Climate Vulnerability Assessment

Climate change is a global phenomenon that may affect each community differently. In recognition of this, Senate Bill 379, Land Use: General Plan: Safety Element (Jackson, 2015) requires that "a city or county to adopt a comprehensive, long-term general plan that includes various elements, including, among others, a safety element for the protection of the community from unreasonable risks associated with the effects of various geologic hazards, flooding, and wildland and urban fires."[1] Thus, a city or county's safety element is therefore to be reviewed and updated as necessary to address applicable climate adaptation and resiliency strategies, including a set of goals, policies, and objectives based on a vulnerability assessment. A Climate Vulnerability Assessment (CVA) serves as the foundation for the Safety Element's Update and Climate Change section, as described in the State of California General Plan Guidelines (2017).[2] This CVA is also designed to meet the requirements set forth in the Board of Forestry and Fire Protection's June 2020 General Plan Safety Element Assessment.

Based on guidance from the California Adaptation Planning Guide (APG)[3] and the Southern California Climate Adaptation Planning Guide[4] the following five steps must be completed to assess the vulnerability of the City of Hemet to the effects of climate change:

1. **Exposure** – Identify the climate change effects a community will experience.
2. **Sensitivity** – Identify the key community structures, functions, and populations that are potentially susceptible to each climate change exposure.
3. **Potential Impacts** – Analyze how climate change exposure will affect the community structures, functions, and populations (impacts). Adjust the impact assessment to account for uncertainty, timing, and adaptive capacity.
4. **Adaptive Capacity** – Evaluate the community's current ability to address the projected impacts.
5. **Vulnerability Scoring** – Determine and rank potential impacts and adaptive capacity

Each of these steps is described in detail below. Data for this CVA was collected from sources including the following:

- CalAdapt,

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[1] Preamble of Senate Bill No. 379, as approved by Governor October 08, 2015.

[2] Governor's Office of Planning and Research, State of California General Plan Guidelines (2017); URL:https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf; Accessed April 18, 2022

[3] URL: https://www.caloes.ca.gov/HazardMitigationSite/Documents/APG2-FINAL-PR-DRAFTAccessible.pdf ; Accessed April 18, 2022

[4] Southern California Association of Government, Southern California Climate Adaptation Planning Guide, October 2020.

- California's Fourth Climate Change Assessment, 2018,
- Western Riverside Council of Governments (WRCOG) Subregional Climate Action Plan (CAP), 2014, Subregional Climate Action Plan Adaption and Resiliency Strategy, and Implementation Model Book,
- City of Hemet Climate Action Plan, 2018
- Western Riverside Adaptation and Resiliency Strategy: Part 1, Vulnerability Assessment, and
- Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan.

1. EXPOSURE – WHAT CLIMATE CHANGE EFFECTS WILL THE COMMUNITY EXPERIENCE?

Climate change affects communities all around the world regardless of their contribution to this phenomenon. Jurisdictions across California are expected to experience different climate change effects to varying degrees based on geography, density of urban development, and environmental factors. *Table 1* below, based on guidance from the California Adaptation Planning Guide, identifies the direct effects of climate change and the associated secondary effects potentially applicable to Hemet. Each of the six is discussed in detail below.

TABLE 1. CLIMATE-RELATED EFFECTS AND HAZARDS POTENTIALLY Applicable to Hemet

Primary Hazard	Secondary Hazard
Air Quality	Public health effects, agricultural distress
Precipitation changes	Snowpack loss, drought, agricultural pests and disease, subsidence
Flooding (riverine)	Flooding, erosion, mud- or land- slides
Severe storms and extreme weather	Intense rainstorms, severe wind, flood, lightning, hail
Temperature changes - warming	Extreme heat/heat waves, agricultural pests and disease
Wildfire	Erosion, landslide

Source: Adapted from OPR's CALIFORNIA ADAPTATION PLANNING GUIDE, June 2020

Notes: Due to Hemet's inland location, potential hazards such as sea level rise, storm surge, hurricane, ocean acidification, hypoxia, and warming are not listed as potentially applicable climate related effects and hazards. Due to the relatively low topography of Hemet, avalanche is also not considered a potential hazard.

The projection of the likelihood, timing, and severity of these primary and secondary hazards to impact Hemet is based on the trajectory of Green House Gas (GHG) concentrations in the Earth's atmosphere, commonly referred to as Representative Concentration Pathways (RCPs). RCPs represent a combination of

the historical data and estimates of concentrations through 2100, based on a set of formulated human behaviors. The pathways describe different climate futures, all of which are considered possible depending on the volume of GHGs emitted in the years to come. The Intergovernmental Panel on Climate Change (IPCC) adopted a number of RCPs in its latest assessment, and SCAG, in its recent guidance[5], chose to focus on three RCPs representing a reasonable range of outcomes, as follows:

1. A low emissions scenario (RCP2.6) – this represents an aggressive emissions reduction scenario that assumes global greenhouse gas emissions will be significantly curtailed. RCP 2.6 most closely corresponds to the aspirational goals of the United Nations Framework Convention on Climate Change 2015 Paris Agreement.
2. A medium emissions scenario (RCP4.5) – this represents a mitigation scenario where global greenhouse gas emissions peak by 2040 and then decrease for the rest of the century.
3. A high emissions scenario (RCP8.5) – this represents a "business-as-usual" scenario where global greenhouse gas emissions continue to rise throughout the 21st century.

Because the RCP2.6 scenario depends on substantive changes in the current set of world-wide policies, regulations, and behaviors it is considered unlikely, and therefore not especially helpful in a climate vulnerability assessment. This VCA will rely primarily on RCP8.5, the high emissions scenario, in alignment with OPR's recommendation that agencies use RCP8.5 when considering impacts through 2050 because there are minimal differences between the low and high emissions scenarios through the first half of the century.[6] When available and illustrative, the RCP4.5 scenario may be shown for additional context.

AIR QUALITY

Hemet is located in Western Riverside County, which lies at the south-eastern boundary of the South Coast Air Basin (SoCAB, or "Basin"). As such the air quality of the region is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD), tasked with setting regulations to ensure that the SoCAB obtain and maintain the National Ambient Air Quality Standards (NAAQS) and continue progress towards meeting the more stringent California Ambient Air Quality Standards (CAAQS).

Despite considerable progress in reducing ground level concentrations in the Basin, Western Riverside County continues to experience high levels of ozone and particulate matter (PM). According to the California Air Resources Board (CARB)7 8:

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[5] SCAG, Southern California Climate Adaptation Planning Guide, October 2020; https://scag.ca.gov/sites/main/files/file-attachments/socaladaptationplanningguide_oct2020_0.pdf

[6] Governor's Office of Planning and Research, Planning and Investing for a Resilient California, 2019, page 19. accessed April 2022 http://opr.ca.gov/planning/icarp/resilient-ca.html

[7] California Air Resources Board, https://ww2.arb.ca.gov/resources/fact-sheets/health-effects-ozone; accessed April 25, 2022

[8] CARB, https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health ; accessed April 25, 2022

Ozone can damage the tissues of the respiratory tract, causing inflammation and irritation, and result in symptoms such as coughing, chest tightness and worsening of asthma symptoms. Specifically, inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms. Exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The occurrence and severity of health effects from ozone exposure vary widely among individuals, even when the dose and the duration of exposure are the same.

Ozone exposure reduces the overall productivity of plants, damaging cells and causing destruction of leaf tissue. As a result, ozone exposure reduces the plants' ability to photosynthesize and produce their own food. Plants respond by growing more leaves thereby reducing the amounts of stored carbohydrates in roots and stems. This weakens plants, making them susceptible to disease, pests, cold and drought. Ozone also reduces crop and timber yields, resulting in millions of dollars in economic losses. Additionally, ozone disturbs the stability of ecosystems, leading to sensitive species dying out. Furthermore, ozone exposure reduces the production of roots, seeds, fruit and other plant constituents, reducing the amount of food available for wildlife.

A number of adverse health impacts have been associated with exposure to both PM2.5 and PM10. 9 For PM2.5, short-term exposures (up to 24-hours duration), have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, PM2.5 is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and world-wide based on the World Health Organization's Global Burden of Disease Project.

Short-term exposures to PM10 have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease (COPD), leading to hospitalization and emergency department visits. Long-term (months to years) exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM10 are less clear, although several studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer (IARC) published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.

[9] PM with a diameter of 10 microns or less (PM10) are inhalable into the lungs and can induce adverse health effects. Fine particulate matter is defined as particles that are 2.5 microns or less in diameter (PM2.5). Therefore, PM2.5 comprises a portion of PM10.

PM can adversely affect ecosystems, including plants, soil and water through deposition of PM and its subsequent uptake by plants or its deposition into water where it can affect water quality and clarity. The metal and organic compounds in PM have the greatest potential to alter plant growth and yield. PM deposition on surfaces leads to soiling of materials. Particulate matter has been shown in many scientific studies to reduce visibility, and also to adversely affect climate, ecosystems and materials. PM, primarily PM2.5, affects visibility by altering the way light is absorbed and scattered in the atmosphere. With reference to climate change, some constituents of the ambient PM mixture promote climate warming (e.g., black carbon), while others have a cooling influence (e.g., nitrate and sulfate), and so ambient PM has both climate warming and cooling properties.

Changes in climate can result in impacts to local air quality. Ozone is not emitted directly, rather it is formed when emissions of oxides of nitrogen (primarily from the combustion of fossil fuels) and reactive organic gases (from evaporative sources such as gasoline, solvents, paints, and other consumer and industrial products and processes) react in the presence of sunlight. Thus, it is widely recognized that atmospheric warming associated with climate change has the potential to increase ground-level ozone formation. According to CalEnviroScreen 4.0, all census tracts within the City limits has a summed concentration of 0.065 parts per million and this concentration is higher than 94% of all census tracts in California.[10] Locally, this threatens the ability of the Basin to obtain the applicable ozone NAAQS and CAAQS under the BAU (RCP8.5) scenario.

PM is caused both by natural and anthropomorphic activities; it is emitted directly from sources (such as earth moving, smokestacks, and fires) and also forms secondarily in the atmosphere when gases and aerosols combine (from sources such as power plants, industries and automobiles). According to the USEPA, the impact of climate change on PM is less certain, but research is underway to address these uncertainties. Climate change, such as decreasing precipitation and increasing wildfires, can result in higher emission of PM into the atmosphere.

[10] https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40, Accessed May 9, 2022

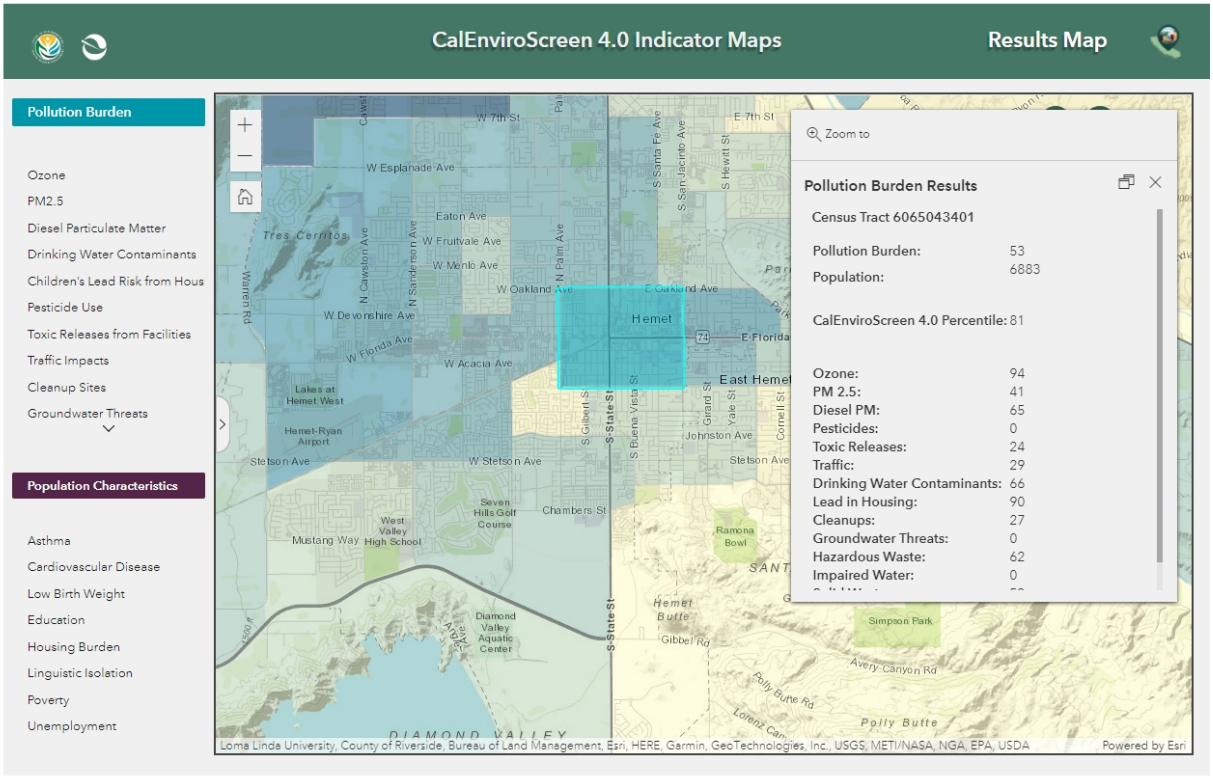
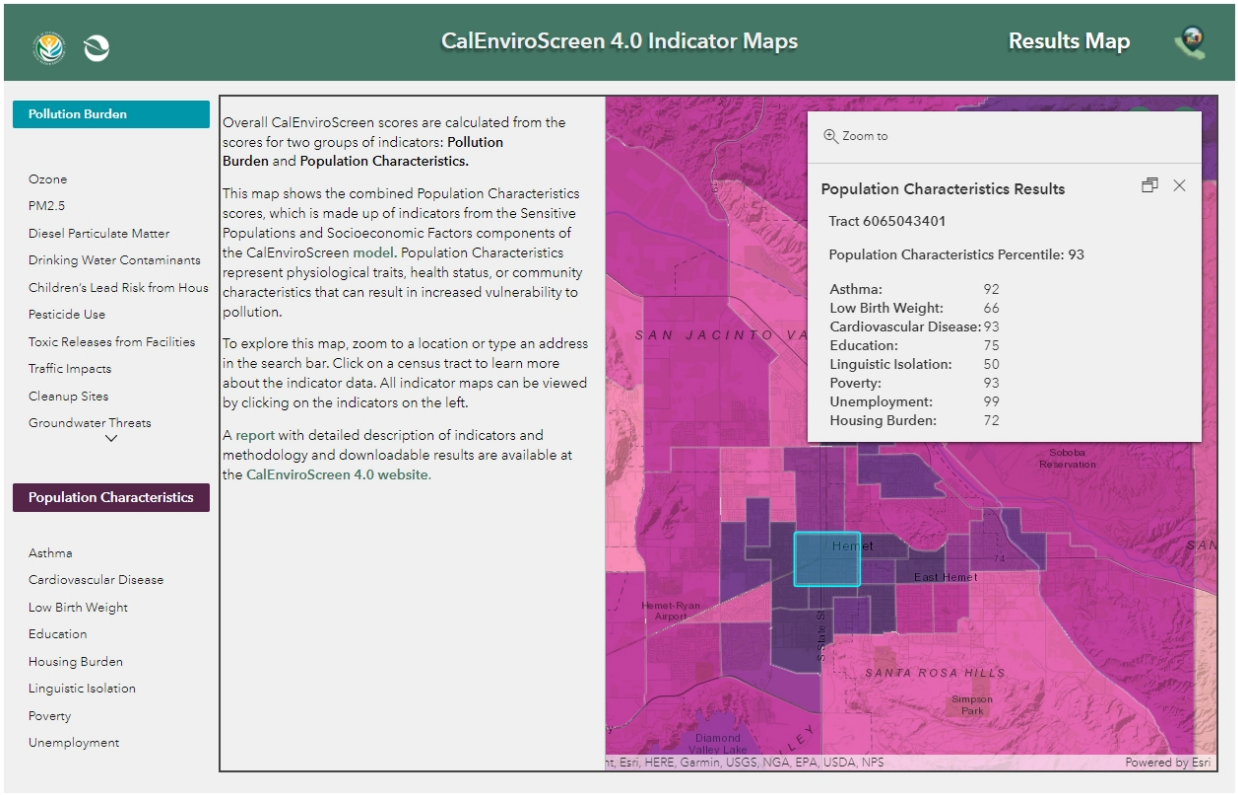


