OC Water Reliability Study
Phase 1 Overview
DRAFT Initial Results

October 28, 2015

Municipal Water District of Orange County

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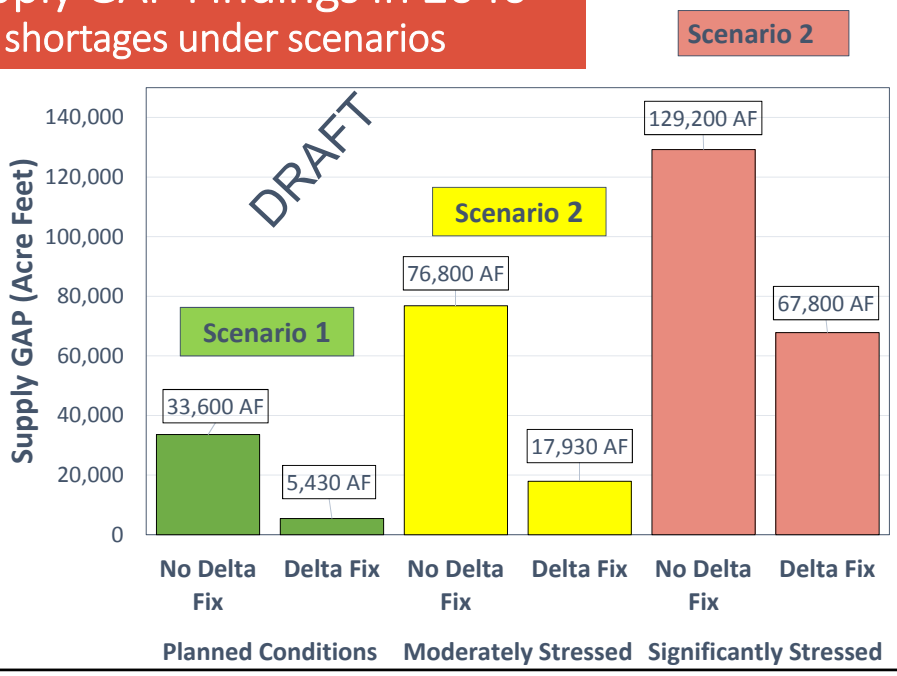
OC Supply GAP Findings in 2040
Average shortages under scenarios



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Two Types of Water Reliability

System

How well can the infrastructure serve customers if parts of the local or regional system are out of service

Supply

Having the wet stuff to meet supplies on a sustainable basis

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Overall Reliability Objectives

- Provide accurate, peer-reviewed information on current water supplies and how combinations of future projects - portfolios - would impact future supply shortfalls
- Collaborative process with team consisting of water planners, modelers, climate experts, seismic experts and member agency experts!
- Not intended to endorse nor provide support for any specific potential local project
- Provide advocacy input to MET's IRP

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Study Phasing

- Phase 1
  - Develop data, models, OC water demand projections for 25 years and analyze supply & system gaps under various scenarios
  - Develop list of projects that could fill the gaps
- Phase 1 Extension
  - Workshops to gather input from member agencies
- Phase 2
  - Quantifies the reliability improvement from project portfolios
  - Portfolios target specific gains in supply reliability, such as lower-cost, higher reliability, more local control, etc.

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Three Study Areas

The study looked at the entire county, breaking it into three subareas:

1. Brea and La Habra
2. OCWD Basin
3. South County

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What are GAPs, Scenarios and Portfolios?

- GAPs represent the inability to meet demands under the given Scenario
  - Supply GAPs due to hydrology or regulatory droughts or water demand growth that is higher than expected
  - System GAPs due to emergencies – primarily earthquakes & power outages
  - System and supply GAPs are analyzed differently
- A Scenario is NOT a prediction, but a plausible planning outcome
- Portfolios are combinations of potential water-supply projects

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Major Uncertainties

Uncertainty	Range of Outcomes
California WaterFix	No/Yes
MET Demands (growth)	Lower/Higher
MET IRP Policies & Investments	Higher or Lower Reliability
OC Demands	Rebound from 2015/WUE
Regional Local Supplies	Low, High
Regional WUE	Low, High
Climate Variability/Change (CRA & SWP)	None, Moderate, High
Santa Ana River Baseflows	Low, Med
Bureau of Reclamation Basin Study	Long Term Sustainability
DWR Projections of SWP Yield	Range of Outcomes
Earthquakes	Will happen

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Six Planning Scenarios

WITH California WaterFix	WITHOUT California WaterFix
1) Planned Conditions	2) Planned Conditions
3) Moderately Stressed Conditions	4) Moderately Stressed Conditions
5) Significantly Stressed Conditions	6) Significantly Stressed Conditions

