

ANNEX K: HAZARD SPECIFIC PROCEDURES

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A. FLOOD

General Situation

Floods are generally classed as slow rising or flash floods. Slow-rise floods may be preceded by a warning time lasting from hours, to days, or possibly weeks. Evacuation and sandbagging for a slow-rise flood may lessen flood-related damage. Conversely, flash floods are the most difficult to prepare for, due to extremely short warning time, if any is given at all. Flash flood warnings may require immediate evacuation within the hour.

Once flooding begins, personnel may be needed to assist with evacuations, rescues, securing utilities, flood protection, cordoning off flood areas and controlling traffic.

Glenn County Situation

Floodwaters are a common occurrence for communities adjacent to and in the lowlands of creeks and rivers in Glenn County. Normally, wintertime storm floodwaters are kept within defined limits by levees, dykes, and open lowlands, causing little to no damage. Dams including Black Butte, Stony Gorge, and Shasta also help control floodwaters. But, occasionally, a combination of frequent storms, extended heavy rain, and melting snow results in floodwaters exceeding normal high-water boundaries and causing damage.

Major Rivers, Creeks, and Canals

River

Sacramento River

Creeks

Brisco Creek, Butte Creek, Elk Creek, French Creek, Grindstone Creek, Hambright Creek, Hamilton Creek, Logan Creek, Stony Creek, Walker Creek, Wilson Creek, Willow Creek

Canals

Glenn-Colusa Canal

Tehama-Colusa Canal

Dams

There are three large dams in Glenn County and two dams that impact Glenn County directly or indirectly. See Hazard Section – Dam for more information

Flood History

A number of areas in Glenn County have a long history of seasonal flooding, often resulting in significant damage. Floodwaters are a common occurrence for communities adjacent to and in the lowlands of creeks and rivers. Normally, wintertime storm floodwaters are kept within defined limits by levees, dykes, and open lowlands, causing little to no damage. Dams including Black Butte, Stony Gorge, and Shasta also help control floodwaters. But, occasionally, a combination of frequent storms, extended heavy rain, and melting snow results in floodwaters exceeding normal high-water boundaries and causing damage.

Over the past 60 years, Glenn County has experienced numerous natural disasters. Most recent major storm events occurred in the county in January 1997, March 1998, February and March 2000, December 2014, February 2015, February 2017, and February 2019. The storms of 1997, 2017, and 2019 resulted in a Federal Major Disaster Declaration by the President.

Hydrology:

The portion of the Sacramento Valley that comprises the Colusa Sub-basin is bounded on the east by the Sacramento River, on the west by the Coast Range and foothills, on the south by Cache Creek, and on the north by Stony Creek. Annual precipitation ranges from 17- to 27-inches with higher precipitation occurring to the west. The Stony Creek Fan occupies the northern extent of the sub-basin and extends from Black Butte Reservoir to the City of Willows, northeast from the City of Willows to the Sacramento River, and north beyond the Tehama County line.

Creeks and Streams

Stony Creek:

Stony Creek is also known for variability in water flow as well as flash flows through communities downstream. Black Butte is fed by Upper Stony Creek. Lower Stony Creek is a designated floodway for releases from Black Butte Reservoir. Flooding on Stony Creek can occur with heavy rain and discharges.

Releases from Black Butte Dam into Stony Creek create rapid rise. Releases of 8,000 to 10,000 CFS will result in minor flooding, impacting roadways. While releases of 12,000 to 15,000 CFS will result in moderate flooding, bank erosion and instability. Flooding and erosion has occurred with 12,000 CFS releases from Black Butte in 2019. At 15,000 CFS, Stony Creek should be heavily monitored for flood risk.

Strong localized rainfall events will cause streams and creeks (Willow, Wilson, Walker, Hambright, Stony creeks) originating in the Coastal Range to overflow causing extensive flooding of areas on the west side. Such flooding does not normally close all roads from the west simultaneously but rather some will begin to open as others close, following the water flow into the basin.

The City of Willows has a mean annual rainfall of approximately 19 inches. Storms of 100-year frequency in the area from the south fork Willows Creek and Wilson Creek will pond north of the city limits and then flows south along Highway 99 and southeast along Willow Creek. The 100-year frequency flows from south fork Willows Creek, Wilson Creek, and Walker Creek will also pond behind the levee of the Glenn Colusa Canal northeast of the City and flow southward, causing flooding between Ventura Street to the west, the Glenn Colusa Canal on the east, and Walnut Street on the south.

Significant roadway impacts have occurred during strong winter storms on 2019, 2017, and 1997-98. In 2017 and 2019, the county experienced several storm systems that brought heavy rains and lead to more than 40 road closures including primary road systems of SR 162 (multiple locations east and west of I-5), County Rd 99 W, County Rd 39, and Ord Ferry/County Rd 32. Interstate 5 was closed south at Maxwell and north at Corning in 2017 and 2019, as well as experienced flooding north of Willows. Interstate 5 has closed once north of Willows during the 1997 storms.

Sacramento River at J Levee

Sacramento River water elevations are primarily governed by releases from upstream dams with some modification from localized rainfall events. Intense rainfall accompanied by high releases from upstream dams (Shasta and Keswick) can cause the Sacramento River to reach flood elevations. Water elevations which exceed **monitor stage** (142 ft) at Hamilton City put stress on the existing J Levee and can cause bank erosion on the northern section manager (managed by Reclamation District 2140). When water reaches **flood stage** (147 ft) at Hamilton City, erosion may impact the northern section. The mid-section of the J Levee, located at Irvine Finch State Park, will see water rise above the first embankment and put stress on the levee. This section of the levee has been covered with wave wash protection to limit erosion. Additionally water will release to the east into Butte County. Water will pool in orchards and Pine Creek at this time but typically does not impact SR 32. The lower section of the J levee system has been recently replaced. This section has a system of dikes to relieve pressure on the levee and allow for outflow into the flood management basin. Significant water will enter the basin between monitor and flood stage. The Park entrance on County Rd 23 will likely flood and close.

Danger Stage – Significant releases from Shasta and Keswick Dams accompanied with rainfall may cause the Sacramento River to exceed Flood Stage and enter Danger Stage (149 ft). At this stage, significant pressure is exerted on the levee system. Water will rise significantly on the eastside of the river in Butte County and water begin to encroach on SR 32, closure is likely at this stage. Closure of SR 32 occurred during the 1997 storms. SR 32 experienced minor flooding in 2017 and 2019 but did not close.

Sacramento River at Ord Ferry

Monitor Stage occurs at 110 ft and Flood Stage at 114 ft at this location. As the river rises to exceed Monitor Stage at the Ord Ferry Gauge, flows will commence over the relief structures, causing significant flooding to the east into Butte County. This flow will move around the north end of the Levee District 3 levee and then to the southeast along and on either side of Angel Slough to the lower end of Butte Creek. This flood flow often closes all ground access east to that District and to Butte County via Ord Ferry Road/County Road 32.

Topography:

In general, ground elevation for the entire length of Levee Districts 1, 2, and 3 falls away from either side of the Sacramento River to the southwest toward the Colusa Drain basin on the right (west) bank and to the southeast toward the Butte Sink on the left (east) bank. Flood waters from a breach in Sacramento River levees will flow generally southwest or southeast respectively toward these basins rather than along the river.

An exception to the above statement is at the north end of Levee District 1 where the ground falls toward the river necessitating several levee penetrations to allow ground water buildup behind the northern section of the District levee to gravity flow into the River. Otherwise, the developed agricultural land behind the Levee District 1, and 2 has a complex network of ditches, canals, and sloughs to carry irrigation tail water, normal runoff and flood runoff from west side creeks and streams to the south toward the Colusa Drain. A similar network on developed agricultural land in LD3 carries irrigation tail water and normal runoff to the southeast toward Angel Slough.

The three principal population centers in or near the Levee Districts; the Town of Glenn, the Town of Butte City, and the Town of Princeton are located on higher ground and would be directly affected by flood flows only by a levee breach in their immediate vicinity.

Reclamation District 2140 (J Levee system) resides in the north eastern section of the county, north and south of Hamilton City. The water flows to the east and into Butte County in this area. Hamilton City would be directly impacted should a breach occur on the northern or mid-section (Irvine Finch area) of RD 2140 levee system.

Sacramento River Flood Stage Levels

In October 2019, Department of Water Resources will make an adjustment to the Gage Datum along the Sacramento River. This adjustment will impact only one gage in Glenn County, the gage at Hamilton City. The primary elevations listed for Hamilton City below are adjusted to reflect this new data. The historical gage elevation for each stage is listed to the side for use in comparing historical data. Although the Gage

reading will change in 2019, the physical level of the water will not change. The amount of water to get to flood stage will remain the same and will continue to impact as it did previously.

SACRAMENTO RIVER AT HAMILTON CITY

- **Monitor Stage: 142.0 ft** (143 Ft prior 10/2019)
- **Flood Stage: 147.0 ft** (148 Ft prior 10/2019)
- **Danger Stage: 149 ft** (150 ft prior 10/2019)
- **Major Flood Stage: 150 ft** (151 ft prior 10/2019)

Historical Crests

- (1) 150.92 ft on 1/02/1997
 - (2) 150.80 ft on 1/24/1970
 - (3) 150.77 ft on 03/01/1983
 - (4) 150.65 ft on 1/10/1995
 - (5) 150.53 ft on 2/18/1986
 - (6) 149.3 ft on 2/19/2017
- * 148.3 ft on 2/27/2019 (added for reference)

SACRAMENTO RIVER AT ORD FERRY

- **Monitor Stage: 110.0 FT**
- **Flood Stage: 114.0 FT**
- **Danger Stage: 122.6 FT**

Historical Crests

- (1) 120.10 ft on 2/25/1958
- (2) 119.79 ft on 1/24/1970
- (3) 118.66 ft on 1/2/1997
- (4) 118.4 ft on 1/16/1974
- (5) 118.3 ft on 2/19/1986

Recent

- 117 ft on 2/19/2017
- 116 ft on 2/28/2019

SACRAMENTO RIVER AT BUTTE CITY

- **Monitor Stage: 89.0 FT**
- **Flood Stage: 97.2 FT**
- **Danger Stage: 98.2 FT**

Historical Crests

- (1) 96.87 ft on 02/07/1942
- (2) 96.70 ft on 02/20/1958
- (3) 95.89 ft on 03/02/1983
- (4) 95.17 ft on 02/12/1941
- (5) 95.15 ft on 02/04/1998

Recent

92.47 ft on 2/19/2017

91 ft on 2/28/2019

Flood Risk

Source - Cal-OES - Northern CA Catastrophic Flood Response Plan

Glenn	Total	# in 100 Yr	% in 100 Yr	# In 500 Yr	% in 500 Yr	# Exposed	% Exposed	# Out of Flood Zone	% Out of Flood Zone
2015 Total Population	28,864	4,517	15.65%	5,532	19.17%	10,049	34.81%	18,815	65.19%
2015 Total Households	10,040	1,505	14.99%	1,220	12.15%	2,725	27.14%	7,315	72.86%
2015 Vacant Households	1,049	170	16.21%	132	12.58%	302	28.79%	747	71.21%
Number of Businesses	1,236	233	18.85%	268	21.68%	501	40.53%	735	59.47%
Unemployed (Age 16+)	837	152	18.16%	179	21.39%	331	39.55%	506	60.45%

River Stage Definitions

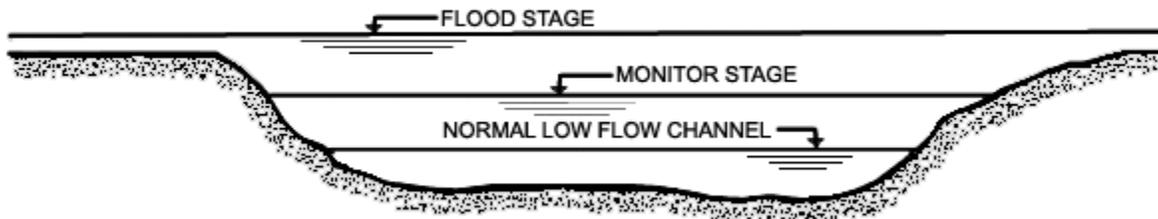
These definitions are used by the California Department of Water Resources (DWR) Flood Center in Sacramento in correspondence and alerts provided to local governments and posted on the California Data Exchange Center (CDEC) and National Oceanic and Atmospheric Administration (NOAA) Webpages.

Non-Leveed Stream Stage Definitions

MONITOR STAGE - The Stage at which initial action must be taken by concerned interests (livestock warning, removal of equipment from lowest overflow areas, or simply general surveillance of the situation). This level may produce over-bank flows sufficient to cause minor flooding of low-lying lands and local roads.

FLOOD STAGE - The Stage at which over-bank flows are of sufficient magnitude to cause considerable inundation of land and roads and/or threat of significant hazard to life and property.

CROSS SECTION - TYPICAL NON-LEVEEED STREAM



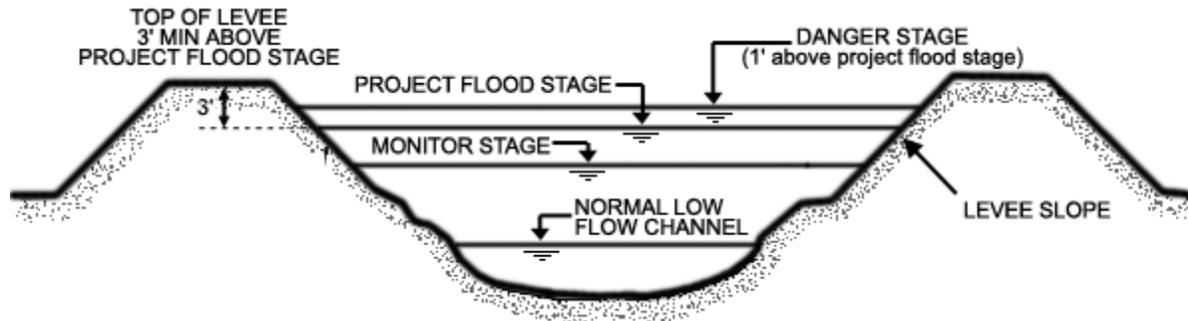
Leveed Stream Stage Definitions

MONITOR STAGE - The Stage at which patrol of flood control project levees by the responsible levee maintaining agency becomes mandatory, or the Stage at which flow occurs into bypass areas from project overflow weirs.

PROJECT FLOOD STAGE - The Stage at which the flow in a flood control project is at maximum design capacity (U.S. Corps of Engineers "Project Flood Plane"). At this level there is a minimum freeboard of 3 feet to the top of levees.

DANGER STAGE - The Stage at which the flow in a flood control project is greater than maximum design capacity and where there is extreme danger with threat of significant hazard to life and property in the event of levee failure. This is generally 1 foot above project flood stage.

CROSS SECTION-TYPICAL LEVEED STREAM



Emergency Readiness Stages

Every year flooding results in the loss of life and causes millions of dollars of damage to property. Except in the case of flash flooding, the onset of most floods is a relatively slow process with a buildup period of several days. This buildup period provides an opportunity for emergency responders to reduce the damage that the flooding will cause.

A slow-rise flood situation could evolve through a series of four stages. Emergency actions will be based on the four stages of response actions:

- Stage 1 – Planning & Preparation (Incoming storms, flooding possible)
- Stage 2 - Monitor Stage (High water levels)
- Stage 3 – Emergency Stage (Flood Stage)
- Stage 4 – Danger Stage (Extensive flooding is imminent)

Weather, Water, and Flood Forecasting Resources

Primary

- **California Data Exchange Center (CDEC)**
 - River forecasts, reservoir capacity and releases, river stages, precipitation, etc.
 - <http://cdec.water.ca.gov/river/rivcond.html>
- **California Nevada River Forecast Center (CNRFC)**
 - Monitor river levels and forecasts
 - <https://www.cnrfc.noaa.gov/>
- **National Weather Service Advanced Hydrologic Prediction Center**
 - River observations, forecasts, and long range flood risk predictions
 - <https://water.weather.gov/ahps2/index.php?wfo=sto>
- **National Weather Service**
 - Weather forecasts, risk maps, etc.
 - www.weather.gov
- **Flood Emergency Response Information Exchange (FERIX)**
 - <http://ferix.water.ca.gov>
- **DWR Levee Flood Protection Zone maps**
 - <http://gis.lfpz.water.ca.gov/lfpz/>
- **FEMA Flood Map Service Center**
 - <https://msc.fema.gov/portal/home>

Secondary

- **DWR Best Available Maps (BAM)**
 - <http://gis.bam.water.ca.gov/bam/>
- **US Army Corp of Engineers (USACE) Water Control Data System:**
 - <http://spk-wc.usace.army.mil/plots/california.html>
- **USGS National Water Information System Mapper**
 - www.maps.waterdata.usgs.gov/mapper/index.html?state=ca
- **National Flood Insurance Program**
 - www.floodsmart.gov/floodsmart
- **Center for Ocean-Lan Atmosphere Studies, Weather and climate data**
 - <http://wxmaps.org>

Local and Regional Flood Plans

- Northern California Catastrophic Flood Response Plan
 - The NCCFRP provides a framework outlining how local, state, and federal governments will respond and coordinate in anticipation of and following a catastrophic flood event, with emphasis on impacts to the Sacramento-San Joaquin Delta. This framework has structured objectives that enable a phased response approach to meet the needs of the affected communities. The plan focuses on establishing response organizations with the readiness to act in support of affected communities.
- Mid Upper Sacramento River Flood Project
 - Unified Flood Fight Command System Operations Manual
 - Glenn County - Hamilton City – J Levee Joint Operational Plan
 - Levee Districts 1, 2, 3 Joint Flood Safety Plan

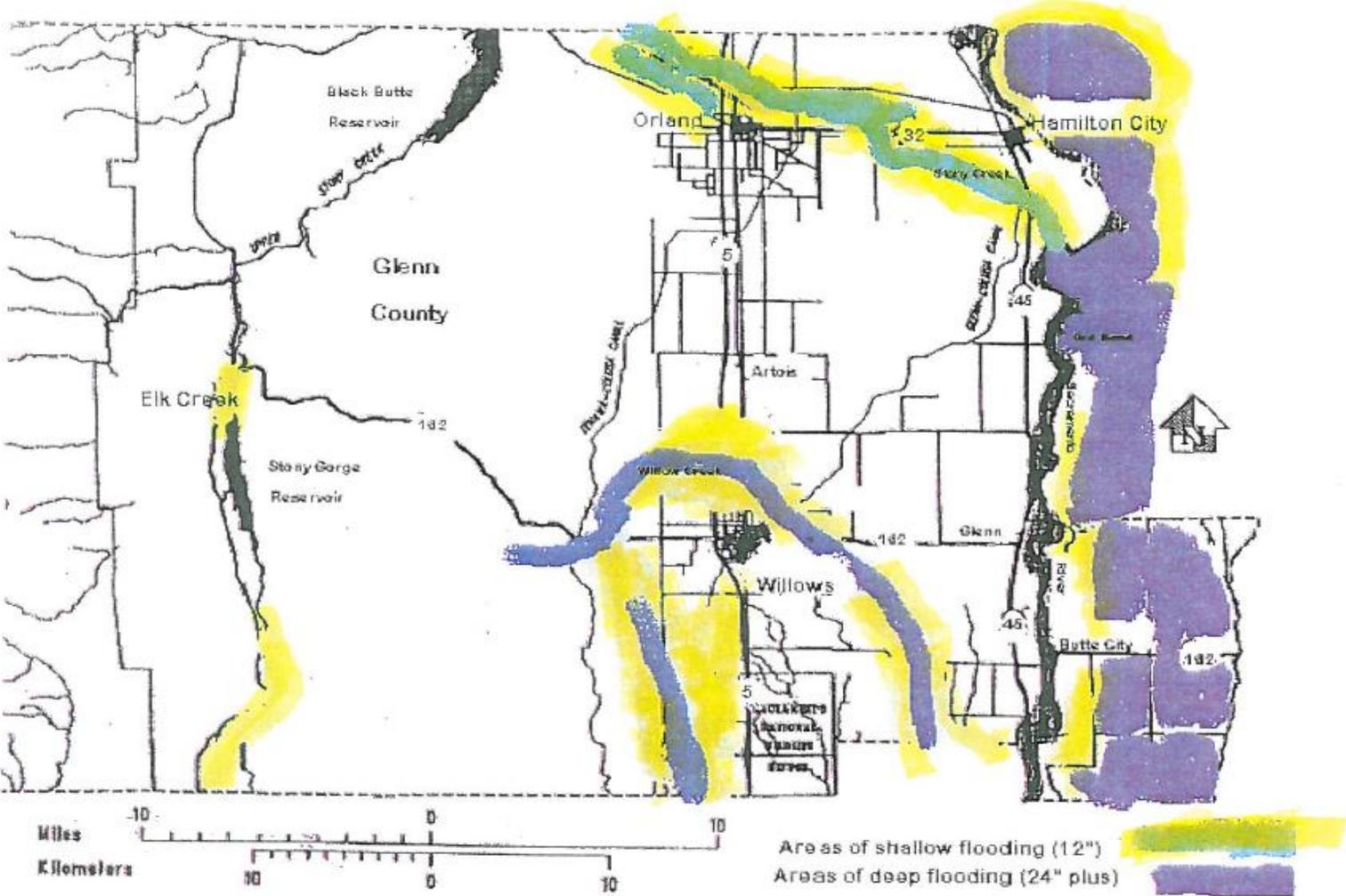
Department of Water Resources

The Department Flood Operations Center in Sacramento will provide technical expertise and flood fight resources to local agencies through Cal OES mission-tasking protocols in response to requests from local operational areas.

