



Illya Azaroff, FAIA | Professor,
New York City College of Technology
(CUNY) and founding Principal,
+LAB Architect PLLC

**Adele Houghton, FAIA,
DrPH** | President, Biositu, LLC
and co-author of Architectural
Epidemiology (2024)

Moderator:

**Frederick Marks, FAIA,
LEED AP BD+C** | Visiting
Scholar & Research
Collaborator, Salk Institute for
Biological Studies

Learning Objectives



Become familiar with the ANCR/International Code Council (ICC) Community Resilience Benchmarks that focused on 19 functional areas to deliver essential services and take practical actions for a community to become more resilient.



Review lessons learned in Florida, Hawaii, Puerto Rico, and the Bahamas in the aftermath of severe hurricanes and how they can be applicable to different regions in California.

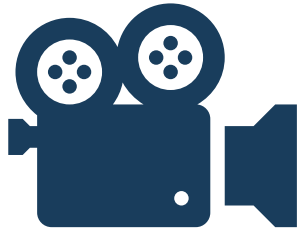


Discover how New York City is enhancing its public waterfront to be more resilient, accessible and attractive and how this could relate to California coastlines.



Learn how architecture teams can integrate regional and hyperlocal data about climate change vulnerability into design projects.

Housekeeping Reminders



Access to today's recording will be made available on our website



Today's session qualifies for 1 AIA HSW/LU



Please use the Q&A function to ask questions for today's presenters



Cultivate a positive learning environment



Frederick Marks, FAIA, LEED AP BD+C
Visiting Scholar & Research Collaborator,
Salk Institute for Biological Studies

CLIMATE
ACTION
WEBINARS

Wednesday, 5.8.24
12:00P | 1 LU/HSW

Making Resilience a Priority





Illya Azaroff, FAIA
Professor, New York City
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Q & A

Thank you



Illya Azaroff, FAIA
iazaroff@pluslabglobal.com
www.pluslabglobal.com



Adele Houghton, FAIA, DrPH
adeleh@biositu.com
www.alignmentprocess.org

AIA members should receive today's course credit on your transcript within 1-2 weeks.



Hurricanestrong Home, Queens New York 2019

A Few Stories from the field +



Hurricane Maria Response, Island of Dominica 2018



HURRIPLAN Training
Saipan, CNMI, Northern Marianas Island 2015

Building capacity across the world
Giving voice and vision to underserved communities



Health Safety and Welfare

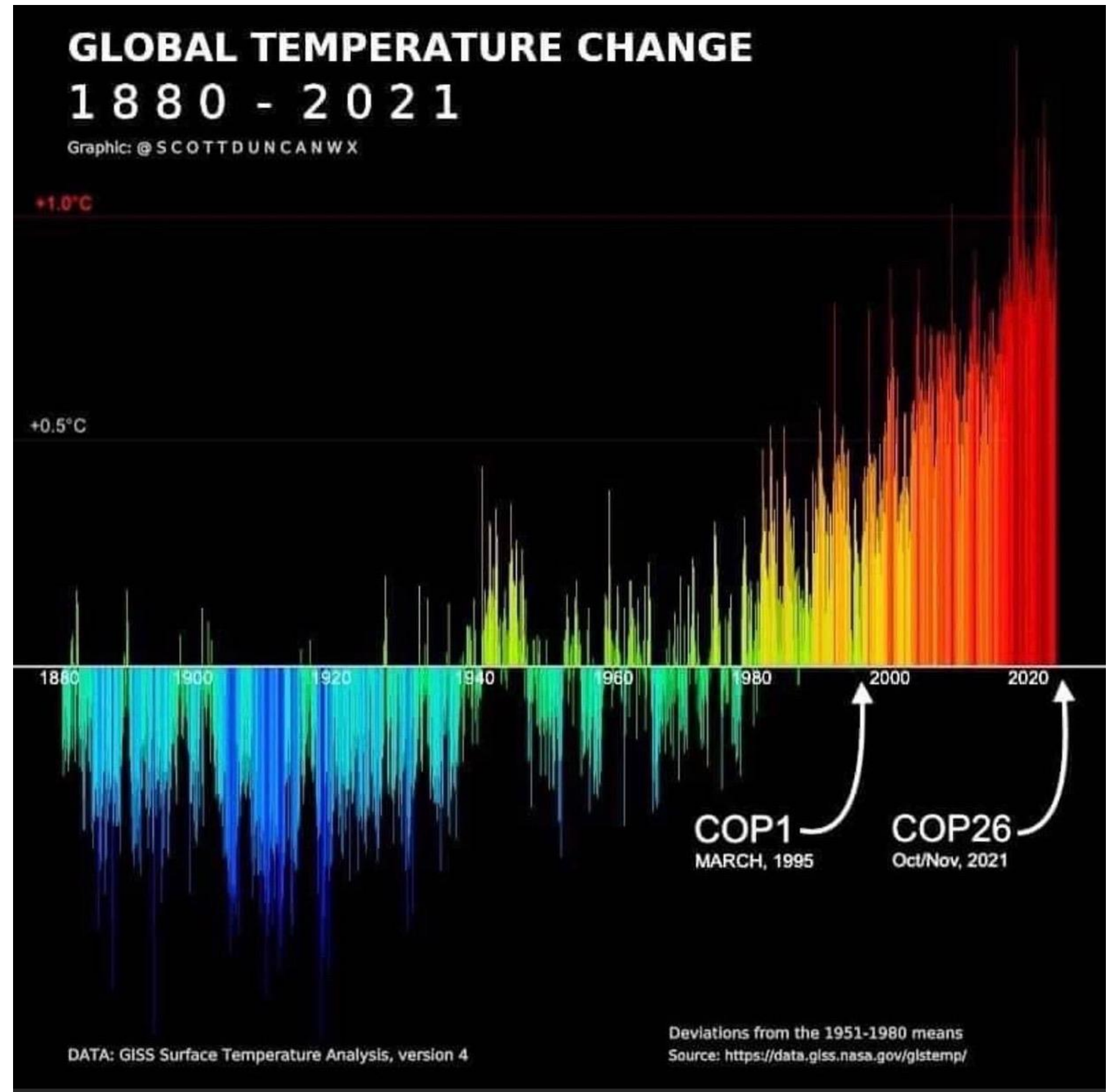
Policy

Disaster Response
Mitigation & Training

+ lab

Making Resilience a Priority Agenda

- WHY – issues we face
- COP Opportunity Need for Architects
- California context
 - Case study 1
- Resilience - How to
 - Case study 2
- Resources



We are all in the same storm.....







Riverine
Flooding

Missouri
and
Mississippi

Economic loss

Food chain

Displacement

Climate Justice











How far do we need to go?



FLOODING: New York to California

+1.5°

The Paris Agreement lower limit goal. Flood damage increases by 160%–240%.

Up to **350 million** more city dwellers than today are vulnerable.

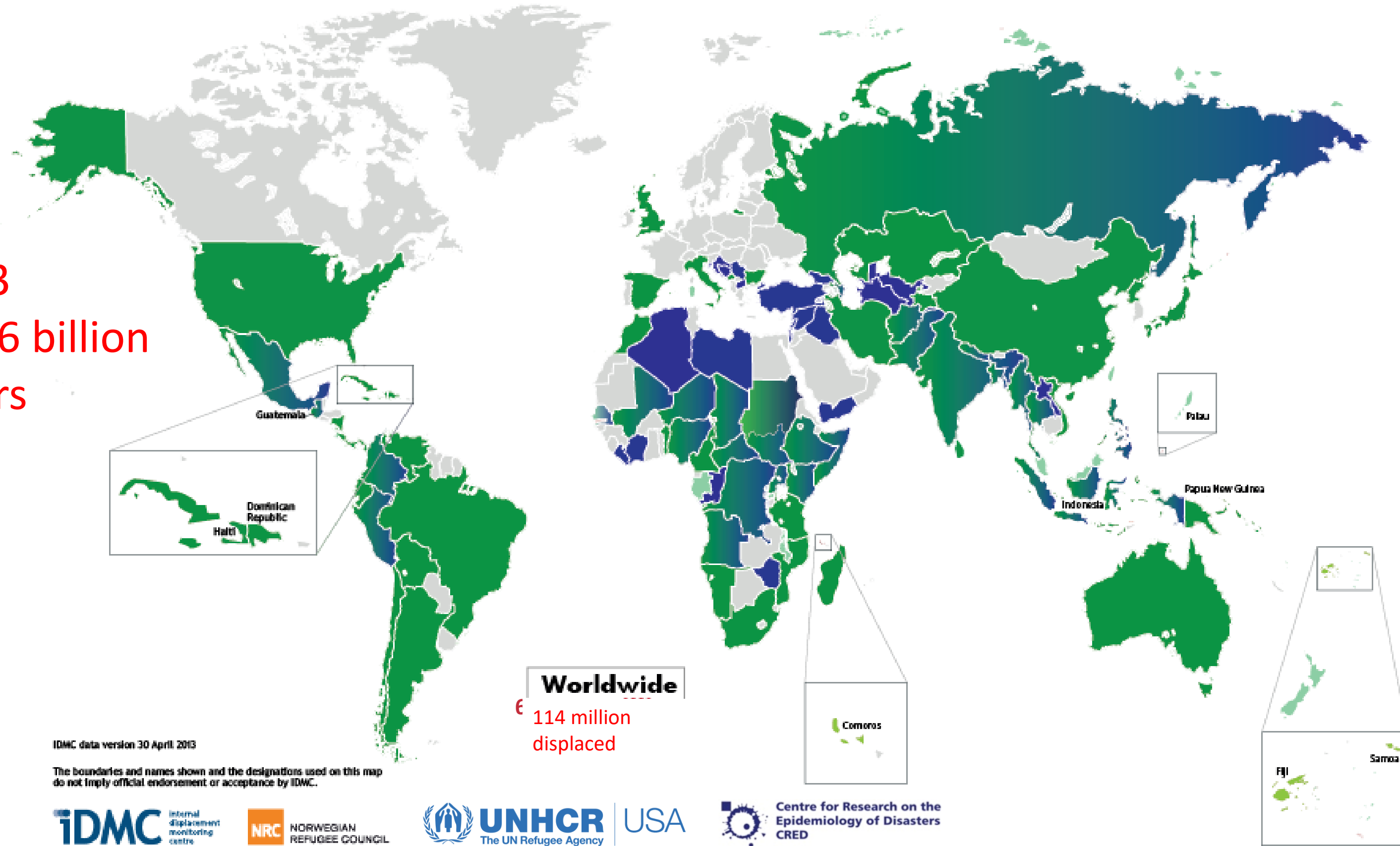
This is the storm

Scale + Scope of our work together



VIOLENCE AND NATURAL DISASTER INDUCED DISPLACEMENT WORLDWIDE

2023
totaled \$236 billion
dollars



Worldwide
€ 114 million displaced

IDMC data version 30 April 2013

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by IDMC.



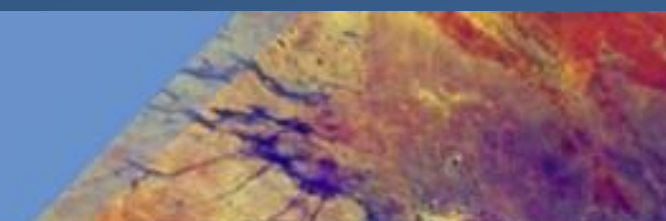
“Living” by the numbers in the 21st century

GLOBAL CLIMATE IMPACTS AND NATURAL DISASTERS



3.3 – 3.6 billion people live in hotspots of high vulnerability to climate change.





Future global climate risks



Heat stress

Exposure to heat waves will continue to increase with additional warming.



Water scarcity

At 2°C, regions relying on snowmelt could experience 20% decline in water availability for agriculture after 2050.



Food security

Climate change will increasingly undermine food security.



Flood risk

About a billion people in low-lying cities by the sea and on Small Islands at risk from sea level rise by mid-century.

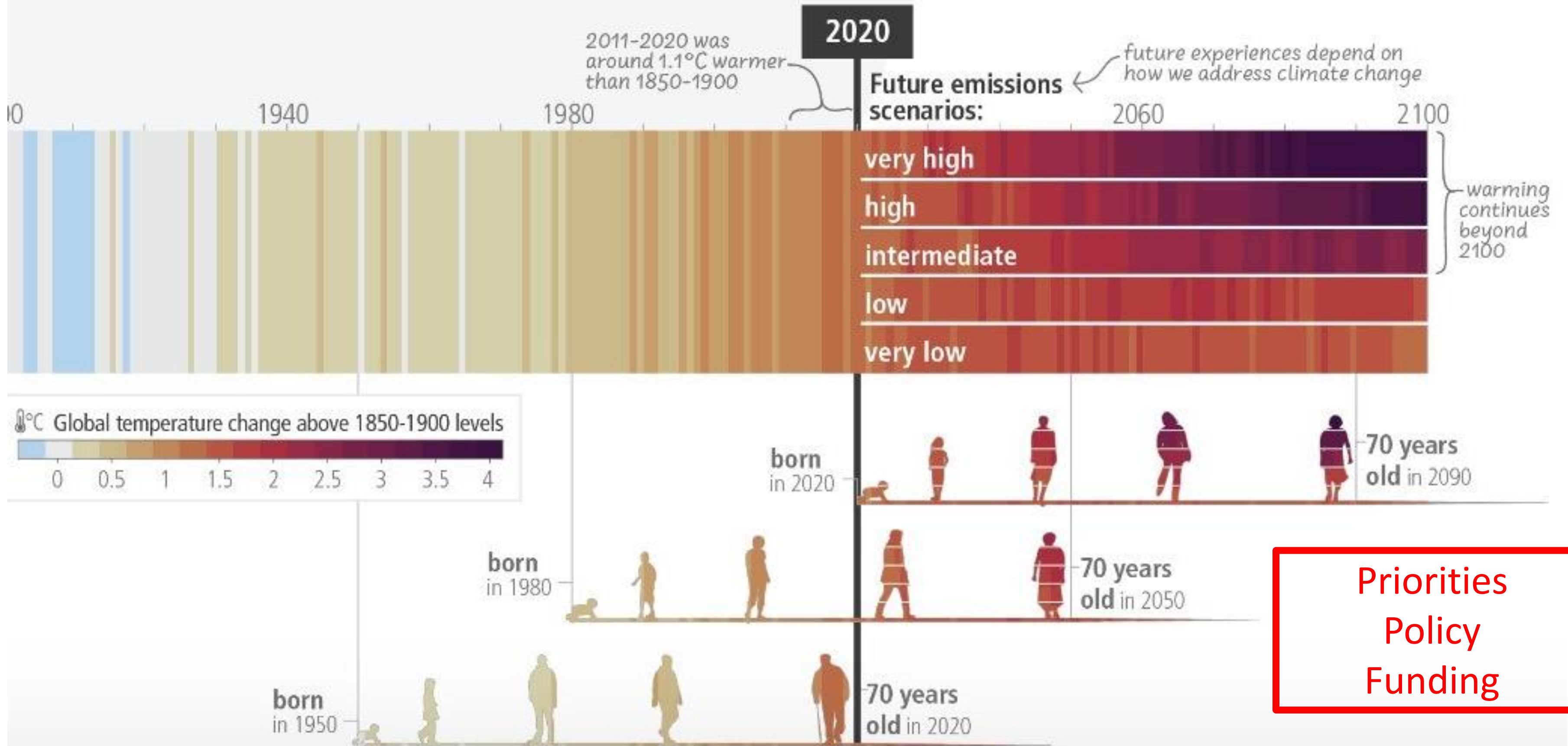
Simultaneous extreme events compound risks

Multiple extreme events that compound the risks are more difficult to manage



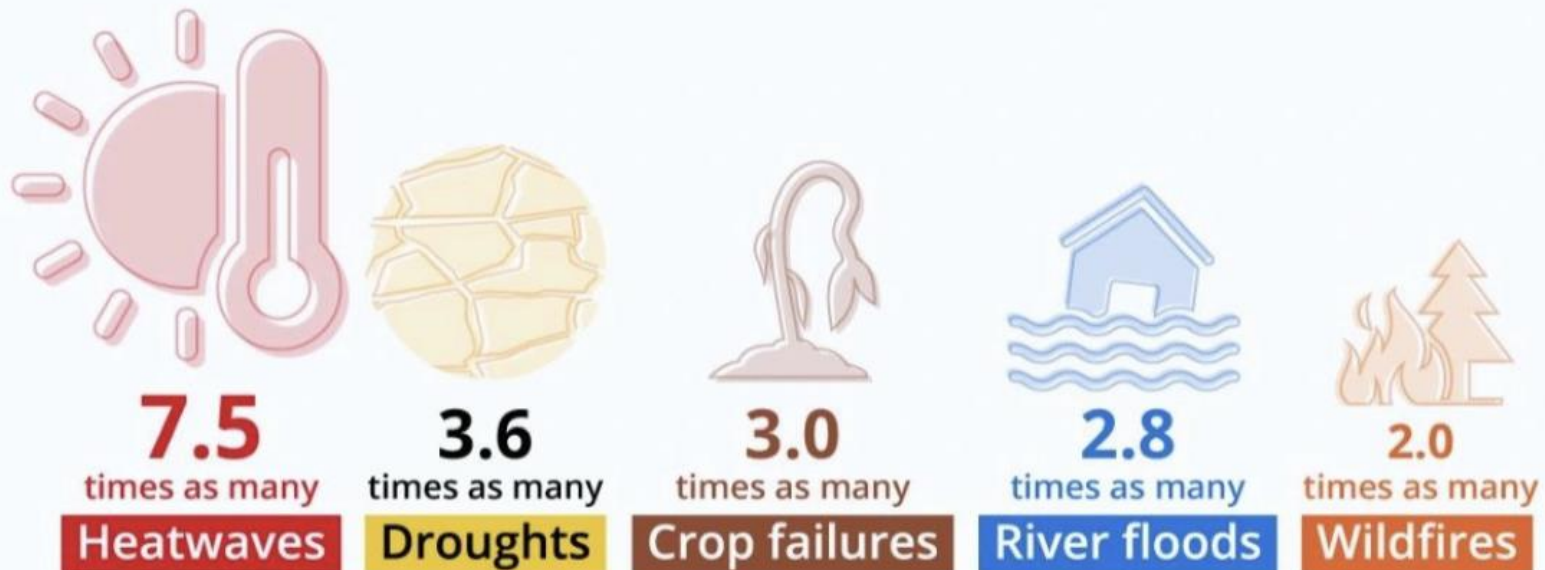
Understanding the Future

The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term



Number of Climate Disasters to Triple for New Generation

Frequency of climate disasters experienced in a lifetime for a person born in 2020 compared to one born in 1960



All climate disasters
~3 times as many

Based on NDC scenario (following Paris Agreement) of 2.7 °C/4.9 °F warming until 2100
Source: Thiery et al. Intergenerational Inequities in Exposure to Climate Change. Science (2021) via media reports



statista



2013

51.2 million
forcibly displaced people



2023

114 million
forcibly displaced people

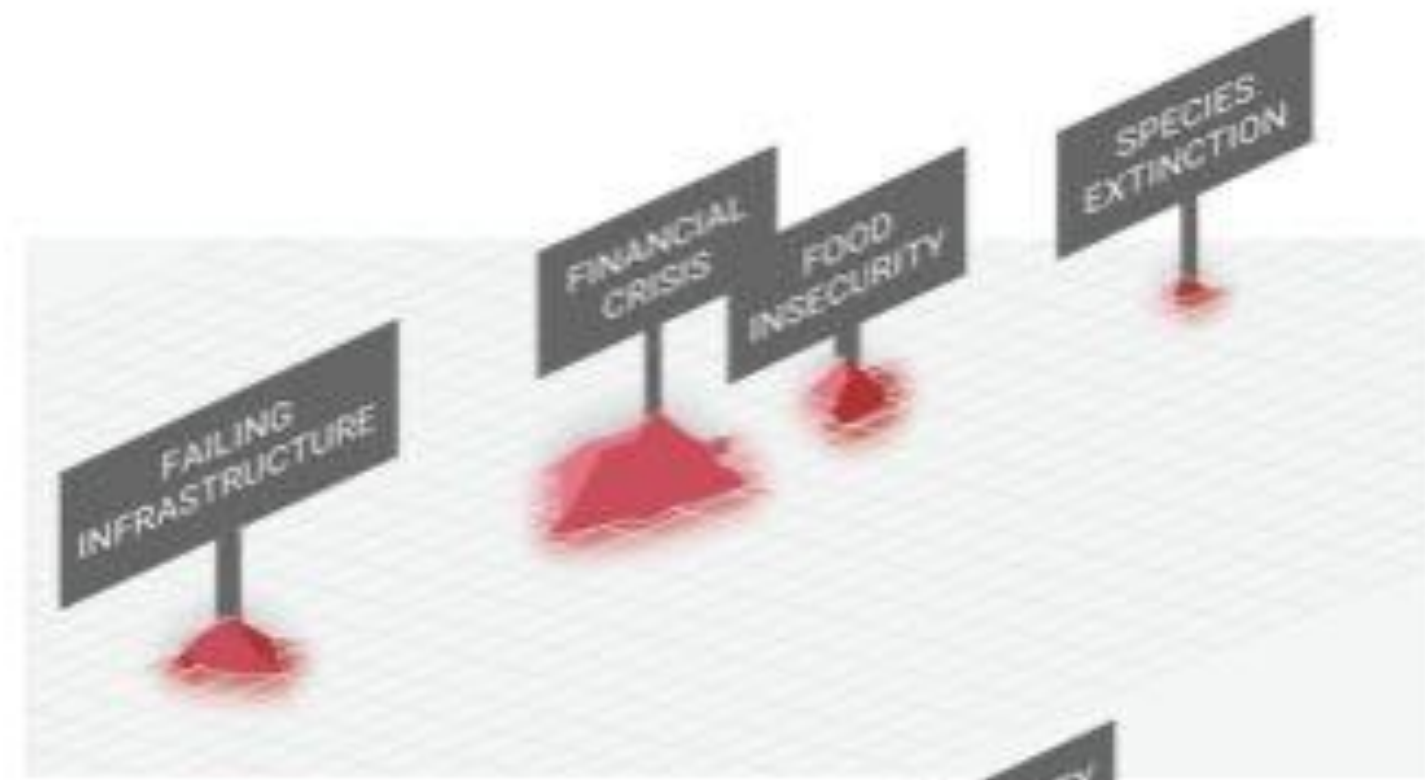


Yearly **economic loss** from disasters has more than **doubled** over the past 30 years.

#StopTheSpiral

Loss and Damage agreement COP27

Realization of risk



Context



Driven by



U.S. 2023 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 28 separate billion-dollar weather and climate disasters that impacted the United States in 2023.



Vulnerabilities of Coastal Communities

Coastal Shoreline Counties

A county is considered a Coastal Shoreline County if it is directly adjacent to the open ocean, major estuaries, or the Great Lakes.

Total population: **124,733,542**
% of total population: **39.1%**

2014 population estimates



dadaviz.com

- Home of 39.1% Americans
- Generate 46% of national GDP (\$6.6T)
- Generate 51M jobs
- Generate 56% of our nation's energy
- Home of all Ocean ports
- Home to commercial and recreational fishing industries.

WHAT WILL OUR FUTURE HOLD?



**YEAR
2050**



200+

million people in need
estimated by 2050

550+

million people in need
estimated by 2100

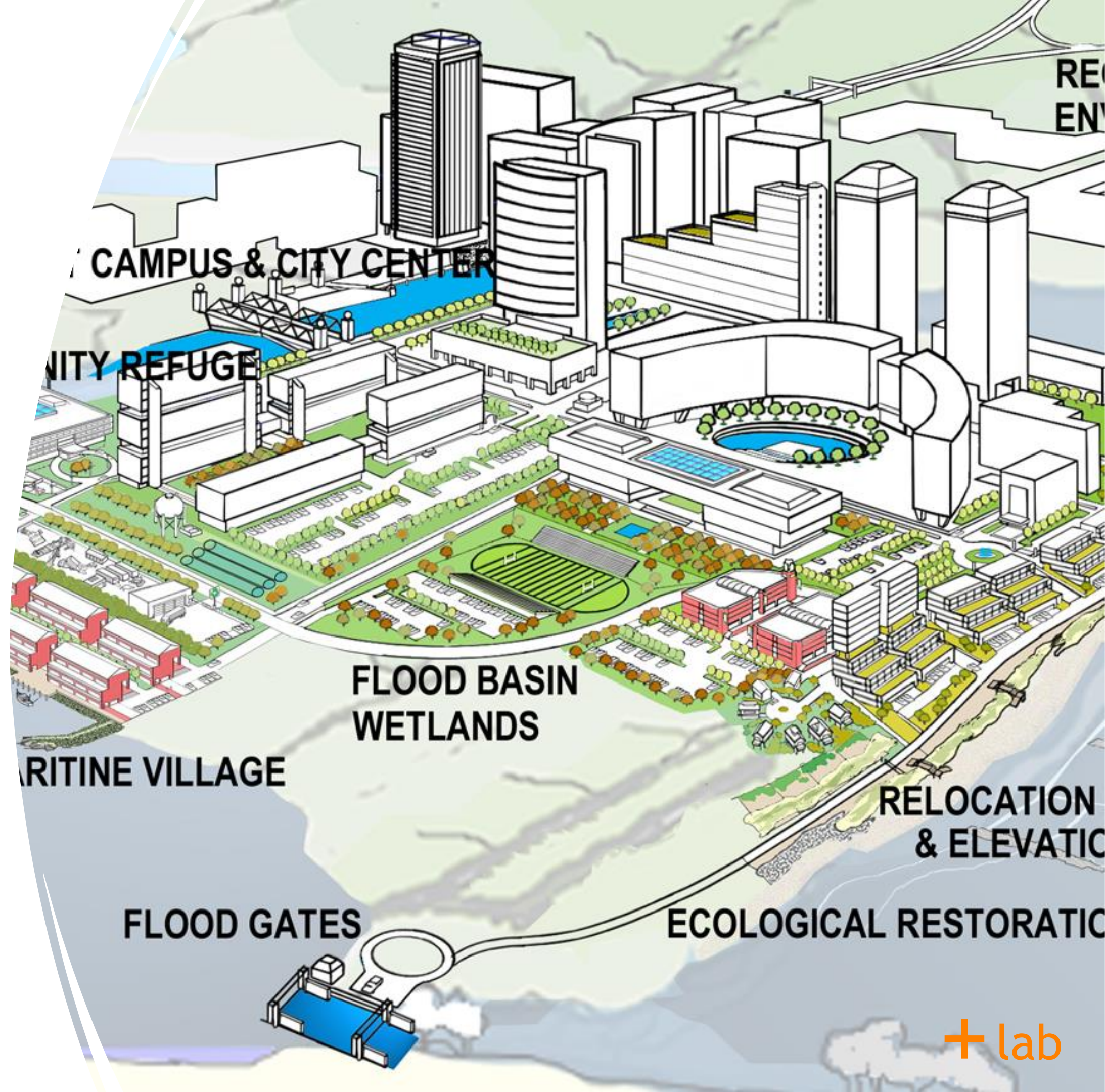
\$200 Trillion

the world will be spending an estimated 200T
dollars on rebuilding from natural disasters by 2100

YEAR
2100

RESILIENT COMMUNITIES = ADAPTIVE COMMUNITIES

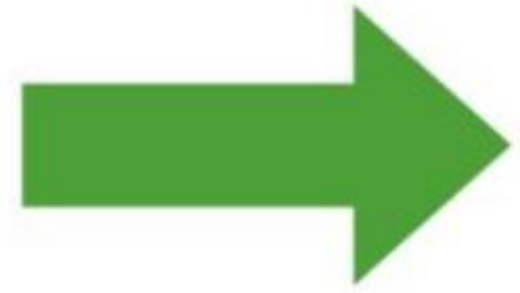
- RECIEVER CITIES!
- HOW DO WE INCREASE CAPACITY?
- THINK OF RESILIENCE AS AN ACTION!



