Intent of the special studies is to answer…

…What is the best use of the treated water resources from the Ventura Water Reclamation Facilities to protect the health of the Santa Clara River Estuary?
Agenda for the day

• Introductions
• Status updates
• Estuary Subwatershed Study
  – Brief review of previously presented major findings
  – Characterization of comments received
  – New information to be added to the report
• Stakeholder input on alternatives
• Stakeholder input on data gaps to be filled
• Questions and Next Steps
Please introduce yourself…

- Name
- Organization Representing
- Interest
Status Update - Since the last Stakeholder Workshop in February 2011:

- Time extension on comments
- Comments received
- Time extension on revised report
- Outstanding lawsuits settled
City has agreed to optimize the discharge

- Ventura Water wants to go beyond enhancement
  - Identify and implement the best feasible discharge alternative
  - On balance promotes beneficial uses,
  - Protects listed species and Estuary habitat as required by the Endangered Species Act
  - Provides more water for reclaimed water uses
Settlement Agreement and Phase 2 Study

- Provides a framework and schedule for attaining the optimization goal with extensive stakeholder input.
- Recognizes the critical nature of ongoing stakeholder input and consensus, as well as the regulatory and permitting authority of the Resources Agencies (NMFS, USFWS, CDFG, RWQCB, etc.).
Project Schedule has been revised

<table>
<thead>
<tr>
<th>Task Description</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
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<tbody>
<tr>
<td>Estuary Subwatershed Study</td>
<td></td>
<td></td>
<td>J F M A M J J A S O N D</td>
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<tr>
<td>Recycled Water Study (Phase 1)</td>
<td></td>
<td></td>
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<tr>
<td>Treatment Wetlands Feasibility Study</td>
<td></td>
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<tr>
<td>Stakeholder Workshops</td>
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</table>
The three studies required by the NPDES permit lead to the next step (Phase 2)

- Recommendations Memorandum
- Estuary Alternatives Development
- Phase 2 Study (due March 2013)

- Recycled Water Market Study (submitted March 2010)
- Wetlands Feasibility Study (submitted March 2010)
Estuary Subwatershed Study - Final Synthesis Report
Estuary Subwatershed Study Approach

Data Review and Collection

Estuary Water Balance

Estuary Physical/Biological Condition

Estuary Ecosystem Function

Climate Change

Develop/Optimize Discharge Scenarios
Discharge scenarios were developed based on stakeholder input

<table>
<thead>
<tr>
<th></th>
<th>VWRF Effluent Discharge</th>
<th></th>
<th>VWRF Effluent WQ</th>
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<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Reduced</td>
<td>None</td>
<td>Existing</td>
<td>Planned Upgrades</td>
<td>Enhanced Denitrification</td>
<td>None</td>
</tr>
<tr>
<td>Alternative 1</td>
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<td></td>
<td></td>
<td>✓</td>
<td></td>
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<tr>
<td>Alternative 2</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 3</td>
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<td></td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Alternative 5</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Alternative 6</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
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</table>
Estuary stage and habitat area was modeled using the water balance.

![Diagram showing water balance with inputs and outputs including River, VWRF Runoff, Rainfall, Evaporation, SCRE, Groundwater, and Ocean. The flow is from Estuary Volume to Stage (Depth) to Habitat Area.]
Modeled estuary stage for each alternative

- **Avg VWRF effluent Q = 5 mgd**
- **Avg VWRF effluent Q = 3.5 mgd**
- **Avg VWRF effluent Q = 0 mgd**

**Alternatives**
- Alternatives 1 – 3 (existing Q)
- Alternatives 4 & 5 (reduced Q)
- Alternative 6 (no discharge)

**Simulation date**

Simulation dates range from 6/1 to 9/29.
Water quality was estimated using the nutrient balance model.

\[
\text{Concentration} = \frac{[\text{River} + \text{VWRF} + \text{Runoff} + \text{Rain} + \text{GW(in)} - \text{GW(out)} - \text{Ocean}]}{\text{Volume}}
\]
## Modeled N conc. for each alternative

