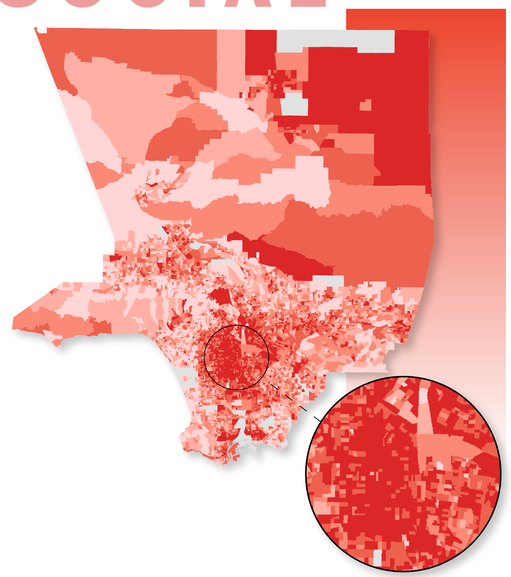
# SOCIAL



## Social Vulnerability

We utilized a modified social vulnerability index (or SoVI) approach. We conducted a principal components analysis with 26 Census variables known to contribute to vulnerability in the event of a natural hazard. These variables included income, education, gender, age, race, and employment characteristics, as well as access to transportation and health insurance. From this, we determined 7 factors that explain the most variance in the data and contribute the most strongly to social vulnerability within the study area.

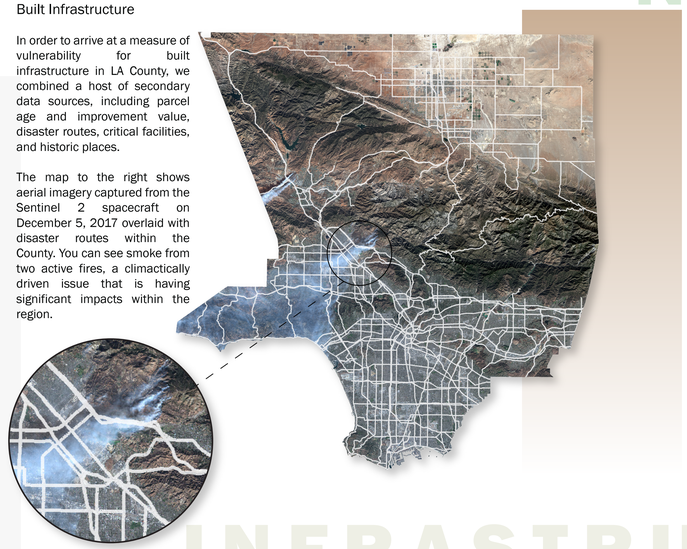
This map shows the aggregate social vulnerability within the study area. There is a cluster of increased social vulnerability in and around downtown Los Angeles, as well as around the port complex in the south and arid regions in the northeast.

# NATURAL RESOURCES

## Built Infrastructure

In order to arrive at a measure of vulnerability for built infrastructure in LA County, we combined a host of secondary data sources, including parcel age and improvement value, disaster routes, critical facilities, and historic places.

The map to the right shows aerial imagery captured from the Sentinel 2 spacecraft on December 5, 2017 overlaid with disaster routes within the County. You can see smoke from two active fires, a climactically driven issue that is having significant impacts within the region.

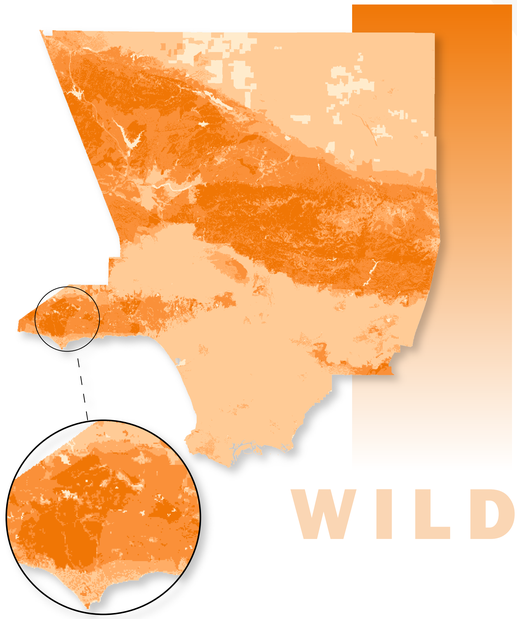


## Natural Resources

Our natural resource vulnerability analysis used a modified landscape ecology approach that incorporates lessons from urban ecology. It included habitat fragmentation, wetlands, state designated significant ecological areas, greenness, tree canopy cover, and modelled species richness, which includes both native and non-native plants, fungi, insects, and animals. These components were then combined to show overall potential vulnerability of natural resources to a risk event. In other words, areas of highest vulnerability will likely experience greater potential impact and loss during an environmental hazard.

