Page News & Courier "Water Matters" – October 23, 2008
Impervious Surfaces and Water Quality

Residents and visitors to the Shenandoah Valley can attest to the strength of our summer thunderstorms. Following the blackening skies and powerful lightening, massive amounts of rain can fall in a short time. This water flows over rooftops, parking lots, across roads and other impervious surfaces, picking up all the materials left behind. In many cases, this means oil, gasoline, antifreeze, and other potential pollutants, carrying it directly to the nearest storm drain. Contrary to what many people think, this water does not go to the waste water treatment plant. Instead, it flows directly into the nearest stream or river, completely untreated. This sudden flush of pollutants can harm fish and the many other aquatic organisms living in the water body.

Impervious surfaces simply mean hardened areas, mainly human-made structures, which do not let storm water infiltrate into the soil. By sealing the soil surface, natural ground water recharge is blocked, leading to drinking water shortages in some cities. Due to the rapid increase in flow, flooding can occur, stream banks can become eroded and natural habitats can be disturbed or destroyed.

Also dark materials like asphalt absorb the heat from the sun increasing the temperature of the stormwater. Fish and other aquatic species are generally not adapted to handle this sudden influx of warm or hot water, once again leading to in impairment to the life in the stream. As trees are cut down and replaced by pavement, the heat island effect expands. Urban areas can be ten degrees hotter in the summer than rural areas.

In a low density residential area, impervious surface in relation to total land area is about 10%. In multi-family communities, it can increase to 50% and in commercial areas can be 70%. In a dense metropolitan area, impervious surface can be 90% or greater. In the built environment, rooftops represent about a third of impervious surfaces while pavement is about two thirds. The Center for Watershed Protection estimates that as impervious surface increase beyond 8-10 %, dramatic changes in stream conditions occur often eliminating sensitive species such as native brook trout.

Fortunately, there are things which can be done to decrease the impact development has on water quality; rain gardens and created wetlands can store water, letting the native plants filter out pollutants and keeping them from reaching drinking water supplies. Rain barrels under a downspout capture rainfall which can be used to water plants or for cleaning purposes. Porous pavements have been created which are virtually indistinguishable from impervious pavement. Roof tops planted with vegetation ("green roofs") reproduce natural conditions and can help decrease the building's energy costs. In parking lots, slightly depressed landscaped islands capture runoff, provide shade and add beauty.

Intentional green communities are borrowing design standards from earlier decades when pavement was not so prevalent. On street parking reduces the need for driveways. Street widths are decreased, trees line sidewalks and green space is incorporated into residential and commercial areas.

The *South Fork of the Shenandoah River Rapid Watershed Assessment* estimates that by the year 2010, almost a quarter of a million people are expected to live in our watershed. As we learn more about our fragile natural resources, we better understand how to balance growth and development with good land use decisions for the good of our communities.

This is the ninth in a series of articles addressing Page County's Water Resources. More information on ways to reduce stormwater runoff can be found at: www.ext.vt.edu, www.clemson.edu and www.nemo.uconn.edu or by contacting the Page County Water Quality Advisory Committee.