

**STEP**

**3**

# Identify and Prioritize Vulnerabilities

## YOUR GOAL

Determine which resources or populations are most vulnerable to the impacts of climate change.

This assessment will serve as the foundation for developing strategies to address climate vulnerabilities in Step 4.

**Task 1: Prepare for the Vulnerability Assessment Workshop**

**Task 2: Facilitate the Workshop**

**Task 3: Develop Vulnerability Assessment Report**

An aerial photograph showing a winding asphalt road that curves through a lush green landscape. In the distance, a small town or village is visible, surrounded by more greenery and some buildings. The sky is clear and blue. In the foreground, two people are standing on a grassy hillside, looking out over the landscape. One person is wearing a blue dress, and the other is wearing a red shirt. The overall scene is peaceful and scenic.

# S U M M A R Y

Building on the completed Climate Trends and Community Primers from Step 2, you will facilitate a workshop and complete a Vulnerability Assessment in this step. Vulnerabilities are locally specific because they depend on geographic location, size of the community, economic drivers, historic patterns of development, social equity, condition of natural resources, and other important factors. In fact, similar climate model projections in two different areas can result in vastly different vulnerabilities. In this step, local expertise is combined with the model projections to determine what the impacts are likely to be specific to your community.

The Vulnerability Assessment will be conducted by bringing together climate science with local expertise in a workshop setting where participants will jointly explore which local resources and populations are most at risk from climate change. During the workshop, participants will be led through a series of exercises to determine how specific resources and populations are expected to be impacted by climate

change. Vulnerabilities will be identified and prioritized in this process. The workshop often results in new relationships and strengthened collaborations, which are vital to implementation. It is also a good opportunity to identify new champions, some of whom may be asked to serve on the Implementation Team once the plan is complete.

## Two Nearby Communities with Different Vulnerabilities

San Luis Obispo County, California encompasses lands from the coast inland to the Diablo range. Fresno County, on the other hand, extends from the eastern side of the Diablo range, into the Central Valley, and up into the Sierra foothills. Two assessments of climate change vulnerabilities throughout these two neighboring counties revealed substantial differences in how people and natural resources are expected to be impacted.

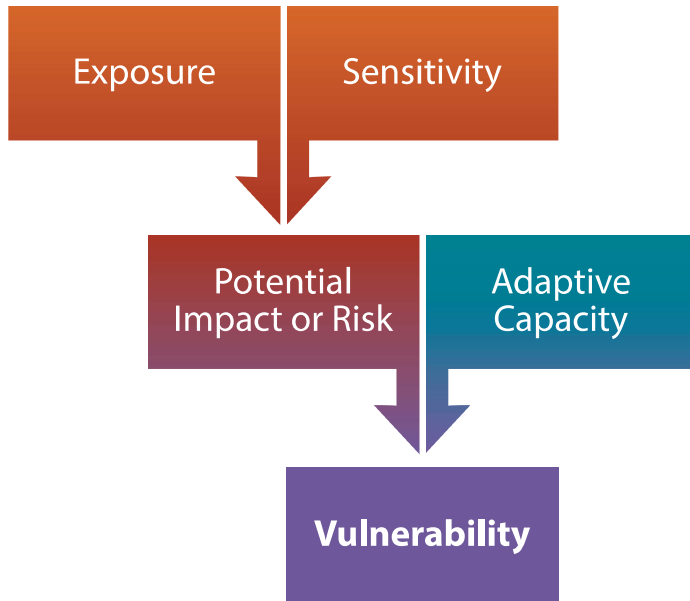
The Central Valley has some of the most polluted air in the nation. Local contributors include agricultural production and transportation. With projected warming of almost 10° F, on average, air quality is expected to decline. The region is already a hot spot for childhood asthma and other respiratory and cardiovascular disease, which are expected to increase significantly due to heat-related formation of ground level ozone. These impacts disproportionately affect disadvantaged and ethnically diverse populations.

Warming across San Luis Obispo County is expected to be only slightly lower, at just over 7° F, than Fresno County. In contrast to Fresno County, San Luis Obispo County's most serious vulnerabilities were identified as coastal hazards (disruption of transportation and other coastal infrastructure), wildfire risk, and ground water shortages. These impacts are expected to affect rural residents, many of whom are retirees.



## Understanding Vulnerability

**Climate Change Vulnerability** is a function of three variables: exposure, sensitivity, and adaptive capacity.



**FIGURE 2** Exposure and Sensitivity together define the impact or risk. Adaptive Capacity can act to lessen the impact or risk.

**1 EXPOSURE** – Exposure is a measure of the character, magnitude, and rate of climatic changes a resource or population is exposed to. The assessment of exposure includes the certainty of different model data. You will get information about exposure directly from the Climate Trends Primer developed in Step 2. Different resources and populations will be exposed to different components of climate change depending on the characteristics of the impact.

For example, a ski area may have high exposure to warming because snowpack is expected to decline 70-80% by the 2080s, even if we reduce emissions. Exposure of the ski area to sea level rise impacts, however, is very low due to elevation and distance from the coast.

**2 SENSITIVITY** – Sensitivity is the extent to which specific resources or populations are expected to be impacted by the projected changes. Some resources and populations are more sensitive to changes than others. For example, infants and elders are more sensitive to severe heat because they are less able to regulate their body temperature.



D. Carbajal, U.S. Air Force



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**3 ADAPTIVE CAPACITY** – Adaptive capacity includes existing behaviors or resources that can help reduce or avoid negative impacts. There are often many things people can do to respond to climate change impacts and reduce their vulnerability. Changing behavior, technology, or distribution of resources can reduce vulnerability to certain impacts. For example, people who can afford air conditioning have higher adaptive capacity during heat waves or periods of hazardous air quality from wildfires.



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**Note:** There is a fine line between adaptive capacity (existing options) and resilience strategies (new options). In general, adaptive capacity is expected to occur without additional outside encouragement or incentives. For example, existing air conditioning is

adaptive capacity for heat and smoke because people who have it can use it as they please. A program to provide air conditioning to people without air conditioners would be a resilience strategy.

It is helpful to consider a person's vulnerability to a sunburn as an analogy to climate change vulnerability.

Is the person EXPOSED to the sun? How much? Do they work indoors or outdoors? Is it cloudy or rainy often? What is the weather forecast?

Is the person SENSITIVE to the sun? Are they fair skinned or do they have more pigment (melanin) to protect them from sunburn?

How much ADAPTIVE CAPACITY does the person have? Did she bring a hat? Sunscreen? Can he choose to go indoors?

In a Vulnerability Assessment, each of these factors is ranked High, Medium, or Low to determine overall vulnerability.



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**Secondary Impacts** – In addition to assessing exposure, sensitivity, and adaptive capacity, workshop participants will explore vulnerabilities related to socioeconomic factors and natural systems using information from the primer. They will also consider secondary impacts. People are expected to respond to climate change in a variety of ways. In many cases, their responses can also have negative impacts, potentially even worse than the initial climate impact.

