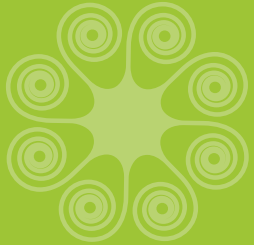


Spring 2021

Rapid Vulnerability & Adaptation Tool



1 SCOPE



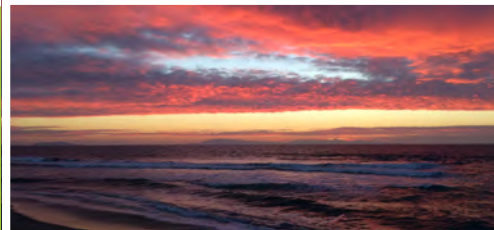
ASSESS **2**



STRATEGY **3**



4 IMPLEMENT



for Climate-
Informed
Community
Planning

INTRODUCTION & ORIENTATION

The Rapid Vulnerability and Adaptation Tool for Climate-Informed Community Planning (RVAT) was developed to make climate adaptation planning a simple, direct, and feasible process for communities. The purpose of the tool is to improve understanding of community vulnerability to climate impacts and to develop implementable solutions that reduce vulnerability and/or increase resilience. The RVAT is designed to cover the major steps of a basic climate adaptation planning process, which include: (1) Project Scoping, (2) Vulnerability Assessment, (3) Adaptation Strategy Development, and (4) Adaptation Implementation.

This guide provides step-by-step coaching on the use of the RVAT by communities, including background information, worksheets, and instructions for filling out those worksheets.

Definitions of Key Terms¹

Adaptation refers to adjustments in natural or human systems in response to changing climate conditions. Adaptation is how we prepare for, respond to, and recover from changes that we are already experiencing or are anticipated to experience.

Mitigation refers to the reduction of greenhouse gas emissions in order to limit the magnitude and rate of climate change.

Vulnerability is the degree to which natural, built, and human systems are susceptible to harm. It is a function of the likelihood of exposure to climate changes, the consequence of those changes, and the capacity to adapt to changes.

What is the RVAT?

This RVAT is a simple, four-step process designed for communities to evaluate their vulnerabilities to climate change and identify adaptation strategies to reduce those vulnerabilities. The RVAT starts with a community

selecting one or more topics, such as comprehensive or hazard mitigation plan elements, sectors, or agencies, and considering how the selected topics are likely to be affected by climate change in addition to existing stressors. Once those vulnerabilities are identified, the community develops solutions to reduce vulnerabilities as well as the steps needed to put those solutions into practice.

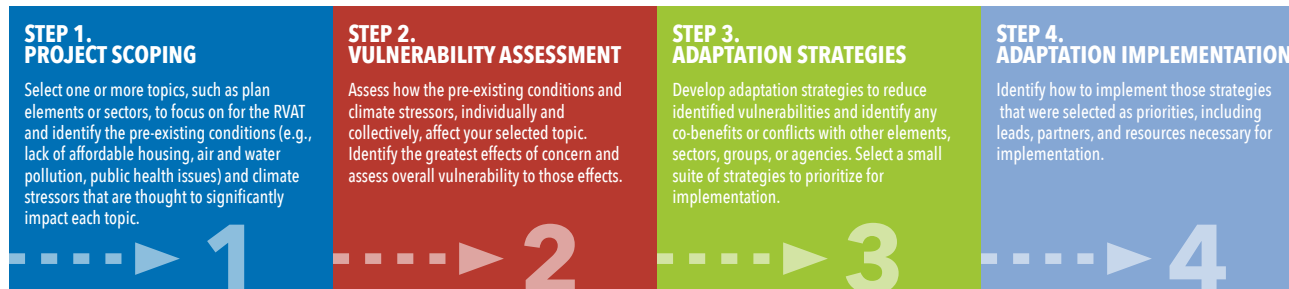
Who uses the RVAT and who should be involved?

Anyone can undertake the RVAT, although it is typically initiated by cities, counties, or other regional planning authorities. Because the RVAT is not conducted for a community but by a community, it is important to invite diverse stakeholders to participate in the process. Collaborative, multi-stakeholder efforts help to ensure diverse perspectives are heard and incorporated, build buy-in into the process and solutions, and can identify alternative avenues by which solutions can be implemented to maximize benefits and avoid harms.

