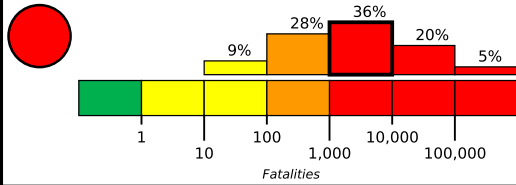


M 6.9, Shakeout SD-TJ Scenario

Origin Time: 2017-05-25 10:00:00 UTC (Thu 03:00:00 local)
Location: 33.0100° N 117.3200° W Depth: 7.7 km

PAGER
Version 1

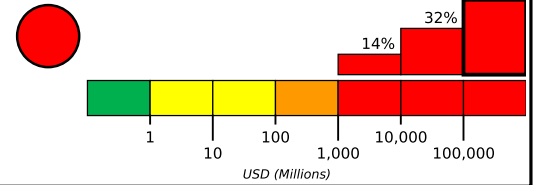
Estimated Fatalities



Red alert for shaking-related fatalities and economic losses. High casualties and extensive damage are probable and the disaster is likely widespread. Past red alerts have required a national or international response.

Estimated economic losses are 0-2% GDP of the United States.

Estimated Economic Losses

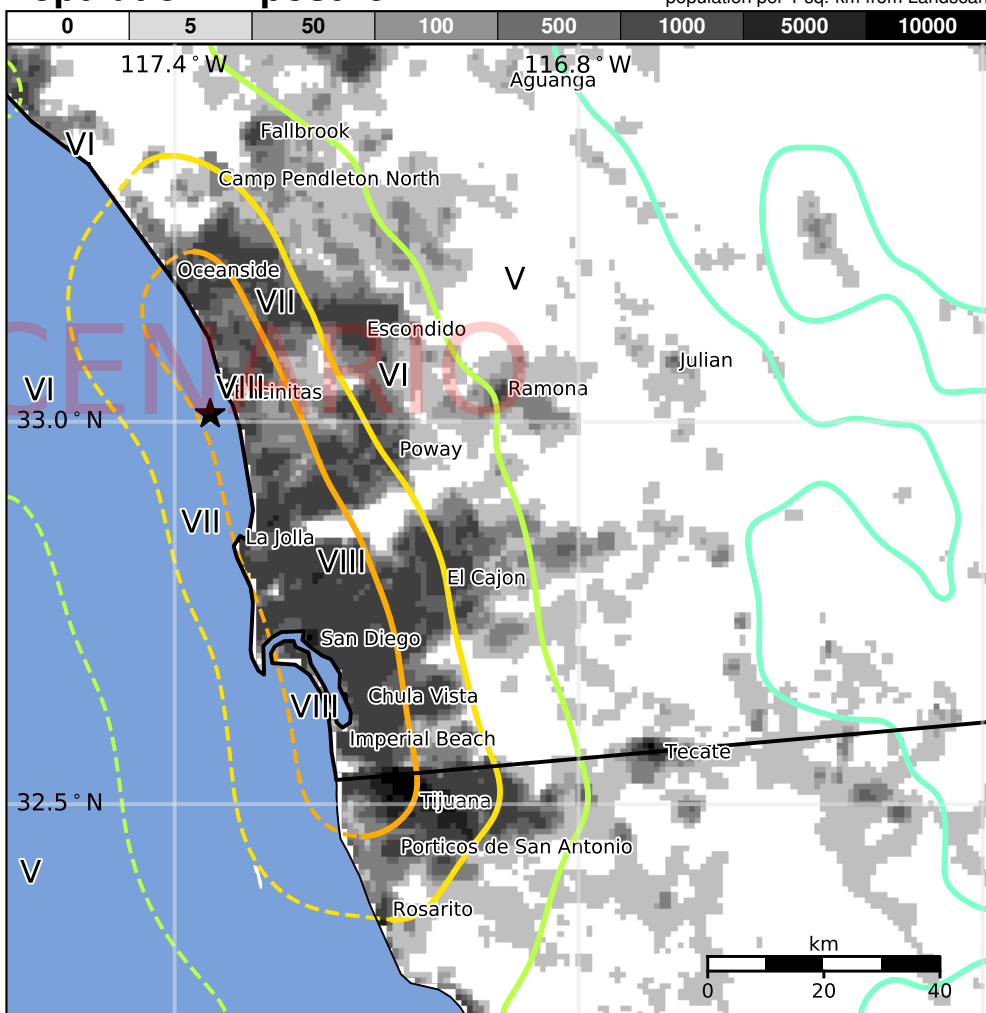


Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k=x1000)		—*	—*	6k*	161k	904k	1,947k	1,950k	344k	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	None	None	None	V. Light	Light	Moderate	Mod./Heavy	Heavy	V. Heavy
	Vulnerable Structures	None	None	None	Light	Moderate	Mod./Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Population Exposure



Structures

Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. The predominant vulnerable building types are adobe block with concrete bond beam and unreinforced brick masonry construction.

Historical Earthquakes

Date (UTC)	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
1986-07-13	49	5.8	V(9,528k)	0
1994-01-17	172	6.7	IX(73k)	33
1971-02-09	183	6.6	IX(21k)	65

Recent earthquakes in this area have caused secondary hazards such as landslides and liquefaction that might have contributed to losses.

Selected City Exposure

from GeoNames.org

MMI	City	Population
IX	San Diego	1,307k
IX	Coronado	19k
IX	Imperial Beach	26k
IX	La Jolla	43k
VIII	Del Mar	4k
VIII	Encinitas	60k
VIII	Carlsbad	105k
VIII	Chula Vista	244k
VIII	Oceanside	167k
VIII	Tijuana	1,376k
VI	Escondido	144k

bold cities appear on map.

