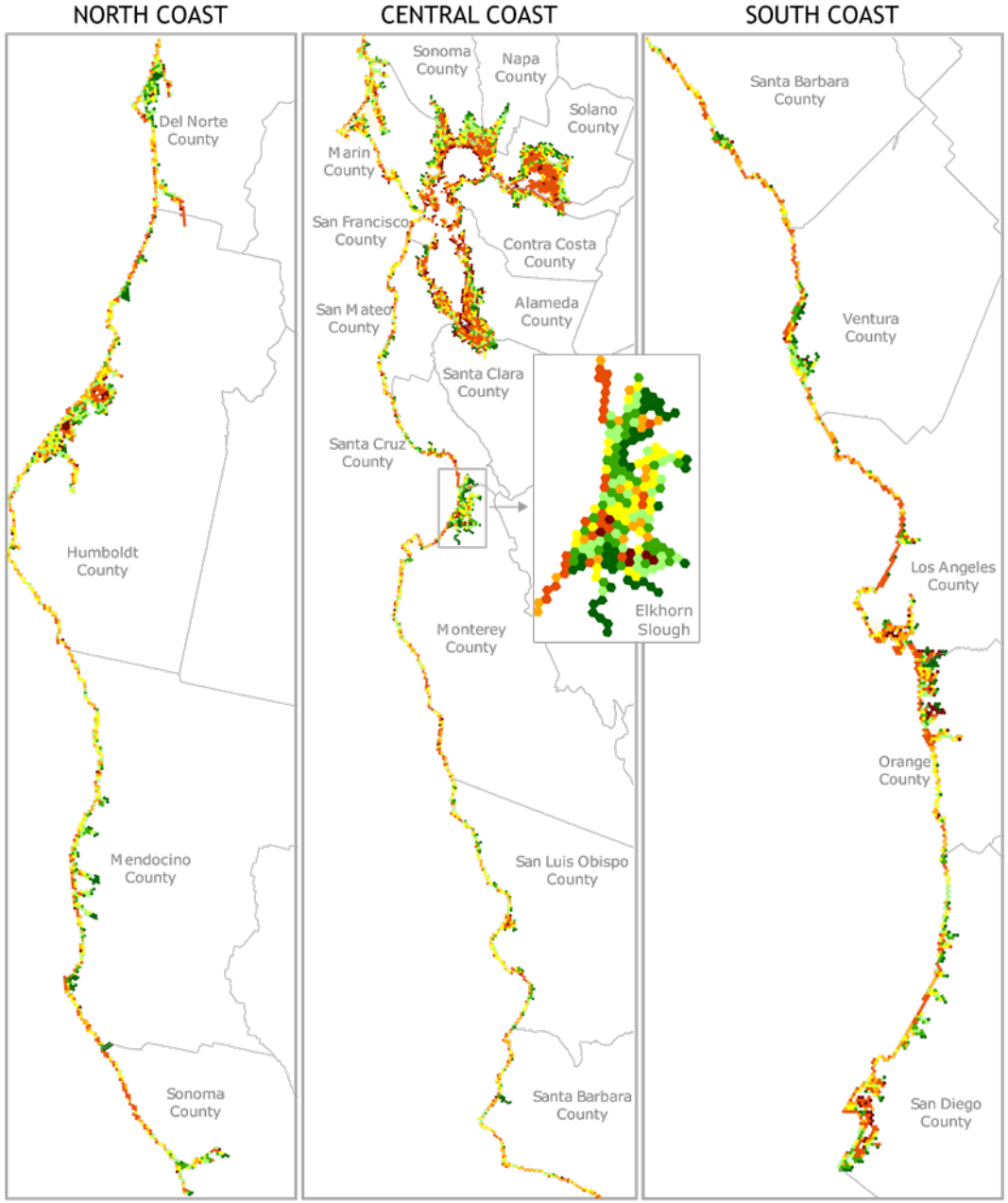
Coastal Resilience: Nature's Role

Sarah Newkirk, Senior Coastal Project Director
The Nature Conservancy in California