¹ Definitions from IPCC Data Distribution Centre Glossary: https://www.ipcc-data.org/guidelines/pages/glossary/glossary_a.html (IPCC 2007, 2014)

What does the RVAT process look like?

This RVAT process uses readily available climate data, local knowledge, and worksheets to guide a community through assessing the impacts of pre-existing conditions and climate stressors on their topics of interest (e.g., agencies, sectors, elements of comprehensive or hazard mitigation plans) and collaboratively develop adaptation strategies to reduce impacts. The RVAT consists of four steps:



The RVAT worksheets were designed to lead you (alone or as part of a workshop) through a four-step process of identifying pre-existing conditions and climate stressors that affect your community, assessing how they impact (alone and together) a community plan element, sector, group, or agency, developing adaptation strategies to reduce vulnerabilities, and exploring ways to put those strategies into practice.

STEP 1

PROJECT SCOPING

What are the pre-existing conditions and climate stressors that most impact your community? Which of those conditions and stressors have the most significant impact on a given plan (e.g., comprehensive, general, hazard mitigation) element, sector, or agency?



Worksheet Instructions

STEP 1A. PRE-EXISTING CONDITIONS AND CLIMATE STRESSORS

1. Identify up to ten topics (e.g., plan element, sector, agency) to explore using the worksheets in the RVAT.
2. Using available resources, including participant expertise, identify up to ten pre-existing conditions and up to ten climate stressors that impact your community. Pre-existing conditions can include stressors such as air or water pollution, aging infrastructure, homelessness, lack of affordable housing, food insecurity, public health issues, or racial inequity, among others.
3. For each topic, place an "X" in the boxes for any pre-existing conditions and climate stressors that impact it now or are anticipated to impact it within the timeframe relevant to your plan (or infrastructure).
4. For each topic, star (*) the top three pre-existing conditions and climate stressors (i.e., those that most impact it). You may want to consider the economic, environmental, and/or public health and well-being impacts of each stressor and any exacerbating or synergistic effects when selecting the most significant stressors. In some cases, it can be useful to combine stressors (e.g., if the stressors have a similar impact on the topic).
5. Select one topic (e.g., plan element, sector, agency) to work on for the remainder of the worksheets. Transfer its top three pre-existing conditions and climate stressors to STEP 2A. IMPACTS ASSESSMENT (top row and left column, respectively).

***Important Note:** for STEPS 1B through 4 of the RVAT, you will need to work through the exercises using a single topic (e.g., plan element, sector, agency) from your list identified in STEP 1A. For each additional topic you will repeat Steps 1B through 4 on separate worksheets.

Worksheet found on page 4.

STEP 1B. ADAPTIVE CAPACITY

Select one topic (e.g., plan element, sector, agency) from STEP 1A, and write it in the top left box (Element/Sector). In the left column, identify up to ten organizations and/or departments that play a role in managing that focal area.

For the primary organization and/or department that manages the topic, evaluate adaptive capacity. **Adaptive capacity** is the ability of an organization to adjust to climate change to moderate potential damages, take advantage of opportunities, or cope with consequences.

1. Assess the organizational and management potential factors using a High (3), Moderate (2), and Low (1) scale. Definitions for each factor are provided below the table. Keep in mind that you do not need to evaluate any factors that do not apply to the organization, and that you can add an additional relevant factor to evaluate in the blank column.
2. Once you have entered rankings for each factor, calculate the average for the row.
3. If you opted to evaluate adaptive capacity for more than one organization, calculate the combined average for these organizations in the second row from the bottom.
4. Use the combined average value to determine the overall adaptive capacity ranking based on the scale provided in the table.
5. Transfer the overall adaptive capacity ranking into STEP 2B. VULNERABILITY ASSESSMENT (Adaptive Capacity column).

Worksheet found on page 5.

STEP 1A. PRE-EXISTING CONDITIONS AND CLIMATE STRESSORS

Element/Sector/ Agency	Pre-existing Conditions										Climate Stressors									



Star (*) the top three pre-existing conditions and climate stressors for each element/sector/agency.