For example, one of the impacts of climate change is expected to be an increase in mosquito-borne diseases in response to warmer temperatures and wetter conditions. An increase in pesticide application in response, however, could also have severe health impacts. Secondary impacts of climate change need to be considered along with the primary impacts in order to create proactive and sound strategies.

## Two Workshops or One Combined Workshop?

Most communities hold two workshops—one to assess vulnerabilities and one to develop solutions—separated by a few weeks or even months. We recommend this structure for the following reasons:

- ▶ Having two separate workshops allows more time to process the information from the Vulnerability Assessment to make it available at the Strategy Development workshop. This step is an important one because the vulnerabilities are re-organized into new categories in preparation for strategy development, which can take quite a few hours.
- ▶ Many people learn about the severity of the impacts of climate change for the first time at the Vulnerability Assessment workshop. The information can be startling or life-changing for some. By holding two separate workshops, people are given time to process their emotions around likely changes to their community before moving straight into the strategy development workshop.
- ▶ It is often the case that not all sectors are evenly represented (in spite of your good efforts) so having time between the workshops gives you time to reach out to certain sectors one-on-one to fill any holes in the Vulnerability Assessment.
- ▶ Holding two separate workshops with weeks or months in between allows for engagement of the larger community to ensure that the vulnerabilities identified are correct prior to strategy development.
- ▶ Specific issues are likely to come up in the Vulnerability Assessment workshop. When the workshops are separated by weeks or months, there is time to engage and include local experts on the most important topics that emerge during the first workshop.

Sometimes there are good reasons to combine the workshops and do both Vulnerability Assessment and Strategy Development as a single workshop spread over two days.



Geos Institute

A single, combined workshop might be the best plan for your community if:

- ▶ Your community is rural and participants have to travel long distances to attend (particularly any experts offering regional expertise).
- ▶ You are on a tight timeline. Combined workshops take less calendar time than hosting two separate ones.
- ▶ Your community or project is quite small. The less complex a community's existing stressors and municipal management are, the more it may be suited to a single, combined workshop.
- ▶ Funding is unavailable for two workshops. A single workshop is generally less expensive, especially if you have to reimburse travel costs, offer stipends for participants, and/or rent facilities.
- ▶ You have limited capacity for coordination and logistics. One larger workshop is easier from a logistics standpoint than two smaller ones.

If you decide to do one combined workshop, read through Steps 3 and 4 first as your process will incorporate information from both steps. Then review the information at the end of Step 4 regarding specific changes you will want to make if hosting one combined workshop.

# Task 1: Prepare for the Vulnerability Assessment Workshop

Task Force members will play a key role in preparing for the Vulnerability Assessment workshop by committing to attend and identifying who to invite from a variety of community systems and sectors. Invitations to prospective workshop participants are most effective if they clearly indicate that the person has been recommended to participate in this workshop by a specific Task Force member.

Now is also a good time to revisit the stakeholder list from Step 1 to ensure that your workshop includes interested leaders from stakeholder groups, local business leaders, under-represented populations, and natural resource managers if they have not already been identified by Task Force members. Geographic distribution across the planning area is also very important, especially if your planning area includes a larger urban center and outlying rural communities.

For the workshop, you are looking for people who have extensive expertise in an important community system or sector and one or more of the following characteristics:

- ▶ influential
- ▶ open to new ideas
- ▶ creative problem solvers
- ▶ good communicators
- ▶ collaborative
- ▶ unafraid to speak up
- ▶ able to disagree honorably and move on

## Steps 3 and 4 are messy!

And it's OK. It can be helpful to think about an experience we have all had—deep cleaning a garden shed, attic, or storage unit. Once we get going, we have to keep moving until the job is done because these projects get very messy before everything comes back together at the end. So it is with Steps 3 and 4. The workshops will generate all sorts of information that will not always fit into tidy boxes. It can feel disjointed and uncomfortable, but this is normal and to be expected. Do your best and lean on your Task Force when you need help so that the decisions you make along the way are based on solid reasoning. It all comes back together in the final climate resilience action plan.




As with the stakeholder identification process, we recommend that you ensure that the following systems are well-represented:

- ▶ **Social Systems:** physical and mental health services, emergency response (police, fire), homeless populations, elders, people with disabilities, other vulnerable or under-represented populations
- ▶ **Built Systems:** utilities (water, energy), transportation, municipal planning, engineering and construction
- ▶ **Natural Systems:** parks and natural areas; public lands; fish, wildlife, and plants; aquatic, terrestrial, and nearshore marine ecosystems
- ▶ **Economic Systems:** local businesses and industries, agriculture, tourism, and recreation

- ▶ **Cultural Systems:** Tribes, local immigrant cultures, other important cultural groups

Note that not all of the workshop participants will be from the local community. Some may be experts in specific issues who are invited to participate so they can share what they know about one of these systems. Universities and state and federal agencies are good sources for experts who are willing and able to participate. Many become actively engaged and can offer their services free-of-charge.

Consider inviting participants from adjoining communities so they might begin to address climate resilience in a coordinated manner. Much of the information and materials you develop will apply at larger scales and can help to motivate neighboring communities to take action.



Elected officials and people from under-represented populations within your planning area can be included in any of the five community systems by their general interest and expertise.





You may encounter the situation where a local expert on an important topic is skeptical about climate change. We encourage you to invite him or her anyway. Many folks are open to taking action from a risk management perspective, even if they are unsure about the science. We do not recommend, however, that you invite active climate change deniers as they will generally not participate in good faith.

Elected officials and people from under-represented populations within your planning area can be

included in any of the above sectors by their general interest and greatest expertise.

Depending on the size of your community, it is best to have between 40 and 75 workshop participants, with the different systems as evenly represented as possible. All of the major resources, populations, or issues relevant to the community should be represented. For very small communities, this number can be smaller, but be sure that all of the important topics and issues are covered by the expertise in the room.

## Workshops Logistics

- ▶ Set the date – Work with your Task Force and 8-10 key people (elected officials, lead city staff, informal community leaders, Tribal leaders, others) to choose a date for the workshop, ensuring that many key participants will be able to attend.
- ▶ Develop a workshop team – Identify 2-3 people responsible for logistics and ensuring that the workshop runs smoothly. Each team member should have an in-depth understanding of the goals of the workshop and how the team intends to meet them.
- ▶ Reserve a venue – Make sure the room is large enough to accommodate breakout groups and that chairs can be moved. Wall space to hang completed flip chart notes is helpful.
- ▶ Plan for food – Stopping for lunch and eating it together is an important part of the workshop. Not only does a shared meal allow people to take a break and recharge, it also provides an opportunity for people to get to know each other better. Relationship development is an important component of the workshop. It is helpful to assign lunch seats so that people eat with others they don't already know.
- ▶ Identify facilitators – Identify who will be the primary facilitator and who will facilitate each of the break out groups. The person facilitating the whole workshop should be experienced with this type of process. The people facilitating the break out groups need to thoroughly understand the process, their role, and what the workshop is intended to accomplish. This is important so that they are able to troubleshoot and organize effectively. Task Force members or other workshop participants can often be trained to facilitate the break

### Assets and Services to include in Reporting for the Covenant of Mayors

If your community is signed on with the Global Covenant of Mayors (GCoM) for Climate and Energy, in addition to GCoM requirements for Greenhouse Gas inventory and planning, there are requirements related to climate resilience or adaptation assessment and planning; these requirements include specific hazards as well as assets and services that should be included in your vulnerability assessment and climate resilience plan. We suggest you review your GCoM documents for guidance (<https://www.globalcovenantofmayors.org/>)

out groups, but it is important that they are able to provide input as well. Facilitation training resources can be found in Appendix E.