Historical Flood Map - Exhibit

1 – 1997-98 Flood Map

EXHIBIT 1 - 1997-98 Flood Map



Emergency Response Actions – Fast Rise Event

Sheriff - OES

- Obtain weather forecast and river flood level predictions to commence response planning.
- Identify the area(s) of impact and determine whether there is threat to any critical facilities, essential equipment or communities.
- Follow evacuation protocol and move employees and visitors from jurisdiction buildings and the general public from threatened areas to safe locations.
- Have the PIO prepare a statement to issue on the Emergency Alert Systems (EAS) and/or for media/social media release
- Develop an initial situation report
- If EOC Activation is warranted, develop an initial action plan
- Determine if recall of county employees is appropriate.

Response Actions by River Level/Flood Stage

Stage 1 - Planning and Preparation Phase (Pre-Monitor Stage with forecast to rise)

Sheriff - OES

- Monitors river forecasts, river levels, dam releases and weather through NWS, CDEC, and CNRFC
- Attend Cal-OES/NWS weather briefing conference calls
- Coordinate with cities, Public Works, and levee districts to ensure readiness
- Provide public information to prepare residents for incoming storms
- Ensure a duty officer is appointed for on-call if primary OES is unavailable

Stage 2 - Monitor Stage (High water levels and forecast to rise)

Sheriff - OES

- Monitors river forecasts, river levels, dam releases and weather through NWS, CDEC, and CNRFC
- Attend Cal-OES/NWS weather briefing conference calls
- Coordinates with cities and Public Works to identify road closures and sand locations
- Reclamation and levee districts monitor levees and report any potential issues to OES
- Provide continual public information on storms, road closures, and sand/sand bag locations
- Coordinate with Public Health MHOAC to provide updated information to healthcare/EMS regarding storms and road closures

Stage 3 – Flood Stage

Command & Management

- Level 3 - Minimum activation of the EOC, if deemed necessary. May be virtual.
- OES Deputy Director (or designee) assumes EOC Director Position and determines hours and operation of EOC.
- OES Deputy Director notifies Cal-OES (REOC if activated) of plan activation and status (Duty Officer and/or Minimum Level Activation of the EOC)
- Notify crisis action team of activation and determine need for any additional staff in the response organization
- Begin written log and documentation of incident
- Monitor river forecasts, river levels, dam releases and weather through NWS, CDEC, and CNRFC
 - Contact DWR Flood Operations Center as needed
- Attend Cal-OES/NWS weather briefing conference calls
- PIO provides continual public information on storms, road closures, and sand/sand bag locations

Operations

- Coordinate with cities, Public Works, and Cal-Trans to identify road closures and sand locations
- Coordinate with reclamation and levee districts to monitor levees to identify any potential issues
- Coordinate with HHSA for preliminary shelter planning.
- MHOAC/Med-Health Branch provides updated information to healthcare/EMS regarding storms and road closures
 - Maintain situational awareness with HCFs and RDMHS

Plans

- Develops Action Plan
- Initiate situational reports. Send operational period situational reports to Cal-OES and relevant response partners including cities, fire districts, levee districts, healthcare facilities, county departments.

Logistics

- Identify any resource needs in preparation for flooding

- Coordinate with partners to have essential vehicles and equipment moved out of danger zones to safe staging areas

Stage 4 - Danger Stage (Extensive flooding imminent)

Command & Management

- Assess conditions and increases EOC activation level. Moderate Level 2 or higher depending on location and anticipated duration of the flooding
 - Notification of change of status to all agencies and emergency organizations.
 - Request Cal-OES ESC for assistance in the OA EOC
- Set EOC briefing schedule, operational periods, and commence Action Planning
- Determine whether a local proclamation is necessary or imminent
- PIO develop and broadcast press releases and media briefings on a regular schedule and when major events occur
 - Identify emergency alert systems that should be activated and prepare messages for dissemination upon approval of EOC Director
 - Coordinate with relevant partner agencies for Joint Information System (JIS)
 - Conduct media monitoring & rumor control
- Continue to monitor river forecasts, river levels, dam releases and weather through NWS, CDEC, and CNRFC
 - Attend Cal-OES situational briefing conference calls
 - Maintain contact with DWR Flood Operations Center

Operations Section

- Coordinate with reclamation and levee districts monitor levees to identify any potential issues and resource needs
- Determine the need for activation of shelters
 - Care and Shelter Branch to be established upon activation of shelter
 - Activate Mass Care and Shelter Plan (Annex D) for establishment of shelters

- Notify American Red Cross and request assistance
- Notify CA DSS ESF 6 Care & Shelter ESC
- Coordinate with PIO for the release of shelter information
- Coordinate with Logistics for resources to support shelters

 Law Enforcement Branch

- Assess conditions for advisory and/or mandatory evacuations
- Coordinate with Public Works & Cal-Trans to identify road closures and threatened areas
- Develop evacuation plans
 - Coordinate with schools in identified/threatened areas to prepare for evacuation/closures
 - Coordinate with Public Works/Cal-Trans to determine evacuation routes
 - Coordinate with Logistics for resources related to evacuations including transportation, barriers, staff etc.
 - Identify and coordinate law enforcement mutual aid requests as needed
 - Provide evacuation information to PIO for emergency alerts and media releases
- Coordinate with Care & Shelter Branch and Logistics for security at shelters
- Coordinate with Logistics and Fire/Rescue Branch for Search and Rescue operations and resources

 Fire/Rescue Branch

- Coordinate with on-scene fire commander
- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests

 Medical-Health Branch

- Identify medical needs for shelters
 - Coordinate with Logistics for medical/BH/EH staff & resources for shelter
- Maintain situational awareness with area healthcare facilities

- Assess conditions for evacuation of healthcare facilities, long term care facilities, and other special needs populations.
 - Coordinate with Law Branch and Transportation/Public works for evacuations
- Determine medical health resource needs for
 - Healthcare facilities
 - Shelters
 - EMS
 - Coordinate all requests with Logistics and RDMHS
- Coordinate with PIO for health and medical related public information releases
- Agriculture Branch – Animal Control Unit
 - Prepare plan for animal evacuations, care, and shelter
 - Identify whether MOU with North Valley Animal Disaster Group should be activated – coordinate with Logistics
 - Identify sites for livestock and animal sheltering
 - Coordinate animal evac and shelter resource needs with Logistics
 - Communicate animal shelter locations and animal owner evacuation procedures with the PIO for release to the public
- Public Works Branch:
 - Coordinate with utilities, Cal-Trans, water districts, levee districts, etc.
 - Coordinate with reclamation and levee districts monitor levees to identify any potential issues and resource needs
 - Provides updated road closure information
 - Provide updated GIS mapping for incident
 - Conduct initial damage assessment
 - Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access

- utility access re-routing
- temporary repairs
- Debris removal

Plans

- Develops Action Plans
- Initiate situational reports within Cal-EOC. Send operational period situational reports to Cal-OES and relevant response partners including cities, fire districts, healthcare facilities, county departments.
- Long term planning
- Incident documentation

Logistics

- Identify any resource needs in preparation for flooding
- Coordinate with partners to have essential vehicles moved out of danger zones to safe staging areas

- Closely monitor and display essential and accurate information including:
 - Number of Deaths
 - Number of Injuries
 - Number of Missing
 - Number of Displaced Victims
 - Number of shelter residents
 - Significant Weather
 - Road closures
 - FEMA Category Damage Assessment Totals
 - Severe, moderate and lightly damaged areas
 - Status of Airports
 - Status of Hospitals
 - Status of Pre-hospital systems

Document flood damage to the following as required by the California Disaster Assistance Act (CDAA):

- Public buildings
- Levees
- Flood-control works
- Irrigation works
- Glenn County streets
- Bridges
- Other public facilities

For Federal Emergency Management Agency (FEMA) programs, document damages sustained to the following:

- Roads
- Water-control facilities
- Public buildings and equipment
- Certain private non-profit facilities
- Public utilities
- Facilities under construction
- Recreational and park facilities
- Educational institutions

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

Refer to ANNEX A - EOC Procedures

B. DAM FAILURE

General Situation

Dam failure is the collapse or failure of an impoundment that causes significant downstream flooding. Flooding of the area below the dam may occur as the result of structural failure of the dam, overtopping, or a seiche (oscillations of the water body). The principle consequences of dam failure are injury, loss of life, and significant downstream property damage. Dams in the United States are inspected by State and Federal Regulatory authorities to ensure they meet safety standards.

The collapse and structural failure of a dam may be caused by a severe storm, earthquake, or internal erosion (piping caused by embankment and foundation leakage). Seismic activity may also cause inundation by the action of a seismically-induced wave that overtops the dam without causing failure of the dam, but significant flooding downstream. Landslides flowing into the reservoir may also cause dams to fail or overtop.

Considerations for Glenn County

Portions of Glenn County would be affected by the failure any of the following five dams: Black Butte, Stony Gorge, East Park, Shasta, and Oroville. Black Butte, Stony Gorge, and East Park are located at least partially within the county. Shasta is located in Shasta County, and Oroville is located in Butte County. All five dams would have varying degrees of impact on Glenn County should failure occur.

Warning time from dam failure until the resulting floodwaters vary on the severity of the damage, the proximity of the dam to the area, the current amount of water in the reservoir, and the current river flow. During winter months, the initial flow is much higher and, at times, may even be equal to or greater than flood stage. This wide variation in initial flow has a significant impact on the areas that must be evacuated; therefore, the number of people to be alerted and evacuated can vary tremendously.

A catastrophic failure of any of the dams would have a significant impact on Glenn County. Water levels could be many times higher than those recorded in the worst floods. Complete devastation could occur in and along the creeks and rivers in which they feed.

East Park and Stony Gorge Reservoirs

East Park and Stony Gorge Reservoirs are operated by the US Department of the Interior - Bureau of Reclamation – Orland Project. East Park Reservoir is located in the western portion of both Glenn and Colusa counties on Little Stony Creek. The dam is a curved, concrete thick arch gravity structure with a height of 139 feet. The reservoir storage is 48,211 acre feet at 1198.18 crest elevation. The spillway has a capacity of 9200 CFS at 1201.68 elevation, with a maximum flow of 11,000 CFS.

Stony Gorge Reservoir is located in Glenn County near Elk Creek. It is approximately 18 miles downstream from East Park. The dam is a concrete slab and buttress structure with a height of 139 feet. The reservoir has a 50,000 acre feet capacity at 841 feet, with a maximum crest elevation of 847 feet. The spillway has a maximum capacity of 38,000 CFS at 844.5 ft.

East Park and Stony Gorge feed into Stony Creek and continue flows in a north-eastern direction to Black Butte Reservoir. Maximum flow release can result in flooding along Little Stony Creek and Stony Creek. Stony Creek has a maximum safe channel flow of 25,000 CFS. Failure can result in significant flooding impacts to areas along these creeks, including the town of Elk Creek. A release from Stony Gorge takes approximately 6 to 8 hours to travel to Black Butte. Due to the capacity of Black Butte, a loss of Stony Gorge may not have a significant adverse impact on Black Butte.

Black Butte Dam

Black Butte Reservoir is operated by the Army Corp of Engineers and is located in Glenn and Tehama Counties, approximately 8 miles northeast of Orland. Black Butte is an earth embankment dam with six earth dikes and an ungated spillway. The crest length of the dam is 2970 ft. and reaches a maximum height of 140 ft. The gross pool is 473.5 ft. and the spillway design flood elevation is 509.8 ft. Black Butte has a storage volume 136,193 acre feet.

Black Butte releases flow in to Stony Creek. The maximum flood control release is 15,000 CFS into Stony Creek, however, minor to moderate flooding has been noted at discharges of 12,000 CFS.

Flooding as the result of an instantaneous dam failure at Black Butte would extend along Stony Creek drainage to the Sacramento River, impacting the communities of Capay, Orland, Hamilton City, Ord Bend, Bayliss, Glenn, Butte City, and Princeton.

Shasta Dam

Shasta Dam is the largest single reservoir in California with a capacity of 4,552,000 acre feet of water, with a maximum crest elevation of 1077 feet. Shasta is a Bureau of Reclamation facility that is located approximately 100 miles north of Glenn County. The spillway has a capacity of 186,000 CFS at the elevation of 1065 feet. Failure of Shasta Dam will result in flooding of downstream communities along the Sacramento River, including Hamilton City, Ord Ferry, and Butte City.

Oroville Dam

Oroville is east of Glenn County and is a part of the California State Water Project, managed by Department of Water Resources. Oroville Dam is the tallest earthen fill dam in the U.S at 770 feet above foundation. It has a maximum storage capacity is 3.5 million acre feet of water with a maximum crest elevation of 922 feet. It has four outlets for water, a main spillway, an emergency spillway and two additional outlets through the Hyatt power plant. The main spillway is triggered via controlled releases above 813 feet. The emergency spillway is uncontrolled when the water reaches a height of 901 feet. The emergency spillway has only been utilized once, during the 2017 failure of the main spillway.

Failure of the Oroville Dam would result in catastrophic downstream impacts, with cascading impacts reaching west into the south-eastern corner of Glenn County including Butte City area.

Dam Failure Response Actions

Confirm report of damage/failure with the Dam Operating Agency

- What Emergency Level is the Dam Operating Agency activated:
 - Level 1 – Non-emergency, unusual event
 - Level 2 – Potential emergency, failure of a component of the dam may occur
 - Level 3 – Dam Failure Imminent or in progress
- **If Level 3, Failure Imminent – confirm level of failure anticipated and approximate timeline**
 - **Proceed to immediate evacuation procedures for area of impact**
 - **Refer to Annex C: Evacuation**
 - **For Black Butte Dam incident – refer to Annex C – 3 and 4 for specific evacuation plan**

Access the specific Dam Emergency Action Plan (EAP) that is stored at the Sheriff’s Office/OES

- Review EAP for response actions and emergency contacts
- Consult Dam EAP for inundation maps

Activate the Emergency Operations Center (Level 2 or 3)

- *Activate the secondary EOC location in Willows for an incident involving Black Butte*

Notify:

- First responder agencies
- EOC members
- Key personnel, elected officials
- Cities
- Cal-OES (REOC/SOC if activated)
- Water, Levee, and Reclamation Districts and Departments
- Notify neighboring counties that may/will be activated to receive and shelter evacuees
 - Notify downstream counties that may be impacted by Black Butte (Butte, Colusa, Sutter)

- Begin written log/documentation of the incident
- EOC management team meets as soon as practical
 - Assess the conditions
 - Identify the potential impacts
 - Identify time to impact/inundation
 - Identify areas for advisory and/or mandatory evacuations
 - Identify healthcare facilities or facilities with persons with special needs that may need assistance to evacuate – Activate Medical-Health Branch to assist with this task
 - Coordinate transportation resources to respond to residential facilities in the impact zone
 - If evacuations are to take place, immediately activate Care and Shelter Branch to begin establishment of shelters
 - Identify if schools are open or will be open in or near areas that may be impacted.
 - Consult with Superintendent of Schools on issue and consider closing/evacuating schools in threatened areas
 - Prepare initial Action Plan
 - Establish regular briefing schedule
 - Brief elected officials
- PIO prepares initial press release and prepares to respond to media inquiries
 - Prepare message for emergency alerting and notification modes
 - Prepare message for all communication modes including websites and social media
 - Coordinates with PIO from Dam Control Agency
 - Determines lead PIO and establishes a JIS to ensure coordinated messaging
- Medical-Health Branch:
 - Notify all healthcare facilities and provides preliminary situation report
 - Sends med-health SITREP to RDMHS, CDPH, EMSA
 - If evacuation of healthcare facilities is likely, *refer to Annex C – Evacuation*

Care and Shelter Branch:

- Identify sites for shelter
- Contact GCHHSA Shelter Operations Staff
- Develop a shelter plan – *refer to Annex D: Mass Care & shelter*

Law Branch:

- Prepare evacuation plan – Refer to Annex C: Evacuation
 - Annex C-3 & 4 for Black Butte Incident
- Identify evacuation areas and routes
- Coordinate with Care and Shelter to identify shelter locations and routes to the sites
- Identify law enforcement staff for evacuations
 - Activate LEMA and make request for assistance
- Communicate evacuation areas to the PIO for release via media and emergency alert modes

Agriculture Branch – Animal Control Unit

- Prepare plan for animal evacuations, care, and shelter
 - Activate NVDAG to assist with animal evac and shelter
- Identify sites for livestock and animal sheltering
- Communicate animal shelter locations and animal owner evacuation procedures with the PIO for release to the public

Public Works:

- Conduct damage assessment
- Coordinate with utilities, water districts, levee districts, etc.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing

- temporary repairs

Transportation:

- Coordinate transportation units for mass evacuations, residential healthcare facilities etc.

Closely monitor and display essential and accurate information including:

- Inundation area
- Evacuation routes and road closures
- Significant Weather
- Severe, moderate and lightly damaged areas
- Number of Deaths
- Number of Injuries
- Number of Missing
- Number of Displaced residents
- Number of Shelter residents
- FEMA Category Damage Assessment Totals
- Status of Airports
- Status of Hospitals
- Status of Pre-hospital systems

Logistics

Resource requests

- Consider requesting a Management Team from Cal-OES to assist EOC staffing
- Coordinate Emergency Management Mutual Aid (EMMA)

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

C. SEVERE WEATHER

General Situation

Glenn County's location within the northern Sacramento Valley creates a climate that is typically hot and dry in the summer and mild, moderately wet winters. Glenn County experiences extreme or severe weather occasionally. The most typical severe weather is in the form of high winds, extreme heat, and flooding. Flooding is addressed in *section A of this Annex*. High winds include straight-line winds and tornadoes. Additionally, when other events (hail, lightning, and winter weather) occur, they do so infrequently. Also infrequent is the occurrence of tornadoes. The most recent was an F0 tornado that touched down in February 2014. Historically, Glenn County has proclaimed emergencies for extreme weather including severe winter storms, drought, freezes, and heavy rains/winds. The following is a brief synopsis of the types of extreme weather that could be experienced in the Glenn County. The information provided is for informational purposes only and responders will rely on their appropriate procedures for such events.

Fog

While normally not considered to be a high risk event, fog which settles close to the ground preventing clear visibility presents a risk to drivers in the valley and often is the cause for major traffic accidents and pile-ups.

Typically the fog lasts only a few hours before "burning off". However, there have been fog events in recent history where zero visibility has been reported for multiple days. Preparation and planning should occur to decrease traffic-related accidents. Response organization and operations may be necessary for traffic-related incidents.

Freeze

Occasionally, during the winter months of December through March, the Sacramento Valley may encounter severe and abnormally cold weather. Although typically brief, there have been periods of several days to a week where record cold spells have occurred. Snow in the valley areas is rare and typically minor. Freezing temperatures typically cause primarily agricultural losses and only minor other impacts. Freeze typically results in an economic impact.

Extreme Heat

Conditions of extreme heat are defined as summertime temperatures that are substantially hotter and/or more humid than average for location at that time of year. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Extremely dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

Typical summer temperatures in California contribute to an average of 20 fatalities per year. The Heat Wave in July 2006 resulted in the loss of 138 people throughout California over a 13 day period. The worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths. Extreme heat results in a greater loss of life than most earthquakes, tornadoes, and other more catastrophic disasters in the US.

Heat emergencies are often slower to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

In 2014, the National Weather Service established the Experimental HeatRisk system. This system applies a consistent methodology nationwide, incorporating high-resolution local climatology and peer-reviewed heat science, to place forecast heat into a numeric and color-based heat risk system. This context can be useful for both identifying unusual heat in the upcoming forecast, and to place historical impacts into a probabilistic risk profile that can be useful to decision makers to take action.

Refer to Appendix K-3 for NWS Experimental HeatRisk Tool

Drought

Drought is a natural phenomenon during which regions or communities experience shifts in the balance between precipitation and evapotranspiration (the processes of evaporation and transpiration)—a balance that is inherent to the earth's water cycle. Several factors affect the impact of drought on humans and other life forms, including the timing of precipitation events, effectiveness of the rain that is falling (i.e., rainfall intensity and the number of rain events), inadequate snow pack, runoff, characteristics of the built environment in the affected area, and local demand for water. Individual areas or communities can be affected differently by drought depending on several additional variables, including:

- the structure and capacity of existing water systems,
- economic development,

- the at-risk populations living within the affected area,
- local governance of water use, and
- other societal factors.

Drought is a progressive, slow moving event that can affect any area of the country at any time. Unlike some natural disasters that occur unexpectedly and necessitate intense response activities (like earthquakes and tornadoes), drought is a condition that can be anticipated well before it becomes a threat to a community. Both preparing for and responding to drought require federal, state, local, and tribal to work collaboratively with other stakeholders and to communicate effectively with the communities they serve.

