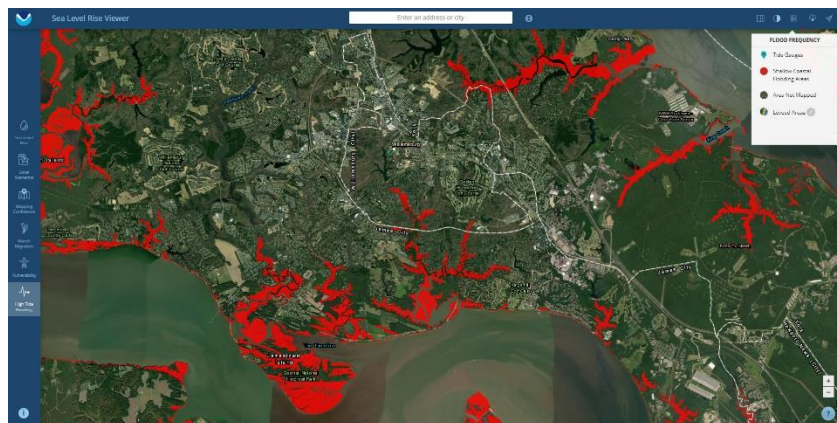


Handout 2.2a Sea Level Rise

“Threats to our water resources and water habitat affect everyone on the Peninsula.”

This is a quote from a website called Land Scope America which is a national conservation guide to American Natural Places, a combined project of National Geographic and Nature Serve. Later in the article you read “It is a strange sight for visitors, but for many residents it is becoming a part of daily life. These rulers are strategically placed in low lying areas to help residents deal with coastal flooding. They help drivers see if the water level is safe to plow through. Even on sunny days there can be standing water on the roads. Sea level rise is rapidly increasing the number of these flood events throughout the year. For instance, the typical annual rate has doubled since 2000, from about 5 days to more than 10 days per year in 2018. Direct loss and fragmentation of habitat, largely due to conversion of open space for residential and commercial development, is the greatest threat to Virginia’s biodiversity. Add to this stiff competition from exotic species, diminished air quality from the combustion of fossil fuels, non-point source pollution of the waterways, climate change and associated sea-level rise -- and the picture can look pretty gloomy.” Threats and Issues in Virginia // LandScope America.

The NOAA Sea Level Rise Viewer shown here is a sea level visualization tool produced by the NOAA Digital Coast program. In this view it shows the Williamsburg coastal area along the James River. Go to [Sea Level Rise Viewer \(noaa.gov\)](https://coast.noaa.gov/slr/) for additional



Tidal Flooding regions within the Williamsburg Area. NOAA Sea Level Rise Viewer - <https://coast.noaa.gov/slr/>

information on the viewer. NOAA recommends that you “Use this web mapping tool to visualize community-level impacts from coastal flooding or sea level rise (up to 10 feet above average high tides). Photo simulations of how future flooding might impact local landmarks are also provided, as well as data related to water

depth, connectivity, flood frequency, socio-economic vulnerability, wetland loss and migration, and mapping confidence.

“Rising Seas and Retreating Shores Sea level is rising more rapidly along Virginia’s shores than in most coastal areas because the land is sinking. If the oceans and atmosphere continue to warm, sea level along the Virginia coast is likely to rise sixteen inches to four feet in the next century. Oceanfront houses in Virginia Beach are vulnerable to severe storms, flooding, and coastal erosion. As sea level rises, the lowest dry lands are submerged and become either tidal wetland or open water. The freshwater wetlands in the upper tidal portions of the Potomac, Rappahannock, York, and James rivers build their own land by capturing floating sediments, and they are likely to keep pace with the rising sea during the next century. But most salt marshes along the brackish portions of those rivers and along Chesapeake Bay are unlikely to keep pace if sea level rises three feet. The wetlands of Back Bay and the North Landing River are even more vulnerable and may be lost if the sea rises two feet. Beaches also erode as sea level rises. A higher ocean level makes it more likely that storm waters will wash over a barrier island or open new inlets. The United States Geological Survey estimates that Virginia’s barrier islands could be broken up by new inlets or lost to erosion if sea level rises two feet by the year 2100. Beach erosion will threaten the oceanfront portion of Virginia Beach, unless people take measures to offset the erosion. Rising sea level also threatens bay beaches and tidal flats.”

“Land subsidence is caused by a combination of factors, both natural and anthropogenic. The Virginia Coastal Plain is particularly vulnerable to land subsidence. Factors like high rates of groundwater withdrawals, the resulting aquifer compaction, and post-glacial isostatic adjustment all contribute to the area's vulnerability. This in turn increases the Coastal Plain’s vulnerability to sea level rise. Therefore, it is important to understand exactly how much subsidence this area of Virginia is experiencing, and how that subsidence may vary across the study area.”

