

This section of the Program Environmental Impact Report (PEIR) describes existing wildfire conditions within the SCAG region, identifies the regulatory framework with respect to laws and regulations that affect wildfire, and analyzes the potential impacts of the Connect SoCal Plan (“Connect SoCal”; “Plan”). In addition, this PEIR provides regional-scale mitigation measures as well as project-level mitigation measures to be considered by lead agencies for subsequent, site-specific environmental review to reduce identified impacts as appropriate and feasible. Other fire protection considerations are addressed in **Public Services, Section 3.15.1, Fire Protection**, in addition emergency access is addressed in **Section 3.17, Transportation, Traffic, and Safety**, and emergency response and evacuation plans are addressed in **Section 3.9, Hazards and Hazardous Materials**.

3.20.1 ENVIRONMENTAL SETTING

3.20.1.1 Definitions

Definitions of terms used in the regulatory framework, characterization of baseline conditions, and impact analysis for wildfire are provided.

CAL FIRE: California Department of Forestry and Fire Protection (abbreviated Cal Fire and styled CAL FIRE). CAL FIRE is the State of California’s fire protection agency responsible for protection and stewardship of over 31 million acres of the state’s privately-owned wildlands. CAL FIRE is an “all-risk” department, meaning its teams may respond to a car crash, medical incident, hazardous material spill, or natural disaster, not just fires. CAL FIRE is also responsible for managing 71,000 acres of Demonstration State Forests, overseeing enforcement of state forest management regulations, and operating training and certification course trainings.¹

Clearance: Space cleared of vegetation as required by law, regulation, easement, etc. for the purpose of preventing fires.

Containment/Control: A fire is contained when it is completely surrounded by a boundary but is still burning and has the potential to jump a boundary line. The boundary may be a “fire line” which is a strip of area where the vegetation has been removed to deny the fire fuel, or a river, a freeway or some other barrier which is expected to stop the fire. Hose lines from fire engines may also contribute to a fire being

¹ California Department of Forestry and Fire Protection. *About Us*. Available online at <https://www.fire.ca.gov/about-us/>, accessed September 10, 2019.

surrounded and contained. A fire is controlled when there is no further threat of it jumping a containment line. While crews continue to do mop-up work within the fire lines, the fire fight is over.

Contract Counties: Contract counties are counties where the local county fire department is contracted by CAL FIRE to protect a State Responsibility Area (SRA). Section 4133 of the Public Resources Code and Section 55607 of the Government Code permit the CAL FIRE Director to contract with counties for protection of SRAs. In California, six counties provide fire-prevention services in SRAs under contract with the state. These counties are Marin, Kern, Santa Barbara, Ventura, Los Angeles and Orange.

Damage Assessment: Amount of economic loss, including cost of fire suppression.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread unchecked has been treated, cleared, reduced or changed in order to act as barrier between the advancing wildfire and the loss to life, property, or resources. This concept is vital for firefighter safety and provides the single significant element of protection of individual property owners. California law requires homeowners to maintain 100 feet of defensible space around homes and structures.

Easement: A right to cross or otherwise use someone else's property for a specified purpose.

Fire Hazard: Dangerous accumulation of flammable fuels in wildland areas, usually referring to vegetation or the flammable materials that may be ignited by various fire risks or cause fires to increase in intensity or rate of spread.

Fire Hazard Zoning: A planning and regulatory activity (typically conducted by a local agency such as a city or county) which provides criteria for what kinds, how many and under what conditions development or other activities should be regulated in areas of various hazard classification.

Fire Season: In California fire season generally lasts for six to eight months, from summer to early fall. In recent years, fire season has extended into December.

Greenbelts: A facility or land use designed for a use other than fire protection, which will slow or resist the spread of a wildfire. Includes parking lots, irrigated or landscaped areas, golf courses, parks, playgrounds and maintained vineyards, orchards or annual crops that do not cure in the field.

Interface/ Wildland Interface: The meeting point of wildland and structures. At this interface, structures and vegetation are sufficiently close that a wildland fire could spread to structures or a structure fire ignites vegetation.

Intermix/ Wildland Intermix: Interspersion of developed land with wildland, where there are no easily discernible boundaries between the two systems. In this setting, there may be homes or other structures intermixed with wildland fuels, as opposed to a distinct area of wildland fuel adjacent to a developed area.

Local Responsibility Area (LRA): Areas where wildland fire protection is the responsibility of the local government. Local responsibility area fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local governments.

Prescribed Burning: Controlled application of fire to wildland fuels, in either their natural or modified state, under conditions of weather, fuel moisture, soil moisture, etc., as to allow the fire to be confined to a predetermined area and at the same time to produce results to meet planned objectives of land management.

Santa Ana Winds: Santa Ana winds blow from the northeast toward the beaches as areas of strong high pressure build across the interior west. The wind speed can be magnified as air squeezes over mountain passes and rushes downhill, heating and drying as it descends in elevation. Severe Santa Ana Wind events pose a heightened wildfire risk.

State Responsibility Area (SRA): SRAs are areas in which the primary financial responsibility for preventing and suppressing fires is that of the state and is defined based on land ownership, population density and land use.² These include: lands covered wholly or in part by timber, brush, undergrowth or grass, whether of commercial value or not; lands which protect the soil from erosion, retard run-off of water or accelerated percolation; lands used principally for range or forage purposes; lands not owned by the Federal government; and lands not incorporated. By Board regulations, unless specific circumstances dictate otherwise, lands are removed from SRA when housing densities average more than 3 units per acre over an area of 250 acres. CAL FIRE has SRA responsibility for the protection of more than 31 million acres of California's privately-owned wildlands.³

Wildland: Refers to unoccupied lands

Wildland Urban Interface: Refers to the geographical point where flammable vegetation meets man-made structures.

² CAL FIRE. 2017. *Fire Prevention Fee*. Available online at: <https://www.cdtfa.ca.gov/taxes-and-fees/fire-prevention-fee.htm>, accessed September 7, 2019.

³ CAL FIRE. *Informational Report for State Responsibility Area Fire Prevention Fee: Fiscal Year 2016-2017*. Available online at: <https://www.fire.ca.gov/media/8146/report-for-sra-fire-prevention-fee-fy16-17.pdf>, accessed August 21, 2019.

3.20.1.2 Existing Conditions

A wildfire is defined as a non-structural fire in undeveloped area with the potential to spread to an urban area. While wildfires are common across California, a variety of factors can affect the likelihood of a fire occurring and the severity of the burn. Unsurprisingly, locations with hot, dry, and windy conditions face a greater fire hazard than wetter and cooler locations, and communities near wildland areas are more endangered than those in cities and towns. Vegetation, topography, roadways, and management methods also contribute to an area's potential for fire hazards. Steep hillsides and varied topography may also increase the risk of wildland fires, and could affect natural resources, as well as life and property. Most fires in California occur during late summer and early fall, but recently the fire season is starting earlier and lasting longer in the year, affecting areas longer, and resulting in more extreme events due to climate change.

CalFire publishes Fire Hazard Severity Zone Maps for the entire State of California, which include fire hazard measurements, as well as the areas that are under State Responsibility Areas (SRA) lands or Local Responsibility Area (LRA) lands, for each county in the State. These maps place areas of the state into different fire hazard severity zones (FHSZ) based on a hazard scoring system using subjective criteria for fuels, fire history, terrain influences, housing density, and occurrence of severe fire weather where urban fire could result in catastrophic losses. As part of this mapping system, land where CAL FIRE is responsible for wildland fire protection and generally located in unincorporated areas is classified as a SRA. In addition to establishing local or state responsibility for wildfire protection in a specific area, CAL FIRE designates areas as very high fire hazard severity (VHFHSZ) zones or non-VHFHS zones.⁴

In 2017, and then again in 2018, California experienced record-breaking heat as a part of a global warming trend. The heat, coupled with years of drought and an increase of forest pests and disease linked to climate change, created perfect fire conditions that allowed for some of the most destructive and deadliest fires in the state's history. Wind direction and intensity, particularly for fires close to populated areas pose not only safety issues, but also air quality related health issues.

Fire Hazard Severity Zones

Wildland fire protection in California is the responsibility of either the local, state, or federal government. Public Resources Code Section 4201-5 (Chapter 806, Statutes of 1982) requires CAL FIRE to evaluate fire hazard severity and map FHSZ for all SRA.⁵ FHSZs are based on factors such as fuel, slope, and weather

⁴ CAL FIRE. 2007. *Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6636/fhszs_map.pdf, accessed August 20, 2019.

⁵ California Legislative Information. 1982. *Article 9. Fire Hazards Severity Zones [4201-4204]*.

and are designated as moderate, high, and very high. Zone classification is based on a combination of how a fire will behave and the probability of flames and embers threatening buildings. By identifying areas with the potential for more severe wildfire hazards, FHSZ maps allow for proper planning, prevention, and mitigation that reduce wildfire damages. As of 2018, CAL FIRE is in the planning stages of updating all FHSZ for SRA counties and upon completion, would make recommendations to LRAs.

After the Oakland Hills Fire of 1991, the “Bates Bill” (Senate Bill 337) was passed in 1992, calling on CAL FIRE to make recommendations to local jurisdictions where VHFHSZs exist. The bill provides direction for local jurisdictions to mitigate fire spread and reduce the intensity of uncontrolled blazes.

Fire hazard severity zone levels range from Moderate to Very High. Fire hazard severity zones are designated in three types of areas based on what level of government is financially responsible for preventing and suppressing wildfires:

- **Federal Responsibility Areas (FRAs):** The federal government is financially responsible for wildfire suppression. Within the District, the Angeles National Forest and federal land in the Santa Monica Mountains National Recreation Area are FRAs.
- **State Responsibility Areas (SRAs):** The state is financially responsible for wildfire suppression. Within the District, SRAs are in outlying areas such as the Santa Susana Mountains, foothills of the San Gabriel Mountains, and parts of the Santa Monica Mountains.
- **Local Responsibility Areas (LRAs):** Cities or the County are financially responsible for wildfire suppression. LRAs in Los Angeles County include foothills of the Santa Susana and San Gabriel Mountains, and in the Verdugo Mountains, Santa Monica Mountains, Hollywood Hills, San Rafael Hills, Puente Hills, and in other hills in the central Los Angeles area.

