HUMBOLDT BAY

SEA LEVEL RISE ADAPTATION PLANNING PROJECT

Adaption Planning Working Group

Meeting

October 29, 2014

- State Coastal Conservancy
- Coastal Ecosystems Institute of Northern California
- Humboldt Bay Harbor, Recreation, and Conservation District
- Humboldt County Public Works Department
- Northern Hydrology and Engineering
- Trinity Associates

Regional Collaboration

The goal of the project is to support informed decision-making and encourage unified, consistent regional adaptation strategies to address the hazards associated with sea level rise in the Humboldt Bay region.

AGENDA

1. APWG Stakeholder Updates/Announcements
2. SLR Grant Program Updates: SCC, CCC, and OPC
3. HBSLRAP Project Overview
4. Going Forward SLR Updates-LCPs:
   COE, COA, HCO, and CCC
5. Highway 101 and Agricultural Lands White Papers Review and Comments
6. APWG November 17th Public Meeting
7. HB SLR Adaptation Planning Project Report and Web Page

Introductions and Stakeholder Updates/Announcements

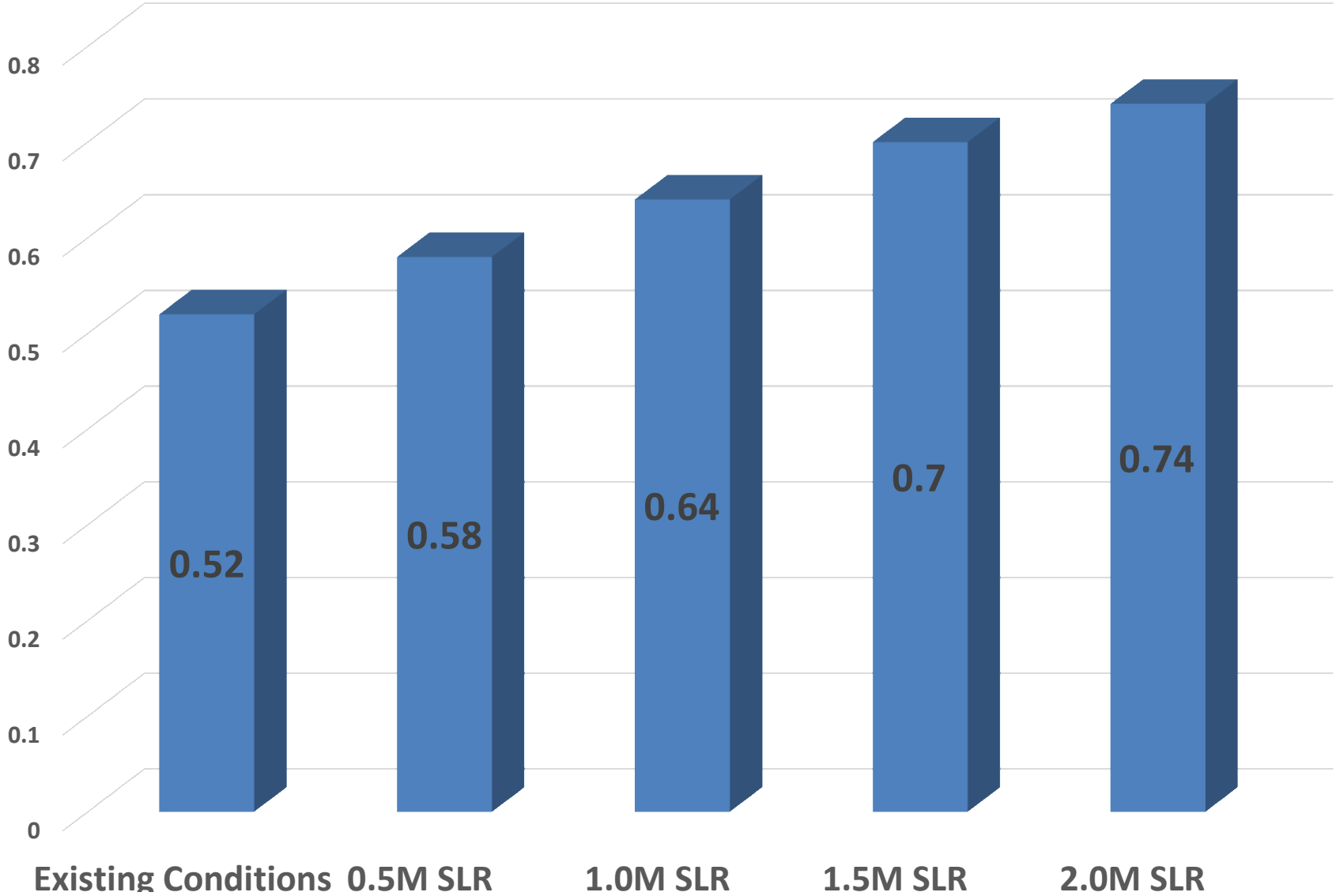

Breached Dike
September 2014

Sea Level Rise Grant Program Updates: CCC/OPC LCP, and SCC Climate Ready, Humboldt County Coastal Resiliency Project

Humboldt Bay
Planning Horizons
Relative Sea Level Rise Estimations

- **Near-term: 2014 to 2030 = 7” [5-11]**
- **Short-term: 2030 to 2050 = 13” [9-23]**
- **Long-term: 2050 to 2100 = 39” [24-64]**

Percent Increase in Bay Footprint as a Result of Shoreline Failure and Sea Level Rise



