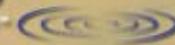




Santa Clara River Estuary Workgroup

July 15, 2009



Agenda

1. Welcome/Introductions
2. Presentation
 1. Project Scope and Schedule
 2. Enhancement Definition
 3. Data Gaps/Draft Monitoring Plan
3. Questions/Discussion
4. Next Steps

Project Scope and Schedule

Use of the Stakeholder Matrix

Stakeholder Matrix		



Goals and Objectives



Project Scope

*** Considered stakeholder goals and objectives in final scope development to the extent feasible given scope and budget.**

Evaluation Metrics



Data Gaps Table		



Draft Monitoring Plan

Task 1 – Estuary Subwatershed Study

CITY OF VENTURA
Santa Clara River Estuary - Special Studies

Task	Task Description	Phase II												Phase III												
		2009						2010						2011												
		M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
1	Estuary Subwatershed Study																									
1.1	Define Framework/Identify Beneficial Uses	█	█	█	█																					
1.2.1	Data Acquisition and Review	█	█	█																						
1.2.2	Monitoring Plan Development	█	█	█																						
1.3	Physical, Water Quality, and Biological Monitoring		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.4.1	Define Estuary Physical and Water Quality Condition		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.4.2	Define Estuary Biological Condition										█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.4.3	Year 1 Data Assessment								█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.5	Synthesis and Conceptual Model Development										█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.6.1	Estimate Future Conditions Due to Climate Change										█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.6.2	Predict Impacts of Climate Change on Estuary																									
1.7	Develop and Assess Discharge Alternatives																									
1.8	Estuary Subwatershed Study Summary Report																									

Task 2 – Recycled Water Market Study

CITY OF VENTURA
Santa Clara River Estuary - Special Studies

Task	Task Description	Phase II												Phase III												
		2009						2010						2011												
		M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
2	Recycled Water Market Study (Phase 1)																									
2.1	Data Acquisition/Background Review																									
2.2	Summary of Supply/Demand Projections																									
2.3	Market Identification/Quantification																									
2.4	Recycled Water Market Mapping																									
2.5	Recycled Water Quality Comparison																									
2.6	Preliminary Alternatives Evaluation																									
2.7	Regulatory Impacts																									
2.8	Phase 1 Recycled Water Summary Report																									

Task 3 – Treatment Wetlands Feasibility Study

CITY OF VENTURA
Santa Clara River Estuary - Special Studies

Task	Task Description	Phase II												Phase III												
		2009						2010						2011												
		M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
3	Treatment Wetlands Feasibility Study																									
3.1	Data/Literature Review																									
3.2	Siting Evaluation																									
3.3	Water Balance																									
3.4	Water Quality Analysis/Model																									
3.5	Design Criteria and Wetlands Development																									
3.6	Treatment Wetlands Feasibility Report																									

Definition of Enhancement

Enclosed Bay and Estuaries Policy requires a finding of “enhancement”

- Discharge is forbidden, except “when the Regional Board finds that the wastewater in question would consistently be treated and discharged in such a manner that it would enhance the quality of receiving waters above that which would occur in the absence of the discharge.”

Bill Dendy (SWRCB) memo on finding of enhancement (1974) suggests the following steps

- Identify beneficial uses
- Identify effluent characteristics that affect beneficial uses
- Provide information showing how conditions due to discharge improve beneficial uses compared to no discharge
- Propose specific effluent characteristics that would enhance receiving water
- Describe treatment facilities and cost to achieve above effluent characteristics
- Describe alternatives to in-bay/estuary discharges, as well as costs

Beneficial uses of Santa Clara River Estuary are:

- Navigation (NAV)
- Water contact recreation (REC-1)
- Non-contact water recreation (REC-2)
- Commercial and sport fishing (COMM)
- Estuarine habitat (EST)
- Marine habitat (MAR)
- Wildlife habitat (WILD)
- Rare, threatened or endangered species habitat (RARE)
- Migration of aquatic organisms (MIGR)
- Spawning, reproduction and/or early development (SPWN)
- Wetland (WET)

