

Hazard Analysis and Planned Responses

Humboldt County

Geography

Humboldt County comprises approximately 3,600 square miles and has the Pacific Ocean for its western boundary. It has a north/south length of 105.5 miles and an average width of approximately 35 miles. The County is primarily mountainous, with elevations varying from sea level to almost 7,000 feet. It is divided into steep-sided terrain compartments by five major streams, which flow generally from southeast to northwest. Two of the rivers, the Eel and the Mad, have fairly broad, extensive deltas. Humboldt Bay, about 13 miles long, but with an entrance less than a mile wide, extends most of the distance between the two deltas.

Climate and Weather

Coastal mountains and the Pacific Ocean are the main determinant of the climate of Humboldt County. As a result of the cool Pacific water, the adjacent area is one of the coolest and cloudiest in the contiguous United States. It also has the most unvaried temperature, with only a 10-degree average variance (47°F to 57°F) between summer and winter. In inland valleys, however, there is a much wider variance and temperatures are from near 0°F to above 100°F.

During the rainy season (October to April), the relatively warm, moist Pacific air is forced up over the coastal mountains, causing it to cool and condense as it rises, resulting in rain on the coast and windward slopes and snow on the peaks. As a result, rainfall averages about 40 inches in the Humboldt Bay area, but over 100 inches in some mountainous areas. Snow is rare along the coast, but can total from 35 to 150 inches in interior areas.

The prevailing wind is from the northwest. Winter storms, however, come in on southerly, southeasterly or southwesterly winds. Damaging winds are sometimes experienced in connection with summer thunderstorms in the mountains or with intense winter storms. Occasionally, during summer months there are strong southerly winds

along the coast, accompanying a low-pressure area. During the salmon season, because of the way Trinidad and Shelter Cove harbors open, these southerly winds can cause destruction to small boats moored in these harbors or fishing in adjacent waters.

Geology and Tectonic Setting

The complexities of the geology and geological history of Humboldt County are largely responsible for the rugged topography of the Coast Range mountains and geologic hazards of the area. The geology of coastal Humboldt County consists of folded and faulted sedimentary rocks that include competent sandstone; intensely sheared, fine-grained material (melange); and youthful, poorly consolidated marine and river sediments. The combination of the broken and weak rocks and heavy rainfall in the region produces very high erosion rates and considerable slope instability. Landslides are common within areas underlain by the less-sheared rock types, and slow-moving earthflows are characteristic in melange terrains. The probability of landslides and earthflows is greatly increased during the rainy season. Engineering structures (particularly roads) on or below unstable slopes are particularly at risk from slope failure during heavy precipitation events.

The geology of Humboldt County is largely influenced by the interaction of the mobile crustal plates of the earth's surface. The seismicity, deformation and uplift (known as tectonics) of the region is a consequence of the unique setting of Humboldt County. The area encompasses the transitional zone between two distinct tectonic regimes. To the south of Cape Mendocino, the Pacific plate is moving northward relative to the North America plate, resulting in strain accumulation and eventual rupture of north strike-slip faults (predominantly resulting in lateral displacement), such as the San Andreas fault. North of the Cape and west of the continental slope, the Gorda plate is being forced eastward and subducted beneath the North America plate. This compressive interaction of the North America and Gorda plates causes folding and thrust-faulting of the earth's crust, resulting in the formation of the northwest ridges and valleys observed on- and off-shore. Additionally, the subducting Gorda plate is deforming internally along numerous seismically active faults. Historical and geological evidence

suggests that earthquakes caused by crustal movements associated with all of these tectonic regimes have occurred in the recent past within and off-shore of Humboldt County.

The Humboldt Bay region is one of the most seismically active areas in the State of California. Although the majority of the historic earthquakes have been off-shore, there are a number of faults on land that are considered to be active, and land use in the vicinity of these faults is regulated under the State of California's Alquist-Priolo Geologic Hazard Zones Act of 1972. The Humboldt State University campus is in the vicinity (within 20 miles) of Fickle Hill, the Mad River, McKinleyville, Blue Lake and Little Salmon Faults. Seismic shaking during earthquakes can cause collapse of multi-storied buildings, trigger landsliding on unstable and marginally stable slopes and initiate liquefaction and flowage of saturated granular deposits (such as river, beach and bay sediments). Damage to roads, bridges and utility lines is likely in the event of strong ground motion. Critical structures that may be affected by large seismic events include the Humboldt Bay (inactive nuclear) Power Plant, local hospitals and schools. Local large earthquakes could also generate sudden tsunamis (seismic sea waves) that could inflict catastrophic destruction in low-lying coastal areas with very little advance warning. Because of the possibility of the occurrence of large earthquake events and these associated hazards, Humboldt County has been identified in the Uniform Building Code of the State of California as a Seismic Risk 4 (highest risk rating) area.

