Integrating Storm Water Practice with Coastal Restoration

Moderator
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Panelists
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David Pohl
Lindsey Sheehan
Mike Hastings

INTRODUCTIONS

What do we mean by integrating storm water and restoration?

CASE STUDIES

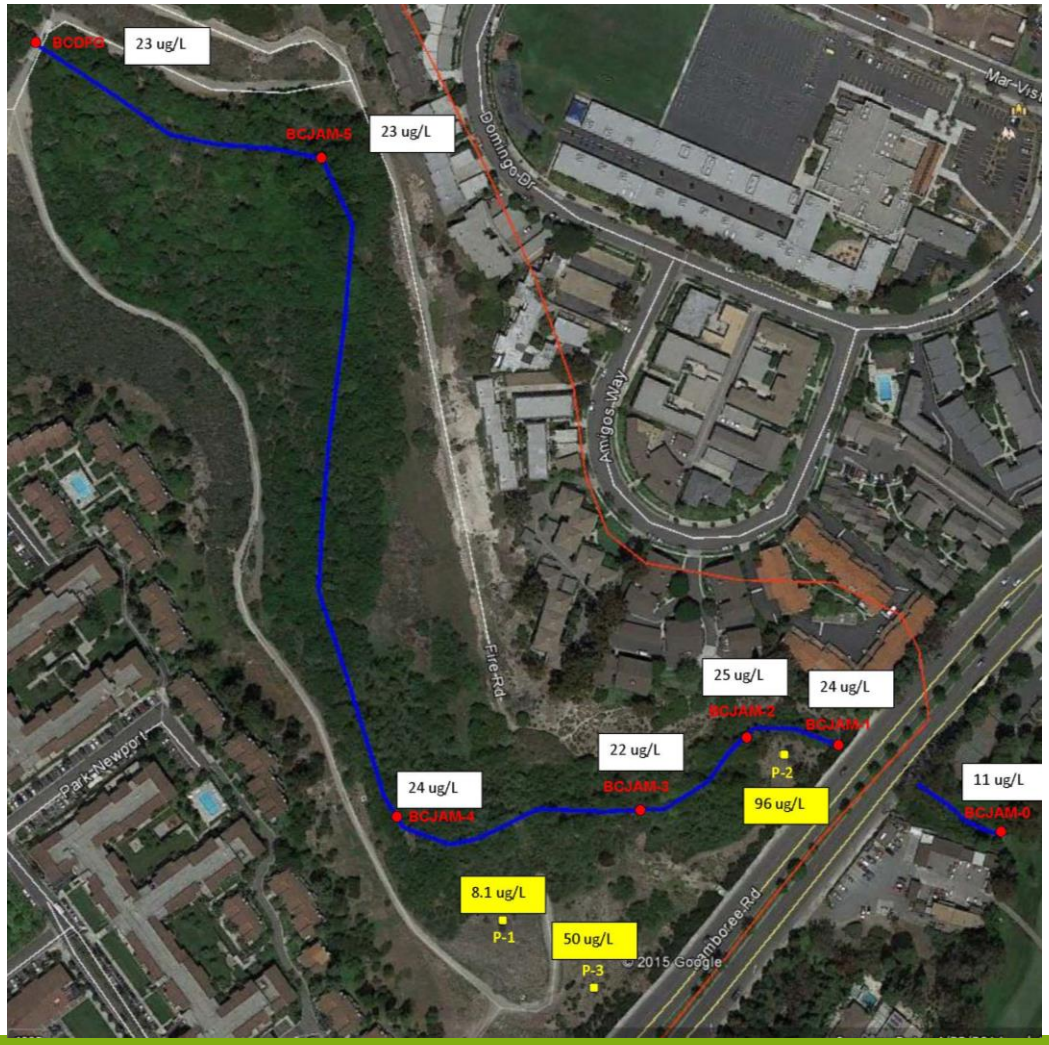
Big Canyon Creek Restoration and Water Quality Improvement Project

- Highly urbanized watershed
- Upstream of Upper Newport Bay Ecological Preserve
- Selenium TMDL

