Optimizing the Use of Non-Potable Water Supplies

CWEA Engineering & Research Workshop

March 17, 2016
Presentation Outline

1. District Background
2. Non potable sources
3. Urban Runoff
4. Additional Recycled Water Uses
5. Seasonal Storage
Santa Margarita Water District

- Provides Water and Wastewater Service to over 155,000 residents
- Over Next 20-30 years ~40,000 More Residents
SMWD 2015 Water Supply

Indoor Use
- 12,100 AF
- 13,400 AF (February low flows)

Outdoor Use
- 8,900 AF
- 14,600 AF (21,000 AF)
- 18,300 AF

Recycled Water
- 7,600 AF
- 5,600 AF (Chiquita ~ 3,800 AF)
- 4,000 AF
- 1,800 AF (Oso Creek, 1,800 AF)
- 3A WRP, 1,800 AF

Wastewater
- Chiquita - 7,200 AF
- 6,500 AF
- Oso Creek - 2,200 AF
- 1,980 AF
- SOCWA - 2,500 AF
- 3,620 AF

Urban Return Flows
- 1,800 AF
  - Oso Barrier - 1,120 AF
  - Horno Basin - 180 AF
  - Trabuco - 300 AF
  - Dove Canyon - 200 AF
  - Future: Gobernadora ~ 800 AF

Potable Water
- 21,000 AF
- 28,000 AF

Ocean Outfall
- 6,300 AF
- 3,130 AF
OPTIONS AVAILABLE FOR MEETING WATER DEMANDS

SHORT TERM
• Conservation
• Recycled Water Conversions
  • Individual Retrofits
  • Community/Neighborhood

LONG TERM
• Conservation
• Develop Additional Non-Potable Supplies
• New Development Recycled Water
• Recycled Water Conversions – District Wide
• Ground Water Harvesting
  • Existing
  • Recharge
Water Use Efficiency: Outdoor Focus

- **Resources:**
  - SustainaBlue Plant List & Website
  - Landscape Design Assistance
- **Incentives & Tools:**
  - Rebates (sprinklers, turf, etc.)
  - WaterDex sprinkler remote control
- **Education & Assistance:**
  - Site surveys @ homes

**CONSERVATION**

- 24% Reduction
- Partner w/ Customers
- Education
SMWD Proactively Seeks Multiple Types of Non-Potable Sources

- RW
  - Oso Creek WRP (2.0 MGD)
  - Chiquita WRP (5 MGD)
  - SOCWA, IRWD, TCWD
- Urban Runoff Capture
  - Oso Creek Barrier Project
  - Dove Canyon Basin
  - Horno Basin
- Imported Water (Portola Reservoir)
Oso Creek Barrier Diversion
Operated Successfully for > 35 Years

– 2 Million Gallons Per Day
– Mixes w/ Oso Creek WRP Effluent
– Pumped to Upper Oso Reservoir
Gobernadora Multi-Purpose Basin

Multiple Benefits/Multiple Benefactors

Flood Management/Storm Water Detention

Surface Runoff Treatment

Environmental Protection

Nondomestic Irrigation

Recreational Trail

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Santa Margarita Water District
Gobernadora Multi-Purpose Basin

Multiple Partners
Public/Private
Gobernadora Multi-Purpose Basin
Project Background and Objectives

• District’s Goals
  – Capture Urban Runoff
  – Protect Downstream Facilities
    • 10” and 16” sewer force main
    • 36” Regional Water Transmission Main

• RMV/OC Public Works
  – Storm water management
  – Protect downstream GERA

• OC Parks
  – Connect two Regional Wilderness Parks
Gobernadora Detention Basin Location
Basin Location – Aerial Image

Design Constraints
- Groundwater
- Biological Habitat
- Available R/W
- Floodplain
- Topography
- Natural alluvial Creek

Coastal Sage

Coto de Caza

Gobernadora Environmental Restoration Area
Multi-Objective Water Resources Facility

- Stormwater Treatment
- Groundwater Recovery
- Flood Peak Attenuation
- Stream Stabilization
- Groundwater Infiltration
Gobernadora Multi-Purpose Basin
Design Features/Facility Operation

• Maximize site use
• Construct in two phases
  – Urban runoff treatment/capture
  – Flood control element
• Minimize impacts on environment
• Provide treatment
• Unstaffed operation
Creek Erosion Between Preliminary to Final Design

- Preliminary design performed in 2008.
- Large storm event December 2010
- Erosion between Preliminary Design reduced available footprint of basin by over 3 acres
- Increased environmental regulatory areas
Gobernadora Multi-Purpose Basin
Dry Weather Operation