Population

Humboldt County is essentially rural with an approximate population of 108,500 and a density of about 30 inhabitants per square mile. However, about 50% of the population is concentrated in the Humboldt Bay area within a 20-mile radius of Eureka. The remainder are clustered in some 40 rural communities, mostly in the river valleys.

Transportation

Highway. Only one major highway, U.S. 101, traverses the County from south to north. U.S. 101 is four-lane through most of its distance through the County. It generally follows the narrow Eel River Valley from the south County boundary to Fortuna, then northward along Humboldt Bay and the

Pacific coast. Two State Sign Routes cross the County from west to east, one north (299) and south (36) of Eureka. A third State highway (96) goes north from Willow Creek (in the northeastern part of the County) along the steep-sided Trinity-Klamath Valley. Because of the mountainous nature of the highway routes, they are subject to closure, especially during winter months and sometimes for prolonged periods, due to slides and/or bridge washouts.

Sea. The Port of Eureka, on Humboldt Bay, exports forest products and imports chiefly petroleum products and chemicals for the pulp mills. Ocean-going vessels up to 30-foot draft can be accommodated. About 1,250,000 short tons of forest products are exported annually.

There are nearly 200 fishing vessels registered as home-ported in Humboldt Bay and another 500 commercial boats from other West Coast ports that use the Port of Eureka facilities.

Pipelines

A single, 12-inch natural gas transmission line from Red Bluff, in the Central Valley, roughly parallels Highway 36 from Dinsmore to Alton and then goes north along Highway 101 to the Humboldt Bay Area.

Industry

Forest products, agriculture, fishing and tourism are the four principal industries of Humboldt County. The tourist attractions in the County and to the north result in daily bus loads of 40 to 50 people entering the County.

Nuclear War

Humboldt County does not contain any targets of strategic value and thus is not considered a "risk" area in the event of nuclear war. Since it is also located in the westernmost part of the contiguous United States and the prevailing winds are also westerly, early fallout from an attack on strategic targets is also considered unlikely during most of the year. There are, however, rarely occurring weather patterns that could cause the area to receive early fallout from the attack on

targets in the San Francisco Bay area and the area is almost certain to receive some level of world-wide fallout.

Summary of County Hazards

Review of the above data indicates that potential hazards to which the County is vulnerable are as follows:

Geography

- ◆ None Directly

Climate and Weather

- ◆ Slow-Rise Flood
- ◆ Coastal Wind Storms
- ◆ Drought

Geology

- ◆ Earthquakes
- ◆ Landslides
- ◆ Tsunamis
- ◆ Dam Failure

Population

- ◆ None Directly

Transportation

- ◆ Hazardous Materials Spills
- ◆ Commercial Aircraft or Bus Accident

Industry

- ◆ Chemical Spill

Nuclear War

- ◆ Fallout

Analysis of County Hazards and Priorities

There are many methods that could be used to analyze these various hazards to determine the priority in which specific contingency plans for each of them should be developed. Any of the methods is to some degree subjective. Therefore, the simplest method is not only adequate but also probably the most practical.

The method employed assigns a likelihood of occurrence on a scale of 1 to 10 and a degree of potential seriousness (in terms of casualties and property damage), also on a scale of 1 to 10. The sum of these two factors gives a total for each hazard, the highest of which indicates the highest priority. In cases where totals are equal, considered judgement is applied to determine which should receive the higher priority. Other factors, such as the requirement for extensive research or the unavailability of required data, may then affect the actual order in which specific plans are developed.

