

# State Route 37 Stewardship Study: Integrating Environment and Community in Transportation Planning

**WELCOME AND INTRODUCTIONS!**

**Fraser Shilling, Ph.D.**  
University of California, Davis  
Road Ecology Center



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## Phase 1: Testing the Ecological Framework Approaches in Corridor Planning

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# INTEGRATING ENVIRONMENT AND COMMUNITY IN TRANSPORTATION PLANNING


Project team composed of agency (Caltrans, District 4), academic (University of California, Davis), NGOs (Sonoma Ecology Center, Sonoma Land Trust), and Napa and Southern Sonoma Resource Conservation Districts





# INTEGRATING ENVIRONMENT AND COMMUNITY IN TRANSPORTATION PLANNING


## Corridor Planning Need:

- to balance access and economic demands with environmental processes and attributes
  - acknowledge and integrate community/stakeholder needs and concerns in planning and decision-making
  - develop a crediting and valuation approach to aid decisions
- 




# INTEGRATING ENVIRONMENT AND COMMUNITY IN TRANSPORTATION PLANNING


## Environmental Need:

- to provide room for the San Francisco Bay to move as sea level rises
  - to allow marshes to connect with rising Bay waters and adapt
  - to reduce traffic noise and air quality impacts to marsh habitats
  - to reduce direct mortality effects on listed and non-listed wildlife
  - to go beyond typical mitigation approaches and treat this as a stewardship process
- 





# Testing The Ecological Framework (Transportation Research Board)

- Step 1: Build and Strengthen Collaborative Partnerships, Vision
  - Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans
  - Step 3: Create Regional Ecosystem Framework (Conservation Strategy +Transportation Plan)
  - Step 4: Assess Land Use and Transportation Effects on resource conservation objectives identified in the REF
  - Step 5: Establish and Prioritize Ecological Actions
  - Step 6: Develop Crediting Strategy
  - Step 7: Develop Programmatic Consultation, Biological Opinion or Permit
  - Step 8: Implement Agreements and Adaptive Management. Deliver Conservation and Transportation Projects
  - Step 9: Update Regional Integrated Plan/Ecosystem Framework
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# The Stakeholders



