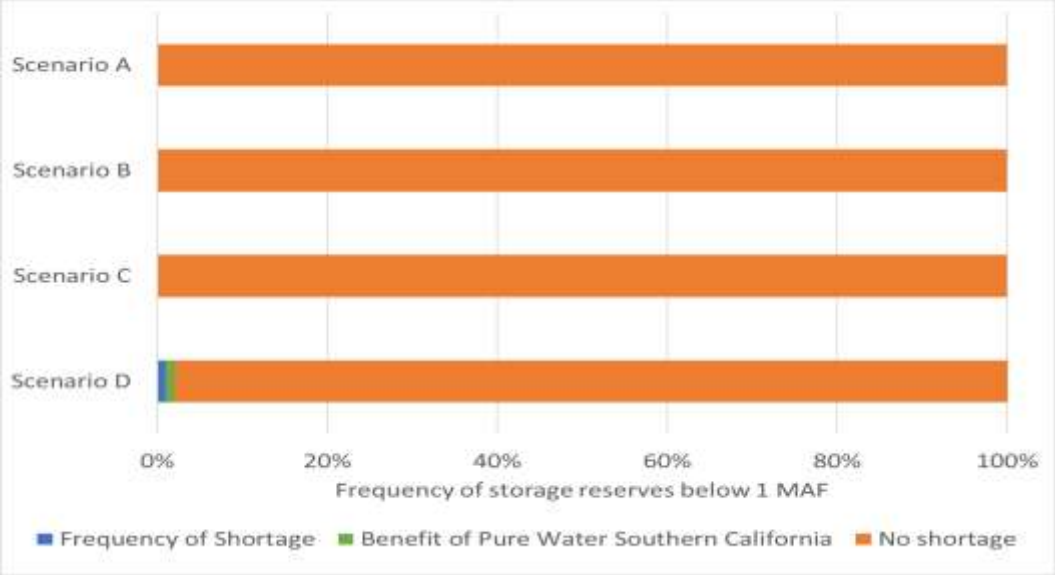


Figure 18: Benefit of Pure Water Southern California to Potential for Net Shortage Below 1 MAF



In the aftermath of such an event, the region would need to rely entirely on local supplies such as Pure Water Southern California, surface storage, and groundwater production while repairs are being made to the aqueducts. As shown in **Figure 19,** Pure Water Southern California is located on the coastal side of the San Andreas Fault with the nearest facilities more than 20 miles away from the fault, which could make the water produced from Pure Water Southern California available during an earthquake emergency, and significantly improve the seismic resilience of the region. Purified water would be available to keep water flowing in Weymouth and Diemer treatment plants even if imported supplies were cut off by the earthquake event. This would allow Metropolitan to continue to meet member agency demands throughout the emergency.

Under the catastrophic loss of water supply the following actions will be implemented, which serve as the criteria for determining Metropolitan's Emergency Storage:

- Suspend any existing interruptible water deliveries;
- Restrict firm supplies by a mandatory cutback of 25 percent from normal-year retail demand levels.
- water stored in the surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available.
- full local groundwater production, recycled water, and local surface emergency storage reserve production would be sustained; and
- Metropolitan would draw on its emergency storage as well as other available storage.

Based upon a study of emergency storage prepared in 2019 (Board Letter 9-3, May 14, 2019), the outage due to a seismic event on any one of our source supplies would range from a few months to as long as five years as shown below:

- Colorado River Aqueduct: 2 to 6 months (recovery of 80% CRA capacity) or 3 to 5 years (recovery of 100% CRA capacity)
- California Aqueduct East Branch 12 to 24 months

- California Aqueduct: West Branch 6 to 12 months
- Los Angeles Aqueduct: 18 months

Figure 19: Location of Pure Water Southern California Relative to the San Andreas Fault

Adequate local supply available during a seismic outage was estimated in this study to range from 1 to 1.2 MAF. Since recycled water projects such as Pure Water Southern California are assumed to be 100 percent available during a seismic outage, Pure Water could increase local supplies by up to 15 percent during a seismic emergency. Increasing the effective local supply available during the emergency could reduce pressure on Metropolitan's emergency storage reserves.

Pure Water Southern California could also improve the seismic resilience of the region by enhancing and maintaining the storage level in groundwater basins before a major seismic event, and by providing a reliable, local supply of high-quality water for groundwater replenishment and for raw water augmentation throughout the emergency. As noted above, during an emergency, the region would rely heavily on groundwater production, which Pure Water Southern California supports.

Purified water from Pure Water Southern California would be available to keep water flowing as replenishment water to the groundwater basins to maintain production throughout the emergency. Using additional local groundwater and raw water augmentation during an emergency would allow Metropolitan to move what imported water is available to the areas where it is needed most.

Operational Flexibility

With a service area spanning 5,200 square miles in six counties, Metropolitan has built an integrated conveyance and distribution system to ensure consistent supplies, reliability, and flexibility throughout the region. The interconnected nature of the system means that Metropolitan can address constraints in one area of the system for the benefit of the entire system. For example, at any time, one area could be

served exclusively from one supply source, while another area could be served a blend of water sources. The need to change the water sources may arise either from the unavailability of a water resource, a water quality issue related to a resource, or other reasons. The integration of its water resources and system flexibility is fundamental to Metropolitan's wholesale water service. The benefits of Pure Water to operational flexibility are described qualitatively below.