STEP 1B. ADAPTIVE CAPACITY

Element/Sector/Agency:	Organizational Potential (High-3, Moderate-2, Low-1)					Management Potential (High-3, Moderate-2, Low-1)						
Organization	Staff Capacity (Training, Time)	Responsiveness	Stakeholder Relationships	Stability/ Longevity		Existing Mandate	Monitoring & Evaluation Capacity	Ability to Learn and Change	Partner Relationships	Science/ Technical Support		Average
Combined Average												
Overall Adaptive Capacity Ranking (Low = 1-1.6; Moderate = 1.7-2.3; High = 2.4-3)												



ADAPTIVE CAPACITY FACTOR DESCRIPTIONS

Organizational Potential

The following explanations describe what is considered for each organizational potential factor of adaptive capacity. Keep in mind that you do not need to evaluate a factor that does not apply to the organization, and that you can add a more relevant factor to evaluate in the blank column.

Staff capacity (training, time): It is useful to consider the diversity of expertise, the understanding and confidence in addressing climate change challenges, and the institution's ability to be flexible and accommodate additional management responsibility and effort. Because few resource management professionals have been trained in climate science and adaptation, adaptive capacity is improved by having staff with the right professional training and the time to apply it.

Responsiveness: The ability of an organization to adjust its management and structure may be necessary in responding to climate change. In some cases, this could be a dramatic shift, such as changing management strategies entirely. In other cases, responsiveness may be more subtle, such as changing the timing of actions.

Stakeholder relationships: Many adaptation actions will require changes in management. In some cases, this will require stakeholder buy-in or action. Having good stakeholder relationships can enhance adaptive capacity.

Stability/longevity: Organizations that have short planning horizons, limited governance structures or lack long-term commitment will have less adaptive capacity as there may not be any ability to follow through on needed actions.

Management Potential

The following explanations describe what is considered for each management potential factor of adaptive capacity. Keep in mind that you do not need to evaluate a factor that does not apply to the organization, and that you can add a more relevant factor to evaluate in the blank column.

Existing mandate: If a management mandate does not exist or it cannot be interpreted to include climate change planning, adaptive capacity is diminished.

Monitoring and evaluation capacity: Even if you have the ability to implement an action, if you cannot measure its efficacy through monitoring and evaluation procedures you will not be able to know if it is effective or if it needs modification to improve outcomes. Adaptive capacity is enhanced when monitoring and evaluation are part of management practice.

Ability to learn and change: It is vital for effective adaptation to have a culture or structure that allows for modification of management actions as new information is acquired. Often referred to as adaptive management, organizations where this is common practice will have a higher adaptive capacity.

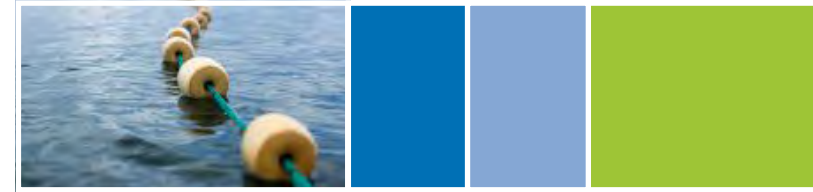
Partner relationships: When adaptation actions require multijurisdictional or interagency cooperation it is essential to have strong partner relationships. Partners will need to have a common understanding of climate projections, vulnerabilities, and adaptation options. In cases where partner relationships are strong, adaptive capacity may be greater owing to the ability to work collaboratively and flexibly.

Science/technology support: Climate science advances daily. Having access to science partners or in-house science expertise is essential for maintaining a sufficient awareness of processes to make informed management decisions. Adaptive capacity will be improved when science and technology support are available.

STEP 2

VULNERABILITY ASSESSMENT

How do pre-existing conditions and climate stressors, individually and collectively, affect your selected plan element, sector, or agency? What are the greatest impacts of concern and how vulnerable is your community to those impacts?



VULNERABILITY ASSESSMENTS improve understanding of how climate change is likely to impact a topic and its ability to respond to those changes. Vulnerability assessments consider the likelihood of exposure to climate changes, the consequence of those changes on a given topic, and the capacity of that topic to adapt to changes. Likelihood and consequence combined give an overall estimation of risk which, when combined with adaptive capacity, provides an overall picture of vulnerability (Figure 1). It is important to evaluate all three components of vulnerability – likelihood, consequence, and adaptive capacity – as it provides a holistic perspective on what is driving vulnerability of the topic to climate change and is the basis for developing adaptation strategies.

