



Chapter 5

Adaptation and Resiliency

INTRODUCTION

The greenhouse gas (GHG) mitigation reduction strategies in this Climate Action Plan (CAP) support the statewide approach to reduce long-term climate change effects. However, the state is already experiencing adverse effects from climate change (CEPA and OEHHA 2013; Cal OES and CNRA 2012; WRCC 2013a). Even if global concentrations of GHGs stopped increasing today, climate change will impact the subregion for the foreseeable future. If GHG levels continue to rise, climate change effects will likely become more severe (IPCC 2013).

The Western Riverside Council of Governments (WRCOG) subregion is a diverse area, exhibiting a variety of socioeconomic conditions, infrastructure types, neighborhood compositions, geographies, and character. Nearly two million people live, work, and recreate in Western Riverside County.

For the subregion to flourish, it is important to understand how the climate could change and begin implementing strategies that help the subregion thrive in a variety of future climate conditions. To achieve this objective, Chapter 5 provides a brief overview of expected climate change effects, assets in the subregion that are vulnerable to climate change effects, and adaptation strategies intended to reduce vulnerability and increase resilience. The chapter concludes with sample work plans to enable local government implementation.

Appendix A provides information regarding the adaptation planning process and background research.

Climate Adaptation and GHG Mitigation

“Greenhouse gas mitigation” strategies reduce greenhouse gas emissions.

“Climate adaptation” strategies reduce the vulnerability of life, property, and natural resources to climate change effects. WRCOG intends to develop adaptation strategies that are GHG emissions neutral or net negative to ensure they are consistent with the CAP emissions reduction target.

CLIMATE CHANGE IN THE SUBREGION

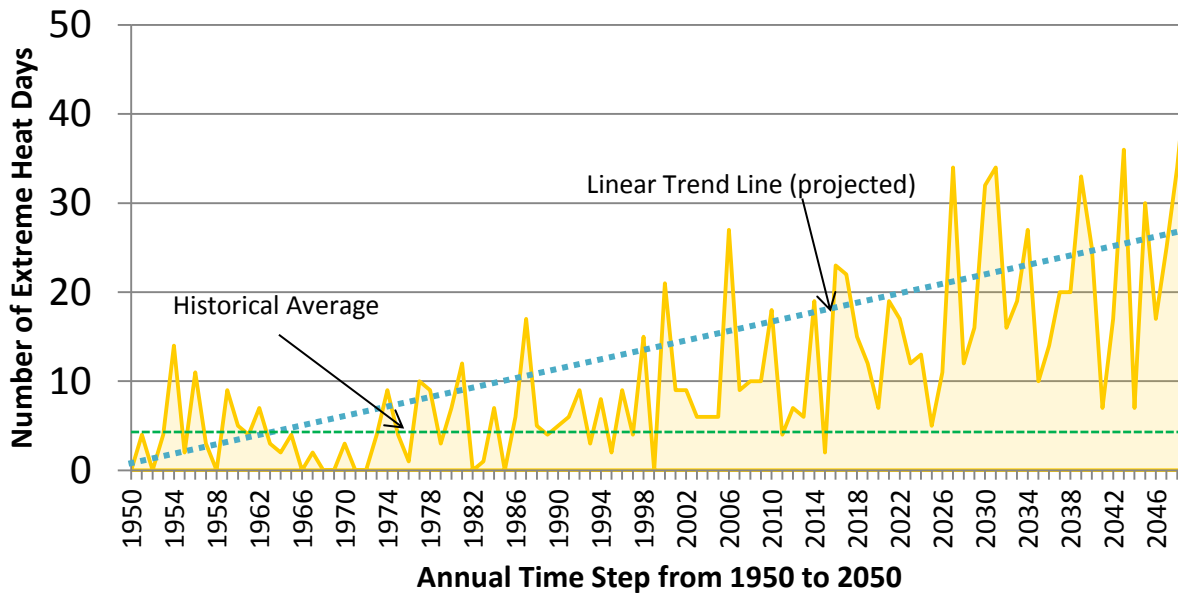
WRCOG identified extreme heat, drought, wildfire, and flooding as the most likely and impactful climate change-related hazards in the subregion. This section explains how these hazards are expected to change as a result of climate change through 2050.

EXTREME HEAT

The WRCOG subregion is a combination of Mediterranean and semi-arid climates. Both climate types are known for hot (sometimes very hot) and dry summers. Residents in the subregion generally expect these desert-like conditions and most of the built environment was designed to withstand extreme heat.¹ In the City of Riverside, for example, the extreme heat day threshold is 100°F. Between 1960 and 1991, the subregion averaged four extreme heat days per year.

Climate change is expected to increase overall global temperatures (IPCC 2013). The subregion will experience this increase in average annual heat in a variety of ways, including increased number of extreme heat days and heat waves, warmer summer evenings, and warmer average years (CEC 2013). In addition to the direct physical threat posed by extreme heat, elevated temperatures impose air quality hazards and can increase the rate of ground-level ozone (smog) formation (EPA 2013). As identified in **Figure 5-1**, the number of extreme heat days is projected to rise through 2050, where the average year could include 27 extreme heat days (CEC 2013).

Figure 5-1: Historic and Projected Extreme Heat Days, 1950 to 2050



Source: CEC 2013

¹ This CAP defines an extreme heat day as a day in April through October when the maximum temperature exceeds the 98th historical percentile of maximum temperatures based on daily temperature maximum data between 1961 and 1990 (CEC 2013).

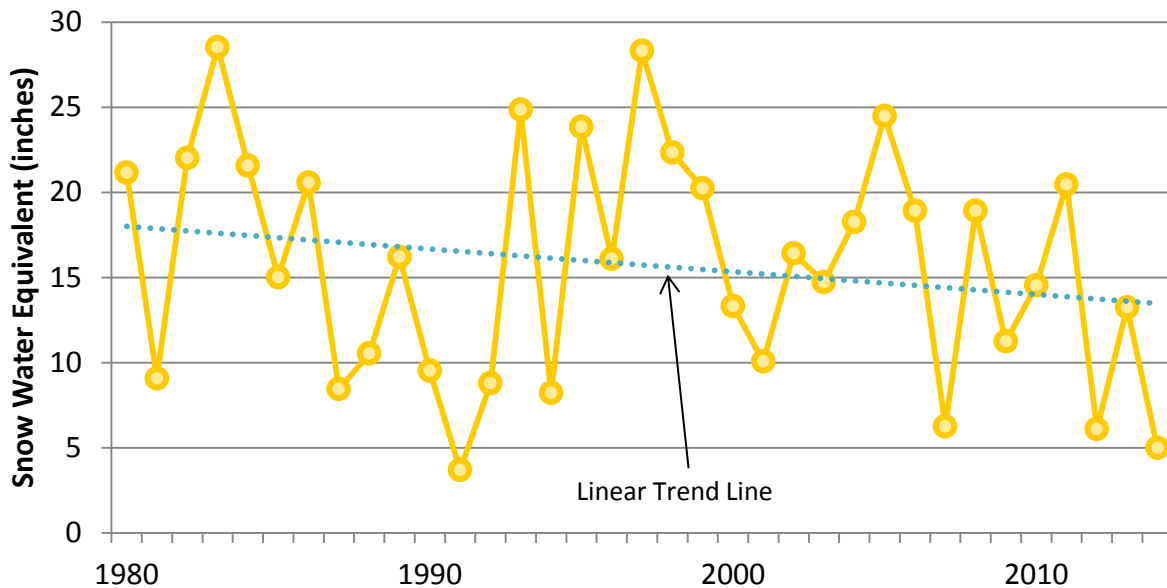
DROUGHT

The subregion contains numerous water agencies and municipal departments that supply water to customers from local and imported sources. From a local government standpoint, the mix of water agencies presents a challenge to implementing jurisdictional water reduction strategies, as some jurisdictions have multiple providers within their boundaries, and some water suppliers function as sub-agencies to others. Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD), which account for the majority of residential and commercial water accounts in the subregion, import roughly 75% of their water from the Sacramento-San Joaquin Bay Delta via the State Water Project and from the Colorado River (EMWD 2011; WMWD 2011). The imported sources rely on winter snowpack to deliver supplies year-round. Other parts of the subregion depend on groundwater resources. Aquifer recharge occurs when local rainwater percolates through the ground.

