OC Water Reliability Study Phase 2 Preliminary Info for OCWD

April 27, 2016

Municipal Water District of Orange County

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MET Reliability Modeling

- Under **EXISTING CONDITIONS** – no NEW Projects
- Under **SIX Portfolios (A thru F)** developed in the modeling process
  - Recommended Portfolio B for OC Work

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MET/MA Portfolios

OC Evaluated MET Portfolio Options	Description
A – Highly Likely	Small amounts of CRA transfers, Carson IPR (phase 1), and most likely and full design MET MA projects
B Selected for OC Portfolios	Moderate amounts of CRA transfers, small SWP transfers, Carson IPR (phases 1 and 2), and MET MA projects through advanced planning
C	Large amounts of CRA transfers and SWP transfers, Carson IPR (phases 1 and 2), and MET MA projects through feasibility
D – Highly Reliable (MET MA Projects)	Largest amounts of CRA transfers and SWP transfers, Carson IPR (phases 1 - 3), and MET MA projects through conceptual
E – Highly Reliable (regional desal)	All projects in Portfolio D, plus regional MET desalination
F – Highly Reliable (CalFix)	All projects in Portfolio D, plus regional CalFix and interim Delta regulatory relief

California WaterFix is only included in MET Portfolio F

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Orange County Reliability Study, Phase 2 - MET Reliability Portfolio Development

Working Draft (2-18-2016)

Portfolios D, E & F are Fully Reliable

New MET/MET Agency Water Supply Projects	Online Date	New Max Supply Yield (AFY)	OC Formulated Portfolios of MET Reliability: Portfolio A Very Achieveable	Portfolio B Used for OC Planning	Portfolio C	Portfolio D Highly Reliable	Portfolio E Highly Reliable	Portfolio E Highly Reliable	
New MET Projects									
Delta Regulatory Relief (only with CalFix)	2020	100,000	-	-	-	-		100,000	1
California WaterFix	2035	440,000	-	-	-	-		440,000	2
MET Regional Ocean Desal	2030	200,000					200,000		
MET-PVID Program	2020	130,000	60,000	80,000	100,000	130,000	130,000	130,000	
Other Colorado River Programs/Transfers	2030	100,000	10,000	50,000	75,000	100,000	100,000	100,000	
Central Valley Water Transfers	2020	150,000	-	50,000	100,000	150,000	150,000	150,000	
Carson IPR, Phase 1	2020	65,000	65,000	65,000	65,000	65,000	65,000	65,000	
Carson IPR, Phase 2	2025	35,000		35,000	35,000	35,000	35,000	35,000	
Carson IPR, Phase 3	2030	68,000	-	-	-	68,000	68,000	0	
New Regional Conservation	2020	TBD							
MET Member Agency Projects[3]									
- Very Likely	2025	88,000	88,000	88,000	88,000	88,000	88,000	88,000	
- Full Design with Funds	2025	23,400	23,400	23,400	23,400	23,400	23,400	23,400	
- Advanced Planning w/ Environmental	2025	51,000	-	51,000	51,000	51,000	0	0	
- Feasibility (more certain)	2030	71,500	-	-		71,500	0	0	
- Conceptual (less certain)	2035	65,700	-	-	-	65,700	0	0	
Total		1,487,600	246,400	442,400	537,400	847,600	859,400	1,031,400	
Scenario 2A GAP (2040) - Average MET Shortage		550,000							
Scenario 2A GAP (2040) - Maximum MET Shortage		1,661,000							

