AHSC Tips: Community Climate Resiliency

Communities will experience effects of climate change in various ways, including increased likelihood of heatwaves, droughts, sea level rise, flooding, wildfires, and severe weather. To be resilient to climate change, it is important to understand if the surrounding community is experiencing specific climate risks and how your AHSC project aims to address specific concerns. This section **is worth 3 out of 15 points** of the narrative, and includes a required supplemental Climate Adaptation Assessment Matrix (Matrix).

STEP 1 - IDENTIFY CLIMATE RISKS: If available, use a local climate vulnerability assessments created by the city, county, regional council of government (COG), or metropolitan planning organization (MPO) to gather information about local climate risks to the project area. If no local assessment is available, or if the local assessment does not provide sufficient data, Cal-Adapt.org is a recommended state tool to use. It has easy-to-use mapping interfaces with downloadable data specific to your project's geographic area. See Cal-Adapt general tips below, then Appendix for snapshots of each data tool and an example of each climate projection.

Tips for using Cal-Adapt

- Input the project address and choose your geographic location by "1/16° Grid ~6x6 km" or "incorporated or census designated places." These are two ways to get the most localized data and evaluate your area's climate impacts and climate risk.
- Two emissions scenarios of Representative Concentration Pathway (RCP) are given: 4.5 and 8.5. The 4.5 RCP is a scenario in which global GHG emissions decline after 2040, whereas the 8.5 RCP describes a scenario in which global GHG emissions continue to increase over the next century. The climate impacts projected in the 4.5 RCP are less dramatic than those in the 8.5 RCP.

- Thirty years is the traditional length of record used in climatological studies and is considered the minimum number of years needed to characterize a regional climate and for applying statistical tests.
    - **Historical baseline - 1961-1990:** The historical baseline is chosen to represent the period in which the majority of California's critical infrastructure was developed. This thirty year period represents the period in which anthropogenic climate change signals were beginning to be felt.
    - **Mid-Century - 2035-2064:** The mid-century epoch is a thirty year climatology centered about the middle of the 21st century. This period is chosen to be coincident with the timelines developed for the recently released Fourth National Climate Assessment.
    - **End of Century - 2070-2099:** The late-century epoch includes the last thirty years of the 21st century in which all model runs are available. This period is chosen to be coincident with the timelines developed for the recently released Fourth National Climate Assessment."
- For more guidance on using Cal-Adapt projections, go here.

STEP 2 - OUTPUTTING CLIMATE INFORMATION INTO THE MATRIX: For inputting Cal-Adapt and/or local vulnerability assessment information into the Matrix, clearly follow the Matrix instructions to list the most relevant projected climate impacts for:

- Heat
- Precipitation Change (e.g. drought or extreme precipitation events)
- Sea Level Rise and Inland Flooding
- Wildfire

The Matrix will help you determine which climate impacts are a priority to address for your project. Additionally, the state's Fourth Climate Change Assessment regional reports could provide more guidance on what priority impacts your project's area is facing.

STEP 3 - DESCRIBE DESIGN STRATEGIES TO ADDRESS CLIMATE IMPACTS: In both the Matrix and narrative, describe how potential climate impacts are taken into consideration in the design of the proposed project. The Matrix asks for what adaptive measures you are considering as options. The table below provides resources on what designs can adapt to certain climate impacts.

Potential designs to address climate impacts	What does it address?	Resources
Trees: Trees provide shade for pedestrian pathways, hold moisture when it rains, and when placed strategically can decrease the amount of energy needed to cool and heat buildings.	Extreme Heat - Urban Heat Island; Drought and Extreme Precipitation	CA ReLeaf, general resources on urban and community forests i-Tree planting calculator for energy cost savings, stormwater capture, and air pollution mitigation