Elevated Selenium Concentrations Can Have Major Ecological Impacts

How Selenium Works:
Natural Source Magnified by Land Use

On-site Selenium Concentrations Exceed EPA Threshold

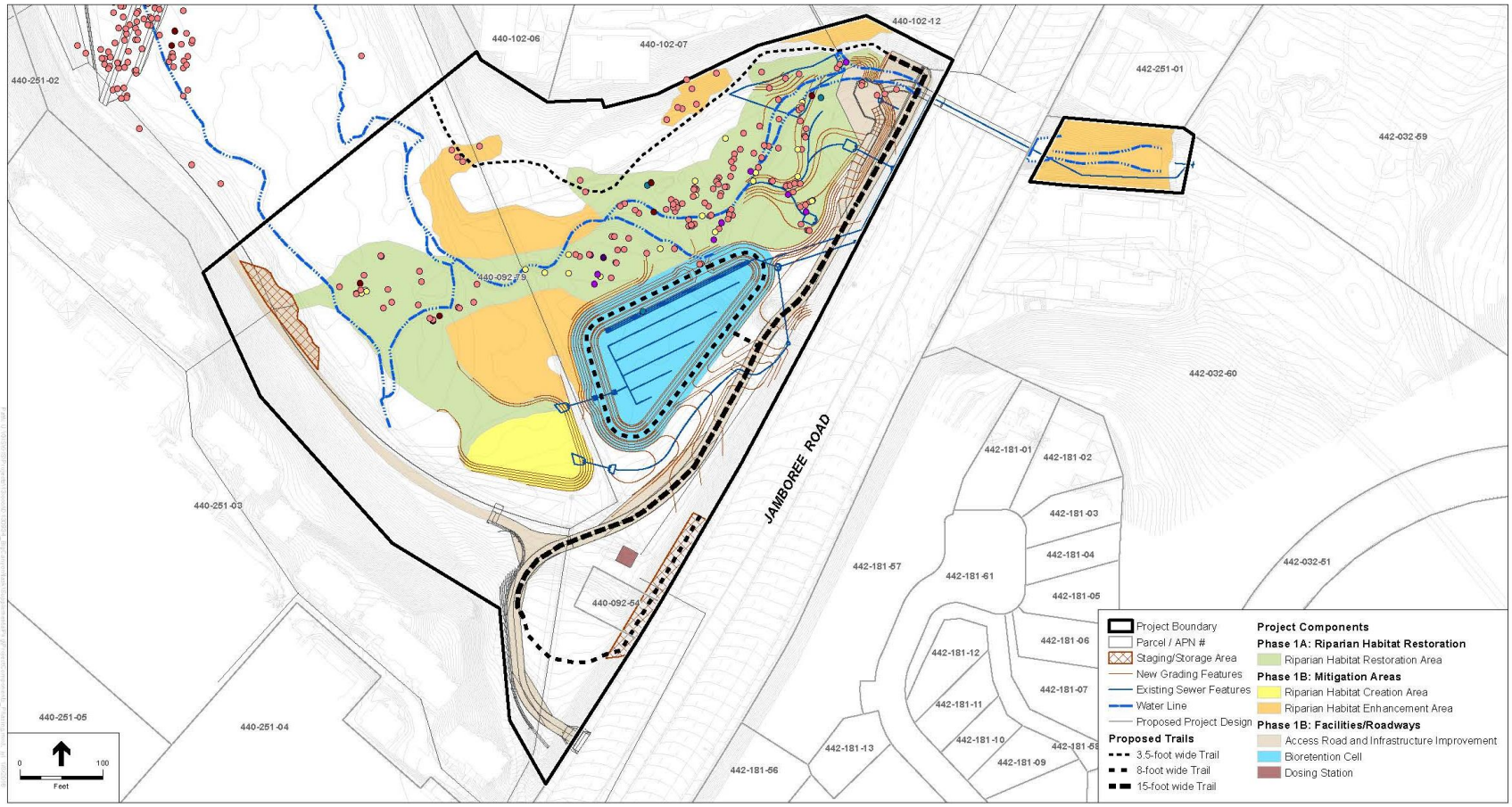


Selenium Hot Spot Identified Upstream

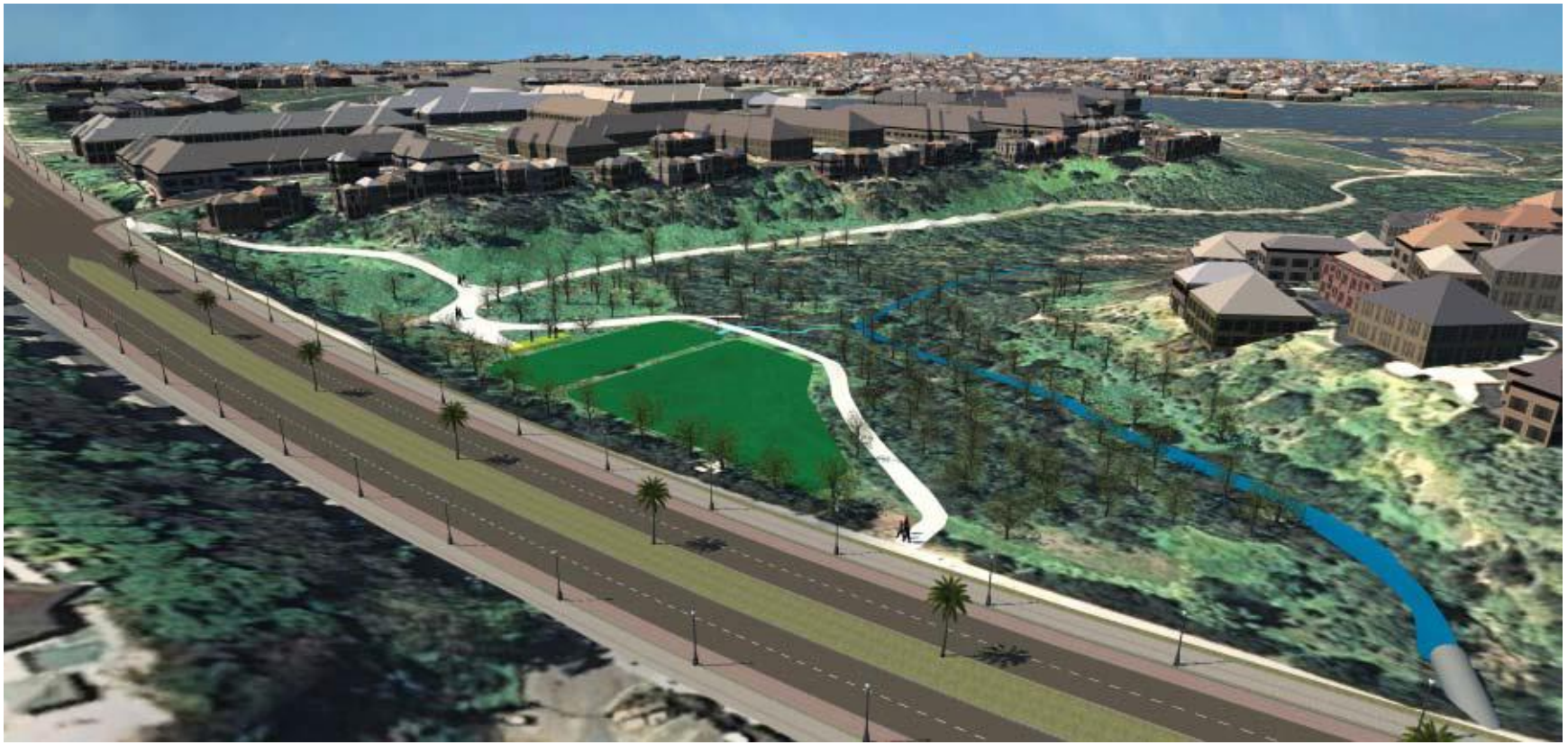
Initial Design Not Fully Integrated

Opportunities for Collaboration to Restore Degraded Habitat

Fully Integrated Design Includes Water Quality Improvement and Habitat Restoration

