

The Back River “Bacteria Diet”




On our last article we talked about the Chesapeake Bay Total Maximum Daily Loads (TMDL), the pollutants of concern (nutrients and sediment) and the practices implemented at LaRC to be compliant with pollution limits set by the Virginia Department of Environmental Quality (VDEQ). **This article will focus on the Bacteria TMDL for the Back River.**

The **Back River** is a tidal estuary of the Chesapeake Bay. Although a historically valuable area for shellfish harvesting and recreation, it is listed as **impaired** for both uses due to high concentrations of bacteria that exceed allowable, “safe” levels. To improve the water quality of the Back River, the VDEQ has established a “pollution diet” of bacteria entering river. The Back River watershed is 36,521 acres (61.8 square miles) in size and receives runoff and discharges from Hampton, Poquoson, Newport News, and York County, Virginia.



What bacteria are we talking about?

There are **three different types** of bacteria that are used as water quality indicators of **fecal contamination** because of their prevalence in the gut and/or feces of warm-blooded animals and humans. High levels of these bacteria in our waterways indicate the possible presence of disease-causing bacteria, viruses, and protozoa. **This often results in beach closures and restrictions on shellfish consumption.**

<u><i>Fecal coliforms</i></u>	<u><i>Escherichia coli (E. coli)</i></u>	<u><i>Enterococci</i></u>
<ul style="list-style-type: none">• Group of bacteria present in the gut and associated with fecal waste.• <i>Measured in shellfish harvesting areas.</i>	<ul style="list-style-type: none">• Coliform species specifically associated with fecal waste.• <i>Measured in fresh recreational waters.</i>	<ul style="list-style-type: none">• Group of bacteria present in the gut.• <i>Measured in marine and transitional recreational waters.</i>
		

Where are the bacteria in the Back River coming from?

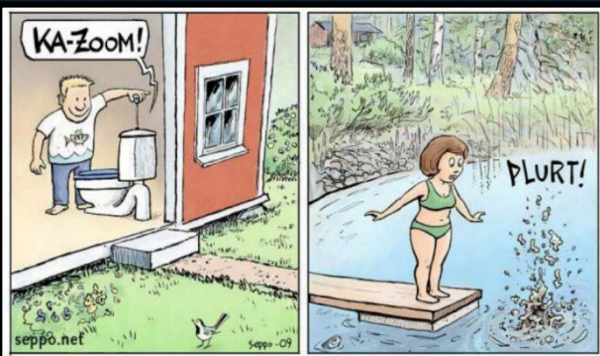
Bacteria come from various sources of feces. The rain runoff from land and hard surfaces (streets, driveways, parking lots) can transport waste and bacteria into ditches, street inlets, and creeks that discharge into the Back River.



Wildlife: In a natural setting, wildlife is rarely concentrated enough to create enough waste that would affect water quality. Waters exposure to sunlight or oxygen as it moves down a stream will kill bacteria and maintain natural, safe levels. However, urbanization has removed massive amounts of natural habitat which causes wildlife to concentrate unnaturally in the few remaining forested strips and wetland areas along bodies of water.



Pets and Livestock: Pet waste, primarily from dogs, is a major source of fecal coliform in the Back River. Animal waste can contain bacteria and worms that can be transmitted to other animals and humans causing harmful viruses such as: **Campylobacteriosis** –causes diarrhea, **Salmonellosis** –the most common bacterial infection transmitted to humans from animals; and **Toxocariasis** - can cause inflammation of internal organs and sometimes the central nervous system.



Humans: These sources are broken down into:

- Septic systems failures-usually caused by lack of maintenance by owners.
- Sanitary sewer overflows- often caused by blockages (from items that shouldn't be flushed) or sewer lines breaks
- Marinas and boating activities- caused when waste is not collected in pump stations or lack of maintenance of pump stations.

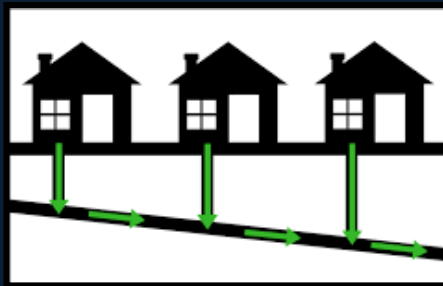
Clean water is the foundation for healthy communities and aquatic habitats across the region. Being able to reduce the discharge of pollutants and meet water quality standards is critical to the Center. Although NASA LaRC's primary contributing source of bacteria is wildlife, we are always mindful of any potential pollutants being discharged from the Center.

IF YOU ARE EVER ON CENTER AND SEE EVIDENCE OF ILLICIT DISCHARGE OR PIPE LEAKAGE, PLEASE CONTACT EMO IMMEDIATELY AT 4-7517 OR 4-7031.

How is Hampton Roads reducing bacteria loads?

1) Green Infrastructure

Many structural BMPs have features that increase bacteria removal. Media filters and bioretention cells are among the most effective by filtering/treating water through the soil. Bioretention cells with different elevations also reduce bacteria by mixing/aerating water which leads to higher dissolved oxygen levels and UV exposure.



2) City Improvements

Cities have expended millions of dollars providing public sewer and taking septic systems offline since 2007. After a major campaign to reduce the number of septic systems in the watershed, water quality condition has improved significantly.

3) Marinas and Pump Outs

Controlling bacteria loadings at marinas adjacent to impaired waters is an important source reduction. Sanitary waste pump-out facilities are in marinas and, along with “No Discharge” education, can help reduce vessel sewage discharges to local waters.



4) Oyster Propagation Programs

Oysters provide a natural filtering mechanism that reduces bacteria as well as nutrients in the water column. Oyster reefs have been one mechanism deployed in numerous locations around Hampton Roads to improve water quality of rivers and help restore the Bay.

5) Don't Pollute! Scoop the Poop.

Cities have installed pet waste disposal stations along trails, public parks and open spaces. Unlike other more elaborate practices to reduce bacteria, this one is easy. Just scoop the poop! Remember to *ALWAYS* pick up after your pet and to properly dispose of it in the trash –*NEVER* in the storm drain.