Overall Building Design: Modifications to buildings can increase ventilation, enhance insulation, and reduce electrical grid demand. *Note, additional points *(total of 8)* can be awarded in other parts of the AHSC application if: - the building is certified as CalGreen - Tier 2 or higher, LEED - Gold or higher, Green Point Rated - Gold, or ENERGY STAR Certified Home *(3 points)* - the building is an Energy Producer, meaning at least one-third (or 33 percent) of the building energy is produced by on site renewable sources *(2 points)* - the building is Zero Net Energy, meaning it produces as much energy as it consumes over the course of a year, when accounted for at the energy generation source *(3 points)*	Extreme Heat - Urban Heat Island	pg. 30 - 43 of Urban Land Institute, "Scorched:Extreme Heat and Real Estate"
Shade structures: Solar panels over parking spaces and bike racks, canopies over tot lots and playgrounds, and awnings over entry ways provide shade that protect people from heat.	Extreme Heat - Urban Heat Island	pg. 30 - 43 of Urban Land Institute, "Scorched:Extreme Heat and Real Estate"
Bus Shelters: Shade protects riders from the heat as they wait for transit.	Extreme Heat - Urban Heat Island	Transit Center, "From Sorry to Superb: Everything You Need to Know about Bus Stops"
Water features and hydration stations: Drinking fountains, swimming pools, and splash pads keep residents hydrated and the community cool during extreme heat events.	Extreme Heat - Urban Heat Island	Center for Disease Control and Prevention, "Extreme Heat Resources to Stay Cool, Hydrated, and Informed"
Cool pavement: Paving materials are designed to reflect solar energy and stay cooler than traditional pavements.	Extreme Heat - Urban Heat Island	US EPA, "Reducing Urban Heat Islands - Compendium of Strategies Cool Pavements" GuardTop, CoolSeal
Cool roofs: Materials reflect sun rays back into the atmosphere and keep buildings cool up to 20% more than traditional roof shingles. Additionally, there are GHG reduction benefits If combined with rooftop solar.	Extreme Heat - Urban Heat Island	US EPA, "Reducing Urban Heat Islands - Compendium of Strategies Cool Roofs" Cool Roof Rating Council

Green roofs: Layers of plants growing on rooftops reduce urban heat island, capture water, and cool buildings by providing vegetation.	Extreme Heat - Urban Heat Island; Drought and Extreme Precipitation	US EPA, "Reducing Urban Heat Islands - Compendium of Strategies Green Roofs"
Green and natural infrastructure: Permeable land cover, soil improvements, watersheds, riparian buffers, wetlands, and floodplains have multiple climate benefits.	Extreme Heat - Urban Heat Island; Drought and Extreme Precipitation; Sea Level Rise and Inland Flooding	US EPA, Green Infrastructure
Native, drought-tolerant vegetation: Plantings save water resources, support biodiversity, and are natural pollinators.	Drought and Extreme Precipitation	CA Dept of Water Resources, "Water Efficient Landscaping"
Water conservation mechanisms: Indoor/outdoor appliances, fixtures, and measures can save water.	Drought and Extreme Precipitation	Alliance for Water Efficiency, "Home Water Works" Metropolitan Water District of Southern California, "Be Water Wise Toolkit"
Rainwater capture and infiltration systems: Systems capture water, conserve energy, reduce flooding, and prevent stormwater runoff.	Drought and Extreme Precipitation; Sea Level Rise and Inland Flooding	Contra Costa Water District, "Rainwater Harvesting 101"
Coastal Adaptation to Sea Level Rise: Building solid barriers, protecting or reestablishing shoreline ecosystems, enhancing aquifer recharge, and reducing saltwater intrusion can mitigate the flooding impacts in a vulnerable region.	Sea Level Rise and Inland Flooding	Coastal Conservancy, "Natural Infrastructure for Coastal Adaptation to Sea Level Rise" US EPA Climate Ready Estuaries, "Synthesis of Adaptation Options for Coastal Areas"
Fuel management work: Creating defensible space and maintaining a low fuel profile can greatly reduce the risk of fire.	Wildfire	University of California Agriculture and Natural Resources, "Forest Research and Outreach"
Wildfire rehabilitation work: Controlling soil erosion through mulching, maintaining tree health through pest management, and using other ecosystem treatments can help forests recover after wildfires.	Wildfire	University of California Agriculture and Natural Resources, "Forest Research and Outreach"
Fire hazard prevention work: Using fire-resistant building materials and designs, such as noncombustible roofs, noncombustible siding, fire	Wildfire	CAL FIRE, "Homeowner's Checklist"

sprinklers, and double-pane windows, can protect housing from fires.		

STEP 4 - FOSTERING SOCIAL NETWORKS: Climate resiliency is also about fostering a social network to respond cohesively to climate impacts. Think about how to make your affordable housing development or transit center a hub for community interaction. Plan the development holistically in conjunction with other community services (clinics, schools, parks, etc.). Innovatively use communal spaces as a city cooling center or for resilience trainings. Proactively establish "check on your neighbor" systems or a Community Emergency Response Team (CERT) for disasters. More resources below:

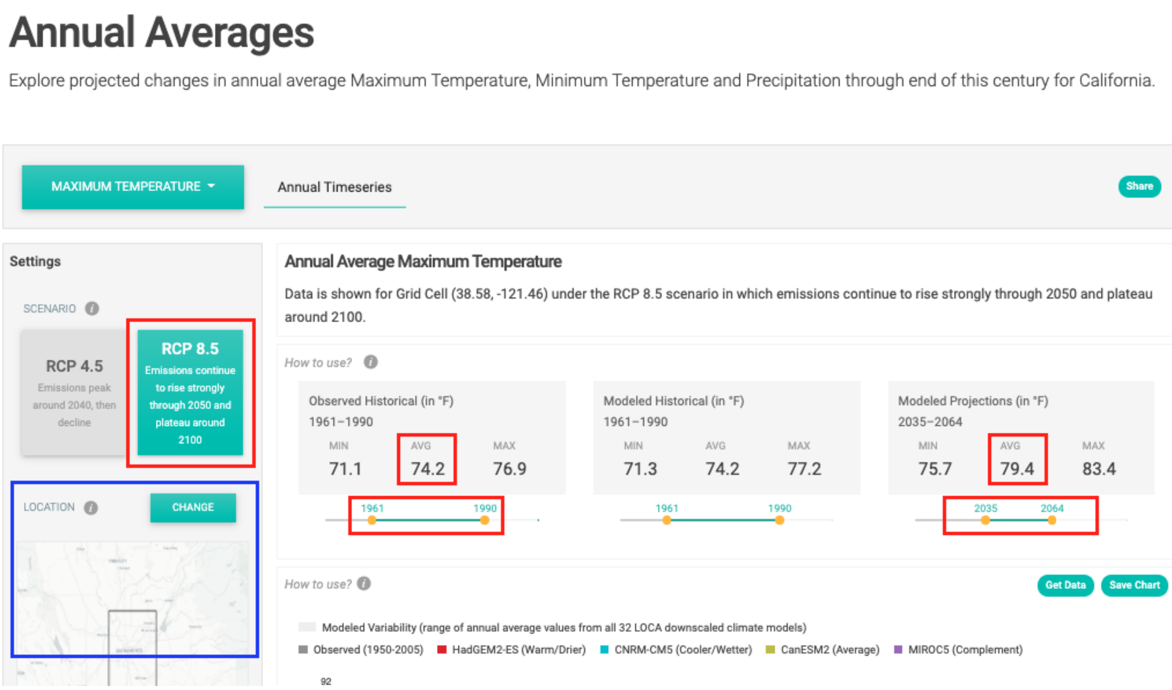
- Center for Disease Control and Prevention, "The Use of Cooling Centers to Prevent Heat-Related Illness - Summary of Evidence and Strategies for Implementation"
- Enterprise Community Partners, "Ready to Respond- Tools for Resilience"
- Department of Homeland Security, "Neighbors Helping Neighbors" approach to emergency preparedness
- Department of Homeland Security, Community Emergency Response Team Program

STEP 5 - RELATING AHSC PROJECT TO CITY'S CLIMATE PLANNING EFFORTS: Consider the lifetime of project elements, risks posed by changing climate conditions, and consequences of those risks (impacts to occupant health and safety, structural integrity, heating and cooling systems, etc.). If your local city or county has added adaptation measures to the General Plan or other local planning documents, describe how the project conforms to the implementation of that plan (Government Code section 65302(g)(4), requires cities and counties to incorporate climate considerations in the Safety Element of the General Plan or other local plan or document by January 1, 2022).

CONCLUSION: With identifying climate risks, inputting climate information into the Matrix, describing strategies to address climate impacts, fostering social networks, and relating the AHSC project to the city's climate planning efforts, the AHSC project can be more resilient to climate change. As a reminder from the Narrative Rubric, full points are awarded to projects that: identify climate vulnerabilities found in Cal-Adapt or other reliable data source; give site-specific description of project area's adaptation needs; and substantially mitigate multiple vulnerabilities in the near future and intermediate future, or are at least scalable to address heightened vulnerabilities expected in 2100.

