2019

City of Chico
Extreme Heat Event Preparedness Plan

CITY OF CHICO
INC. 1872

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Introduction

Chico is located at the northeastern edge of the Sacramento Valley, one of the richest agricultural areas in the world. According to the United States Census Bureau, the city covers a total area of 27.8 square miles. The Sierra Nevada Mountains lie to the east, with Chico's city limits venturing several miles into the foothills via Bidwell Park. The Sacramento River lies five miles to the west of the city limits. Chico is the most populous city in Butte County, with an estimated population of 89,180 at the 2015 census estimate. The City's service area is 33 square miles and is characterized by an urban and suburban community mix. The city is a cultural and commercial center for a three-county regional market area. Chico supports a diverse range of industries including agriculture, recreation, tourism, healthcare manufacturing, and education. California State University, Chico is the second oldest institution in the California State University system, enrolling more than 16,000 students. Bidwell Park, the Country's 26th largest municipal park and the 13th largest municipally-owned park makes up over 17% of the City's area. Enloe Medical Center is located in Chico and serves as the regional medical hospital and Level II Trauma Center.

Chico's terrain is mostly flat with increasingly hilly terrain beginning at the eastern city limits. The city is bisected by Bidwell Park, which runs five miles from the city center to the foothills of the Sierra Nevadas. The city is also traversed by a number of creeks and flood channels flowing westward to the Sacramento River, including Big Chico Creek, Little Chico Creek, Lindo Channel (also known as Sandy Gulch), Mud Creek, Sycamore Creek, Comanche Creek, Dead Horse Slough, and Butte Creek.

Purpose

The purpose of this Extreme Heat Preparedness Plan (hereby referred to as Plan) is to guide the City of Chico in preparation for and during an extreme heat weather event. This plan identifies resources, actions and critical issues regarding a weather event including: monitoring, dissemination of public information and activation of a cooling shelter.

This Plan is intended to provide a written action plan to prepare the City of Chico in managing and responding to an extreme heat weather event that is both a multi-department and multi-disciplinary effort. As with all emergency plans, these are *guidelines* that may be deviated from as the situation dictates and justifies.

Background

According to Cal-Adapt, a climate change scenario planning tool developed by the California Energy Commission (CEC) and the University of California, Berkeley Geospatial Innovation Facility, the City of Chico is projected to experience an increase in annual average temperatures, with nighttime temperatures increasing at a faster rate than daytime temperatures, and an increase in the number of extreme heat days (Tables 1 and 2). Additionally, Cal-Adapt shows an expansion in the timeframe for extreme heat events with extreme heat days occurring earlier in the spring and later in the fall.

Excessive heat emergencies develop slowly and it may take a multiple days of oppressive heat to have a significant or quantifiable impact. Heat waves can take a cumulative effect by slowly reducing the body's ability to adapt and recover.

Typical summer temperatures in California contribute to approximately 20 deaths per year. The July 2006 Heat Wave in California was responsible for the death of 140 people over a 13-day period. While this emergency did not include major damage to infrastructure like the 1989 Loma Prieta and the 1994

Northridge earthquakes, approximately twice the number of human deaths were credited to the heat wave.

Excessive heat can be less dramatic but deadlier. It is important to note that a lack of uniformity with how coroners classify heat-related deaths means that heat-related deaths are thought to be severely underreported. For example, while coroners attributed 140 deaths to hyperthermia during the 2006 heat wave, a follow-up study by the California Department of Public Health estimated that 655 excess deaths occurred during the heat wave. California currently has no real-time, statewide surveillance system to rapidly identify cases of heat illness or determine the extent of heat wave impacts on health.

Historic and Projected Temperatures

When planning for excessive heat, it is imperative to take into account the projected increase in temperatures and heat events caused by climate change.

The numbers provided below are from Cal-Adapt, a climate modeling tool. The RCP 8.5 emissions scenario is used, which assumes that greenhouse gas emissions continue to rise strongly through 2050 and plateau around 2100. The threshold temperature used to determine an extreme heat day or warm night is calculated to be the 98th historical percentile of daily maximum/minimum temperatures based on observed historical data from 1961 to 1990 between the months of April and October.

Daytime Temperatures

Table 1: Historic and projected annual average maximum temperatures and number extreme heat days

Indicator	**Historic Annual Avg.** 1961 – 1990	**2020** 2010 – 2030	**2030** 2020 – 2040	**2040** 2030 – 2050	**2050** 2040 – 2060
Temperature Annual Average	75.2°F	78.0°F	78.9°F	79.5°F	80.7°F
Extreme Heat Above 104.8°F	4	12	16	20	26

Nighttime Temperatures

Across the nation, summer nighttime temperatures have increased at almost twice the rate of days. Warm summer nights are problematic when the body doesn't have a chance to cool down during nighttime hours. It is especially problematic in places where people are less acclimated physiologically and less behaviorally adapted to warmer nighttime temperatures.

Cal-Adapt identifies a warm night as a night when the minimum temperature exceeds the 98th percentile of nightly minimum temperatures based on the historic data. For Chico, it identifies a warm night as one where the lowest nighttime temperature exceeds 69.2°F.