This map shows that natural resource vulnerability tends to coincide with forested and wetland areas. Due to the metrics used, areas of natural resource vulnerability also exist in urban parks and landscapes, as well as along rivers across the County.

# INFRASTRUCTURE



## Wildfire Risk

Wildfire risk incorporated state wildfire threat data that was determined through a combination of fire frequency, or the likelihood of a given area burning, and potential fire behavior. These two factors are combined to create four threat classes ranging from moderate to extreme.

Some at-risk areas coincide with mountain ranges due to wind and fuel availability. There are also areas of concern at the intersection of natural and urban areas. This is exacerbated in areas where suburban sprawl has expanded into areas that were once allowed to naturally burn at lower intensity before recovering. Now when fires occur, there are not only more structures at risk, but more fuel as well.

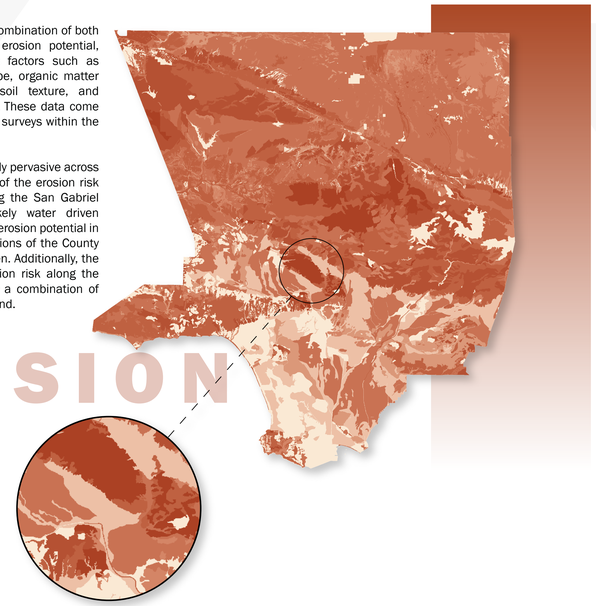
# WILDFIRE

# EROSION

## Erosion Risk

Erosion risk is a combination of both wind and water erosion potential, and incorporates factors such as hydrologic soil type, organic matter content, slope, soil texture, and moisture content. These data come from national soil surveys within the County.

Erosion risk is fairly pervasive across LA county. Some of the erosion risk that is high along the San Gabriel Mountains is likely water driven erosion. The high erosion potential in the more arid regions of the County is likely wind driven. Additionally, the thin strip of erosion risk along the coastline is likely a combination of both water and wind.

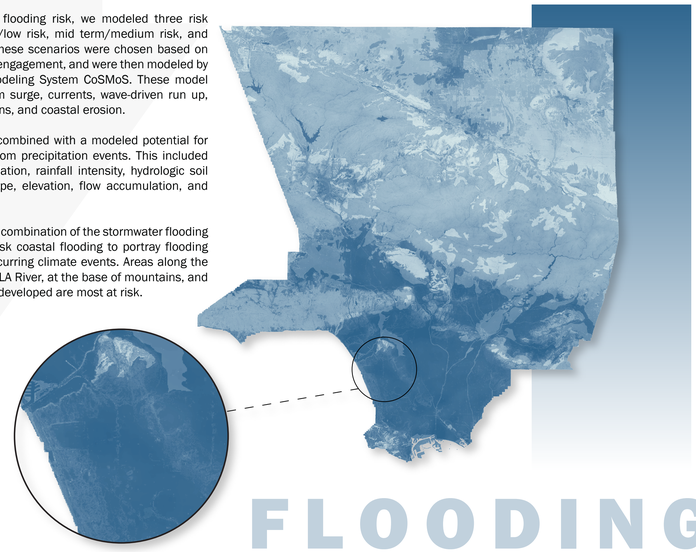


## Flooding Risk

To determine coastal flooding risk, we modeled three risk scenarios: short term/low risk, mid term/medium risk, and long term/high risk. These scenarios were chosen based on literature and partner engagement, and were then modeled by the Coastal Storm Modeling System CoSMoS. These model runs incorporate storm surge, currents, wave-driven run up, sea level rise projections, and coastal erosion.