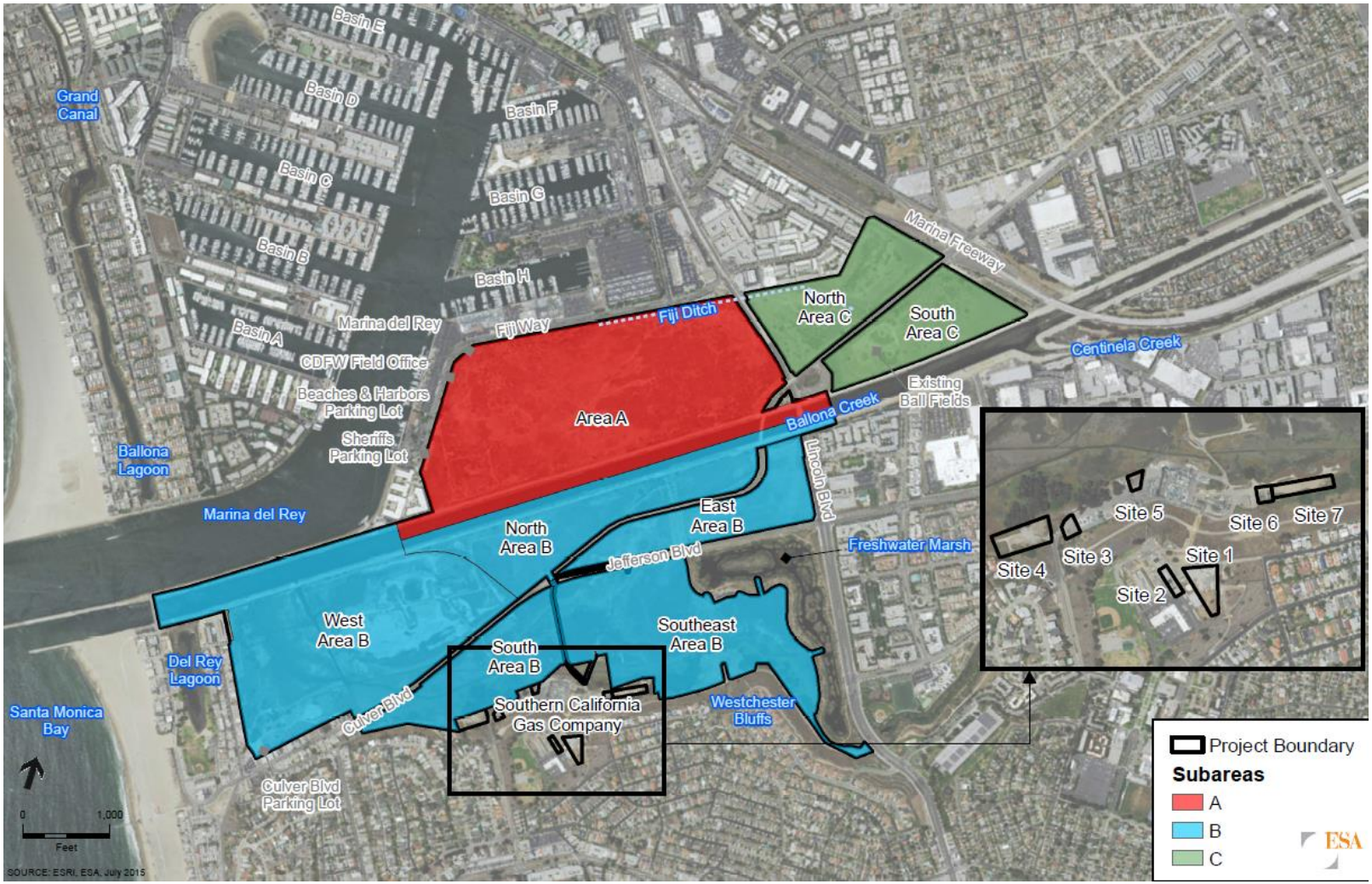


Current and Future Vision of Big Canyon Watershed

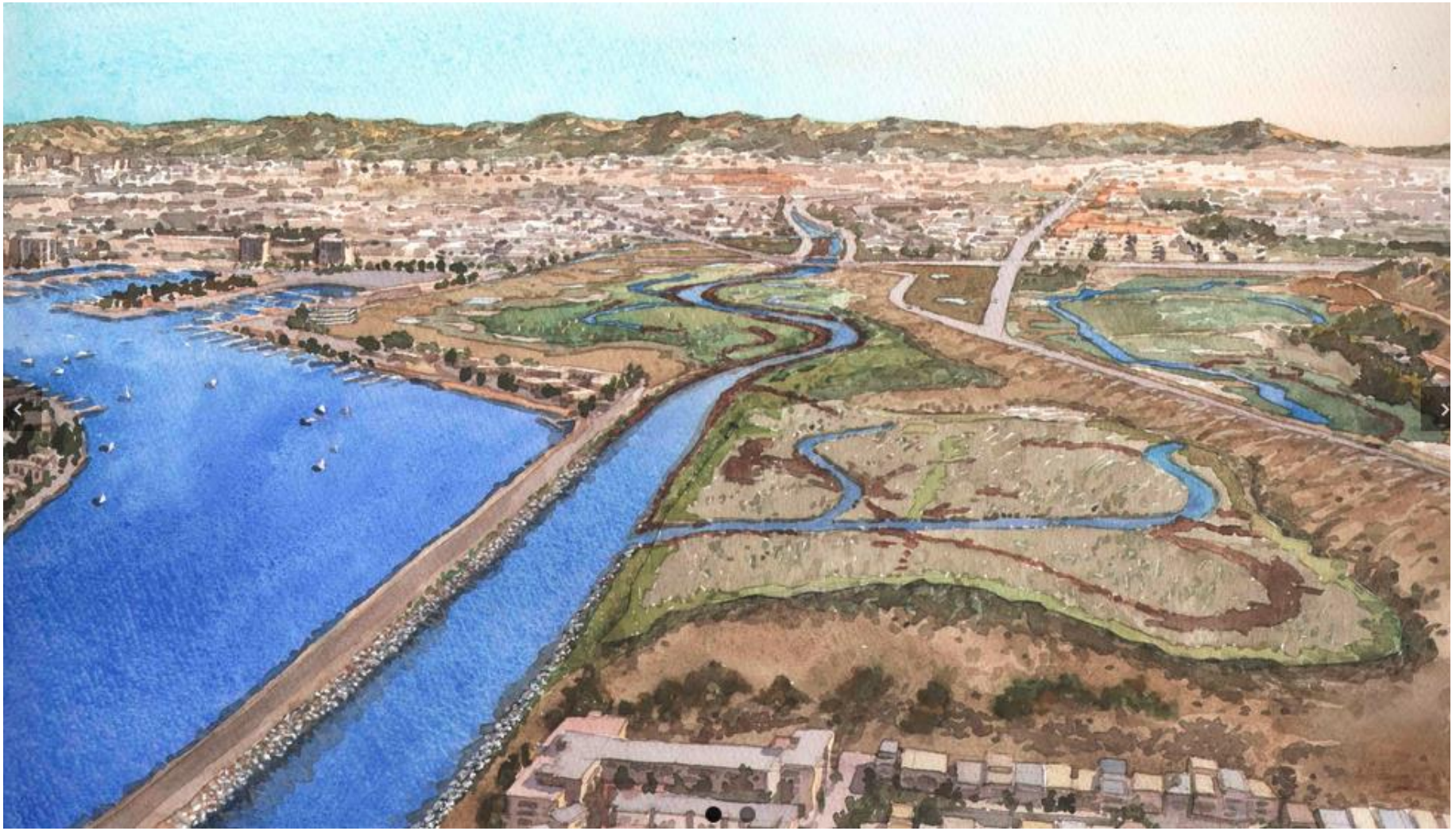


Ballona Wetlands Restoration Project

Project Site



Alternative 1- Naturalized Creek



Ballona Creek and Estuary TMDLs

- 2006 Toxics TMDL for Ballona Estuary
- 2008 Metals TMDL for Ballona Creek
- Revised TMDL in 2013 combined metals in the water column (Ballona Creek) with sediment in channel (Ballona Estuary)

Stormwater Design Features

- Channel connected to wetland- more treatment through vegetation
- Drainage control features (e.g. bioswales, pre-treatment basins) for direct site runoff
  - **Along roads, backside of levees**
  - **Near parking lots**

LOS PEÑASQUITOS LAGOON & ITS WATERSHED

By Mike Hastings, Executive Director
Los Peñasquitos Lagoon Foundation

Photo courtesy of Patricia Masters

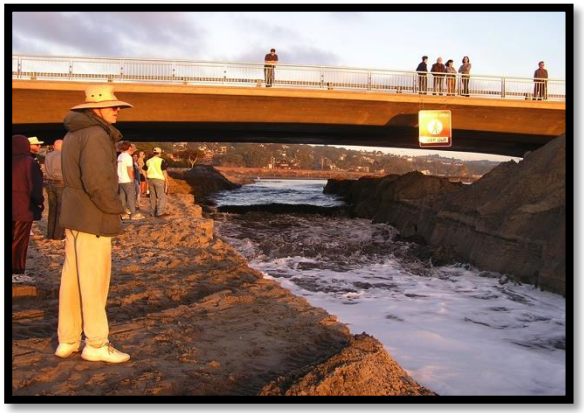



- Part of the Torrey Pines State Natural Reserve.
- Dedicated Marsh Natural Preserve & Critical Coastal Area #77.
- 303(d)-listed impaired water body with a Sediment and Bacteria TMDL.
- 26 sensitive plant species & 6 listed bird species.
- Key stopover for migratory birds along the Pacific Flyway.
- Ecosystem Services (Flood Control, Carbon Sequestration).



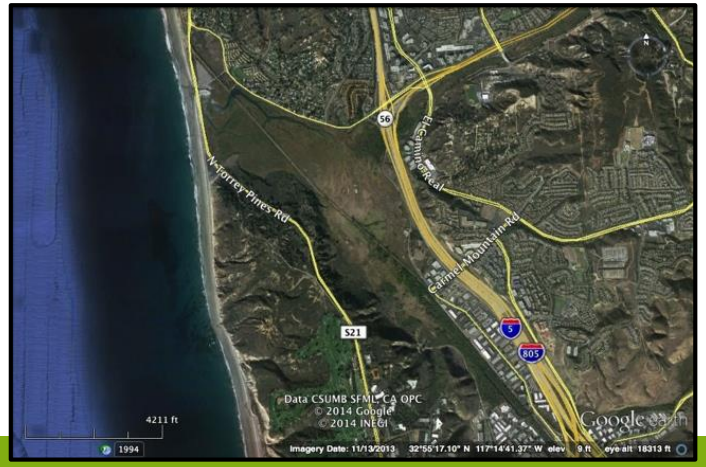
LOS PEÑASQUITOS LAGOON FOUNDATION

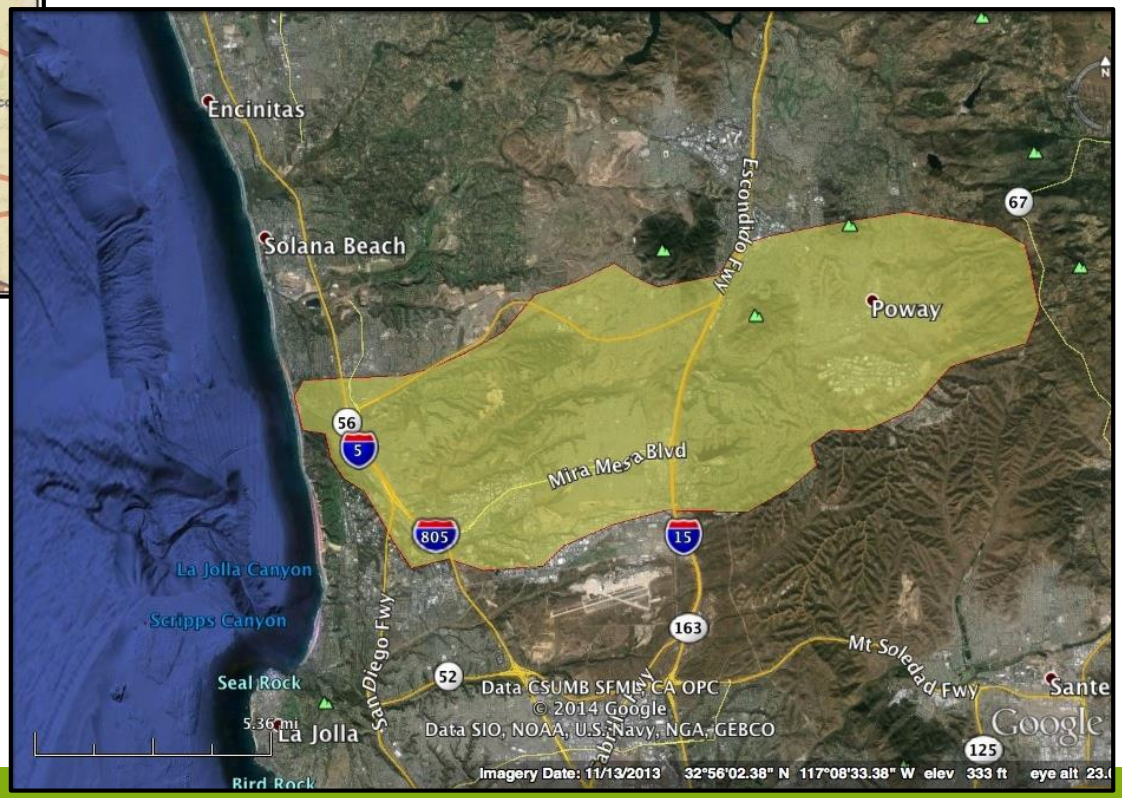
Founded in 1983 to help the State Coastal Conservancy and California State Parks develop and implement the Los Peñasquitos Lagoon Enhancement Plan, certified in 1985.