Examples of previous findings of enhancement

- City of Arcata
 - Discharge to Humboldt Bay
- Cities of Palo Alto and Sunnyvale
 - Discharge to the San Francisco Bay south of the Dumbarton Bridge
- City of San Jose
 - Discharge to the San Francisco Bay south of the Dumbarton Bridge

Data Gaps Analysis/ Draft Monitoring Plan for Estuary Subwatershed Study

Background/Context

- 1974 Enclosed Bay and Estuaries Policy
- **LARWQCB Order R4-2008-0011 Workplans**
 - Estuary Subwatershed Study
 - **Estuary Water Balance** – hydrologic data analysis to assess current and potential future discharge scenarios on breaching, inundation, and habitat extent
 - **Functionality of the Estuary and Subwatershed** – habitat mapping and modeling to assess changes vegetation and habitat suitability for birds, fish, flora, and human uses.
 - **Research Monitoring and Sampling** – Continue and/or initiate data collection efforts on water quality, lagoon volume, estuary breaching, avian and fish surveys, etc.
 - Treatment Wetlands Study
 - Recycled Water Market Study

Estuary Subwatershed Study Approach

- **Initial Data Review (See Data Gaps Analysis), Data Collection, Water Quality and Habitat Assessments**
- **Develop Estuary Water Balance**
 - VWRP and other Inflows vs. Outflows
- **Develop Estuary Stage Relationships vs.**
 - Inundation Area, Volume, Habitat Suitability
- **Develop/Optimize Discharge Scenarios**
 - Enhance existing beneficial uses considering future inflows, sea level rise, water quality
 - Optimize discharge location (e.g., diversion, recycling, etc.), amounts, and quality (e.g., VWRP and wetland denitrification)

Data Gaps Analysis

- **Purpose**

- Determine data needs for completing the Estuary Subwatershed Study

- **Methods**

- Compilation of known recent data sources related to Estuary physical and biological condition
- Included technical studies, monitoring reports, and data sets

Data Gaps Analysis (cont'd)

- **Findings**

- New and updated data for a range of conditions are needed for the following:

- **Estuary water surface elevation**
 - **Groundwater elevation**
 - **Surface water and groundwater quality**
 - **Upland and aquatic habitat type and extent**

Draft Monitoring Plan Overview

- **2009-2010 Monitoring Activities**
 - Estuary Hydrology and Morphology Surveys
 - *Estuary stage*
 - *Groundwater elevation*
 - Estuary Water Quality and Nutrient Surveys
 - *Estuary surface water quality*
 - *Groundwater quality*
 - Tidal and Upland Vegetation and Aquatic Habitat Mapping
 - *Annual vegetation mapping*
 - *Seasonal aquatic habitat mapping*

Draft Monitoring Plan Schedule

Surveys	Sampling Frequency							
	Summer 2009 (July)	Fall 2009 (Sept/Oct)	Winter 2010 (Jan/Feb)		Spring 2010 (Apr)	Summer 2010 (July/Aug)		Fall 2010 (Oct/Nov)
	<i>Closed Mouth</i>	<i>Closed Mouth</i>	<i>Open Mouth</i>	<i>Closed Mouth</i>	<i>Open or Closed Mouth</i>	<i>Open Mouth</i>	<i>Closed Mouth</i>	<i>Closed Mouth</i>
Estuary Hydrology and Morphology Surveys	✓	✓	✓	✓	✓	✓	✓	✓
Estuary Water Quality and Nutrient Surveys	✓	✓	✓	✓	✓	✓	✓	✓
Tidal and Upland Vegetation and Aquatic Habitat Mapping	✓	✓			✓			✓