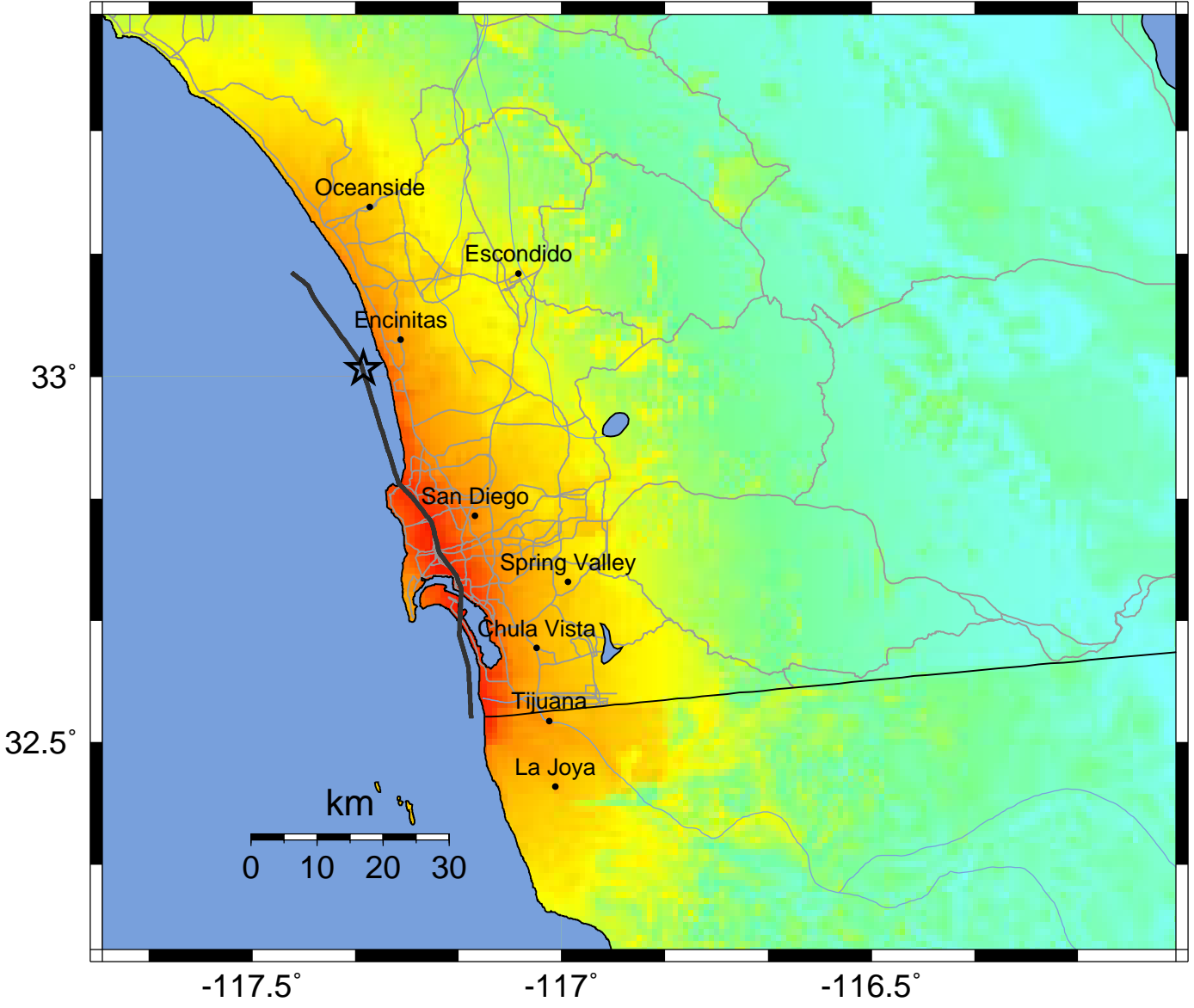
(k = x1000)

PAGER content is automatically generated, and only considers losses due to structural damage. Limitations of input data, shaking estimates, and loss models may add uncertainty.
<http://earthquake.usgs.gov/data/pager/>

Event ID: usshakeout_sdtj2015_hybridvs30_tj.se

-- Earthquake Planning Scenario --
ShakeMap for Shakeout SD-TJ - Southern Directivity Scenario

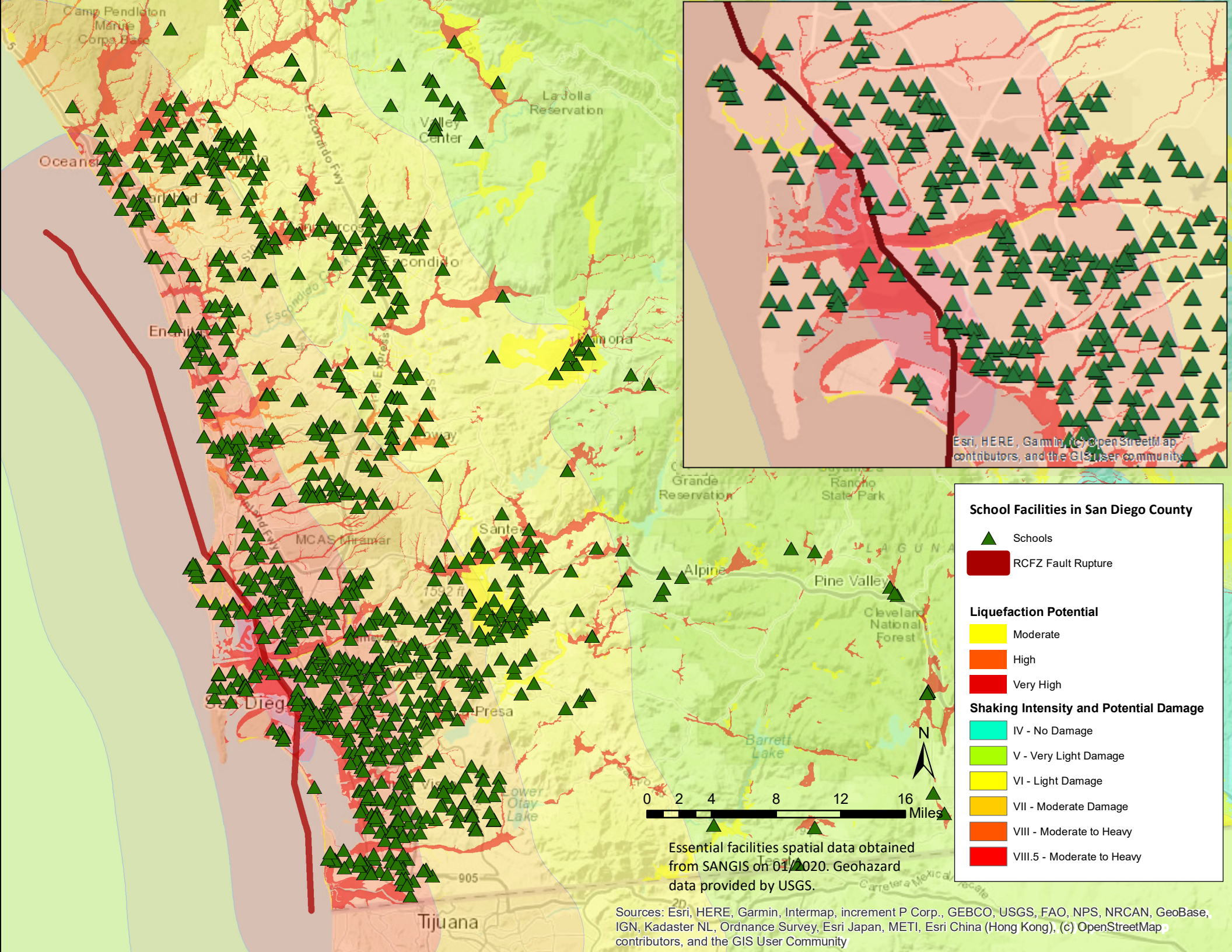
Scenario Date: May 25, 2017 04:00:00 AM MDT M 6.9 N33.01 W117.32 Depth: 7.7km

