Causes of water pollution

Runoff from urban, residential, and agricultural land (fertilizer, manure, oil, food, waste, bacteria, and pretty much anything there) and point sources (pipes from plants and factories)!
Harmful algal blooms result from this pollution

• Nutrients contained in runoff can “fertilize” excessive algal growth.

• Algal blooms can be transported to connected waterways.

• Some algae make toxins. Blooms can be deadly to shellfish (e.g., oyster larvae) and fish that live in the water. We have observed 100% mortality of juvenile fish within 5 hours of exposure!

• Dead zones are areas devoid of oxygen and are formed when algae sink and decay on the bottom. Fish can’t “breathe”!

• Managers set limits on nutrient pollution from runoff and point sources (ends of pipes) to improve water quality.

Algae “bloom” to unhealthy levels and discolor the water.

Cells reach densities of more than 13,000 cells per teaspoon during blooms! Above is a scanning electron microscope image of *Cochlodinium polykrikoides*, one of the algae responsible for summer blooms in the Elizabeth River and lower Chesapeake Bay.

Some are bioluminescent!
• Coastal flooding is increasing in Hampton Roads region due to sea level rise and land subsidence.

• Coastal flooding also carries fertilizers, pet waste, oil, and other nutrient containing litter and detritus into the Chesapeake Bay estuary, similar to runoff.

• Nutrient inputs from coastal flooding are NOT currently accounted for by managers setting allowable nutrient loads for Chesapeake Bay’s “nutrient diet”.

• All this goes into the Bay without being filtered by wetlands, wastewater treatment plants, etc.

• None of it is accounted for at present.

• We want to measure how much is going in so we can adjust Chesapeake Bay’s nutrient diet.
King Tide project

• During regular high tides we often have flooding.

• During the highest astronomical tide of the year, on October 27, 2018. Tides will be more than 2 feet higher than normal and streets in Norfolk will be flooded – rain or shine.

• WHRO’s “King Tide” project is a “citizen science” project aimed to improve flood maps and flood awareness. Hundreds of people are already signed up to map the extent of flood waters during the king tide. They will use the Sea Level Rise phone app to map the high water line at high tide.

• Dr. Margie Mulholland, from ODU, and Mr. Skip Stiles from Wetlands Watch, are organizing teams to measure pollutants going into the Chesapeake Bay as a result of coastal flooding. Why?

http://kingtide.whro.org/
Measure the Muck

• Volunteer to help us “Measure the Muck” that goes into Chesapeake Bay when there is coastal flooding.

• Volunteers will be partnered with teams participating in the “King Tide” project on October 27, 2018. All MHS students will be partnered with ODU personnel.

• See the fliers about how to sign up. Training is October 20, 1-3 pm at ODU. I will give lab tours at this time as well.