Estuary Hydrology and Morphology Surveys

- **Goals**

- Collect data to help determine

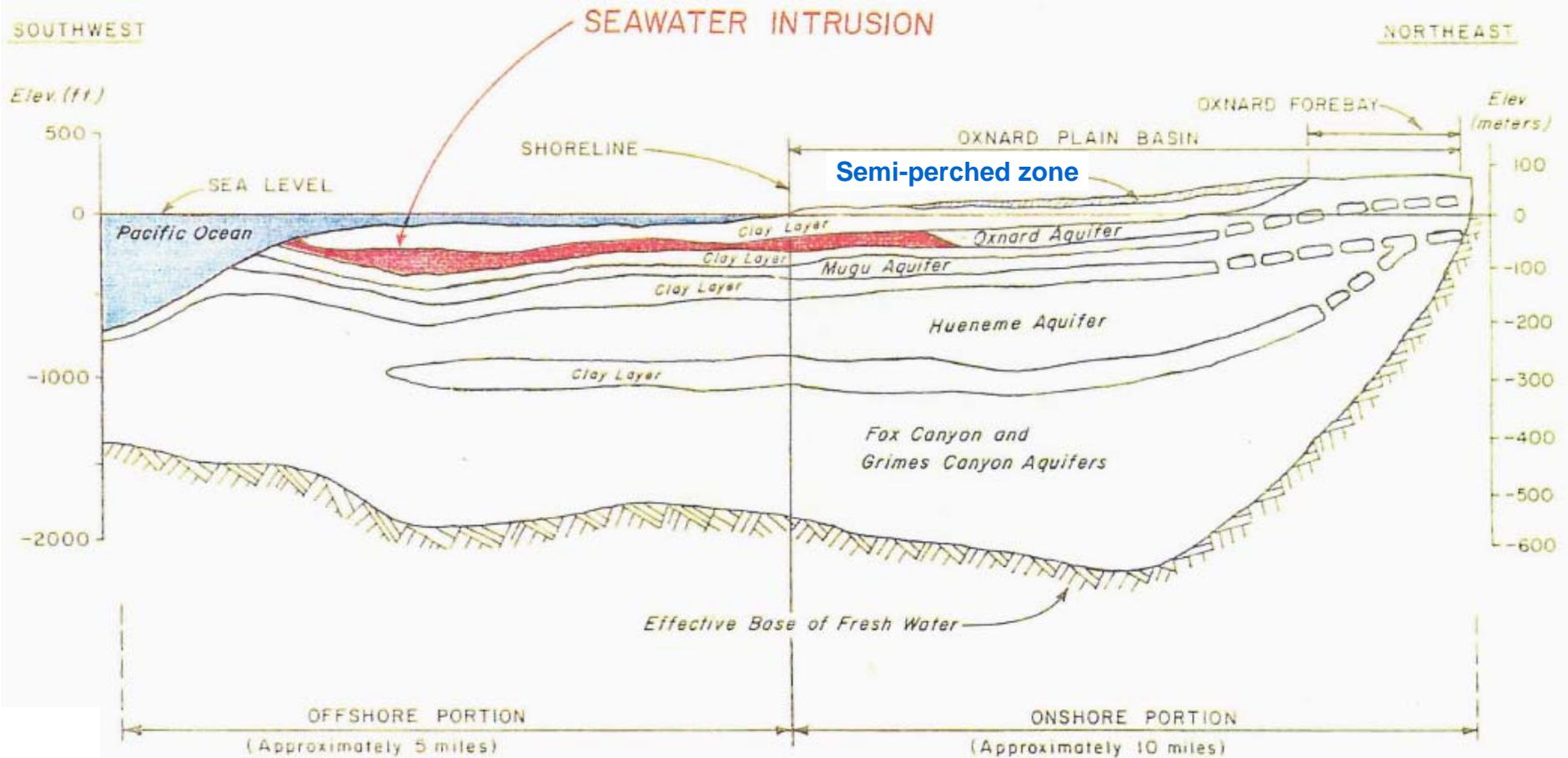
- The current contribution of groundwater relative to VWRP and other inflows (Estuary Water Balance)
 - The current influence of Estuary stage on inundation extent, groundwater gradients, mouth breaching dynamics, and hydroperiod

Estuary Hydrology and Morphology Surveys (cont'd)