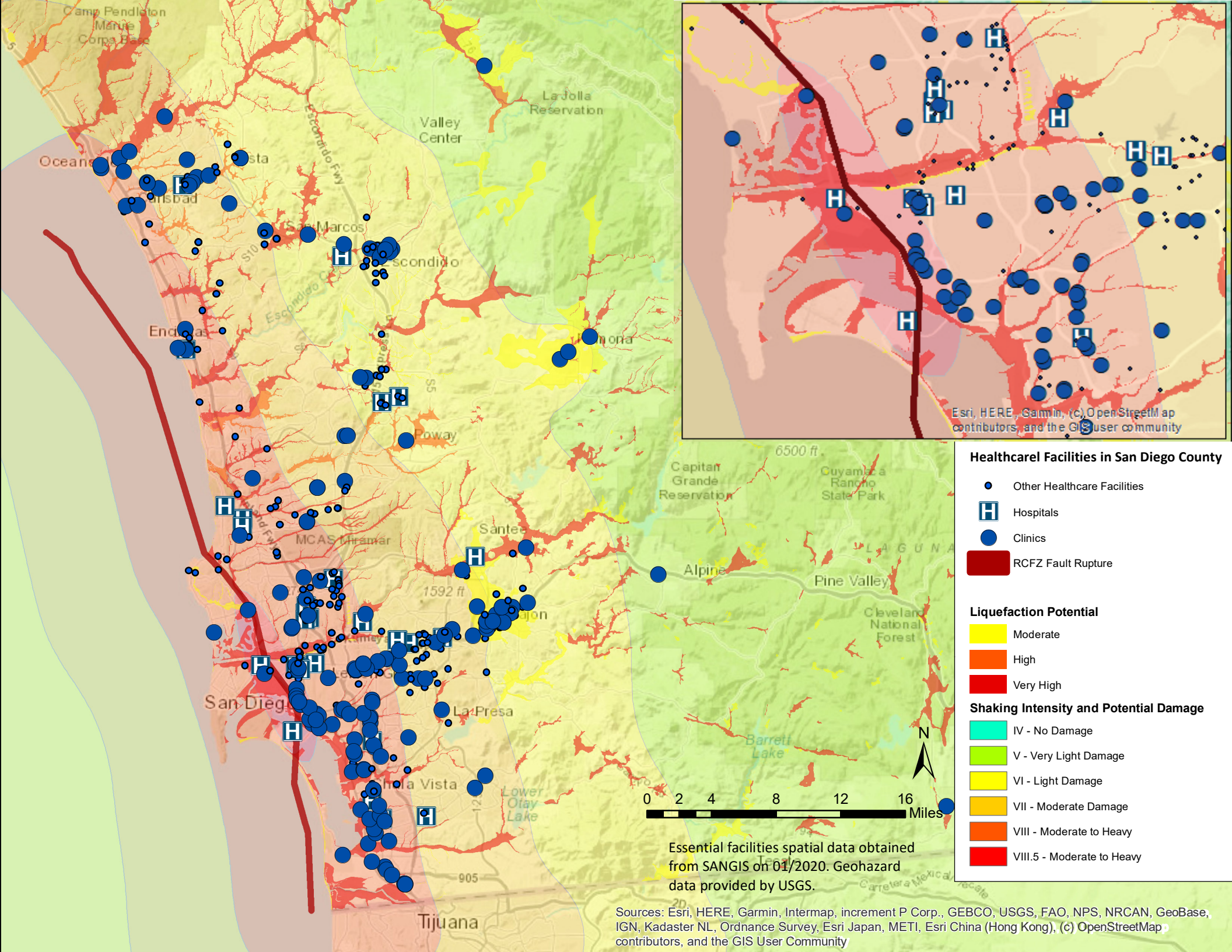


PLANNING SCENARIO ONLY -- Map Version 1 Processed 2017-05-25 01:13:25 PM MDT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)





Healthcare Facilities in San Diego County

- Other Healthcare Facilities
- H Hospitals
- Clinics
- RCZ Fault Rupture

Liquefaction Potential

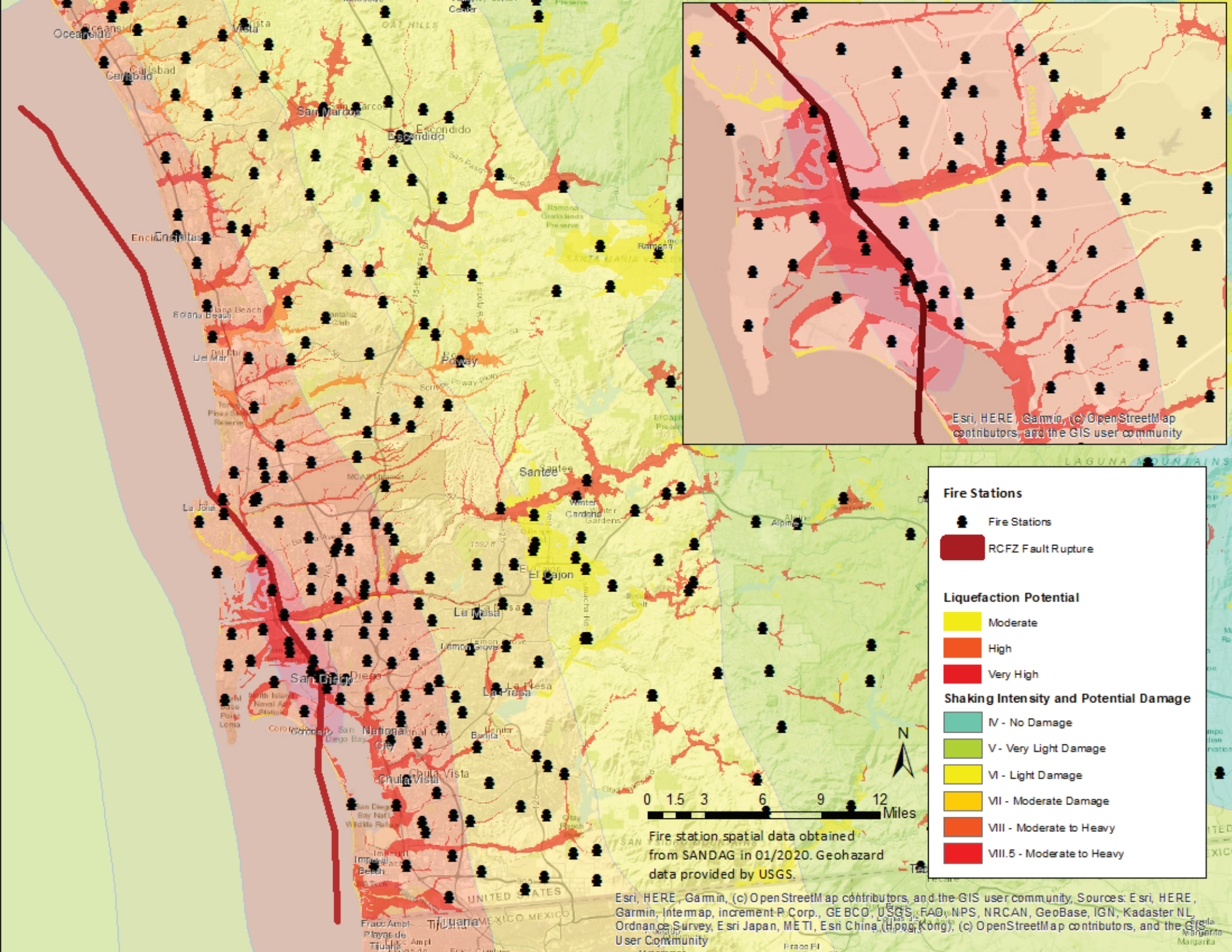
- Moderate
- High
- Very High

Shaking Intensity and Potential Damage

- IV - No Damage
- V - Very Light Damage
- VI - Light Damage
- VII - Moderate Damage
- VIII - Moderate to Heavy
- VIII.5 - Moderate to Heavy

Essential facilities spatial data obtained from SANGIS on 01/2020. Geohazard data provided by USGS.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Fire Stations

