Tribal Climate Toolkit

To Engage Community & Build Resilience

EFCWest
Environmental Finance Center West

Tribal Climate Tools
To Engage Community & Build Resilience

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Tribal Resilience Toolkit
To Engage Communities

Toolkit Overview

The following toolkit is designed to support Tribal efforts to prepare vulnerability assessments, and adaptation and resilience plans. The toolkit includes approaches to community engagement as well as methodologies and tactics to set priorities and develop step by step blueprints to map adaptive measures. Each tool can stand alone or be used in combination with a selection of all or some, depending on the needs and approach of the Tribe. In general, most of the tools are designed to help the user take a more systemic view of the complexity of climate change.

Several of the tools are augmented by online tutorials and/or webinars which can be found on the EFCWest website at the following URL: http://www.efcwest.net/climate-toolkit-tutorials

The Toolkit is broken down into the following sections:

- Downscaling climate data
- Identifying important assets
- Capturing local information
- Organizing your assets
- Preparing a vulnerability assessment
- Testing your vulnerabilities against system knowledge
- Ranking your adaptation options
- Using Backcasting to plan for adaptation

Please feel free to contact us with your questions or if you just need some feedback on your approach.

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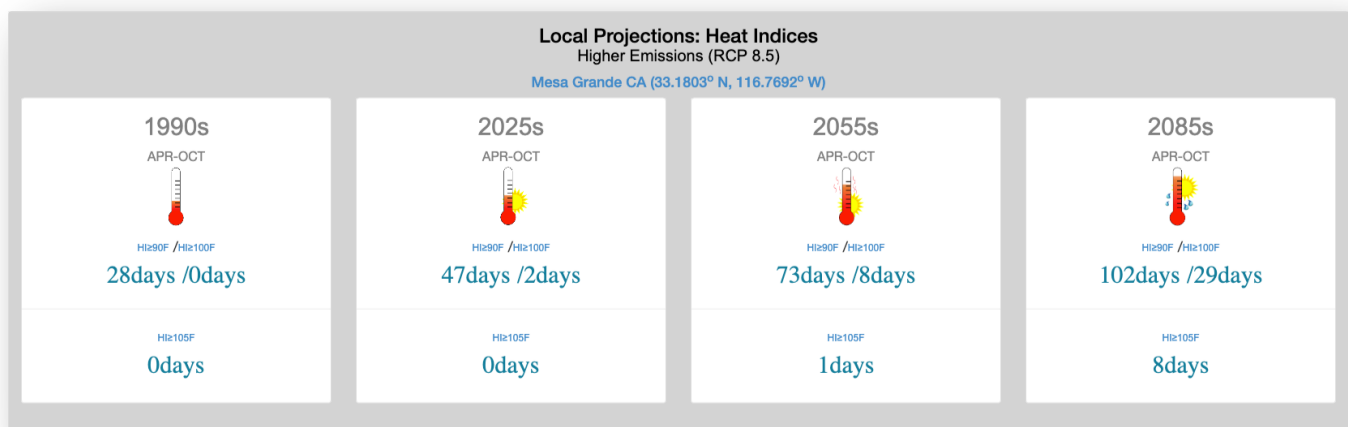*510-878-9968*

Downscaling Climate Data

Almost all resilience efforts begin through downscaled data of climate impacts. While the science is improving regularly, the data provided at the local level is built from Global Climate Models (GCMs). There are several GCMs, all of which provide different results depending in part on the emission scenario used. Downscaled data is often provided over specific time periods (usually between the current year and 2100) and by levels of expected emissions (low, medium or high). The results can be confusing – ranging from no impact under low emissions to significant changes in precipitation, heat, drought, severe storms, etc. under high emissions – and it is up to Tribal staff to choose the optimum scenario for their project.

The chart for Mesa Grande, California below, prepared with the Climate Explorer (https://crt-climate-explorer.nemac.org/) provides a good example of the wide variety of predictions inherent in downscale modeling. The chart presents the effect of two emission levels (low and high) on the increase in average mean temperature through 2100. The difference is striking: projections suggest that averages could increase by over 14 degrees Fahrenheit at higher emissions (in red), or only by 2 degrees Fahrenheit if we experience lower emissions (in blue). Thus, choosing an emissions scenario presents a significant challenge to planning for resilience as well as a certain level of risk if actions are implemented based on a scenario that proves incorrect. The science is inexact, yet we are forced to plan with no specificity on what will happen when, or even if it ever will.
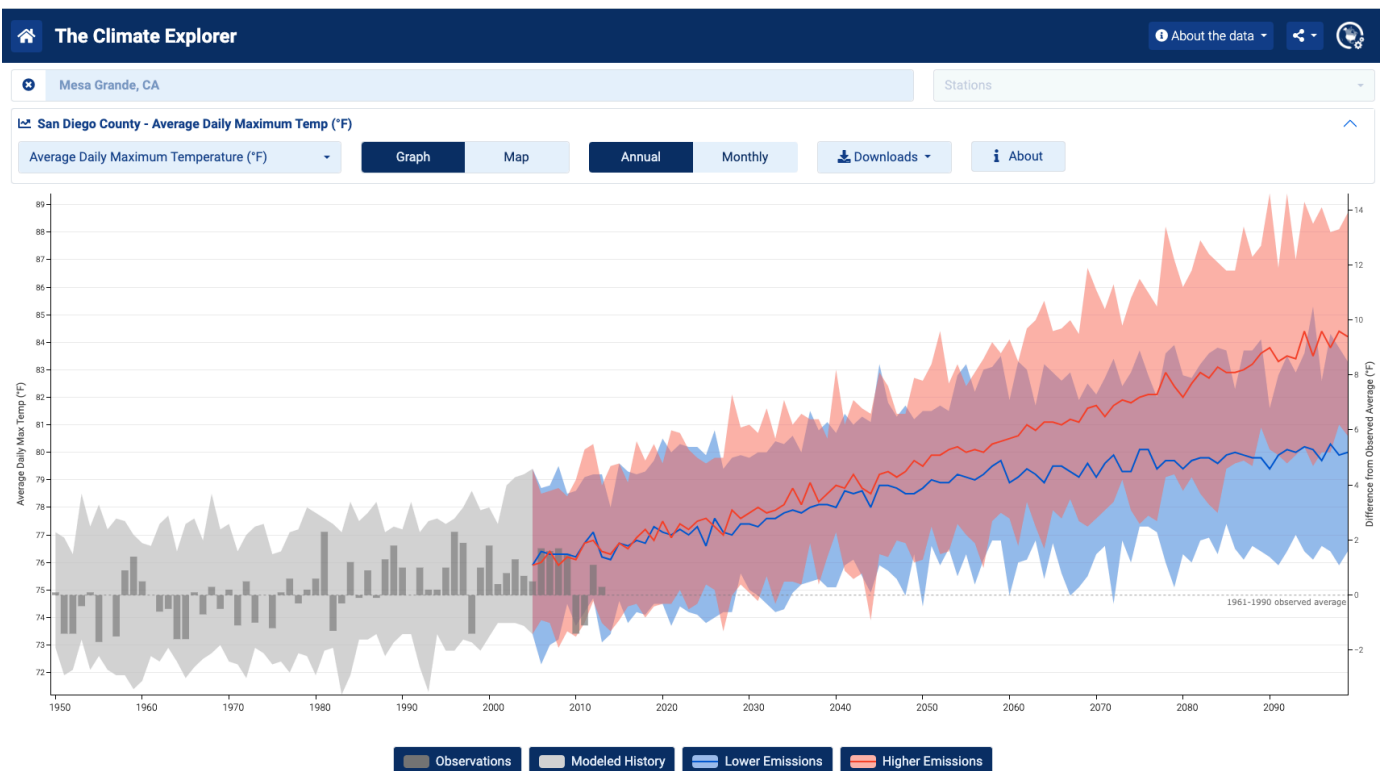
At the same time, purchasing downscaled information for your specific location can be costly and may not provide a level of certainty necessary to adequately plan for the future, and perhaps more importantly, fund for the future. This is not to say that you shouldn't try to better understand the various potential consequences. You will need downscaled information, but you don't necessarily have to pay for it. The following are some websites that allow free access to downscaled information. They are simple to use and a great place to start.

