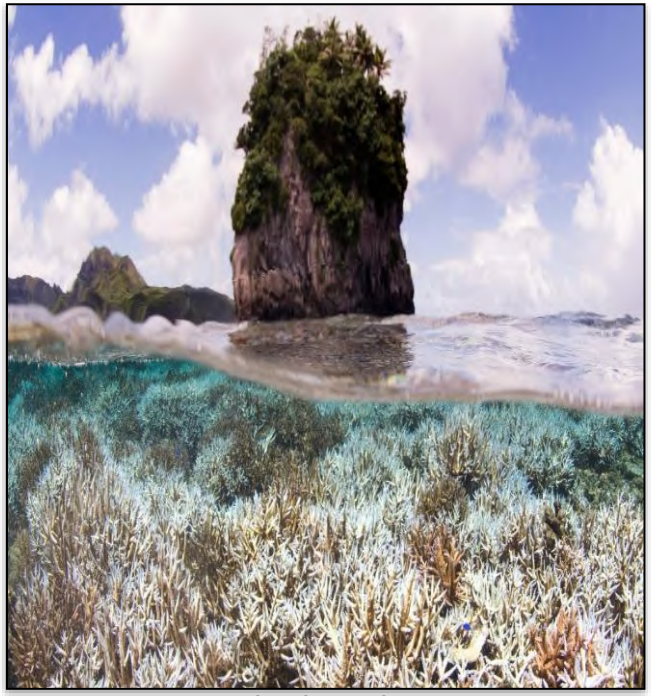
Relative SLR in American Samoa



Coral Bleaching
Fatu & Futi, AS

Sea Level Rise
Fagatogo, AS

Extreme Weather Events
TC Olaf, AS

Coastal Inundation
Lions Park, AS

Kelley Anderson Tagarino - American Samoa Sea Grant Extension Agent
KelleyAT@Hawaii.edu – 1 (684) 258-2967

RESEARCH PROJECT

From: https://pi-casc.soest.hawaii.edu/research/research-projects/slr-viewer-american-samoa/

Sea-level rise viewer for American Samoa: A co-developed visualization and planning tool

American Samoa has narrow strips of low lands surrounding steep inland interiors, making infrastructure particularly vulnerable to sea-level rise impacts.

American Samoa is vulnerable to sea-level rise in part due to the steep terrain of its islands. This terrain requires the majority of the islands' villages and infrastructure to be located along thin strips of coastal land. The situation is worsened by the recently recognized rapid sinking of the islands, which was triggered by the 2009 Samoa earthquake and is predicted to last for decades. This subsidence is estimated to lead to roughly twice as much sea-level rise by 2060 as what is already predicted from climate change alone. As a result, the timeline of coastal impacts in American Samoa will be decades ahead of similar island communities in the Pacific. Despite this urgency, decision-makers in the region lack the necessary projections and tools to plan for rising sea levels in American Samoa.

PROJECT DETAILS

FUNDED:
FY2020

PI:
Phil Thompson
Associate Director of UH Sea Level center, UH Mānoa

Co-Is:
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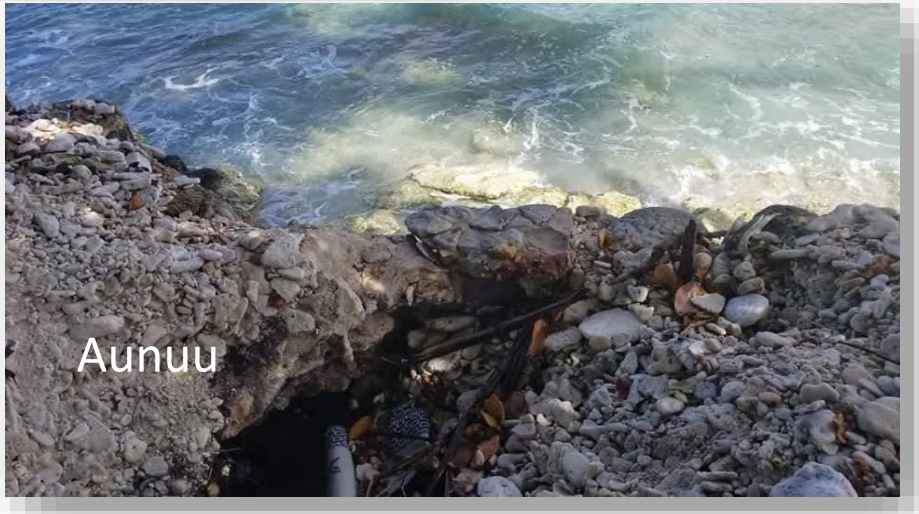
Extension Specialist, American Samoa Community College
Justin E. Stopa
University of Hawai'i at Mānoa
Curt Storlazzi
Research Geologist, USGS Pacific Coastal and Marine Science Center