SDGs - GLOBAL COMMITMENTS



How architects support the goal



Architects design buildings that support the health and well-being of all people, considering physical, mental and emotional effects.



AIA offers ongoing architecture education and supports programs from K-12 to higher education for the growth of the profession.



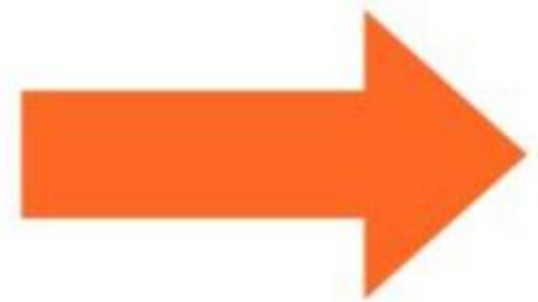
AIA celebrates female voices in architecture through leadership development, career resources, and a strong peer network.



Architects have the design expertise and technological advancements to bring emissions to zero.



Buildings are a key engine for economic growth.



Architects advocate for resilient and inclusive infrastructure with policymakers and developers.



Architects create designs that address inequality in communities to be more just.



AIA Architecture & Design Materials Pledge helps ensure firms use sustainable materials.



AIA Framework for Design Excellence shows how firms can create buildings responsibly.



The AIA 2030 Commitment and AIA A&D Materials Pledge help track climate action progress for accountability.



Welcome to Dubai – COP -28



Making Resilience a Priority

Global Resilience Partnership / Events / Sharm el Sheikh Adaptation Agenda: The Opportunity to Accelerate System Transformation for Resilience

SHARM EL SHEIKH ADAPTATION AGENDA:

The Opportunity to Accelerate System Transformation for Resilience

Marrakech
Partnership



GLOBAL
RESILIENCE
PARTNERSHIP



RACE TO ZERO

**COP27 Presidency launches
Adaptation Agenda to build
climate resilience for 4 billion
by 2030**

Sharm-El-Sheikh Adaptation Agenda

The global transformations towards
adaptive and resilient development

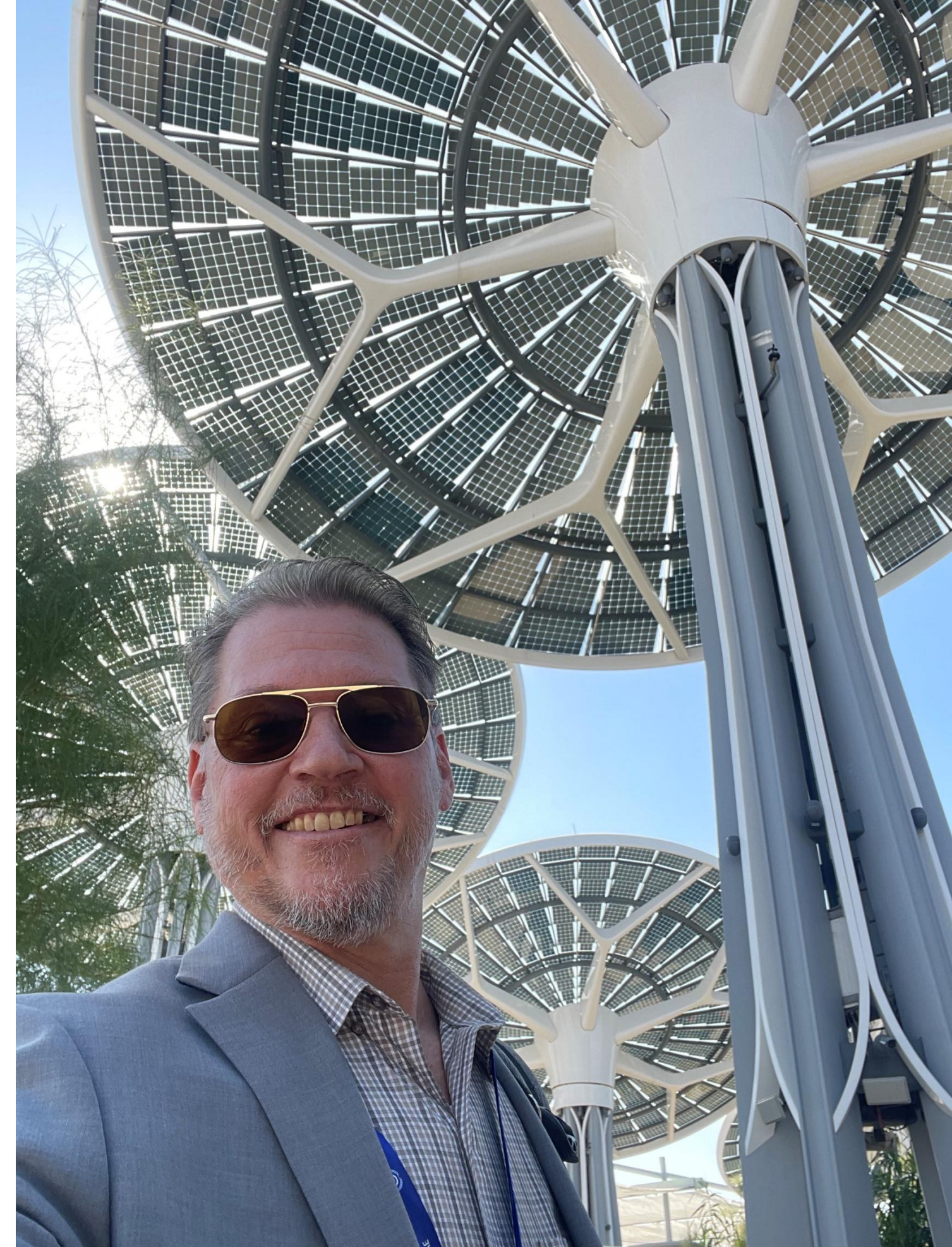
COP-28

SHIFT IN GLOBAL FINANCING AND FOCUS

Moving to Adaptation globally
Less than 2% to 9%.

Asset management shift (GEP)
Biodiversity and ecosystem services

- 2023 United Nations Climate Change Conference – Dubai - UAE





The SDGs can be linked together economically, societally and ecologically. Illustration: J. Lokrantz/Azote

GEP pictures an overview of the ecosystem's status quo and brings ecosystem services into decision-making.

Image: Biosphere Futures



Global Adaptation Fund Agreement USD 188 million for 100 new projects in 2019

Rising adaption costs are likely to range from USD 140 billion to 300 billion per annum by 2030 and could rise between USD 280 Billion and 500 billion per annum by 2050.

Need is estimated at USD 180 Billion annually from 2020-2030 and USD 50 Billion annually for developing countries

Half of the worlds largest companies estimate, Climate adaptation solutions could result in USD 236 billion in increased revenue

Some suggest in the Land use and food security sector alone the climate challenge provides an annual business opportunity of USD 4.5 Trillion a year by 2030

UN estimates the global cost of climate adaptation

Investing in Climate Resilience:

Unlocking a Growing Market of
Adaptation Solutions

Lead Author: Lori Collins

Contributors: Umar Ashfaq, Turbold Baatarchuluu, Erica Downing, Tara Guelig, Jay Koh, Linda-Eling Lee

A discussion paper by:



Global Adaptation &
Resilience Investment
Working Group

Data and analysis by:



The **Lightsmith** Group

In partnership with:



March 2024

Newly released
Tools for financing combining

- Adaptation
- Mitigation
- Ecosystem services

Climate Resilient Development

The solutions framework:

- Involves marginalized groups
- Prioritises equity and justice
- Reconciles different interests, values and world views



[Mika Baumeister / Unsplash; Aulia Erlangga/CIFOR CC BY-NC-ND 2.0]



The wider benefits of adaptation



For more than 3.4 billion people in rural areas: improved roads, reliable energy, clean water, food security

SDG 1: No poverty



Green buildings, green spaces, clean water, renewable energy, sustainable transport – in cities

SDG 3: Good health and wellbeing



Policies that increase youth access to land, credit, knowledge and skills can support agri-food employment

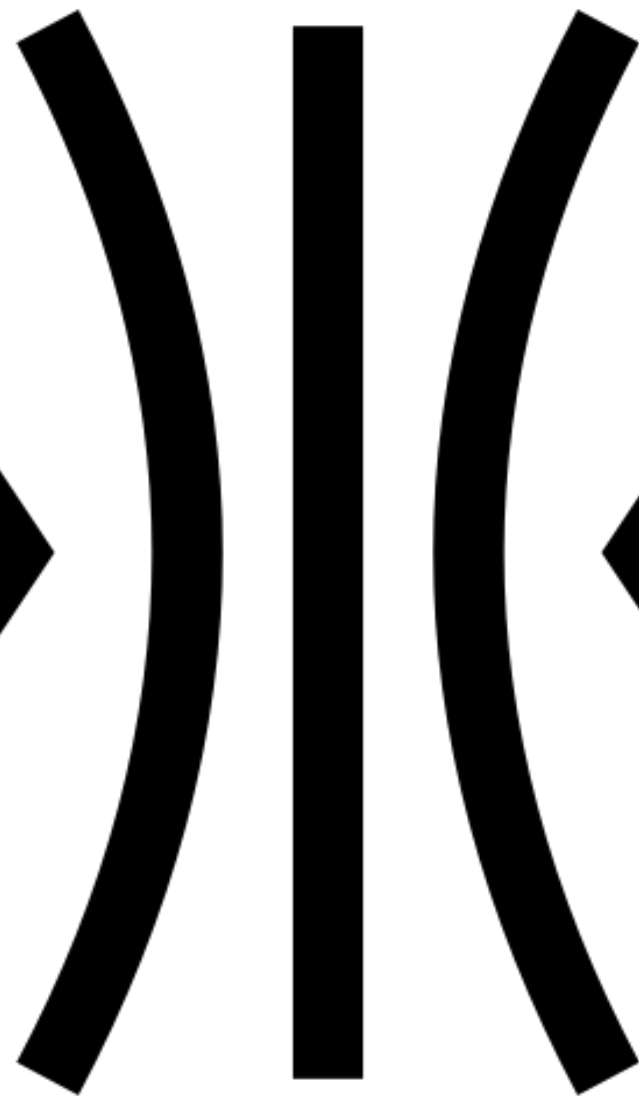
SDG 10: Reduced inequality



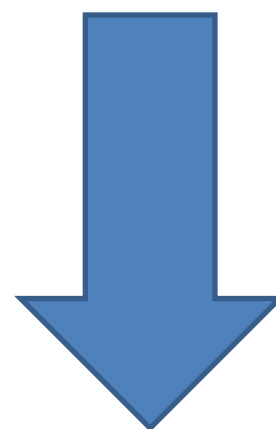
Restored and connected habitats can provide corridors for vulnerable species

SDG 14/15: Life on land & below water

**Resilience
(Adaptation)**



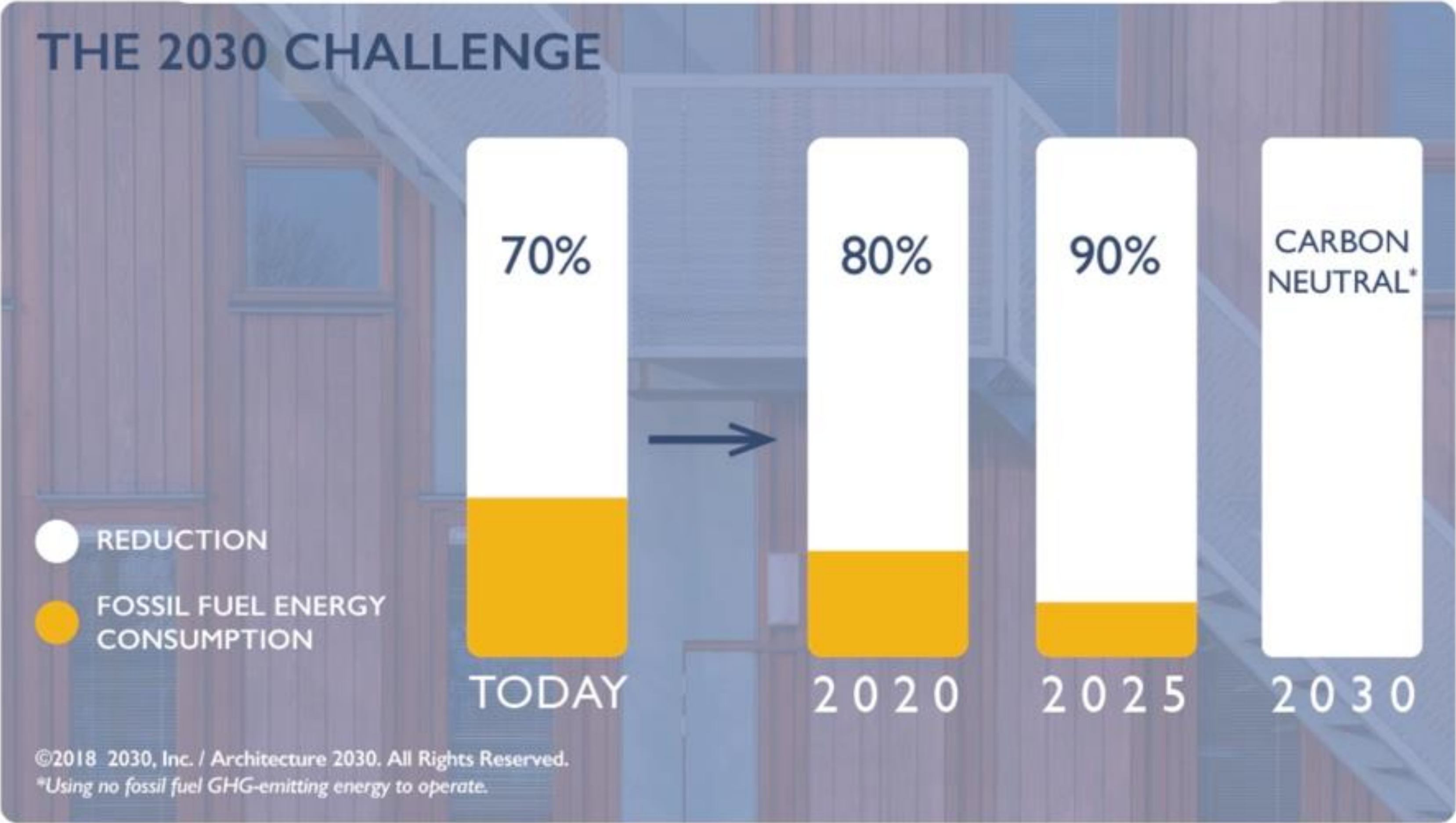
**Sustainability
(Mitigation)**



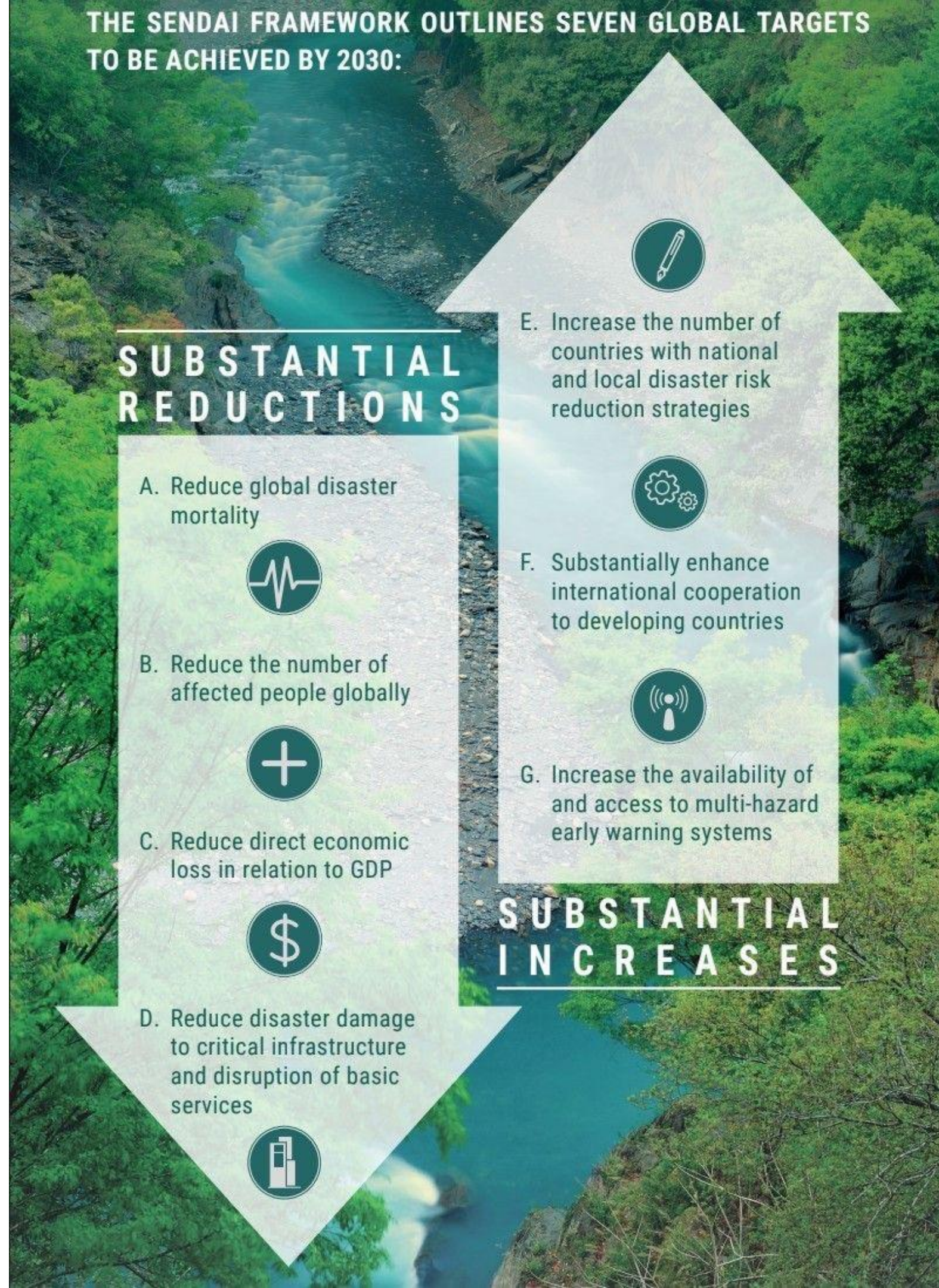
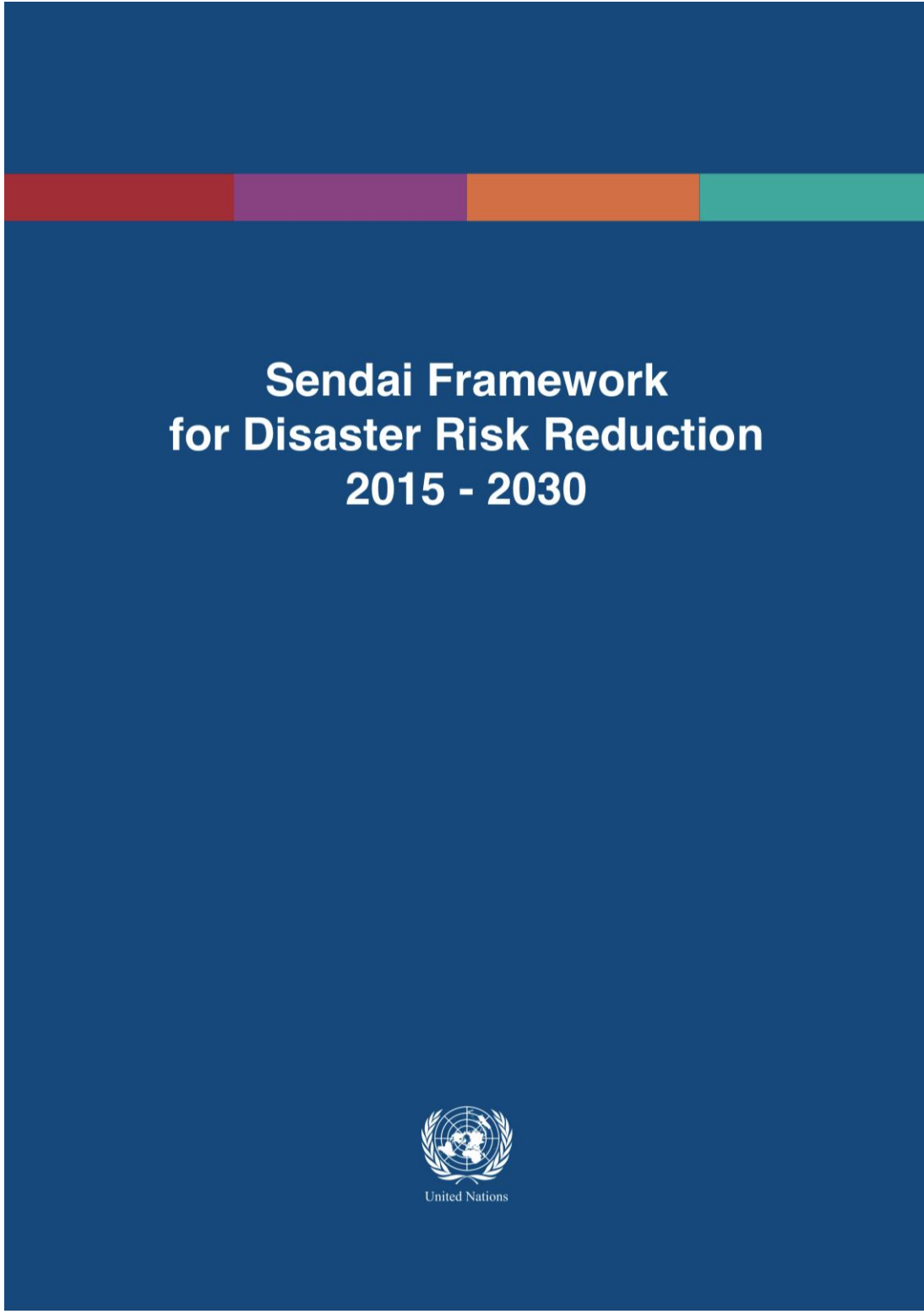
Equity

Many are committed to the 2030 challenge

Mitigation



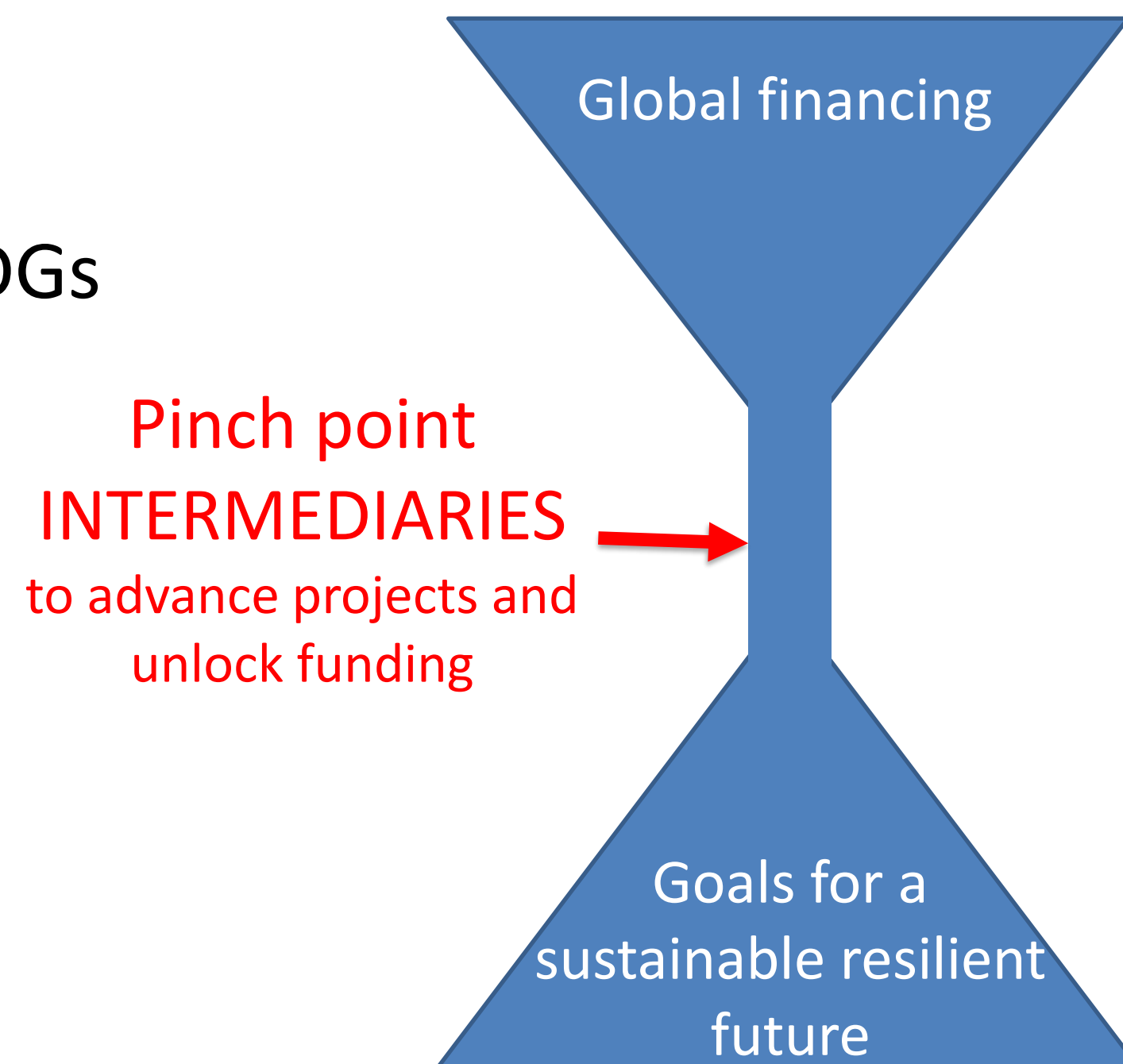
Many are not aware of THIS 2030 challenge?



