The Nature Conservancy
Protecting nature. Preserving life.®

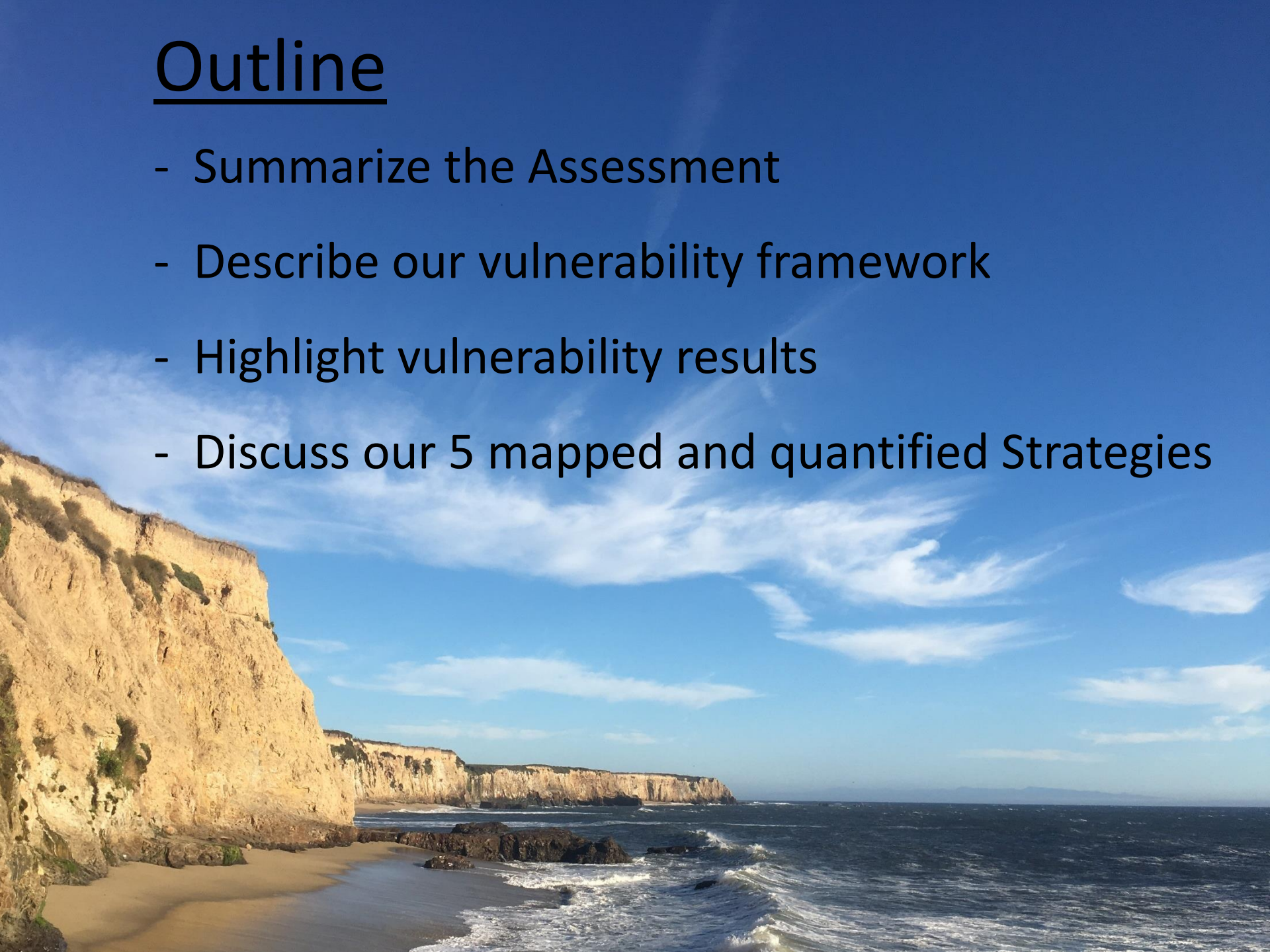
Coastal Conservancy

Conserving California's Coastal Habitats:

A Legacy and a Future with Sea Level Rise

Outline

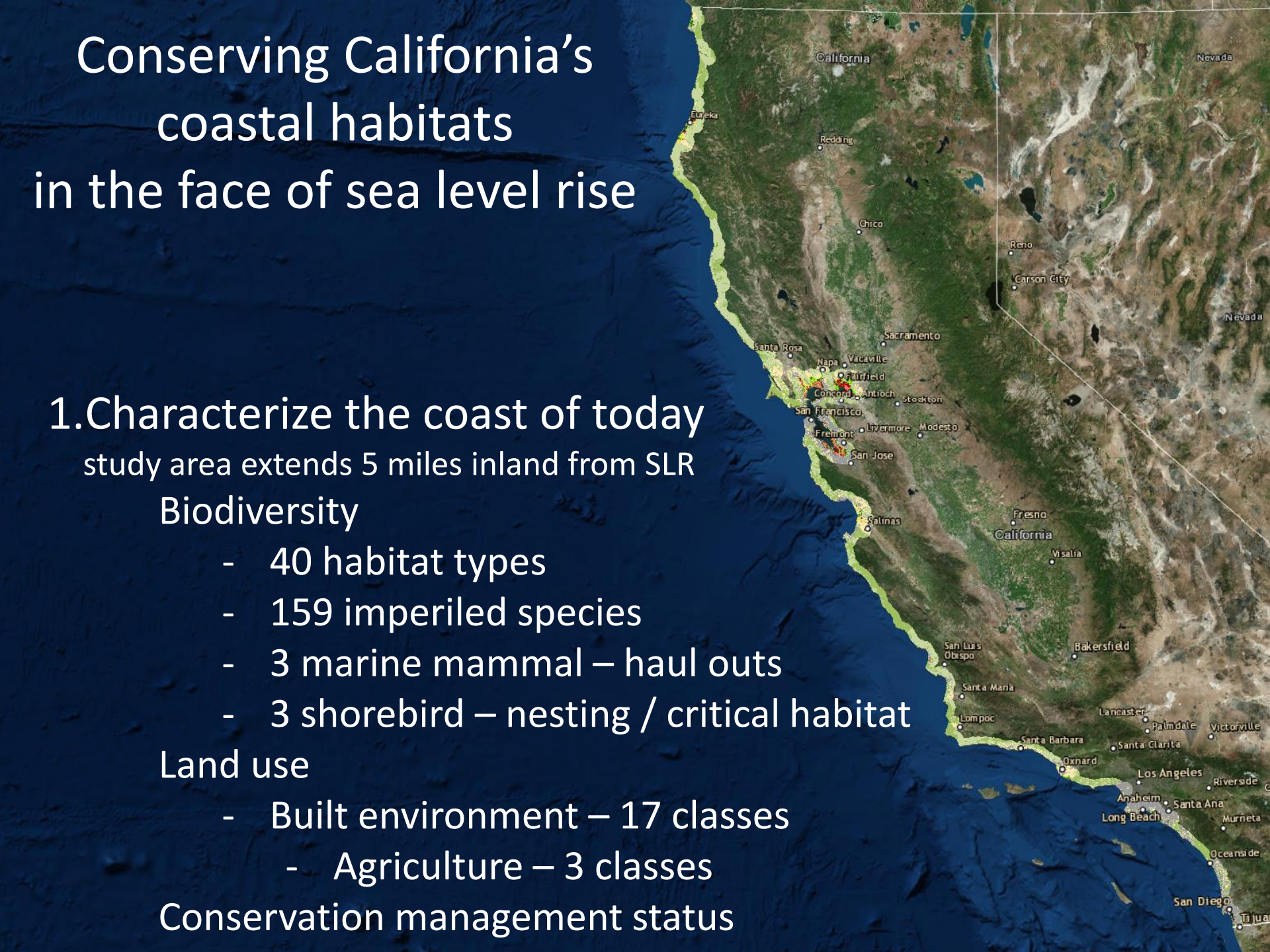
- Summarize the Assessment
- Describe our vulnerability framework
- Highlight vulnerability results
- Discuss our 5 mapped and quantified Strategies




Given sea level rise
and existing land cover and management
is no net loss possible?

Conserving California's coastal habitats in the face of sea level rise

Conserving California's coastal habitats in the face of sea level rise



1. Characterize the coast of today

study area extends 5 miles inland from SLR

Biodiversity

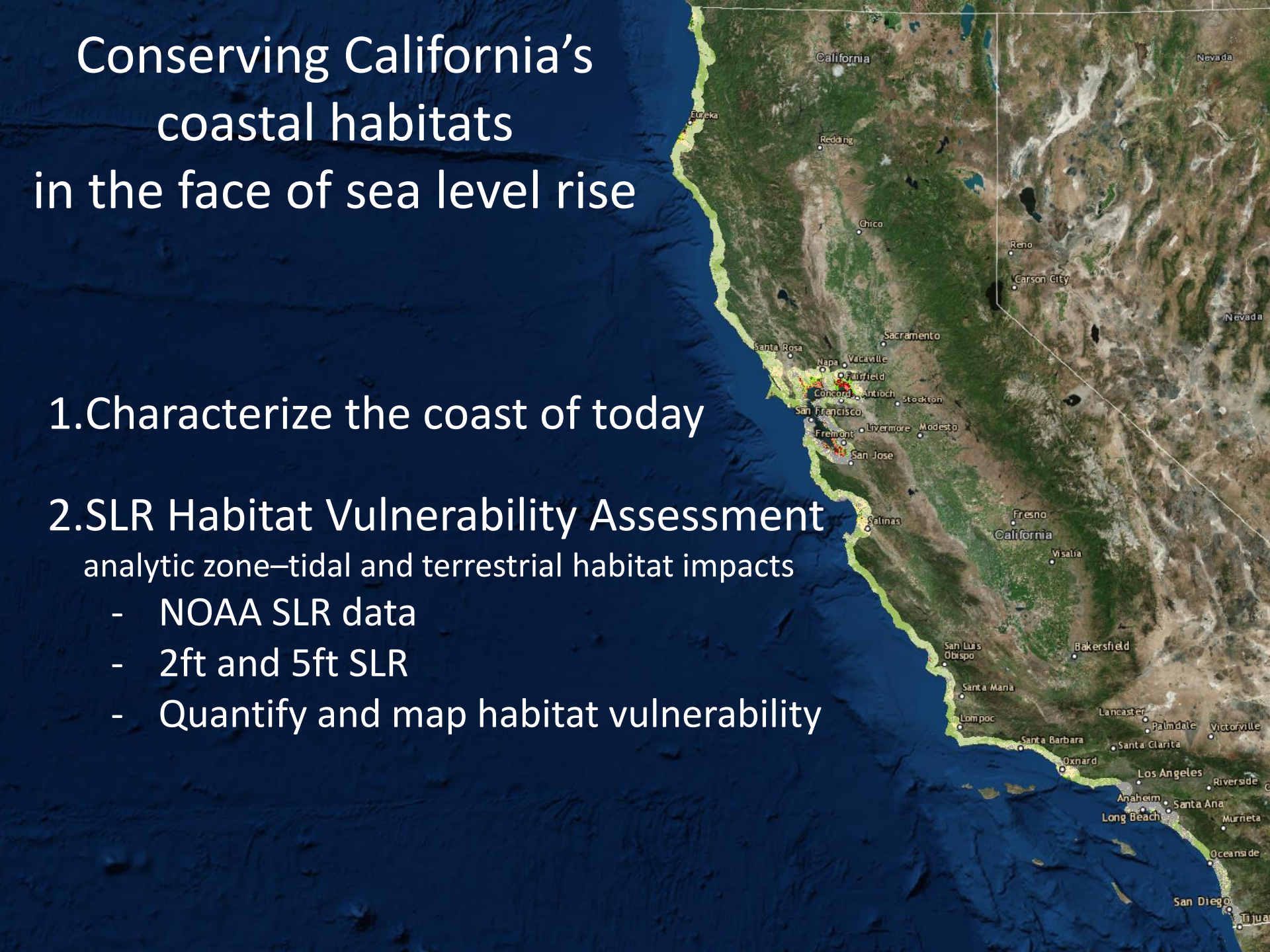
- 40 habitat types
- 159 imperiled species
- 3 marine mammal – haul outs
- 3 shorebird – nesting / critical habitat

