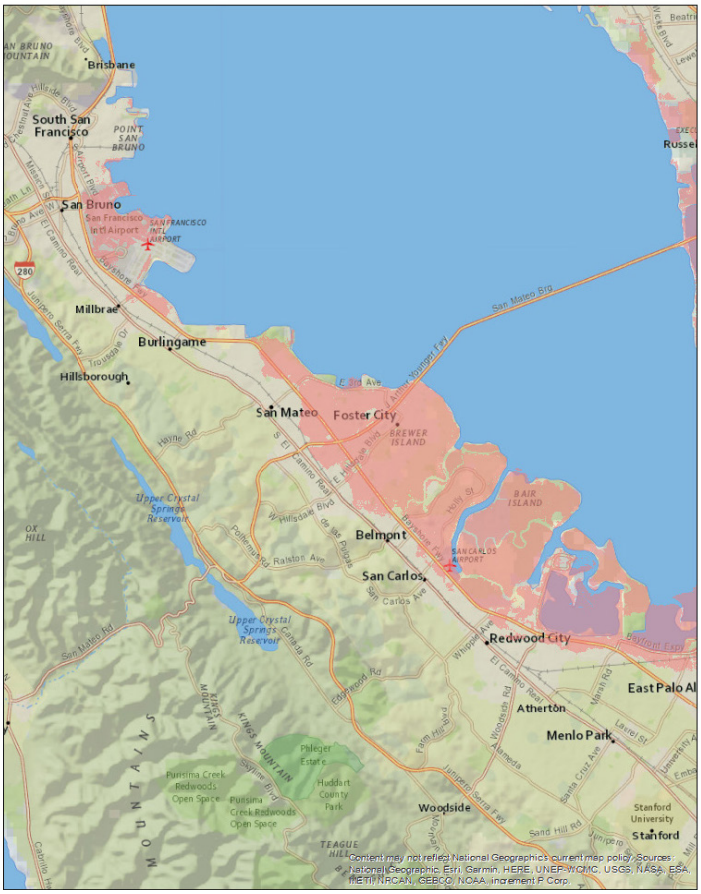
ECONOMIC AND SOCIAL COSTS OF SEA LEVEL RISE IN SAN MATEO COUNTY: STANFORD SUSTAINABLE URBAN SYSTEMS SMC RISK STUDY

Stanford's Sustainable Urban Systems (SUS) Initiative is running a year-long project-based learning course in partnership with the San Mateo County Office of Sustainability to help assess and plan for coastal flood risk. The SUS urban risk methodology focuses on the estimation of average annualized loss (the amount we would expect to pay each year in losses from flood damage) for buildings in the county, as well as indirect losses in the form of commute and business disruption, and cascading impacts on vulnerable communities. This framework can be used to evaluate the system impacts of a wide range of policy and infrastructure interventions available to the County and its jurisdictions and constituents.

Area Map

Project estimates of the direct coastal flood damages for the entire bayside of San Mateo County.



AECOM DATA REPRESENTING THE REGION OF SMC INUNDATED BY 100-YR COASTAL FLOODING EVENT WITH 1.6 FEET OF SEA LEVEL RISE.

Timeline

The project is a year-long endeavour which will assess the risks of coastal flooding and sea level rise in the San Francisco bay area. Between October and December of 2017 a baseline risk assessment for a set of cities in the west and south bay regions was conducted, ranging from Burlingame in the north to San Jose in the south. Estimates of average annualized losses for these regions were provided, as well as some indirect losses and cascading impacts associated with flood events were explored.

Between January and March of 2018, SUS partnered with the San Mateo County Office of Sustainability and refined the analysis for the county for the period 2020-2040. More accurate estimates of average annualized loss were provided by refining tools and data. The team assessed the uncertainty in the data, analyzed impacts to vulnerable communities and assessed the impacts of flooding to commutes.

Between April and June of 2018, the goal is to further refine the analysis by incorporating current and future coastal protection projects, as well as studying the potential risks to the major utilities and infrastructures in the county such as the wastewater treatment plants.

Partners

SUS completed the assessment for the San Mateo County Office of Sustainability in coordination with the Stanford Public Policy Team, a group that studied the policy landscape for sea level rise and corresponding adaptation measures in the bay area. The work included representatives from local municipalities and community groups.

Results

The analysis of the risk of coastal flooding and sea level rise to San Mateo County show that the average annualized loss, i.e. the expected damage to buildings per year, while accounting for the uncertainty in flood events and sea level rise, may rise to $530 million by the year 2040. The distribution of these losses is studied based on the residential-commercial sector divide and the effects of flood insurance and the residual burden of costs faced by homeowners is explored.

In addition to direct damage losses, we study the broader indirect losses that results from potential network effects as well as underlying socioeconomic vulnerabilities of communities is examined. The project analyzes the cascading impacts of residential damage to households of various income brackets and highlights the tipping point vulnerabilities of the households with the lowest discretionary incomes.

The inundation of roads can lead to potential commute disruption that impacts businesses due to the delay and absence of employees. With the preliminary analysis, the project quantifies this commute disruption and highlights potential regions in San Mateo County, both near the bay as well as further inland, where workplaces may face substantial commute disruption due to flood events.

Website

http://www.sus.stanford.edu/resilience