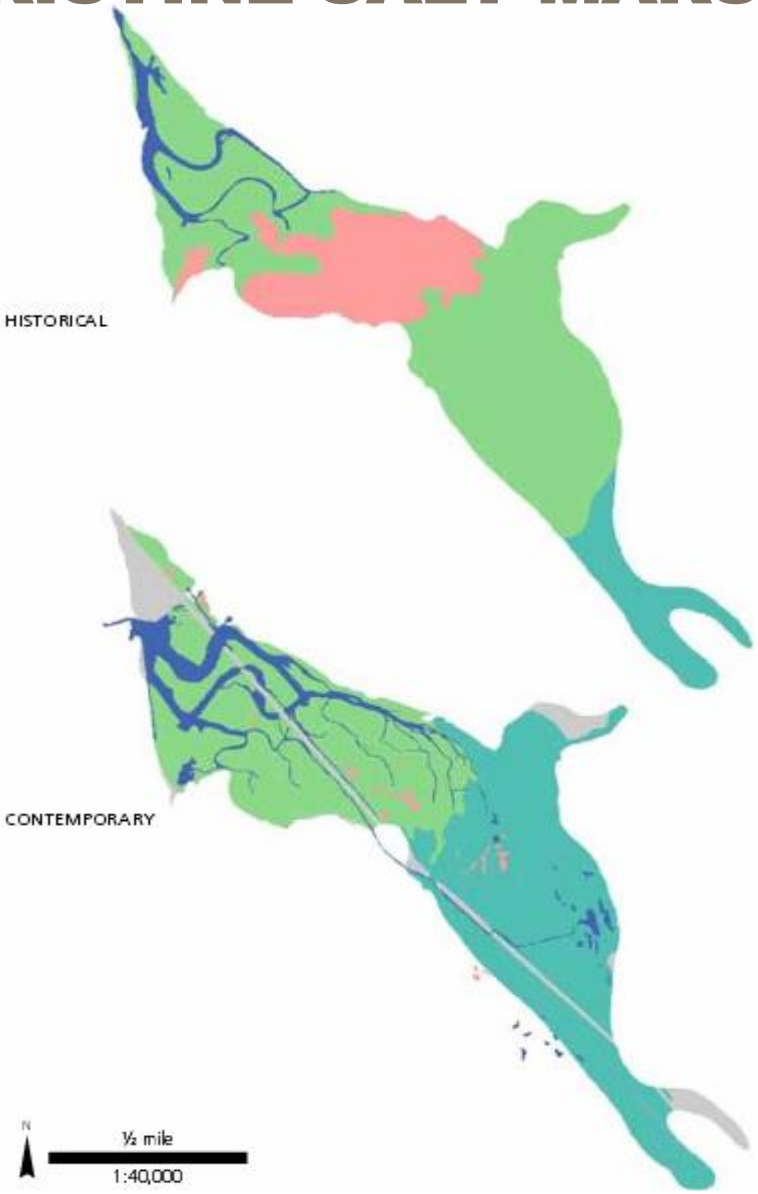
Lospenasquitos.org

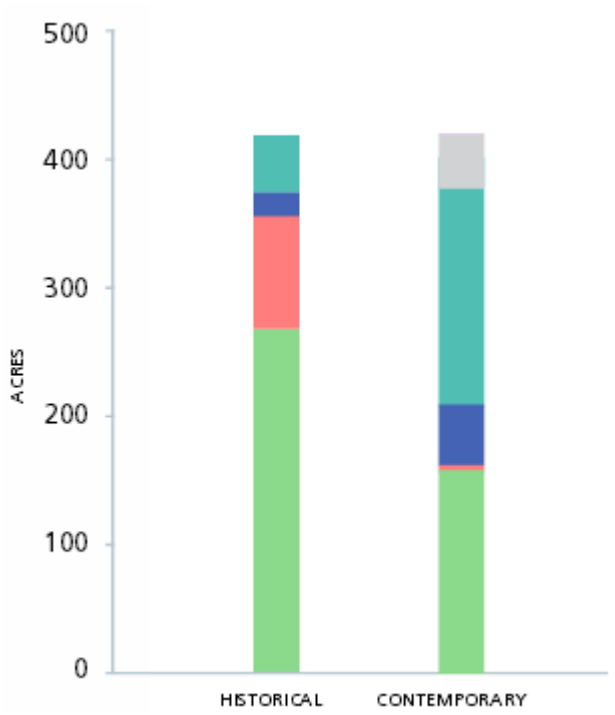
Where is Los Peñasquitos Lagoon and its Watershed?



