

Developing Your Climate Data Story with The Northwest Climate Toolbox (Handout 3)

About this Handout—This handout will help you develop your climate data story for the CIRC Spokane Community Adaptation Project (SCAP) by marrying your expertise and on-the-ground knowledge of the Spokane area with the Northwest Climate Toolbox and the data it provides. Consider this handout a reference that you can draw on as you work with the Toolbox.

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Climate Data Story—a narrative outlining the climate conditions your community faces.

About the Toolbox—The Northwest Climate Toolbox is a virtual toolbox of applications designed to help decision makers and resource managers respond to and prepare for climate impacts in the Pacific Northwest.

About CIRC—The Pacific Northwest Climate Impacts Research Consortium (CIRC) is a climate-science-to-action team funded by the National Oceanic and Atmospheric Administration’s (NOAA) Regional Integrated Sciences and Assessments (RISA) program.

Resources:

- Northwest Climate Toolbox—climatetoolbox.org.
- CIRC website—pnwcirc.org.



Navigating the Toolbox

Every tool in the Toolbox is a little different; however, there are common features and designs to keep in mind.

About the Tools

Tools in the Toolbox are organized according to four broad climate impact-related categories:

- **Agriculture**—climatetoolbox.org/agriculture
- **Climate**—climatetoolbox.org/climate
- **Water**—climatetoolbox.org/water
- **Wildfire**—climatetoolbox.org/wildfire



Common Navigation Features

Common navigation features are displayed as buttons found at the top right of a tool's page. These include:

- **Documentation**—provides you with information on:
 - **Source**—documentation concerning the tool's data sources.
 - **Variables**—an explanation of the variables used.
 - **Calculation**—an explanation of the calculations made by the tool.
 - **Tool**—a rough description of the tool, its potential use, and its collaborators and funders.
- **Example**—provides you with an example of how the tool could be used.
- **Take a Tour**—guides you through a tool's functions and capabilities.
- **Cite Tool**—describes Creative Commons licensing used and guidance on how to cite a figure developed using the tool.

Querying the Toolbox

Querying the Toolbox is a process of whittling and pruning. Start broad and then refine your climate-related question. Let the information from the Toolbox guide you to a more focused question.

1. Identify Your Climate Question

Frame your climate question by considering a climate condition or impact that currently affects your community or that you are concerned will affect your community in the future.

Tip:

- Climate impacts are effects on human communities and natural systems that result from changes in the climate. Climate impacts can result from human-caused climate change or from natural climate variability. Climate impacts covered by the Toolbox include drought, wildfire, and growing conditions.

2. Pick a Climate Category

Once you have a climate question in mind, choose a climate category that best fits your impact.

- *Agriculture*—climatetoolbox.org/agriculture
- *Climate*—climatetoolbox.org/climate
- *Water*—climatetoolbox.org/water
- *Wildfire*—climatetoolbox.org/wildfire

Tips:

- If you're interested in a broad climate impact, consider dividing your inquiry into pieces. For instance, climate impacts to human health can include poor air quality due to smoke (*Wildfire*) and impacts from rising temperatures, including heatstroke (*Climate*).
- Climate categories often share the same tools and variables.

3. Pick a Tool by Considering Time and Space

Now it's time to pick a tool. Consider the timeframe and location/geographic area you are interested in by asking yourself two questions:

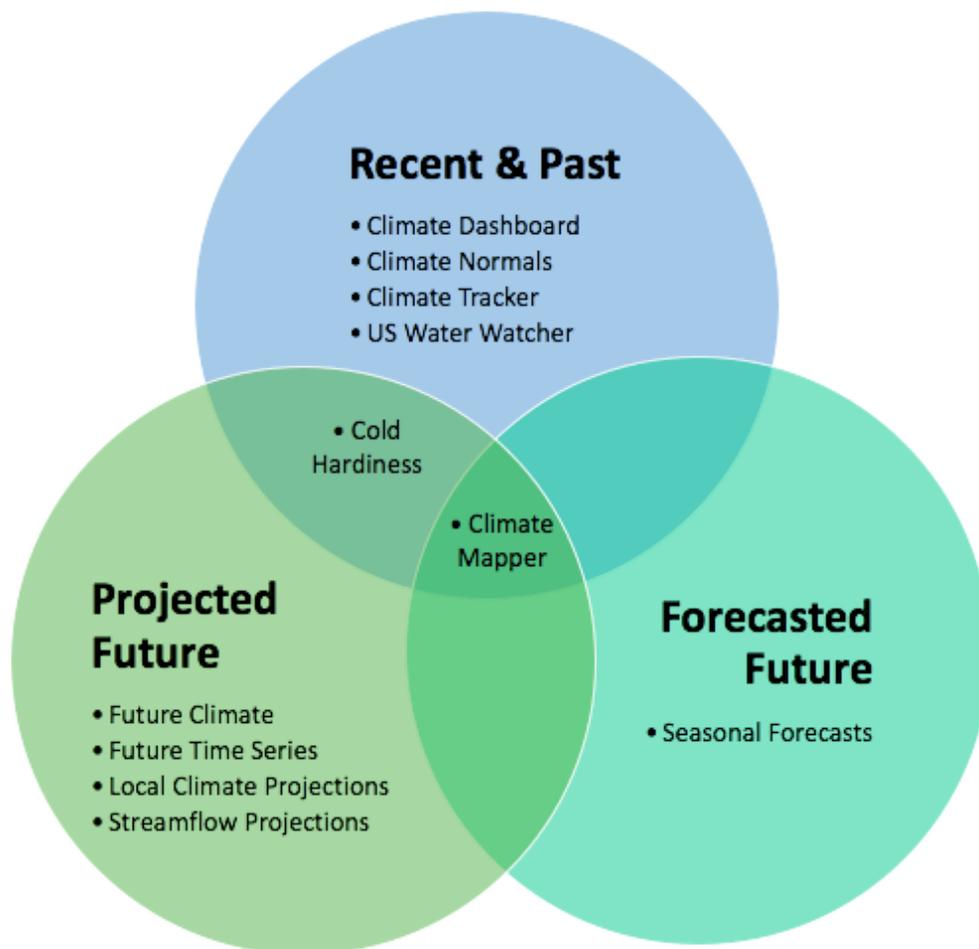
- Am I interested in past, present, or projected future conditions?
- Do I need a tool that includes a mapping feature so I can consider a large geographic area or will a specific location work?

A. Consider Time When Picking a Tool

The Toolbox uses three basic categories to represent time:

- **Recent & Past Conditions**—examines current climate conditions and how they stack up to conditions experienced in recent decades.
- **Forecasted Future Conditions**—provides short-term (on the order of months) climate and weather forecasts.
- **Projected Future Conditions**—provides long-term (on the order of decades) climate projections.





Tools Sorted by Time

Note: Projected Future Scenarios and Representative Concentration Pathways

Representative Concentration Pathways (RCPs) are used as proxies for the warming associated with CO₂ and other greenhouse gasses. RCPs are the standard used to represent future emissions of greenhouse gases, also called *emission scenarios*.

While a broad range of scenarios exist, the Toolbox uses just two RCPs:

Higher Emissions Scenario (RCP 8.5)—considers the current trajectory of increased greenhouse gas emissions and population growth through the end of the century with nominal policies to reduce emissions. This “business as usual scenario” assumes warming will continue at its current high rate.

Lower Emissions Scenario (RCP 4.5)—considers a curtailment in greenhouse gas emissions through greenhouse gas mitigation efforts. Assumes warming will continue but will slow from its current rate.