Adaptation
&
Resilience

COP-28 Summary

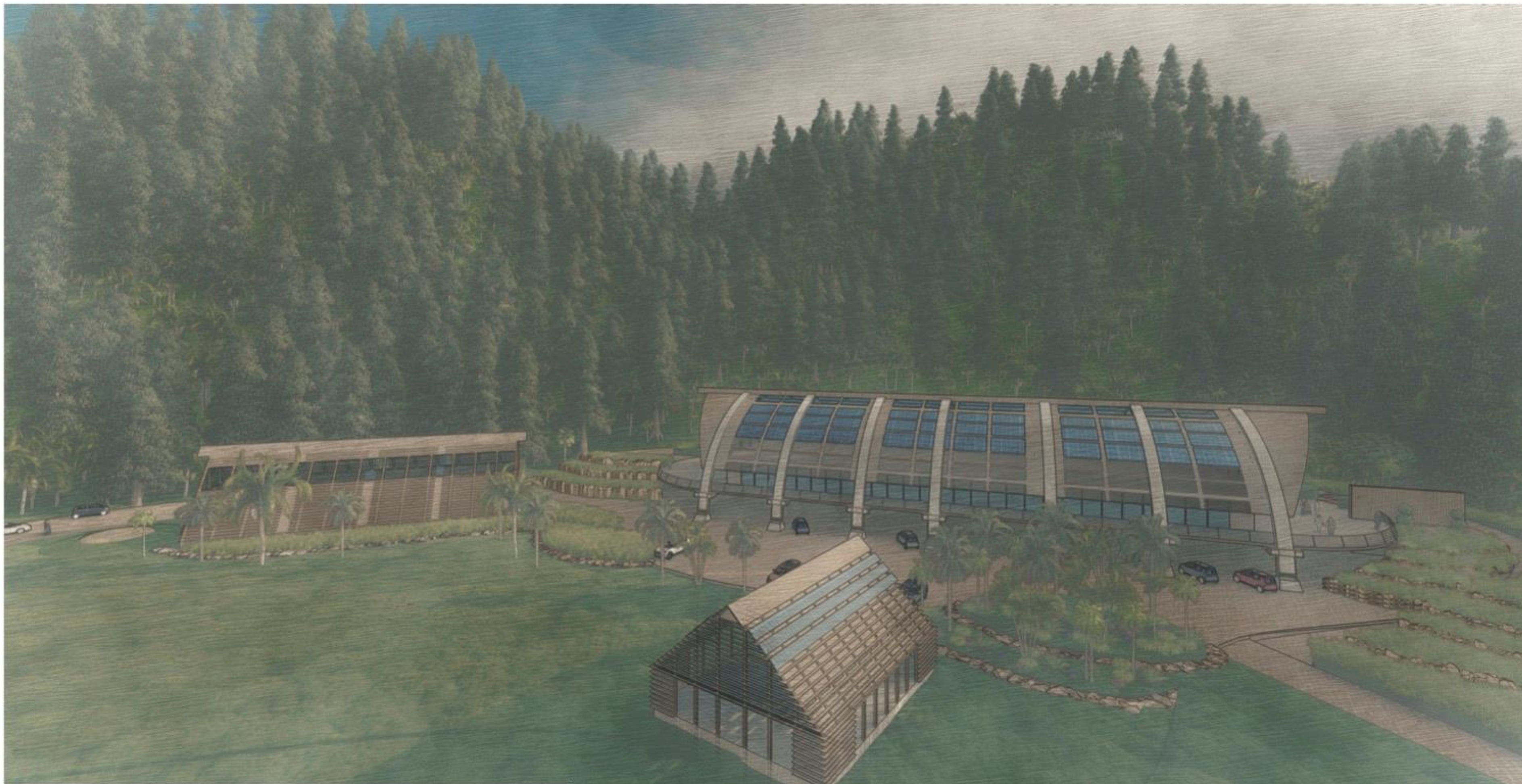
- IPCC Report
- SDG commitments with Adaptation Agenda CRDGs
- All countries – we are behind!
- Sharm Framework implementation
 - DRR 4 billion by 2030
- Financing shift to Adaptation from 2% to 9%
- Bio diversity and Bio regions integration - GEP



Pass to Adele
California case study

Navigating the storm.....





KCRH - Ko'olauloa Community Resilience Hub

Process

- Assess** the hazards today & tomorrow
- Analyze** the site
- Plan** with the community
- Align** with government & funding programs
- Design** the site and buildings
- Build** the project



FEMA

Risk Index

Expected Annual Loss

Social Vulnerability

Community Resilience

All Natural Hazards

Avalanche

Coastal Flooding

Cold Wave

Drought

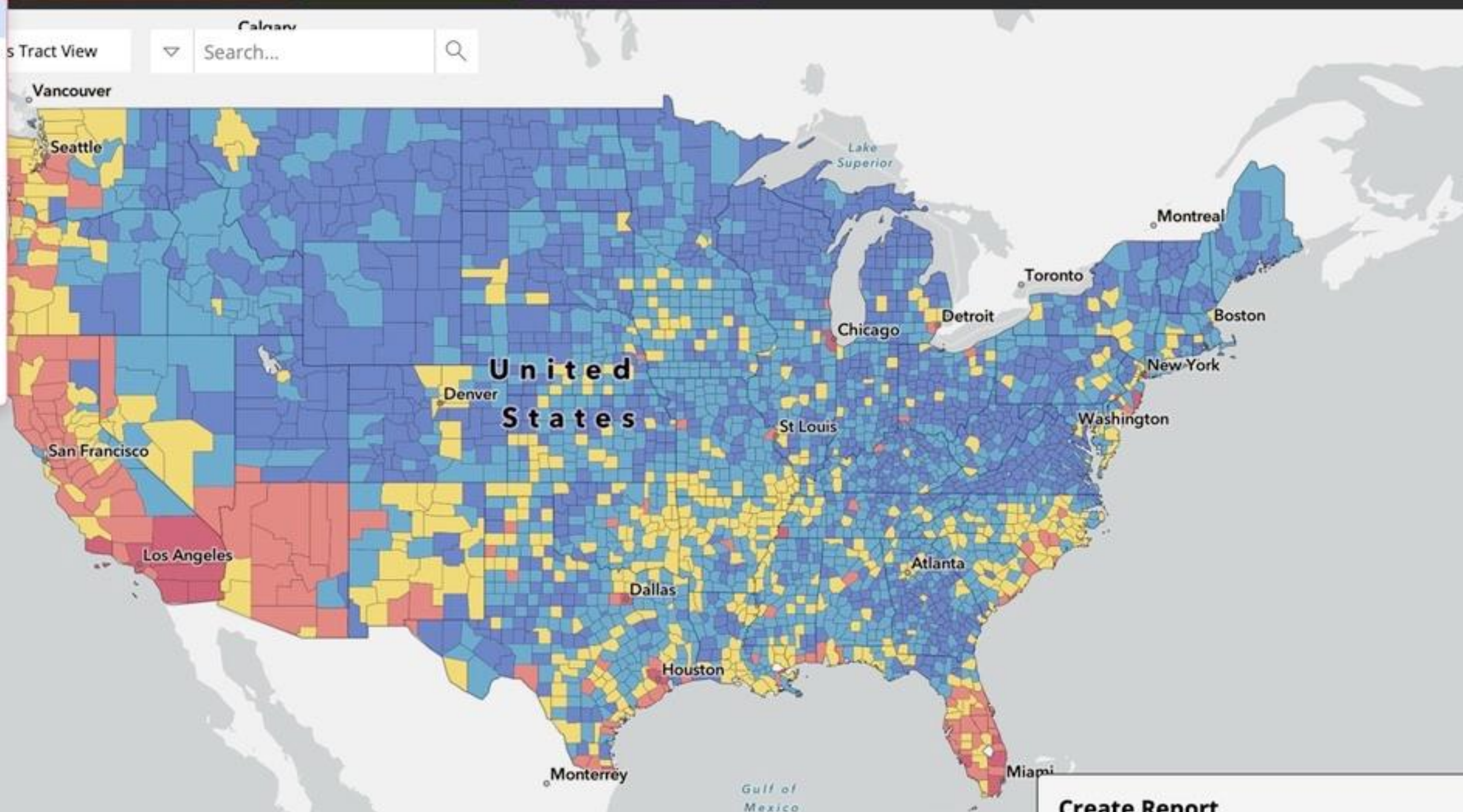
Earthquake

Hail

Heat Wave

Hurricane

Ice Storm



Legend

Basemaps

Create Report

HMP Identified Hazards (Assess)

Natural Hazard is a **natural process** or **event** with the potential to cause harm

Natural Hazard



Natural Process	Event
Erosion	Hurricane
Scour	Tsunami
Wave Inundation	Sea Level Rise
Flooding	Rain Bomb/Cloud Burst
Wind	Climate Change
	Tornado
	Earthquake
	Volcano
	Landslide
	Drought/Torrential Rain
	Extreme Temperatures

Cascading Effects (Assess)

Climate Hazard



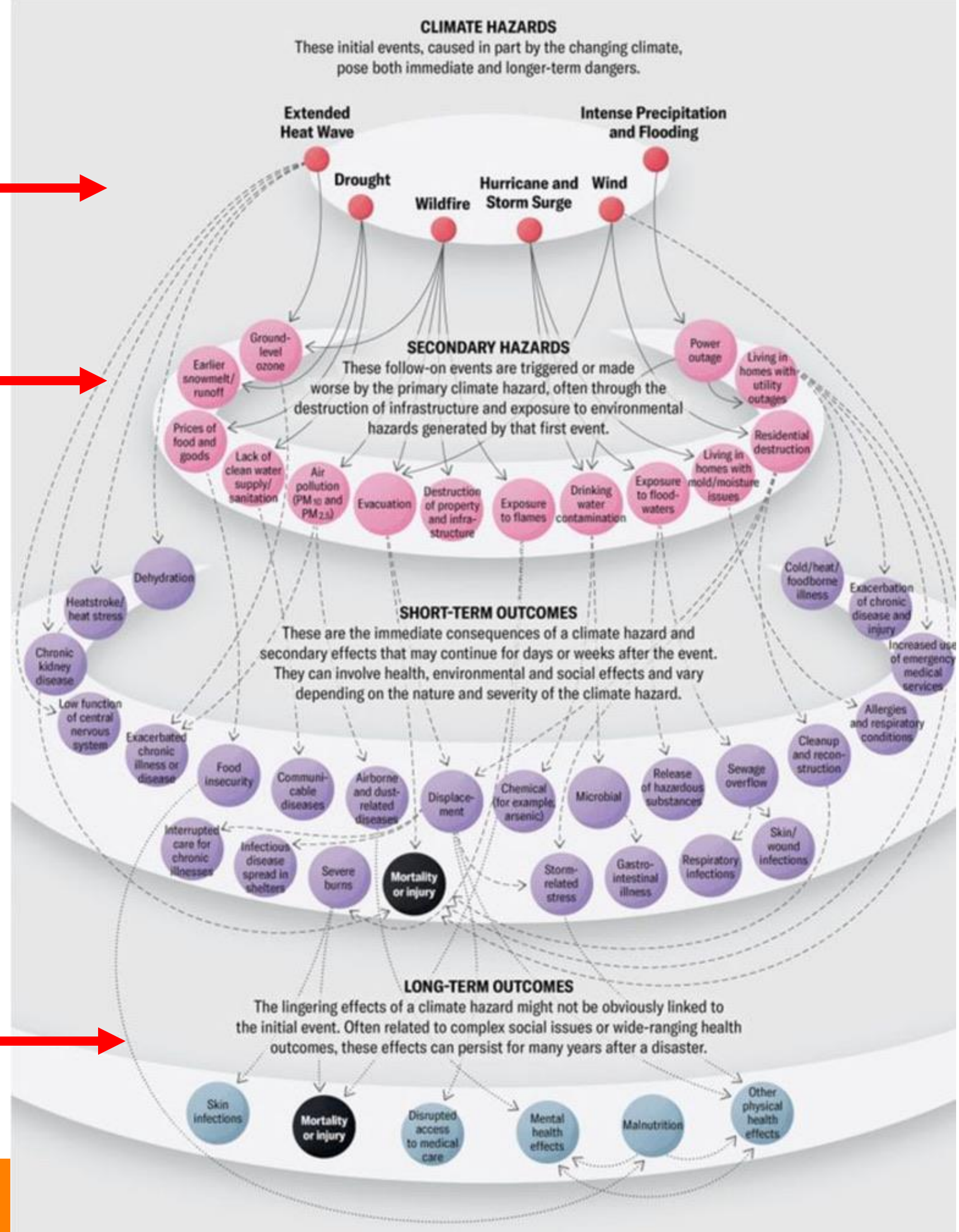
Secondary Hazard



Short Term Outcomes



Long-Term Outcomes



Community lifelines

Tied to a framework of resilience and response.

Community Assessment in these
7 + 1 categories
bring forward a plan for
communities to strengthen
weaknesses.



Safety and Security - Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety



Food, Water, Shelter - Food, Water, Shelter, Agriculture

WATER!



Health and Medical - Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management



Energy - Power Grid, Fuel



Communications - Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch



Transportation - Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime



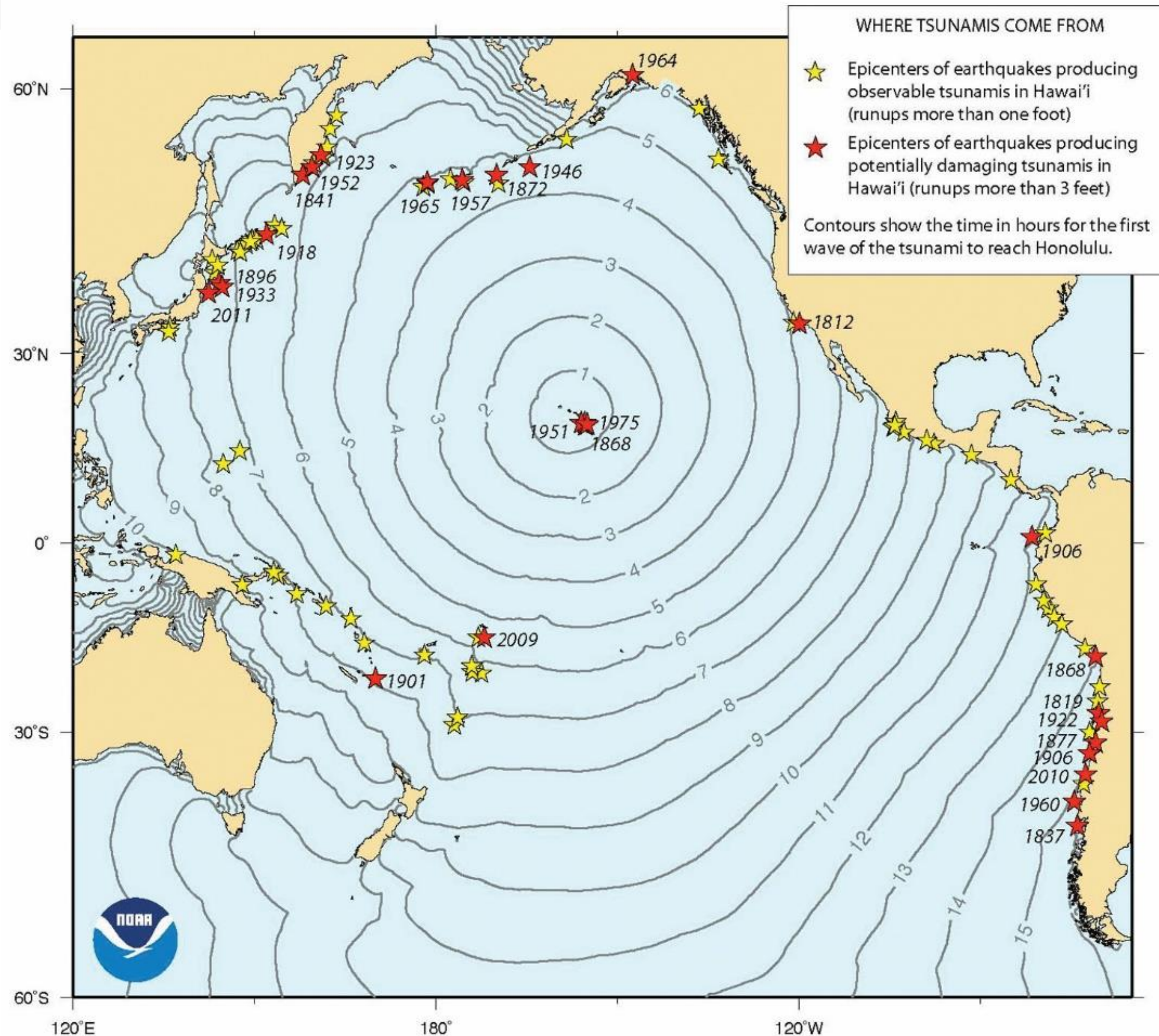
Hazardous Material - Facilities, HAZMAT, Pollutants, Contaminants

Time! Project forward. Designing for 7 generations

- Respects the culture, character, beauty, and history of our state's island communities;
- Strikes balance among economic, social and community, and environmental priorities; and
- Meets the needs of the present without compromising the ability of future generations to meet their own needs.



Analyze the Site

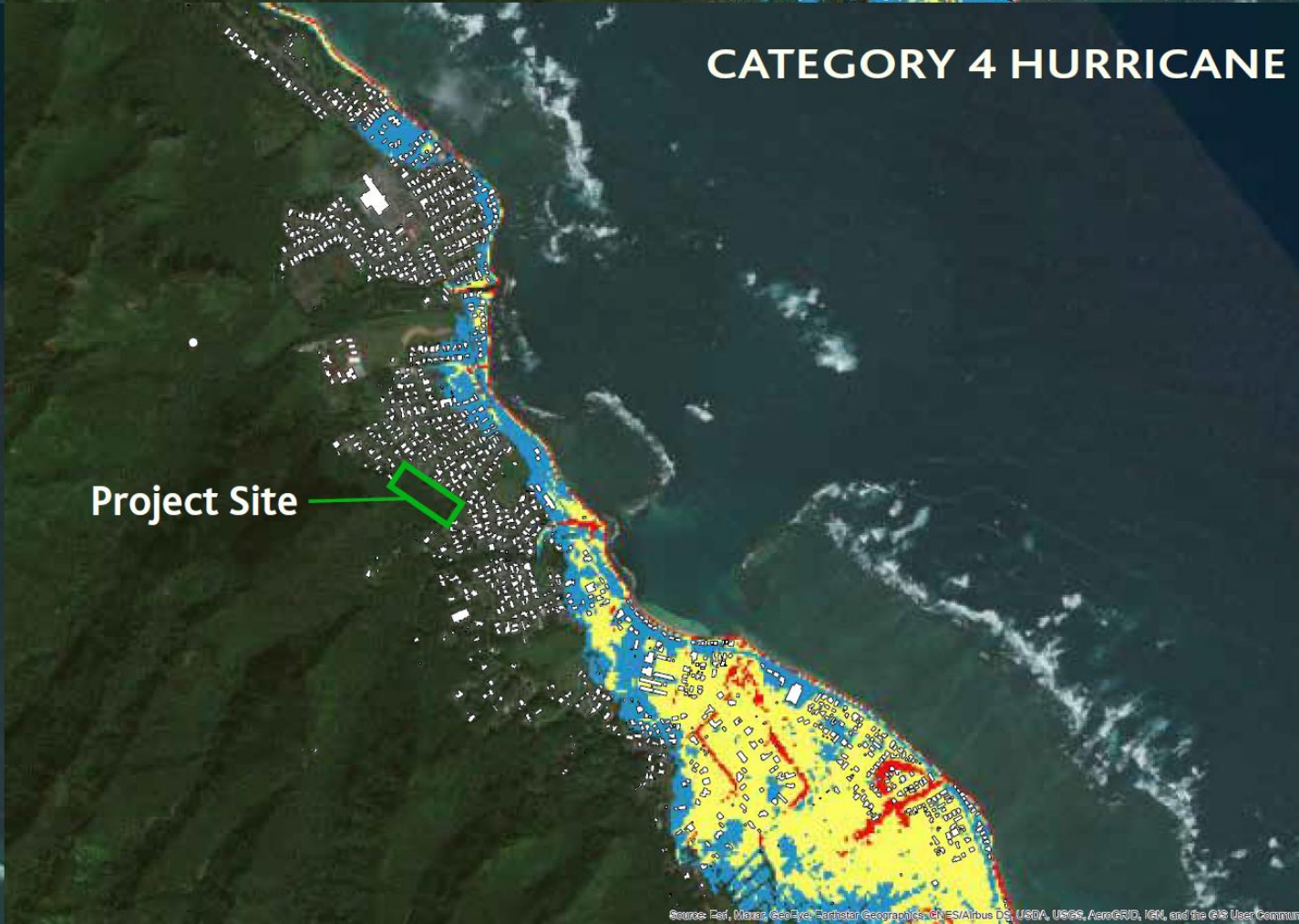
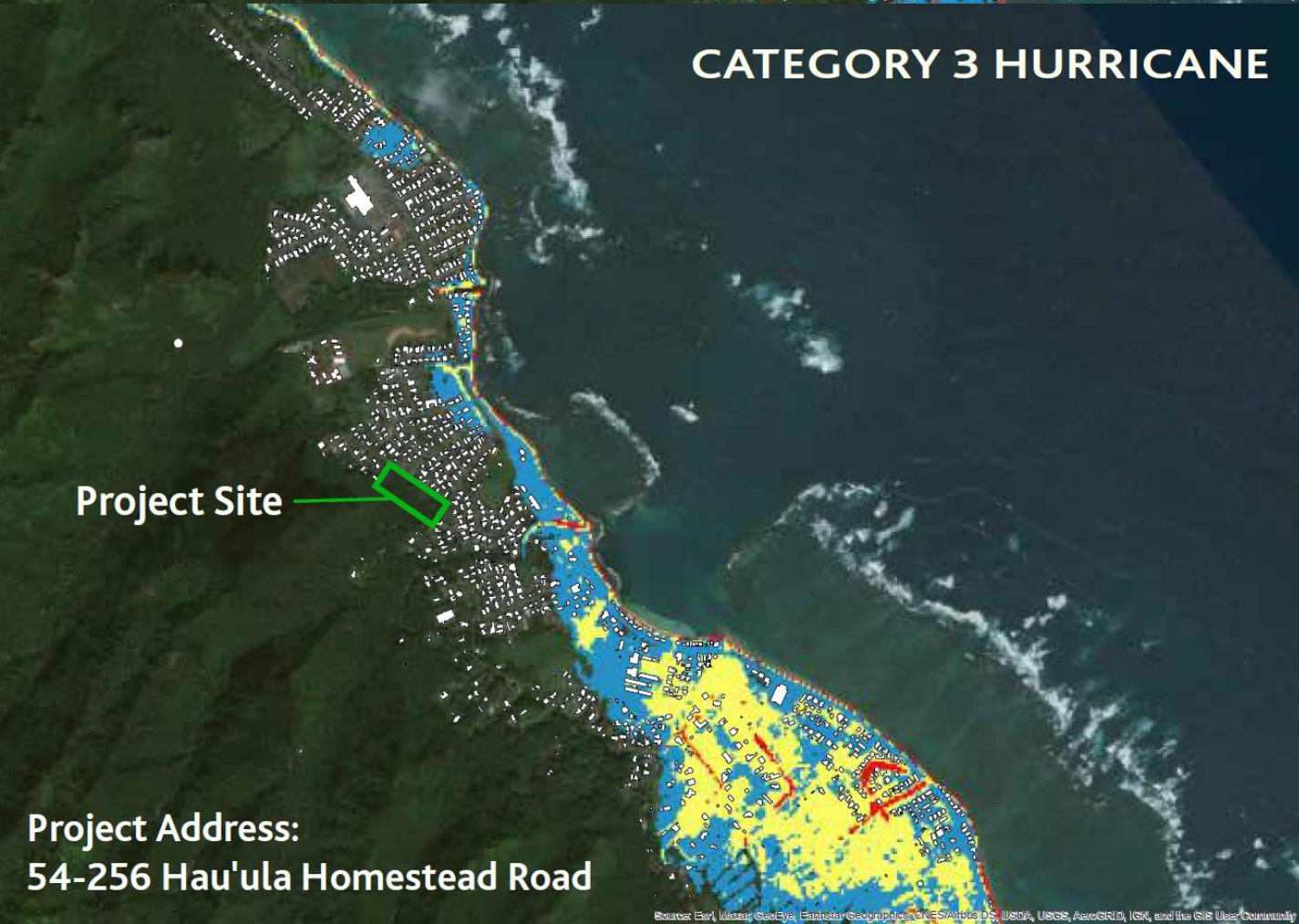
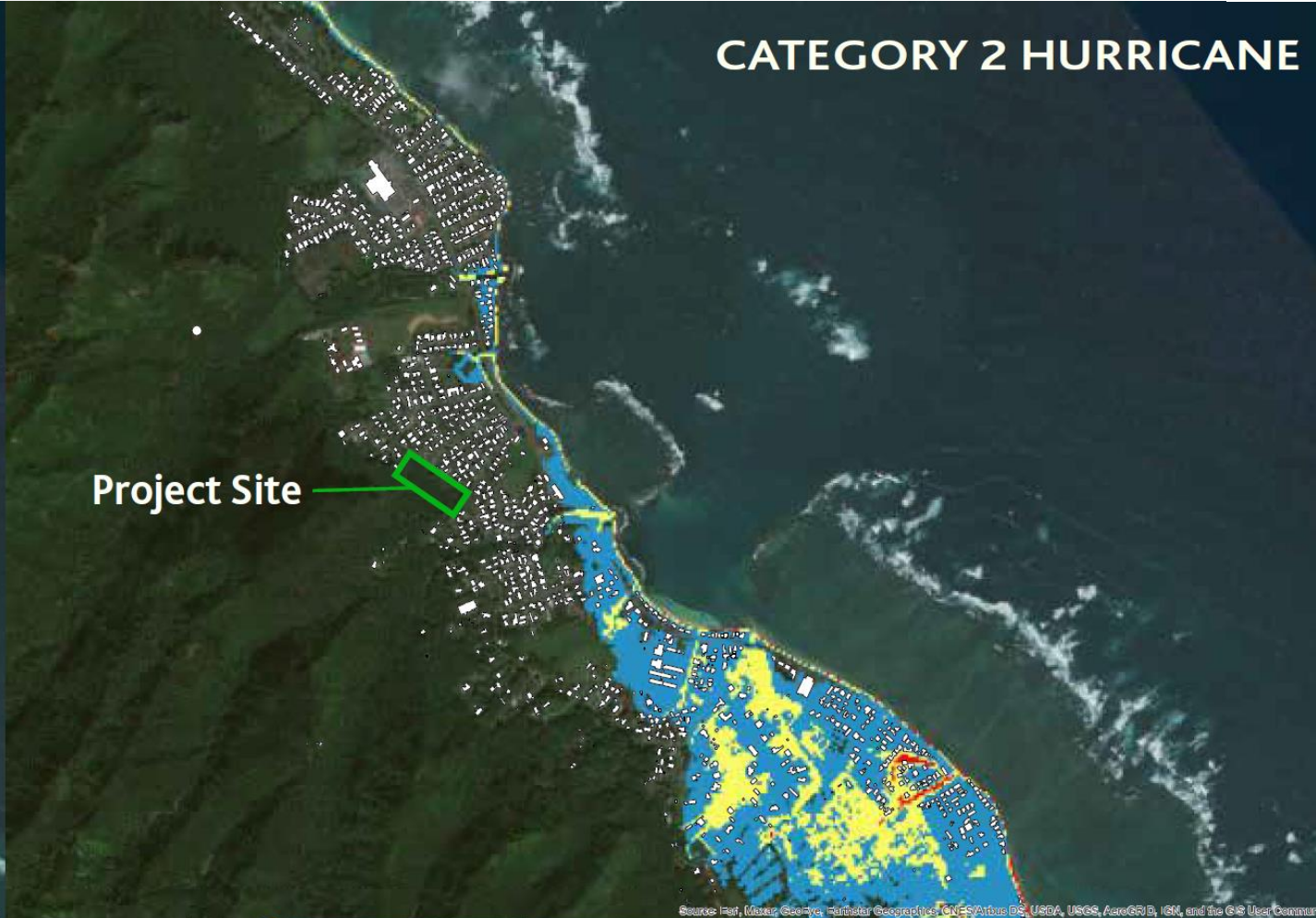
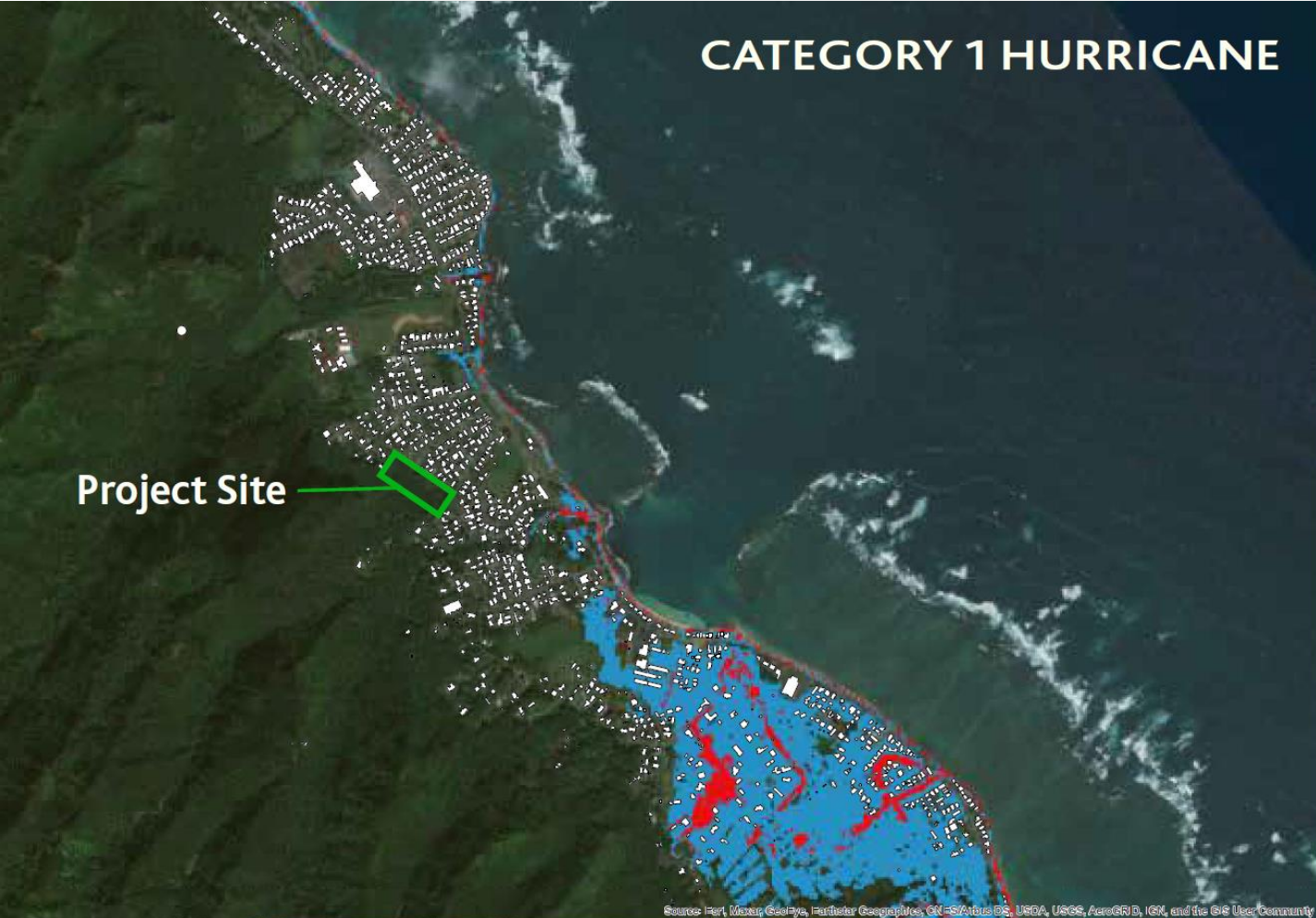