Collaborators:
Scott Burch
National Park of American

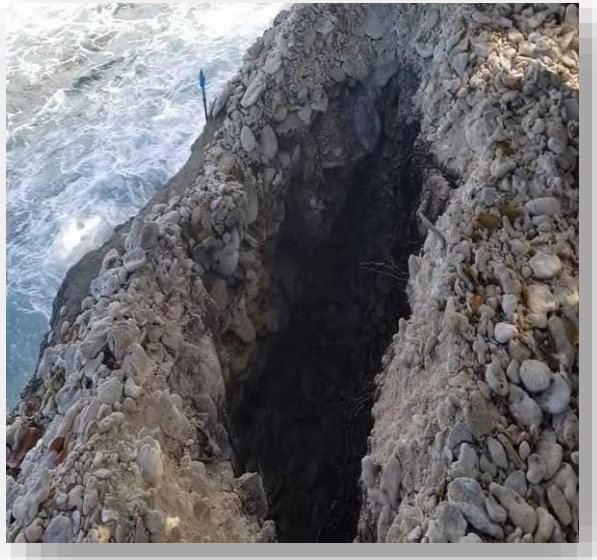
CLIMATE CHANGE IMPACTS:
Coastal Inundation and Coastal Erosion



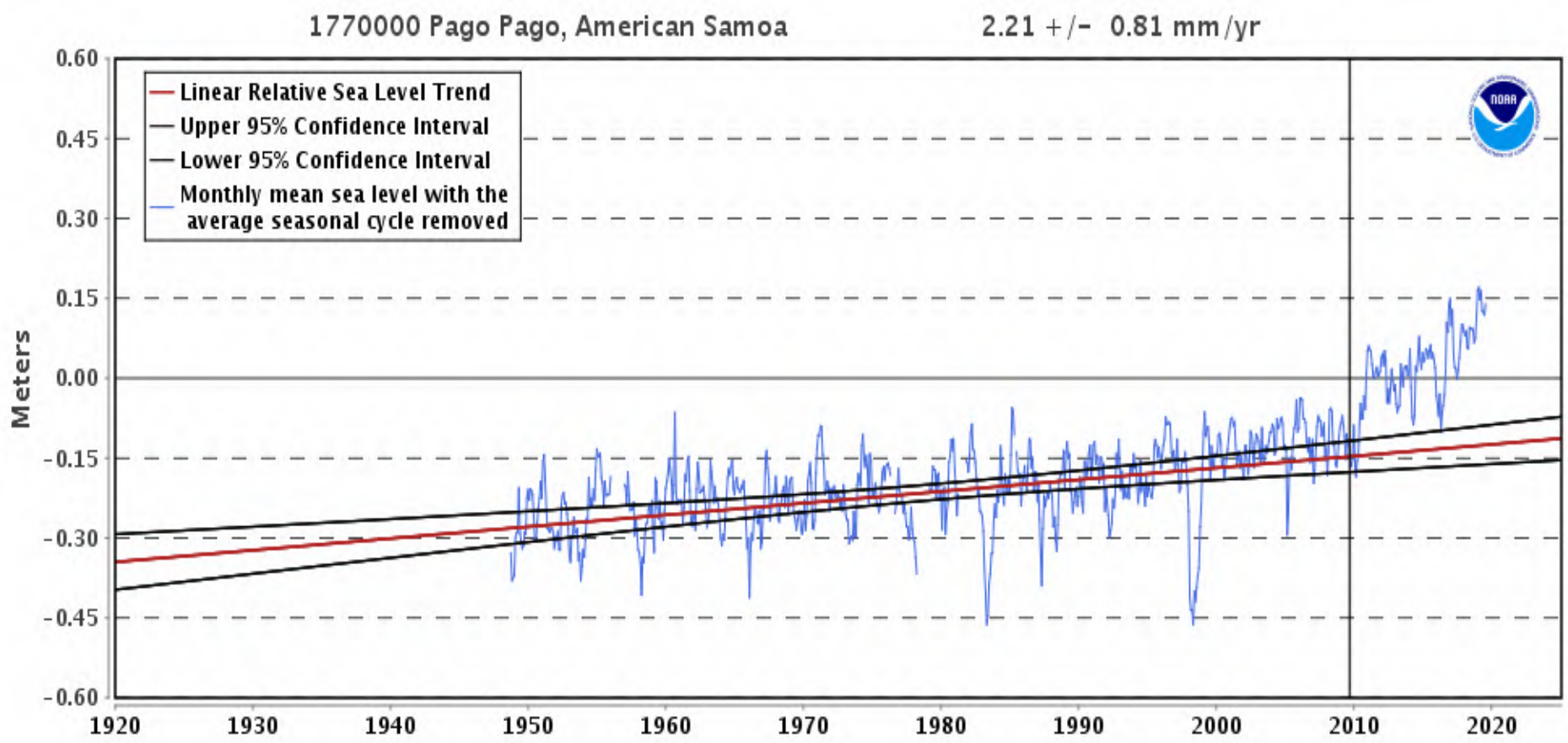
AUNU'U ISLAND, 2020

Sea Level Rise Impacts on Aunu'u:

- Saltwater Intrusion on:
  - Homes
  - Critical Infrastructure
    - ASPA's Power Generation System
    - ASPA's Water System
    - Exacerbation of existing salinity issues with drinking water quality



