


OC Water Reliability Study 2022 Update

P&O Committee
September 6, 2022

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Reason for 2022 OC Study Update

1) Worsening imported water supply conditions for Southern California:
   - State Water Project (SWP) Table A drought allocations of 20% in 2020, 5% in 2021, and 5% in 2022
   - Lake Mead at its lowest reservoir elevation levels on record triggering shortage declarations on the Colorado River for Arizona and Nevada, with a California shortage declaration highly probable for 2023
2) Delays in environmental permitting for modernization of aging SWP infrastructure in the Bay-Delta, and Department of Water Resource's ultimate withdrawal of permit applications for a two-tunnel 'Delta WaterFix' project on May 2, 2019
3) Lower regional water demands for MET's service area
4) Increased understanding of climate change impacts relating to temperature
5) April 12, 2022 MET Board adoption of the MET 2020 Integrated Resources Plan (IRP) Needs Assessment
6) July 27, 2022 release of the Draft Environmental Impact Report (DEIR) for a single tunnel SWP water supply reliability project in the Bay-Delta – 'Delta Conveyance Project' (DCP)
7) State Water Resources Control Board (SWRCB) planning to set water use standards based on combined levels of indoor water usage, outdoor water usage, and system losses

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Purpose of 2022 OC Study Update

The 2022 OC Study update will provide the following information to aid regional water supply planning in Orange County and for MET's IRP Implementation (Phase 2):

1) Estimates of the probability and magnitude of potential water shortages in Orange County and the MET service area under various planning scenarios,
2) Potential economic benefits of reducing water shortages in Orange County from the implementation of additional water supply projects

The 2022 OC Study will not rank potential water supply projects in Orange County, but rather provide information that can be used by local water agencies in the planning and implementation of projects for improved water supply reliability.

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Major Assumptions for OC Study

1) Planning horizon is 2050 (MET IRP uses 2045)
2) Simulations represent modified climate-changed hydrology from 1965-2021 (MET IRP uses 1922-2019)
3) All water shortages are **without** voluntary/mandatory water demand restrictions
4) Planned OC recycled water projects **are** included as baseline assumptions, **but** other new OC projects (ocean desalination, water transfers, and San Juan watershed projects) are not included in order to show the value of these projects

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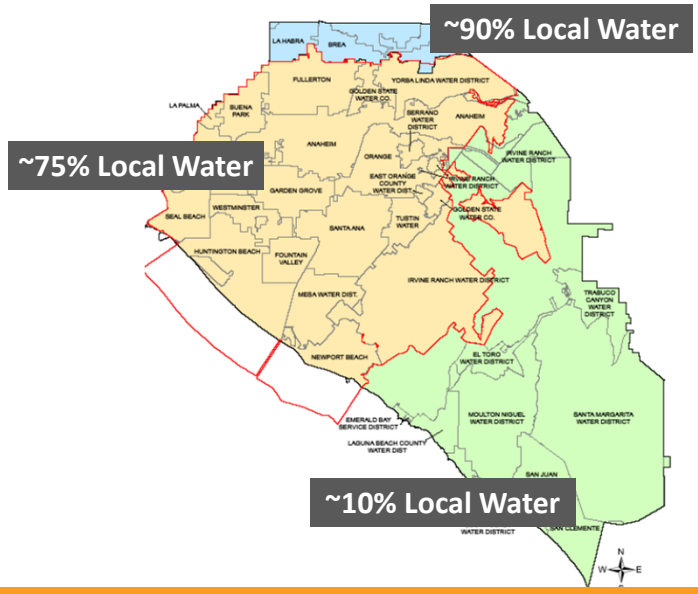
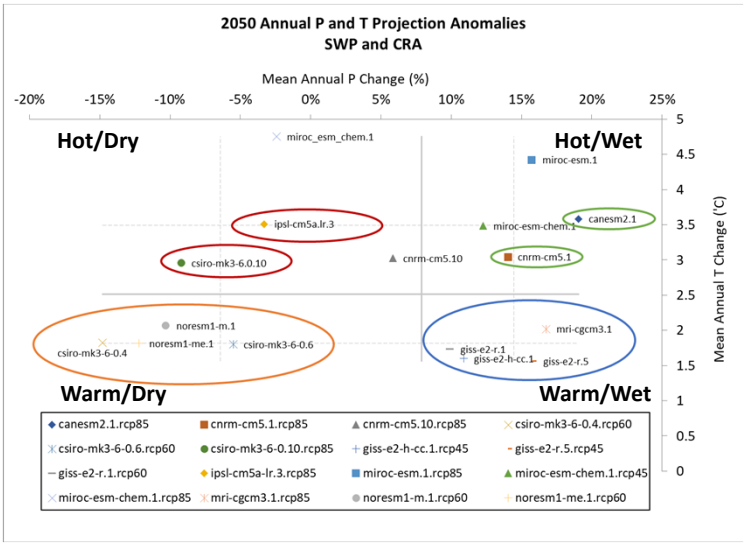
Results Presented for Three Planning Areas in OC