Step 1: Build and Strengthen  
Collaborative Partnerships, Vision

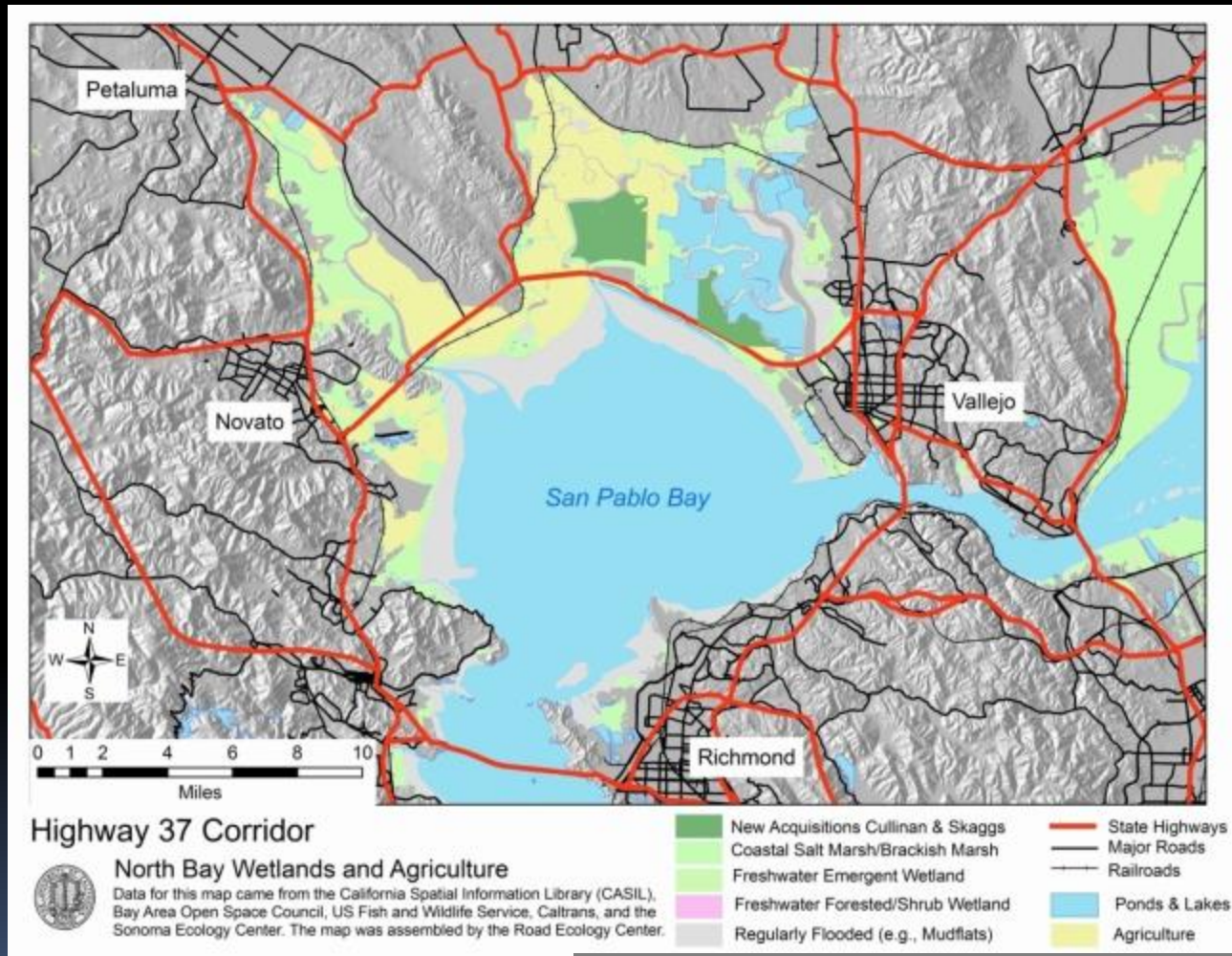
# Stakeholder List

Army Corps of Engineers ,Association of Bay Area Governments, Bay Planning Coalition, Bay Conservation and Development Commission, Black Point Improvement Club Buck Institute, California Department of Fish and Game, Caltrans HQ, Caltrans District 4, California Highway Patrol, City of Vallejo, City of Vallejo Sanitation District, Coastal Conservancy, Congressman George Miller, Ducks Unlimited, East Bay Regional Park District, ESA PWA (consultant), Felidae Conservation Fund, Federated Indians of Graton Rancheria, Friends of the Esteros, Friends of the Napa River, GAIA (consulting), Hanson Bridgett LLP, Hungry Owl Project, Infineon Raceway, Landowner (5), Marin Audubon, Marin County Bicycle Coalition, Marin County Public Works, Michael Allen Assembly-member 7th District, Moffatt and Nichol, Metropolitan Transportation Commission, Napa County Transportation and Planning Agency, Napa County, Napa County Resource Conservation District, Napa Valley Bike Coalition, Napa-Solano Audubon, NBAA / Canalways, National Oceanic and Atmospheric Administration, North Bay Agricultural Alliance, North Bay Leadership Council, Natural Resource Conservation Service, Nute Engineering, Point Reyes Bird Observatory, San Francisco Bay Regional Water Board, San Francisco Estuary Project, Save the Bay, Schellville Fire Department, Senator Noreen Evan's Office, San Francisco Bay Joint Venture, Sonoma County Agricultural Preservation & Open Space District, Solano County, Solano Transportation Authority, Sonoma County Bike Coalition, Sonoma County Permit and Resource Management Department, Sonoma County Regional Parks, Sonoma County Transportation Authority, Sonoma County Water Agency, Sonoma Ecology Center, Sonoma Land Trust, Sonoma Marin Area Rail Transit, Sonoma Valley Heritage Coalition, Southern Sonoma County Resource Conservation District, Transportation Authority of Marin, The Bay Institute, Trout Unlimited Redwood Chapter, US Environmental Protection Agency, US Fish & Wildlife Service (regulatory), USFWS - San Francisco Bay National Wildlife Refuge, Vallejo Sanitation and Flood Control, Weston Solutions, Inc.