Figure 1 – CalEnviroScreen 4.0, Hemet Pollution Burden Results



PRECIPITATION CHANGES

Hemet, like the Western Riverside subregion, is a combination of Mediterranean and semi-arid climates, characterized by hot, dry summers and mild, wet winters. The average precipitation observed in Hemet between 1950 and 2004 was 11.8 inches with a high of 26.9 inches and low of 4.8 inches.[11]

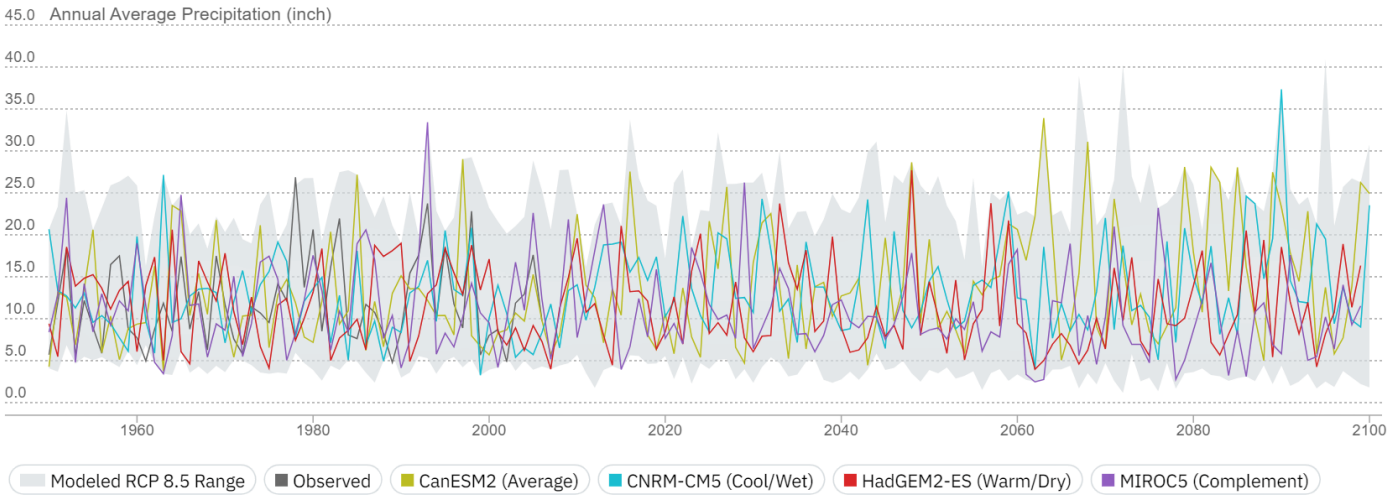
As presented in Figure 3, local annual levels of precipitation are not anticipated to change drastically for the Hemet area. It is projected that the average precipitation in Hemet from 2035-to-2064 will increase slightly to 12.1 inches and increase slightly further to 13.0 inches in the 2051-to-2099 time frame under the RCP8.5 scenario.[12] Changes in annual precipitation of these minimal ranges alone are not expected to pose much risk to the built or human environment. The role of changing precipitation amounts and patterns in expanding the extent or geographic distribution of vector-born disease is not clearly understood at this time.[13]

[11] https://cal-adapt.org/tools/annual-averages/ , Accessed April 15, 2022
[12] Ibid
[13] OEHHA, https://oehha.ca.gov/media/downloads/climate-change/document-presentation/13humankramer.pdf

Hemet, California

Projected changes in **Annual Average Precipitation** under a **High Emissions (RCP 8.5) Scenario**.

OBSERVED HISTORICAL	FUTURE PROJECTIONS		FUTURE PROJECTIONS	
1950-2004	**Mid-Century (2035-2064)**		**End-Century (2070-2099)**	
55 YEAR AVG	30 YEAR AVG	30 YEAR RANGE	30 YEAR AVG	30 YEAR RANGE
11.8 inch	12.1 inch	2.5–33.9 inch	13.0 inch	2.8–37.3 inch



Source: Cal-Adapt. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility).

Figure 3 – CaAdapt, Hemet Average Annual Precipitation

Though much of the subregion's potable water supply is provided by importing water originating from the northern Sierra Nevada or from the Colorado River, the city of Hemet's primary potable water source is groundwater. In 2016, the City received approval for a Self-Certification of Supply Reliability; indicating that the City's groundwater supply exceeds projected demand for several years. Thus, the City of Hemet's vulnerability to changes in snowpack is small. However, since Lake Hemet Municipal District serves as an emergency connection to the City and has its own customers in the subregion, a discussion of worsened drought as a consequence of precipitation changes is warranted.

According to Cal-Adapt, a climate change induced decline in the northern Sierra Nevada of 32% in snow water equivalence by 2050 and 77% by 2099 is anticipated and declines in the southern Sierra Nevada of up to 10% and up to 40% by 2050 and 2099, respectively. Precipitation levels are not expected to change significantly for the Colorado River Basin. However, as temperatures rise and precipitation levels decrease

on a larger geographic scale, the snowpack volume is expected to drop, potentially resulting in a 9 percent decline in the total flow of the Colorado River.

Droughts are common in California, and it is widely recognized that dry conditions may be experienced more regularly in the future given the impact of climate change on California's snowpack. Currently the southwestern Riverside County region is classified within the -3 to -5 range of the Palmer Drought Severity Index (PDSI)[14], where a value of -4 and beyond represents "extreme drought." Drought can lead to reductions in the quality and quantity of water, degradation of air quality, increase in agricultural vectors and disease, and decreases in crop yield.[15] According to the California Department of Public Health, health consequences of drought may impact the following vulnerable/sensitive populations most: "the elderly, children, individuals of low socioeconomic status, rural communities, populations living in nursing homes, hospitalized patients, those who rely on electrical equipment to survive, farmers, and agricultural workers."[16]

AGRICULTURAL PESTS AND DISEASE

The Western Riverside subregion contains thousands of acres of agricultural land that contributes roughly $1.42 billion to the regional economy, and 27,442 agricultural jobs in Riverside County (County of Riverside 2020). The city of Hemet has a district valuation or $165,415,000. The majority of the agricultural products grown within city limits include lettuce leaf, oranges, trees, and grapefruit (County of Riverside 2020).

These pests and diseases can cause plants and animals to grow slower, to be damaged making them less appealing and harder to sell, or even die. While there are treatment options for a number of agriculture diseases, some have no cure – such as the devastating citrus disease Huanglongbing (HLB), which is already in the region (CCPDPC 2018).

Though not considered a Primary Environmental Hazard, agricultural pests and diseases and general agricultural distress, are persistent secondary hazards and their potential impacts and risks are discussed separate from their primary hazards. According to the 2010 City of Hemet General Plan, there are a total of 17,503 acres of farmland within City limits.[17] Temperature increases play a key role in agricultural pests and diseases, as higher temperatures can increase the rate of reproduction for insects and mites (Hall 2018). High temperatures earlier and later into the year also create a wider window for pests and diseases to be active (IPCC 2013). Many crop plants, trees, and livestock may also be harmed and consequently weakened by warmer temperatures and changes in precipitation. The weaker plants and animals may not be able to fend off infestations or infections as well as a stronger plants and animals, causing pests and diseases to affect more of the population.

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[14] https://wrcc.dri.edu/wwdt/index.php?region=ca , accessed April 22, 2022.

[15] https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CHVIs/Drought_802_Narrative_11-8-2016.pdf ; accessed March 22, 2022

[16] Ibid, page 1.

[17] Ramona Creek Specific Plan, *Draft Environmental Impact Report IV.C Agricultural Resources*, Table IV.C-1

FLOODING

The accumulation of excess water due to increased precipitation or natural water flows can lead to the flooding of nearby floodplains or low-lying valleys. Floodplains, or areas adjacent to water bodies, are especially susceptible to flooding hazards. The severity of flooding within a floodplain is directly related to the capacity and volume of the neighboring body of water or waterway. Flooding within larger, flatter floodplains occurs more predictably for longer durations. Flooding can occur more quickly and with minimal warning in steep, mountainous areas.[18] Although Cal Adapt does not provide emissions-based flooding projections, the City of Hemet (City) has worked in conjunction with the County of Riverside (COR) to produce the COR Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) which outlines the existing flooding risks present in the City.

According to the City's LHMP, the City is not considered to be significantly affected by flooding within the Riverside Operational Area. [19] However as can be seen in Figure 4 much of the City sits within 100 and 500-year flood zones. Dark purple represents 100-year storm zones and light purple represents 500-year storm zones.

[18] City of Hemet. (2018). County of Riverside, Multi-Jurisdictional Local Hazard Mitigation Plan. Page 252. Hemet, CA: City of Hemet.
[19] Ibid, page 250

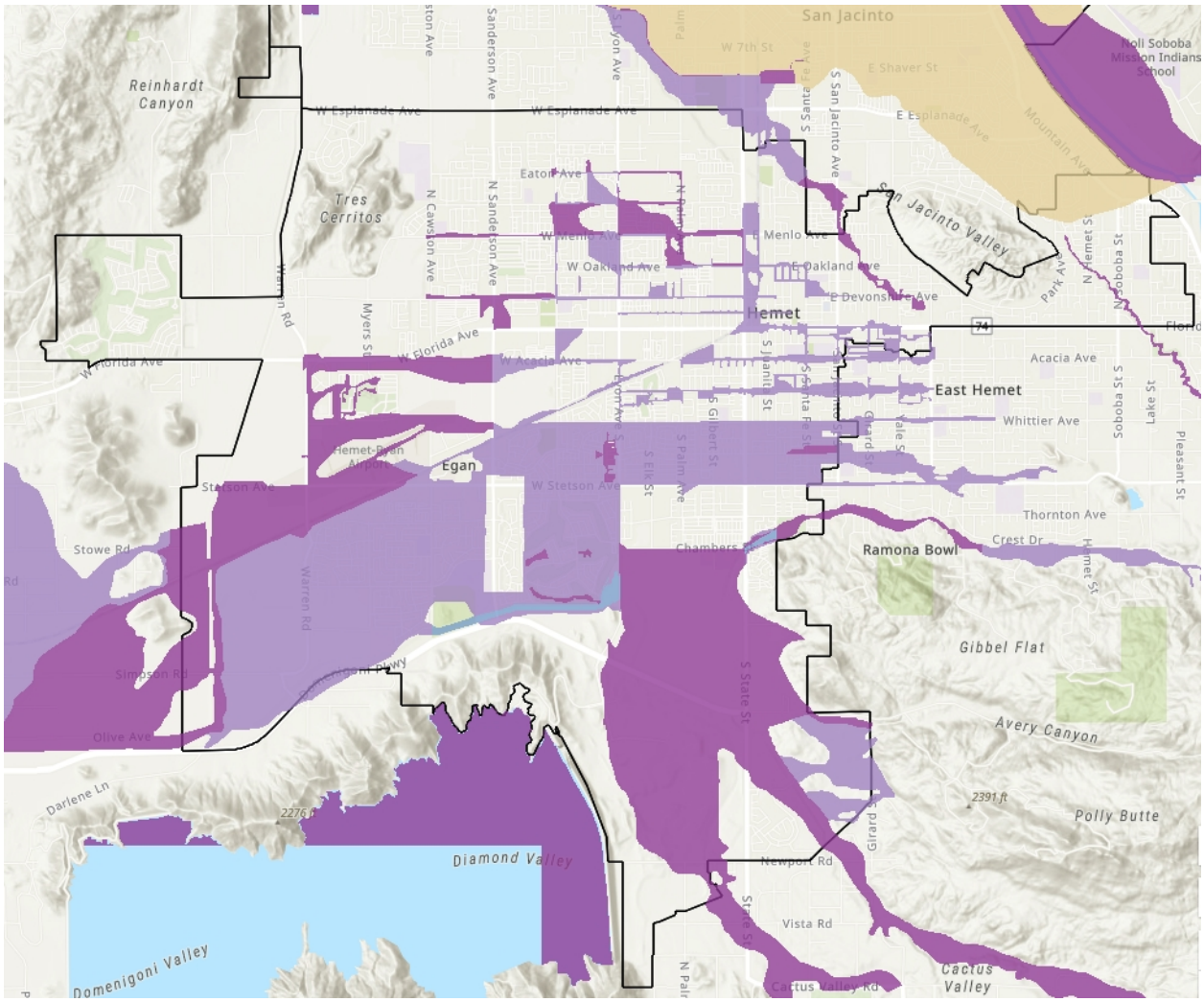

Figure 4 – FEMA Natural Flood Hazards, Hemet 100- and 500-Year storm zones

SEVERE STORMS AND EXTREME WEATHER

California's Fourth Climate Change Assessment explains that, despite model predictions of only small changes in average precipitation in the Los Angeles region (of which Hemet is included), extreme dry and wet patterns are both expected to increase in the future. Please refer to the discussion of precipitation changes and droughts in Section 1.2 above. This section also addresses land and mudslides that may result from sever rain events.