Since the 1950s, Riverside County has received an average of 10–12 inches of rainfall per year, although that number can vary greatly between years (WRCC 2013a, 2013b, 2013c). As of late 2014, the National Drought Mitigation Center classified the entire region as being in an “extreme drought,” the second-most intense drought condition classification (Rosencrans 2014). Although precipitation projections tend to be less certain than other types of climate change projections, a slight decrease in average precipitation is expected through midcentury (CEC 2013).

Most of the imported water used in the WRCOG subregion comes from the Sierra Nevada range. Reduced winter precipitation levels and warmer temperatures have greatly decreased the size of the Sierra Nevada snowpack (the volume of accumulated snow), which in turn makes less fresh water available for communities throughout California. Continued decline in the Sierra Nevada snowpack volume is expected, which may lead to lower volumes of available imported water (Cal OES and CNRA 2012). An example of this change can be seen in **Figure 5-2**, which shows February snowpack levels in Sierra Nevada between 1980 and 2014.

Figure 5-2: February Snowpack Levels in the Sierra Nevada, Five-Site Average, 1980–2014



Source: NRCS 2014

WILDFIRE

Existing Conditions

A wildfire is an uncontrolled fire spreading through vegetative fuels, and is one of the hazards in the subregion that poses the greatest risk to life and property (County of Riverside 2012). In addition to the direct physical threat to life and property, smoke released during an event can have a detrimental effect on the subregion’s air quality. In 2012, the California Energy Commission (CEC) commissioned a projection of wildfire risks for California. The report (Krawchuk and Moritz 2012) provides baseline wildfire risk, as well as projections for 2039. **Figures 5-3, 5-4, and 5-5** show baseline (2010) and 2039 fire risk, as well as the change in risk between baseline and 2039.

As shown in **Figures 5-3, 5-4, and 5-5**, the report projects increasing fire risk throughout most of the subregion through 2039 with particularly large changes in the southwest and in most high elevation areas. Wildfire risks are expected to increase as a result of hotter and drier conditions and associated secondary impacts such as reduced ground moisture, humidity, and changes to plant communities.

Fire Response in the Subregion

Within the WRCOG subregion, the cities of Corona, Hemet, Murrieta, Norco, Riverside, and Temecula provide their own fire and emergency services. The Riverside County Fire Department, in cooperation with the California Department of Forestry and Fire Protection (CAL FIRE), provides fire and emergency services to the unincorporated county and remaining cities. The Riverside County Fire Department and CAL FIRE have defensible space requirements for new and existing development, and provide comments on new development in high fire hazard severity areas.