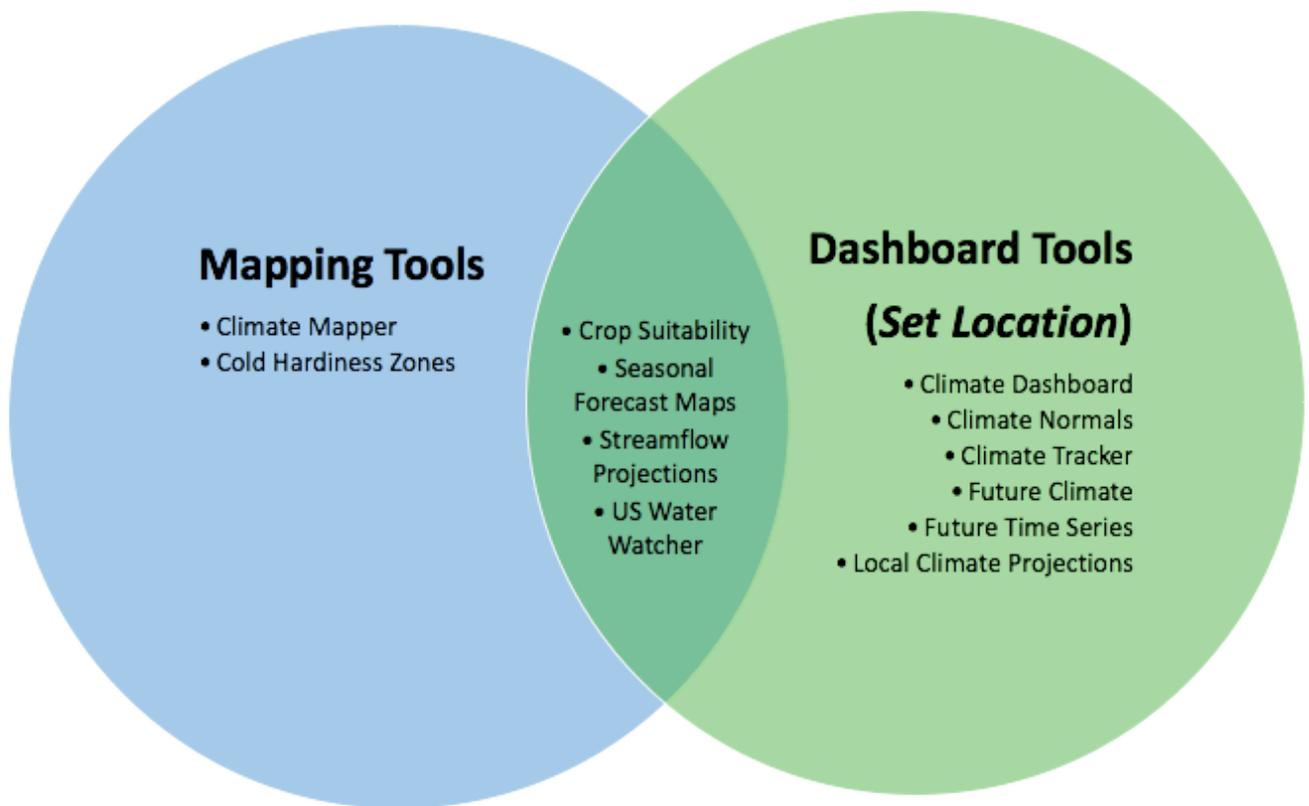
Projected Future Scenarios employing RCP projections can be viewed for the early (2010–2039), middle (2040–2069), and late decades (2070–2099) of this century.

B. Consider Location/Geographic Area When Picking a Tool

Considered spatially, Toolbox tools have two main designs:

- **Mapping Tools**—tools that display climate data on maps of the United States.
- **Dashboard Tools (*Set Location*)**—tools that create graphs and other visualizations for specific locations using climate data.





Tools Sorted By Mapping and Dashboard (*Set Location*) Functions

Tip:

- When framing your climate question for your location/geographic area, ask yourself whether your climate question includes just the Spokane region or whether a larger region should be considered.
 - **Mapping Tools**—useful when considering region-wide impacts that also create local impacts, such as impacts to the regional watershed from changes in mountain snowpack or impacts to the regional airshed due to smoke from fires, which may or may not burn locally.
 - **Dashboard Tools**—are useful when considering narrower local climate impacts and concerns, such as average maximum temperature and average minimum temperature.
- **Setting Your Location**
 - **Mapping Tools**—allows you to set specific geographic locations by
 - Clicking on a map
 - Typing in a location
 - Typing in a coordinate using degrees of longitude and latitude
 - **Dashboard Tools**—allow you to set specific geographic locations by using a *Set Location* function to view specific data for that location.