SCAG Region

Though wildland fires are a natural part of the ecological processes, in the past, it was presumed that all wildland fires should be extinguished promptly. This caused “protected” vegetation to grow denser, weakening vegetation in a struggle for living space and increasing destruction by pests and disease; and in turn, added fuel for future fire. In addition, the absence of fire can alter or disrupt the cycle of natural plant succession and the associated habitats that form. Recognizing this, land management agencies are now committed to finding ways, such as prescribed burning, to reintroduce fire into natural ecosystems. In addition, California has extended droughts, which increase dead and dying vegetation, dry fuel per acre volumes, and many days of low humidity. Furthermore, the majority of wildfires in the region are human caused by factors including but not limited to campfires and building fires. This remains true

even before accounting for the crisis of anthropogenic climate change, which exacerbates wildfires. Wildfire increases the potential for runoff and erosion, as fire removes ecological stabilizers such as vegetation and healthy soil. In coastal regions and other areas with steep slopes, scorched land left after a wildfire is particularly susceptible to debris flow and other hazards.

SRAs and LRAs have been mapped in every county in the SCAG region.⁶ The majority of VHFHSZs are located where wildlands meet urbanized areas, usually near large recreation areas.

Los Angeles County

Northern and western Los Angeles County feature vast swaths of wildland areas. The County's largest wildland area is the Angeles National Forest, a 700,000-acre forest that stretches across northern Los Angeles County between Gorman and Mt. Baldy. Much of the forest is marked by dense chaparral shrubs and woodlands. The Santa Monica Mountains National Recreation Area, a 150,000-acre area in the western portion of Los Angeles County, is comprised of several contiguous open space areas, including Malibu Creek State Park, Topanga State Park, and Leo Carrillo State Park. The Woolsey Fire in November 2018 burned 88 percent of all National Park Service acres within the park boundary. Following the Woolsey Fire, a wet winter allowed black mustard plants to quickly establish a presence in the area. This non-native plant quickly dries and provides fuel for future fires.

In Los Angeles County, heavily urbanized areas in the northwest and southern parts of the County are largely excluded from VHFHSZ designations, whereas communities near Topanga State Park and Angeles National Forest are at a much higher risk of wildfire impacts. However, even densely populated areas may be designated as VHFHSZ depending on their proximity to wildlands, such as the highly urbanized area surrounding the Kenneth Hahn State Recreation Area in Los Angeles.⁷

Orange County

Orange County is highly urbanized with wildland areas located primarily in the east and southeast of the county. The largest wildland area is the Cleveland National Forest, a 460,000-acre forest partially located in Orange County along the boundary with Riverside County. The Cleveland National Forest is characterized by chaparral and a warm, dry Mediterranean climate. The South Coast Wilderness Area, located along the Orange County Coast between Newport Beach and Laguna Niguel, is comprised of

⁶ CAL FIRE. *Fire Hazard Severity Zones Maps*. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>, accessed September 7, 2019.

⁷ CAL FIRE. 2007. *Los Angeles County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6705/fhszs_map19.pdf, accessed August 20, 2019.

several contiguous open space areas, including Crystal Cove State Park, Laguna Coast Wilderness Park, and Aliso and Wood Canyons Wilderness Park.⁸ These parks feature rugged coastal canyons, grasslands, and riparian woodlands. Wildfire increases the potential for runoff and erosion, as fire removes ecological stabilizers such as native vegetation and healthy soil and replaces them with invasive plants and debris. In addition, a portion of the 14,173-acre Chino Hills State Park is located in northern Orange County and features chaparral plant communities.

CAL FIRE marks portions of the following cities as VHFHSZs: Aliso Viejo, Anaheim, Brea, Dana Point, Fullerton, Irvine, La Habra, Laguna Beach, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Newport Beach, Orange, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Tustin, Villa Park, and Yorba Linda.

San Bernardino County

Most of San Bernardino County is in an FRA. Thus, fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government. The San Bernardino County Fire Protection District is one of the largest providers of fire protection services in these areas. Due to its dry, desert climate San Bernardino County has limited areas of very high FHSZ. The only very high FHSZs in the county are located in the southwest corner, stretching along the San Gabriel Mountains from the county's western border to Yucca Valley.⁹ Most of the very high FHSZs in San Bernardino County are along its north and northeast edges at the foot of the San Bernardino and San Gabriel mountains; at its southeast margin in the north end of the San Timoteo Badlands; and in the southwest corner of the region in Chino Hills. Nearly the entire Mountain Region is mapped as very high FHSZ, while most of the desert regions are mapped outside of high or very high FHSZs. As of 2019, it is estimated that more than 34,000 residents in the unincorporated county live in very high fire hazard areas, and more than 63,000 live in high fire hazard areas.¹⁰

Imperial County

Imperial County is a predominantly agricultural area and approximately 50 percent of County lands are undeveloped and under federal jurisdiction. The potential for a major fire in the unincorporated areas of the County is generally low.

⁸ CAL FIRE. 2007. *Orange County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6737/fhszs_map30.pdf, accessed August 20, 2019.

⁹ CAL FIRE. 2007. *SW San Bernardino County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6781/fhszs_map62.pdf, accessed August 20, 2019.

¹⁰ San Bernardino Countywide Plan Draft PEIR, June 2019

From the standpoint of fire safety, building and fire codes are the tool most commonly used by local jurisdictions. The County implements the Uniform Building Code (UBC) and the Uniform Fire Code (UFC).^{11,12} The Imperial County Codified Zoning Ordinance also contains provisions which act to reduce fire hazards. The Imperial County Subdivision Ordinance is also used to reduce the risk of fire by securing, as a condition of subdivision of land, water systems of adequate size and pressure for firefighting, and adequate roadway widths for emergency service vehicle access including maneuverability of fire trucks.¹³ Additionally, the County's Fire Prevention and Explosives Ordinance, contains provisions for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion. This program enables the public to be better prepared when an emergency fire situation occurs.

Imperial County's Fire Prevention Bureau runs the Imperial County Fire Prevention Program. The purpose of the Imperial County Fire Prevention Program is to assist in preventing injuries, deaths, business interruption and property damages resulting from fires and other emergencies. The Fire Prevention Bureau currently enforces the 2010 California Fire, Building, Electrical, County Ordinances, as amended by the County of Imperial Municipal Code, in addition to National Fire Protection Association standards; Title 19, of the California Public Safety Code; and, the California Health and Safety Code.¹⁴

Imperial County has virtually no VHFHSZ, with only extremely small areas located near the northwest and southwest corners of the county.¹⁵ Similar to Imperial, the eastern half of Riverside County contains essentially no VHFHSZ.¹⁶ The western half of Riverside County, however, is where a significant amount of the county's wildland interface occurs, and a majority of the land is designated VHFHSZ. Lands near the San Bernardino National Forest and the Santa Ana mountains are largely within SRA, while urban

11 Imperial County Municipal Code. 91003.00 – *Adoption of the California Building Code*. Available online at: https://library.municode.com/ca/imperial_county/codes/code_of_ordinances?nodeId=TIT9LAUSCO_DIV10BUSE_GRRE_CH3CABUCO_91003.00ADCABUCO, accessed August 21, 2019.

12 Imperial County Municipal Code. 8.20.010 – *Findings and adoption of the Uniform Fire Code*. Available online at: https://library.municode.com/ca/imperial_county/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.20UNFIC_OAD_8.20.010FIADUNFICO, accessed August 21, 2019.

13 Imperial County Planning & Development Services. *Title 9, Division 8: Subdivision Ordinance*. Available online at: http://www.icpds.com/CMS/Media/TITLE9Div8_2014.pdf, accessed August 21, 2019.

14 Imperial County Fire Department & Office of Emergency Services. *Prevention*. Available online at: <https://www.co.imperial.ca.us/firedept/index.asp?fileinc=prevention>, accessed September 7, 2019.

15 CAL FIRE. 2007. *Imperial County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6680/fhszs_map13.pdf, accessed August 20, 2019.

16 CAL FIRE. 2007. *Eastern Riverside County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6749/fhszl06_1_map61.pdf, accessed August 20, 2019.

communities near smaller portions of wildland, such as Terra Cotta and eastern Sun City, are under the jurisdiction of an LRA.¹⁷

Ventura County

Much of Ventura County is considered a VHFHSZ and is primarily located in a SRA. Specifically, the central and northern portions of the County are part of the Los Padres National Forest, accounting for 46 percent of the overall landmass. The forest features semi-arid, chaparral vegetation, which is prone to wildfire. The Fire Hazard Reduction Program is the cornerstone of Ventura County Fire Department's (VCFD) Wildland Fire Action Plan. In partnership with property owners and neighbors, VCFD recommends a 100-foot defensible space radius between structures and vegetation and places restrictions on certain types of vegetation.¹⁸

Several major freeways in Ventura County are located within VHFHSZs, including US-101 between Camarillo and Thousand Oaks, SR-33 between Ventura and Ojai, and SR-118 between Moorpark and Simi Valley. Much of the housing in these cities is located within an urban-wildland intermix area, and as such, wildfires and subsequent evacuations are a concern. In December 2017, the Thomas Fire burned through Ventura and Santa Barbara Counties and was the largest wildfire in California history at the time. The fire spread quickly, destroying hundreds of structures, prompting evacuations, and leading to deadly mudflows after a rainstorm the following month.