- ▶ Identify notetakers – Each breakout group, as well as the larger group, will need a notetaker. Look to participating organizations or local universities for notetakers. Ideally, notetakers should not be breakout group participants, but sometimes it is necessary.
- ▶ Line up speakers – Line up a mix of inspirational and informational speakers. Inspirational speakers may include local storytellers, elected leaders, pastors, or business leaders who are passionate and able to build enthusiasm for the effort. Informational speakers may include yourself, city or county staff, NGO leaders, professors, local scientists, or others with expertise in community planning and/or climate trends. Make sure they have an engaging speaking style so that they can effectively communicate what the workshop participants need to understand.

### Consider How to Make the Workshop Accessible to All Potential Participants

In order to maximize participation from diverse groups, it is important to:

- ▶ Reserve a venue that is accessible to those with disabilities
- ▶ Offer childcare, if needed
- ▶ Offer a “Children’s Program” (in lieu of childcare) if this increases your funding opportunities.
- ▶ Provide a translator, if needed
- ▶ Provide stipends for those who need them
- ▶ Allow people who are not able to attend to provide input online, ahead of the workshop



It is important to track workshop RSVPs to ensure that the five community systems are well-represented and that you have people attending from under-represented populations. If you are low in any system, recruit!

### The speakers will need to present the following information:

- ▶ Overall context and why you all are there
- ▶ Historical climate trends, future climate projections, socioeconomic trends, and Traditional Ecological Knowledge (TEK) if it is available. If TEK is available, it should be presented side-by-side with the science. It is important to follow the guidance for use and sharing of TEK found in Step 2.
- ▶ Topical issues of particular importance to the community

### Develop the Agenda

Talking about the problems that climate change will cause your community can be downright depressing, even for the most cheerful person. This is why the agenda is so important. The workshop should be organized to keep people engaged and active, and leave them hopeful. The presentations should be brief so that there is more time for people to work together. There should be plenty of opportunities for participants to get out of their seats and move around. We encourage creativity in designing the agenda to make it engaging for participants, and to communicate the message that we can solve these difficult problems by working together.



Ed Edahl, FEMA

### Suggested Agenda (more details about each item can be found in the next task):

- ▶ Welcome and overview of the resilience planning process and how the workshop fits into that process
- ▶ Introductions – If the group is large this can be done within the breakout groups
- ▶ Local values exercise so that participants are working toward a shared vision
- ▶ Presentations of historical climate change, climate change projections, socioeconomic trends, Traditional Ecological Knowledge (if available), and any relevant local issues or trends
- ▶ Assess vulnerabilities – Breakout groups identify sector specific vulnerabilities and rank exposure, sensitivity, and adaptive capacity for each
- ▶ Share assessments and prioritize – Report outs from each of the breakout groups to the larger group and exercise to prioritize across sectors
- ▶ Introduction to adaptation – initiate the discussion about resilience and share stories about what others have done
- ▶ Close out and next steps

### Other recommendations:

- ▶ include a 15 minute break every 1.5 to 2 hours
- ▶ avoid having more than 1/3 of the day be presentations
- ▶ make sure participants move to a different location at least once over the course of the day (going to breakout sessions and back to the full group usually handles this)

## Invite and Prepare Workshop Participants

### Workshop Invitations (8 weeks ahead of the workshop)

Draft an invitation letter with an RSVP deadline and two attachments: a short overview of the overall project and a 1-page draft agenda. The overview should include why the project is important for the community, details about the workshop, the need for local expertise, and what participants will get out of it. It is good to reference one or two of the projected changes in climate that are especially relevant to the community. They will also get more detailed projections prior to the workshop.

As RSVPs start coming in, track them to ensure that the five community systems (economic, built, natural, cultural, and human) are well-represented and that you have people attending from under-represented populations. If a particular system or population is missing representation, reach out directly to the people who have been invited from those systems or populations to ensure their participation. Task Force members can often be very helpful in the effort to ensure representation of all community systems at the workshop. Do not let local experts send others in their place unless the replacement also has the needed expertise.

### Workshop Preparation Packet (2 weeks prior to workshop)

It is helpful if participants are able to review some basic information on climate change trends and projections, specific to the region, ahead of the workshop. All workshop participants should receive the Climate Trends Primer and the Community Primer in this packet. If you created an electronic presentation of the Climate Trends and Community Primers in Task 4 of Step 2, you will share that with your participants at this point. Send the links to the primers and electronic presentations out to the participants along with a short survey. The survey can be used to collect preliminary information on community values and likely impacts and it will help you track who has reviewed the materials.

Questions to ask include:

- ▶ After reviewing this material, what resources, systems, or populations do you think are most vulnerable?
- ▶ Is there anything else you would like the workshop organizers to know?



Information from the survey can also help you develop preliminary lists of vulnerabilities for the workshop. Remember that not all workshop participants may have access to electronic documents, so you may need to create hardcopy versions to mail. If an invited person cannot attend the workshop, but would like to, send them the online summary and survey so their input is able to be included in the workshop.

### Final Workshop Confirmation (2 days prior to workshop)

The final workshop confirmation should go out 2 days prior to the workshop thanking people for attending and letting them know any logistical information necessary for the workshop (parking, IDs needed, etc.), including a revised agenda. The one page context document that you included in the original invitation and the link to the projections and survey are good to include here as well.

## Develop Breakout Groups

Breakout groups are tasked with identifying the likely risks associated with climate change specific to the region and each individual system or sector. Breakout groups of 6-8 people will be assigned for each of the five community systems as well as any specific sectors within those systems that have significant representation (water, for example, is often a large enough topic to have its own breakout group).

Be sure that there are participants with significant expertise for all relevant topics, and note where any gaps exist so that they can be filled later. Under-represented populations can be addressed as a separate breakout group if there are enough participants do so. If not, they can also be dispersed throughout other relevant sector groups.

