



Virtual Meeting Guidelines



Please stay muted unless you're actively speaking



React or provide nonverbal feedback at any time



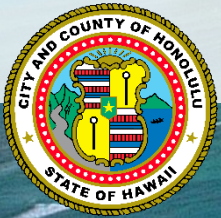
To ask a question, type your question into the chatbox
OR
wait until a Q&A pause



Allow other participants the space to speak



Tech isn't always perfect – thank you for your patience!

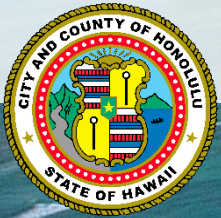


Climate Ready O'ahu Community Advisory Hui

Agenda November 09, 2020

- 1. Welcome and Advisory Member Roster Updates**
2. Acceptance of Notes from Meeting #1
3. Climate Ready O'ahu Project Updates: Susan Asam, Vice President, ICF International
4. Activity and Discussion on Recommendations for Adaptation Action Areas and Evaluation Criteria
5. Discussion on Recommendations for Community and Stakeholder Engagement
6. Discussion on Recommendations for Future Agenda Items
7. Public Input for Matters Not on the Agenda
8. Tentative Next Meeting Date
9. Adjournment



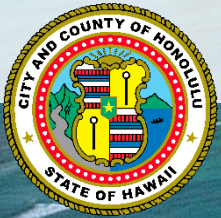


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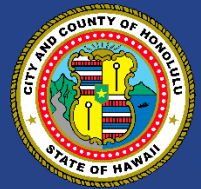
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Climate Ready O'ahu

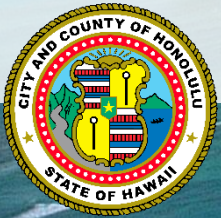
Community Advisory Hui Meeting – November 9, 2020



City and County of Honolulu

Office of Climate Change, Sustainability and Resiliency

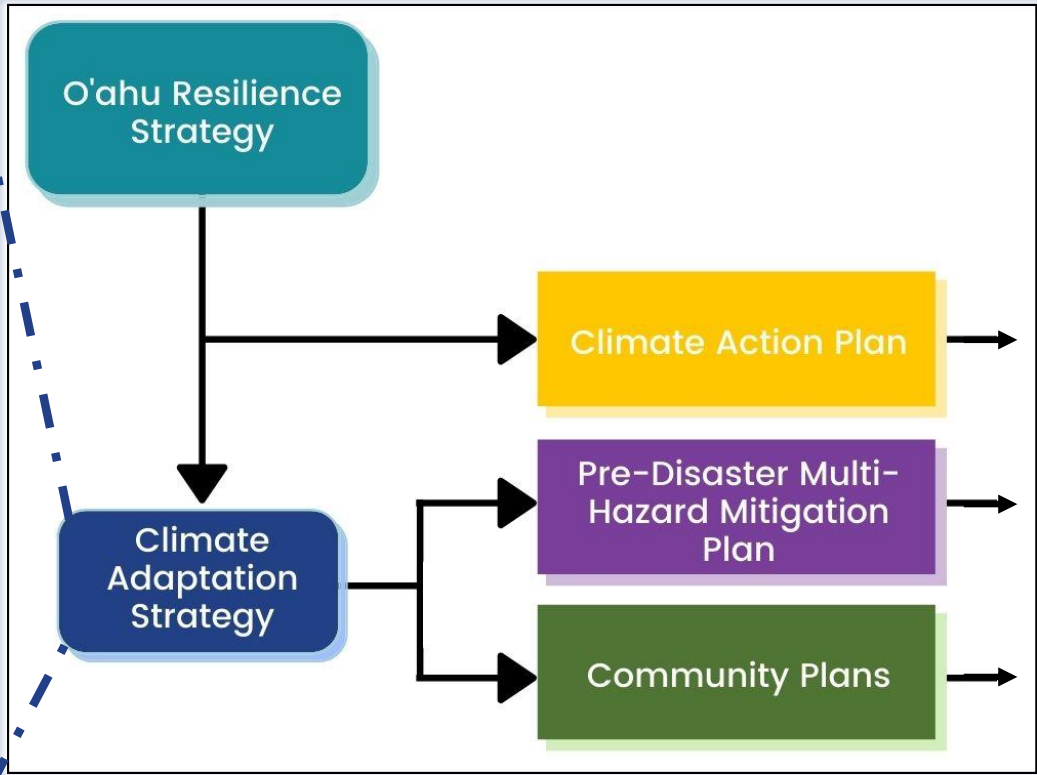
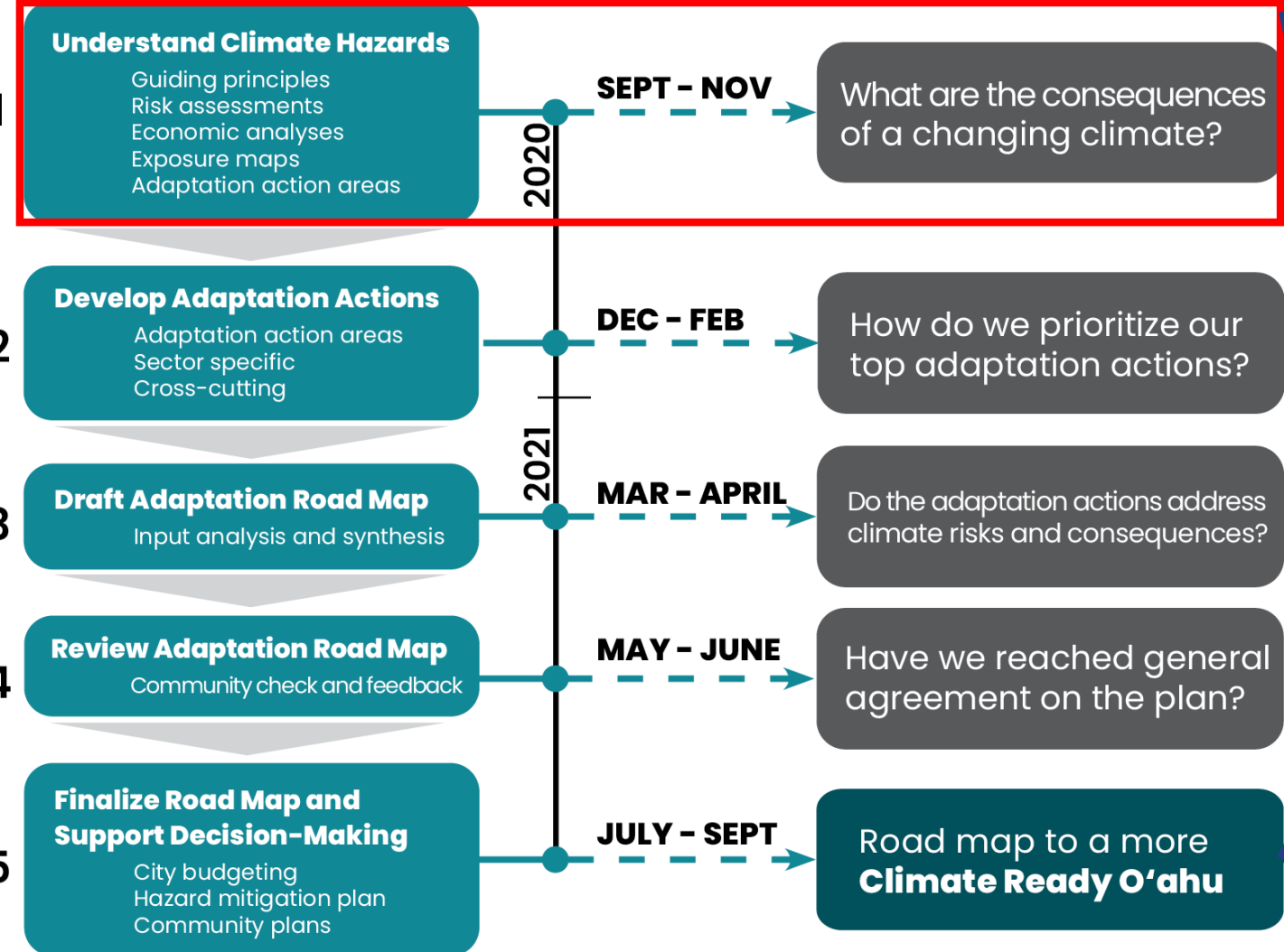