Riverside County

With development growing into outlying hill and grassland areas and an increasing number of people owning homes and businesses in Riverside County, wildfires are becoming a growing and catastrophic hazard in the County. As more and more people are moving into areas of wildland-urban interface, the danger for wildfire conditions from the mix of fuels, topography, and accessibility, are posing increasing risks to residents, as well as to fire protection service providers. In some parts of Riverside County, fire danger can be worsened by steep, rugged topography, which would allow wildland fire to spread quickly and make it more difficult to fight.

The Riverside County Hazard Reduction Office, a division within the Riverside County Fire Department, enforces the abatement of hazardous vegetation and abandoned or neglected orchards, groves, and vineyards. The County's Hazard Abatement Program requires property owners to maintain 100 feet of

¹⁷ CAL FIRE. 2007. *Western Riverside County: Fire Hazard Severity Zones in SRA*. Available online at: https://osfm.fire.ca.gov/media/6752/fhszs_map60.pdf, accessed August 20, 2019.

¹⁸ Ventura County Fire Code, Fire Hazard Reduction Program, Appendix W, available online: <https://vcfd.org/images/FHRP/Ord-30-Appendix-W-FHRP.pdf>, accessed September 12, 2019.

defensible space between structures and vegetation. Guidelines on horizontal and vertical spacing of plants and trees are also enforced.

CAL FIRE's recommendations on VHFHSZs for Riverside County bisect the county into an eastern and western portion. Eastern Riverside County is primarily comprised of dry, desert land and is sparsely populated. This region is designated as a Moderate Fire Hazard Severity Zone. Western Riverside County has a greater variety of climates, topography, and flora. The 800,000-acre San Bernardino National Forest is located in this half of Riverside County within a VHFHSZ. At the boundary with Orange County, the Cleveland National Forest is also a designated VHFHSZ. Additionally, several major freeways in Riverside County are located within VHFHSZs, including I-15 between Lake Elsinore and Temecula, I-215 between Sun City and Murrieta, and SR-60 between Moreno Valley and Beaumont.

Climate Change

In the last decade, California has experienced five of the state's 10 largest wildfires and seven of its 10 most destructive fires in its history. Between 2017 and 2018, the State spent over \$1.5 billion on fire suppression, far more than any previous 2-year period. Over the past five decades, summertime forest fires have increased in size by roughly 800 percent. Though no single wildfire can be attributed solely to climate change, evidence shows that the increase in average temperatures statewide is creating conditions more prone to wildfires.¹⁹ Southern California has warmed about three degrees Fahrenheit in the last century, and every additional increment of warming speeds up evaporation, dries out soil and vegetation, and increases the amount of fuel available for a wildfire.²⁰ In 2018, wildfires in California released approximately 68 million tons of carbon dioxide, or about 15 percent of the State's annual emissions.²¹ Studies suggest that greenhouse gas emissions from wildfires create a positive feedback loop, wherein the emissions warm the planet further, leading to more wildfires and more emissions.

19 Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed impacts of anthropogenic climate change on wildfire in California. *Earth's Future*, 7, 892–910. Available online at: <https://doi.org/10.1029/2019EF001210>, accessed September 16, 2019.

20 US Environmental Protection Agency, *What Climate Change Means for California*. Available online at: <https://www.epa.gov/sites/production/files/2016-09/documents/climate-change-ca.pdf>, accessed September 16, 2019.

21 US Department of Interior, *Press Release, November 30, 2018*. Available online at: <https://www.doi.gov/pressreleases/new-analysis-shows-2018-california-wildfires-emitted-much-carbon-dioxide-entire-years>, accessed September 17, 2019.

3.20.2 REGULATORY FRAMEWORK

3.20.2.1 Federal

Disaster Mitigation Act (DMA) of 2000

DMA 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for state, local and tribal governments as a condition of mitigation grant assistance. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasize the need for state, local, and tribal entities to closely coordinate mitigation planning and implementation efforts. The requirement for a state mitigation plan is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the state level through the establishment of requirements for two different levels of state plans. DMA 2000 also established a new requirement for local mitigation plans and authorized up to 7 percent of Hazard Mitigation Grant Program (HMGP) funds available to a state for development of state, local, and tribal mitigation plans.²²

Federal Response Plan

The Federal Response Plan of 1999 is a signed agreement among 27 federal departments and agencies, including the American Red Cross, that (1) provides the mechanism for coordinating delivery of federal assistance and resources to augment efforts of state and local governments overwhelmed by a major disaster or emergency; (2) supports implementation of the Robert T. Stafford Disaster Relief and Emergency Act, as well as individual agency statutory authorities; and (3) supplements other federal emergency operations plans developed to address specific hazards. The Federal Response Plan is implemented in anticipation of a significant event likely to result in a need for federal assistance or in response to an actual event requiring federal assistance under a Presidential declaration of a major disaster or emergency.²³

Federal Emergency Management Agency (FEMA) Regulation

The primary mission of FEMA is to reduce the loss of life and property and protect the nation from all hazards, including natural disasters, acts of terrorism, and other human-made disasters, by leading and supporting the nation in a risk-based, comprehensive emergency management system of preparedness,

²² FEMA. *Disaster Mitigation Act of 2000*. Available online at: <https://www.fema.gov/media-library/assets/documents/4596>, accessed August 20, 2019.

²³ *Federal Response Plan, April 1999*. Available online at: http://www1.mwco.org/security/security/otherplans/fed_response_sum.pdf, accessed August 21, 2019.

protection, response, recovery, and mitigation.²⁴ SCAG is under the jurisdiction of FEMA Region 9, which covers Arizona, California, Hawaii, Nevada, Guam, American Samoa, Commonwealth of Northern Mariana Islands, Republic of Marshall Islands, Federated State of Micronesia, and more than 150 sovereign tribal entities. In Southern California, FEMA Region 9 specifically plans for hazards such as major earthquakes and wildfires.²⁵

National Fire Plan

The Department of the Interior's National Fire Plan is intended to ensure an appropriate federal response to severe wildland fires, reduce fire impacts to rural communities, and ensure sufficient firefighting capacity in the future.²⁶ The Rural Fire Assistance program is funded to enhance the fire protection capabilities of rural fire districts and safe and effective fire suppression in the wildland/urban interface. The program promotes close coordination among local, state, tribal, and federal firefighting resources by conducting training, equipment purchase, and prevention activities on a cost-shared basis.²⁷

3.20.2.2 State

Senate Bill 99

In November 2018, the Camp Fire devastated the town of Paradise, California, killing 86 people and destroying nearly 19,000 structures. One reason the Camp Fire was so deadly was the lack of adequate evacuation routes to simultaneously allow residents to leave and first responders to enter. Although modern developments require adequate ingress and egress routes, many existing developments, such as those in Paradise, predate these requirements. SB 99, signed into law on August 30, 2019, requires cities to identify in the safety element of their general plans any residential developments in any wildfire hazard areas that do not have at least two emergency evacuation routes.²⁸

²⁴ Government Publishing Office. *Title 44: Emergency Management and Assistance*. Available online at: <https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=44:1.0.1.4.53>, accessed August 20, 2019.

²⁵ FEMA. *FEMA Region IX: Arizona, California, Hawaii, Nevada, & the Pacific Islands*. Available online at: <https://www.fema.gov/fema-region-ix-arizona-california-hawaii-nevada-pacific-islands>, accessed August 20, 2019.

²⁶ *Wildland Fire Management: The National Fire Plan*. Available online at: https://www.forestsandrangelands.gov/documents/resources/reports/2007/nfp2007_budget_justification.pdf, accessed August 20, 2019.

²⁷ U.S. Fish & Wildlife Services Fire Management. 2009. *Rural Fire Assistance*. Available online at: https://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml, accessed August 21, 2019.

²⁸ California Legislative Information. 2019. *Senate Bill No. 99*.

Senate Bill 901

After record-breaking drought in California from 2011 to 2017, perfect wildfire conditions allowed faulty PG&E utility lines to spark devastating fires that would scorch over 4,000 square miles of land across the state. In response to the deadly season, the California Legislature developed Senate Bill 901 (Utility Wildfire Management Plans) as the “centerpiece measure” in its attempt to rectify damages from the 2017 wildfires and prevent future wildfire disasters. SB 901 mandates all electric utilities to prepare and submit wildfire mitigation plans that describe the utilities’ plan to prevent, combat, and respond to wildfires affecting their service territories. The California Public Utilities Commission (CPUC) will review and refine the plans before implementing and enforcing them. In the short-term, SB 901 allows PG&E to lean on its customers in paying for billions of dollars in fire-related damages. It also provides over \$1 billion for vegetation management over five years.²⁹

Assembly Bill 1054 (AB 1054)

AB 1054 was signed into law by Governor Gavin Newsom on July 12, 2019, creating a \$21 billion fund to help California’s investor-owned utilities cover liabilities caused by wildfires. Under the legislation, the state’s investor-owned utilities will put a combined \$5 billion toward improvements in their electrical grids to access the fund. Ratepayers will also contribute \$10.5 billion by way of a 15-year extension of an existing rate increase. The bill also imposes several conditions on utilities, including \$5 billion in safety investments and utility participation in a new annual safety certification process overseen by CPUC.³⁰ The legislation was passed in the wake of the Camp Fire, California’s deadliest and most destructive wildfire in history. Pacific Gas & Electric (PG&E) Corp’s equipment failure was responsible for the blaze. PG&E sought bankruptcy protection after the Camp Fire so it could reorganize its finances to pay \$30 billion in liabilities from multiple wildfires.³¹

Senate Bill 1079 (SB 1079)

SB 1079 (Forest Resources: Fire Prevention Grant Fees) builds from existing laws establishing grants to private entities, Native American tribes, and public agencies to assist in the implementation and administration of projects and programs relating to improving forest health and reducing GHG emissions. SB 1079 authorizes CAL FIRE to make advance payments to grantees (such as fire safe

²⁹ California Public Utilities Commission (CPUC). *Utility Wildfire Mitigation Plans (SB 901)*. Available online at: <http://cpuc.ca.gov/SB901/>, accessed March 29, 2019.