Feel free to organize the breakout groups however they work best for your community, but some suggested breakout groups include:

Natural systems (separate terrestrial and aquatic in larger workshops)

Water (supply, wastewater, and stormwater)

Infrastructure (housing, energy, transportation, etc)

Health and emergency services (separate in larger workshops)

Agriculture, forestry, and tourism

Other businesses and industry

Indigenous people, livelihoods, and resources

Vulnerable or under-represented populations (especially people with disabilities, low income populations, outdoor workers, and non-English speakers)

Other sectors, as appropriate

## Final Preparations

The week before the workshop:

- ▶ Make sure your facilitator’s agenda is complete—A facilitator’s agenda should include far more detail than the short agenda that you hand out to participants. It will include names associated with specific tasks, a detailed description of what each task entails and what the desired outcome is, desired messaging at different stages of the workshop, what supplies and equipment are needed and when, and any other details that the organizers might need to remember along the way. Make sure all the organizers have a copy and that they have highlighted their responsibilities.
- ▶ Walk through the facilitator’s agenda with your workshop coordination team.
- ▶ Confirm the speakers, facilities, and food.
- ▶ Confirm and train facilitators and notetakers for the breakout sessions.
- ▶ Create name tags if you want to have them available at the beginning of the workshop. Alternatively, you can have people write their own name tags.
- ▶ Assemble workshop packets that include an agenda, short overview of the project, Executive Summaries (or whole documents) from the Climate Trends and Community Primers, and a list of participants.
- ▶ See Step 3, Task 2, Part B of the workshop agenda for the list of column headers you will need to prepare your flip charts.

Risk/Impact	Exposure	Time Frame	Certainty	Sensitivity	Adaptive Capacity	Focal Populations	Other Stressors
CHANGING WORKFORCE - DECLINE IN SALES/PROFIT - SERVICE - QUALITY - NEW PRODUCTS	DECLINE IN SALES/PROFIT - SERVICE FROM WORKERS	NEAR	HIGH	HIGH <i>on ability with/without capacity of firm</i>	LOW	- LOW INCOME - IMMIGRANT (LANGUAGE) - ELDERLY - DISABLED - WORKERS <i>(for health, financial, time, quality)</i>	- poverty - mental health - addiction - low skill - training needs - lack of resources - STRESSORS
ACTIVITY-BASED CULTURE & EVENTS	SEE ABOVE - SERVICE HEAT	NEAR	HIGH	HIGH <i>changing industries directly impact on income &amp; social support</i>	LOW	- LOCALS - IMMIGRANTS - IMMIGRANTS - LOW INCOME - LACK OF RESOURCES - LACK OF SUPPORT	- poverty - training needs - lack of resources - lack of support - STRESSORS
INCREASE IN POPULATION	- RISING TEMPS ELSEWHERE - LACK OF H2O - FIRE DANGER TO OTHER COMMUNITIES	NEAR <i>(local populations)</i> MED <i>(impact on pop. growth)</i>	HIGH	HIGH <i>infrastructure is not equipped for increase</i> <i>external small town where no longer used as would have to</i>	LOW	- LOCALS - LOW INCOME <i>(impact of population from other communities moving into town)</i>	- overcrowding - weather/climate - accessibility



### TIPS FOR SUCCESS

Make sure you have balanced breakout groups and that all community systems are represented.

Get creative with activities, food (chocolate is always a mood enhancer!), and storytelling to keep spirits up.

Make sure that the activities get people up out of their seats as much as possible.

### OUTPUTS

- Workshop agenda
- Facilitators agenda
- Workshop logistics arranged
- Projections survey completed by workshop participants and stakeholders and responses reviewed

### RESOURCES

A current list of resources is available on the Climate Ready Communities website: <https://climatereadycommunities.org/resilience-resources/>

#### General Resources

##### California Adaptation Planning Guide: Defining Local and Regional Impacts

provides valuable discussions of what factors increase or decrease vulnerability for many community discussions. It may be a helpful resource as you begin to think about your community's vulnerabilities.

[http://resources.ca.gov/docs/climate/APG\\_Defining\\_Local\\_and\\_Regional\\_Impacts.pdf](http://resources.ca.gov/docs/climate/APG_Defining_Local_and_Regional_Impacts.pdf)

#### Annual Support subscribers

Tutorial: Communicating About Climate Change

Template: Vulnerability Assessment Workshop Invitation Letter

Template: Sample Participant Workshop Agenda

Template: Sample Facilitator's Workshop Agenda

Subscriber resources for this task are [here](#).

#### Other Services (available with or without a subscription)

Blocks of consulting time to:

- answer questions and explain concepts
- identify speakers and topics for the workshop
- develop the agenda
- manage RSVPs and logistics
- train facilitators and notetakers

Workshop facilitation

Other Services are [here](#)

## Task 2: Facilitate the Workshop

The Vulnerability Assessment workshop is a major milestone in the climate resilience planning process. Your two primary goals are to gather the information you need from community leaders and experts AND to ensure that participants leave feeling engaged and that their day was well-spent.

The preparations you have just completed for the workshop will create a strong foundation for suc-

cess. In this task, you will implement the workshop using specific guidance for each component. While you want to capture the conversations that happen during the workshop, there will always be holes in the information that need to be filled in later. This is normal. Your job is do your best to limit the number of holes that need to be filled by the Task Force after the workshop.

### Workshop Agenda


#### Part A. Introduction to climate change, local climate change impacts, identify local values (Maximum of 1 hour and 45 minutes)

► Welcome and overview (5-10 minutes) – this is generally done by an elected official or representative from the organization that is convening the process. This person should identify the context and the importance of the work that will be done in the workshop as well as make it clear to partici-

pants how this workshop fits into the larger planning process. Any housekeeping announcements will happen at this point. Ask people to stay off of their phones and computers except during break times.



- ▶ Introductions and local values exercise (20-30 minutes).
  - ▶ Have participants form a single line based on how long they have lived in the community. Then have them go one by one saying their name, organization, and how long they have lived in the community. Put the group back together and ask participants what they value across the community - and what they believe are common values that others hold. How does the community think of itself? Keep track of the values on a flip chart in front of the room, and note where what is said overlaps.
  - ▶ Alternative – Technology is available that allows you to ask the group as a whole to name the three to five values they believe are represented by their community. Workshop participants answer using smart phones (see [www.menti.com](http://www.menti.com) as an example) and the program creates a word cloud in real time that can be projected onto a screen.
- ▶ Trends and projections presentations (45-60 minutes) – Have experts share a high level overview of historical changes in climate, climate science and projections, socioeconomic and natural system trends, and Traditional Ecological Knowledge (if available), with time for question and answer. This section should cover the difference between weather and climate and define adaptation/resilience and mitigation. People come into the workshop with different information on climate change, from a variety of different sources, so it is important that the participants are all working with a common understanding of what can be expected for the local area.



Using flip charts helps participants see the work being done and facilitates the prioritization process later in the workshop.