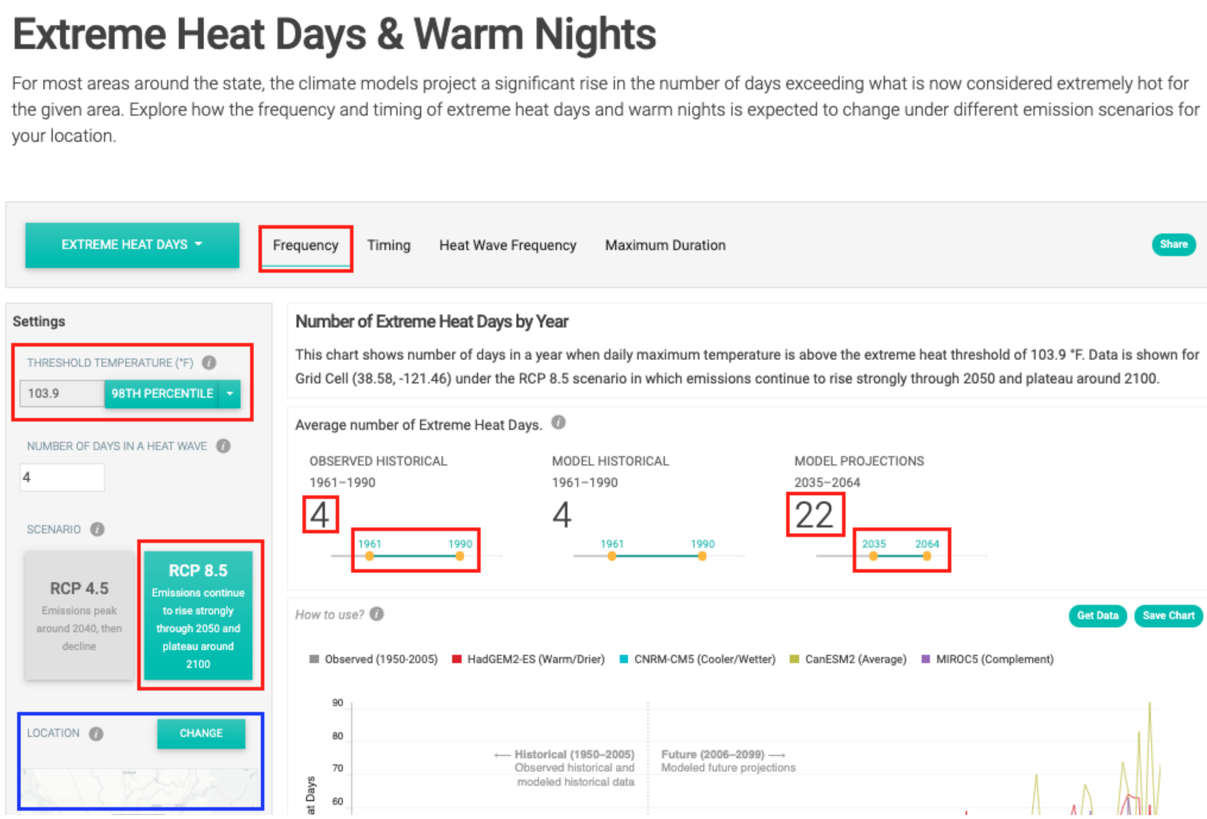
Appendix - Example Snapshots for Using Cal-Adapt Tools

1. **HEAT - MAXIMUM TEMPERATURE:** Below is a snapshot of *Maximum Temperatures for the Historic Annual Average Maximum Temperature for 1961-1990* and the *Modeled Projected Annual Average Temperature for 2035-2064 under the RCP 8.5 scenario* according to the Annual Averages tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. <u>Note, there are default observed data timelines in the slider. To show different projections, one would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099.</u> Blue box shows where to change location (example location is Sacramento).



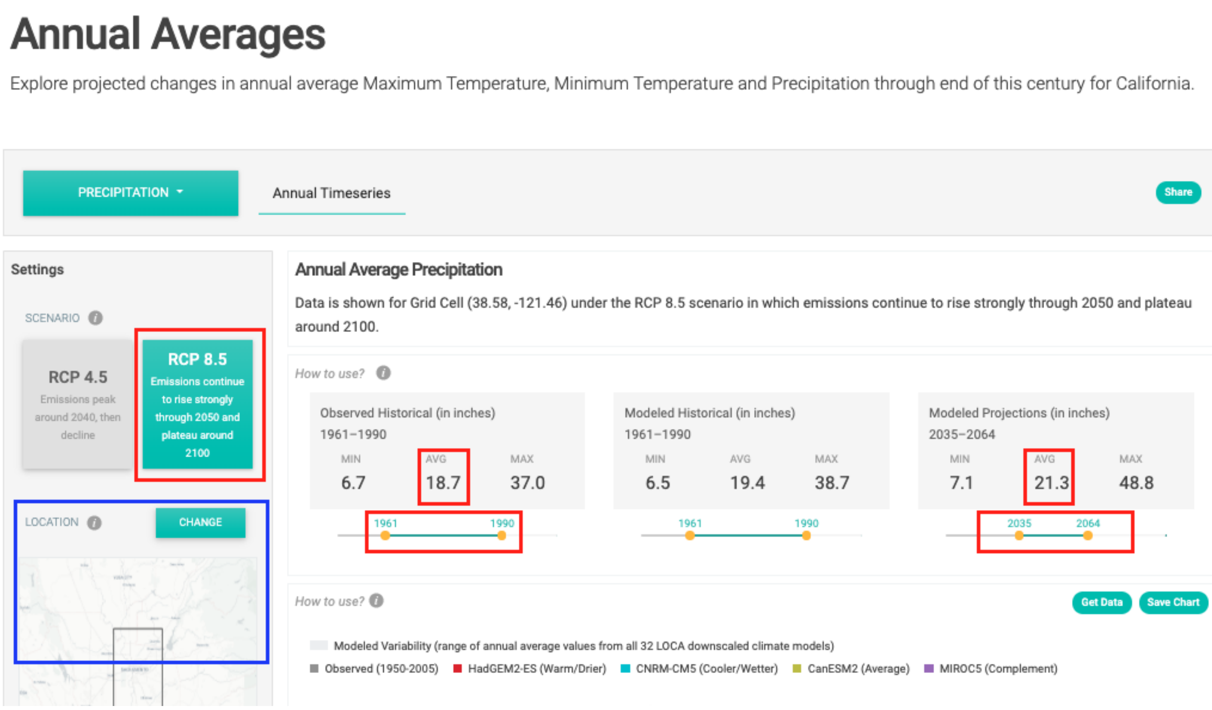
Description of above readout: Between 1961 and 1990, downtown Sacramento's annual average maximum temperature was 74.2 degrees F. RCP 8.5 projects downtown Sacramento's annual average maximum temperature will increase to 79.4 F by mid-century (2035-2064).