Travel times of tsunamis for the major subduction zones in the Pacific.

**Alaska - 4.5 hours
Kamchatka - 6 hours
Japan - 7-8 hours
Chile - 15 hours**

Historical events also marked (e.g., 1946 Tsunami off Aleutian Islands)

Analyze the Site



Ko'olauloa Resilience Hub Project Hau'ula, O'ahu, Hawai'i

Site Analysis

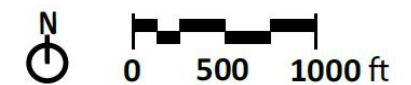
Sea, Lake, and Overland Surges from Hurricanes

The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model is a computerized model made by the National Weather Service. The model estimates storm surge heights for each category of hurricane by using atmospheric pressure, size, forward speed, and other types of data. This map of Hau'ula is overlaid with the SLOSH model to describe the projected impacts of hurricane storm surge. The project site is protected from Category 1 to 4 storm surge.

Legend

- 1 to 3 feet of storm surge
- 3 to 6 feet of storm surge
- 6 to 9 feet of storm surge

Date: August 14, 2020
By: Cuong Tran
Sheet 1 of 1



Link to SLOSH:
<https://www.nhc.noaa.gov/nationalstorm/#data>

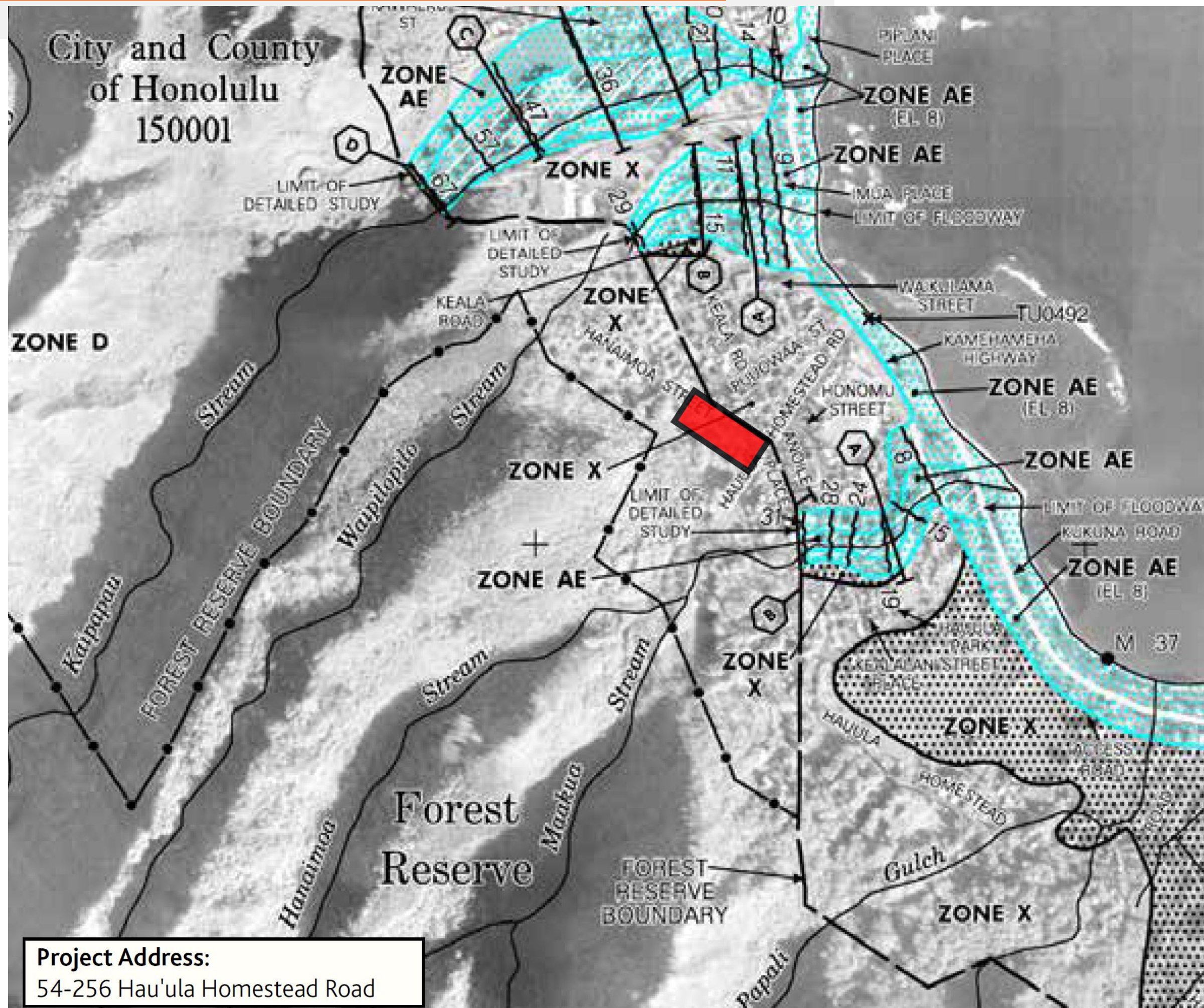
Project Address:
54-256 Hau'ula Homestead Road

Analyze the Site



Ko'olauloa Resilience Hub Project Hau'ula, O'ahu, Hawai'i

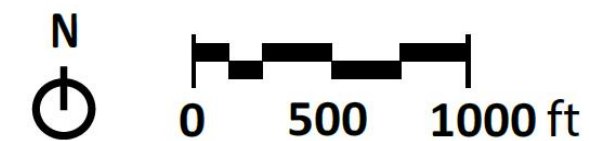
Site Analysis Flood Insurance Rate Map (FIRM)

The Ko'olauloa Resilience hub project site is located in the Zone D designated flood area. The flood area Zone X surrounds the project site, where inland flooding is of minimal risk. The right of the project site shows the boundary of a floodway that is connected to the Ma'akua and Hanaimoia streams. The Kaipapa'u and Waipilopilo streams connect to the floodway to the left of the project site. This FIRM map is effective as of September 30, 2004 and is listed as number 15003C0135F.



Legend

-  Project Site
-  Special Flood Hazard Areas Subject to Inundation By The 1% Annual Chance Flood
- Zone AE Base Flood Elevations Are Determined
- Zone A Base Flood Elevations Are Not Determined
- Zone X Areas determined to be outside the 0.2% annual chance floodplain
- Zone D Areas in which flood hazards are undetermined, but possible



Date: August 20, 2020
By: Cuong Tran
Sheet 8 of 8

Link to FIRM download tool:
<https://msc.fema.gov/portal/home>

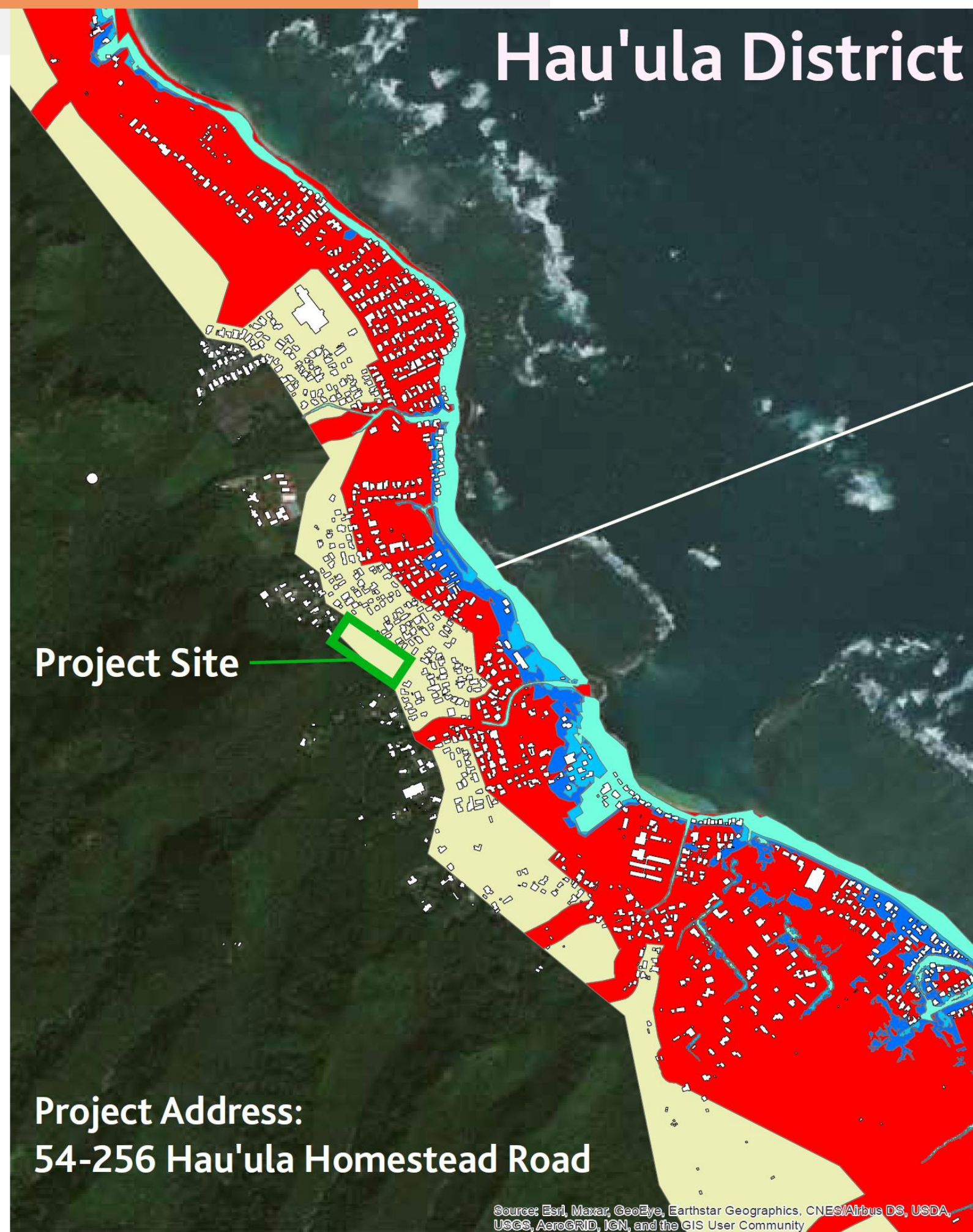
Project Address:
54-256 Hau'ula Homestead Road

Analyze the Site



Tsunami Evacuation Zone – Based on Historical Tsunami Events impacting Hawaii – 1946, 1957, 1960.

Extreme Tsunami Evacuation Zone – Based on Extreme Event (“Great Earthquake and Tsunami Event” - e.g., Indonesia 2005, Japan 2011)



Hau'ula District

Ko'olauloa District

Project Location

Project Site

Project Address:
54-256 Hau'ula Homestead Road





Ko'olauloa Resilience Hub Project Hau'ula, O'ahu, Hawai'i

Site Analysis

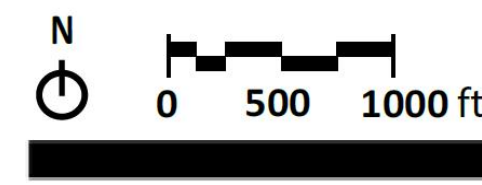
Sea Level Rise and Tsunami Hazard Vulnerability

The district map of Hau'ula is overlaid with three future sea level rise (SLR) projections modeled by PacIOOS. The designated tsunami evacuation zones are also color-coded. The Ko'olauloa Resilience Hub site is located away from up to 3.2 feet of SLR inundation, and is located in the Extreme Tsunami Evacuation Zone.

Legend

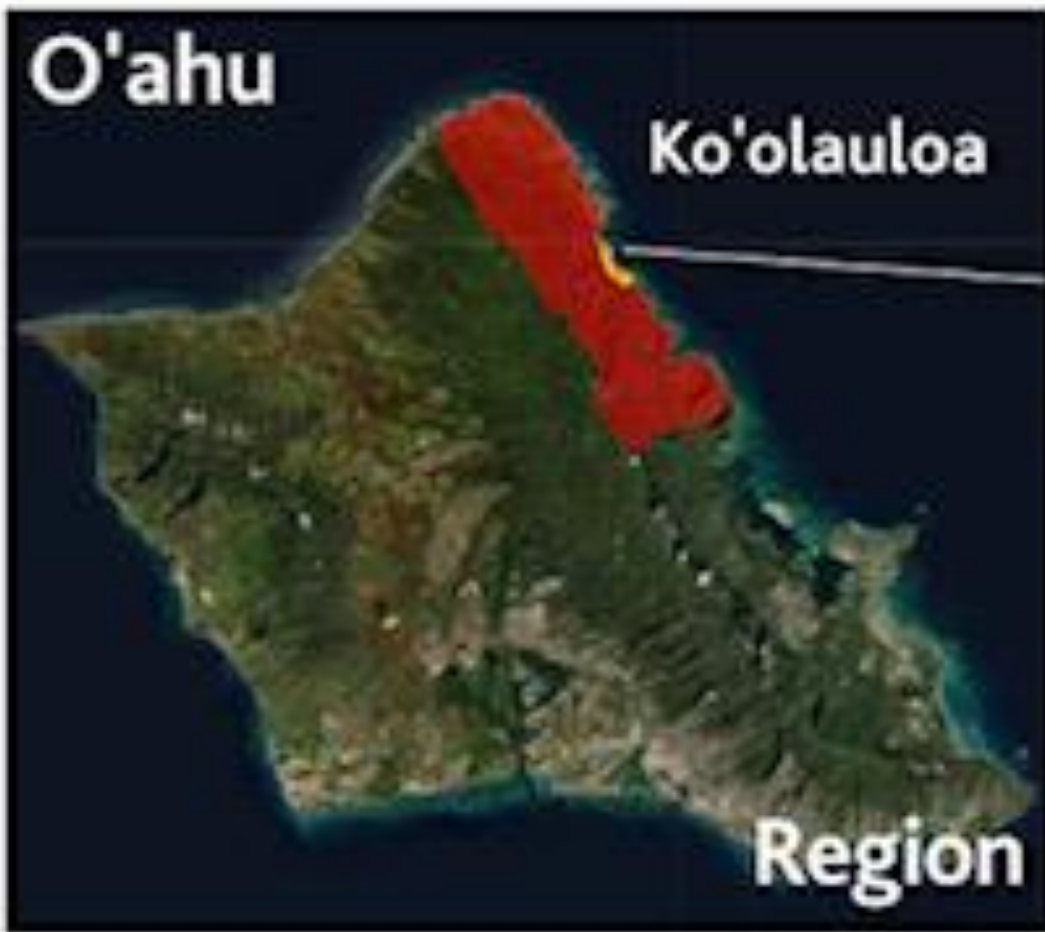
- | | | | |
|---|--------------|---|---------------------------------|
|  | 1.1 feet SLR |  | Tsunami Evacuation Zone |
|  | 2.0 feet SLR |  | Extreme Tsunami Evacuation Zone |
|  | 3.2 feet SLR | | |

Date: August 13, 2020
By: Cuong Tran
Sheet 1 of 8



Link to PacIOOS:
<https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/>
Link to Tsunami Evacuation Zones:
https://www.pacioos.hawaii.edu/voyager/info/tsunami_evac_zones_summary.html

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Ko'olauloa Resilience Hub Project

Hau'ula, Ko'olauloa, O'ahu
Site Photo Documentation

Site:
54-256 Hau'ula Homestead Road

Date and Time of Visit:
July 14, 2020/10:00AM - 12:00PM

Attendees:

SHADE Institute:
Dean Sakamoto
Cuong Tran
Ben Credle
Nicole Nomura

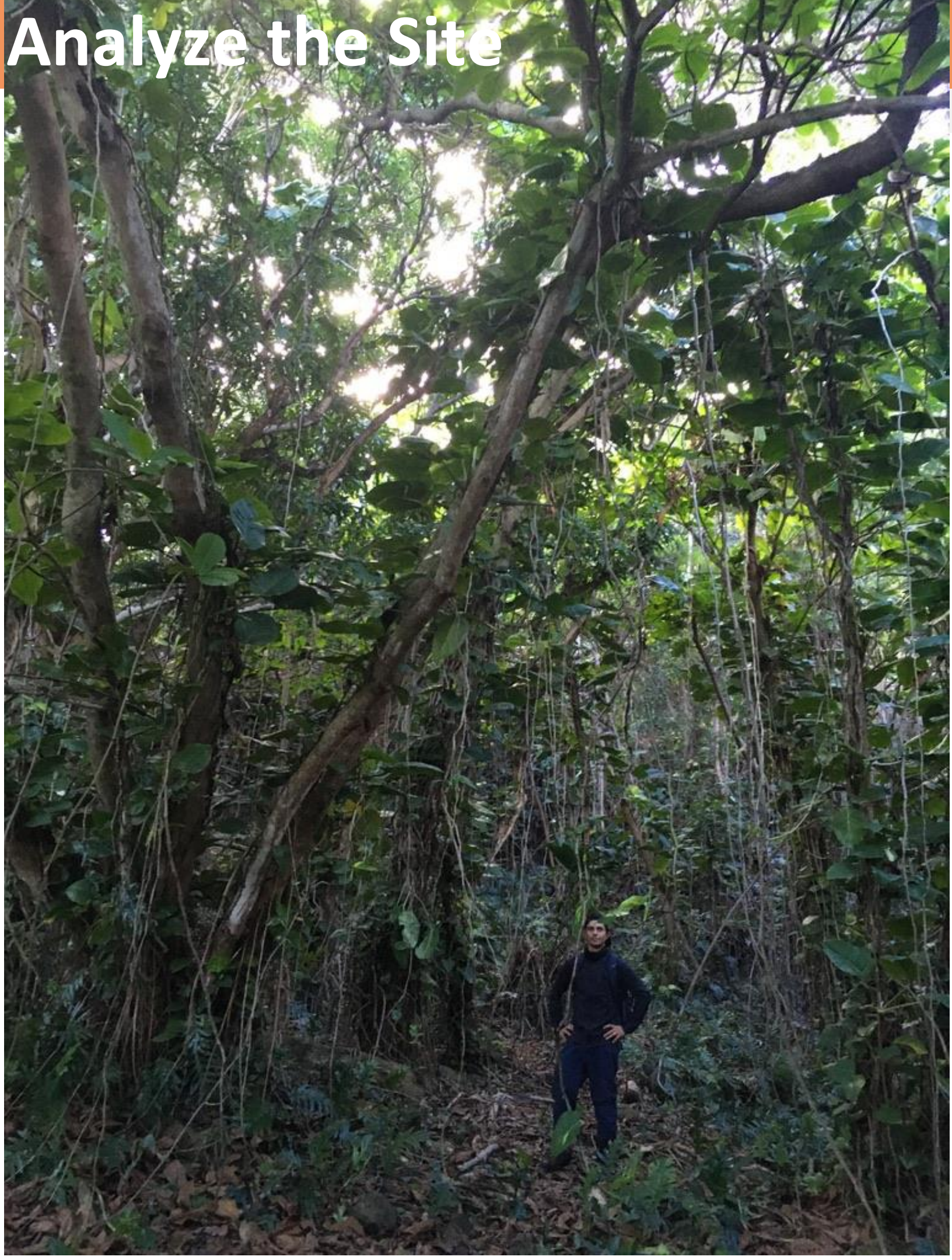
G70:
Ryan Char
Cody Winchester
Remy Fung