Land use

- Built environment – 17 classes
  - Agriculture – 3 classes

Conservation management status

Conserving California's coastal habitats in the face of sea level rise



1. Characterize the coast of today

2. SLR Habitat Vulnerability Assessment

   analytic zone–tidal and terrestrial habitat impacts

   - NOAA SLR data
   - 2ft and 5ft SLR
   - Quantify and map habitat vulnerability

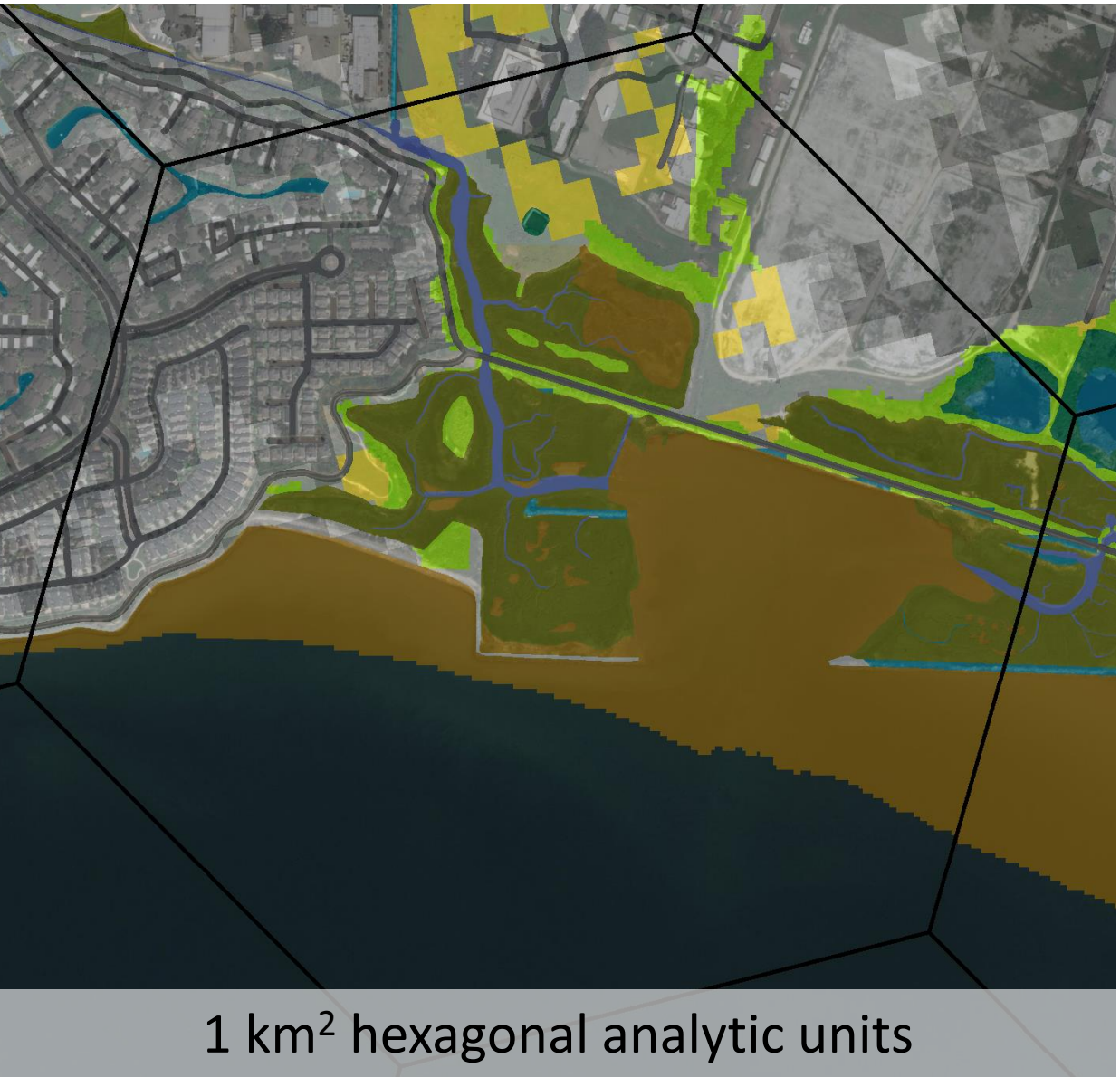
Conserving California's coastal habitats in the face of sea level rise

1. Characterize the coast of today

2. SLR Habitat Vulnerability Assessment

3. Direct conservation:
   - Identified 5 strategies to conserve habitat
   - Quantify and map strategies
   - Statewide prioritization
   - With local detail

High resolution site level spatial data e.g. El Cerrito



1 km^2 hexagonal analytic units

Habitat

- Annual Grassland
- Freshwater Marsh
- Lakes / Ponds
- Irregularly-flooded Estuarine Marsh
- Regularly-flooded Estuarine Marsh
- Tidal Channel
- Tidal Flat and Salt Panne

Built Environment Groups

- Transportation infrastructure
- Developed - high intensity
- Developed - medium intensity
- Developed - low intensity
- Other infrastructure
- Undeveloped uplands

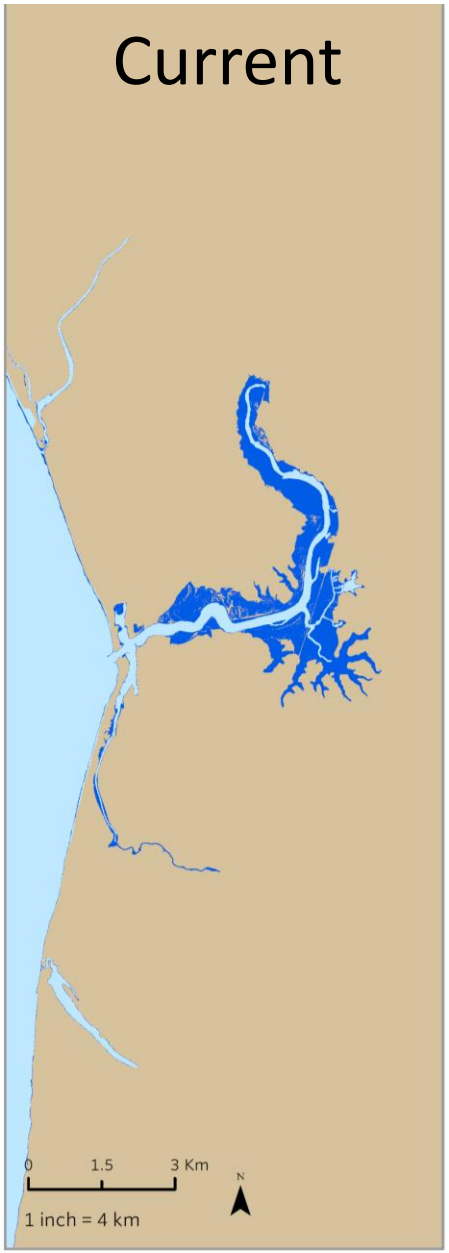
- Coastal Analytic Units

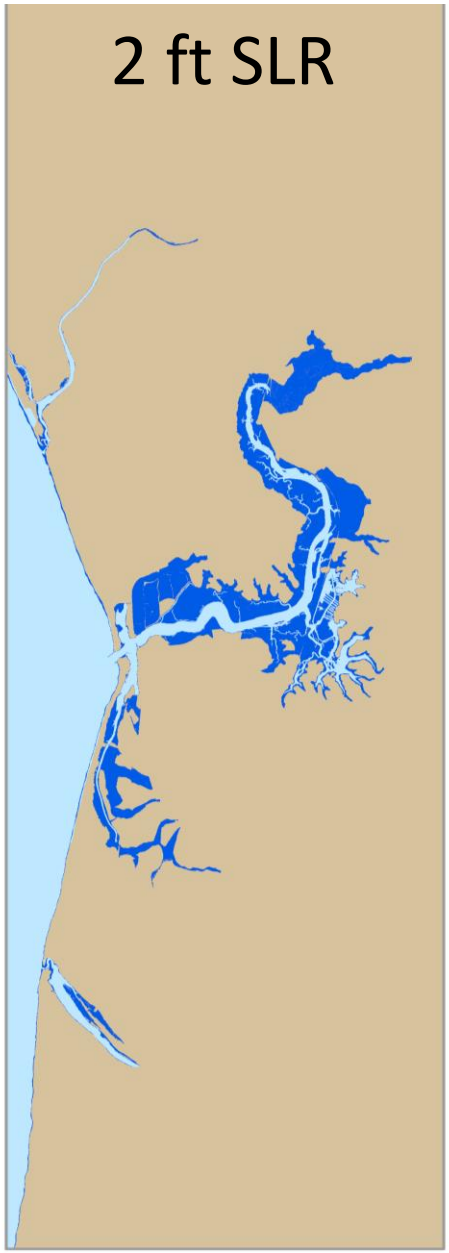
Characterize sea level rise into subtidal and intertidal exposure