- **Survey Design**

- Estuary stage at 2 locations
 - Fixed pressure transducers along south bank
- Shallow groundwater elevation at 4 locations
 - Monitoring well transect adjacent to Estuary
- 30-min. time series (July/Aug 2009 – Nov 2010)

Estuary Hydrology and Morphology Surveys (cont'd)



from Kennedy/Jenks Consultants 2002

Proposed Monitoring Locations



Estuary Hydrology and Morphology Surveys (cont'd)

- **Follow-up Analyses**

- Water surface elevation time series
 - Estuary water surface variation (seasonal, open and closed mouth conditions)
 - Groundwater elevation variation (seasonal, open and closed mouth conditions)
- Groundwater gradient and flow estimates
- Estuary stage thresholds and timing of mouth breaching
- Estimates of available habitat area vs. Estuary stage
- Scenario evaluation

Estuary Water Quality and Nutrient Surveys

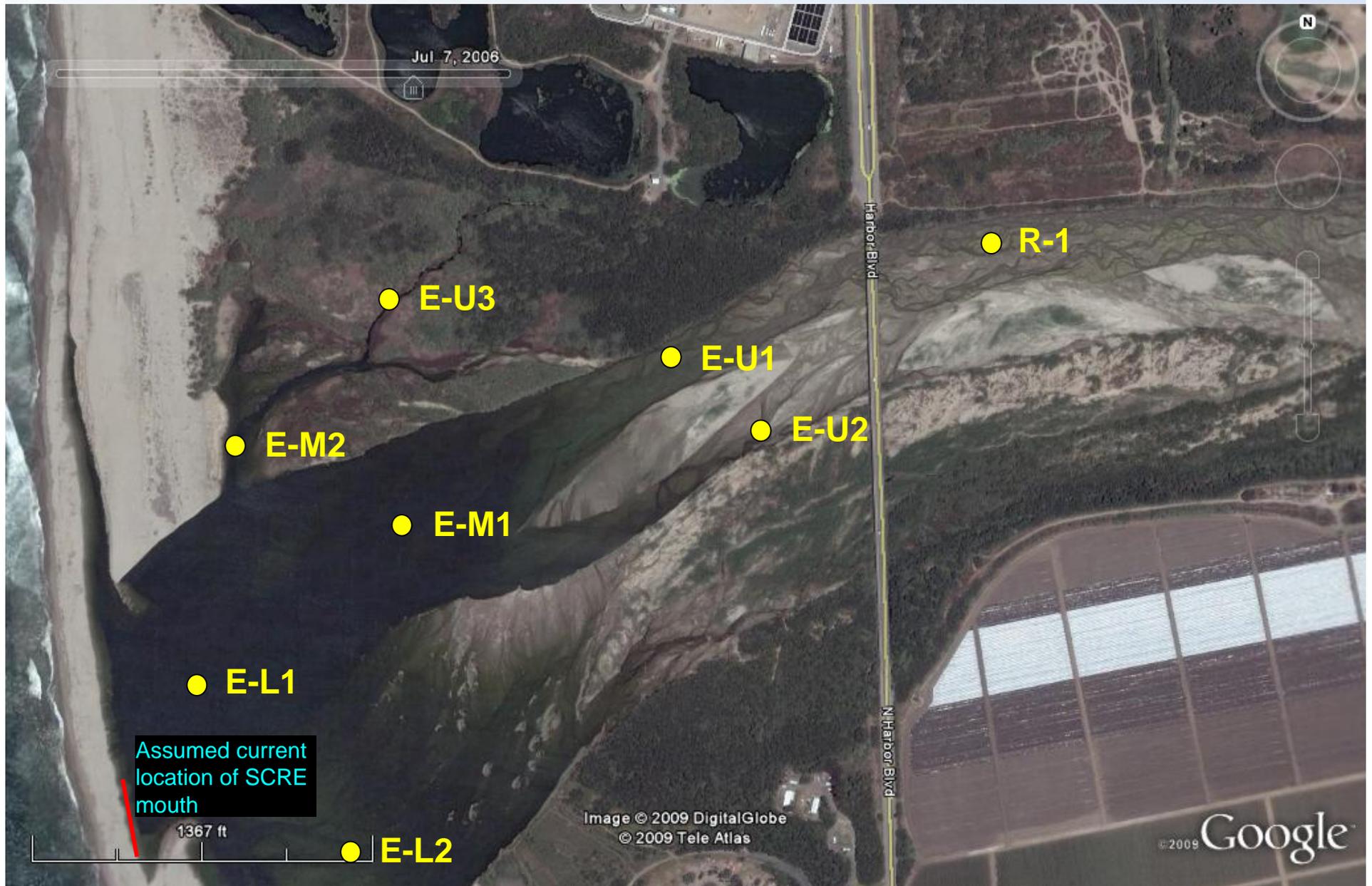
- **Goals**
 - Collect data to assess
 - Effects of VWRF discharge on water quality
 - Current trophic status of the Estuary
 - Beneficial use attainment/enhancement under current conditions and future discharge scenarios