<table>
<thead>
<tr>
<th>Alternative</th>
<th>SCRE Area, Acres</th>
<th>Total N load, ppd</th>
<th>Natural N uptake, ppd</th>
<th>Estimated range of N, mg/l</th>
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</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>174</td>
<td>750</td>
<td>78 - 160</td>
<td>10 - 15</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>174</td>
<td>500</td>
<td>78 - 160</td>
<td>4 - 9</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>174</td>
<td>300</td>
<td>78 - 160</td>
<td>2 – 6</td>
</tr>
<tr>
<td>Alternative 4</td>
<td>151</td>
<td>390</td>
<td>68 – 140</td>
<td>3 – 9</td>
</tr>
<tr>
<td>Alternative 5</td>
<td>151</td>
<td>200</td>
<td>68 – 140</td>
<td>2 – 6</td>
</tr>
<tr>
<td>Alternative 6</td>
<td>131</td>
<td>30</td>
<td>63 – 130</td>
<td>2 – 6</td>
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</table>
### Alternatives Assessment

<table>
<thead>
<tr>
<th>Focal Species Habitat</th>
<th>Tidewater goby</th>
<th>Steelhead</th>
<th>Plover &amp; Tern Nesting</th>
<th>Tern Foraging</th>
<th>Water Quality Conditions</th>
<th>Recreational Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Habitat Area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>=</td>
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<tr>
<td>Existing Conditions</td>
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<tr>
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<td>=</td>
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<tr>
<td>Planned upgrades</td>
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<td>enhanced dentifirication</td>
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<tr>
<td>Alternative 4</td>
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<td>↓</td>
<td>↑</td>
<td>=</td>
<td>↑</td>
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</tr>
<tr>
<td>flow reduction</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Alternative 5</td>
<td>=</td>
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<td>↑</td>
<td>=</td>
<td>↑↑↑↑</td>
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<tr>
<td>flow reduction with enhanced dentifirication</td>
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<td>Alternative 6</td>
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<td>↓↓</td>
<td>↑</td>
<td>=</td>
<td>↑↑↑↑</td>
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<tr>
<td>Complete effluent removal</td>
<td></td>
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</tr>
</tbody>
</table>
What can we conclude from the report?

• Question of enhancement:
  – Definition of enhancement: is any beneficial use improved with discharge as compared to absence of discharge?
  – Steelhead beneficial use affected by absence of discharge (less habitat provided and less depth)

• What can be done to optimize the discharge regime and volume?
  – Less flow in summer to reduce unseasonal breeching
  – Improve water quality to reduce nutrients

• Others?
Comments received on Synthesis Report fell into several categories:

1. Species evaluated and habitat needs for those species
2. Water balance issues
   - Breaching
   - Confidence in model and data
3. Water quality as pertains to suitable habitat
4. Preference for particular alternatives
5. Additional data needs/other recommendations
Updated Estuary Study

- Text additions/clarifications
- Measured and modeled water depths
  - Relationship between stage and average depth
  - Water depth range for given stage
- Model sensitivity
  - Modeled SCRE stage for decreased mouth berm length and estuary area (i.e., more ‘average’ conditions)
Next Steps
Next steps

• Updated Estuary Study due Sept. 16, 2011:
  – *Updated text revisions* and clarifications to March 2011 submission draft of the “Final Synthesis Report”
  – *Responses to Comments* on March 2011 submission draft of “Final Synthesis Report”
  – *Recommendations/Next Steps Memo*
    ▪ To list the additional data needs/next steps for Phase 2 Study
    ▪ Based on Comments on March 2011 submission draft of “Final Synthesis Report and Input from YOU
    ▪ Another stakeholder meeting to discuss recommendations memo – date TBD
Next Steps

• Phase 2 Study Report due Feb 10, 2013 per NPDES permit
  – Two Stakeholder Workshops budgeted
  – Should additional time and workshops be added given optimization goal?
  – Workplan may need to be revised per Memo of Recommendations
Stakeholder Input
We want your input for Phase 2 …. 