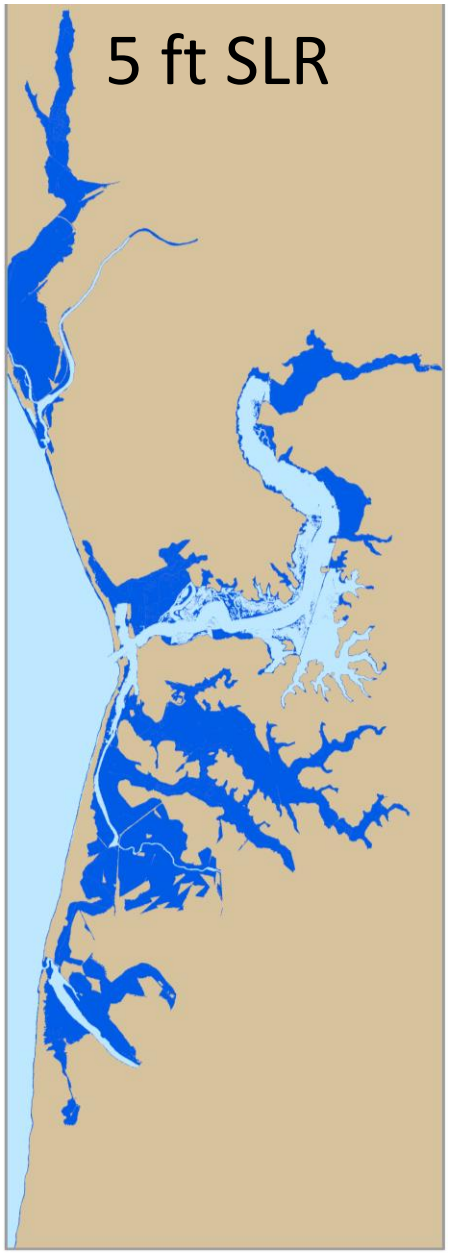
Intertidal

Subtidal

NOAA SLR data

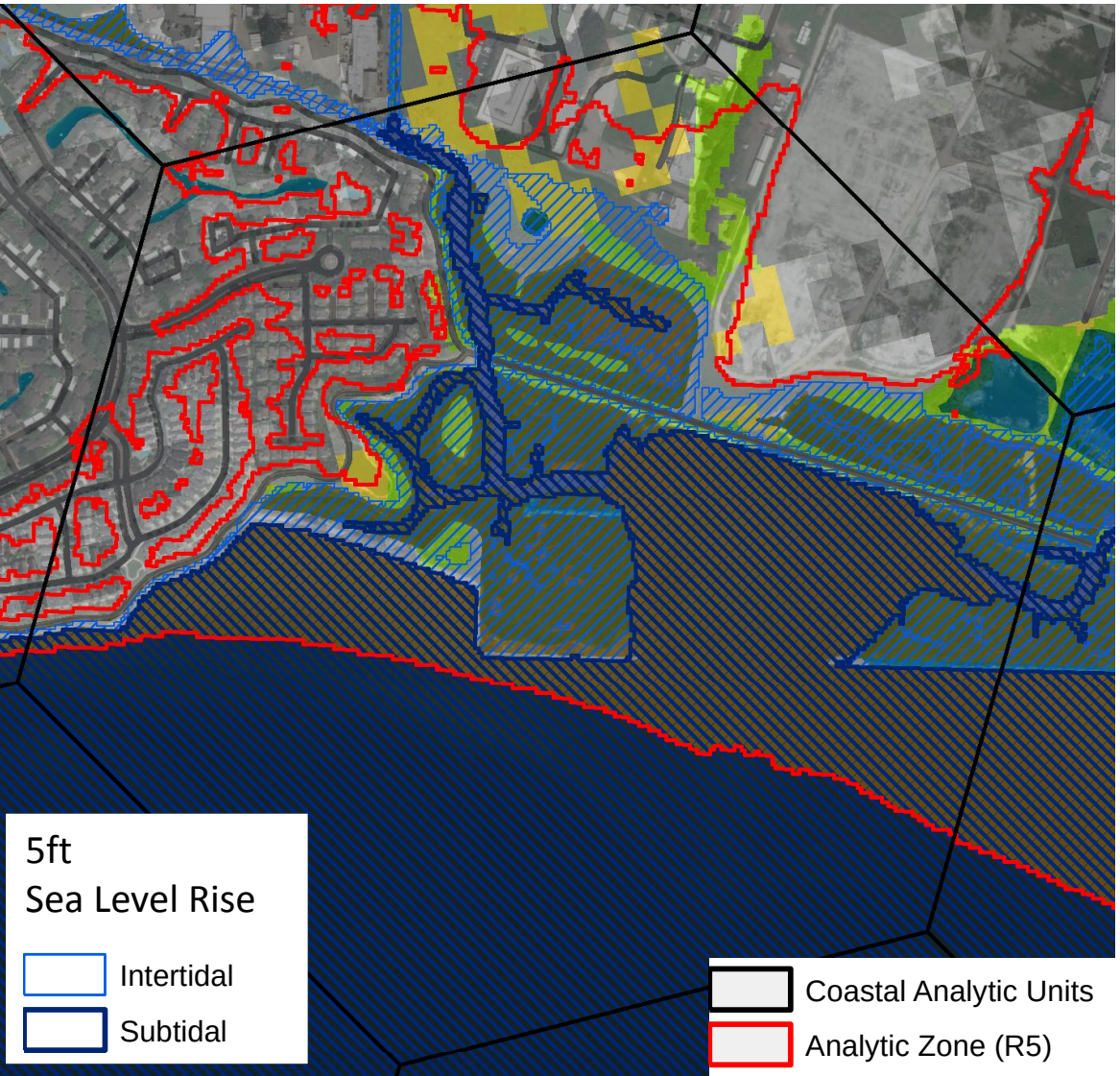






Vulnerability = *Potential Impact / Adaptive Capacity*

Habitat *(Exposure * Sensitivity)* *(room for Transgression)*



Vulnerability bin

More vulnerable
- V = 2 (no Adaptive Capacity)
- 1.5 ≤ V < 2
- 1.2 ≤ V < 1.5

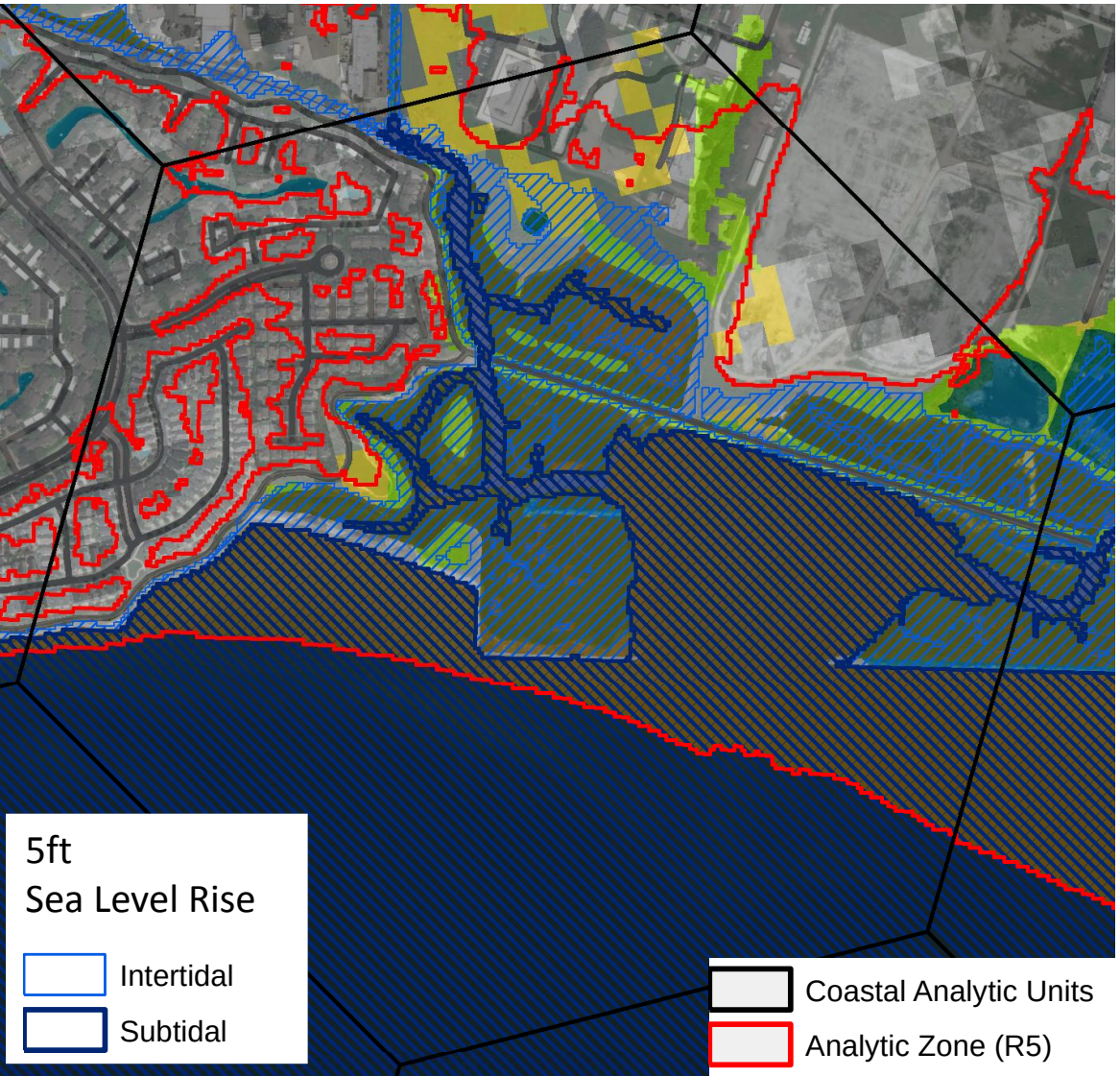
Less vulnerable
- 0.8 ≤ V < 1.2
- 0.5 ≤ V < 0.8
- 0 < V < 0.5
- V = 0 (no Potential Impact)

Habitat

Annual Grassland	V = 0.3
Freshwater Marsh	V = 0.1
Lakes / Ponds	V = 0.5
Irregularly-flooded Estuarine Marsh	V = 1.0
Regularly-flooded Estuarine Marsh	V = 0.7
Tidal Channel	V = 0.1
Tidal Flat and Salt Panne	V = 1.1

Vulnerability = *Area weighted average of all* $V_{habitat}$

Index



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Tidal Channel	V = 0.1
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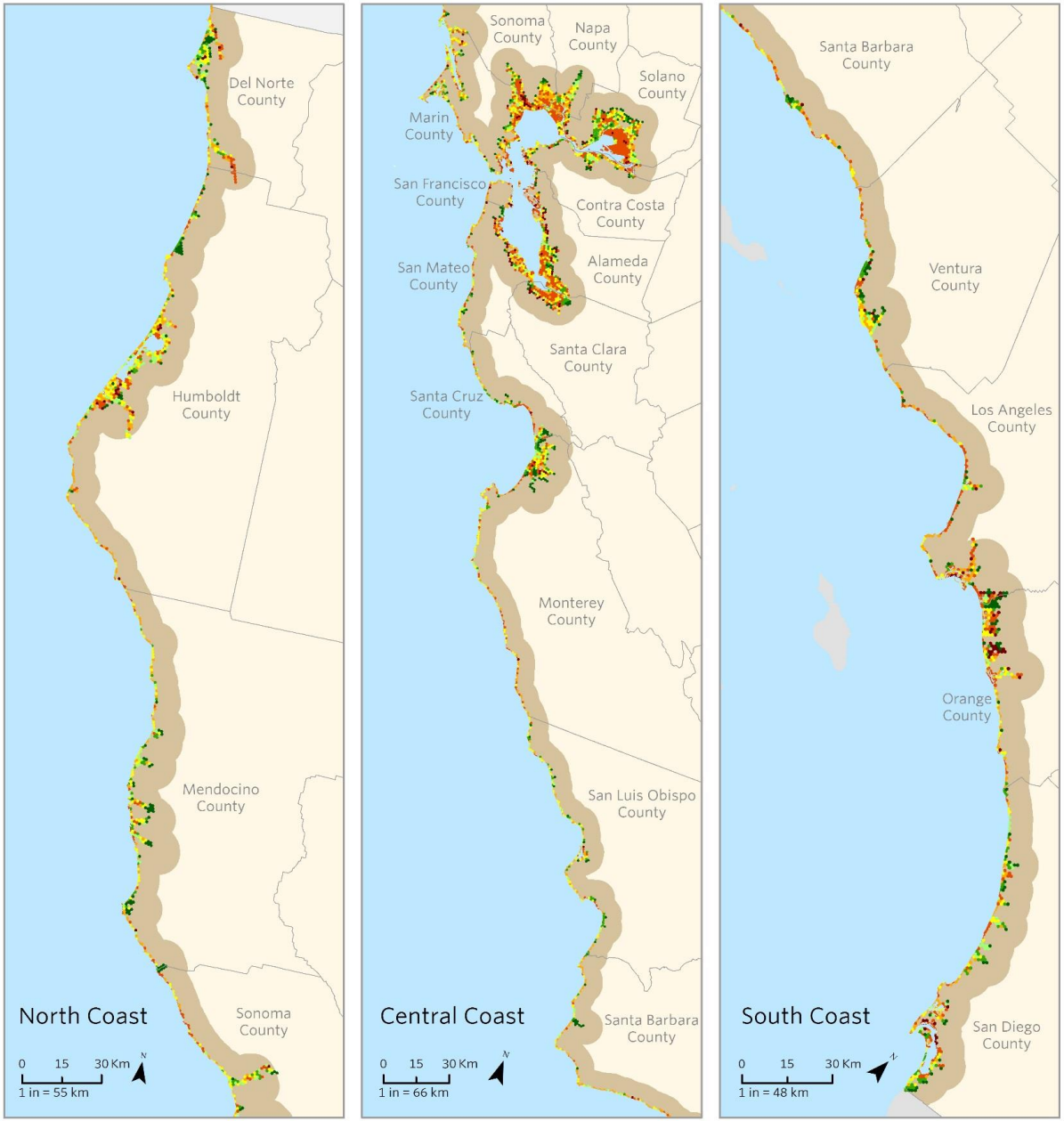
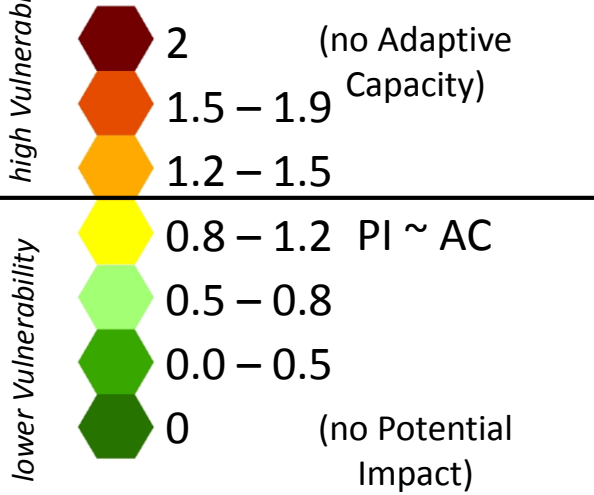
$V_{index} = 0.8$

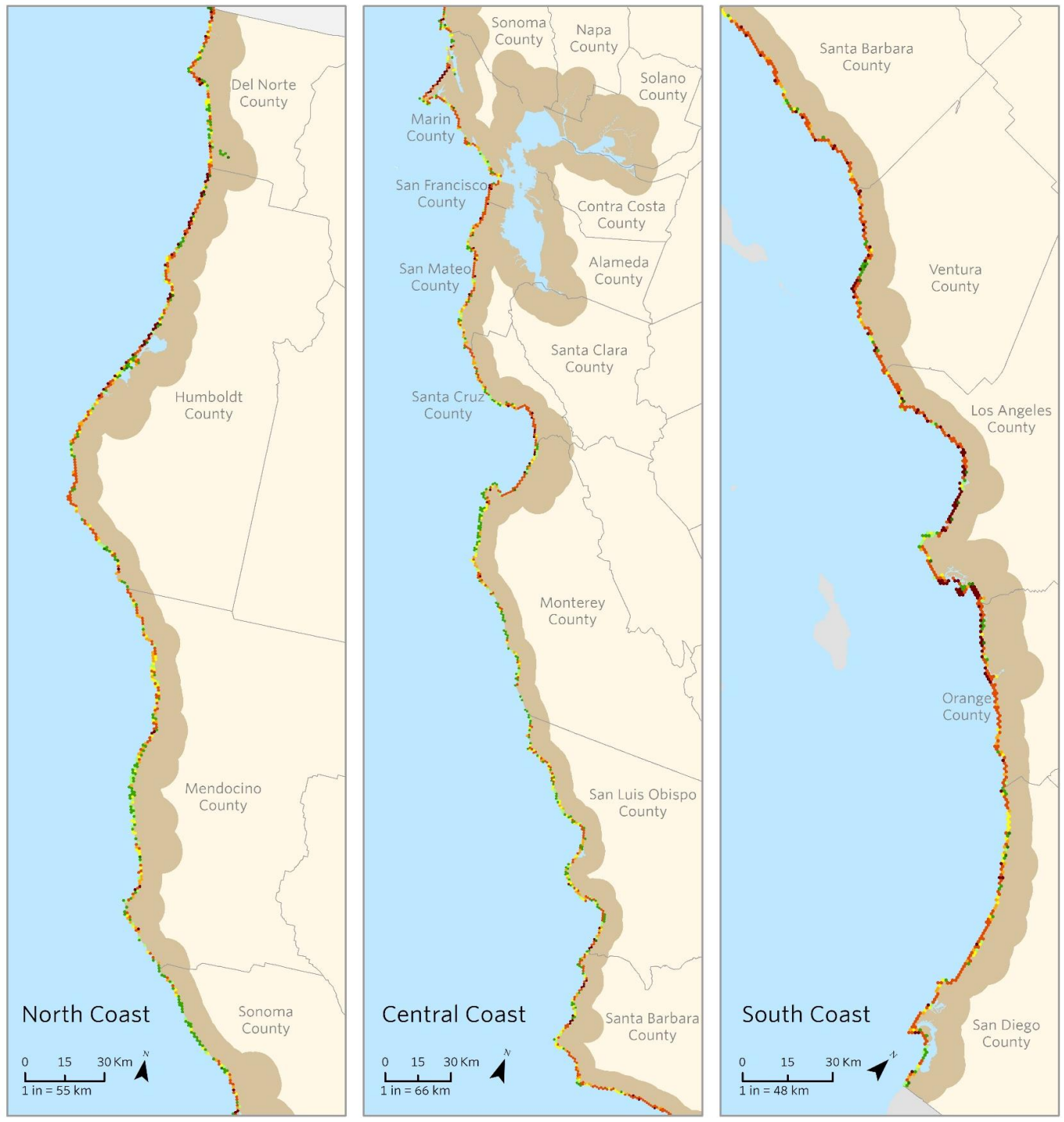
INDEX OF VULNERABILITY OF HABITATS
5FT SEA LEVEL RISE