Figure 5-3: Baseline Wildfire Risk, 2010

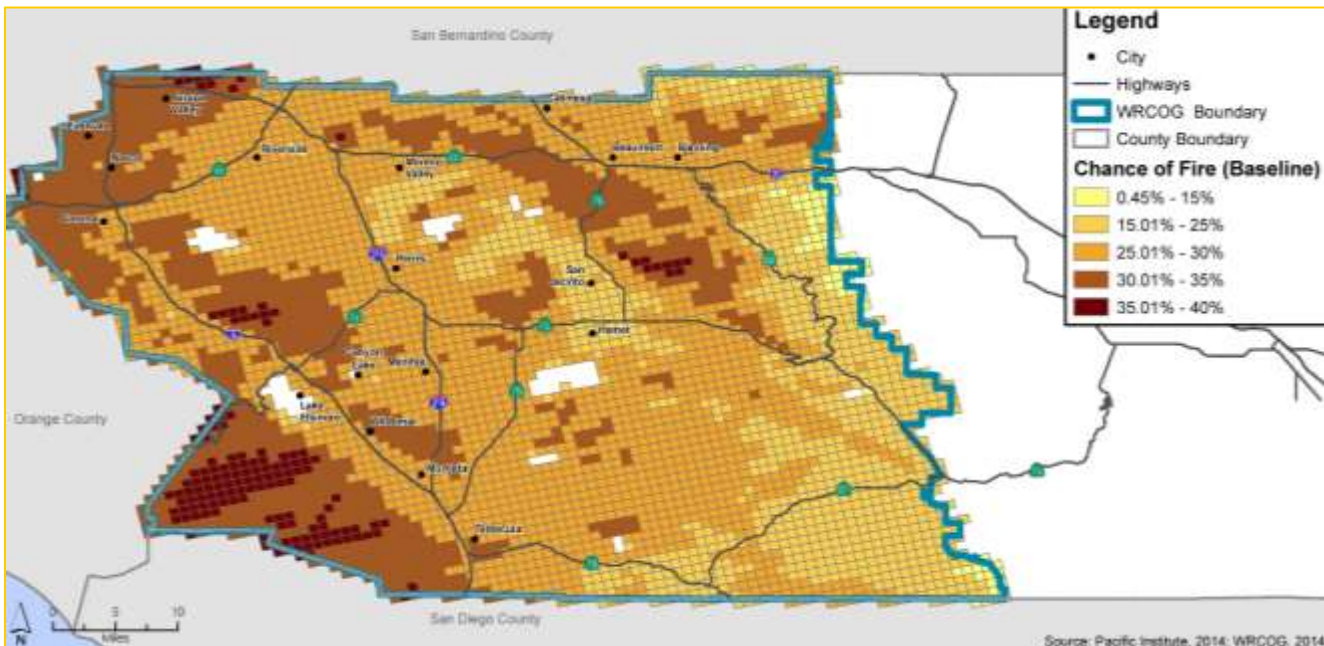


Figure 5-4: Wildfire Risk, 2039

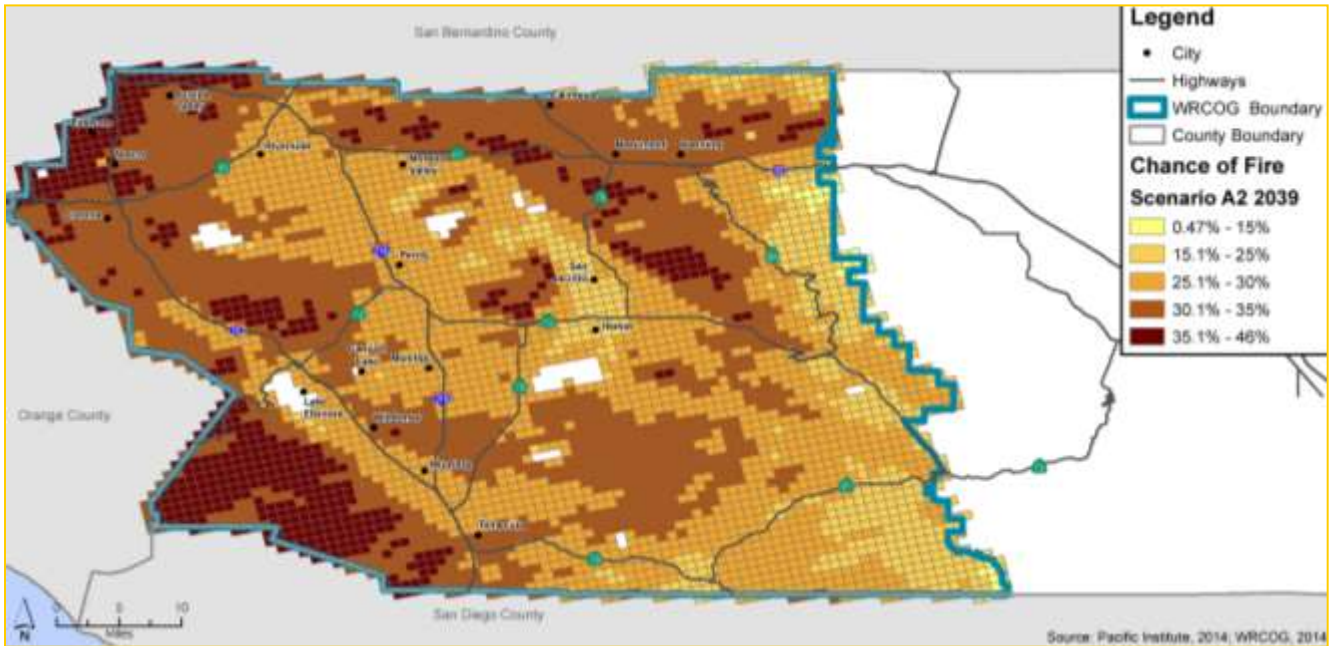
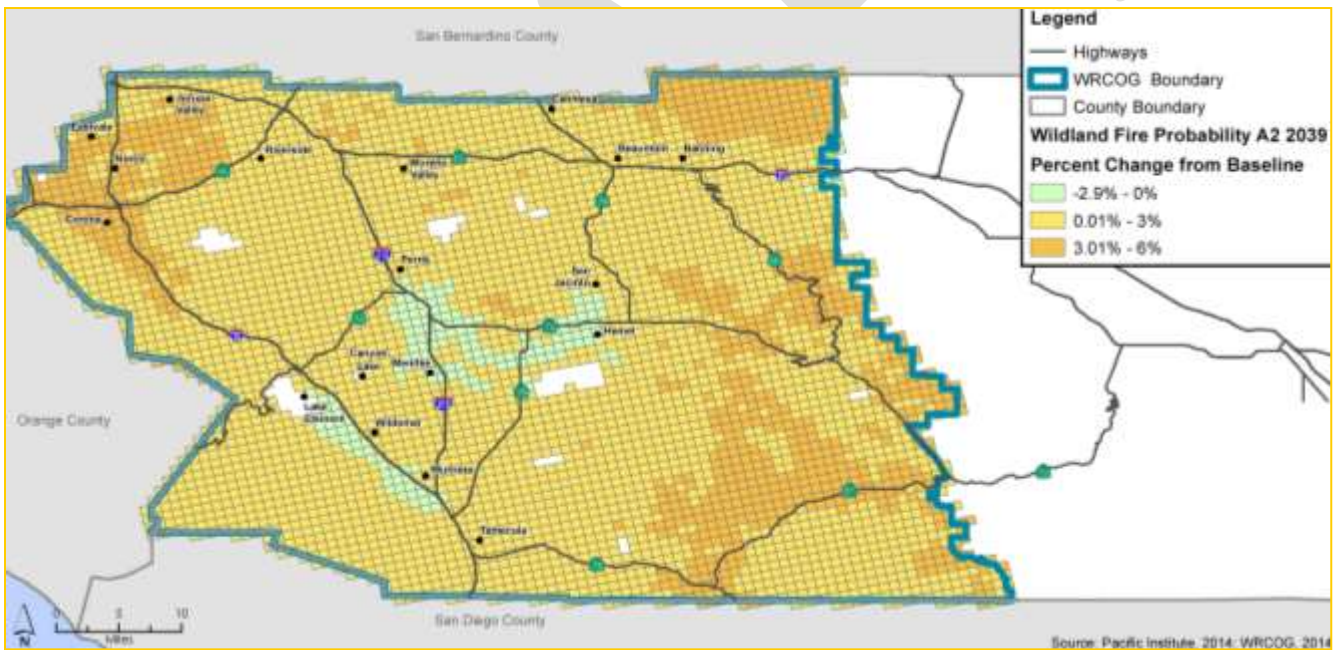


Figure 5-5: Change in Wildfire Risk, Baseline to 2039



FLOODING

The WRCOG subregion consists of valleys nestled within mountain ranges; this topography makes it susceptible to flooding. High volume monsoons are common in the summer. Although flooding may occur in other areas, the regulatory standard for identifying flood areas are through the Federal Emergency Management Agency (FEMA) special hazard flood zone maps, which identify 100-year flood zones.² **Figure 5-6** identifies FEMA 100-year flood zones for the subregion.

Figure 5-6: FEMA 100-Year Flood Zones



Although Southern California is likely to experience a decrease in overall precipitation levels due to climate change, the region is also expected to see an increase in the number of extreme precipitation events. A meteorological phenomenon known as the “atmospheric river,” a narrow stream of extremely moist air, is frequently responsible for the more intense storms that strike California. Atmospheric rivers generally deliver high levels of precipitation, up to 50% of the state’s total precipitation in any given year.

Some recent studies indicate that atmospheric rivers may strengthen as a result of climate change. This is expected to lead to an increase in the number of storms caused by atmospheric rivers (Dettinger 2012; Gershunov et al. 2013). Additionally, there is some indication that the most powerful atmospheric river storms will increase in intensity (Dettinger, Das, and Cayan, n.d.). Although there are no specific flooding projections for the subregion, flood events are expected to become more frequent, and it is possible that the areas subject to flooding will expand.

² A 100-year flood is one that, given historic conditions, is expected to occur once every 100 years, or has a 1 percent chance of occurring in any given year.

KEY ADAPTATION ISSUES AND STRATEGIES

The next century will likely bring more extreme heat days, more wildfires, less potable water, and more extreme weather and flooding (CEC 2013). To understand how these changes could affect the subregion, WRCOG conducted a vulnerability assessment. Through the assessment, WRCOG identified how important structures, populations, and functions in the subregion would be vulnerable to extreme heat, wildfire, drought, and flooding. The vulnerability assessment process is documented in **Appendix A**. WRCOG identified nine priority issues through the vulnerability assessment process:

1. Planning and Emergency Response Frameworks
2. Disadvantaged Communities
3. Public Health
4. Transportation Infrastructure and Operations
5. Wildfire and Flood-Resilient Development
6. Electricity Resources and Reliability
7. Agriculture
8. Biological Resources
9. Plan Maintenance

This section describes a series of strategies to address each issue. The strategies provide recommendations for WRCOG and its member jurisdictions to consider when planning for the future. To assist with implementation, sample work plans are included which identify the potential implementing agency for each strategy (i.e., some strategies would be implemented by WRCOG, while others may be implemented by local governments).

There are numerous strategies in the CAP and local energy action plans, and through state programs, that increase resilience in the subregion. The strategies in this chapter are designed to remain consistent with these existing strategies without duplicating them.

ISSUE 1: PLANNING AND EMERGENCY RESPONSE FRAMEWORKS

Extreme heat, wildfires, and drought conditions are endemic to Riverside County; much of the subregion is prepared for these harsh conditions. As a result, most local governments and public safety departments are prepared to deal with wildfire, flooding, drought, and extreme heat (County of Riverside 2012). However, most of these agencies are currently prepared for these hazards as they have occurred historically, not as they are projected to occur. As the climate changes and these hazards increase in frequency and severity, public safety departments and governments in general will need to adapt in order to adequately provide services to their residents.

WRCOG conducted a policy audit to identify how local governments currently address the four hazards considered in this chapter and to determine the extent to which climate change is part of their planning framework. WRCOG obtained General Plan Safety Elements, Local Hazard Mitigation Plans (LHMP), and Emergency Operations Plans (EOP) for each member jurisdiction.³ In general, flood and wildfire are planned for in all communities within the subregion. Extreme heat and drought, on the other hand, are only considered in the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan, which also considers climate change (County of Riverside 2012).

³ Not all documents for all jurisdictions could be identified or obtained.

STRATEGIES FOR PLANNING AND EMERGENCY RESPONSE FRAMEWORKS

Strategy 1.1: Adopt a local climate adaptation plan.

WRCOG developed the Subregional CAP and this chapter to be used as resources by the subregion. Member jurisdictions that do not have their own CAP or similar GHG reduction plan are encouraged to take local action to adopt the Subregional CAP, including this adaptation chapter. Local governments that have adopted the Subregional CAP can adopt this additional chapter directly. Alternatively, local governments can utilize information from this chapter and the technical appendix and format this information to be consistent with their local CAPs or public safety planning documents.

- **Implementing Agency:** Local governments

Strategy 1.2: Integrate climate change adaptation considerations into public safety documents.

Almost all communities maintain plans to help prepare community members and municipal staff for disasters and other hazards, and to guide staff response once a disaster occurs. These plans can include General Plan Safety Elements, LHMPs, and EOPs, among others. Climate change-related emergencies can pose threats to human health and property, and should be included in public safety documents. Communities in the WRCOG subregion should strive to ensure that their public safety documents address emergencies that may be created or otherwise affected by climate change, including discussion on how the risks may be altered in the future by a changing climate. These plans should also be updated regularly to include the most recent and relevant climate change projections.

- **Implementing Agency:** Local governments

Strategy 1.3: Incorporate extreme heat and air quality annexes into emergency operations plans.