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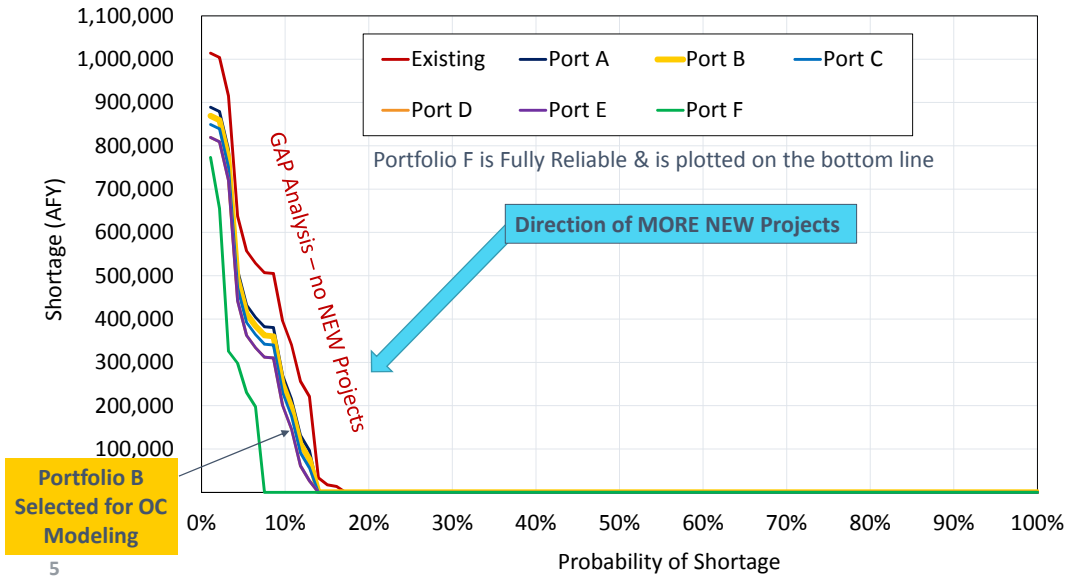
MET Reliability Under Different Portfolios – 2020



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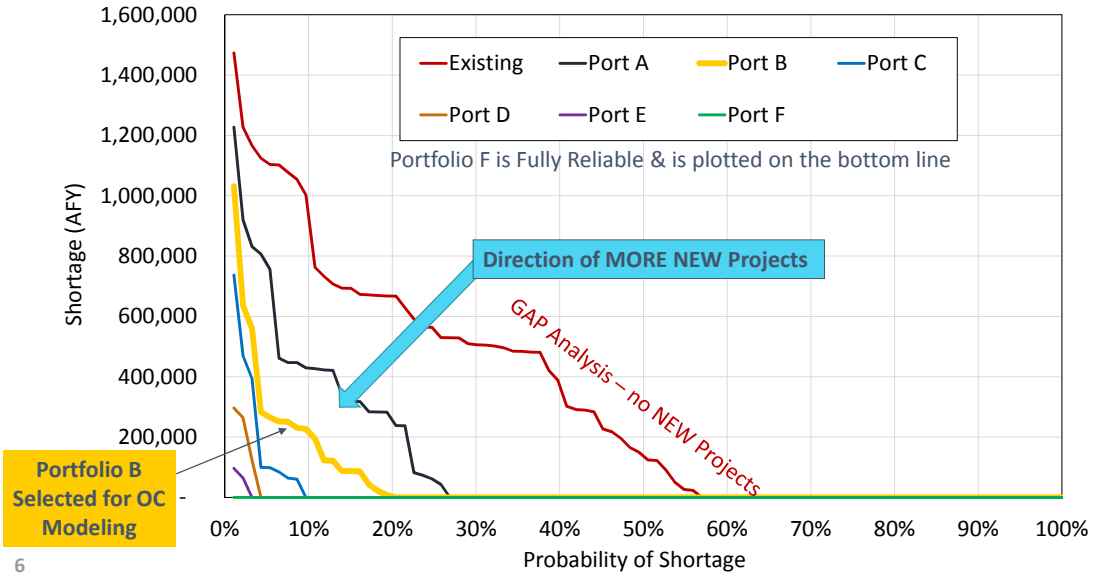
MET Reliability Under Different Portfolios – 2030



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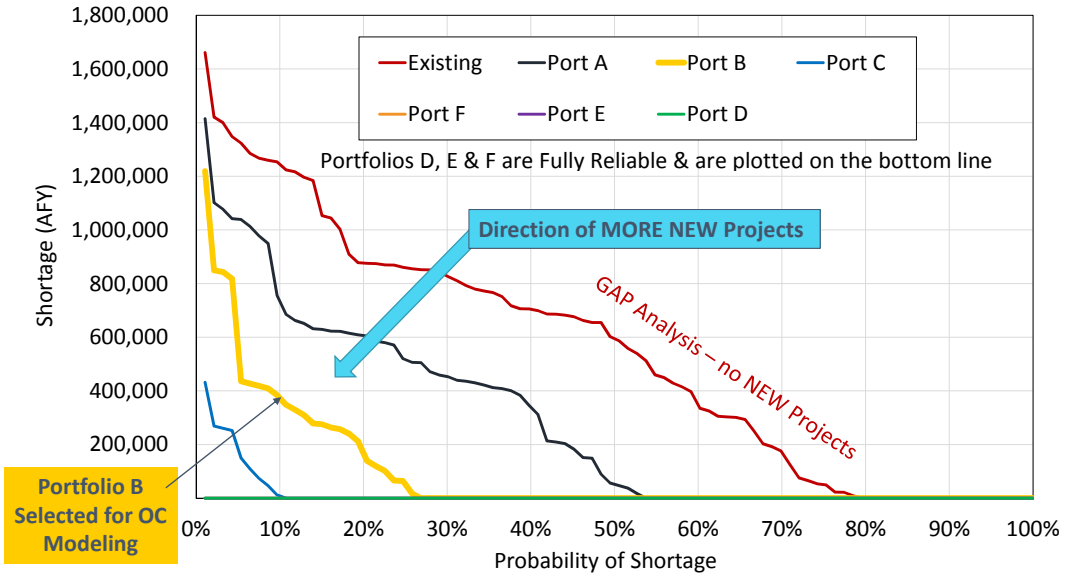
MET Reliability Under Different Portfolios – 2040