Flexibility to Meet Demands. Adding Pure Water Southern California as an additional water source benefits Metropolitan's overall system flexibility by increasing the options available to meet demands throughout its service area. The additional imported water resulting from demands replaced by Pure Water Southern California purified water deliveries would increase Metropolitan's overall water resource portfolio. Also, the Program will help create additional flexibility to address drought. Because purified water from the Program is a drought-resilient supply, it would be available during periods of drought and emergency.

Flexibility to Add Additional Storage. In addition to freeing up capacity in the existing facilities to meet demands by member agencies or DPR, the freed-up capacity could also be used to import water for additional storage within and outside of Metropolitan's service area. Full implementation of Pure Water Southern California would free up 150 mgd of capacity in the existing conveyance and distribution system. This would allow Metropolitan to capture additional imported water through transfers, exchanges, or other agreements. In addition, Metropolitan would have added flexibility for capturing more available water during wet years.

Flexibility to Meet Specific Demands. Adding Pure Water Southern California as an additional water source benefits Metropolitan's overall system flexibility by increasing the options available to meet demands throughout the service area. Any additional imported water resulting from demands replaced by Pure Water Southern California purified water deliveries would increase Metropolitan's overall water resource portfolio. Full implementation of Pure Water Southern California would free up 155,000 AF of capacity in the existing conveyance and distribution system. This would allow the flexibility to move additional water through transfers, exchanges, or other agreements. In addition, Metropolitan would have added flexibility for capturing and transporting more available water during extreme rain events.

Summary

Pure Water will treat and convey up to 150 mgd for industrial needs, groundwater recharge, and raw water augmentation upstream of Weymouth and Diemer WTP. From Weymouth and Diemer, water can be conveyed through Metropolitan's existing integrated system to the majority of Los Angeles and Orange Counties.

The purpose of this Addendum is to update White Paper No. 2 to address:

- Changed conditions and updates to the Program description since White Paper No. 2 was published
- Updated Program needs based on the 2020 IRP Needs Assessment
- Improved regional benefits evaluation based on the 2020 IRP Needs Assessment
- Integration with the Climate Adaptation Master Plan for Water

Changed Conditions Since White Paper No. 2 was Published

Many things have changed since White Paper No. 2 was published in 2020. Higher temperatures in the Southwest have led to a dramatic reduction in Colorado River runoff. Variable weather in Northern California and stressed ecosystems have resulted in unprecedented low imports from the SWP. Despite good hydrologic conditions in water year 2023, 48 percent of the groundwater basins in Metropolitan's service area remain below their established operating ranges. Therefore, the Program is more important than ever as the region struggles with the impacts of climate change and declining storage.

Since White Paper No. 2 was published, other significant changes to the Program include:

- **Adoption of the 2020 IRP**. The Board unanimously adopted the Regional Needs Assessment of the 2020 IRP in April 2022

- **Climate Adaptation Plan**. Metropolitan's CAMP4Water now integrates current climate, water resources, hazard mitigation, and financial planning efforts to prepare the region for the extremes of climate change.

- **DPR Regulations.** The SWRCB proposed criteria for direct potable reuse.

- **Colorado River partnerships**. Colorado River partners (SNWA, CAP, AZDWR) and a SWP contractor (SGVMWD) have each expressed interest in the Program and formalized Letters of Intent (LOIs) to collaborate on critical issues, and

- **Project Description**. Additional enhancements to the Program:
    - RWA is Phase 1 of the program and eliminated the direct-to-Orange County Pipeline
    - Developing an Early start and early delivery process to kick-start the Program
    - Updating the treatment process and nitrogen limits based on DDW requirements.

These changes have helped the Program team to refine the project elements and move the program forward. Pure Water Southern California is more important than ever as climate change continues its grip on the Southwest will be even more important as this Program progresses.

Need for Pure Water Southern California

Pure Water Southern California is one alternative that would help achieve 100 percent reliability by shoring up core supplies and reducing the chances of a net shortage in the future. Updated data from the 2020 IRP were used to update the needs assessment in this Addendum. Specifically, the Program would help address the following threats to Metropolitan's water supply:

- **Net Shortage.** Risk of net shortages, especially in the SWP dependent areas up to 66 percent of the time by 2045. An additional 650,000 AF of new annual supply is needed to prevent the risk of a net shortage.

- **Low Regional Storage**. Risk of regional storage below 1 million AF that could result in significant reliability issues for the region. Based upon the 2020 IRP analysis, this could occur up to 2 percent of the time

- **Declining Groundwater**. Potential loss of groundwater production capabilities due to the continuation of declining water levels, which could reduce production by up to 10 percent by 2040

- **Slow Development of Local Supplies**. Potential shortfall in local supplies development of approximately 400,000 AF.