EOPs describe various emergency events that may threaten a community and how municipal staff should respond when emergencies occur. Extreme heat and air quality are not frequently addressed in EOPs, and existing emergency response protocols may not always be suitable for these types of events. To ensure that EOPs are fully responsive to these threats, communities in the WRCOG subregion should update their EOPs to include annexes on extreme heat and the degraded air quality that results from extreme heat and wildfire events. These annexes should describe the hazards (including how they may change in the future), and include any specific, necessary emergency response policies and practices to address these risks.

- **Implementing Agency:** Local governments

ISSUE 2: DISADVANTAGED COMMUNITIES

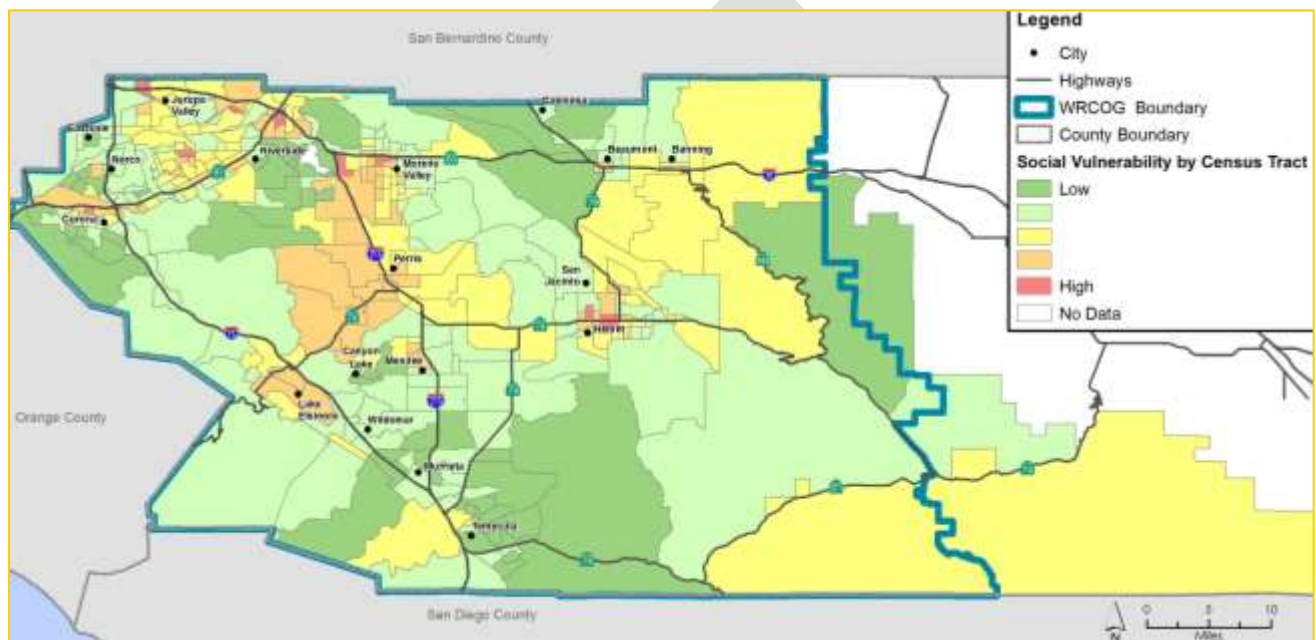
The diversity in socioeconomic conditions across Western Riverside County creates a disparity among communities' abilities to adapt to the four hazards identified in this chapter. For example, communities with older homes that lack modern insulation and air conditioning features are more vulnerable to increases in extreme heat than communities with newer homes. Similarly, local governments with resources to make significant investments in flood management infrastructure are more resilient than governments that cannot afford to maintain their existing flood management infrastructure.

In addition to discrepancies between jurisdictions, certain areas of the subregion have high levels of social vulnerability to climate change effects. Social vulnerability is the susceptibility of a given population to harm from exposure to a hazard based on its ability to prepare for, respond to, and recover from that hazard (Cooley et al. 2012). For example, individuals 65 years of age or older, who make up 3% of the subregion as a whole but as much as 30% in certain census tracts (Cal OEHH 2014), are more susceptible to the adverse effects of heat than younger adults.

Similarly, low-income individuals are less likely to adapt to increased prices for food, water, and other basic necessities as a result of drought conditions. Some areas in the subregion have high rates of poverty; in some census tracts, over 70% of residents are identified as low income (Cal OEHHA 2014).

Social vulnerability to climate change effects is exacerbated by other variables including limited mobility, physical disabilities, language barriers, and the lack of a formal social support structure. To account for these multiple variables, WRCOG developed a Social Vulnerability Index, which identifies census tracts with demographic conditions that predict increased vulnerability to climate change effects. The index includes 17 social variables, which are detailed in **Appendix A**. **Figure 5-7** illustrates relative social vulnerability to climate change by census tract in the WRCOG subregion. The red areas show census tracts that were identified as having the highest social vulnerability, relative to other census tracts in Western Riverside County, while the dark green areas are census tracts with the lowest social vulnerability. The light green, yellow, and orange areas represent the range in between.

Figure 5-7: Social Vulnerability in the Subregion



STRATEGIES FOR DISADVANTAGED COMMUNITIES

Strategy 2.1: Host a subregional adaptation forum.

An effective subregional response to climate adaptation requires a collaborative and integrated approach. A subregional adaptation forum allows communities and other involved organizations to share information, develop partnerships, and craft unified policy responses. The forum could be a recurring event to ensure participants have access to the latest climate change projection information and project funding opportunities.

- **Implementing Agency:** WRCOG

Strategy 2.2: Provide a space for a menu of best practices on the WRCOG website.

Many communities have already invested in resiliency strategies. WRCOG can leverage these investments by sharing lessons learned and best practices with the rest of the subregion using the WRCOG website. Jurisdictions can use the website to share model ordinances, provide best practices for government operations, and coordinate subregional activities. WRCOG may also link publicly available climate data and provide best practices for using the data to update local plans.

- **Implementing Agency:** WRCOG

Strategy 2.3: Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.

It is vital that all residents have access to pertinent information during emergency situations such as updates on the status of the emergency, calls for evacuation, and the location of available shelters. This information should be made available in multiple languages, as non-English speakers can comprise up to one-third of all residents in some parts of the WRCOG subregion. WRCOG should use the Social Vulnerability Index to identify those parts of the subregion that are most in need of multilingual communications.

- **Implementing Agencies:** WRCOG, local governments, CAL FIRE, Riverside County

Strategy 2.4: Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.

Members of disadvantaged communities are most in need of a cooling center during extreme heat events. However, limited mobility and reduced access to information can make disadvantaged individuals less aware of available cooling centers or less able to travel to the nearest one. Communities can address this by locating cooling centers as close as possible to where disadvantaged individuals live. By establishing a set temperature for when cooling centers open, communities can help residents know with greater certainty if a center will be open, reducing confusion during times of emergency. WRCOG should help jurisdictions in the subregion work toward ensuring that a sufficient number of new cooling centers are located in areas with higher concentrations of disadvantaged individuals using the Social Vulnerability Index and other tools.

- **Implementing Agencies:** WRCOG, local governments, CAL FIRE, Riverside County

Strategy 2.5: Identify ways for individuals with restricted mobility to reach cooling centers.

Communities and organizations should develop ways to ensure that individuals with mobility challenges, such as low-income residents, senior citizens, and physically disabled individuals, can reach a cooling center. For example, senior citizen housing complexes with their own shuttle services can include cooling centers as a destination during extreme heat events. Similarly, in locations with a large concentration of individuals with limited mobility, it may be effective to establish a temporary shuttle service to and from the nearest cooling center for the duration of the extreme heat event.

- **Implementing Agencies:** Local governments, CAL FIRE, Riverside County

ISSUE 3: PUBLIC HEALTH

Climate change could degrade public health by directly affecting residents and employees. The increased health-care needs resulting from these hazards could strain the subregion’s public health infrastructure (e.g., health-care facilities, health-care workers, emergency responders), particularly during emergencies or disasters.

Increased temperatures are expected to result in more intense and frequent extreme heat and poor air quality events, which pose health risks. Warmer temperatures may help the subregion support a larger population of disease-carrying organisms such as mosquitoes and ticks, potentially causing increased exposure to pathogens such as West Nile virus and the bacteria that cause Lyme disease (California Department of Public Health 2012).