Significant drought events have affected the United States throughout history. Droughts can last from a single season to multiple decades and can impact from a few hundred to millions of square miles. The years 1987-1989 were well below average in precipitation, especially in the mountain regions that provide most of the runoff. Below is a list of significant drought years in California.

Multi-year droughts of large-scale extent since 1900:

- 1918–1920
- 1923–1926
- 1928–1935
- 1947–1950
- 1959–1962
- 1976–1977
- 1987–1992
- 2000–2002
- 2007–2009
- 2012-2018

In an average year, ground water provides about 40% of the State’s water for irrigation and urban usage. In severe drought years, ground water dependency increases dramatically. For example in 1977 (a drought year) ground water in the Upper Sacramento Valley provided 76% of the water supply.

Glenn County has a large aquifer fed by many wells. The aquifer has been quite shallow existing at approximately 60 feet in depth. However, over the years hundreds of wells have been dug which has resulted in significant draw down of the water table. The resultant pumping has lowered it to a moderately deep level of about 120-150 feet.

Both California Water Service and the Bureau of Reclamation share Water Master Duties for the Glenn County area. They manage several hundred wells which pump approximately 2 million gallons of water

into storage tanks located throughout the operational area. In drought periods, both the quantity and quality of the available water supply is usually diminished.

An increase in the number of new wells being drilled or of existing wells being deepened is typical during droughts. Private residential wells represent the single largest category of new or deepened wells. As with small water systems, residential well problems are common in fractured rock groundwater production areas. Increased groundwater use is reflected in declining groundwater levels. A pattern of water level drawdown during dry conditions and recovery during wet conditions is typically seen. Groundwater level decline in over drafted basins is typically exacerbated by drought.

Wind/Dust

The Sacramento Valley is fairly flat with major expanses of agricultural areas. Additionally, meteorological conditions occasionally cause sporadic wind storms, similar to “straight winds” experienced in coastal area that produce relatively high sustained winds with a duration from minutes to hours. These winds can combine with dust to create dust storms. Usually, the dust storms occur in the fall and early winter months coinciding with harvest, however, they can occur at any time when conditions are right.

Dust storms can last for extended periods, causing disruption of the county’s transportation corridors and communications systems. As well as generate health problems (particularly respiratory) and negatively impact the economy.

Extreme wind storms typically resulting from winter storms have negatively impacted the county. In the winter wind storm event of 2008, thousands of residents lost power, hundreds of power poles and lines downed and agricultural losses were in the 10’s of millions, resulting in a major disaster declaration.

Thunderstorms, Lightning, and Hail

Some thunderstorms can be seen approaching, while others hit without warning. It is important to recognize the danger signs and to plan ahead.

A *severe thunderstorm watch* is issued by the National Weather Service when the weather conditions are such that a severe thunderstorm (damaging winds 58 miles per hour or more, or hail three-fourths of an inch in diameter or greater) is likely to develop.

A *severe thunderstorm warning* is issued when a severe thunderstorm has been sighted or indicated by weather radar. At this point, the danger is very serious and everyone advised to shelter in place.

Light travels faster than sound which results in the sighting of lightning long before the resulting thunder is heard. Lightning has been known to strike up to 15 miles away from the parent cloud. Lightning causes, on average, 87 fatalities each year across the nation.

Hail is produced by many strong thunderstorms. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. In a hailstorm, take cover immediately. Pets and livestock are particularly vulnerable to hail, so bring animals into a shelter. Thunderstorms in Glenn County occasionally produce damaging hail. While fatalities from hail are few, hail can cause many injuries and results in millions of dollars in property damage each year.

Tornadoes

Minor tornadoes occur in the Sacramento Valley. Tornadoes in this area are typically categorized as EF-0 but have historically hit category EF-2. The most recent tornado in Glenn County was an EF-1 in March 2014. These tornadoes typically occur in rural areas, tend to be small in nature, and rarely impact the populous.

Historical Data – Tornadoes in Glenn County

Date	dead	injured	Category
APR 09, 1941	0	1	F2
MAY 19, 1953	0	0	F2
APR 17, 1993	0	0	F1
JLY 05, 2000	0	0	F0
JUN 06, 2005	0	0	F0
JAN 24, 2009	0	0	F0
MAR 08, 2010	0	0	F0
May 25, 2011	0	0	F1
MAR 26, 2014	0	0	F1

Emergency Response Actions

Severe Weather

For Extreme Heat Response – proceed to next action list in this section

- Monitor National Weather Service and attend Cal-OES weather briefings
- Conduct appropriate alerts/notifications for incoming severe weather
- If weather may result in large impacts, notify Crisis Action Team and conduct an Initial Threat Assessment Meeting to determine if the EOC should be activated and at what level
- If the weather has already resulted in impacts to the area, immediately activate the EOC
- Notify:
 - EOC staff
 - Cal-OES (REOC/SOC if activated)
 - Cities
- Begin written log/documentation of incident
- EOC management team meets as soon as practical
 - Assess the conditions
 - Identify the (potential) impacts
 - Identify if shelter in place orders should be released
 - Identify if any areas will need advisory and/or mandatory evacuations
 - Identify healthcare facilities or facilities with persons with special needs that may need assistance to evacuate – Activate Medical-Health Branch to assist with this task
 - If evacuations are to take place, immediately activate Care and Shelter Branch to begin establishment of shelters
 - Identify if schools are open or will be open in or near areas that may be impacted.
 - Consult with Superintendent of Schools on issue and consider closing/evacuating schools in threatened areas
 - Prepare initial Action Plan

- Establish regular briefing schedule
- Brief elected officials

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare message for all communication modes including websites and social media

Medical-Health Branch:

- Assess health impacts related to the weather event
 - Provide subject matter expertise and input for command and management briefings
 - Provide health-related information for the event to the PIO
- Notify all healthcare facilities and provides preliminary situation report
 - Request facility SITREPs
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- If evacuation of healthcare facilities is likely, request assistance from CDPH

Care and Shelter Branch:

- Identify sites for shelter
- Contact American Red Cross and GCHSA Shelter Operations Staff
- Develop a shelter plan and initiate upon request of the EOC Manager

Law Branch:

- Coordinate law resources for incidents that may have occurred as a result of the weather
- If evacuations are necessary:
 - Prepare evacuation plan
 - Identify evacuation areas and routes
 - Coordinate with Care and Shelter to identify shelter locations and routes to the sites
 - Identify law enforcement staff for evacuations
 - Communicate evacuation areas to the PIO for release via media and emergency alert modes

Fire/Rescue:

- Identify any fire/rescue needs
- Coordinate resources for incidents that may have occurred as a result of the weather

Agriculture Branch – Animal Control Unit

- If evacuations may occur:
 - Prepare plan for animal evacuations, care, and shelter
 - Identify sites for livestock and animal sheltering
 - Communicate animal shelter locations and animal owner evacuation procedures with the PIO for release to the public

Public Works:

- Conduct damage assessment
- Coordinate with utilities
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing
 - temporary repairs

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

Extreme Heat Event Response Actions

Temperatures over 100 degrees are typical in the valley areas of Glenn County. The primary activity during high heat events is public information.

Typical High Heat Event Response Actions:

- Update the list of Cooling Zones – public buildings that are open and available to the public to cool off. The list should contain the hours of operation for each site.
- Post the Cooling Zone locations on the www.countyofglenn.net/oes webpage
- Distribute the list of Cooling Zones to city and county staff and emergency response partner organizations
- Conduct public information via social media and media
 - Provide messaging on Cooling Zones
 - Health effects of high heat
 - Encourage neighbors to check on each other

High Heat Event with Power Outage Response Actions:

High heat events that are accompanied by power outages in excess of 12 hours present additional concerns. The following activities should be conducted in addition to the activities listed above:

- Determine the extent of the power outage, expected duration and any critical facilities impacted
- Determine if EOC activation is necessary
 - Activate response structure consistent with the Level of Activation
 - If activating the EOC, refer to Annex A – EOC Procedures
 - Refer to Annex H: Utilities Disruption – PSPS Plan for additional activities
- Determine whether public Cooling Center and/or medical charging center activation is necessary. One of the following options may be employed:
 - **Option 1** - Identify a Cooling Zone that is already operational that can be provided as an option for the impacted population
 - **Option 2** - Identify a location such as a shelter site outside the impacted area that has power to open as a cooling center and medical device charging location
 - **Option 3** - If outage is widespread, Willows Memorial Hall may be opened as a Cooling Center/medical charging location (generator power)
 - *Contact WestHaven to determine availability to provide access for medical charges in Orland.*
 - OES will contact HHSA Shelter/EP team should Option 2 or Option 3 be employed to activate a small shelter team to open and staff the cooling center/medical charging
 - A cooling/charging site may be daytime operational only, with the hours set by the needs of the incident.
 - Services may be limited to cooling and charging of medical equipment

Refer to Appendix K-3 for NWS Experimental HeatRisk Tool

Refer to Annex H: Utilities Disruption – PSPS Plan for full response actions

D. HAZARDOUS MATERIALS

General Situation

Glenn County is home to many businesses that manufacture, store, sell, use and dispose of hazardous materials. Additionally, large volumes of hazardous materials are transported through the county on various transportation corridors such as railway and highways. The release of hazardous materials into the environment could cause a multitude of problems within the Glenn County area. Potential for injuries, economic damages, environmental impact, and disruption of transportation infrastructure from hazardous materials incidents is significant. The probability of an incident is substantial as materials pass through the county daily by highway, commercial airline route, and railway. Illicit manufacture and transportation of methamphetamine and its components and precursors pose additional risks. Past spills and accidents have resulted in injuries, necessitated large scale evacuations and destroyed millions of dollars' worth of property.

Certified Unified Program Agency (CUPA)

Glenn County's Air Pollution Control District (GCAPCD) was designated as the Certified Unified Program Agency (CUPA), previously referred to as the Administering Agency (AA), for hazardous materials in Glenn County in 2002. This office has responsibility for planning, preparation, review, and coordination of the Hazardous Materials Emergency Response Area Plan as required by Chapter 6.95 of the Health and Safety Code (HSC) and Title 19 of the California Code of Regulations (CCR). This plan was developed to protect the public, environment and property from an accidental release involving chemicals.

The Certified Unified Program Agency (CUPA) is also delegated authority for administering the following programs:

- Business Plan and Inventory Reporting requirements for hazardous materials as mandated by HSC 6.95, Sections 25500-25519
- Hazardous Waste Management requirements as mandated by HSC Chapter 6.5 and CCR Title 22;
- Aboveground Petroleum Storage Tank Program requirements as mandated by HSC Chapter 6.7 Sections 25270-25270.13
- Underground Storage Tank management requirements as mandated by HSC Chapter 6.7 and CCR Title 23;

- California Accidental Release Program (Cal-ARP) requirements as mandated by HSC Chapter 6.95 and CCR Title 19, Division 2, Chapter 4.5; and
- California Fire Code requirements CCR Title 24 as assigned to the CUPA.

Due to the potential dangers posed by hazardous materials usage, handling, storage, and transportation, the Area Plan was prepared so that all responders can follow the correct procedures in the event of a hazardous materials incident. The Area Plan outlines the relative responsibilities of each response agency in any hazardous material response. The Area Plan provides the methods and procedures that decision makers, county regulatory personnel, and response agencies will use for managing, tracking, containing, removing and disposing of the hazardous materials from a hazardous materials incident in Glenn County. The Plan includes a facility list and inventory data which is also provided quarterly, and upon request to the local Fire Districts or other emergency responders.

Refer to the CUPA's Hazardous Materials Emergency Response Area Plan for additional information

Hazards

Transportation Routes

Highways, railways, and commercial and military aviation routes constitute a major threat due to the multitude and quantities of chemicals and hazardous substances transported along them. Large amounts of hazardous materials are transported throughout the community, but the specific product quantities are not known. A significant concern is the elevated railway coming through the metropolitan area of the county and highway transportation of dangerous goods. Major transportation routes include:

- California Northern Railroad
- Interstate 5 (north and south)
- State Highway 32 (east and west)
- State Highway 162 (east and west)
- State Highway 45 (north and south)
- Other major county arterials

Business and Industry

There are small pockets of manufacturing and light industrial development within the county. These areas are primarily centered in and around the major transportation routes. However, facilities handling or storing hazardous materials are located throughout the entire county. Even remote communities, such as Elk Creek, have facilities with hazardous materials in the way of fuel service stations and natural gas wells. As of May 2018, there were approximately 301 businesses and 442 farms included in the Hazardous Materials Emergency Response Plan and Inventory Reporting program in Glenn County. Another 75 to 100 facilities are being evaluated to determine if they meet the criteria for inclusion in one or more of the mandated hazardous materials programs.

Refer to Appendix K-1 for list of high risk facilities in Glenn County. Please note that this Appendix is For Official Use Only (FOUO) and is not available in the public version.

Agriculture

The primary industry for the area is agriculture. Accidental releases of pesticides, fertilizers, and other agricultural chemicals are of major concern in Glenn County due to the county's rural/agrarian base. Agricultural-based operations are prevalent throughout the valley regions of the county and constitute a significant threat for accidental hazardous material releases. Certain times of the year, specifically the spring and summer growing months, are of highest risk due the increased volume of agricultural chemicals transported and applications by air, ground, and/or irrigation waters.

Illegitimate Businesses

Illegitimate businesses, such as clandestine drug laboratories, are a significant threat to human health, property, and the environment. Clandestine dumping is the criminal act of disposing of toxic materials and wastes from drug lab activities on public or private property. In many instances, drug lab wastes are dumped in remote areas of the county or along roadways, posing a serious health threat to the unsuspecting person who might stumble upon it and to the environment.

Hazardous Waste

Hazardous wastes (e.g., used motor oil, cleaning solvents, or paint) are occasionally dumped in remote areas of the county or along roadways. Like clandestine drug lab wastes and residues, illegally dumped hazardous wastes poses a threat to human health, property and the environment.

Aviation

As previously mentioned, aviation constitutes a significant threat with the transportation of hazardous materials by air. Heavy crop duster traffic due to the county's agricultural base, and two moderately sized regional airports, represents a significant potential for aviation-based hazardous materials emergencies.

Emergency Response Actions - HazMat

- Confirm release of hazardous material
 - Type of chemical and hazard potential
 - Impact area
 - Request information from the Incident Commander on site, the initial life and safety threats relating to the incident.

- Activate the Emergency Operations Center (Level 2 or 3)

- Contact the CUPA (Air Pollution Control) to ensure activation of the Glenn County Hazardous Materials Emergency Response Area Plan
 - Coordinate with CUPA for response related needs from the EOC

- Notify:
 - EOC members
 - Key personnel
 - Cities
 - Cal-OES (REOC/SOC if activated)
 - Notify the State OES Warning Center and obtain a spill control number
 - Request a mission number for mutual aid response hazmat response team

- Begin written log/documentation of the incident

- EOC management team meets as soon as practical
 - Assess the conditions
 - Identify the potential impacts
 - Identify if shelter in place orders should be released
 - Identify areas for advisory and/or mandatory evacuations
 - Identify healthcare facilities or facilities with persons with special needs that may need assistance to evacuating or sheltering in place – Activate Medical-Health Branch to assist with this task

- If evacuations are to take place, immediately activate Mass Care and Shelter Branch to begin establishment of shelters
- Identify if schools are open or will be open in or near areas that may be threatened
 - Consult with Superintendent of Schools on issue and consider shelter in place or closing/evacuating schools in threatened areas
- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare message for all communication modes including websites and social media

Medical-Health Branch:

- Notify all healthcare facilities and provides preliminary situation report and recommendations on intended response actions: shelter in place/evacuation, decontamination of incoming patients, etc.
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- Monitor hospital bed availability, casualty counts, and triage counts
- If evacuation of healthcare facilities is likely, request assistance from CDPH
- Assess health impacts related to the incident
 - Provide subject matter expertise and input for command and management briefings
 - Provide health-related information for the incident to the PIO

Mass Care and Shelter Branch:

- Identify sites for shelter
- Contact American Red Cross and GCHSA Shelter Operations Staff
- Develop a shelter plan

Law Branch:

- Perimeter and security planning
- Prepare evacuation plan
 - Identify evacuation areas and routes
 - Coordinate with Care and Shelter to identify shelter locations and routes to the sites
- Identify law enforcement personnel for activities
- Communicate evacuation areas to the PIO for release via media and emergency alert modes

Fire/Rescue Branch

- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests

Agriculture Branch/CUPA

- Provide assistance and information regarding specific hazards associated with pesticides, herbicides, fertilizers, and other agricultural chemicals
- Provide Plume Modeling, as necessary.
- Assist CUPA with contact to agricultural chemical manufacturers.
- Animal Control Unit
 - Prepare plan for animal evacuations, care, and shelter
 - Identify sites for livestock and animal sheltering
 - Communicate animal shelter locations and animal owner evacuation/shelter in place procedures with the PIO for release to the public

Public Works:

- Assess impact(s) to drainage areas and waterways
- Assist with incident mapping
- Coordinate with utilities, water districts, etc.
- Coordinate and monitor:

- reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
- alternate route identification
- building access
- utility access re-routing
- temporary repairs
- Conduct damage assessment

HazMat:

- Coordinate with CUPA (Air Pollution Control) for HazMat Response activities
- Provide subject matter expertise and input for command and management briefings
- Provide hazardous material information for the incident to the PIO
- Identify specialized resources that may need to be requested to assist with the response

Resource requests

- Consider requesting a Management Team from Cal-OES to assist/supplement EOC staffing
- Identify any specialized resources that may need to be requested such as a HazMat Response Team, spill containment equipment, air monitoring equipment, bomb squad, etc.

Plan for extended operations. Ensure that adequate staffing (EOC and field) will be available for the next operational period.

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

Refer to the CUPA's Hazardous Materials Emergency Response Area Plan for additional information

Action Plan – Hazardous Material Release

Operational Period:

OBJECTIVES AND PRIORITIES	STRATEGY	RESOURCES & EOC MGR.
<p>LIFE SAFETY</p> <p>Identify and respond to life threatening situation</p> <p>Evacuate areas that pose threat to safety of citizens</p> <p>Identify potential health impacts and immediate medical needs</p>	<p>Assess safety of affected areas & respond with appropriate resources (Activate regional hazmat team)</p> <p>Develop and implement Evacuation Plan</p> <p>Research the chemical and develop appropriate community health and medical actions</p>	<p>Fire/Rescue, Law Enforcement and Public Works Branch</p> <p>Law Enforcement with other EOC Section Chiefs assisting</p> <p>Medical-Health Branch</p>
<p>PROTECTION OF PROPERTY</p> <p>Contain Hazmat situation</p> <p>Provide security for evacuated areas</p>	<p>Assess needs & identify threatened areas; establish & implement response with appropriate resources</p> <p>Develop and implement Security Plan</p>	<p>Fire/Rescue Branch supported by Law Enforcement Branch & Logistics Section Chief</p> <p>Law Enforcement Branch supported by Mutual Aid</p>
<p>PROTECTION OF ENVIRONMENT</p> <p>Contain Hazmat situation</p>	<p>Ensure Hazmat team has appropriate resources</p>	<p>Fire/Rescue Branch in coordination with Hazmat Team</p>
<p>OTHER ISSUES</p> <p>Establish Care & Shelter</p> <p>Damage assessment of impacted area</p> <p>News releases for mass media & local residents</p> <p>Extended operations of EOC and field responders</p>	<p>Establish shelter(s) in safe zones</p> <p>Develop Damage Assessment Plan for implementation</p> <p>Coordinate with agency PIOs for area news release</p> <p>Develop plan for conducting extended operations</p>	<p>Care & Shelter Branch</p> <p>Damage Assessment Unit Leader</p> <p>PIO with EOC Director’s review and approval</p> <p>Planning Section Chief with support from other Section Chiefs</p>

E. WILDFIRE

General Situation

Fire is a likely hazard in Glenn County including both structural and wildland. Natural, man-made and technological sources of ignition include lightning strike, discarded matches or cigarettes, sparks from equipment, vehicle catalytic converter, and industrial accident, among others could lead to fire. Favorable dry weather conditions, an ignition source, fuel loading, and the slope/grade of the land over which the fire passes can greatly affect the size, scope and impact potential for fire.

Fires traveling upslope as opposed to level ground burn unassisted up to 16 times faster. Prevailing winds, temperature, humidity and the relative wetness of the fuel can impact the rate of fire speed and spread, however, the general rule is the steeper the slope, the faster a fire burns. Grass covered areas tend to spread fire more quickly than those with dense shrubs or tree but rarely attain the size and temperature needed to threaten man-made structures. Dense fuels such as fallen branches, trees, dense dry shrubs with oily resins increase the risk for impacting residential and commercial structures. Flammable material or accelerants increase the spread and impact of any fire regardless of terrain. Locations used for storage, transportation (pipeline) and pumping of flammable materials may readily sustain an intense combustion if ignited by even the most innocuous of sources.