1. What can we do to reach consensus on optimal discharge regime and competing goals reflected in comments on the “Final Synthesis Report.”
   a) Which alternatives do you want to pursue?
   b) What modifications or new alternatives would you support considering?
   c) What additional information do you need to see to increase your confidence in determination of the optimal discharge regime?

2. What “Safety Measures” or “Time and Manner” restrictions for implementing optimal discharge should be explored
Recycled Water Market Study
NPDES Permit and Work Plan goals for Phase 1 Recycled Water Study:

- Address macro-level supply and demand issues and their impact on a local recycled water market
  - expansion of the City’s service area
  - other areas within five miles of the VWRF.

Types of recycled water considered:

- Urban Irrigation
- Agricultural Irrigation
- Recharge
Existing recycled water pipeline extends from harbor to golf course.

Marina Park and Harbor Area

Along Olivas Drive

Golf Courses
## Summary of opportunities and challenges to implementing reuse

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Opportunity</th>
<th>Challenge</th>
</tr>
</thead>
</table>
| **Urban Users**     | • Potential demand varies seasonally from 1.1 to 3.7 mgd  
                      • No additional treatment | • Cost = $62 Million (Pipes, pump stations)  
                      • Extensive pipe network  
                      • Feasibility of serving Oxnard golf course unknown (~1 mgd annual average demand) |
| **Agricultural Users** | • Potential demand (north of Estuary) varies seasonally from 1.6 to 11 mgd | • Cost = $145 Million (Pipes, pump stations, MF/RO)  
                      • Requires additional treatment and brine disposal  
                      • Requires conversion of ponds to storage or construction of alternative storage  
                      • Requires agreement by growers |
| **Groundwater Recharge** | • Potential seasonal demand up to 12 mgd | • Cost = $36 Million (Pipes, pump stations)  
                      • Does NOT include treatment costs  
                      • Regulatory feasibility uncertain  
                      • Additional treatment may be required  
                      • Requires agreement with UWCD |
Treatment Wetlands Feasibility Study
Work Plan goals for Treatment Wetlands Feasibility Study

- Identify and evaluate a potential location, treatment capability, and cost of a treatment wetland for water quality improvement purposes within proximity of the VWRF discharge.
Based on water quality, reduction of nitrates is primary goal for wetlands.

And performance varies with:

- Temperature
- Vegetation
- Residence time (need 4-12 days)
Onsite and offsite opportunities were identified as potential treatment wetland sites.
Summary of the potential onsite and offsite treatment wetland opportunities

<table>
<thead>
<tr>
<th></th>
<th>Wet Area at 85% Use, acres</th>
<th>HRT, days(^1) (existing to future flow)</th>
<th>Total Project Costs, millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite (Ponds 1 &amp; 2)(^2)</td>
<td>12.4</td>
<td>1.7 to 0.9</td>
<td>$2.8</td>
</tr>
<tr>
<td>Offsite(^3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City-Owned</td>
<td>29</td>
<td>4.9 to 2.3</td>
<td>$11.4</td>
</tr>
<tr>
<td>Berry</td>
<td>92</td>
<td>15.6 to 7.3</td>
<td>$30.3</td>
</tr>
<tr>
<td>McGrath/TNC</td>
<td>120</td>
<td>20.4 to 9.5</td>
<td>$44.6</td>
</tr>
</tbody>
</table>

1. Assumes average water depth of the offsite opportunities is 2.5 feet.
2. Existing flow to onsite = 5.9 mgd and future flow = 11.4 mgd.
3. Existing flow to offsite (less evaporation from ponds) = 4.8 mgd, future = 10.3 mgd.
Stakeholders provided input on alternatives for recycled water and wetlands treatment.
And the preferred locations for the potential treatment wetlands...