SEVERE RAINSTORMS

In southern California, extreme precipitation often arrives via so called "atmospheric rivers," which the National Oceanic and Atmospheric Administration (NOAA) defines as "a flowing column of condensed water vapor in the atmosphere responsible for producing significant levels of rain and snow, especially in the Western United States."[20] Further NOAA recognizes that atmospheric rivers "that contain the largest

[20] NOAA, https://www.noaa.gov/stories/what-are-atmospheric-rivers; accessed March 22, 2022.

amounts of water vapor and the strongest winds can create extreme rainfall and floods."[21] Data presented in the Fourth Climate Change Assessment suggests "the frequency of atmospheric river events may increase in the future, and that the storms themselves will be associated with higher water vapor transport rates compared to historical conditions."[22] Please refer to Section 1.3 for discussion of the change in potential flooding impacts.

EXTREME WEATHER

In addition to extreme rain events, other severe weather phenomena include strong winds (see discussion under Section 1.4.3), hail, and lightning. Severe weather can pose hazards resulting in injury or death, damage to buildings, structures, infrastructure, and trees, fires, and diminished or blocked transportation access. Hail events are considered rare in the sub-region, and lightning occurs only occasionally.[23]

SANTA ANA WINDS

Between October and April, southern California is susceptible to the unique phenomenon of so called "Santa Ana Winds." These dry, hot, offshore winds originate when high pressure sets up over the Great Basin, combined with low pressure off the southern California coast. As the winds sweep across the deserts of eastern California and encounter the Transverse Ranges, winds flow down slope and channel through the mountain passes. Santa Ana winds frequently exceed 40 miles per hour. The Fourth Climate Change Assessment recognizes the uncertainty in predicted changes to the patterns of Santa Ana winds due to global climate change, with some models predicting increases and others decreases in the number of annual events. Theories hypothesize that "warming of interior land masses may weaken the ocean-to-desert temperature gradient that partly drives Santa Ana winds."[24]

LAND SLIDES

Weather induced landslides occur when a hillside becomes unstable, caused by severe or persistent rain events, causing soil and rocks to slide downslope. In some cases, the hillsides can become so saturated that slope failures result in a mudslide, a mixture of soil and water moving downslope. Unstable hillsides, such as those denuded of vegetation by wildfires, drought, or pests, are at greater risk of land- and mudslides. The climate change induced increase in rainfall, especially severe rain events, may result in an increase in landslides and mudslides.

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[21] Ibid.

[22] California Office of Planning and Research, California Energy Commission, and California Natural Resources Agency, California's Fourth Climate Change Assessment, Los Angeles Region Report, September 28, 2018; https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf, Accessed May 10, 2021; page 14.

[23] WRCOG, p. A-17.

[24] California Office of Planning and Research, California Energy Commission, and California Natural Resources Agency, California's Fourth Climate Change Assessment, Los Angeles Region Report, September 28, 2018; https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf, Accessed May 10, 2021; page 14.

The California Department of Conservation provides a map of existing Landslide Susceptibility, see Figure 5. Unfortunately, this map does not take into account or predict future risks of landslides accounting for the effects of climate change.

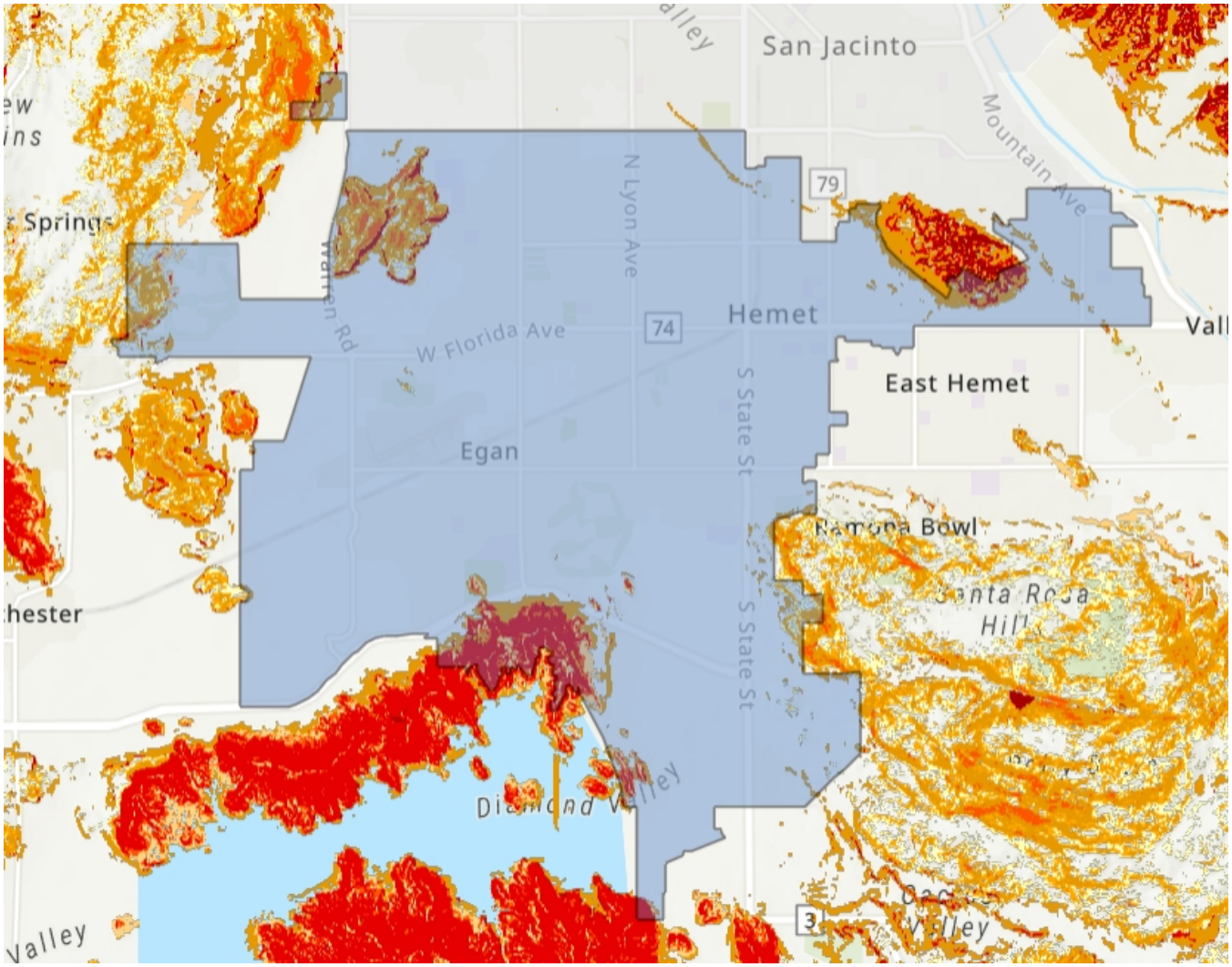

Figure 5 – California Department of Conservation, Hemet Landslide Susceptibility

TEMPERATURE CHANGES

A rise in temperature has been observed in many Southern California communities including those in southwestern Riverside County. According to long-term data (the approximately 12 decades from 1896 to 2015) presented in California's Fourth Climate Change Assessment, trends in annual average, maximum, and minimum temperatures show an increase of 0.16 degree Celsius (equal to 0.29 ºF) per decade.[25] Warming is expected to increase across the region in the coming decades, with interior regions "expected to experience the highest amounts of warming, up to 10°F in the late-21st century under RCP8.5."26 According to Cal-Adapt, the average maximum temperature observed for Hemet in the years 1950 through 2004 was 80.4 degrees Fahrenheit (ºF). The maximum and minimum day-time maximum temperatures observed during this period were 82.9 and 77.3 ºF, respectively.

In the projections based on the RCP 8.5 scenario, Hemet could experience an average maximum temperature of 86.2 ºF during the years 2035-2064. For the same time-period, the maximum and minimum daily maximum temperatures could reach 91.2 and 82.8 ºF, respectively. During the years 2064 through 2099 the projections for Hemet includes an average maximum temperature of 89.3 ºF, with maximum and minimum day-time maximum temperatures of 94.8 and 84.3 ºF, respectively. By 2099, the annual average temperature is projected to further increase 2.9 degrees to 93.3 ºF. Figure 3 provides the estimated annual average maximum temperatures for Hemet in an RCP 8.5 scenario. According to the California Office of Environmental health hazard Assessment (OEHHA) and California Department of Public Health disruptions in weather patterns due to global climate change, such as warmer spring temperatures and overall increases in temperatures will "likely alter the distribution and occurrence of West Nile virus, Lyme disease, hantavirus, and other insect or animal transmitted diseases in California."[27]

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https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf, Accessed March 22, 2022; page 9.

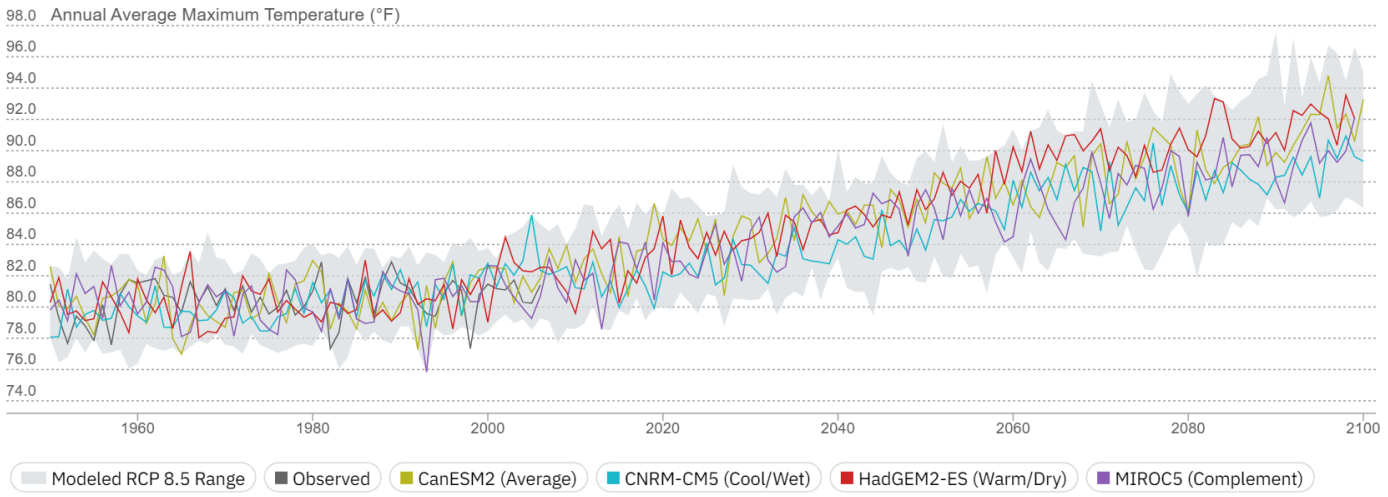
[26] Ibid, page 11.

[27] California Office of Environmental health hazard Assessment (OEHHA), https://oehha.ca.gov/media/downloads/climate-change/document-presentation/13humankramer.pdf; accessed March 22,2022.

Hemet, California

Projected changes in **Annual Average Maximum Temperature** under a **High Emissions (RCP 8.5) Scenario**.

OBSERVED HISTORICAL		FUTURE PROJECTIONS		FUTURE PROJECTIONS	
1950-2004		**Mid-Century (2035-2064)**		**2064-2099**	
55 YEAR AVG		30 YEAR AVG	30 YEAR RANGE	36 YEAR AVG	36 YEAR RANGE
80.4 °F		86.2 °F	82.8–91.2 °F	89.3 °F	84.3–94.8 °F



Source: Cal-Adapt. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility).

Figure 6 – CalAdapt, Hemet Annual Average Maximum Temperature

EXTREME HEAT DAYS

According to the Fourth Climate Change Assessment, "[t]he intensity and frequency of extreme heat are also projected to increase over the LA region".[28] Extreme heat days are defined as a day when the maximum temperature on any day in April through October exceeds the 98th historical percentile of maximum temperatures between 1961 and 1997. According to Cal-Adapt, for Hemet the extreme heat temperature threshold is 107.4 degrees Fahrenheit (ºF).[29] In the RCP 8.5 high emissions scenario Hemet is projected to experience 30 extreme heat days per year between the years 2035 and 2064. Figure 7 provides the estimated number of extreme heat days for Hemet in an RCP 8.5 scenario. This is a 26-day increase from the annual extreme heat days observed during the years 1950 to 2004 – a 6 to 7-fold increase from historical levels. Models predict the number of extreme heat days in Hemet may rise to 48 per year in the 2064 – 2099 timeframe.

[28] Ibid, page 11.
[29] Cal-Adapt https://cal-adapt.org/tools/extreme-heat/ ; Accessed May 7, 2022.