**Step 1: Build and Strengthen  
Collaborative Partnerships, Vision**



# The Environmental Context



Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans

Years of Bay Area environmental science have assessed the past and present conditions of the baylands ecosystem and recommended ways to improve its ecological health. This report presents the Baylands Ecosystem Goals.



Baylands Ecosystem

Baylands Ecosystem

# Habitat Goals

Habitat Goals



A Report of Habitat Recommendations  
Prepared by the San Francisco Bay Area  
Wetlands Ecosystem Goals Project

## CALIFORNIA WILDLIFE Conservation Challenges



## CALIFORNIA'S WILDLIFE ACTION PLAN

Prepared by UC Davis Wildlife Health Center for the California Department of Fish and Game

CALIFORNIA DEPARTMENT OF TRANSPORTATION

## Guidance on Incorporating Sea Level Rise

For use in the planning and development of  
Project Initiation Documents

Prepared by the Caltrans Climate Change Workgroup, and the HQ Divisions of  
Transportation Planning, Design, and Environmental Analysis

May 16, 2011

This guidance is intended for use by Caltrans Planning staff and Project Development Teams to determine whether and how to incorporate sea level rise concerns into the programming and design of Department projects. Because of the evolving nature of climate change science and modeling, this guidance is subject to revision as additional information becomes available.



prbo

### Tidal Marsh Bird Population and Habitat Assessment for the San Francisco Estuary Under Future Climate Change Conditions

Edward Vukobratovic, Nadeen Khatib, Alexandra Salas, Diana Stralberg, Dennis Jongsomjit, Julian Wroble, Lee Liu, Grant Ballard

Report to the California Landscape Conservation Cooperative  
Version 1.0 May 4, 2011

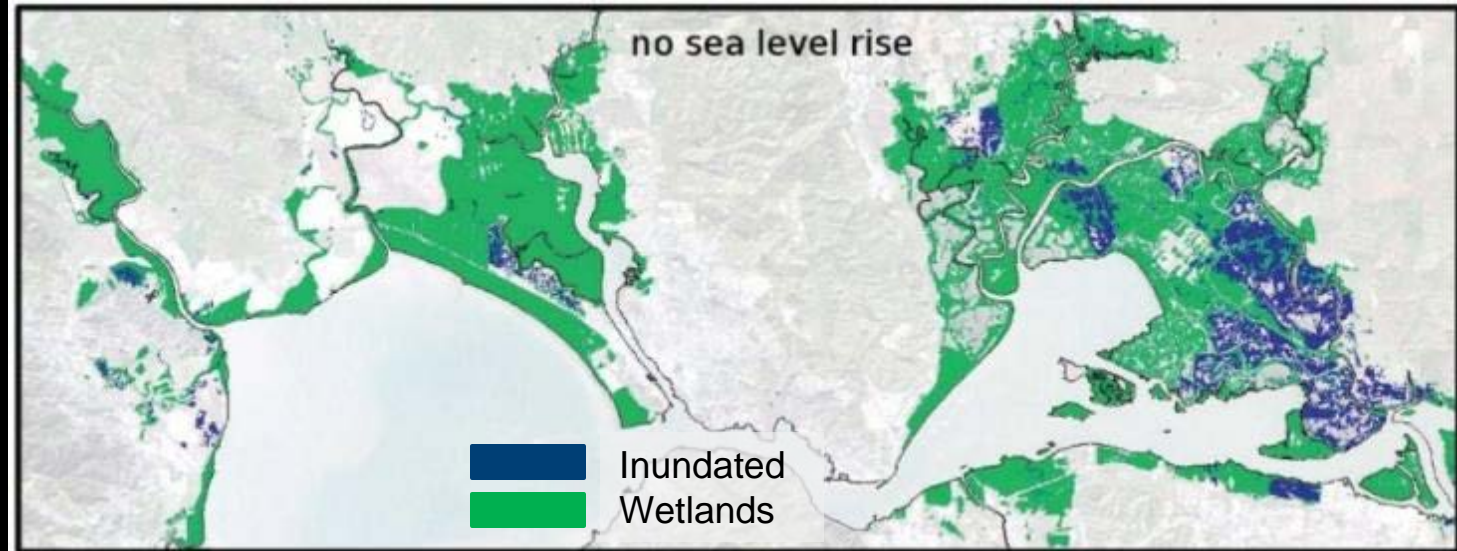


PRBO Conservation Science  
4600 University Ave., Suite 100  
Palo Alto, CA 94304  
650.755.0200  
www.prbo.org

