Santa Ana River Watershed

Integrated Regional Water Management Planning – An Approach to Climate Change

Southern California Groundwater & Climate Workshop
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Who is SAWPA?

Santa Ana River Watershed Counties, Member Agencies

Map showing the Santa Ana River Watershed with counties and member agencies such as IEUA, SBVMWD, WMWD, OCWD, and EMWD.
You are the hub of the watershed future and sustainability
“This is an opportunity for greatness which has never been offered to any civilization, any generation in any civilization in human history before to act as a generation to do the right thing. If we fail to receive that opportunity, to act on it, then my feeling is that we will become the most vilified generation that has ever lived in human history.”

Dr. Roger Payne, Ocean Alliance, President
Planning for the 4 Horsemen of the Apocalypse

- Climate Change
- Reduced Water from Delta
- Colorado River Basin Drought
- Urban Sprawl & Population Growth
Santa Ana Watershed
Population Projections through 2050

Source: Southern California Association of Governments
SPRAWL: The Number One Threat to Water Sustainability
Colorado River
Danger on the Delta
WATER RELATED IMPACTS OF GLOBAL WARMING

- Decreased snowpack
- Decreased surface storage water supply
- Decreased hydroelectric output
- Decreased natural groundwater
- Inverse peak flows and increased flooding
- Increased risk of fire
- Decreased water quality
- Decreased agricultural demand
- Increased agricultural demand
- Increased urban demand
- Increased precipitation events and increased flooding
- Increased salt water intrusion into ground water
- Wetlands flooded by rising sea level
- Reduced summer streamflows
- Impacts to commercial and recreational fisheries
- Higher temperatures harming fish and wildlife habitat
- Decreased coastal water quality
OWOW Vision

A sustainable Santa Ana Watershed that is drought-proofed, salt balanced, and supports economic and environmental vitality in the year 2030
What do we want?
Healthy Drinking Water!
We want Healthy Fisheries
Swimmable Rivers
Productive Agriculture
Water Wise Landscape
Smart Growth and Low Impact Development

Photo Simulation by Steve Price, Urban Advantage
(www.urban-advantage.com)
One Water One Watershed: The Promise of IRWMP

HARVARD Kennedy School
ASH CENTER for Democratic Governance and Innovation

Moving Toward Sustainability

One Water One Watershed
2010 Integrated Regional Water Management Plan

Threats
- Climate Change
- Reduced Water from Delta
- Reduced Groundwater Recharge
- Colorado River Basin Drought

Santa Ana Watershed Project Authority
Watershed Level Thinking

- Beneficial Use Assurance
- Multi-Hazard Preparation
- Natural Resources Stewardship
- Energy and Environmental Impact Response
- Land Use Planning
- Water Use Efficiency
- Operational Efficiency and Water Transfers
- Government Partnerships
- Disadvantaged and Tribal Community
- Water Resource Optimization
OWOW Guiding Principles

1. **Create Anew** – OWOW shared vision and adopting a new water ethic

2. **Collaboration Across Boundaries**
   Citizens of watershed, multi-jurisdictional solutions

3. **Adopt Systems Approach** – Problems are interrelated, seek synergies, create catalysts
The Systems Approach

1. The Santa Ana River Watershed is a hydrologic whole

2. Working in concert with nature is cost effective

3. See each problem as interrelated, seek efficiencies and synergies
OWOW Plan 2.0

- Web-based Tools
- Watershed Assessment
- Climate Change Adaptation/mitigation
- System-Wide Projects/Programs
Climate Change Story
Adaptation and Mitigation
Climate Change Partnership – SAWPA-Reclamation-DWR
OWOW Plan 2.0 - Reclamation Analysis Tasks

- Review & Select Climate Change Model Forecast for Watershed
- Groundwater Level Impacts
- Sea Water Level Rise Impacts
- Greenhouse Gas Emission Calculation Tool
- Decision Support Tools to Manage Impacts
36 Key Locations in Watershed Analyzed For Hydrologic Impacts
Hydrology Projections
Flow Impacts

- Annual and seasonal streamflow impacts
- 2020s – increase in annual runoff and winter (Dec-Mar) runoff, decrease in spring-summer (Apr-Jul) runoff from the 1990s reference
- 2050s – decrease in annual, winter, spring-summer runoff from the 1990s reference
- 2070s - decrease in annual, winter, spring-summer runoff from the 1990s reference
### Summary of Impacts

**Santa Ana River Adams St. Gage**

<table>
<thead>
<tr>
<th>Hydroclimate Metric (change from 1990s)</th>
<th>2020s</th>
<th>2050s</th>
<th>2070s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (%)</td>
<td>0.67</td>
<td>-5.41</td>
<td>-8.09</td>
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<tr>
<td>Mean Temperature (deg F)</td>
<td>1.22</td>
<td>3.11</td>
<td>4.10</td>
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<tr>
<td>April 1st SWE (%)</td>
<td>-38.93</td>
<td>-80.40</td>
<td>-93.07</td>
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<tr>
<td>Annual Runoff (%)</td>
<td>2.60</td>
<td>-10.08</td>
<td>-14.61</td>
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<tr>
<td>Dec-Mar Runoff (%)</td>
<td>9.82</td>
<td>-3.01</td>
<td>-6.38</td>
</tr>
<tr>
<td>Apr-Jul runoff (%)</td>
<td>-6.35</td>
<td>-25.24</td>
<td>-31.39</td>
</tr>
</tbody>
</table>

Similar analysis was done for all the 36 sites in the Santa Ana Basin.
Groundwater Basins

DWR Bulletin 118 Groundwater Basins
Example: Runoff Impact
Santa Ana R. Adams St. Gage

Tributary Information
Lat, Lon: 33.67264, -117.945069
Tributary cells: 40
Estimated trib area: 6410 km²
Estimated trib area: 2475 mi²

http://gdo-dcp.ucllnl.org/downscaled_cmip3_projections/dcpinterface.html
Moving Forward on Sustainability – not the next grant
Additional 10% Water Savings – 150,000 AF/yr
Biggest Bang for Buck: Water Use Efficiency
Recycled Water

- Reliable source of regular supply
- Low comparative energy costs
- Accessible to most urban communities
- More sustainable than other alternative water sources
Wastewater Reuse in the Santa Ana River Watershed

Wastewater is recycled and reused 2-3 times before discharge to ocean.

Low pumping cost as flows and use move downstream.
Groundwater Desalination

Avg. Cost $700 - 800/AF

Additional 5% Water Savings – 75,000 AF/yr
Manage Rainfall as a Resource

- Maximize use of rain water
- Provide flood control capacity
Forest First

Santa Ana River Trailhead
San Bernardino National Forest
Operational Efficiency and Water Transfers
Cumulative Benefit of Expanded Watershed Water Supply Development – 775,000 AFY

- Water Efficient Irrigation – New and Retrofit: 300,000 AFY
- Recycled Water: 250,000 AFY
- Tiered Allocation Rates: 200,000 AFY
- Groundwater Desalination: 150,000 AFY
- Stormwater Capture: 100,000 AFY
Components of Ideal Project

Ideal OWOW Project

- Watershed Approach
- Multiple Benefits
- Sustainable
- Adaptability to Climate Change
- Ready to Implement
- Env. Justice/DAC
- Multi Jurisdictional

OWOW

DAC
Water Sustainability Moving Forward – “Beyond LEED” Example