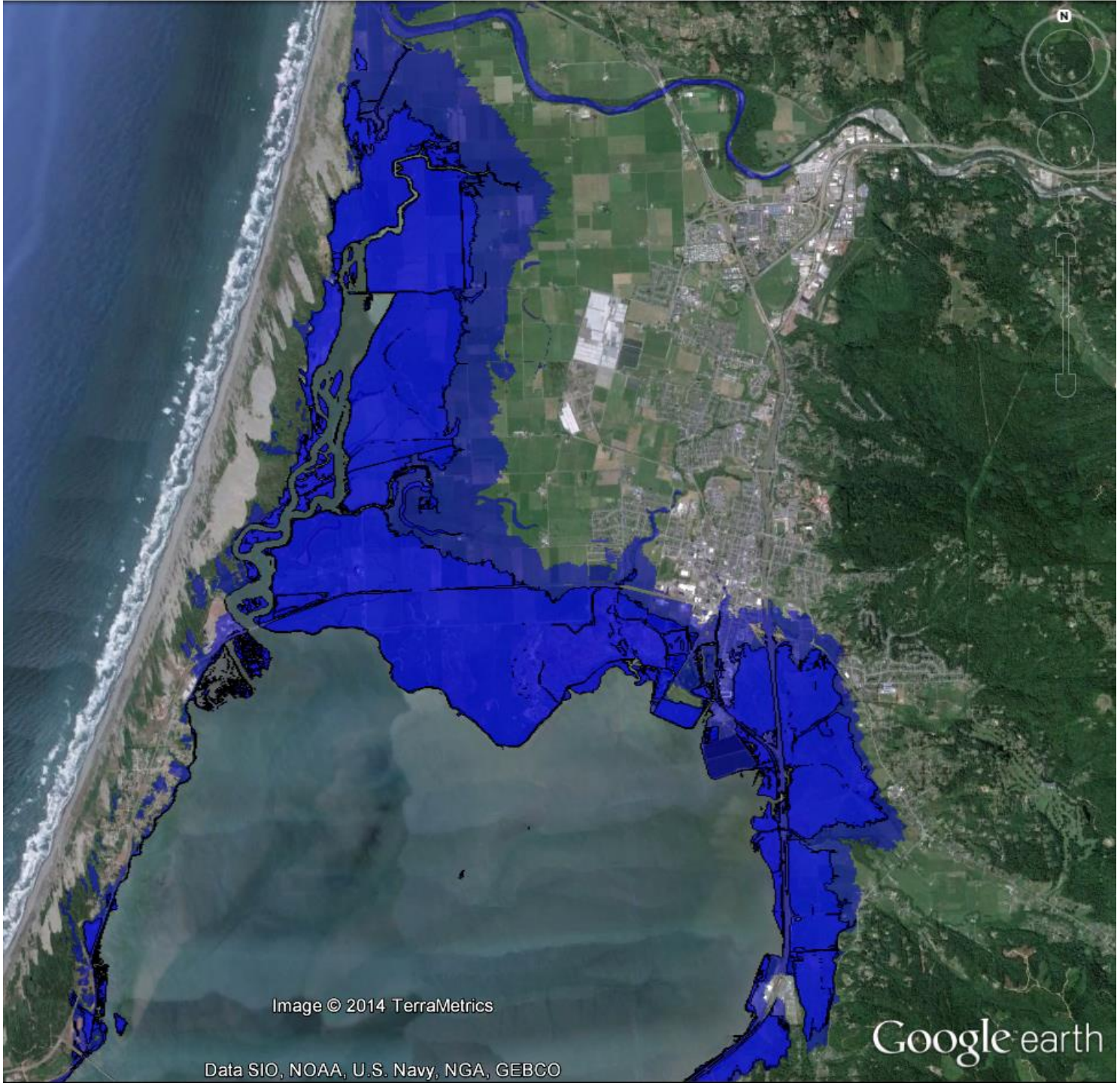


Image © 2014 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

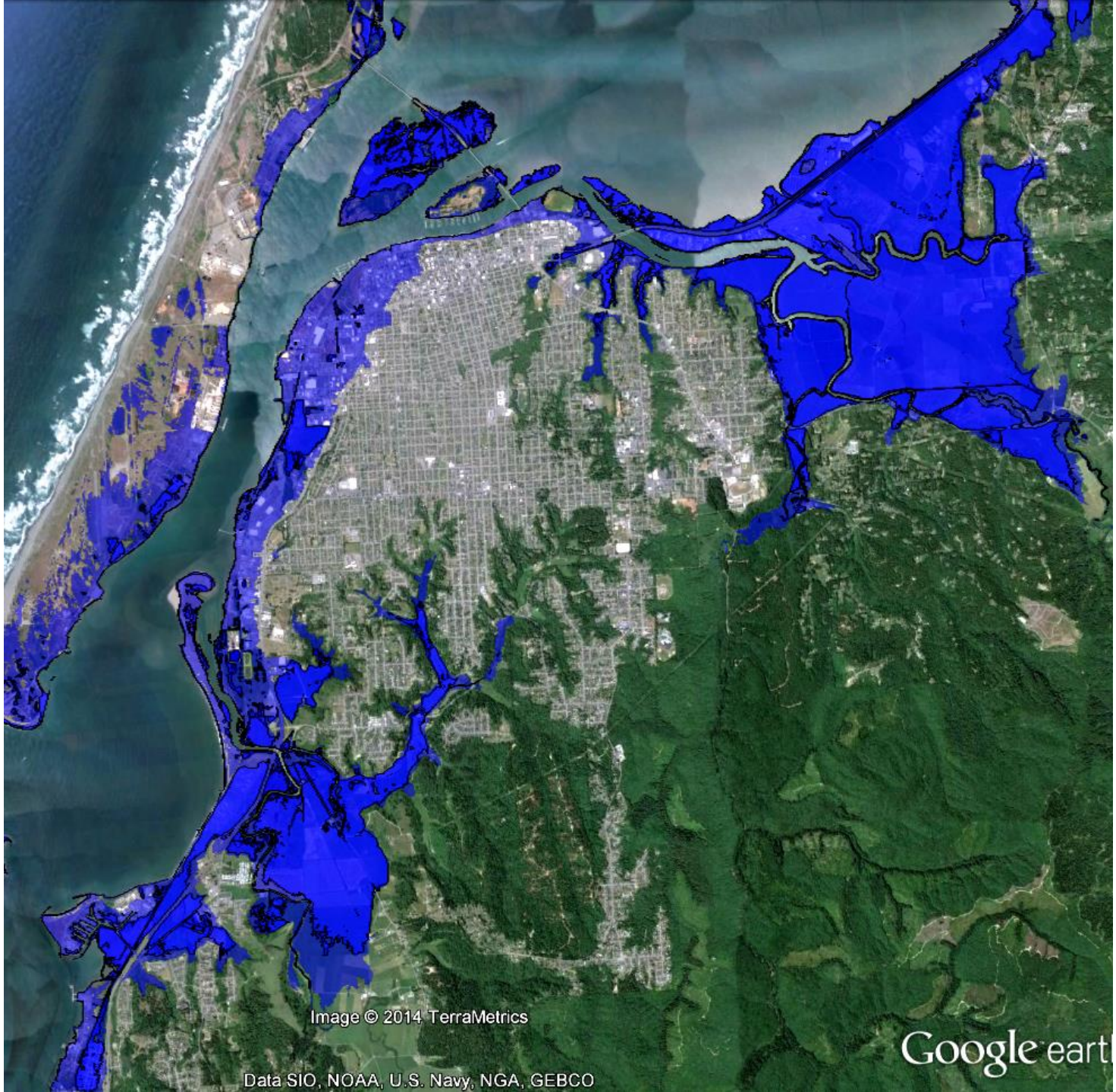


Image © 2014 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

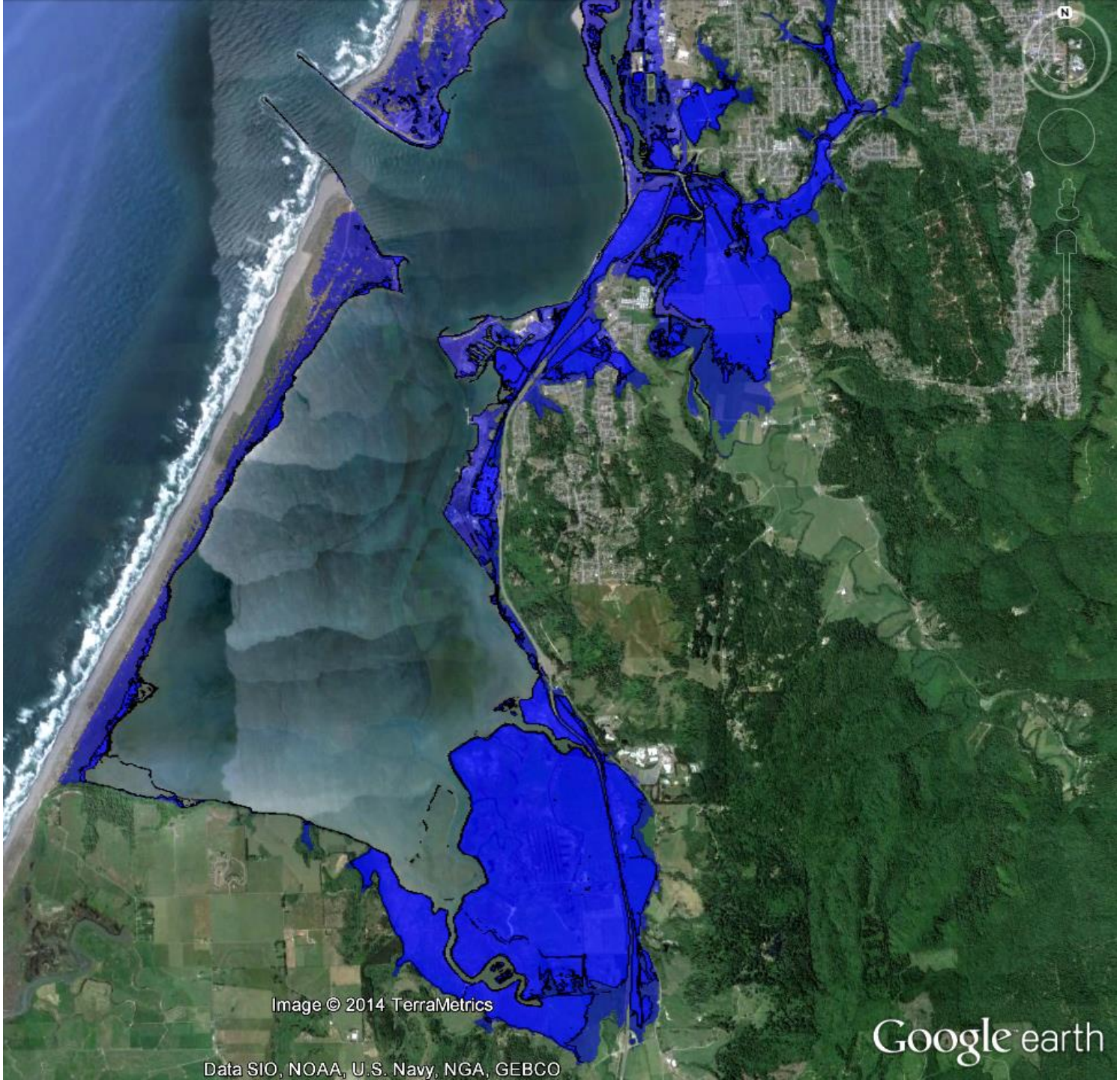


Image © 2014 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

Regional Assets at Risk:
Existing Conditions: 2014-2030

- **Coastal Resources:**