PRBO

Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans





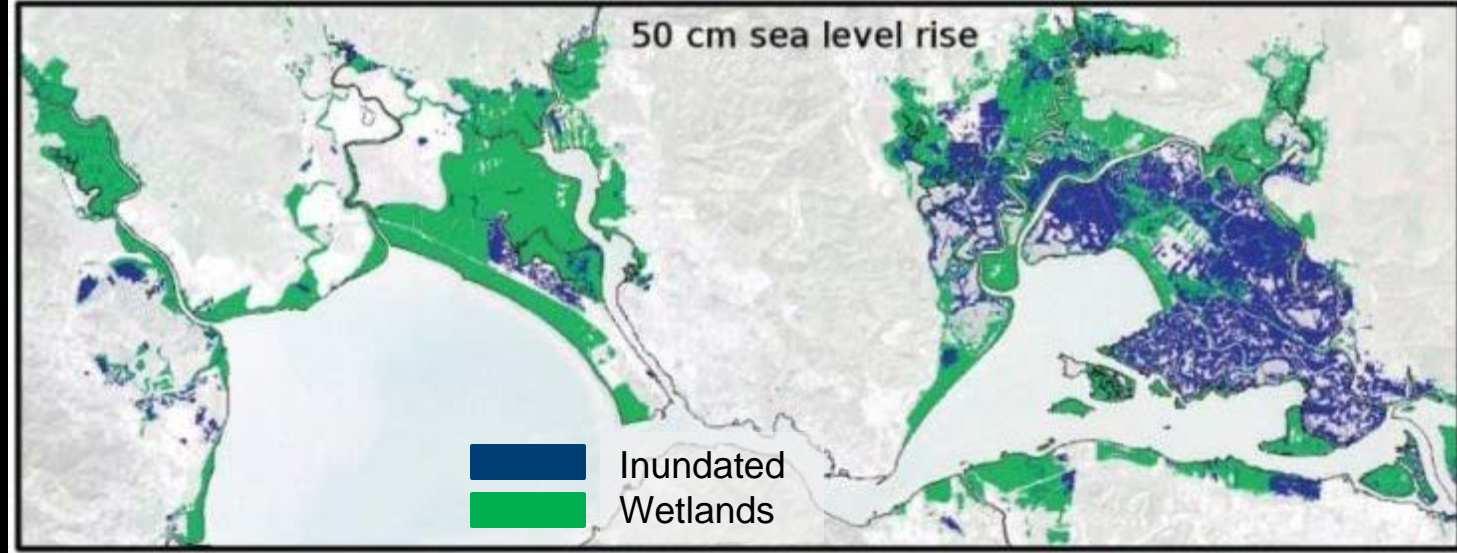
# Sea Level Rise Marshes

Potentially inundated wetland areas (Knowles, 2010)

<http://escholarship.org/uc/item/8ck5h3qn>

Bay Area-wide, \$48 billion in infrastructure at risk from 1 meter rise in sea level  
(Gleick and Maurer, 1990)

Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans



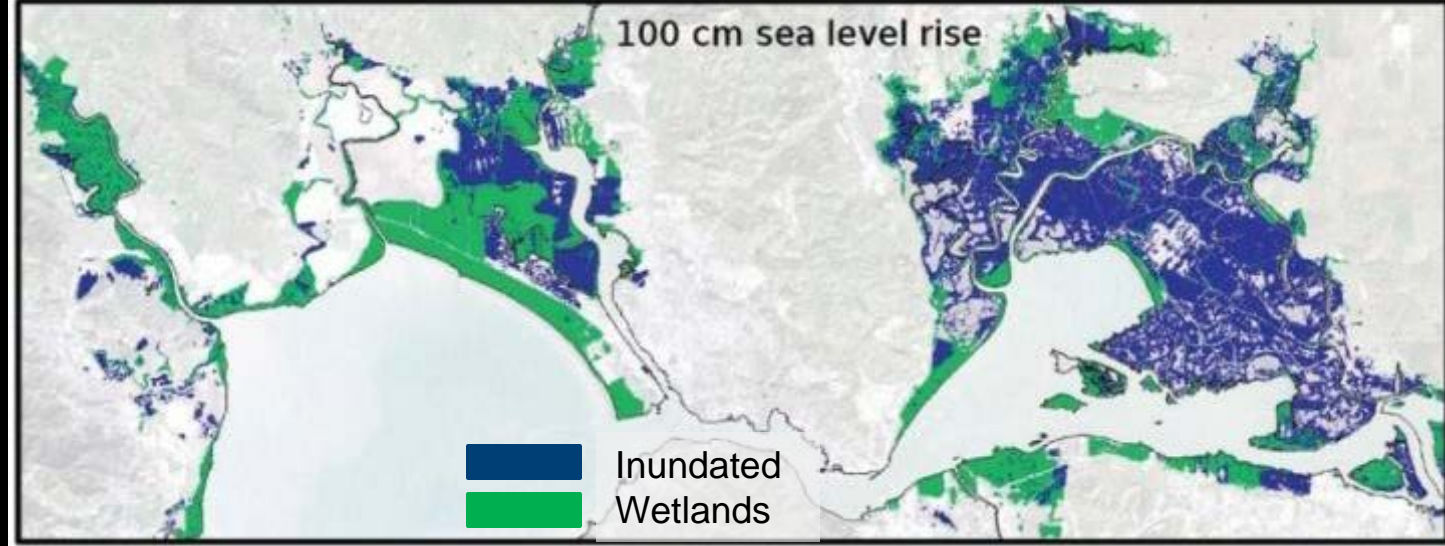
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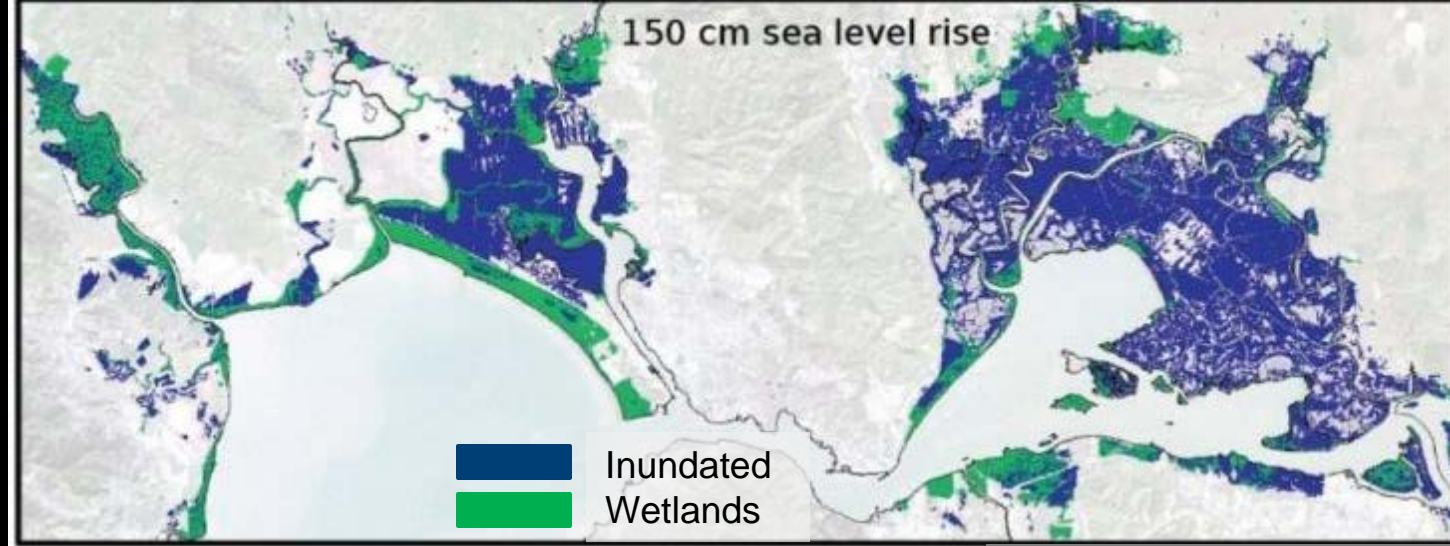
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2100 estimated rise