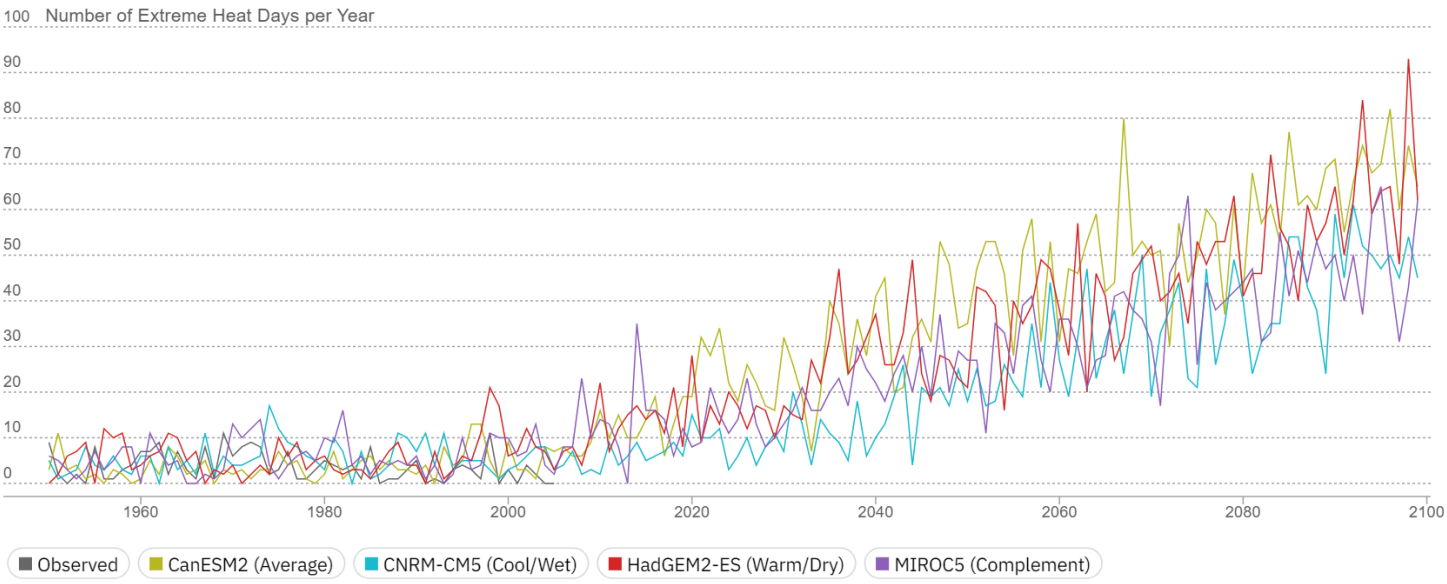
An increase in extreme heat days can correlate with an overall increase in temperature. Further, the heightened frequency of extreme heat days can pose a risk to sensitive communities such as homeless residents, senior citizens, and people with disabilities. This would create a greater reliance on climate modifying appliances such as air conditioning and refrigerants. The increased use of these utilities would increase the risk of blackouts to the area's power grid due to overconsumption.

Figure 7 – CalAdapt, Hemet Number of Extreme Heat Days per Year

Hemet, California

Projected changes in **Number of Extreme Heat Days per Year** when **daily maximum temperature** is above **107.4 °F** under a **High Emissions (RCP 8.5) Scenario**.

OBSERVED HISTORICAL	FUTURE PROJECTIONS		FUTURE PROJECTIONS	
1950-2004	**Mid-Century (2035-2064)**		**2064-2098**	
55 YEAR AVG	30 YEAR AVG	30 YEAR RANGE	35 YEAR AVG	35 YEAR RANGE
4 days/yr	30 days/yr	4–59 days/yr	48 days/yr	17–93 days/yr



Source: Cal-Adapt. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility).

COOLING DEGREE DAYS

As WRCOG recognizes[30], most of the built environment of the sub-region was designed to withstand heat. Nonetheless, even small increases in average temperatures and in the number of extreme heat days can lead to sharp increases in utility demand to cool buildings. A helpful measure of this demand is the Cooling Degree Day (CDD), which, according to Cal-adapt, is defined as the number of degrees by which a daily average temperature exceeds a reference temperature (typically 65 degrees Fahrenheit).[31] Figure 8 presents the CDD for Hemet, showing an increase from 1,577 CDDs from 1950 – 2004, to 2,738 CDDs projected for 2035 to 2064, and up to 3,521 CDDS in the 2064 to 2099 period under the RCP 8.5 scenario.

[30] WRCOG, Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment page 3

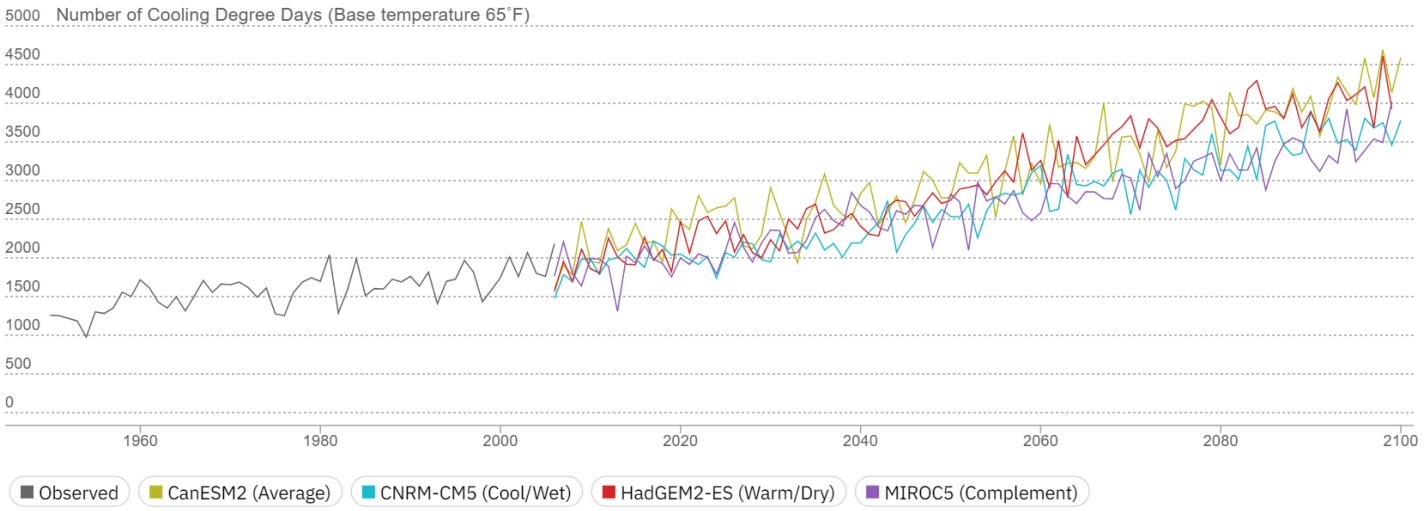
[31] The reference temperature loosely represents an average daily temperature below which space cooling (e.g., air conditioning) is not needed.

For additional context, under the RCP4.5 scenario, these would range from 2,485 (for the years 2021 to 2050) to 2,797 (for 2051 to 2099).

Hemet, California

Projected changes in **Annually Cooling Degree Days** using a base temperature of **65 °F** under a **High Emissions (RCP 8.5) Scenario**.

OBSERVED HISTORICAL	FUTURE PROJECTIONS		FUTURE PROJECTIONS	
1950-2004	**Mid-Century (2035-2064)**		**2064-2099**	
55 YEAR AVG	30 YEAR AVG	30 YEAR RANGE	36 YEAR AVG	36 YEAR RANGE
1577 degree days	2738 degree days	2008–3725 degree days	3521 degree days	2560–4694 degree days



Source: Cal-Adapt. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder).

Figure 8 – CalAdapt, Hemet Annual Cooling Degree Days

WILDFIRE

Across California, wildfire season typically runs between late summer to early spring, but CalFire reports that fires are starting earlier and ending later with each passing year. Intense dry seasons, warmer spring and summer temperatures, reduced snowpack, and earlier snowmelt make forests and vegetation more susceptible to wildfires. Natural events such as warm and dry Santa Ana winds, which typically occur in early fall, further increase the growth of fires and threat to urban areas. CalFire estimates the length of fire season had increased by 75 days in 2020. In 2015, wildfires in Riverside County and nearby municipalities resulted

in approximately $42 million worth of losses in residential and commercial properties.[32]

Hemet's projected burn area associated with wildfire risks is estimated to decrease over time as shown in Figure 6 below. The burn area is estimated to decrease its average size from 16.9 hectares (41.76 acres) between the years 1953 through 2004 to 10.5 hectares (25.95 acres) in the years 2035 through 2064. This decrease in area burned differs from the overall County of Riverside since the burn area for the county is expected to gradually increase.

Figure 7 shows that a small portion of the City falls within the Very High Fire Hazard Severity Zone (VHFHSZ) within both the Local Responsibility Area (LRA) and within State Responsibility Area (SRA). As structures are built within the FHSZ's adjacent the wildland urban interface (WUI) areas, which is the transition area between unoccupied land and human development, fires will become an increasing problem for fire departments, per the U.S. Fire Administration.[33] Additionally, according to CalFire, Wildland Urban Interface is a condition when structures abut wildland areas and therefore have a greater potential for house-to-house ignition.

Land located within the VHFHSZ mostly includes the area in the northwest area of the City and includes the area of Sunwest Village Specific plan, Low-medium Density residential, Rural Residential, and Mixed-use development. The VHFHSZ also includes the area along the southwest including Diamond Velley Lake Park Specific Plan, Rural Residential development, quasi-public/cultural development, and single-family zoned properties with densities ranging from Rural Residential to Low Density Residential.

Additionally, land located in the northeast along the northern boundary of the City is also within the VHFHSZ and zoned Rural Residential and Low Density Residential.[34]

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[32] Desert Sun. (2015). *Local Wildfires Rack up $42 million bill in 2015*. Retrieved from: https://www.desertsun.com/story/news/environment/2015/11/16/local-wildfires-rack-up-42-million-bill-2015/75544134/

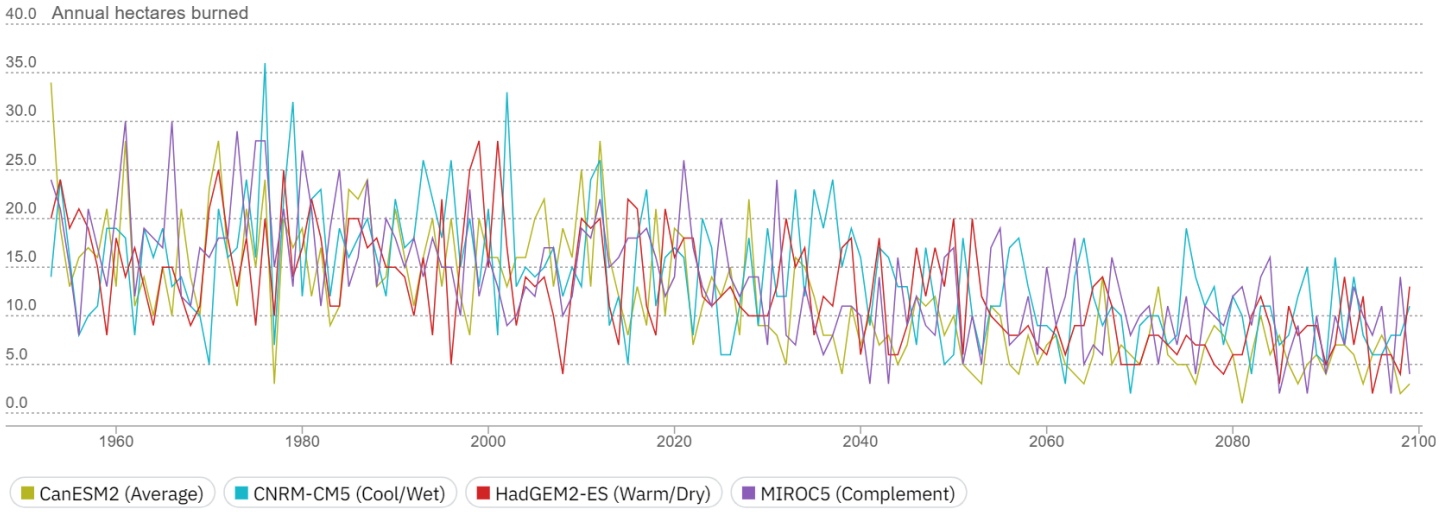
[33] U.S. Fire Administration. What is the WUI? https://www.usfa.fema.gov/wui/what-is-the-wui.html, Accessed March 23, 2022.

[34] City of Hemet, *Specific Plan/Planned Unit Development/Planned Community Development Map*, https://www.hemetca.gov/DocumentCenter/View/3210/specificplan?bidId=

Hemet, California

Modeled Annual Area Burned under a **High Emissions (RCP 8.5) Scenario** and Central Population Growth scenario

OBSERVED HISTORICAL	FUTURE PROJECTIONS		FUTURE PROJECTIONS	
Baseline (1961-1990)	**Mid-Century (2035-2064)**		**End-Century (2070-2099)**	
30 YEAR AVG	30 YEAR AVG	30 YEAR RANGE	30 YEAR AVG	30 YEAR RANGE
– hectares	10.5 hectares	3.0–24.0 hectares	8.0 hectares	1.0–19.0 hectares



Source: Cal-Adapt. Data: Wildfire Simulations for California's Fourth Climate Change Assessment (University of California Merced), Wildfire Simulations Derived Products (Geospatial Innovation Facility).

Figure 9 – CalAdapt, Hemet Annual Area (hectare) Burned

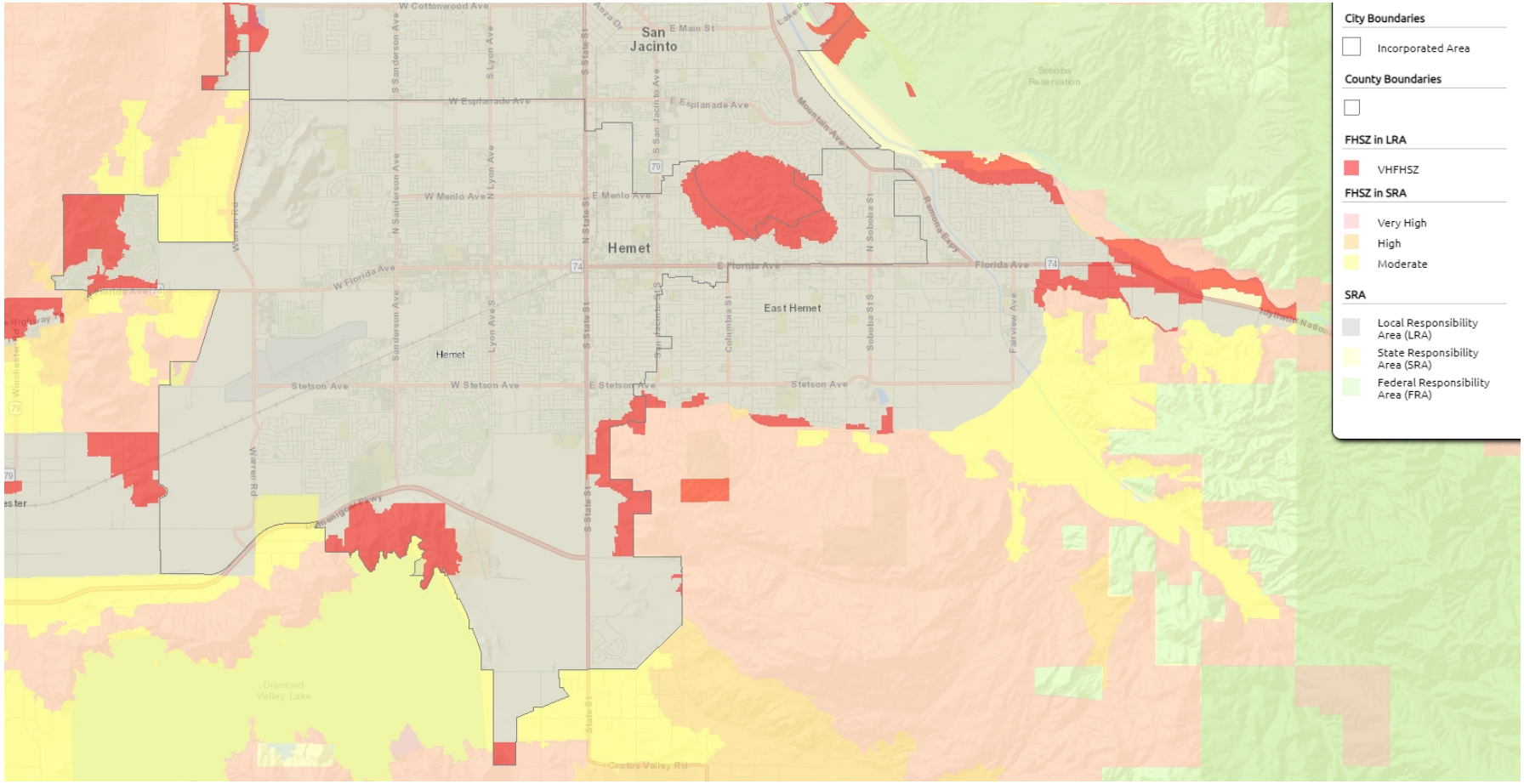


Figure 6 – Cal FIRE, Hemet Very High Fire Hazard Severity Zones

2. SENSITIVITY – WHAT ASPECTS OF THE COMMUNITY WILL BE AFFECTED?

Sensitivity refers to the risk certain structures, functions, and populations may face from climate change-impacts. In alignment with the California Adaptation Planning Guide[35], this step simply identifies resources in each category that could be affected by climate-related events. The next step in the process evaluates how the impacts may occur and severe they may be.