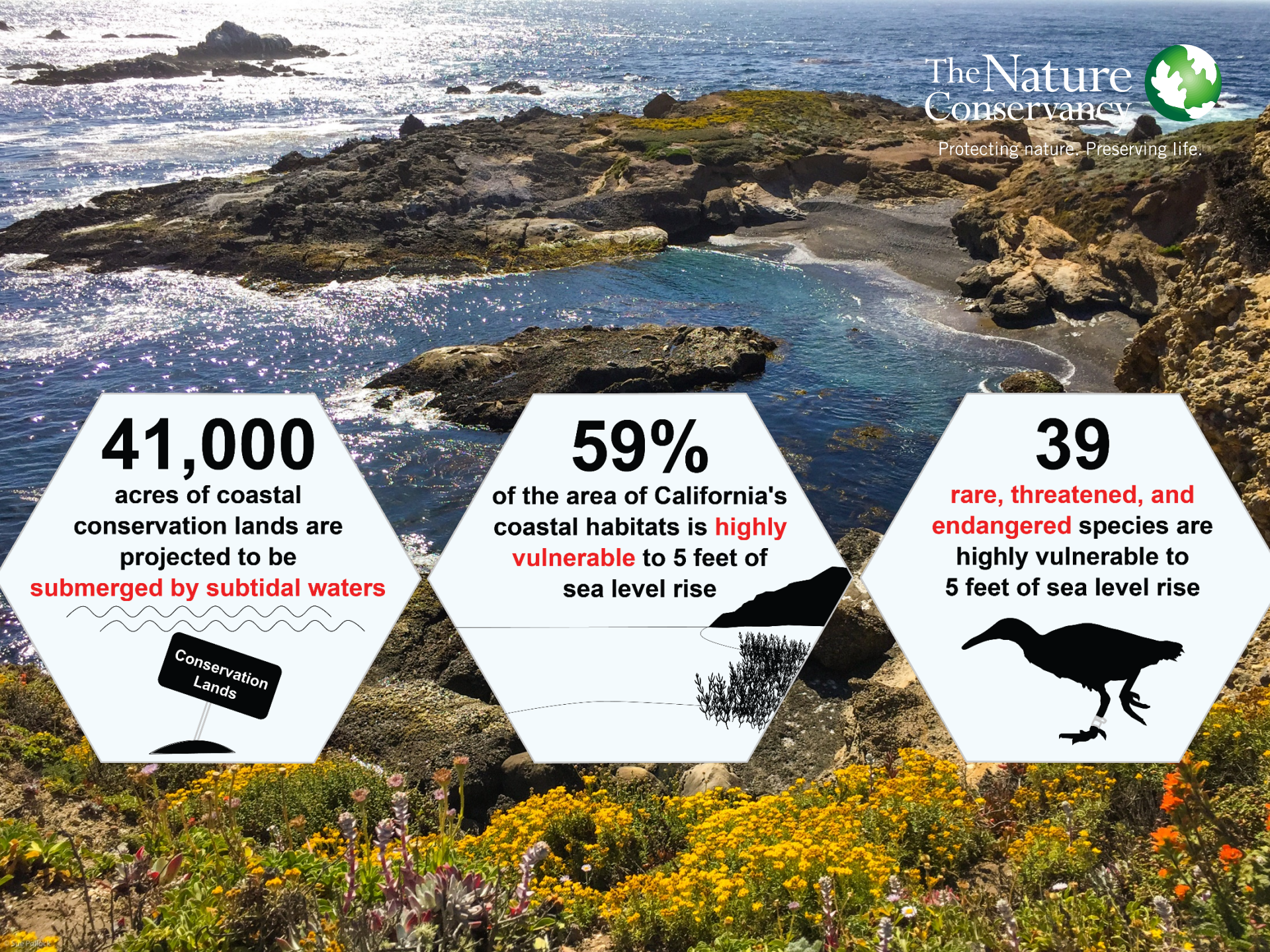
The Nature Conservancy

Protecting nature. Preserving life.

VULNERABILITY INDEX, 5 ft SEA LEVEL RISE



Lower vulnerability High vulnerability


The Nature Conservancy
Protecting nature. Preserving life.
41,000
acres of coastal conservation lands are projected to be submerged by subtidal waters
Conservation Lands
59%
of the area of California's coastal habitats is highly vulnerable to 5 feet of sea level rise
39
rare, threatened, and endangered species are highly vulnerable to 5 feet of sea level rise

