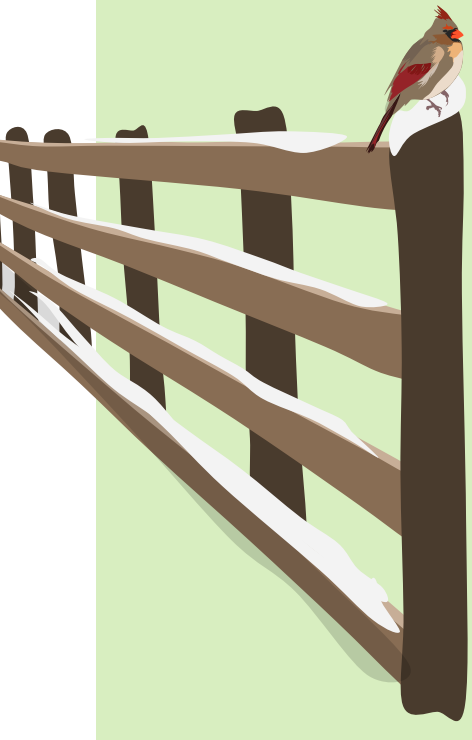
down to earth

Environmental Restoration Quarterly • Winter 2019



Too Much of a Good Thing

By Zachary Neal, Hydrogeologist

Let's face it; it hasn't exactly been a dry summer or fall. It hasn't been a particularly consistent year either, moving from one hydrologic extreme to the other. But how does this year stack up to previous years? The short answer: wetter than most, possibly all.

When people talk about precipitation, their focus is usually on instantaneous or daily results. If they talk about long-term precipitation trends, it is often in regards to the calendar year. In comparison, hydrologists analyze hydrologic trends with regards to the water year, which spans from October 1st to September 30th. Precipitation, streamflow and groundwater data are analyzed this way because changes in storage (groundwater and snowpack) over this period are thought to be negligible, allowing for a better year-to-year comparison.

This calendar year, most of Carroll County received somewhere between 70 and 80 inches of rain, with the Sykesville, Mount Airy and New Windsor areas surpassing 80 inches. The wettest months by far were July and November, though monthly precipitation totals were also above normal for February, May, June, August, September and December. The last calendar year during which it was even close to this wet was 2003, and that generally fell between 10 and 20 inches short of totals for this year.

The effects of all this precipitation are well known and easily observable at the surface (hydrology) in the way of sediment laden streamflow and associated flooding. But there is a critical resource hidden beneath our feet that not everyone knows of or thinks about: groundwater. Those of you outside of our municipalities know just how vital this resource is, as you each likely own a well that provides all of the water you use. And for those of you within the municipalities, you may be surprised to learn that most, if not all, of your water originates from groundwater rather than surface water.

But let's take a step back and put this (water) year together chronologically. The months of October 2017 through January of 2018 were generally drier than normal. At the beginning of this calendar year, much of the County was experiencing a moderate drought. Groundwater levels were declining, which in turn meant the baseflow components of streams (think of the clear water you see flowing day-to-day, which largely originates from groundwater) were declining. The water levels in groundwater wells were also similarly declining. That all changed with our wetter-than-normal February, which had the effect of ending the drought. Month after month of above average precipitation thereafter helped replenish, and then ultimately surpass normal groundwater storage, resulting in a higher water table (the surface where the soil/rock is fully saturated). The water year ended with a precipitation total between 60 and 70 inches across much of the County, with a few select areas receiving 70-80 inches.

The Carroll County Department of Land and Resource Management maintains 50 monitoring wells across the County, which we visit on a bi-weekly basis for manual water level measurements. Each well has its own unique response to this year's precipitation regime due to a number of factors, including localized differences in precipitation, well casing depth,

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protecting and managing Carroll County's natural resources for the pleasure and enjoyment of its Citizens