STRUCTURES

Climate change-related impacts may affect the integrity of structures or buildings depending on, but not limited to the age, location, and materials used in the resource. The structures at risk include those which may pose a direct threat to the community, as well as those which may threaten the environment, economy, and current livelihood of Hemet. The California Adaptation Planning Guide recommends evaluating the potential for non-traditional "structures" such as parks and open spaces, and historic, cultural, and natural resource areas as part of this category.

☒ Residential	☒ Parks and Open Space	☒ Dikes, Dams, and Levees
☒ Commercial	☒ Recreational Facilities and Infrastructure	☒ Water Treatment Plan and Delivery Infrastructure
☒ Industrial	☒ Transportation Facilities and Infrastructure	☒ Wastewater Treatment Plant and Collection Infrastructure
☒ Government	☐ Marine Facilities	
☒ Institutional (schools, churches, hospitals, prisons, etc.)	☒ Communication Infrastructure	

The following is an example of the type of structures that are considered sensitive to climate change[36]:

- Residential neighborhoods and communities, especially those near Sunwest Village and sensitive communities adjacent to West Florida Ave.
- City of Hemet City Hall, Fire Station, Police Station, and other municipal structures.
- Hemet Valley Medical Center, Hemet Dialysis Center and other healthcare facilities.
- Mary Henley Park and other recreational facilities.
- State Road 74, State Road 79, Burlington Northern Santa Fe Railroad Corridor and the City's main access roads and arterial roadways.

[35] California Emergency Management Agency and California Natural Resources Agency, Adaptation Planning Guide, Planning for Adaptive Communities, July 2012. Page 20.
[36] Community Vulnerability Profiles, Western Riverside County, February 2020. Page 26

- Diamond Valley Lake Dams
- EMWD San Jacinto Water Reclamation Facility and other water and wastewater facilities.

Transportation Systems

Transportation system functions serve to move residents and visitors through the City as efficiently as possible and are critical in the event of a climate emergency for evacuation purposes. Roads, highways, railways, public transportation, and overpasses may be affected by climate change. State Routes 79 and 74 runs through the City and serves as major corridors for the region. Vehicular impacts may inhibit residents and visitors from accessing safety and resources. Transportation infrastructure in the subregion is vulnerable to extreme heat, flooding, and wildfire. State Routes 79 and 74 are critical evacuation routes that run through large areas of 100-year flood zones (WRCOG 2014c). The Hemet General Plan Circulation Element identifies three bicycle facility classifications found throughout the City and their locations. Bikeways provide local opportunities for cyclists and regional connections which may be affected by climate change such as, but not limited to, precipitation, extreme heat days, and/or wildfires.

Utility Systems

The City of Hemet is served by water, wastewater, energy, and communication services which may be overwhelmed or damaged during a climate change event. The Hemet Open Space and Conservation Element of the General Plan identify energy resources available to the City, which include natural gas supplied by Southern California Gas Company and electricity supplied by Southern California Edison (SCE). Extreme heat days or wildfire risks may result in temporary energy blackouts which may prevent the community from accessing air conditioning and cooling services.

FUNCTIONS

The climate change effects expected to impact Hemet have the potential to affect the function types indicated below. Critical emergency response functions, which may include, but are not limited to, emergency services, medical care, firefighting, property protection, public safety, and government functions, must be able to operate quickly and effectively in the event of a climate-related hazard or disaster. As with sensitive structures, impacts of varying severity on certain functions may cause damage to the economy, the environment, and public safety.

☒ Government Continuity	☒ Business Continuity	☐ Social Services
☒ Potable Water	☒ Housing Access	☒ Ecological Function
☒ Energy Delivery	☒ Employment and Job Access	☐ Tourism
☒ Emergency Services	☐ Food security	☒ Recreation
☒ Public Safety	☒ Mobility/transportation/ access	☒ Agriculture, Forest, and Fishery Productivity
☒ Public Health	☒ Quality of Life	☐ Industrial Operations
☐ Emotional and Mental Health	☒ Wastewater/Sewer	☒ Solid Waste

POPULATIONS

The population of Hemet may be affected differently by climate hazards depending on income, age, employment, housing type and location, health and disabilities, gender, language, race/ethnicity, and access (to medical services, technology, transportation, etc.). Populations within Hemet that may be additionally affected by climate hazards include the following:

☒ Seniors	☒ Individuals without access lifelines (e.g. car or transit, telephones)	☒ Renters
☒ Children	☒ Non-White communities	☒ Students[1]
☒ Individuals with disabilities	☒ Low-Income, unemployed, or underemployed communities	☒ Seasonal residents[2]
☒ Individuals with compromised immune systems	☒ Individuals with limited English skills	☒ Individuals uncertain about available resources because of citizenship status
☒ Individuals who are chronically ill	☒ Unsheltered Individuals[37]	

Notes:

1. Includes non-adult students in K-12 schools
2. Includes "Snowbirds," those seasonal residents who move from northern to southern, warmer, locales during the winter season

A person may experience greater threats to their livelihood from climate change depending on, but not limited to, their income, access to transportation, language, physical ability, and/or age. For example, Seniors may be at higher risks of injury or heat-related sickness during extreme heat events. During wildfire season, seniors, children, and those with chronic respiratory illnesses may be more sensitive to the effects of poor air quality.

The City of Hemet was estimated to have a population of 89,833[38] persons in the year 2020. From 2020 to 2045, Hemet is forecasted a population growth of 52.1 percent[39] that is a faster population growth than the County of Riverside's forecasted growth of 31.3 percent. Hemet's population is comprised mostly of individuals in between 18 to 65 years of age (47.8 percent). The population above the age of 45 years makes up 22.5 percent of the population, with 21.8 percent being aged 65 and over. The median age of Hemet's population is 37.9 years. The City of Hemet is made up approximately 69 percent white persons, 9.3 percent black persons, and 2.6 percent Asian persons.

Employment characteristics may point toward a population's ability to recover from a climate change event. Persons with lower incomes may be disproportionately affected by climate change events and may therefore

[37] WRCOG, Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment, page A-20

[38] United States Census Bureau, Quick Facts for City of Hemet and Riverside County, https://www.census.gov/quickfacts/fact/table/hemetcitycalifornia,US/PST045221, Accessed July 7th, 2022

[39] SCAG SoCal Demographics and Growth Forecast Adopted September, 2020, Accessed March 22, 2022

benefit from community services. Those who are unemployed, for example, may not have the means to prepare emergency resources or alternative temporary shelter. Hemet has an unemployment rate of 10.8 percent. The City of Hemet also has a much lower (63.9% lower) median household income than the County of Riverside. [40]

3. POTENTIAL IMPACTS AND RISK – HOW WILL CLIMATE CHANGE AFFECT THE POINTS OF SENSITIVITY? HOW LIKELY ARE THE IMPACTS AND HOW QUICKLY WILL THEY OCCUR?

In this step, we address how climate change exposure may affect the community structures, functions, and populations.

For infrastructure components or functions/services, this evaluation may include consideration of the following:

- Asset value and intangible importance
- Location of asset (current or future hazard zone)
- Extent of community reliance
- Potential for partial or total loss of service
- Consequence of loss or interruption
- Ease of restoration of service

For populations, this evaluation may include answering the following:

- What sort of hardships would be felt by the population as a result of exposure to the hazard? Would it result in a decrease in quality of life or threaten to damage and/or destroy property?
- Is there a risk of mortality or morbidity to the population as a result of the hazard?
- How many people are affected by the hazard? Is it a relatively small group within the community, or is it most or all of the residents?
- In the event that hardships occur, how long would the population be affected? Would hardships diminish in severity over time or remain at the same level of severity during the course of the impact?

Each potential point of sensitivity identified above is given an impact score from IM0 (minimal impact) to IM4 (severe impact) for each hazard, in accordance with the approach used in WRCOG's Vulnerability Assessment.[41] *Table A-4 of WRCOG's Vulnerability Assessment* is provided below.

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[40] United States Census Bureau, Quick Facts for City of Hemet and Riverside County, https://www.census.gov/quickfacts/fact/table/hemetcitycalifornia,US/PST045221, Accessed July 7th, 2022

[41] WRCOG; https://wrcog.us/DocumentCenter/View/7478/Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment; page A-27; Accessed May 9, 2022.

Table 1: WRCOG Impact Scores

Impact Score	Summary (Buildings and Infrastructure, Economic Assets, Community Services)	Summary (Populations and Biological Resources)
IM0	Impacts are minimal. There are no service disruptions that community members are aware of.	All impacts are minimal. Community members may not notice effects.
IM1	Performance or services may be somewhat degraded on occasion.	Community members notice minor impacts. There may be mild disruptions to some behaviors or actions.
IM2	The asset is likely to experience chronic stress, limiting the ability to reliably function. Effectiveness may be entirely disrupted on occasion.	There is a marked decline in overall quality of life. Reductions to health, public safety, and/or community viability are likely.
IM3	The asset may only function in a limited way. It may frequently or always be unable to meet community needs.	There is a substantial drop in the well-being of the affected communities. Current lifestyles/habitat may no longer be viable.
IM4	The ability of the asset to provide beneficial service is destroyed.	There is a severe risk of injury or death in human populations and of major habitat shifts or degradation for biological communities.

Source: Western Riverside Council of Governments. (2019). Western Riverside Adaptation and Resiliency Strategy: Part 1, Vulnerability Assessment. Table A-3: Impact Scores. Page A-27. Available at: https://wrcog.us/DocumentCenter/View/7478/Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment (Accessed March 22, 2022)

AGRICULTURAL PESTS AND DISEASES

One of the most direct effects of climate change is that average temperatures are increasing, which has a bearing on pests and diseases. Higher temperatures can increase the rate of reproduction for insects and mites, which can result in increased pesticide use and damage to crops (Hall 2018). Temperatures are expected to get warmer earlier in the year and remain warmer until later in the year due to climate change, creating a wider window for pests and diseases to be active (IPCC 2013).

Climate change can also indirectly create a greater risk of agriculture and forestry pests and diseases. Many crop plants, trees, and livestock may be harmed and consequently weakened by warmer temperatures and changes in precipitation. The weaker plants and animals may not be able to fend off infestations or infections as well as a stronger plants or animal, causing pests and diseases to affect more of the population. Increased temperatures may also increase evapotranspiration rates and water demand, which can increase production costs, salinity buildup in topsoil, and adversely impact yield and quantity of crops and livestock (Hall 2018). These could create secondary issues for increasing food insecurity and outdoor worker health. These impacts would be considered an **IM0** for structures, and **IM2** for functions and sensitive populations.

AIR QUALITY

As discussed above, Hemet is predicted to experience slowly increasing temperatures and slightly increasing rates of precipitation by the end of the century, both of which could pose a threat to the ability of the region to meet and maintain the NAAQSs for ozone and PM. Air pollution is considered a risk factor for serious and sometime fatal public health outcomes, such as heart attacks, asthma, and cardiovascular and lung disease. In addition to Public Health, other functions such as Quality of Life, Ecological Function, and Agricultural Productivity may be directly impacted while Recreation and Tourism may be indirectly impacted. Elevated ground level pollutant levels pose no threat to structures.

The elderly, children, and the chronically ill are most at risk, and the NAAQS are designed to be health protective of these sensitive populations. The SCAQMD issues periodic Air Quality Advisories[42] (for specific events such as fires, windblown dust, and ash) and produces next-day air quality forecasts[43] that residents, public administrators, employers, and workers can consult regarding decisions to minimize exposure or curtail activities for sensitive populations, or in extreme cases, all populations. SCAQMD offers predictions of both the pollutant concentrations and the Air Quality Index (AQI) score for 44 distinct areas, including the Temecula Valley station near Hemet. The AQI rating system,[44] where a pollutant-specific score of 100 equates to meeting the applicable NAAQS, is a relatively new tool easily understood by the public. The SCAQMD offers a mobile app in English and Spanish. The greatest limitation may be accessibility to the internet for people of low economic means. Those engaged in physical labor outdoors are also at elevated risk.

Tourism and recreation functions in Hemet may be indirectly impacted by increasing pollutant levels if the AQI were to become consistently elevated and results in a perceived decrease in the value of the recreational or tourism activity. This outcome is considered minimal and not likely to occur. Because climate-induced changes in temperature and precipitation predicted for Hemet are moderate though relatively slow to occur, impacts to agricultural interests would be moderate. Given the availability of data regarding daily predictions of potentially elevated pollutant levels, that the majority (approximately 49%) of Hemet's residents are between ages 18 and 65, and Hemet has lower-than-County-average income, the impact from air quality to most populations, and to public health and quality of life is considered moderate. In alignment with suggested summary language in Table A-3 of WRCOG's Vulnerability Assessment, community members may notice moderate impacts from air quality hazards, and there may be mild disruptions to some behaviors or actions, garnering an impact score of **IM2**.