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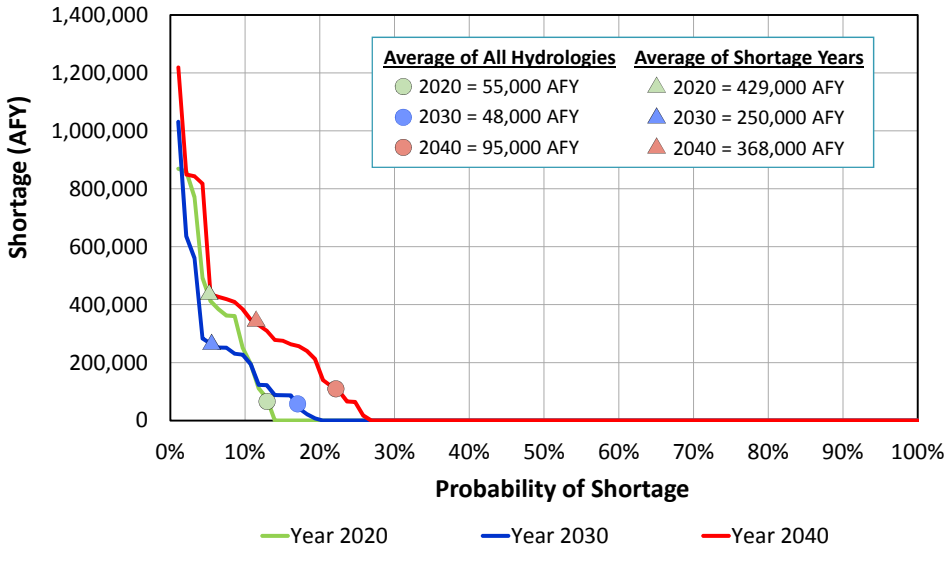
MET Supply Reliability Under MET Portfolio B



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Findings at the MET Level

- We identified three paths to full reliability (Portfolios D, E, & F); only F has the California Fix
  - The costs of these options have not been analyzed yet
- Storage and use of storage is critical to reliability; refilling MET storage is key to near-term reliability; we should support MET in seeking additional transfers/exchanges to fill storage on the SWP and CRA systems.
- We should support MET on the Carson IPR Project

For OC, a good strategy is to Plan for Portfolio B and use Adaptive Management to correct the direction if necessary

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OCWD Analysis – MET Portfolio B

- All OCWD BPP scenarios use MET Portfolio B as starting point, including MET's Carson Project providing full reliability of 65,000 AFY for replenishment water
- GWRS full expansion to 130,000 AF is included
- Did NOT include:
  - Prado Improvements
  - West OC Wellfield
  - Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)
  - Purchase of Upstream SAR Water