Table 2: Historic and projected number of warm nights

Indicator	**Historical Average** 1961 – 1990	**2020** 2010 – 2030	**2030** 2020 – 2040	**2040** 2030 – 2050	**2050** 2040 – 2060
Warm night Above 69.2°F	4	12	17	21	28

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Urban Heat Island Effect

Temperatures in urban areas can be significantly higher than surrounding, less urbanized areas because asphalt, concrete and buildings absorb sunlight and heat. While this causes daytime temperatures to be higher than rural areas, it has the largest effect on nighttime temperatures because the heat is released slowly at night, raising the area's ambient temperature. There are long-term strategies to help reduce the urban heat island effect on a city's temperature.

Situation and Assumptions

1. A multi-department, multi-discipline planning team was formed to create the Plan to ensure effective response to an extreme heat situation.
2. (TBD) is responsible to update and maintain the contents of this Plan.
3. This Plan may be activated by (list appropriate personnel here)
4. (TBD) is responsible for monitoring weather information and providing Excessive Heat information to (TBD). *City manager receives NWS alerts and outreach from Butte County OES.*
5. The Plan assumes enough warning time of an extreme heat event will be provided by the National Weather Service in order to implement any planned activities as depicted in this plan.
6. Some people who are directly threatened by a hazard may ignore, not hear, or not understand warnings issues by the government.
7. People with disabilities and others with access and functional needs may require special attention to ensure a workable warning system is established.
8. There will be an increased burden on the electrical system of People's Gas & Electric. Coordination with this utility is vital.

Concept of Operations

The primary concept of operation for an Extreme Heat Event will focus on providing public information using multiple notification tools including press releases, websites and other mechanisms discussed later in this Plan. Dependent on the progression, duration and impact of the Excessive Heat Event, cooling center locations may be made available to community members.

Response to an Excessive Heat Event will utilize a three-phase approach based on weather information from the National Weather Service, a Stage 3 Electrical Emergency or planned rotating outage occurring during an Excessive Heat Event.

These phases are intended to provide adequate time for dissemination of information and implementation of appropriate actions. These trigger points should be reviewed and/or revised before the heat season, based on the changes from historical data compiled by the NWS, and any recommendations made by them.

Extreme Heat Events and Public Health

Characteristics that increase the risk of heat-related illnesses

Any individual, regardless of age or health status can develop heat stress if engaged in intense physical activity and/or exposed to environmental heat and humidity. If heat exposure exceeds the body's capacity to cool and the core body temperature rises, a range of heat-related symptoms and conditions can develop – from relatively minor treatable heat cramps to severe life-threatening heat stroke, which is always an extreme medical emergency. Even when people are acclimatized to the level of heat, adequate hydration is critical to avoid the development of heat-related illness.

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It is important to note that the risk of heat-related illness can increase substantially with certain meteorological conditions, demographic characteristics, social or behavioral factors and geographic location (see Table 3).

Table 3: Characteristics that increase the risk of heat-related illness

Meteorological conditions • EHE occurring earlier in the spring/summer • Exposure to hot, dry winds • Duration of the EHE
Demographic Characteristics • Age-Older adults: persons 65 years old or older • Age-Children: children ages five years and younger (including infants) • Economic constraints: persons living at or below the poverty line • Persons with pre-existing diseases or mental health conditions • Persons on certain medications
Social / Behavioral Factors • Social isolation: persons living alone, especially the elderly • Prolonged exposure to the sun • Use of alcohol
Geographic / Location Factors • Living in urban areas • Lack of air conditioners • Living in top floor apartments • Living in nursing homes/bedridden

Phases of Activation

Weather conditions in California can vary greatly from one region to another. People are acclimatized to the usual weather conditions in the climate zone they reside in; those in a desert climate tolerate heat differently than those in a coastal climate. Because of these differences, there is no “one size fits all” tool for the entire state to define what constitutes an Excessive Heat Event.

The National Weather Service defines Excessive Heat as a combination of high temperatures (significantly above normal) and high humidity. At certain levels, the human body cannot maintain proper internal temperatures and may experience heat stroke. The Heat Index is a measure of the effect of the combined elements on the body. When temperatures “spike” for two or more consecutive days without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to community members without cooling capabilities, identified health problems or fragility due to age. Therefore, the definition of excessive heat for a particular climate zone should consider both daytime maximum temperatures and nighttime maximum low temperatures.

National Weather Service Alerts and HeatRisk

The City of Chico’s weather forecasts are provided by the National Weather Service (NWS), Sacramento office. The NWS, Sacramento office issues special written products to alert the public when unusually hot weather is expected to occur in Butte County.

The NWS issues Excessive Heat Watches, Excessive Heat Warnings and Excessive Heat Advisories to warn of an extreme heat event within the next 36 hours. If NWS forecasters predict an excessive heat event beyond 36 hours, then the NWS will issue messaging in the form on a Special Weather Statement,

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partner emails and social media between the 3-7 day time frame. The NWS will use Potential HeatRisk output to determine if an Excessive Heat Watch/Warning or Heat Advisory is warranted.