PRECIPITATION CHANGES

The IPCC reports the probability of precipitation changing is over 90 percent. As discussed in Section 1.2 above, changes in annual average precipitation for Hemet due to climate change are expected to be minimal, increasing 0.3 to 1.2 inches, a range of 2.5 to 10.2 percent. See discussion regarding the potential for secondary flooding impacts in Section 3.3 below. Of greater concern is how the potential for loss of

[42] https://www.aqmd.gov/home/air-quality/air-quality-advisories ; Accessed March 22, 2022
[43] https://www.aqmd.gov/home/air-quality/air-quality-forecasts ; Accessed March 22, 2022
[44] https://www.airnow.gov/aqi/aqi-basics/ ; Accessed March 22, 2022

snowpack in the Sierras or Colorado River Basin or prolonged and more extreme droughts regionally may impact emergency water supplies for Hemet.

Most structures in Hemet are predicted to withstand the minimal increase in annual precipitation, including the sewage and water supply systems. The routine functions of the City, including water and sewer service, are expected to remain unchallenged by the increases in annual rainfall; agricultural productivity and groundwater supplies will likely benefit from the increases. With no service disruptions expected related to the increase in annual average local rainfall amounts, the potential for impacts to structures and functions would garner a score of **IM0**.

Threats to the quantity and quality of the water supply due to decreases in the snowpack that provide the majority of Hemet's potable water and local drought conditions are not likely to impact the City's water supply infrastructure and functions, parks, ecological function, and agricultural productivity. These would be considered an impact score of **IM1**.

FLOODING

The City's LHMP acknowledges that existing flood risks are low within the City, likely to occur in the next year, and that the Riverside County Office of Education (RCOE) stated in their LHMP that "There are no major areas of concern for our jurisdiction as all of our critical facilities are located in areas of low hazard flooding.."[45]

Because the increase in frequency and intensity of severe rainstorms predicted to occur in the future will result in increases in flooding, the risk to structures, transportation and mobility, energy delivery, public safety, and public health are expected to increase. The effects are not expected to impact sensitive receptors more than the general population. The performance of these assets and services may be somewhat degraded on occasion, resulting in an impact score of **IM1**.

SEVERE STORMS AND EXTREME WEATHER

As discussed in Sections 1.4.1 above, despite predictions of minimal changes in annual precipitation, Hemet is precited to experience an increase in the frequency of and water vapor transport rates associated with severe rainstorms, or so called "atmospheric rivers." The ability of structures, functions, and sensitive populations to withstand extreme events may be different than impacts discussed for precipitation changes in Section 3.2 above.

The capacity of structures such as the storm sewer, sewage treatment system, and water supply system, to withstand more intense single-event rainstorms, or more frequent large storms, should be further studied, but is generally thought to be at some risk of increase stress to reliability. Secondary impacts, such as falling trees resulting in disruption to energy delivery and mobility, combined with stressed emergency and social services, could occasionally degrade public safety functions noticeably. These impacts would be experienced more by the elderly, individuals with disabilities, individuals without access lifelines, low-income

[45] Riverside County Office of Education, Local Hazard Mitigation Plan. Page 38. June 2017

communities, renters (not responsible for maintenance or repair of housing, for example), individuals with limited English skills, seasonal residents, and individuals uncertain about available resources because of citizenship status, than the general population of Hemet. This is primarily because temporarily moving out of storm-impacted housing to shelters is difficult to accomplish without access to reliable transportation, emergency communications in people's primary language, paid time off, or trust in government assistance. These would be considered an impact score of **IM1** (water infrastructure) to **IM2** (functions and sensitive populations).

Extreme weather (e.g., hail, fog, lightening) is rare in Hemet, and as such, impacts to structures, functions, and sensitive populations from extreme weather are minimal. Santa Ana winds threaten to topple trees, interrupt energy delivery, and damage structures, creating temporary public safety and possible mobility/access issues. According to the LHMP, areas within the City of Hemet have been identified as a zone of high wind erosion susceptibility.[46] Santa Ana windstorms may decrease as the effects of climate change increase through the end of the century, and the impact score for assets in Hemet would be **IM1**. All populations share the potential to experience impacts from Santa Ana winds.

Land- or mudslides could result in the loss of structures, communication infrastructure, energy delivery, or transportation infrastructure (i.e., roadways), on a temporary or more substantive basis. There could be injuries and/or deaths, and damage to structures and personal property from landslides due to debris flow and/or flooding. This could create issues related to access, mobility, emergency services, and public safety. However, due in part to the low probability rating (as discussed in the Riverside Multi-Jurisdictional LHMP)[47] and minimal areas of the city susceptible to land- or mudslides, these would be considered an impact score of **IM1**.

TEMPERATURE CHANGES

The southwestern Riverside communities are especially susceptible to changes in temperature, especially increased temperature maximums. This is due to their proximity to hotter desert climates and distance from temperate climates like coastal areas. As discussed in Section 1.5, the average maximum daytime temperature in Hemet is expected to rise noticeably (6.2 ºF to 86.2 ºF), in the 2035-to-2064-time frame, as compared to historic averages, and another 3 ºF in the latter half of this century. Additionally, the number of extreme heat days per year (when maximum temperatures climb above 107.4 ºF) in Hemet is predicted to rise appreciably, as are the cooling degree days.

As Hemet is accustomed to hot, dry temperatures, the integrity of the built environment, including structures and roadways, is not expected to be compromised by these rising temperatures. However, parks and recreational amenities may be negatively impacted. Energy delivery is most threatened as the demand for power to cool buildings increases when people seek shelter indoors from the heat. Hot temperatures can threaten water supply also. Agricultural productivity could decrease, and pest populations increase, increasing food insecurity. Employment and job access can be impacted, especially for populations reliant upon mass transit due to the hardship of accessing public transportation (e.g., lack of adequate bus shelters,

[46] Ibid. Page 33.

[47] City of Hemet. (2018). County of Riverside, Multi-Jurisdictional Local Hazard Mitigation Plan. Page 349. Hemet, CA: City of Hemet.

distance to nearest transit stop traversed by walking). Heat sensitivity (or heat intolerance) and heat stroke could increase, mosquito borne diseases would increase, air quality would degrade, and the desirability of recreating outdoors could decrease, threatening public health and quality of life. Seniors, children, individuals with disabilities, compromised immune systems, or chronic illnesses, individuals without access to lifelines, low-income communities, renters, seasonal residents, and the unhoused are most at risk from impacts due to rising temperatures. These impacts would be considered an **IM3** for buildings, functions, and sensitive populations.

WILDFIRE

The California Department of Forestry and Fire Protection (Cal Fire) has recommended that the urban, low-lying areas in Hemet be classified as having a Moderate Fire Hazard, whereas the hillside and mountainous areas are generally classified as having a Very High Fire Hazard. The areas between the flatlands and the hillsides are classified as High Fire Hazard.

The State of California has seen increased wildfire activity and greater burn areas with each passing year and experts anticipate the trend to continue if climate change is not immediately addressed. Hemet contains multiple areas noted as Very High Fire Hazard Severity Zones which puts it in greater danger of experiencing potentially devastating wildfires. Wildfires pose immediate risks to structures and populations, but they also create additional indirect impacts to the health and safety of a community such as destruction of communication infrastructure, destruction or damage to recreational facilities, parks, and open spaces (such as environmental and ecological preserves), damage to power distribution infrastructure, and blocked evacuation routes, and stressed emergency services. Secondary impacts can include erosion, loss of vegetation leading to landslides, poor air quality, and public health issues. Extreme heat can exacerbate wildfire risks. All populations can experience threats and effects of wildfires, but some are more pronounced in those with chronic illnesses and from lower economic means. Given the extent of the VHFHSZs in Hemet and the potential for increased stress, the impact score for wildfires would be **IM2**.

4.ADAPTIVE CAPACITY - WHAT IS OR CAN BE CURRENTLY DONE TO ADDRESS THE IMPACTS?

Adaptive Capacity is defined as "the ability of the sensitivity to respond to impacts using existing resources"[48]. Although the process of evaluating the ability of a community, function, or asset to address the projected impacts relies on a combination of quantitative and qualitative data, an adaptive capacity assessment is primarily a qualitative effort.

For structures and functions the following topics are considered:

- Extent of existing policies, plans, or programs in place or being considered to guide the response
- Availability and capacity of temporary alternatives while service is being restored
- Fiscal impact and ability to respond or repair
- Whether recovery would be voluntary or mandatory

[48] WRCOG, page A-27.

- Significant or insurmountable barriers to a full or timely response (i.e. requiring solutions that are technologically and/or politically infeasible)

To evaluate the adaptive capacity of populations, consider:

- Whether existing or planned policies or programs exist to assist individuals with the response, and whether community members have easy (and equitable) access to such services
- The ability of the different populations to respond to an impact, including overcoming barriers such as fiscal, language, immigration status, access to lifelines (transportation, internet, cell phone, etc.), physical limitations, etc.
- Access to alternatives that may reduce or eliminate the hardships caused by the hazard
- Significant or insurmountable barriers to adaptation (i.e. requiring solutions that are expensive of technologically difficult, require widespread lifestyle changes, and/or politically unpopular)

Following the approach used by the WRCOG, scores ranging from AC0 (no feasible adaptation method available) to AC4 (adaptation easily implementable) will be assessed, based on the following definitions as shown in *Table 2: WRCOG Adaptive Capacity Scores*:

Table 2: WRCOG Adaptive Capacity Scores

Impact Score	Summary
AC4	Assets and populations can adapt with little or no effort. Overall quality of life may improve as a result.
AC3	Adaptive solutions are feasible for most or all sensitivities. Some sensitivities may face limited challenges.
AC2	Threats can be reduced or mitigated, but solutions are only feasible for some assets. Many assets are likely to face substantive difficulties in adapting.
AC1	Adaptive solutions are expensive and/or technologically difficult, but feasible. Approach may require politically unpopular actions or widespread lifestyle changes.
AC0	No method of adapting is currently feasible, although solutions may be possible in the future.

Source: Western Riverside Council of Governments. (2019). Western Riverside Adaptation and Resiliency Strategy: Part 1, Vulnerability Assessment. Table A-4: Adaptive Capacity Scores. Page A-28. Available at: https://wrcog.us/DocumentCenter/View/7478/Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment (Accessed March 22, 2022)

The City of Hemet and Riverside County both have a variety of plans adopted which each address various aspects of the potential threats outlined in this Climate Vulnerability Assessment. Both jurisdictions recognize the importance of public and private partnerships and planning for potential issues the community may face in the coming years. *Table 3* identifies plans, programs, and reports that participate in ensuring Hemet's preparedness during future potential climate change events.

Table 3: Planning Documents	
Document	**Adoption Date**
Hemet	
General Plan	2012
Climate Action Plan	2018
Riverside County	
Climate Action Plan	2019
WRCOG Subregional Climate Action Plan	2014
WRCOG Adaption and Resiliency Strategy	2014
WRCOG Model Book	2014
Multi-Jurisdictional Local Hazard Mitigation Plan	2018

AIR QUALITY

Local ground level air pollutant levels are created by emissions generated within Hemet, in the surrounding vicinity and communities, and, for some pollutants, emissions released upwind "can travel great distances (i.e., hundreds of miles), affecting air quality and public health regionally."[49] The good news is, the SCAQMD, CARB, and USEPA are regulatorily mandated to make progress towards meeting and maintaining the NAAQS, and substantial progress has been made within the Basin to reduce emissions. Feasible adaptive solutions, such as reducing reliance on fossil-fuels in personal and commercial vehicles, and requiring enhanced filtration in residences, exist. However, they are expensive, technologically difficult, and/or politically unpopular. Locally, the City has established a number of policies in the Safety Element, Circulation Element, and Open Space & Conservation Element to the General Plan that would help to reduce GHG emissions, and provide the co-benefit of reducing emissions of harmful criteria air pollutants, including:

C-1.3: Maintain Level of Service (LOS) C or better for roadway segment operations, and LOS D or better for peak-hour intersection movements. Portions of Florida Avenue and Sanderson Avenue may operate at or below LOS D on a case-by-case basis.

C-2.6: Promote the extension of Metrolink service on the Burlington Northern Santa Fe Railway line from Riverside to stations located near the realigned SR 79 and downtown Hemet.

C-2.7: Coordinate with Western Riverside Council of Governments, Riverside County, and Riverside County Transportation Commission to identify, protect, and pursue opportunities for public transit along major transportation corridors and future rail service that connect the City with other population and employment centers.

[49] United States Environmental Protection Agency, "What is Interstate Air Pollutant Transport?", https://www.epa.gov/interstate-air-pollution-transport/what-interstate-air-pollution-transport; accessed March 22, 2022.

C-3.6: Work with HUSD, local private schools, parent teacher associations, homeowner associations, and other interested parties to establish safe drop-off and pick-up zones, create "walking school buses" and "bike trains", encourage carpooling, and facilitate expanded use of crossing guards.

C-4.1: Promote urban design measures that encourage alternatives to single-occupancy vehicle transportation and direct new growth along transportation corridors as a means of reducing roadway congestion, air pollution, and non-point source water pollution.

C-4.2: Support a variety of transit vehicle types and technologies and encourage alternatives to single-occupancy automobile use such as rail, public transit, paratransit, walking, cycling, and ridesharing.

C-4.3: Identify opportunities to implement the Western Riverside County Non-Motorized Transportation Plan within key activity centers of the City through the development nonmotorized transportation corridors and facilities.

C-4.4: Promote the use of neighborhood electric vehicles (NEVs) by using low-speed streets within projects and by ensuring connectivity with adjacent supporting uses such as neighborhood commercial uses.

C-4.5: Require new development to include opportunities for alternative transportation, such as bicycle paths, pedestrian connections, bicycle storage, and other facilities such as NEV paths, and charging stations.

C-4.6: Encourage and promote the reduction of vehicle miles traveled for all vehicles and for carbon-based fueled vehicles, and reduce the use of gasoline and diesel fuel for on-road vehicles in accordance with Senate Bill 375 regional and/or subregional targets established by the California Air Resources Board. Create and implement programs that will aid in improving air quality by reducing motor vehicle trips, such as those programs recommended by the Regional Transportation Plan, Riverside County Integrated Project, and the Southern California Air Quality Management Board.