1. Brea/La Habra
2. OC Basin
3. South Orange County

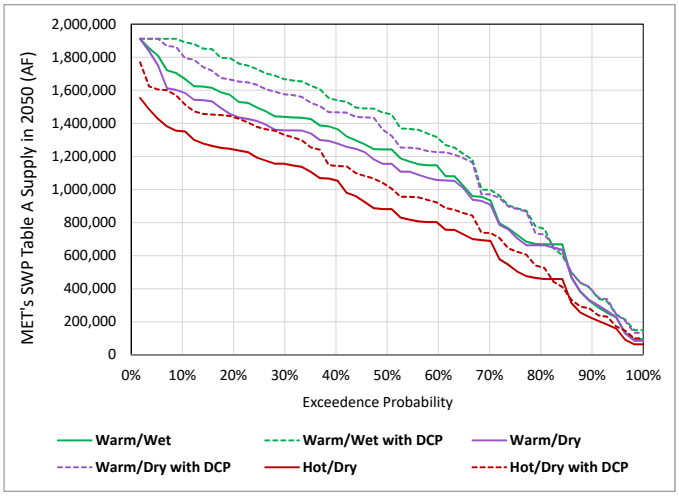


CDM Smith Climate Change Method for OC Study



1) A subset of 16 GCMs from CIMP5 were selected to represent four future boundaries (hot/dry, hot/wet, warm/dry, warm/wet)
2) David Yates, under contract with CDM Smith, ran all 16 models through Southwest WEAP hydrologic model of Sierra Nevada, Colorado River Basin, and OC Basin watersheds
3) CDM Smith ensembled hydrologic model results (see circles) to represent the four future conditions more concisely, discarding the use of GCMs that had greater that 4°C increase
4) Results were applied to historical hydrology sequence of 1965-2021

Impacts of Climate Change and DCP on MET's SWP Supply



- SWP supplies **without** existing MET transfers or banking, as they are modeled separately
- Under warm/wet climate future, MET's SWP supply is projected to be less than 1.24 million acre-feet (MAF) 50% of the time **without the DCP** in the year 2050.
- Under hot/dry climate future, MET's SWP supply is projected to be less than 0.88 MAF 50% of the time **without the DCP** in the year 2050.
- In an average year, the DCP provides about 0.20 MAF of additional SWP supply under these climate futures. **But the true value of the DCP is cumulative in nature due to MET's storage capabilities.**

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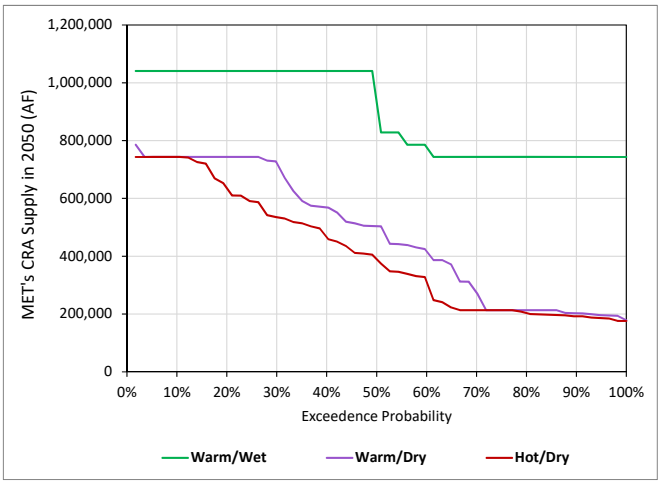
Impacts of Climate Change on MET's CRA Supply