# Sea Level Rise Marshes

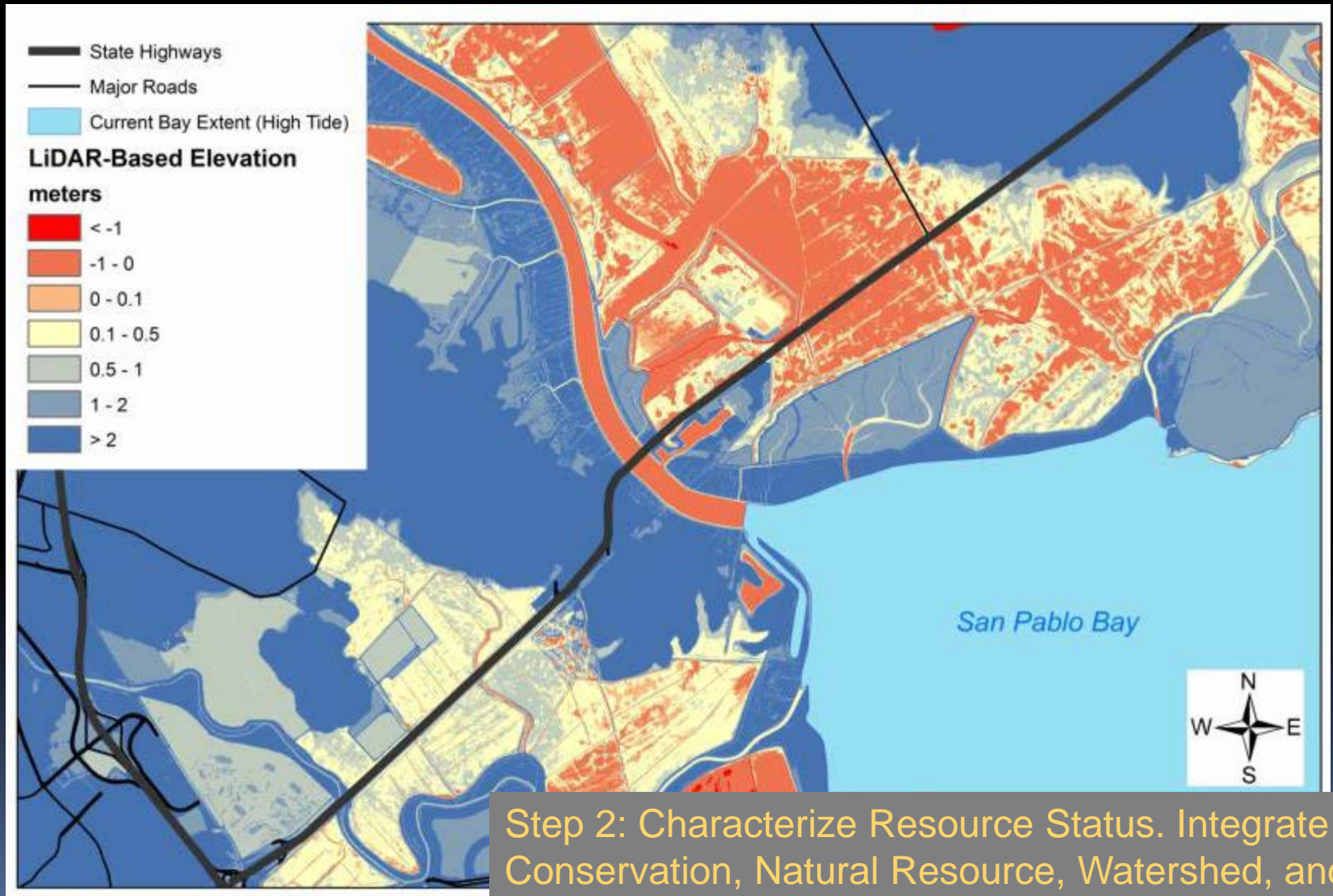
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Bay Area-wide, \$48 billion in infrastructure at risk from 1 meter rise in sea level (Gleick and Maurer, 1990)

