



Riparian forest buffers help to reduce pollutants to the Chesapeake Bay

Nitrogen, phosphorus, and suspended sediment are contaminants that have widely contributed to the deterioration in the water quality of Chesapeake Bay. These contaminants are derived from various sources and are transported to surface waters by surface (overland) runoff and ground-water discharge.

Riparian forest buffers are one of the primary management practices that can be used to reduce nutrients and sediment in the Bay watershed. Forests adjacent to surface waters provide buffers that remove phosphorus and sediment from surface runoff. Numerous studies also have indicated that forest buffers remove some of the nitrate in ground water that flows beneath them forest. The effectiveness of the forest buffer varies, depending on the underlying geology and ground-water conditions.

The USGS did a study examining the effect of riparian forest buffers on nitrate concentrations in ground water. These findings have important implications for crop-management practices, land-use planning, and water-resources management.



Some of the major findings include:

- Ground-water discharge is a significant source of nitrate load to tidal creeks, coastal estuaries, and Chesapeake Bay.
- Different studies have found that forest buffers greater than 200 feet wide remove most of the nitrate from passing ground water. These buffers are commonly included in regional nutrient-management strategies.
- The presence of forest buffers alone may not significantly decrease nitrate load in ground-water discharge. The effectiveness of forest buffers largely depends on the composition of local soils and ground-water flow paths
- Large amounts of nitrate are removed from ground water by the natural process of denitrification, which may occur independently of the presence or absence of forest buffers.
- In addition to the presence of forest buffers, a range of other natural factors, such as soil texture and organic matter content and ground-water flow paths, affect the fate of nitrate in ground water. These factors are important to include along with forest buffers in developing comprehensive nutrient-management strategies.

For more information, please see the USGS fact sheet FS-178-97:

[Natural Processes for Managing Nitrate in Ground Water Discharged to Chesapeake Bay and Other Surface Waters: More than Forest Buffers](#)

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http://va.water.usgs.gov/online_pubs/FCT_SHT/FS178_97/fs178_97.html

Also see related USGS Feature:

["Ground water and its influence on nitrogen delivery to Chesapeake Bay"](#)

<http://chesapeake.usgs.gov/featuresnitrogen.html>