The Sacramento office of the National Weather Service, using the climate-region-specific criteria, will predict an Excessive Heat Event and then issue alerts in the form of a Special Weather Statement alert based on how far in advance they are making the prediction. Specifically:

> **Excessive Heat Outlooks** are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead-time to prepare for the event.
>
> **Excessive Heat Watches** are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
>
> **Excessive Heat Advisory** is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas that are not used to dangerous heat conditions.
>
> **Excessive Heat Warning** is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas not used to extreme heat conditions.

HeatRisk

In 2017, the NWS began using the NWS Experimental HeatRisk forecast to influence the issuance of, and add value to, the NWS's official heat watches, advisories and warnings in the Western United States. The on-line tool provides daily guidance on potential heat risks out to 7 days. HeatRisk has five categories, each assigned a specific color, with the goal of alerting individuals to the level of risk based on individual demographic and behavioral characteristics. The HeatRisk tool aims to provide more comprehensive information for to allow for decisions to be made based on individual heat tolerance and situation and for appropriate actions to be taken when that level is forecast.

HeatRisk takes into consideration:

1. How significantly above normal the temperatures are at your location
2. Time of year (i.e. early season vs. typical summer heat)
3. Duration of the unusual heat, including taking into account nighttime temperatures
4. If temperatures are at levels that pose an elevated risk for heat complications

City of Chico Phases

Following the State of California's recommendations, the City of Chico has created a three-phased approach to respond to an EHE. This section describes each phase, including activation criteria and

Phase I – Seasonal Readiness

Actions are taken prior to hotter months to prepare for and maintain a state of readiness. During this phase, threshold temperatures not expected to be reached.

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Response:

- Initial notification of key stakeholders
- Review of existing plans, procedures and resources
- Verification of use/availability of key facilities
- Updating/validating notification processes
- Initiating awareness campaigns, disseminating information to public

Phase II – Heat Alert

Trigger (one or more of the following):

NWS issues an Excessive Heat Warning or Advisory indicating the following criteria:

- Dry bulb temperature of 100°F or higher for two or more consecutive days
- California Independent System Operator (CAISO) issues a Stage 3 Electrical Emergency or rotating outages during an Excessive Heat Event
- Increased reports of heat related illnesses, medical emergencies or mortality reported by local healthcare providers or other credible sources

Response:

- Activation of cooling center
- Continued monitoring of weather
- Issue press release(s)
- Provide information to public
- Consider activating call centers and/or public information lines through various county departments. If not activated, set up for rapid activation
- Increased monitoring of persons with disabilities and others with access and functional needs
- Increase surveillance of heat related illnesses/injuries
- Coordinate and pre-identify potential transportation issues
- Monitor electrical demands and any CAISO issues
- Look ahead to Phase Three activities

Phase III – Extreme Heat Event

In the case of an extreme heat event, the City will likely need to defer to the county. (Unsure how this is best stated)

Trigger (one or more of the following):

NWS issues an Excessive Heat Warning or Advisory indicating the following criteria:

  - Heat index of over 110°F (air temperature & humidity combined) or
  - High daytime air temperature greater than 115°F or
  - Night time temperatures of 80°F or more
- NWS Heat Warning/Advisory issued for more than three days
- CAISO issues a Stage 3 Electrical Emergency or rotating outages during an Excessive Heat Event
- Increased reports of heat related illnesses, medical emergencies or mortality reported by local healthcare providers or other credible sources
- Heat Emergency declaration is deemed necessary by [TBD]

Response:

- Continue to monitor weather
- Issue press release(s)
- Provide information to public
- Maintain and support the call center and/or public information hotlines
- Increased monitoring of persons with disabilities and others with access and functional needs

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- As necessary, activate cooling center(s)
- Coordinate any transportation requests to cooling centers
- Monitor electrical demands and any CAISO issues

Organization and Assignment of Responsibilities

Monitoring

[TBD] is responsible for monitoring weather information from the NWS and Excessive Heat Event conditions.

Specifically, the NWS Excessive Heat Watch, Warning, and Advisories will serve as one of the trigger points for decision-making. The experimental NWS Potential Heat Risks can be found at https://www.wrh.noaa.gov/wrh/heatrisk/?wfo=sto it gives a snapshot of current risk and a 7 day forecast.

Public Information

Information sharing and dissemination of public information is crucial during an Excessive Heat Event. [TBD] will be the lead for press releases and related health bulletins. However, multiple departments and organizations may have a role in the risk communication process.

Risk Communication priorities may include (but are not limited to):

- Assist in informing and educating the public regarding health precautions and other heat related materials.
- If warranted, provide continual updates (via press releases, news conferences etc.) on the incident to the media.
- Provide direction and instructions regarding cooling center activation, locations and operational hours.