C-4.7 Encourage all employers, especially employers of 100 or more persons to support alternative forms of transportation by providing appropriate facilities, including parking for vanpools, bicycle parking, and passenger loading areas.

C-4.9: Promote public transportation systems that use alternative fuels or promote energy

conservation.

C-4.11: Encourage new senior citizen and multiple-family housing projects of greater than 100 units to provide transportation services as a project amenity.

C-4.12: Coordinate the development of new public facilities with mass transit service and other alternative transportation services and facilities including the consideration of light rail/monorail within the City.

C-4.13: Require the provision of park-and-ride facilities at transit centers and stations and potential carpool origination points.

C-7.2: Ensure that environmental impacts such as noise, air quality, pollution, traffic congestion, and public safety hazards associated with continued operation of Hemet-Ryan Airport are mitigated to the extent practical.

CSI-5.10: Explore the use of grant funds and programs with SCE and non-profit agencies to establish programs for energy conservation (e.g., home weatherization, Energy Star applicants) and transition to the use of clean and renewable energy (e.g., photovoltaic retrofits, solar hot water heaters and pumps)

PS-7.5.5: a leadership position in the development and use of renewable energy resources such as wind, geothermal, solar, biomass, and hydro.

OS-6.1: Encourage the efficient use of energy resources by residential, commercial, and industrial users by requiring project proposals to incorporate energy-efficient products and techniques into their designs in accordance with adopted California Green Building Standards Code standards and other development standards.

OS-6.2: Encourage the efficient use of energy resources by residential, commercial, and industrial users by requiring project proposals to incorporate energy-efficient products and techniques into their designs in accordance with adopted California Green Building Standards Code standards and other development standards.

OS-6.3: Encourage homeowners, business owners, and other energy users to use incentives offered by federal, state, and utility companies; to identify voluntary retrofit opportunities and funding options that increase building energy performance; and to reduce energy consumption.

OS-6.4: Require Redevelopment Agency–funded projects, public sector projects, and publicly

owned institutions and facilities to use systems, methods, and practices that promote energy conservation.

OS-6.5: Support the use and production of clean energy resources through green technology and programs that promote wind, solar, renewable, biomass, and cogenerating energy resources, where compatible with adjacent land uses.

OS-6.6: Encourage existing or new structures to maximize solar access by promoting passive solar energy design, natural ventilation, effective use of daylight, an onsite solar generation.

OS-7.1: Reduce the amount of air pollution emissions from mobile and stationary sources, and enhance the South Coast Air Basin by using best management practices in development proposals and project implementation.

OS-7.2: Pursue expansion of the public transportation system, as well as bicycle and pedestrian trails, that are linked to the regional transit network, to reduce vehicle trips.

OS-7.3: Promote the use of fuel-efficient and low-emissions vehicles, including neighborhood electric vehicles (NEVs).

OS-7.4: Manage the municipal fleet to achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available.

OS-7.5: Encourage a mix of housing types that are affordable to all segments of the population and are near job opportunities to further reduce vehicle trips.

OS-7.6: Encourage employers to implement transportation demand management (TDM) measures to reduce trips and vehicle miles traveled.

OS-7.7: Encourage businesses to use clean, innovative technologies and promote the use of alternative clean-fueled vehicles, new transportation technologies, and other alternatives to the combustion engine for City vehicles and individual use.

OS-7.8: Encourage green building techniques that improve indoor air quality, energy efficiency and conservation in buildings, and utilization of renewable energy sources.

OS-7.9: Continue to minimize stationary source pollution through the following:

- Ensure that industrial and commercial land uses are meeting existing South Coast Air Quality Management air thresholds by adhering to established rules and regulations.
- Encourage the use of new technology to neutralize harmful criteria pollutants from

stationary sources.

- Reduce exposure of the City's sensitive receptor s to poor air quality nodes through smart land use decisions.

OS-7.11: Reduce the amount of fugitive dust released into the atmosphere by construction and demolition, materials handling, paved roads, unpaved roads, and stock piles through development standards and compliance with CEQA regulations.

This study recommends adding the following policies:

PS-14.7: The City shall maintain consistent outreach to notify the community of extreme air quality and hazards.

PS-14.8: Continue to require environmental analysis for proposed projects which may produce harmful levels of greenhouse gas.

CSI-7.3: Promote alternative forms of energy production such as solar or wind power.

Overall, the adaptive capacity of the potentially impacted functions and sensitive populations would be rated as **AC1**, in accordance with Table A-4 of WRCOG's Vulnerability Assessment and *Table 6*, above.

PRECIPITATION CHANGES

This section will focus on the functions, structures, and places which were identified in Section 3.4 as susceptible to reliability and effectiveness issues arising from the chronic stress of decreased or threatened water supply, and sensitive populations negatively impacted by food insecurity, employment challenges, and declines in emotional and mental health, recreation, and overall quality of life. Drought conditions are becoming increasingly common in California and are best managed at the State level. Water supply in Hemet is primarily sourced from local groundwater, however there are also connections served by the Eastern Municipal Water District (EMWD) and Lake Hemet Municipal Water District (LHWMD); the former which obtains water from the Metropolitan Water District (MWD). Threats to water supply can be somewhat mitigated by reducing demand but not fully alleviated. Some functions, such as agriculture and open space/recreation facilities may face substantial difficulties in adapting. EMWD maintains Water Use Efficiency Requirements, found in Article 6 – Water Conservation section of the Administrative Code,50 and periodically updates these policies, including but not limited to use restrictions, tiered rates, and water efficient landscaping requirements, to provide long-term water reliability for existing and future customers.

The City's Safety Element, Community Services and Infrastructure Element, and Open Space & Conservation Element contains goals and policies aimed at increasing the resiliency of water and wastewater infrastructure and systems, including the following:

[50]EMWD Administrative Code, Adopted May 15, 2013; https://www.emwd.org/sites/main/files/file-attachments/admincode.em_._6.19.19_full_pkt_rev_070219_0.pdf?1619022636 ; accessed May 10, 2022.

CSI-2.1: Coordinate with the Eastern Municipal Water District and Lake Hemet Municipal Water District to meet the projected water demand and to ensure reduction of existing and projected water supply impacts.

CSI-2.2: Require evidence of adequate water supply, or a water supply assessment when appropriate pursuant to state law, to support proposed development.

CSI-2.3: Developments shall be required to install water facilities sufficient to meet performance standards established by the water agency serving the project. All facilities must be operational prior to issuance of building permits.

CSI-2.7: Ensure that adequate aquifer water recharge areas are preserved and protected through a comprehensive water management strategy.

CSI-3.1: New development shall install sufficient sewer facilities needed to meet performance standards established by the site's wastewater collection agency.

CSI-3.4: Promote the extension of sanitary sewers to serve all new and existing land uses and densities, as feasible, to protect groundwater quality. Require new development, and existing development where feasible, to connect to the sanitary sewer system. Exceptions may be considered for properties with a minimum lot size of ½ acre and that are located more than 660 feet from a sewer line.

CSI-4.3: Prevent pollutant discharge into storm drain systems and natural drainages and aquifers by cooperating in regional programs with stakeholders and the Regional Water Quality Control Board to implement the National Pollutant Discharge Elimination System program, Storm Water Pollution Prevention Plans, Water Quality Master Plans, , comply with the requirements of the Lake Elsinore Canyon Lake TMDL to reduce nitrogen and phosphorous in the San Jacinto River Watershed, and provide education on best management practices for the public and the development community.

CSI-4.4: Require development projects to minimize stormwater runoff and provide on-site opportunities for groundwater recharge that are integrated into the project design and amenities, and utilizing Low Impact Development techniques.

CSI-4.11: Incorporate the Ahwahnee Water Principles for Resource Efficient Land Use into development design, as appropriate, to reduce costs and improve the reliability and

quality of the City's water resources.

OS-5.1: Use natural approaches to the maximum extent possible to manage streams and create drainage infrastructure systems to protect groundwater recharge areas, conserve groundwater resources, maintain water quality through pollution reduction, channel drainage in environmentally sensitive ways, and design attractive and multi-use open space areas for recreation and habitat.

OS-5.1: Use natural approaches to the maximum extent possible to manage streams and create drainage infrastructure systems to protect groundwater recharge areas, conserve groundwater resources, maintain water quality through pollution reduction, channel drainage in environmentally sensitive ways, and design attractive and multi-use open space areas for recreation and habitat.

OS-5.1: Use natural approaches to the maximum extent possible to manage streams and create drainage infrastructure systems to protect groundwater recharge areas, conserve groundwater resources, maintain water quality through pollution reduction, channel drainage in environmentally sensitive ways, and design attractive and multi-use open space areas for recreation and habitat.

OS-5.2: Identify and protect the area's waterways and groundwater resources from depletion and sources of pollution in cooperation with local water districts, Riverside County Flood Control District, the Santa Ana Regional Water Quality Control Board, or other appropriate agencies.

OS-5.3: Encourage the efficient use of water resources by residential, commercial, and industrial users by requiring development project proposals to incorporate best management practices into their designs, including the use of new technology in development design.

OS-5.5: Require new landscape installations or rehabilitation projects by public agencies, nonresidential developers, multi-family residential developers, and homeowners to use water efficiently, encourage water conservation, and prevent water waste.

OS-5.6: In cooperation with local water suppliers, adopt and implement a comprehensive water management strategy that specifies the City's role in the conservation and groundwater recharge effort.

OS-5.7: Participate in regional water resource management planning to facilitate the long-term availability of clean water resources for Western Riverside County.

OS-5.8: Support and engage in educational outreach programs with local water suppliers and other agencies that promote water conservation, drought-tolerant landscapes, and widespread use of water-saving technologies.

This Study recommends adding the following policies:

Policy PS-7.2: Ensure that the City's water supply is protected against drought conditions intensified by climate change.

Policy PS-7.9: Promote drought resistant landscaping to continue reducing water consumption and potential fuel sources.

The City of Hemet's reliance on local groundwater insulates much of the City's population and assets from the expected precipitation changes. Nonetheless, sensitive populations experiencing a marked decline in overall quality of life are likely to face substantive difficulties in adapting. This would result in an Adaptive Capacity score of **AC2**.

FLOODING

The City has established the following goals related to flood risks:

Goal PS-2: Reduce risk of property damage and human injury from flood hazards.

Goal CSI -4: Maintain adequate stormwater management and drainage systems to help protect against flood hazards, recharge the aquifer, and preserve groundwater quality

The City's Safety Element contains the following six policies aimed at reducing the risk of damage to structures, infrastructure, and services, and improving public safety related to flood risks:

PS-2.1 Ensure that waterways used for flood control are kept clear of obstructions and are regularly maintained.

PS-2.2 Encourage flood control infrastructure that does not reduce the natural character or limit use of the site.

PS-2.3 Minimize additional flood risk exposure in developing areas.

PS-2.4 Cooperate with Riverside County Flood Control and Water Conservation District to evaluate the effectiveness of existing flood control systems and improve those systems as necessary to meet capacity demands.

PS-2.6 Require new construction within the 100-year flood zone to meet National Flood Insurance Program standards.

PS-2.7 Develop and maintain flood zone inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and Hemet Fire Department.

The City's Community Services and Infrastructure Element contains the following three policies aimed at reducing the risk of damage to structures, infrastructure, and services, and improving public safety related to flood risks:

CSI-4.1 Ensure sufficient levels of stormwater drainage are provided to protect the community from flood hazards and to minimize the discharge of materials into the storm drain system that are toxic or that would obstruct flows.

CSI-4.2 Provide public storm drainage facilities to adequately accommodate expected 100-year flood flows. Ensure that roadways remain passable for at least one lane in each direction. Coordinate with the Riverside County Flood Control District regarding the preference and requirements for District maintenance of regional and master planned drainage facilities.

CSI-4.1 Provide comprehensive and ongoing updates to the City's Master Flood Control and Drainage Plan or create sub-area Drainage Plans to reflect current land use patterns, best management practices, and environmental constraints.

This Study recommends adding the following policy:

PS-2.8: Coordinate with FEMA to ensure that flood mapping and flood risk information is current and available.

Even with incorporation of these policies, the adaptive capacity is limited. Many assets face substantive difficulties in adapting. This would result in an Adaptive Capacity score of **AC2**.

SEVERE STORMS AND EXTREME WEATHER

The City has established several policies in support of its existing disaster preparedness, response, and recovery planning process, which are applicable to severe rain and windstorms, including:

C-1.12: Maintain and encourage the existing grid system of streets to facilitate neighborhood accessibility, emergency response, and transportation capacity.

C-3.4: Establish and implement street standards that maintain an acceptable right-of-way to accommodate emergency, utility, maintenance, and service vehicles.

C-8.5: Promote the provision of the emergency services available, including paramedic, ambulance, and helicopter transport to area hospitals and trauma centers.

PS-1.3: Require adequate mitigation of potential impacts from erosion, slope instability, or other hazardous slope conditions for development occurring on slope and hillside areas.

PS-8.4: Establish and Ensure that outlying areas and newly annexed areas can be served by emergency communication systems as new development occurs.

PS-10.2: Work with and encourage essential service providers (water, sewage, electrical power, communication, transportation, natural gas, and liquid fuel systems) and transportation agencies to periodically evaluate the vulnerability of their systems in the event of a disaster.

PS-10.3: Review and consistently update the City's disaster contingency plans. Recommend that plans for critical facilities and service providers cover the adequate provision of emergency supplies and power supplies to provide essential services.

PS-10.4: Maintain mutual aid agreements and communication links with federal, state, county, and other local agencies to respond to emergencies.

This Study recommends adding the following policies:

PS-7.14: Continue to monitor potential climate risks occurring within the City.

CSI-7.10: Promote the use of climate ready architecture designed to maintain adequate indoor climate with minimal energy use.

PS-7.11: The City shall communicate the location and availability of shelters in cases of hazardous climate conditions such as wildfire, severe rain events, and extreme temperatures

S-7.12: The City shall maintain consistent outreach to notify the community of extreme weather hazards such as extreme heat, severe rain events, and potential wildfire risk.

The City has established several related implementing policies, including:

CSI-5.1: Facilitate provision and enhancement of telecommunications services throughout the

Planning Area while promoting collocated and/or "stealthed" wireless communications antenna facilities and the provision of new technology to minimize cell towers.

CSI-5.2: Promote the availability of reliable and reasonably priced utilities necessary for businesses and residences to prosper.

CSI-5.3: Ensure the provision of reliable, quality energy services and promote energy conservation throughout the City.

PS-10.1: Support community participation in safety and crime prevention through public outreach programs under the police, fire, and emergencies services departments.