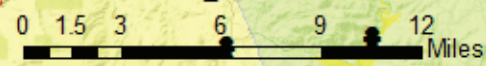
- Fire Stations
- RCFZ Fault Rupture

Liquefaction Potential

- Moderate
- High
- Very High

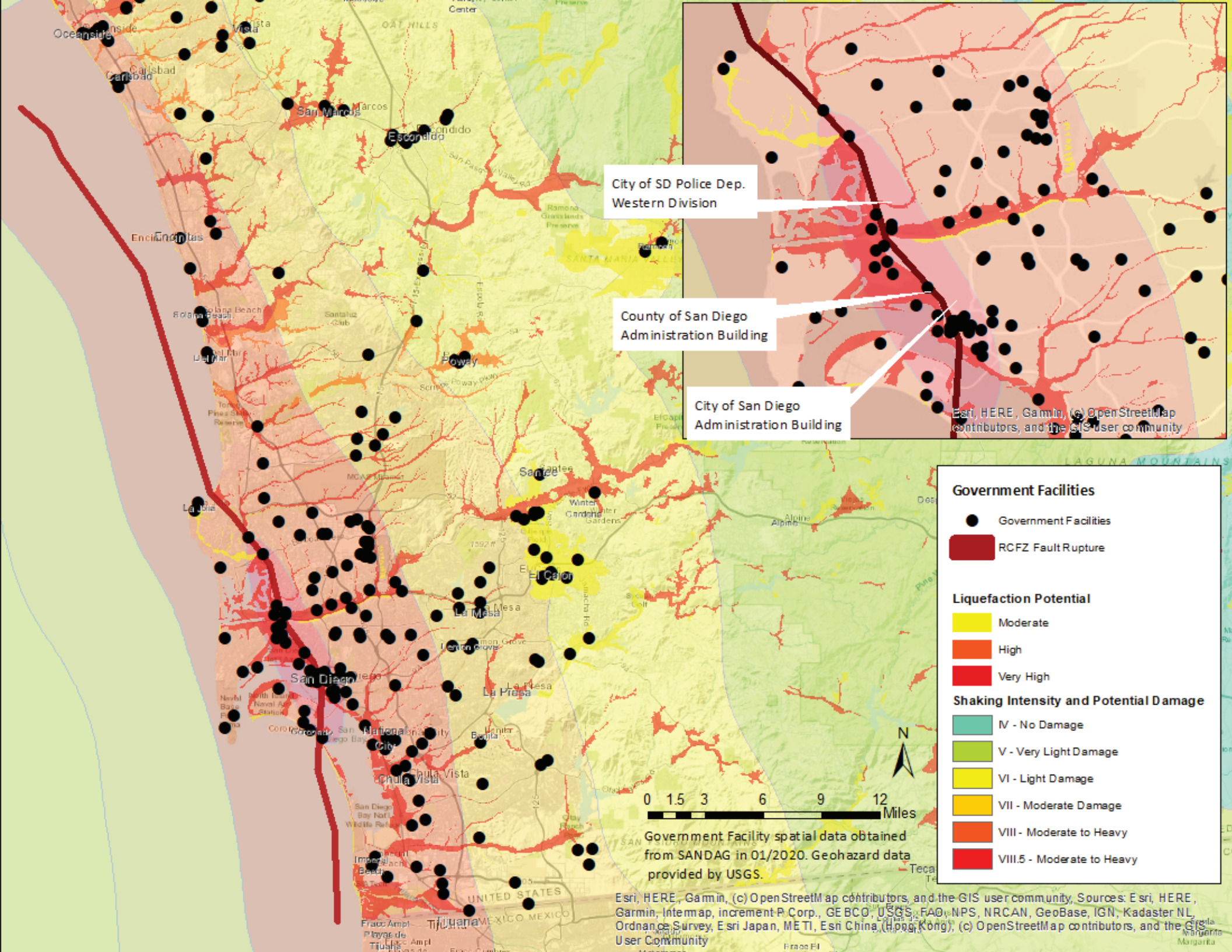
Shaking Intensity and Potential Damage

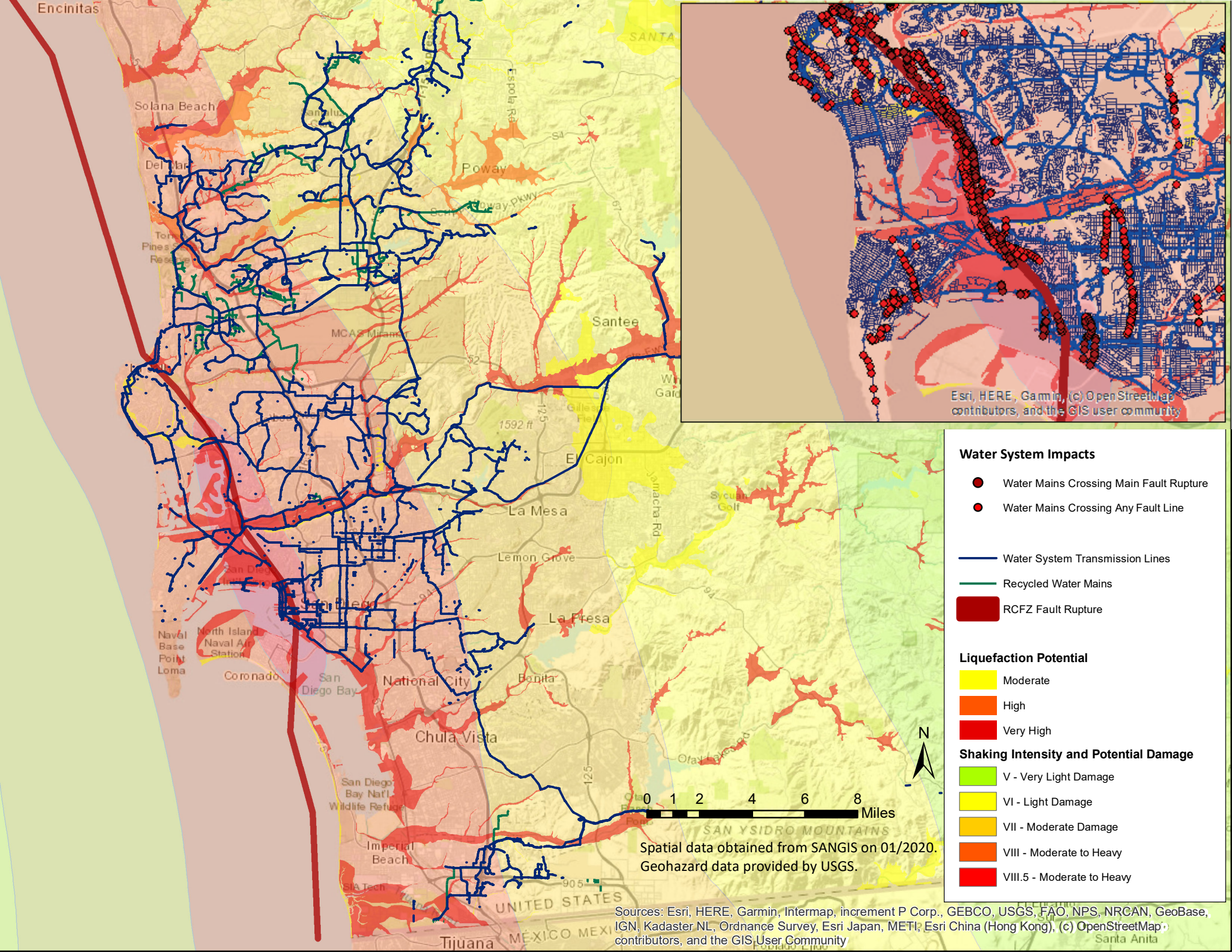
- IV - No Damage
- V - Very Light Damage
- VI - Light Damage
- VII - Moderate Damage
- VIII - Moderate to Heavy
- VIII.5 - Moderate to Heavy



Fire station spatial data obtained from SANDAG in 01/2020. Geohazard data provided by USGS.

