

SCENARIO FOR A M 8+ EARTHQUAKE IN NORTHWESTERN CALIFORNIA

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INTRODUCTION

Between 1982 and 1995, CDMG has produced 8 earthquake planning scenarios for major California earthquakes in urban areas. These have been used mainly for planning earthquake preparedness and response activities. The goal is to mitigate the effects of disruption of the utilities and transportation infrastructure. The scenarios are intended for regional emergency planning, not for site specific evaluations. The most recent of these scenarios is addressed here, and its possible uses are discussed.

HUMBOLDT SCENARIO

This assumes a M 8.4 event resulting from rupture of the 240 km Gorda segment of the Cascadia Subduction zone, in northernmost coastal California.

The southern end of the surface trace of the fault is at the coastline near Cape Mendocino, and trends NNW so that it is 75 km offshore at the California border with Oregon.

Offshore deformation generates a tsunami, and its effects on Eureka and Crescent City are assessed in the scenario.

The fault plane dips shallowly eastward, and is at depths of less than 20 km beneath the northernmost 200 km of coastal California. For alluvial sites, shaking intensities of MM IX extend inland 75 km near Cape Mendocino, and 10 km near the Oregon border. The three main population centers, Eureka, Arcata, and Crescent City, are in the MM VIII shaking zone.

Local intensities could be greater than those from shaking only, mainly due to liquefaction in alluvial areas, and landslides in hilly areas.

SPECIFIC IMPACTS TO CONSIDER IN PLANNING

1. Transportation: The highway system will be damaged by landslides in the Coast Ranges separating the impacted area from Central California, and by liquefaction at crossings of rivers and bays. This will severely limit access to this remote part of the state. Transport of supplies into the area, and of casualties out of it, will depend critically on aircraft. In the area, 2 airports with runways longer than 1.5 km should be functional after the event. These can accommodate large transport aircraft, such as C-130's. Several small airfields will also be available to accommodate light aircraft and helicopters.

2. Hospitals: The limited number of hospital beds and facilities in the impacted area will require that casualties be transported to available facilities 150km to 300 km away.
3. Tsunami: At Crescent City, tsunami destruction will exceed that from the 1964 tsunami generated by the M 9.2 Alaska earthquake. The 1964 tsunami runup and destruction reached 4th street, while this scenario indicates runup reaching 8th street. The lack of warning time from such a local tsunami source, makes it important for individuals to move to higher ground immediately upon feeling strong shaking. Eureka will be relatively sheltered from the tsunami by the Samoa Peninsula, the residents of which should also move to local high ground upon feeling strong shaking.
4. Water and gas utilities: Water and gas lines will be disrupted, mainly in areas of soil liquefaction. This will result in gas fires that will be difficult to control because of damage to the water system. The local fire fighting facilities should recognize this threat, and develop plans to deal with it.