Public health infrastructure faces potential direct effects as well. For example, by 2039, five existing hospitals, 13 existing community health agencies, and 10 existing mental health facilities in the subregion will be located in areas of elevated fire risk (WRCOG 2014b). Losing these facilities to fire, or losing their services to electricity outages during a fire, would degrade the capacity of health-care organizations to respond to emergencies or disasters. The combination of these effects could reduce access to and effectiveness of public health services, further increasing the vulnerability of the subregion, particularly among disadvantaged populations.

STRATEGIES FOR PUBLIC HEALTH

Strategy 3.1: Augment employee and worker training in industries with outdoor work, including assurance of adequate water, shade, rest breaks, training on heat risks, and vector-borne disease avoidance.

Health effects from climate change can be more severe for individuals who work outdoors, who constitute approximately 10% of the employed population in the WRCOG subregion (US Census Bureau 2010a), such as construction workers, landscapers and grounds crews, and agricultural workers. Extreme heat is the primary health risk for these workers, although elevated levels of air pollution and increased exposure to potential disease vectors such as ticks and mosquitoes can also pose hazards. The County and local governments can provide guidance to their employees, as well as work with the private sector, to ensure that outdoor employees are aware of the risks posed by these hazards and how to reduce them.

- **Implementing Agencies:** Local governments, Riverside County

Strategy 3.2: Identify and remedy poor drainage areas to reduce disease risk from stagnant water.

Stagnant water provides a breeding ground for mosquitoes, which in turn can increase the risk of mosquito-borne pathogens such as West Nile virus. Stagnant water can develop in areas of poor drainage following flood events, creating a health risk in the vicinity. Communities in the WRCOG subregion can identify poorly drained areas and complete infrastructure improvements so that they drain properly. If infrastructure improvements are not feasible, the community can categorize these locations as needing mosquito-control efforts following a flood event.

- **Implementing Agencies:** Local governments, Riverside County Flood Control and Water Conservation District (RCFC&WCD), Northwest Mosquito and Vector Control District

Strategy 3.3: Target critical health-care facilities’ energy efficiency outreach programs.

Energy efficiency programs can help health-care facilities function more effectively during periods when the electricity grid may be stressed, such as during an extreme heat event. Even under normal conditions, financial savings from energy efficiency measures can be spent to improve quality of care and for other beneficial purposes. WRCOG and its member jurisdictions can work with local health-care facilities to promote grants and rebates for energy efficiency measures from various public and private organizations. WRCOG can also provide HERO-related outreach directly to eligible facilities.

- **Implementing Agencies:** WRCOG, local governments

Strategy 3.4: Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.

Although significant health risks are associated with extreme heat events, extreme heat is not always addressed as part of the training provided to volunteer emergency responders. Extreme heat events are expected to become more intense and more severe as climate change continues. To help ensure that volunteer emergency responders remain effective in WRCOG subregion communities, all volunteers should receive extreme heat training. This training should include the health threats posed by extreme heat, the individuals most at risk from extreme heat, and details on both preventative and curative care. Extreme heat training should also be included in required recurring training sessions.

- **Implementing Agencies:** Local governments, CAL FIRE, Riverside County

Strategy 3.5: Include public health topics and invite appropriate staff to a subregional climate adaptation forum.

A subregional climate adaptation forum (Strategy 2.1) offers interested stakeholders an opportunity to share information about climate change adaptation in the WRCOG subregion and to develop adaptive strategies. Given the important public health implications of climate change, the subregional forum should include staff from agencies and organizations who work on public health issues and the forum's organizers should dedicate time to discussing these matters.

- **Implementing Agency:** WRCOG

ISSUE 4: TRANSPORTATION INFRASTRUCTURE AND OPERATIONS

Transportation infrastructure in the subregion is vulnerable to extreme heat, flooding, and wildfire. The average commute time in most of the WRCOG subregion exceeds 30 minutes each way and is greater than 45 minutes in some locations (US Census Bureau 2014). Extreme events caused by climate change may cause more substantial delays. For example, extreme heat can buckle asphalt and rails, slowing or even halting traffic along these routes. Floodwaters can wash away transportation lines or block transportation networks with debris. For safety reasons, roads and rail lines near active wildfires are often closed, and burned areas are more susceptible to landslides which may block roads long after a fire. A closed road or railway line can create congestion throughout the transportation network, causing impacts beyond the directly affected area (DOT 2011).

If major transportation routes are damaged and in need of repair, congestion and delays may continue for months after the event. Public transportation may also be disrupted by damage to transit stops and stations, creating further congestion and mobility problems for individuals lacking access to personal vehicles. Additionally, some emergency events may directly damage transit vehicles, such as floods and fires that affect bus or rail storage facilities. Individuals who maintain and operate transportation networks may also face increased health risks from exposure to extreme events, particularly high temperatures.

Flooding can damage roadways and drainage infrastructure, trigger mudslides, and remove sediment around abutments and piers, which may compromise bridge structures. Approximately six major bridges, including two across I-15, and dozens of smaller bridges are located within 100-year flood zones. Most bridges are designed to span the floodplain, but many are in disrepair. Approximately 15 Arizona crossings (also known as fords) are located in 100-year flood zones (WRCOG 2014c). Because more frequent and intense 100-year floods are anticipated, this could extend periods where such crossings are flooded and impassible (Dettinger 2012), and may damage roads. Certain residential communities can only be accessed by roads with Arizona crossings.

Similarly I-15, I-215, Ramona Expressway, and State Routes 74 and 79 are critical evacuation routes that run through large areas of 100-year flood zones (WRCOG 2014c).

STRATEGIES FOR TRANSPORTATION INFRASTRUCTURE AND OPERATIONS

Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme events.

Agencies can take a number of steps to increase transportation resiliency including the use of special sealants and other materials can help prevent roadways from softening during extreme heat or fire, treating rail lines to be heat-resistant, and incorporating expansion joints into rails that reduce the risk of damage during high temperatures. Roads and railways can also be built on foundations that are resistant to being washed away during flood events. Transportation agencies should integrate these features into all new construction projects throughout the WRCOG subregion.

Implementing Agencies: WRCOG, Riverside County Transportation Commission (RCTC), Riverside County, local governments

Strategy 4.2: Facilitate coordination of traffic signal systems between adjacent communities

Traffic signal synchronization involves adjusting the timing of traffic signals so that a vehicle traveling on a major roadway reaches each intersection during a green light. This allows vehicles to move rapidly with little or no idling time. In addition to reducing air pollution and GHGs, signal synchronization allows faster movement of emergency response vehicles, and can facilitate more effective evacuation during emergency events. Within the WRCOG subregion, a major roadway may cross the boundaries of multiple communities, so the transportation agencies in the subregion should coordinate their synchronization efforts to ensure that traffic can continue to flow rapidly across jurisdictional boundaries. RCTC and the California Department of Transportation (Caltrans) would be important partners in the implementation of this strategy.

- **Implementing Agencies:** WRCOG, RCTC, Caltrans, Riverside County, local governments

Strategy 4.3: Commission studies to simulate how expanded wildfire or flooding impacts might affect the transportation system

While there are projections for how wildfire or flooding may affect the WRCOG subregion in the future, this information does not allow for a detailed analysis of particular effects on specific transportation infrastructure components. This detailed information is necessary to prioritize preventative maintenance, to identify alternative routes, and for other emergency preparedness work. The transportation agencies in the WRCOG subregion should initiate studies to investigate the specific effects of climate change on the area's transportation infrastructure, and use the results to develop and implement strategies that reduce risks to the infrastructure.

- **Implementing Agencies:** WRCOG, RCTC, Riverside County

Strategy 4.4: Commission evacuation studies for wildfire and flood events.

Transportation agencies in the WRCOG subregion should conduct evacuation studies to identify areas where evacuations may be problematic, and take steps to improve infrastructure in these areas.

- **Implementing Agencies:** WRCOG, RCTC, Riverside County

Strategy 4.5: Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.

Disruptions to transit services can deprive some residents of their only means of travel. To help ensure that transit services can continue to operate during and after extreme events, transit providers should identify alternate routes and stops in the event that they can no longer use normal infrastructure. These alternative routes and stops should be located as close to the normal routes and stops as possible to minimize disruption. The location of alternative routes should also be clearly communicated to riders through signage and flyers, television, radio, print media, and digital services. All communication should occur in relevant languages and be culturally appropriate.