  - Agricultural Lands
  - Seasonal Freshwater Wetlands
- **Underground Utilities:**
  - Municipal water and gas lines
- **Transportation System:**
  - Portions of Highway 101 (SB) and 255 (AB),
  - Portions of local streets and roads (MRS, ES, ERS)
- **Urban Areas:**
  - Jacobs Ave Eureka and South G St Arcata

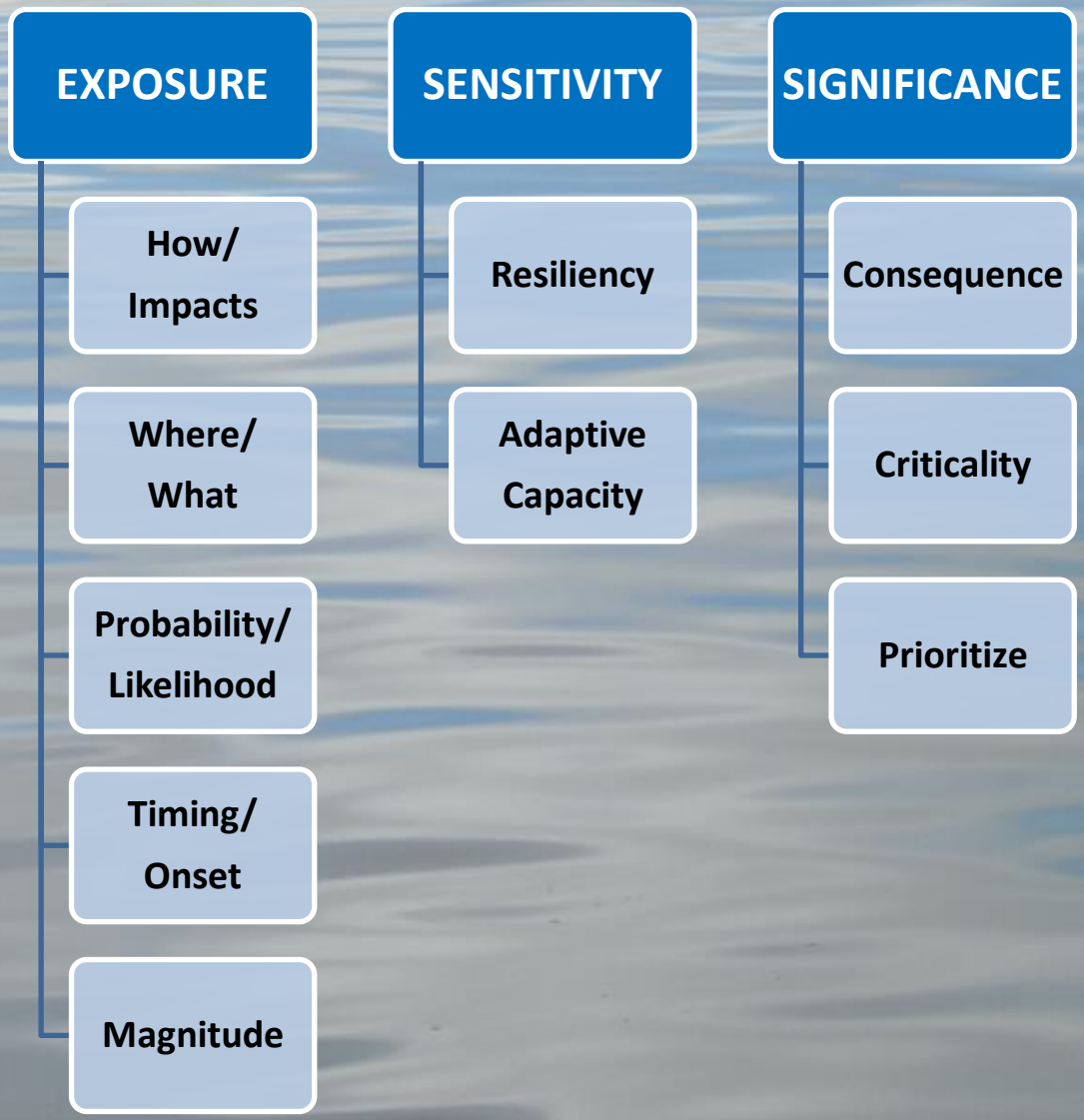
Regional Assets at Risk:
0.5 meter RSLR: 2050