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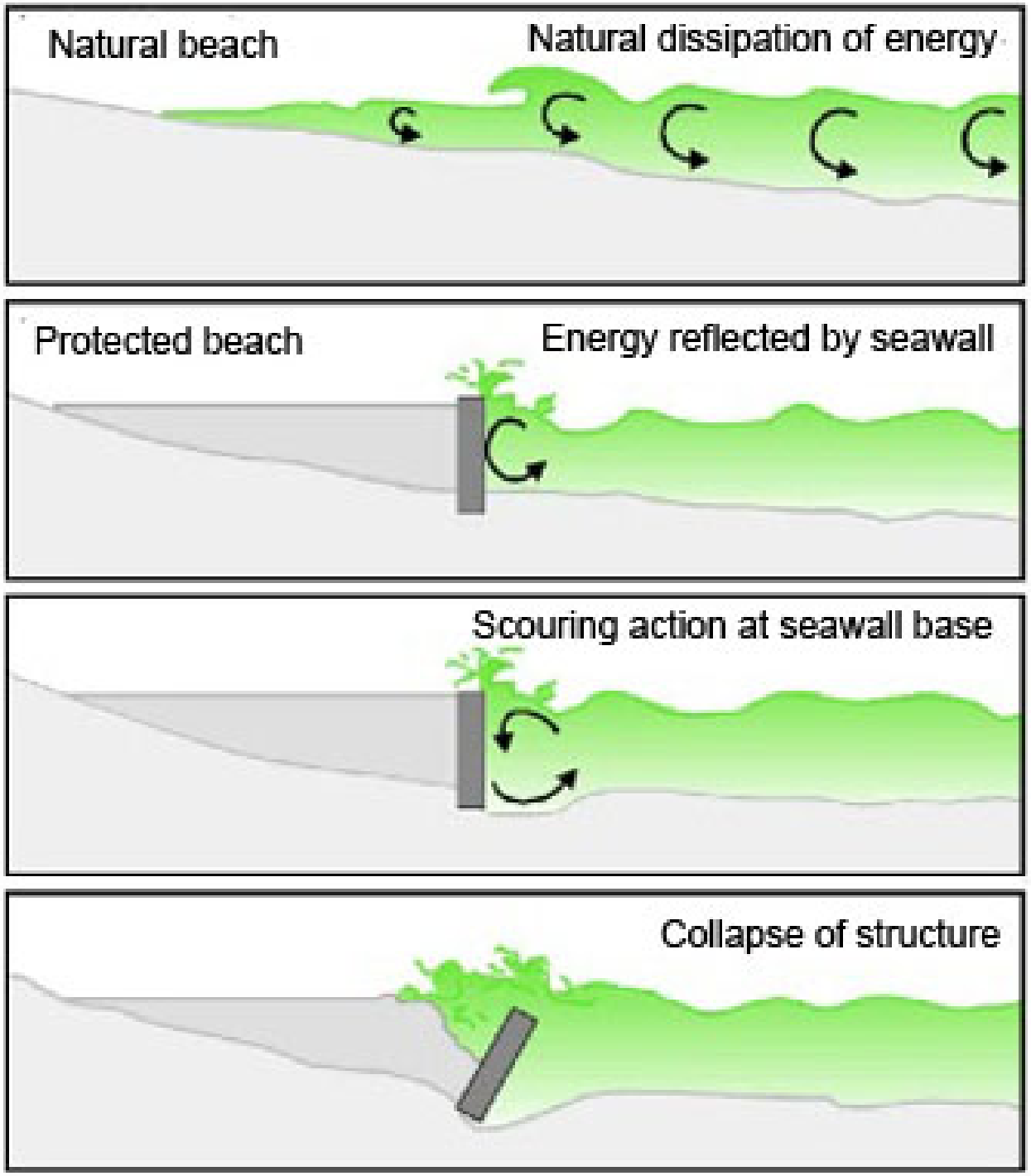
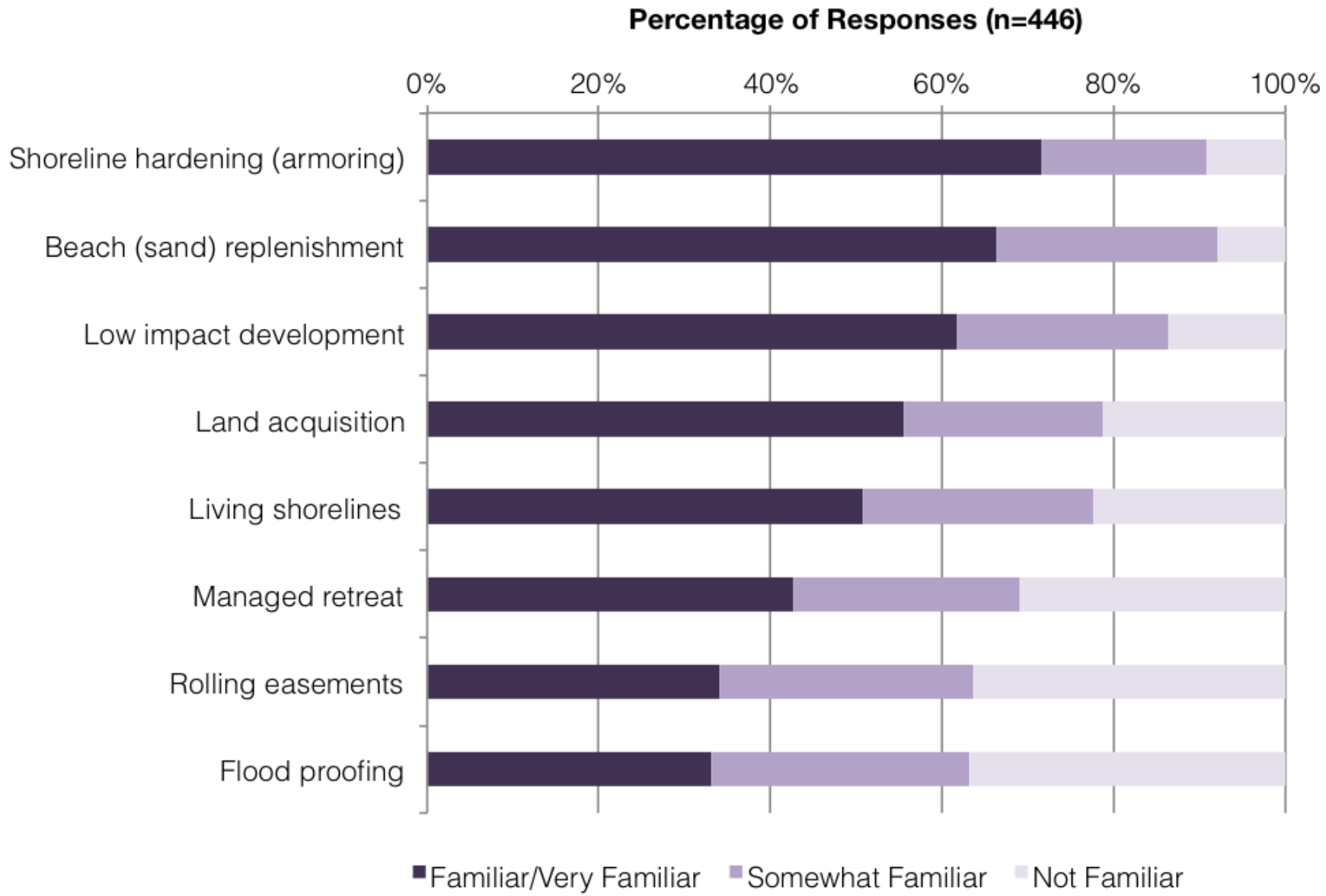