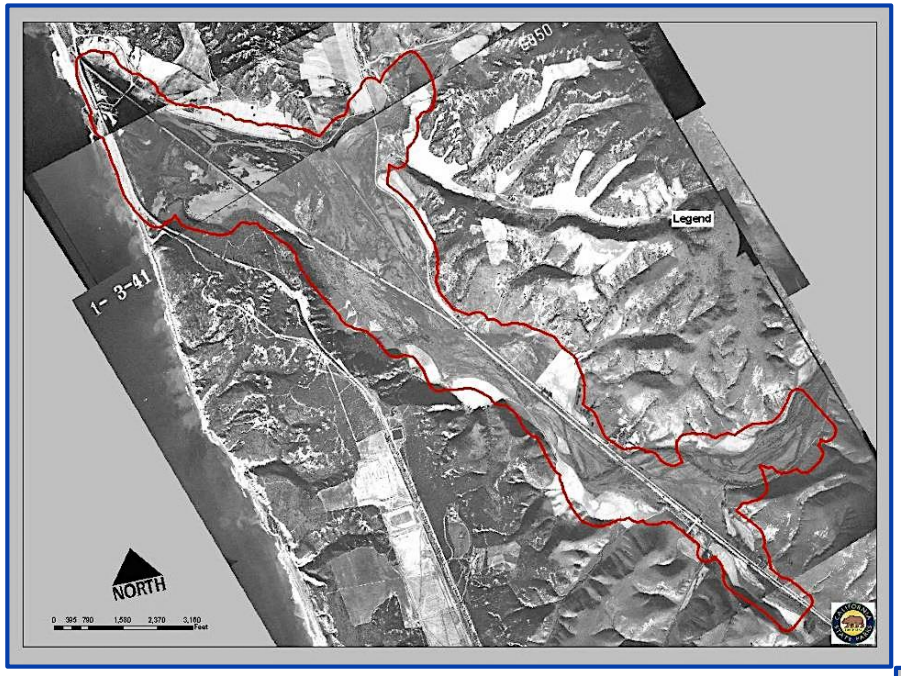


PRISTINE SALT MARSH TO MANAGED SYSTEM





SFEI, 2014



KEY DRIVERS FOR LAGOON IMPAIRMENT

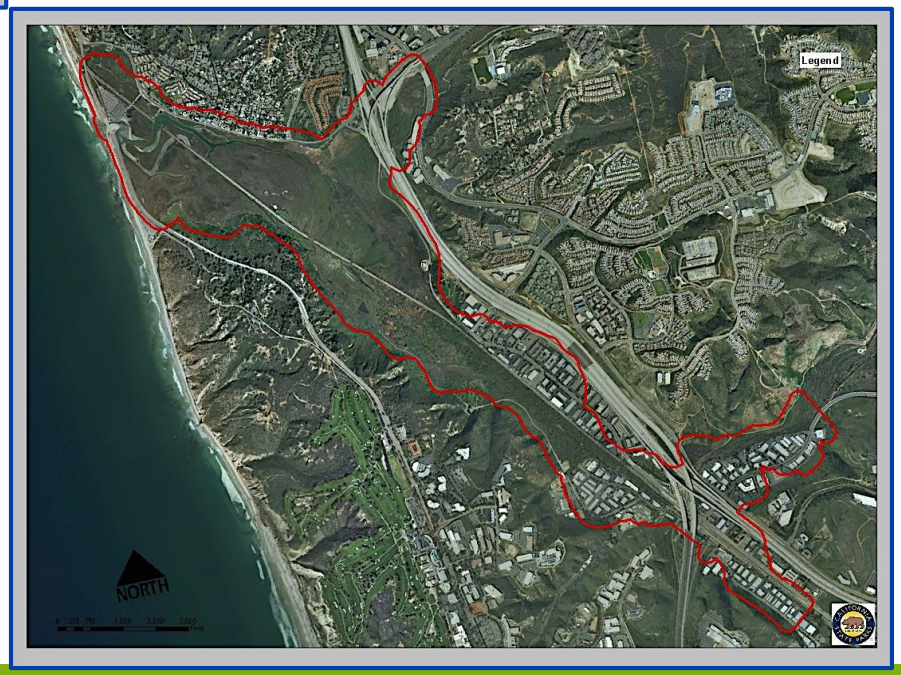
Historic Land Use

Legacy Pollutants

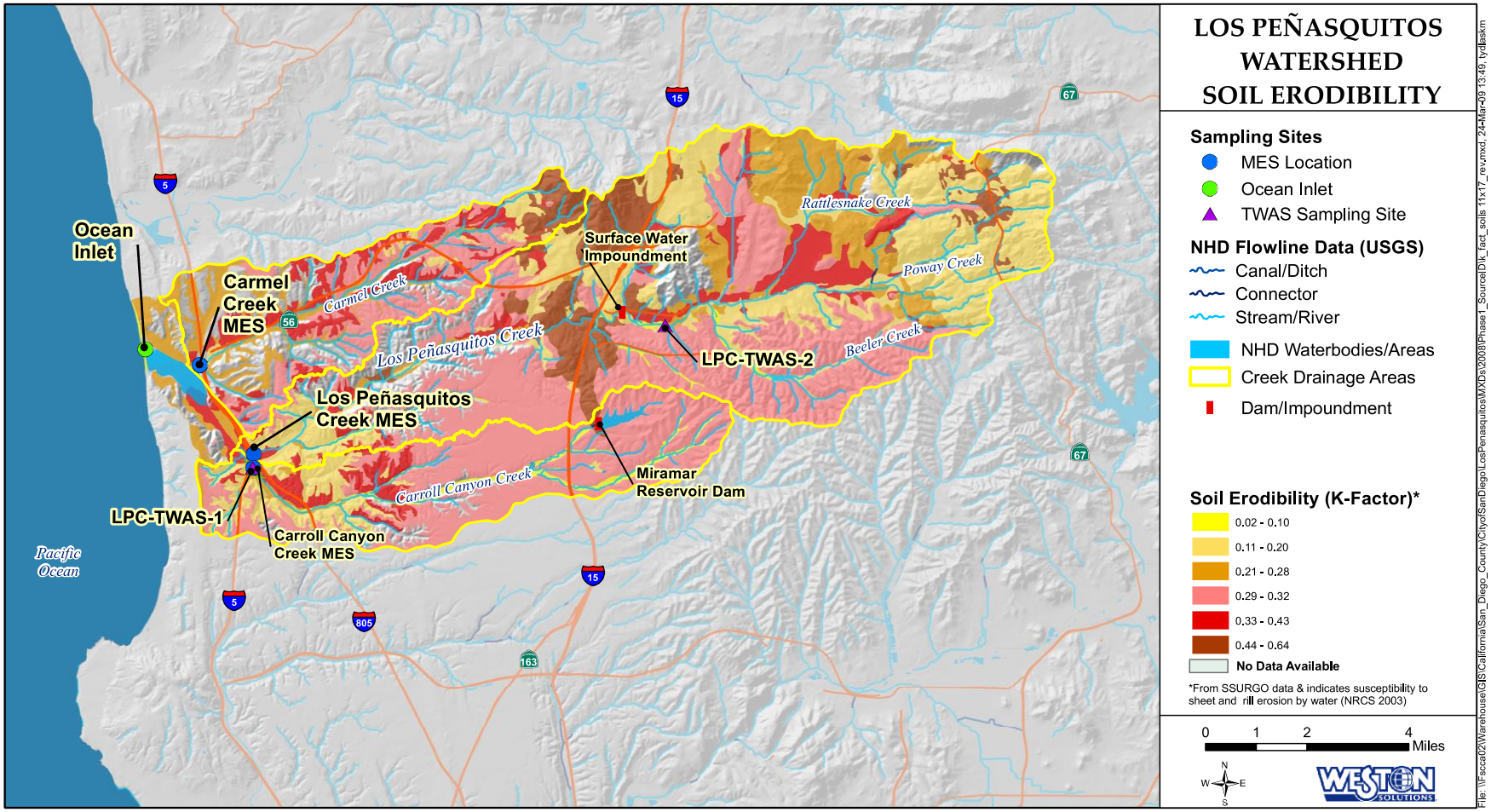
Transportation Infrastructure

Development of the Flood Plain

Urbanization of the Watershed



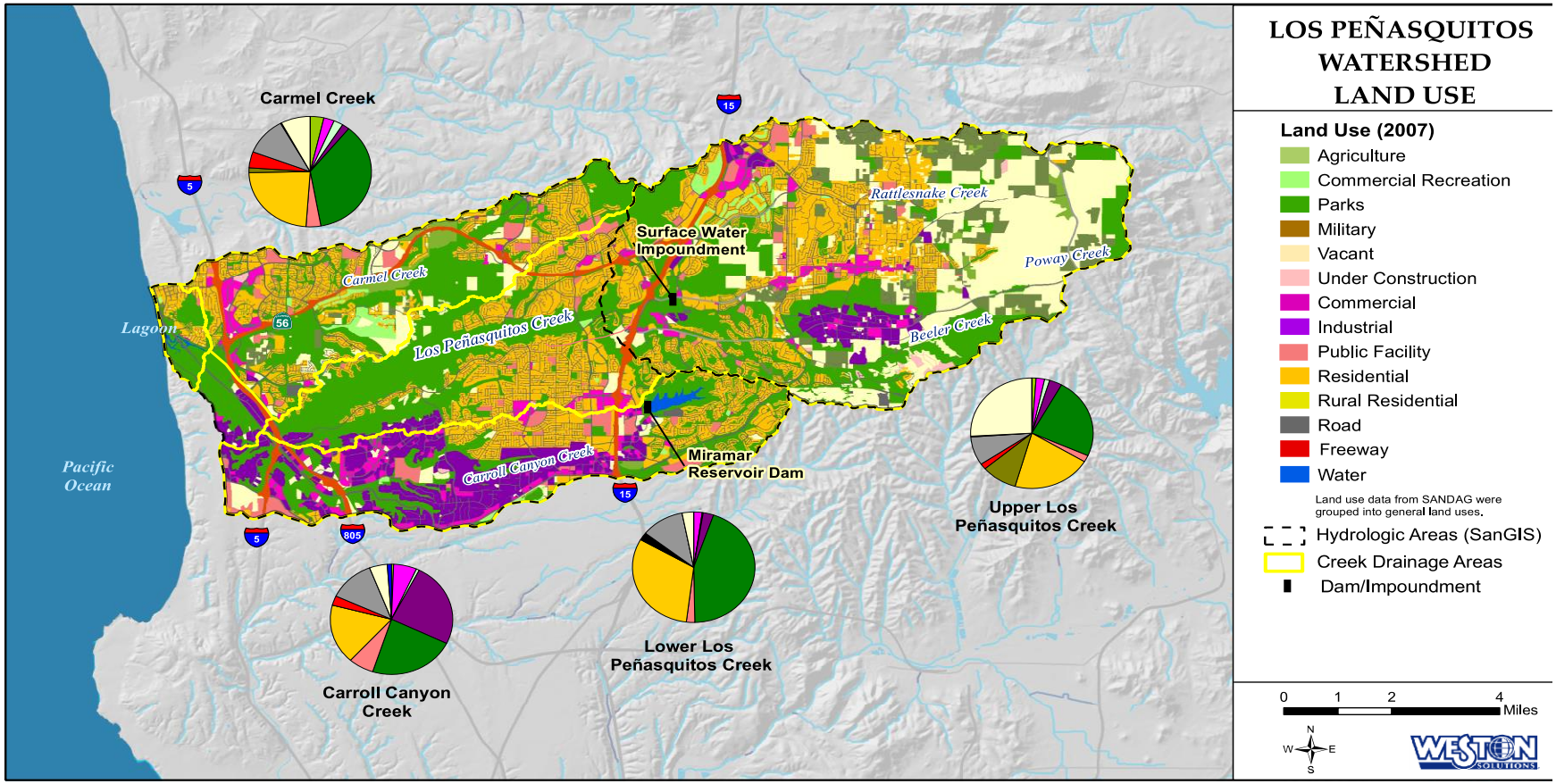
SOIL ERODIBILITY IN THE WATERSHED (K-FACTOR)



<0.2 = Resistant, 0.25 - 0.4 = Moderate, >0.45 = Highly Erosive

Graphic by Weston Solutions, Inc. 2009

LAND USE –
A TALE OF THREE SUB-WATERSHEDS



HYDROMODIFICATION + EROSIVE SOILS = IMPACTS

Dry Weather Flows

Photo by Mike Hastings (2011)

Increased Volume & Peak Flows

Photo by Mike Hastings (2011)

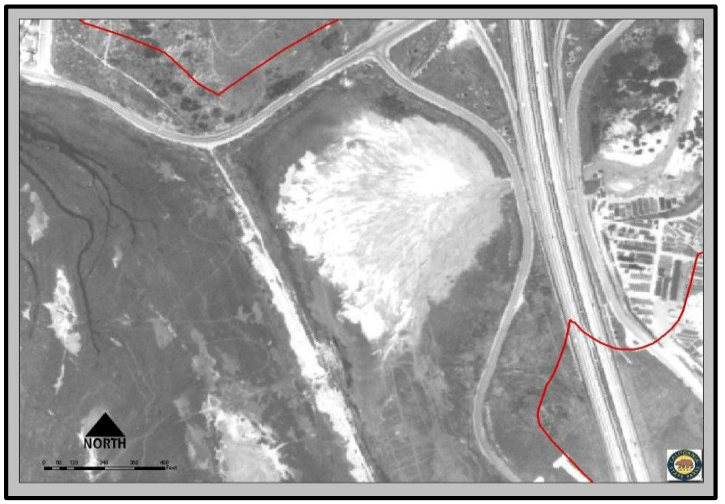
Scour and Gullies

Photo provided by the City of San Diego

Sediment Deposition

Photo by Mike Hastings (2010)