- **Transportation System:**
  - Highway 101 and 255 (AB and SB)
  - Local streets and roads
- **Infrastructure:**
  - Arcata WWTF
  - Chevron Fuel Depot
- **Underground Utilities:**
  - Stormwater, wastewater, drinking water, gas, electrical and communications
- **Communities:**
  - King Salmon, and Fields Landing

Regional Assets at Risk:
1.0 meter RSLR: 2100

- **Transportation System:**
  - Highway 255 and 101 (AB, ERS, SB)
  - Local streets and roads
- **Infrastructure:**
  - Eureka WWTF
  - Portions of PG&E Power Plant
  - Marinas
- **Communities:**
  - Fairhaven, West of Broadway Eureka

ASSET RISK ASSESSMENT



ADAPTIVE CAPACITY

is a measure of the ability of the asset owner to address impacts:

Publically vs Privately Owned Assets

Shoreline vs Non-Shoreline

Sea Level Rise Adaptation Strategies

- No Action
- Protect
- Educate
- Regulate
- Adapt
- Relocate

Proposed Weighted Assessment Criteria to Rank Asset Adaptation Options

1. Level of Performance/Effectiveness
2. Usable Life
3. Social Considerations
4. Environmental Considerations
5. Equivalent Annual Cost
6. Flexibility
7. Total Capitol Investment

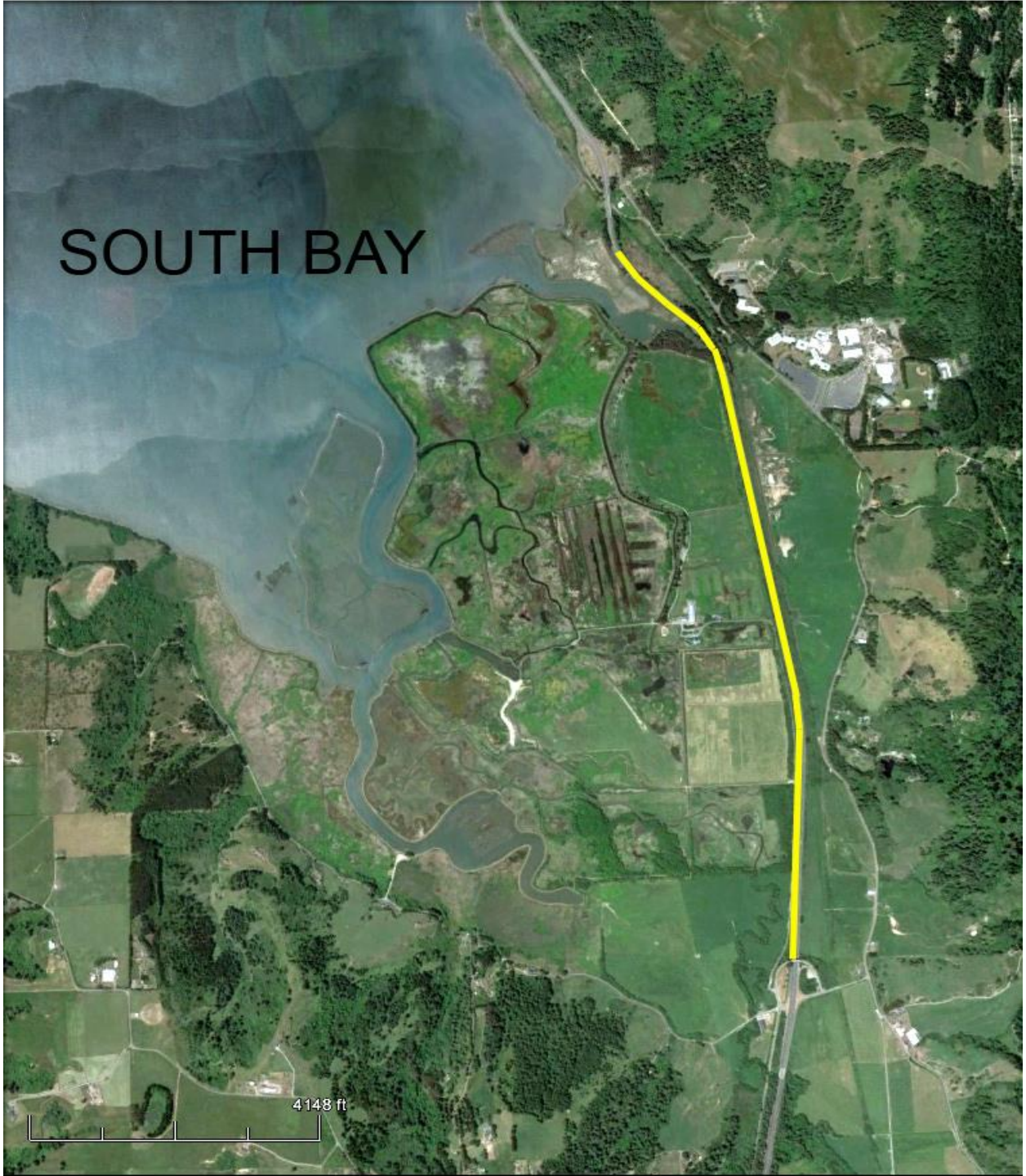
Going Forward: SLR LCP Updates COA, COE, HCO, and CCC