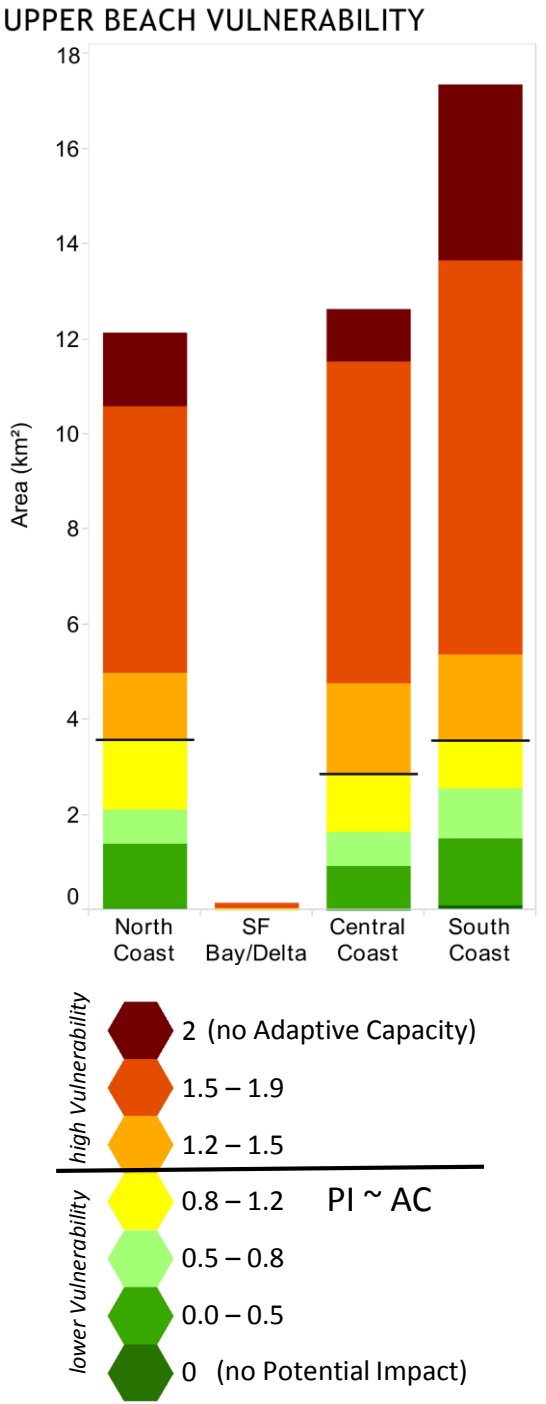
ECOREGION

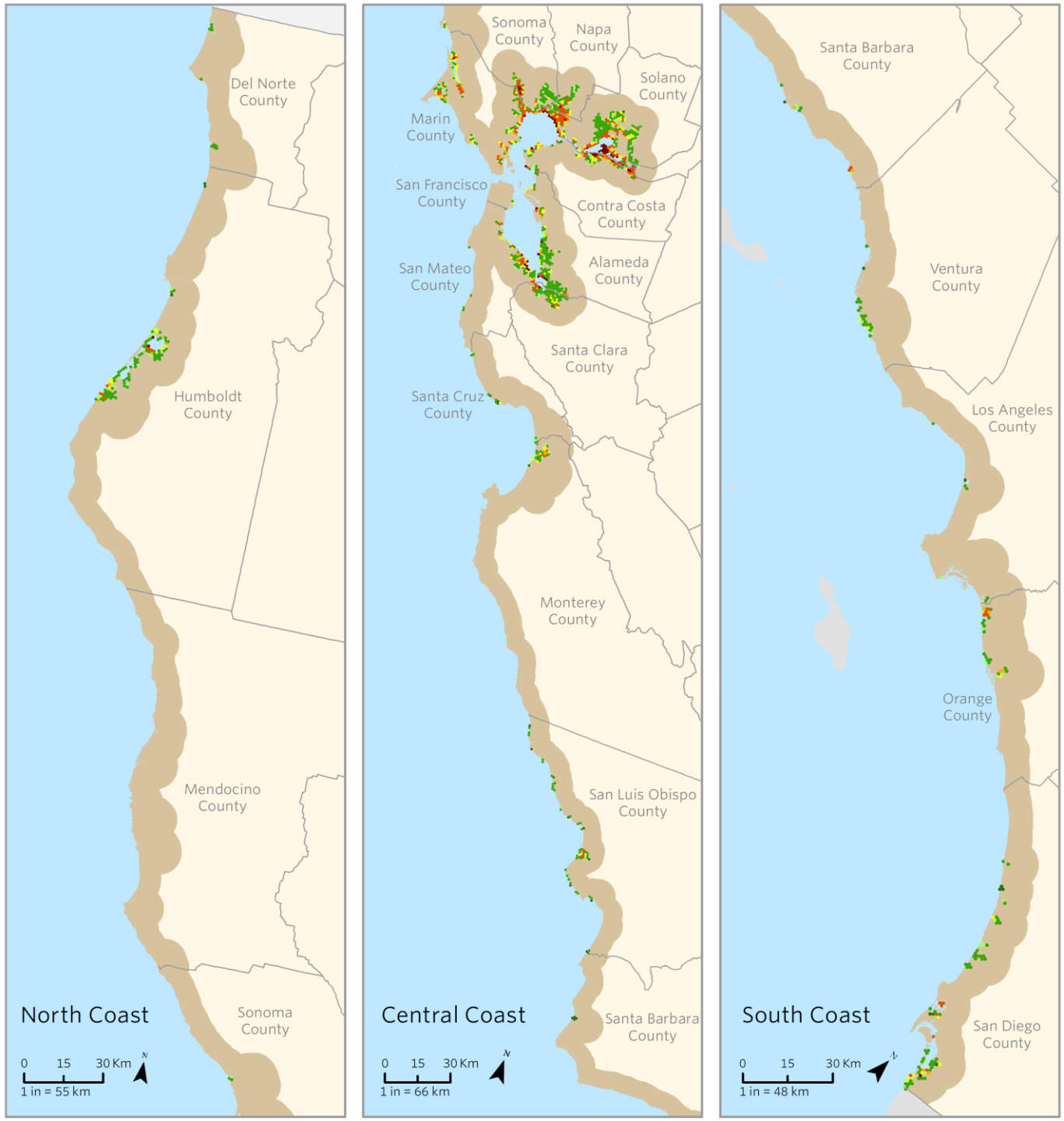


59%
of the area of California's coastal habitats are highly vulnerable to 5 feet of sea level rise

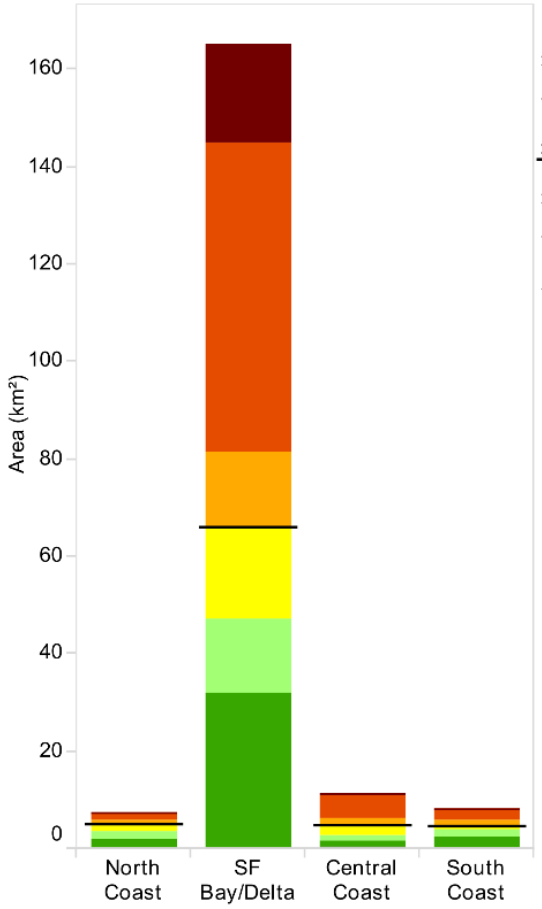


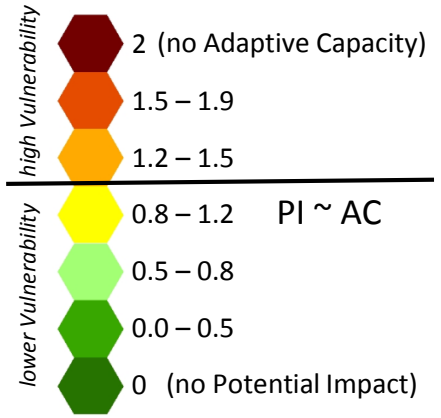

Del Norte County
Humboldt County
Mendocino County
Sonoma County
North Coast
0 15 30 Km
1 in = 55 km
Sonoma County
Napa County
Solano County
Marin County
San Francisco County
Contra Costa County
Alameda County
San Mateo County
Santa Clara County
Santa Cruz County
Monterey County
San Luis Obispo County
Santa Barbara County
Central Coast
0 15 30 Km
1 in = 66 km
Santa Barbara County
Ventura County
Los Angeles County
Orange County
San Diego County
South Coast
0 15 30 Km
1 in = 48 km

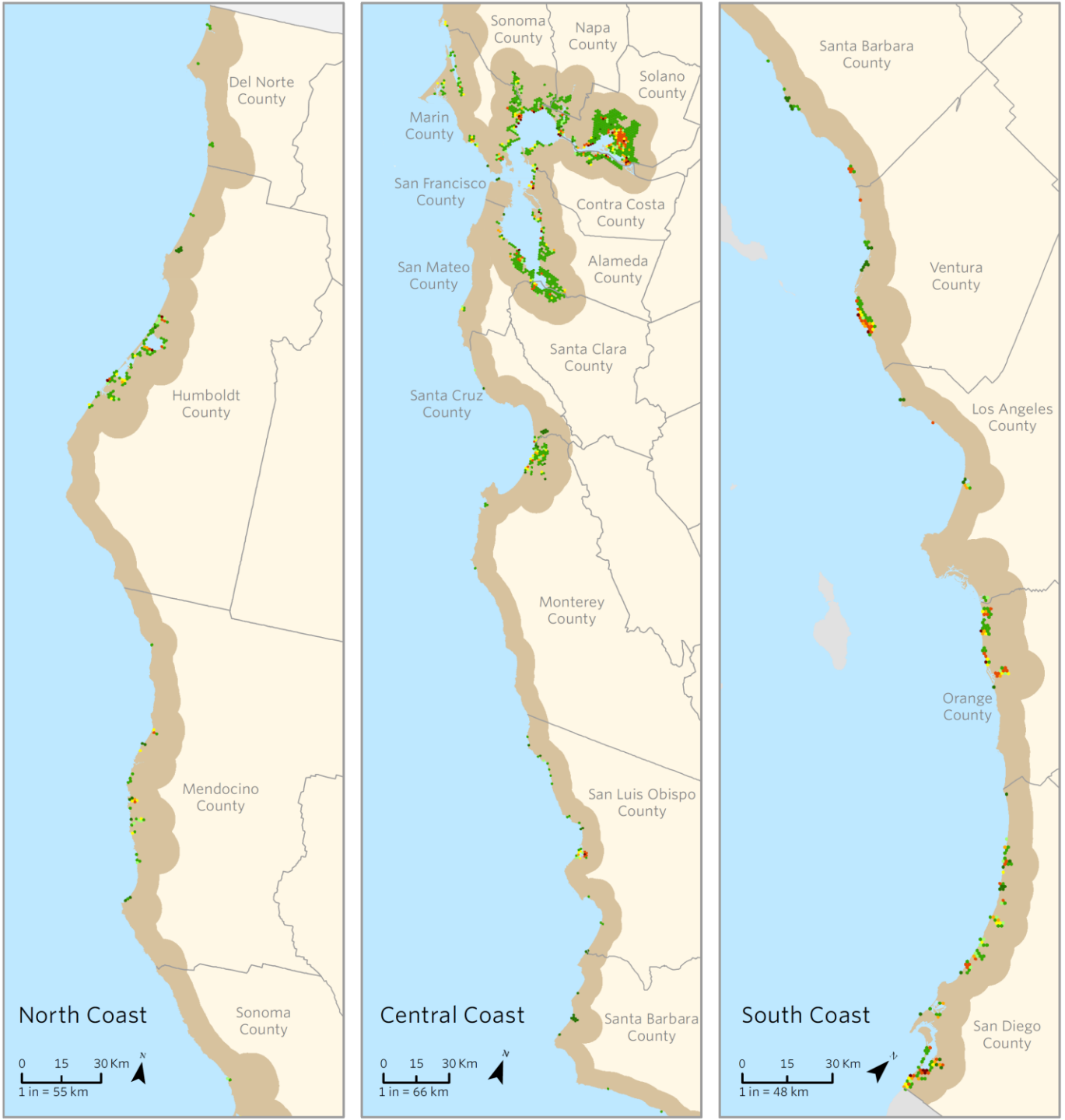

UPPER BEACH VULNERABILITY
Area (km²)
0
2
4
6
8
10
12
14
16
18
North Coast
SF Bay/Delta
Central Coast
South Coast
high Vulnerability
2 (no Adaptive Capacity)
1.5 – 1.9
1.2 – 1.5
PI ~ AC
lower Vulnerability
0.8 – 1.2
0.5 – 0.8
0.0 – 0.5
0 (no Potential Impact)