Likelihood is the degree to which a topic is exposed to significant changes in climate, and considers both the anticipated direction and magnitude of change.

Consequence is the degree to which a topic is affected by exposure to a changing climate, and considers both the anticipated impacts of climate stressors as well as the impacts of current non-climate stressors.

Adaptive capacity is the ability to adjust to climate change to moderate potential damages, take advantage of opportunities, or cope with consequences.

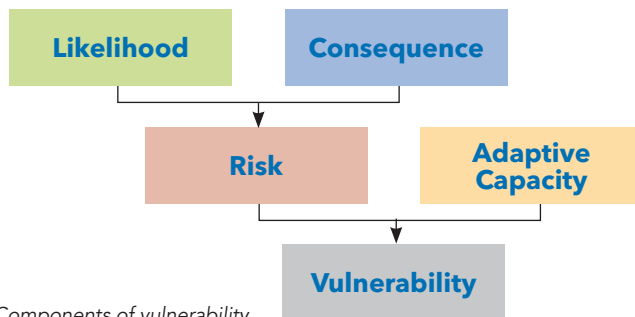


Figure 1. Components of vulnerability.

Worksheet Instructions

STEP 2A. IMPACTS ASSESSMENT

1. Write the name of your selected topic (e.g., plan element, sector, agency) in the upper left box.
2. Add a short description of the selected topic. For example, what are its major goals or the major services it provides?
3. In the top two rows of the table (yellow boxes), describe how each pre-existing condition is currently or has historically affected this topic.
4. For each climate stressor (blue boxes), summarize information about the observed and/or projected direction and magnitude of change in the first column. In the second column, consider the changes you listed for each stressor and describe how they will affect the topic. Use your knowledge and available resources to describe the anticipated effects of the stressors.
5. In the remaining boxes (grey boxes), use your local knowledge of the pre-existing conditions and the current and anticipated effects of climate change to describe their combined impacts on your focal area.
6. Star (*) the five effects/impacts of greatest concern due to either climate change alone or climate change combined with pre-existing conditions.
7. Transfer the five effects/impacts of greatest concern to STEP 2B. VULNERABILITY ASSESSMENT.

Worksheet found on page 8.

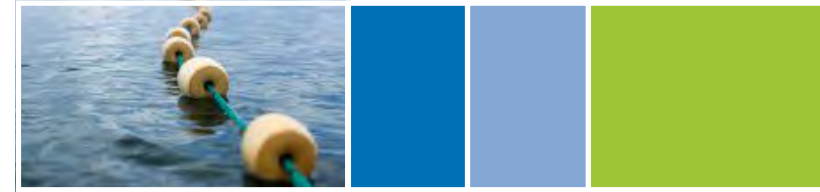
STEP 2A. IMPACTS ASSESSMENT

Element/Sector/Agency:		Pre-existing conditions			
Description of Element/Sector/Agency:		How does this condition affect this element/sector/agency?			
Climate stressor	Indicate observed or anticipated change (direction, magnitude, any specific relevant details) ⁺	What are the current and anticipated effects of this stressor on the element/sector/agency?	What is the combined impact of the pre-existing condition and climate stressor on your element/sector/agency?		



Star (*) the five effects/impacts of greatest concern due to climate change alone, or climate change combined with pre-existing conditions.

⁺Use available resources to make this assessment.



STEP 2B. VULNERABILITY ASSESSMENT

1. Write the name of your selected topic (e.g., plan element, sector, agency) in the upper left box.

2. Select a timeframe for your assessment:

- Length of the plan (e.g., next 10-20 years)
- Lifetime of the infrastructure that is informed by the plan (e.g., 50-100 years)
- Other

3. For each effect/impact of greatest concern, evaluate Likelihood, Consequence, Risk, and Vulnerability. Adaptive capacity should already be filled in using the ranking from STEP 1B. ADAPTIVE CAPACITY.