4. Pick a Variable in Your Chosen Tool

Variables differ from tool to tool, ranging from simple metrics to more complex ones. Variables can be viewed in their simple, raw form or expressed as percentiles or anomalies. Choose from the list of variables most relevant to your climate condition or impact question.

5. Calendar Time Periods—Considering Time Again

Climate conditions and impacts can differ significantly during different times of the year. Along with allowing you to examine variables across past, present, and projected future climate conditions, the Toolbox also allows you to examine variables across specific *Calendar Time Periods*, including:

- *Yesterday* (literally yesterday)
- *Last 7 Days*
- *Last 15 Days*
- *Last 60 Days*
- *Last 90 Days*
- *Since the 1st* of each calendar month (*Since Oct. 1st*, *Since Jan. 1st*, etc.)
- *Winter* (Dec/Jan/Feb)
- *Spring* (Mar/Apr/May)
- *Summer* (June/July/August)
- *Fall* (Sept/Oct/Nov)
- *Annual* (conditions across all months of the year)

Tip:

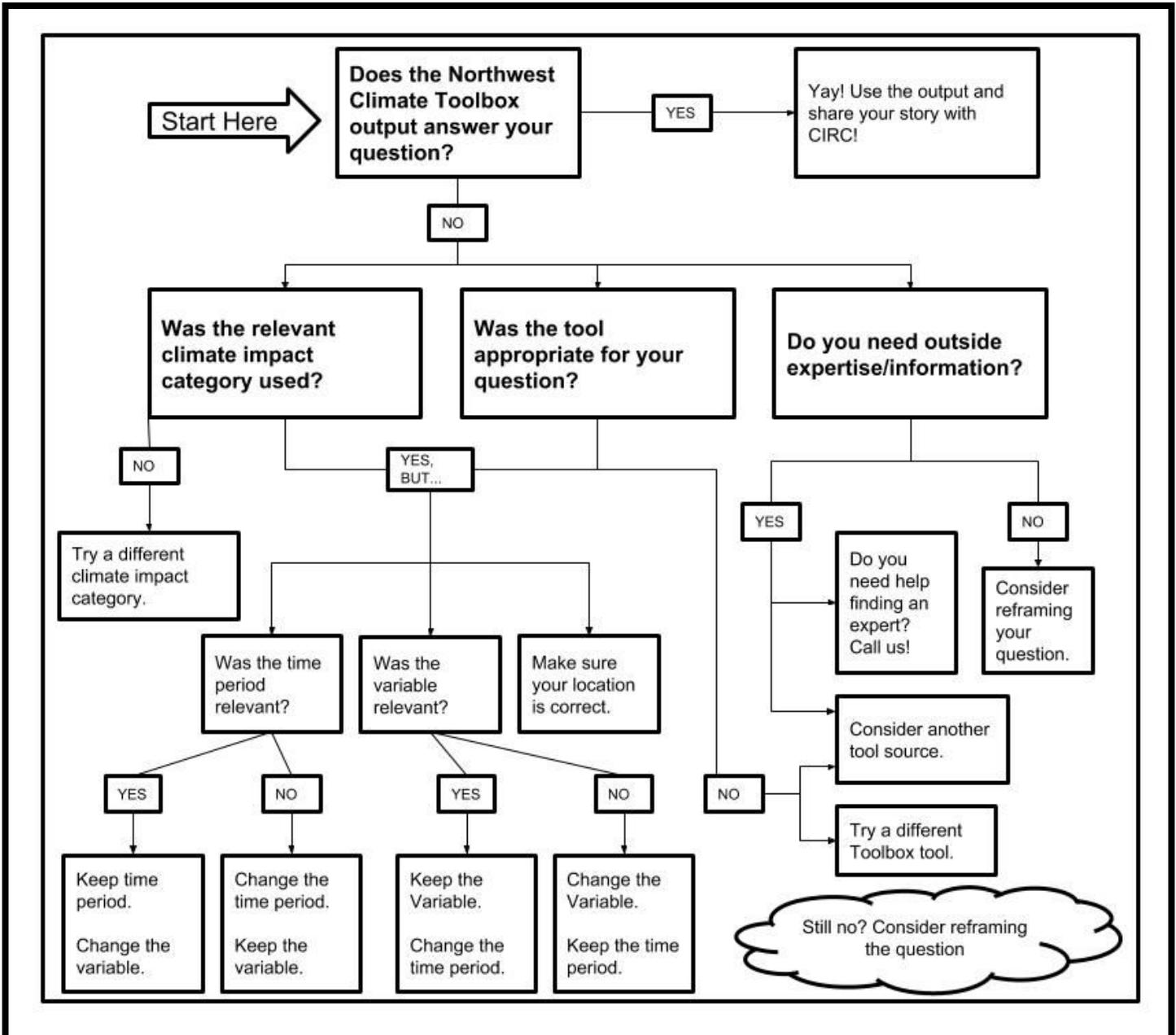
- Compare multiple time periods when asking your climate question. For example, it might have rained more than normal over the past 7 days, but less than normal over the past 90 days.