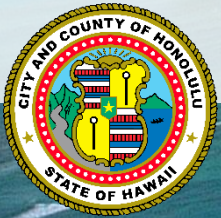


Climate Ready O'ahu Project Overview

Phase and Topics

Timeframe and Key Questions

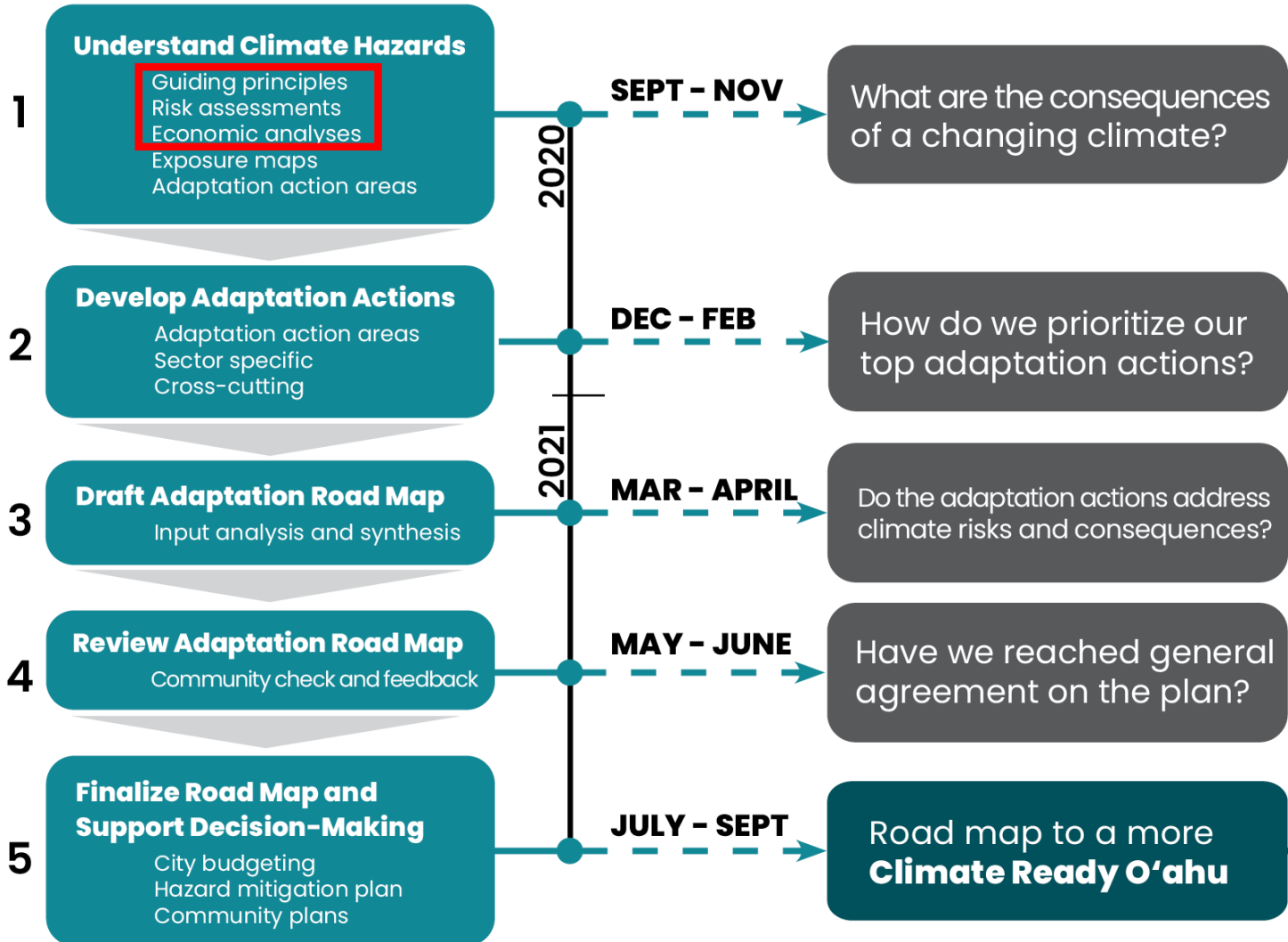




Round 1 Recap

Phase and Topics

Timeframe and Key Questions



- Climate changes and local action
- What's your take on climate hazard impacts?
- Guiding principles for climate change adaptation

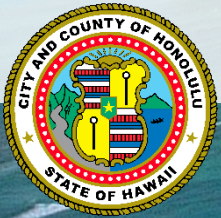
Round 1

3 virtual meetings were held during the week of October 19, 2020

[View Presentation](#)
[Watch Recording](#)
[Take the Survey](#)

climateredyoahu.org/participate

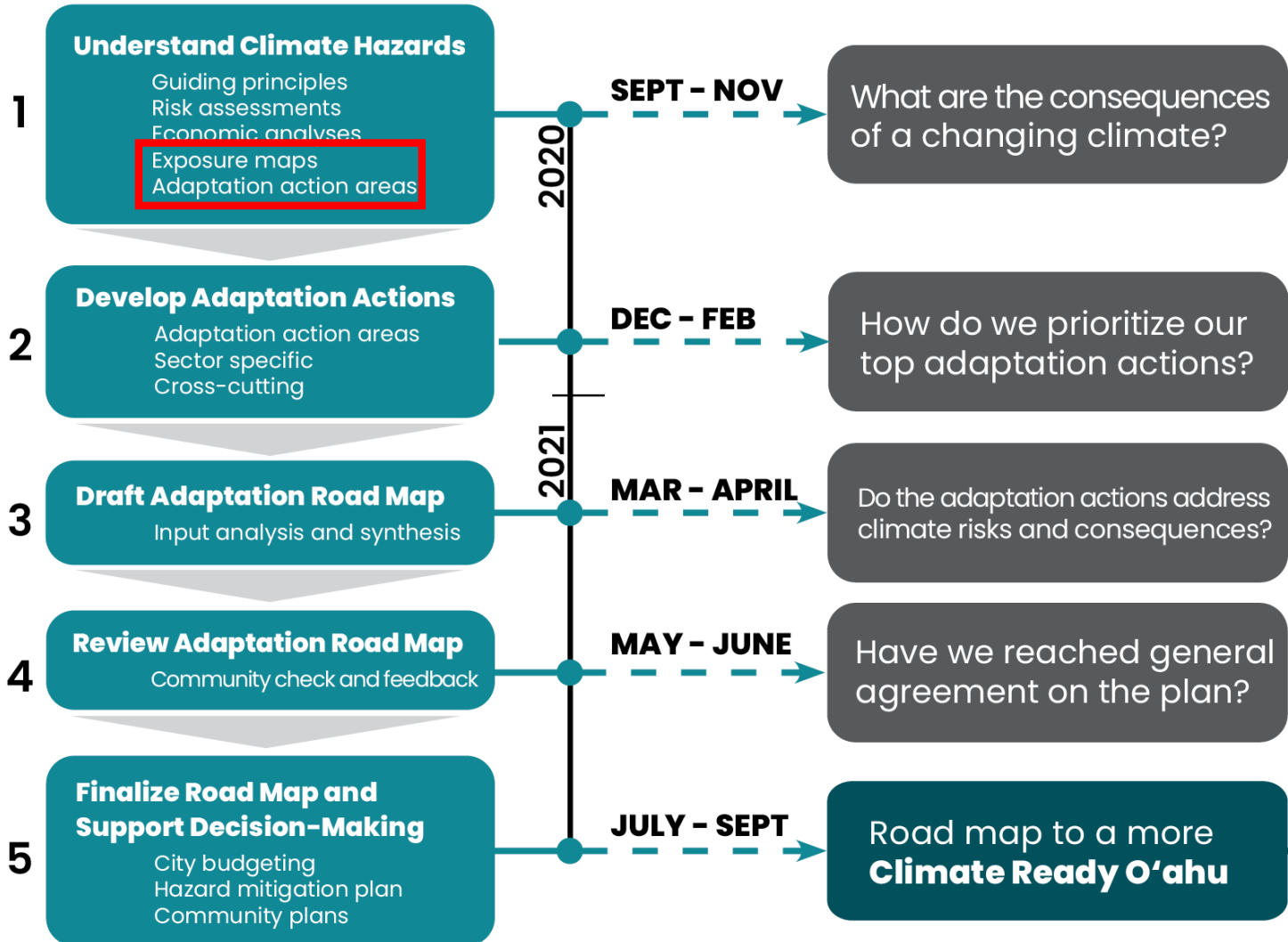




Round 2 Recap

Phase and Topics

Timeframe and Key Questions



- Understanding climate hazards and exposure
- Adaptation action areas

Round 2

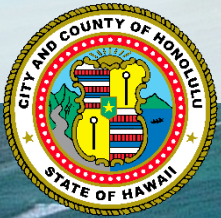
3 virtual meetings were held during the week of November 2, 2020