- **Likelihood** is the degree to which a topic is exposed to significant changes in climate. Given all the information you know, assign the likelihood of the anticipated effects/impacts occurring in the chosen timeframe. This evaluation is based on available information, including personal knowledge and/or formal assessments. Use the following scale:
 - Almost Certain (>75% probability)
 - Likely (25-75% probability)
 - Unlikely (<25% probability)
 - Rare (probability zero or close to it)

- **Consequence** is the degree to which a topic is affected by exposure to a changing climate. Given all the information you know, assign the degree of consequence of the anticipated effects/impacts on your selected topic. This evaluation is based on available information, including personal knowledge and/or formal assessments. Use the following scale:

Catastrophic: Service to community ceases to exist

Major: Service significantly impacted

Moderate: Service diminished

Negligible: Service not visibly or functionally affected

- **Risk** is the interaction of likelihood and consequence. For each effects/impacts row, use the Risk Calculator Matrix (found on page 11) to determine the level of risk by combining the likelihood and consequence levels assigned to each row. Enter each ranking in its respective box in the Risk column.
- **Vulnerability** is the degree to which the selected topic is susceptible to harm. For each effects/impacts row, use the Vulnerability Calculator Matrix (found on page 11) to determine the level of vulnerability by combining risk and adaptive capacity. Transfer vulnerability rankings to their respective boxes in the Vulnerability column.

Worksheet found on page 10.

STEP 2B. VULNERABILITY ASSESSMENT

Element/Sector/Agency:	Likelihood	Consequence	Risk	Adaptive Capacity	Vulnerability
Timeframe:					
Effects/Impacts of Greatest Concern	Likelihood	Consequence	Risk	Adaptive Capacity	Vulnerability

Timeframe

- Length of the plan (e.g., 10-20 years)
- Lifetime of the infrastructure (e.g., 50-100 years)
- Other?

Likelihood

Almost Certain:
>75% probability

Likely:
25-75% probability

Unlikely:
<25% probability

Rare:
Probability zero or close to it

Consequence

Catastrophic:
Service to the community ceases to exist

Major:
Service significantly impacted

Moderate:
Service diminished

Negligible:
Service not visibly or functionally affected

RISK CALCULATOR MATRIX

Likelihood	Consequence			
	Negligible	Moderate	Major	Catastrophic
Rare	Low	Low	Low	Low
Unlikely	Low	Moderate	Moderate	High
Likely	Low	Moderate	High	Extreme
Almost Certain	Low	High	Extreme	Extreme

VULNERABILITY CALCULATOR MATRIX

Risk	Adaptive Capacity		
	Low	Moderate	High
Low	Low	Low	Low
Moderate	Moderate	Moderate	Low
High	High	Moderate	Moderate
Extreme	High	High	Moderate

STEP 3

ADAPTATION STRATEGIES

What are possible solutions to reduce your effects/impacts of greatest concern? Are there any co-benefits with or unintended consequences on other elements, sectors, groups, or agencies?



CLIMATE CHANGE ADAPTATION is how we prepare for, respond to, and recover from climate impacts on natural and human systems. Conversely, climate change mitigation addresses the underlying causes of climate change by reducing greenhouse gas emissions. Effectively responding to climate change requires that we reduce greenhouse gas emissions while concurrently preparing for and adapting to impacts.

Understanding what drives the vulnerability of a topic to climate change (e.g., likelihood, consequence, or adaptive capacity, or some combination of these components) provides a good starting point for identifying possible adaptation strategies. As you consider strategies to reduce vulnerability, think about ways to limit exposure, minimize consequence, or increase adaptive capacity.



Worksheet Instructions

STEP 3. ADAPTATION STRATEGIES

For each effect/impact of greatest concern, write down any possible adaptation strategies that reduce vulnerabilities. For each adaptation strategy, identify any co-benefits with and unintended consequences on other resources.

- **Co-Benefits** – List any opportunities for synergies or benefits across elements, sectors, groups, or agencies
- **Unintended Consequences** – List any potential conflicts with or unintended consequences on other elements, sectors, groups, or agencies

Understanding the co-benefits and unintended consequences associated with different adaptation strategies can help you to prioritize ones for implementation.

Star (*) the five strategies you most want to implement and transfer them to the table in STEP 4. ADAPTATION IMPLEMENTATION.

Worksheet found on page 13.

STEP 3. ADAPTATION STRATEGIES

Element/Sector/Agency:	Likelihood	Consequence	Adaptive Capacity	Possible Adaptation Strategies to Reduce Vulnerability	Co-Benefits	Unintended Consequences
Effects/Impacts of Greatest Concern						

Star (*) the five strategies you most want to implement and transfer them to STEP 4.