Alert and Warning

Every extreme heat related advisory, watch or warning should be communicated to the public as soon as possible. [TBD] will be tasked with community outreach before, during and after an extreme heat event. Below are examples of several methods which could be utilized for alert and warning to ensure the widest possible dissemination of emergency communications to the public:

Emergency Mass Notification System

Code Red is the emergency mass notification system used by the county to alert the public during a disaster. Code Red is the primary notification system for all county unincorporated residents. Residents have the ability to input additional phone numbers and e-mail addresses not found in the E911 database by going to the self-registration portal at: www.buttecounty.net/massnotification

Local Media

Local media can be utilized to disperse press releases and other pertinent information to the general public.

City of Chico Website

Press releases and other information will be posted on the City of Chico website

People with Disabilities and Others with Access and Functional Needs

Language barriers must always be considered when warning messages are developed for the public. The most common non-English languages spoken in Chico are Spanish, Hmong and Chinese (source: datausa.io).

It should be requested that television stations utilize closed captioning and media crawls to provide information visually. Sign language may also be used.

Transportation

The B-Line (Butte Regional Transit) is Butte County's regional transit system that services Chico, Oroville and Paradise and provides travel between these cities. The B-line can be used to travel to identified Cool Zones or Cooling Centers.

The B-Line also offers two additional service options: Dial-a-Ride-Service and ADA Paratransit Service. These are shared-ride services that complement the B-Line fixed route bus services and offer door-to-door ambulatory and non-ambulatory transportation services.

ADA Paratransit Service is for individuals who cannot use the fixed-route system. Individuals must receive Americans with Disabilities Act (ADA) certification to use this service. This certification ensures trips are given priority status.

Dial-a-Ride-Service is available for seniors aged 70 or older with proof of age. Dial-a-Ride trips are not given priority status when individuals with ADA certification need the service.

Prior to using either service, riders must complete an application and be certified eligible and then registered by B-Line. Applications can be found online or be requested by calling (530) 809-4616.

Cooling Centers

A cooling center is a location where people can officially go to get out of the heat. It is a temporary, air-conditioned public space set up to deal with the health effects of a heat wave. A cooling center can be established at various facilities including senior and community centers, libraries and public buildings.

Pre-established points of contact should be made with each facility. Identification of services provided at the cooling centers should be taken into consideration including: accommodations for people with disabilities and others with access or functional needs, service animals, domestic pets, and operating hours. Appendix F has additional information to assist with establishing cooling centers.

When a cooling center is activated, the responsible jurisdiction shall forward this information to the Butte County OEM. The Butte County OEM disseminates cooling center information to Public Health, DESS, other jurisdictions and the Governor's Office of Emergency Services (Cal OES).

Additionally, it is common practice that a list of pre-identified cooling center not be published to any website prior to an Excessive Heat Event. While the Appendix calls for pre-identifying cooling centers, the publication of these cooling centers without confirming operation for each Excessive Heat Event can cause confusion.

Cooling Center in Chico

On February 5, 2019 Chico's City Council voted to allocate $100,000 for the city to open an emergency winter shelter. This funding was expanded to include preparation and opening of cooling centers,

funding and possible cooling center locations will need to be examined again before the 2020 summer season.

The 2019 Cooling Center is being handled by the Jesus Center, a local non-profit organization.

The Jesus Center
1297 Park Ave.
Chico, CA 95928
(530) 345-2640
Hours: 10am – 9pm

Trigger (2019): Dry bulb temp. of more than 100°F for two or more consecutive days

Cooling Shelter

Similar to a cooling center, a cooling shelter is a location where people can remain overnight. Because average nighttime temperatures are increasing faster than daytime temperatures, a cooling shelter provides a place where the body can recover by cooling off at night.

Currently, the City of Chico does not have any cooling shelters identified that will be open to the public overnight. There are privately run facilities that house people overnight, however they are limited in scope and space and are not open to the public on an as-needed basis.

Cool Zones

A Cool Zone is a location for residents to get out of the heat to let their body cool down. A Cool Zone does not offer snacks, water or other services, only air-conditioned facilities open during normal business hours.

Location	Hours
Chico Public Library 1108 Sherman Ave. Bus route: 4	Tuesday – Thursday, 10am – 6pm Friday – Saturday, 10am – 5pm Sunday, 1pm – 5pm
Chico Mall 1950 E. 20th St. Bus routes: 5, 14, 17, 20, 40/41	Monday – Saturday, 10am – 9pm Sunday, 11am – 6pm

Schools and Chico Unified School District

Schools should follow their pre-established emergency plans for after school or athletic activities. Based on information received, recommendation to cancel, change or move forward with activities or school events lies solely with the School District.

Historically, most heat events have been during summer months while the school district and local universities are not in session. Cal-Adapt projections show that the length of the extreme heat season is beginning to expand, with higher temperatures beginning earlier in the spring and lasting later into the fall.

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Chico Unified School District (CUSD) does not currently have any extreme heat plan. Historically, excessive heat days have occurred outside of the CUSD regular school year.

Institutions of Higher Education

California State University, Chico recognizes the need for preparation for extreme heat events and is currently in the process of preparing to prepare a plan. The university currently works closely with Chico Fire to prepare for emergency event situations as well as with the university's Communication Office to get alerts out to CSU Chico students.