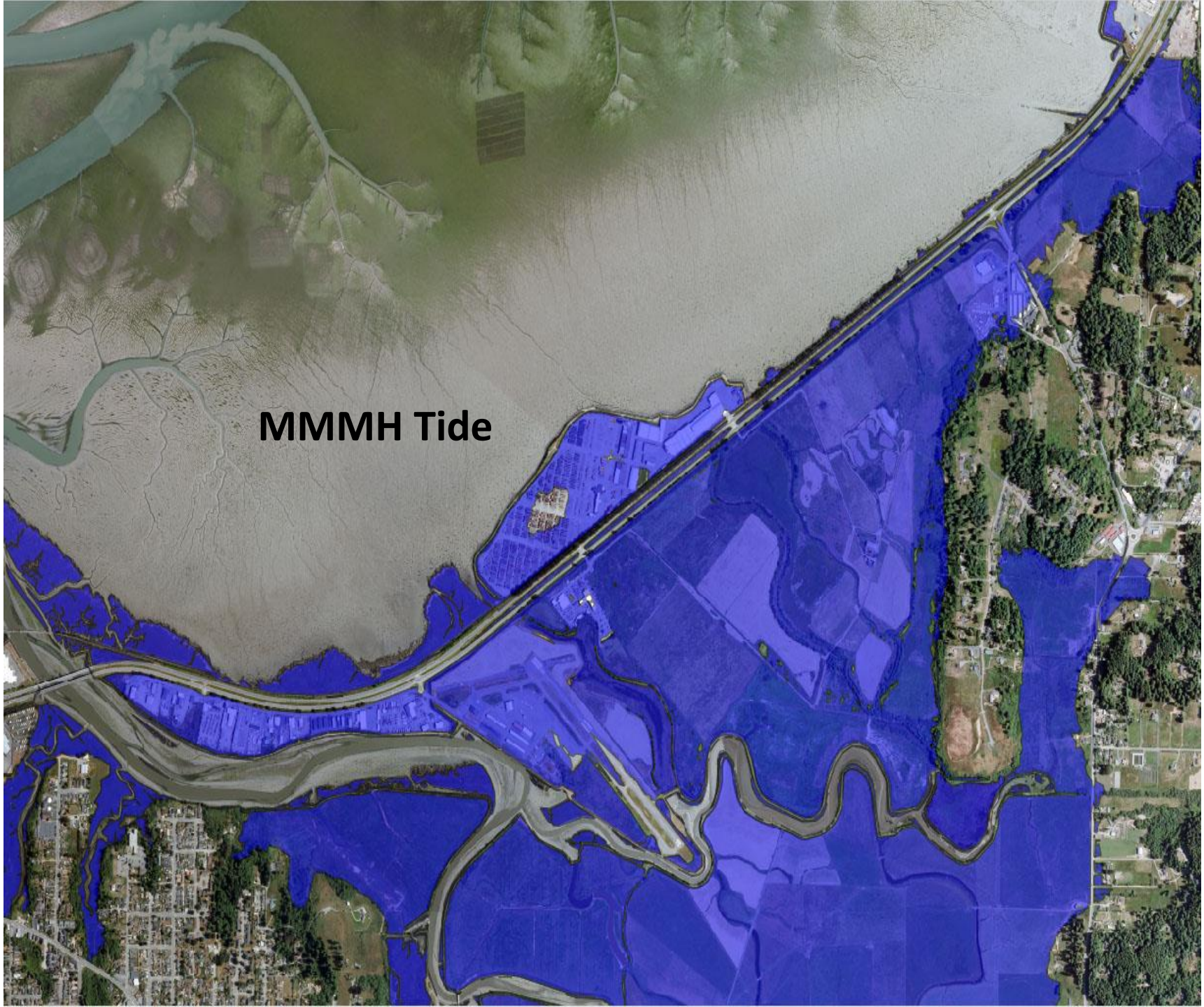
Regional Collaboration

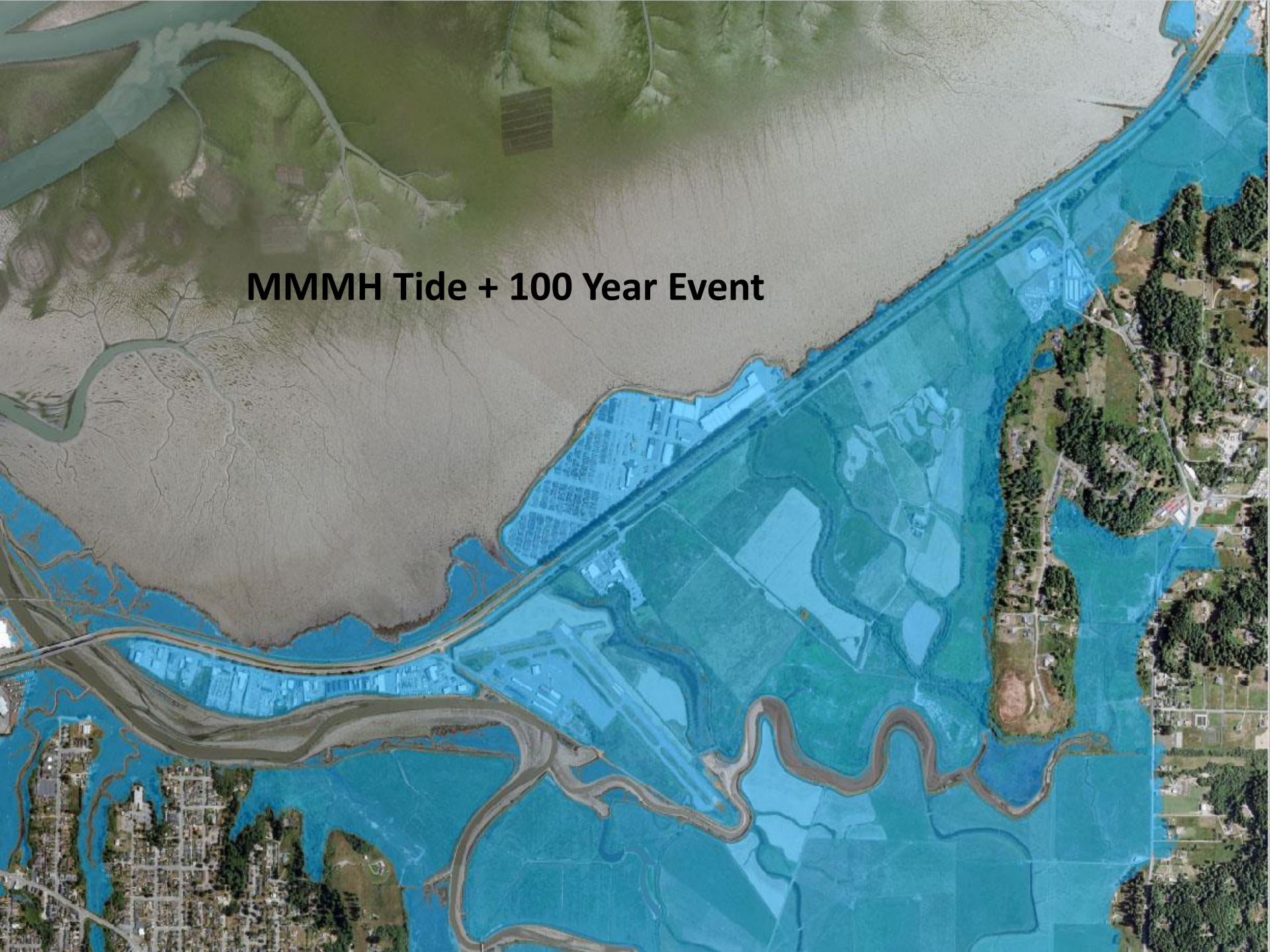
How can the Highway 101 corridor on Humboldt Bay adapt to sea level rise?