³⁰ California Legislative Information. 2019. *Assembly Bill No. 1054*.

³¹ New York Times. *California Says PG&E Power Lines Caused Camp Fire That Killed 85*. Available online at: <https://www.nytimes.com/2019/05/15/business/pg-e-fire.html>, accessed September 18, 2019.

councils, Native American tribe, or special district), which receive funds from the healthy forest and local fire-prevention grant programs.³²

Senate Bill 1241 (SB 1241)

In 2012, SB 1241 added Section 66474.02 to Title 7 Division 2 of the California Government Code, commonly known as the Subdivision Map Act. The statute prohibits subdivision of parcels designated very high fire hazard, or that are in a SRA, unless certain findings are made prior to approval of the tentative map. The statute requires that a city or county planning commission make three new findings regarding fire hazard safety before approving a subdivision proposal. The three findings are, in brief: (1) the design and location of the subdivision and its lots are consistent with defensible space regulations found in PRC Section 4290-91, (2) structural fire protection services will be available for the subdivision through a publicly funded entity, and (3) ingress and egress road standards for fire equipment are met per any applicable local ordinance and PRC Section 4290. The Occupational Safety and Health Act (29 Code of Federal Regulations [CFR] Parts 70 to 2400), which is implemented by the Federal Occupational Safety and Health Administration (OSHA), contains provisions with respect to hazardous materials handling. Federal OSHA requirements, as set forth in 29 CFR Section 1910 et seq., are designed to promote worker safety, worker training, and a worker's right-to-know. In California, OSHA has delegated the authority to administer OSHA regulations to the State of California.³³

Assembly Bill 301

Assembly Bill 301 was enacted to amend Section 4213.1, and to add Section 4213.2 to the Public Resources Code related to fire prevention. Section 4213.1 requires CAL FIRE to notify a property owner that the property's terms of sale could include a portion of the Fire Prevention Fee. Section 4213.2 allows a property owner to negotiate a portion of the fee as one of the terms of sale.³⁴

Assembly Bill 38 (California Emergency Services Act)

This bill would require the Natural Resources Agency, by July 1, 2021, and in consultation with the State Fire Marshal and the Forest Management Task Force, to review the regional capacity of each county that contains a very high fire hazard severity zone to improve forest health, fire resilience, and safety, as specified. On or after July 1, 2021, the bill would require a seller of real property located in a high or very high fire hazard severity zone to provide specified documentation to the buyer that the real property is in

³² California Legislative Information. 2018. *Senate Bill No. 1079*.

³³ California Legislative Information. 2012. *Senate Bill No. 1241*.

³⁴ California Legislative Information. 2015. *Assembly Bill No. 301*.

compliance with the wildfire protection measures or a local vegetation management ordinance, or enter into an agreement with the buyer pursuant to which the buyer will obtain documentation of compliance.³⁵

Assembly Bill 2551

Approved in 2018, Assembly Bill 2551 Forestry and Fire Prevention: Joint Prescribed Burning Operation (AB 2551) authorizes CAL FIRE to collaborate with private landowners on controlled burns to reduce wildfire fuel. Mismanagement of the forests can lead to a build-up of forest underbrush that serves as a perfect fuel for wildfires. By allowing small, non-industrial landowners to choose to individually implement various fire prevention programs, such as prescribed burns, AB 2551 promotes good, local forest management in the state.³⁶

State California Department of Forestry and Fire Protection

CAL FIRE protects the people of California from fires, responds to emergencies, and protects and enhances forest, range, and watershed values providing social, economic, and environmental benefits to rural and urban citizens. CAL FIRE's firefighters, fire engines, and aircraft respond to an average of more than 5,600 wildland fires each year. The Office of the State Fire Marshal supports CAL FIRE's mission by focusing on fire prevention. It provides support through a wide variety of fire safety responsibilities including regulating buildings in which people live, congregate, or are confined; controlling substances and products which may, in and of themselves, or by their misuse, cause injuries, death, and destruction by fire; providing statewide direction for fire prevention in wildland areas; regulating hazardous liquid pipelines; reviewing regulations and building standards; and providing training and education in fire protection methods and responsibilities.³⁷

State Fire Regulations

Fire regulations for California are established in Sections 13000 et seq. of the California Health and Services Code and include regulations for structural standards (similar to those identified in the California Building Code); fire protection and public notification systems; fire protection devices such as extinguishers and smoke alarms; standards for high-rise structures and childcare facilities; and fire suppression training. The State Fire Marshal is responsible for enforcement of these established

³⁵ California Legislative Information. 2008. *Assembly Bill No. 38*.

³⁶ California Legislative Information. 2018. *Assembly Bill No. 2551*.

³⁷ CAL FIRE Office of the State Fire Marshal. 2019. *About the Office of State Fire Marshal*. Available online at: <https://osfm.fire.ca.gov/about-us/>, accessed August 20, 2019.

regulations and building standards for all state-owned buildings, state-occupied buildings, and state institutions within California.³⁸

California Governor's Office of Emergency Services (OES)

Cal OES is the Emergency Management authority for the State of California. The California Governor's Office of Emergency Services (Cal OES) began as the State War Council in 1943. With an increasing emphasis on emergency management, it officially became OES in 1970. On July 1, 2013, Governor Edmund G. Brown Jr.'s Reorganization Plan #2 eliminated the California Emergency Management Agency (Cal EMA); restored its powers, purposes, and responsibilities to Cal OES; and also merged it with the Office of Public Safety Communications. Cal OES' mission statement is the following: "Protect lives and property, build capabilities, and support our communities for a resilient California." OES goals include:³⁹

- **Goal 1:** Anticipate and enhance prevention and detection capabilities to protect our State from all hazards and threats.
- **Goal 2:** Strengthen California's ability to plan, prepare for, and provide resources to mitigate the impacts of disasters, emergencies, crimes, and terrorist events.
- **Goal 3:** Effectively respond to and recover from both human-caused and natural disasters.
- **Goal 4:** Enhance the administration and delivery of all state and federal funding, and maintain fiscal and program integrity.
- **Goal 5:** Develop a united and innovative workforce that is trained, experienced, knowledgeable, and ready to adapt and respond.
- **Goal 6:** Strengthen capabilities in public safety

California Public Resources Code

Fire Hazard Severity Zones – Public Resources Code Sections 4201–4204 Public Resources Code (PRC) Sections 4201–4204 and Government Code Sections 51175–89 direct CAL FIRE to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. FHSZ define the application of various mitigation strategies to reduce risk associated with wildland fires.^{40, 41}

³⁸ California Legislative Information. *Division 12. Fires and Fire Protection*.

³⁹ Governor's Office of Emergency Services. *2014-2018 Strategic Plan Summary*. Available online at: [https://www.caloes.ca.gov/NewsMediaSite/Documents/Cal%20OES%20Strategic%20Plan%20Summary%20Booklet%20\(FINAL\).pdf](https://www.caloes.ca.gov/NewsMediaSite/Documents/Cal%20OES%20Strategic%20Plan%20Summary%20Booklet%20(FINAL).pdf), accessed August 20, 2019.

⁴⁰ California Legislative Information. 1982. *ARTICLE 9. Fire Hazard Severity Zone [4201-4204]*.

California Fire Code

Part 9 of the 2019 California Building Standards Code (CBC) (Cal. Code Regs., Title 24) covers the California Fire Code (2019, Title 24, Part 9). The purpose of the California Fire Code is to establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, and premises.

The purpose of the California Fire Code is to establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, and premises. The Fire Code also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout California. The Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas. Several jurisdictions within the SCAG region have adopted the California Fire Code as part of their building regulations.⁴²

California Fire Plan

The Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection. By placing the emphasis on what needs to be done long before a fire starts, the Fire Plan looks to reduce firefighting costs and property losses, increase firefighter safety, and to contribute to ecosystem health. The current plan was adopted in 2018, which reflects CAL FIRE's goals of 1) fire prevention and suppression activities to protect lives, property, and ecosystem services, and 2) natural resource management to maintain the state's forests as a resilient carbon sink to meet California's climate change goals and to serve as important habitat for adaptation and mitigation.⁴³

⁴¹ California Legislative Information. 1992. *CHAPTER 6.8. Very High Fire Hazard Severity Zones [51175-51189]*.

⁴² Building Standards Commission. *California Building Standards Code*. Available online at: <https://www.dgs.ca.gov/BSC/Codes>, accessed August 20, 2019.

⁴³ CAL FIRE. *Strategic Fire Plan for California*. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/fire-plan/>, accessed September 7, 2019.

California Disaster Assistance Act (CDAA)

The California Disaster Assistance Act (CDAA; CCR Title 19, Chapter 6) authorizes the Director of the California Governor’s Office of Emergency Services (Cal OES) to administer a disaster assistance program that provides financial assistance from the state for costs incurred by local governments as a result of a disaster event. Funding for the repair, restoration, or replacement of public real property damaged or destroyed by a disaster is made available when the Director concurs with a local emergency proclamation requesting state disaster assistance.⁴⁴

Governor’s Office of Planning and Research (OPR)

The Governor’s Office of Planning and Research serves the Governor and his Cabinet as staff for long-range planning and research and constitutes the comprehensive state planning agency (Government Code Section 65040). OPR is empowered to draft *CEQA Guidelines* for adoption by the Secretary of Natural Resources in collaboration with the Natural Resources Agency. In January 2018, OPR transmitted its proposal for comprehensive updates to the *CEQA Guidelines* to the Natural Resources Agency, who finalized the updates in late 2018. The updated Guidelines became effective on December 28, 2018.