Estuary Water Quality and Nutrient Surveys (cont'd)

- **Survey Design**

- Quarterly synoptic surveys
 - *In situ* (DO, Temp, pH, EC) and analytical (N, P, Chl-a) parameters
 - 12 Sites (1 u/s control, 7 estuary, 4 GW wells)
 - Open and Closed Mouth Conditions
- Continued SCCWRP Sonde deployment (2009-2010)

Proposed Surface Water Sampling Locations



Proposed Groundwater Sampling Locations



Estuary Water Quality and Nutrient Surveys (cont'd)

Site Code	Sampling Frequency							
	Summer 2009 (July)	Fall 2009 (Sept/Oct)	Winter 2010 (Jan/Feb)		Spring 2010 (Apr)	Summer 2010 (July/Aug)		Fall 2010 (Oct/Nov)
	<i>Closed Mouth</i>	<i>Closed Mouth</i>	<i>Open Mouth</i>	<i>Closed Mouth</i>	<i>Open or Closed Mouth</i>	<i>Open Mouth</i>	<i>Closed Mouth</i>	<i>Closed Mouth</i>
R-1	✓	✓	✓	✓	✓	✓	✓	✓
E-U1	✓	✓	✓	✓		✓	✓	
E-U2	✓	✓	✓	✓		✓	✓	
E-U3	✓	✓	✓	✓	✓	✓	✓	✓
E-M1	✓	✓	✓	✓	✓	✓	✓	✓
E-M2	✓	✓	✓	✓	✓	✓	✓	✓
E-L1	✓	✓	✓	✓	✓	✓	✓	✓
E-L2	✓	✓	✓	✓	✓	✓	✓	✓
GW-1		✓	✓	✓	✓	✓	✓	✓
GW-2		✓	✓	✓	✓	✓	✓	✓
GW-3		✓	✓	✓	✓	✓	✓	✓
GW-4		✓	✓	✓	✓	✓	✓	✓

Estuary Water Quality and Nutrient Surveys (cont'd)

- **Follow-up Analyses**

- Surface water quality (open vs. closed mouth)
 - Seasonal and spatial patterns/trends
 - Diel variations (SCCWRP locations)
 - Nutrient limitation and trophic assessment
- Groundwater quality gradients (EC, NO₃)
- Nutrient loading estimates (e.g., VWRF, surface and groundwater inputs)
- Scenario modeling

Tidal and Upland Vegetation and Aquatic Habitat Mapping

- **Goals**

- Collect data to help determine relationship between Estuary stage and the extent of suitable habitat for focal aquatic and terrestrial species

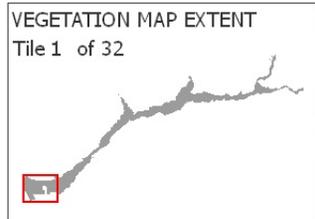
Tidal and Upland Vegetation and Aquatic Habitat Mapping (cont'd)