Hau'ula Community Center:
Dotty Kelly-Paddock



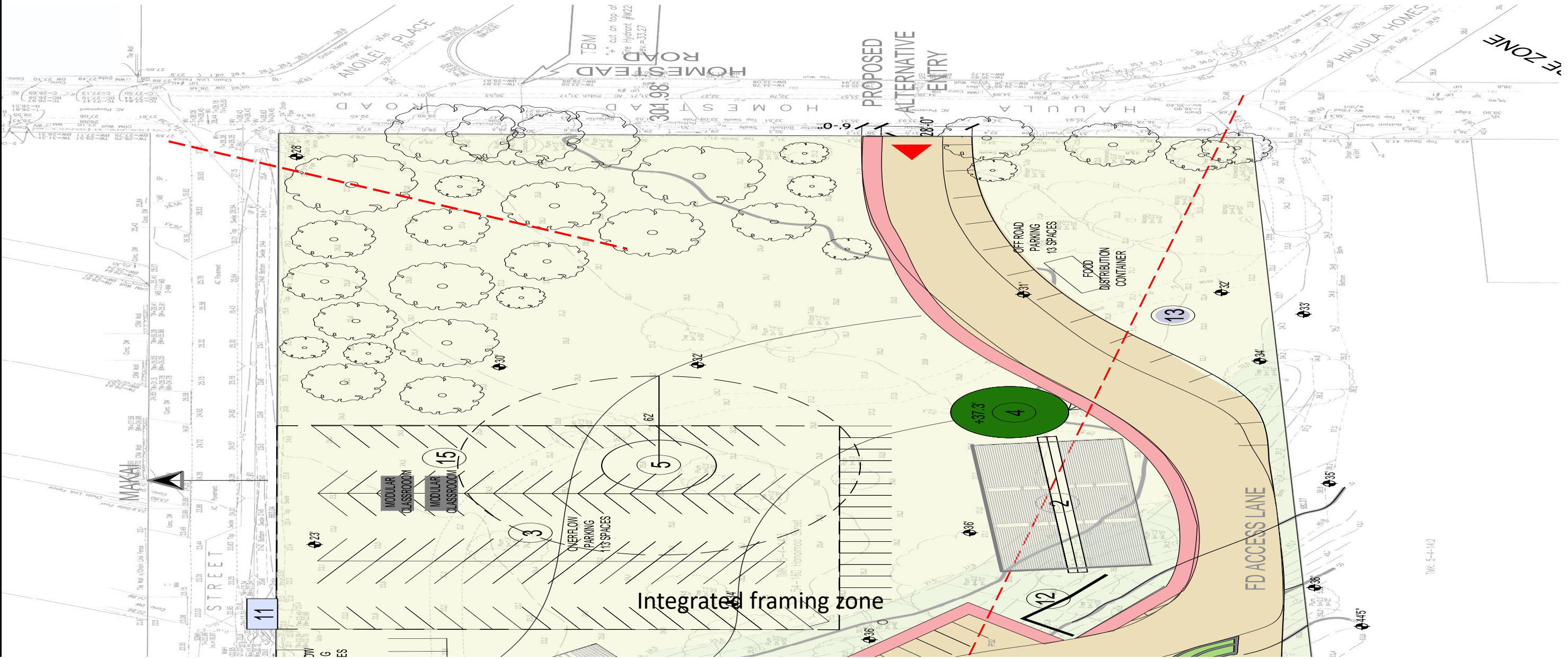
26,000 Residents
Single road
fragile
and
vulnerable

Analyze the Site



REVISIONS

NUMBER	DATE	DESCRIPTION



SITE PROGRAM LEGEND	
①	PRIMARY HUB
②	SECONDARY SUPPORT BLDG
③	OVERFLOW PARKING
④	HIJIA MOUND

LEGEND	

Extreme Tsunamis limit

TWC: 5-4-142



*“My Community is
Self aware
Self actualized, and
Invisible”*

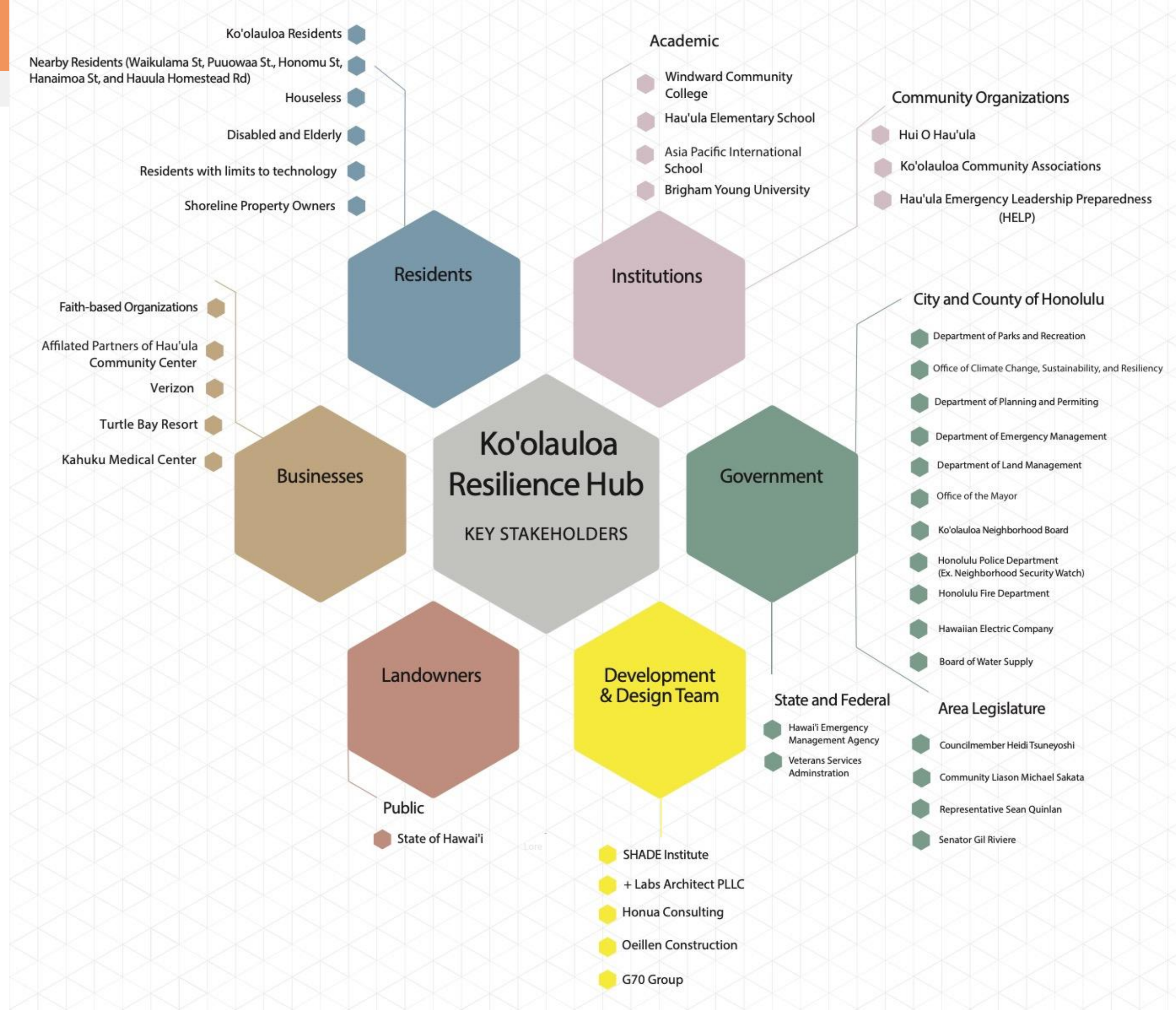


Plan with Community

- Team organization

Key Stakeholders

- Residents
- Landowners
- Businesses
- Institutions
- Government
 - City and County
 - State and Federal
 - Areas of Legislature
 - Funding
- Development and Design Team



Mission Critical functions for Hau'ula?

EQUITY + CULTURE + PEOPLE + JUSTICE



Food Security

96717

- Before the pandemic this is a community need
- Food and equity



Resilience is Action

New systems needed

“Bridging” the middle is needed

Self Actualization





Energy Security?

- TCOM waste to energy
- Energy autonomy must be part of the HUB
- Community asset for steady state reliability
- Renewable resources





Housing Vulnerabilities

- Survey of housing throughout the region
- **85% of the homes** here are projected to be damaged from a category one hurricane



Coastal erosion and flooding

- Wave inundation and rain
- Vulnerabilities and access compromised
- Infrastructure failure

Community lifelines

HMP – Hazard Mitigation Plans are based on these

Tied to a framework of resilience and response.

Community Assessment in these
7 + 1 categories
bring forward a plan for
communities to strengthen
weaknesses.

Federal funding tied to these areas.

- IRA and EPA funding
- Homeland security
- FEMA
- HUD



Safety and Security - Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety



Food, Water, Shelter - Food, Water, Shelter, Agriculture

WATER!



Health and Medical - Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management



Energy - Power Grid, Fuel



Communications - Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch



Transportation - Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime



Hazardous Material - Facilities, HAZMAT, Pollutants, Contaminants

Align

KCRH project considers the following hazards from the State and City HMP

- **Climate Change Effects** (Designing for Tomorrow: 150+ years)
- **Coastal Erosion** (Transportation and Supply Chain, 30-day Isolation)
- **Strong Winds** (Non-Tropical Cyclonic)
- **Tropical Cyclones** (Including Hurricanes)
- **Floods** (Rain and topographic flooding)
- **Tsunamis** (Extreme tsunami zone location)
- **Earthquakes** (base isolation of the building)
- **Landslides and Rock Falls** (location and topographic effects)
- **Droughts** (native plantings and Ahupua restoration)
- **Wildfire** (Materials and defensible space)
- **Hazardous Materials** (By Transportation, or Island Storage, Infiltration etc.)
- **VOG's** (Volcanic Gases will be addressed in Design Development)

Align

O'ahu Resilience Strategy

<https://resilientoahu.org/resilience-strategy>

Action 15: Develop a Network of Community Resilience Hubs



PILLAR I.

Remaining Rooted

Ensuring an Affordable Future for Our Island



PILLAR II.

Bouncing Forward

Fostering Resilience in the Face of Natural Disasters



PILLAR III.

Climate Security

Tackling Climate Change by Reducing Emissions and Adapting to Impacts



PILLAR IV.

Community Cohesion

Leveraging the Strength and Leadership of Local Communities



How We Got Here

Community workshops

Resilient Building Design for Coastal Communities

- Residents
- Stake holders
- Government representatives
- Facilitators
- Historians

Friday, November 20-21, 2020 8:30-3:30PM
Hau'ula Community Center

~~TO CULTURAL~~ CENTER

- 1- FAMILY SECURITY / SAFETY
- 2- HEALTHY COMMUNITY
 - MEDICAL CAPABILITIES
 - SELF SUSTAINING CENTER
 - SEWAGE / UTILITIES / INTERNET / COMM.
 - KITCHEN / CULTURE / FOOD SOURCE
 - VOLUNTEERS
 - SOCIAL BENEFIT
 - EMPLOYMENT / FITNESS
 - EDUCATION
- 3- TRANSPORTATION / ACCESSIBILITY



Priorities Identified

- 8 teams in two workshops
- Over 100 participants
- Partners and stakeholders





Community input for a **Holistic** design approach
Mining Indigenous wisdom



Community has a face

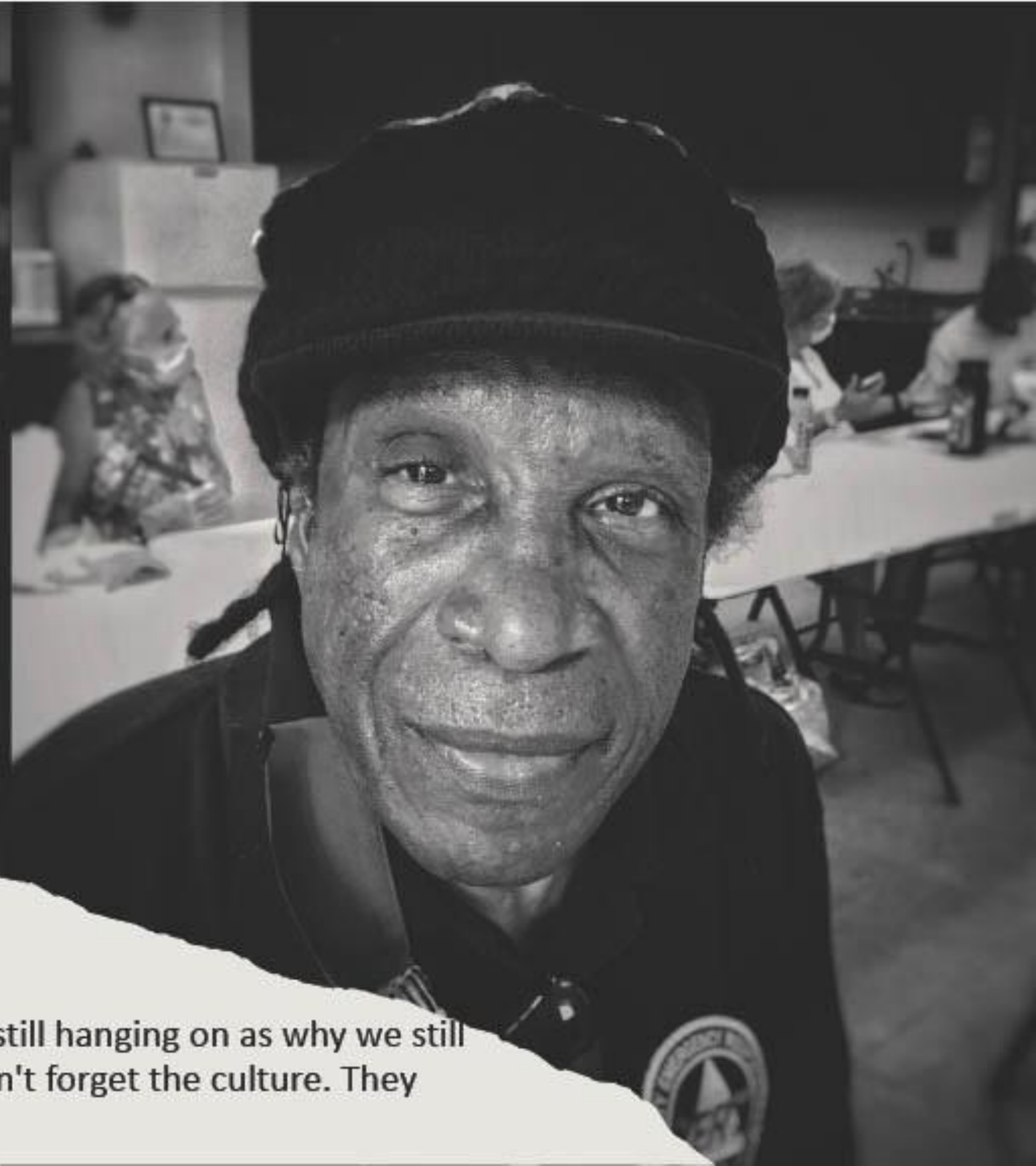
- Resilience is an action and people of Hau'ula take action

“This community has not had a voice, we have not been visible. The community engagement, getting together, talking, sharing, laughing, hurting together, whatever it is, builds bonds in the community”.



Future of the community

“When we talk about sustainability, and sustaining our life, I believe helping to sustain our culture”



Voices of the people

“We may be poor, but we are rich in our culture. That's why we still hanging on as why we still do what we do. We fight for the next generation so that they don't forget the culture. They don't forget where they're from and their roots”

Community Queries

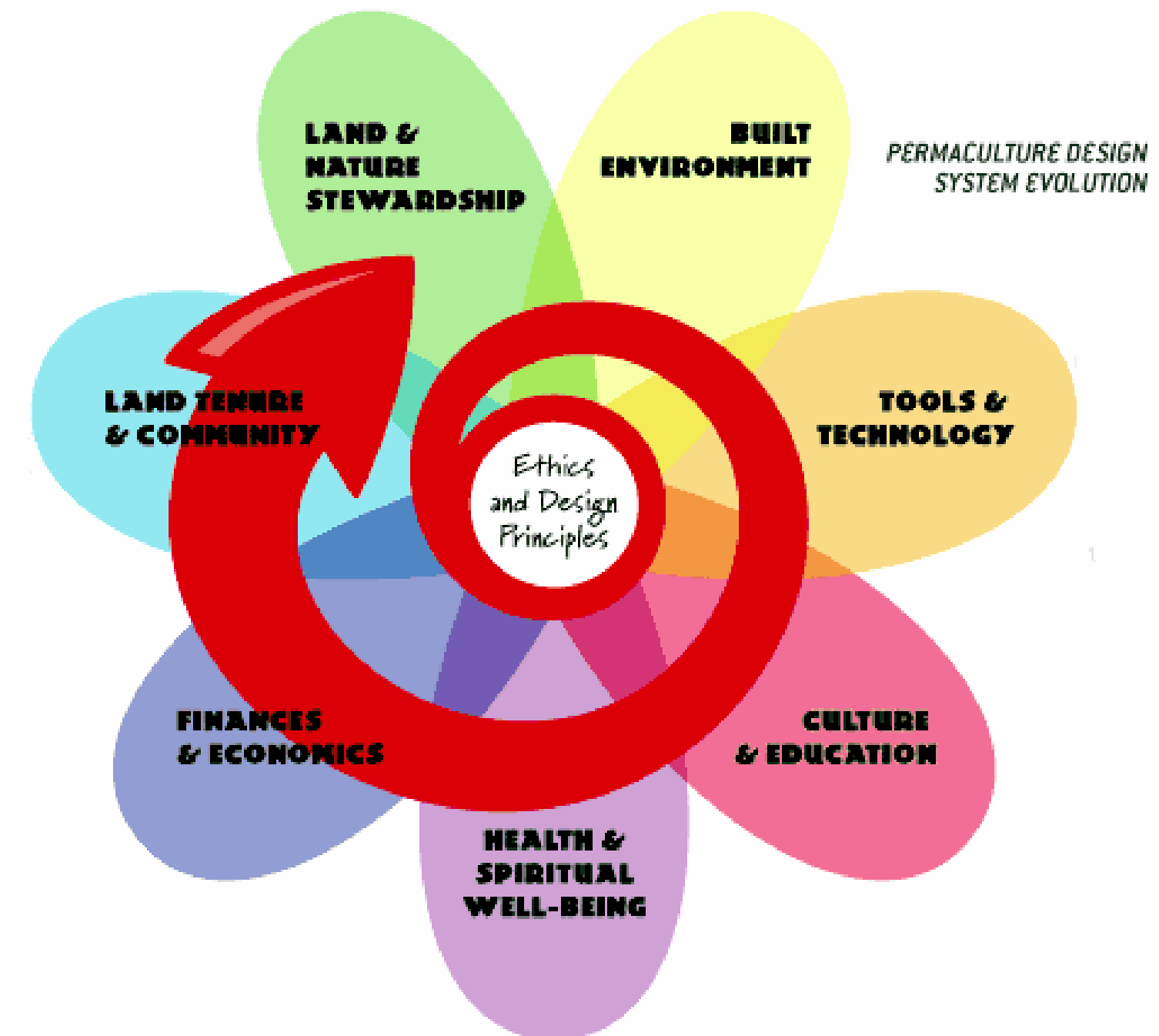
2 This is a stated goal of the community.

The community wants the resilience hub to be:

“Ke Kipukapono center perpetuating an oasis of well being”

“A Pono Center”

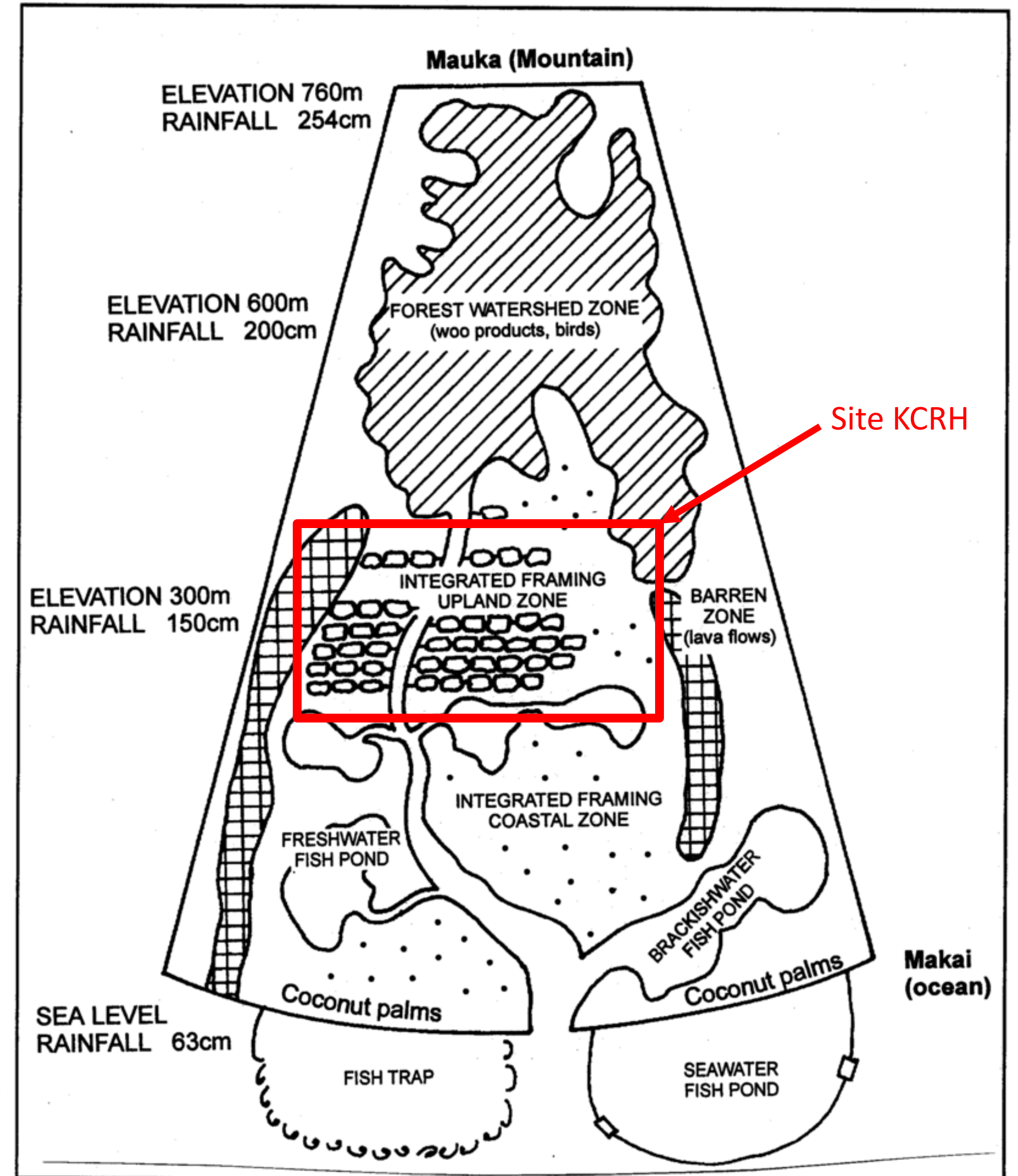
A Pono Center allows for the goal of **revisoning the relationships with place, people and culture** in Hawaii, through creating balance and harmony throughout all of these aspects to elevate existing life and culture in the community.



Two ideas underpin the design

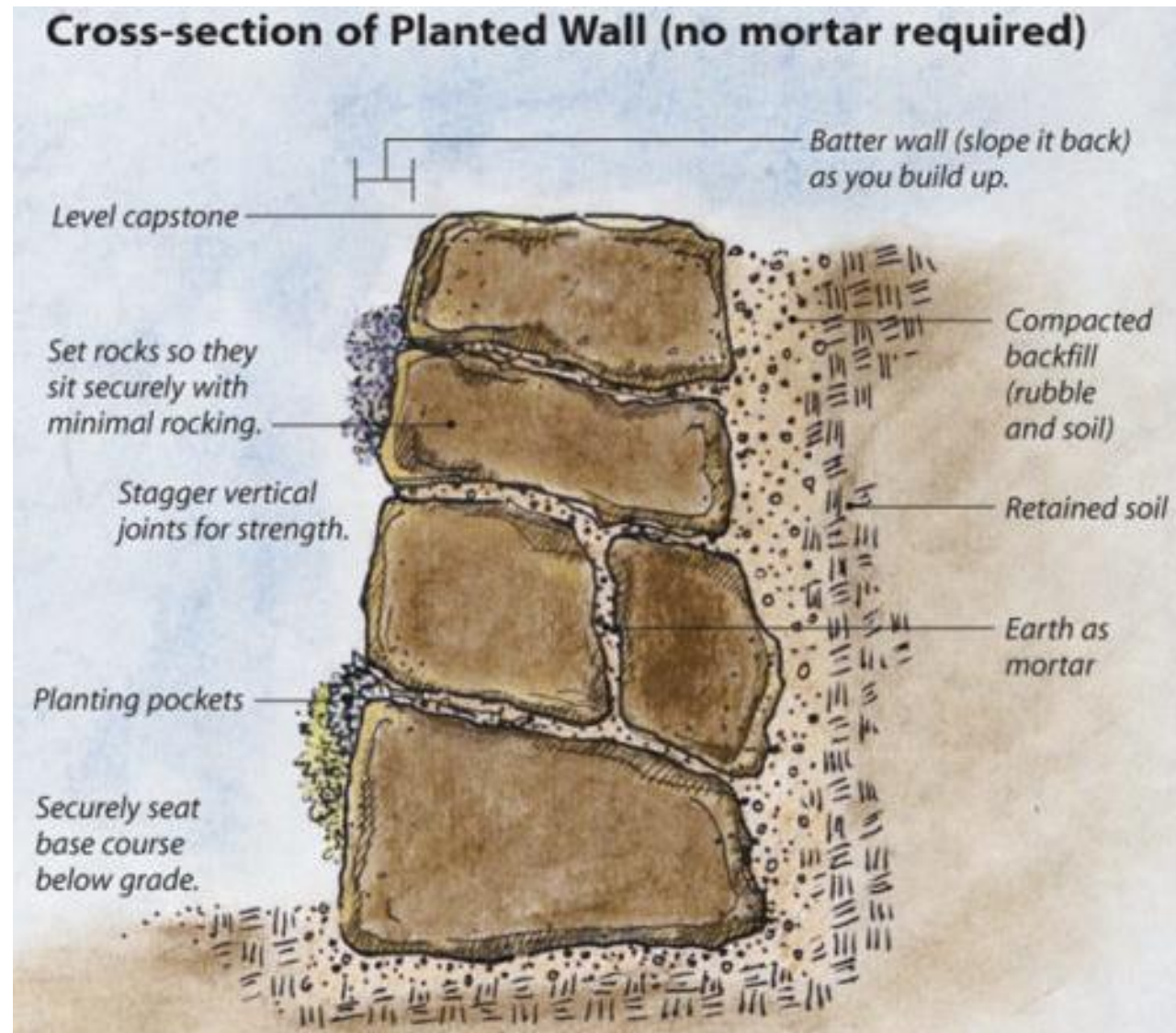


Consideration for the Community and stakeholders
two central ideas
Wa'a for the buildings
and
Ahupua'a for the land management



Ahupua'a Concept

Uhau Huma Pohaku (Dry Stack Stone Wall)



The Hawaiian name for dry stack stone walls is Uhau Huma Pohaku. The foundation stones are set into the ground about a half foot deep. The Hawaiian name for the two exterior walls is Kululu. The wall is completed by wedging smaller stones in between the rocks to secure and create a solid dry stack wall.