Most wild land fires are controlled within the first few hours by fire protection systems that include federal, state, and local government fire protection agencies. Those few fires that escape initial control efforts often become large and especially destructive. These large fires cause most of the annual loss to natural resources, life, and property. Often these fires occur when air temperature rises to over 100 degrees, relative humidity drops to near zero, and hot north or east winds blow at high velocities. Fires burning under these conditions have two characteristics in common: rapid spread and high intensity. Generally, they spread with only minor regard to topography and vegetation types. In addition, they often project flaming embers several miles ahead of the main fire front making control all but impossible.

Fire Considerations for Glenn County

The central and eastern portions of Glenn County, where the major population centers lie, are nearly flat and lack heavy, dense fuels. The slope percentage for most of Glenn County may be considered in degrees less than 5%. However, the western side of the County is very rugged and steep. This area of the county is greatly covered by the Mendocino National Forest which contains heavy dense fuels conducive to wildland fire.

Communities at Risk

In Glenn County, remote communities and residences at risk from fires originating from wildlands are primarily located within the county's grasslands and oak woodlands. Such remote communities include Elk Creek, Chrome, the Grindstone Rancheria, Newville, and Stonyford, which is located just south of the Glenn/Colusa County line. Additional scattered development of individual homes and other domestic structures are found within the Mendocino National Forest (MNF) and include Sky Hi, Keeran Camp, El Manzano Rancho, Snow Basin, Jenks Camp, Garnett Camp, Cabin Tract, and Lee Logan Camp. In addition, a number of federal and state owned facilities are located at Alder Springs. In terms of wildfire threat, these areas of rural development have been described as points where the fuel feeding a wildfire changes from natural (wildland) to manmade fuel, such as structures, crops, and urban debris. The west side the county is a Wildland Urban Interface (WUI) area where intermingling of wildland and manmade fuel, increasing the danger and potential for destruction by wildfire.

Urban structure fires present a serious threat to any area, but particularly to the downtown section of both Willows and Orland. There are still some buildings built with common walls, basements and ceilings. In past remodeling of this area it was common practice to install a new roof over an existing one creating a small crawl space between upper and lower roofs. If a fire were to impact this space it may be able to spread from one building to another without being readily detected.

Other significant wildfire concerns

In addition to the fire threats facing Wildland Urban Interface (WUI) areas within Glenn County, several other significant wildfire issues confront Glenn County residents. Among these are highly flammable invasive fuels (Arundo donax and Tamarisk) along the Lower Stony Creek stream channel from Black Butte Lake to the Sacramento River. This dense vegetation threatens both the urban core of the Orland community as well as the Highway 32 corridor to the east. Urban development, farms, and ranches located along the stream channel to the west of Orland are threatened as well. Finally, high vegetative fuel levels are found along the Sacramento River corridor and within the U.S. Fish and Wildlife Service (USFWS) Sacramento National Wildlife Refuge (SNWR) located just south of Willows, a condition that threatens structures and communities within the eastern and southern portions of Glenn County.

Hazardous and Flammable Materials

Large bulk storage facilities of propane, paints and thinners, oil and fuel and large repositories of aqueous ammonia gas are also evident in the both cities. While there are hazardous materials located throughout Glenn County, the highest concentrations of volatile chemicals are located in an area roughly defined as being within the city limits of both Orland and Willows.

The Glenn County Air Pollution Control District is the Administering Agency and the Certified Unified Program Agency (CUPA) for Glenn County with responsibility for regulating hazardous materials

handlers, hazardous waste generators, underground storage tank facilities, above ground storage tanks, and stationary sources handling regulated substances.

The CUPA maintains a repository of hazardous materials contents for each registered facility that is available to the fire districts and Office of Emergency Services during an incident at a facility.

Fire Districts and Departments

The California Department of Forestry and Fire Protection (Cal-Fire) and the United States Forest Service (USFS) have responsibility for the wild land fire protection in some area of Glenn County. Other areas, defined as “Local Responsibility Areas”, include individual fire districts or areas protected by city fire departments. These districts or cities are responsible for vegetation fire suppression in their local area and act as mutual aid for other departments. Departments or districts dealing with Local responsibility wild land fires may also request mutual aid from Cal-Fire or the USFS.

Glenn County is divided into twelve fire protection districts: Artois, Bayliss, Bear Valley- Indian Valley (Stonyford), Capay, Elk Creek, Glenn-Codora, Glenn-Colusa (Butte City), Hamilton City, Kanawha, Ord, Orland Rural, and Willows Rural. Additionally, there are two City Fire Departments - City of Willows and City of Orland.

EXHIBITS:

1 - Composite [Fire Hazard Severity Ratings](#) for Vegetative Fuel Loading, Slope and Weather Conditions

2 - [Glenn County Fire Districts](#)

3 – [Glenn County Fire Hazard Maps](#)

EXHIBIT 1 – Fire Hazard Severity Ratings

**COMPOSITE FIRE HAZARD SEVERITY RATINGS FOR
VEGETATIVE FUEL LOADING, SLOPE AND WEATHER CONDITIONS
CRITICAL FIRE WEATHER FREQUENCY**

	<u>Frequency I</u>			<u>Frequency II</u>			<u>Frequency III</u>		
	Slope %			Slope %			Slope %		
	0-40	41-60	61+	0-40	41-60	61+	0-40	41-60	61+
Fuel Loading¹	(1)	(1.6)	(2)	(1)	(1.6)	(2)	(1)	(1.6)	(2)
Light (grass) (1)	1	1.6	2	2	3.2	4	8	12.8	16
Medium (scrub) (8)	8	12.8	16	16	25.6	32	64	102.4	128
Heavy (wood) (16)	16	25.6	32	32	51.2	64	124	204.8	256

Source: California Department of Forestry, “Fire Safety Guides for Residential Development in California - 1980.

1. Fire Hazard Severity Ratings can be interpreted as follows:
 Moderate Hazard = 1.0 - 12.8
 High Hazard = 16.0 - 32.0
 Extreme Hazard = 51.2 - 256.0
2. Critical Fire Weather Frequency is a term used by the California Department of Forestry to rate weather conditions that are likely to produce high intensity fires. The frequency ratings, I, II, and III are based on the number of days per year that a critical fire load index is exceeded in a given fire danger area. Frequency I (moderate) is assigned to area exceeding this index less than one day per year over a 10-year period. Frequency II (high) is assigned for area exceeding the index from 1 - 9.5 days per year and Frequency III (extreme) for those areas exceeding 9.5 days.
3. The figure in parentheses represent numerical values assigned to slope/fuel loading classes in order to arrive at the fire hazard severity ratings.

EXHIBIT 2 – Glenn County Fire Districts

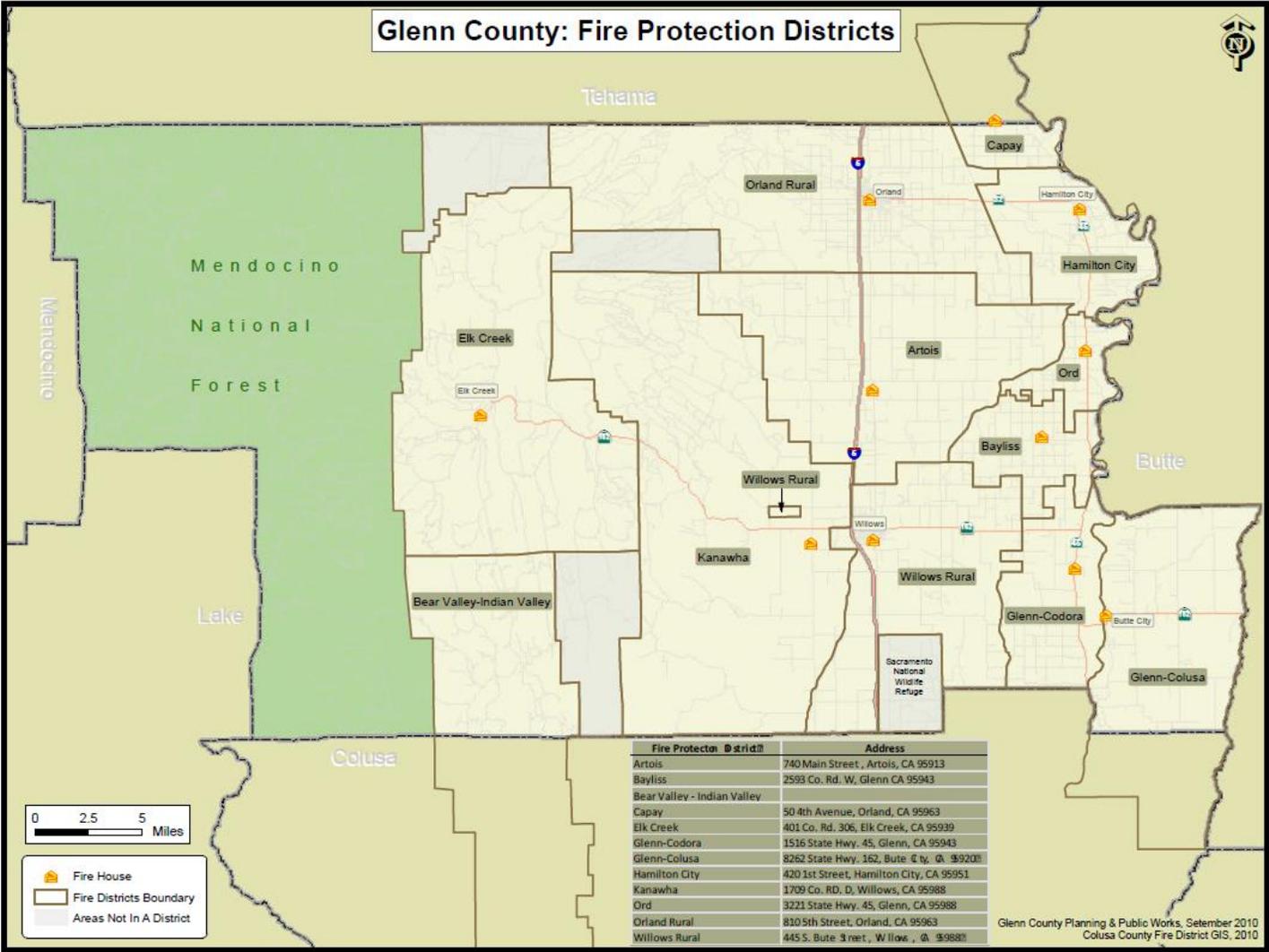
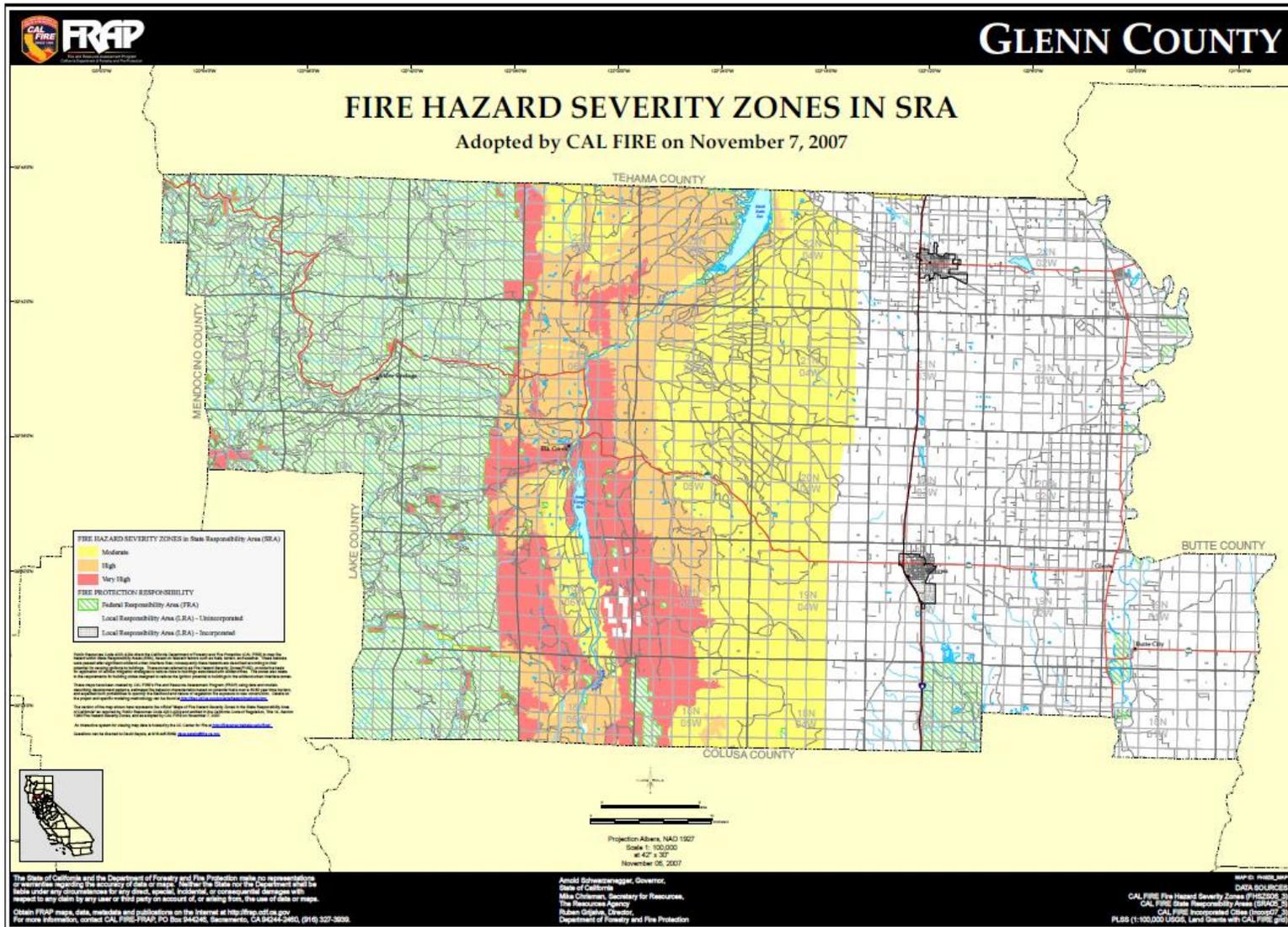
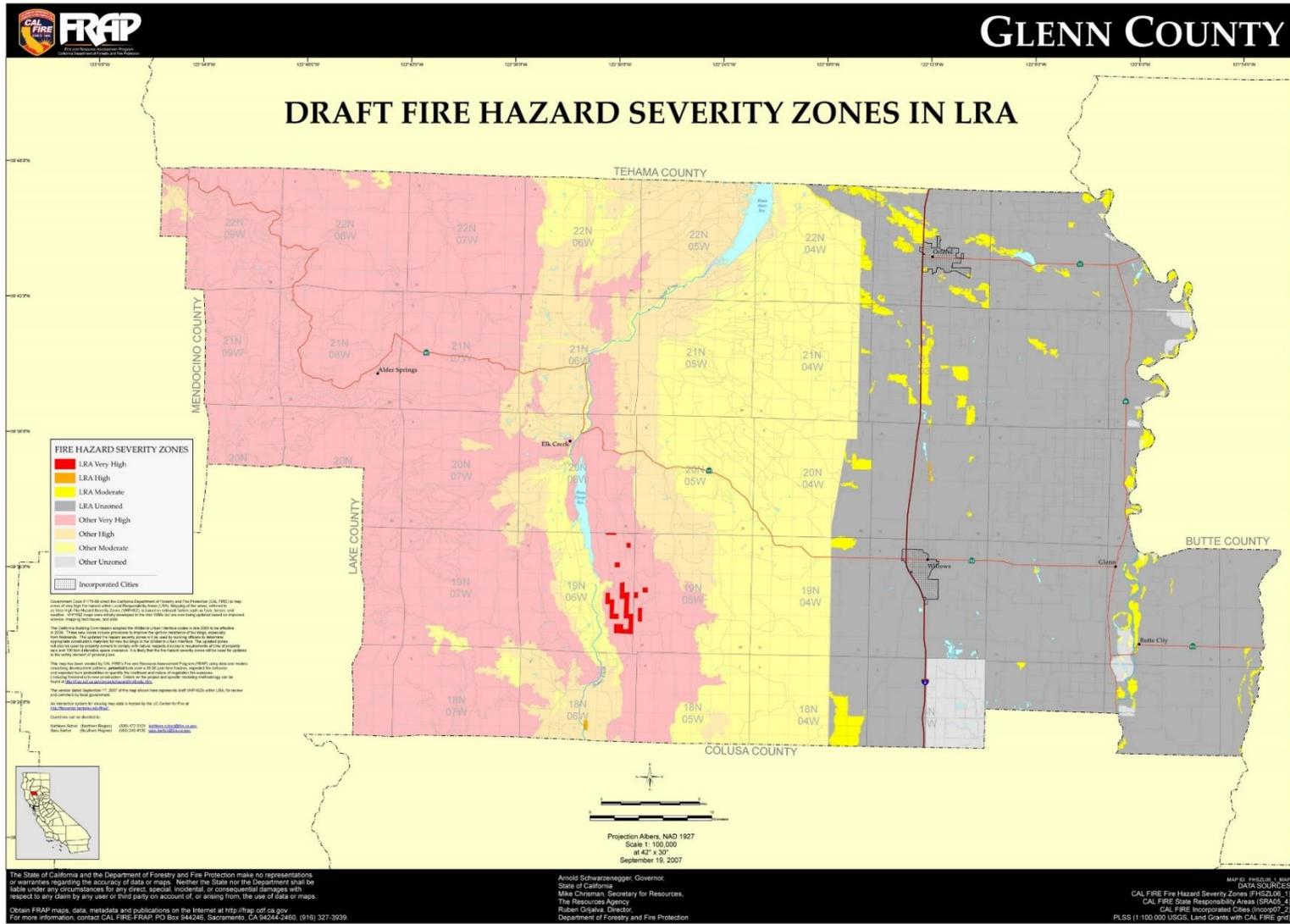


EXHIBIT 3 – Fire Hazard Maps *State Responsibility Area (SRA)*



Local Responsibility Area (LRA)



Emergency Response Actions

- Confirm report of wildland fire with appropriate fire authority
 - Identify impacts and projected impacts

- Obtain situation status briefing from agency with jurisdiction for the fire. Based on the severity of the situation determine whether to monitor or activate.

- Determine any alert and warnings that may be required immediately

- Activate the Emergency Operations Center (if determined)
 - Determine level of activation

- Notify:
 - EOC members
 - Key personnel
 - Cities
 - Cal-OES (REOC/SOC if activated)
 - RDMHS

- Begin written log/documentation of the incident

- EOC management team meets as soon as practical
 - Assess the conditions
 - Identify the potential impacts
 - Identify areas for mandatory Evacuations Warnings and/or Orders
 - Identify healthcare facilities or facilities with persons with special needs that may need assistance to evacuate – Activate Medical-Health Branch to assist
 - If evacuations are to take place, immediately activate Care and Shelter Branch to begin establishment of shelters
 - Identify if schools are open or will be open in or near areas that may be impacted.
 - Consult with Superintendent of Schools on issue and consider closing/evacuating schools in threatened areas

- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare message for all communication modes including websites and social media
- Coordinate information with fire agency, Cal-OES Inland Region, adjacent Counties, affected local cities, agencies and districts as appropriate.
- Contact 2-1-1 to establish non-emergency hotline

Fire/Rescue Branch

- Operations Section Chief
- Coordinate with on-scene fire commander
- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests through Cal-OES Fire Branch

Medical-Health Branch:

- Notify all healthcare facilities and provides preliminary situation report
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- Facilitate Medical and Health Mutual Aid and resource requests through the MHOAC
- If evacuation of healthcare facilities is likely, *refer to Annex C Evacuations*, and notify RDMHS & LEMSA
- Monitors air quality and makes health recommendations for modifications to activities in the community
- Health Officer determine if Local Health Emergency is necessary for recovery

Care and Shelter Branch:

- Identify sites for shelter
- Contact HHS A EP and Shelter Team
- Develop a shelter plan – *refer to Functional Annex D: Mass Care & shelter*

Law Branch:

- Prepare evacuation plan (*refer to Annex C – Evacuation*)
- Identify evacuation areas and routes
- Coordinate with Care and Shelter to identify shelter locations and routes to the sites
- Identify law enforcement staff for evacuations
- Communicate evacuation areas to the PIO for release via media and emergency alert modes
- Coordinate with Cal-OES Law Branch to facilitate Law Enforcement Mutual Aide (LEMA) requests to include Coroner’s MA and Search and Rescue MA

Agriculture Branch – Animal Control Unit

- Prepare plan for animal evacuations, care, and shelter
- Identify sites for livestock and animal sheltering
- Communicate animal shelter locations and animal owner evacuation procedures with the PIO for release to the public

Public Works:

- Coordinate with utilities, water districts, levee districts, etc.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing
 - temporary repairs
- Conduct damage assessment

Closely monitor and display essential and accurate information including:

- Number of Deaths
- Number of Injuries
- Number of Missing

- Number of Displaced Victims
- Number of Victims in Shelters
- Significant Weather
- Air quality
- FEMA Category Damage Assessment Totals
- Status of Hospitals
- Severe, moderate and lightly damaged areas
- Status of Airports
- Status of Pre-hospital systems

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

F. SEISMIC EVENTS

EARTHQUAKE

General Situation

The Pacific Rim Region which includes the state of California is one of the most active earthquake regions on earth. California's geographic features are dominated by the juncture of two of the world's tectonic plates, the North American plate and the Pacific plate.