## Part B. Assess Vulnerabilities (2-3 hrs with breaks)

- ▶ Give instructions for the breakout groups – let people know what they will be doing and what you hope to get out of it (10 minutes)
- ▶ Breakout groups – Move participants into sector-based breakout groups. You can put a color-coded sticker on the back of their name tags that corresponds to a breakout group if you have pre-assigned the participants to breakout groups or you can let them self-select the group that they have the most expertise in.
- ▶ Introductions exercise (10-20 minutes) – The participants in these breakout groups will spend the next several hours working together, so it is helpful to do another round of introductions.
  - ▶ What is your name?
  - ▶ What is your specialty or expertise?
  - ▶ A group question, such as “how do you know you are home here in ‘*name of community*’” For participants who do not live in your community, they can say what they really like about the community.
- ▶ Assess vulnerabilities (2-2.5 hours) – You will ask each breakout group to identify what individual climate projections mean for their system or





sector. These individual projections have already been developed in Step 2. Be sure the group has a copy of the two primers and especially the one-page Executive Summaries. Examples of individual projections the breakout group will assess include, but are not limited to:


- ▶ Changes in temperature (specify how much and by when)
- ▶ Changes in precipitation (specify how much and by when)
- ▶ Sea level rise (specify the range of likely values)
- ▶ Increased storm intensity or frequency (specify how many days or likely size of storms)
- ▶ Shifts in dominant vegetation (such as shifts from conifers to deciduous, or forested to grasslands)
- ▶ Increase in wildfire frequency and severity (include percent increase)
- ▶ The breakout group can collect information on flip chart sheets, arranged so that data is entered in a series of rows and columns, or in Excel, which would need to be projected on the wall or a screen. The paper version is more effective, especially for

larger groups. This guide assumes that flip charts are hung on the wall in a long row, with column headers.

- ▶ The flip charts should include the following column headers:
  - ▶ **Risk** – The specific impact or effect you are concerned about. An example would be an increase in asthma from ground level ozone related to heat.
  - ▶ **Exposure** – The climate change related projection or trends leading to this risk. These come from the Climate Trends and Community Primers. The Climate Trends Primer should have a one-page Executive Summary with the most relevant and/or meaningful trends listed, which can be easily referenced during the workshop.

Examples include:

- 80% decline in snowpack
- Doubling of the number of days above 100°F
- Shift from coniferous forest to deciduous woodlands



Each breakout group must fill in the first six fields of the matrix for each risk in order for you to have the information you need for the next step.

- ▶ **Time Frame** – The Climate Trends Primer can be referenced to obtain projected time frames for climate trends. You can set your own time frames, or use the ones below. If specific dates are associated with a projected trend, those can also be listed (such as Mid-term or 2030-60).

Short-term (within 15 years or already occurring)

Mid-term (occurring by 2050)

Long-term (occurring between 2050-2100)

- ▶ **Certainty** – Ranked as Low, Medium, or High. Certainty is based on the level of agreement among the models as well as the time frame. Short-term projections have higher certainty than long-term projections, for example.

Both temperature increase and loss of snow-pack are considered High Certainty climate projections (or trends) because the climate models largely agree on their trajectory and they are already occurring in most areas. Loss of coniferous forest, however, may have lower certainty because the models do not accurately project when or how forests will experience landscape-level change.

- ▶ **Sensitivity** – How much the focal population or resources will be affected by the risk, and/or the severity of the effect. These are ranked as Low, Medium, or High. Encourage workshop participants to provide a short description of the justification.

- ▶ **Adaptive Capacity** – Ranked as Low, Medium, or High based on whether behaviors or resources are already in place to protect the focal resources or populations from the risk. Encourage workshop participants to provide a short justification for their ranking.

- ▶ **Other Stressors** – Past and ongoing stressors that exacerbate this risk. Some examples include:

- Air pollution from vehicles (exacerbates asthma or other respiratory disease)
- Development in the Wildland Urban Interface (exacerbates increase risk of wildfire to homes and other development)
- Fish passage barriers such as dams, levees, or other structures (exacerbates low flow and warm water impacts to fish and to Native Americans who rely on subsistence fisheries)

- ▶ **Secondary Vulnerabilities** – Likely responses to climate change that could exacerbate the risk. Some examples include:

- Increased demand for water for agriculture leading to pressure to build new dams and water storage, which affect fish and fisheries
- Loss of important wildlife habitat due to the development of renewable energy
- Increased pesticides and herbicides applied to control pests, disease, and invasive species

- ▶ **Focal Populations** – The populations or resources at risk. In addition to the overall population or resource, note whether there are regions, neighborhoods, natural areas, etc. that are (1) especially resilient or protected from this risk or (2) especially vulnerable to the impacts of this risk.
- ▶ **Solutions** – Ideas for solutions invariably come up during Vulnerability Assessment discussions, so the matrix has a column for solutions. These ideas will be captured and saved for the next workshop, but do not spend time making sure that column gets filled in.
- ▶ **Timing** – The first step is for each breakout group to spend some time brainstorming the list of risks for their sector. When the brainstorming is completed, spend a few minutes lumping like risks together and then have the breakout group members prioritize the risks using sticky dots. We often give each participant 5-7 sticky dots with instructions that they cannot vote more than one sticky dot on a given risk. This will allow you to put the risks in priority order. When done, count the number of risks you need to discuss and divide the minutes you have left in the

agenda for this part of the workshop by the number of risks. This calculation gives you the number of minutes you should spend on each risk, which will help you manage time. Try to move through each one in the time allotted. If you are not able to complete all of the columns for a particular risk before it is time to move on to the next one, make sure you have completed the columns for exposure, timeframe, certainty, sensitivity, and adaptive capacity. Information can be added to the remaining columns after the workshop if necessary.

- ▶ **Parking Lot** – Make sure to have a flip chart up for additional information that needs to be captured, but is not part of the immediate discussion. Use this chart as much as possible, to keep the conversation moving quickly and to avoid getting bogged down in topics that are not central to the task.
- ▶ **Prioritize** – When the breakout group is done identifying the climate change risks to their sector or topic area, give each participant five stickers (number can be higher or lower depending on the number of risks overall) and have them vote on the risks they think are the most important.