<i>Hazard</i>	<i>Likelihood of Occurrence</i>	<i>Potential Seriousness</i>	<i>Total</i>	<i>Priority</i>
Flood	10	7	17	1
Earthquake	5	8	13	3
Coastal Storm	9	2	11	6
Chlorine Spill	2	10	12	4
Aircraft Crash	5	8	13	2
Hazardous Spill	7	3	10	9
<i>Dam Break</i>				
Eel	(1)	(5)	(6)	
Mad	(1)	(6)	(7)	
Trinity	(1)	(9)	(10)	
Klamath	(1)	(3)	(4)	
Composite	1	6	7	11

Tsunami	3	9	12	5
Drought	2	6	8	10
Power Plant	2	8	10	8
Nuclear War	1	10	11	7

HSU Community

Location and Population Characteristics

The HSU main campus consists of approximately 150.5 acres within the incorporated boundaries of the City of Arcata. HSU also owns, operates or manages eight satellite facilities, all located within Humboldt County. A map of the main campus and a list of campus facilities is incorporated in this plan. There are about 1,100 people residing in 12 dwelling units at HSU. Two of the residence halls have a capacity of approximately 212 each (Redwood and Sunset); eight residence halls with a capacity of 50 each (Alder, Cedar, Chinquapin, Hemlock, Madrone, Maple, Pepperwood and Tan Oak); one with a capacity of 232 (Cypress); and one with a capacity of 45 (Redwood Manor). The number of staff and service personnel is about 900. There are approximately 100 disabled individuals.

HSU has two children-related programs with a total of approximately 85 children. The HSU Children’s Center provides day care and an educational program for toddlers and pre-school children. The Child Development Laboratory offers an educational program for pre-school children of students, staff and community residents. HSU students who are studying child development and other majors observe the children and also serve as student teachers.

Access/Egress Routes and Parking

The Campus map shows the roads at HSU and the major access/egress routes; L.K. Wood Boulevard connects to Sunset Avenue to the north and 14th Street to the south, both of which connect to U.S. 101, which is a four-lane freeway.

There are approximately 2,075 parking spaces provided on the campus. It is estimated that more than 80% of the campus community have automobiles.

Special Considerations

There are occasions during the year when additional resources to cope with emergencies would have to be provided. That is:

- ◆ During summer, HSU hosts participants in various workshops and conferences. Participants are generally unfamiliar with the campus and community, and live in campus residence halls that are minimally staffed.

Satellite Facilities

HSU owns, leases or administers eleven satellite facilities. Administrative powers have been delegated to HSU for its educational purposes.

- ◆ The Marine Laboratory is located 15 miles north of campus off U.S. 101 in the city of Trinidad. There is one building having a total of 16,208 square feet.
- ◆ The Redwood Sciences Laboratory is manned by the U.S. Forest Service and is located on the east boundary of the campus.
- ◆ The Fickle Hill Physical Science Field Laboratory is located in the mountains approximately 9 miles east of the main campus at an elevation of 2,040 feet. There are two structures totaling 670 square feet.
- ◆ The Pilot Point Fossil Bed is located approximately 23 miles north of campus, near Moonstone Beach, and is a geological exposure containing fossil outcroppings. No structures are located at this site.
- ◆ The Mad River Slough Islands are two small islands totaling approximately 15 acres located approximately 3 miles west of the main campus. No structures are located at these sites.
- ◆ The Lanphere Christensen Dunes are approximately 400 acres of vegetation-covered dunes located

approximately 3 miles west of campus adjoining the Pacific Ocean. No structures are located at this site.

- ◆ The Clam Beach Lagoons are located approximately 8 miles north of campus on the east side of U.S. 101. They are long, narrow lagoons consisting of approximately 5 acres. No structures are located at these sites.
- ◆ The Samoa Road Property is located approximately 3 miles west of campus to the north of Samoa Road and east of the Mad River Slough. It is approximately 7 acres of raw land. No structures are located at this site.
- ◆ The Natural History Museum is located at 1315 G Street in Arcata, approximately one mile west of campus. There is one building having a total of 4,423 square feet.
- ◆ The First Street Art Gallery is located at 422 First Street in Eureka, approximately 8 miles south of campus. Square footage of 3,424 on the first floor of the building is administered by the University.
- ◆ The Schatz Tree Farm is located near Maple Creek, approximately 25 miles northeast of campus, and consists of 385 acres. There is one structure on the site.