[View Presentation](#)

[Watch Recording \(coming soon\)](#)

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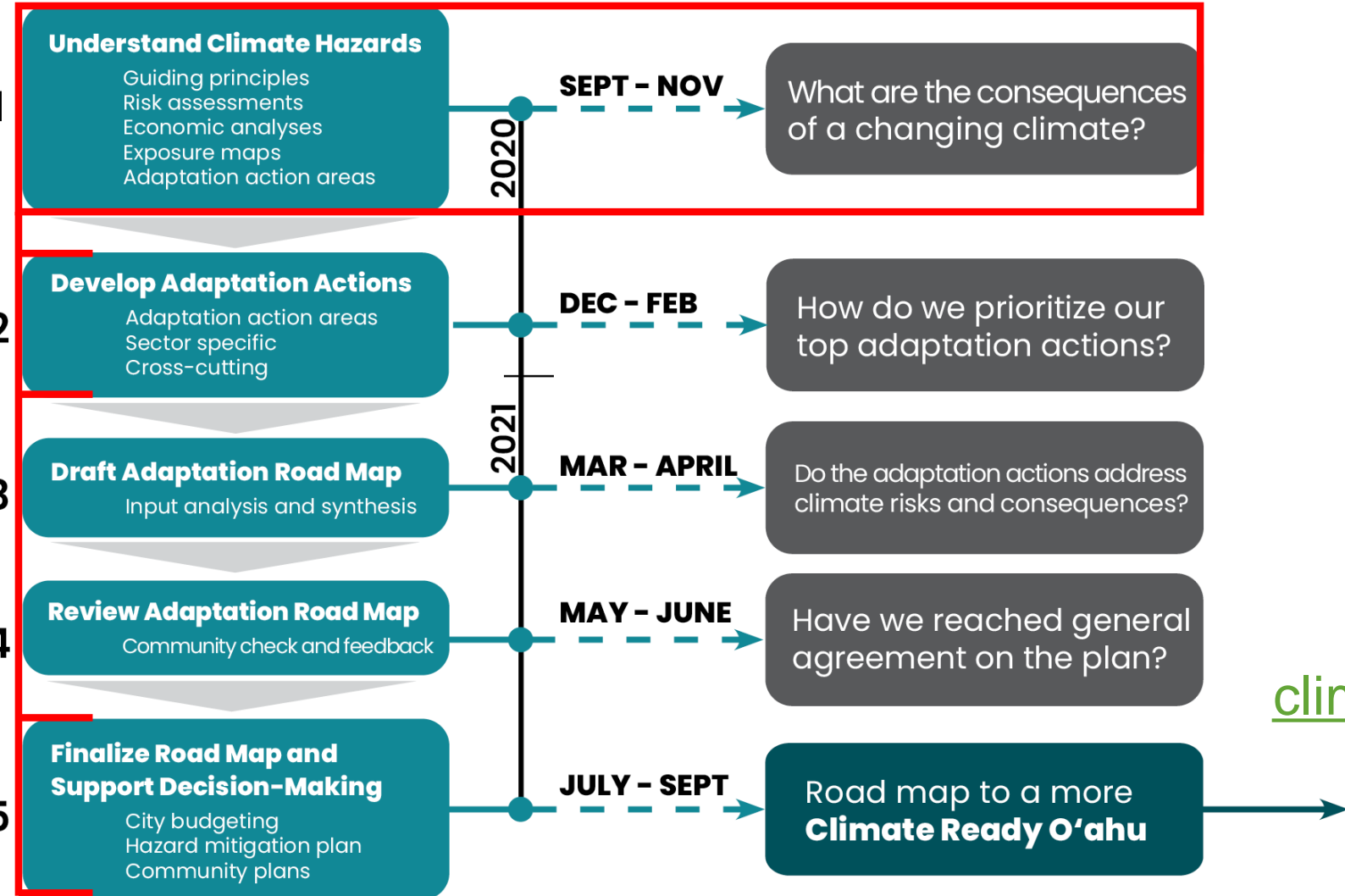




Community Advisory Hui Meetings #1 and #2

Phase and Topics

Timeframe and Key Questions



Meeting 1

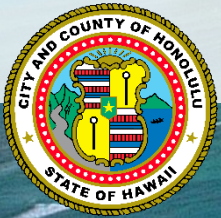
Tuesday, October 20, 2020
[Agenda](#) | [Presentation](#) | [Recording](#) |
[Climate Hazard Impacts and Adaptation Guiding Principles Responses](#) | [Meeting Notes](#)

Meeting 2

Monday, November 9, 2020
[Agenda](#)

climateredyoahu.org/advisory-hui





Guiding Principles for Adaptation

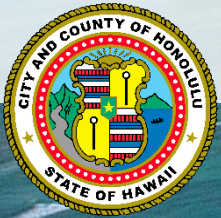


Advisory Hui



Virtual Engagement





Climate Change Brief & Climate Hazard Impacts

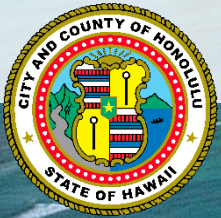


Sea Level Rise and Coastal Hazards

Rainfall

Heat





Climate Change Brief & Climate Hazard Impacts



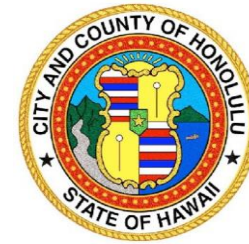
Sea Level Rise and Coastal Hazards

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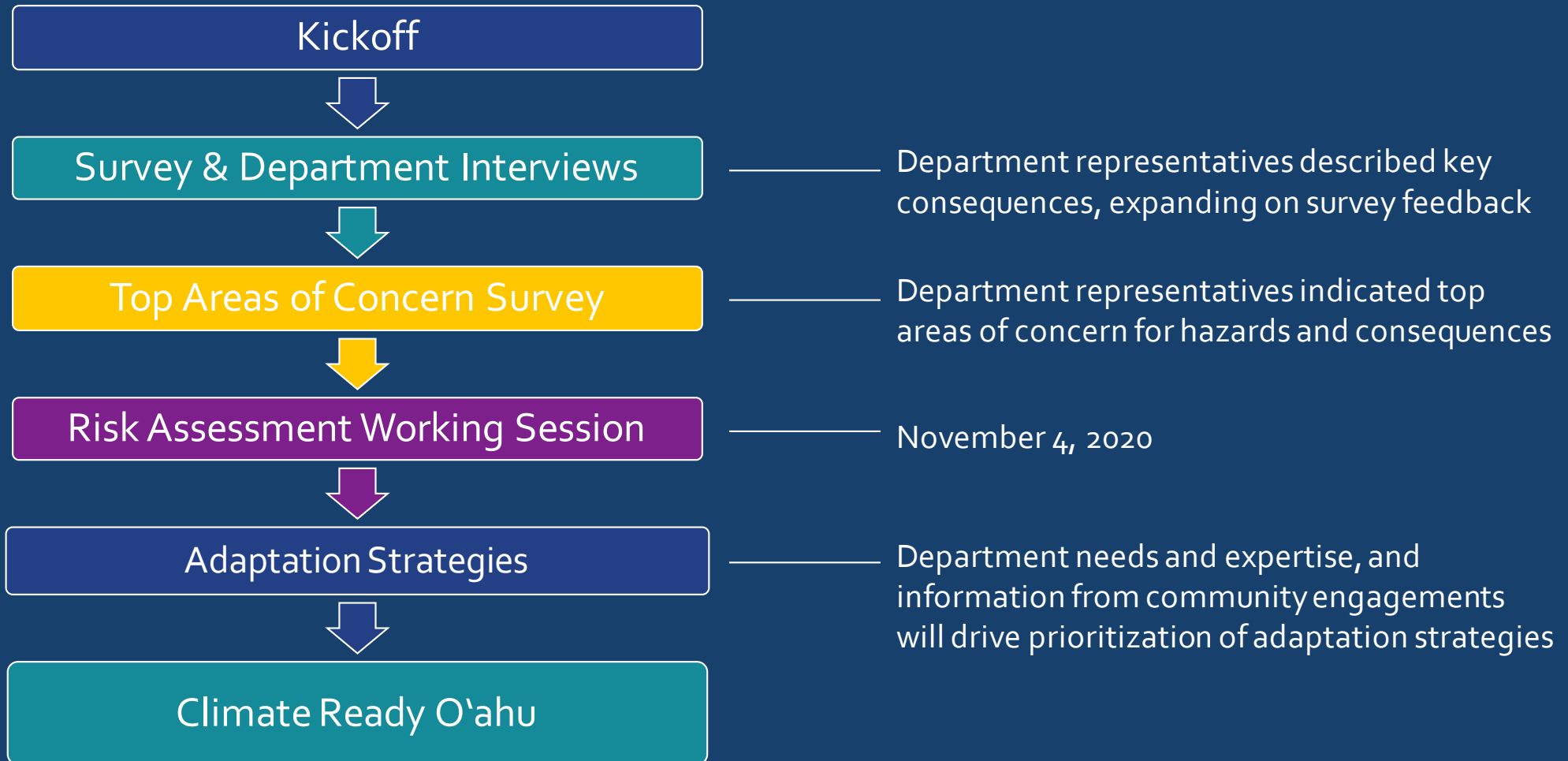