1. Dry weather diversion gated culvert
2. Force Main
3. SMWD Pump Station
4. Return Water Flow for habitat

UPPER BASIN
LOWER BASIN

Upper Basin Water Quality Treatment & Recharge
Dry Weather Flow Diversion Operation
Two 80’ Deep Recovery Wells that Lift to Distribution Pumps’ Suction
Gobernadora Multi-Purpose Basin
Flood Flow Operation

- Upper to Lower Basin Spillways
- Lower Basin = Flood Control
- Outlet Spillways to Channel
- Gravity Outlet
- Upper Dam Deflated
- Channel Side Weir
- Lower Dam Inflated
Initial Grading Operation
Inflatable Dam Installation Process
Inflatable Dams – Installed
Channel Side Weir - Installed
Water Reclamation Pump Station
Pumping Facility has Desilting, Straining, and Return Flow to Creek
Pump Station – Constructed
Recycled Water
Current Supplies

• 11 treatment plants
  – 43 MGD
  – 17,700 AF recycled
  – 30,800 AF ocean disposal

• San Juan Watershed
  – 18,900 AF Outfall

• Aliso Creek
  – 11,900 AF Outfall
**Uses**

- Current and Future recycled demands by agency
- Types
  - Purple pipe use predominates today
  - Future use may include indirect and direct reuse
- Additional supply available
Future Supplies

- 11 treatment plants
  - 48 MGD
  - 44,100 AF recycled
  - 10,100 AF ocean disposal
  - SJBA

- San Juan Watershed
  - 3,400 AF Outfall

- Aliso Creek
  - 6,700 AF Outfall
PROPOSED RECYCLED WATER PROJECTS

- Califia – 220 afy
- Misc. Conversions
  - Hidden Ridge – 35 afy
  - Palmia – 70 afy
- Lake Mission Viejo APWTF – 300 afy
- Coto de Caza – 400-1,250 afy
- Las Flores – 220 afy
- Melinda Road – 150 afy
- Rancho Santa Margarita – 1,000 afy
Groundwater Harvesting

- Existing
- Recharge
San Juan Basin Watershed Boundary Approx. 175 Sq. Mi.
Primary Areas of Interest for Basin Water Production and Recharge
Primary Areas of Historic Groundwater Pumping

Rancho Mission Viejo

City of San Juan Capistrano
San Juan Hills Golf Course, Equestrian Centers

South Coast Water District
Groundwater Recharge: Stormwater and/or Recycled Water

Adaptive Management Strategies For Recharge and Production

Seawater Intrusion Barrier: Extraction Trough (or Injection Mound)
Possible T-levee locations

San Juan Creek

T Levee Recharge Option
In-Stream / Near-Stream Recharge Option

Groundwater Recharge: Stormwater and/or Reclaimed Water
Ranney Type Well Option

Ranney Type Well Possibly Located At Junction of San Juan Creek and Trabuco Creek
Channelized San Juan Creek

Possible Location of Extraction Barrier Wells

State Park Land

Estimated Zone of “Ancient Brackish” Water

Improved Capture of Groundwater Underflow

Capture of “Seawater” Reducing Intrusion Potential

Vertical Extraction Well Barrier Option
CURRENT PROJECTS

Metropolitan Water District Foundational Actions Fund (FAF) Grant: SJBA Preliminary Adaptive Production Management Alternatives

United States Bureau Of Reclamation WaterSMART Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Grant Program for FY 2014: SMWD San Juan Groundwater Basin Recharge, Reclamation, and Reuse Feasibility Study
FUTURE OF GROUNDWATER RECHARGE
Seasonal Storage of Recycled Water
Repurpose tailings storage dam for recycled water storage
Raise dam to increase reservoir capacity and provide 13.5’ freeboard
Option 1: ~ 3,000 ac-ft storage, 21-ft raise, ~ $48M
Option 2: ~ 5,000 ac-ft storage, 40-ft raise, ~ $65M
District Goals

SHORT TERM

• Meet the 24% State Mandated Reduction
District Goals

LONG TERM

• Develop Regional Approach
• Make the Current Conservation Permanent
• Increase Sustainable Supplies
  • 100% Recycling
  • Groundwater Recovery
  • Brackish Water Recovery
## POTENTIAL RECYCLED WATER CONVERSION PROJECTS

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<th>Project</th>
<th>Water Saved (AF-Yr)</th>
<th>Capital Cost ($)</th>
<th>Life (Years)</th>
<th>Amortized Capital Cost of Water ($/AF)</th>
<th>Time to Implement</th>
<th>Design/Bid/Build (Months)</th>
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