Natural beach
Natural dissipation of energy
Protected beach
Energy reflected by seawall
Scouring action at seawall base
Collapse of structure

710 miles of seawalls
10% of CA coastline overall
33% of southern CA coastline

Adaptation Options: The Familiarity Gap

From: Hart et al., *Rising to the Challenge* (2011)



EXIT

celebrating 10 years

2017

COASTAL Resilience.org

90 SCIENCE PUBLICATIONS

making the case for nature-based solutions that reduce risk

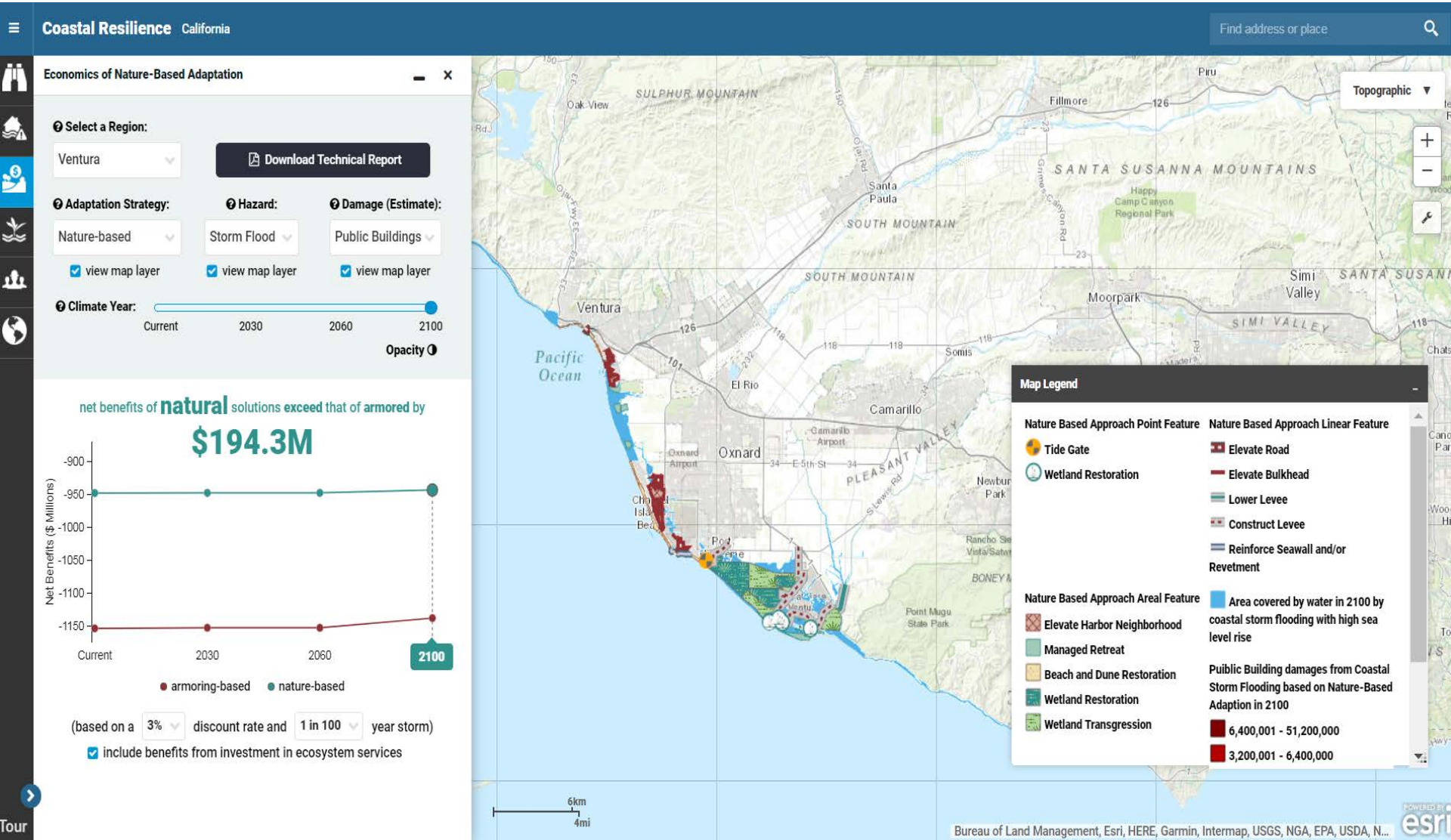
Influencing business practices in **TECHNOLOGY, ENERGY, INSURANCE,** and **HUMANITARIAN** sectors

Decision support tool applied to more than **25 RESTORATION** or **CONSERVATION** actions

Coastal Resilience California
Find address or place
Flood and Sea Level Rise
Select a Region:
Monterey
Select a Hazard:
Storm Flooding
aggregate data
Climate Year:
Current 2030 2060 2100
Sea Level Rise:
Low Medium High
Opacity
Imagery
Map Legend
Flood Inundation by Large Storm 2100
Low
Connected to ocean over topography
Connectivity uncertain

Economics of nature-based adaptation, California

http://maps.coastalresilience.org/California/



Catalyzing Nature-Based Coastal Flood Mitigation and Adaptation

- Lack of technical standards to guide implementation and evaluation;
- Low levels of cross-jurisdiction coordination among local, state, and federal entities;
- Insufficient funding for localized data collection, strategic planning, and regional coordination; and
- Lack of public familiarity with nature-based strategies, leading to a lack of political support.

"[How can we] gauge the effectiveness of nature--based strategies when there are no technical standards"?

"We're asking public works people to make these decisions, and they like to build things that work, so they know how to design a seawall and the life expectancy. They don't know how to do managed retreat and beach nourishment and know [those approaches] will have the same level of certainty that needs to happen to make the mayor and everyone else happy.... We don't have the expertise for these [nature--based] strategies."

Case Studies of Natural Shoreline Infrastructure in Coastal California

A COMPONENT OF *IDENTIFICATION OF NATURAL INFRASTRUCTURE OPTIONS FOR ADAPTING TO SEA LEVEL RISE*

The Nature Conservancy

ESA

Point Blue Conservation Science

STATE OF CALIFORNIA resources AGENCY

California's Fourth Climate Change Assessment

Case studies

design, implementation, performance

1. Humboldt Bay Dune Restoration Project
2. SF Bay Livin Project
3. Hamilton Wetland Restoration Project
4. Surfer's Point Managed Shoreline Retreat Pr
5. Seal Beach Thin-laye Marsh Sediment Augmentation Proje