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Phase 1 SUPPLY GAP Findings

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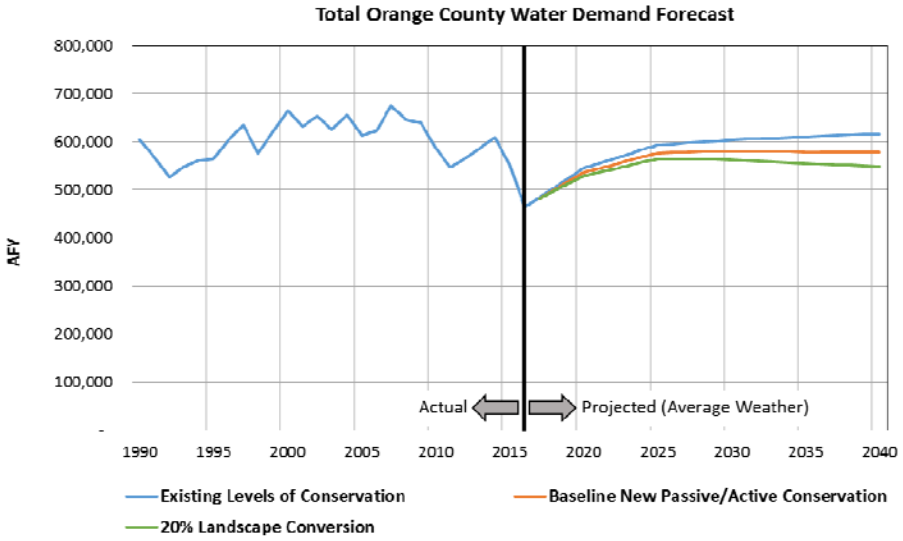
OC Water Demand Forecast



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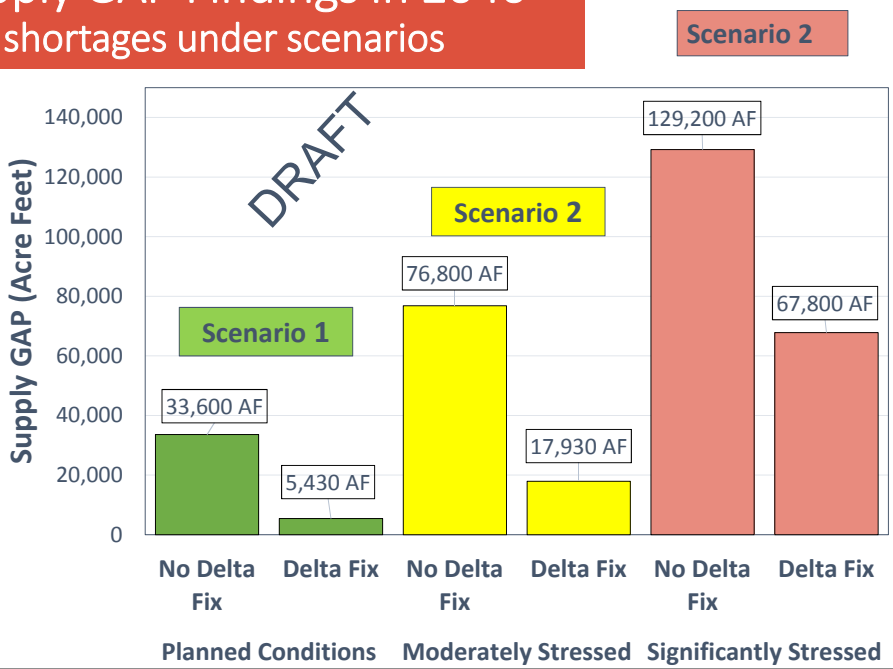

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Supply GAP Observations

- Orange County supply reliability is dependent on combination of actions by DWR, MET and OC agencies
- Using Scenario 1 (MET's assumptions), supply gaps can be managed, especially with construction the California Water Fix
- OC's potential projects include enough options to satisfy demands under Scenario 1 (with or without California Fix)
- Supply reliability suffers under tougher scenarios that increase demands and incorporate climate change impacts on SWP, CRA and local hydrology; the outlook is substantially more challenging under Scenario 3 without the Delta Fix

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Phase 1 System GAP Findings

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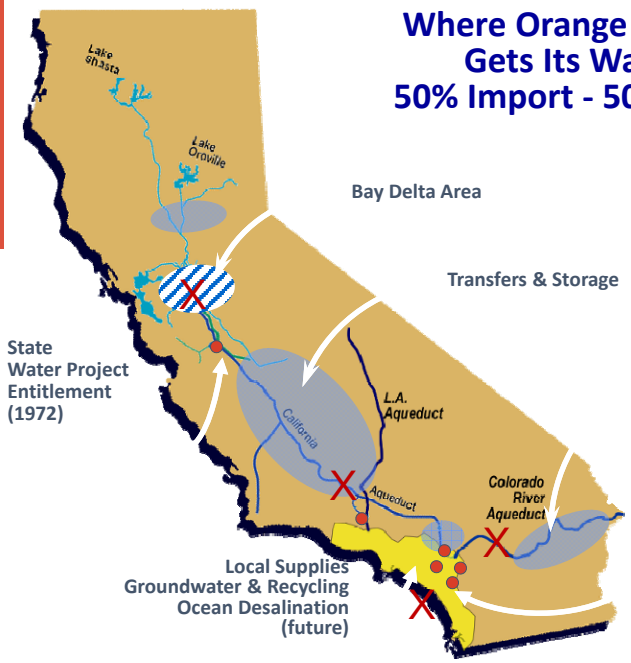
SYSTEM (EMERGENCY) GAP Analysis