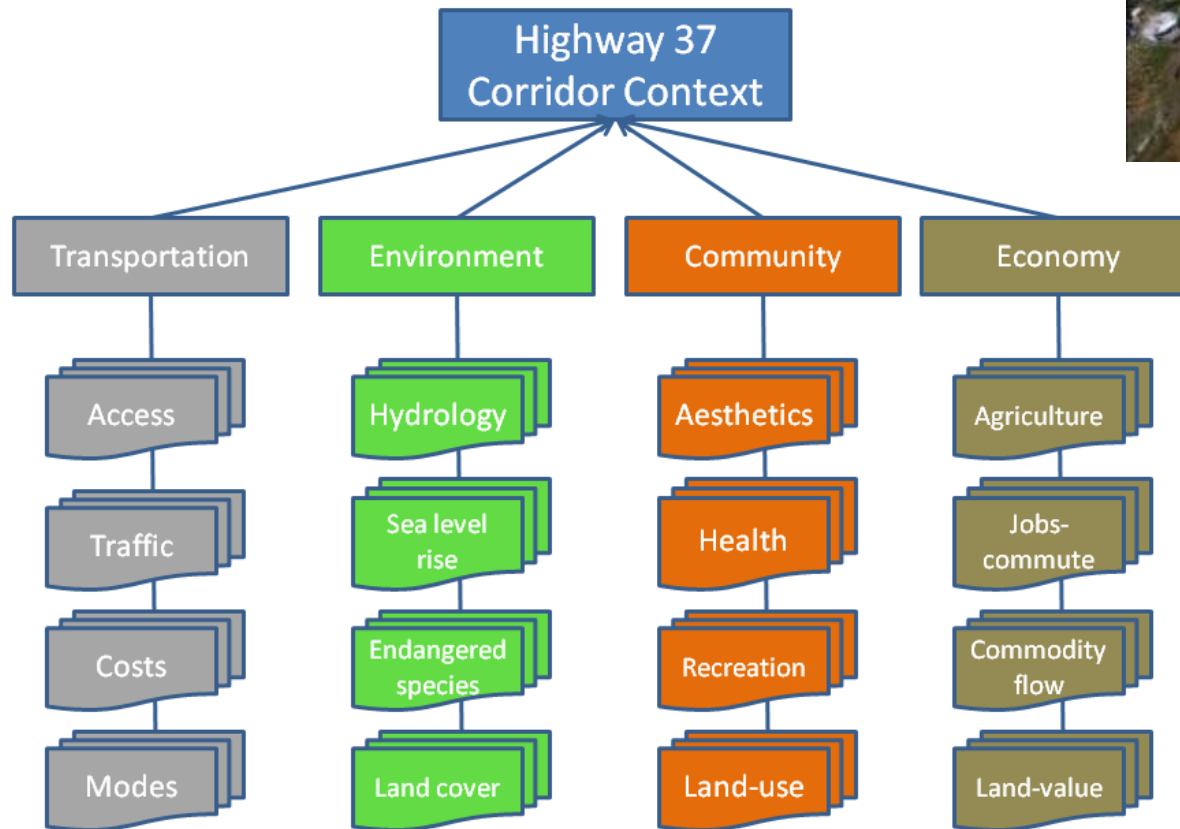
Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans

# Sea Level Rise – Highway



Step 2: Characterize Resource Status. Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans

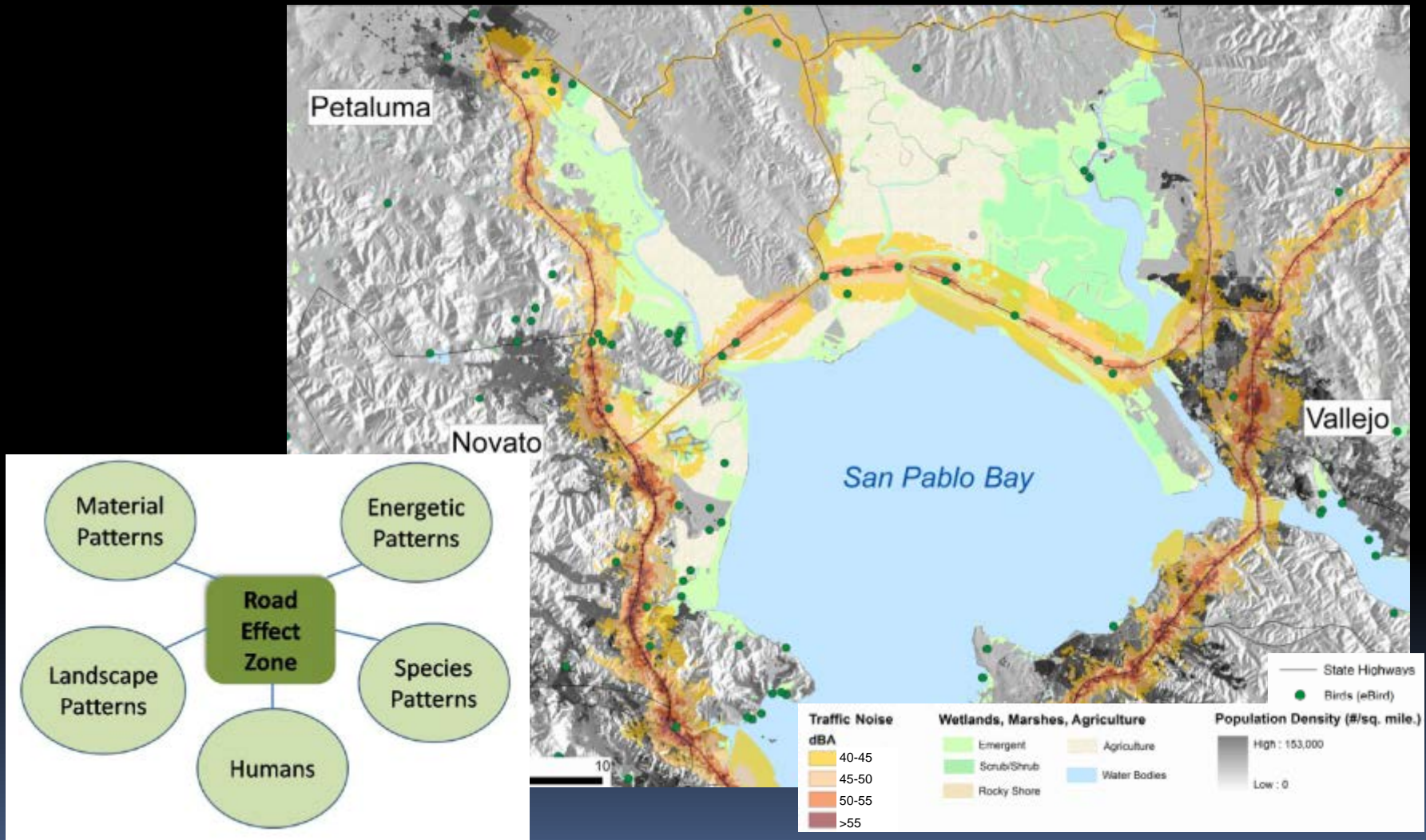
# The Corridor Context



Step 3: Create Regional Ecosystem Framework  
(Conservation Strategy + Transportation Plan)