- **Implementing Agencies:** WRCOG, Riverside Transit Agency, Riverside County, local governments

ISSUE 5: WILDFIRE AND FLOOD-RESILIENT DEVELOPMENT

While drought and extreme heat more or less affect the entire subregion, wildfire and flooding have specific spatial bounds. As the climate changes, the amount of area at elevated risk for such spatially limited hazards may increase (CEC 2012). Areas that are currently vulnerable to wildfires and floods may face these hazards more frequently, and the hazards themselves may be more severe.

Wildfires and floods may begin to affect areas that are not currently vulnerable to these hazards. These risks may be exacerbated by high development pressure, resulting in more buildings and infrastructure built in high-risk areas. Wildfires and floods already occur in the WRCOG subregion; in general, the subregion is well prepared to mitigate and deal with current wildfire and flood effects on urban environments (County of Riverside 2012). However, increases in frequency and severity could increase vulnerability.

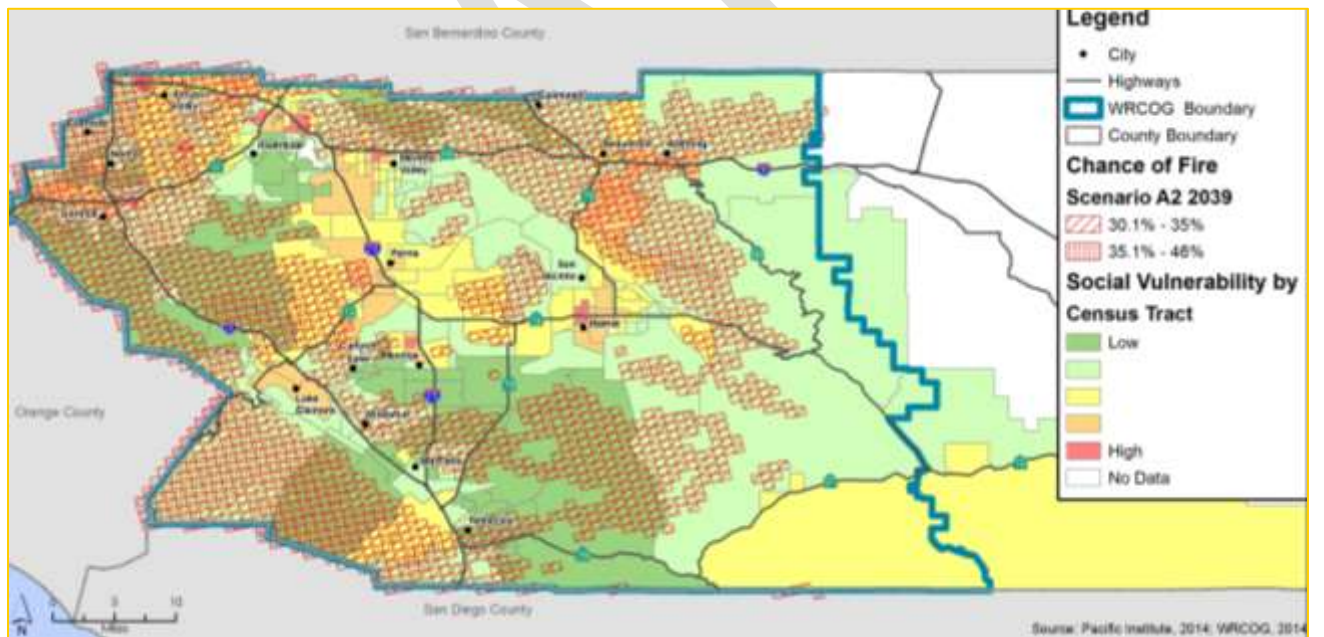


As mentioned above, different communities are especially vulnerable or resilient to climate change effects. This is particularly true for spatial hazards like wildfire and flood, where rapid evacuation may be necessary. For example, there are 20 census tracts in projected 2039 high fire risk areas where 10% or more of the current population do not have access to a vehicle (Krawchuk and Moritz 2012; Cal OEHHA 2014). In these locations, individuals will likely need assistance if evacuation is necessary. The lack of vehicle access may make it difficult for such individuals to move to safer areas during extreme events. **Figures 5-8** and **5-9** illustrate how projected flood and wildfire hazards are expected to affect current socially vulnerable communities.

Figure 5-8: Flood Hazards and Social Vulnerability



Figure 5-9: Wildfire Hazards and Social Vulnerability, 2039



In addition to vehicle access, a number of additional factors make residents or employees more vulnerable to flooding and wildfire. First, individuals with disabilities could have limited mobility and could be medically dependent on electric devices. There are six census tracts in projected 2039 high fire risk areas where 20% or more of the current population has some type of disability. Physically disabled individuals may have limited mobility in case of an evacuation, and respiratory problems could be aggravated by smoke.

Second, nearly every census tract in projected 2039 high fire risk areas currently has at least 20% of households living at two times below the federal poverty level. Low-income individuals are less likely to have access to high quality housing units, support networks, or other resources that limit exposure to poor air quality or protect against fire. They are also less able to recover and rebuild their quality of life if fire results in destruction of their property or affects their health.

Third, there are 12 census tracts located in projected 2039 high fire risk areas where 20% or more of the current employed population has an outdoor occupation (Krawchuk and Moritz 2012; US Census Bureau 2010a). Outdoor workers are directly impacted by poor air quality caused by wildfire.

Fourth, houses near high fire risk areas are at increased risk of burning. In the WRCOG subregion, 51,875 acres of residential land are currently located in an elevated fire risk area. This acreage is expected to increase to 107,749 acres around 2039 (this does not account for new development, which will increase this figure) (Krawchuk and Moritz 2012).

Fifth, at least 20% of owner-occupied households are overpaying for housing in approximately 75% of census tracts located in the 100-year floodplain. At least 20% of renter-occupied households are overpaying for housing in approximately 20% of census tracts located in the 100-year floodplain. Individuals paying a high percentage of their income on housing may have fewer resources available to limit exposure to flooding (FEMA 2014; Cal OEHHA 2014). The higher cost of housing may also result in greater financial losses from a given flood event.

Finally, nearly 75% of census tracts located in the 100-year floodplain have at least 20% of households living two times below the federal poverty level (Cal OEHHA 2014). Low-income individuals are less likely to have access to high-quality housing units or access to the necessary resources (e.g., sandbags) to protect their homes from flooding. They are also less able to recover and rebuild if flooding results in destruction of property or degraded health.

STRATEGIES FOR WILDFIRE AND FLOOD-RESILIENT DEVELOPMENT

Strategy 5.1: Continue to provide information to homeowners about statutory vegetation management requirements.

California law requires landowners in areas with flammable groundcover (e.g. forest, brush, grasslands) to maintain defensible space around buildings that can help slow or prevent the spread of wildfire. Local communities and fire protection agencies may require additional vegetation management and other defensible space requirements. While these standards can reduce wildfire risk, not all landowners may be aware of them and may not take appropriate action. Local communities can work with fire protection agencies to provide information to landowners about creating defensible space.

- **Implementing Agencies:** WRCOG, CAL FIRE, local governments

Strategy 5.2: Encourage retrofits of hardscaped areas to use permeable paving.

Permeable surfaces allow water to filter through them into the soil below, in contrast to conventional hardscape paving (water that falls on these surfaces runs off and often ends up in a storm drain). By increasing opportunities for water to soak into the ground instead of running off, permeable paving decreases the amount of water on the surface and can minimize flooding. Additionally, permeable paving can replenish groundwater supplies and may qualify as a “cool surface” compared to conventional heat-absorbing surfaces such as asphalt, reducing the urban heat island effect. Local communities can encourage landowners to use permeable paving when making retrofits to sidewalks/pedestrian plazas, driveways, parking lots, and other large hardscaped areas. Policies encouraging the use of these materials should be integrated into local development codes and communicated to project applicants as part of the ongoing project review process.

- **Implementing Agency:** Local governments

Strategy 5.3: Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas.

Numerous design strategies can make buildings more resilient to wildfire, including using fire-resistant materials in the walls and roofs of buildings, fire-resistant window shutters and doors, and hardscaped defensive areas (e.g., patios, swimming pools) around houses. New neighborhoods can also improve resistance to wildfires by using fire-resistant plants and landscaping materials, and by including multiple ingress and egress routes that facilitate evacuations and emergency vehicle movement as needed. Local communities can adopt these provisions using design guidelines, then recommend them through the ongoing development review process and community outreach.