Post Rain Event - 2003



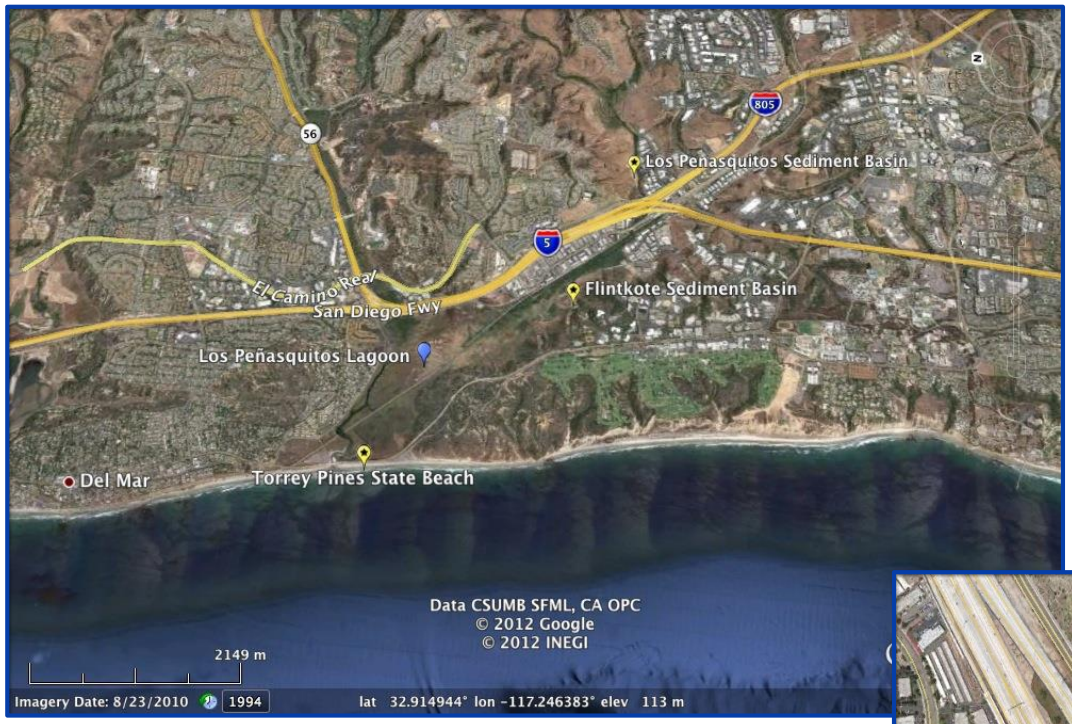
Sediment Plume - 1983

Habitat Conversion - 2000

Established Riparian – 2010

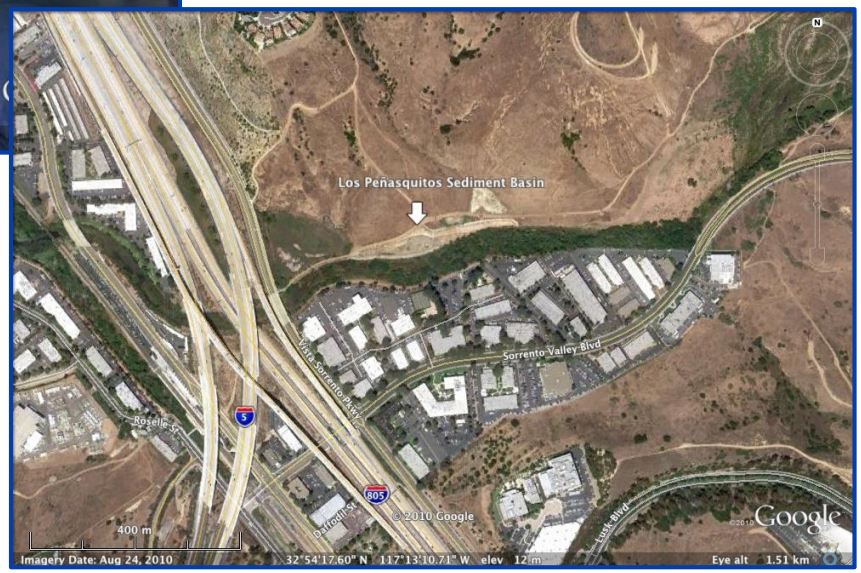
Photo provided by the City of San Diego

LOS PEÑASQUITOS LAGOON AND SEDIMENT BASINS



Graphics adapted from Google Earth (2012)

Photos by Mike Hastings



LOS PEÑASQUITOS SEDIMENT BASIN

30,500 cubic yards (cy) excavated along Los Peñasquitos Creek.

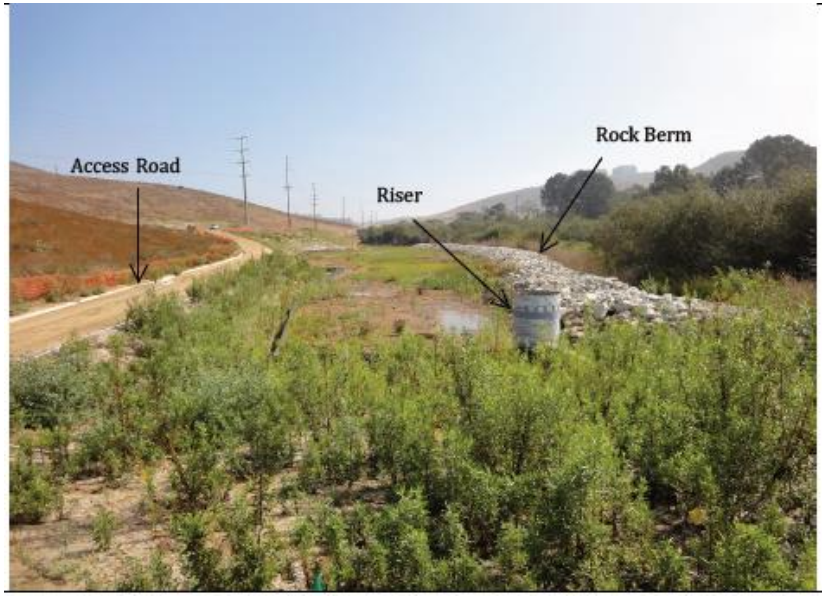
- 26,500 cy hauled to Miramar Landfill at a cost of $15/cy.
- 3,500 cy of culturally sensitive materials placed near site at a cost of $5/cy.
- 500 cy remained onsite as compacted fill.

Excavating the Basin Floor (November 2009).

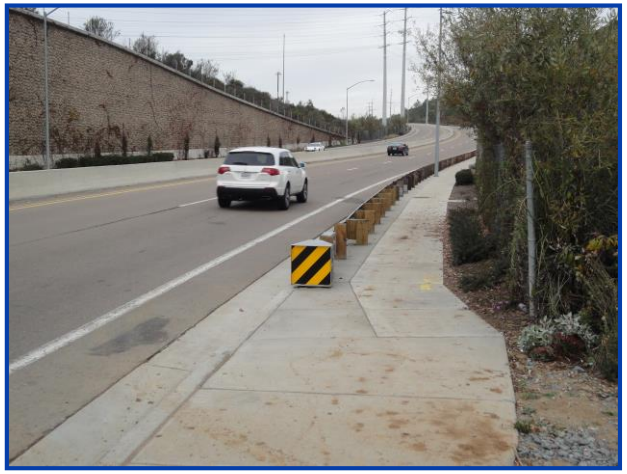
Project Site, Selected for Basin Construction (2003).

Los Peñasquitos Sediment Basin (August 2010).

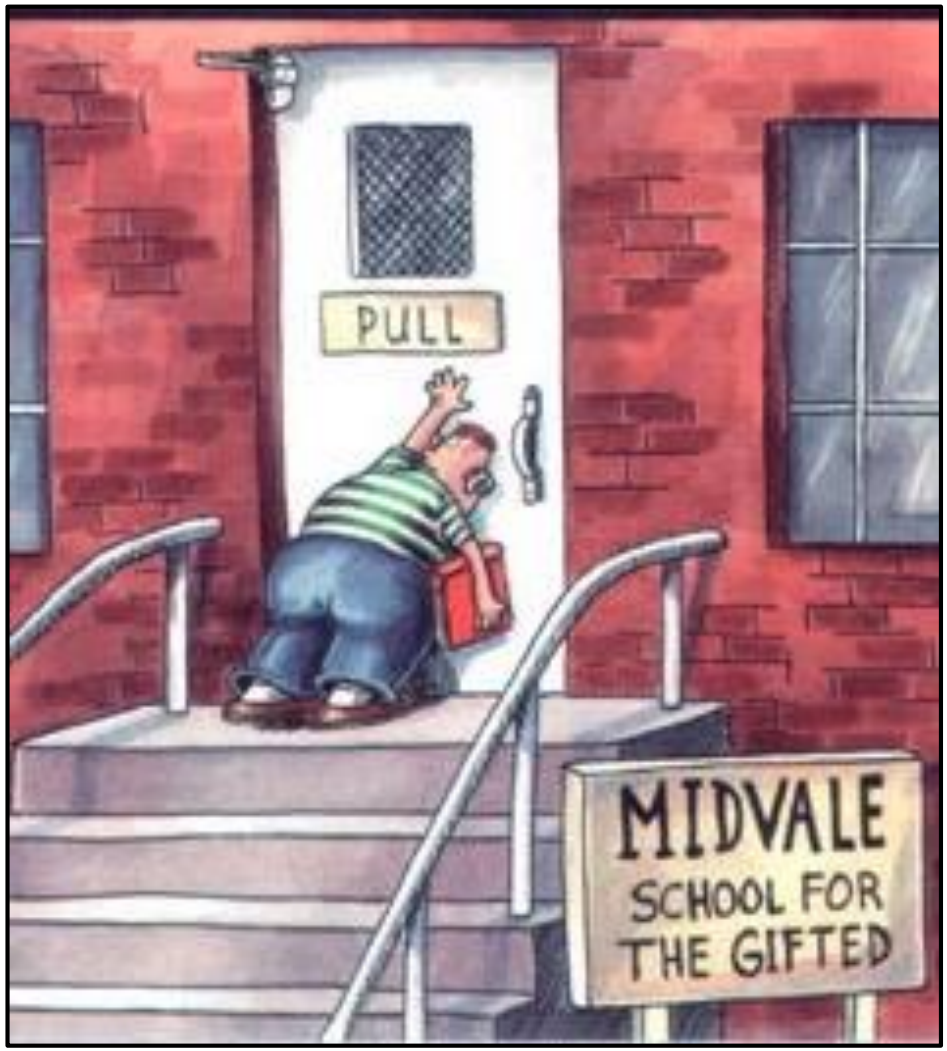
LOS PEÑASQUITOS SEDIMENT BASIN POST CONSTRUCTION