The San Andreas Fault runs the entire length of the state, north to south. The San Andreas Fault is not the only fault system capable of causing considerable loss of life, property and environmental damage. The western half of the state, particularly in the southern and northern regions, are honeycombed with smaller fracture faults and small to moderate independent fault systems each capable of causing significant damage. Research indicates that small, independent fault systems are capable of "linking" together to produce significant earth movement overtime.

Historically, there has been regular activity along these faults. In any given year, California experiences between 2,000 and 6,000 seismic events, however, most of these are of low magnitude and produce little surface effects. There have been significant events over the last couple of centuries, particularly in the southern and south-central section of the state.

Major earthquakes in the Central Valley, Bay Area, and Southern California have caused death and injuries, substantial property loss and disruption of services for extended periods of time. Additional severe seismic activity has occurred in the eastern foothills near Oroville (Butte County) and the along the western portion of Glenn County within fairly recent history.

Faults Systems within Glenn County

Six earthquake Fault Systems are present within the Glenn County area. These fault systems have produced or have the potential to produce seismic events of moderate to major impact. The longest of these are the **Bartlett Springs (Coast Range) Fault** and the **Great Valley (Willows) Fault**. The Bartlett Springs Fault runs generally north and south along the western side of Glenn County within the Mendocino National Forest. The Bartlett Springs Fault System contains several faults that run through western Glenn and Tehama counties and eastern Lake and Mendocino counties. This Fault System runs through the bottom of Black Butte Reservoir. The Great Valley Fault enters the county at the southern end and traverses the county in a northwesterly direction, sitting just west of I-5.

There are a number of small fracture faults of this system, including **Stony Creek Fault** which is parallel to the reservoir and tributary of the same name and terminates at the town of Stonyford. The **Corning Fault** branches off from the Willows Fault where the two pass under the Colusa Canal and the Corning Fault continues up along the central part of the county following the path of Highway 5.

In the south-eastern region of the county, **Indian Valley and Resort Faults** have been inactive for over 50 years but are significant enough in potential to be cause for concern.

The last major seismic activity affecting Glenn County was located near the Oroville Dam area in the 1975. This earthquake was a magnitude 5.8 and produced only minor damage in Glenn County.

The USGS database shows that there is a 60.91% chance of a moderate earthquake (magnitude 5.0 or higher) within 30 miles of Glenn County within the next 50 years. The largest earthquake within 30 miles of Glenn County, CA was a 5 Magnitude in 1995.

Historical Earthquake Data

Glenn County-area historical earthquake activity is significantly below California state average; however, it is 724% greater than the overall U.S. average.

Earthquakes in or near Glenn County

- 5/17/1995 5 mag 13mi depth, 10.03 mi NE Paskenta, CA
- 5/22/2001 4 mag 0mi depth, 18.72 mi NE Paskenta, CA
- 11/25/1997 4 mag 17mi depth, 3.60 mi SW Artois, CA
- 8/28/2010 4 mag 14mi depth, 11.36 mi SW Upper Lake, CA
- 8/8/1989 4 mag 11mi depth, 14.98 mi SW Potter Valley, CA
- 3/29/2003 4 mag 17mi depth, 3.97 mi E Hamilton City, CA
- 7/18/1982 4 mag 10mi depth, 6.10 mi SE Paskenta, CA
- 12/6/2007 4 mag 5mi depth, 7.21 mi NE Paskenta, CA
- 9/3/1982 4 mag 5mi depth, 3.31 mi NE Elk Creek, CA
- 10/14/1992 4 mag 17mi depth, 4.31 mi E Hamilton City, CA
- 11/23/2001 3 mag 21mi depth, 1.73 mi S Elk Creek, CA
- 10/3/1989 3 mag 5mi depth, 3.81 mi S Elk Creek, CA

- 9/3/1982 4 mag 5mi depth, 3.31 mi NE Elk Creek, CA
- 11/25/1997 4 mag 17mi depth, 3.60 mi SW Artois, CA
- 11/27/1989 3 mag 5mi depth, 9.48 mi SE Stonyford, CA

Moderate Earthquakes in the Area

- On 8/1/1975 at 20:20:12, a magnitude 5.8 (5.8 MB, 5.6 MS, 5.8 MW, 5.7 ML, Class: Moderate, Intensity: VI - VII) earthquake occurred 48.4 miles away from the county center
- On 11/26/1998 at 19:49:53, a magnitude 5.4 (5.0 MB, 4.9 MS, 5.4 MW, 5.2 ML, Depth: 14.5 mi) earthquake occurred 69.0 miles away from the county center
- On 3/8/1992 at 03:43:04, a magnitude 5.5 (5.3 MB, 5.3 MS, 5.5 MW, 5.3 ML, Depth: 8.1 mi) earthquake occurred 99.2 miles away from the county center
- On 9/3/2000 at 08:36:30, a magnitude 5.2 (4.9 MB, 4.9 MS, 5.2 ML, 5.0 MW, Depth: 6.3 mi) earthquake occurred 86.8 miles away from Glenn County center
- On 8/10/2001 at 20:19:26, a magnitude 5.2 (4.8 MB, 4.9 MS, 5.2 MW, 5.1 MW, Depth: 11.1 mi) earthquake occurred 88.5 miles away from the county center
- On 1/19/2008 at 23:13:05, a magnitude 4.9 (4.9 MB, 4.3 MS, 4.9 MW, 4.7 MW, Depth: 1.8 mi, Class: Light, Intensity: IV - V) earthquake occurred 43.7 miles away from the county center

Magnitude types: body-wave magnitude (MB), local magnitude (ML), surface-wave magnitude (MS), moment magnitude (MW)

Structures and Soil

The geologic structure of the land area in the southern, central and eastern sections of the county is nearly 100% based in a mixture of old and new alluvium and old stream channel and fan deposits. This makes for rather loose, unconsolidated soil with a potential for strong ground surface displacement. Additionally, alluvium is conducive to the rolling secondary waves of an earthquake.

Two significant phenomena are most responsible for potential loss of life and property damage, ground shaking and ground failure (liquefaction/subsidence).

Strong Ground Motion is the movement of the earth's surface in response to the seismic event. The intensity of the ground shaking and the subsequent damages are determined by the magnitude (energy release) of the earthquake, the distance from the epicenter, and the characteristics of the surface geology. The central Glenn County region is formed from new alluvium and stream/riverine basin deposits washed down from the surrounding mountain systems over 100,000 years ago. This subsoil

structure is not as stable as bedrock and will intensify strong ground motion. There are few structures over three stories within the county, and most residential construction is of wood frame construction on slab foundation. Additionally, there are only a few of the original unreinforced masonry structures still standing in the area.

Liquefaction occurs when the surface soil is rearranged by the shaking of strong ground motion and infused with surface water or areas of high ground water. Liquefied solids behave like a heavy fluid or thin mud. It may cause underground tanks to float to the surface or cause structures to sink several inches or feet. Historically, ground water was relatively close to the surface in central Glenn County, existing at a depth of 35-70 feet; however, due to heavy pumping of the surface aquifer for drinking water and irrigation, the current ground water table has fallen to a depth of nearly 200 feet. Liquefaction as a result of strong ground motion in the County of Glenn remains a remote possibility due to ground water infusion programs.

Impacts of an Earthquake

A major earthquake is unlikely, however, a moderate earthquake of a 5.0 is possible in Glenn County or adjacent jurisdictions. A moderate earthquake could lead to property damage, transportation system damage, utility outages, fires, flooding, landslides, and other ensuing hazards.

Emergency Response Actions

- Complete a quick life safety check and analysis of the situation and danger to employees and visitors in the jurisdiction buildings.
- Determine status of key facilities and essential equipment.
- If appropriate, follow evacuation protocol and move employees and visitors from jurisdiction buildings to open areas away from buildings.
- Confirm the primary or alternate EOC is structurally safe for operation.
- Unless properly trained, do not re-enter buildings until Building Inspectors or Structural Engineers have checked for possible structural damage, gas line leakage, and other utility disruptions.
- If appropriate, commence EOC activation and staff notification. Level I EOC activation is recommended for most serious earthquake situations.
- Notify:
 - EOC members
 - Key personnel
 - Cities
 - Cal-OES (REOC/SOC if activated)
 - RDMHS
- Begin written log/documentation of the incident
- Activate the EOC – determine level of activation and recall appropriate staff for the level of activation
- EOC management team meets as soon as practical
 - Assess the conditions
 - Identify areas for advisory and/or mandatory evacuations
 - Identify healthcare facilities or facilities with persons with special needs that may need assistance to evacuate – Activate Medical-Health Branch to assist with this task
 - If evacuations are to take place, immediately activate Care and Shelter Branch to begin establishment of shelters

- Request and obtain an Initial Damage Assessment (Safety Survey) (Safety Assessment) from field responders through Public Safety Communications.
- Contact the operators for the Black Butte and Stony Gorge dams for initial damage assessment.
- Determine status of communications (capabilities and requirements). Direct the Communications Unit Leader in the Logistics Section to obtain additional communications equipment, radios, batteries etc. to support response operations.
- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare messages for all communication modes including websites and social media
- Contact 2-1-1 to provide public information and activate non-emergency hotline

Medical-Health Branch: (refer to Annex E: Health & Medical)

- Notify all healthcare facilities and provides preliminary situation report
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- If evacuation of healthcare facilities is likely, *refer to Annex C - Evacuation and coordinate with RDMHS and LEMSA*
- Monitor EMSystems for hospital bed availability
- Consider if activation of Region III MCI Plan and/or GC Healthcare Surge Plan
 - If Region III MCI Plan is activated, Immediately contact Medical Control Facility for MCI and identify primary contact for this incident
 - All patient distribution & tracking should be coordinated by Medical Control Facility
 - Contact Medical Control Facility for patient identification, tracking, family reunification coordination
 - Refer to Patient Tracking System in Annex E: Med-Health
 - Coordinate with on-scene medical to ensure patient transportation documentation is maintained and transmitted to MHOAC

- Identify the need for temporary field treatment/triage sites and/or Alternate Care Sites (ACS)
- Assists with medical-health resource needs/requests
- Assess health impacts related to the incident
 - Provide health-related information for the incident to the PIO
 - Coordinate Disaster Behavioral Health Response
 - Coordinate Environmental Health Response

Fire/Rescue Branch

- Coordinate with on-scene fire commander
- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests

Care and Shelter Branch:

- Identify sites for shelter
- Contact HHS EP and Shelter Team
- Develop an incident-specific shelter plan – *refer to Annex D: Mass Care & shelter*

Law Branch:

- Prepare evacuation plan
- Identify evacuation areas and routes
- Coordinate with Care and Shelter to identify shelter locations and routes to the sites
- Identify law enforcement staff for evacuations and security
- Communicate evacuation areas to the PIO for release via media and emergency alert modes

Agriculture Branch – Animal Control Unit

- Prepare plan for animal evacuations, care, and shelter
- Identify sites for livestock and animal sheltering
- Communicate animal shelter locations and animal owner evacuation procedures with the PIO for release to the public

Public Works:

- Conduct damage assessment
- Coordinate with utilities, water districts, levee districts, etc.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing
 - temporary repairs

Closely monitor and display essential and accurate information including:

- Number of Deaths
- Number of Injuries
- Number of Missing
- Number of Displaced Victims
- Number of Victims in Shelters
- Significant Weather
- FEMA Category Damage Assessment Totals
- Status of Hospitals
- Severe, moderate and lightly damaged areas
- Status of Airports
- Status of Pre-hospital systems

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

EXHIBITS:

1- [Modified Mercalli Scale](#)

2- [Glenn County Fault Map](#)

EXHIBIT 1- Modified Mercalli Intensity Scale

- I. Not felt. Marginal and long-period effects of large earthquakes.
- II. Felt by persons at rest, on upper floors, or favorably placed.
- III. Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
- IV. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV, wooden walls and frames creak.
- V. Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
- VI. Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle).
- VII. Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also un-braced parapets and architectural ornaments). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
- VIII. Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
- IX. General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Frame structures, if not bolted, shifted off foundations. Frames cracked. Serious damage to reservoirs. Underground

pipes broken. Conspicuous cracks in ground. In alluvial areas, sand and mud ejected, earthquake fountains, sand craters.

- X. Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
- XI. Rails bent greatly. Underground pipelines completely out of service.
- XII. Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

Definition of Masonry A, B, C, D:

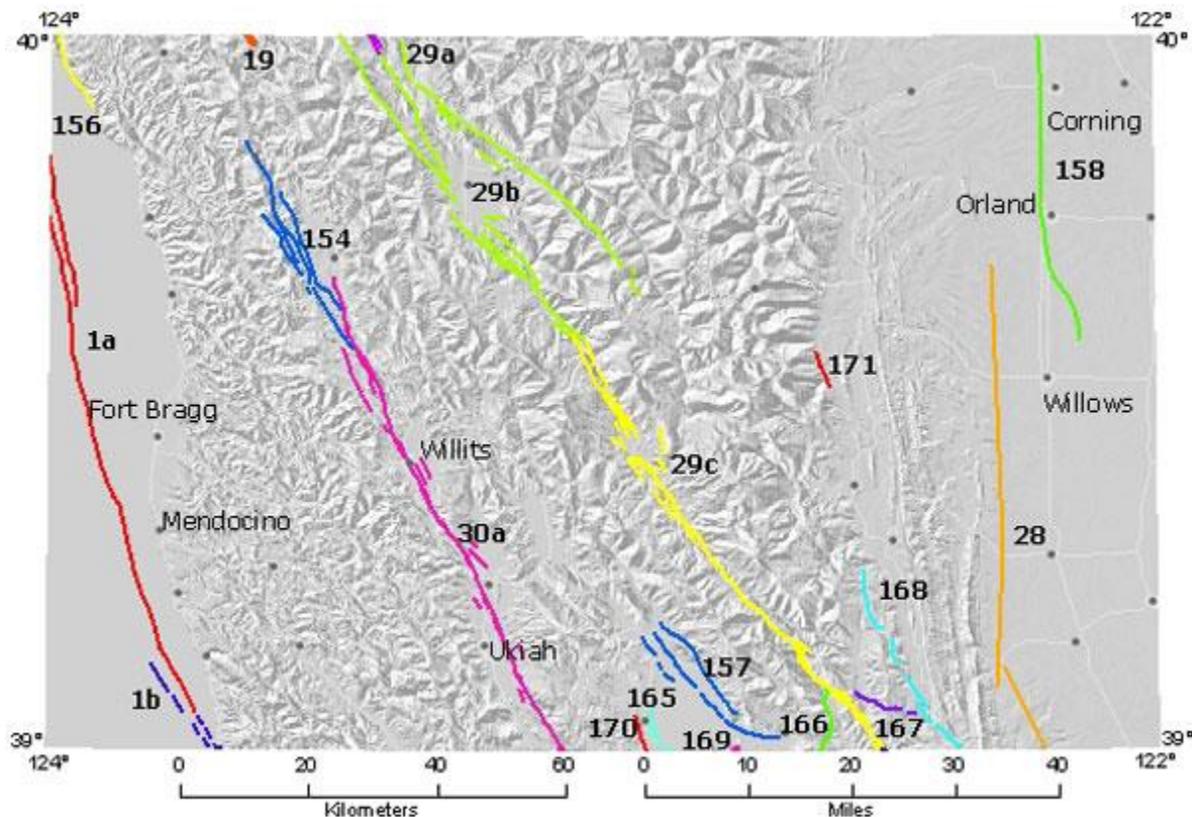
Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.

Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.

Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

EXHIBIT 2- Glenn County Fault Maps



Use the number and/or name in the USGS Database Search to get more information about a fault.

Faults bolded and underline are in Glenn County

1a San Andreas fault zone, Shelter Cove section

1b San Andreas fault zone, North Coast section

19 Garberville-Briceland fault zone

28 Great Valley fault zone

29a Bartlett Springs fault system, Lake Mountain section

29b Bartlett Springs fault system, Round Valley section

29c Bartlett Springs fault system, Bartlett Springs section

30a Maacama fault zone, north section

154 Brush Mountain shear zone

156 Whale Gulch-Bear Harbor fault zone

157 Clover Valley fault zone

158 Corning fault

165 Big Valley fault zone

166 Cross Spring fault zone

167 Little Indian Valley fault zone

168 Resort fault zone

169 Konocti Bay fault zone

170 West Margin fault

171 Stoney Creek fault

VOLCANO

General Situation

Glenn County does not have a volcano located within the county; however, volcanoes within the region could produce hazardous impacts to the county. The Cascade Volcanic Arc stretches from southwestern British Columbia through northern California. Mt. Shasta and Mt. Lassen are located in the stretch within northern California. Mt. Shasta is situated approximately 130 miles north and Mt. Lassen is situated 77 miles northeast of Glenn County.

All of the volcanoes of the Cascade Range and Modoc Plateau region are geologically young, and it is almost certain that there will be future eruptions in the region. In addition, the presence of magma at shallow depths may be responsible for the geothermal activity around Clear Lake in the northern Coast Ranges. Though these areas are distant from large population centers, future eruptions could produce widespread impacts, adversely affecting distant communities as well as local residents and visitors. A major volcanic eruption in the Cascade Range or elsewhere in northern California could also affect agriculture, transportation, communications, water quality, timber resources, and recreation over a broad area.

Volcanic eruptions can threaten human welfare by generating destructive flows of lava or debris, by filling the skies with clouds of ash and other fine rock particles, and by emitting noxious gases such as carbon dioxide, chlorine, or acidic compounds. Of these multiple potential hazards, large flows of pyroclastic material from Cascade volcanoes would be the greatest threat in northern California. The geologic evidence indicates that between 300,000 and 360,000 years ago, an explosive eruption at Mount Shasta produced a volcanic debris flow that traveled over 25 miles from the volcano and buried an area exceeding 175 square miles in rubble. Even larger volcanic mudflows, known as lahars, resulted from prehistoric eruptions at both Mount Lassen and Mount Shasta. And during the relatively small eruptions of 1915 and 1918, ash particles from Mount Lassen fell as far away as Elko, Nevada, 300 miles to the east.

Mount Shasta and Mount Lassen (along with other areas in central and southern California) are continuously monitored by scientists from the U.S. Geological Survey for signs of renewed activity. In the absence of any means to accurately predict future volcanic eruptions, the combination of hazard assessments beforehand, strategic preparedness and monitoring will help limit the harmful consequences of future eruptions.

Glenn County OA EOP

U.S. Geological Survey California Volcano Observatory (CalVO)

<http://volcanoes.usgs.gov/observatories/calvo/>



The USGS, Volcano Hazards Program monitors volcanoes, assesses their hazards, responds to volcanic crises, and conducts research to fulfill a Congressional mandate (Public Law 93-288) that the USGS issue "timely warnings" of potential volcanic hazards to responsible emergency-management authorities and to the populace affected. The USGS provides eruption warnings and related notifications based on data and observations collected from extensive volcanic monitoring networks operated by five USGS volcano observatories.

Located in Menlo Park, CA, the USGS **California Volcano Observatory**, or CalVO has responsibility for monitoring all potentially active volcanoes in California and Nevada and identifying and responding to all volcanic hazards. During periods of quiescence, CalVO watches for signs of unrest, conducts research, and provides long-term hazard assessments to government agencies, private industry, non-governmental organizations, educational institutions, and the public. During volcanic unrest and eruption, CalVO issues hazard alerts, providing timely information as volcanic activity ramps up, and, as importantly, as the volcano returns to quiescence.

The 2018 update to the national volcanic threat assessment lists the potentially active centers in California (and Nevada) as shown on the map above. This report can be accessed at:

<https://pubs.er.usgs.gov/publication/sir20185140>

Mount Shasta and Mount Lassen are both ranked in the very high threat category with a ranking of number 5 for Mt. Shasta and 11 for Mt. Lassen.

Glenn County OA EOP

Primary Impacts to Glenn County

Glenn County is located far enough from the volcanoes that direct impacts from lava, lahars, etc. should not be felt. The most likely impacts will be poor air quality from ash, fine rock particles, and noxious gases such as carbon dioxide, chlorine, or acidic compounds. This will create hazardous air quality and result in primarily a public health emergency. Hazardous air including falling ash and debris can produce additional impacts to agriculture, transportation, communications, electrical lines and substations, and water quality. Additional impacts may include sheltering evacuees from surrounding counties that have been forced to evacuate their homes due to primary impacts from the eruption.

Activation of the EOC including the medical health branch, care and shelter branch, agriculture branch, and other specialty branches may be needed to monitor and respond to the impacts of the eruption.

