

Oakland, CA Disaster Vulnerability Analysis

Preparation for an Earthquake Disaster

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Projection: NAD 1983 California State Plane III FIPS 2001

Data Sources: City of Oakland, California Department of Conservation, USGS, Census 2010

Background

Learn ♦ Lead ♦ Lift is a disaster justice pilot project lead by the City of Oakland Fire Department's Emergency Management Services Division (EMSD). The project seeks to engage and integrate all Oakland neighborhoods in disaster planning, preparedness, and mitigation efforts regardless of social, cultural, religious, and economic status.

Through Learn ♦ Lead ♦ Lift, the City is focused on building effective coordination and fostering working relationships with community resources in order to increase disaster readiness.

Oakland, CA is at risk for a series of disasters, including earthquakes, floods, and fires. This vulnerability analysis focuses on the city's present danger of a major earthquake.

The spatial questions at play in the investigation look to see how social factors interact with the built environment to produce a vulnerable zone during a natural disaster.

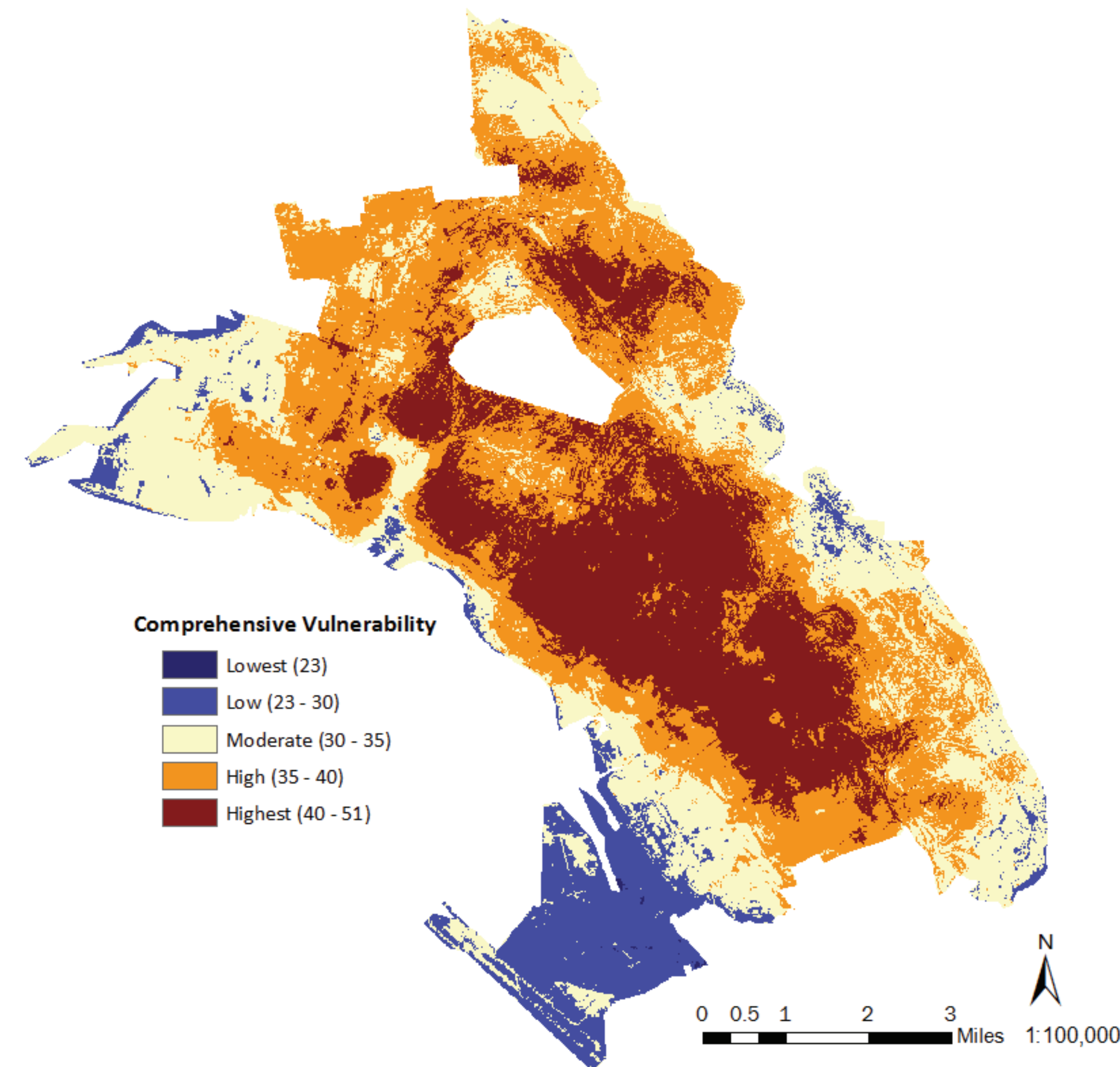
The maps presented demonstrate vulnerability through a series of variables including:

- Physical Vulnerability
- Vulnerability with the inclusion of resource accessibility
- Vulnerability including resource accessibility and social vulnerability

Methodology

In order to produce a map of vulnerability within Oakland, one must analyze a series of variables. As noted, the variables included within the presented maps are within three main categories of vulnerability.

Each variable has been assigned a classification from 1 – 6, with 1 standing as the least vulnerable and 6 as the most vulnerable. All variable were summed to create a comprehensive vulnerability score, with a maximum vulnerability score of 51.



Results

The maps presented show high physical vulnerability within the Oakland hills. Resource availability alleviates vulnerability within East and Downtown Oakland. However, with the addition of social variables that take into account population density and vulnerable age densities, vulnerability increases strongly in East, Southeast, and Downtown Oakland.

2010 Census Data, used to project median yearly income, reveals a high percentage of Oakland's low-income residents inhabiting the higher vulnerability zones of the city.

These maps provide a basic outline of the City of Oakland's vulnerability in the event of a major earthquake.

As shown in the following map, the focus neighborhoods of Learn ♦ Lead ♦ Lift are located within fairly vulnerable regions of the city.

Layer	Variable Reclassifications					
	1 (least vulnerable)	2	3	4	5	6 (most vulnerable)
<i>Physical vulnerability variables</i>						
Impervious Land	0-12%	12-32	32-51	51-67	67-81	81-100
Oakland Liquefaction	3+ mile distance	2 - 3 miles	1 - 2 miles	½ mile - 1 mile	¼ - ½ mile	¼ mile
Oakland Landslide	3+ mile distance	2 - 3 miles	1 - 2 miles	½ mile - 1 mile	¼ - ½ mile	¼ mile
Hayward Fault	3+ mile distance	2 - 3 miles	1 - 2 miles	½ mile - 1 mile	¼ - ½ mile	¼ mile
Slope	0 -5%	5 - 10	10 - 15	15 - 25	25 - 40	40+
Land Cover	Open Space, Forest (21, 41, 42, 43, 51, 52, 71, 81, 82)	Water (11, 12, 90, 95)	Barren Land (31)	Developed, Low Intensity (22)	Developed, Medium Intensity (23)	Developed, High Intensity (24)
Superfund Sites	3+ mile distance	2 - 3 miles	1 - 2 miles	½ mile - 1 mile	¼ - ½ mile	¼ mile
<i>Resources</i>						
Hospitals	0 - ¼ mile distance	¼ - ½ mile	½ - 1 mile	1 mile - 2 miles	2 - 3 miles	3+ miles
Schools designated as shelters	0 - ¼ mile distance	¼ - ½ mile	½ - 1 mile	1 mile - 2 miles	2 - 3 miles	3+ miles
Parks	0 - ¼ mile	¼ - ½ mile	½ - 1 mile	1 - 1 ½ mile	1 ½ mile - 2 miles	2+ miles
<i>Social vulnerability variables</i>						
Residents 65 years and older	0 - 500 individuals	500 - 1,000	1,000 - 2,500	2,500 - 4,000	4,000 - 5,500	5,500 - 7,463
Children ages 9 and younger	0 - 200 individuals	200 - 600	600 - 1,500	1,500 - 2,500	2,500 - 3,500	3,500 - 5,425
Population	0 - 2,500 individuals	2,500 - 5,000	5,000 - 12,000	12,000 - 18,000	18,000 - 25,000	25,000 - 35,500

These maps demonstrate the importance of the Learn ♦ Lead ♦ Lift's goal of working directly with the community to prepare for disaster.