Engineering Guidelines

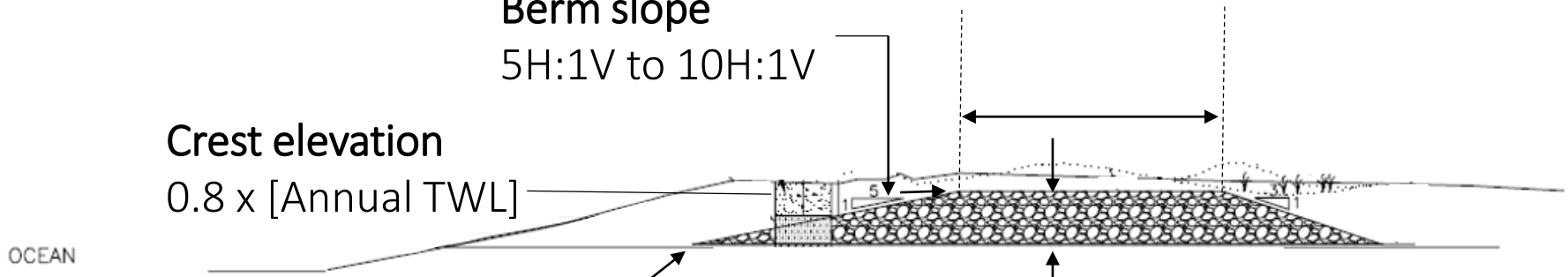
Cobble Berm Example: Surfer's Point

Scaling and Thresholds

Top Width
50' min. open coast
10' min. sheltered coast

Berm slope
5H:1V to 10H:1V

Crest elevation
0.8 x [Annual TWL]



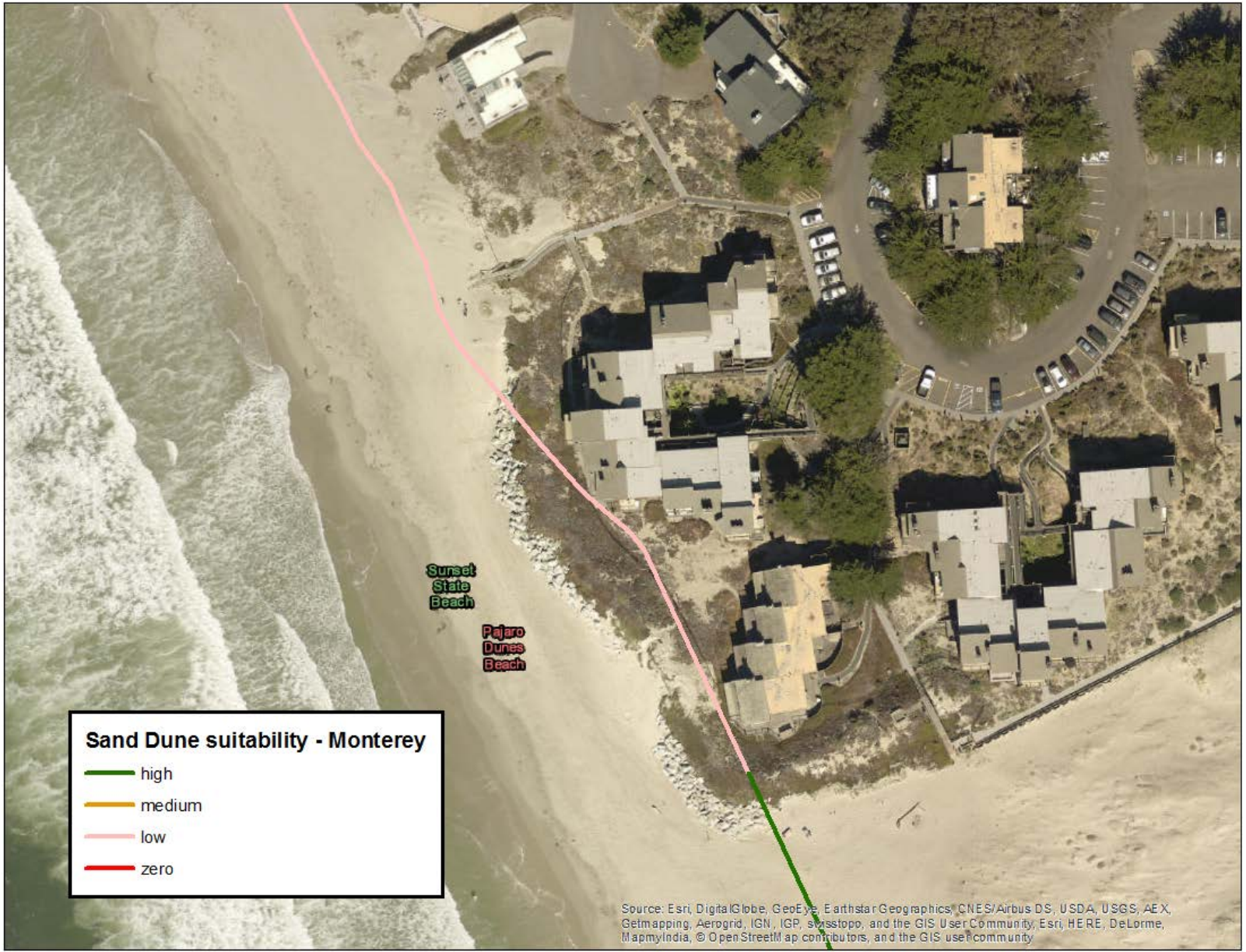
Slope toe brought down to native cobble substrate