Volcanic Alert Levels

Volcano-alert notifications are produced by Volcano Observatory scientists and are based on analysis of data from monitoring networks, direct observations, and satellite sensors. They are issued for both increasing and decreasing volcanic activity and include text about the nature of the unrest or eruption and about potential or current hazards and likely outcomes. Scientists describe a volcano's status using the alert levels and color codes and issue different types of notifications to address specific information needs. All notifications are publicly available and can be accessed at: <https://volcanoes.usgs.gov/vhp/updates.html>

Information Statements

Unusual events such as steam bursts (with or without ash fall), small avalanches, rock falls, minor mudflows, attract media and public interest and inquiry. Most volcano-related events are usually short-lived, and some may be hazardous. Information Statements may also be issued to provide commentary about notable events occurring within any staged alert level during volcanic unrest.

Glenn County OA EOP

Volcanic Activity Notice (VAN)

Announces alert-level changes or significant volcanic activity within an alert level; covers all volcanic hazards—lahars (volcanic mudflows), lava flows, ash fall, airborne ash, pyroclastic flows. VAN utilizes a four tier alert level system. See Volcanic Alert Levels.

Volcanic Alert Levels

ALERT-LEVEL TERMS.	
When the volcano alert-level is changed, a Volcano Activity Notice (VAN) is issued.	
NORMAL	Volcano is in typical background, noneruptive state or, <i>after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state.
ADVISORY	Volcano is exhibiting signs of elevated unrest above known background level or, <i>after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
WATCH	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway but poses limited hazards.
WARNING	Hazardous eruption is imminent, underway, or suspected.

Glenn County OA EOP

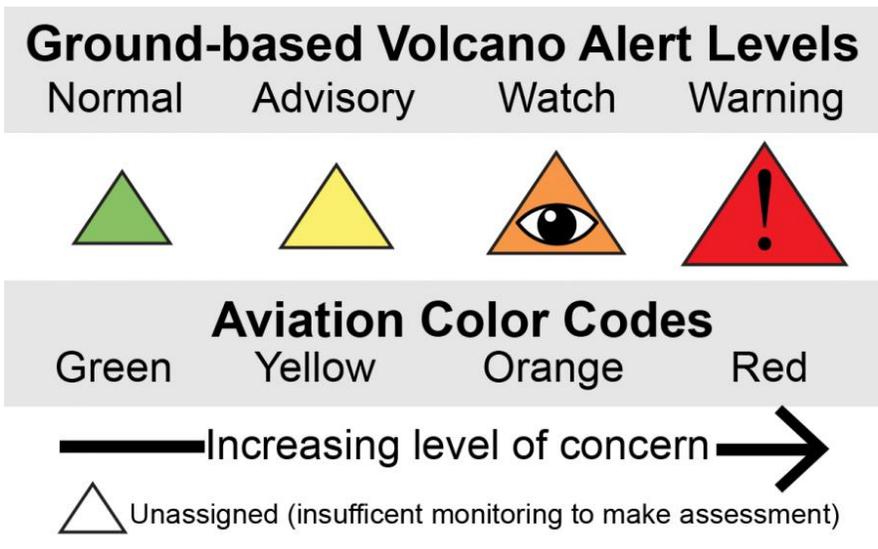
Notification for Aviation (VONA)

Aviation-sector specific (for pilots, dispatchers, air-traffic managers, meteorologists); focuses on ash emissions.

Volcanic Color Code

AVIATION COLOR CODES	
When the volcano color code changes, a Volcano Observatory Notification for Aviation (VONA) is issued.	
GREEN	Volcano is in typical background, non-eruptive state <i>or, after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state.
YELLOW	Volcano is exhibiting signs of elevated unrest above known background level <i>or, after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway with no or minor volcanic-ash emissions [ash-plume height specified, if possible].
RED	Eruption is imminent with significant emission of volcanic ash into the atmosphere likely OR eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible].

Volcanic Alert Level Icons



Normal/Green

Non-erupting volcano is exhibiting typical background activity (including steaming, seismic events, thermal feature, or degassing), as long as such activity is within the range of typical non-eruptive phenomena seen at the volcano.

Volcano Advisory/Yellow

The volcano is exhibiting signs of elevated unrest above known background activity.

Volcano Watch/Orange

The volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain OR an eruption is underway that poses limited hazards including no or minor volcanic-ash emissions.

Volcano Warning/Orange

Major volcanic eruption is imminent, underway, or suspected but it poses limited hazards to aviation because of no or minor volcanic-ash emissions (e.g., an eruption with only substantial lava flows and no risk of ash production).

Volcano Watch/Red

Volcanic eruption is underway that poses limited hazards to ground-based communities but includes significant emission of ash into the atmosphere that could affect aviation (e.g. an ash plume that does not yield significant ash fall onto ground communities but does drift into air routes).

Volcano Warning/Red

Major volcanic eruption is imminent, underway, or suspected with hazardous activity both on the ground and in the air.

Glenn County OA EOP

Emergency Response Actions

Initial Response

- Conduct and Initial Threat Assessment Meeting to identify the incident and the threat to the county
 - Be sure to include public health representation in this meeting as the primary immediate impacts of an eruption will be health-related
- Determine whether life, safety, environment will be impacted in Glenn County due to the volcanic eruption
 - Determine if evacuations from an adjacent county will impact the OA
 - Determine if electrical power may be disrupted (*Refer to Annex H: Utilities Outage*)
- Determine whether activation of the EOC is required and at what level
- If appropriate, proceed with EOC activation procedures (refer to Annex A – EOC Procedures)
- PIO prepare initial statement to be immediately released to the public. If health-related, consult with Public Health. Coordinate information release with adjacent counties and Cal-OES/CDPH
- Conduct initial assessment of communications and utilities
- Care and Shelter Branch - contact HHS A EP Shelter Team to standby for sheltering operations

On-going Response

- Monitor impacts from the eruption including impacts on air quality, healthcare, infrastructure, transportation, and agriculture
- Provide operational coordination and logistical support to response operations including public safety, care and shelter, health and medical, infrastructure repair, etc.
 - Activate and follow procedures specific to the affects (refer to appropriate annexes)
- Provide timely public information and guidance on appropriate public response actions
- Provide mutual aid to counties directly impacted by the volcanic eruption
- Maintain communications with region and state operation centers (REOC, SOC, MHCC)
- Maintain appropriate documentation and accounting for incident related activities and costs

Glenn County OA EOP

G. TRANSPORTATION /MULTI- CASUALTY INCIDENT

General Situation

There is a real threat of a transportation emergency occurring in Glenn County. There are numerous opportunities for incidents on the highway, rail or aircraft. Most transportation emergencies are roadway accidents. The majority of these accidents are minor in scope of response and recovery operations, typically not requiring the activation of the EOC. However, major roadway, train, and aircraft accidents do occur and can lead to mass casualties, mass fatalities and may cause ancillary emergencies such as hazardous materials spills. Complex transportation incidents such as this will require a higher level of coordination and response.

The following is a brief synopsis of the types of transportation emergencies that could be experienced in the Glenn County. The information provided is for informational purposes only and responders will rely on their appropriate procedures for response.

Major Roadway Accidents

Vehicle accidents occur frequently with most involving passenger vehicles. A multi-car accident, bus, or major truck/auto accident on any of the major routes would severely limit access into and out of the County. Road closures would cause traffic to overflow onto local surface roads creating significant traffic problems for local law enforcement agencies. Alternate routes are not available on some portions of the major highways. Heavy transport vehicles travel throughout the County carrying fruit, vegetables, dairy products, animals, pesticides, petroleum and other chemicals. This list is not inclusive but displays that any accident has the potential of a major catastrophe.

Glenn County has several major roadways including State Routes 32, 45, 162, and Interstate 5 (I-5). These highways are heavily travelled routes including truck routes. Historically, there have been numerous occasions where severe weather such as fog has reduced the flow of traffic and lead to multi-vehicle accidents.

In April of 2014, Glenn County experienced a transportation multi-causality incident when a Fed-Ex truck collided with a tour bus with 46 high-school aged students and young chaperones on I-5 north of Orland. The accident resulted in 10 fatalities and 34 injured. A multi-agency response occurred immediately and involved mutual aid from the region. Injured patients were transported to seven hospitals from Sacramento to Redding and I-5 was closed for 17 hours and traffic diverted to surface streets.

Refer to Appendix K-2 for an overview of the road system in Glenn County

Glenn County OA EOP

Railway Incidents

There is one rail system that traverses the full length of Glenn County. It is owned and maintained by Union Pacific who leases the tracks to California Northern Railroad for their use. The system runs centrally through the county paralleling County Rd 99W (south to north), travelling through eastern Willows and central Orland. This railway primarily transports freight and cargo.

The rail that traverses from Johns Manville is in operation and is under control of Cal Northern. It runs to the plant and dead ends. The Yoyo loop that goes out to Hamilton City and ends at the old Holy Sugar plant will be reopened and operational in 2019, under control of Cal Northern.

A derailment or collision of a rail with a vehicle could lead to serious incident and may involve the release of hazardous materials (*refer to Hazardous Materials*). A train accident can result in considerable loss of life, property, and environmental damage. Complex transportation incidents such as this will require a higher level of coordination and response.

Aircraft Incidents

There are two general aviation airfields in the Glenn County, the Willows-Glenn County Airport and Haigh Field in Orland. Airports and planes in general bring risks of accidents. Both airports are small uncontrolled airports, used primarily by hobbyists and private pilots as well as small corporate jets and crop dusting services.

Crashes of small planes in the past have not posed extensive problems to the county. However, a crash of a large jetliner or military aircraft could occur due to the over fly area and could lead to serious implications.

Glenn County OA EOP

Emergency Response Actions

Initial Response

- Obtain situation status briefing from on-scene Incident Commander.
 - Determine if major implications such as MCI, hazardous materials release, etc.
 - Based on the severity of the situation, determine the need to activate the Emergency Operations Center or whether OES can provide low level support
- Coordinate with Public Health’s Medical Health Operational Area Coordinator (MHOAC) to determine status of EMS and hospitals and their capability to handle the influx of patients.
 - Refer to Annex E: Health and Medical
 - Notify LEMSA, RDMHS, CDPH/EMSA
 - Determine need to activate:
 - Region III Multi-Casualty Incident (MCI) Plan
 - Field Treatment Site Plan
 - Glenn County PH & Medical EOP
 - Glenn County Healthcare Surge Plan
- Refer to the Region III Multi-Casualty Incident (MCI) Plan for response operations related to MCIs

If the incident includes the release of a hazardous material, refer to Hazardous Materials for response actions

Extended Response

- Notify:
 - Key personnel
 - Cities
 - Cal-OES (REOC/SOC if activated)
 - RDMHS
 - EOC members (if activated)
- Begin written log/documentation of the incident
- EOC management team meets as soon as practical

Glenn County OA EOP

- Assess the conditions
- Identify the potential impacts
- Identify if shelter in place or evacuations will be necessary
 - Activate Care and Shelter Branch to begin establishment of shelters and/or family reunification center
- Status on healthcare facilities and EMS
- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials
- ☐ Closely monitor and display essential and accurate information including:
 - Number of Deaths
 - Number of Injuries
 - Number of Missing
 - Number of Displaced Victims
 - Number of Victims in Shelters
 - Significant Weather
 - Severe, moderate and lightly damaged areas
 - Status of Airports
 - Status of Hospitals
 - Status of Pre-hospital systems
 - FEMA Category Damage Assessment Totals
- ☐ PIO prepares initial press release and prepares to respond to media inquiries
 - Prepare message for emergency alerting and notification modes
 - Prepare message for all communication modes including websites and social media
 - Identify whether activation of a Joint Information System will be necessary to coordinate messaging among jurisdictions and agencies involved
 - Prepare for multi-agency press conference and/or press briefings
 - Notify 2-1-1 of incident and activate non-emergency hotline
- ☐ Medical-Health Branch:
 - Refer to Annex E: Health and Medical for procedures including Patient tracking system

Glenn County OA EOP

- Immediately contact Medical Control Facility for MCI and identify primary contact for this incident (Refer to Region III MCI Plan for Med Control Facility)
 - All patient distribution & tracking should be coordinated by Medical Control Facility
 - Contact Medical Control Facility for patient identification, tracking, family reunification coordination
- Coordinate with on-scene medical to ensure patient transportation documentation is maintained and transmitted to MHOAC
- Monitor EMS systems for hospital bed availability
- Identify the need for temporary field treatment/triage sites
- Notify all healthcare facilities (that may be involved) and provide preliminary situation report and recommendations on intended response actions: decontamination of incoming patients, etc.
- Develops and sends med-health SITREP to RDMHS, CDPH, EMSA
- Assists with medical-health resource needs/requests and coordinate Medical Health mutual aid
 - Consider emergency medical resource requests such as Disaster Medical Support Units (DMSU)
- Assess health impacts related to the incident
 - Provide subject matter expertise and input for command and management briefings
 - Provide health-related information for the incident to the PIO
- Coordinate Disaster Behavioral Health response
- Activate & coordinate Victim Witness Advocate Services

Care and Shelter Branch:

- Identify sites for shelter
- Contact HHS A EP and Shelter Team
- Develop a shelter plan
 - Coordinate with transportation branch for transport of stranded motorists, survivors, etc. to shelter
 - Coordinate with Law Branch for shelter security
 - Coordinate with PIO for release of shelter locations

Glenn County OA EOP

Law Branch:

- Perimeter and security planning
- Determine status of key transportation corridors (highways, railroads, roads, streets). Ensure traffic plan is developed
- Prepare evacuation plan if evacuations will occur (Refer to Annex C: Evacuation)
- Coordinate with Sheriff/Coroner to address management of fatalities
 - Coordinate with local mortuaries for transport and storage
 - Identify temporary morgue storage as needed
- Contact Cal-OES Law Branch and request Law Enforcement Mutual Aid, to include Search and Rescue and Coroner mutual aid

Fire/Rescue Branch

- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests
- Contact Cal-OES Fire Branch if Fire Mutual Aid is required

Public Works Branch:

- Determine status of key transportation corridors (highways, railroads, roads, streets). Coordinate with Section Chiefs to reopen key access roads or to go around damaged areas
- Assess impact(s) to drainage areas and waterways
- Assist with incident mapping
- Coordinate with utilities, water districts, etc.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing
 - temporary repairs
- Conduct damage assessment

Glenn County OA EOP

Transportation Branch:

- Contact & coordinate with appropriate transportation authority (railroad, airport, highway)
- Coordinate transportation for stranded motorist, evacuees, etc. to shelter site
- Identify transportation needs for returning stranded motorist/survivors home or to point of departure
 - Coordinate with involved transportation company, if applicable, to identify return transportation
 - Coordinate with any remaining stranded motorist/survivors to ensure return transportation is identified

Resource requests

- Identify any specialized resources that may need to be requested such as a HazMat Response Team, spill containment equipment, air monitoring equipment, bomb squad, mobile medical units, etc.

Plan for extended operations. Ensure that adequate staffing (EOC and field) will be available for the next operational period.

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

H. DISEASE EPIDEMIC – PANDEMIC

General Situation

New and emerging infectious diseases are a constant threat to our society. Germs are constantly evolving, trying to outsmart our immune system and wreak havoc on our population. Epidemics affecting humans have occurred for thousands of years with devastating results. The development and implementation of public health measures including hygiene, immunizations, sanitation, and vector control has dramatically reduced the overall frequency and severity of disease outbreaks in developed countries.

Disease is a unique hazard that requires a unique response. Diseases can go undetected for some time, developing, replicating, infecting or it can occur swiftly with immediate destruction to its host. The impacts can be far reaching as rates of death and disease exceed the capacity of society. With widespread disease such as a pandemic, the concept of mutual aid and external resources may be non-existent. Pandemics can come and go in waves with periods of extreme desolation and lulls that create a false sense of recovery. Pandemics can become a long drawn out event with the potential for substantial impacts.

Definitions

Outbreak - A disease outbreak happens when a disease occurs in greater numbers than expected in a community or region or during a season. An outbreak may occur in one community or even extend to several countries. It can last from days to years.

Sometimes a single case of a contagious disease is considered an outbreak. This may be true if it is an unknown disease, is new to a community, or has been absent from a population for a long time.

Epidemic - An epidemic occurs when an infectious disease spreads rapidly to many people. New cases of a certain disease, in a given human population, and during a given period, substantially exceed what is expected based on recent experience. For example, in 2003, the severe acute respiratory syndrome (SARS) epidemic took the lives of nearly 800 people worldwide.

Pandemic - An outbreak of disease that covers a wide geographic area & affects large numbers of people.

Pandemic Influenza - A global outbreak of disease that occurs when a new flu virus emerges for which there is little or no immunity in the human population. This virus can cause serious illness to humans and once the virus acquires the ability to transmit from person to person, it will spread rapidly from one community to another and across the globe.

Emerging Infectious Disease (EID) - An infectious disease whose incidence has increased in the past 35 years and could increase in the near future. EIDs are caused by newly identified species or strains (e.g. SARS, AIDS) that may have evolved from a known infection (e.g. influenza) or spread to a new population (e.g. West Nile virus) or are undergoing ecologic transformation (e.g. Lyme disease), or be reemerging infections, like drug resistant tuberculosis.

Impacts of Disease

It is difficult to predict the impact of a disease epidemic or pandemic. Each disease varies dramatically in its effects. Within each type of disease (flu, anthrax, etc.) there are large variances. Influenza, for example, occurs annually with minor impacts on our society. However, a novel influenza virus can have dramatically different results. Novel influenza viruses are typically more severe and spread more quickly, rapidly becoming pandemic. Pandemic flu viruses tend to be more virulent, cause more severe symptoms, & more fatalities. Pandemic influenza is unlike seasonal flu viruses we see each year, as most people will not have any immunity to a new influenza virus and no vaccine currently exists to prevent it.

The potential impact on people and the community range from small, such as increased absenteeism and illness, to severe, with significant disruption of business, healthcare and high numbers of deaths. The impact depends upon the nature of the microorganism involved and factors affecting its spread and severity.

Impacts of Pandemic Influenza

A pandemic may come and go in waves, each of which can last for 6-8 weeks spanning a 18 month to two year period. An especially severe pandemic could lead to high levels of illness, death, social disruption, and economic loss. Everyday life would be disrupted because so many people in so many places become seriously ill at the same time.

A severe pandemic can disrupt the community by reducing business activity, causing high employee and school absenteeism, interfering with harvesting crops, disrupting transportation, and overwhelming healthcare. Healthcare worker illness can also affect the ability of healthcare facilities to cope with the amplified need for their services. Large numbers of fatalities may cause strain on the mortuary services and affect the morale of the community. Mental wellbeing of both responders and people in the community may be affected both short and long term. Businesses and financial institutions may be seriously affected with the risk of some closing permanently and affecting employment.

- Impacts of the virus will be dependent on the severity of the strain and the ease of transmission.
 - Severe strain: 50% of infected may require clinical care (4200 Glenn County residents) and 15% may require hospitalization (1265 Glenn County residents)
- Depending on the scope of the incident, day-to-day activities may be interrupted and schools closed.
- Staff absenteeism due to illness, school closure, etc.
- Implementation of social distancing measures may lead to cascade effects
 - School closure, social distancing, isolation, and quarantine orders may be issued to slow disease
- Vaccine development will take 6 months +
- Impacts of surge at healthcare facilities
- Potential legal and ethical issues involving crisis standards of care and scarce resource allocation.
- Alternate Care Sites may be needed but staff will be an issue

Glenn County OA EOP

- Widespread impacts to the region, state, nation, and even the world will lead to an inability to acquire external assistance and resources

Response to Pandemics

The response to a pandemic is a complex and multifaceted task that requires engagement of all segments of the County, including the county emergency response structure, healthcare community, local businesses, private organizations, and individual families.

Public Health will be the lead for response to medical and health emergencies and public health threats. Public Health will be joint lead with law enforcement during a bioterrorism event. Public Health will provide support and guidance to other County agencies for protective measures and personal protective equipment (PPE) related to communicable disease or bioterrorism threats as needed.

Depending on the severity of the disease and the expected impacts on the community, Public Health officials in conjunction with emergency management officials, will determine whether the response can be coordinated and managed from the Public Health Department Operations Center (DOC) or whether activation of the OA Emergency Operations Center (EOC) is necessary.

Glenn County Public Health maintains a Pandemic Influenza Emergency Response Plan in addition to its Public Health and Medical Emergency Operations Plan. These plans were designed to work together and to integrate into this overall Operational Area EOP. The Pandemic Influenza Emergency Response Plan will be utilized to guide response to a pandemic or serious epidemic of infectious disease. The Public Health and Medical Emergency Operations Plan provides a framework and organization for response to a medical-health emergency. Activation of the Public Health plans as well as this EOP will be coordinated to manage the response.

Refer to the Public Health & Medical Emergency Response Plans

Glenn County OA EOP

OA EOC Activation & PH Declarations

If the severity of the situation warrants, the Health Officer or Medical Health Operational Area Coordinator (MHOAC) will recommend that local OES activate this Plan and the Operational Area Emergency Operations Center (OA EOC) to support all aspects of the County wide emergency response. Medical-Health will be appointed as EOC Operations Chief to coordinate operations to this health-focused incident.

Under the premise of a pandemic striking Glenn County suddenly and significantly, without affecting other areas in the U.S. first, the Health Officer will utilize his authority to proclaim a local health emergency. This proclamation would immediately activate all applicable emergency response plans and expedite the process of establishing the OA EOC and/or Health DOC. The Health Officer will immediately inform local OES, CDPH and Cal-OES (California Office of Emergency Services) of the proclamation of a local health emergency. Glenn County Public Health will request the Board of Supervisors meet to ratify the proclamation within 7 days.

