Recycled Water Demand Prioritization and Management; Maximizing Beneficial Use

WateReuse Inland Empire Chapter
January 27, 2014

John Wuerth
Recycled Water Program Analyst
Agenda

- Eastern Municipal Water District (EMWD) and Recycled System Overview
- September 2011 System Conditions
- Demand Management Plan
- Results
- Challenges
- Opportunities
EMWD Overview

• 542 Square Miles

• Population of 768,000 / 45% Ultimate Build-out

• Water, Wastewater and Recycled Water Services

• 7 Cities plus Un-incorporated Riverside County
EMWD Began Treating Wastewater in the 1960’s

Originally Disposed in Ponds & Fields

In 1991, Began To Develop a Recycled Water “Backbone” to Expand Reuse
Recycled Water System History

- Four Operating RWRF’s
- Two Billion Gallons of Storage
- Over 200 Miles of Pipeline
- All RWRF’s Connected

Since 2003 – Increase Demands:
- System Pressurization
- Mandatory Use Policy
- RW Strategic Plan
- Facilities Master Plan
- Operations Plan
The Current Recycled Water System

• $50M Improvements
  • American Recovery and Reinvestment Act - $12M

• Recently Completed:
  • 5 MG Converted Tanks
  • 11 MG New Tanks
  • 2 – In Line Boosters
  • 5 – Miles 36-Inch Pipeline

• Currently Constructing:
  • 3 – Pond Pump Stations

• In Design:
  • 1,500 AF New Seasonal Storage
  • Storage Optimization Study
Recycled Water’s Role

• 90% Current Reuse

• 25% Total Water Supply

• RW Planning Objectives:
  • Maximize Beneficial Use
  • 100% Utilization
  • Optimize Salt Balance
  • Minimize Cost

• Primary “New” Supply
The Start of Demand Management

• System Conditions – September 2011:
  • High Demands
  • System Pressures Dropped
  • Customer Supply Shortages
  • Required System Augmentation

• Demand Management Plan Initiated:
  1. Evaluate Supply, Commitments, and Demands
  2. Classify / Analyze Customer’s Needs
  3. Develop Customer Allocations
  4. Develop Demand Monitoring Tool

• Primary Focus: What Happened, Why and Prevent
### Recycled Water Annual Production (GPM)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Production (09-11 avg)</th>
<th>Average Rounded Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVRWRF</td>
<td>9.6 MGD</td>
<td>6,725</td>
</tr>
<tr>
<td>PVRWRF</td>
<td>10.4 MGD</td>
<td>7,275</td>
</tr>
<tr>
<td>SJVRWRF</td>
<td>8.2 MGD</td>
<td>5,725</td>
</tr>
<tr>
<td>TVRWRF</td>
<td>13.3 MGD</td>
<td>9,275</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41.5 MGD</strong></td>
<td><strong>29,000</strong></td>
</tr>
</tbody>
</table>
# Storage Pond Delivery Capacities

<table>
<thead>
<tr>
<th>Pond Site</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nandina Pump Station</td>
<td>4,200</td>
</tr>
<tr>
<td>Skiland Pump Station</td>
<td>1,900</td>
</tr>
<tr>
<td>Case Rd. Floating Pump</td>
<td>1,900</td>
</tr>
<tr>
<td>Trumble Rd. Floating Pump</td>
<td>1,900</td>
</tr>
<tr>
<td>Winchester Caisson Pumps</td>
<td>6,500</td>
</tr>
<tr>
<td>Winchester Floating Pump</td>
<td>1,000</td>
</tr>
<tr>
<td>MWD Ponds Pump Station</td>
<td>1,000</td>
</tr>
<tr>
<td>Alessandro Pond Gravity Pipe</td>
<td>3,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,400</strong></td>
</tr>
</tbody>
</table>
Total System Delivery Capacity

Delivery Capacity By Month (GPM)