Rock walls that are cemented have a different look because the mortar is visible on the sides and surfaces. Part of the beauty of dry stack is the story it speaks, stone to stone layered to work together.

Kauai Ahupua'a





Restoring
traditional farming
practices



**Fire Hazard and
life safety is
open everyone's
mind**



PRELIMINARY DESIGN

**FOR
 ENVIRONMENTAL ASSESSMENT
 PURPOSES ONLY**

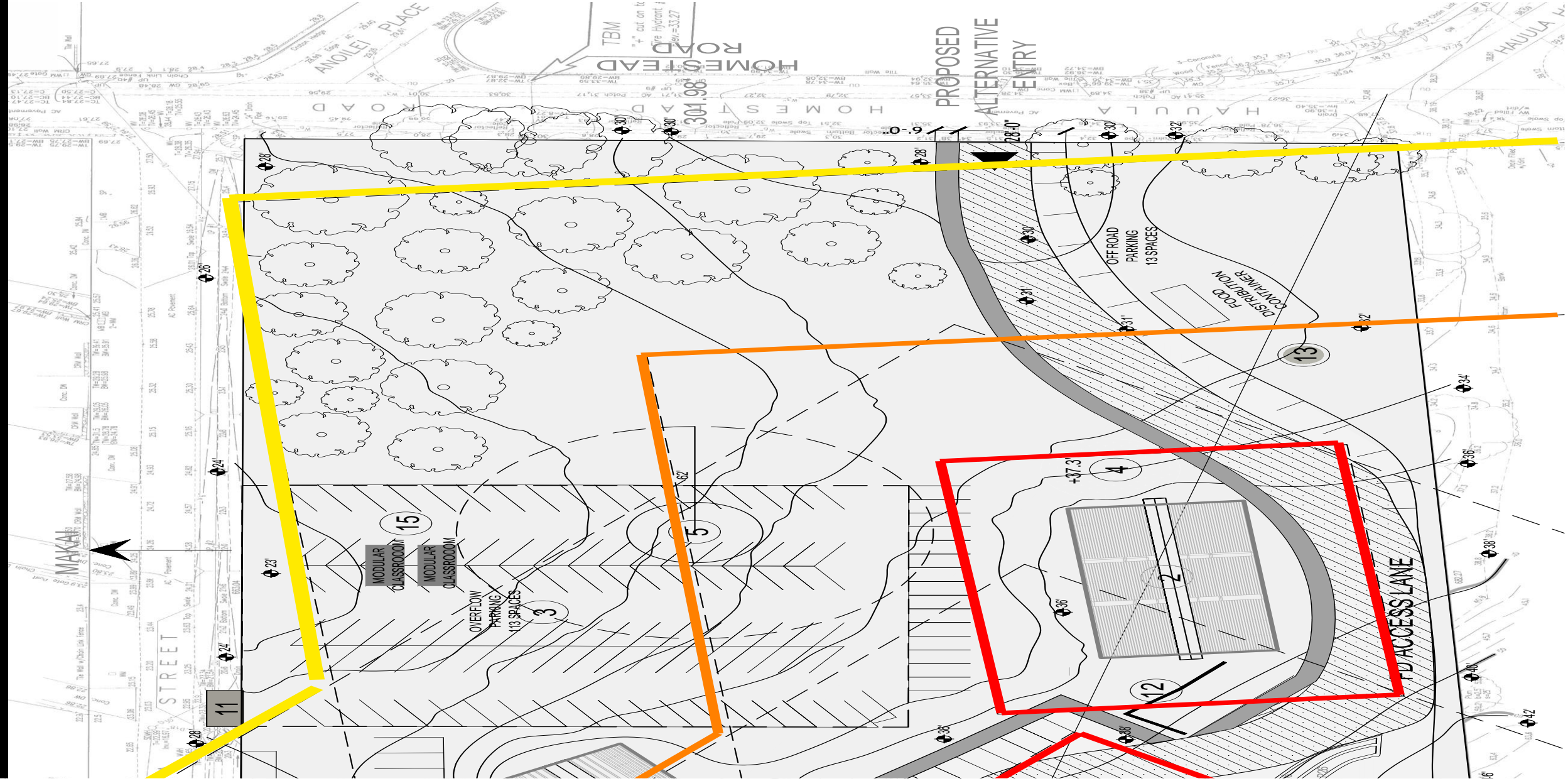
REVISIONS

NUMBER	DATE	DESCRIPTION

© Copyright +LAB Architect PL

DO NOT SCALE PLANS

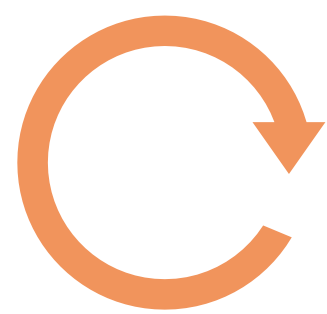
CONTRACTOR TO PROMPTLY NOTIFY ARCHITECT OF ANY MATERIAL VARIATIONS BETWEEN FIELD CONDITIONS AND CONDITIONS AS INDICATED IN COORDINATING DOCUMENTS



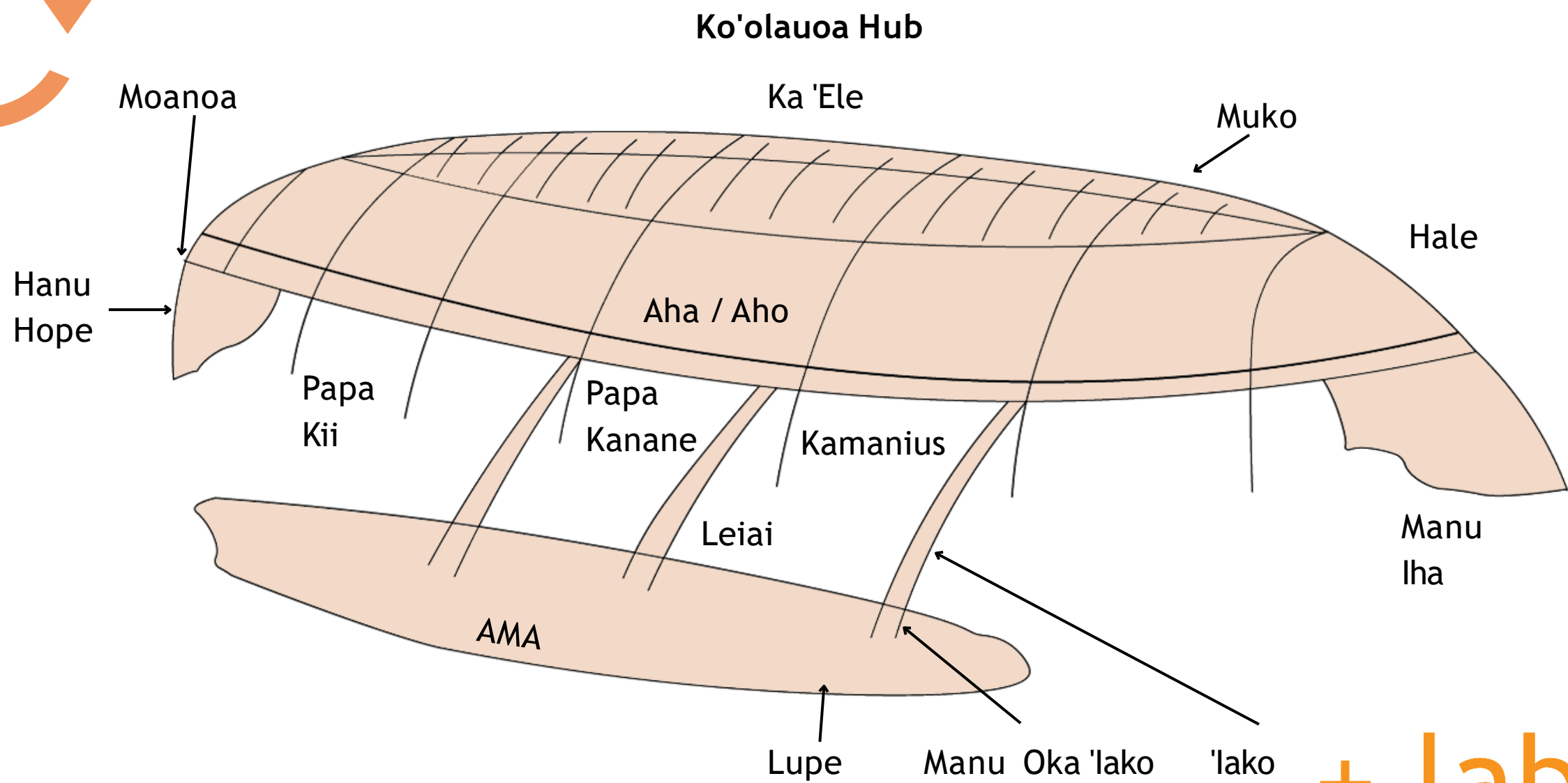
SITE PROGRAM LEGEND

①	PRIMARY HUB
②	SECONDARY SUPPORT BLDG

Wa'a Concept Diagram



"Huli"
Flip over the canoe
to stay safe



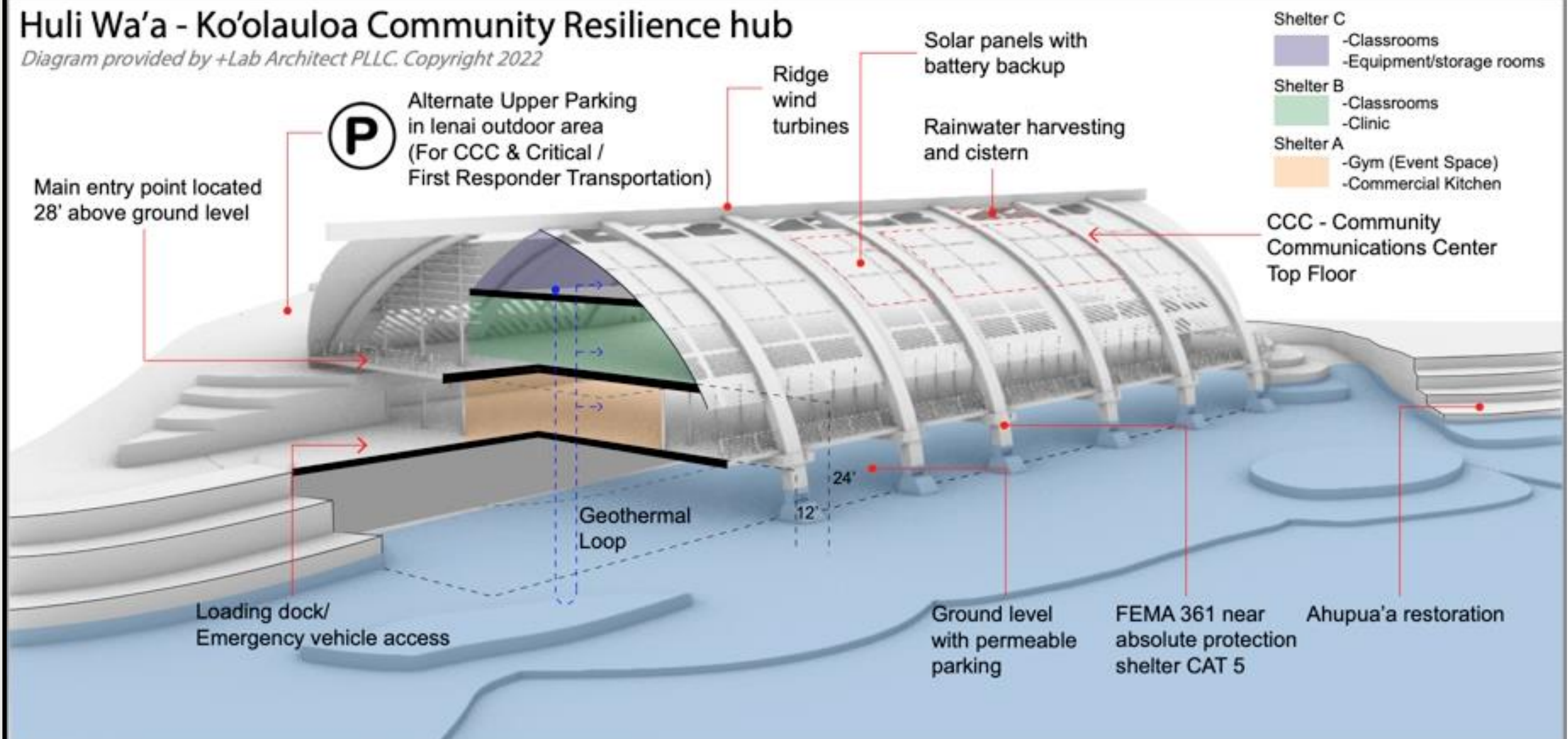
"When you see the storm you flounder
the boat so it stays put" - Dr. Tusi ...

Ko'olauloa Community Resilience Hub



Huli Wa'a - Ko'olauloa Community Resilience hub

Diagram provided by +Lab Architect PLLC. Copyright 2022



FEMA 361

30 days off grid capable

Shelter Capacity 1500



Services + Programming

- Commercial Kitchen
 - Food Preparation
 - Food Storage
- Satellite Medical of Shelter A (Gymnasium)
- Classroom (Shelter Space C)
 - Designated space for childcare



Communications

- Computer lab and youth center (wi-fi)
 - Charging Station
 - Printers
- Hardened Cell Tower



Building + Landscape

- ADA Accessible entrances throughout
- EV Charging stations
- Community Garden
- Rainwater capture tank
- ADA accessible sidewalks
- Outdoor Seating
- Tree Canopy/Shading



Power Systems

- Back-up Battery
- Solar Panels
- Community Micro Grid
- Geothermal
- E/V Car Charging Stations
- Wind turbines

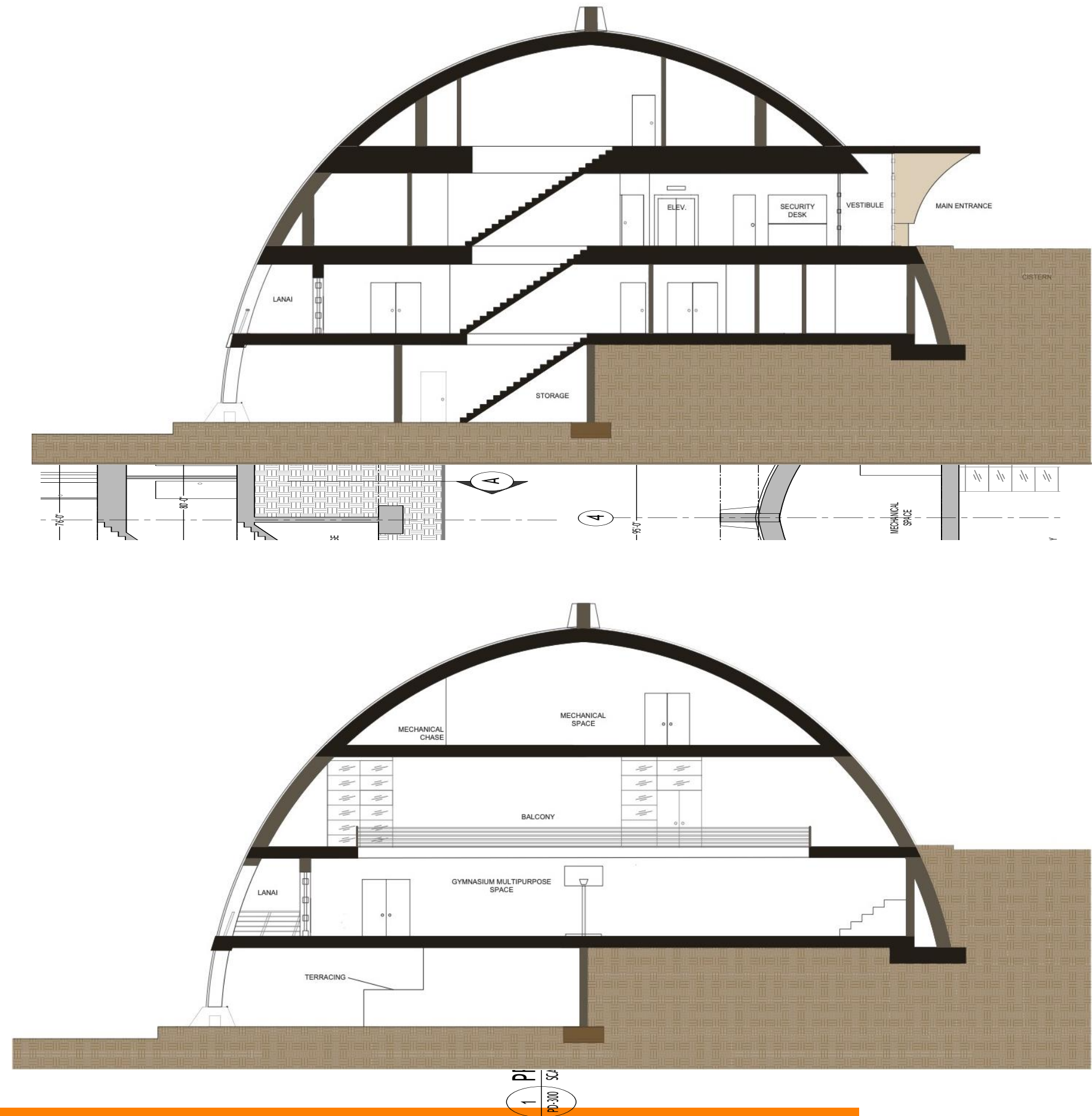
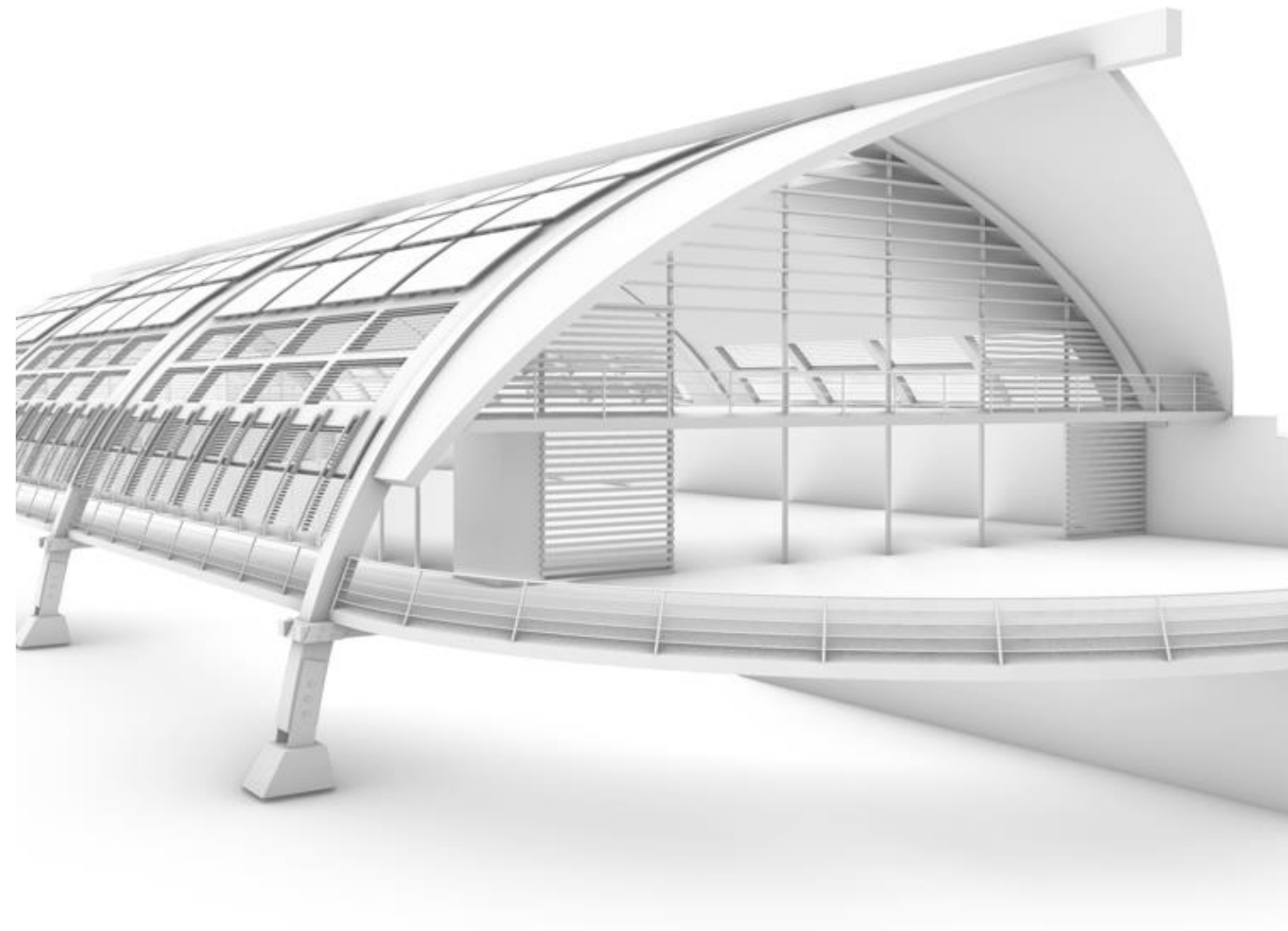


Operations

- Security checkpoints
- Main entrance
- Passcode protected door
- CCC - Community Communications Center
- Equipment Storage
- Bathrooms and Showers



FEMA BRIC - TA grant



Master Carvers

- Part of our team and community

Tuione Pulotu



He traveled to Tonga in January 2020, and because of Covid-19 restrictions, has been unable to travel back to Hawaii until they are lifted. He built two large canoes and around 30 small canoes to help with food security.



ETIPP – DOE Building Energy Model (BEM)

RENEWABLE POWER STRATEGIES

SOLAR
WIND
HYDROGEN
GEO-THERMAL
HYDRO
WAVE

4 models:

- Business as usual (BAU) NormOps (all electric loads)
- BAU ResOps (only critical loads)
- High efficiency (HE) NormOps
- HE ResOps

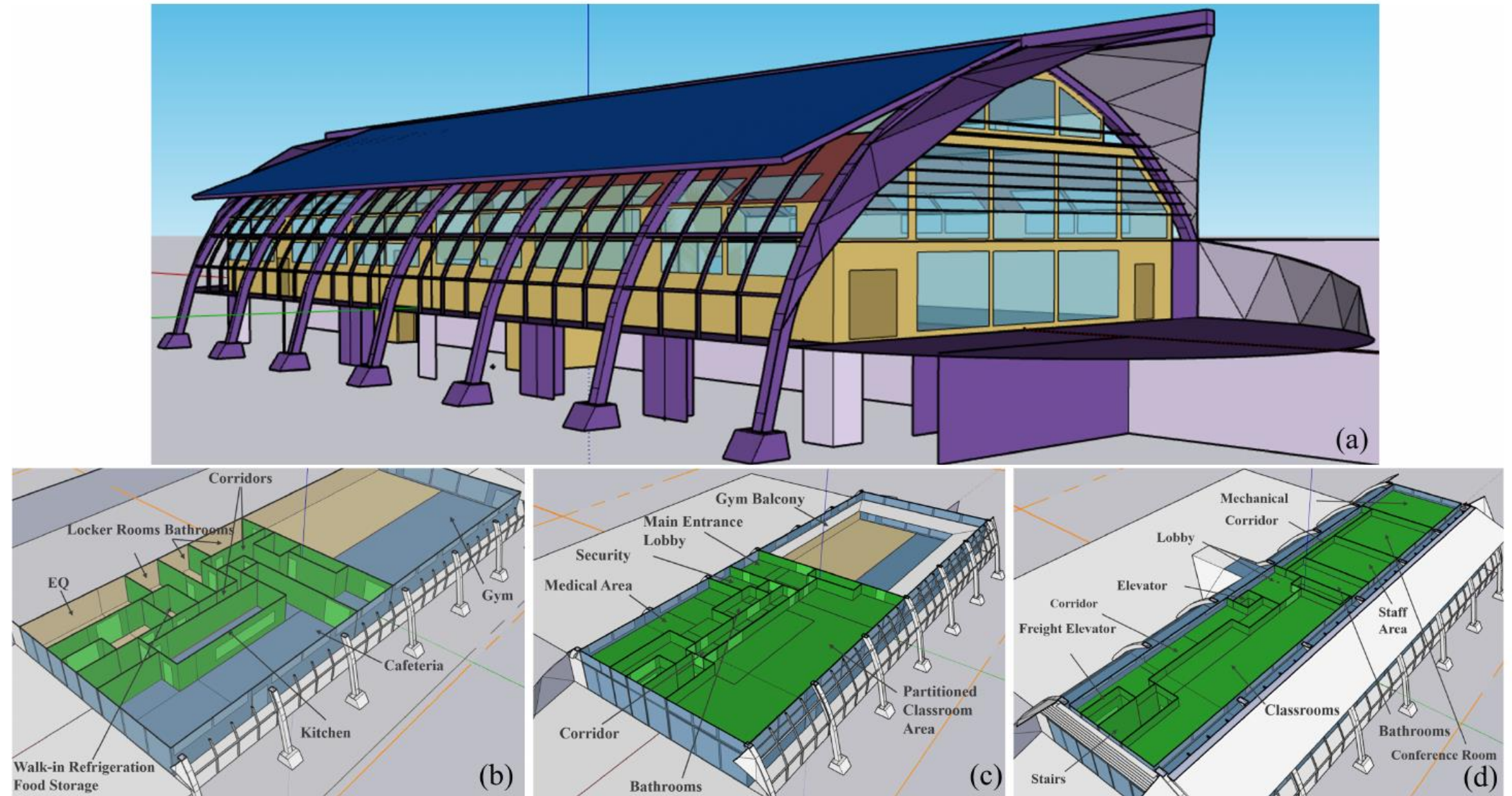


Figure 2: KCRH in Hau'ula, Hawaii OpenStudio model with three levels. (a) isometric view showing covered parking (b) lower floor, (c) main entrance floor, and (d) upper floor. The design is by +Lab Architect PLLC (Azaroff 2023).