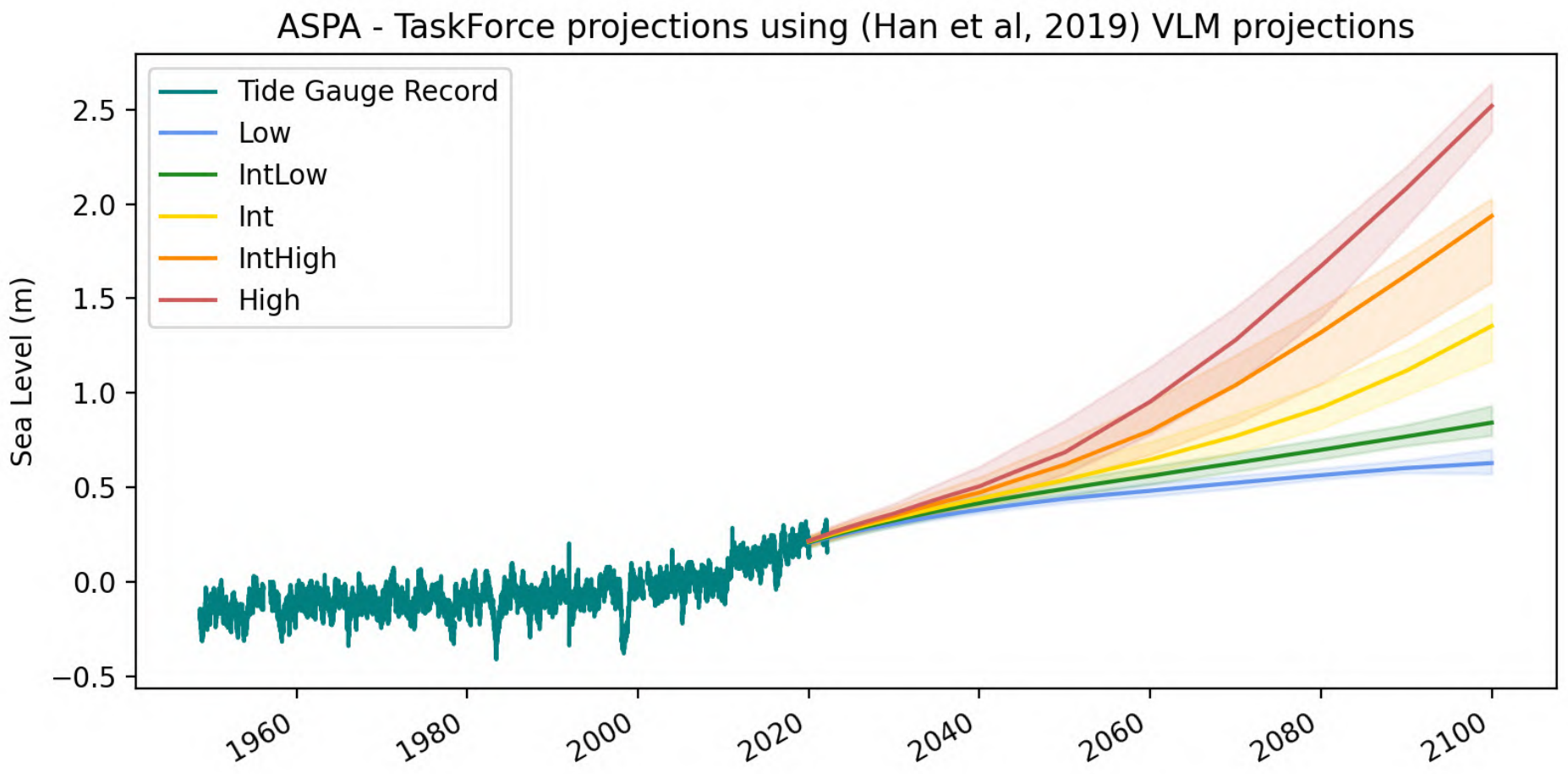
Relative Sea Level Rise in Pago Pago



Subsidence = 16 mm/yr or 0.6 in/yr

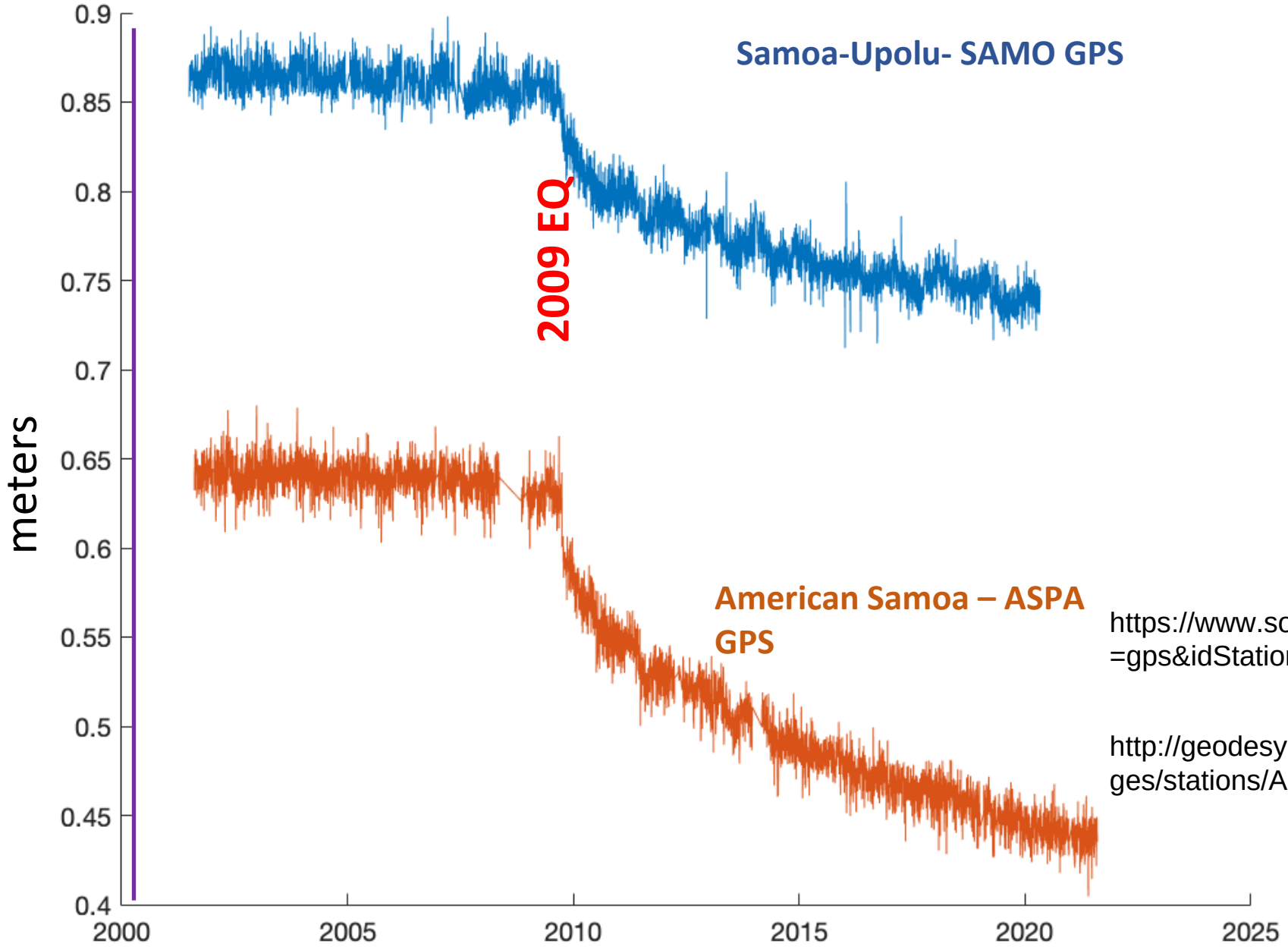
Historical rate = 2.2 mm/yr or 0.08 in/yr – current rate = 3.2mm/yr or 0.13 in/yr