- Max – 50,400 GPM
- Sept – 41,400 GPM
- Min – 35,900 GPM
## Commitments

### Max Daily Supply & Demand (GPM)

<table>
<thead>
<tr>
<th></th>
<th>Contract</th>
<th>Actual Use (Meter Reads)</th>
<th>Max Day (Sept.) Available Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ag</strong></td>
<td>40,220</td>
<td>19,808</td>
<td></td>
</tr>
<tr>
<td><strong>Ag In-Lieu</strong></td>
<td>8,500</td>
<td>3,900</td>
<td></td>
</tr>
<tr>
<td><strong>Golf</strong></td>
<td>3,300</td>
<td>2,800</td>
<td></td>
</tr>
<tr>
<td><strong>Landscape</strong></td>
<td>-----</td>
<td>5,000 (estimate)</td>
<td></td>
</tr>
<tr>
<td><strong>Rec/Env.</strong></td>
<td>9,250</td>
<td>7,370</td>
<td></td>
</tr>
<tr>
<td><strong>Industrial</strong></td>
<td>5,000</td>
<td>3,500</td>
<td></td>
</tr>
<tr>
<td><strong>Wholesale</strong></td>
<td>2,650</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td><strong>Constr</strong></td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>68,920</td>
<td>44,978</td>
<td>41,400</td>
</tr>
</tbody>
</table>

*“Allocated” and “As-Available” Manual Reads*
Other Contributing Factors

Challenges:
• Customer flows exceeded allocations
• Pressure fluctuations changed flow conditions
• RWRF Maintenance / construction activities
• Manual meter read process
• Storage pond pumping constraints

Immediate Mitigation Measures:
• Augmentation
• RWRF coordination
• Frequency of manual reads
• Customer coordination
Customer Analysis

- Classify Customers
  - Level of Service

- Analysis – 2010/11 Usage Data
  - Seasonal curve
  - % Total Demand
  - % Total Revenue
  - % of Commitment
  - % Total Demand within Summer Months

1. Agricultural
2. Agricultural In-Lieu
3. Recreational
4. Landscape
5. Golf Course
6. Industrial
7. Wholesale
8. Construction
% Total Sales

- **Agricultural, In-Lieu**: 16%
- **Agricultural**: 48%
- **Recreational**: 11%
- **Landscape**: 7%
- **Industrial**: 10%
- **Golf Course**: 6%
- **Wholesale**: 3%
- **Construction**: 0%
Agricultural

• “Legacy” Customer
  o 24-hour water window
• 48% Total Sales
• 54% Utilization of Contract
• 34% Total Revenue
• 49% in Summer Months

Agricultural Seasonal Distribution

% of Total Demand

0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0%

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Calendar Year 2010  Calendar Year 2011  Proposed 2012
Agricultural In-Lieu

• “Ground-water” Customer
  - 2012 California Customer of the Year – Bruce Scott
• 16% Total Sales
• 53% Utilization of Contract
• 4% Total Revenue
• 47% in Summer Months
Recreational

- Duck Clubs / DF&W
  - 24-hour water window
- 11% Total Sales
- 76% Utilization of Contract
- 4% Total Revenue
- 54% in Summer Months
Landscape

- Common Areas
  - 9-hour water window
  - 2011 California Customer of the Year – Valley Wide
- 7% Total Sales
- 16% Total Revenue
- 49% in Summer Months

![Landscape Seasonal Distribution]

Legend:
- Calendar Year 2010
- Calendar Year 2011
- Proposed 2012
- Eto CIMIS # 179
Golf Courses

• Six Customers
  o 24-hour take
• 6% Total Sales
• 15% Total Revenue
• 55% in Summer Months

Golf Course Seasonal Distribution

% of Total Demand

Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  \\
-----|------|------|------|------|------|------|------|------|------|------|------
0.0%  |      |      |      |      |      |      |      |      |      |      |      \\
5.0%  |      |      |      |      |      |      |      |      |      |      |      \\
10.0% |      |      |      |      |      |      |      |      |      |      |      \\
15.0% |      |      |      |      |      |      |      |      |      |      |      \\
20.0% |      |      |      |      |      |      |      |      |      |      |      \\
25.0% |      |      |      |      |      |      |      |      |      |      |      \\