INTEGRATING O&M INTO DESIGN

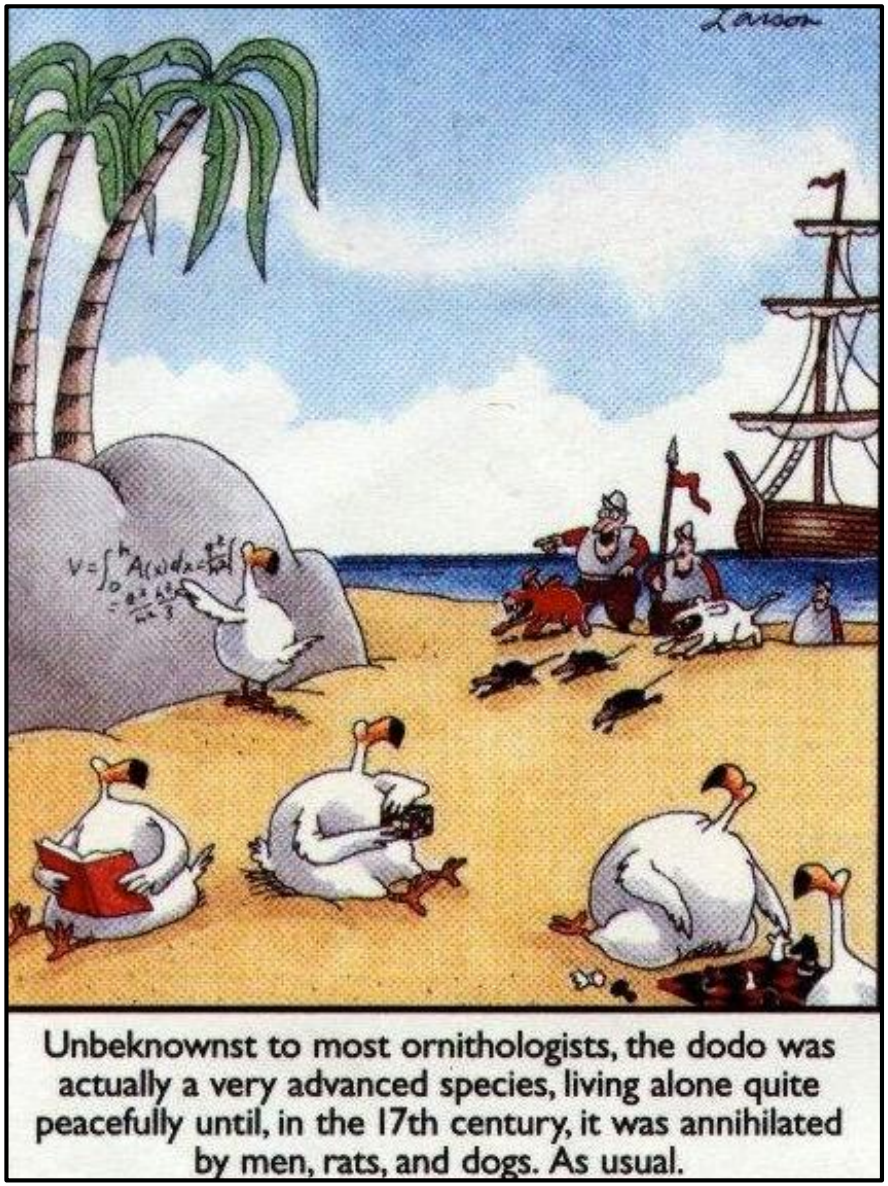


- Permits
- Access
- Who's job is it?
- Is there will?
- Is there capacity?
- Is there funding?
- "Established Habitat"



Comic by Gary Larson

Given what we know, are we using the right approach?



Will we do more harm than good?

What are the regulatory drivers for storm water and restoration?

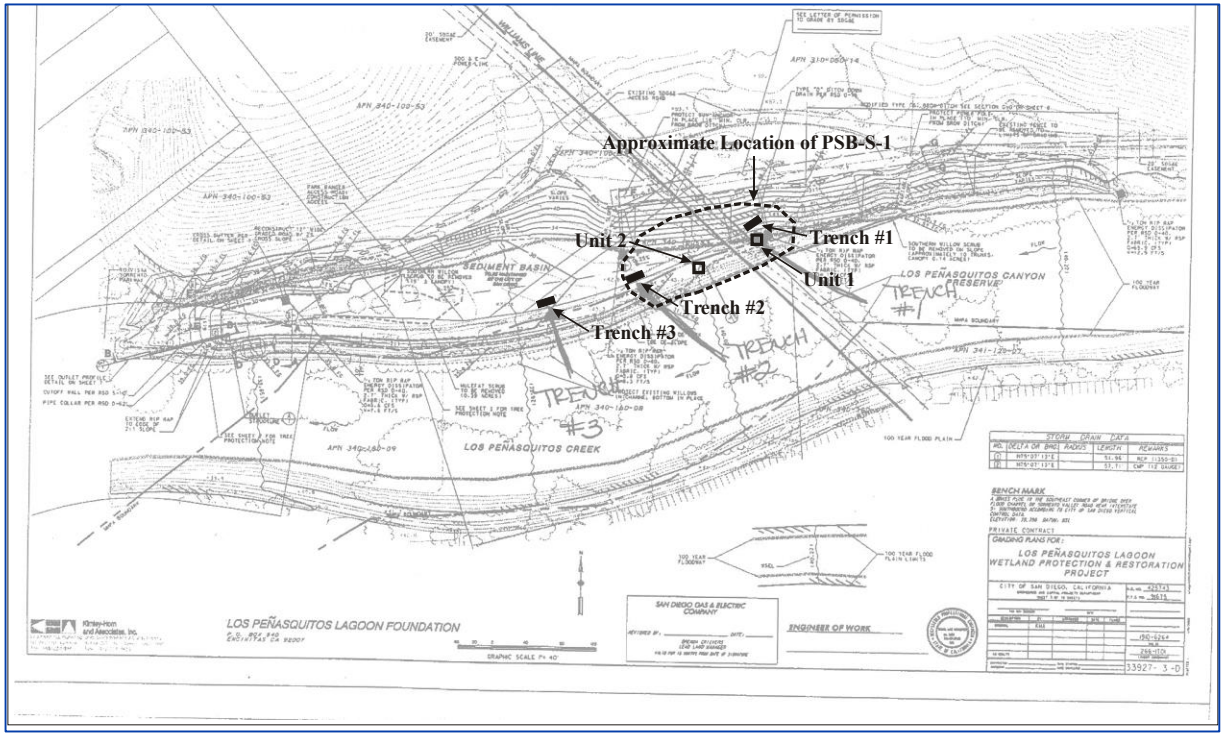
Selenium Monitoring in Big Canyon Creek

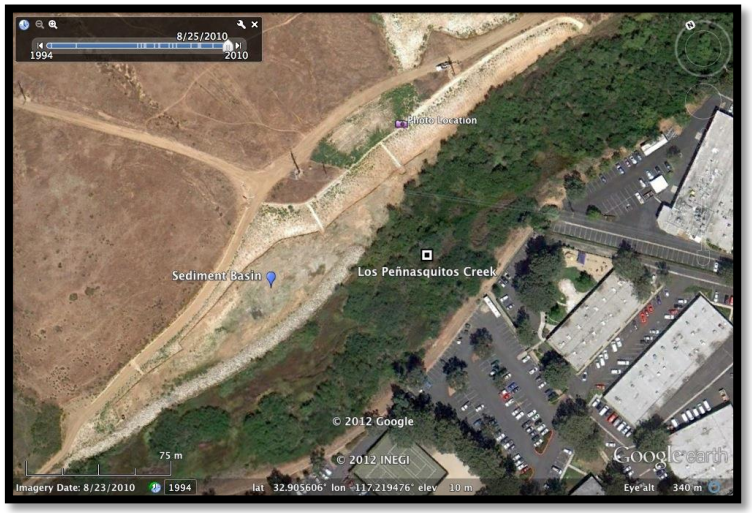
What are the opportunities for collaboration between storm water practitioners and restorationists?

Multi-Benefit Approaches Example:
Oro Loma Horizontal Levee Demonstration Project

What are the biggest challenges and constraints to this approach?

Cultural Discoveries





QUESTIONS?

What is the relationship of these types of projects to the planning process?