A number of these policies address the risks to sensitive infrastructure and populations discussed above in Section. Even with these policies, the adaptive capacity would be considered a score of **AC2**, as it relates to extreme rain and wind events, because many of the sensitive populations, such as the elderly, disabled, and those without access to lifelines and transportation, would likely face substantive difficulties in adapting. As for land- and mudslides, the adaptive capacity is lower, **AC1**, because adaptive solutions would be expensive and potentially unpopular. Other extreme weather poses little threat to assets in Hemet, and as such, assets can adapt with little to no effort (**AC4**).

TEMPERATURE CHANGES

The City has established several policies in support of protecting its sensitive structures, functions, and populations from the risks associated with climate change; the City has adopted several implementing policies applicable to temperature change impacts and sensitivities, including:

C-2.6: Promote the extension of Metrolink service on the Burlington Northern Santa Fe Railway line from Riverside to stations located near the realigned SR 79 and downtown Hemet.

C-2.7: Coordinate with Western Riverside Council of Governments, Riverside County, and Riverside County Transportation Commission to identify, protect, and pursue opportunities for public transit along major transportation corridors and future rail service that connect the City with other population and employment centers.

C-3.10: Identify and seek to eliminate hazards to safe and efficient bicycle or pedestrian movement citywide.

C-4.4: Promote the use of neighborhood electric vehicles (NEVs) by using low-speed streets within projects and by ensuring connectivity with adjacent supporting uses such as neighborhood commercial uses.

C-4.8: Work with the Riverside County Transportation Commission, senior agencies, retirement

communities, and local organizations to provide affordable and reliable paratransit and demand-responsive transit services that satisfy the transit needs of the elderly and disabled.

C-4.10: Develop icons for easy identification of public transit facilities, and require that projects incorporate them when practical.

C-4.11: Require new development to incorporate transit-oriented design features and attractive, accessible, and appropriate transit, bicycle, and pedestrian amenities to promote and support public transit and alternate modes of transportation, including but not limited to:

a. Designing transit stops to reduce disruption to vehicular traffic;

b. Locating transit stops to minimize the impact of buses and ridership on nearby neighborhoods;

c. Ensuring that all transit stops are ADA accessible;

d. Requiring transit stop amenities such as benches, shade, lighting, and shelters , where appropriate;

e. Requiring all new transit stops be equipped with bicycle racks and/or bicycle lockers;

f. Encouraging senior citizen and affordable family housing projects to provide transportation services; and requiring new public facilities to incorporate transit facilities.

C-5.6: Connect commercial activity centers to adjacent residential areas with well-designed pedestrian linkages that include amenities such as benches, trees, landscaping, and shade structures to encourage people to walk to destinations.

C-5.9: Pursue funding or grant opportunities to plan, construct, and maintain pedestrian, bicycle, and multi-use trails.

This Study recommends adding the following goals and policies:

C-3.11: Require new development to provide transit facilities, such as bus shelters, transit bays, and turnouts, as necessary.

C-3.12: Build green infrastructure improvements into regular street upgrades and capital

improvement projects to ensure continued investment in heat-reducing practices throughout the community.

CSI-5.11: The City shall communicate the location and availability of shelters in cases of hazardous climate conditions such as wildfire, severe rain events, and extreme temperatures.

Goal: PS-14 Protect lives, property and natural resources from dangers associated with the effects of increasing temperatures

PS-14.1: Coordinate with energy providers to ensure reliable energy availability for the City's residents.

PS-14.2: Promote alternative forms of energy production such as solar or wind power.

PS-14.3: Promote the use of climate ready architecture designed to maintain adequate indoor climate with minimal energy use.

PS-14.4: Continue to monitor potential climate risks occurring within the City.

PS-14.6: The City shall maintain consistent outreach to notify the community of extreme weather hazards such as extreme heat, severe rain events, and potential wildfire risk.

Even with this robust list of policies, threats to sensitive populations can be reduced but not eliminated. Low-income individuals will face substantive economic hardship in implementing feasible adaptation strategies. Thus, the adaptive capacity related to increases in temperatures, extreme heat days, and cooling days is rated **AC1**.

WILDFIRE

Due to the natural topography, terrain, volatile fuel types and climate conditions, wildfire in and near Hemet will continue to be an ongoing threat. As such, the City set goals of being:

PS-6: Protect lives, property, and natural resources from the potentially disastrous effects of fire hazards.

PS-7: Ensure that an adequate service level of fire protection is provided for all residents, visitors, and businesses throughout the City of Hemet.

The City has previously adopted sixteen implementing policies applicable to managing wildfire risks:

PS-6.1 Adopt and enforce federal, state, and local construction and design standards regarding fire prevention and protection, particularly for high-occupancy, dependent-care, or essential facilities.

PS-6.2 Require all new commercial, industrial, institutional, multiple—family residential, and mixed—use developments to install fire protection systems and encourage the use of automatic sprinkler system where not otherwise required by existing codes and ordinances.

PS-6.3 Continue to conduct building and fire code inspections and enforcement to ensure safe structures and the protection of land and property.

PS-6.4 Require all new development projects to incorporate adequate egress systems in their design and encourage existing strictures to upgrade their egress systems.

PS-6.5 Require an evaluation of all new development that will be located in or adjacent to wildland areas to assess the development's vulnerability to fire and its potential as a source of fire.

PS-6.6 Coordinate with Riverside County to evaluate and establish a fire buffer program along heavily traveled roadways to prevent fuel buildup.

PS-6.7 Implement brush clearing, fuel modification plans, and other fire prevention programs on open space lands and landscape buffers that 1›alances reducing the possibility for the encroachment of wildland fires onto inhabited areas with maintaining accessibility for recreational purposes.

PS-6.8 Mitigate existing fire hazards related to urban development of patterns of urban development as they are identified and as resources permit.

PS-6.9 Continue education programs on preventing fires, monitor their effectiveness, and expand or alter the programs, as necessary.

PS-7.1 Assess the impacts of incremental increases in community development density and intensity and subsequent impacts on traffic congestion, municipal infrastructure capacity, fire hazards, and emergency response times. Ensure through the development review process that new development and redevelopment will not result in a reducing fire protection services below acceptable, safe levels with adequate fire flows and response time of five minutes or less for 80 percent of fire and emergency calls on both a citywide and response area basis.

PS-7.2 Maintain and implement a fire department strategic plan to address staffing and facility

needs, service goals, deployment strategies, and other departmental issues.

PS-7.3 Require development projects to contribute development impact fees, form public safety districts, oz other financing mechanisms based on their proportional impact and on—going demand for fire services.

PS-7.4 Require adequate access for emergency vehicles, including adequate street widths, vertical clearance on new streets, and multiple points of access.

PS-7.5 Maintain adequate and appropriate personnel, emergency vehicles, and other firefighting equipment and technology to respond to fires and other disasters of emergencies.

PS-7.6 Pursue strategies that maintain and improve the City's Insurance Services Office rating.

PS-7.7 Continue to coordinate fire protection services with Riverside County, the California Department of Forestry and Fire Protection, Idyllwild Fire Protection District, and all other agencies and districts with fire protection powers

The City proposes thirteen additional policies to further reduce wildfire risks:

PS-7.8: The City and Fire Department shall develop a policy or program promoting public outreach about defensible space and evacuation routes. The City and Fire District shall include specific plans to reach at risk populations.

PS-7.9: When feasible, the City will minimize all new residential, commercial, and industrial development in the VHFHSZ.

PS-7.10: When feasible locate new essential public facilities outside of high fire risk areas, including, but not limited to, hospitals and health care facilities, emergency shelters, emergency command centers, and emergency communications facilities, or identifying construction methods or other methods to minimize damage if these facilities are located in a state responsibility area or very high fire hazard severity zone.

PS-7.11: Coordinate with Eastern Municipal Water District and Lake Hemet Municipal Water District to ensure adequate water availability for fire suppression.

PS-7.12: Encourage multi-family housing, group homes, or other community housing in SRAs, LRAs, or VHFHSZs to develop a policy to create emergency evacuation or shelter in

place plans.

PS-7.13: All new development located in the LRA VHFHSZ shall be required to provide a site-specific Fire Protection Plan (FPP) and a Fuel Modification Plan that address fuel modification or incorporate open space and other defensible space areas, as well as multiple points of ingress and egress before approval.

PS-7.14: All new development within the LRA VHFHSZ shall be responsible for long-term maintenance of fire reduction projects; including but not limited to, a roadside fuel reduction plan (including private/public road clearance), defensible space clearances (including fuel breaks) around structures, subdivisions, and other development in the VHFHSZ.

PS-7.15: When feasible, the City will prepare a survey of existing non-conforming developments to identify all existing developments within the City that do not provide two points of access/evacuation routes and identify measures or improvement plans to address opportunities to improve access. Where no additional access opportunities exist, the City and Fire Department should identify a plan for emergency operations in fire/emergency events.

Even with the addition of thirteen new policies, threats to structures and functions from wildfires will remain. More stringent, more restrictive adaptive measures are expensive or politically unpopular. Thus, the adaptive capacity related to wildfire is rated **AC1**.

5. VULNERABILITY SCORING – WHAT ARE THE OUTCOMES OF THE VULNERABILITY ASSESSMENT?

Following the WRCOG approach, each sensitivity's impact score and adaptive capacity score are combined, which results in a vulnerability score, ranging from V0 (low) to V5 (high). *Table 4: Vulnerability Scoring Matrix* illustrates how a sensitivity's impact score and adaptive capacity score combine to create a vulnerability score. For example, a low impact score and high adaptive capacity score results in a low vulnerability score, while the opposite results in a higher vulnerability score.

Table 5: Summary of Vulnerability Assessment Scores, summarizes the impact scores and adaptive capacity scores related to each of the six potential climate change induced environmental stressors. The vulnerability score ranges from V0 (low) to V5 (high). Each is discussed below.

Table 4: Vulnerability Scoring Matrix[51]

Adaptive Capacity Score	Impact Score				
	IM0	**IM1**	**IM2**	**IM3**	**IM4**
AC0	V2	V3	V4	V5	V5
AC1	V1	V2	V3	V4	V5
AC2	V1	V1	V2	V3	V4
AC3	V0	V1	V1	V2	V3
AC4	V0	V0	V0	V1	V2

Table 5: Summary of Vulnerability Assessment Scores

Topic	Impact Score	Adaptive Capacity Score	Vulnerability Score
Air Quality	IM2	AC1	V3
Precipitation Changes			
Average Local Rainfall	IM0	AC3	V0
Drought/water supply	IM1	AC1	V2
Flooding	IM1	AC2	V1
Severe Storms and Extreme Weather			
Severe Rain	IM2	AC2	V2
Extreme Weather	IM0	AC4	V0
Santa Ana Winds	IM1	AC2	V1
Landslides	IM1	AC2	V1
Temperature Changes	IM3	AC1	V4
Wildfire	IM2	AC1	V3

AIR QUALITY

An impact score of IM2 and an adaptive capacity score of the potentially impacted functions and sensitive populations of AC1, results in a vulnerability score of V3, in accordance with Table A-5 of WRCOG's Vulnerability Assessment and *Table 4*, above.

[51] Source: Western Riverside Council of Governments. (2019). *Western Riverside Adaptation and Resiliency Strategy: Part 1, Vulnerability Assessment. Table A-5: Vulnerability Scoring Matrix.* Page A-29. Available at: https://wrcog.us/DocumentCenter/View/7478/Western-Riverside-Adaptation-and-Resiliency-Strategy_Vulnerability-Assessment (Accessed May 9, 2022)

PRECIPITATION CHANGES

Increases in annual average local rainfall amounts has a very low impact score of IM0. Because the changes would be minimal and gradual, the adaptive capacity of structures, functions, and populations to these changes would be very high, with a score of AC3. The resultant vulnerability score would be V0.

Threats to the quantity and quality of the water supply due to decreases in the snowpack that provide a small minority of Hemet's potable water and local drought conditions combined with a marked decline in overall quality of life for sensitive populations result in an impact score of IM1. Although threats to water supply can be reduced, the adaptive capacity score would be AC1. The resultant vulnerability score would be V2.

FLOODING

The performance of the potentially impacted assets and services may be somewhat degraded on occasion, resulting in an impact score of IM1. Even with incorporation of numerous policies, the adaptive capacity is limited, result in an Adaptive Capacity score of AC2. The overall vulnerability score is low, V1.

SEVERE STORMS AND EXTREME WEATHER

As discussed above, an impact score of IM2 was assigned to water infrastructure and IM2 to functions and sensitive populations related to extreme rainfall. A relatively high adaptive capacity score of AC3 for each was assigned because there are feasible mitigation solutions available. Thus, the vulnerability of Hemet to severe rain garners a vulnerability score of V2 for infrastructure, functions, and sensitive populations.

The impact from extreme weather will be nonexistent or minimal, IM0. Structures, functions, and populations can adapt easily, AC4. The result is a vulnerability score of V0.

Santa Ana wind risks are likely decreasing, and the disruptions when they do occur are considered mild, with an impact score of IM1. The adaptive capacity is fair, AC2, although some sensitivities may face challenges. Thus, the vulnerability of Hemet to Santa Ana winds is a vulnerability score of V1.

Land- or mudslides could result in the loss of structures, communication infrastructure, or transportation infrastructure (i.e., roadways), which would be considered an impact score of IM1. The City is aware of the hazards and addressed them in the Riverside Multi-Jurisdictional LHMP. However, adaptive solutions are potentially expensive and potentially unpopular, earning an AC1. The combination of impact score and adaptive capacity results in a vulnerability score of V2 for Landslides and mudslides.

TEMPERATURE CHANGES

Seniors, children, individuals with disabilities, compromised immune systems, or chronic illnesses, individuals without access to lifelines, low-income communities, renters, and seasonal residents and the unhoused are most at risk from impacts due to rising temperatures. These impacts would be considered an IM3 for buildings, functions, and sensitive populations. Even with this robust list of policies, threats to sensitive populations can be reduced but not eliminated. Low-income individuals will face substantive economic hardship in implementing feasible adaptation strategies. Thus, the adaptive capacity related to increases in temperatures, extreme heat days, and cooling days is rated AC1. This combination results in a vulnerability score of V4.

WILDFIRE

Given the extent of the VHFHSZs in Hemet, the potential for increased wildfires, and the burden to sensitive populations, the impact score for wildfires would be IM2. Although the City is taking steps to minimize the risk, further adaptive solutions are expensive and/or politically unpopular, and the adaptive capacity is AC1. Thus, the vulnerability score would be V3.