Calendar Year 2010
Calendar Year 2011
Proposed 2012
Eto CIMIS #179
Industrial

- Cooling Towers
  - 24-hour take
- 10% Total Sales
- 59% Utilization of Contract
- 22% Total Revenue
- 38% in Summer Months

![Industrial Seasonal Distribution](image)

- Calendar Year 2010
- Calendar Year 2011
- Proposed 2012
Key Objectives for 2012/13

- Re-allocate Supplies Based on Actual Use
- Minimize Diurnal Peaking
- Flatten Seasonal Peak
- Establish Customer Priorities
Customer Allocations

Actual Use Analysis

- 2-YR AVG AF/Y

Establish Priorities

- Times AVG Seasonal Distribution Monthly %

Customer Meetings

- = AF Per Month AF/M

Adjustments

- 24-Hour Use Requirement GPM
2013/2014 Allocation Priorities

• Priority 1 - Long-term Contractual Obligations
• Priority 2 – Landscape and Golf Course
• Priority 3 – “Demand” Agricultural
• Priority 4 – Existing Agricultural & Recreational
• Priority 5 – New Agricultural & Recreational
Demand Monitoring

Customer Allocations By Account

FlexNet Meter Data (AMR)

Enterprise Data Warehouse

Oracle Business Intelligence

Reports / Alerts

Customer / System Performance

Customer Communication

Maplet Meter Data (Manual)
Customer Performance

Water Window Analysis

For Customer: 
Time run: 9/3/2013 5:02:57 PM

<table>
<thead>
<tr>
<th>Read Time</th>
<th>Flow (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/29/2013 12:00:00 PM</td>
<td>251</td>
</tr>
<tr>
<td>8/29/2013 1:00:00 PM</td>
<td>290</td>
</tr>
<tr>
<td>8/29/2013 2:00:00 PM</td>
<td>306</td>
</tr>
<tr>
<td>8/29/2013 3:00:00 PM</td>
<td>152</td>
</tr>
<tr>
<td>8/29/2013 4:00:00 PM</td>
<td>127</td>
</tr>
<tr>
<td>8/29/2013 5:00:00 PM</td>
<td>173</td>
</tr>
<tr>
<td>8/29/2013 6:00:00 PM</td>
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<tr>
<td>8/29/2013 7:00:00 PM</td>
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<td>8/29/2013 9:00:00 PM</td>
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<td>8/29/2013 10:00:00 PM</td>
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<td>8/30/2013 10:00:00 AM</td>
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<tr>
<td>8/30/2013 11:00:00 AM</td>
<td>234</td>
</tr>
<tr>
<td>8/30/2013 12:00:00 PM</td>
<td>261</td>
</tr>
</tbody>
</table>
Results

• Increased Communication / Collaboration with Customers

• Enhanced Understanding of Level of Service Requirements
  o Accurate, granular and enterprise data is key
  o Recycled demand is “discretionary”

• Minimizes “Committed But Not Used” Supply

• 2012 – Highest Recycled Water Use Ever
  o Over 36,000 Acre Feet

• No Delivery Shortages
Challenges

• Paradigm Shift
  • Recycled Water as “Commodity”
  • Level of service impacts to customers and system and vice versa

• Balancing Supplies, Storage and Demands
  • (2014 is off to a bad start)

• Real-time Accurate Demand Data
• Real-time Accurate Supply Data
Opportunities

Short term:
• Enterprise Data Management / Analysis
  • Meter flow data
  • Geographic demand management
  • Customer coordination / support / empowerment
• Additional Analytical Support
• Optimize Management of Seasonal Storage and Associated Water Losses

Long term:
• Pursue a Balanced Demand Portfolio
  • Relative value of commodity – recover cost
  • Seasonality of demands – flatten composite curve
  • Support of long-term Strategic Objectives
• Pursue Additional “Non-potable” Supplies
Questions?

John Wuerth
951-928-3777 ext.4334
wuerthj@emwd.org

Becky Rathbone
951-928-3777 ext.6242
rathboneb@emwd.org