California Public Utilities Commission Fire Safety Rulemaking

In December 2017, CPUC issued Decision (D.) 17-12-024 adopting regulations to enhance fire safety in the High Fire Threat District (HFTD) and subsequently adopted CPUC’s final fire threat map. This map, together with CAL FIRE’s Tier 1 High Hazard Zones comprise the HFTD Map where stricter fire-safety regulations apply. These regulations include requiring utilities to prioritize safety hazards, maintain more stringent wire-to-wire clearances in certain areas, and prepare a fire prevention plan annually if they have overhead facilities in the HFTD. Further, electric utilities may disconnect service to customers who refuse to provide access to their property for the removal of trees that pose an immediate threat for contacting a power line.⁴⁵

⁴⁴ Governor’s Office of Emergency Services. 2019. *California Disaster Assistance Act (CDAA)*. Available online at: <https://www.caloes.ca.gov/cal-oes-divisions/recovery/public-assistance/california-disaster-assistance-act>, accessed August 20, 2019.

⁴⁵ California Public Utilities Commission, Press Release December 14, 2017. *CPUC Adopts New Fire-Safety Regulations*. Available online at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M201/K352/201352402.PDF>, accessed September 26, 2019.

3.20.2.3 Local

County General Plans

In addition to federal and state requirements, general plans and municipal codes of counties and cities in the SCAG region may include safety elements that goals and policies related protecting people and property from risks from wildfires and associated hazards.

Los Angeles County General Plan

The Safety Element of the Los Angeles County General Plan 2035 Update, in conjunction with the All-Hazard Mitigation Plan prepared by the Chief Executive Office, Office of Emergency Management (CEO OEM), sets strategies for natural and man-made hazards in Los Angeles County.⁴⁶ The 2014 All-Hazard Mitigation Plan, which has been approved by FEMA and Cal OES, includes a compilation of known and projected hazards in Los Angeles County.⁴⁷ Specific applicable goals and policies related to fire hazards within the County of Los Angeles include, but are not limited to:

- Goal S: An effective regulatory system that prevents or minimizes personal injury, loss of life, and property damage due to fire hazards.
- Policy S 3.1: Discourage high density and intensity development in VHFHSZs.
- Policy S 3.2: Consider climate change implications in fire hazard reduction planning for FHSZs.
- Policy S 3.3 Ensure that the mitigation of fire related property damage and loss in FHSZs limits impacts to biological and other resources.
- Policy S 3.5: Encourage the use of low-volume and well-maintained vegetation that is compatible with the area's natural vegetative habitats.
- Policy S 3.8: Support the retrofitting of existing structures in FHSZs to help reduce the risk of structural and human loss due to wildfire.

⁴⁶ County of Los Angeles, Department of Regional Planning. *General Plan 2035, Safety Element*. Available online at: http://planning.lacounty.gov/assets/upl/project/gp_final-general-plan-ch12.pdf, accessed September 10, 2019.

⁴⁷ County of Los Angeles, Chief Executive Office – Office of Emergency Management. *2014 All-Hazard Mitigation Plan*. Available online at: <https://ceo.lacounty.gov/wp-content/uploads/OEM/hazmitgplan.pdf>, accessed September 8, 2019.

San Bernardino County General Plan

The San Bernardino County General Plan contains a Hazards Element, which addresses wildfires. It mandates the development of Community Wildfire Protection Plans (CWPP) for mountain communities, compliance with the County's Tree Preservation Ordinance, improvements to public notification systems, and the continued monitoring of post-wildfire debris flow hazard evaluation and prediction methodologies. Specific applicable goals and policies related to fire hazards within the County of San Bernardino include, but are not limited to:⁴⁸

- Goal HZ-1: Minimized risk of injury, loss of life, property damage, and economic and social disruption caused by natural environmental hazards and adaptation to potential changes in climate
- Policy HZ-1.2: All new development is required to be built outside of high or very high fire hazard severity zones. For any lot or parcel that does not have sufficient buildable area outside of such hazard areas, mitigation is required.
- Policy HZ-1.7: Underground utilities are required to be designed to withstand seismic forces, accommodate ground settlement, and be hardened to fire risk.

Imperial County General Plan

The Land Use Planning and Public Safety and Emergency Preparedness Elements of the Imperial County General Plan have established goals related to protection of public health and safety for consideration in the land use planning process. The specified goals and objectives are intended to minimize potential hazards to public health and safety and prevent the loss of life and damage to properties and rely heavily on ensuring conformance with established applicable state codes. However, the Plan does not include any goals or policies relating directly to wildfire at this time.⁴⁹

Orange County General Plan

The Safety Element of the Orange County General Plan provides for the protection of people and property from risks associated with hazards, including those affiliated with wildfire, through the implementation of mitigation measures as outlined in the California Emergency Plan, the California Master Mutual Aid Agreement, the Orange County Emergency Plan, the Orange County Operational

⁴⁸ County of San Bernardino. 2014. *2007 General Plan*. Available online at: <http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf>, accessed August 20, 2019.

⁴⁹ Imperial County Planning & Development Services. 2015. *Land Use Element of the Imperial County General Plan*. Available online at: [http://www.icpds.com/CMS/Media/Land-Use-Element-\(2015\).pdf](http://www.icpds.com/CMS/Media/Land-Use-Element-(2015).pdf), accessed August 20, 2019.

Area Plan, S.O.N.G.S. Plan, County of Orange and Orange County Fire Authority Hazard Mitigation Plan, and other emergency management plans. The Safety Element of the Orange County General Plan focuses primarily upon the County's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, intentional acts of terrorism and nuclear protection operations. To reduce the County's susceptibility and vulnerability to extraordinary emergency situations, the Safety Element recommends continued emphasis is placed on several coordinated efforts:⁵⁰

- Mitigation
- Emergency planning
- Training of full-time, auxiliary, and reserve personnel
- Public awareness and education; and assuring the adequacy and availability of sufficient resources to cope with such emergencies

In November 2015, the Board of Supervisors adopted a new County of Orange and Orange County Fire Authority Hazard Mitigation Plan (HMP) in compliance with federal and state regulations.⁵¹

The County's Wildland Fire Defense Planning and Prevention oversees its READY! SET! GO! program, which aims to reduce wildland fire risk through a formalized fuel modification inspection and enforcement program, and monitors wildland and vegetation conditions to identify potential hazards, ensuring communities in the wildland urban interface areas are better protected from the risk of wildland fire. Specific applicable goals and policies related to fire safety within the Safety Element of the Orange County General Plan are:

Goal 1: Provide a safe living environment, ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property fire.

Policy 1: To encourage periodic updating of fire hazard mapping and continue to analyze existing fire hazard data as it pertains to Orange County.

Policy 13: To improve emergency response times for emergency responders through the use of computer-aided dispatch system and "preempt traffic signal control" system.

⁵⁰ Orange County Planning & Development. *General Plan: Chapter IX. Safety Element*. Available online at: <https://www.ocgov.com/civicax/filebank/blobdload.aspx?blobid=40234>, accessed August 20, 2019.

⁵¹ County of Orange, Orange County Fire Authority. 2015. *Local Hazard Mitigation Plan*. Available online at: https://www.smwd.com/DocumentCenter/View/2193/APPENDIX-H_OC-HMP-Final, accessed August 20, 2019.

Ventura County General Plan

The Safety Element of the Ventura County General Plan contains specific goals to minimize the risk of loss of life, injury, serious illness, damage to property, and economic and social dislocations resulting from fire hazards and wildfire. Additionally, the Plan identifies areas with high fire hazard severity zones and lists specific management practices to protect those who currently live within such a zone, and prepare appropriate development and management in the future. Specific policies related to fire hazards within Ventura County include, but are not limited to:⁵²

- Minimize the risk of loss of life, injury, damage to structures, and economic and social dislocations resulting from fire hazards.
- Ensure that development in high fire hazard areas is designed and constructed in a manner that minimizes the risk from fire hazards.
- Require at least two means of access for emergency vehicles and resident evacuation for new residential subdivisions, except if otherwise permitted by County Fire Chief.

City General Plans

The SCAG region spans six counties and 191 cities, each of which has a general plan that contains policies related to hazards, including those related to fires. Additional plans and ordinances at the master plan level, city-level, and specific plan level may also apply within the SCAG region. Furthermore, fire departments and other agencies in the SCAG region have a variety of local laws that regulate reporting, storage, handling, and transporting hazardous substances and materials.

3.20.3 ENVIRONMENTAL IMPACTS

3.20.3.1 Thresholds of Significance

For the purposes of this PEIR, SCAG has determined that adoption and/or implementation of the Plan could result in significant adverse impacts related to wildfire risk, if transportation projects and anticipated development projects are located in or near SRAs or lands classified as very high hazard severity zones and would result in any of the following:

⁵² Ventura County. 2019. *2040 General Plan: Preliminary Public Review Draft*. Available online at: https://vc2040.org/images/2040_General_Plan_Files_-_May_2019/PPRD_2040_General_Plan_COMPLETE-compressed.pdf, accessed August 20, 2019.

- Substantially impair an adopted emergency response plan or emergency evacuation plan (this criterion is addressed in **Section 3.17, Transportation, Traffic, and Safety**);
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

In addition, the following criterion from **Section 3.9, Hazards and Hazardous Materials**, is addressed along with wildfire:

- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires

3.20.3.2 Methodology

The methodology for determining the significance of the Plan's impacts to wildfire response and related hazards and infrastructure compares the existing conditions to future (2045) conditions. Wildfire conditions and hazards within the SCAG region were evaluated at the programmatic level of detail, in relation to the general plans of the six counties and 191 cities within the SCAG region; the management plans for the four national forests in the SCAG region, Angeles National Forest, San Bernardino National Forest, Los Padres National Forest, and Cleveland National Forest; the California Department of Forestry and Fire Protection, and a review of related literature germane to the SCAG region.

The Plan includes transportation projects as well as regional transportation and land use strategies. Although land use development is anticipated to occur within the region even without the Plan, Connect SoCal includes regional land use strategies that could influence growth, including distribution patterns, throughout the region. This analysis considers the Plan's impacts on wildfire hazards, provides mitigation measures, where necessary, and addresses the environmental effects related to wildfire hazards. The potential for impacts related to wildfire was assessed by evaluating the location of existing and planned major transportation projects in relation to surrounding land uses and fire hazard severity zones. Because some transportation projects and growth under the Plan could be located in or near SRAs or lands classified as very high hazard severity zones, all potential wildfire impacts are analyzed below.