Primary Risks are:

- **Earthquake**
- **Power Outages**



Where Orange County Gets Its Water
50% Import - 50% Local

X = **Potential Earthquake Locations**

Bay Delta Area

Transfers & Storage

State Water Project Entitlement (1972)

Colorado River Aqueduct (1941)

Local Supplies
Groundwater & Recycling
Ocean Desalination
(future)

Conservation
(Water Use Efficiency)

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Seismic Impacts Analysis

- Utilized the services of GeoPentech and G&E Engineering for technical support
- Conducted high level review of MET system and OC Water Systems
- Outage information is consistent with prior MET scenarios
- MWDOC developed Spreadsheet Tool to Assist Local Agencies in examining a range of emergency outage scenarios

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Seismic Impacts to OCWD Basin

- The number of wells in the OCWD basin at risk from permanent ground deformation is small - about 11 wells out of 199 major wells in the Basin
- Local agency water system damage in close proximity to fault could be substantial
- For agencies further from faults, the restart of well production could be hampered by
  - Well head damage
  - Power outages
  - Damage to local distribution system

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Potential Duration of SYSTEM Outages

Reliability Event	Duration
Regional Transmission Lines in OC	One Month
MET Regional Conveyance Outside of OC	Two Months
Colorado River Aqueduct	6 months
Diemer WTP Outage	One week to 2 months
Delta Levee Failure	1 to 2 Years
Edmonston Pumping Plant & East/West Branch Outages	Not analyzed – posited at 1-2 years
Local Water Systems	Days, weeks, possibly longer depending on Fault
Electrical Grid Outages	7 Days

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OC System Gap Summary

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Preliminary Summary of System Gap[1]			
Scenario	Brea/La Habra	OCWD	SOC[2]
1. No MET Deliveries	No Needs	No Needs	14-62 cfs
2. No MET Deliveries, No Grid	Back-up Power for 7 days	Back-up Power 25 – 50 wells for 7 days	6-37 cfs and/or Back-up power for 7 days
	Countywide need for fueling plans		

(1) These numbers could change with additional input from the local agencies and therefore should be considered as preliminary at this time
(2) Assumes Baker Plant is operational under both scenarios

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Phase 1 Summary

- Demands developed for OC that account for recent conservation trends
- Supply Gaps are projected by MET's IRP and the OC Model if future investments in water projects are not made
- The California WaterFix improves Supply Reliability considerably, but additional investments are required
- Emergency System Gaps will occur following major earthquake events without additional investments
- Investments can be made by MET, OC entities or some combination thereof

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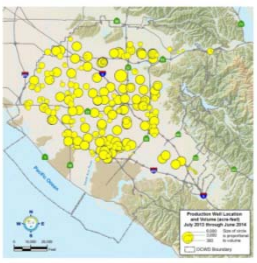
Next Step: Phase 1 Extension

- Gather Input from Member Agencies
  - 3-5 workshops
  - Understand implications from Phase 1
  - Additional model runs with modified assumptions
  - Phase 2 Scoping
    - Financial/Economics of decisions
  - Complete workshops in January
  - Begin Phase 2



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Need for Phase 2

- Planning + Investments = Reliability
- Key issues in Phase 2
  - Balancing OC decisions with MET decisions
  - Considering decisions given future uncertainties
  - Utilization of OCWD Basin by producers and others
- Providing local officials best information to chart course for their decisions affecting their stakeholders

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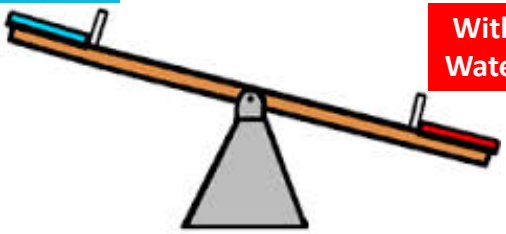
Phase 2 Challenges/Rewards

For Elected Officials

OC Water Reliability

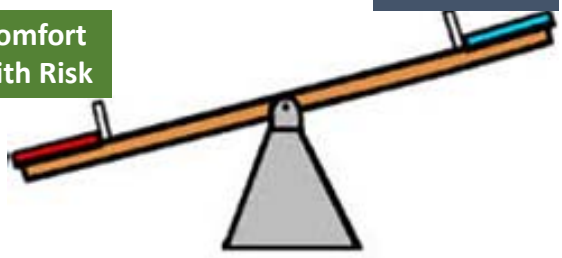
With Water Fix

Without Water Fix



Comfort with Risk

Level of Investment



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Questions

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