2. **HEAT - EXTREME HEAT DAYS AND THRESHOLD TEMPERATURE:** Below is a snapshot of projected *Average Number of Extreme Heat Days and the 98th Percentile Threshold Temperature for 1961-1990 and 2035-2064 under the RCP 8.5 scenario,* according to the Extreme Heat Days & Warm Nights tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. <u>Note, there are default observed data timelines in the slider. To show different projections, one would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099.</u> Blue box shows where to change location (example location is Sacramento).



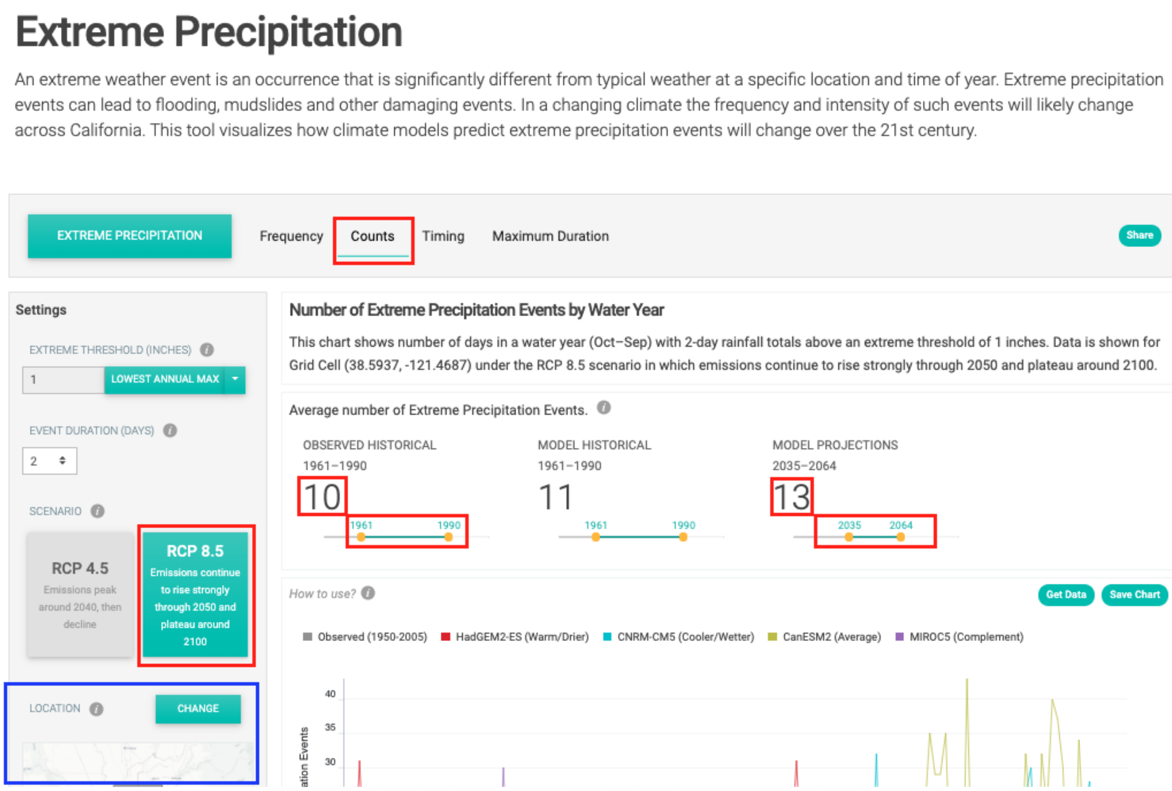
Description of above readout: Between 1961 and 1990, downtown Sacramento has historically experienced about 4 extreme heat days per year. RCP 8.5 projects downtown Sacramento will experience an average of 22 extreme heat days by mid-century (2035-2064) beyond a threshold temperature of 103.9 degrees F.

