

APPENDIX A - Historical Hazards

Data sources for historical hazards include: Monterey County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), the National Oceanic and Atmospheric Administration (NOAA) Storm Events Database, and historic records at the Carmel Library

Disaster Type (Storm, drought, wildfire, heat event)	Date	Location	Local Impact
Storm	Winter of 1982/83	Monterey Peninsula	<p>El Niño winter. During this period, severe winter storms struck Carmel every 10 days. More sand was removed from the beach than at any previous time in the memory of long-term residents or documented history. Additionally, heavy rains overwhelmed the City's storm drain system. Uncontrolled stormwater flows washed away portions of the City's coastal bluffs and undermined beach access stairways. Between 1983 and 1988, the entire Scenic Road storm drain system was rebuilt with larger drain pipes and catch basins, and moving outfalls to less erosive locations.</p> <p>Johnson (1984) recorded several areas of significant erosion during the 1982/83 winter:</p> <ul style="list-style-type: none"> - Loss of 20 feet of bluff north of 8th Avenue, - Loss of 25 feet of bluff between 10th and 11th Avenues, - Loss of 30 feet of bluff between 8th and 9th Avenues, - Loss of 30 feet of bluff near Santa Lucia Avenue, - Loss of 40 feet of bluff between 9th and 10th Avenues.
Wildfire	July 1987	Pebble Beach/Carmel	<p>The fire that rushed up a canyon and destroyed 32 homes in Pebble Beach on May 31 was fueled by acres of dead underbrush and thick stands of trees, according to a forester who toured the area Thursday. Bill Ruskin, a vegetative management coordinator with the California Department of Forestry and Fire Protection in Felton, said after the tour: "It was a situation that was waiting to happen." Ruskin described the devastated residential area as one located in a "perilous" position, on top of a box canyon containing an "incredible number of stems per acre — about 200 to 300 per acre." Fanned by strong winds and funneled by steep terrain, the fire raced up the canyon as it burned dense underbrush and released gases that ignited above the tree crowns, creating a "crown fire" effect, Ruskin said. Ruskin collected fuel data in Del Monte Forest to simulate the path of the fire in a computer model. He said results would not be available until later this summer. "It may or may not verify whether the response should have been different," Ruskin said. In the computer model, Ruskin said, he will be able to use fuel data, topography and weather conditions to determine ways to manage the forest and devise ways to fight further fires in the area. As for the disastrous Sunday afternoon when heat from an illegal campfire ignited pine needles and set off the tragic chain of events,</p>

