Outline of talk

- Chino Basin background
- Attempting sustainability in the Chino Basin
- Role of Chino Basin recharge master plan in sustainable groundwater management
- 2013 Recharge Master Plan highlights
- Take aways

Groundwater Management Plan

- Historically the basin was in overdraft until adjudicated by stipulated agreement in 1978
- Pumping rights were established
- Physical solution ensures sustainable groundwater management
- The basin stakeholders developed the Optimum Basin Management Program in 1998 and began implementation in 2000

The OBMP Includes Nine Program Elements

- Comprehensive Monitoring Program – PE 1
- Comprehensive Recharge Program – PE 2
- Water Supply Plan for Impaired Areas – PE 3
- Subsidence Area Management Program – PE 4
- Regional Supplemental Water Program – PE 5
- Cooperative Programs with Regulators – PE 6
- Salt Management Program – PE 7
- Storage Management Program – PE 8
- Storage and Recovery Program – PE 9
Increase in Impervious Area
The loss of streambed recharge from channelization was about 15,000 afy.

Since the adjudication:
- Deep infiltration of precipitation and applied water decreased ~18,000 afy
- Streambed infiltration decreased ~15,000 afy
- The recharge master plan was incorporated into the OBMP PE 2 to mitigate the lost recharge
- Recharge master planning is a continuous process

Why do a recharge master plan?

The loss of streambed recharge from channelization was about 15,000 afy.
What is a recharge master plan?

- Facilities plan that identifies the universe of storm and supplemental water recharge projects
- Evaluates them based on stakeholder criteria
- Recommends projects for implementation
- Includes an implementation plan to refine, design, prepare environmental documentation, permit, finance, and construct projects

Scientifically-Defensible Basis of Design for New Stormwater Projects

- Developed surface water model to estimate a long-term daily time history of discharge at points of interest
  - Daily precipitation record July 1949 through June 2012
  - Current land use (2012) and drainage management

2013 RMPU Project Identification and Screening Process

- Recharge master plan steering committee:
  - Issued a call for projects to all stakeholders
  - Developed evaluation criteria
  - Used modeling tools to estimate new recharge
  - Developed cost opinions
  - Applied evaluation criteria

- 35 facility improvement projects and eight O&M improvement projects were evaluated
- Nine facility improvement projects were selected for implementation

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Recharge Capacity in the Chino Basin

<table>
<thead>
<tr>
<th>Water Type</th>
<th>Pre-GBMP Recharge Capacity in 2000</th>
<th>Capacity after 2000 RMP Recharge Projects Were Completed in 2004</th>
<th>Capacity after 2013 RMPU Recharge Projects Are Completed in 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm</td>
<td>2,000</td>
<td>11,000</td>
<td>15,900</td>
</tr>
<tr>
<td>Recycled</td>
<td>500</td>
<td>13,200</td>
<td>20,300</td>
</tr>
<tr>
<td>Imported</td>
<td>28,500</td>
<td>45,900</td>
<td>38,800</td>
</tr>
<tr>
<td>Total</td>
<td>31,000</td>
<td>70,500</td>
<td>75,000</td>
</tr>
</tbody>
</table>

Unit Cost of Stormwater Recharge

<table>
<thead>
<tr>
<th></th>
<th>2000 RMP</th>
<th>2013 RMPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (afy)</td>
<td>+9,000</td>
<td>+4,900</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>$65 million</td>
<td>$30 million</td>
</tr>
<tr>
<td>Annualized Capital Cost</td>
<td>$4.2 million</td>
<td>$1.9 million</td>
</tr>
<tr>
<td>Annual O&amp;M Cost</td>
<td>$0.27 million</td>
<td>$0.18 million</td>
</tr>
<tr>
<td>Unit Cost</td>
<td>$500/afy</td>
<td>$440/afy</td>
</tr>
<tr>
<td>Avoided Imported Water Unit Cost</td>
<td>$666/af in 2017</td>
<td>$1,000/af in 2025</td>
</tr>
</tbody>
</table>
Implementation Status

- 2013 Recharge Master Plan Update adopted by IEUA and the Watermaster in 2013
- Five projects are in pre-construction/final design
- Some projects have received grant funds and low-interest financing; more funding is being sought
- Construction of five projects is expected to be completed in 2020
- Next recharge master plan update is scheduled for 2018

Take Aways

- Chino Basin stakeholders developed and applied a scientifically-defensible, systems-approach to:
  - identify recharge opportunities
  - characterize and assess feasibility
- Approach was used in the 1998, 2001, and 2013 recharge master plans; and is planned in 2018

Take Aways

- The recharge projects implemented through 2020 will replace the stormwater recharge lost to channelization
- The Chino Basin recharge master plan stakeholder and technical processes can be reproduced anywhere

Questions

Contact me at: grapp@weiwater.com
+1 949-600-7525

Technical documents can be viewed here: http://www.cbwm.org/rep_engineering.htm

End
R4 simulates soil water and stormwater runoff for each combination of land use and soil in each HSA.