Modern rate = 19.2 mm/yr or 0.76 in/yr



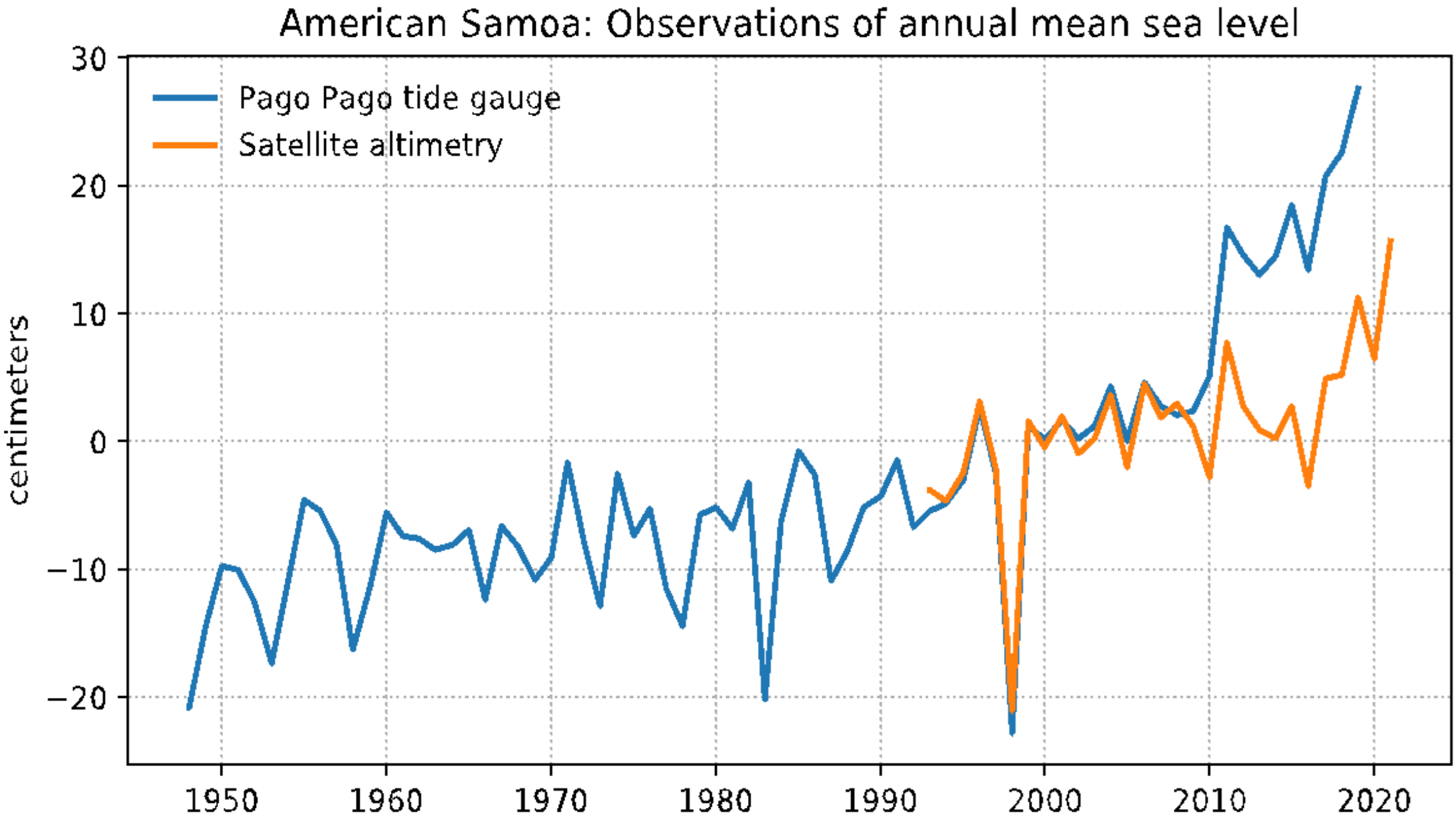
Note - the zero on the Y axis represents mean sea level in 2005, so by 2030 we expect to be 0.38m/1.25ft above the MSL in 2005.