			<p>leaving 49 people homeless, Ruskin said the heat was so intense from the fire that houses began burning just from the radiated heat instead of flames. "The point is that you had so much heat going up that canyon," said Ruskin, 36, who has been a forester with CDF for five years and received a forestry management degree from the University of California at Berkeley. The point of origin of the fire has been determined as being on forested property owned by Pebble Beach Co. and adjacent to the Morse Botanical Reserve.</p> <p>Notified of Results The property was surveyed Tuesday by Pebble Beach Co., which notified the Del Monte Forest Foundation, owner of the botanical reserve, of the results in a letter this week. Ruskin said that dead materials, including fallen limbs and pine needles, burned the thickly packed Monterey pine trees and sent gases above the ground smoke to be fanned by oxygen and winds. The intense gaseous fire created "radiated and convected" heat that spared few of the homes." Only the houses made of stucco and not having wood on the outside and one with double-pane windows were able to withstand the heat," Ruskin said. "It was not a crown fire in those trees," Ruskin said. "... Flames shooting up and over the trees could very well have been gases going up to meet oxygen in the wind. That's where they were being ignited." In the wake of the fire, Ruskin said, the bad news is that many of the trees in the 160-acre swath cut by the four-day blaze did not survive. However, he said, seeds released by exploding pine cones will regenerate the forest.</p> <p>Alternative Vegetation Ruskin said that as equipment is used to clear trees and brush, now is a good time to consider alternative vegetation — coastal and coyote brush — that would stay succulent throughout a fire season and be less likely to add fuel to a fire. Ruskin added that selective hand-cutting of trees could also be done in forest management. Controlled burns, Ruskin said, can be effective but "it may not be aesthetically desirable from what we learned at Point Lobos." Foresters learned that a controlled burn last October at Point Lobos led to "an unexpectedly high amount of tree mortality." "The Monterey pine is a shallow-rooted tree," Ruskin said. "Even in a controlled burn, you are killing a lot of roots." In addition, Ruskin said, the controlled burn at Point Lobos created "burning pitch pockets," which also weaken trees. "I'm not sure that a prescribed burn is an acceptable management alternative," Ruskin said.</p> <p>Ruskin observed after the tour that the fire appeared to have fed on pine trees 60 to 80 years old and "petered out" in younger trees. Mission Trail Park Ruskin also toured Camel's Mission Trail Park to assess the amount of fuel there that could lead to fire. Ruskin recommended to Gary Kelly, Carmel city forester, that some clearing of brush and fallen trees should take place and that a "pre-suppression plan" should be devised for the park area. Ruskin said that "fire-retardant vegetation" should be planted at the park rather than pine trees. Ruskin said the Mission Trail Park area did not have as much stored fuels as the Pebble Beach area. "He didn't seem to find any major concerns other than cleanup and a pre-fire plan," Kelly said. Ruskin was invited to tour the area by Kelly and Roy Perkins, CDF district fire chief.</p>
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Heat Event	April 1988	Monterey Region	<p>Hot temperatures Sunday in the mid-80s in Monterey and into the low-90s in Carmel Valley set weather records for April 10. Monterey's high temperature of 86 degrees at 2 p.m. topped the record of 80 degrees in 1968 for the date, according to Robert J. Renard, observer in Monterey for the National Weather Service. It also marked only the seventh time in 37 years of recordkeeping that the temperature reached 86 or higher during a day in April, he said. There has never been an 86-degree reading recorded in Monterey for January, February and March, he said, and Sunday's high temperature was the third earliest recording of an 86 or higher in a calendar year. Twice in previous years on April 2, the temperature climbed to 86 or above, with 88 and 87, respectively. Sunday's low temperature in Monterey also was a record. The 57 degrees was the highest minimum not only for April 10 but also for this early in the calendar year, Renard said. Meanwhile, in Carmel Valley, where temperatures on hot days are typically up to 10 degrees warmer than Monterey, the high temperature got up to 93 after an early morning low of 51, according to Graham Matthews, who keeps weather records for Carmel Valley. The 93 reading, which set a record for the date, topped the previous mark of 85 degrees set in 1968, Matthews said.</p> <p>Source: Monterey Herald, April 1988</p>
Storm	January 1995	Monterey Region	<p>In January 1995, sustained precipitation fell throughout the region and over 125 residential properties in the Carmel Valley sustained damage. Two months later, Monterey County experienced a second significant winter storm, which resulted in further sustained precipitation falling on already saturated watersheds. Devastating flooding occurred throughout Monterey County, particularly in the unincorporated communities of Castroville, Mission Fields, Carmel Valley, Cachagua, Carmel Highlands, Spreckels, and Big Sur. Over 1,500 residences and 100 businesses were damaged.</p>
Storm	January 10, 1995	Carmel Area	<p>A Monterey County Sheriff's deputy evacuates two elderly residents from their flooded Mission Fields neighborhood home in Carmel on January 10, 1995. According to a new study, extreme weather swings — a historic drought followed by drenching winter storms that cause flooding — will become the norm over coming generations.</p> <p>Source: Monterey Herald, April 2, 2018</p>
Wildfire	Oct – Nov 1996	Northern Big Sur	<p>This fire known as the Big Sur fire began Oct 18 near Ventana Camp Park. Much of the fire occurred in the Ventana wilderness area. 2500 Fire fighter participated. 4400 acres were burned. Light rain helped control fire. The cost of fighting the fire is estimated 12.3 million. 180 fire engines were used. 13 helicopters and 3 air tankers were used.</p>
Storm	December 21, 1996	Monterey Peninsula	<p>2.96" of rain in 11 hours at Monterey, Seaside had 2.5" and Marina had 2.12". Streets and intersections were flooded in Monterey, Del Rey Oaks, Pacific Grove, Carmel Highlands, and Carmel. HWY 101 N of Salinas was flooded.</p>