The planning revealed that a large portion of Metropolitan's service area is vulnerable to Northern California drought and regulatory restrictions. Metropolitan has limited capacity to move Colorado River water to the northern portions of the district's service area served by the SWP. Additionally, the Colorado River is facing unprecedented drought conditions. Pure Water Southern California plays an important role in Metropolitan's future, response to a net shortage, and integration into Metropolitan's regional system.

When the 100 percent reliability goal is not met by developing new supplies, the deficit can result in significant increased imported water demands on Metropolitan's member agencies and the regional system. Pure Water Southern California would help the region reduce net shortages, declining groundwater, and stagnant local supply development to improve the region's resilience to climate change, reliability for all member agencies, and the integrated system.

Regional Benefits

For Metropolitan and all Southern California, Pure Water Southern California offers significant benefits to all of Metropolitans member agencies. The production of up to 150 mgd of purified water can help to maintain groundwater production, prevent a strain on regional water supply reserves and it can complement other Metropolitan initiatives such as Delta Conveyance by providing reliable replenishment supplies that free up imported water. Pure Water Southern California can be integrated into the existing regional system and become part of Metropolitan's network of facilities.

Pure Water Southern California provides regional benefits to more agencies than just the member agencies that would directly receive the purified water. While Pure Water Southern California would provide water directly to certain member agencies for groundwater replenishment through IPR, and potentially to some industrial users, these deliveries would replace current and future imported deliveries and increase Metropolitan's storage, increasing reliability for everyone. Pure Water Southern California would also deliver water through DPR via raw water augmentation to Metropolitan's Weymouth and Diemer plants. This DPR approach would directly serve many member agencies as treated water from Weymouth and Diemer is delivered to most of Metropolitan's service area. This would include member agencies throughout Los Angeles and Orange Counties. Additional conceptual planning efforts to extend the reach of Pure Water throughout the service area. As an increased source within Metropolitan's distribution system, other imported sources are made available for use in the rest of the service area and for storage.

Improved Regional Resilience due to Pure Water Southern California

Pure Water Southern California plays an important role in Metropolitan's future. As shown in this addendum, Pure Water Southern California improves regional resilience of Metropolitan's service area and integrated system in the following areas:

- **Reduces Chances of a Net Shortage.** The Program reduces the risk of net shortages, especially in the SWP dependent areas by reducing the chance of a net shortage from 66 percent to 57 percent of the time by 2045. The Program also reduces the need for new annual supply from 650,000 AFY to 495,000 AFY.
- **Improves Chances of Low Regional Storage**. The Program reduces the risk of regional storage below 1 million AF. Based upon the 2020 IRP analysis, the Program would reduce the occurrence of regional storage below 1 million AF by 50 percent.
- **Improves Groundwater Sustainability**. The Program would prevent potential loss of groundwater production capabilities due to the continuation of declining water levels in the four groundwater basins.
- **Improves Development of Local Supplies**. The Program would increase local supplies by 155,000 AFY, improving the local supply portfolio.

Pure Water Southern California will help improve the reliability and resilience of Southern California and Metropolitan's integrated system.

Conclusion

Pure Water Southern California plays a vital role in Metropolitan's future. This addendum shows that Pure Water Southern California is needed to address forecasted net shortage conditions within Metropolitan's integrated system. It also will provide multiple benefits to Metropolitan's entire service area, as shown below in **Table 4**.

The next phase of this Program will be to initiate the cost-of-service analysis for this Program, including an update of the Program capital and O&M costs and a rate study to study the Program's impact on Metropolitan's water costs. Additionally, Staff will work with the Board over the next several months to develop a cost-recovery approach for the Program.

In recent months, Metropolitan's Board has accepted an $80 million grant from the State Water Resources Control Board for the program and approved the procurement of a Program Manager Consultant. The next steps include developing Term Sheets to confirm agency demands and beginning some preliminary design for identified early start/early delivery projects that will allow early delivery of water around the JWPCP in Carson and reduce the schedule risk for the entire Program. This CIP work is needed to meet the Program completion target of 2035.

Table 4: Summary of Needs and Benefits of Pure Water Southern California

Topic	Issues	How Pure Water Southern California Addresses Issues
Net Shortage and Drought	• Risk of a net shortage up to 66 percent of the time • Need for up to 650,000 TAFY of new core supply • Risk of storage below 1 MAF up to 2 percent of the time	• Reduces risk of net shortage by 9 percent • Reduces need for additional supply to 495,000 TAFY • Reduces risk of storage below 1 MAF by 50 percent
Groundwater Sustainability	• Projected 17 percent of the groundwater basins would be unsustainable • Risk of loss of groundwater production by up to 10 percent	• Prevents a portion of the loss of groundwater production in Main San Gabriel, West Coast, Central, and Orange County Basins. • Reduces percent of unsustainable basins from 17 percent to 15 percent.
Local Supply Development	• Stagnant growth in local supply development	• Increases local supply by 155 TAFY
Seismic Event	• Significant loss of imported supply capacity for up to 24 months due to catastrophic seismic event	• Increases the effective local supply during a seismic emergency by up to 15 percent • DPR could help maintain flow at treatment plants
Operational Flexibility	• Operational flexibility may be limited during times of emergency or drought	• Improves flexibility to meet demands and maintain regional storage