CLIMATE READY O'AHU



Community Advisory Hui
November 9, 2020

DEPARTMENT ENGAGEMENT PROCESS



OBJECTIVES OF NOV. 4 WORKING SESSION

Refine risk assessment
consequence ratings and
justifications

Determine selection criteria for
the adaptation action areas

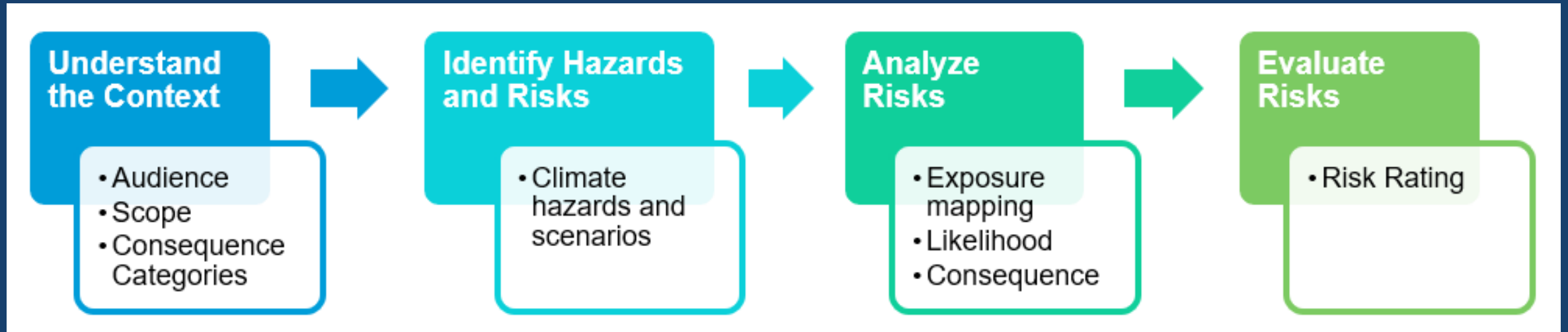
DRAFT CLIMATE RISK ASSESSMENT

Methodology and Results

KEY TERMINOLOGY

- **Climate hazard:** Changes or events that would consequently result in major impacts to the City and County of Honolulu.
 - Climate hazards can be **shocks** (e.g., hurricane) or **stresses** (e.g., sea level rise)
- **Likelihood:** The expected frequency of a climate hazard occurring (i.e., shock) or a critical climate hazard threshold being crossed (i.e., stress)
- **Consequence:** A measure of the severity of impacts from a climate hazard
- **Risk:** The chance that a hazard will cause harm. Risk is a function of the likelihood a hazard will occur and the severity of its consequences

RISK ASSESSMENT METHODOLOGY



Engagement-driven approach

CLIMATE HAZARDS AND SCENARIOS | 2050

Each scenario represents one permutation to illustrate the types of consequences associated with the hazard

Climate Hazard	Scenario
Hurricane	Landfall of a major hurricane with storm surge, rainfall, and high winds
“Rain bomb”	Significant rain event with 4 inches of rain/hour
Sea level rise and coastal erosion	Sea level rise and associated coastal erosion on a trajectory to 3.2 feet by 2100 with impacts due to high tides and/or coastal hazard events decades in advance
Decrease in precipitation	Leeward side of island becomes up to 60% drier contributing to droughts
Increase in temperature	Increase in average annual temperature of 2.7°F to 4.5°F contributing to heat waves

OVERALL RISK EVALUATION PROCESS

Risk = Likelihood x Consequence

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Negligible	Low	Medium	Medium	Medium
Rare	Negligible	Negligible	Low	Low	Medium

Risk Score (low end inclusive)	Rating
0 – 3	Negligible
3 – 5	Low
5 – 11	Medium
11 – 18	High
18+	Extreme

CONSEQUENCE CATEGORIES

Category	Sub-Category
Population	Physical health and safety
	Mental health
	Community cohesion and equity (e.g., differential impacts to daily life or identity)
Economy	Economic prosperity (e.g., impacts to specific industries or scale of economic losses)
	Infrastructure (e.g., disruption to critical infrastructure and/or City services)
Environment and Culture	Environment and culture (e.g., measure of impacts to the natural environment and culture)

LIKELIHOOD RATING SCALE

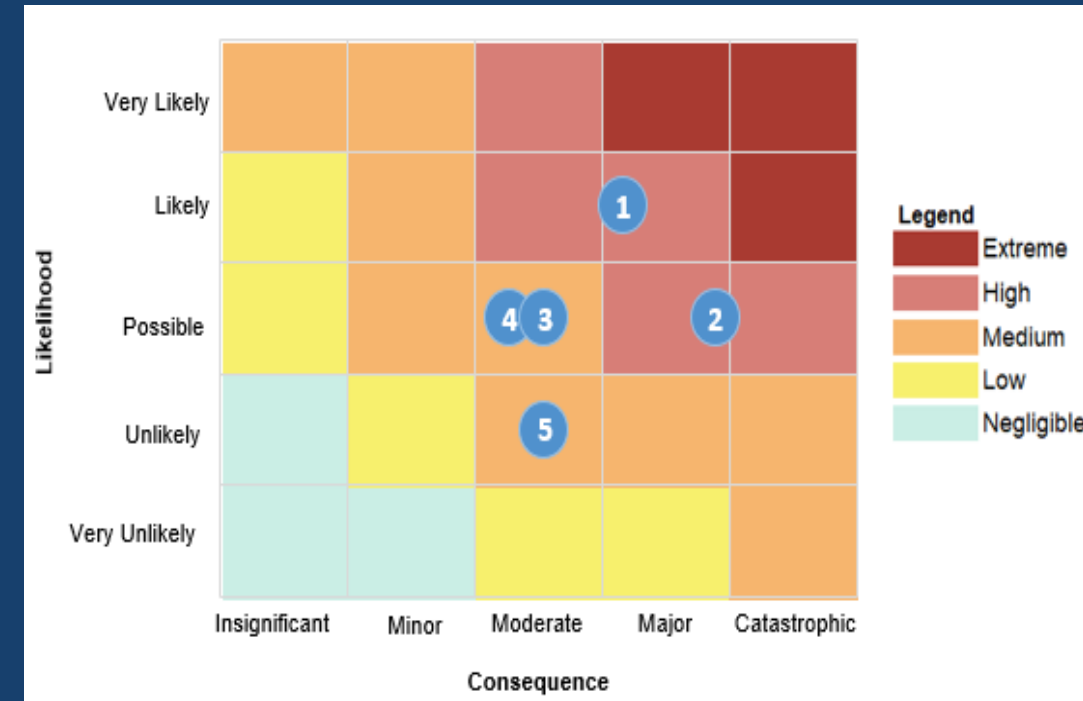
Likelihood	Rating	Shock Events	Stress Events
Very Likely	5	Event is expected to happen about 15 or more times in a 30-year period.	Event is almost certain to cross critical threshold.
Likely	4	Event is expected to happen about 5 to 15 times in a 30-year period.	Event is expected to cross critical threshold. It would be surprising if this did not happen.
Possible	3	Event is expected to happen about 3 to 5 times in a 30-year period.	Event is just as likely to cross critical threshold as not.
Unlikely	2	Event is expected to happen about 1 to 3 times in a 30-year period.	Event is not anticipated to cross critical threshold.
Very Unlikely	1	Event is not expected to happen in a 30-year period.	Event is almost certain not to cross critical threshold.