ADAPTATION IMPLEMENTATION

How do you put your adaptation strategies into action? Who will take the lead on implementing a given strategy, and what partners will be important to involve? What resources will be needed to implement a given strategy, and how feasible is it to implement?



Worksheet Instructions

STEP 4. ADAPTATION IMPLEMENTATION

For each adaptation strategy, identify the following:

- **How & When to Implement** – Where or how could the strategy be enacted? For example, where might it go in a general, comprehensive, or hazard mitigation plan? Or does it become part of daily operations outside the scope of a plan? When should the strategy be implemented? How long will it take?
- **Leads & Partners** – What agency, organizations, or departments would be responsible for leading the implementation of this strategy? Who are key partners to involve?
- **Resources & Barriers** – What resources (e.g., funding, staff time, policies) are needed to implement this strategy? Star (*) any resources that already exist. Are there any barriers to implementing this strategy? If so, how might it be overcome?
- **Efficacy** – If this strategy were to be implemented, would it achieve the desired outcome? Assign a High (H), Moderate (M), or Low (L) value.
- **Feasibility** – Could this strategy actually be implemented? Assign a High (H), Moderate (M), or Low (L) value.

[Worksheet found on page 15.](#)

Next Steps

After going through the RVAT exercises, you should have a good understanding of how your topic is vulnerable to climate change, a suite of possible adaptation strategies, and implementation plans for putting a handful of those strategies into action. This information can be integrated into your plans, programs, operations, and projects.

As you work toward this integration, it is important to monitor and evaluate climate impacts and adaptation strategies. Monitoring and evaluation are critical to minimize the risk of wasting time, money, and effort, and allowing you to understand whether or not adaptation strategies are having their intended effect and indicating when or where changes might be needed.

Monitoring and evaluation plans can be fairly simple. For each adaptation strategy, consider:

- desired **outcomes**,
- what **parameter(s)** to monitor to track progress and the method to do so,
- a **“red flag” indicator** or threshold that signals a diversion from the desired outcome, and
- possible **alternative strategies** if that “red flag” threshold is crossed.

Finally, keep in mind that climate adaptation is an iterative process. You will need to review new information and revisit climate change projections, vulnerability rankings, and adaptation strategies on a regular basis (e.g., every 5-10 years) and incorporate updates into your efforts to stay effective.

STEP 4. ADAPTATION IMPLEMENTATION

Element/Sector/Agency:					
Adaptation Strategy	How & When to Implement	Leads & Partners	Resources & Barriers (star (*) those resources that exist)	Efficacy (H, M, L)	Feasibility (H, M, L)
		Leads: Partners:			
		Leads: Partners:			
		Leads: Partners:			
		Leads: Partners:			
		Leads: Partners:			



Acknowledgements

This guide was developed by the authors based on over a decade of adaptation workshop experience that has supported over 6500 participants, the results of an expert facilitator **Delphi Process**² and surveys of participants of past workshop, all to identify the features that result in successful adaptation outcomes.

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² Stern, M.J., J. Brousseau, C. O'Brien, K. Hurst and L.J. Hansen. 2020. *Climate adaptation workshop Delphi study report: Facilitators' viewpoints on best practices*. Virginia Tech and EcoAdapt.

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Companion Resources



Climate Change Adaptation Certification Tool: Moving Communities from Planning to Implementation

The Climate Change Adaptation Certification Tool was developed to support communities beyond planning—helping them implement their updated Comprehensive Plan. Using this 3-step tool allows for rapid implementation of climate savvy planning goals and policies to enable community services, infrastructure, ecosystems and economies to better anticipate and respond to the effects of climate change.

Climate Adaptation Knowledge Exchange www.CAKEx.org

The world's largest, most used source of climate adaptation case studies and resources, CAKE is used by planners, managers, community members, scientists, educators and everyone else interested in adaptation. CAKE supports informed adaptation action by presenting what other people have done and what tools and resources they used to make it happen, while spanning all geographies, sectors and phases of the adaptation process. CAKE is your online adaptation destination.



EcoAdapt provides support, training, and assistance to make planning and management less vulnerable and more Climate Savvy. EcoAdapt, founded by a team of some of the earliest adaptation thinkers and practitioners in the field, has one goal—creating a robust future in the face of climate change. We bring together diverse players to reshape planning and management in response to rapid climate change. www.EcoAdapt.org