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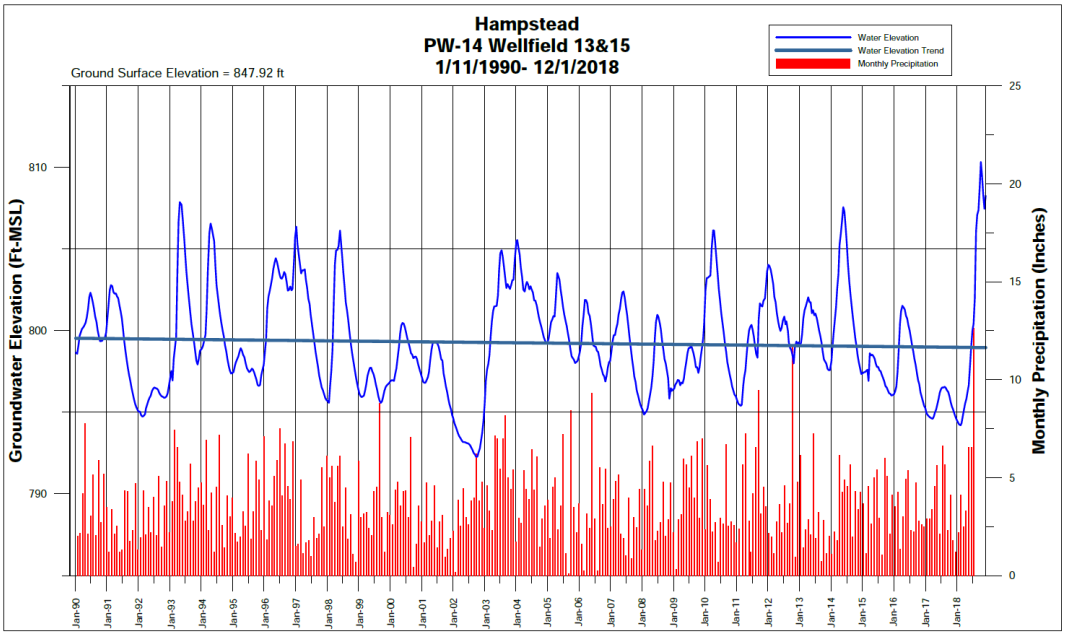
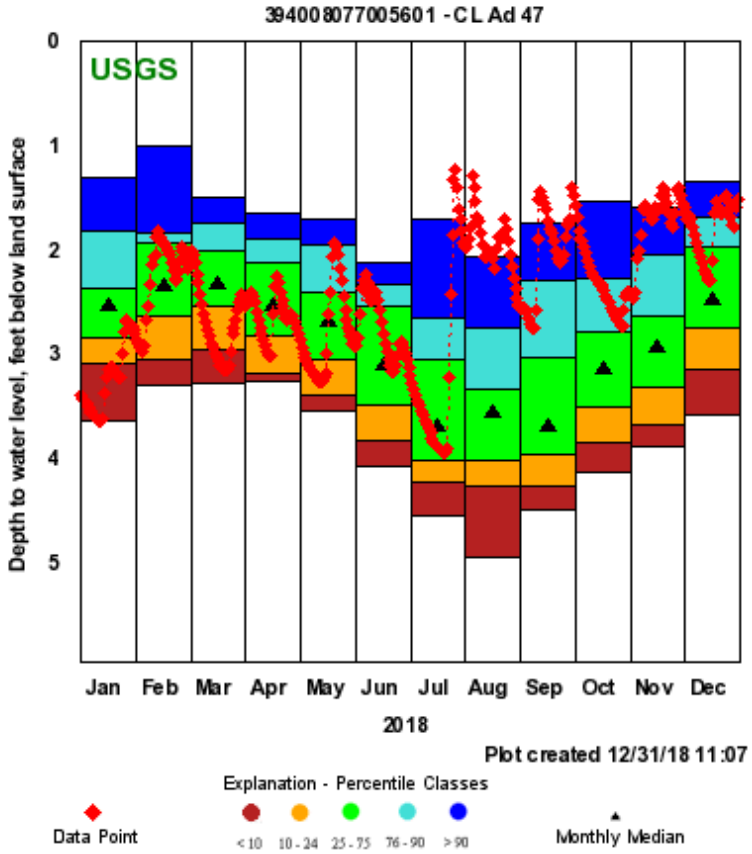
fracture zone depth, fracture permeability and interconnectivity, topographic position, etc. Speaking very generally, water levels across the monitoring network have been higher than usual, particularly for summer and fall. In some cases, wells showed new record high groundwater levels this year. For others, the record high was not broken, but the period of elevated water levels was longer than usual. The hydrographs for the wells maintained by the County can be accessed via the County's Department of Land and Resource Management webpage.