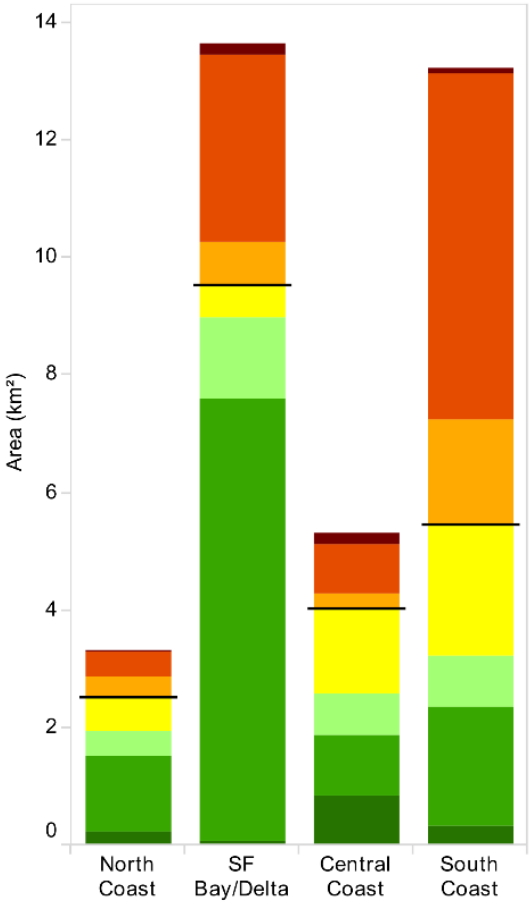
REGULARLY-FLOODED ESTUARINE MARSH

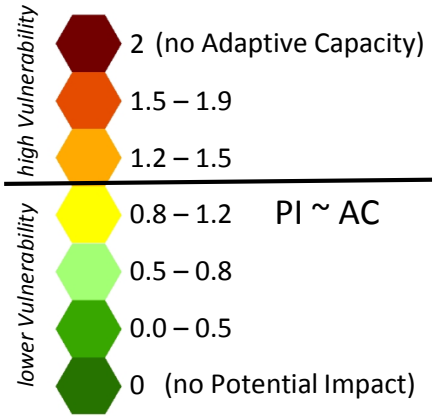




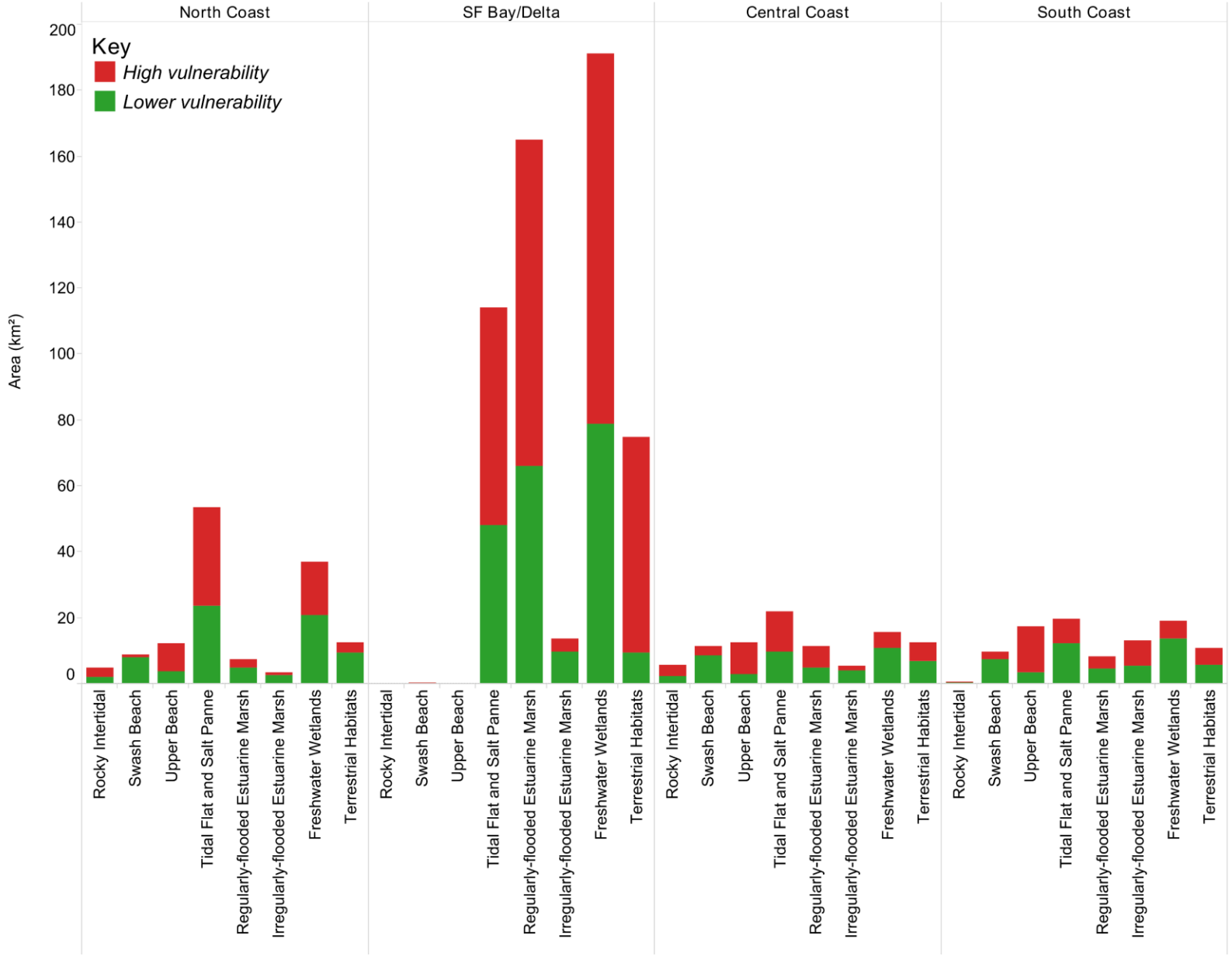


IRREGULARLY-FLOODED ESTUARINE MARSH





AREA OF FOCAL HABITAT VULNERABILITY BY ECOREGION



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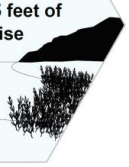
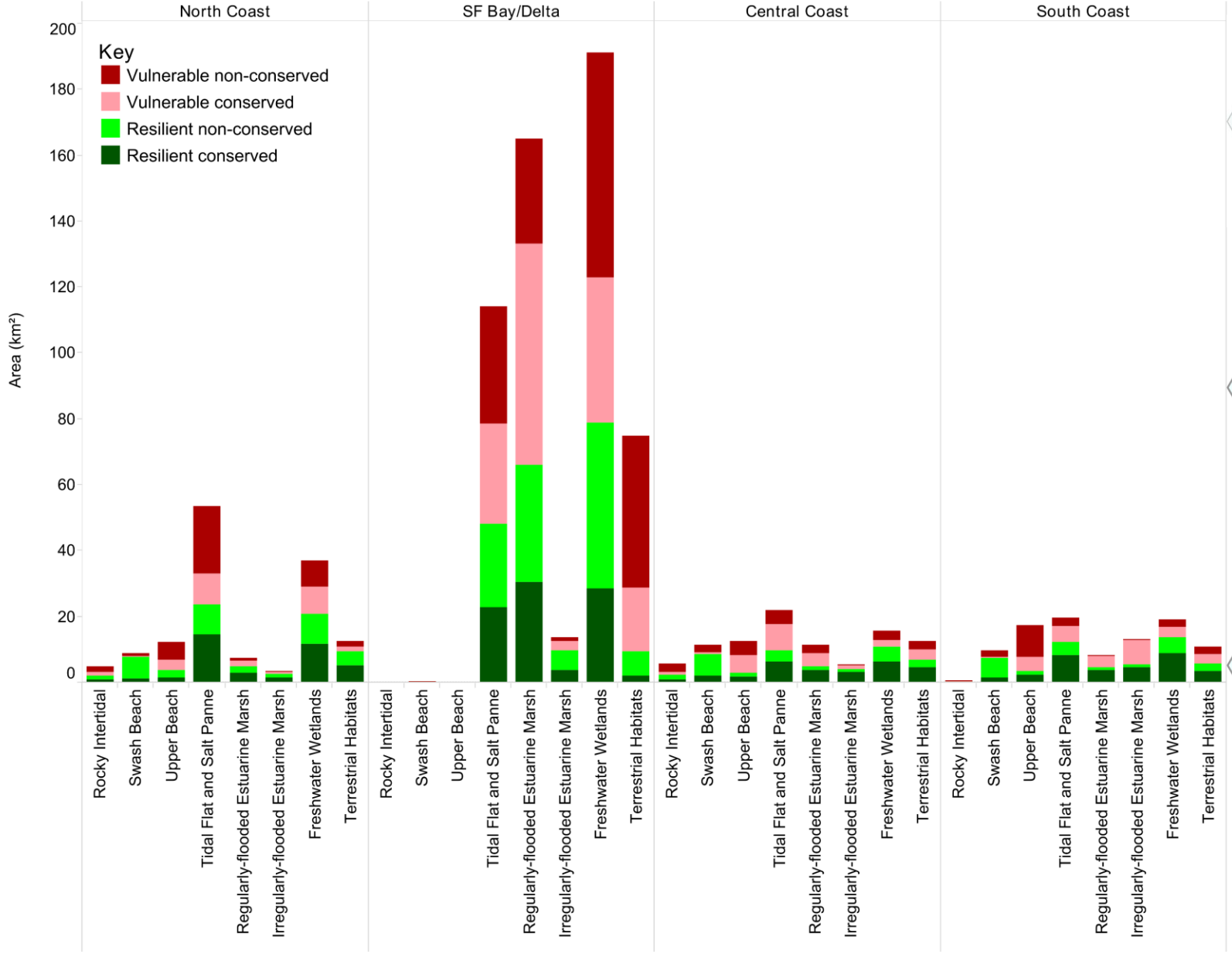


39
rare, threatened, and endangered species are highly vulnerable to 5 feet of sea level rise

FOCAL HABITAT VULNERABILITY AND CONSERVATION MANAGEMENT STATUS



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of the area of California's coastal habitats are highly vulnerable to 5 feet of sea level rise

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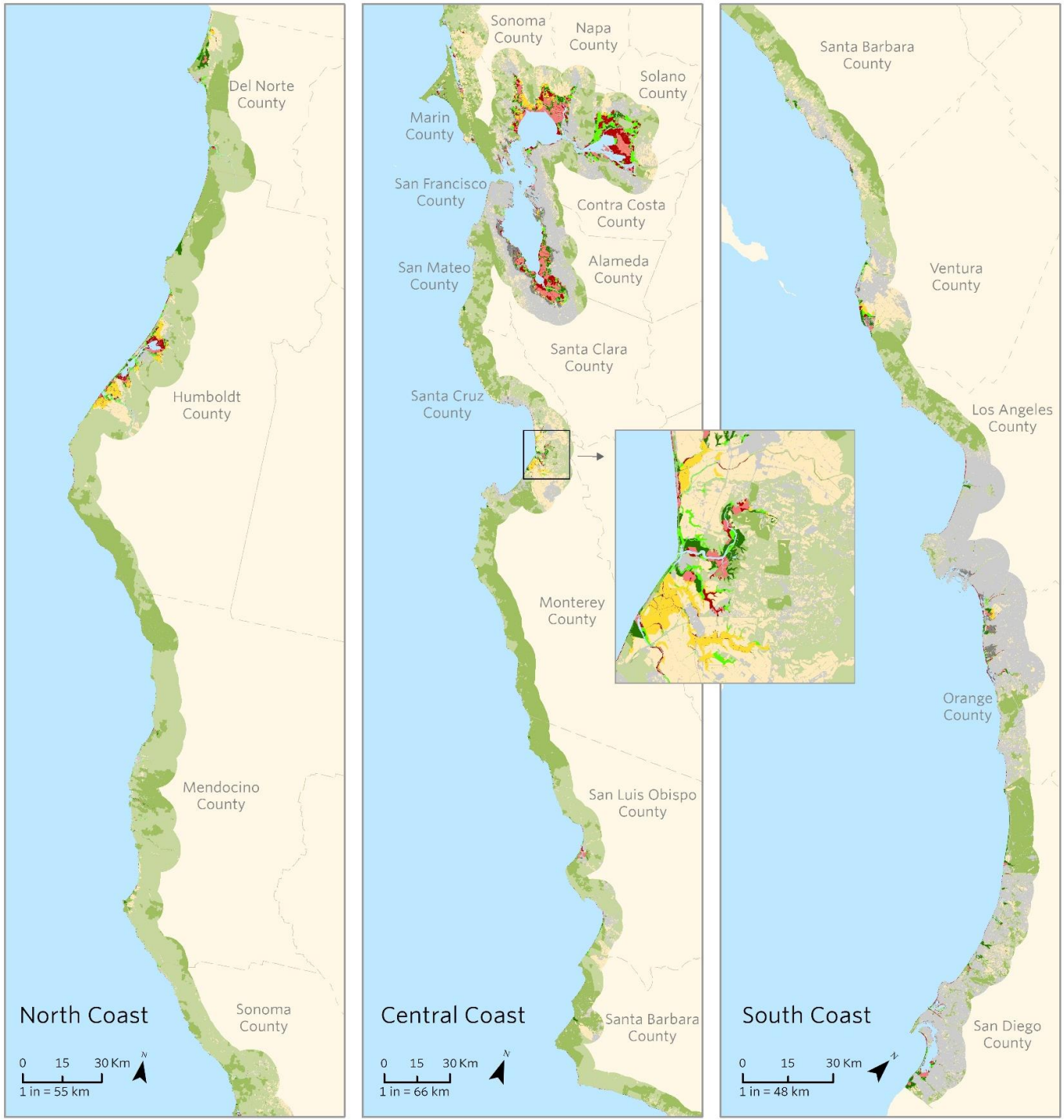
rare, threatened, and endangered species are highly vulnerable to 5 feet of sea level rise