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community





Water System Impacts

- Water Mains Crossing Main Fault Rupture
- Water Mains Crossing Any Fault Line

- Water System Transmission Lines
- Recycled Water Mains
- RCFZ Fault Rupture

Liquefaction Potential

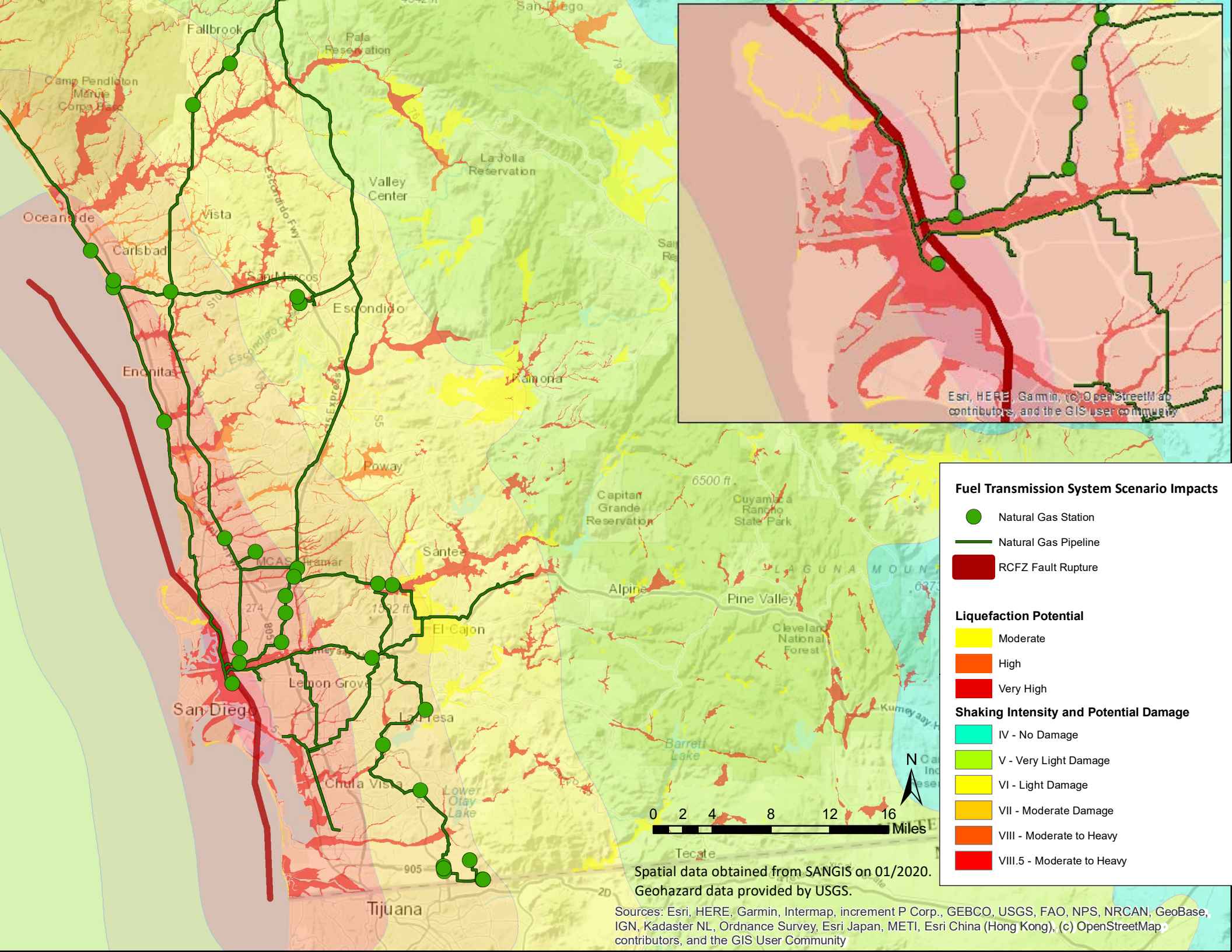
- Moderate
- High
- Very High

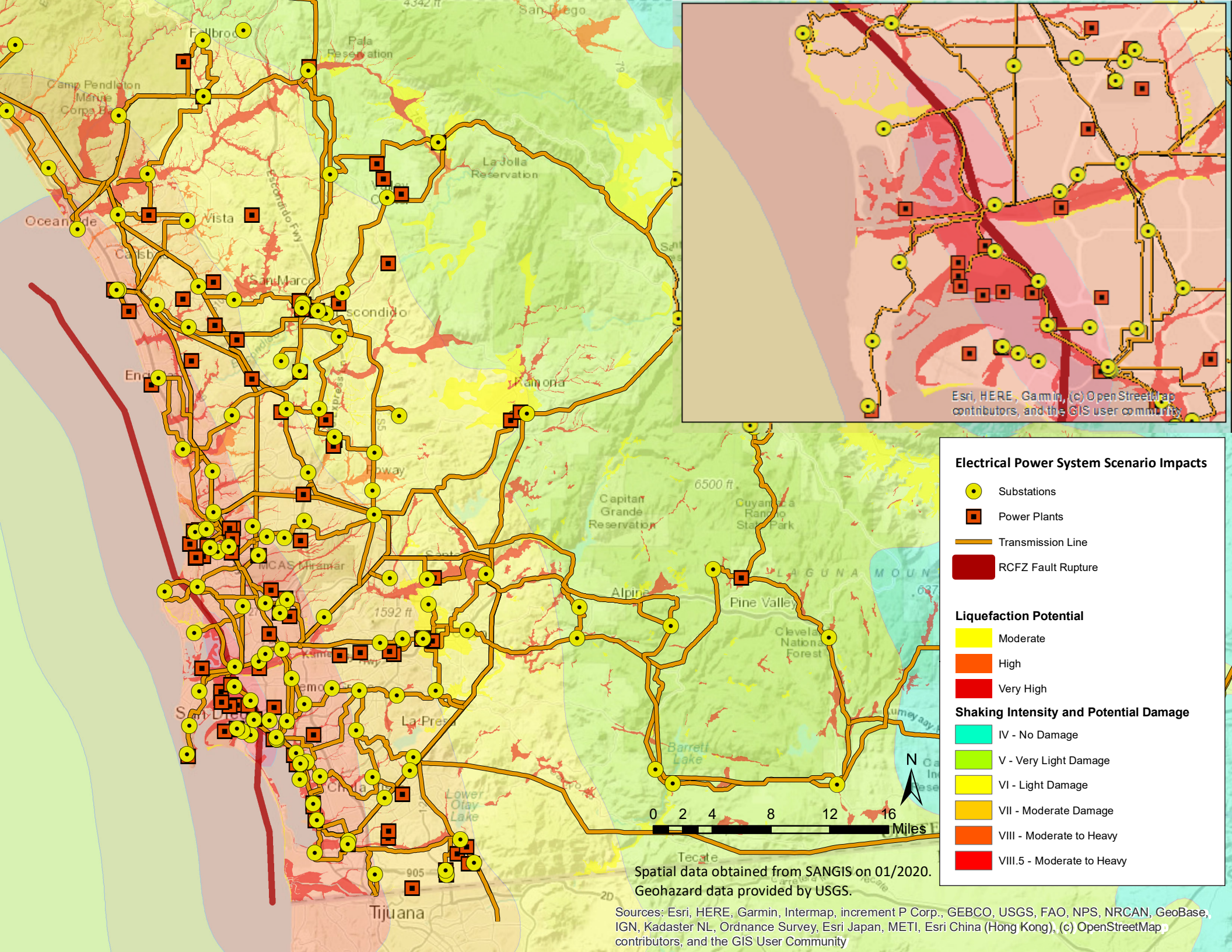
Shaking Intensity and Potential Damage

- V - Very Light Damage
- VI - Light Damage
- VII - Moderate Damage
- VIII - Moderate to Heavy
- VIII.5 - Moderate to Heavy