Some wells in the network respond rapidly to precipitation events, while others exhibit delayed responses, in some cases up to a month following a particularly wet period. Those wells that respond quickly generally didn't always depict new record water levels, whereas many of those with delayed responses, such as PW-14 (see hydrograph at right) exhibited elevated water levels not seen over the timeframe they've been monitored.

Groundwater wells monitored by the United States Geological Survey (USGS) depict similar trends. The USGS hydrograph to the right depicts water level trends at the Union Mills Homestead Park. The hydrograph shows that water levels (in red) at the start of the year were lower than normal (in the lowest 10% of recorded values) and increase through time before reaching unusually high levels in July, August, September and November. There was only one instance in late February 2003 in which water levels historically surpassed those observed at the height of this year.



While all this rain may hamper outdoor plans and events, there are some pretty considerable pros. The increase in groundwater levels associated with all this rainfall means more water is available for future use in the way of groundwater storage. The storage isn't indefinite; it slowly declines daily through discharge to streams. However, it does buffer against the effects of short-term dry-spells and helps maintain elevated well yields. Homeowners may also find they seldom have to irrigate lawns or other outdoor plants.

At the same time, the loss of dry space (called the unsaturated or vadose zone) separating the ground surface from the water table decreases the amount of water an area can absorb before ponding and flooding begins to occur, though this can also be influenced by the infiltration rate of the soils. This is particularly true in valley bottoms where the depth to groundwater, particularly near stream corridors, is often shallow. Those of us with basements may have experienced wet or dampness issues the last few months, courtesy of elevated groundwater levels that have contributed to inflow through imperfections in the foundation. Those in the agricultural industry may have also suffered crop loss due to either flooding or elevated groundwater levels that can rot susceptible plant roots over prolonged periods of time. For municipalities with sewer systems, the elevated water levels can be both a good and bad thing simultaneously. Infiltration of groundwater into municipal sewer lines increases operating costs, but may otherwise help identify an unknown problem (i.e., leak). And for those in the construction industry, all this water may have resulted in project delays, and/or additional expenditure on groundwater dewatering for subsurface construction. In short, while the buffer against short-term dry spells is great, economically speaking, it is possible to have too much of a good thing.

Carroll County Water Resource Coordination Council Recognized as Utility of the Future Today

By Brenda Dinne, Special Projects Coordinator

The Carroll County Water Resource Coordination Council (WRCC) has received national recognition as a Utility of the Future Today under the Partnering & Engagement activity area for its coordination and joint leadership on significant water resource issues facing the County as a whole.

The WRCC is one of 32 water utilities being recognized for transformational work in community engagement, watershed stewardship, and recovery of resources such as water, energy, and nutrients.

In the early 2000s, as a result of droughts, State water supply appropriation issues, new National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permits, and the impending Chesapeake Bay Total Maximum Daily Loads (TMDLs), the County and municipalities were facing major challenges with water supply development, stormwater runoff, and wastewater discharge caps that impacted opportunities for growth and development. To foster integrated and collaborative solutions to these challenges, the County, municipalities, and Health Department agreed to form a joint partnership to provide a forum for discussion of ideas, solutions, policies, and cost saving approaches to water resource development and protection. The WRCC was formed in 2007 to serve as the lead intergovernmental agency for water resource planning, development, and protection in Carroll County. The County provides staff support to the WRCC.

The Utility of the Future Today concept is being promoted as water systems are facing challenges such as aging infrastructure, water pollution, workforce shortages, and impacts of climate change, including drought, floods, storms, and sea level rise. The Utility of the Future Today program was launched in 2016 by the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), the Water Environment & Reuse Foundation (WE&RF) and the WateReuse Association, with input from the U.S. Environmental Protection Agency (EPA). The recognition celebrates the achievements of water utilities that transform from the traditional wastewater treatment system to a resource recovery center and leader in the overall sustainability and resilience of the communities they serve.

"The innovations coming to the water sector present an opportunity for a paradigm shift in the way utilities think about and solve long-standing challenges to clean and reliable water," said Eileen O'Neill, Executive Director of WEF. "WEF is excited to recognize Carroll County Water Resource Coordination Council for embracing innovative ways to better serve their communities." To learn more, visit https://www.wef.org/utility-of-the-future/.