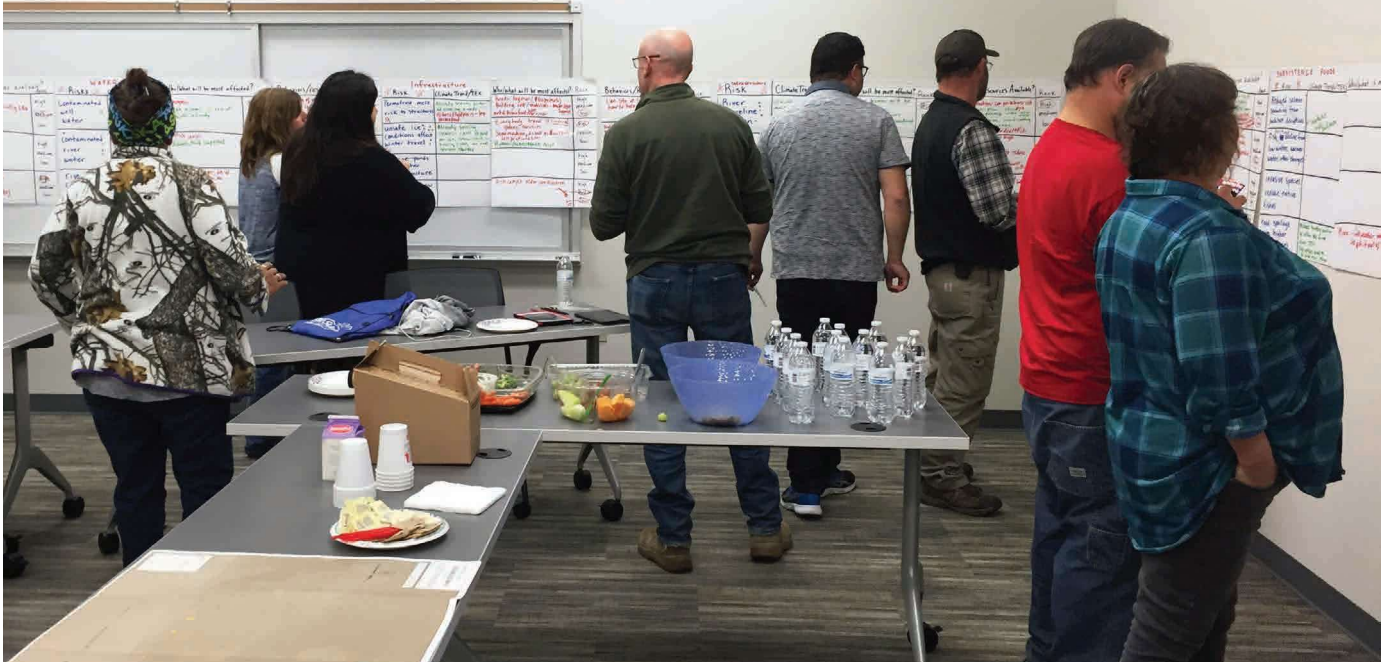
Risk	Exposure	Time Frame	Certainty	Sensitivity	Adaptive Capacity	Focal Populations	Other Stressors	Secondary Vulnerabilities	Solutions
Increased rates of asthma and allergies	More severe heat; doubling of # days above 100° F	Near-term	High (models agree on warming)	High	Low	Children most at risk; people with respiratory illnesses	Poor air quality	None noted	
Higher demand and lower availability for water for agriculture	Higher temperatures cause more evaporation and evapotranspiration	Mid-term	High	High	Medium (different crops can be planted)	Farmers (specific crops, like rice, that need a lot of water)	Competing water demands and declining ground water stores	None noted	Research new crops that use less water; upgrade water infrastructure
Loss of tourist revenue due to smoke and heat waves	More severe heat and more frequent heat waves	Near-term (already happening)	High	Medium	High (activities can shift from summer to shoulder seasons)	Local businesses, especially rafting outfitters	Low flows due to overdraft of the river already limiting rafting and fishing	Proposals for new water storage infrastructure and water diversions for agriculture	

**FIGURE 3** Example of information recorded on the flip charts, specific to each identified risk.

## Part C. Share Sector Assessments and Prioritize (20-30 minutes)

- ▶ Once risk identification and ranking is complete, each breakout group will report out to the larger group on the highlights of their assessment for their community system or sector. This is an important step as it allows people to hear about how climate change is likely to impact other sectors. This interdisciplinary understanding of climate impacts across the community is critically important in the effort to develop effective, cross-sector solutions. Once participants become aware of the impacts to other sectors, they are more likely to develop collaborative and well-coordinated adaptation strategies, rather than strategies that benefit one sector but increase the risk to other sectors.
- ▶ After all groups have reported out, workshop participants can move from one breakout group's notes to another adding their thoughts to those of the group. Have them do this with a different color pen than the original group.
- ▶ Provide each participant with approximately 10 sticky dots that are a different color than the ones used within the sector-based breakout groups. Each participant will now rank risks across all sectors. Again, they should only cast one vote per risk. You can allow individuals to use their own personal criteria to rank the risks by importance, but be sure to remind everyone of the common values that your group is working toward.

Sharing positive stories of other communities taking action helps your workshop participants remain hopeful as they look to the future.



## Part D. Introduction to Adaptation (15-20 minutes)

▶ Participants can become overwhelmed by the bad news presented during the Vulnerability Assessment workshop and the reality that climate change represents for their community. It is important to start to discuss how you will overcome the risks that have been identified. Begin by introducing the concept of adaptation and present some case studies of other communities and the positive actions they are taking. Be sure to show how both adaptation and mitigation are

needed, and how they can be done together to transform the community in positive ways. Also emphasize all of the co-benefits (multiple benefits across the community) associated with adaptation actions. Most adaptation strategies have extensive benefits to health, well-being, nature, and economies. Make sure this session is positive, hopeful, and locally-specific. Choosing the right speaker to present this information is critically important.

## Part E. Close Out/Next Steps (10 minutes)

It is often a good idea to have the person who opened the day with an inspirational message close the day by:

- ▶ thanking the participants for their energy, expertise, and time
- ▶ acknowledging that what they have grappled with is difficult, but that they have done very important work
- ▶ letting them know what they can expect next. Your team will take all of the information from the workshop and create a draft Vulnerability Assessment that identifies the highest priority vulnerabilities. Participants will then be asked to review this draft and invited to attend the strategy development workshop. Next steps include public feedback on the Vulnerability Assessment (either through electronic means and/or a public event) in preparation for the strategy development workshop.

We often like to end the day with the following exercise to ensure that people leave the workshop on a positive note. Ask participants to take their agenda and write one asset that the community has that it can bring to the task of addressing the climate challenge. It can be a physical asset, a financial asset, a characteristic of the community, relationships within the community or between your community and its neighbors, etc. Anything they think is going to be important going forward is fair game for this exercise. Then ask them to make a paper airplane and when it is ready, sail it across the room. Younger participants may need help from older participants in the airplane building process. Then everyone picks up someone else's plane, lines up in a circle, and reads off the assets one by one moving around the circle.

Include time to have people fill out an evaluation of the workshop. Include a question that asks how they can help the process going forward.

## Part F. Logistics wrap up

Take pictures of the notes on the walls prior to removing them. Make sure to gather the notes from all of the breakout groups and number them as you take them down from the wall so that you can re-create that order when pulling information from

those sheets to develop the draft assessment. If note takers have electronic notes, ask them to send them to you immediately so that you can integrate them with the paper notes.

## Identifying New Champions

Many workshop participants will have been invited by the Task Force member associated with their sector, so there will be many new faces at the workshop. New champions for climate resilience can come from anywhere, and many of the most powerful champions are from sectors that do not ordinarily communicate about climate change. Champions are those participants who take an active role in the workshop and become highly engaged in climate resilience in their sector. Watch for these new champions and follow up with them after the workshop to keep them engaged. Many of the people asked to



participate in the Implementation Team once the planning is complete will come from the workshops, so make sure you update your stakeholder list after the workshop.

### TIPS FOR SUCCESS

Make sure you have balanced breakout groups and that all community systems are represented.