Berm thickness
4' min. open coast
3' min. sheltered coast

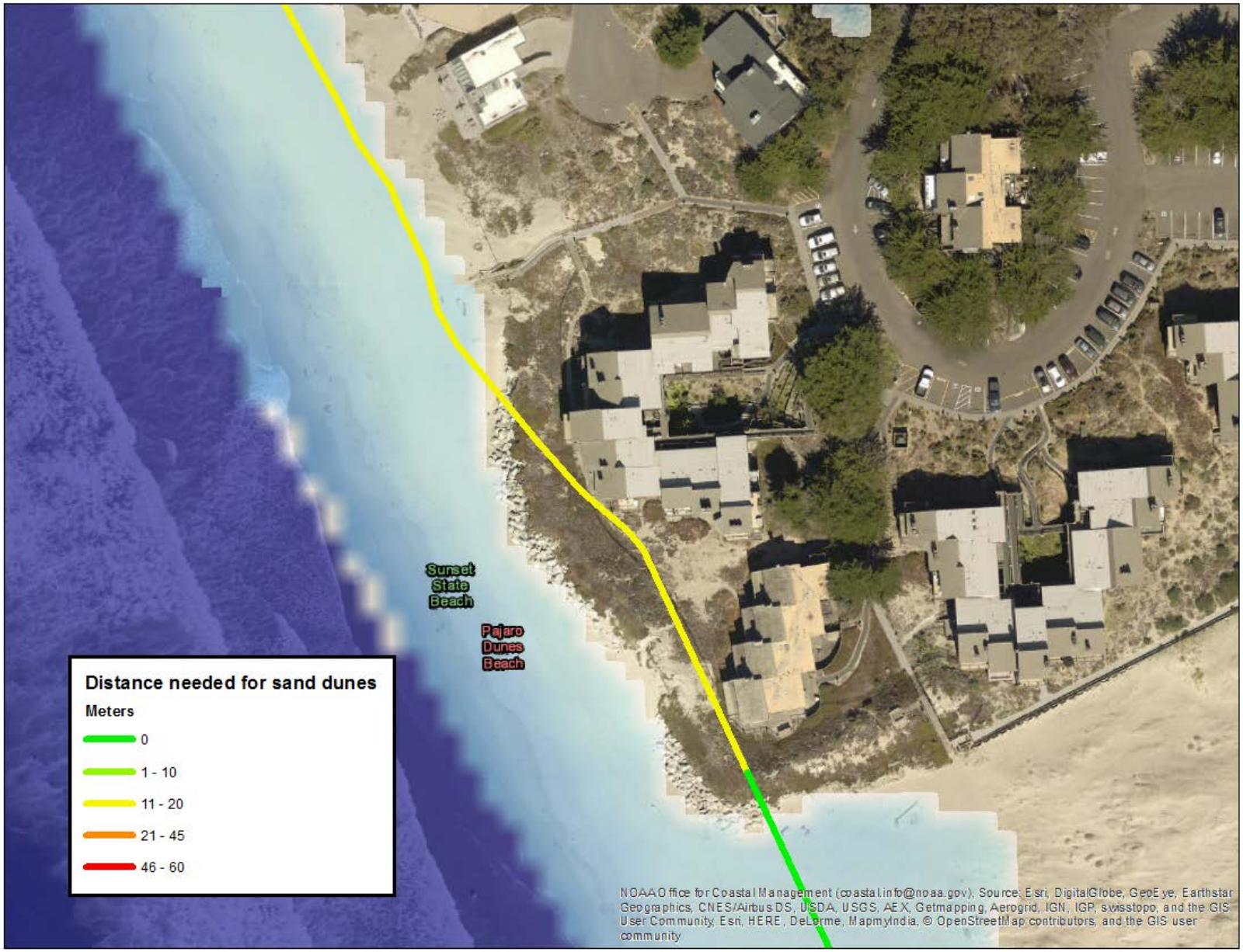
Based off of cobble berm design at Surfer's Point Managed Retreat