# Accounting for Impacts



Step 4: Assess Land Use and Transportation Effects on resource conservation objectives identified in the REF



# Corridor options

- No expanded capacity (business-as-usual)
- Expanded footprint, increased capacity
- Causeway, increased capacity
- Strategic co-alignment
- Tunnel under San Pablo Bay





# Corridor Options

- No expanded capacity (business-as-usual)
  - Cost-effective (short-term), supports rural character, future risk increases with sea level rise
- Expanded footprint, increased capacity
  - Costly, provides capacity, harms rural character and environment, unknown adaptation to sea level rise
- Causeway, increased capacity
  - Costly, good for rural character and environment, provides capacity, adaptive to sea level rise
- Strategic co-alignment
  - Cost-effective, good for environment, does not provide capacity, adaptive to sea level rise
- Tunnel
  - Costly, good for environment, provides capacity, adaptive to sea level rise

# Valuing Scenarios & Crediting

Accounting for Impacts (avoidance, acres, intensity, fiscal equivalents)

Community survey (values, choices, trade-offs)

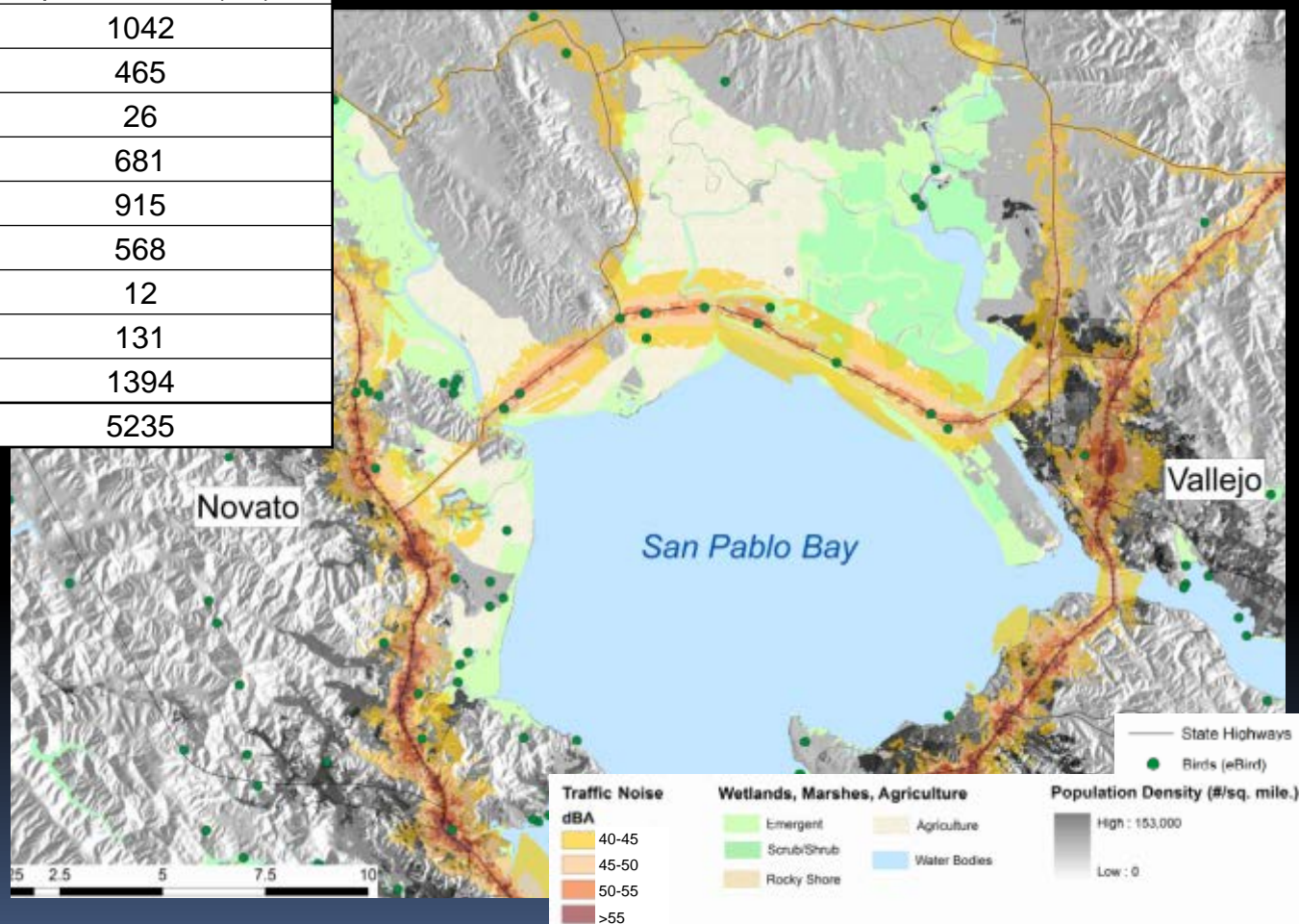
Credits – land, \$, avoided harm

Source: <http://fws.gov>



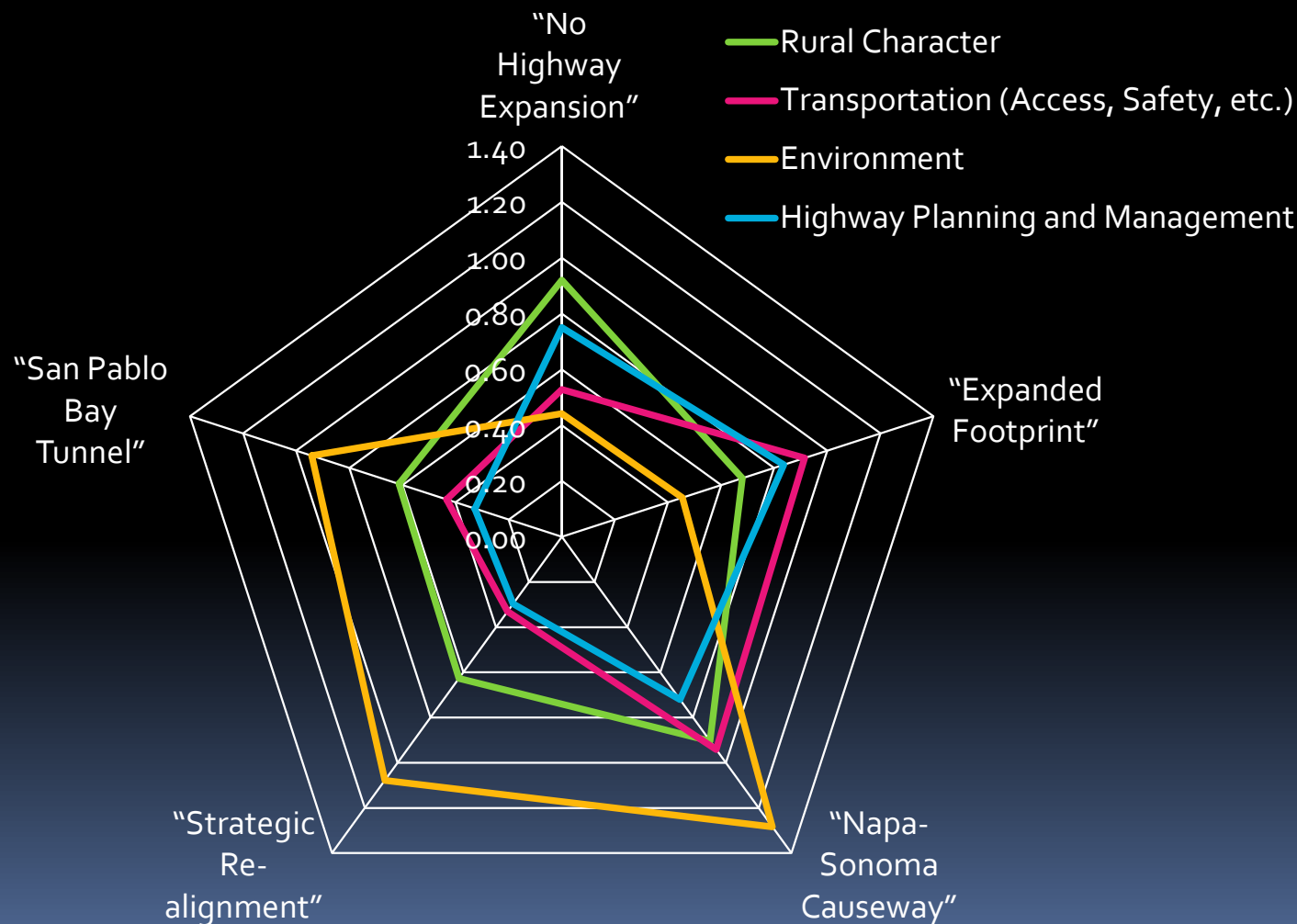
# Accounting for Impacts

Land Cover Type	Impacted Area (Ha)
Lacustrine	1042
Annual Grass	465
Coastal Oak Woodland	26
Urban	681
Saline Emergent Wetland	915
Fresh Emergent Wetland	568
Blue Oak Woodland	12
Barren	131
Cropland	1394
Total	5235



# Valuing Scenarios

Community survey (n=525)



Step 6: Develop Crediting Strategy

# Early Regulatory Consultation

- No expanded capacity (business-as-usual)
  - Permits for emergency repair and small-scale “improvements”
- Expanded footprint, increased capacity
  - Permits not likely to be awarded without legislative action
- Causeway, increased capacity
  - “Self-mitigating”, permits for construction
- Strategic co-alignment
  - Permits for removal of roadway
- Tunnel
  - Permits for construction, removal of roadway