Pay attention to the emotions in the room. Vulnerabilities can be upsetting due to the sheer magnitude and extent of bad news for the community. This can elicit fear, despair, anger, and/or denial. If you need to deviate from the agenda to address people's feelings or answer additional questions, do it. Be sure to share examples of what other communities have done and communicate enthusiasm and hope for the future. But also let people grieve for the inevitable losses of important community resources (snow, for example).

Keep the focus on vulnerabilities at the workshop. People instinctively want to get started on strategy development before they have discussed, ranked, and prioritized the vulnerabilities. Keep track of those strategy ideas as they come up, but keep the conversation focused on vulnerabilities.

Have someone responsible for roaming the room and circulating among groups. If any groups are lagging behind the others, or getting stuck on certain points, the roamer should not be shy about jumping in and helping them move forward.

Make the workshop engaging, creative, and dynamic. We have all been to workshops that are effective at sharing information, but do not really engage the participants in a meaningful way. The more you can encourage creativity and active participation, the better.

Have colored sheets of paper in the middle of the table and encourage people to jot down their thoughts at any time. Be sure to collect the colored sheets before people leave. Many folks are uncomfortable sharing their insights in a large group, especially on controversial topics, or may not feel they are able to get their voice heard. Make sure there are a variety of different types of opportunities to contribute.

## OUTPUTS

- Notes assembled from the workshop for report development
- Completed Vulnerability Assessment workshop

## RESOURCES

A current list of resources is available on the Climate Ready Communities website: <https://climatereadycommunities.org/resilience-resources/>

### General Resources

Workshop facilitation resources and workshop openers and activities can be found in Appendix E

### Annual Support subscribers

Tutorial: Creating Your Vulnerability Assessment Spreadsheet

Template: Vulnerability Assessment Examples

Template: Vulnerability Assessment Workshop Evaluation

Template: List of Supplies

Subscriber resources for this task are [here](#).

### Other Services (available with or without a subscription)

Blocks of consulting time to:

answer questions, explain concepts, and provide guidance

Workshop facilitation

Other Services are [here](#)



## Task 3: Develop Vulnerability Assessment Report

Using the information gathered from your Vulnerability Assessment workshop, you will develop a draft Vulnerability Assessment, engage with workshop participants, your Task Force, and the public for feedback, and finalize the Vulnerability Assessment in preparation for strategy development in Step 4.

First, gather and review the flip charts from the workshop, in the correct order for each breakout group. If you have questions about any of the material, reach out to the table facilitator and/or the notetaker for that breakout group and clarify the information on the notes.

Next you will organize the data from the workshop by creating a spreadsheet that includes all of the column headings from your row of flip charts. Add a column to record which breakout group the data are from, and another to record the prioritization score for each risk from the dot voting process near the end of the workshop where participants prioritized across sectors. Once you have that spreadsheet prepared, start with one breakout group and enter all risks from that breakout group. If these risks are not numbered, number them as you add them to the spreadsheet and keep the numbering system moving up as you move through the breakout groups.

This spreadsheet will serve as the raw data for you to use to develop your risk matrix (see Figure 4). Identify all of the risks that have high exposure and then drop them into the grid boxes following the axis lines based on whether the community has high, medium, or low sensitivity and high, medium or low adaptive capacity. Make sure you pay attention to how the grid is laid out in terms of which direction the high, medium, low boxes flow.

Once this grid is complete, you will have a visual representation of the climate-related vulnerabilities in

your community and will be able to guide your community toward solutions in Step 4 of this process.

Next develop a report outline (see box) that includes the information in the matrix and begin to populate it with the information from the notes into the community values and vulnerabilities sections. It is best to do this while memories are fresh for the participants, facilitators, and note takers in case any additional questions arise.

Once you have drafted the existing community values and vulnerabilities sections, draft the introduction, import key portions of the climate change projections report into the projections section, and draft the results from the workshop. It is helpful to organize the risks into a risk matrix similar to the example provided in Figure 4. The purpose of the

### EXAMPLE: Climate Change Vulnerability Assessment Outline

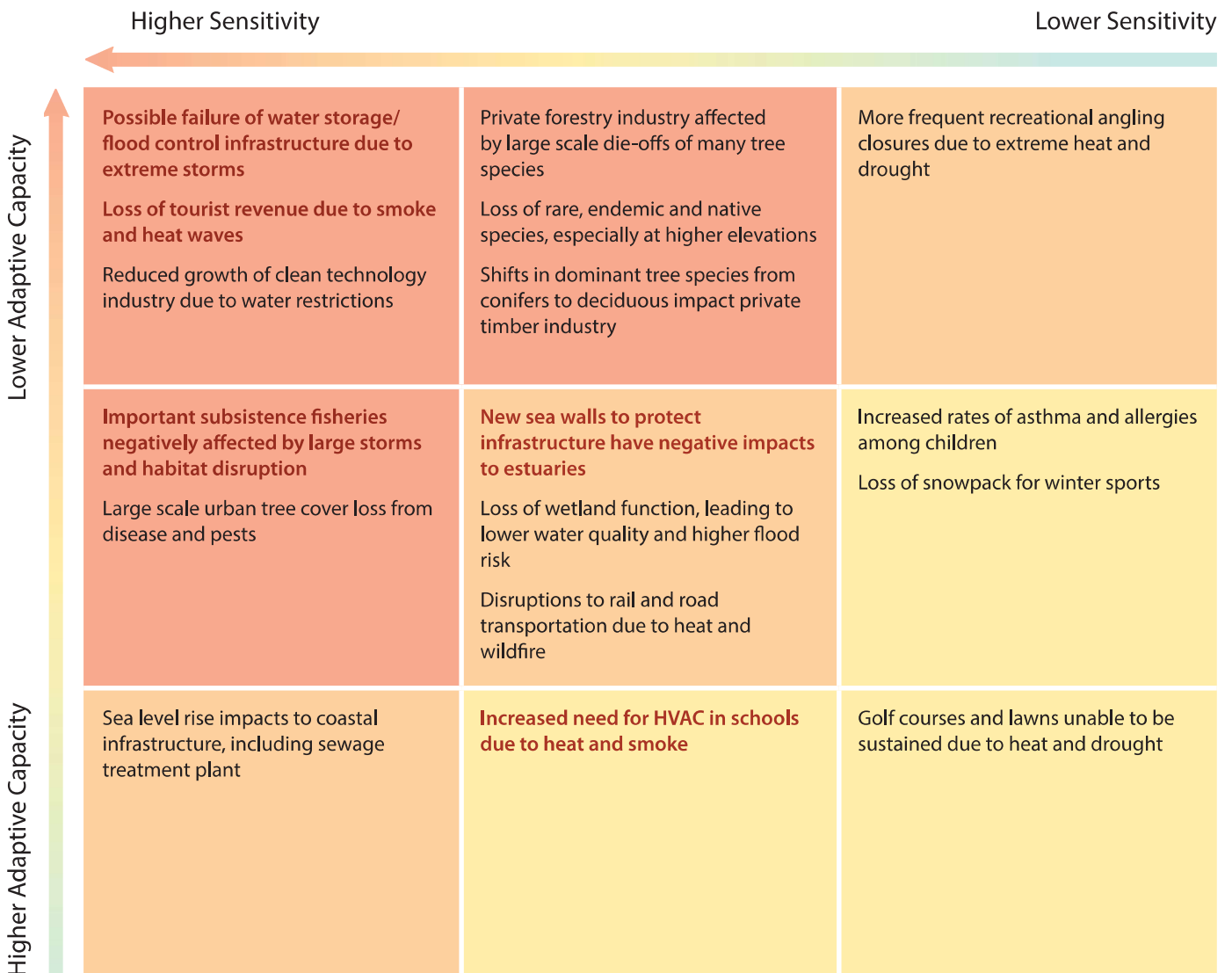
- ▶ Executive Summary
- ▶ Introduction
- ▶ Purpose
- ▶ Community Values
- ▶ Key Climate Trends (short overview)
- ▶ Sector-specific Vulnerabilities
  - ▶ Sector overview (based on break out group topics)
  - ▶ Vulnerabilities (in priority order)
- ▶ Risk Matrix
- ▶ Developing Resilience Strategies
- ▶ Conclusions and Next Steps
- ▶ References
- ▶ Appendices with participant list and full list of all vulnerabilities identified at the workshop