Spatial data obtained from SANGIS on 01/2020.
 Geohazard data provided by USGS.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community





Electrical Power System Scenario Impacts

- Substations
- Power Plants
- Transmission Line
- RCFZ Fault Rupture

Liquefaction Potential

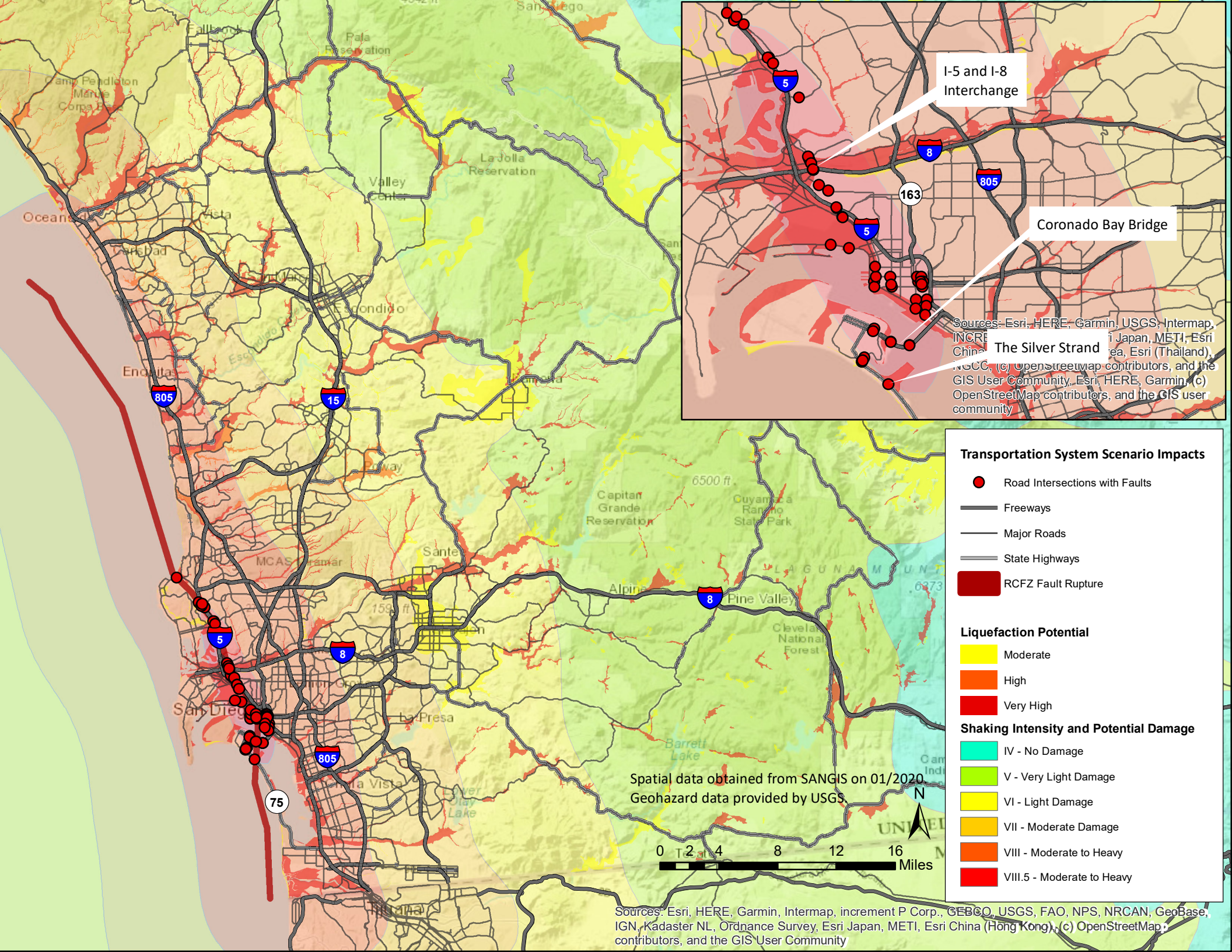
- Moderate
- High
- Very High

Shaking Intensity and Potential Damage

- IV - No Damage
- V - Very Light Damage
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- VII - Moderate Damage
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- VIII.5 - Moderate to Heavy

Spatial data obtained from SANGIS on 01/2020.
 Geohazard data provided by USGS.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Transportation System Scenario Impacts

- Road Intersections with Faults
- Freeways
- Major Roads
- State Highways
- RCFZ Fault Rupture

Liquefaction Potential




- Moderate
- High
- Very High

Shaking Intensity and Potential Damage




- IV - No Damage
- V - Very Light Damage
- VI - Light Damage
- VII - Moderate Damage
- VIII - Moderate to Heavy
- VIII.5 - Moderate to Heavy