Source: Virginia and West Virginia Water Science Center

<https://www.usgs.gov/centers/virginia-and-west-virginia-water-science-center>

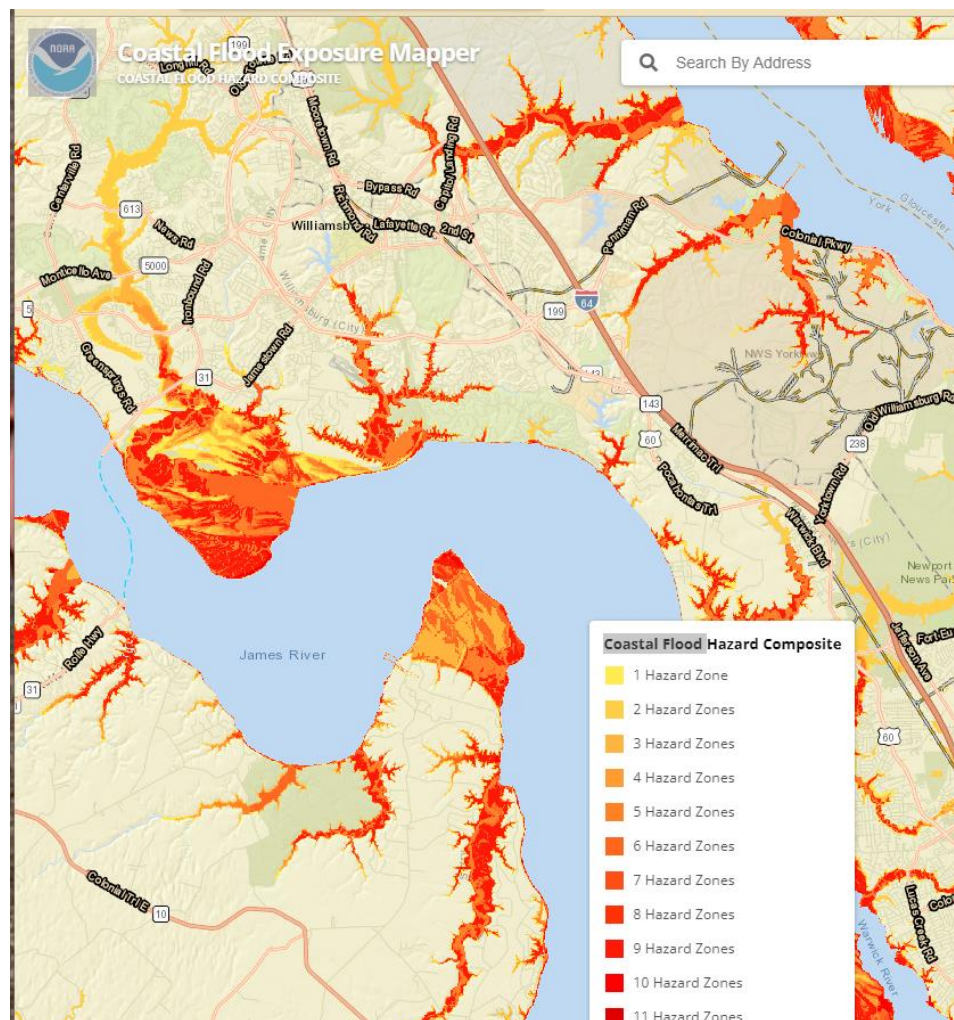
The Coastal Flood Exposure Mapper, shown below, is an online visualization tool supports communities that are assessing their coastal hazard risks and vulnerabilities. The tool creates a collection of user-defined maps that show the

people, places, and natural resources exposed to coastal flooding. The maps can be saved, downloaded, or shared to communicate flood exposure and potential impacts. In addition, the tool provides guidance for using these maps to engage community members and stakeholders.

Features

- Visualize people, places, and natural resources exposed to coastal flood hazards
- Share online maps to communicate with and engage stakeholders

Figure 1
Level Rise
Viewer -



Sea

<https://coast.noaa.gov/digitalcoast/tools/slr.html> To launch viewer use
<https://bit.ly/3z2KyDO>

A good overall report on the subject of sea level rise is the *2022 Sea Level Rise Technical Report* ([2022 Sea Level Rise Technical Report \(noaa.gov\)](https://www.noaa.gov/2022-sea-level-rise-technical-report))

In this report NOAA scientists state that Sea Level will “Rise in the next three decades is anticipated to be, on average: 10 - 14 inches (0.25 - 0.35 meters) for the East coast; 14 - 18 inches (0.35 - 0.45 meters) for the Gulf coast; 4 - 8 inches (0.1 - 0.2 meters) for the West coast; 8 - 10 inches (0.2 - 0.25 meters) for the Caribbean; 6 - 8 inches (0.15 - 0.2 meters) for the Hawaiian Islands; and 8 - 10 inches (0.2 - 0.25 meters) for northern Alaska.

One result of sea level rise will be “Sea level rise will create a profound shift in coastal flooding over the next 30 years by causing tide and storm surge heights to increase and reach further inland. By 2050, “moderate” (typically damaging) flooding is expected to occur, on average, more than 10 times as often as it does today, and can be intensified by local factors.”