- **Survey Design**

- Annual tidal and upland vegetation mapping
 - *Extend (2005) riparian/upland mapping (500-yr floodplain)*
 - *Closed-mouth inundation extent (upstream)*
 - *Focus on subtidal vegetation*
- Bi-annual aquatic habitat maps based on suitability criteria
 - *Vegetation/cover*
 - *Physical parameters (WQ, flow, and substrate)*
 - *Result in focal species suitability polygons*

Tidal and Upland Vegetation and Aquatic Habitat Mapping (cont'd)

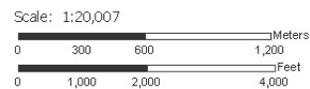
2005 vegetation mapping extent



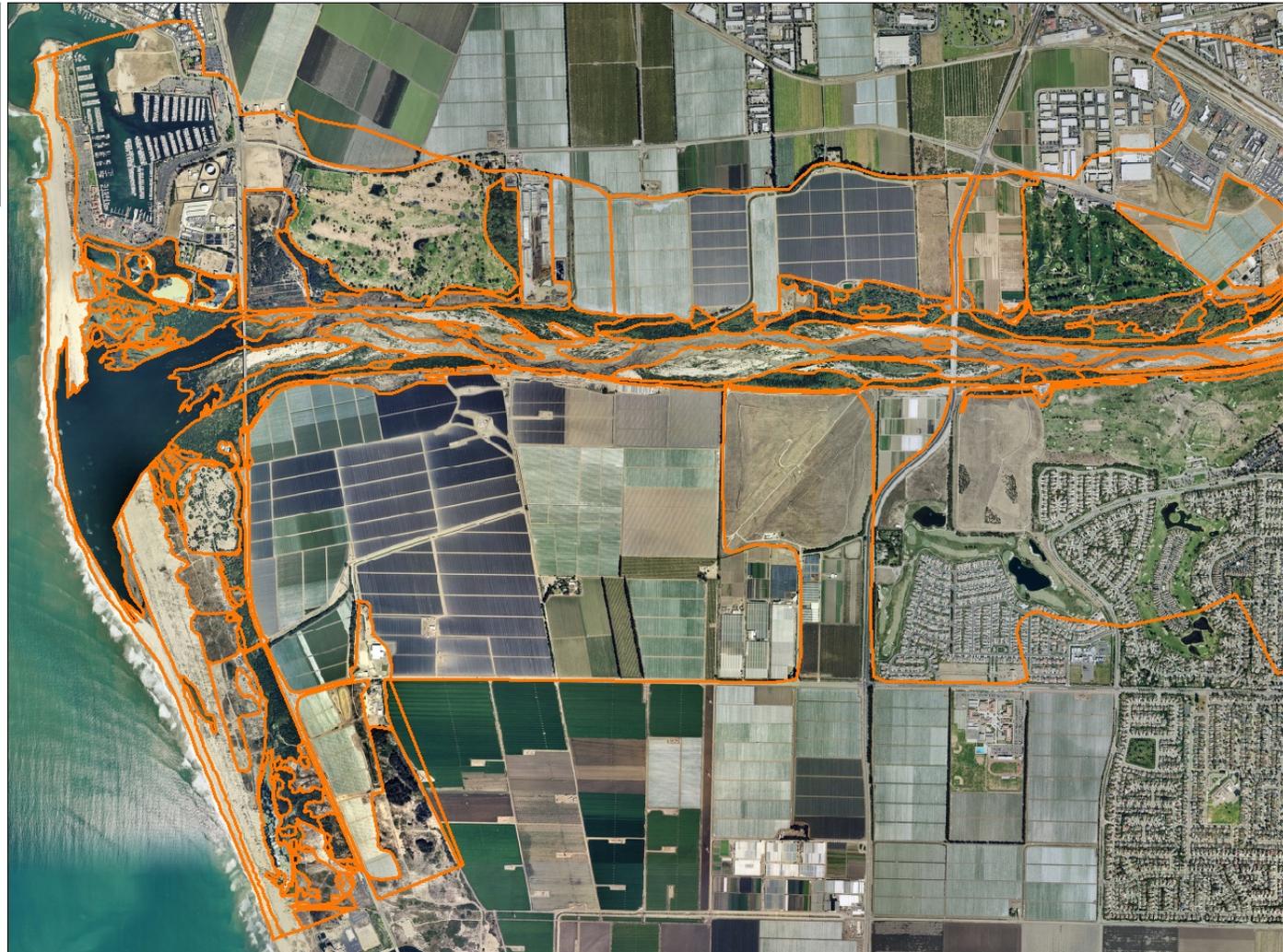
Riparian Vegetation Mapping
and Preliminary Classification
for the Lower Santa Clara River
and Major Tributaries
Ventura County, California