One issue to be considered is how much collaboration Butte College and CSU Chico would be able to have to coordinate events like opening of cooling centers. Any heat plan that CSU Chico decides to create would be added as an annex to their Emergency Operations Plan.

Recovery

Emergency costs carried by local governments in response to an Excessive Heat Event may be recovered under the California Disaster Assistance Act (CDAA), when the Governor has proclaimed a State of Emergency and approved the eligibility for CDAA funding. The City of Chico would have to demonstrate response to this event was far beyond its response and recovery capabilities.

Eligible costs may include the extra costs of establishing cooling centers, staffing EOCs, renting generators and air conditioners for the emergency cooling effort, emergency public information costs, heat emergency related morgue costs, and overtime costs for police and fire/rescue activities related to the Excessive Heat Event. Additionally, publicly owned infrastructure can be repaired if damaged by the Excessive Heat Event. This includes damaged transformers and other electrical equipment owned by a public utility. It also includes buckled local (non-federal) roads, buckled public rails, and other transportation systems damaged by the Excessive Heat Event.

If the response and repair costs meet certain federal guidelines, the Federal Emergency Management Agency (FEMA) may process a Presidential Declaration of Emergency, opening up federal funds for these same applications under the Stafford Act. The Federal Emergency Repair Program of Federal Highways Administration may be independently activated so highways in the federal aid system can be covered for buckling damage.

Under the U.S. Department of Agriculture, aid can be provided to agricultural businesses for loss of livestock and other business losses.

The U.S. Small Business Administration (SBA) provides assistance through low interest disaster loans to homeowners, renters, businesses, and private nonprofit organizations to repair or replace real estate, personal property, machinery, equipment, inventory and business assets not covered by insurance which were damaged or destroyed during a Presidentially declared disaster.

Administration and Plan Maintenance

This Appendix will be reviewed every year and may be revised before the beginning of the heat season (primarily summer months June – September).

Authorities and References

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California Government Code Section (within the Emergency Services Act, Chapter 7, Division 1, Title 2):

- §8630(a): A local emergency may be proclaimed only by the governing body of a city, county, or city and county, or by an official designated by ordinance adopted by that governing body.

- §8558(c): "Local emergency" means the duly proclaimed existence of conditions of disaster or of excessive peril to the safety of persons and property within the territorial limits of a county, city and county, or city caused by such conditions as air pollution, fire, flood, storm, epidemic, riot, drought, sudden and severe energy shortage, plant or animal infestation or disease, the Governor's warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy, which are or are likely to be beyond the control of the services, personnel, equipment, and facilities of that political subdivision and require the combined forces of other political subdivisions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission.

It is possible to proclaim a local emergency for health-related reasons.

- §8625: Gives Governor the authority to proclaim "state of emergency" when requested by local jurisdiction or when he finds local authority is inadequate to cope with emergency.

California Health and Safety Code Section:

- §101040: Authority to take preventive measures during emergency.
  (a) The local health officer may take any preventive measure that may be necessary to protect and preserve the public health from any public health hazard during any "state of war emergency," "state of emergency," or "local emergency," as defined by Section §8558 of the Government Code, within his or her jurisdiction.
  (b) "Preventive measure" means abatement, correction, removal or any other protective step that may be taken against any public health hazard that is caused by a disaster and affects the public health….
  (c) The local Health Officer, upon consent of the County Board of Supervisors or a city governing body, may certify any public health hazard resulting from any disaster condition if certification is required for any federal or state disaster relief program.

California Government Code §8588.15

This Government Code requires the incorporation of the Disability Community into the California Standardized Emergency Management System (SEMS) via representatives on the SEMS Committees and the SEMS Technical Working Group. Within the Standardized Emergency Management System structure, the State secretary shall ensure, to the extent practicable, that the needs of the disabled community are met by ensuring all committee recommendations regarding preparedness, planning, and procedures relating to emergencies include the needs of people with disabilities.

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Appendix A: Heat Index Readings and Associated Health Risks

The heat index is also known as the apparent temperature, often referred to as “feels like” by weather sites. It is what temperature feels like to the human body when relative humidity and air temperature are combined.

When the body gets too hot it will begin to perspire or sweat to cool itself off. Evaporation is a cooling process, and when the sweat is evaporated off the body it effectively reduces the body’s temperature. If the sweat is not able to evaporate, the body cannot regulate its temperature. When the atmospheric moisture content (relative humidity) is high, the rate of perspiration from the body decreases. This results in the body feeling warmer in humid conditions. When the relative humidity decreases the rate of perspiration increases, so the body actually feels cooler in arid conditions.

Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15°F. Additionally, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Temperature (°F) \ Relative Humidity (%)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
80	77	78	78	79	79	79	80	80	80	81	81	82	82	83	84	84	85	86	86	87
81	78	79	79	79	79	80	80	81	81	82	82	83	84	85	86	86	87	88	90	91
82	79	79	80	80	80	80	81	81	82	83	84	84	85	86	88	89	90	91	93	95
83	79	80	80	81	81	81	82	82	83	84	85	86	87	88	90	91	93	95	97	99
84	80	81	81	81	82	82	83	83	84	85	86	88	89	90	92	94	96	98	100	103
85	81	81	82	82	82	83	84	84	85	86	88	89	91	93	95	97	99	102	104	107
86	81	82	83	83	83	84	85	85	87	88	89	91	93	95	97	100	102	105	108	112
87	82	83	83	84	84	85	86	87	88	89	91	93	95	98	100	103	106	109	113	116
88	83	84	84	85	85	86	87	88	89	91	93	95	98	100	103	106	110	113	117	121
89	84	84	85	85	86	87	88	89	91	93	95	97	100	103	106	110	113	117	122	
90	84	85	86	86	87	88	89	91	92	95	97	100	103	106	109	113	117	122	127	
91	85	86	87	87	88	89	90	92	94	97	99	102	105	109	113	117	122	126	132	
92	86	87	88	88	89	90	92	94	96	99	101	105	108	112	116	121	126	131		
93	87	88	89	89	90	92	93	95	98	101	104	107	111	116	120	125	130	136		
94	87	89	90	90	91	93	95	97	100	103	106	110	114	119	124	129	135	141		
95	88	89	91	91	93	94	96	99	102	105	109	113	118	123	128	134	140			
96	89	90	92	93	94	96	98	101	104	108	112	116	121	126	132	138	145			
97	90	91	93	94	95	97	100	103	106	110	114	119	125	130	136	143	150			
98	91	92	94	95	97	99	102	105	109	113	117	123	128	134	141	148				
99	92	93	95	96	98	101	104	107	111	115	120	126	132	138	145	153				
100	93	94	96	97	100	102	106	109	114	118	124	129	136	143	150	158				
101	93	95	97	99	101	104	108	112	116	121	127	133	140	147	155					
102	94	96	98	100	103	106	110	114	119	124	130	137	144	152	160					
103	95	97	99	101	104	108	112	116	122	127	134	141	148	157	165					
104	96	98	100	103	106	110	114	119	124	131	137	145	153	161						
105	97	99	102	104	108	112	116	121	127	134	141	149	157	166						
106	98	100	103	106	109	114	119	124	130	137	145	153	162	172						
107	99	101	104	107	111	116	121	127	134	141	149	157	167							
108	100	102	105	109	113	118	123	130	137	144	153	162	172							
109	100	103	107	110	115	120	126	133	140	148	157	167	177							
110	101	104	108	112	117	122	129	136	143	152	161	171								
111	102	106	109	114	119	125	131	139	147	156	166	176								
112	104	107	111	115	121	127	134	142	150	160	170	181								
113	104	108	112	117	123	129	137	145	154	164	175									
114	105	109	113	119	125	132	140	148	158	168	179									
115	106	110	115	121	127	134	143	152	162	173	184									
116	107	111	116	122	129	137	146	155	166	177										
117	108	112	118	124	132	140	149	159	170	181										
118	108	113	119	126	134	142	152	162	174	186										
119	109	114	121	128	136	145	155	166	178											
120	110	116	122	130	138	148	158	170	182											
121	111	117	124	132	141	151	162	174	187											
122	111	118	125	134	143	154	165	178												
123	112	119	127	136	146	157	169	182												
124	113	120	129	138	148	160	172													
125	114	121	130	140	151	163	176													

Heat Index

Extreme Danger	Heat stroke likely.
Danger	Sunstroke, musde cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	Sunstroke, musde cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	Fatigue possible with prolonged exposure and/or physical activity.

Appendix B: Heat Related Health Risks and Recommended Responses

https://www.cdc.gov/disasters/extremeheat/warning.html#text

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It is the body's response to an excessive loss of the water and salt contained in sweat. Those most prone to heat exhaustion are elderly people, people with high blood pressure, and people working or exercising in a hot environment.

WHAT TO LOOK FOR

- Heavy sweating
- Cold, pale, and clammy (moist) skin
- Fast and shallow breathing
- Fast, weak pulse
- Nausea or vomiting
- Muscle cramps
- Tiredness or weakness
- Dizziness
- Headache
- Fainting (passing out)

WHAT TO DO

- Move to a cool place
- Loosen your clothes
- Put cool, wet cloths on your body or take a cool bath or shower
- Sip water
- If possible, move to an air-conditioned environment

Get medical help right away if:

- You are throwing up
- Your symptoms get worse
- Your symptoms last longer than 1 hour

If heat exhaustion is untreated it may progress to heat stroke.

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

WHAT TO LOOK FOR

- High body temperature (103°F or higher)
- Hot, red, dry, or damp skin
- Fast, strong pulse
- Headache
- Dizziness
- Nausea
- Confusion

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- Losing consciousness (passing out)

WHAT TO DO

- Call 911 right away-heat stroke is a medical emergency
- Move the person to a cooler place, use any available methods to cool the person
- Help lower the person's temperature with cool cloths or a cool bath
- Do not give the person anything to drink

The person should be cooled rapidly using whatever methods you can. For example, immerse them in a tub of cool water; place the person in a cool shower; spray them with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the person in a cool, wet sheet and fan him/her vigorously.

Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the person on his/her side.

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Health Risks Attributable to EHE Conditions

Condition	Symptom(s)	Causes	Safety Tips
Heat rash	• Red clusters of pimples • Blisters • Itching • Red rash on the skin, usually occurs on the neck, chest, breast and/or groin	• Blockage of sweat ducts	Remove the affected person from heat. Minimize exposure of skin to sun. Keep the affected area dry. Seek medical attention if rash does not improve.
Heat edema	• Swelling in the ankles, feet and hands • Body temperature normal or core temperature up to 104°F	• Occurs in persons who are not acclimatized to heat • Increased blood flow to the skin in limbs	Elevate and apply compressive stockings to the affected limbs.
Heat tetany	• Respiratory problems, such as difficulty breathing • Muscular problems, including spasms or numbness or tingling of muscles • Body temperature normal or core temperature up to 104°F	• Hyperventilation • Respiratory alkalosis	Remove the affected person from the heat and advise the person to breathe slowly.
Heat cramps	• Muscle spasms • Muscles usually affected include the abdomen, calf, thighs and shoulder muscles • Body temperature normal or core temperature up to 104°F	• Drinking liquid without electrolytes • Dehydration • Electrolyte deficiency	Stop all activities, relocate to cool location, rest and drink electrolyte containing fluids. Seek medical attention if symptoms persist.
Heat syncope	• Dizziness • Fainting • Body temperature normal or elevated temperature up to 104°F	• Increased blood flow to the skin resulting in decreased blood flow to the central nervous system	Lay the affected person gently on the floor and provide lots of fluid. Seek medical attention.
Heat exhaustion	• Profuse sweating • Weakness • Rapid breathing • Dizziness • Nausea/vomiting • Muscle cramps • Normal mentation • Body temperature normal or core temperature up to 104°F	• Drinking liquid without electrolytes • Dehydration • Electrolyte deficiency	Stop all activities, relocate to a cool location, rest and drink electrolyte containing fluids. It can be difficult to determine if someone has heat stroke and not exhaustion. If symptoms do not improve quickly, or unable to orally rehydrate, seek medical attention.
Heat stroke This is a life-threatening condition	• Oral body temperature of 104°F and above • Often sudden onset of symptoms • Confusion or loss of consciousness • Rapid and strong pulse • Hot, red and dry skin • Headache • Dizziness • Nausea/vomiting	• Profound dehydration • Profound electrolyte deficiency • Body is unable to maintain heat through the skin • Normal regulation of body temperature is no longer intact • Mortality can be as high as 50%	Call 911 immediately if you see anyone with these symptoms and a body temperature of 104°F and above. While waiting for first responders, the affected person should be taken to a cool shady area. Cool the person with immersion in cool water, spray the person with cool water while fanning vigorously, or place ice packs on neck, axilla and groin. The person is unlikely to be able to tolerate oral fluids.

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Appendix C: Animal Vulnerabilities during Excessive Heat Events

Pets:
Dogs and cats are designed to conserve heat and are less efficient at cooling than humans. They are in danger of heat stroke at 110 °F. Pets' sweat glands are located on the nose and footpads, which are inadequate for cooling on hot days. Panting and drinking water help cooling, but if the air temperature is overheated, brain and organ damage can occur in 15 minutes. Risk factors to heat stress include body size, age (young and old), breed (short nosed breeds, such as bulldogs), obesity, and existing metabolic, cardiovascular or respiratory disease.

Facts:
Car with window rolled down slightly combined with windows collecting light, trapping heat inside equals pressure cooker effect:

<u>Outside air = 85 ° F</u>

- After 10 minutes: inside car = 102 °F
- After 30 minutes: inside car = 120 °F

<u>Outside air = 72 ° Fahrenheit + humidity</u>

- After 30 minutes: inside car = 104 °F
- After 60 minutes: inside car = 112 °F

Prevention:

- Never leave pets in a car on warm days
- Call animal control or police immediately if an animal is in distress in a car
- Be alert for any sign of heat stress: heavy panting, glazed eyes, a rapid pulse, unsteadiness, a staggering gait, vomiting, deep red or purple tongue
- Never leave pets tied up without shade, air circulation, and fresh water
- Offer a cool place to rest when temperatures are uncomfortable
- If you are going to take advantage of a local Cooling Center and feel the need to bring your pet, always call ahead to find out if they are able to accept pets and what preparations are necessary (i.e., leash for dog, cage for cats, etc.)

Treatment:

- Overheated pets must be cooled immediately
- Move pet to shade
- Apply cool water all over body
- Apply ice packs to neck and chest area
- Allow licking ice and small amount of water (large amount will cause vomiting)
- Take to veterinarian immediately for evaluation

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Appendix D: PG&E and Possible Power Outages

In 2019, PG&E began expanding their Community Wildfire Safety Program to reduce wildfire risks, which included expanding the Public Safety Power Shutoff (PSPS) Program to include all electric lines that pass through high fire-threat areas, this includes both distribution and transmission lines. Because PG&E is working to provide spaces for residents to remain cool during these power outages (see Community Resource Centers section), a PG&E power outage does not trigger a phased response from the City.