41,000
acres of coastal conservation lands are projected to be drowned by subtidal waters

Conservation Lands

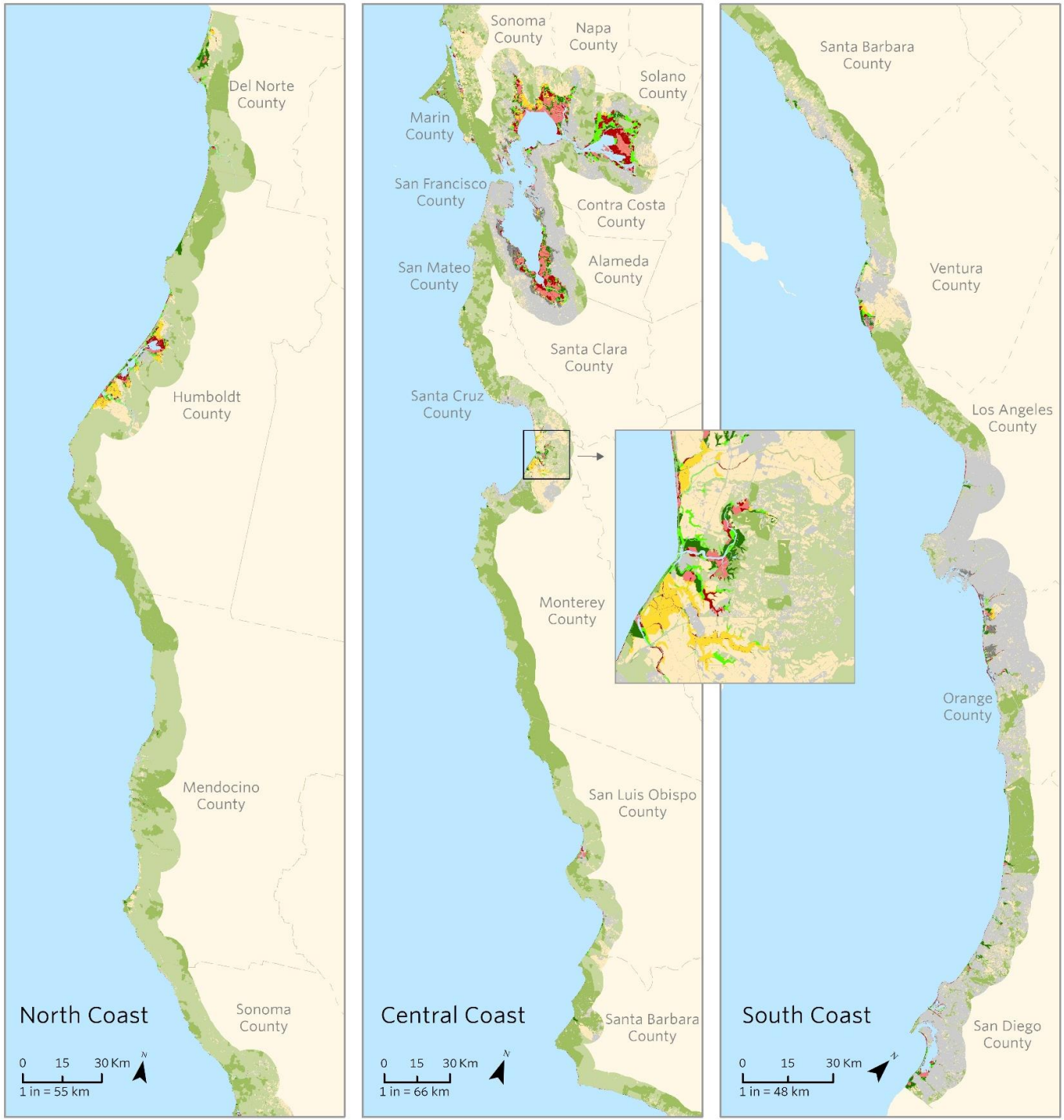


Conserve and Manage for Resilience

- **Resilient Conserved Habitat**
  Maintain the resilience and conservation status of existing conservation land.
- **Resilient Non-conserved Habitat**
  Invest in conserving resilient landscapes.
- **Vulnerable Conserved Habitat**
  Manage in place for resilience to help habitat keep pace with sea level rise.

Mitigate Potential Losses of Vulnerable Habitats

- **Vulnerable Non-conserved Habitat**
  Mitigate potential losses by adapting adjacent built environment and/or investing in potential future habitat.
- **Potential Future Habitat**
  Invest in conservation and management that allows vulnerable habitat to transgress inland.
- **Exposed Built Environment**
  Adapt the built environment to enhance habitat area and function.



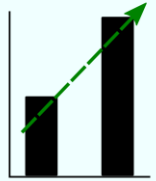
Conserve and Manage for Resilience

Resilient Conserved Habitat
Maintain the resilience and conservation status of existing conservation land.

Resilient Non-conserved Habitat
Invest in conserving resilient landscapes.

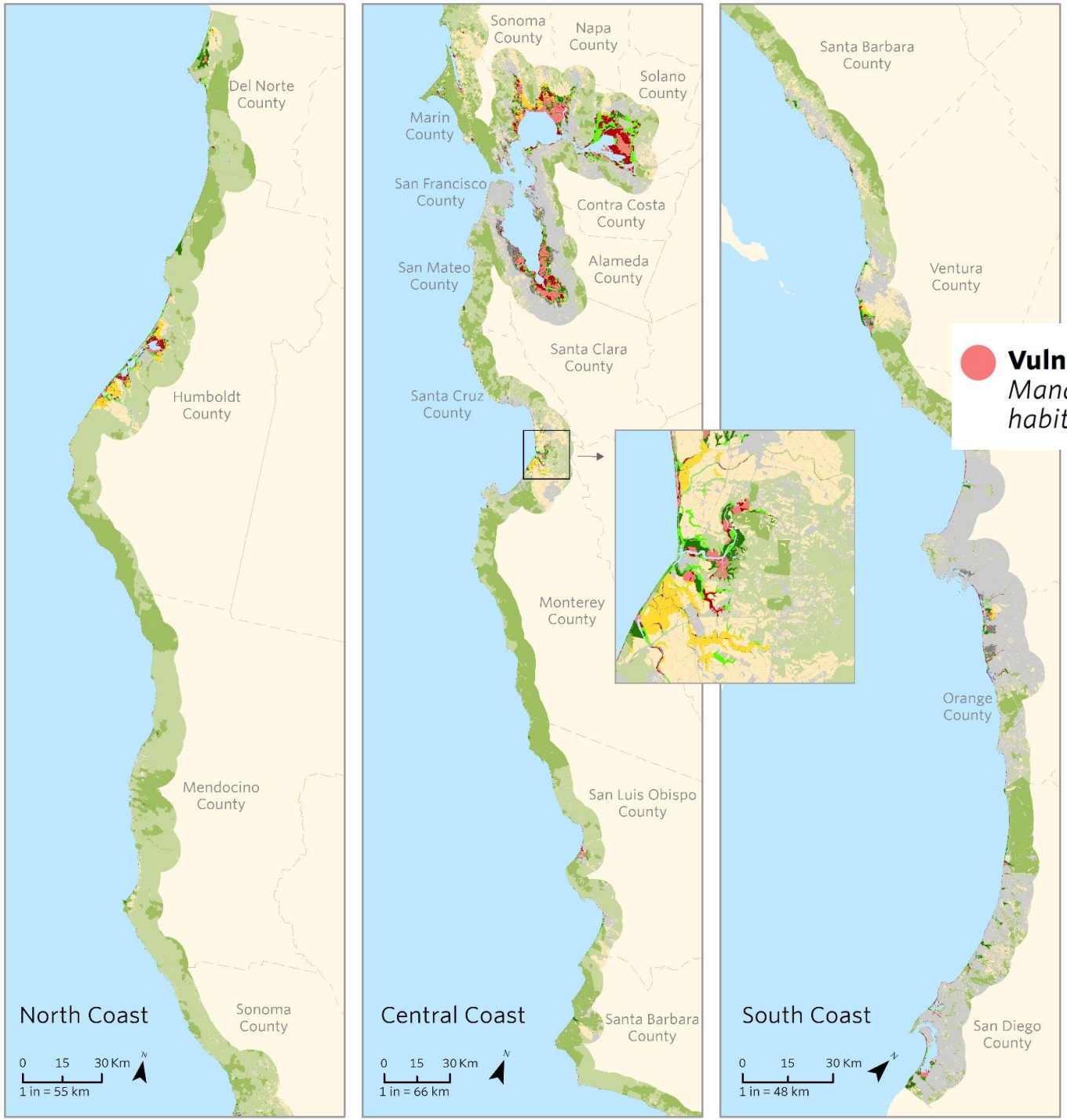
2x

California could double the statewide area of conserved resilient habitats with concerted action



Important for *all* habitats

Critical for:
Rocky intertidal
Beaches
Irregularly-flooded marsh
Terrestrial habitats



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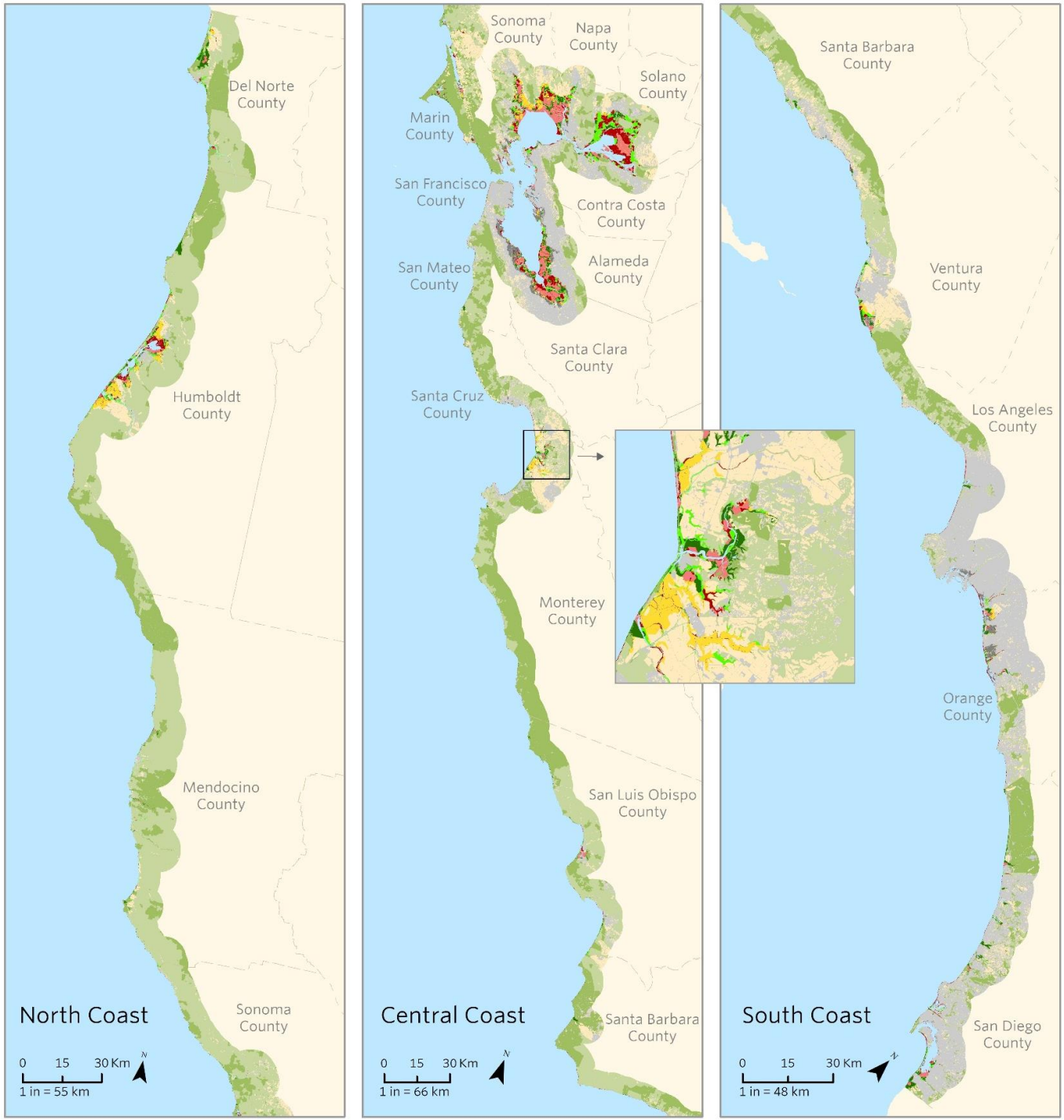
Vulnerable Conserved Habitat
Manage in place for resilience to help habitat keep pace with sea level rise.