Continuously Operating Reference Stations



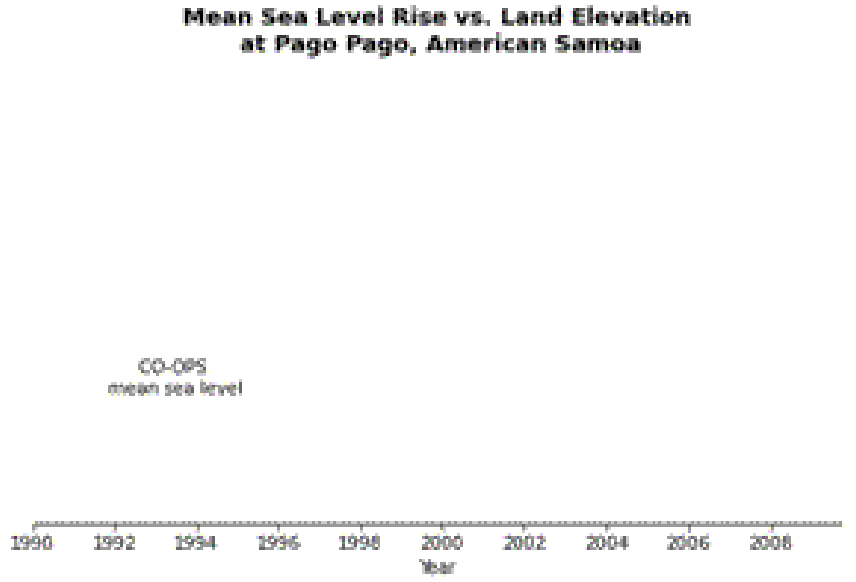
https://www.sonel.org/spip.php?page=gps&idStation=631

http://geodesy.unr.edu/NGLStationPages/stations/ASPA.sta


American Samoa: Observations of annual mean sea level
Pago Pago tide gauge
Satellite altimetry
centimeters
30
20
10
0
−10
−20
1950
1960
1970
1980
1990
2000
2010
2020

AS RSLR in last 11 years > previous 100 years

- “Following the earthquake, relative sea levels on Tutuila Island rose 250 millimeters (9.8 inches) in just 11 years. The increase was captured by NOAA’s water level station between September 2009 and January 2020.”



- Before 2009 our RSLR was 9.5 inches

per 100 years!

From: https://tidesandcurrents.noaa.gov/news_posts/article.html?post=1294

Where are we now

- Currently all surveyors I spoke with use the ASD62 without a correction. Some mentioned this is required by law.
- **Tutuila is currently about 40cm (15.8 inches) lower relative to sea level than in 1962**
- A new NGS datum should be ready by 2025 (not 2022 as planned due to pandemic travel restrictions)
- Current AS datum is the Local Tidal Datum and

  is required by law to be used for any federally

  funded projects.
    - NGS Datum conversion tool: https://geodesy.noaa.gov/NCAT/

WHAT DOES SEA LEVEL RISE MEAN FOR AMERICAN SAMOA?