CONSEQUENCE RATING SCALE

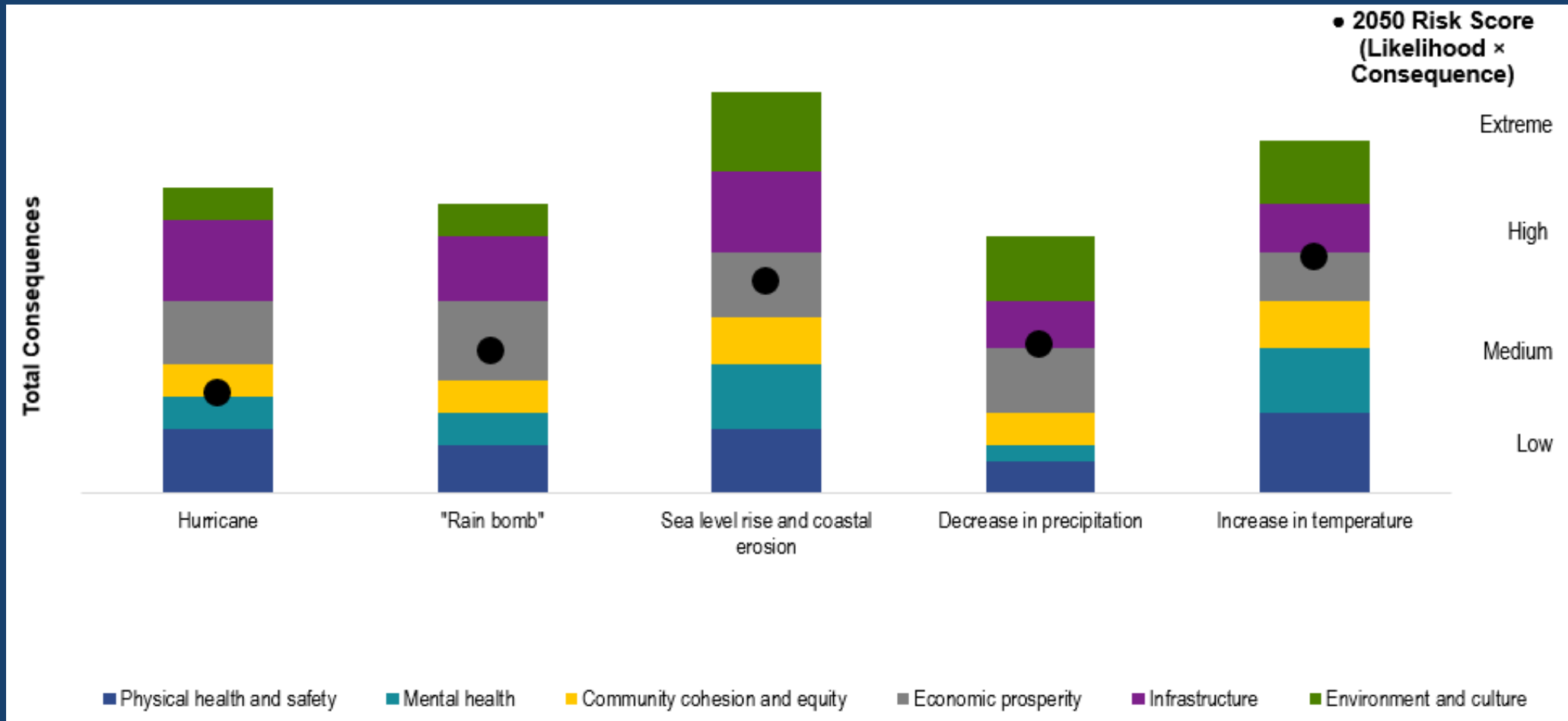
	Population			Economy	Infrastructure	Environment and Culture
	Physical Health and Safety	Mental Health	Community Cohesion and Equity	Economic Prosperity	Infrastructure	
Catastrophic -5	1,000+ people affected	Widespread, severe mental health impacts lasting years	Widespread, severe impacts to daily life (e.g., inability to access employment, education) or identity (e.g., loss of home or sense of place), lasting months to years	Severe, long-term disruption to multiple industries with effects on employment Over \$100 million in potential economic losses	Months-long disruption in infrastructure services Widespread disruption to critical infrastructure system	Irreversible damage or change to a broadly valued environmental and/or cultural area/resource
Major -4	100-1,000 people affected	Widespread, severe mental health impacts lasting weeks to months	Widespread, severe impacts to daily life (e.g., inability to access employment, education) or identity (e.g., loss of home or sense of place), lasting days to weeks	Moderate, long-term disruption to multiple industries; or severe long-term impacts to one industry with effects on employment \$10 million to \$100 million in potential economic losses	Weeks-long disruption in infrastructure services Disruption to multiple critical infrastructure assets	Widespread, significant damage or change to a broadly valued environmental and/or cultural area/resource Recovery would take years to decades
Moderate -3	10-100 people affected	Widespread, moderate mental health impacts lasting years	Widespread, moderate impacts to daily life (e.g., inability to access employment, education) or identity (e.g., loss of home or sense of place), lasting months to years	Severe, weeks- to months-long disruption to multiple industries; or moderate long-term impacts to one industry with effects on employment \$1 million to \$10 million in potential economic losses	Days-long disruption in infrastructure services Localized disruption to a singular critical infrastructure asset	Localized, significant damage or change to an environmental and/or cultural area/resource Recovery would take years to decades
Minor -2	<10 people affected	Widespread, moderate, mental health impacts lasting weeks to months	Widespread, moderate impacts to daily life (e.g., inability to access employment, education) or identity (e.g., loss of home or sense of place), lasting days to weeks	Moderate, weeks- to months-long disruption to multiple industries; or severe short-term impacts to one industry with effects on employment \$100,000 to \$1 million in potential economic losses	Hours-long disruption in infrastructure services	Localized, moderate damage or change to an environmental and/or cultural area/resource Recovery would take months to years
Insignificant -1	Extremely low possibility for physical health and safety impacts	Minimal expected mental health impacts	Minimal expected impacts to daily life or identity	Insignificant disruption to sector Less than \$100,000 in potential economic losses	Temporary nuisance	Minimal damage or change to an environmental and/or cultural area/resource Recovery would take days to months

DRAFT RESULTS

	Climate Hazard	Scenario	2050 Risk Score	Rating
1	Increase in temperature	Increase in average annual temperature of 2.7° F to 4.5° F contributing to heat waves	14.7	High
2	Sea level rise and coastal erosion	Sea level rise and associated coastal erosion on a trajectory to 3.2 feet by 2100 with impacts due to high tides and/or coastal hazard events decades in advance	13.2	High
3	Decrease in precipitation	Leeward side of island becomes up to 60% drier contributing to droughts	9.2	Medium
4	“Rain bomb”	Significant rain event with 4 inches of rain/hour	8.3	Medium
5	Hurricane	Landfall of a major hurricane with storm surge, rainfall, and high winds	6.1	Medium



DRAFT RESULTS



ADAPTATION ACTION AREAS: OBJECTIVES

- Selecting adaptation action areas allows us to:
 - Explore different adaptation options for climate hazards and potential compounding impacts
 - Develop adaptation strategies for City infrastructure/services
 - Develop cross-cutting or overarching strategies that require collective action to protect multiple pieces of infrastructure
 - Develop approaches to integration into city plans and policies
 - Consider community feedback regarding guiding principles for adaptation
- Mapping exercises are not intended to prioritize communities, but rather to serve as one data point that helps to identify areas of top concern

ADAPTATION ACTION AREAS: DRAFT CRITERIA

Draft evaluation criteria for selecting adaptation action areas

- Top area of concern for city departments by each climate hazard
- Top area of concern for the public by each climate hazard
- Top area of concern for disruptions to people
- Top area of concern for disruptions to the environment
- Top area of concern for disruptions to economy
- Diversity of areas (e.g., locations, communities, hazards, infrastructure)
- Upcoming opportunities that this work could feed into (e.g., community plan updates)