Climate Mapper: Climate Mapper is our preferred site. It provides projected impacts for lower and higher emissions through 2099 and includes simple and easily understood graphs for heat projections. The graph below for Mesa Grande presents higher emissions through the 2085s, starting with no days over 100 degrees in the 1990s to 29 days by 2085.

Local Projections: Heat Indices
Higher Emissions (RCP 8.5)
Mesa Grande CA (33.1803° N, 116.7692° W)

1990s	2025s	2055s	2085s
APR-OCT	APR-OCT	APR-OCT	APR-OCT
HI≥90F / HI≥100F	HI≥90F / HI≥100F	HI≥90F / HI≥100F	HI≥90F / HI≥100F
28days /0days	47days /2days	73days /8days	102days /29days
HI≥105F	HI≥105F	HI≥105F	HI≥105F
0days	0days	1days	8days

Climate Mapper provides other data, including maps, tables and graphs, for crop suitability, cold hardiness, stream flows, hydrology, fire danger, agriculture, fire danger and drought. https://climatetoolbox.org/tool/climate-mapper

Climate Explorer: Climate Explorer provides a wealth of data and charts for downscaled information on temperature, precipitation and growing days. https://crt-climate-explorer.nemac.org/

EJSCREEN: EJSCREEN is a USEPA developed mapping tool that now includes climate impacts as well as environmental justice, socioeconomic, pollution and health indicators. Climate change risk assessments include flood, fire and sea level rise. https://ejscreen.epa.gov/mapper/

US Climate Resilience Toolkit: The Climate Resilience toolkit contains a vast amount of information on all things climate-related. It is definitely worth reviewing with the knowledge that it is a proverbial rabbit hole and you can spend hours sifting through the information. https://toolkit.climate.gov

Identifying Important Assets

Resources Needed: Worksheets 1&2 printouts and extra pens

Once you have determined the downscaled data you would like to use, the next step is to determine the Tribal assets you would like to test for vulnerabilities. Assets can be anything the Tribe deems important to its resilience. That includes culture, traditional knowledge, landscapes and environmental resources. You should also consider, what buildings and agencies or departments are critical? What helps you maintain or build economic sovereignty, educate your youth, and protect your elders? Determining what assets are most important should involve engaging as much of the Tribe as possible.

Using PESTEL to Address Complexity

Climate change is a complex issue. It has multiple causes, and it impacts us all differently. As a result, we all have a different perspective on its effects and how best to cope. There are also unlimited solutions, yet at best, we will only manage the problem, not actually fix it. In response, we need to make sure that we use as much of our system knowledge as possible to ensure that we are not being redundant or trying to address an issue without the right information to make the best choices. That means that when we consider our assets, we want to make sure we remember to include all possibilities. Later, when we seek to understand our vulnerabilities, we want to make sure we have included all avenues of information. Finally, when we work on steps to be more resilient, we want to make sure that all important rights holders and stakeholders are working together to strengthen the Tribe.

To address complexity, and in order to ensure that community members are incorporating systemic (or holistic) approaches, we encourage users of this guide to incorporate a tool called PESTEL into many of the exercises. PESTEL is an acronym that stands for:

- **P**olitical
- **E**nvironmental
- **S**ocial
- **T**echnological
- **E**conomic
- **L**egal/Regulatory

For example, in terms of assets, PESTEL should be used as a guide to encourage community members to think of:

- Political Assets – Tribal Council, state and federal government, etc.,
- Environmental Assets – water resources, grasslands, forests, areas of cultural significance, etc.,
- Social Assets – schools, elders, cultural activities, emergency services, etc.,

- Technological Assets – cell towers, solar panels, water pumps, sewer lagoons, etc.,
- Economic – casinos, tribal businesses, grants, etc.,
- Legal/Regulatory – Tribal agencies, government agencies like USEPA, HUD, USDA, etc.

This is the first time you will be encouraged to use PESTEL, but you will find it again later in this guidebook.

As you work with your community, Worksheets #1 and #2 below will help you use PESTEL as a framework to identify assets that are most valuable to Tribal members. Start by asking participants to simply write down all the assets they can think of. Then move on to prioritizing those assets.

Worksheet #1: Identifying Tribal Assets

Name _____

Department _____

Are you: ☐ 25 or younger   ☐ 26 – 50   ☐ 51 or older

Write down a list of assets or community resources you consider to be important to the Tribe. This would include assets specific to your department (if applicable) as well as overall community assets including political/governance, social/cultural, environmental, economic, technological, infrastructure etc.

Tribal Assets

Worksheet #2: Asset Prioritization and Criteria

Now rank the assets above in terms of their importance to the Tribe by listing the asset under the most appropriate level of importance: highest, medium, or low. Then describe the What criteria you used to rank the asset that way (e.g., cultural significance, economic significance, food security, etc.)?

Asset	Criteria
Highest Level of Importance	

Asset	Criteria
Medium Level of Importance	
Lowest Level of Importance	

Once you have completed the asset exercise with multiple departments, Tribal Council, youth, elders, and other important Tribal members, you should have a definitive list of what the Tribe values most and why. You will likely see quite a bit of repetition which will allow you to assign a higher level of priority to those assets that have been included at the highest level of importance by the majority of participants. In addition, when it comes time to present the vulnerability assessments and adaptation plans back to the community, you will have a collective justification for why certain assets are deemed more important than others.

While this exercise will help you define the most important Tribal assets, don't forget to incorporate other material such as General Plans, Economic Plans, Environmental Plans, etc.

Capturing Local Information

As part of the early process, you will want to collect information about local climate knowledge, especially information and concerns about what has already been experienced. Have there been longer droughts, hotter days, less snow and/or rain, than has been seen in the past? Have there been tendencies towards damaging floods or a history of extreme storms bringing hail, lightning strikes or other large disruptions? It is also important to capture the community's concerns over changes in the weather patterns and what has been the individual impact, and the impact on the Tribe as a whole. The following are two simple tools to help you gather local information in a fun and engaging way and almost any age can participate.