The mitigation measures in the PEIR are divided into two categories: SCAG mitigation and project-level mitigation measures. SCAG mitigation measures shall be implemented by SCAG over the lifetime of the Plan. For projects proposing to streamline environmental review pursuant to SB 375, SB 743 or SB 226 (as described in **Chapter 1.0, Introduction**), or for projects otherwise tiering off this PEIR, the project-level mitigation measures described below (or comparable measures) can and should be considered and implemented by lead agencies and project sponsors during the subsequent, project- or site-specific environmental reviews for transportation and development projects as applicable and feasible. However, SCAG cannot require implementing agencies to adopt mitigation, and it is ultimately the responsibility of the implementing agency to determine and adopt project-specific mitigation.

3.20.3.3 Impacts and Mitigation Measures

Impact WF-2 **Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.**

Impact HAZ-7 **Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.**

Significant and Unavoidable Impact - Mitigation Required.

The SCAG region is susceptible to wildfires particularly during the summer and fall seasons, especially during Santa Ana wind conditions. Examples of recent fires in the SCAG region include the October 2019 Getty Fire in Los Angeles which was sparked by a tree branch that broke off and landed on nearby powerlines, and the December 2017 Thomas Fire sparked by two power lines touching. Both fires were ignited during strong Santa Ana wind conditions.^{53,54} Wildfires have the potential to occur not only in fire-prone undeveloped areas, but also in developed areas where existing transmission lines, lightning strikes, lawn equipment operated over dry grass, fireworks, and even arson may ignite a wildfire. While the urban and developed areas of Riverside, San Bernardino, Imperial, and Ventura counties, may include fire resistant and drought tolerant plants that offer some protection to existing structures, these counties also have more undeveloped areas susceptible to wildfire risks than Los Angeles and Orange counties. According to the Fire Hazard Severity Zones for the area, the rural areas in the SCAG region

⁵³ Los Angeles Times. *DWP power liens hit by tree branch sparked Getty fire that destroyed homes*. Available online at: <https://www.latimes.com/california/story/2019-10-29/getty-fire-arson-investigation>, accessed October 30, 2019.

⁵⁴ Los Angeles Times. *Southern California Edison power lines sparked deadly Thomas fire, investigators find*. Available online at: <https://www.latimes.com/california/story/2019-10-29/getty-fire-arson-investigation>, accessed October 30, 2019.

range from Moderate to Very High under the State’s Wildfire Hazard Severity Zones.⁵⁵ Population in the SCAG region is expected to grow by 3.2 million people by 2045 and SCAG estimates that an additional 343,000 people and 154,300 dwelling units would be in areas at risk of wildfire (very high fire hazard severity zones). The Plan recognizes inherent constraints to expansive regional growth, and areas that are susceptible to natural hazards and a changing climate must be recognized. Because of this, Connect SoCal sets forth land use strategies that encourage conservation of farmland, resource areas and habitat corridors, and guide growth away from lands that are vulnerable to wildfire, flooding and near-term sea-level rise.

During peak wildfire season where high winds and low humidity may occur, electrical utilities may preemptively shut off power to customers in wildfire-prone areas as a precautionary measure. For example, Southern California Edison began this practice in 2017 and notifies customers two days in advance. At the direction of CPUC, customers who live in high fire risk areas, as defined by CPUC maps, are more likely to experience a power shutoff.⁵⁶

The ongoing crisis of climate change has worsened wildfire conditions in California and the SCAG region. Since the early 1970s, California's annual wildfire extent increased fivefold, punctuated by extremely large and destructive wildfires in 2017 and 2018. This trend was mainly due to an eightfold increase in summertime forest-fire area and was very likely driven by drying of fuels promoted by human-induced warming.⁵⁷ Since climate change makes droughts more frequent and severe and makes temperatures warmer in California, the drying of fuels is likely to continue worsening conditions in wildfire-prone areas of the SCAG region.

Wildfires pose a significant public health risk due to their air quality impacts, particularly with regard to smoke and particulate matter exposure. This risk persists even after a wildfire is extinguished because particulate matter from fire ash can be picked up by winds. In addition, as discussed in **Section 3.8, Greenhouse Gases**, wildfires release substantial amounts of greenhouse gases.

Connect SoCal’s land use strategies deemphasize development on agricultural lands in unincorporated counties, and in areas subject to future two-foot sea level rise. To further prioritize natural habitat areas

⁵⁵ CAL FIRE. *Fire Hazard Severity Maps*. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>, accessed September 8, 2019.

⁵⁶ Southern California Edison. *Public Safety Power Shutoffs*. Available online at: <https://www.sce.com/safety/wildfire/psps>, accessed September 26, 2019.

⁵⁷ Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed impacts of anthropogenic climate change on wildfire in California. *Earth's Future*, 7, 892–910. Available online at: <https://doi.org/10.1029/2019EF001210>, accessed September 10, 2019.

and avoid impacts to the environment, Connect SoCal’s strategies seek to avoid growth in wetlands, wildlife corridors, biodiverse areas, wildfire prone areas and floodplains. The Plan includes greenbelts and community separators to serve as contiguous areas that support land conservation. Creating a sustainable, “green” region requires that the built environment and natural resource areas coexist in a well-balanced land use pattern that encourages mutual co-benefits. The quality and range of conservation, natural and agricultural areas present in the region can be reinforced and enhanced by a range of regional and local tools. Paired with an emphasis on compact development, Connect SoCal’s conservation strategies promote the economic and ecological benefits of preserving natural areas and farmlands, while also maximizing their potential for greenhouse gas reduction. New housing and employment development is emphasized in Growth Priority Areas, such as Job Centers, TPAs, HQTAs and NMAs, and away from natural and farm lands on the edges of urban and suburban areas, to incentivize infill development and the concentration of varied land uses. This emphasis on concentrated, compact growth makes it easier to travel shorter distances, which reduces per-capita greenhouse gas emissions. In addition, natural areas and farmlands have the capacity to absorb and store atmospheric carbon dioxide, preventing additional contributions of GHG emissions. Natural lands conservation has the co-benefit of protecting communities from major hazards caused or exacerbated by climate change, such as wildfires and flooding.

Furthermore, wildfire-prone areas tend to pose accessibility challenges for vehicular access points due to topography. These roads could face more gridlock in the event of a sudden emergency evacuation than flat, urbanized areas may experience. Such circumstances could expose vehicle occupants to active flames and potential death, as was seen in the recent Camp Fire in Paradise and the Woolsey Fire in Malibu in 2018.⁵⁸ Transportation projects and anticipated development projects may be located in wildfire-prone areas which could potentially exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from wildfires or the uncontrolled spread of wildfires, particularly those populations living down wind of the fire. As such, impacts would be significant and unavoidable. Mitigation is required.

Mitigation Measures/

SCAG Mitigation Measures

SMM WF-1: SCAG shall facilitate minimizing future impacts to fire protection services through information sharing regarding Fire-wise Land Management (vegetation data, fire-resistant building materials, locations where development is vulnerable to wildfire, and best

⁵⁸ New York Times, *Forced Out by Deadly Fires, Then Trapped in Traffic*. Available online at: <https://www.nytimes.com/2018/11/11/us/california-fire-paradise.html>, accessed September 18, 2019.

practices for safe land management) with county and city planning departments. Furthermore, SCAG shall examine wildfire risk management strategies in areas where at-risk critical electrical infrastructure is located based on CPUC and CAL FIRE maps.

- SMM WF-2:** SCAG, in partnership with technical experts and stakeholders shall launch or continue existing initiatives to help local cities and counties to protect Southern California communities and economies from the disruption of wildfire occurrences. Initiatives could include but not be limited to seminars that review the risk of wildfire and approaches for preparation, including strengthening of infrastructure, emergency services, emergency evacuation plans and reviewing building safety codes.
- SMM WF-3:** SCAG shall develop a regional resilience program and identify specific strategies to reduce vulnerabilities from natural disasters related to land based or atmospheric hazards, climate change, wildfire and other extreme weather events.

Project Level Mitigation Measures

- PMM WF-1:** In accordance with provisions of sections 15091(a)(2) and 15126.4(a)(1)(B) of the *State CEQA Guidelines*, a Lead Agency for a project can and should consider mitigation measures to wildfire risk, as applicable and feasible. Such measures may include the following or other comparable measures identified by the Lead Agency:
- a) Launch fire prevention education for local cities and counties such that local fire agencies, homeowners, as well as commercial and industrial businesses are aware of potential sources of fire ignition and the related procedures to curb or lessen any activities that might initiate fire ignition.
 - b) Ensure structures in high fire risk areas are built to current state and federal standards which serve to greatly increase the chances the structure will survive a wildfire and also allow for people to shelter-in-place.
 - c) Improve road access for emergency response and evacuation so people can evacuate safely and timely when necessary.
 - d) Improve, and educate regarding, local emergency communications and notifications with residents and businesses.
 - e) Enforce defensible space regulations to keep overgrown and unmanaged vegetation,

accumulations of trash and other flammable material away from structures.

- f) Provide public education about wildfire risk and fire prevention measures, and safety procedures and practices to allow for safe evacuation and/or options to shelter-in-place

Level of Significance after Mitigation

As discussed above, regulations and polices would reduce impacts but given the regional scale of the analysis in this PEIR, it is not possible to determine if all impacts would be fully mitigated by existing regulations and policies. Therefore, this EIR identifies project-level mitigation measures consistent with applicable regulations and polices designed to reduce impacts. Lead Agencies may choose to include project-level mitigation measures in environmental documents as they determine to be appropriate and feasible. However, because of the regional nature of the analysis and lack of project-specific detail, including project locations, and SCAG's lack of authority to impose project-level mitigation measures, this PEIR finds impacts related to exacerbating wildfire risk and exposure of residents to pollutants could be significant and unavoidable even with implementation of mitigation.