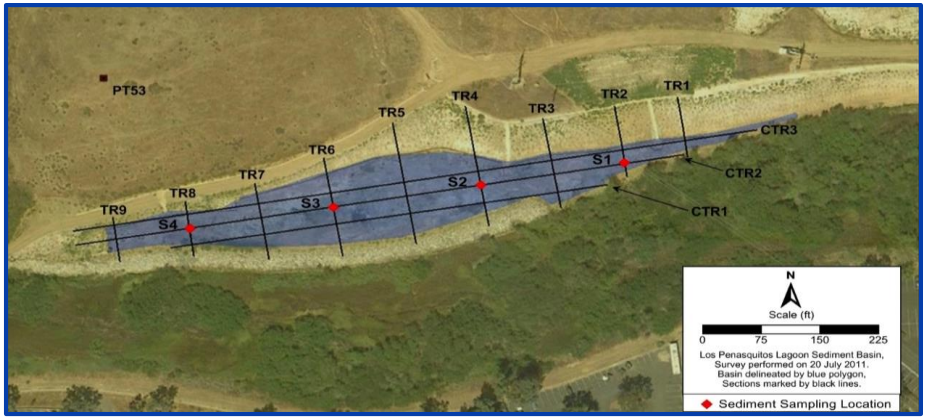
A Beneficial Project

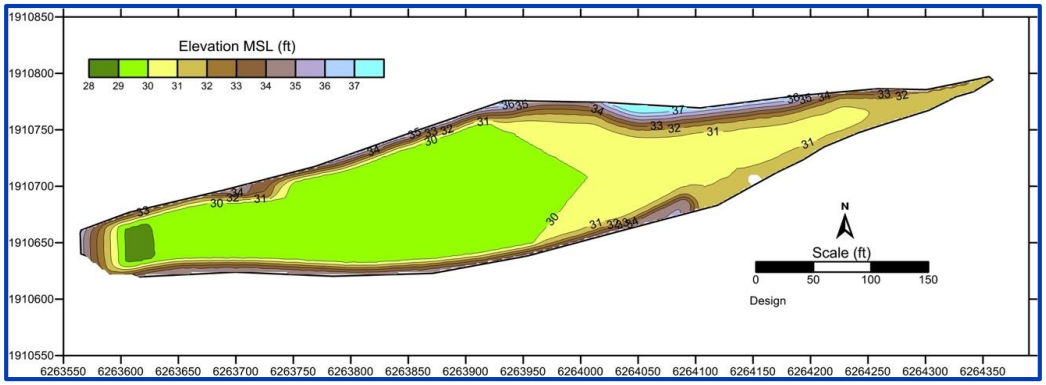
Existing Conditions

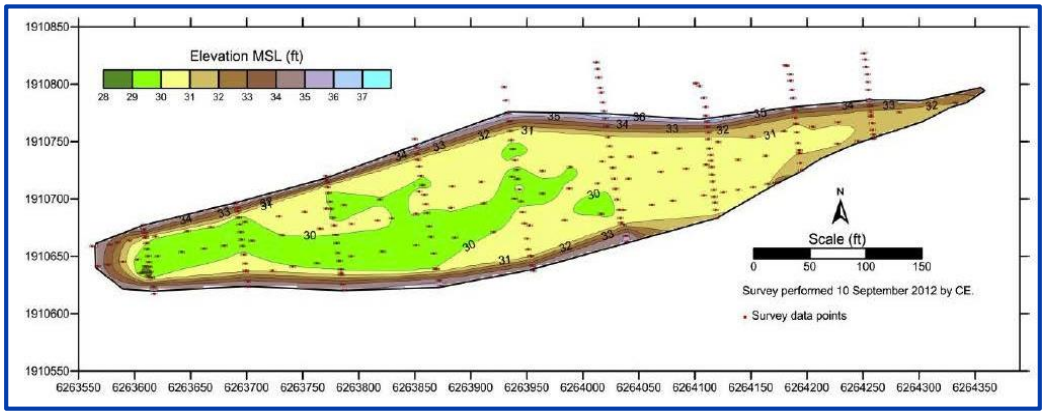
Reconnect channel to marsh to improve habitats

FURTHER DISCUSSION?

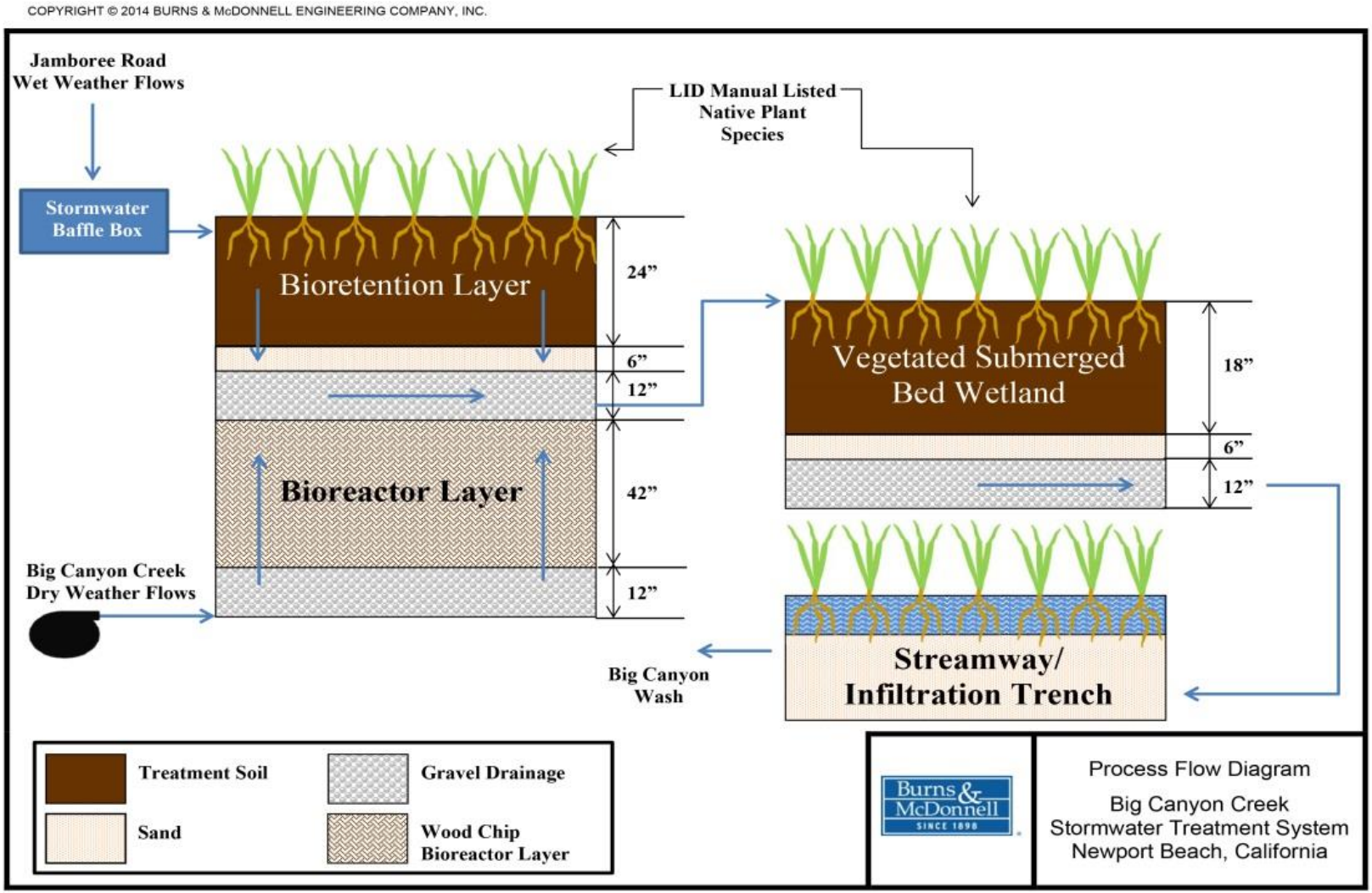
Monitoring


PT53
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
TR9
CTR1
CTR2
CTR3
S1
S2
S3
S4
N
Scale (ft)
0 75 150 225
Los Penasquitos Lagoon Sediment Basin,
Survey performed on 20 July 2011.
Basin delineated by blue polygon,
Sections marked by black lines.
Sediment Sampling Location


Elevation MSL (ft)
28 29 30 31 32 33 34 35 36 37
N
Scale (ft)
0 50 100 150
Design
1910850
1910800
1910750
1910700
1910650
1910600
1910550
6263550 6263600 6263650 6263700 6263750 6263800 6263850 6263900 6263950 6264000 6264050 6264100 6264150 6264200 6264250 6264300 6264350


Elevation MSL (ft)
28 29 30 31 32 33 34 35 36 37
N
Scale (ft)
0 50 100 150
Survey performed 10 September 2012 by CE.
Survey data points
1910850
1910800
1910750
1910700
1910650
1910600
1910550
6263550 6263600 6263650 6263700 6263750 6263800 6263850 6263900 6263950 6264000 6264050 6264100 6264150 6264200 6264250 6264300 6264350

Original Design



Revised Big Canyon Conceptual Plan