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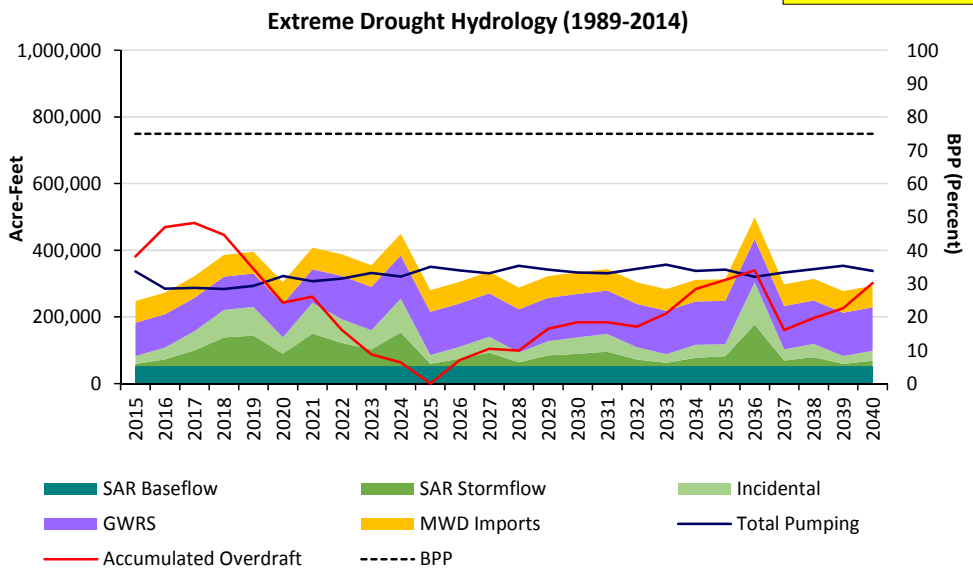
OCWD Analysis – Sample Extreme Hydrology - *Constant BPP Scenario*

1 of 93 hydrologies – this is the worst!



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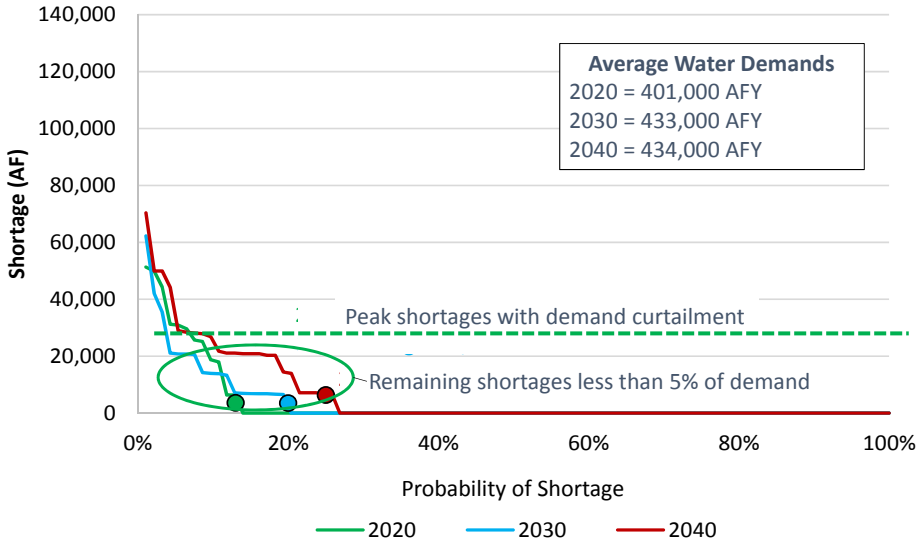
OCWD Analysis
Constant BPP Scenario



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Observations for OCWD Basin

- With constant BPP set at 75%, overdraft in the basin averages 300,000 AF under worst-case 25-year hydrologic sequence; the basin fills once under this hydrologic trace.
- Remaining water shortages peak at 70,000 AFY (16% of demand) during extreme drought conditions; but with demand curtailment, peak shortages are reduced to 25,000 AFY (<5% of demand).
- Given that basin overdraft is approximately 300,000 AF at the end of the worst-case drought sequence, additional basin management could further reduce remaining shortages.

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Follow-up with OCWD

- Additional fine tuning with OCWD staff to review results
  - Need to better understand swings in the basin storage due to various hydrologies when the BPP is fixed. The analysis can be used to tease out additional information regarding storage and use of storage during drought situations for basin reliability.
  - Consider operating strategies when the BPP **should** be varied instead of fixed (during and after droughts)
  - Examine options to develop Extraordinary Supplies for the basin
  - Other
- Examine expansion of Emergency Services Plan to South Orange County