LEGEND

- Mapping Unit Boundary 
- Tile Boundary (white dashed line)

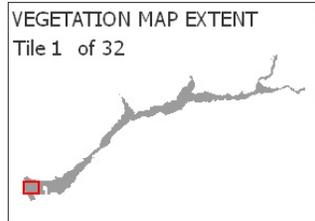


Data Sources:
Stillwater Sciences and URS Corp. (2005)
AirPhotoUSA (2005)



Tidal and Upland Vegetation and Aquatic Habitat Mapping (cont'd)

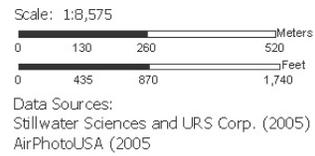
2005 vegetation mapping extent



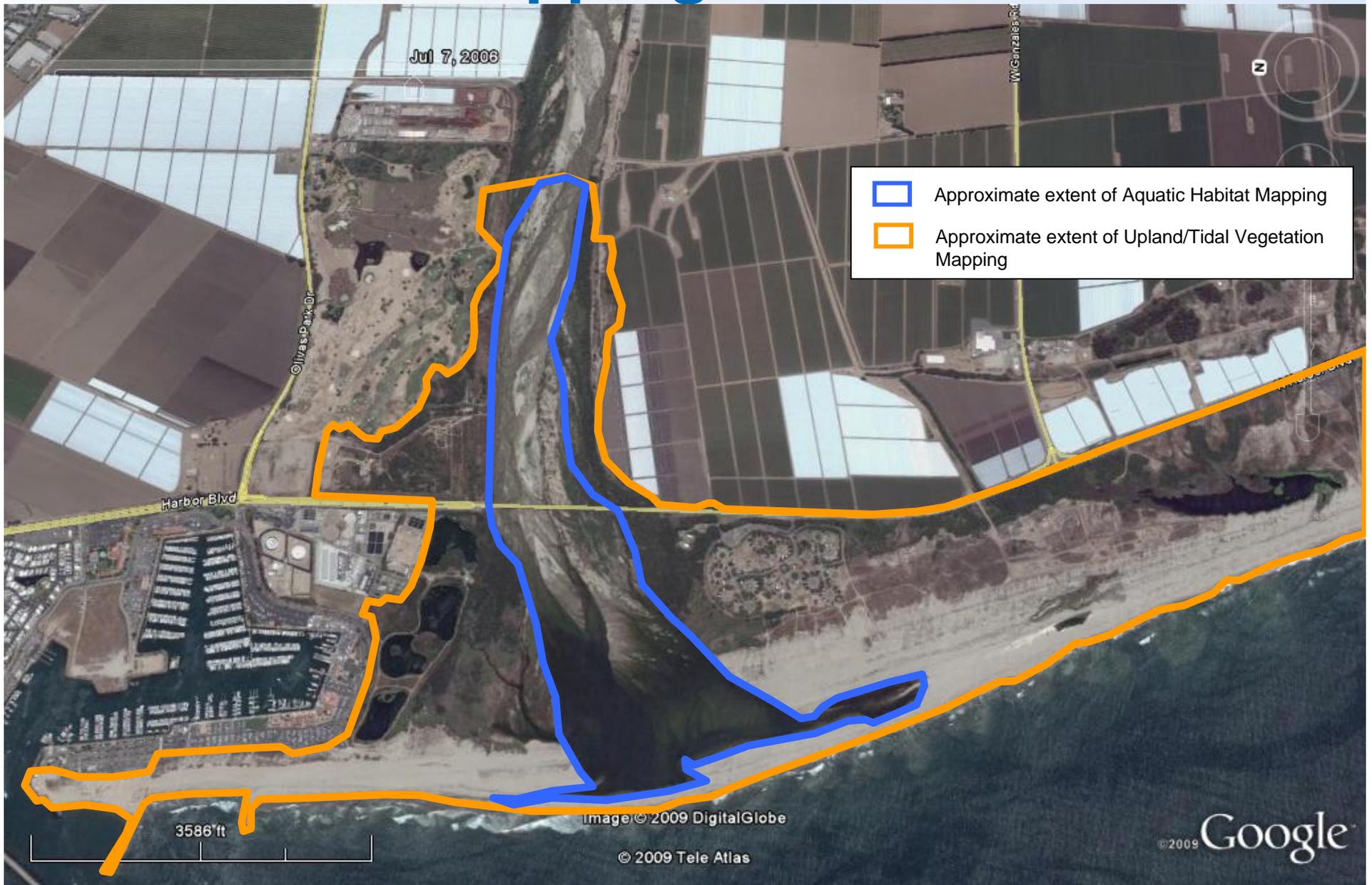
Riparian Vegetation Mapping and Preliminary Classification for the Lower Santa Clara River and Major Tributaries Ventura County, California