Wildfire	September 1999	Carmel Valley	<p>A surface low off the CA Coast brought tropical moisture and mild instability over the coastal CA are and lightning continued through the night over the entire Central Coast and San Francisco Bay area.</p> <p>Kirk Complex (consisted of Tassajara, Five, Big Pine, Elephant, Lone Pine, Freed, 7, Torre, Devil, Kirk and Hare Fires) Complex was divided into the North and South Components).</p> <p>Cause: Lightning strikes</p> <p>Location: In the Ventana Wilderness approximately 20 miles Southeast of Carmel, CA. Monterey Co.</p> <p>Size: 85,634 acres (as of 10/19/99)</p> <p>Containment: October</p> <p>Fatalities: none</p> <p>Structures Lost: none</p> <p>Cost: \$66.9 million (as of 10/19/99)</p>
Storm	January 2008	Monterey Peninsula	<p>Strong coastal storm brought flooding rains, high winds, record high surf and coastal flooding to Monterey County and resulted in nearly \$1 million in property damages. Approximately 30 homes in the Carmel Lagoon area were affected by some degree of flooding.</p>
Wildfire	December 2013	Northern Big Sur	<p>The Pfeiffer Fire started on December 17th 2013 around midnight in the vicinity of Pfeiffer Ridge in the Monterey Ranger District of Los Padres National Forest. The fire burned 917 acres. Thirty four (34) residence and 4 outbuildings were damaged/destroyed. The fire was declared contained on December 20 2013 at 6:00 p.m.</p>
Storm	January 8, 2017	Monterey Peninsula	<p>Potent atmospheric river bringing heavy rain, strong southerly winds, and storm surge issues. This AR is following a normal to slightly above normal 3 month period, meaning the grounds were saturated. Three to four feet of standing water at Casa Verde Road and SR 1N.</p>
Storm	February 9, 2017	Monterey Peninsula	<p>A cold front passed over the area Thursday Feb 9. There were strong winds ahead of the front and heavy rains associated with the frontal passage that produced roadway flooding and debris flows.</p>
Storm	February 20, 2017	Monterey Peninsula	<p>Potent AR brought copious amounts of rain to the region causing widespread flooding, debris flow, accidents, and over topping of reservoir spillways.</p> <p>Roadway flooding on Quail Meadows Dr in Carmel Valley. Large section of roadway flooded, vehicles sliding.</p>
Lightning / Wildfire	September 11, 2017	Central Coast/Monterey County	<p>A disturbance rotating around an upper level low west of San Diego brought thunderstorm activity to the Bay Area on September 11. Widespread reports of lightning were received along with a few small hail reports and strong wind gusts. It has been reported that there were over 40,000 lightning strikes across the Central Coast of California during this event. Several brush fires were also ignited due to lightning strikes.</p>

			Various lightning strikes sparked 15 fires in Monterey County that were contained on the same day http://www.mercurynews.com/2017/09/13/crews-contain-15-fires-started-by-lightning-in-monterey-county/ . Timing has been estimated.
Storm	November 29, 2018	Monterey Peninsula	A mid/upper level low moved through the region at the end of November. A cool unstable air mass allowed for the development of scattered thunderstorms across the region that produced lightning and small hail. An associated surface low approached the coast during this time causing high surf and gusty winds. Some locations saw wave heights above 25 feet. This system caused roadway flooding, minor debris flows, and downed trees along with damage from gusty winds. Flooding at Hwy1 and Hwy 68.
Storm	January 2019	Carmel/Monterey Peninsula	After a strong cold front brought severe weather to the Central Coast on Wednesday night, the cleanup process began Thursday. Pacific Gas & Electric Co. crews worked to restore power after more than 10,000 Monterey Peninsula customers lost power due to the storm. Power was restored to about half of those without power by early afternoon Thursday and spokeswoman Mayra Tostado said PG&E was aiming to restore power by the evening to customers without any access issues caused by mudslides, flooding or blocked roads.... According to Carmel City Administrator Chip Rerig, a significant trunk line transformer just outside the city blew up, causing a citywide power outage. In Carmel, 12 streets were closed due to trees that fell on electrified wires. City crews began cleaning up the streets after PG&E removed trees touching or adjacent to live wires. "The storm last night hit us hard," Rerig wrote in a post to Carmel's website. "Fortunately there have been no reported injuries to residents, guests, staff, or contractors." The city opened the Carmel Youth Center as a warming center, welcoming residents to stop by and charge their mobile devices and get a cup of coffee or water. Speaking by phone Thursday afternoon, Rerig said city staff worked with PG&E to open up many of the streets that had been closed and explained the city came together overnight into Thursday to respond to the storm damage. "We really had a great concerted effort last night with our police department, our public works, who are fantastic, Monterey Fire (Department), which is our contracted fire services, responded to 1 think 32 calls, we had a series of volunteers, our Community Emergency Response Team and a litany of other staff members," he said. People from Senior Helping Seniors checked in on some of the city's elderly population to make sure they were OK during the outage. The Carmel Unified School District canceled classes and activities at all of its schools for Thursday due to the road closures and power outages but planned on opening its schools Friday. Source: Monterey Herald, Jan 18, 2019
Storm	February 4, 2019	Monterey Peninsula	A mid/upper low with a very cold air mass moved through in early February bringing snow to lower elevation peaks across the region prompting a rare Winter Weather Advisory. Junipero Serra Peak received around a foot of snow. Rainfall just ahead of this