Assessing Toolbox Outputs

The following section will help you assess whether the Toolbox has answered your climate question or if you need to take additional steps to get your answer.

Northwest Climate Toolbox Climate Data Story Flowchart



Tip:

- Querying the Toolbox takes practice. Keep playing with it and be patient. If you continue to struggle, give CIRC a call and we will help.



Downloading and Citing Your Results

To tell your Climate Data Story, there is a short list of to-dos you should perform to download and cite your work.

Downloading Data

Some Toolbox tools allow you to download the data used in your visualizations. This varies from tool to tool.

- **Download Data**—To download data in the Climate Mapper, click on the *Download Data* button on the left.
- **Save Dashboard**—Dashboard tools like the Climate Projection Dashboard and Real-Time Climate Dashboard have *Save Dashboard* buttons that allow you to save their dashboards as simple image files.
- **“Hamburger” (Three Stacked Lines)**—Other apps use an icon made of three stacked lines—sometimes called a “hamburger”—that functions as a download button. Click the icon to see your download options.

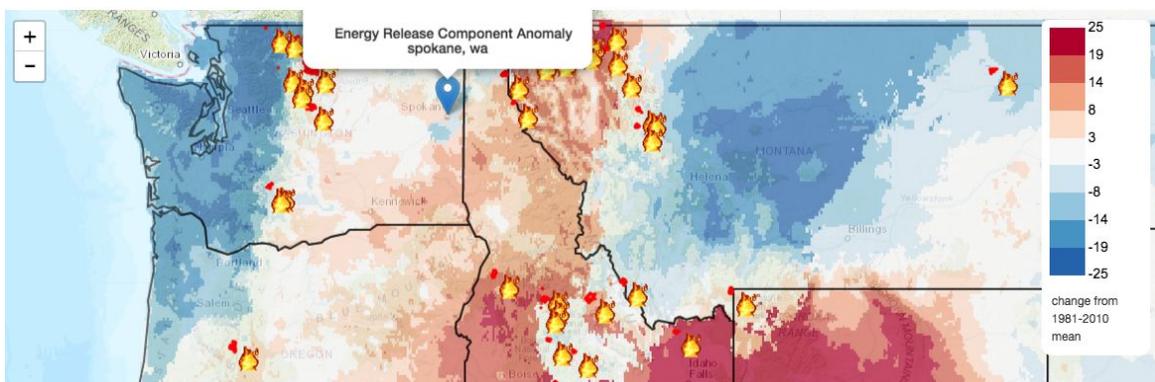
Screenshots

Perhaps the easiest way to save your work is by taking a screenshot. Instructions on how to take a screenshot using different operating systems can be found alongside many of the Toolbox’s mapping tools.

- **Mac**—Press Shift-Command-4. Pointer changes to a crosshair. Move the crosshair to where you want to start the screenshot. Click and hold your mouse/trackpad. Drag crosshair, creating a rectangle that encompasses desired area. Release mouse or trackpad when ready. Image file will download to your computer.
- **Windows**—Microsoft includes a built-in utility for Windows called the *Snipping Tool*. In the Snipping Tool, click the *New* button. This freezes the screen and lets you frame your screenshot by clicking the mouse on the screen and dragging it to form a rectangle view of the screen. Once the screenshot is taken, the image is automatically pasted into a new *Paint* window. It is also copied to the clipboard, so you can paste it into another program.