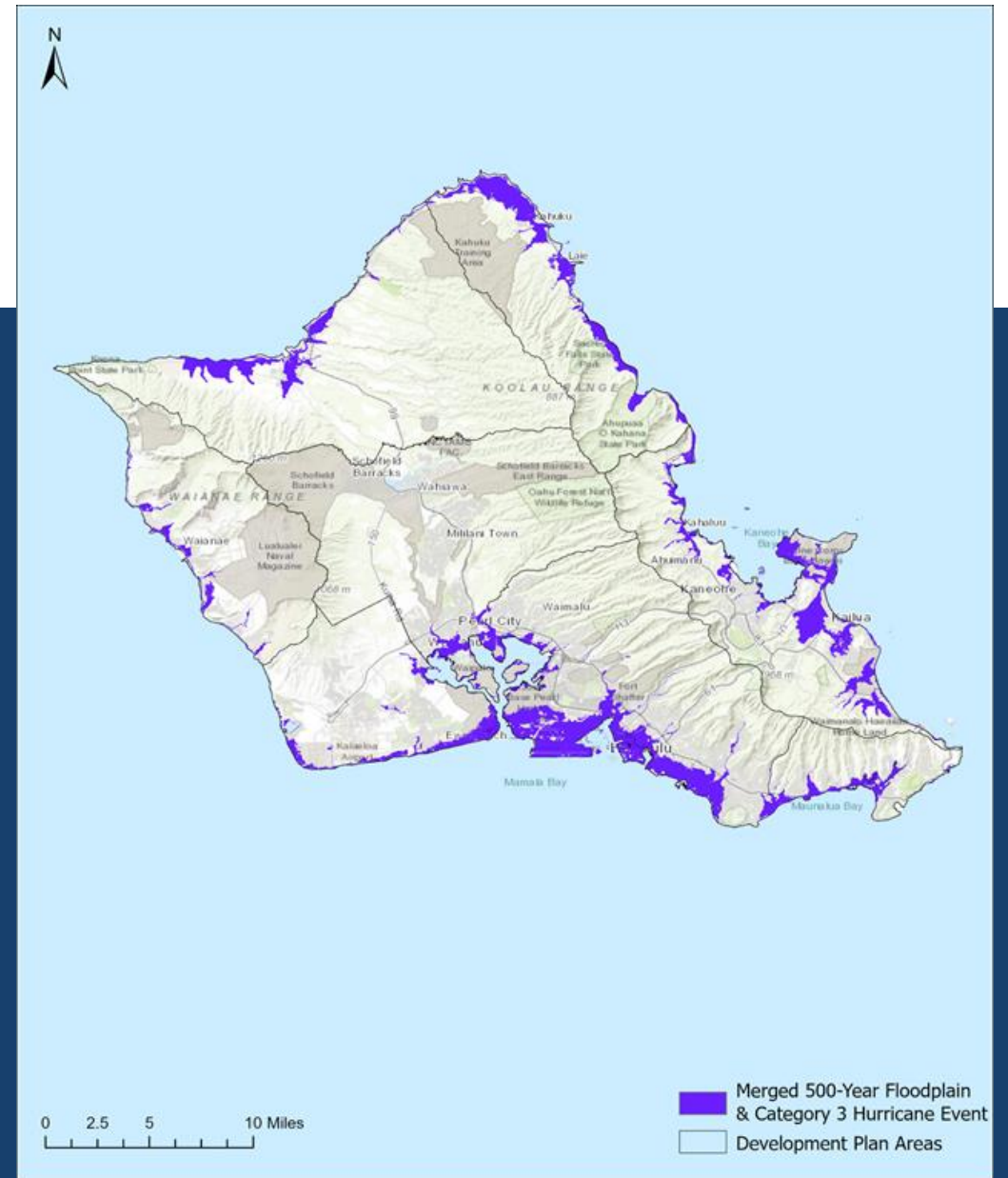
NEXT STEPS

- Integrate department feedback into the final risk assessment
- Engage the public and the Community Advisory Hui on the **adaptation action areas** and finalize the selection at the end of November
- Develop department-specific and cross-cutting adaptation strategies
 - Provide input on **adaptation strategies** in **December & January**

HAZARD MAPS: HURRICANE

O'ahu currently experiences tropical storms and could experience landfall of a hurricane. More frequent tropical cyclones are projected for the waters near Hawai'i.

This hazard includes the landfall of a major hurricane with storm surge and inland flooding. The map shows flood zones from both FEMA Flood Insurance Rate Maps (FIRM) and NOAA-modeled storm surge from a Category 3 hurricane (**note: storm surge impacts are highly dependent on a storm's direction of approach*).

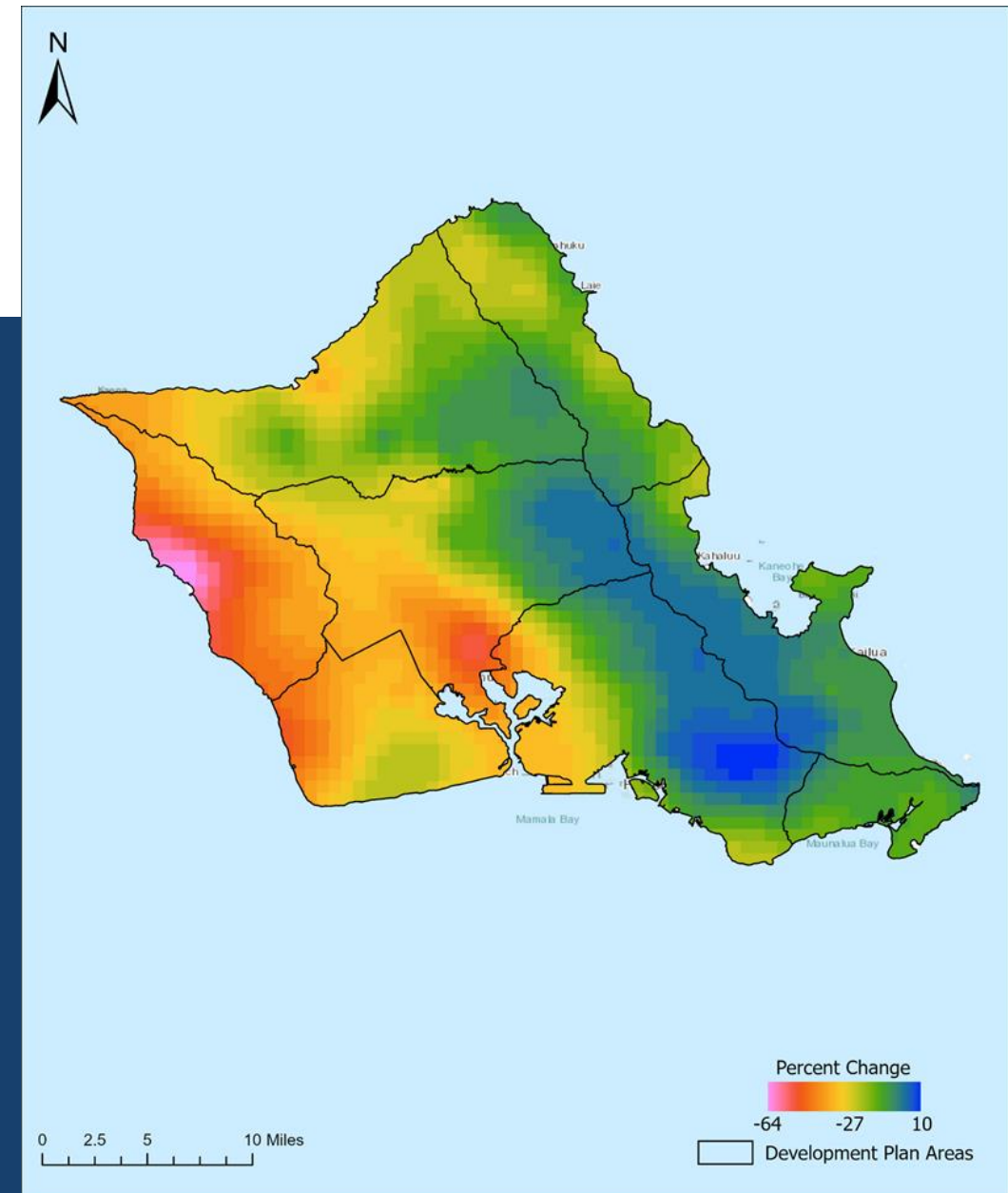


500 Year Flood Hazards

HAZARD MAPS: RAIN BOMB

Stress: Precipitation is expected to get heavier during the wet season on the windward side of the island.