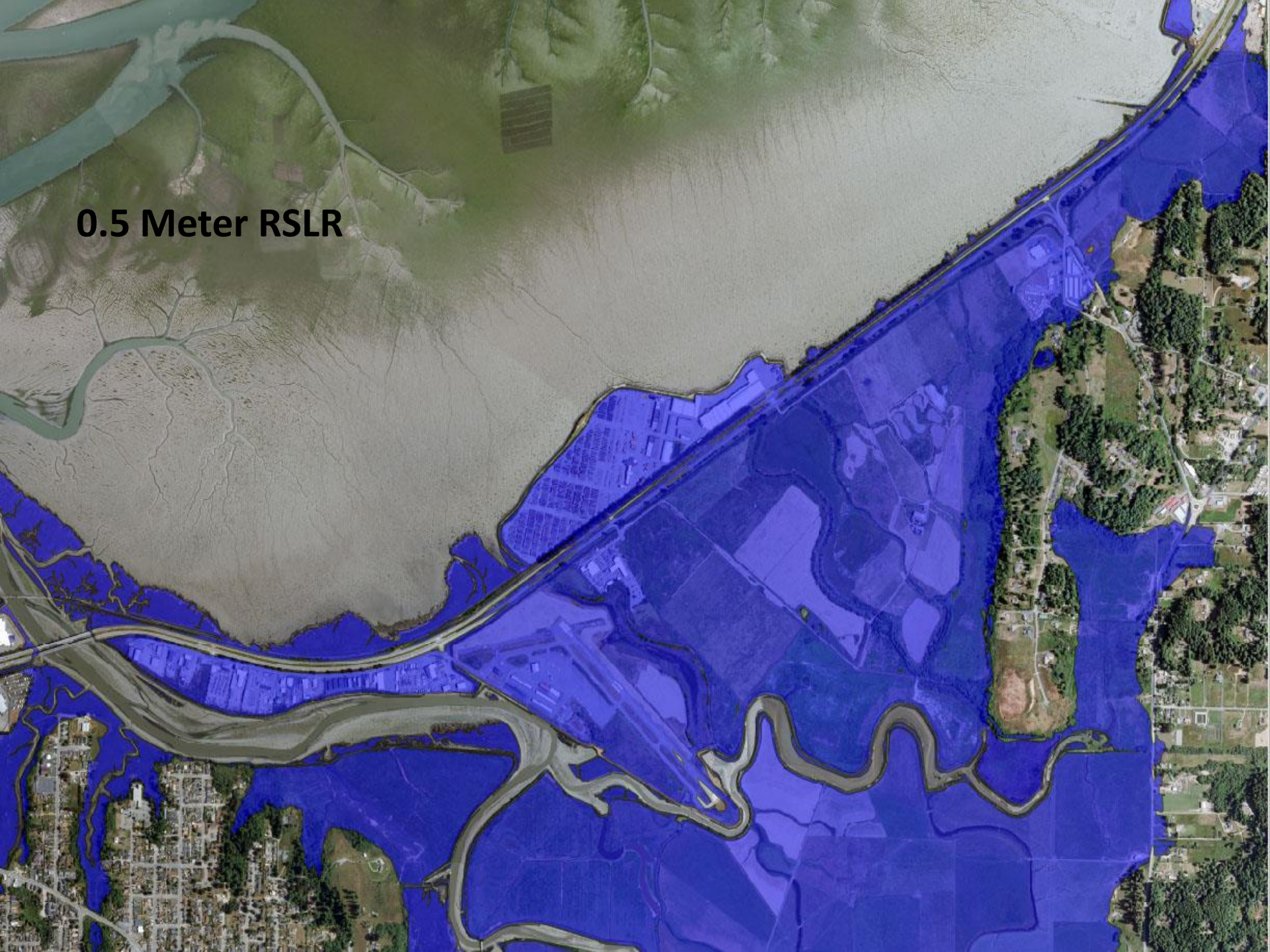

ARCATA
EUREKA
Image © 2014 TerraMetrics
6847 ft


EUREKA
KING SALMON
4158 ft


SOUTH BAY
4148 ft


MMMH Tide


MMMH Tide + 100 Year Event


0.5 Meter RSLR

Highway 101 Inundation

MMMH Tide

- South Bay = Partially Inundated
- Elk River Slough = Causeway
- Arcata Bay = Causeway