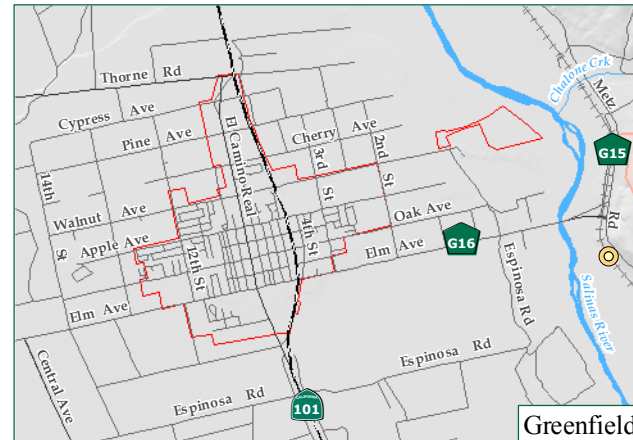
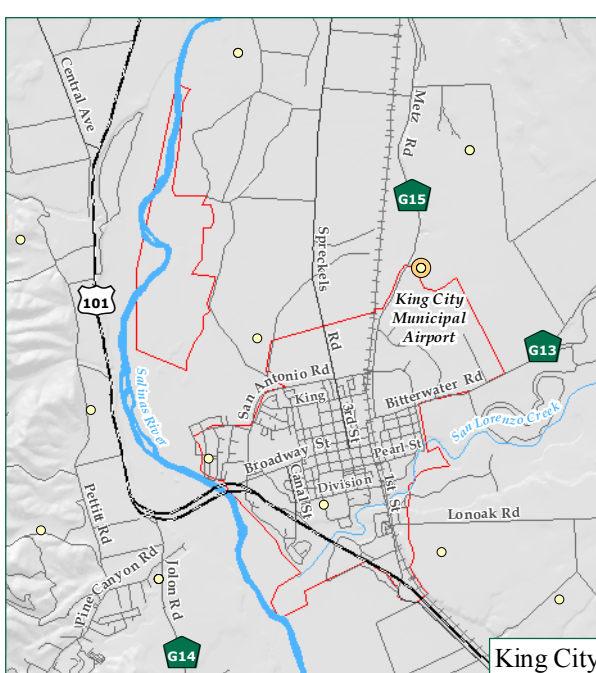
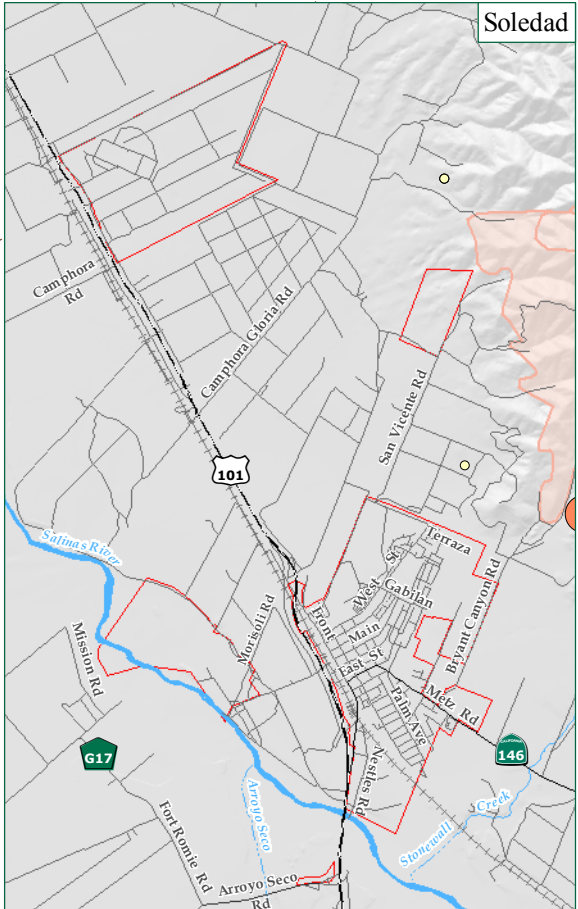
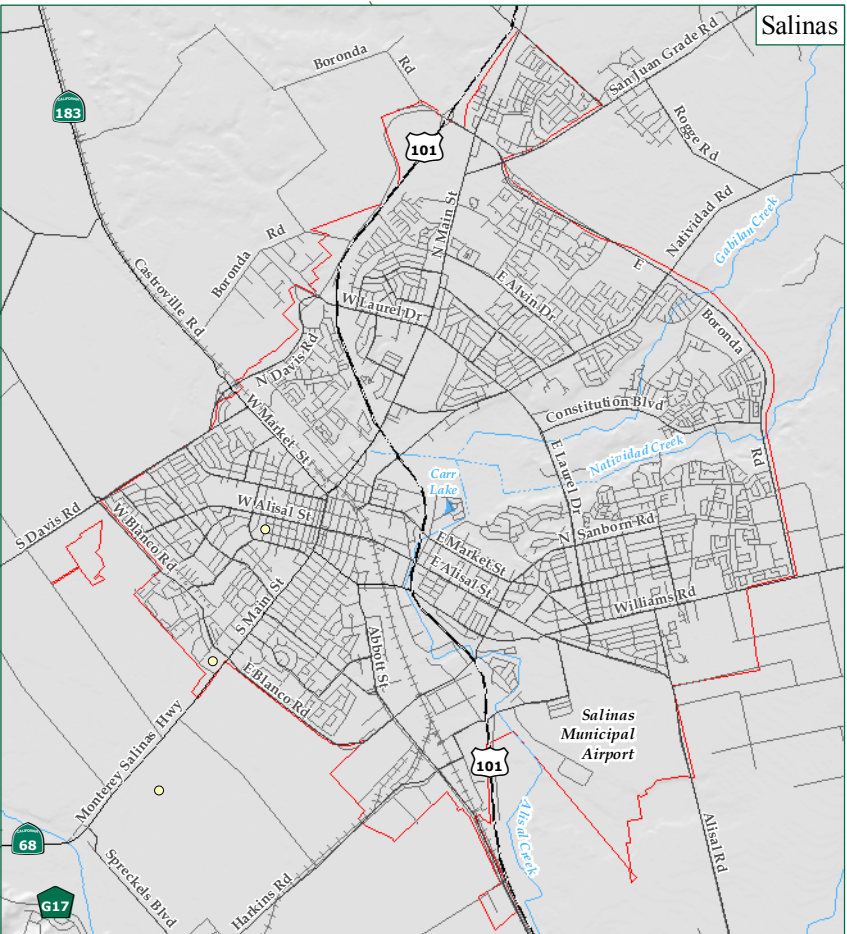
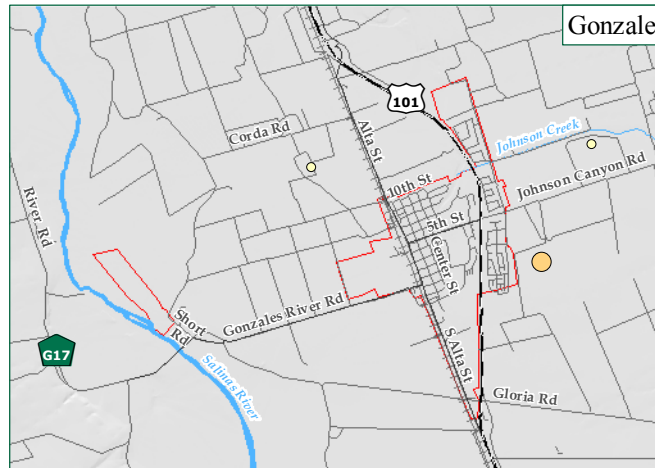
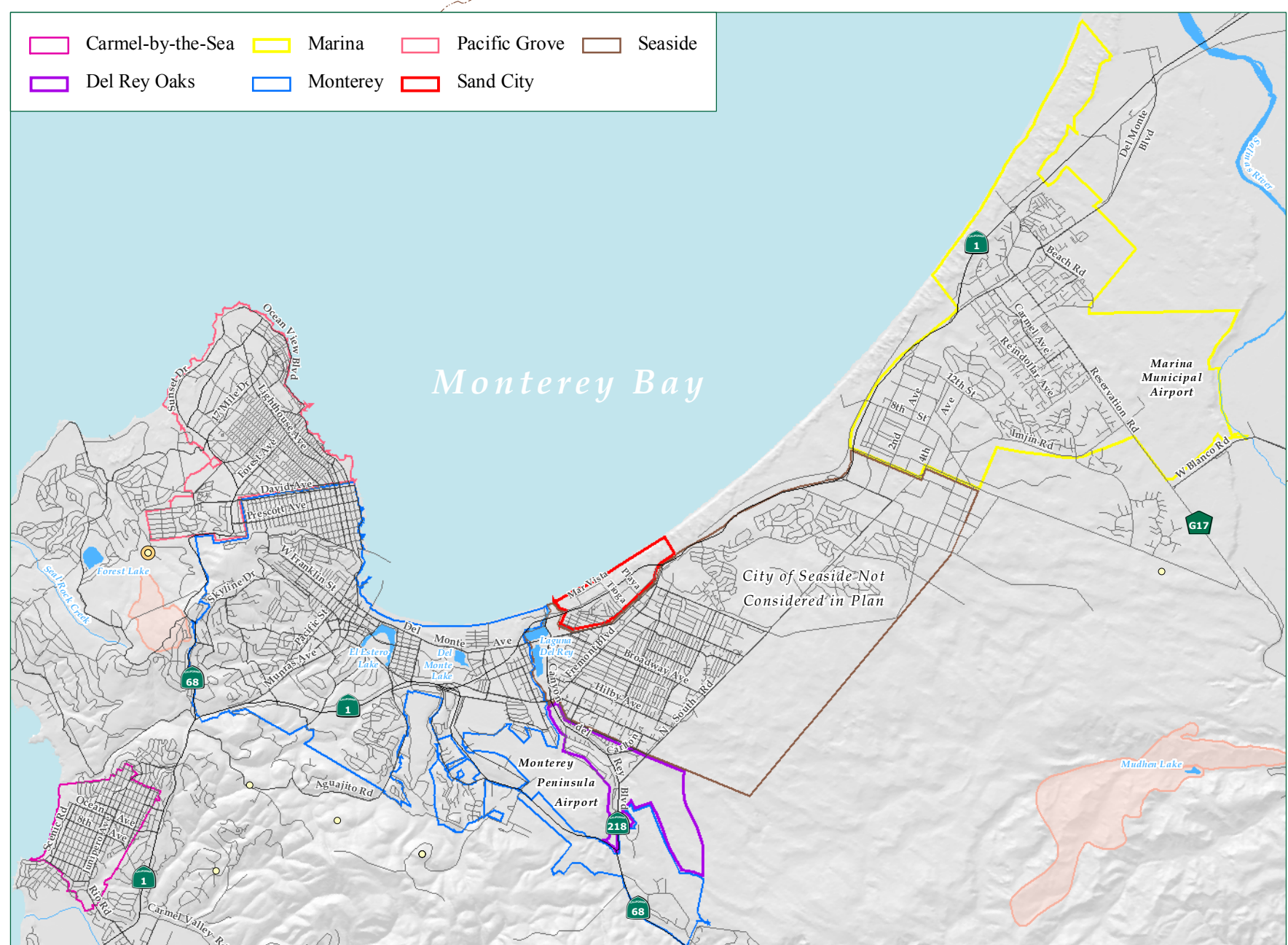
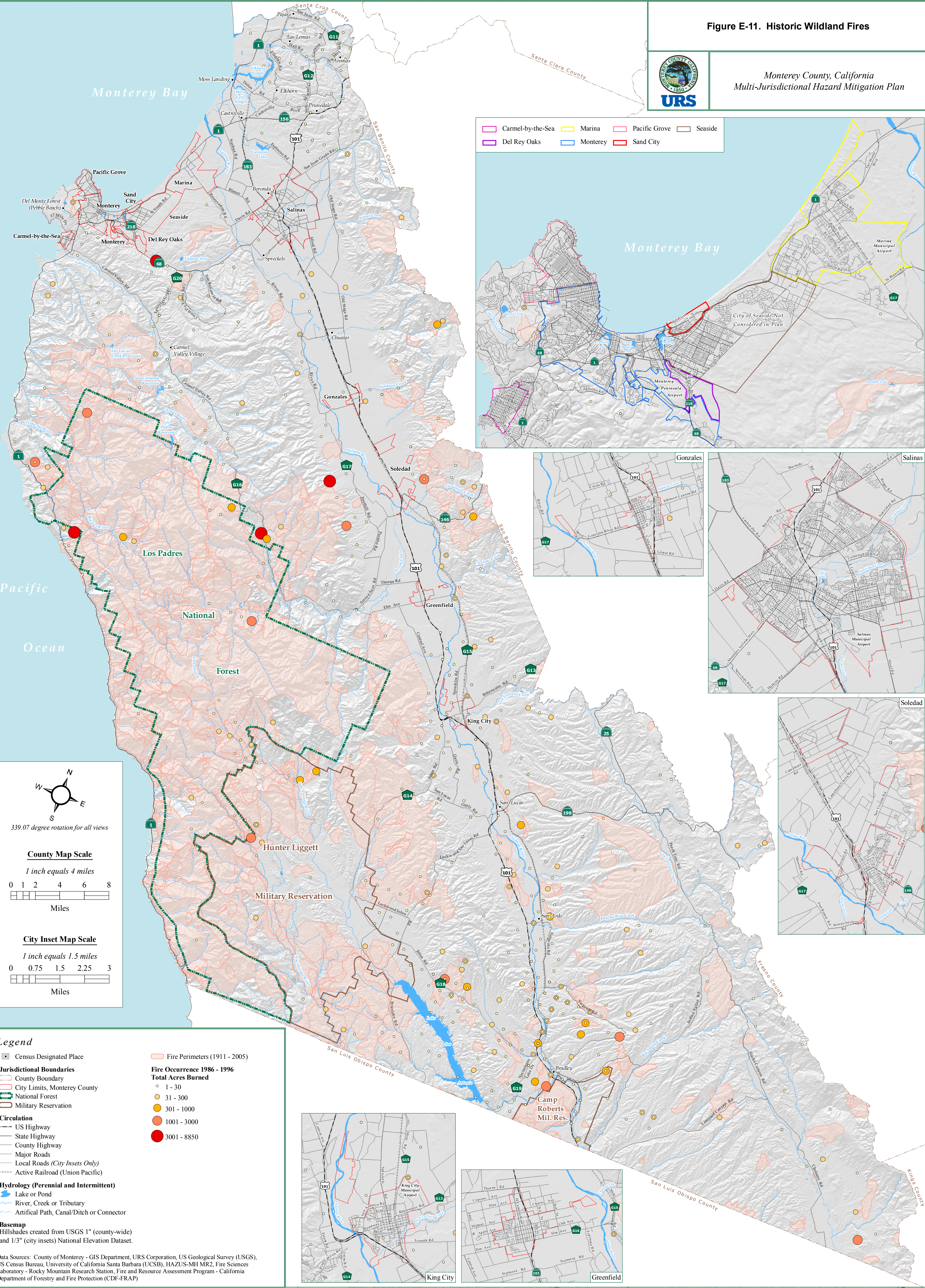
			system also brought roadway flooding and minor debris flows. Carmel River flooding near Mid Valley. SR 1 at Rio Rod culvert is flooding, water going over the roadway.
Storm	November 30, 2019	Carmel	A low pressure system moving in from the Gulf of Alaska and drawing in moisture from the tropics combined to bring the first atmospheric river event of the winter season to the Greater Bay Area. This system brought widespread heavy rainfall, roadway flooding, and strong winds to the region. Rare Storm Warnings were issued over the coastal waters where buoys reported wind gusts in excess of 50 mph. Bay Area peaks recorded wind gusts between 