- CRA supplies modeled with extension of BOR Drought Contingency Plan. Once Lake Mead goes below elevation 1,000 feet, shortages allocated proportionally among states and CA parties until dead pool storage is reached
- CRA supplies **include** existing water transfers/irrigation conservation
- Under warm/wet climate future, MET's CRA supply is projected to be less than 0.83 million acre-feet (MAF) 50% of the time in the year 2050.
- Under hot/dry climate future, MET's CRA supply is projected to be less than 0.40 MAF 50% of the time in the year 2050

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2022 OC Study Planning Scenarios

Scenario Name	Climate Change Future	OC Basin	MET & OC Water Demands	New MET Water Transfers and Storage	MET Pure Water Southern California	Delta Conveyance Project (DCP)
1. Low Stress without Delta Conveyance	Warm/Wet	• BPP Target of 82% • Median SAR baseflows	Lower baseline with current water use efficiency targets	• 100 TAF CRA Transfers (2030)	102 TAF (2035)	Not implemented
2. Moderate Stress without Delta Conveyance	Warm/Dry	• BPP Target of 82% • Median SAR baseflows	Lower baseline with current water use efficiency targets	• 100 TAF CRA Transfers (2030)	102 TAF (2035)	Not implemented
3. Moderate Stress with Delta Conveyance	Warm/Dry	• BPP Target of 82% • Median SAR baseflows	Lower baseline with current water use efficiency targets	• 100 TAF CRA Transfers (2030)	102 TAF (2035)	Implemented (2040)
4. Significant Stress without Delta Conveyance	Hot/Dry	• BPP Target of 82% • Low SAR baseflows	Lower baseline with increased water use efficiency targets	• 100 TAF CRA Transfers (2030) • 250 TAF MET Local Storage (2035)	168 TAF (2035)	Not implemented
5. Significant Stress with Delta Conveyance	Hot/Dry	• BPP Target of 82% • Low SAR baseflows	Lower baseline with increased water use efficiency targets	• 100 TAF CRA Transfers (2030) • 250 TAF MET Local Storage (2035)	168 TAF (2035)	Implemented (2040)

Notes:
(1) SAR = Santa Ana River; (2) TAF = thousand acre-feet; (3) BPP = Orange County Water District Basin Pumping Percentage; (4) online dates for new MET and DCP projects shown in parentheses; (5) If OC Basin overdraft is greater than 500,000 acre-feet for extend period of time due to combination of reduced stormflows and MET drought allocations, BPP gets adjusted downward

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2022 OC Study Water Demand Assumptions for MET

All Scenarios:

1) Retail demands based on average of MET IRP Scenarios A & B (low and high growth with min CC)
2) MET local water supplies for Scenario B, except for LAA (which was based on LADWP 2020 UWMP) and seawater desalination (which was reduced to exclude all OC projects)

Moderate Stress (Sc 2 & 3):

1) Retail demands increased 5% by 2050 for warm/dry climate
2) Groundwater reduced from current for warm/dry climate
3) Surface reservoir supply reduced 10% and LAA reduced by 6% by 2050 for warm/dry climate

Significant Stress (Sc 4 & 5):

1) Retailed demands first increased 7% by 2050 for hot/dry climate, then reduced by 5% by 2050 to account for increased water use efficiency
2) Groundwater reduced from current for hot/dry climate
3) Surface reservoir supply reduced 15% and LAA reduced by 12% by 2050 for hot/dry climate

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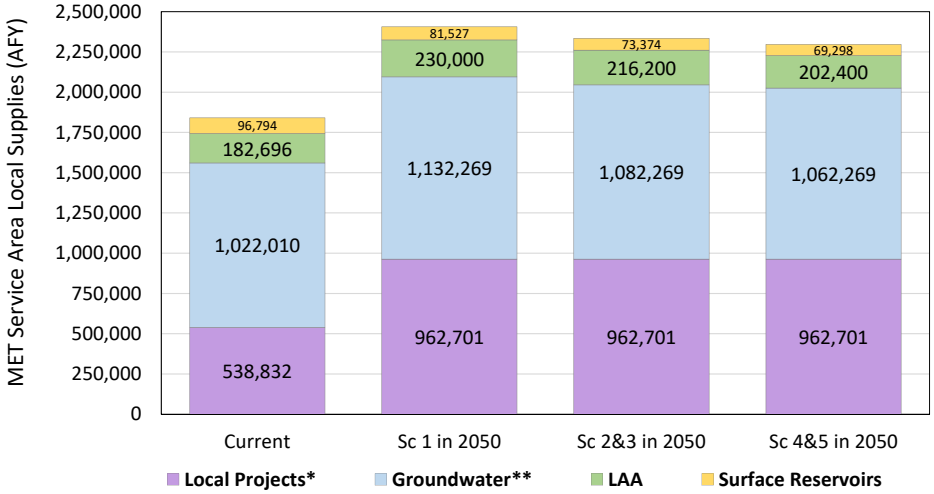
2022 OC Study Assumptions for Local Supplies for MET Service Area