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community







Federal Infrastructure Impacts

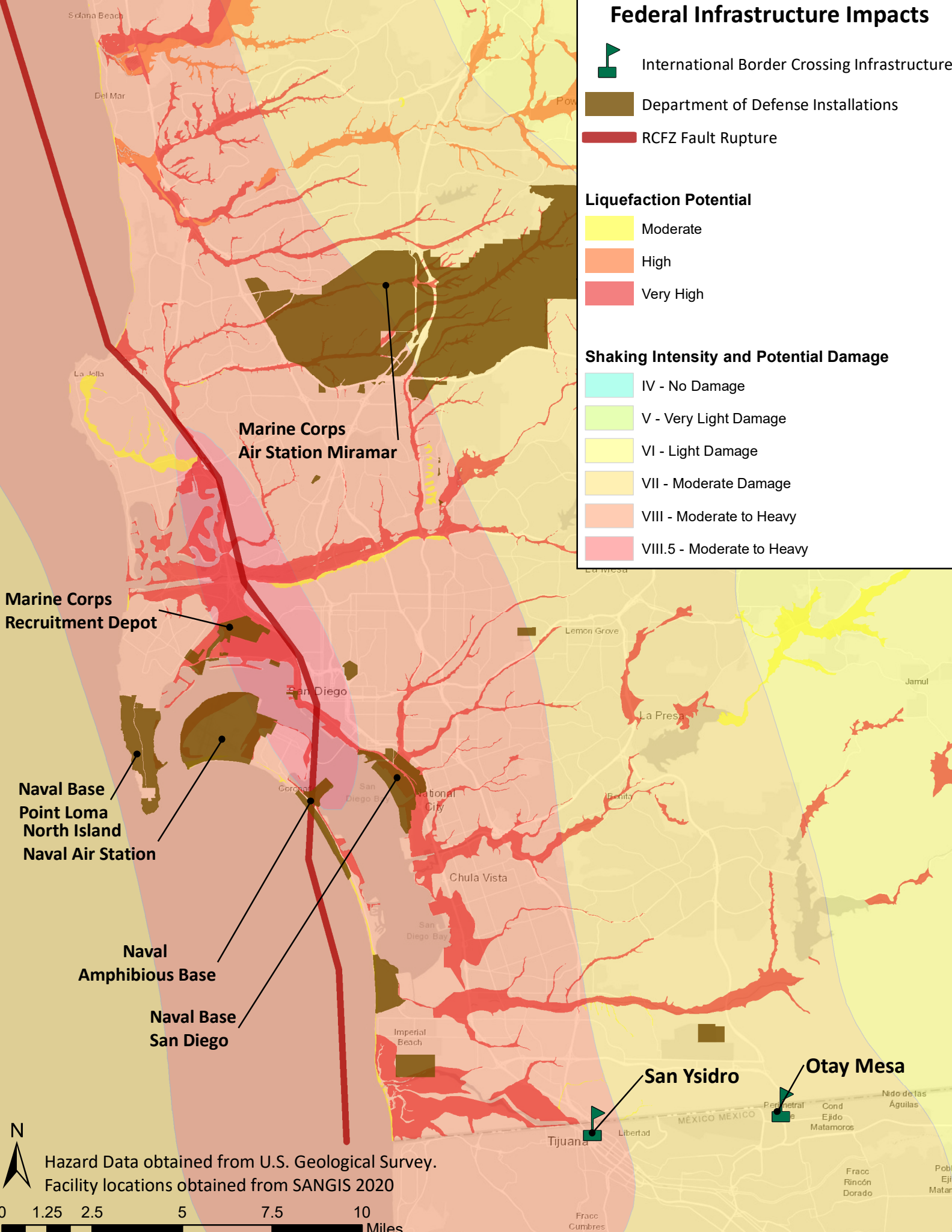
-  International Border Crossing Infrastructure
-  Department of Defense Installations
-  RCFZ Fault Rupture


Liquefaction Potential

-  Moderate
-  High
-  Very High

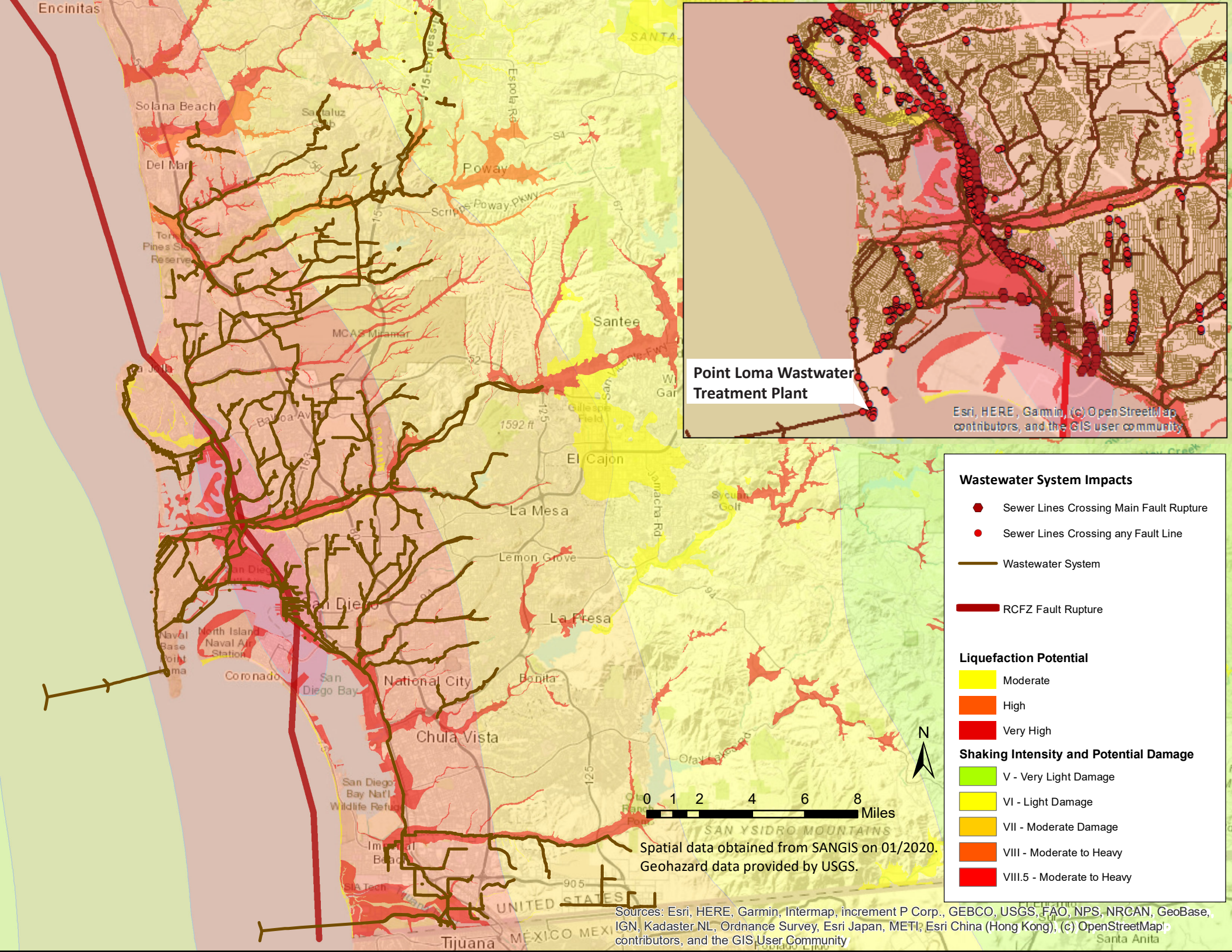
Shaking Intensity and Potential Damage

-  IV - No Damage
-  V - Very Light Damage
-  VI - Light Damage
-  VII - Moderate Damage
-  VIII - Moderate to Heavy
-  VIII.5 - Moderate to Heavy



 Hazard Data obtained from U.S. Geological Survey.
Facility locations obtained from SANGIS 2020

0 1.25 2.5 5 7.5 10 Miles



Point Loma Wastewater Treatment Plant

Wastewater System Impacts

- Sewer Lines Crossing Main Fault Rupture
- Sewer Lines Crossing any Fault Line
- Wastewater System