Pago Pago International Airport

Pago Pago International Airport by 2100 (7ft Sea Level Rise)

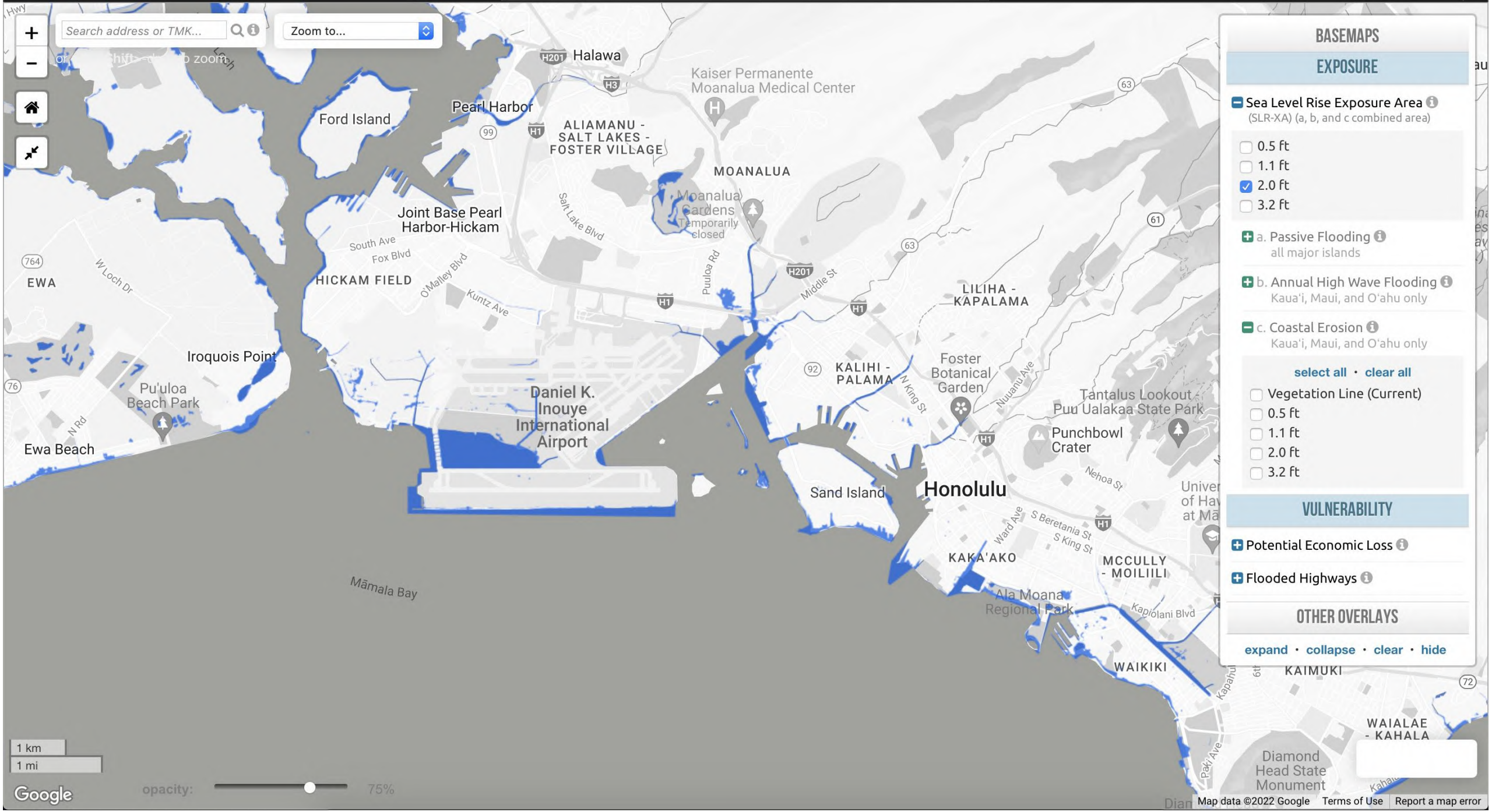
Source: https://coast.noaa.gov/slr/#/layer/slr

WHAT DOES SEA LEVEL RISE MEAN FOR AMERICAN SAMOA?

Fagatogo and Utulei

Fagatogo and Utulei by 2100 (7ft Sea Level Rise)

Source: https://coast.noaa.gov/slr/#/layer/slr


Search address or TMK...
Zoom to...
BASEMAPS
EXPOSURE
Sea Level Rise Exposure Area
(SLR-XA) (a, b, and c combined area)
0.5 ft
1.1 ft
2.0 ft
3.2 ft
a. Passive Flooding
all major islands
b. Annual High Wave Flooding
Kaua'i, Maui, and O'ahu only
c. Coastal Erosion
Kaua'i, Maui, and O'ahu only
select all • clear all
Vegetation Line (Current)
0.5 ft
1.1 ft
2.0 ft
3.2 ft
VULNERABILITY
Potential Economic Loss
Flooded Highways
OTHER OVERLAYS
expand • collapse • clear • hide
Halawa
Pearl Harbor
Ford Island
ALIAMANU - SALT LAKES - FOSTER VILLAGE
Kaiser Permanente Moanalua Medical Center
MOANALUA
Moanalua Gardens
Temporarily closed
Joint Base Pearl Harbor-Hickam
HICKAM FIELD
EWA
Iroquois Point
Pu'uloa Beach Park
Ewa Beach
Daniel K. Inouye International Airport
Sand Island
Honolulu
KALIHI - PALAMA
LILIHA - KAPALAMA
Foster Botanical Garden
Tantalus Lookout - Puu Ualakaa State Park
Punchbowl Crater
KAKA'AKO
MCCULLY - MOILIILI
Ala Moana Regional Park
WAIKIKI
KAIMUKI
WAIALAE - KAHALA
Diamond Head State Monument
Māmala Bay
1 km
1 mi
opacity:
75%
Google
Map data ©2022 Google
Terms of Use
Report a map error

Losing Our Shores

Figure 2. Faga'alu shoreline along Matafao Elementary circa 1967 (above left) and 2014 (above right).