3. **PRECIPITATION CHANGE - AVERAGE:** Below is a snapshot of *Inches of Precipitation for Historical Annual Average for 1961-1990* and the *Modeled Projected Annual Mean for 2035-2064 under the RCP 8.5 scenario* according to the Annual Averages tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. Note, there are default observed data timelines in the slider. To show different projections, one would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099. Blue box shows where to change location (example location is Sacramento).



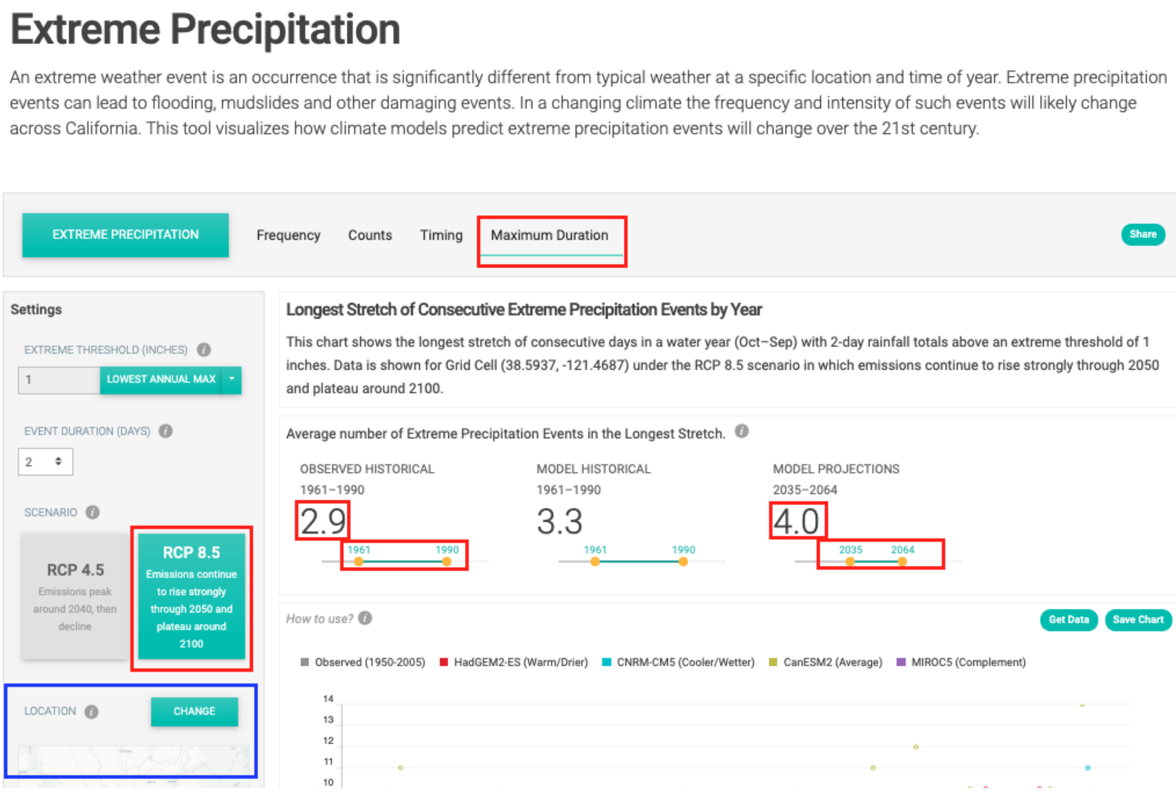
Description of above readout: Between 1961 and 1990, downtown Sacramento's annual average precipitation was 18.7 inches. RCP 8.5 projects downtown Sacramento's annual average precipitation will increase to 21.3 inches by mid-century (2035-2064).

4. **PRECIPITATION CHANGE - EXTREME PRECIPITATION EVENTS, COUNT:** Below is a snapshot of the *Historical Counts (# of Extreme Precipitation Events) for 1961-1990* and the *Model Projections for 2035-2064 under RCP 8.5 scenario* according to the Extreme Precipitation Events tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. Note, there are default observed data timelines in the slider. To show different projections, one would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099. Blue box shows where to change location (example location is Sacramento).