Citing Figures and Data

Click on the *Cite Tool* button to cite a figure. A suggested citation will populate at the bottom of the window. If you want to cite the data a figure uses, click *Documentation* then *Source* to find a suggested citation for the data used in your visualization. Below is an example map pulled from the Climate Mapper tool listing a citation.



Caption: Energy release component anomalies and active fire parameters displayed for September 15, 2018.

Citation: Hegewisch, Katherine C., John T. Abatzoglou, Bart Nijssen, Liz Clark, Hordur Bragi, Oriana Chedwiggen, Nathan Gilles, and Holly Hartmann. “Climate Mapper web tool, The Northwest Climate Toolbox.” *The Pacific Northwest Climate Impacts Research Consortium, a NOAA RISA Team*. Accessed on Sept 17, 2018. <https://climatetoolbox.org/tool/Climate-Mapper>.



Using Your Results to Tell Your Climate Data Story

Once you've concluded that the data you have informs your question (see *Assessing Toolbox Outputs*) it is time to use your expertise and knowledge to craft a locally relevant climate data story.

Make Your Story About Local Issues

- **Apply Local Knowledge and Expertise**—The most essential piece to telling your climate data story is you, your local knowledge and expertise, and how your knowledge integrates with the impersonal data provided by the Toolbox. Add your knowledge to make your story locally relevant.
- **Add Your Sense of Place**—Be sure to make the local landscape a key feature of your climate story. This will help contextualize your climate data for your community.
- **Know Your Audience**—Tailor your communication to your audience. Different audiences come with different concerns and different levels of knowledge about climate science. Ask yourself, who will be using your information and what decisions they might make based on your climate data story.

Tip:

- Be transparent. Whenever possible cite data sources and note your assumptions and how comparisons have been made.

Make Meaningful Comparisons

- **Historical Baselines**—The Toolbox uses several different databases that cover different historical periods. These periods form the different historical baselines used by the Toolbox. Historical baselines tend to be different based on the variable of interest. Be sure to describe what historical baseline you used when telling your climate story.
- **Calendar Time Comparisons**—When considering a variable displayed as a unit of *Calendar Time*—*Last 90 days*, *Winter (Dec/Jan/Feb)*, etc.—be sure to describe both the unit of Calendar Time and the historical baseline.
 - For instance, when describing the variable *Maximum Temperature Percentile* for the calendar period *Last 90 Days*, you are comparing your last 90 calendar days to the same 90-day calendar period for each year from 1979 to 2015 (1979–2015 is the historical baseline used for this variable).
- **Use Both Percentiles and Anomalies**—Because they tell slightly different stories, it's helpful to use both percentiles and anomalies when examining a variable. Percentiles help you gauge how current conditions compare to past conditions. Anomalies help you determine how far outside of “normal” (historical mean) current conditions are. Using them together tells a rich climate story that appeals to a wider audience.

Percentiles—The Toolbox calculates percentiles as follows:

- record lowest
- bottom decile (bottom 10%)
- bottom tercile (bottom 33%)
- middle tercile (middle 33%)
- top tercile (top 33%)
- top decile (top 10%)
- record highest

Historical baselines are used to rank current or future conditions against past ones. Baselines can differ from variable to variable.

Anomalies—The Toolbox expresses anomalies as the difference from a climatological average expressed over a 30-year base-period—for instance, 1981–2010 or 1971–2000.

Conditions above the historical mean are displayed in positive numbers while conditions below the historical mean are displayed as negative numbers.



Describe Terms, Calculations, and Tricky Concepts

- **Variables**—The Toolbox uses multiple variables to help you tell your climate story. When you present your story to a broader audience, be sure to explain what the variables are and note your data sources.
- **Projections, Not Predictions**—The future climate projections, or *future scenarios*, the Toolbox uses present probable future effects of climate change. These projections are based on the best available science, but they are not predictions depicting a set-in-stone future. It's key when talking about future climate projections that you use the word *projection*.

Learning to Think Inside the Toolbox

Learning to work inside the Toolbox can be complicated and even frustrating at the beginning. Keep with it! As you have questions, please reach out to the CIRC team.

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