DOE and Sandia labs modelling

Cost metrics



Purchase (\$M)
Diesel (\$h)

Resilience metrics

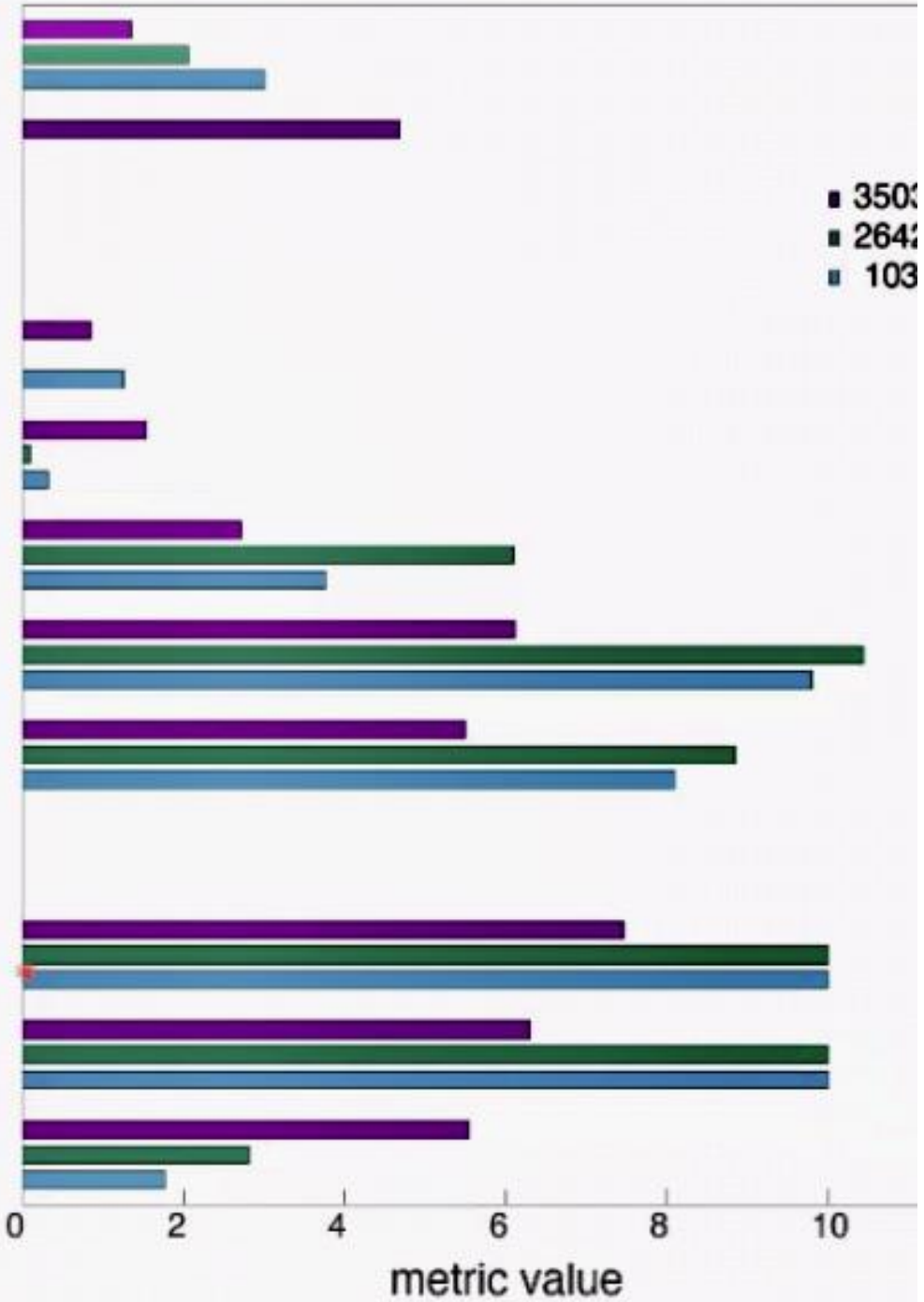


max outage (hr)
load loss L1 (%)
load loss L2 (%)
load loss L3 (%)
load loss L4 (%)

Environment metrics

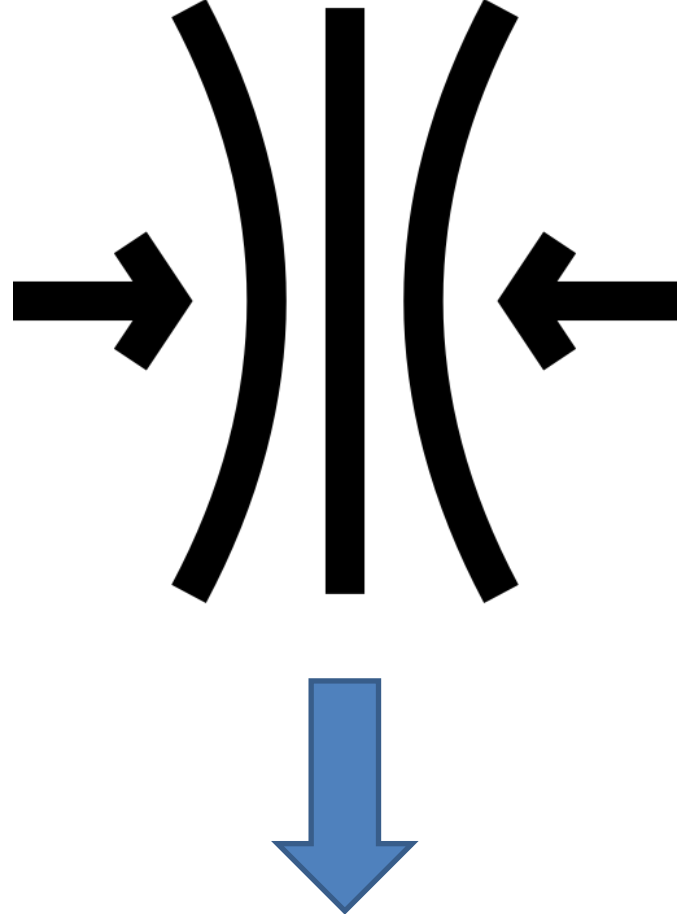


RE supply (%/10)
RE pen (%/10)
RE spilled (MWh)



Three plots

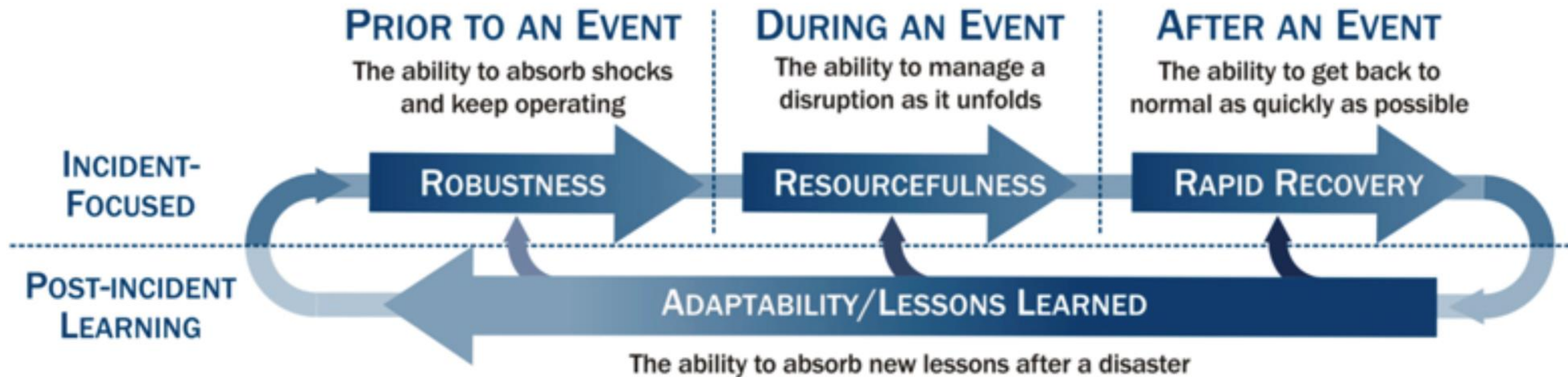
Resilience, Finance and Environmental fitness



Strategies for Resilient Communities

The 4 “R”s

Robustness, **R**esourcefulness, **R**apid-Recovery, & **R**edundancy



NIAC model for continuous infrastructure resilience improvement – Public Domain image

Clearing the site

- Clearing invasive species
- Identifying significant features



Team Rubicon





○ EA SITE PLAN
Ko'olauloa Community Resilience Hub

03.05.2024

Schatz Secures Nearly \$400 Million In New Earmark Funding For Hawai'i Non-Profits, Projects, More Earmarks Expected In Next Round Of Funding

WASHINGTON – U.S. Senator Brian Schatz (D-Hawai'i), chair of the Senate Appropriations Subcommittee on Transportation, Housing and Urban Development, secured \$394 million in new congressional directed spending, also known as earmarks, in the first half of this year's government funding bill. Additional earmark funding for Hawai'i is expected to be included the second half of the funding deal which is set to be announced on March 22.

"We are bringing home nearly \$400 million in new earmark funding and expect more to come," said Senator Schatz, a member of the Senate Appropriations Committee. **"These earmarks will give local non-profits and projects more resources to serve communities across Hawai'i."**

As a senior member of the Senate Appropriations Committee, Schatz worked with congressional leaders to ensure Hawai'i received its fair share of federal earmark funding.

EARMARKS SECURED BY SENATOR SCHATZ INCLUDE THE FOLLOWING:

Sustainable Moloka'i – \$1.3 million

This project would fund the acquisition of land to support the development of a permanent food hub on Moloka'i. (Schatz and Tokuda joint request)

Hui o Hau'ula – \$5.4 million



Funding will support construction of a community center and shelter in Hau'ula. (Schatz, Hirono, and Tokuda joint request)

Island of Hawai'i YMCA – \$625,000

Progress!



Resources: Climate Action at AIA and beyond



AIA Framework for Design Excellence

The AIA Framework for Design Excellence represents the defining principles of design excellence in the 21st century. Comprised of 10 principles and accompanied by searching questions, the framework informs progress toward a zero-carbon, healthy, just, resilient, and equitable built environment.





Federal Climate Adaptation Plans

[Home](#) / Federal Climate Adaptation Plans

As directed by President Biden's January 28, 2021, Executive Order 14008, major Federal agencies are required to develop an adaptation and resilience plan to address their most significant climate risks and vulnerabilities. On October 7, 2021, the White House [announced the release of more than](#)

Department of Health and Human Services



Download the Department of Health and Human Services's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

Department of Homeland Security



Download the Department of Homeland Security's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

Department of Commerce



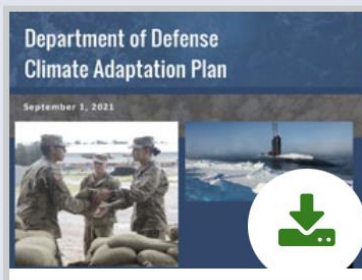
Download the Department of Commerce's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

Department of Housing and Urban Development



Download the Department of Housing and Urban Development's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

Department of Defense








Download the Department of Defense's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

Department of the Interior



Download the Department of the Interior's [2021 Federal Climate Adaptation Plan \(PDF\)](#).

National Institute of BUILDING SCIENCES™		ADOPT CODE	ABOVE CODE	BUILDING RETROFIT	LIFELINE RETROFIT	FEDERAL GRANTS
Overall Benefit-Cost Ratio		11:1	4:1	4:1	4:1	6:1
Cost (\$ billion)		\$1/year	\$4/year	\$520	\$0.6	\$27
Benefit (\$ billion)		\$13/year	\$16/year	\$2200	\$2.5	\$160
 Riverine Flood		6:1	5:1	6:1	8:1	7:1
 Hurricane Surge		not applicable	7:1	not applicable	not applicable	not applicable
 Wind		10:1	5:1	6:1	7:1	5:1
 Earthquake		12:1	4:1	13:1	3:1	3:1
 Wildland-Urban Interface Fire		not applicable	4:1	2:1	not applicable	3:1

Copyright © 2019 The National Institute of Building Sciences.

For every dollar spent in mitigation the savings are 4X, 6X, 8X.....

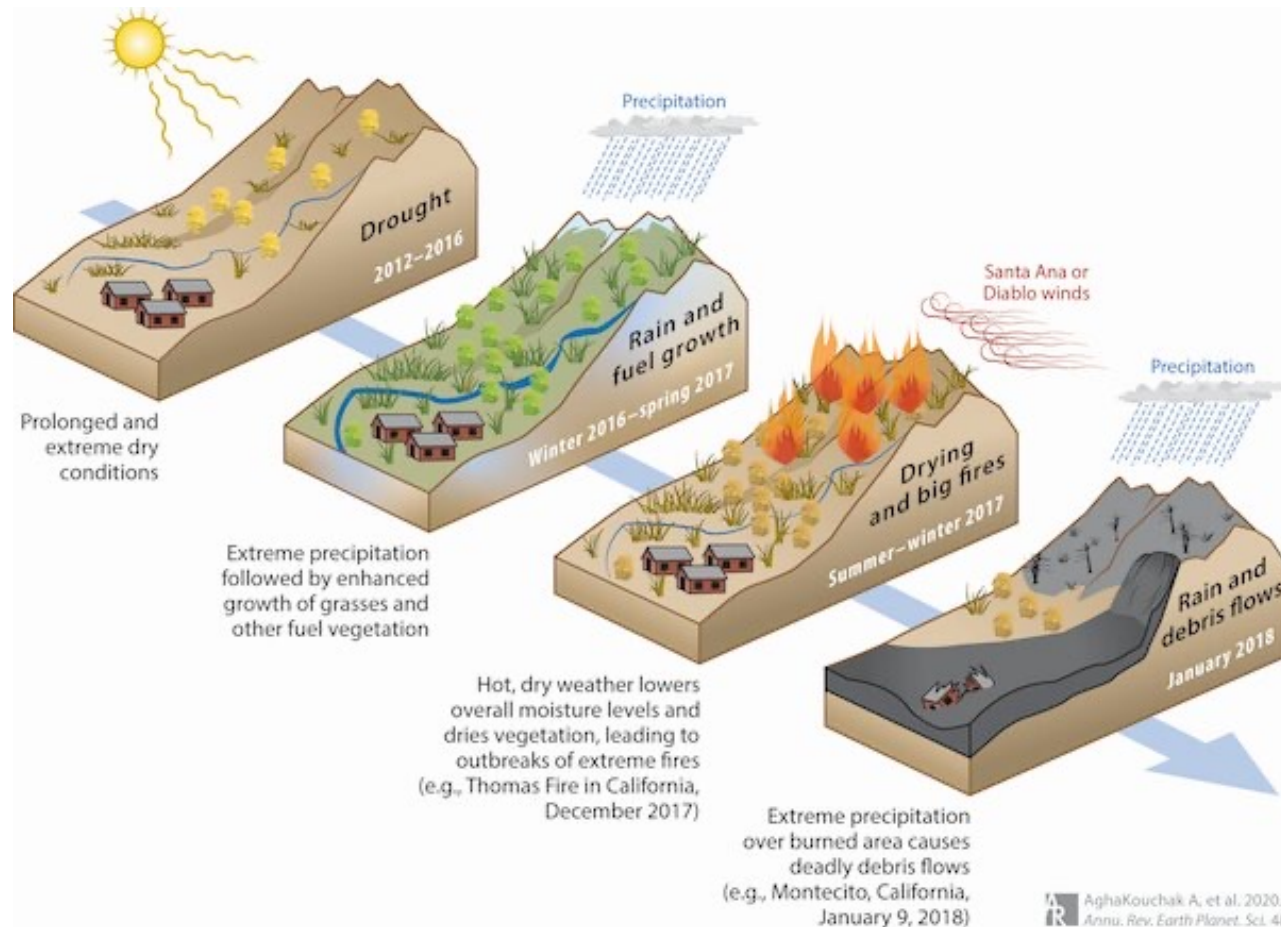


The Answer lies within YOU!

Illya Azaroff, FAIA

Cascading Climate Change-Related Effects in California

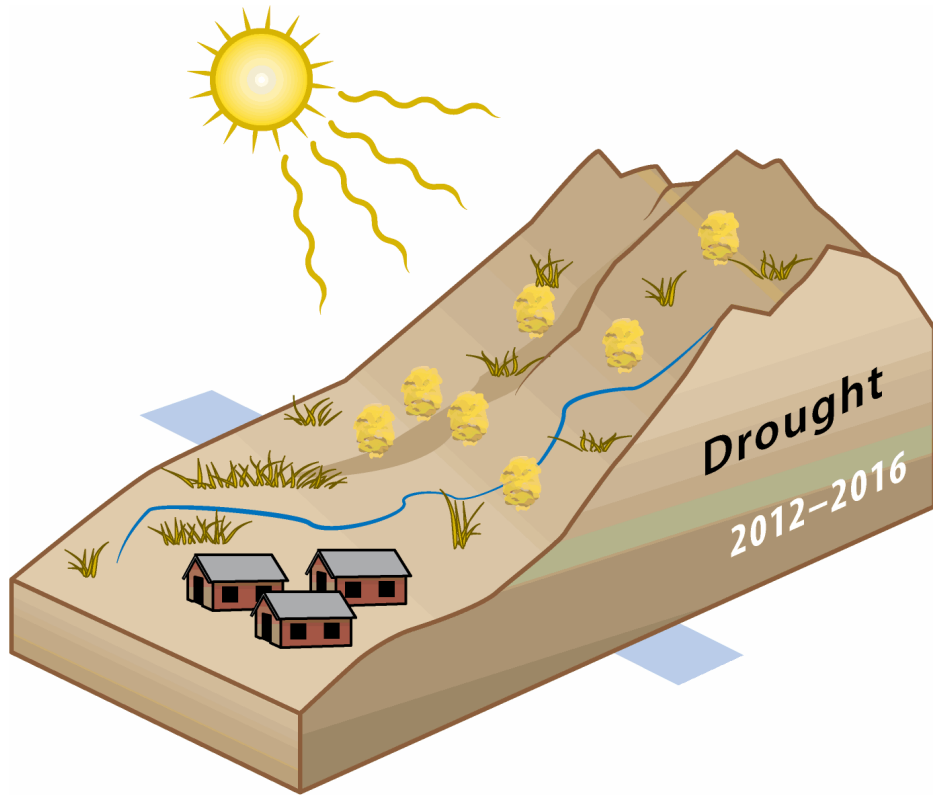
Environmental Effects



Credit: AghaKouchak et al., *Annual Review of Earth and Planetary Sciences*, 2020
<https://www.annualreviews.org/content/journals/10.1146/annurev-earth-071719-055228>

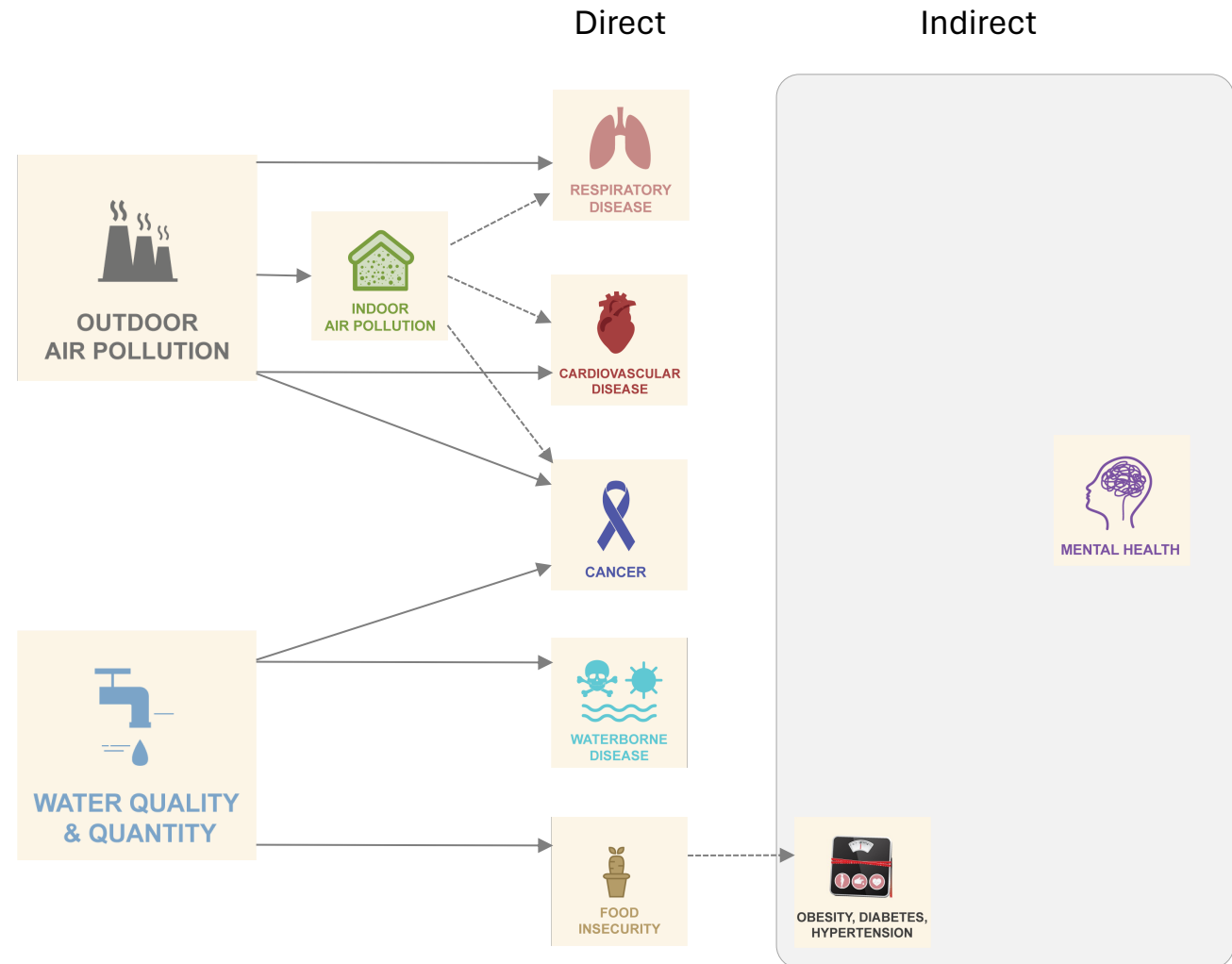
Cascading Climate Change-Related Effects in California