Conversation Mapping

Resources Needed: Butcher paper, non-toxic colored pens (Crayola), masking tape, scissors
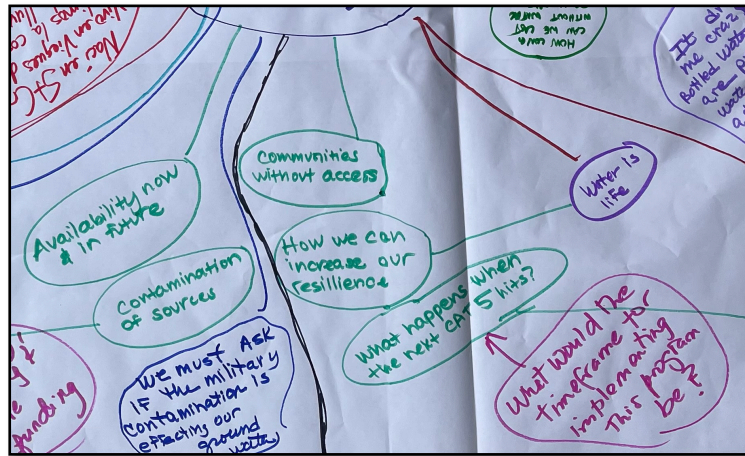

Kewa Pueblo, New Mexico

Conversation Mapping is one of the simplest exercises within the EFCWest suite of systemic tools. This hands-on process allows the user to access stakeholder and community knowledge and concerns in a short time. It can reveal hidden information, identify synergies for issues, and help break through hierarchies that may interfere with the free flow of information.

To begin a map, clear away any chairs and cover a large table (round or square) with butcher paper like you see in the Kewa Pueblo picture to the left. The "conversation" begins with a trigger centered in the middle of the paper. The table should be large enough to allow 8-15 participants to write at the same time. During the exercise, participants can write whatever they think and feel about the trigger, or other participant's comments. They can even argue, but there is no talking.

The trigger that initiates the conversation is extremely important. It can be as broad as *Expectations for the Future* or it can be a more specific concept such as *Climate Change*.

However, climate change is a tough topic, can leave participants in despair, can illicit fear, and may direct the map to be heavily problem centered. In this case, if you have enough people or time to do at least two maps, it is a good idea to include a second map with a more hopeful trigger, which will trigger a conversation about a positive future, such as *Resilient Tribe 2040*. In this way, participants can express their concerns about climate change while also projecting their hopes and ideas for a better future. By capturing both concepts, the organizers will better understand existing vulnerabilities while at the same time gather ideas for a resilient and adaptive future that is specific to the community.

When the Map is complete, either the participants or the organizers can perform the transcription and analysis. One option is to perform a SWOT analysis on the Map. SWOT stands for Strengths, Weaknesses, Opportunities and Threats and can help reveal, both vulnerabilities and potential actions for Tribal resiliency. An example of a SWOT analysis of a Southwestern Tribal Conversation Map is presented below. The trigger in this example was simple: Climate Change.

Ultimately, the SWOT or other analysis can reveal key issues, promote brainstorms, reveal barriers or uncover opportunities, depending on the purpose of the exercise. Ultimately, the goal is to promote inclusion by eliciting multiple perspectives within a brief period of time from all stakeholders. With this tool, even the quietest of attendees has a voice through their pen.

To learn more about Conversation Mapping, go to http://www.efcwest.net/climate-toolkit-tutorials. There you will find three short tutorials on Conversation Mapping: 1) Conversation Mapping Basics, 2) Analyzing a Conversation Map and 3) Facilitating a Conversation Map.

Using SWOT to Analyze a Conversation Map

Strengths

- Water Rights
- Surface and groundwater
- Natural Resources Department
- Alternative water sources
- Securing/ensuring sovereignty
- Language program
- Providing homes for increasing population

Weaknesses

- Lack of funding
- Abandoned traditional farming practices
- Hydro-power – no collaboration – funding – who has authority
- Integrating change – outreach and education,
- Losing sight of traditions
- Cost of maintenance for solar and wind
- Land and location for homes

Opportunities

- Adjudication of water rights
- Exploring other farming methods & technology
- Solar power & Wind power
- Drug and alcohol rehab center – trauma and informed care
- Open a Tribal school
- Making eco-friendly homes
- Rehabilitation of existing homes
- Casino

Threats

- Adjudication of water rights
- Potential of contamination from nearby mining sites
- Potential for wildfire
- More technology affecting traditions and cultures
- Deterioration of existing homes
- Greed - Casino

Gathering Local Information about Climate Change

Resources Needed: Worksheet #3 printouts (or easel paper) and extra pens

While Conversation Mapping will provide a broad discussion about your trigger, it may not get to the specificity needed to understand the level of impacts already being experienced on the reservation or to determine if those impacts are critical. Worksheet #3 below is a useful tool to gather local information about what community members are witnessing on the ground. The worksheet asks four simple questions: 1) What changes are you seeing? 2) Why do you think it's happening? 3) How is it effecting you and/or the Tribe? 4) What if it continues for the next 10 years?

This exercise should not only focus on environmental changes. Participants should be taught to incorporate PESTEL as guidance since political, economic, social and technological changes can be driven by extreme variations in our weather and climate.

Worksheet #3: Local Information Exercise

As the holder of local information, you are the best person to answer the questions below. Please feel free to talk about any changes you have seen, not just those related to weather or environment, such as social, economic, political or technological. Then think about why those changes might be happening and their impact now and in the future. There is no wrong answer.

| 1. What changes are you seeing?	2. Why do you think it's happening?

| 3. How is it effecting you and/or your community?	4. What if it continues for ten more years?

Gathering Local Information about Climate Change

Resources Needed: Easel paper and extra pens

If the opportunity you have to engage Tribal members is in a larger, more public setting (such as a health fair or earth day celebration), you may want to reduce the number of questions, post them on easel paper, and focus on just two: 1) What changes are you seeing? 2) What should the Tribe do about it?
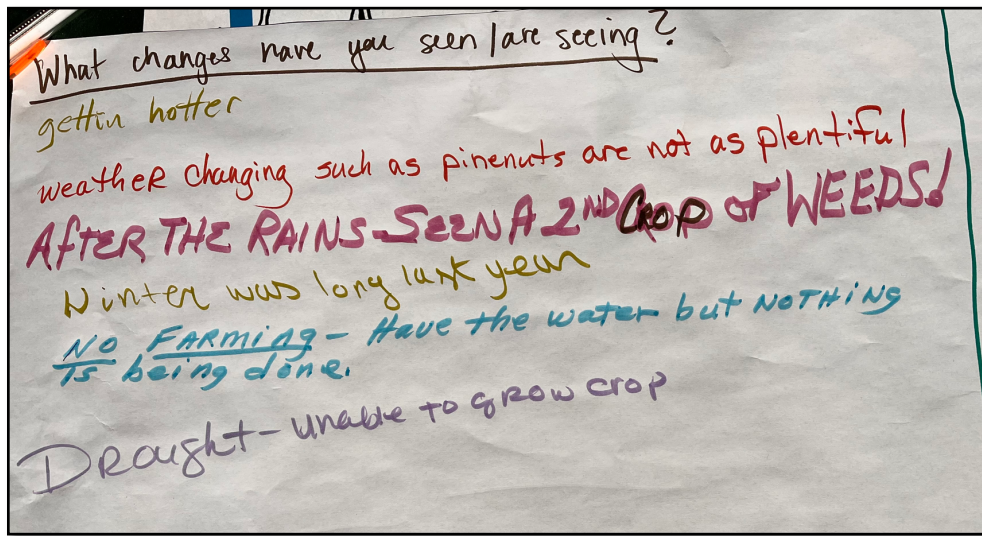
Asking these two specific questions potentially provides the Tribe with both a better understanding of vulnerabilities and the actions you might pursue in response.
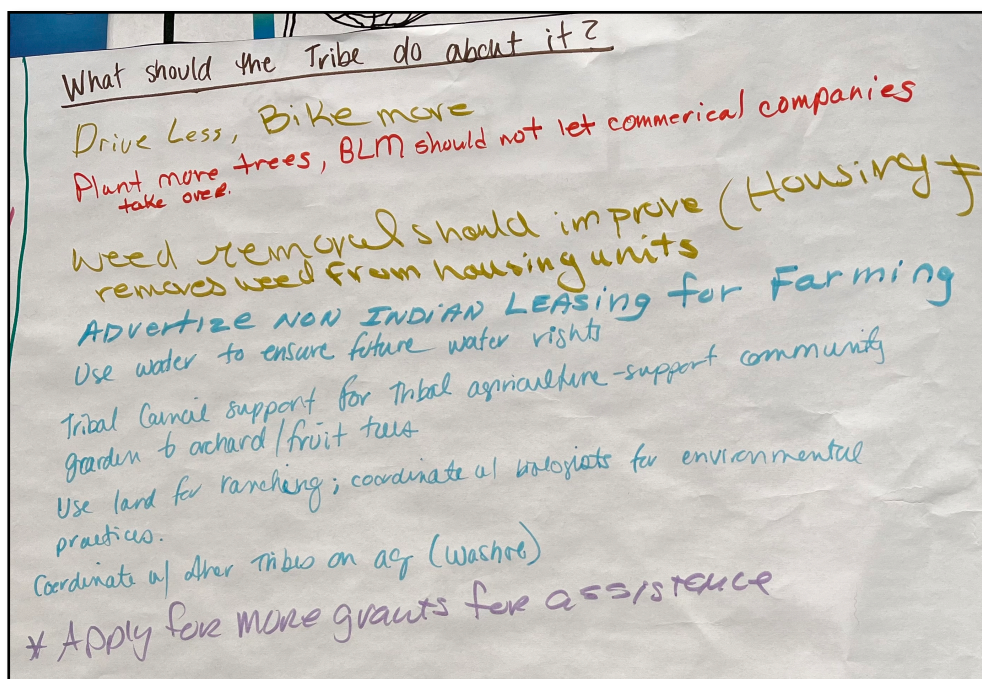
Organizing Your Assets