RCFZ Fault Rupture

Liquefaction Potential

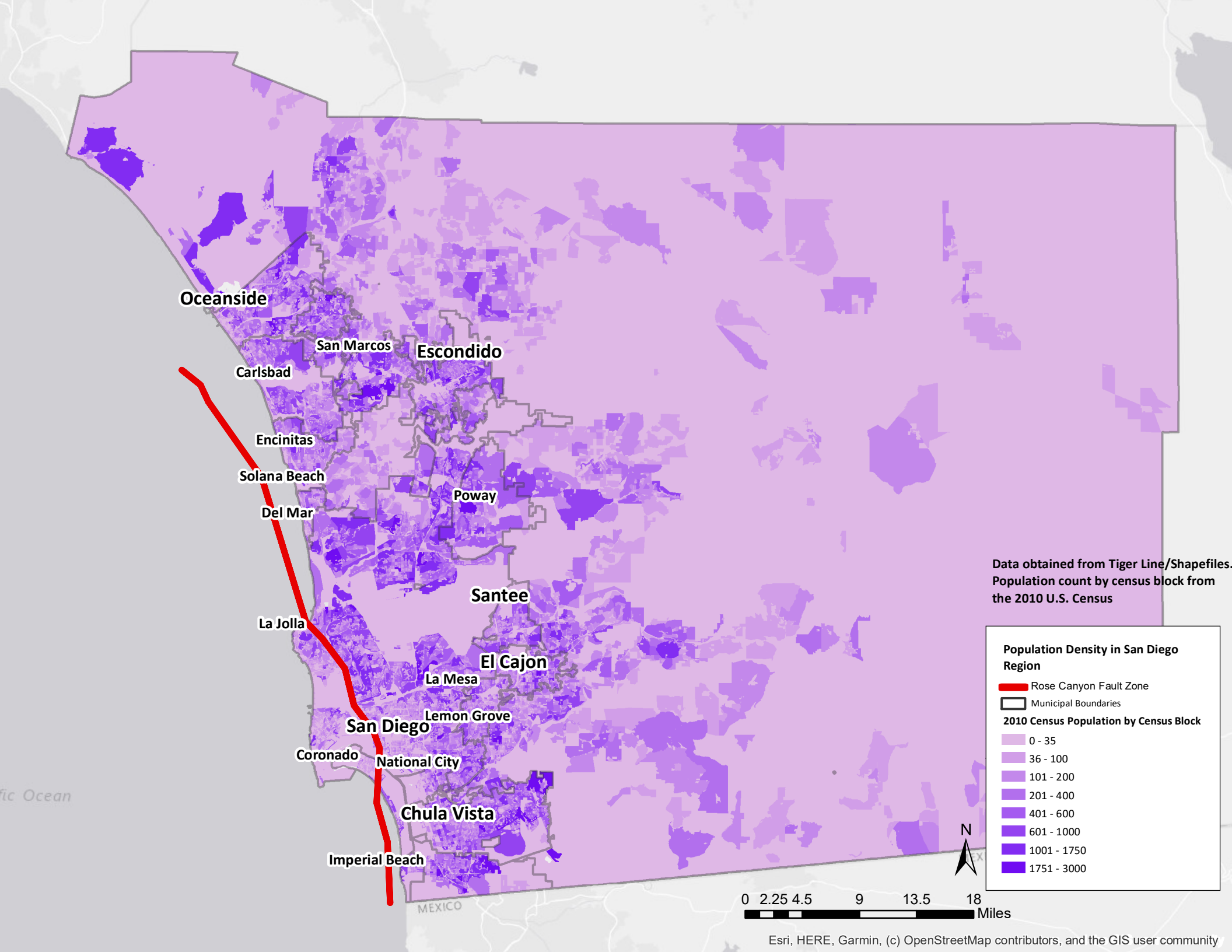
- Moderate
- High
- Very High

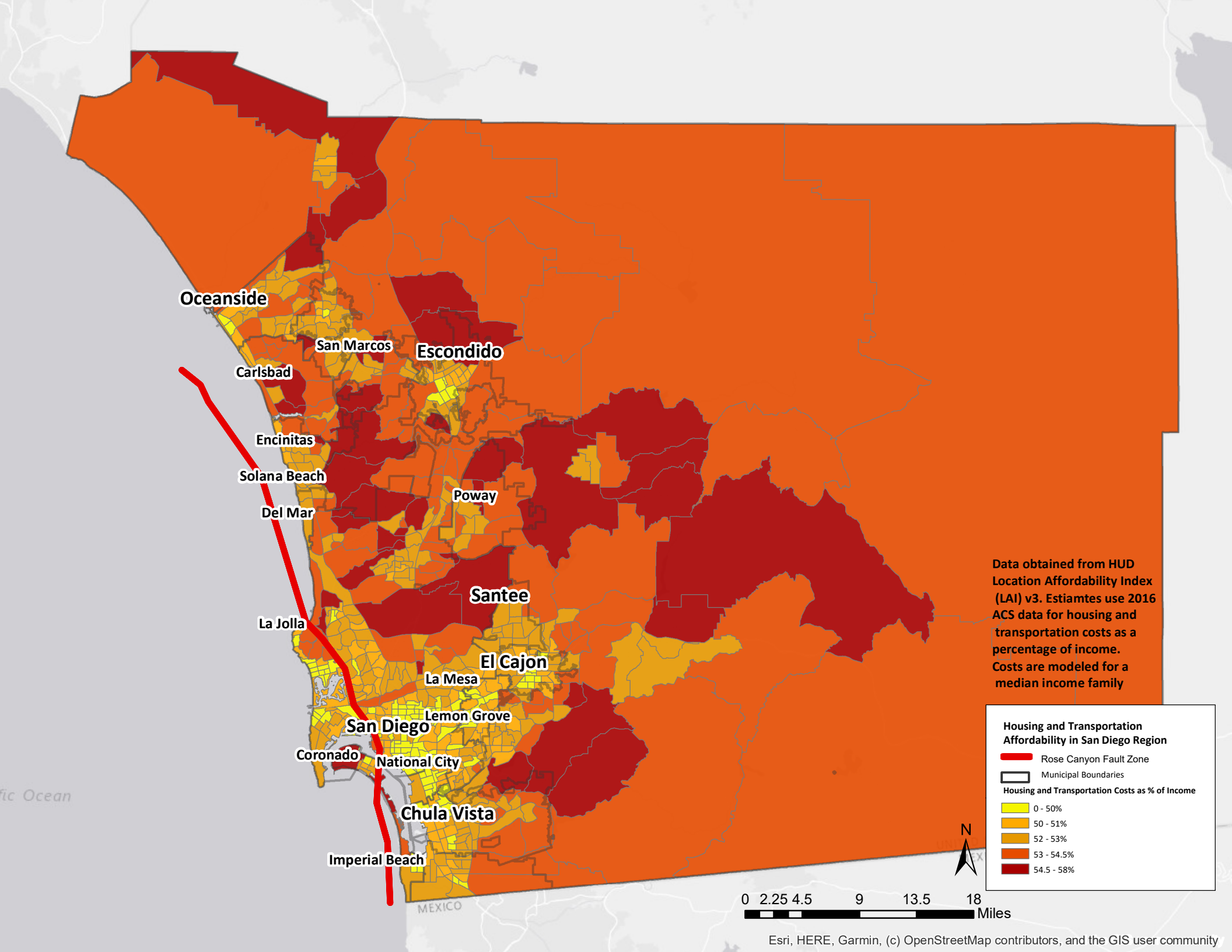
Shaking Intensity and Potential Damage

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Spatial data obtained from SANGIS on 01/2020.
Geohazard data provided by USGS.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community





Oceanside

San Marcos

Escondido

Carlsbad

Encinitas

Solana Beach

Del Mar

Poway

La Jolla

Santee

El Cajon

La Mesa

Lemon Grove

San Diego

Coronado

National City

Chula Vista

Imperial Beach

Data obtained from HUD
Location Affordability Index
(LAI) v3. Estimates use 2016
ACS data for housing and
transportation costs as a
percentage of income.
Costs are modeled for a
median income family

Housing and Transportation Affordability in San Diego Region

- Rose Canyon Fault Zone
- Municipal Boundaries
- Housing and Transportation Costs as % of Income**
- 0 - 50%
- 50 - 51%
- 52 - 53%
- 53 - 54.5%
- 54.5 - 58%