Health Effects



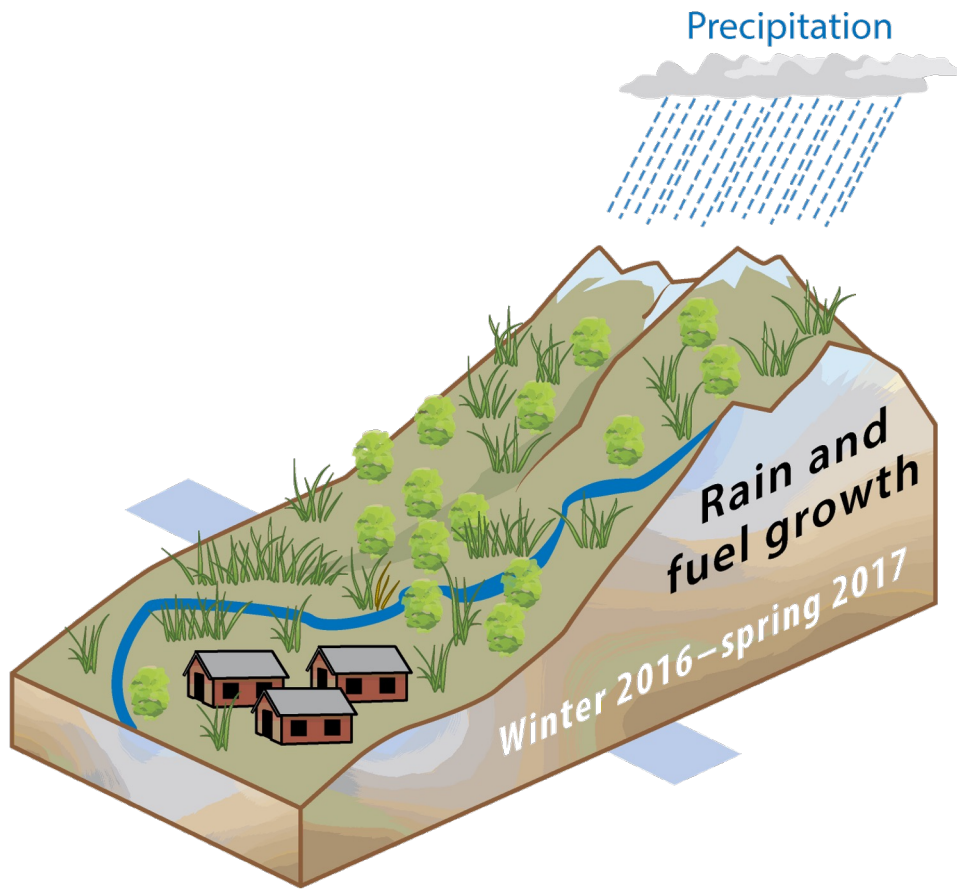
Exposures

Health Outcomes



Cascading Climate Change-Related Effects in California

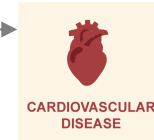
Health Effects



Exposures

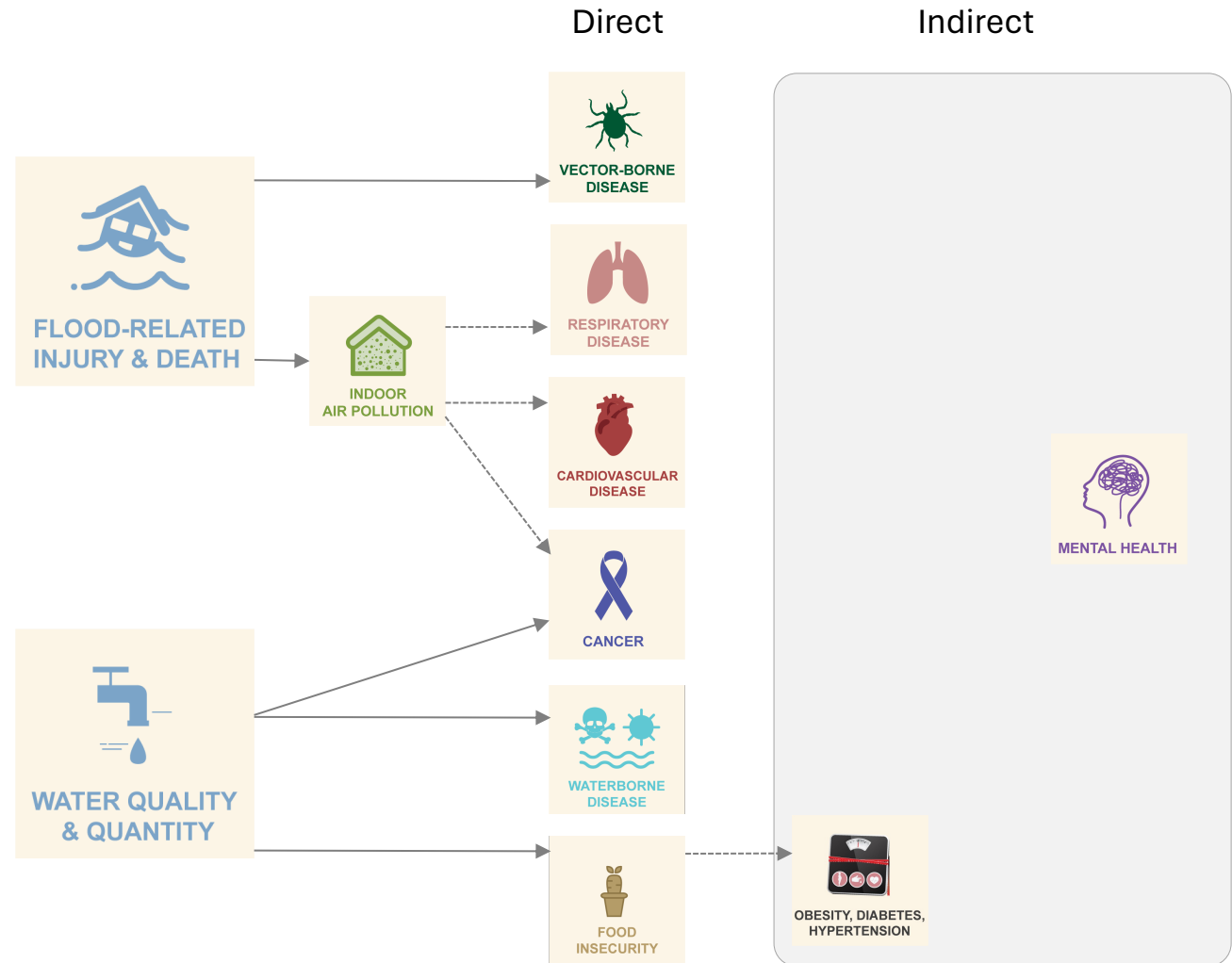
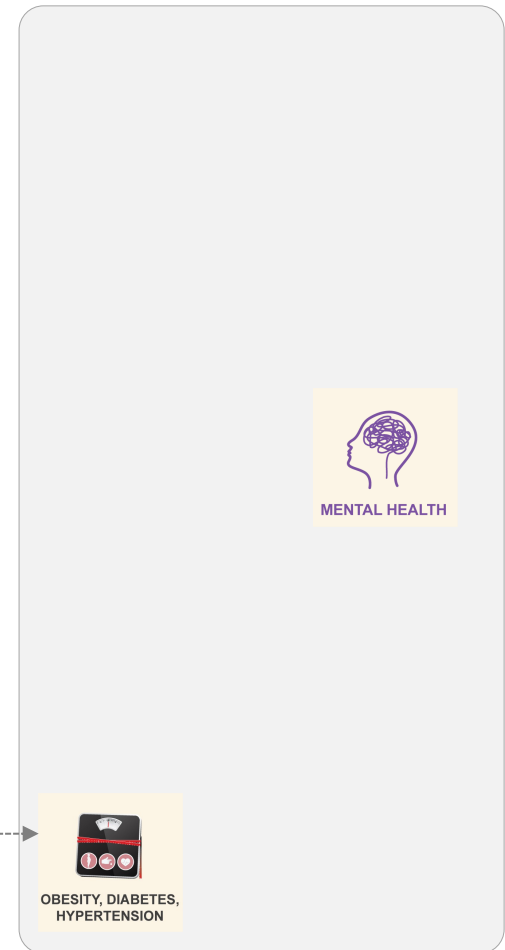


Direct



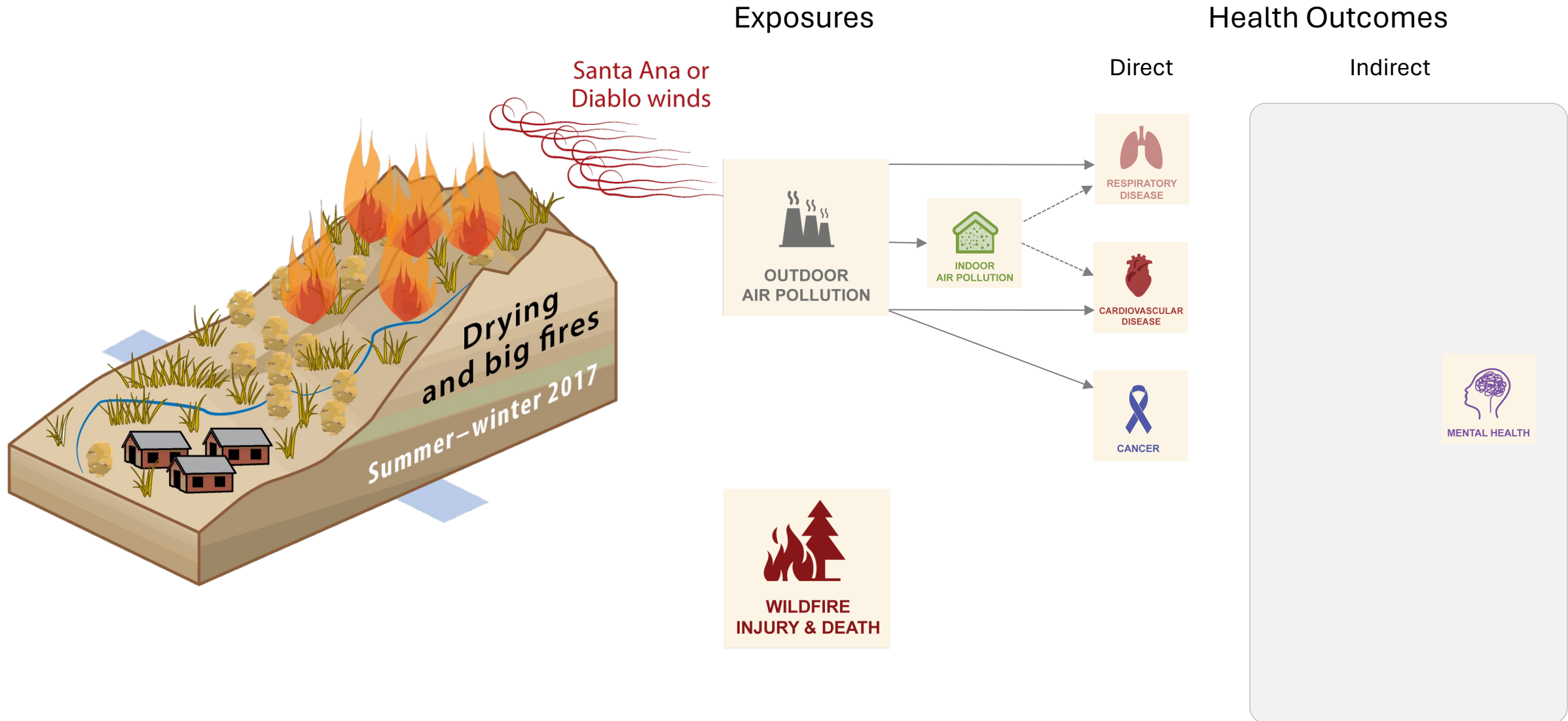
Health Outcomes

Indirect



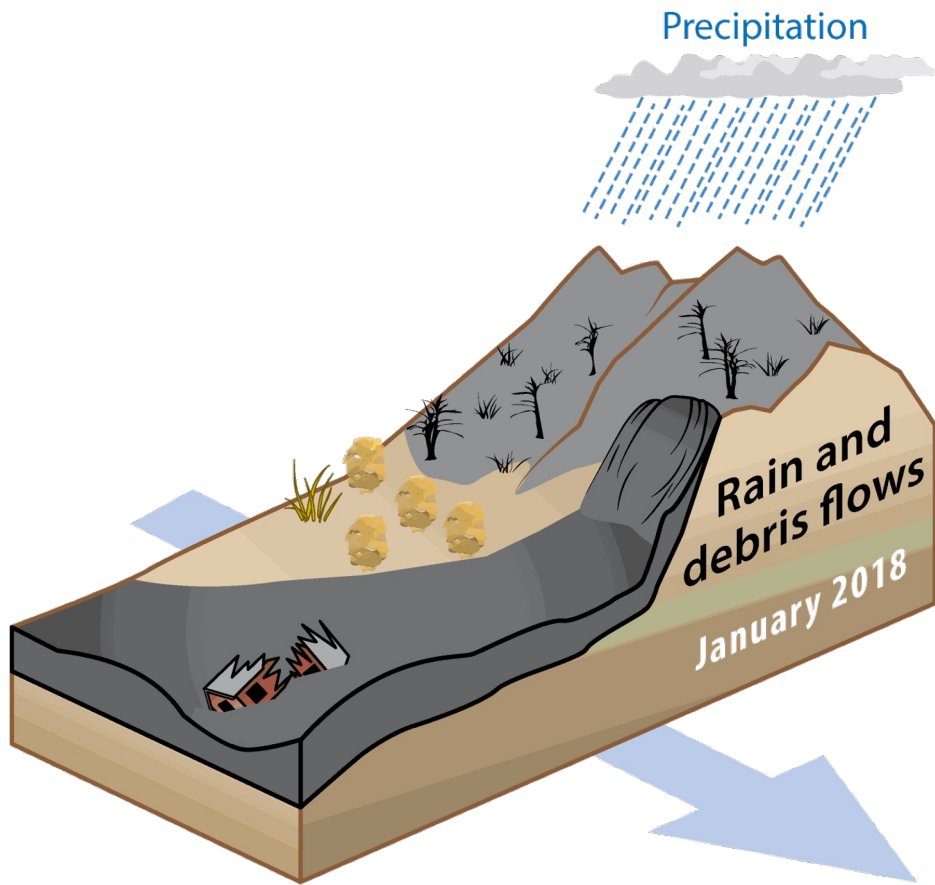
Cascading Climate Change-Related Effects in California

Health Effects

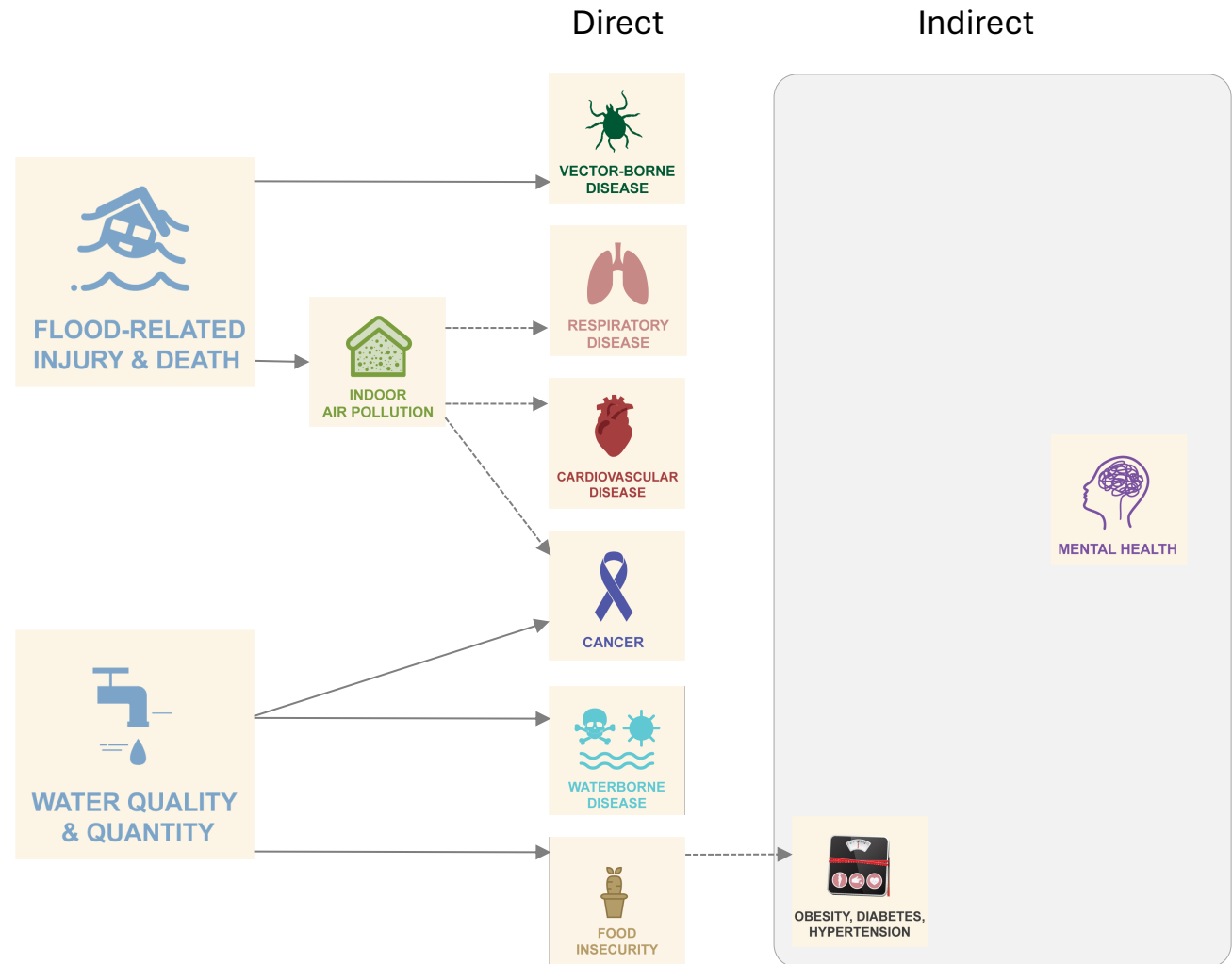


Cascading Climate Change-Related Effects in California

Health Effects

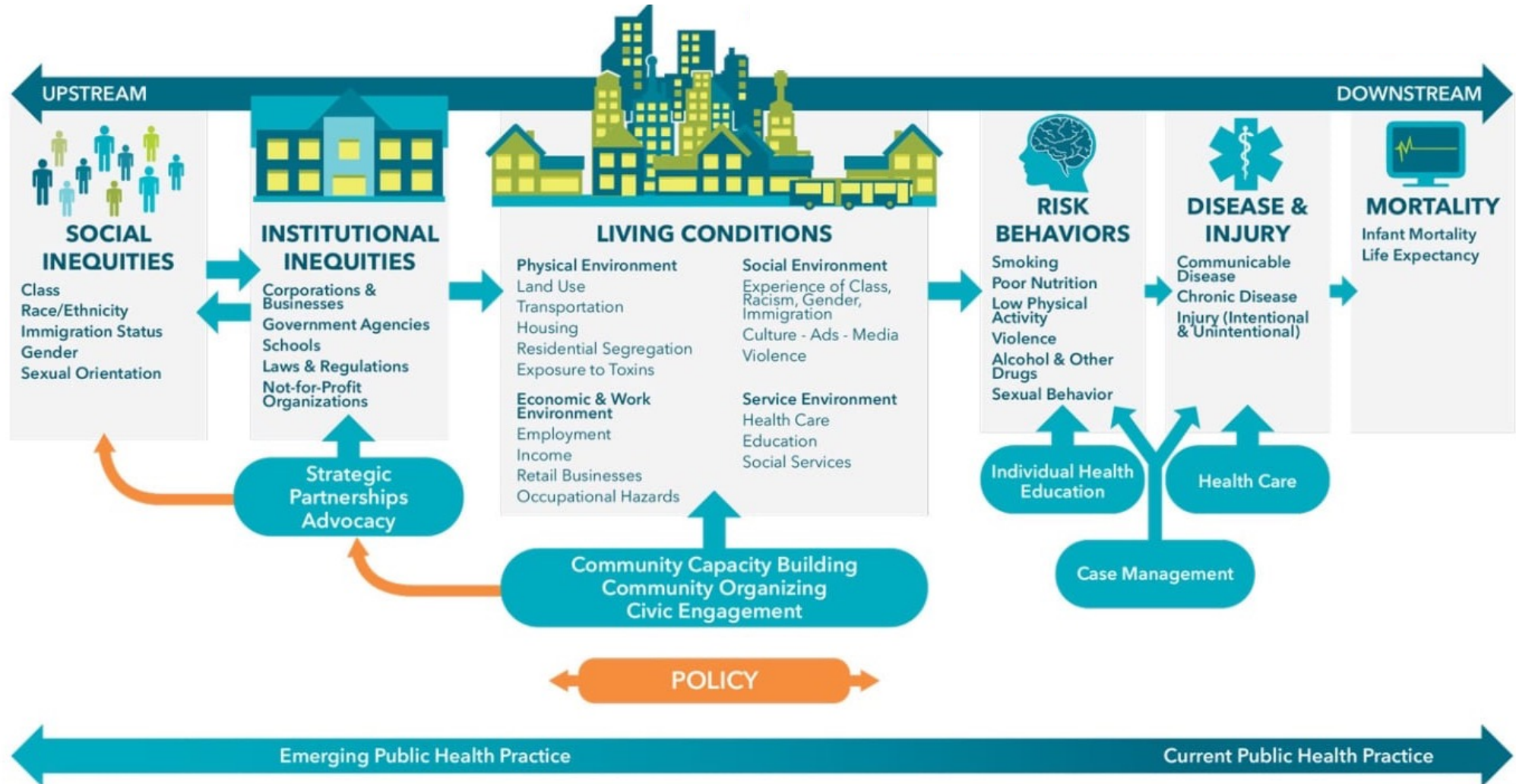


Exposures



Cascading Climate Change-Related Effects in California

Who is Most at Risk?




Credit: Bay Area Regional Health Inequities Initiative, <https://barhii.org/framework/>

California-Specific Resources

Data

cal-adapt Tools



Explore and analyze climate data from California's Climate Change Assessments

Cal-Adapt provides the public, researchers, government agencies and industry stakeholders with essential data & tools for climate adaptation planning, building resiliency, and fostering community engagement.

CCHViz About Vulnerability County Snapshot Single Indicator Query the Data How to Use

Vulnerability

Visualize California Counties based on levels of both an exposure variable and a population sensitivity variable.

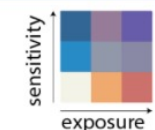
The plot illustrates the intersection of hazard (from an aspect of climate change) and sensitivity (from circumstances of the population or place that tend to increase susceptibility to the hazards of climate change). Counties are assigned to the bottom (least), middle, or top (most) third for both exposure and sensitivity. The most vulnerable counties appear in top and right-most portions of the figure. Points are sized according to the population living in that county. Hover over points for the county name, population, and indicator values.

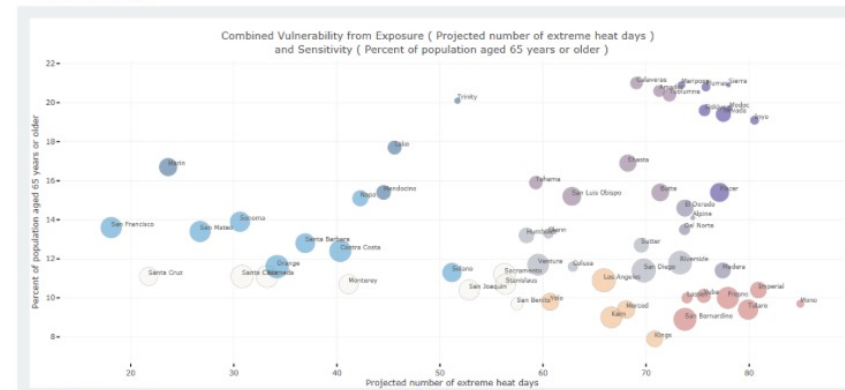
Some examples of important combinations to consider are

- Heat + elderly / outdoor workers / health insurance / air conditioning / tree canopy / impervious surfaces
- Ozone + children
- PM2.5 + children
- Wildfire + elderly / disability

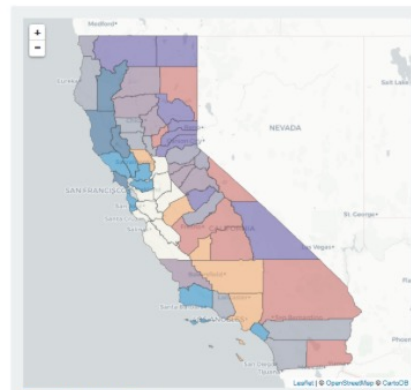
Exposure Indicator
Projected number of extreme heat days

Sensitivity Indicator
Percent of population aged 65 years or older





Download the data in this figure



Download the data in this Map



California-Specific Resources

Funding



[ABOUT](#) [OUR WORK](#) [RESOURCES](#) [SERVICES](#)



Sustainable Communities & Climate Protection Program

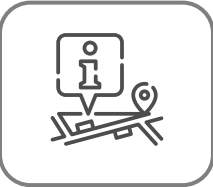


California
**ELECTRIC
HOMES**



California Climate Investments Funded Programs

Alignment Process

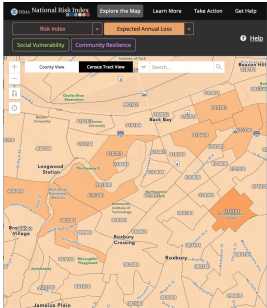


+

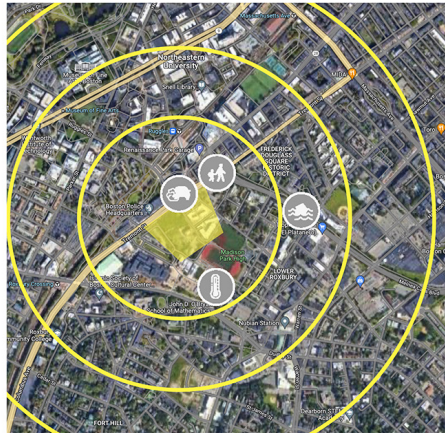


Step 1: Data + Step 2: Alignment

1. Use census tract data from federal agencies ...



... to identify neighborhood conditions that could be improved through building design or renovation.



Entire Neighborhood: [Icons for Heat, Flood, Social Vulnerability]

High Risk [Icons: Fire, Person, Flood]

Moderate Risk [Icons: Wind, Person, Flood]

Low Risk [Icon: Information]

Rank each indicator according to the census tract's risk level ...

2. Stakeholders revise the draft analysis and jointly develop an aligned vision for the project.



Case Study:

Medical Office Building in Northern California

INDICATOR RANKING BY RISK LEVEL: RESILIENCE HUB NEIGHBORHOOD

SOCIAL DETERMINANTS OF HEALTH

- Children
- Elderly
- Housing Insecurity
- Minorities
- Income Disparity
- Social Vulnerability

COMMUNITY HEALTH INDICATORS

- Cancer
- Heart Disease
- Respiratory Disease
- Obesity, Diabetes, Hypertension
- Mental Health
- Bicycle/Pedestrian Safety

CLIMATE CHANGE & HEALTH INDICATORS

- Strong Winds/Hurricane
- Wildfire
- Air Pollution
- Heat
- Vectors
- Earthquake
- Flooding

HIGH PRIORITY ENVIRONMENTAL HEALTH TOPICS

AIR POLLUTION & SAFETY

HEAT-RELATED INJURY & DEATH

EARTHQUAKE-RELATED INJURY & DEATH

FLOOD-RELATED INJURY & DEATH

VECTOR-BORNE DISEASE

EVIDENCE-BASED DESIGN IDEAS: BY SPATIAL SCALE

Building

- Seismic Design
- Design for Net Zero Energy
- Health-promoting Indoor Air
- Avoid High Emitting Materials & Chemicals of Concern
- Design for Net Zero Water
- Garden Roof/ Pavement

Campus/ Neighborhood

- Low Impact Landscaping
- Reduce Exposure to Sources of Air Pollution

Community

- Multi-modal Transportation Infrastructure
- Protected & Shaded Pathways Through the Property Linking to Off-site Multi-modal Infrastructure
- Compact, Multi-use Development Near Transit & Bike/ped Infrastructure
- Reduce Flood Risk in Flood-prone Locations
- Resilience Hub
- Build Redundancy into Muni Water Supply with Rainwater Capture, Filtration, Reuse