A or B

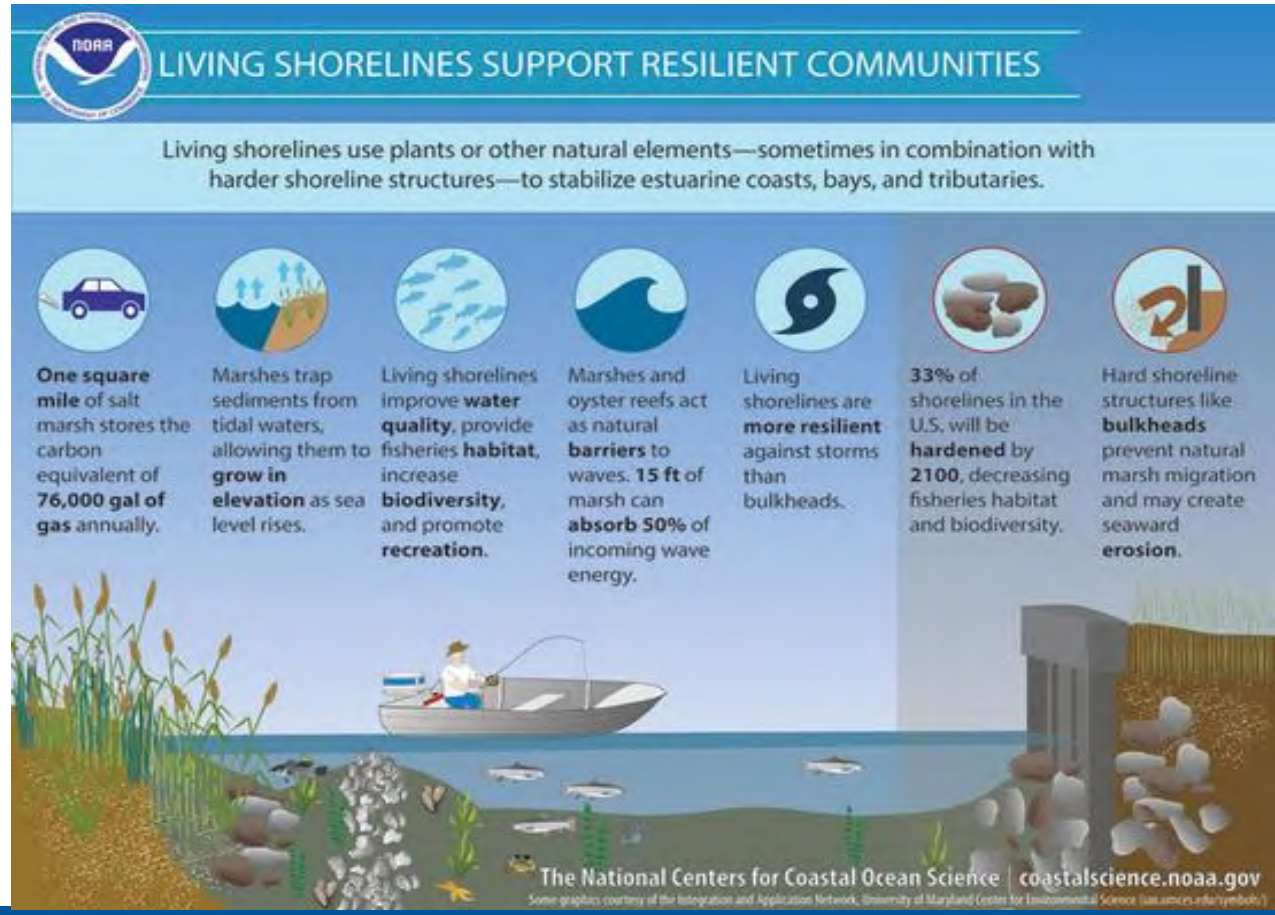
Costly failures

- Seawalls are failing at an increasing rate
- Proper repairs aren’t easy
- DPW already stretched thin
- Road access is limited during repairs

Living shorelines

Living shorelines allow:

- The intertidal habitat to remain
- Natural migration as sea levels rise
- Community residents to become shoreline stewards
- Gleaning, or hand harvesting of clams, etc.