By now, you should have collected and prioritized your Tribal assets and it is time to organize them for the vulnerability assessment. There are several ways to divide Tribal assets and ultimately it is up to individual users to determine how best to divide what is likely a long list. In general, assets should be divided into larger categories to make them manageable. Potential categories include:

- Infrastructure/Built Environment
- Natural Environment (or Natural Resources)
- Social/Cultural Assets
- Agricultural Assets (for a Tribe that is highly agricultural)
- Economic Assets
- Marine Assets (for a Tribe that is coastal)

Any one of the categories above could be broken down into smaller subcategories. For example, Built Environment could include housing, utilities, government buildings, Tribal businesses etc.

An abbreviated example of an Asset list by category is presented below (you will likely have many more resources to assess). The priority assigned (1, 2 or 3) is based on the Asset exercise (Worksheet #2) in which participants were asked to prioritize their assets as High (1), Medium (2) or Low (3).

Social Cultural	Infrastructure/Built Environment	Natural Resources	Agriculture
1-Care for Community	1-Church	1-Air quality	1-Grazing livestock
1-Art/Artists	1-Clinic	1-Wetlands	1-Beans
1-Cultural Resources	1-Community Center	1-Wildlife	1-Corn
1-Tradition	1-Electrical utilities	1-Reservation land	1-Farming
1-Education	1-Gas Station	1-Range/Grazing	1-Farmland
1-Elders	1-Grader	1-Rio Grande/Rio Galisteo	1-Food
1-Employees	1-Health Center	1-Water - ground	1-Fruit trees
1-Family	1-Housing Site #1	1-Water - surface	1-Greenhouse
1-Human health	1-Housing Site #2	1-Water rights	1-Irrigation ditches & pipelines
2-Fitness Center	2-Bridges	2-Native plants	1-Livestock/animals
2-Cultural sites	2-Library	2-Uplands	1-Chilis
2-Respect	2-Roads	2-Woodlands	1-Melons
2-Tribal Courts	2-Fitness Center	2-Ancestral lands	1-Ag land
	3-Cell Towers		1-Seed Bank
	3-Post Office		2-Private fields
	3-Lift Station		2-Community garden
	3-FEMA Trailer		

Preparing a Vulnerability Assessment

Using Resources from ITEP
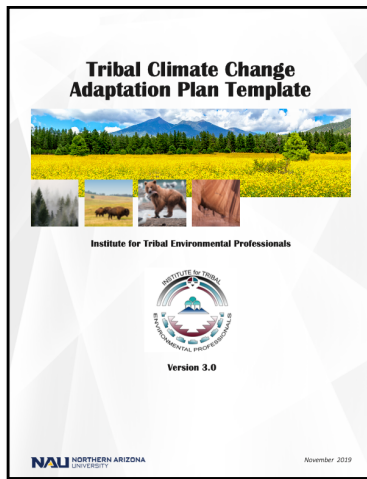
Once you have identified and prioritized your assets, you can move on to a vulnerability assessment. Determining your vulnerability will feel more like an art than a science because there is little accuracy to the climate predictions. That said, we can work with generalities to at least understand where we may be vulnerable to weather extremes. In many cases, we can build vulnerability scenarios from the climate and events we have already seen or are beginning to witness. Simply put, if it has already happened and/or is occurring more frequently such as 100-year floods every ten years, or prolonged droughts, then we should plan for extreme floods and extreme droughts in the future.

For an in-depth dive into vulnerability assessments and adaptation planning, go to the Institute for Tribal Environmental Professionals (ITEP) website and download their Adaptation Toolkit: http://www7.nau.edu/itep/main/tcc/Resources/adaptation

ITEP's toolkit is a great resource and designed specifically for Tribes. According to ITEP, here are some things to consider when assessing Tribal sensitivity and vulnerability:

- Are there already existing stresses on the system?
- Relevant climate conditions and how they affect the system
- How the stresses on the system will change with changing climate conditions
- Will the demand for a resource increase with climate change?
- For plant and animal species, is the species of concern located near the edge of its range?
- Is there an impact threshold associated with the system? (for example, a temperature threshold for cold water fish)

The ITEP approach is extensive but also built to be easily adapted to individual Tribal needs. The ITEP planning spreadsheet incorporates almost all elements of the vulnerability assessment and adaptation planning process, from breaking down categories such as built environment, into sectors (ex., utilities) and planning areas (ex., water), to identifying impacts, timing, vulnerability, risk and adaptation goals and actions. The spreadsheet also includes columns to help identify the required authority and potential funding needed to develop adaptation goals.

While ITEP segments their analysis by category, others may choose to divide the assessment by climate impact. A simplified example is presented below where Built Environment is segmented by specific extreme weather (drought and heat) and then further broken down into sector (ex. housing). In this example, health impacts are a critical indicator for determining whether or not a specific area within the sector is a high priority. Clearly the more modern

housing at the Western and Northern complexes can withstand the demands of a prolonged drought as is evidenced by the drought they are currently experiencing and the low impact of droughts in the past. As a result, they are not a high priority for adaptation planning. The older homes in the village and by the river, populated by high numbers of elders and children, are much more vulnerable, having experienced high impacts from the current drought and in the past. As a result, they have a much lower capacity to adapt, are extremely vulnerable and have the potential for high levels of health impacts. Village housing and the river area will be a high priority sector for adaptation planning.