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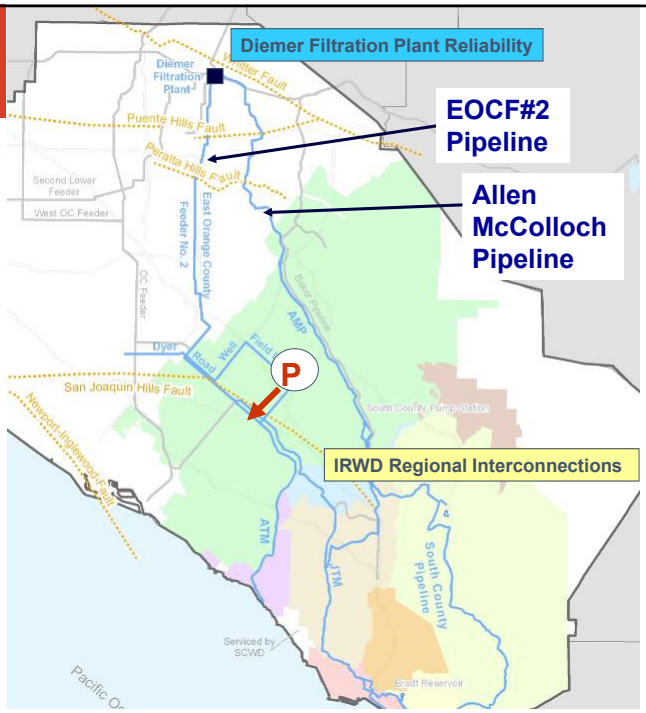
Emergency Services Program from 2006

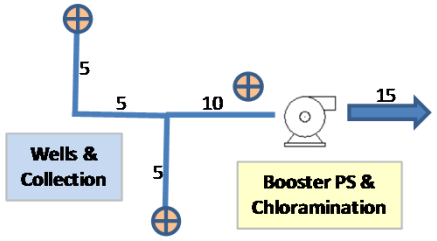
- Approved in 2006 by MWDOC, OCWD & IRWD
- Allows Emergency Needs to be supplied, up to 50 cfs for up to 30 days max
- IRWD and SOC Agencies constructed facilities to deliver up to 30 cfs from IRWD Zone 1 to SOC
- IRWD excess capacity goes to zero in 2030
  - IRWD examining options
  - MWDOC examining EOCF#2 Pump-in option



EOCF#2 Pump-in Option

- Conceptual at this time; similar to MET's Conjunctive Use Program
- Wells can be used by Producer's until needed by SOC during emergency
  - Cost sharing & other terms to be determined
  - Max SOC need = 53 cfs; depends on IRWD System evaluation
  - As an example, assume SOC Pays:
    - 1/3 cost of wells
    - Full cost of booster pump station & connection to pipeline
    - Full cost of water

Generic 15 cfs Wellfield and Collector/Transmission System (Flows in cfs)



Estimated Cost
$32,000,000

Developed for 15 cfs of Emergency Capacity – can be prorated to other sizes

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Illustrative SOC Portfolio Analysis

PRELIMINARY DRAFT DATA subject to change

Base Analysis: MET Portfolio B is implemented as assumed

Cost Parameter	Portfolio 1	Portfolio 2	Portfolio 3	Status Quo*
OC Emergency Cost (PV $Millions)	$36	$25	$21	$52
OC Supply Cost (PV $Millions)	$373	$688	$812	$0
LRP Savings (PV $Millions)	($45)	($80)	($53)	($0)
MET Purchase Cost (PV $Millions)	$2,273	$2,069	$1,941	$2,559
MET Shortage Cost (PV $Millions)	$0	$0	$0	$892
Total Cost (PV $Millions)	**$2,637**	**$2,703**	**$2,721**	**$3,503**
Overall Unit Cost (PV $/AF)	**$1,655**	**$1,675**	**$1,708**	**$2,199**
Other Attributes	**Portfolio 1**	**Portfolio 2**	**Portfolio 3**	**Status Quo***
Level of SOC Control	Med	High	Med	Low
Resiliency to Unknowns	Med	High	High	Low

* Only the new emergency project is included in Status Quo; no new water supply projects are implemented.

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Sensitivity/Uncertainties need to be considered

- CalFix - Success or no success? Might know more in 2 years.
- MET Carson IPR Project – Will project go forward and at what cost? What about other local projects by MET member agencies?
- Water Demands – Will future demands in OC bounce back higher than expected or lower than expected?
- Climate Change – Will it happen sooner and stronger than expected, or not be very significant in impacting imported and local water supply?
- Environmental Regulations – Will more biological opinions and Endangered Species Act (ESA) regulations impact Delta exports? Will ESA impact Colorado River supply?

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Other Questions?
Where did El Nino go???
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