Roles & Responsibilities

This is an overview of the general responsibilities for Public Health and Emergency Management during a pandemic or serious disease epidemic.

Public Health has a lead role in mobilizing public health and medical partners in the county to respond to pandemic influenza. PH will:

- Coordinate the overall health and medical response through the MHOAC Program
- Conduct surveillance and epidemiological investigation activities
- Public information and education for prevention and treatment of the disease
- Provide or coordinate vaccination and prophylaxis
- Implementation of Health Officer orders

Glenn County OES has the responsibility for overall emergency management during the pandemic. OES will:

- Coordinate emergency response organization, including provision of security at PODs, health care facilities and alternate care sites.
- Providing direction and oversight on the implementation of Continuity of Government plans, Fatality Management Plans, & recovery efforts
- Oversight and enforcement of Health Officer orders

Glenn County OA EOP

Emergency Response Actions

Following the confirmation of a significant threat to the community by Public Health:

- Obtain situation status briefing from Public Health - MHOAC
 - Conduct an Initial Threat Assessment Meeting
 - Determine if the situation can be managed through the Public Health Department Operations Center (DOC) with support from emergency management (OES)

OR

- Based on the severity of the situation, determine the need to activate the Emergency Operations Center.

- Public Health's Medical Health Operational Area Coordinator (MHOAC)
 - Notify LEMSA, RDMHS, CDPH/EMSA
 - Determine need to activate:
 - Pandemic Influenza Emergency Response Plan
 - Glenn County PH & Medical EOP
 - Glenn County Ebola Response Plan
 - Glenn County Special Pathogens Infectious Disease Emergency Response Plan (SPIDER)
 - Butte- Glenn Healthcare Coalition Response Plan
 - Other response plans including:
 - Glenn County Healthcare Surge Plan
 - Region 3 MCI Plan
 - Mass Fatality Management Plan
 - Provide preliminary data on the disease and the anticipated impacts
 - Determine status of healthcare facilities and their capability to handle the influx of patients
 - Determine severity and need for assistance from EOC

Glenn County OA EOP

Following EOC Activation

Notify:

- EOC members
- Key personnel
- Cities
- Cal-OES (REOC/SOC if activated)
- RDMHS

Begin written log/documentation of the incident

EOC management team meets as soon as practical

- Assess the conditions
- Identify the current and potential impacts
- Status on healthcare facilities and EMS
- Determine need for and type of social distancing measures and Health Officer Orders
- Determine need for Health Emergency Declaration
- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare message for all communication modes including websites and social media
- Notify 2-1-1 of the incident and activate non-emergency hotline
- PIO to coordinate all releases with Public Health
 - Ensure releases are consistent with State and Federal releases related to the disease

Medical-Health Branch:

- Assess health impacts related to the incident
- Provide subject matter expertise for command and management briefings
- Provide health-related information for the incident to the PIO

Glenn County OA EOP

- Notify all healthcare facilities and provide preliminary situation report and recommendations on intended response actions
- Coordinate with Regional Epidemiologist and provide incident data
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- Facilitates medical-health resource needs/requests
- Monitor EMSystems for hospital bed availability
- Identify the need for Alternate Care Sites and Points Of Dispensing
- Identify and implement Non-Pharmaceutical Interventions including social distancing isolation and quarantine (Refer to PH SPIDER Plan)
- Coordinate Disaster Behavioral Health

Care and Shelter Branch:

- Assists Health and Medical Branch with planning for and establishment of Alternate Care Sites and/or Points Of Dispensing Sites (PODS)

Law Branch:

- Perimeter, security, access control, traffic/crowd control planning for Public Health venues including, but not limited to, Points Of Dispensing Sites (PODS), Alternate Care Sites (ACS), and any medicine storage and distribution sites
- Assess and plan for response to potential social unrest
- Mass fatalities management planning
- Assist with Health Officer Order implementation
- Coordinate with Cal-OES Law Branch and request Law Enforcement Mutual Aid, to include Coroner's mutual aid, as needed

Public Works:

- Assist with Public Health related facility needs for Points Of Dispensing Sites, Alternate Care Sites, and medicine storage and distribution sites
- Assist law branch with access and crowd control and fatalities management planning
- Assist with incident mapping
- Coordinate with utilities, water districts, etc.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)

Glenn County OA EOP

- alternate route identification
- building access
- utility access re-routing
- temporary repairs

Resource requests

- Medical-Health resource requests will follow the process set forth in the California Public Health and Medical Emergency Operations Manual and the Glenn County Public Health and Medical Emergency Operations Plan
 - Resource requests will need to be processed by the MHOAC to the RDMHS to CDPH/EMSA
- Non-medical mutual aid and resource requests will be requested as stated in the Resource Management of this Plan

Plan for extended operations.

- Consider extended operational periods.
- Ensure that adequate staffing (EOC, health and medical) will be available.
- Conduct long term planning and forecasting.

Continue operational periods:

- Briefings
- Action Plans
- Shift change
- Situation Reports

I. TERRORISM

General Situation

Terrorism has impacted the lives of every American following the attacks on September 11, 2001. Terrorism became a common word in America, one that brought us both fear and resilience. The impacts from the terrorist attacks on 9-11 and the subsequent bio-terrorist postal attacks with anthrax created a new world, one in which America was vulnerable.

Post 9-11 world became one of resilience and mitigation. The Department of Homeland Security was created to ensure a homeland that is safe, secure, and resilient against terrorism and other hazards. Homeland Security Presidential Directives were issued to establish a system of preparedness, a standardized response organization, and to strengthen the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation, including acts of terrorism, cyber-attacks, pandemics, and catastrophic natural disasters.

Terrorism Defined

Terrorism poses a real and serious threat to the security and safety our community. Terrorism can come in many forms. Terrorism involves the use or threatened use of criminal violence against people, institutions, livestock, food sources or facilities to achieve a political or social objective through fear and intimidation, rather than direct confrontation. Unlike a disaster caused by nature or an accident involving hazardous materials, it requires the deliberate and premeditated action of a person or group to occur.

Terrorist tactics continue to evolve. Terrorists seek sophisticated means of attack, including chemical, biological, radiological, nuclear and explosive weapons, and cyber-attacks. Threats may come from abroad or be homegrown. It is a global threat that knows no border, nationality or religion – a challenge that the global community must tackle together. Counter-terrorism focuses on improved threat awareness and preparedness, developing adequate capabilities and enhancing engagement with partner agencies.

Categories of Terrorism

The following section will define the various forms of terrorism.

Weapons of mass destruction (WMD)

Weapons of mass destruction are defined as any weapon that is designed or intended to cause death or serious bodily injury to large quantities of people through the release, dissemination, or impact of toxic or poisonous chemicals; disease organisms; radiation or radioactivity; or explosion or fire.

Chemical, biological, and radioactive agents present a unique scenario as their presence may not be immediately obvious, making it difficult to determine when and where they have been released, who has been exposed, and what danger exists for first responders and medical personnel. Additionally, there is limited scientific understanding of how these agents affect community populations.

In general, terrorist weapons can be categorized into four major types. It is important to remember that different types of weapons can be combined or used sequentially.

The four categories of weapons are:

- Conventional Weapons & Explosives
- Nuclear and Radioactive Weapons
- Chemical Weapons
- Biological Weapons

These categories coincide with the acronym CBRNE: Chemical, Biological, Radiological, Nuclear, or Explosive

Incendiary/Explosives

The easiest to obtain and use is a conventional explosive device, or improvised bomb. An explosive device may be utilized to cause massive local destruction or to disperse chemical, biological, or radiological agents. The components are readily available, as is the information on constructing such a device.

Improvised explosive devices are categorized as being explosive or incendiary, employing high or low filler explosive materials to explode and/or cause fires. Projectiles and missiles, including aircraft used against high-profile targets such as buildings, monuments, and special events, also can cause explosions and fires. Bombs and firebombs are cheap and easily constructed, involve low technology, and are the terrorist weapon most likely to be encountered.

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Large, powerful devices can be outfitted with timed or remotely triggered detonators and can be designed to be activated by light, pressure, movement, or radio transmission. The potential exists for single or multiple bombing incidents in single or multiple municipalities. Historically, less than five percent of actual or attempted bombings were preceded by a threat.

Explosive materials can be employed covertly with little signature and are not readily detectable. Secondary explosive devices may also be used as weapons against responders and the public in coextensive acts. Other diversionary events or attacks could also be aimed at responders.

Biological

Biological weapons present a serious challenge for response planning. There is risk that a biological attack may not be detected for days or weeks after it occurs. First responder resources, therefore, may be of little use at a bioterrorism incident unless it is detected promptly.

Recognition of a biological hazard can occur through several methods, including identification of a credible threat, discovery of bioterrorism evidence (devices, agent, clandestine lab), diagnosis (identification of a disease caused by an agent identified as a possible bioterrorism agent), and detection (gathering and interpretation of public health surveillance data). When people are exposed to a pathogen such as anthrax or smallpox, they may not know that they have been exposed, and those who are infected, or subsequently become infected, may not feel sick for some time. This delay between exposure and onset of illness, the incubation period, is characteristic of infectious diseases. The incubation period may range from several hours to a few weeks, depending on the exposure and pathogen.

Unlike acute incidents involving explosives or hazardous chemicals, the initial detection and response to a biological attack on citizens is likely to be made by health care providers and the public health community. Terrorists could also employ a biological agent that would affect agricultural commodities (e.g., wheat rust, a virus affecting livestock), potentially devastating the local, state or even national economy. The response to agricultural bioterrorism should also be considered during the planning and response process. Responders should be familiar with the characteristics of the biological agents of greatest concern for use in a bioterrorism event. Unlike victims of exposure to chemical or radiological agents, victims of biological agent attack may serve as carriers of the disease with the capacity of infecting a multitude of other people.

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There are two types of biological weapons:

- **Pathogens:** These are disease-causing organisms, some of which can reproduce and keep spreading long after the attack. The potential for many thousands of casualties is possible but the more likely number is much less because of the difficulty of efficiently delivering the pathogenic agents to large numbers of people.
 - Pathogens can be bacteria such as anthrax, viruses such as smallpox, or fungi like yeast and molds, mycoplasmas that cause pneumonia and similar problems, or rickettsiae. Plague, smallpox, anthrax, hemorrhagic fever, and rabbit fever are known to be probable biological weapons.
 - Not all diseases are contagious, and many have a low mortality rate when properly treated.

- **Toxins:** Toxins are poisonous substances produced by living things. Many toxins are extremely lethal and small quantities can kill very large numbers of people. In many ways a toxin attack is more like a chemical attack than a biological one.
 - Some possible toxin weapons are ricin, botulism toxin, and aflatoxin.
 - the difficulty for the terrorist is in finding an effective way to disperse or distribute the toxin.

Biological Agents

Potential biological agents are numerous. Attention has been focused on those agents that would serve the greatest impact on health and security. These agents are highly contagious or have the potential to be engineered for widespread dissemination via small-particle aerosols.

Bioterrorism agents can be separated into three categories, depending on how easily they can be spread and the severity of illness or death they cause. Category A agents are considered the highest risk and Category C agents are those that are considered emerging threats for disease.

Category A biological agents are highly pathogenic and lead to rare diseases. The U.S. public health system and primary healthcare providers must be prepared to recognize and address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they can be easily disseminated or transmitted from person to person; result in high mortality rates and have the potential for major public health impact; might cause public panic and social disruption; and require special action for public health preparedness.

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Category A Agents

High-priority agents include organisms that pose a risk to national security because they:

- can be easily disseminated or transmitted from person to person;
- result in high mortality rates and have the potential for major public health impact;
- might cause public panic and social disruption; and
- require special action for public health preparedness.

Diseases/Agents

- Anthrax (*Bacillus anthracis*)
- Botulism (*Clostridium botulinum* toxin)
- Plague (*Yersinia pestis*)
- Smallpox (*variola major*)
- Tularemia (*Francisella tularensis*)
- Viral hemorrhagic fevers (filoviruses [e.g., Ebola] & arenaviruses [e.g., Lassa, Machupo])

Some indicators of biological attack are given in Table 1.

Table 1. General Indicators of Possible Biological Agent Use

Stated Threat to Release a Biological Agent
Unusual Occurrence of Dead or Dying Animals
Unusual Casualties <ul style="list-style-type: none">• Unusual illness for region/area• Definite pattern inconsistent with natural disease
Unusual Liquid, Spray, Vapor, or Powder <ul style="list-style-type: none">• Spraying; suspicious devices, packages, or letters

Observations that might indicate terrorist release of hazardous materials:

- Multiple people with similar complaints (signs/symptoms)
- The disease or symptoms seems to be spreading quickly/very contagious
- Disease presentation is out of the ordinary (wrong season, many severe cases, etc.)
- Situation is preceded by an explosion or other type of airborne substance release (sprays, clouds, mists)
- Insects and animals are dropping to the ground with health effects
- Vegetation may be dead near the release site

Refer to Glenn County Public Health for more information on biological threats and incidents

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Chemical

Chemical warfare agents are intended to kill, seriously injure, or incapacitate people through physiological effects. A terrorist incident involving a chemical agent will demand immediate reaction from emergency responders—fire departments, police, hazardous materials (HazMat) teams, emergency medical services (EMS), and emergency room staff—who will need adequate training and equipment.

Hazardous chemicals, including industrial chemicals and chemical warfare agents, can be introduced via aerosol devices (e.g., munitions, sprayers, or aerosol generators), breaking containers, or covert dissemination. Such an attack might involve the release of a chemical warfare agent or an industrial chemical, which may have serious consequences. Chemicals may have local effects on the eyes, skin, or airways (riot agents, chlorine), some have only systemic effects (hydrogen cyanide), and some have both (nerve agents and vesicants).

Early in an investigation, it may not be obvious whether an infectious agent or a hazardous chemical caused an outbreak; however, most chemical attacks will be localized, and their effects will be evident within a few minutes. There are both persistent and non-persistent chemical agents. Persistent agents remain in the affected area for hours, days, or weeks. Non-persistent agents have high evaporation rates, are lighter than air, and disperse rapidly, thereby losing their ability to cause casualties after 10 to 15 minutes, although they may be more persistent in small, unventilated areas. Some indicators of the possible use of chemical agents are listed in Table 2.

Categories of Chemical Warfare Agents

Biotoxins: Poisons that come from plants or animals. A Ricin is a known biotoxin.

Blister Agents/Vesicants: Chemicals that severely blister the eyes, respiratory tract, and skin on contact. Can be in liquid or gas/vapor form. Agents: Sulfur mustard- Mustard gas (HD), Lewisite (L), Nitrogen Mustard (HN), Phosgene Oxime (CX).

Blood Agents: Poisons that affect the body by being absorbed into the blood. Agents: Hydrogen Cyanide (AC), Cyanogen Chloride (CK), Arsine (SA).

Pulmonary/Lung/Choking Agents: Chemicals that cause severe irritation or swelling of the respiratory tract (lining of the nose, throat, and lungs). Agents: Chlorine (Cl₂), Phosgene (CG).

Nerve Agents: Highly poisonous chemicals that work by preventing the nervous system from working properly. Agents: Chemical warfare agents: Sarin (GB), Cyclohexyl Sarin (GF), Soman (GD), VX, Tabun. Pesticides: organophosphates.

The CDC has stockpiles of nerve agent antidotes (Chempacks) strategically located throughout the US and CA. Contact Public Health immediately if you suspect a nerve agent exposure. Glenn County Public Health maintains the local CHEMPACK Activation and Deployment Plan.

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Table 2. General Indicators of Possible Chemical Agent Use

Stated Threat to Release a Chemical Agent
Unusual Occurrence of Dead or Dying Animals <ul style="list-style-type: none">• For example, lack of insects, dead birds
Unexplained Casualties <ul style="list-style-type: none">• Multiple victims• Surge of similar 911 calls• Serious illnesses• Nausea, disorientation, difficulty breathing, or convulsions• Definite casualty patterns
Unusual Liquid, Spray, Vapor, or Powder <ul style="list-style-type: none">• Droplets, oily film• Unexplained odor• Low-lying clouds/fog unrelated to weather
Suspicious Devices, Packages, or Letters <ul style="list-style-type: none">• Unusual metal debris• Abandoned spray devices• Unexplained munitions

Nuclear and radiological

Terrorist use of radioactive materials or a nuclear device constitutes a plausible threat. Such an incident could occur in one of five ways:

- Simple Radiological Device (SRD)
- Radiological Dispersal Device (RDD)
- Reactor sabotage
- Improvised Nuclear Device (IND)
- Nuclear weapon

The consequences of the incident will be dependent on the type of device utilized. In addition to the physical effects, the mental health effects will impact the community significantly.

The difficulty of responding to a nuclear or radiological incident is compounded by the nature of radiation itself. In an explosion, the fact that radioactive material was involved may or may not be obvious, depending upon the nature of the explosive device used. The presence of a radiation hazard is difficult to ascertain, unless the responders have the proper detection equipment and have been trained to use it properly. Although many detection devices exist, most are designed to detect specific types and levels of radiation and may not be

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appropriate for measuring or ruling out the presence of radiological hazards. Table 3 lists some indicators of a radiological release.

Table 3: General Indicators of Possible Nuclear Weapon/Radiological Agent Use

Stated Threat to Deploy a Nuclear or Radiological Device
Presence of Nuclear or Radiological Equipment <ul style="list-style-type: none">• Spent fuel canisters or nuclear transport vehicles
Nuclear Placards/Warning Materials Along with Otherwise Unexplained Casualties

The scenarios constituting an intentional nuclear/radiological emergency include the following:

- Use of an Improvised Nuclear Device (IND). Includes any explosive device designed to cause a nuclear yield. Depending on the type of trigger device used, either uranium or plutonium isotopes can fuel these devices. While “weapons-grade” material increases the efficiency of a given device, materials of less than weapons grade can still be used.
- Use of a Radiological Dispersal Device (RDD). Includes any explosive device utilized to spread radioactive material upon detonation. By placing radiological material in close proximity, any improvised device could be used. The initial explosion kills or injures those closest to the explosive device, while the radioactive substances remain to expose and contaminate survivors and responders.
- Use of a Simple Radiological Device (SRD). This is the act of spreading radiological material without the use of an explosive. Any nuclear material (including medical isotopes or waste) can be used in this manner.

Combined Hazards

WMD agents can be combined to achieve a synergistic effect – greater in total effect than the sum of their individual effects. They may be combined to achieve both immediate and delayed consequences. Mixed infections or toxic exposures may occur, thereby complicating or delaying diagnosis. Casualties of multiple agents may exist. Casualties may also suffer from multiple effects, such as trauma and burns from an explosion, which exacerbate the likelihood of agent contamination. Attacks may be planned and executed so as to take advantage of the reduced effectiveness of protective measures produced by employment of an initial WMD agent. Finally, the potential exists for multiple incidents in single or multiple municipalities.

Agro-terrorism

Any terrorist act using biological agents, achieved by poisoning the food or water supplies or by introducing diseases among livestock. Table 4 lists some indicators of an agro-terrorism attack.

Table 4: General Indicators of Possible Agro-terrorism Attack

Stated Threat to Release a Chemical/Biological Agent into the Agriculture Industry
Unusual Liquid, Spray, Vapor or Powder
Unexplained Presence of Dead or Dying Animals, Birds and/or Insects
Presence of Abandoned Spray Devices

Cyber-terrorism

Cyber terrorism involves the malicious use of electronic information technology to commit or threaten to commit acts dangerous to human life, or against a nation's critical infrastructures in order to intimidate or coerce a government or civilian population to further political or social objectives (FBI NIPC, Congressional testimony, August 29, 2001).

Our daily life, economic vitality, and national security depend on a stable, safe, and resilient cyberspace. We rely on this vast array of networks to communicate and travel, power our homes, run our economy, and provide government services.

Yet cyber intrusions and attacks have increased dramatically over the last decade, exposing sensitive personal and business information, disrupting critical operations, and imposing high costs on the economy.

As with other critical infrastructure guidance, most cyber protection guidance focuses on security measures to protect computer systems against intrusions, denial of service attacks, and other forms of attack rather than addressing issues related to contingency and consequence management planning. However, emergency management planning efforts for the year 2000 (Y2K) transition provided a real-world exercise and a prototype for developing and implementing systems to respond to the consequences of massive computer outages.

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Table 5: General Indicators of Possible Cyber-terrorism Attack

Stated Threat of a Cyber-terrorism Attack
Detection of a Computer Virus by a Software Program
Unexplained Malfunctioning of a Computer Control System That Could Result in Injury or Death <ul style="list-style-type: none">• Dam or Levee• 9-1-1 System• Streetlights• Air Traffic Control System
Collapse of Infrastructure Computer System <ul style="list-style-type: none">• Electric Power Grid• Nuclear Power Plant• Water Treatment Plant
Collapse of Vital Computer Databases <ul style="list-style-type: none">• NCIC

Infrastructure Attacks

Our Nation’s critical infrastructure—both physical and cyber—is crucial to the functioning of the American economy and our way of life. Critical infrastructure provides the means and mechanisms by which critical services are delivered to the American people; the avenues that enable people, goods, capital, and information to move across the country; and the engine that underpins the Nation’s defense, manufacturing of goods, production of energy, and our overall system of commerce. Our critical infrastructure is increasingly connected and interdependent and protecting it and enhancing its resilience is an economic and national security imperative.