Critical for:
Estuarine marshes
Tidal flats
Beaches



57%

We could mitigate more than half the losses from subtidal inundation by investing in potential future habitat

Mitigate Potential Losses of Vulnerable Habitats

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  Manage in place for resilience to help habitat keep pace with sea level rise.
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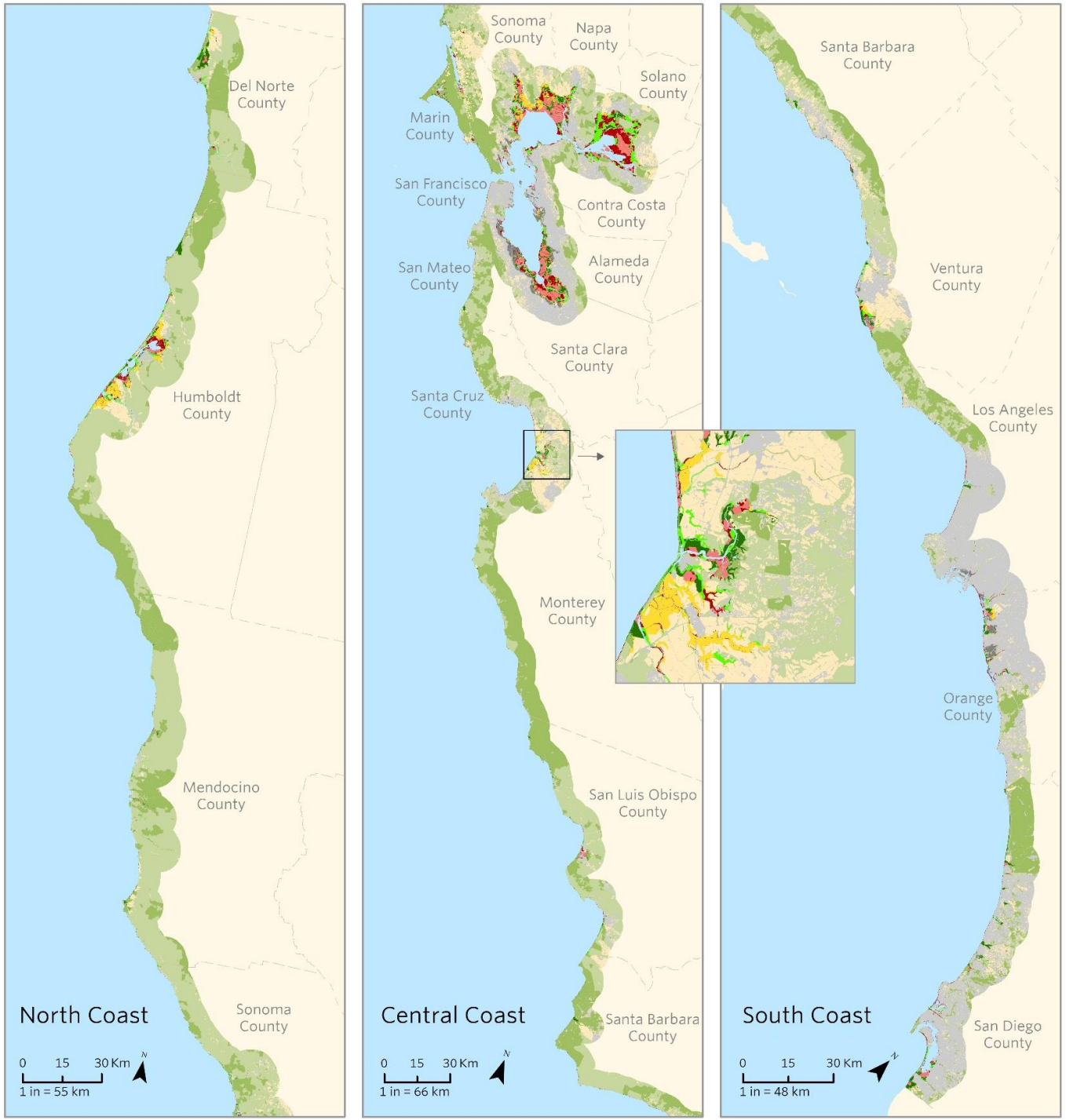
Critical to maintenance of habitat area



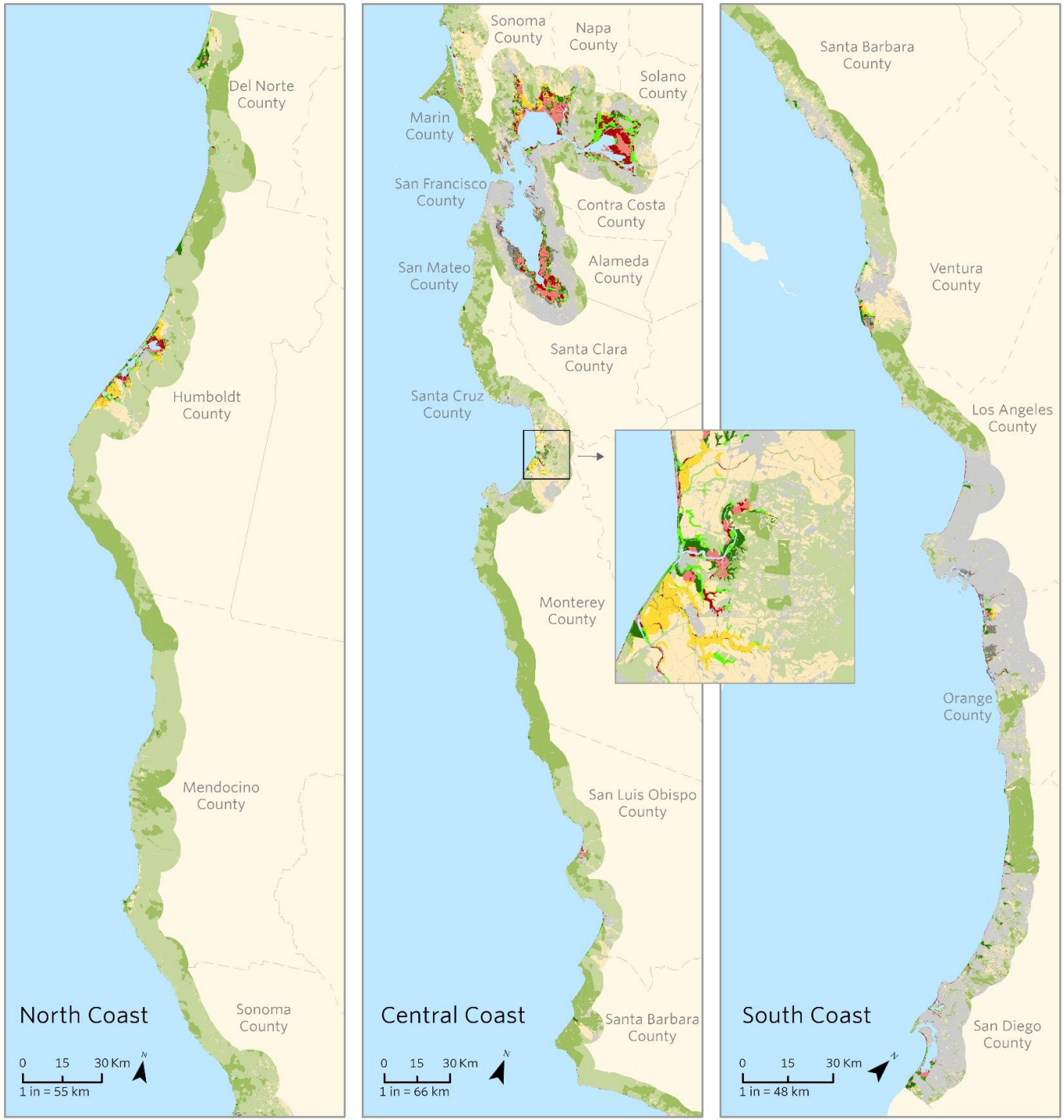
Mitigate Potential Losses of Vulnerable Habitats

Vulnerable Conserved Habitat
Manage in place for resilience to help habitat keep pace with sea level rise.

Vulnerable Non-conserved Habitat
Mitigate potential losses by adapting adjacent built environment and/or investing in potential future habitat.

Exposed Built Environment
Adapt the built environment to enhance habitat area and function.

Critical to maintenance of habitat area and function
AND
Provides benefits to people



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Conserving California's Coastal Habitats

A Legacy and a Future with Sea Level Rise

http://coastalresilience.org/CoastalAssessment

Walter N Heady
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HOPE for the COAST

Time and time again Californians have voted to protect and invest in our iconic coastline, a more than three thousand-mile-long treasure that people enjoy every day. But sea level rise is changing today's coast. The coast of tomorrow will not be the same as the coast of today.

To inform current and future adaptation decisions and conservation actions, The Nature Conservancy in California and the California State Coastal Conservancy (SCC) collaborated to produce the first statewide, comprehensive assessment of the vulnerability of California's coastal habitats, imperiled species, and conservation lands to sea level rise.

DOWNLOAD THE REPORT

DOWNLOAD THE MAP

www.coastalresilience.org/hope4coast

Climate Resilient Highways & Coasts

Pilot Project at Elkhorn Slough

HOPE FOR THE COAST

OUR VISION

The Nature Conservancy is asking California state and local coastal management agencies to renew their leadership at the
GLOBAL CLIMATE ACTION SUMMIT.

We are urging them to adopt a bold vision:

We will maintain and enhance California's coast in the face of sea level rise, other climate change-induced challenges, and development. By working collectively and guided by science, we will ensure the coast is protected for future generations to enjoy, replete with as much or more habitat and wildlife, as well as social, economic, and recreational benefits, as we have today.

JOIN US!

We are working with state and local coastal management agencies to adopt the vision and make bold commitments for action

Natural Resources Secretary John Laird will launch this vision for California at the Global Climate Action Summit

Contacts:
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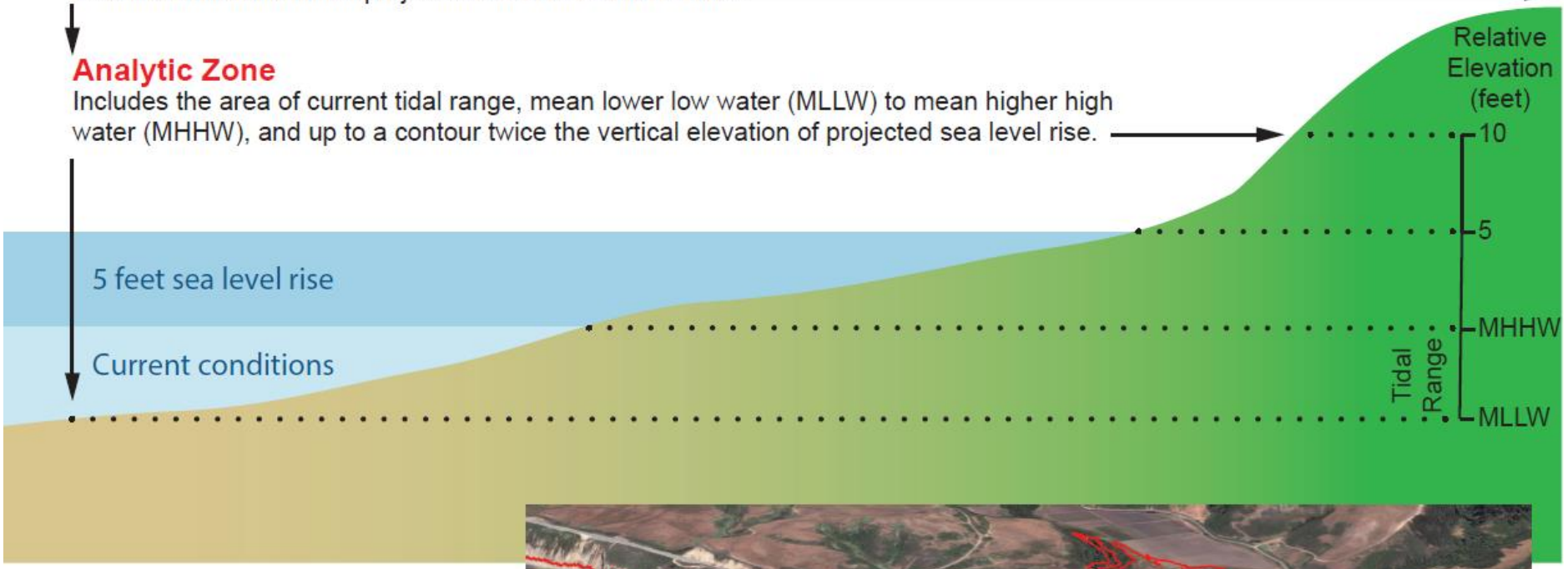
Sarah Newkirk, Senior Coastal Project Director, The Nature Conservancy, snewkirk@tnc.org

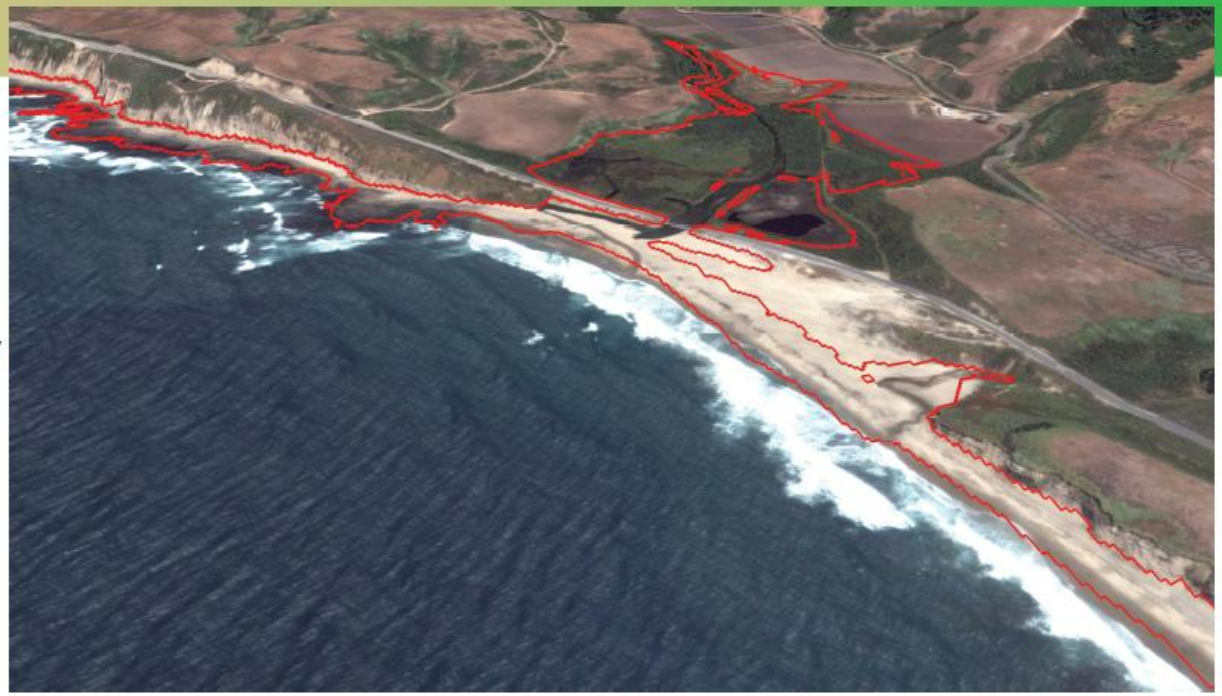
www.coastalresilience.org/hope4coast

Study Area
Includes analytic zone, extends 5 miles inland from farthest extent of inundation from projected 5 feet of sea level rise.

