

Handout 2.1 Major Water Related Threats to the Virginia Peninsula

This series of handouts briefly cover some of the threats to the water resources on the Virginia Peninsula and in Virginia. Primarily, I am providing reference material for your further study.

When I try to categorize the threats to the waters of the Virginia Peninsula, I have found that they can be considered as driving and responding issues. The **driving issues** in my adopted schema are: Climate Change and Over-development. The **responding issues** include storm flooding, tidal flooding, lack of pure drinking water, lack of high-quality natural waters, wetland and habitat loss and others that we might name as we continue our discussion. I have listed the driving forces and resulting issues below. This of course is my categorization, experts in the field may have other ways of categorizing.

1. Climate Change
 - Sea Level Rise and subsidence
 - Storm Flooding and Wind Damage
2. Over Development
 - Lack of Potable Water
 - Quality of Natural Waters
 - Wetland and habitat loss

Finally, the argument can and is made that many of the issues listed in the slide are both anthropogenic and natural in causation. In many cases this argument is made to obscure the real issues, which, again in my opinion, are centered on our species not the natural world. We will also explore these differences as we move further into this course. But one thought I want to leave with you and that is when you are looking at the difference between anthropogenic and natural drivers to various issues look at the time line for change. It is true that in geologic history we have experienced many periods of extreme warming and cooling; however, in the present epoch, the rate of change seems different than those the world has so far experienced.

The first driving force we will discuss is climate change. OSHER offers several excellent courses on the climate change so I will not go into this subject in great detail, but focus on the effects that climate change responding issues have had on the peninsula. I would refer you to courses taught by Tom White, Robin Church and John Delano. Also, I would recommend that you take Jim Perry's courses on wetland and upland habitats to better understand the issue of overdevelopment, subsidence and sea level rise.

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle, or those caused by the earth's "wobble" (<https://www.jpl.nasa.gov/>). However, scientific evidence is pretty clear that since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas. – Intergovernmental Panel for Climate Change - <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures. Examples of greenhouse gas emissions that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and forests can also release carbon dioxide. Energy, industry, transport, buildings, agriculture and land use are among the main emitters. – UN Emissions Gap Report – 2020 - <https://www.unep.org/emissions-gap-report-2020>

Climate Change impacts all of our Peninsula's water resources and water habitat. Sea Level Rise driven by human forced climate change is already a major factor in coastal communities including our Virginia Peninsula. Flooding from storms, increasing numbers of high tide flooding.

The second major driver, in my opinion, is over-development which has and, in the future, may result in wetland and habitat loss. Issues like drinking water purity, habitat loss, and the quality of natural waters are impacted by both sea level rise, and poorly or loosely controlled industrial and residential over development in areas that are important to surface and groundwater reserves and habitat. But I will discuss these issues within the area of over development. Also, issues are inter-related, for example the loss of wetlands not only impacts habitat, it exacerbates flooding and periods of draught.