60 to 70 mph with gusts along the Monterey Peninsula and Big Sur Coast at 50 to 60 mph. These winds caused downed trees and power outages across the area. Street at 3438 Martin Rd in Carmel, CA is flooding along with potential flooding at residence as water is being diverted down reporting party's driveway.
Storm	December 3, 2019	Carmel	A low pressure system moving in from the Gulf of Alaska and drawing in moisture from the tropics combined to bring the first atmospheric river event of the winter season to the Greater Bay Area. This system brought widespread heavy rainfall, roadway flooding, and strong winds to the region. Rare Storm Warnings were issued over the coastal waters where buoys reported wind gusts in excess of 50 mph. Bay Area peaks recorded wind gusts between 60 to 70 mph with gusts along the Monterey Peninsula and Big Sur Coast at 50 to 60 mph. These winds caused downed trees and power outages across the area. Carmel River Lagoon rose significantly overnight after 3 to 5 inches of rain fell over the Carmel River Basin. The Monterey OES phoned to say Public Works tried to breach the Lagoon and was unable to do so in time so the surrounding area had to be evacuated due to flooding. Minor Street flooding was observed along 15th, 16th, 17th Ave as well as Carmelo St and Scenic Rd. The unofficial flood stage of the Carmel River Lagoon is 10 ft. The gauge exceeded 10 ft during this time period before the Lagoon was breached and the water level fell dramatically just after 1 am.
Wildfire	August - September 2020	Central Coast, Carmel Valley	A prolonged and oppressive heat wave swept the Central Coast and Bay Area for almost a week from August 14th to August 19th with widespread record breaking temperatures observed across the region. This was caused by a strong high pressure system over the Desert Southwest that expanded westward into California. This dome of heat brought hot temperatures to the area for several days. Multiple days of triple digit afternoon highs were recorded inland with some coastal locations even reaching the mid-90s. Several days of hot and dry weather further dried fuels over the area increasing fire danger. During this event, a surge of monsoonal and tropical moisture from a former Tropical Storm advected northward with sufficient instability to generate multiple high based and dry thunderstorms that produced several thousand lightning strikes over the Greater Bay Area. Many locations saw wind gusts of 40-50 mph with isolated areas seeing gusts of 60-75 mph. This prompted the San Francisco Bay Area forecast office to issue a rare severe thunderstorm warning. These lightning strikes in combination with gusty and erratic outflow winds sparked hundreds of wildfires across the state of California. Several smaller