Built Environment	General Impacts	Happening Now?	Happened in Past?	Capacity to Adapt	Vulnerability Level	Health Impacts	Priority
Drought/Reduced Precipitation/Increased Heat							
Housing - Modern (Post 1995)							
Western complex	Higher demand for air conditioning, water	Yes 3rd Drought year - low impact	Yes Past droughts - low impact	High	Low	Low	Low
Northern complex	Higher demand for air conditioning, water	Yes 3rd Drought year - low impact	Yes Past droughts - low impact	High	Low	Low	Low
Housing - Older (Pre-1950)							
Village housing	No air conditioning, overheating homes, high demand for fans and cooling areas, high elder impact	Yes 3rd drought year, elders experiencing heat stress; unable to plant gardens - high impact	Yes Past droughts brought illness and some deaths due to extreme heat – high impact	Low	High	High	**High**
Southern river area	No air conditioning, overheating homes, high demand for fans and cooling areas, high number of children impacted	Yes 3rd drought year, children experiencing heat stress; unable to play outside – high impact	Yes Past droughts caused illness and some hospitalizations due to extreme heat – high impact	Low	High	High	**High**

Testing Your Vulnerabilities Against System Knowledge

Once you have worked through your vulnerabilities you may find that you are overwhelmed by the number of high priority issues. However, upon review, most assets can be grouped by similar vulnerabilities. For example, under a high heat scenario, housing, clinics, community

centers, senior centers and schools may all be susceptible to higher air conditioning/cooling needs and costs, and in the case of emergency services, higher demand for transport and treatment for heat related illnesses. Important crops and livestock may be equally susceptible to drought, flood and high heat, which will all require water conservation and management. Vulnerabilities broken down by individual plant (corn, beans, squash) or livestock type (chickens, goats, cattle) can be daunting, yet the overall impacts are similar and can be addressed together.

Probably more important at this point in the process is to ensure that the vulnerabilities that have been identified and prioritized are truly reflective of the community. Climate weaknesses should be presented to community members who should then be able to add their own input into the process. In some case, you may find that what you thought was a vulnerability has actually already been addressed. You should also find that sourcing the collective knowledge of the system (your community) will provide new insights into exposures and potential adaptive measures. One tool that is useful for community input is called a Wind Tunnel. The Wind Tunnel can be implemented in a single setting for multiple stakeholders, or it can travel to different departments and groups, allowing input from throughout the reservation.

Implementing a Wind Tunnel

Resources Needed: Butcher paper, Post-its, masking tape, scissors, yard stick/straight edge, extra pens

A Wind Tunnel is a planning tool that can test your vulnerabilities against various future climate scenarios. This tool helps you to understand the level of your resilience, reduce future conflict and identify and prioritizes exposures. In addition, a Wind Tunnel lets you test your long-term sustainability against those futures that are highly unlikely but if they happen, could be devastating to your operations. Wind Tunnel results can be incorporated into strategic planning and climate plans.

Like a Conversation Map, developing a Wind Tunnel starts with large pieces of butcher paper covering a square table as shown in the picture above. Draw a grid with the approximate dimensions of 6 feet wide and 5 feet high as shown in the Sample Wind Tunnel Grid below. You will need one large black magic marker to draw the grid and Post-It notes, enough for each person around the grid to write at least 10-20 thoughts. However, make sure you have plenty of extras because some people will have more than 20. Extra ballpoint pens are also a good idea, just in case.

Across the top of the grid you will write your vulnerability scenarios in each column which can be as broad as "5-Year Drought Continues" or as specific "5-Year Drought Leaves Tribe's Reservoir Dry," as you like. You will also assign a scenario date and write it in the upper left box

(ex., 2035), since these are future scenarios. Down the left side of the grid you will list the important stakeholders needed to provide input on the scenarios. The Sample Wind Tunnel Grid includes both general and specific scenarios. The Wind Tunnel participants role is to write on Post-its what they think life will look like for each set of rights holders and stakeholders under each vulnerability as shown in the Sample Wind Tunnel Segment. After participants populate the grid with their Post-its, the group will discuss and analyze whether or not they feel the Tribe is resilient (the last row in the Sample Grid) under each vulnerability.

Sample Wind Tunnel Grid

Vulnerability Scenarios

2035	3 Months (Aug-Oct) of 95+ degree heat	Severe storms destroy 45 homes, cause mold in 100s	Summer fires shroud reservation in smoke for 4 months	Winter is 2 months shorter; Summer is 2 months longer	5-Year drought leaves rivers dry
Community (includes youth/elders)					
Tribal Council					
Emergency Services	Stakeholders				
Environmental Department					
Farmers & Ranchers					
		Resilient?			

Sample Wind Tunnel Segment

| 2025	3 Months of 95+ degree heat	Severe storms destroy 45 homes, cause mold in 100s	Summer fires shroud reservation in smoke for 4 months	Winter is 2 mths shorter, summer is 2 mths longer	5-Year drought leaves rivers dry
Community (includes youth/elders)					
Tribal Court					
Emergency Services					
Environmental Department					
Farmers & Ranchers					

2025	3 Months (Aug-Oct) of 95+ degree heat
Community (includes youth & elders)	Classrooms are too hot to learn in, homes are too hot to study, children are fighting Electrical bills are going through the roof Heat related illnesses are increasing, elders & children are experiencing heat stroke Outdoor activities are extremely difficult including agriculture and exercise

Actual Wind Tunnel

The photo below shows the beginning of an actual wind tunnel for a Southern California Tribe with scenarios occurring in 2033. The stakeholders included Tribal Administration, Safety and EMS, Natural Resources and Services and Community. The scenarios included the following:

- Temperatures are over 105 degrees for 6 weeks,
- 7 Atmospheric rivers in 1 winter with 14 inches of rain in each event,
- 10 Year drought with 1 inch of rain per year,
- Valley fever outbreak with 30% infection rate and 10% death rate, and
- Federal balanced budget bill passes! 30% cuts implemented across all government departments and agencies.
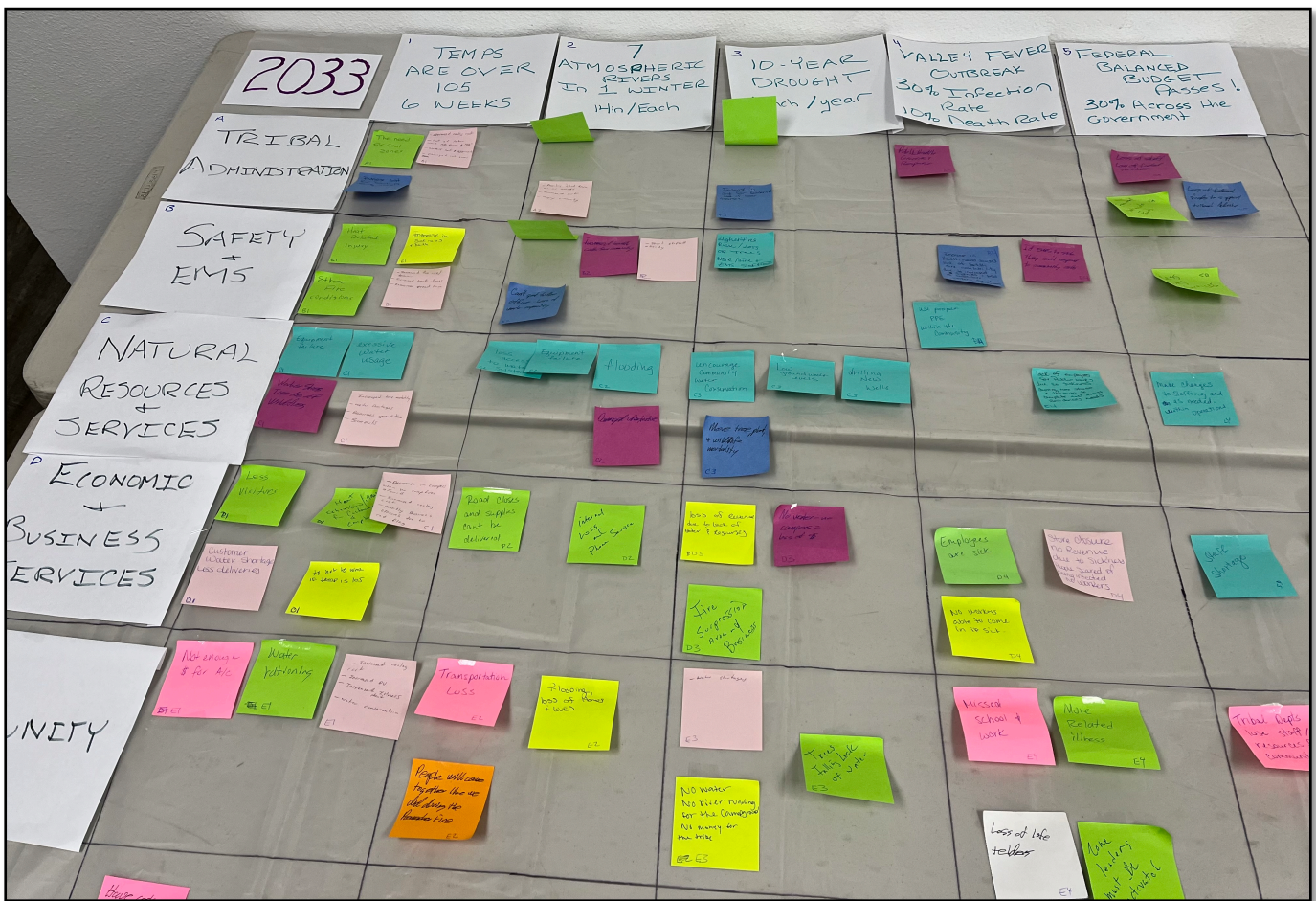
To learn more about the process of Wind Tunneling, go to http://www.efcwest.net/climate-toolkit-tutorials.

Assessing Resilience

At the end of this exercise, you should have a full Wind Tunnel(s) with input from most if not all of your important stakeholders. Now is the time to think about solutions. In some cases, you may find that the Tribe has already taken the necessary measures to be resilient for some vulnerabilities, such as a prolonged drought or heatwave, but less so for others, like a major storm or flood. Discussing the vulnerability scenarios with multiple stakeholders, should provide insights and potential opportunities for the Tribe to pursue. For example, it may be determined that while you have planned for a public cooling space during a brief heat wave, too many homes still lack air conditioning and there may not be enough shared spaces to support all vulnerable populations. At this point you can work with Tribal members and departments through staff and community meetings to identify opportunities for improving the resilience of the Tribe, such as writing grant proposals to develop evaporative cooling systems in homes or developing more community cooling areas where members can escape the heat. These are your adaptation measures that will help the Tribe become more resilient.

Accessing community input on preferred adaptation measures can include Conversation Mapping at public events as described earlier in this toolkit, small workgroups, online social media questions and presentations, and online and in-person surveys. Basically, however you have successfully obtained community input in the past will be your best option for gathering new insights. Most importantly, when asking members how best to address vulnerabilities, they should be able to describe:

- What should be done,
- How it should be done, and
- Why it is the best way to address vulnerabilities.

Building the Adaptation Plan Table

An adaptation plan table should be developed for quick review and will likely have multiple adaptation opportunities. In order to present these opportunities to the Tribe, it will help to have a simplified format that briefly describes the vulnerabilities and impacts, followed by adaptation options. The example below was drawn from a larger adaptation plan that assessed climate impacts (drought/increased heat, fire and smoke, floods/severe storms/freezes, and warmer/shorter winters) on built environment, social/cultural, agriculture, and natural resources. More specifically, the example provides an overview of the vulnerabilities and impacts from floods/severe storms/freezes, and then identifies adaptation opportunities for community members which were included under social/cultural.

Flood/Severe Storms/Freezes

Have Floods, Severe Storms and Freezes occurred in the past? Yes, major floods occurred in the 1700s and 1800s destroying parts of the village. In 2010 and 2013 hail storms caused major damage to homes.

Are Floods, Severe Storms and Freezes occurring now/recently? In 2021, all of the state experienced drought. When heavier precipitation falls on drought-hardened or wildfire-transformed soil, which has a reduced ability to absorb moisture, more of the water runs off into streams instead of percolating into the ground. This can lead to flash floods, as occurred in 2014.

Social/Cultural: Community Members

Impacts:

1) Increased risks of temporary or long-term housing relocations due to disruptions of critical infrastructure affecting homes, schools, community infrastructure and livelihoods;
2) Loss of farmland and agriculture leading to reduced nutrition options;
3) Injuries from storm impacts including loss of life.

Assets	Adaptation Measures
Community/Families	1) Develop risk assessment plan to identify threatened households and individuals; 2) Educate Tribal residents on household health issues due to mold and flooding; 3) Identify/understand current health needs and how they may be impacted by extreme weather events; 4) Identify emergency food options in response to crop damage and loss of agricultural land.
Elders	1) Support and strengthen multigenerational homes; 2) Develop risk assessment plan to identify threatened households and individuals; 3) Identify/map homes where elders live alone and may need additional support. 4) Subsidize home weatherization to reduce health issues due to mold and flooding;
Youth/Children	1) Develop risk assessment plan to identify threatened households and individuals; 2) Create more opportunities to link elders with youth; 3) Provide indoor opportunities for youth activities.

What Comes First: Ranking Your Adaptation Options

Now that you have gone through the process of identifying your assets and prioritizing your vulnerabilities, and identifying adaptation opportunities, it is likely that you will have quite a number of high priority sectors with a large number of adaptation measures. In order to determine what sectors should be addressed first, it may be necessary to develop ranking criteria. Worksheets 4 and 5 that follow on pages 22 and 23, provide some simple examples of how to assess what vulnerabilities need to be addressed first.

When establishing criteria, you may find that you want to prioritize certain elements over others. For example, if your most important asset is culture, then you may want to further break down elements of culture so that it receives more points under the scoring process, and you can prioritize the specific elements. Rather than having a single criterion for an action such as "Protects Tribal Culture" you could expand this category to include:

- Protects and Advances Tribal Language
- Protects and Advances Tribal Cultural Practices
- Protects and Advances Tribal Cultural Sites

By expanding the cultural criteria, you have created a system where cultural protection is more heavily weighted than other elements such as cost or economic development. The following two worksheet examples emphasize two different areas of importance, community and environment.

Worksheet #4: Environment, focuses on protecting the environment and assigns the highest level of points to those actions that will protect water, agriculture and the pristine nature of the land.

Worksheet #5: Economic Development, favors jobs and revenue over other factors.

Worksheets 4 and 5 present two different ways of scoring and two different sets of criteria for the same action: expanding casino operations to include a hotel and resort. Depending on the criteria and weighting system, the casino expansion receives both high and low scores. Economic development ranks high in Worksheet #4 but cannot win the debate when competing against criteria that are weighted to protect the environment. In Worksheet #5, the project will clearly harm the environment, but the criteria are weighted towards development.