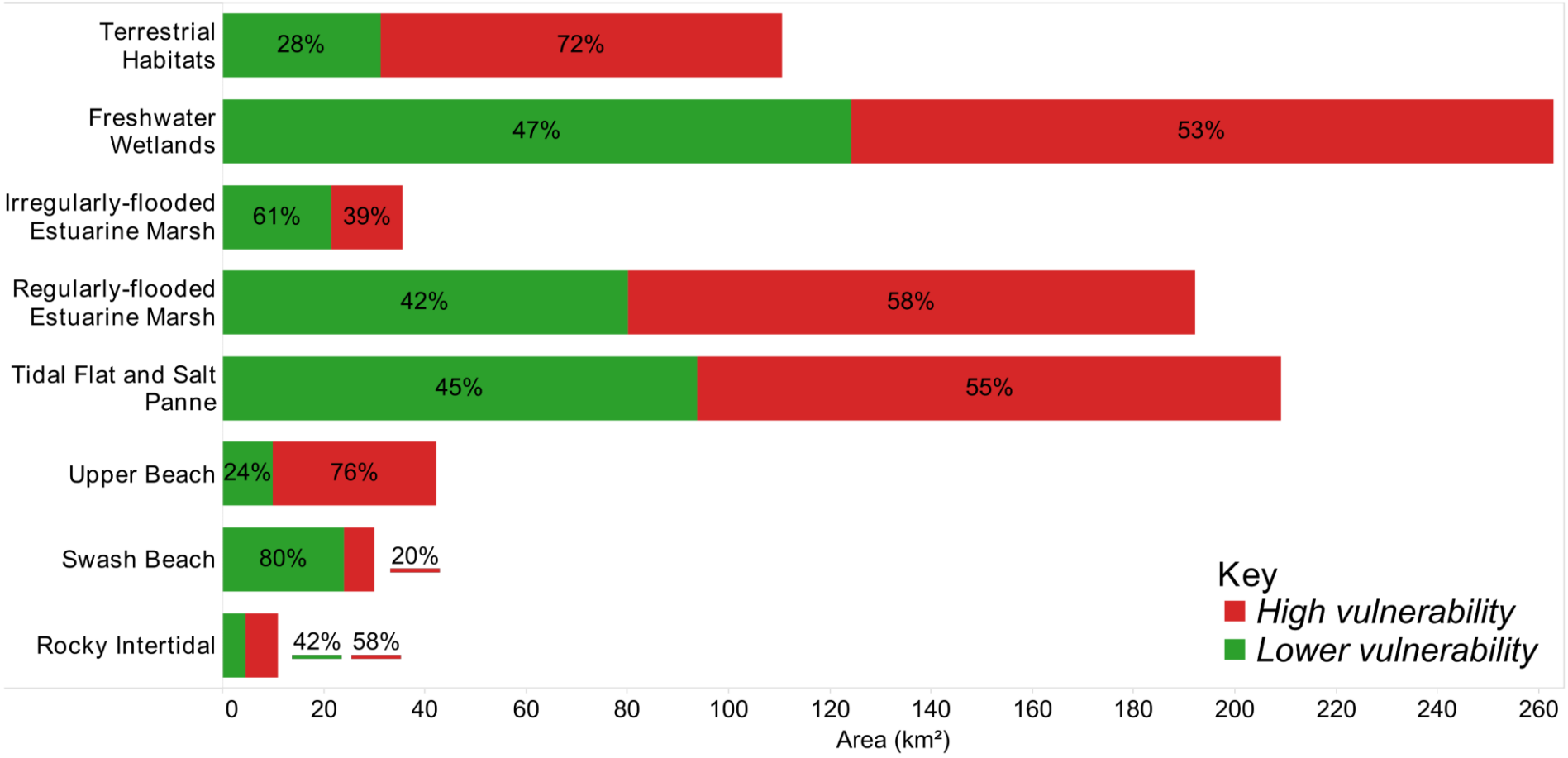
Analytic Zone
Includes the area of current tidal range, mean lower low water (MLLW) to mean higher high water (MHHW), and up to a contour twice the vertical elevation of projected sea level rise.



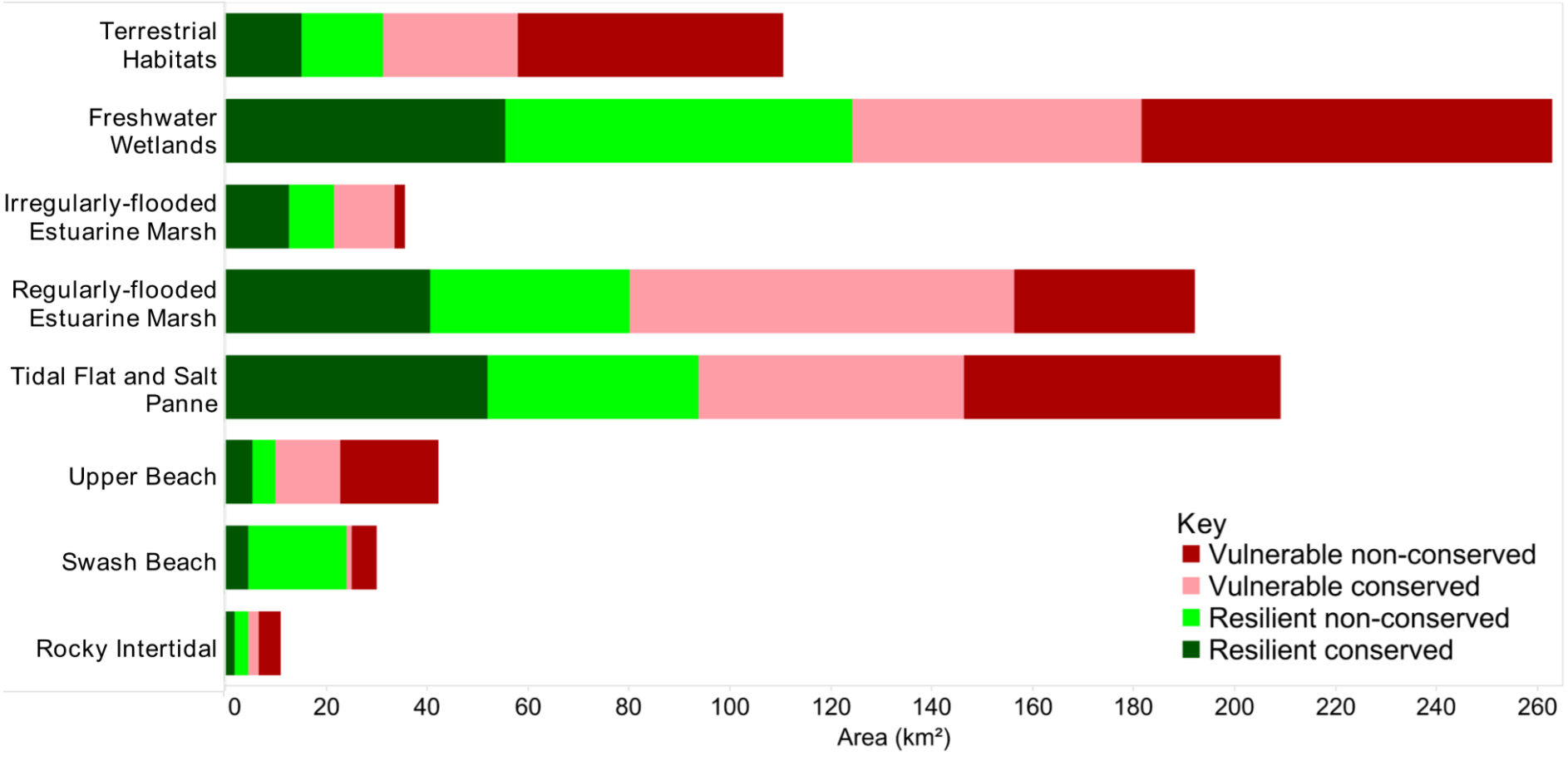
Analytic zone on the ground ▶
This image from Santa Cruz County shows how the analytic zone lies on the ground (red polygon). The area inside the analytic zone represents a realistic zone of influence for sea level rise. Differences in slope and topography determine the area of the analytic zone as it follows an elevation contour five vertical feet above projected sea level rise. Image © DigitalGlobe



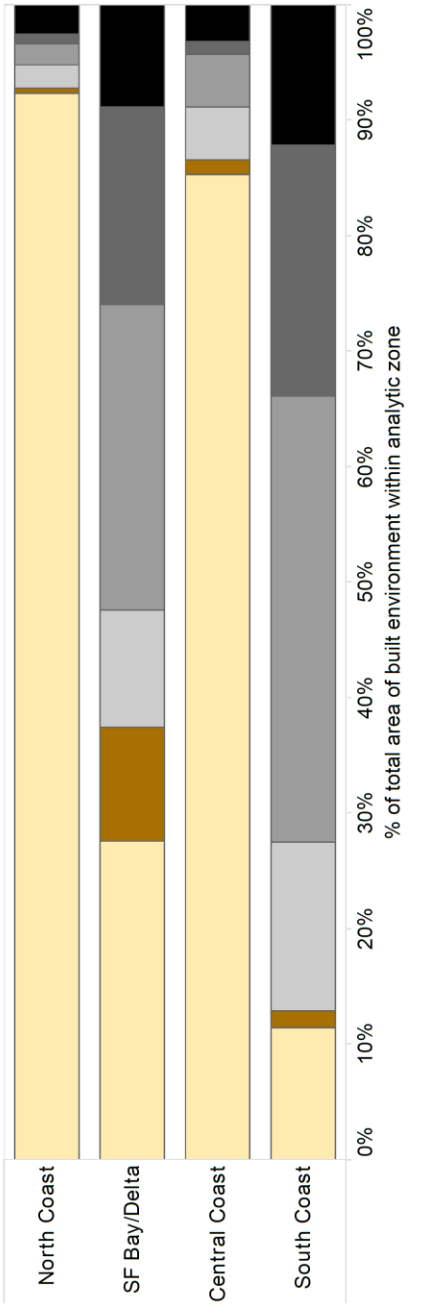
Statewide Habitat Vulnerability

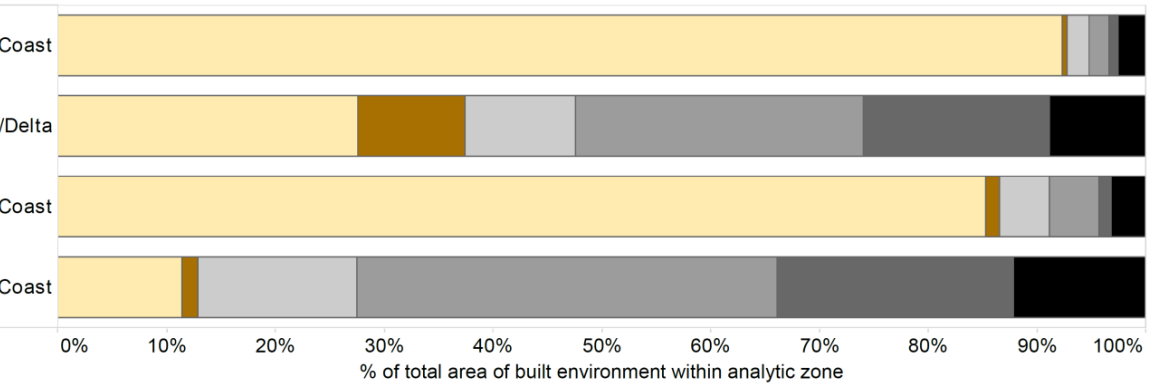


Statewide Habitat Vulnerability and Conservation Management Status



Built Environment Categories




Coast
/Delta
Coast
Coast
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% of total area of built environment within analytic zone