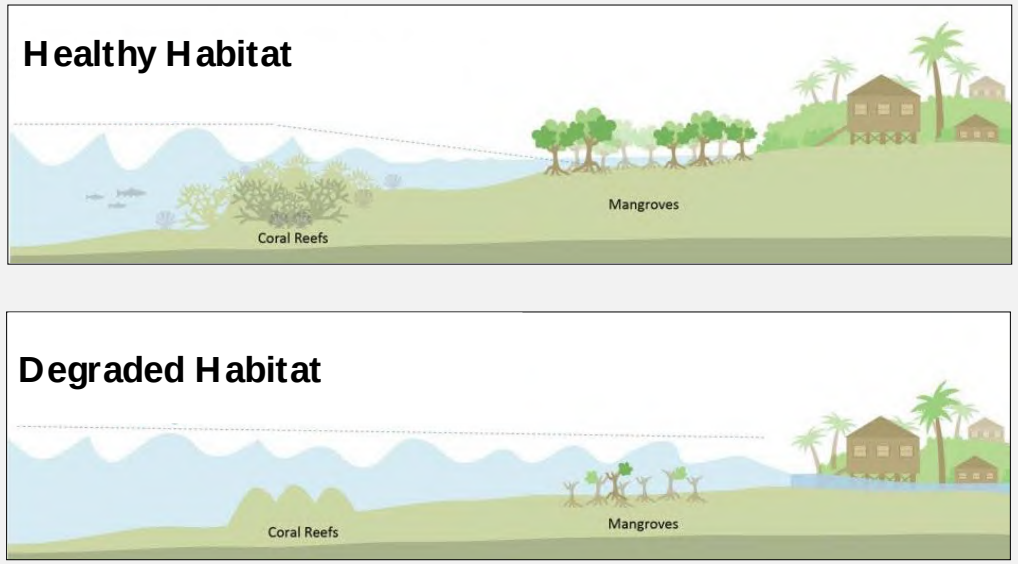


Appropriate shoreline solutions are site dependent

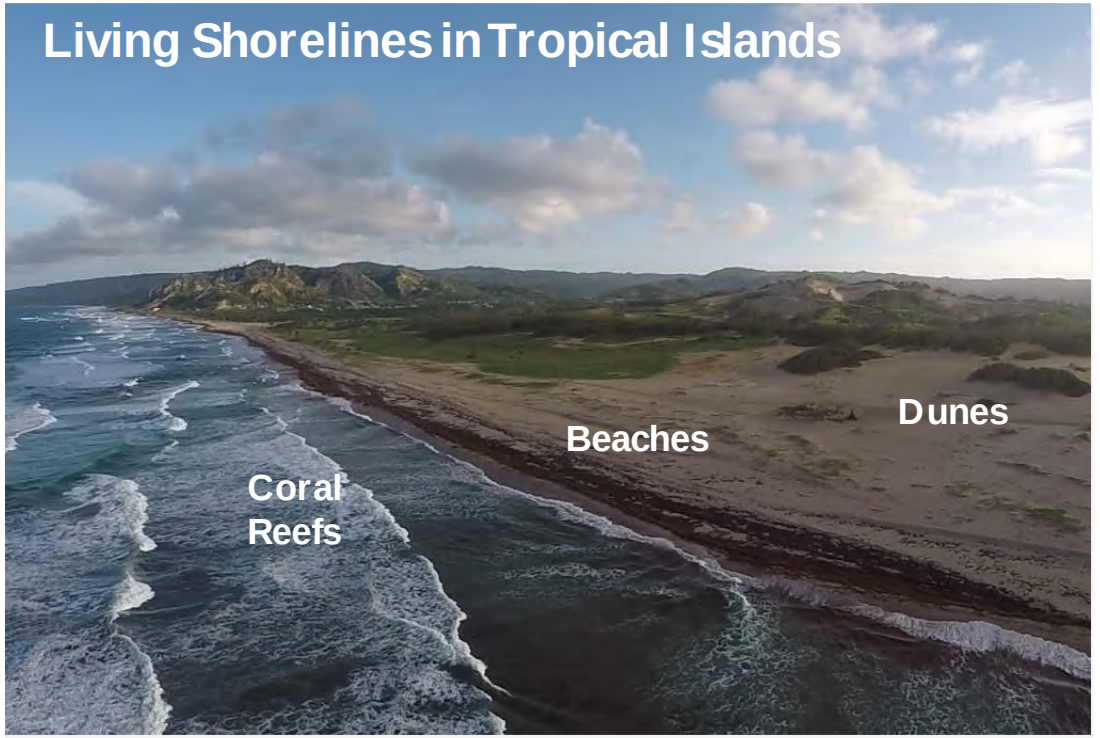
Sunset Beach, O‘ahu, USA

Using our natural infrastructure

Healthy Coastal Habitats Reduce Waves and Storm Surge



Credit: The Nature Conservancy



Bathsheba, Barbados

Supporting coral reefs

Oyster reefs

Oyster reefs have many benefits:

- Each oyster can filter 50 gallons of water a day
- Serve as shoreline protection
- Can install different shapes as wave breaks
- Serve as carbon sink

Lions Park Living Shoreline

- Lions Park has lost over 20 feet of dry land over the past 20 years
- Will serve as Territory's first living shoreline installation
- Three planed locations for installations along the shore
- Combination of oyster reefs, local rock, and shoreline plants

AS RSLR Viewer

- Our planned RSLR viewer would be the first tool that would incorporate American Samoa's subsidence and put a projected timeline to impacts
- This empowers families to work within their family or village to form adaptation plans
- Remember – American Samoa has traditional land tenure, so adaptation must come from residents, not the government!

Questions? Email me at KelleyAT@Hawaii.edu
Fa’afetai tele lava!

Accurate info

↓

Engagement

↓

Empowered people

↓

Protected places

Together, we can!