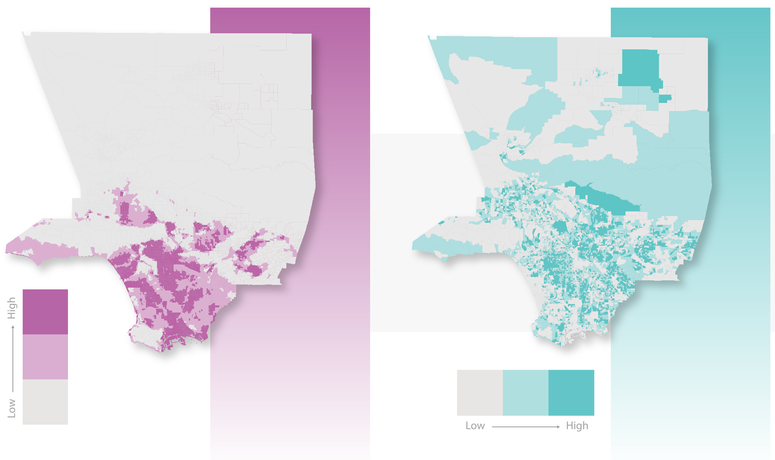
Coastal flooding was combined with a modeled potential for stormwater flooding from precipitation events. This included data on flow accumulation, rainfall intensity, hydrologic soil group, land cover, slope, elevation, flow accumulation, and drainage density.

The map here shows a combination of the stormwater flooding with long term/high risk coastal flooding to portray flooding potential during co-occurring climate events. Areas along the coast, adjacent to the LA River, at the base of mountains, and those that are heavily developed are most at risk.



# FLOODING

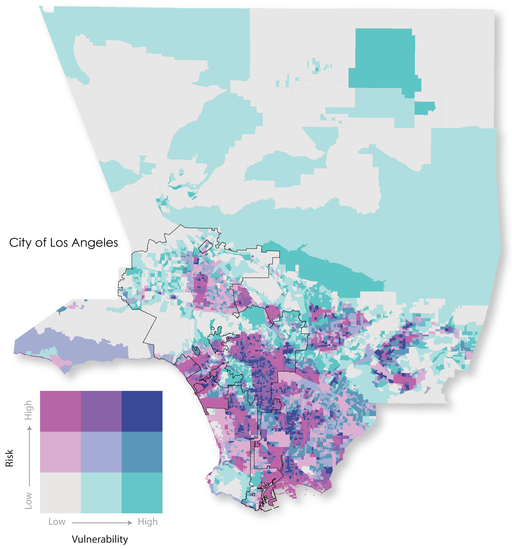
# COMBINED RISKS




## Bivariate Mapping

Bivariate choropleth mapping is a technique that allows for easy comparisons between vulnerability and risk indices. They depict areas where high vulnerability intersects high risk. These maps can aid in decision making when preparing for climate adaptation and mitigation, and can help prioritize both actions and their locations. Areas with high vulnerability and high risk might be of primary importance, while areas of low vulnerability and low risk may be of lesser concern.

To the left, the combined flooding risk profile is displayed in pink. Next to that, composite vulnerability (all vulnerabilities combined) is shown in blue. These two maps are then combined on the right to show where flooding risk and composite vulnerability intersect. As shown in the bivariate legend, dark blue areas have both high risk and vulnerability potential. Many areas in downtown LA stand out, especially along the LA river. Parts of the inland empire have intersecting high vulnerability and risk, and there is also a coastal band of medium risk and vulnerability overlapping.




# COMBINED VULNERABILITIES

# NCCOS VULNERABILITY FRAMEWORK

## Supporting resilient ecosystems, communities, and economies

The overarching goal of this project was to evaluate a coastal community's vulnerability to the localized impacts of climate variability and change. The Framework considers a broad range of ecological, social, economic, and cultural components, and examines how these components might be impacted by specific climate-driven risks. Integration of a wide range of vulnerability and risk profiles enables users to more easily understand the complexities of overall vulnerability and risk within their region. Originally developed for the Chesapeake Bay, and applied most recently to Los Angeles County, California, the Framework is a transferable tool to any area within the United States and beyond. For its most recent iteration, data were aggregated to the Census block group for final mapping.

A Project of NOAA's National Centers for Coastal Ocean Science

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