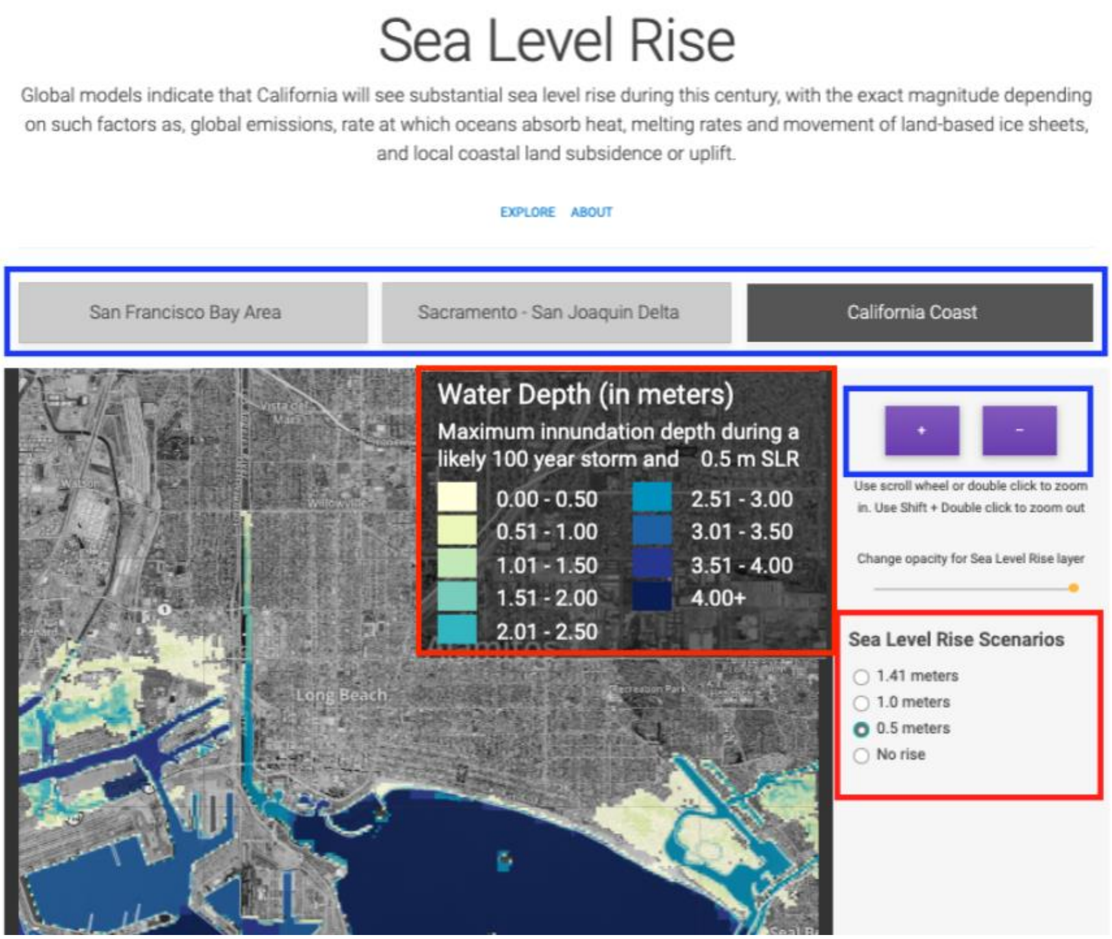
Description of above readout: Between 1961 and 1990, downtown Sacramento had about 10 extreme precipitation events per year. RCP 8.5 projects downtown Sacramento's extreme precipitation events will increase to an average of 13 per year by mid-century (2035-2064).

5. **PRECIPITATION CHANGE - EXTREME PRECIPITATION EVENTS, MAXIMUM DURATION:** Below is a snapshot of the projected *Maximum Duration (longest duration of consecutive extreme events by year) for the Historical 1961-1990 and Model Projections for 2035-2064 under the RCP 8.5 scenario* according to the Extreme Precipitation Events tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. Note, there are default observed data timelines in the slider. One would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099 if they are not the default. Blue box shows where to change location (example location is Sacramento).