The criteria you choose will be unique to the Tribe and should be developed with the support of community members. A well-developed ranking system will allow you to move forward with adaptation measures that respect and respond to the criteria the Tribe values most. In addition, an accepted ranking system allows the staff to move forward on projects with the knowledge that they are being guided by community preferences.

Worksheet # 4: Environment

Action: Casino Expansion

Criteria Categories	Score			
	Low (3)	**Medium (2)**	**High (1)**	**Score**
Cost (Estimate funding needs and resources)			*Very expensive*	1
	High (3)	**Medium (2)**	**Low (1)**	**Score**
Protects Water Resources (Protects and improves ground and surface water)			*This will increase water use harm runoff*	1
	Improves (3)	**Protects (2)**	**No Impact (1)**	**Score**
Support Tribal Member Health (Ensures and/or improves the health of Tribal members)		*Additional funding could improve health*		2
	High (3)	**Medium (2)**	**Low (1)**	**Score**
Supports Community Agriculture (Protects Tribal agricultural lands and land use)			*This project will convert ag lands to casino use*	1
	Benefits (3)	**No Impact (2)**	**Harms (1)**	**Score**
Protects Natural Resources (Protects Tribal natural resources, protects air quality and preserves natural balance of the reservation)			*Expansion will increase traffic, harm air quality and impact the pristine nature of the Tribal lands*	1
	High (3)	**Medium (2)**	**Low (1)**	**Score**
Economic Development (Brings job and funding to the Tribe)	*This will bring both*			3
Total Score				**9**

Worksheet #5: Economic Development

Action: Casino Expansion

| Criteria Categories	Points					Score
	5	**4**	**3**	**2**	**1**	**Score**
Job Creation	Creates jobs for all levels of community members	75% of community members can access jobs	50% of community members can access jobs	25% of community can access jobs	Less than 25%	5
Cultural Use	Supports 100% of community practicing cultural traditions, etc.	Supports 75% of community practicing cultural traditions, etc.	Supports 50% of community practicing cultural traditions, etc.	Supports 25% of community practicing cultural traditions, etc.	Less than 25%	1
Tribal Financial Sovereignty	Provides high-level of Tribal financial sovereignty	Provides medium-level of Tribal financial sovereignty	Provides low-level of Tribal financial sovereignty	Potential for Tribal financial sovereignty	No impact	5
Environmental Protection	Improves the environment	Increases protection for the environment	Prevents threat to the environment	No impact	Causes harm	1
Generates Tribal Revenue	Fosters high level of revenue generation	Fosters medium level of revenue	Fosters low level of revenue	Provides jobs only	No impact	5
Total Score						**17**

Creating a Prioritized Adaptation Plan Table

As one of the final products you may want to create a simple table that identifies all the proposed adaptation measures and how they ranked based on the criteria deemed most important by Tribal members. The table below emphasizes and is weighted towards human health, elder and youth, housing and culture protection. For each of these elements a score of "3" is high, "2" is medium and "1" is low. In addition, the table also assesses cost. If the cost is high, the scoring is the opposite and it receives a "1", "2" for medium and "3" for low. In this way, those measures that received the highest scores were those that were the most protective and required the lowest financial cost.

Adaptation Measure: Drought & Heat	Protects Health	Protects Elders & Youth	Protects Housing	Protects Culture	Cost	Total
Regularly update communications plan including emergency texting capacity, door to door outreach and social media	3	3	3	3	3	15
Support and strengthen multigenerational homes	3	3	3	3	3	15
Develop smoke ready education material (including printed, broadcast and social media platforms)	3	3	3	3	3	15
Work with county leaders to better identify Dam risks, responses and potential adaptation measures	3	3	3	3	3	15
Integrate TEK into adaptation measures	3	3	2	3	3	14
Develop fire/smoke emergency response plan	3	3	3	3	2	14
Identify a Resiliency Education Center, where community members can go to learn about climate-related hazards and other effects, how to prepare and respond to them, and enhance community connections to increase adaptive capacity.	3	3	3	3	2	14
Develop and implement emergency plans and funding to prevent long-term displacement due to extreme weather events	3	3	3	3	2	14
Maintain community garden & grow food locally	3	3	1	3	3	13
Continue maintaining and using outdoor education circles	3	3	1	3	3	13
Provide weather stripping for vulnerable homes	3	3	3	1	3	13
Set up a community Facebook page to keep members informed	3	3	3	1	3	13
Educate on eating/using and harvesting edible/medicinal plants	3	3	1	3	3	13
Build storytelling opportunities and ways to transfer knowledge	3	3	1	3	3	13

Using Backcasting to Plan for Adaptation

Resources Needed: Butcher paper, black felt tip pens, Post-its, masking tape, scissors, extra pens
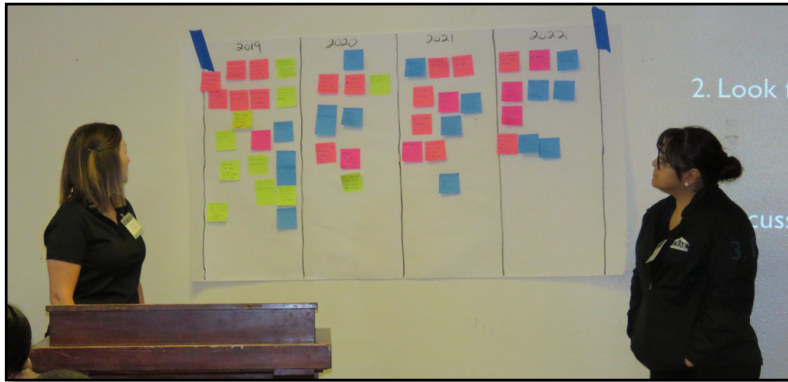
Once you have developed the criteria to prioritize your adaptation options, you should have a short list of those measures you plan to pursue first. In some cases, it may be as simple as identifying a project and writing it into your General Assistance Program (GAP) or other funding plan. However, other priorities may be more challenging, and you may be wringing your hands trying to figure out the steps necessary to actually realize your efforts. This final tool, Backcasting, can help you organize your efforts to effectively plan for and implement adaptation measures.