			<p>fires combined to form complexes some of which are now among the largest wildfires in state history. Most of which were still actively burning at the end of August. Hundreds of thousands of acres have been burned with several hundred structures destroyed as well as a handful of deaths and injuries. Tens of thousands of residents were also forced to evacuate. Additionally, all of these wildfires burning simultaneously across the state gave the Bay Area the worst air quality in the world at one point.</p> <p>Lightning sparked the River Fire in Monterey County on the afternoon of the 16th. Several evacuation orders were issued throughout the month and four people including fire personnel and civilians were injured. Both the River and Carmel Fires caused smoke and ash to rain down on surrounding cities. The River Fire continued to burn through early September. A total of 48,088 acres burned with 30 structures destroyed, 13 damaged, and 4 injuries https://www.fire.ca.gov/incidents/2020/8/16/river-fire/.</p>
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Figure E-11. Historic Wildland Fires



Monterey County, California
Multi-Jurisdictional Hazard Mitigation Plan



339.07 degree rotation for all views

County Map Scale
1 inch equals 4 miles

0 1 2 4 6 8
Miles

City Inset Map Scale
1 inch equals 1.5 miles

0 0.75 1.5 2.25 3
Miles

Legend

- Census Designated Place
- Jurisdictional Boundaries**
 - County Boundary
 - City Limits, Monterey County
 - National Forest
 - Military Reservation
- Circulation**
 - US Highway
 - State Highway
 - County Highway
 - Major Roads
 - Local Roads (City Insets Only)
 - Active Railroad (Union Pacific)
- Hydrology (Perennial and Intermittent)**
 - Lake or Pond
 - River, Creek or Tributary
 - Artificial Path, Canal/Ditch or Connector
- Basemap**
Hillshades created from USGS 1" (county-wide) and 1/3" (city insets) National Elevation Dataset.

Fire Perimeters (1911 - 2005)

**Fire Occurrence 1986 - 1996
Total Acres Burned**

- 1 - 30
- 31 - 300
- 301 - 1000
- 1001 - 3000
- 3001 - 8850

Data Sources: County of Monterey - GIS Department, URS Corporation, US Geological Survey (USGS), US Census Bureau, University of California Santa Barbara (UCSB), HAZUS-MH MR2, Fire Sciences Laboratory - Rocky Mountain Research Station, Fire and Resource Assessment Program - California Department of Forestry and Fire Protection (CDF-FRAP)