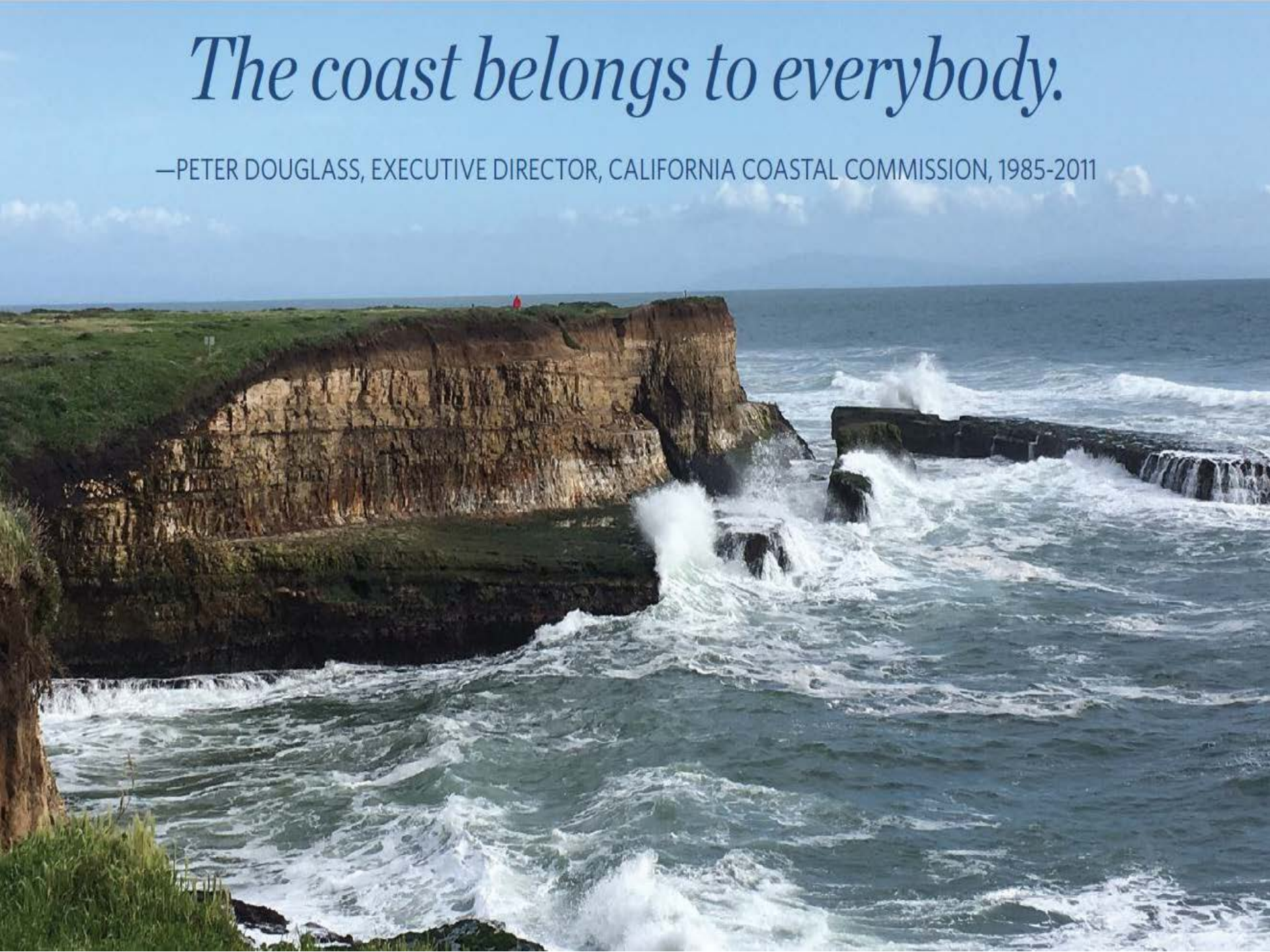
Annual TWLs based off of values calculated in *Relating Future Coastal Conditions to Existing FEMA Flood Hazard Maps: Technical Methods Manual* (ESA, 2016) using Stockdon and Modified TAW methods.

Sand Dune Suitability



Sand Dune Suitability




The coast belongs to everybody.
—PETER DOUGLASS, EXECUTIVE DIRECTOR, CALIFORNIA COASTAL COMMISSION, 1985-2011