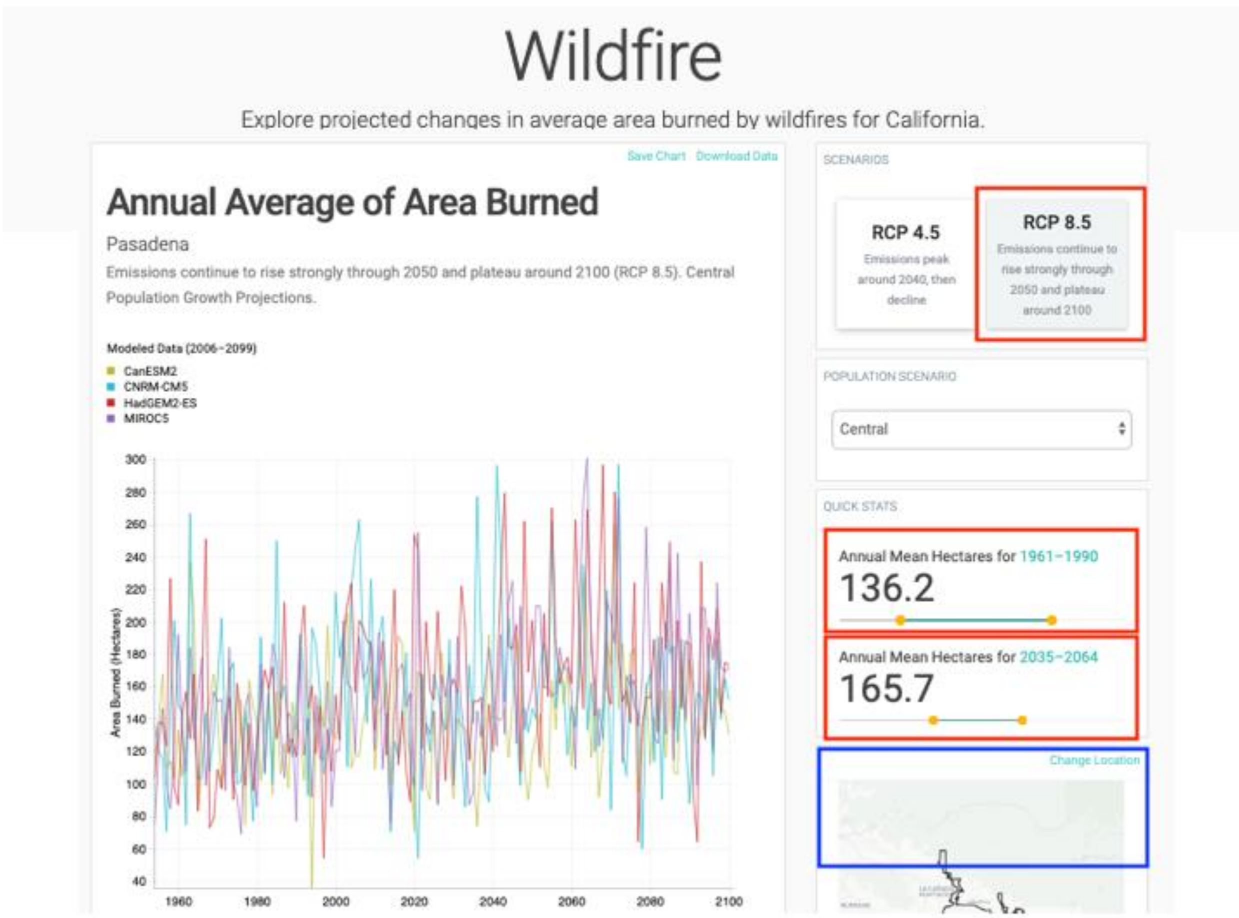
Description of above readout: Between 1961 and 1990, downtown Sacramento's longest extreme precipitation events averaged 2.9 consecutive days. RCP 8.5 projects downtown Sacramento's longest extreme precipitation events could average 4.0 consecutive days by mid-century (2035-2064).

6. **SEA LEVEL RISE / INLAND FLOODING, MAXIMUM INUNDATION DEPTH:** Below is a snapshot of the Sea Level Rise (SLR) tool to evaluate flood risk *(inundation/water depth in meters)* from sea level rise or inland flooding *under a .5 SLR meter scenario.* Red boxes show where the information is provided and where to toggle inputs, like SLR scenarios. Blue box shows where to change and view location (example location is Long Beach). <u>One would need to use cursor on the map to center location and zoom in to the map to see what the actual inundation depth range is in and around a potential project site.</u> NOTE: The Sea Level Rise tool on Cal-Adapt may not cover your project's area of the California coast. In the case that your project is in a Coastal region without Cal-Adapt data, use a different source. Projects located in inland communities do not have to report this data.



Description of above readout: At a sea level rise scenario of .5 meters and during a likely 100 year storm, a couple of residential neighborhoods of Long Beach could have a maximum inundation depth of between 1.01 and 1.5 meters.

7. **WILDFIRE - ANNUAL MEAN HECTARES BURNED:** Below is a snapshot of the *Annual Mean Hectares burned for 1961-1990* and the projected *Annual Mean Hectares burned for 2035-2064 under the RCP 8.5 scenario* according to the Wildfire tool. Red boxes show where this information is provided and where to toggle inputs, like year and RCP. Note, there are default observed data timelines in the slider. To show different projections, one would toggle the slider to get a projection for 1961-1990, 2035-2064, or 2070-2099. Blue box shows where to change location (example location is Pasadena).



Description of above readout: Between 1961 and 1990, Pasadena's annual mean of hectares burned was 136.2. RCP 8.5 projects Pasadena's annual mean of hectares burned will increase to 165.7 by the mid-century (2035-2064).