It is important to note that while customers in high fire-threat areas are more likely to be impacted, all PG&E customers are subject to power cuts if the community relies on a line that passes through a high fire-threat area. Therefore, areas don't have to be directly impacted by severe weather to be placed in a Public Safety Power Shutoff.

Public Safety Power Shutoff Criteria

While there is no single specific criteria to trigger a Public Safety Power Shutoff, some factors include:

- A red flag warning declared by the National Weather Service
- Low humidity levels – generally 20% and below
- Forecasted sustained winds generally above 25 MPH and wind gusts in excess of approximately 45 MPH, depending on location and site-specific conditions such as temperature, terrain and local climate
- Condition of dry furl on the ground and moisture content of live vegetation
- On-the-ground, real-time observations from PG&E's WSOC and field observations from PG&E crews

Protocol for Public Safety Power Shutoffs

PG&E lists the following steps as their current protocol for PSPS events.

1. Warning Notification
2. Ongoing Updates
3. Safety Inspections
    - After the threatening weather has passed, power lines in affected areas will be inspected before power can be safely restored
4. Power Restoration
    - Power outages may last multiple days depending on the severity of weather and the time needed for inspection

Community Resource Centers

Beginning in May of 2019, PG&E began a Community Resource Center program. These centers are designed to provide residents with a location to meet their basic power needs if a PSPS is required.

PG&E plans to utilize both indoor and outdoor locations, with indoor facilities being preferred when possible. Indoor facilities will either have a backup generator or will be able to accept it (i.e., retrofitted with a manual transfer switch). Possible outdoor locations include parking lots and recreation sites where pop-up tents can be deployed. These locations will include security, traffic control. All locations will include access to restrooms, hand washing stations, water, charging stations and Wi-Fi access where possible.

Note: Plans for PG&E's Community Resource Centers have not been in any way finalized and this portion of the plan will be updated as details are finalized.

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Appendix E: The Electrical Grid and CAISO

Electric power capability and transmission grid is impacted by the increased loads resulting from heat events. The California Independent System Operator (CAISO) is tasked with managing about 80 percent of the California electrical grid that supplies most of California, except in areas serviced by municipal utilities.

Alerts

CAISO employs a series of Alerts based on electrical power demand and supply/reserve forecasts. The alerts are:

- Stage 1 - When the reserve margin falls below 7%
- Stage 2 - When the reserve margin falls below 5%
- Stage 3 - When the reserve margin falls below 1.5%

  **Rotating outages will occur when Stage 3 is reached.

Electric Power Load Shedding

When the power system is under excessive stress due to heavy demand and/or failure of critical components, it is sometime necessary to intentionally interrupt the service to selected customers to prevent the entire system from collapsing. In such cases, customer service (or load) is cut, sometimes with little or no warning. One form of load shedding called a "rotating outage" involves cutting service to selected customers for a predetermined period (usually not more than one and a half hours). As power is restored to one block of customers, power to another block of customers is interrupted to reduce the overall load on the system.

Exemptions from rotating outages in communities served by utilities regulated by the CPUC

Mandated under California Public Utilities Commission (CPUC) Decision 02-04-060, 4/25/02, essential facilities who volunteer to use their facilities as a public "cooling station" are exempt from rotating power outages. This regulation only applies to communities that are serviced by utilities regulated by the CPUC such as Southern California Edison, Pacific Gas and Electric Company, and San Diego Gas and Electric.

Undefined "cooling centers" are not covered by this rule and are not exempt from rotating power outages; however, Cal EMA may request an exception from the utilities through CUEA. There are no commonly defined criteria for cooling centers.

Notifications

Utilities generally rely on media releases to inform the public of electric power disruptions. Ongoing emergency coordination between city and county emergency managers and utility providers could enhance advance notification of electric disruptions and restoration coordination.

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Appendix F: Suggested Cooling Center Checklist

The following is a suggested list of important criteria for setting up a cooling center. There are **no established** criteria for cooling centers. Additionally, **facilities used as cooling centers are not exempt from rotating outages**.

Important Criteria

- Air conditioning or equivalent (temperature maintained at 79°F)
- Accessible to all / ADA compliant
- Ample seating appropriate to the jurisdiction
- Public restrooms accessible to people with disabilities and others with access and functional needs
- Access to potable water (drinking fountain, etc.)
- Access to 911 services
- Publicly advertised
- Parking access
- Proximity to public transit

Suggested Criteria

- Back-up generators
- Secure, facility has security service
- Communications, phone (including TDD/TTY/video capabilities), internet access, sign-language interpreters
- Child friendly with materials for children to play with while at the cooling center
- Medical Personnel such as nurses and/or aides
- 24 hour, 7 days a week operation
- Large capacity
- Personal assistance services for people with disabilities and others with access and functional needs
- Available televisions, books, games
- Transportation for those lacking their own, including wheelchair accessible services
- Follow-up procedures for those in need of additional services (health care, social services, etc.)
- Area for pets
- Veterinary resources available if needed

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