With Backcasting, you will start at the point of success (or a goal), for example, constructing a solar farm to take Tribal housing off-grid, and work your way backwards to determine what steps need to be taken and when, to reach your goal. The following Backcasting example tracks an effort to end all illegal dumping on a reservation. Like many of the tools discussed above, you will need butcher paper, Post-its and pens for this exercise. Create a simple grid, as shown below, on large butcher paper, with labels for each year up to when your goal is achieved (the example below is also split into half years, which may help to estimate timing of events). Next, use Post-its to write out specific actions, tasks, milestones that need to happen so you can ultimately achieve your goal. Once you decide on an item, consider what essential steps that need to happen before and possibly after that event, in order to achieve your goal. Write down each item on a separate Post-it and place on the grid in the time frame it needs to happen. Create a grid for each significant goal and repeat the process.
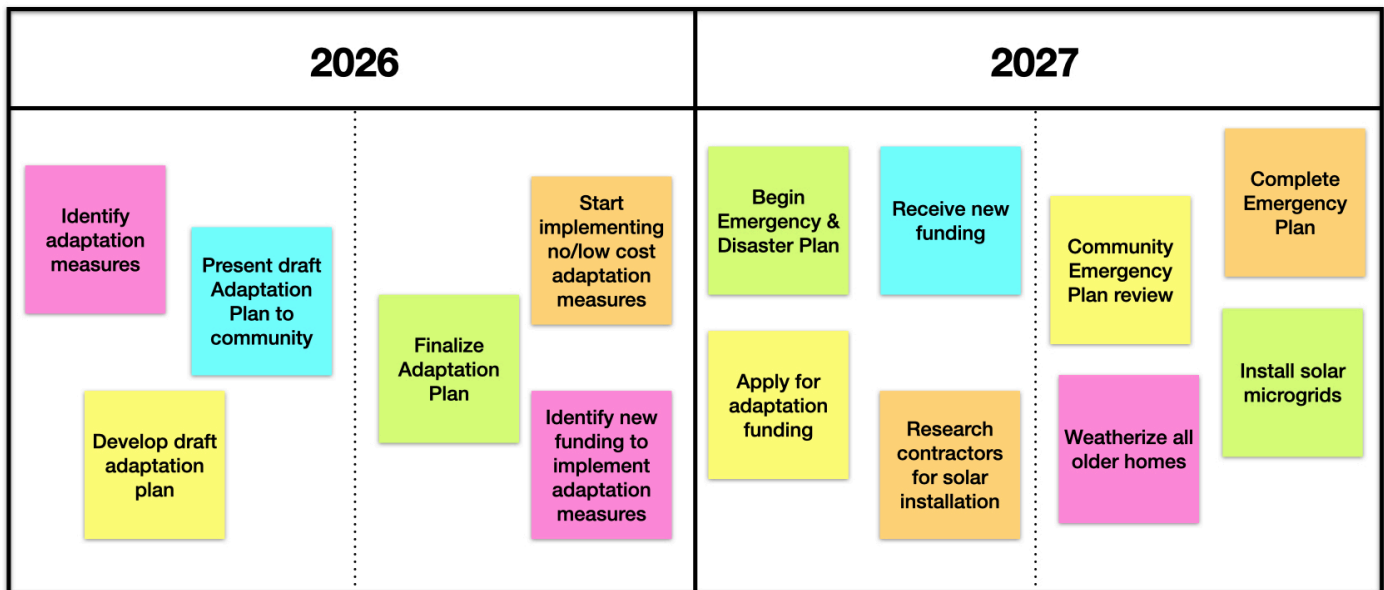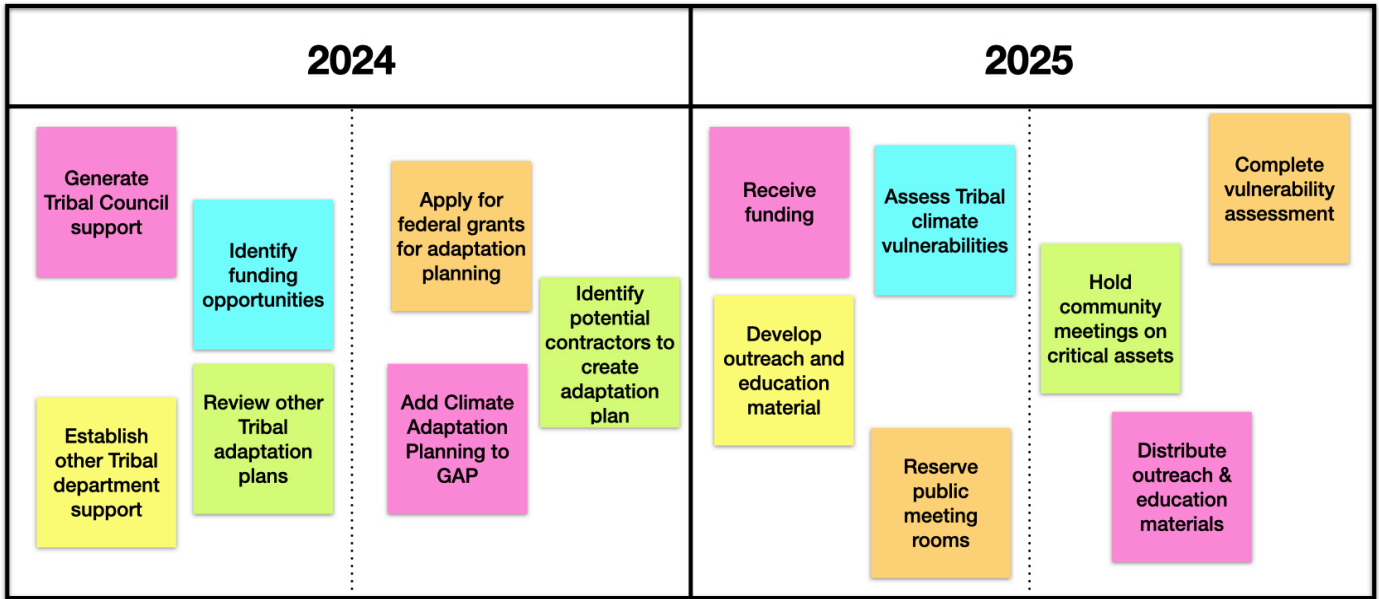
Backcasting Grid

2024		2025		2026		2027	

After you've populated the grid(s), use PESTEL (p. 6) to ensure that you incorporate a systemic view of what needs to happen in order to succeed. Are there political considerations you may have forgotten? Do you need money? Do you need community input? What other political, environmental, social, technological, economic and legal factors, stakeholders and issues need to be included in your efforts. You can work backwards (i.e. in half years) or simply place your Post-its wherever you think they need to go (popcorn style). We use Post-its so we can generate as many ideas as possible and move them into different timelines. As you go through the process, you will likely notice that some steps need to happen before others, or that a major step needs to happen early to make others possible. For example, in the case of building a solar array to take residential building off the grid, you would likely need a study, but first you need to secure funding in order to conduct the study.

The following Backcasting example is broken into four years, ending with solar mini-grids, home weatherization and a completed Emergency and Disaster Plan by 2027. This example only includes the major points — your Backcast will have many more Post-its that lay out the steps to arriving at your goal. In this example, participants recognized that there needed to be Adaptation Plan funding and Tribal Council and Department support secured in year 1, before they could successfully move forward. In 2025, they assumed that funding would be awarded and that a vulnerability assessment would be completed by the year's end, which would enable adaptation planning and implementation to begin in 2026.

Climate Adaptation Planning & Implementation – 2024-2027

2024	2025
Generate Tribal Council support · **Identify funding opportunities** · **Establish other Tribal department support** · **Review other Tribal adaptation plans** · **Apply for federal grants for adaptation planning** · **Add Climate Adaptation Planning to GAP** · **Identify potential contractors to create adaptation plan**	**Receive funding** · **Develop outreach and education material** · **Assess Tribal climate vulnerabilities** · **Reserve public meeting rooms** · **Hold community meetings on critical assets** · **Distribute outreach & education materials** · **Complete vulnerability assessment**

Conclusion

Preparing a Climate Vulnerability Assessment and Adaptation Plan can be complicated, but it doesn't have to be. There are numerous tools and approaches available online for free that will help you through the process. The tools in this guidebook are designed specifically to engage the community and gather as much stakeholder input as possible. You can use them all as you progress through the process, or you can pick and choose what bests fits your situation. We hope you find them useful, and we value your input. Please reach out an let us know what worked, what didn't and if you modified the tools to work with your own approach.

Good luck!