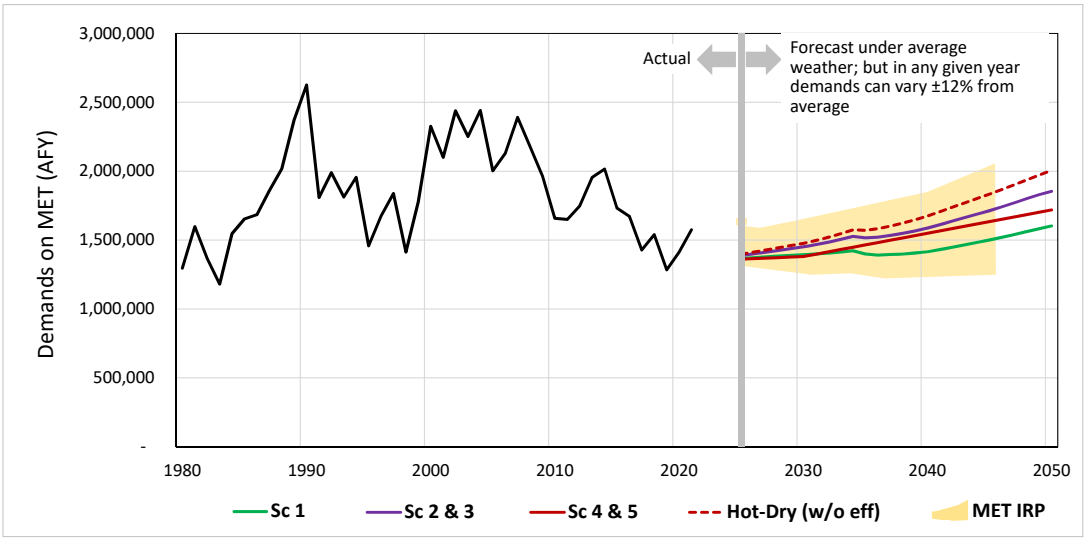


Additional water use efficiency assumed for Scenarios 4 & 5:

- MET service area = 340,000 AFY
- Orange County = 40,000 AFY

* Recycled, GW Recovery and Seawater Desal based on MET IRP Scenario B, with reduced seawater desalination (OC projects removed).
** Net of replenishment by MET and recycled water

CDM Smith Forecast Range of Demands on MET



2022 OC Study Water Demand Assumptions for Orange Co.

All Scenarios:

1) Water demand forecast Orange County based on 2020 UWMP

Moderate Stress (Sc 2 & 3):

1) Demands increased 4-5% by 2050 for warm/dry climate

Significant Stress (Sc 4 & 5):

1) Demands increased 6-7% by 2050 for hot/dry climate
2) Demands for OC Basin and Brea/La Habra decreased 6% for increased water use efficiency
3) Demands for South Orange County decreased 4% for increased water use efficiency (efficiency not as high as OC Basin due to significant recycled water used for landscape irrigation)