Potential attacks on elements of the nation’s infrastructure require protective considerations. Infrastructure protection involves proactive risk management actions taken to prevent destruction of or incapacitating damage to networks and systems that serve society, Department of Homeland Security – Office of Infrastructure Protection.

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Key Elements for a Response to a Terrorist Incident

Key areas of particular concern during a terrorist event would include:

- Clearly identifiable terrorist event such receipt of a call indicating a terrorist event
- Detection, identification and sampling to provide early detection for appropriate control of the scene and confirmed identification through sampling to expedite appropriate medical intervention.
- Hospital/Public Health Coordination
 - Coordination with local public health officials and hospitals that includes professional medical guidance on agent identification, mass triage and decontamination, victim intake, and treatment for specific agents.
 - Medical Treatment/Management will direct medical intervention in Chemical Biological Radiological Nuclear Explosive (CBRNE) incident consequences including victim triage, field level treatment based on locally established protocols, and transportation to definitive medical care facilities.
 - Decontamination Coordination with the existing Incident Command System (ICS) and Multi-Casualty Incident Plan (MCIP) to establish mass decontamination facilities in the field and at hospitals.
 - Pharmacology Maintenance, distribution, and administration of appropriate medications to support local treatment protocols for CBRNE incidents, maintaining an inventory of medications and monitoring the medications shelf life to ensure they remain current.
- Communications Maintenance and inventory of communications equipment and coordination with the local responders to establish common communications capabilities.
- Public Information Officer (PIO)/Media Relations Coordination with the other jurisdiction's PIOs to establish information parameters and determine the appropriate information releases to avert further casualties due to mass hysteria.
- Law Enforcement Coordination (Intelligence/Security) with local law enforcement officials and joint briefings on the potential impacts of the incident and courses of action to take.
- Mental Health / Critical Incident Stress Debriefing (CISD) Coordination with internal county and local mental health resources, to brief them on the potential impacts of the incident and courses of action that may be needed to care for responders, victims, and the community.
- Mortuary and Forensic Activities Coordination with Glenn County Sheriff/Coroner to establish appropriate services for deceased victims, and to assure proper collection, preservation, and maintenance of evidence of criminal activity from deceased victims.

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Response to a Terrorist Incident

Organizational Structure

Glenn County will activate the appropriate SEMS functions based upon the terrorist threat or actual event. Personnel from Glenn County will be assigned to the Emergency Operations Center and/or the Joint Field Office (Federal) if activated or requested.

Coordination of Disciplines

Glenn County will use multi-agency, multi-discipline coordination in its response to a terrorist threat or event. A Unified Command will be established from the various agencies with responsibility for the incident. The Unified Command will facilitate coordination among agencies and disciplines.

Efforts to resolve life safety threats to the public, including firefighting, rescue operations, and treatment of persons wounded by terrorist activity are known as consequence management. These efforts are the primary responsibility of local government and require close coordination between law enforcement, the fire service, public health, and medical providers. During response to terrorism acts these efforts are coordinated through the Emergency Operations Center.

FBI

The Federal Bureau of Investigation (FBI) is the lead federal agency with responsibility for all terrorist acts within the United States. In Glenn County, the FBI closely coordinates this activity with local law enforcement through the Sacramento Regional Threat Assessment Center.

Sheriff's Office

The Sheriff Office will be the lead local agency for terrorist events. The Sheriff's Office maintains several staff as Terrorism Liaison Officers (TLO). Sheriff's Office will be lead for the following activities: crisis management, perimeter security, access control, traffic/crowd control, evacuations, notifications, and safeguarding evidence. Crisis management activities may include investigation, tracking, and maintaining scene integrity. The Sheriff Office will also coordinate coroner issues. It will assist with damage assessment and fatalities management. The Sheriff Office will request law enforcement mutual aid if needed to accomplish these functions.

Public Health

Public Health will act as co-lead with law enforcement during bioterrorist incidents and other terrorist incidents with substantial medical and health impacts. Public Health is responsible for the identification, surveillance, detection, containment, and response to biological agents. Public Health will provide subject

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matter expertise and guidance on protective actions and response measures during terrorist incidents with medical and health impacts. Public Health maintains the authority for issuance of Health Officer Orders and declarations for Public Health Emergency.

Public Health maintains the responsibility of the Medical Health Operational Area Coordinator and therefore will act as lead for the 17 MHOAC functions as stated in Health & Safety Code §1797.153. Refer to the Glenn County Public Health and Medical Emergency Operations Plan for more information on the responsibilities of the MHOAC and Health Officer.

Medical-Health resource requests will follow the process set forth in the California Public Health and Medical Emergency Operations Manual and the Glenn County Public Health and Medical Emergency Operations Plan.

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Emergency Response Actions

Initial Response

Following the confirmation of a significant terrorist threat or defined incident:

- Obtain situation status briefing from identifying agency or incident commander
 - Conduct an Initial Threat Assessment Meeting
 - Determine if the situation is a terrorist event and what type
 - If terrorist, notify the FBI immediately
 - Determine activation level of the Emergency Operations Center

- If bio-terrorism or significant health event, conduct immediate coordination with Public Health's Medical Health Operational Area Coordinator (MHOAC) who will conduct the following immediate tasks:
 - Notify LEMSA, RDMHS, CDPH/EMSA, Regional Epidemiologist
 - Determine need to activate:
 - Glenn County PH & Medical EOP
 - Refer to Bio-Terrorism Response Actions in PH-Med EOP
 - Region III Multi-Casualty Incident Plan
 - Glenn County Special Pathogens Infectious Disease Emergency Response Plan (SPIDER)
 - Glenn County Healthcare Surge Plan
 - Glenn County Strategic National Stockpile (SNS) and Medical Countermeasures Plan
 - Glenn County CHEMPACK Activation and Deployment Plan
 - Provide preliminary data on the disease and the anticipated impacts
 - Determine status of healthcare facilities and their capability to handle the influx of patients
 - Determine severity and need for assistance
 - Determine whether emergency medical countermeasures from the CDC's Strategic National Stockpile (SNS) and/or CHEMPACK should be requested

Refer to Glenn County Public Health and Medical Emergency Operations Plan for response operations related to health and medical events including CBRNE.

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Extended Response

Notify:

- EOC members
- Key personnel
- Cities
- Cal-OES (REOC/SOC if activated)
- RDMHS/CDPH

Begin written log/documentation of the incident

EOC management team meets as soon as practical

- Assess the conditions
- Identify the current and potential impacts
- Status on healthcare facilities, EMS, and law enforcement
- Identify if shelter in place orders should be released
- Identify areas for advisory and/or mandatory evacuations
 - If evacuations are to take place, immediately activate Care and Shelter Branch to begin establishment of shelters
- Determine need for and type of social distancing measures and Health Officer Orders
- Determine need for Emergency Proclamations
- Depending on the type of incident, request a technical expert if necessary to serve as an advisor where needed. Contact Cal-OES and/or CDPH for appropriate technical expert.
- Prepare initial Action Plan
- Establish regular briefing schedule
- Brief elected officials

Obtain operational status of public safety response staff and equipment for:

- Law Enforcement
- Fire/Rescue
- Public Works
- EMS
- Public Health
- Coroner's Office
- Lifeline utility systems
- Medical systems and facilities

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Closely monitor and display essential and accurate information including:

- Number of Deaths
- Number of Injuries/illness
- Number of Missing
- Number of Displaced Victims
- Number of Victims in Shelters
- Significant Weather
- FEMA Category Damage Assessment Totals
- Status of Hospitals and Pre-hospital systems
- Severe, moderate and lightly damaged areas
- Status of Airports

PIO prepares initial press release and prepares to respond to media inquiries

- Prepare message for emergency alerting and notification modes
- Prepare message for all communication modes including websites and social media
- Establish a Joint Information System (JIS) to include FBI, CDPH, Cal-OES, and local partners
- If a chemical, biological or radiological agent is used request a technical expert from the California Department of Public Health to help disseminate a clear and accurate message.

Medical-Health Branch:

- Assess health impacts related to the incident
- Provide subject matter expertise for command and management briefings
- Provide health-related information for the incident to the PIO
- Notify all healthcare facilities and provide preliminary situation report and recommendations on intended response actions
- Sends med-health SITREP to RDMHS, CDPH, EMSA
- Facilitates medical-health resource needs/requests
 - Coordinate with RDMHS for medical mutual aid requests
- Monitor EMSsystems for hospital bed availability
- Identify the need for Alternate Care Sites and Points Of Dispensing
- Identify the need for emergency medical countermeasures
- Coordination with LEMSA and EMS providers
- Coordination of mental health services
- Activate & coordinate Victim Witness Advocate Services

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Care and Shelter Branch:

- Assists Health and Medical Branch with planning for and establishment of Alternate Care Sites and/or Points Of Dispensing Sites (PODS)
- Identify sites for shelter
 - Develop a shelter plan
 - Contact HHSA EP and Shelter Team

Law Branch:

- Coordinate with FBI and Joint Field Office (JFO – if established)
- Coordinate and plan for:
 - intelligence concerns
 - investigative guidelines and statutory authority
 - hostage situations, hijackings, kidnappings
 - use of force
 - bomb procedures
 - facility and personnel protection
 - use of special weapons and tactics (SWAT) units
- Perimeter, security, access control, traffic/crowd control planning for Public Health venues including, but not limited to, Points Of Dispensing Sites (PODS), Alternate Care Sites (ACS), and any medicine storage and distribution sites
- Mass fatalities management planning
- Prepare evacuation plan
 - Identify evacuation areas and routes
 - Coordinate with Care and Shelter to identify shelter locations and routes to the sites
 - Communicate evacuation areas to the PIO for release via media and emergency alert modes
- Assist with Health Officer Order implementation
- Coordinate with Cal-OES Law Branch to facilitate Law Enforcement Mutual Aid requests to include Coroner's Mutual Aid

Fire/Rescue Branch

- Monitor fire response and medical/rescue operations
- Facilitate fire/rescue resource requests
 - Coordinate with Cal-OES Fire Branch for fire mutual aid requests
- Coordinate and plan for

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- addressing environmental needs
- obtaining personnel with radiological training
- Ensuring decontamination procedures (radiological and chemical) in place and ensuring biological agents containment.
- support to hazardous materials operations
- coordination with EMS and hospitals
- personnel protection issues
- coordination with public works and utilities

Public Works:

- Determine status of key transportation corridors (highways, railroads, roads, streets). Coordinate with Section Chiefs to reopen key access roads or to go around damaged areas.
- Assist with Public Health related facility needs for Points Of Dispensing Sites, Alternate Care Sites, and medicine storage and distribution sites
- Assist law branch with access and crowd control and fatalities management planning
- Assist with incident mapping
- Coordinate with utilities, water districts, etc.
- Make contact with public transportation agencies to determine status and availability of transportation resources.
- Coordinate and monitor:
 - reconnaissance of public infrastructure (roads, bridges, facilities, and utilities)
 - alternate route identification
 - building access
 - utility access re-routing
 - temporary repairs

Resource requests

- Medical-Health resource requests will follow the process set forth in the California Public Health and Medical Emergency Operations Manual and the Glenn County Public Health and Medical Emergency Operations Plan
 - Resource requests will need to be processed by the MHOAC to the RDMHS to CDPH/EMSA
- Non-medical mutual aid and resource requests will be requested as stated in the Resource Management of this Plan
- For extended response incidents, consider requesting Emergency Management Mutual Aid (EMMA) resources

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- Identify any specialized resources that may need to be requested such as a HazMat Response Team, spill containment equipment, air monitoring equipment, bomb squad, radiological response personnel and equipment, etc.

- Plan for extended operations. Ensure that adequate staffing (EOC, health and medical, law enforcement) will be available for the next operational period.

- Continue operational periods:
 - Briefings
 - Action Plans
 - Shift change
 - Situation Reports

APPENDICES

APPENDIX K-1

Hazardous Materials Facilities – For Official Use Only (FOUO)

This appendix is For Official Use Only (FOUO) and will be redacted from public version. This information is for emergency/first responder use only.

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APPENDIX K-2

Glenn County Road System

Purpose:

To serve as a reference providing an overview of the Glenn County road system. County roads are numbered or lettered. Many roads are segmented with numerous segments that don't connect. Cross streets are needed when providing directions for responders.

Numbered Roads

- Numbered roads run East to West, from Road 1 at Glenn/Tehama (north) County line to Road 71 at Glenn/Colusa (south) county line
- The central county divider is Road 33 in Artois. This divider is utilized in law and EMS sectors.
- Hwy 162 is level with Road 50. Roads < 50 will be north of Willows and roads > 50 will be south of Willows.
- Numbered roads with addresses 5500-6500 will be west of I-5. 6500-9200 will be east of town.
- Glenn is in the 8000 range. Butte City is in the 8500 range.

Lettered Roads

- Lettered roads run north to south, from Road B near Thunderhill (level) to Road ZZ near Butte City.
- Roads B-HH are west of I-5.
- Roads I-XX are east of I-5.
- Lettered road addresses above 3000 are north of Artois and less than 3000 are in Willows area.
- Road P runs almost the length of the county and is at the 7000 range for numbered roads.
 - o i.e. 7010 Road 39 will be just east of Road P and 6900 Road 39 will be just west of Road P.

APPENDIX K-3

NWS Experimental Heat Risk

The National Weather Service (NWS) experimental HeatRisk forecast provides a color and numeric value that places forecast heat for a specific location into an appropriate level of heat concern, along with identifying groups potentially most at risk at that level. The HeatRisk is accompanied by recommendations for heat protection and is a useful tool for planning for upcoming heat and its associated potential risk. Based on the high resolution NWS national gridded forecast database, a daily Heat Risk value is calculated for each location from the current date through seven days in the future. *At this time, the experimental Heat Risk forecast is being used to influence the issuance of, and to add value, to the NWS's official heat watches, advisories, and warnings across much of the western United States in an experimental capacity.* This product is another NWS tool that can be used to protect lives and property from the potential risk of excessive heat, being especially useful for those who are more easily affected by heat or those who provide support to those communities of heat vulnerable individuals. The experimental HeatRisk product ensures that communities have the right information at the right time to be better prepared for upcoming heat events.

The Experimental HeatRisk tool and current forecast can be accessed at:

<https://www.wrh.noaa.gov/wrh/heatrisk/>

Who are most susceptible to heat?

Heat commonly affects certain groups, typically identified as heat sensitive or heat vulnerable, at lower thresholds than other populations. Some of these groups include:

- The elderly and the very young;
- Those on certain medications and/or those with preexisting conditions which make them more sensitive to heat (your doctor can let you know if this is you);
- Those working outdoors -- especially new workers, temporary workers, or those returning to work after a week or more off;
- Those exercising or doing strenuous activities outdoors during the heat of the day - especially those not used to the level of heat expected, those who are not drinking enough fluids, or those new to that type of activity;
- Those without a reliable source of cooling and/or hydration;
- Those not acclimated to the level of heat expected - especially those who are new to a much warmer climate
- Some economic sectors are also affected by increasing levels of heat, such as energy and transportation.

Understanding the Heat Risk Product

The purpose of the NWS experimental Heat Risk product is to help you understand what forecasted heat means to you. To make it easier to understand, the Heat Risk is divided into five categories:

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Heat Risk Categories

Heat Risk Values	Risk of Heat Effects	Level of Heat Concern
When the Heat Risk value is:	...the risk of heat effects are:	...as symbolized by this color:
0	Very Low	Green
1	Low	Yellow
2	Medium	Orange
3	High	Red
4	Very High	Magenta

Simply put, the higher the value, the greater the level of heat concern would be for that location. If both the overnight lows and daytime highs are exceptionally warm for that date at a given location over a period of at least 48 hours, at levels that pose an elevated risk for heat complications, the highest level of 4 for HeatRisk is achieved.

Essentially when HeatRisk values are 1 or greater, heat is considered to be of concern – at first for those who are extremely sensitive to heat, then for everyone as HeatRisk values get to the highest levels. For example, a HeatRisk value of 0 represents no *elevated* risk for heat concerns; a HeatRisk value of 2 represents a moderate potential risk for members of heat sensitive groups; while a HeatRisk value of 3 represents a high potential risk of heat effects for anyone without proper hydration and adequate cooling.

The NWS has assigned a specific color to each HeatRisk category to make it easier for people to understand quickly whether heat is reaching a high enough level to create heat concerns for their unique situation. Each HeatRisk category corresponds to a different level of potential heat concern. The five levels of heat concern and what they mean are shown in the table below.

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HeatRisk Table

Numerical Value	Meaning	Who/What is at Risk?	How Common is this Heat?	For those at risk, what actions can be taken?
0	<ul style="list-style-type: none"> Level of heat poses little to no risk 	<ul style="list-style-type: none"> No elevated risk 	<ul style="list-style-type: none"> Very Common 	<ul style="list-style-type: none"> No preventative actions necessary
1	<ul style="list-style-type: none"> Heat of this type is tolerated by most; however there is a low risk for sensitive groups to experience health effects 	<ul style="list-style-type: none"> Primarily those who are extremely sensitive to heat 	<ul style="list-style-type: none"> Very Common 	<ul style="list-style-type: none"> Increase hydration Reduce time spent outdoors or stay in the shade when the sun is strongest Open windows at night and use fans to bring cooler air inside buildings
2	<ul style="list-style-type: none"> Moderate risk for members of heat sensitive groups to experience health effects Some risk for the general population who are exposed to the sun and are active For those without air conditioning, living spaces can become uncomfortable during the day, but should cool below dangerous levels at night 	<ul style="list-style-type: none"> Primarily heat sensitive groups, especially those without effective cooling or hydration Some transportation and utilities sectors 	<ul style="list-style-type: none"> Fairly common most locations Very common in southern regions of country 	<ul style="list-style-type: none"> Reduce time in the sun between 10 a.m. and 4 p.m. Stay hydrated Stay in a cool place during the heat of the day Move outdoor activities to cooler times of the day Open windows at night

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3	<ul style="list-style-type: none"> • High Risk for much of the population who are 1) exposed to the sun and active or 2) are in a heat sensitive group • Dangerous to anyone without proper hydration or adequate cooling • Poor air quality is possible • Power interruptions may occur as electrical demands increase 	<ul style="list-style-type: none"> • Much of the population, especially people who are heat sensitive and those without effective cooling or hydration • Transportation and utilities sectors 	<ul style="list-style-type: none"> • Uncommon most locations • Fairly common in southern regions of country 	<ul style="list-style-type: none"> • Try to avoid being outdoors in the sun between 10 a.m. and 4 p.m. • Stay hydrated • Stay in a cool place especially during the heat of the day • If you have access to air conditioning, use it. Fans may not be adequate • Cancel outdoor activities during the heat of the day
4	<ul style="list-style-type: none"> • Very High Risk for entire population • Very dangerous to anyone without proper hydration or adequate cooling. • This is a multi-day excessive heat event. A prolonged period of heat is dangerous for everyone not prepared. • Poor air quality is likely. • Power outages are increasingly likely as electrical demands may 	<ul style="list-style-type: none"> • Entire population is at risk. • For heat sensitive groups, especially people without effective cooling, this level of heat can be deadly. • Most Transportation and utilities sectors 	<ul style="list-style-type: none"> • Rare most locations • Occurs up to a few times a year in southern regions of country, especially the Desert Southwest 	<ul style="list-style-type: none"> • Avoid being outdoors in the sun between 10 a.m. and 4 p.m. • Stay hydrated • Stay in a cool place, including overnight • If you have access to air conditioning, use it. Fans will not be adequate • Cancel outdoor activities during the heat of the day

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reach critical levels.

How does the HeatRisk work?

The HeatRisk takes into consideration:

1. how significantly above normal the temperatures are at your location,
2. the time of the year (for example, is this early season heat that you likely haven't become used to, or late season heat that you have become more used to),
3. the duration of unusual heat (for example, are temperatures overnight at levels that would lower heat stress, or will warm overnight low temperatures continue to add to heat stress into the next day), and
4. if those temperatures are at levels that pose an elevated risk for heat complications, such as heat stress, based on peer reviewed science.

Heat Exhaustion occurs when the body is dehydrated:

- Symptoms -- headache, nausea, dizziness, cool and clammy skin, pale face, cramps, weakness, profuse perspiration
- First Aid -- move to a cooler spot, drink water with a small amount of salt added (one teaspoon per quart)
- Without Intervention -- it can lead to collapse and heatstroke.

Heatstroke occurs when perspiration cannot occur and the body overheats:

- Symptoms -- headache, nausea, face flushed, hot and dry skin, no perspiration, body temperature over 101°F, chills, rapid pulse
- First Aid -- cool person immediately, move to shade or indoors, wrap in a cool, wet sheet, get medical assistance
- Without Intervention -- it can lead to confusion, coma, and **death**.