Impact WF-3 Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risks or that may result in temporary or ongoing impacts to the environment.

Significant and Unavoidable Impact - Mitigation Required.

The SCAG region is a mix of urban and rural communities, natural woodland areas, as well as semi-desert areas. Future development and/or re-development in these areas has the potential to require the installation of new roadways or infrastructure facilities such that there is an increased risk of new ignition sources generating the spread of wildfires. Areas with dry vegetation have the potential to exacerbate wildfire risk due to future development activities that could generate flammable debris piles. This is particularly true in the rural and underdeveloped parts of the SCAG region. Future roadway and development construction in such areas, while likely to be less in the future, may still occur, such development has the potential to result in significant impacts as a result of construction equipment generating sparks or oil spill and other combustible materials leading to the start and spread of wildfires. Newer electrical equipment providing power to any new homes developed in fire prone areas is anticipated to be fitted with fire-safe devices, but hazards may remain as a result of electricity infrastructure as well as common fire hazards associated with human habitation.

The Plan includes land use strategies that encourage further development in urban areas. As discussed above, natural lands conservation has the co-benefit of protecting communities from major hazards caused or exacerbated by climate change, such as wildfires and flooding.

Nonetheless, it is expected that new development will also occur in rural or suburban areas which may have a greater wildfire risk. Increased development, in combination with a push for more electrical infrastructure (e.g., SB 100), may result in increased wildfire risk due to power lines. SCE maintains a policy to shut off power to its lines during high wildfire probability events (i.e., when conditions are such that wildfire is a high probability) which would help to reduce potential impacts.⁵⁹ In addition, many local jurisdictions and plans require undergrounding of electrical infrastructure which also helps to reduce risk of wildfire. Due to the anticipated number of greenfield areas that would be converted to other land uses under the Plan, development may continue to occur in urban/wildlands interface areas which would necessitate infrastructure such as power poles that could result in wildfire risk. As such, significant impacts would occur and mitigation measures are required.

Mitigation Measures

SCAG Mitigation Measures

See SMM-WF-1, SMM WF-2, SMM AG-4, and SMM BIO-3.

Project Mitigation Measures

See PMM HAZ-4.

PMM WF-2: In accordance with provisions of sections 15091(a)(2) and 15126.4(a)(1)(B) of the *State CEQA Guidelines*, a Lead Agency for a project can and should consider mitigation measures to wildfire risk, as applicable and feasible. Such measures may include the following or other comparable measures identified by the Lead Agency:

- a) New development or infrastructure activity within very high hazard severity zones or SRAs shall be required to
 - 1) Submit a fire protection plan including the designation of fire watch staff;
 - 2) Maintain water and other fire suppression equipment designated solely for firefighting on site for any construction and maintenance activities;

⁵⁹ Southern California Edison. *Public Safety Power Shutoff*. Available online at: <https://www.sce.com/safety/wildfire/psps>, accessed October 30, 2019.

- 3) Locate construction and maintenance equipment in designated “safe areas” such that they do not discharge combustible materials; and
- 4) Designate trained fire watch staff during project construction to reduce risk of fire hazards.

Level of Significance after Mitigation

As discussed above, regulations and policies would reduce impacts, but given the regional scale of the analysis in this PEIR, it is not possible to determine if all impacts would be fully mitigated by existing regulations and policies. Therefore, this EIR identifies project-level mitigation measures consistent with applicable regulations and policies designed to reduce impacts. Lead Agencies may choose to include project-level mitigation measures in environmental documents as they determine to be appropriate and feasible. However, because of the regional nature of the analysis and the lack of project specific-detail, including project components and locations, and SCAG’s lack of authority to impose project-level mitigation measures, this PEIR finds impacts related to installation of infrastructure that could exacerbate fire risks could be significant and unavoidable even with implementation of mitigation.

Impact WF-4 Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope stability, or drainage changes.

Significant and Unavoidable Impact - Mitigation Required.

Wildfires are becoming more and more common and intense in all areas within the SCAG region. While the Plan focuses development in urban and compact areas, SCAG recognizes there will continue to be development towards, and through natural wildland areas. The Plan estimates consumption of 41,546 greenfield acres and identifies and additional 154,300 housing units in very high fires hazard zones by 2045. These potential fire-prone spaces have created situations where people and property could be impacted by wildfire and associated subsequent hazards (flooding, landslides, etc.). As discussed in **Section 3.10, Hydrology and Water Quality**, in Southern California, intense rainfall may occur during the winter months, creating natural flooding events when the ground is saturated and water levels are high. This has the potential for flooding issues, and fire hazards may exacerbate such flooding and debris flows along waterways. Since debris flows may occur quickly and without warning, such flows can damage structures, block drainage or even sweep away vegetation resulting in tenuous post-fire slope stability. Fast moving debris flows can be one of the most dangerous post-fire hazards. Due to the loss of vegetation and potential resulting soil erosion, debris flows may cause a risk to life and physical property, destroy or strip vegetation, block existing drainage patterns, and impact roadways and other

infrastructure. If this were to occur within the 100-year floodplain areas, existing flow conditions may be altered, or new sources of flooding may be created. This has the potential to alter peak flow conditions and affect upstream, as well as downstream areas. Typically, debris flow from fire damaged areas may be a result of excessive rainfall runoff and surface erosion, since previously-burned slopes repel water and generate higher runoff rates. This can be especially true in the higher elevation areas, with steep slopes and limited drainage basins. Post-fire debris flows are typically triggered by heavy rainfall in areas already damaged by recent wildfire events, and susceptible to soil erosion.

Debris flows could affect both the transportation network, utilities, and new development. In December 2018, the Thomas Fire burned through Ventura and Santa Barbara Counties, leading to loss of vegetation and soil erosion along sloped hillsides. Subsequently, a strong storm poured five inches of rain onto charred hillsides over a short period of time on January 9, 2019. The storm resulted in deadly mudslides, caused extensive property damage, and caused the closure of US-101 for nearly two weeks.^{60,61} A similar incident occurred in Malibu as a result of a mudslide following the Woolsey Fire, which forced the closure of a 13-mile stretch of Pacific Coast Highway.⁶² Furthermore, mudflows could expose people to hazards posed by ruptured methane gas pipelines, as occurred in Burbank in January 2018 following the La Tuna Fire of September 2017.⁶³ Development of homes and infrastructure is anticipated to continue to occur in areas of the region that are subject to wildfire hazards, despite the Plan's focus on adding development to existing urban areas. Due to the anticipated increased consumption of greenfields under the Plan, development may continue to occur in urban/wildlands interface areas which would result in significant risks for people and structures. Therefore, the impacts would be significant and unavoidable, requiring mitigation.

Mitigation Measures

SCAG Mitigation Measures

-
- ⁶⁰ NASA, *NASA Calculated Heavy Rainfall Leading to California Mudslides*. Available online at: <https://www.nasa.gov/feature/goddard/2018/nasa-calculated-heavy-rainfall-leading-to-california-mudslides>, accessed September 18, 2019.
- ⁶¹ Ventura County Star, *Highway 101 reopens in Montecito after long closure from deadly mudslide*. Available online at: <https://www.vcstar.com/story/news/local/communities/ventura/2018/01/21/highway-101-reopens-montecito-after-long-closure-deadly-mudslides/1052292001/>, accessed September 18, 2019.
- ⁶² ABC Los Angeles, *PCH could stay closed until Tuesday near Malibu after mudslides*. Available online at: <https://abc7.com/weather/pch-could-stay-closed-until-tuesday-after-mudslides/5024931/>, accessed September 18, 2019.
- ⁶³ CBS Los Angeles, *Evacuation Orders Lifted for Burbank Neighborhood, Still In Place For La Tuna Canyon*. Available online at: <https://losangeles.cbslocal.com/2018/01/11/evacuation-orders-lifted-burbank/>, accessed September 18, 2019.

See SMM-WF-1, SMM WF-2, SMM HYD-3, SMM GEO-1 and SMM GEO-2.

Project Level Mitigation Measures

See PMM WF-1, PMM WF-2, PMM HYD-1 and PMM HAZ-4.

Level of Significance after Mitigation

As discussed above, regulations and policies would reduce impacts but given the regional scale of the analysis in this PEIR, it is not possible to determine if all impacts would be fully mitigated by existing regulations and policies. Therefore, this PEIR identifies project-level mitigation measures consistent with applicable regulations and policies designed to reduce impacts. Lead Agencies may choose to include project-level mitigation measures in environmental documents as they determine to be appropriate and feasible. However, because of the regional nature of the analysis and the lack of project specific-detail, including project components and locations, and SCAG's lack of authority to impose project-level mitigation measures, this PEIR finds impacts related to exposing people and structures to significant risks, as a result of runoff, post-fire slope stability, and drainage changes could be significant and unavoidable even with implementation of mitigation.

3.20.4 SOURCES

ABC Los Angeles, PCH could stay closed until Tuesday near Malibu after mudslides. Available online at: <https://abc7.com/weather/pch-could-stay-closed-until-tuesday-after-mudslides/5024931/>, accessed September 18, 2019.

Building Standards Commission. California Building Standards Code. Available online at: <https://www.dgs.ca.gov/BSC/Codes>, accessed August 20, 2019.

CAL FIRE Office of the State Fire Marshal. 2019. About the Office of State Fire Marshal. Available online at: <https://osfm.fire.ca.gov/about-us/>, accessed August 20, 2019.

CAL FIRE. Fire Hazard Severity Zones Maps. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>, accessed September 7, 2019.

CAL FIRE. 2007. Eastern Riverside County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6749/fhszl06_1_map61.pdf, accessed August 20, 2019.