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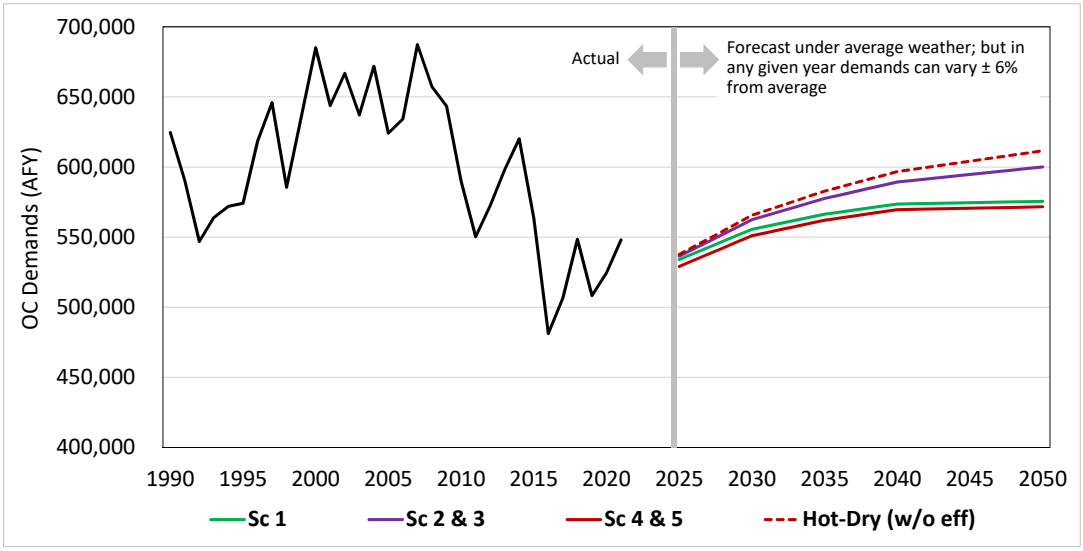
Total OC Water Demand Forecast Range



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Water Supply Reliability Summary (without Demand Restrictions)

Max Water Shortage w/o Water Demand Restrictions (TAFY)

Region	Max Shortage (TAF) in 2040*					Max Shortage (TAF) in 2050*				
	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5
MET Service Area	0	543	310	852	387	80	1,200	900	1,400	1,100
OC Basin	0	76	38	130	54	8	158	74	167	132
South Orange County	0	31	17	48	20	2	57	37	64	49
Brea/La Habra	0	3	2	6	3	0	6	4	8	6

Probability of Any Shortage (%)

Region	Probability of Any Shortage (%) in 2040					Probability of Any Shortage (%) in 2050				
	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5
MET Service Area	0	2	2	5	3	4	30	15	38	18
OC Basin	0	2	2	5	3	3	30	12	38	17
South Orange County	0	2	2	5	3	3	30	11	36	16
Brea/La Habra	0	2	2	5	3	3	30	12	37	17

MET IRP for Sc D for 2045: 1.2 MAF max shortage, with 66% probability of any shortage

Note: MET IRP does not include any new MET supplies or Delta Conveyance

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Water Supply Reliability Summary (with Demand Restrictions)

Max Water Shortage w/o Water Demand Restrictions (TAFY)

Region	Max Shortage (TAF) in 2040					Max Shortage (TAF) in 2050				
	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5
OC Basin	0	76	38	130	54	8	158	74	167	132
South Orange County	0	31	17	48	20	2	57	37	64	49
Brea/La Habra	0	3	2	6	3	0	6	4	8	6

Max Water Shortage with 20% Demand Restrictions in Worst-case Droughts (TAFY)

Region	Max Shortage (TAF) in 2040					Max Shortage (TAF) in 2050				
	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5	Sc 1	Sc 2	Sc 3	Sc 4	Sc 5
OC Basin	0	0	0	46	0	0	74	0	79	44
South Orange County	0	4	0	21	0	0	29	9	36	21
Brea/La Habra	0	0	0	2	0	0	2	0	4	3

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Comparison of MET Shortage Between MET IRP and 2022 OC Study

	1.2 MAF Shortage in 2045	1.4 MAF Shortage in 2050	
Variable	**MET IRP Scenario D**	**2022 OC Study Scenario 4**	**Impact on MET Supply Shortage**
Hydrology/Forecast Period	Hydrology 1922-2019 Projected to 2045	Hydrology 1965-2022 Projected to 2050	Higher shortage for OC Study
Water Demand	Greater baseline demands without new efficiency targets	Lower baseline demands with new efficiency targets	Lower shortage for OC Study
Climate Change	Lower impact on local and imported supplies	Higher impact on local and imported supplies	Higher shortage for OC Study
New MET Supplies	No new MET supplies	MET Pure Water, new Colorado River transfers, and new local storage	Lower shortage for OC Study

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Next Steps

1) Incorporate comments from today's P&O Committee meeting
2) Meeting with MET staff to review any areas of concern
3) Estimate the economic benefits of improving supply reliability from local water supply projects in Orange County
4) Present findings to the MWDOC Member Agencies Managers Meeting to receive comments and input
5) Complete a draft of the report by November 2022

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