0.5 Meters RSLR

- South Bay = Inundated
- Arcata Bay/Lower Reach = Inundated

1.0 Meters RSLR

- Elk River Slough = Inundated
- Arcata Bay/Upper Reach = Partially Inundated

1.5 Meters RSLR

- Arcata Bay/Upper Reach = Inundated

COMMENTS RECEIVED

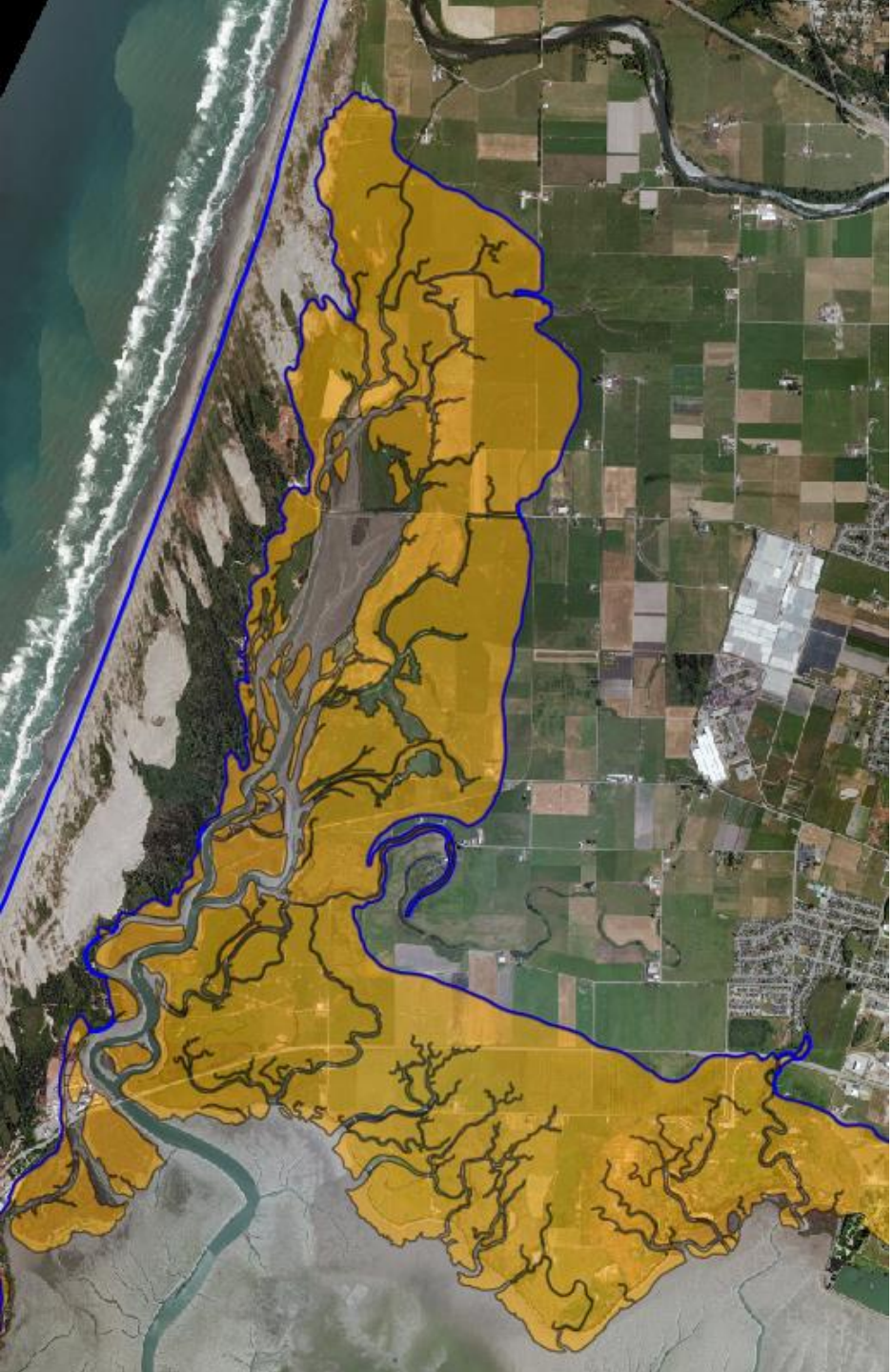
- Appreciate all of the maps
- Need a Bay-wide map to locate segments
- Define adaptation option terms
- Heavy on vulnerability portion which is focused and specific
- Light on adaptation portion which is board and general
- Need conceptual illustrations of adaptation options
- Estimate inundation frequency and duration under each scenario and planning horizon
- Need qualitative estimates of costs
- Need a table summarizing adaptation options, qualitative costs, and out comes

Can agricultural lands and uses on Humboldt Bay adapt to sea level rise?

On Humboldt Bay the Most Vulnerable Areas to Sea Level Rise are:

Agricultural Lands
&
Coastal Freshwater Wetlands

RISING SEA LEVELS & RISING GROUNDWATER & SALT WATER INTRUSION

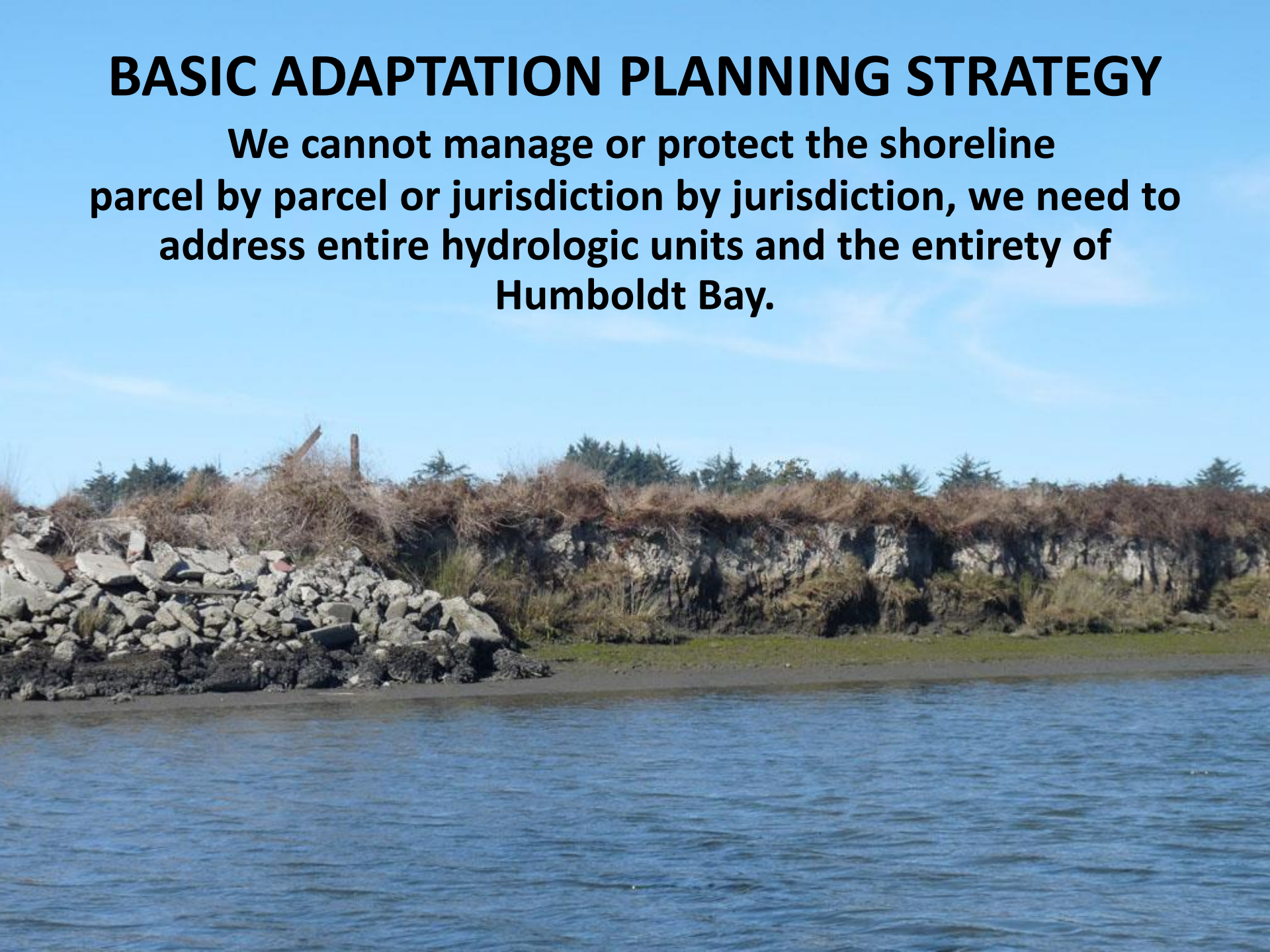


Agricultural Land Types:

- Former Tidelands
- Subsided Lands
- Alluvial Bottom

BASIC ADAPTATION PLANNING STRATEGY

We cannot manage or protect the shoreline parcel by parcel or jurisdiction by jurisdiction, we need to address entire hydrologic units and the entirety of Humboldt Bay.



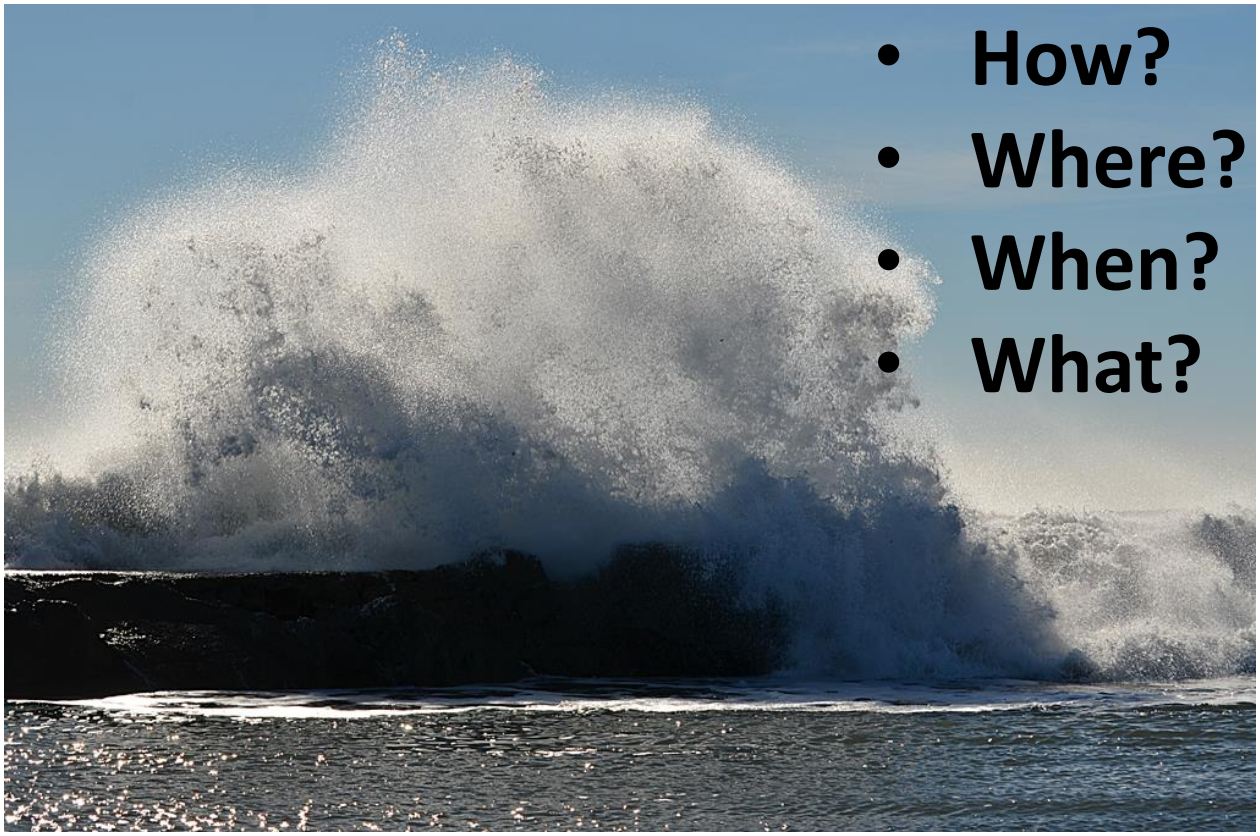
Humboldt Bay
Diked Agricultural Lands
Protect Critical Infrastructure & Utilities:

- Highway 101
- City of Eureka Water Transmission Lines
- PG&E Gas Transmission Lines
- Sewer Lines
- Electrical and Communications

Conclusion

- Dikes on agricultural lands provide protection to critical non-agricultural assets
- Agricultural uses on diked lands will be limited by RSLR to possibly 2075 if adaptation measures are employed
- Partnerships will be required to finance implementation of adaptation measures
- Ultimately, Humboldt Bay will reclaim these diked agricultural lands

Rising Tides on Humboldt Bay



PUBLIC MEETING
November 17, 2014

PUBLIC MEETING
November 17th
6:00 to 8:00 p.m.
HSU Aquatic Center

1. Overview of Humboldt Bay Sea Level Rise Adaptation Planning Project
2. State-funded Sea Level Rise Initiative in Humboldt County
3. Inundation Vulnerability Mapping and Estimates of Relative Sea Level Rise
4. Regional Risk Analysis and Adaptation Strategies and Options
5. Addressing Sea Level Rise in Local Coastal Program Updates
6. Caltrans District 1 Climate Change Pilot Study

HB SLR Adaptation Planning Project Report and Web Page

Humboldt Bay Sea Level Rise Adaptation Planning Project

Recent Updates:
June 2014 Meeting Presentation

April 2014 Inundation Maps: Zip file download

April 2014 Meeting Presentation (pdf file)

Contents

2013-2015
APWG Meeting Schedule:

2013	2014	2015
~~2/27~~	~~2/26~~	01/07
~~4/24~~	~~4/30~~	
~~(7/15)~~	~~6/25~~	
~~8/28~~	~~8/27~~	
~~10/30~~	~~10/29~~	