Shock: Additionally, heavy rainfall events or "rain bombs" (e.g., 4 or more inches of rain in an hour) have become more common.



Wet Season Changes in Precipitation

HAZARD MAPS: SLR AND EROSION

O'ahu is currently on a trajectory to experience 3.2 feet of sea level rise by 2100, with impacts during high tides decades before then.

This hazard includes increases in: passive coastal and groundwater flooding (areas becoming permanently wet); annual high wave flooding (areas becoming wet on an annual basis); and, coastal erosion (permanent loss of land).

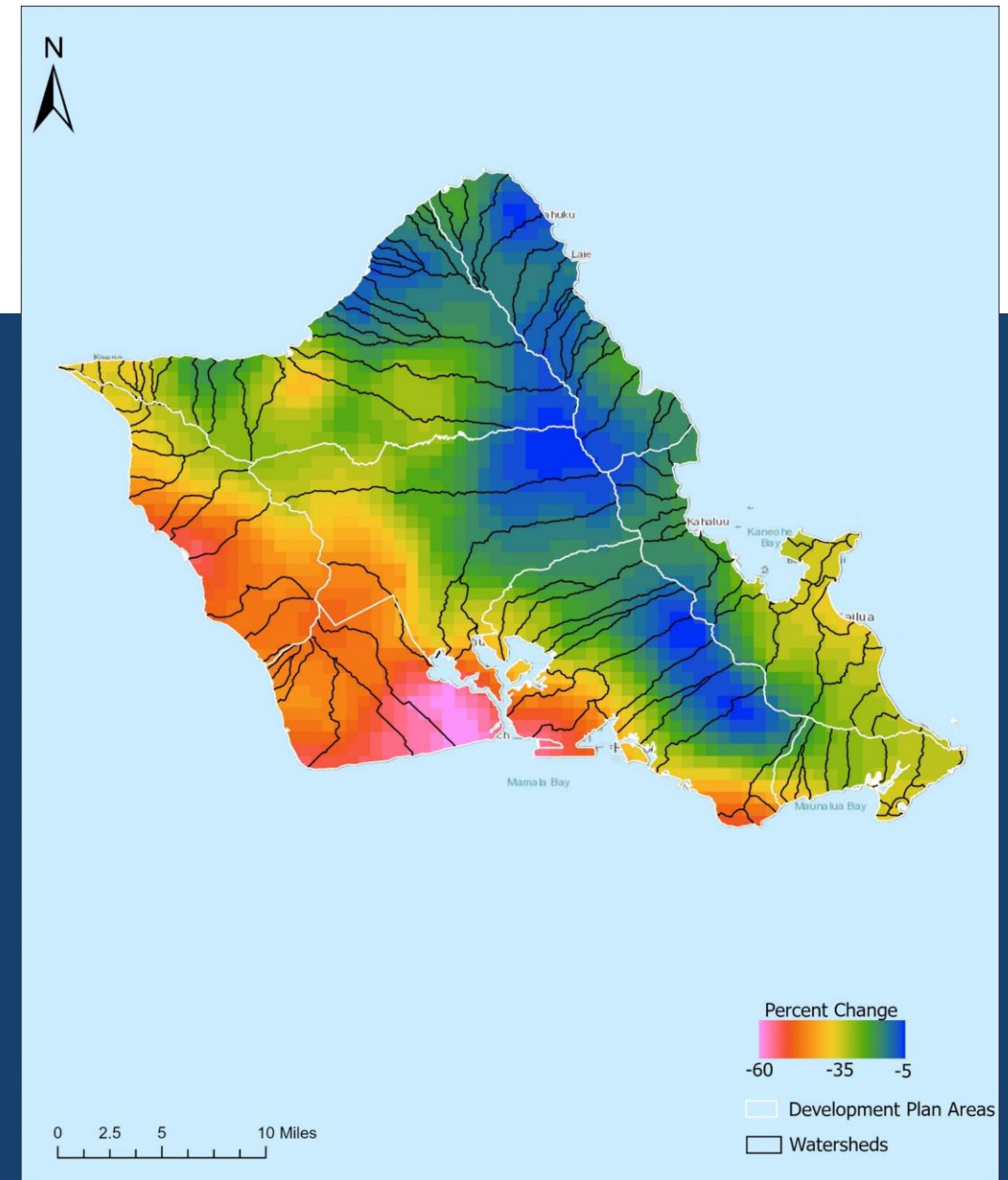
Note: map includes
Inundated Highways (orange)



3.2 Feet Sea Level Rise

HAZARD MAPS: DECREASED PRECIPITATION

The leeward side of the island is expected to become up to 60% drier by 2030-2050.

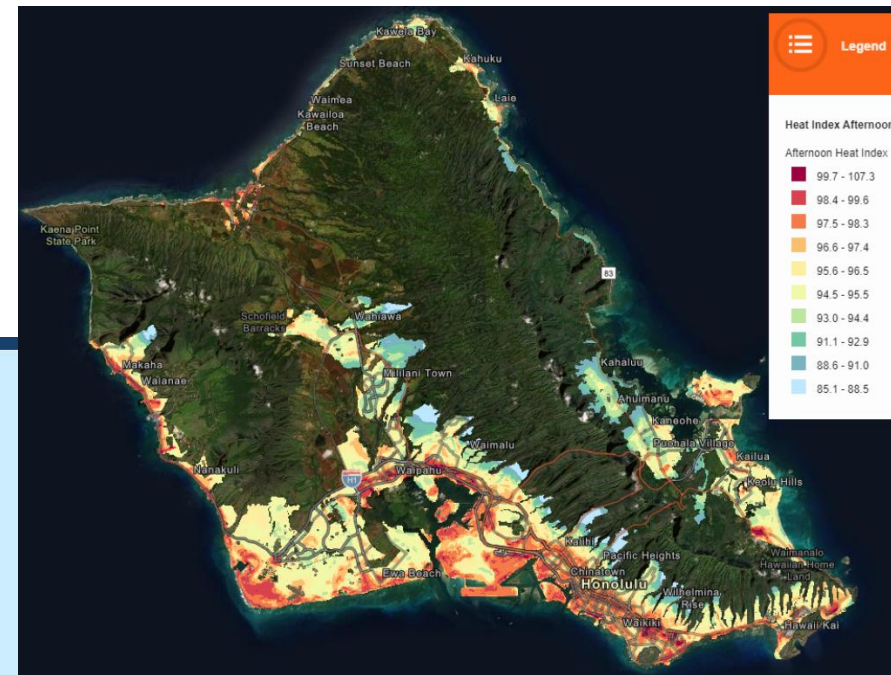
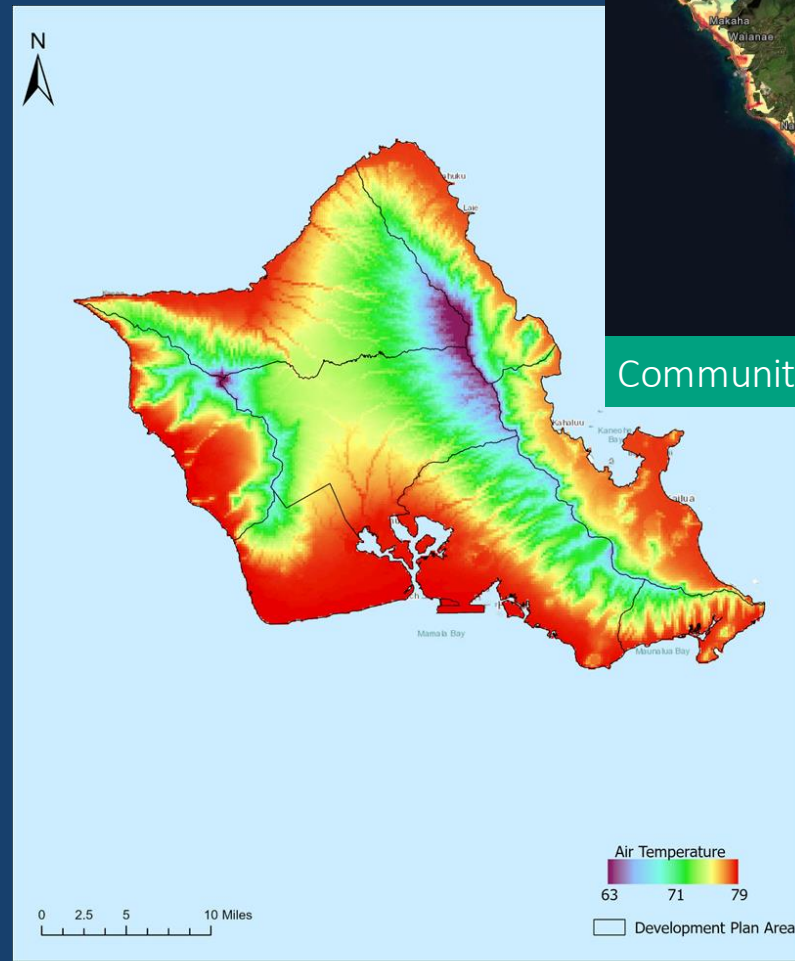


Dry Season Changes in Precipitation

HAZARD MAPS: TEMPERATURE

O'ahu is expected to experience an increase in average annual temperature of 2.7°F to 4.5°F.