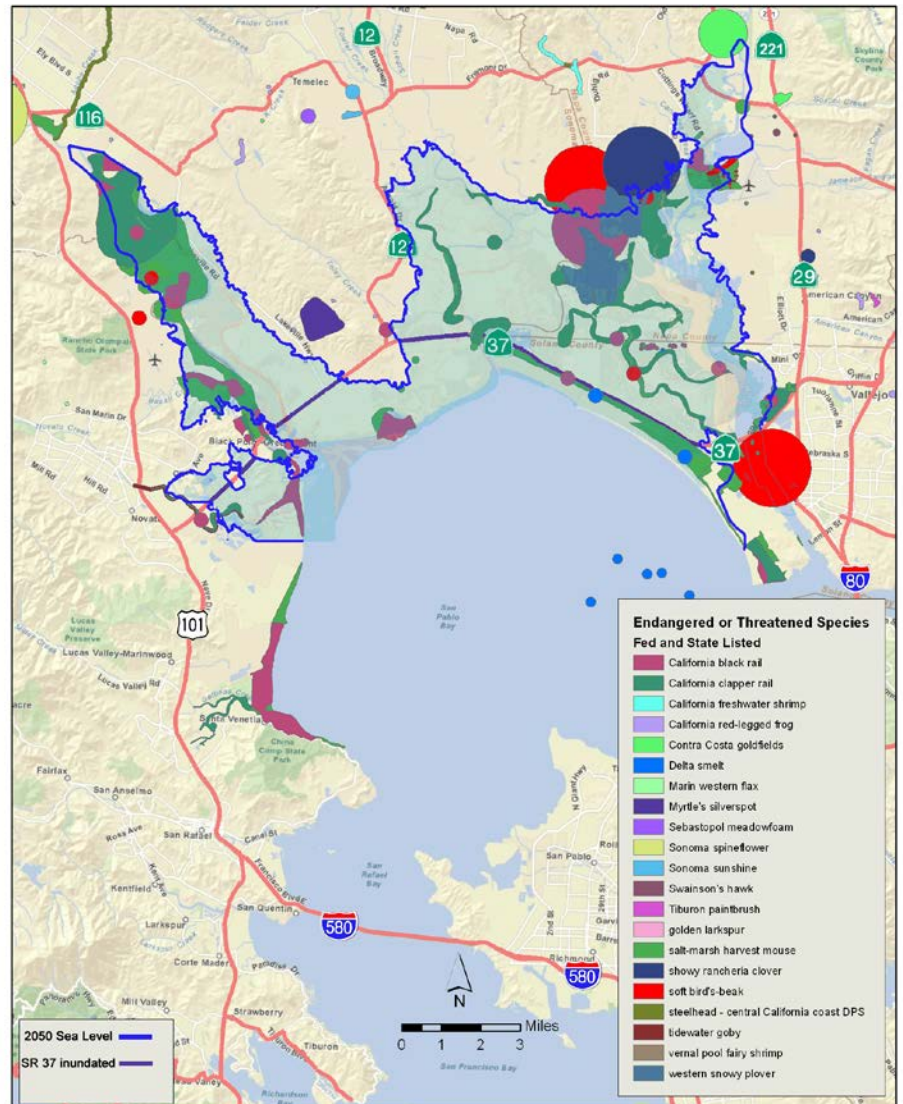




# Questions?



# Phase II: State Route 37 Integrated Traffic, Infrastructure and Sea Level Rise Analysis: Goals, Milestones, & Outputs



Listed Species Map

# Goals

- Maintain and improve transportation corridor benefits and develop long-term solutions for the corridor
- Determine how to support large-scale restoration of tidal and other marshes to benefit native species, ecological processes, and decrease the severity of storm and tidal action on coastal infrastructure



# Tasks

- Task 1. Inundation Mapping
- Task 2. Vulnerability and Risk Assessment
- Task 3. Engineering Concept Design; Engineering Cost Estimation; 3D Visualization
- Task 4. Environmental and Community Benefits
- Task 5. Stakeholder Engagement
- Task 6. Project Reporting and Website



# Timeline

Tasks/Sub-tasks	FY 2014/15												FY 2015/16											
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F		
Execute Contract																								
1. Inundation Assessment of Transportation System and Associated Lands																								
1a. Assessment of SLR Maps, incl. overtopping potential maps																								
1b. Memo with methods and results																								
2. Vulnerability Assessment for Existing Transportation System																								
2a. Risk assessment memo for 3 SLR scenarios + vulnerability assessment																								
3. Design and Cost Estimates																								
3a. Designs: plans, profiles, cross-sections																								
3b. Cost estimates																								
3c. 3D simulations of 3 engineered scenarios																								
4. Environmental and Community Benefits for Future Scenarios																								
4a. Report of community and environmental benefits																								
5. Stakeholder Involvement																								
5a. Quarterly stakeholder meetings																								
5b. Bimonthly small group meetings																								
5c. Three presentations to CT upper management and critical stakeholders at the same time or in place of the bimonthly/quarterly meetings (5a)																								
6. Project Management and Technical Reporting																								
6a. Task reporting and presentation to sponsor																								
6b. Project website to support stakeholders and future project development																								
6c. Technical paper submitted and presented at TRB 2015																								







# Task 1. Inundation mapping


- Based on SCC LiDAR data (high-resolution elevation data)
- Include analysis of MHHW with sea level rise and storm surge of varying intensity
- Include analysis of currently-protected areas with over-topping analysis







## Task 2. Vulnerability and risk assessment

- Assess exposure and sensitivity of SR 37 to inundation
  - Likelihood of impacts, consequences of impacts
  - Estimated and acceptability of risk
- 




# Task 3a. Engineering concept design

- 3 concepts modeled – roadway on levee, roadway on monopods, and roadway on trellis
  - Engineering concept designs of each
- 



## Task 3b. Engineering cost estimation

- Order of magnitude for each of the 3 alternatives
  - Based on current state of the art contracted highway construction
- 



# Task 3c. 3D visualization of scenarios

- 3D rendering of each scenario under one SLR condition
- Before and after renderings



Source: <http://en.wikipedia.org>

# Task 4. Environmental and community benefits

- Combined vulnerability assessment and possible designs to evaluate benefits and dis-benefits for nature and communities
- Consider rail and transit as other modes for moving freight and people



Source: <http://watchsonomacounty.com>

# Task 5. Stakeholder engagement

- Meet with large group of stakeholders quarterly
- Meet with smaller groups every other month

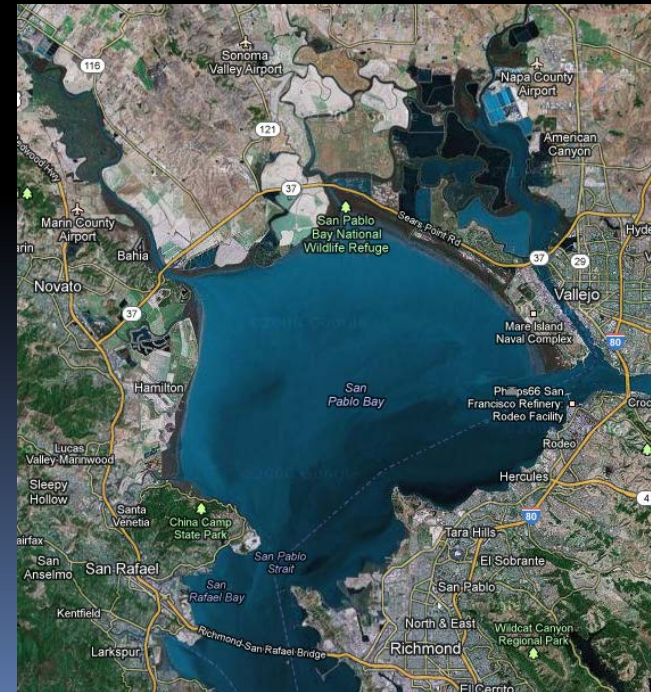


Source: Sonoma Index-Tribune

# Task 6. Project reporting and website

<http://hwy37.ucdavis.edu>


Source: <http://maps.google.com>







# Issues

- Selecting adaptive scenarios
  - Speed of planning and programming vs. speed of sea level rise
  - Conflicting goals
  - Other?
- 



# More Information

<http://hwy37.ucdavis.edu>

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