# *Vulnerable Housing Quick Facts*

What makes Virginia housing vulnerable?

Vulnerable Housing is housing stock that is likely to face higher than usual damages in the event of a natural hazard such as a hurricane or Nor'easter. Vulnerable housing may also be more susceptible to damage from recurrent flooding or sea level rise. Housing stock may be vulnerable due to its type (e.g. mobile homes), age or vacancy rate. In Virginia, we identified two primary types of vulnerable housing- empty houses (sky blue) due to both vacancy or being used as 2nd homes and fragile stock (turquois) i.e. where a large
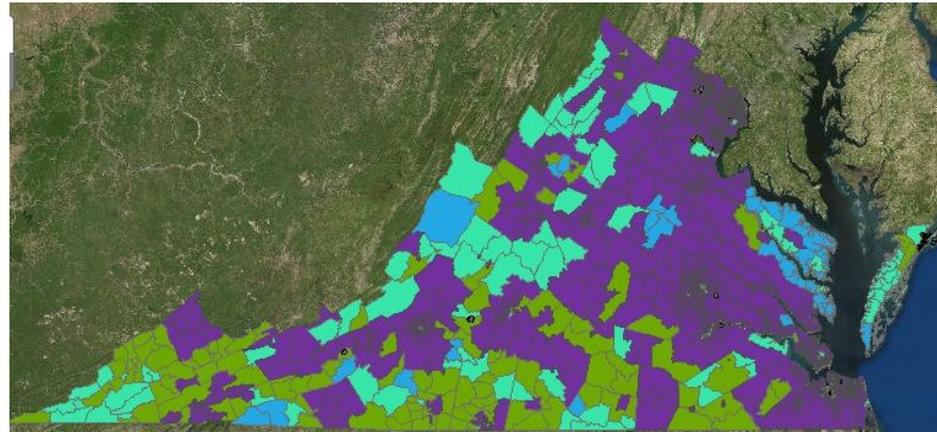
percentage of the housing stock consists of mobile homes or homes without complete plumbing. Housing vulnerability is important to identify in the event of a natural disaster because these areas may require more disaster assistance and recovery support. Local governments can also use this information to identify areas where additional housing assistance is needed, future housing developments, or various other development projects. Knowing where vulnerable housing lies in an area can help governments and policy makers better aid their communities in the event of a natural disaster or sea level rise.

How did we use is cluster analysis to identify vulnerable houses?

Cluster analysis takes lots of vulnerability factors and boils them down to an easy to interpret measure of housing vulnerability by grouping "like" observations into clusters that share similar characteristics. We used the following 12 variables for our housing cluster analysis: density, median year built, homes lacking plumbing (e.g. hot and cold running water, a flush toilet, a bathtub or shower, and a sink with a faucet), mobile homes, vacancy (housing units for sale or rent), 2nd homes (housing units that are vacant because they are not primary residence), owner to renter ratio, median home value, median gross rent, median year owners move into their homes, median year renters moved in, and home purchase loans (number of approved loans for home purchases divided by the number of housing units in the tract)[1]. Based on our cluster analysis approximately 20% of the census tracts in Virginia have vulnerable housing stock either because a large percentage is empty or because the stock itself is fragile due to age or lack of complete plumbing facilities.

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[1] *Data came from the 2010 census, 2009-2014 American Community Survey dataset, or the 2012-2014 Home Mortgage Disclosure Act dataset.*