- **Implementing Agency:** Local governments

Strategy 5.4: Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.

While converting natural streams to concrete channels can provide flood management benefits in the immediate area, these actions can also exacerbate downstream flood risks. Concrete banks and streambeds offer little opportunity for water to absorb in the ground and present few obstacles to slow the water down, which can lead to a large volume of fast-moving water that may pose hazards. Local communities can work to restore these streams to their natural state, which allows water to slow down and percolate into the ground, potentially reducing flood risks. Natural riparian areas can act as green infrastructure, providing a cooling benefit during extreme heat events. Natural riparian corridors also provide habitat and help connect open space areas to improve the well-being of vegetation communities.

- **Implementing Agency:** Local governments

Strategy 5.5: Encourage the use of low-impact development practices in new development. Low-impact development (LID) uses natural systems and principles to manage stormwater, rather than relying exclusively on concrete drainage channels and storm drains. In many LID systems, water is channeled into landscaped areas, where plants slow the water and allow it to percolate into the ground, reducing runoff and potentially decreasing flood risk. Communities in the WRCOG subregion should promote use of LID principles through the ongoing development review process and public outreach.

- **Implementing Agency:** Local governments

Strategy 5.6: Avoid siting important infrastructure in or near flood areas. Important infrastructure should not be located in areas that are currently recognized as flood areas or locations that may be vulnerable to flooding within the infrastructure’s expected operational life. Keeping important infrastructure out of flood zones decreases the risk of damage or destruction by floodwaters, reducing reconstruction costs and allowing the infrastructure to continue to function during a flood event. If there is no feasible alternative location for an important piece of infrastructure, the facility should be designed to reduce the risk of flood damage to the extent possible.

- **Implementing Agencies:** WRCOG, local governments, RCFC&WCD, RCTC

ISSUE 6: ELECTRICITY RESOURCES AND RELIABILITY

The electrical grid can be less efficient and more prone to breaking down during periods of high temperatures. The U.S. Department of Energy (DoE) estimates that for a 9-degree increase in temperature, transmission line capacity falls by 7–8% and substation capacity falls by 2–4% (DoE 2013). These problems are compounded when electricity demand spikes during a heat wave, primarily due to increased air conditioning loads. This can in turn cause health and safety problems when power losses shut down key pieces of equipment.

Because electricity is more expensive during summer afternoons and early evenings, the increased need for air conditioning may also create economic hardships for low-income households. Approximately 34% of housing units in Riverside County were built before 1980 (US Census Bureau 2010b). These homes are more likely to be energy inefficient, making them less likely to retain cool temperatures in the event of a power outage during warm weather. In the Riverside/San Bernardino/Ontario metropolitan area, which includes the WRCOG subregion, 91% of homes have central or in-room air conditioning (US Census Bureau 2011). Older homes may require air conditioners to be used more often due to the home's inefficiency, which can put stress on the grid and increase the occupants' electricity bill. Residents, businesses, and government operations in the WRCOG subregion can reduce their dependence on the electricity grid by promoting energy efficiency and renewable energy, which decreases stress on the grid and reduces utility bills.

STRATEGIES FOR ELECTRICITY RESOURCES AND RELIABILITY

Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.

Many of the materials in urbanized areas, such as asphalt and building roofing materials, can radiate heat back to the environment, creating higher temperatures than in rural areas; this is known as the urban heat island effect. By contrast, green infrastructure such as plants and landscaped areas can help reduce temperatures around them, creating a cooler urban environment. Green infrastructure installations should be designed to be drought-tolerant in order to survive and continue to provide benefit during times of little or no rainfall.

- **Implementing Agencies:** WRCOG, local governments

Strategy 6.2: Amend the local development code to require high-reflectivity pavement or increased tree cover in large commercial parking lots.

The dark asphalt surfaces of large parking lots absorb light and radiate large amounts of heat, raising temperatures in the immediate area and increasing the intensity of extreme heat events, which may be particularly problematic for individuals who are highly vulnerable to high temperatures. Communities can address this problem by amending local development codes to require large parking lots to be constructed using materials that radiate less heat, such as high-reflectivity surfaces that do not absorb as much light. Shade trees, which communities can require for parking lots, also block light from being absorbed and create shaded areas that provide additional cooling effects. Development codes requiring shade trees or other green infrastructure should specify that all plants be drought-resistant in order to provide benefit during times of little or no rainfall.

- **Implementing Agency:** Local governments

Strategy 6.3: Identify and implement municipal renewable energy projects for daily and emergency operations.

Municipal renewable energy measures, together with local municipal energy action plans, offer a number of benefits, including saving taxpayer money and providing a platform to demonstrate leadership. Additionally, these actions allow communities to function with improved effectiveness during periods when the electricity grid is stressed, such as during high heat events. Large renewable energy systems in combination with extensive

energy efficiency retrofits allow buildings to produce as much energy as they use, resulting in zero net energy. These buildings can be designed to be entirely grid-independent, allowing them to continue to function for long periods during prolonged power failures.

- **Implementing Agency:** Local governments

Strategy 6.4: Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.

Some residents in the subregion may be unaware of the opportunities the HERO program can offer. Many of these residents may be elderly individuals, people with limited English skills, low-income individuals, or otherwise members of a disadvantaged community. WRCOG communities can expand their HERO outreach events to reach locations with a large proportion of disadvantaged individuals as determined by the Social Vulnerability Index.

- **Implementing Agency:** WRCOG, local governments

ISSUE 7: AGRICULTURE

Agriculture is a major activity in Riverside County, and in 2013 the county produced over \$1.3 billion in agricultural products. Agricultural activities can be highly vulnerable to the impacts of climate change, including drought conditions and extreme heat. In 2014, drought conditions cost agriculture in California approximately \$2.2 billion, and costs may be substantially higher in the future if continued drought further depletes groundwater supplies (Howitt et al. 2014). Additionally, changes to temperatures and precipitation patterns may increase the prevalence of weeds, pest insects, and other organisms that damage agricultural products. Although agriculture is slowly declining in some parts of the subregion with urbanization, local agriculture (mainly nurseries, cattle farms, and dairy operations) still plays an important role in the local economy and culture. Other predicted effects of increased warming on agriculture include yield changes, alteration of viable crop types, new/increased diseases and pest invasions, pollination changes, and increased stress on crops and animals, resulting in losses of crop quality and yield and increasing the risk of livestock morbidity and mortalities (CEC 2006).

In addition to temperature changes, wildfire may also become an elevated issue for agricultural resources. There are currently 84,392 acres of agricultural land in an area of elevated fire risk in the WRCOG subregion. This number is expected to rise to 154,376 acres by 2039 (Krawchuk and Moritz 2012).

STRATEGIES FOR AGRICULTURE

Strategy 7.1: Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.

Farmers and ranchers can increase resiliency to climate change through more efficient irrigation practices, the use of biological control agents to target new pest organisms, changes to planting and land management techniques, and expanding into crops that are better suited for a warmer and drier climate. Regional farming organizations, in collaboration with the County Agricultural Commissioner’s office and educational institutions such as the University of California, Riverside (UCR), can help distribute information about these ways to reduce risks.

- **Implementing Agency:** WRCOG, UCR, Riverside County, local governments

Strategy 7.2: Encourage efficient irrigation techniques and identify financial resources to support installation.

High-efficiency irrigation techniques (e.g., drip irrigation) can meet the water needs of crops using substantially less water than conventional irrigation systems. They are highly suitable for areas under increased drought pressure such as the WRCOG subregion. However, high-efficiency irrigation systems often have a high upfront cost that may exceed the financial resources of some farmers. The HERO program should target agricultural users in future outreach programs.

- **Implementing Agency:** WRCOG

Strategy 7.3: Promote secondary revenue streams that support a strong, sustained agricultural sector.

Farmers and ranchers face many financial pressures, even without the added stresses caused by climate change. To help agriculture remain viable, communities in the WRCOG subregion can support secondary activities that allow farmers and ranchers to generate additional revenue. For example, farmers and ranchers could devote part of their land to agritourism operations such as direct marketing (e.g., farm stalls, self-pick operations), small-scale processing, retail sales of commodities, and picnic and event space. Other potential sources of revenue include setting aside land for habitat conservation, carbon sequestration and carbon offsets, biomass energy generation, or small-scale renewable energy systems. Communities should alter local development codes to allow these types of operations with minimal permitting and financial barriers for landowners, and promote these operations through tourism and other marketing opportunities.