Carroll County Designated "SolSmart Silver" for Advancing Solar Energy Growth

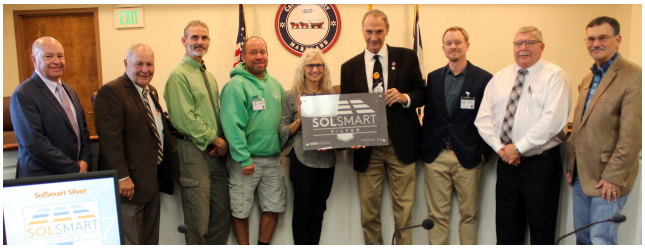
By Brenda Dinne, Special Projects Coordinator

Carroll County is receiving a Silver designation from the national SolSmart program for making it faster, easier, and more affordable for homes and businesses to go solar. This designation recognizes Carroll County for taking bold steps to encourage solar energy growth and remove obstacles to solar development. For companies looking to expand, a SolSmart Silver designation is a signal that Carroll County is "open for solar business."

SolSmart is led by The Solar Foundation and the International City/County Management Association and funded by the U.S. Department of Energy Solar Energy Technologies Office. More than 200 cities, counties, and small towns have achieved SolSmart designation since the program launched in 2016. Carroll County is the first county in Maryland to receive a SolSmart designation.

As a SolSmart designee, Carroll County is helping solar companies greatly reduce the cost of installations and pass those savings on to consumers. This allows even more local homes and businesses to obtain affordable, clean, and reliable electricity through solar. The actions Carroll County has taken will help encourage solar companies to do business in the area, driving economic development and creating local jobs.

To receive the designation, cities and counties make changes to their local processes to reduce the time and money it takes to install a solar energy system. This includes evaluating local permitting processes, as well as planning and zoning procedures. Since 2014, Carroll County has included provisions in the zoning code to allow commercial and accessory solar energy conversion facilities. In 2017, the Carroll County Environmental Advisory Council produced *A Guide to Residential Solar Installation in Carroll County* to help citizens navigate the process to take advantage of solar power at their homes.



Outdoor School at the Farm Museum

By Kelly Martin, Watershed Grants Technician

The Bureau of Resource Management (BRM) hosted the Outdoor School at the Carroll County Farm Museum for a day of exploration and hands-on learning on Wednesday, October 3. The Northwest Middle School sixth graders were broken into four groups and rotated between activities led by BRM staff. These activities included: (1) exploring and identifying the macroinvertebrates found in the stream and understanding how that determines stream health; (2) discussing the benefits trees provide to the environment and teaching how to properly plant them; (3) touring the Best Management Practices (BMPs) that were recently installed and planted by previous Outdoor School students, learning how they function and benefit the watershed; and (4) viewing the dam and stormwater management pond and discussing how these facilities are built to address run-off from the surrounding area.

At the end of the day, each group was provided a map depicting the area surrounding the Farm Museum. Students used illustrations of the BMPs they had explored earlier in the day, and discussed where additional BMPs might be constructed to provide additional benefit to the watershed.

These activities expanded on the week-long environmental literacy curriculum of the Outdoor School. Students were provided a packet of information to share with their families to show how they can incorporate what they learned into their home life and community.

Code Amendments: Chapters 151 & 152

By Kelly Martin, Watershed Grants Technician

On November 8, 2018, the Board of County Commissioners directed staff to schedule a public hearing on the proposed amendments to Chapter 151, Stormwater Management, along with revisions to the Carroll County Stormwater Management Supplement to the 2000 Maryland Stormwater Design Manual Volumes I and II and Chapter 152, Grading, Erosion, and Sediment Control.

The amendments to Chapter 151 include additions and modifications to the Definitions section, address repairs/replacement of impervious surfaces, change regional pond requirements, add requirements relating to downstream flooding, prohibit the use of plastic modular underground rainwater storage systems, add a statement regarding building construction in a dam breach inundation area, add maintenance, inspection and certification requirements for privately owned stormwater management facilities, and update the Penalty section to be consistent with other Chapters of the Code.

Changes to Chapter 152 include additions and modifications to the Definitions section, change the validity of the approved soil erosion and sediment control plan from 2 to 3 years, eliminate the inspection requirement of "on the average of once every two weeks", and update the Penalty section to be consistent with other Chapters of the Code.

A public hearing on the amendments was held on November 29, 2018, and the amendments were approved by the Board of County Commissioners. Additional information regarding the Code amendments can be found at http://ccgovernment.carr.org/ccg/attorney/ordinance/. If you have questions, please contact the Bureau of Resource Management at 410-386-2712.