CAL FIRE. 2007. Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6636/fhszs_map.pdf, accessed August 20, 2019.

CAL FIRE. 2007. Imperial County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6680/fhszs_map13.pdf, accessed August 20, 2019.

- CAL FIRE. 2007. Los Angeles County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6705/fhszs_map19.pdf, accessed August 20, 2019.
- CAL FIRE. 2007. Orange County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6737/fhszs_map30.pdf, accessed August 20, 2019.
- CAL FIRE. 2007. SW San Bernardino County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6781/fhszs_map62.pdf, accessed August 20, 2019.
- CAL FIRE. 2007. Western Riverside County: Fire Hazard Severity Zones in SRA. Available online at: https://osfm.fire.ca.gov/media/6752/fhszs_map60.pdf, accessed August 20, 2019.
- CAL FIRE. 2017. Fire Prevention Fee. Available online at: <https://www.cdtfa.ca.gov/taxes-and-fees/fire-prev-fee.htm>, accessed September 7, 2019.
- CAL FIRE. Fire Hazard Severity Maps. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>, accessed September 8, 2019.
- CAL FIRE. Informational Report for State Responsibility Area Fire Prevention Fee: Fiscal Year 2016-2017. Available online at: <https://www.fire.ca.gov/media/8146/report-for-sra-fire-prevention-fee-fy16-17.pdf>, accessed August 21, 2019.
- CAL FIRE. Strategic Fire Plan for California. Available online at: <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/fire-plan/>, accessed September 7, 2019.
- California Department of Forestry and Fire Protection. About Us. Available online at <https://www.fire.ca.gov/about-us/>, accessed September 10, 2019.
- California Legislative Information. 1982. ARTICLE 9. Fire Hazard Severity Zone [4201-4204]. Available online at: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=1.&article=9., accessed August 20, 2019.
- California Legislative Information. 1992. CHAPTER 6.8. Very High Fire Hazard Severity Zones [51175-51189]. Available online at: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=1.&title=5.&part=1.&chapter=6.8.&article=, accessed August 20, 2019.
- California Legislative Information. 2008. Assembly Bill No. 38. Available online at: http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=200720080AB38, accessed August 20, 2019.
- California Legislative Information. 2012. Senate Bill No. 1241. Available online at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB1241, accessed August 20, 2019.

- California Legislative Information. 2015. Assembly Bill No. 301. Available online at: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB301&search_key words=public+resources+code, accessed August 20, 2019.
- California Legislative Information. 2018. Assembly Bill No. 2551. Available online at: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2551, accessed August 20, 2019.
- California Legislative Information. 2018. Senate Bill No. 1079. Available online at: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1079, accessed August 20, 2019.
- California Legislative Information. 2019. Assembly Bill No. 1054. Available online at: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1054, accessed September 18, 2019.
- California Legislative Information. Division 12. Fires and Fire Protection. Available online at: https://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=HSC&division=12.&title=&part=&chapter=&article=, accessed August 20, 2019.
- California Public Utilities Commission, Press Release December 14, 2017. CPUC Adopts New Fire-Safety Regulations. Available online at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M201/K352/201352402.PDF>, accessed September 26, 2019.
- CBS Los Angeles, Evacuation Orders Lifted for Burbank Neighborhood, Still In Place For La Tuna Canyon. Available online at: <https://losangeles.cbslocal.com/2018/01/11/evacuation-orders-lifted-burbank/>, accessed September 18, 2019.
- County of Los Angeles, Chief Executive Office – Office of Emergency Management. 2014 All-Hazard Mitigation Plan. Available online at: <https://ceo.lacounty.gov/wp-content/uploads/OEM/hazmitgplan.pdf>, accessed September 8, 2019.
- County of Los Angeles, Department of Regional Planning. General Plan 2035, Safety Element. Available online at: http://planning.lacounty.gov/assets/upl/project/gp_final-general-plan-ch12.pdf, accessed September 10, 2019.
- County of Orange, Orange County Fire Authority. 2015. Local Hazard Mitigation Plan. Available online at: https://www.smwd.com/DocumentCenter/View/2193/APPENDIX-H_OC-HMP-Final, accessed August 20, 2019.
- County of San Bernardino. 2014. 2007 General Plan. Available online at: <http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf>, accessed August 20, 2019.
- Federal Response Plan, April 1999. Available online at: http://www1.mwco.org/security/security/otherplans/fed_response_sum.pdf, accessed August 21, 2019.

- FEMA. Disaster Mitigation Act of 2000. Available online at: <https://www.fema.gov/media-library/assets/documents/4596>, accessed August 20, 2019.
- FEMA. FEMA Region IX: Arizona, California, Hawaii, Nevada, & the Pacific Islands. Available online at: <https://www.fema.gov/fema-region-ix-arizona-california-hawaii-nevada-pacific-islands>, accessed August 20, 2019.
- Government Publishing Office. Title 44: Emergency Management and Assistance. Available online at: <https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=44:1.0.1.4.53>, accessed August 20, 2019.
- Governor's Office of Emergency Services. 2014-2018 Strategic Plan Summary. Available online at: [https://www.caloes.ca.gov/NewsMediaSite/Documents/Cal%20OES%20Strategic%20Plan%20Summary%20Booklet%20\(FINAL\).pdf](https://www.caloes.ca.gov/NewsMediaSite/Documents/Cal%20OES%20Strategic%20Plan%20Summary%20Booklet%20(FINAL).pdf), accessed August 20, 2019.
- Governor's Office of Emergency Services. 2019. California Disaster Assistance Act (CDA). Available online at: <https://www.caloes.ca.gov/cal-oes-divisions/recovery/public-assistance/california-disaster-assistance-act>, accessed August 20, 2019.
- Imperial County Fire Department & Office of Emergency Services. Prevention. Available online at: <https://www.co.imperial.ca.us/firedept/index.asp?fileinc=prevention>, accessed September 7, 2019.
- Imperial County Municipal Code. 8.20.010 – Findings and adoption of the Uniform Fire Code. Available online at: https://library.municode.com/ca/imperial_county/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.20UNFICOAD_8.20.010FIADUNFICO, accessed August 21, 2019.
- Imperial County Municipal Code. 91003.00 – Adoption of the California Building Code. Available online at: https://library.municode.com/ca/imperial_county/codes/code_of_ordinances?nodeId=TIT9LAUS_CO_DIV10BUSEGRRE_CH3CABUCO_91003.00ADCABUCO, accessed August 21, 2019.
- Imperial County Planning & Development Services. 2015. Land Use Element of the Imperial County General Plan. Available online at: [http://www.icpds.com/CMS/Media/Land-Use-Element-\(2015\).pdf](http://www.icpds.com/CMS/Media/Land-Use-Element-(2015).pdf), accessed August 20, 2019.
- Imperial County Planning & Development Services. Title 9, Division 8: Subdivision Ordinance. Available online at: http://www.icpds.com/CMS/Media/TITLE9Div8_2014.pdf, accessed August 21, 2019.
- NASA, NASA Calculated Heavy Rainfall Leading to California Mudslides. Available online at: <https://www.nasa.gov/feature/goddard/2018/nasa-calculated-heavy-rainfall-leading-to-california-mudslides>, accessed September 18, 2019.
- New York Times, Forced Out by Deadly Fires, Then Trapped in Traffic. Available online at: <https://www.nytimes.com/2018/11/11/us/california-fire-paradise.html>, accessed September 18, 2019.
- New York Times. California Says PG&E Power Lines Caused Camp Fire That Killed 85. Available online at: <https://www.nytimes.com/2019/05/15/business/pge-fire.html>, accessed September 18, 2019.

Orange County Planning & Development. General Plan: Chapter IX. Safety Element. Available online at: <https://www.ocgov.com/civicax/filebank/blobdload.aspx?blobid=40234>, accessed August 20, 2019.

San Bernardino Countywide Plan Draft PEIR, June 2019.

Southern California Edison. Public Safety Power Shutoffs. Available online at: <https://www.sce.com/safety/wildfire/psps>, accessed September 26, 2019.

U.S. Fish & Wildlife Services Fire Management. 2009. Rural Fire Assistance. Available online at: https://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml, accessed August 21, 2019.
1 California Public Utilities Commission (CPUC). Utility Wildfire Mitigation Plans (SB 901). Available online at: <http://cpuc.ca.gov/SB901/>, accessed March 29, 2019.

US Department of Interior, Press Release, November 30, 2018. Available online at: <https://www.doi.gov/pressreleases/new-analysis-shows-2018-california-wildfires-emitted-much-carbon-dioxide-entire-years>, accessed September 17, 2019.

US Environmental Protection Agency, What Climate Change Means for California. Available online at: <https://www.epa.gov/sites/production/files/2016-09/documents/climate-change-ca.pdf>, accessed September 16, 2019.

Ventura County Fire Code, Fire Hazard Reduction Program, Appendix W, available online: <https://vcfd.org/images/FHRP/Ord-30-Appendix-W-FHRP.pdf>, accessed September 12, 2019.

Ventura County Star, Highway 101 reopens in Montecito after long closure from deadly mudslide. Available online at: <https://www.vcstar.com/story/news/local/communities/ventura/2018/01/21/highway-101-reopens-montecito-after-long-closure-deadly-mudslides/1052292001/>, accessed September 18, 2019.

Ventura County. 2019. 2040 General Plan: Preliminary Public Review Draft. Available online at: https://vc2040.org/images/2040_General_Plan_Files_-_May_2019/PPRD_2040_General_Plan_COMPLETE-compressed.pdf, accessed August 20, 2019.

Wildland Fire Management: The National Fire Plan. Available online at: https://www.forestsandrangelands.gov/documents/resources/reports/2007/nfp2007_budget_justification.pdf, accessed August 20, 2019.

Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed impacts of anthropogenic climate change on wildfire in California. *Earth's Future*, 7, 892–910. Available online at: <https://doi.org/10.1029/2019EF001210>, accessed September 10, 2019.