- **Implementing Agency:** Local governments

ISSUE 8: BIOLOGICAL RESOURCES

Biological communities in the WRCOG subregion are highly variable and include desert scrubs, riparian areas and vernal pools, meadows and marshes, and mountain forests (Western Riverside County Regional Conservation Authority 2003). Many of these communities are highly vulnerable to the effects of climate change, such as wildfire, extreme heat, and drought (CEPA and OEHHA 2013). These communities may not be adapted to extreme events and may have a difficult time reestablishing following a disaster, particularly if these events occur more frequently. Climate change may also indirectly threaten existing biological communities in the WRCOG subregion by making the climate in the area more suitable for invasive species, which may out-compete native species for food and other resources.

STRATEGIES FOR BIOLOGICAL RESOURCES

Strategy 8.1: Incorporate climate change projections in future conservation plans.

Threats posed by climate change to biological communities are varied and may not be fully accounted for in the existing Western Riverside County Multiple Species Habitat Conservation Plan. In order to help ensure the long-term success of the biological communities in the WRCOG subregion, local governments and advocacy groups should work with state and regional agencies to include detailed analyses of how climate change may threaten native habitats and species. These analyses should be used to develop and implement strategies to protect these biological communities in the future.

- **Implementing Agencies:** WRCOG , Western Riverside County Regional Conservation Authority, local governments

Strategy 8.2: Continue to monitor and research the potential impacts of climate change on local habitat and wildlife.

While conservation plans are often developed by state and regional agencies, local communities can also protect habitat and wildlife through planning, through updates to conservation and/or open space elements of local general plans. As with state and regional conservation plans, any local conservation planning efforts should address the risk of climate change on biological communities.

- **Implementing Agency:** Local governments

ISSUE 9: PLAN MAINTENANCE

Climate change is a dynamic topic, with projections and research updated and released regularly. The adaptive needs of residents and businesses in the WRCOG subregion may change with new climate conditions and demographic shifts. WRCOG will regularly update this chapter of the Subregional CAP to ensure measures are adjusted based on ongoing performance and to incorporate best available climate change data.

STRATEGIES FOR PLAN MAINTENANCE

Strategy 9.1: Monitor and refresh climate change projections.

This chapter recommends several strategies to incorporate climate change projections in local planning documents. These projections can change as new science emerges, GHG emission levels deviate from forecasted paths, or as forecasting tools improve. As the policies in these plans depend upon assessments of future climate change effects, any changes to projections may alter the effectiveness or prioritization of individual strategies. To address this, WRCOG should regularly update this chapter of the subregional CAP. Local plans that include a discussion of climate change effects should be updated concurrently with WRCOG’s update to incorporate the most current information.

- **Implementing Agencies:** WRCOG, local governments

Strategy 9.2: Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.

WRCOG may update the Subregional CAP as needed to include a new GHG inventory, modify existing GHG reduction measures, or make other changes to the document. When this happens, WRCOG should also update this adaptation chapter to ensure it includes the most recent science and descriptions of climate change-related hazards, and to revise the adaptation measures as needed. WRCOG should also encourage individual communities to develop local climate adaptation plans, and to update them along with their own local hazard mitigation plans to keep the documents current and fully integrated.

- **Implementing Agencies:** WRCOG, local governments

Strategy 9.3: Assess the implementation status and effectiveness of adaptation strategies.

WRCOG and local communities should closely monitor implementation of policies in this adaptation chapter, and determine if the strategies are working as intended. If not, WRCOG and local communities should alter implementation to improve effectiveness.

- **Implementing Agencies:** WRCOG, local governments



WORK PLANS

This section organizes the adaptation strategies into a work plan for WRCOG and a work plan for local governments.

WRCOG

WRCOG should implement the following strategies to increase subregional resilience.

WRCOG Strategy		Key Issue
2.1	Host a subregional adaptation forum.	Disadvantaged Communities
2.2	Provide a space for a menu of best practices on the WRCOG website.	Disadvantaged Communities
2.3	Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.	Disadvantaged Communities
2.4	Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.	Disadvantaged Communities
3.3	Target critical health-care facilities' energy efficiency outreach programs.	Public Health
3.5	Include public health topics and invite appropriate staff to a subregional climate adaptation forum.	Public Health
4.1	Use materials and features in transportation infrastructure that can improve resiliency to extreme events.	Transportation Infrastructure and Operations
4.2	Facilitate coordination of traffic signal systems between adjacent communities.	Transportation Infrastructure and Operations
4.3	Commission studies to simulate how expanded wildfire or flooding impacts might affect the transportation system.	Transportation Infrastructure and Operations
4.4	Commission evacuation studies for wildfire and flood events.	Transportation Infrastructure and Operations
4.5	Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.	Transportation Infrastructure and Operations
5.1	Continue to provide information to homeowners about statutory vegetation management requirements.	Wildfire and Flood-Resilient Development

WRCOG Strategy		Key Issue
5.6	Avoid siting important infrastructure in or near flood areas.	Wildfire and Flood-Resilient Development
6.1	Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.	Electricity Resources and Reliability
6.4	Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.	Electricity Resources and Reliability
7.1	Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.	Agriculture
7.2	Encourage efficient irrigation techniques and identify financial resources to support installation.	Agriculture
8.1	Incorporate climate change projections in future conservation plans.	Biological Resources
9.1	Monitor and refresh climate change projections.	Plan Maintenance
9.2	Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.	Plan Maintenance
9.3	Assess the implementation status and effectiveness of adaptation strategies.	Plan Maintenance

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LOCAL GOVERNMENTS

Local governments should implement the following strategies to increase local and subregional resilience.

Local Government Strategy		Key Issue
1.1	Adopt a local climate adaptation plan.	Planning and Emergency Response Frameworks
1.2	Integrate climate change adaptation considerations into public safety documents.	Planning and Emergency Response Frameworks
1.3	Incorporate extreme heat and air quality annexes into emergency operations plans.	Planning and Emergency Response Frameworks
2.3	Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.	Disadvantaged Communities
2.4	Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.	Disadvantaged Communities
2.5	Identify ways for individuals with restricted mobility to reach cooling centers.	Disadvantaged Communities
3.1	Augment employee and worker training in industries with outdoor work, including assurance of adequate water, shade, rest breaks, training on heat risks, and vector-borne disease avoidance.	Public Health
3.2	Identify and remedy poor drainage areas to reduce disease risk from stagnant water.	Public Health
3.3	Target critical health-care facilities' energy efficiency outreach programs.	Public Health
3.4	Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.	Public Health
4.1	Use materials and features in transportation infrastructure that can improve resiliency to extreme events.	Transportation Infrastructure and Operations
4.2	Facilitate coordination of traffic signal systems between adjacent communities.	Transportation Infrastructure and Operations
4.5	Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.	Transportation Infrastructure and Operations
5.1	Continue to provide information to homeowners about statutory vegetation management requirements.	Wildfire and Flood-Resilient Development

Local Government Strategy		Key Issue
5.2	Encourage retrofits of hardscaped areas to use permeable paving.	Wildfire and Flood-Resilient Development
5.3	Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas.	Wildfire and Flood-Resilient Development
5.4	Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.	Wildfire and Flood-Resilient Development
5.5	Encourage the use of low-impact development practices in new development.	Wildfire and Flood-Resilient Development
5.6	Avoid siting important infrastructure in or near flood areas.	Wildfire and Flood-Resilient Development
6.1	Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.	Electricity Resources and Reliability
6.2	Amend the local development code to require high-reflectivity pavement or increased tree cover for large commercial parking lots.	Electricity Resources and Reliability
6.3	Identify and implement municipal renewable energy projects for daily and emergency operations.	Electricity Resources and Reliability
6.4	Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.	Electricity Resources and Reliability
7.1	Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.	Agriculture
7.3	Promote secondary revenue streams that support a strong, sustained agricultural sector.	Agriculture
8.1	Incorporate climate change projections in future conservation plans.	Biological Resources
8.2	Continue to monitor and research the potential impacts of climate change on local habitat and wildlife.	Biological Resources
9.1	Monitor and refresh climate change projections.	Plan Maintenance
9.2	Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.	Plan Maintenance
9.3	Assess the implementation status and effectiveness of adaptation chapter measures.	Plan Maintenance



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