The far map shows the afternoon heat index on one day in August 2019 and how hot it already feels across our communities.



Legend

Heat Index Afternoon

Afternoon Heat Index

99.7 - 107.3

98.4 - 99.6

97.5 - 98.3

96.6 - 97.4

95.6 - 96.5

94.5 - 95.5

93.0 - 94.4

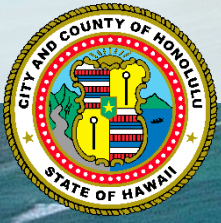
91.1 - 92.9

88.6 - 91.0

85.1 - 88.5

Community Heat Index

Average Annual Afternoon Temperature

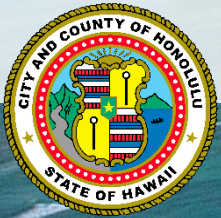


Climate Ready O'ahu Community Advisory Hui

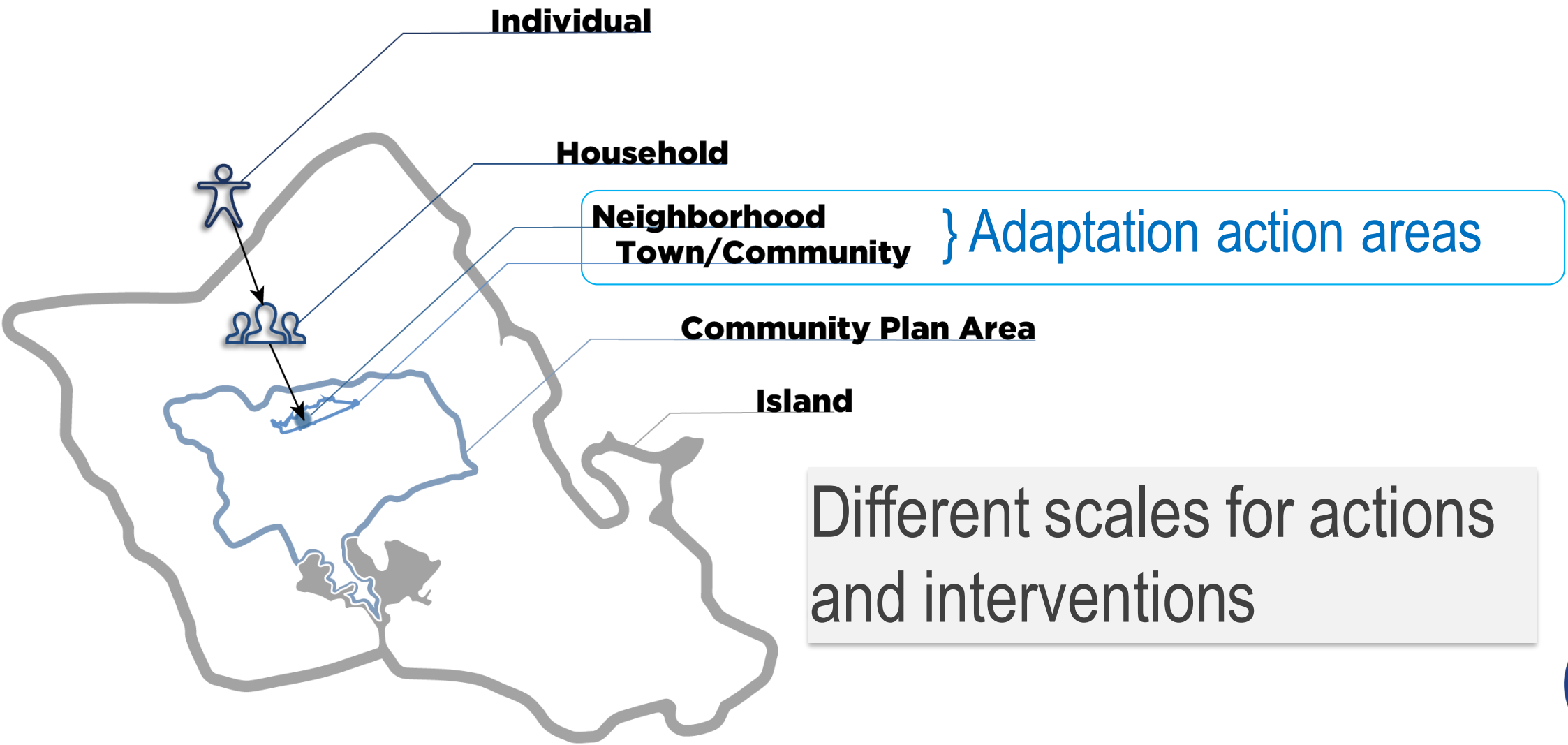
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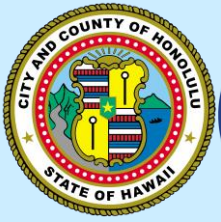
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Adaptation Action Areas





Testing... 1, 2

**Where
do you
live,
work,
and
play?**





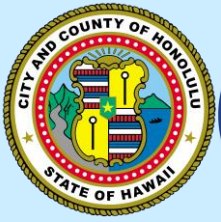
Where will changes in climate that result in temporary or permanent damage and disruption **most impact the people** that live in that area?





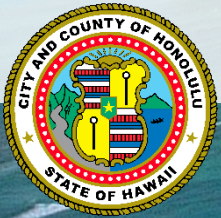
Where will changes in climate that result in temporary or permanent damage and disruption **most impact the environment** in that area?





Where will changes in climate that result in temporary or permanent damage and disruption **most impact the economy** of the island?





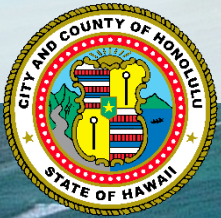
Climate Ready O'ahu Community Advisory Hui

Agenda Item #4: Activity and Discussion on Recommendations for Adaptation Action Areas and Evaluation Criteria

Draft Evaluation Criteria

- Top area of concern for city departments by each climate hazard
- Top area of concern for the public by each climate hazard
- Top area of concern for disruptions to people
- Top area of concern for disruptions to the environment
- Top area of concern for disruptions to economy
- Diversity of areas (e.g., locations, communities, hazards, infrastructure)
- Upcoming opportunities that this work could feed into (e.g., community plan updates)



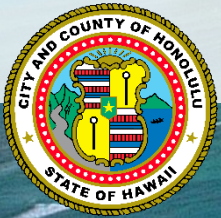


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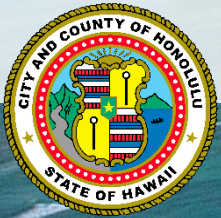


Climate Ready O'ahu Community Advisory Hui

Agenda Item #5: Discussion on Recommendations for Community and Stakeholder Engagement

- Neighborhood Board notifications [*past presentations: mahalo Wai'anae!*]
- Future Virtual Engagements: January 2021, April, and June
- Future Community Advisory Hui Meetings: January 2021, April, and June
- "Visions of O'ahu" call for creative submission: January 2021-April
- Soliciting bids for Project Promotion and Participation contractor



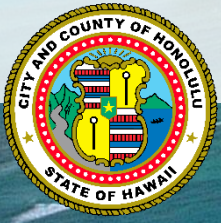


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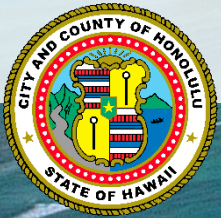


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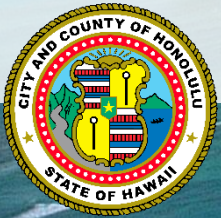


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6. Discussion on Recommendations for Future Agenda Items
7. Public Input for Matters Not on the Agenda
8. Tentative Next Meeting Date
- 9. Adjournment**