LEGEND

- Mapping Unit Boundary
- Tile Boundary (white dashed line)



2009-2010 Mapping Extent



Tidal and Upland Vegetation and Aquatic Habitat Mapping (cont'd)

- **Follow-up Analyses**

- Vegetation and habitat maps
 - *Subtidal, tidal, and upland vegetation alliances*
 - *Aquatic and terrestrial habitat suitability assessment for focal species*
- Estimates of habitat availability vs.
 - *Estuary stage*
 - *Season*
 - *Changes in extent and timing (mouth breaching, high flow events, etc.)*
- Scenario evaluation

Questions/Discussion – Draft Monitoring Plan

Next Steps

Next Steps

- Estuary Subwatershed Study
 - Initial data collection work July 27th- July 30th
 - Comments due July 24th
 - Finalize monitoring plan
- Recycled Water (Phase 1)
 - Continue data acquisition
 - Begin analysis
- Treatment Wetlands Feasibility
 - Continue data collection
 - Begin literature review
 - Begin analysis
- Next Workshop – Draft Findings of Wetlands and Reuse Studies
 - October/November 2009

Project website

www.cityofventura.net/rivers



The screenshot shows the City of Ventura website's 'Rivers & Estuaries' page. The header features the City of Ventura logo and the text 'CITY OF VENTURA'. Below the logo is a navigation menu with links: LIVING IN VENTURA, BUSINESS IN VENTURA, VISITING VENTURA, CITY GOVERNMENT, eRECREATION, JOB OPPORTUNITIES, PUBLIC MEETINGS, CITY DEPARTMENTS, MEDIA PORTAL, and MAPS. The main content area has a green navigation bar with links for Home, Public Works, and Environmental & Water Resources. Below this is a dark blue banner with the text 'RIVERS & ESTUARIES'. A large photograph of a river estuary is displayed. Below the photo is a paragraph of text: 'The City of Ventura is bordered by the Santa Clara River to the south and the Ventura River to the north.' The page title 'Santa Clara River' is prominently displayed, followed by the subtitle 'Santa Clara River Estuary Special Studies'.


CITY OF
VENTURA

Home | Public Works | Environmental & Water Resources

RIVERS & ESTUARIES



The City of Ventura is bordered by the Santa Clara River to the south and the Ventura River to the north.

Santa Clara River

Santa Clara River Estuary Special Studies

End of Presentation