prioritization process was to ensure that unsupported or misguided vulnerabilities are not moved forward in the process. All of the information from the breakout groups should be captured and included as an appendix, but only the vulnerabilities that received support from the larger group will be covered in the main body of the report.

Remember to stress that the purpose of this Vulnerability Assessment process is to build the foundation for developing strategies to address

these vulnerabilities. We do not recommend that you list any potential solutions because you have not vetted those ideas and people can get very excited, in either direction, if they see specific potential strategies listed. This Vulnerability Assessment will be reviewed by the Task Force, the workshop participants, and the general public and it will be very depressing for some, so be sure to speak to the fact that this document is the base upon which strategies will be developed either in the introduction or next steps section of the Vulnerability Assessment.



**FIGURE 4** Example risk matrix showing relative levels of sensitivity and adaptive capacity. Only the risks with high exposure are included. Highest priority risks (based on voting by workshop participants) are shown in red type.

Offer this draft to the Task Force for edit suggestions. We recommend a shared document (Google docs or another system) with a request that reviewers suggest edits rather than make permanent edits. It is always good to keep a clean copy outside of the shared folder as a backup. Allow the Task Force two weeks to review the draft Vulnerability Assessment, reminding them within the last few days to get in their comments by the deadline.

Incorporate the edits into the document and then release the revised draft Vulnerability Assessment to the workshop participants using the same shared document format above. Task Force members will be part of this group as well assuming all of them were able to attend the workshop. Again, two weeks is generally sufficient for review.

Incorporate the edits from workshop participants and Task Force members into the draft so it is ready for public feedback. At this point, consider building

on the electronic presentation that you previously created for the workshop participants by adding the results of the Vulnerability Assessment. Have the Task Force review comments from the public and decide how to address each one. Incorporate any accepted edits into the draft Vulnerability Assessment. Also, create a survey that asks:

- ▶ What vulnerabilities have not been identified in each of the five community systems (economic, built, natural, human, and cultural)?
- ▶ What vulnerabilities should be given higher or lower priority than what is in the report?
- ▶ What are ideas the Task Force should consider for addressing specific vulnerabilities?
- ▶ Would they like to be kept updated on the process and opportunities to participate as it moves forward? If so, ask for their name and email address.

It is best to process the data from the workshop within two weeks while memories are fresh in case questions arise.





The draft Vulnerability Assessment, electronic presentation, and survey can all be shared with the general public with a request for feedback via the survey. This is a particularly important place in the process for addressing issues of equity, especially since low income populations and people of color may not be easy to engage on the Task Force and in the workshop. Go back to your initial list of stakeholders and reach out to each of them to encourage them to share the electronic summary and survey with their networks. If there is a particular segment of your population that is not well-represented in the feedback you have received, now is the time to take additional steps to get that feedback. Additional steps can include working with local organizers in that community to bring

together a group for a feedback discussion or increasing efforts to get information about the survey into that particular segment of the community.

Essentially, you are checking with the larger community to ensure that the workshop participants identified and prioritized the vulnerabilities correctly. However, an equally important part of this step is to provide transparency, and to help the community move along with the Task Force in developing its understanding of climate vulnerabilities. The more participation you are able to generate in this step, the easier the next step and eventual implementation might be. It is vital that your process identify all high and medium priority vulnerabilities in the community, so it is a particularly important time to put energy into community engagement efforts, particularly with under-represented populations.

If your community is supportive of the process, you may consider hosting a public forum at this point in the process to engage the community and gather feedback on the vulnerabilities identified at the workshop. If your community has pockets of aggressive resistance that are likely to be drawn to a public event, it may be better to just do the electronic summary and survey.

Leave the survey open as long as possible as you work to organize the strategy development workshop. Once you have closed the survey, incorporate the public feedback, pass it back through the Task Force highlighting any changes that you have made due to public feedback, and finalize the Vulnerability Assessment.

### “MEETING-IN-A-BOX”

It can be helpful to create a kit that stakeholders can take to meetings with their networks or constituents to provide feedback to your process. A “Meeting-in-a-Box” kit includes basic information about the climate projections and vulnerabilities identified in the workshop as well as hard-copy surveys for those who are not able to access the electronic survey. Another kit can be created after the Strategy Development workshop to solicit feedback on strategies developed at the workshop.



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### TIPS FOR SUCCESS

Keep the process moving. Keep the time between the two workshops to less than 3 months if at all possible. Having a longer gap can cause the project to lose momentum.

Sifting through the workshop notes and pulling them into a report can be intimidating, but that process becomes more difficult as more time passes from the workshop. Try to have the workshop notes compiled within two weeks of the workshop.

Remember that this is an iterative process and refinement will happen with each step.

### OUTPUT

- Completed Vulnerability Assessment

### RESOURCES

A current list of resources is available on the Climate Ready Communities website: <https://climatereadycommunities.org/resilience-resources/>

#### General Resources

An example of an electronic presentation can be found here – <https://prezi.com/tavfbaikives/hot-enough-yet/>

Examples of vulnerability assessments can be found here – [www.climatewise.org/projects](http://www.climatewise.org/projects)

#### Annual Support subscribers

Template: Vulnerability Assessment Spreadsheet (including auto-generated risk matrix)

Template: Tips for integrating workshop data into Vulnerability Assessment Spreadsheet

Subscriber resources for this task are [here](#).

#### Other Services (available with or without a subscription)

Workshop facilitation and/or processing of workshop output

Writing and layout of the Vulnerability Assessment report

Blocks of consulting time to:

- answer questions, explain concepts, and provide guidance

- review the draft vulnerability assessment

Other Services are [here](#)

If you have feedback or ideas about how we might improve this Guide, please contact us at: [info@geosinstitute.org](mailto:info@geosinstitute.org).