
**Conodoguinet Creek Watershed Association
Newsletter**

September 2002

HELP WANTED

The Conodoguinet Creek Watershed Association Needs Your Help

Your watershed association needs a Recording Secretary and Treasurer. If you have any free time to help, PLEASE CALL OR EMAIL Wilbur Wolf at 776-5915 or wewjr@epix.net.

WE HAVE A WEBSITE

CCWA is finally joining the ranks of numerous PA watershed associations to spreading the word about their watershed associations through the Internet.

Chris Woltemade, Shippensburg University Professor and CCWA Board Member has set up a website through his university home page. Our page now includes our mission, photos of the creek, information on our meetings, our board of directors, and links to other sites. It will soon have past and present newsletters and additional information on our activities. If you have anything to share- photos, thoughts, things you like about the creek and the watershed, etc.- please send them to Chris.

Our website address is: www.ship.edu/~cjwolt/ccwa.

Updates on upcoming events and additional activities scheduled will be added to the website, so please check regularly to see the news.

**CLEAN-UP DAY SCHEDULED FOR CONODOGUINET CREEK
at GOOD HOPE DAM REMOVAL SITE**

Saturday October 19, 2002, 9 am to 12 noon, will be the day to help clean up the trash at the old Good Hope Dam. This is an opportunity to see the site and help rid the creek banks and stream of accumulated debris and trash. **RAIN DATE Saturday October 26, 2002. Please contact Kurt Henry at 763-6231**, to register. Check the website for updated information on the clean-up.

DEP Drought Information Center Reports

From Department of Environmental Protection News Releases

August 5 and 9, 2002

With groundwater and stream-flow levels reaching record lows in some areas, Gov. Mark Schweiker extended the drought emergency for 14 counties across Southcentral and Southeast Pennsylvania and added seven counties to drought-watch status. These counties are indicated on the Pennsylvania map at <http://www.dep.state.pa.us/dep/subject/hotopics/drought>.

For the month of July 2002, 63 of 67 Pennsylvania counties had below normal precipitation. Departures from normal precipitation ranged from 0.8 inches (Clarion County) to -3.6 inches (Berks County). The average departure from normal precipitation for the state as a whole for this period was -1.86 inches. Localized thunderstorms occurred across the state however they did nothing to alleviate the dry conditions.

Record and near-record low stream flows were recorded the week of August 5 in four counties currently under the emergency declaration. Low stream-flow levels are indicators of below-normal groundwater levels, which could lead to water supply problems later this year. The creeks at or near record low flows are Tulpehocken Creek in Berks County, Brandywine Creek in Chester County, Chester Creek in Delaware County, and the Conodoguinet Creek in Cumberland County.

Instantaneous streamflow readings for August 5th at 1:45 a.m., indicated that 49 out of 159 reporting stream gages were registering flows below the 25th percentile, 33 less than the 10th percentile and 5 at record lows. This represents a significant increase in below normal streamflows across the state. The below normal rainfall in July nullified the above normal spring rainfall. Areas of concern still remain in the southcentral and southeastern portions of the state; however, potential drought conditions are creeping northward and westward from

the current drought emergency areas. Streamflow levels across the state are dropping due to the lack of significant rainfall and above normal temperatures during July and August.

Stream flow charts can be viewed on the USGS website at <http://www.usgs.gov/>. Check Realtime Data, then chose graphs or tables.

Drought Worsens, 5 More Counties in Emergency- September 6, 2002

Gov. Mark Schweiker added five counties - Bucks, Dauphin, Montgomery, Perry and Philadelphia - to the drought-emergency declaration Aug. 5, bringing the total number of drought-emergency counties to 19. Gov. Schweiker also added 24 counties to the drought watch, bringing the total to 31. Five counties are in drought warning status.

Gov. Schweiker emphasizes that residents across Pennsylvania conserve water, especially those in the drought-emergency counties. "Everyone - from farmers to residents - is feeling the impacts of this drought. Since we're heading into the driest part of the year, we need to make sure we don't take this natural resource for granted."

The 19 counties in drought-emergency status are: Adams, Bedford, Berks, Bucks, Chester, Cumberland, Dauphin, Delaware, Franklin, Fulton, Lancaster, Lebanon, Lehigh, Montgomery, Northampton, Perry, Philadelphia, Schuylkill and York. Residents in these counties must reduce their water usage by 15 percent.

Record Lows for Regional Pennsylvania Streams

Nearly all the streams in southcentral and southeastern Pennsylvania were at record low levels for the day on February 25, 2002, as reported in the last newsletter, and more recently, on August 22, 2002. (See Table on page 4). This means flows were the lowest ever recorded for that date since the gages were installed- 40 years ago in some instances.

The only streams that were not at record lows on August 22 were the Susquehanna River, Juniata River, Perkiomen Creek and the Delaware River. The Kiski River was the only stream at a record low in Western PA. Northern PA streams are in better shape than the southeast and southcentral; none at record lows. State College has received much more rain than Harrisburg this summer. Rainfall has been spotty at best and very limited in extent and duration. Can anyone remember when we last had an all-day rain? The drought continues.

Notice that the drainage area does not necessarily correlate with stream flow. This is due to geology and stream water withdrawals. The Conodoguinet Creek drainage area is more than twice as much as the Yellow Breeches Creek; however, the stream flow of the Conodoguinet Creek was only 60% of the Yellow Breeches on August 15, 2002.

What is happening? I suspect the reason is that more water is being withdrawn from the Conodoguinet Creek for water supplies. The Conodoguinet Creek watershed also has larger areas of shale bedrock and very shallow soil, which contribute to greater runoff of the rainfall we do get. Notice the spikes in the graph below. The Conodoguinet Creek is very flashy for the size of its watershed. That means that much of the rain hitting the watershed runs off into the stream and less replenishes the groundwater.

Actually, the Conodoguinet Creek should have more flow than the Yellow Breeches Creek since more of the groundwater in the limestone Cumberland Valley flows to the Conodoguinet Creek than to the Yellow Breeches. The Yellow Breeches has no tributaries flowing into it from the limestone valley; all of streams originating in the valley- such as Big Spring, Alexander Spring, and Mount Rock Spring- flow north to the Conodoguinet Creek. At least 10% of the groundwater flow that should go to the Yellow Breeches is captured by Big Spring and flows north to the Conodoguinet Creek. During most summers, however, the smaller spring creeks, including Mount Rock and Alexander Spring no longer reach the Conodoguinet Creek; they lose surface flow long before their confluence with the Conodoguinet Creek.

Photos of the low flow conditions on the Conodoguinet Creek, Letort Spring, and Yellow Breeches Creek and other area streams can be viewed at www.dep.state.pa.us. At DirectLink, enter Drought. Lots of other interesting drought and rainfall information and links to other sites are available on this site.

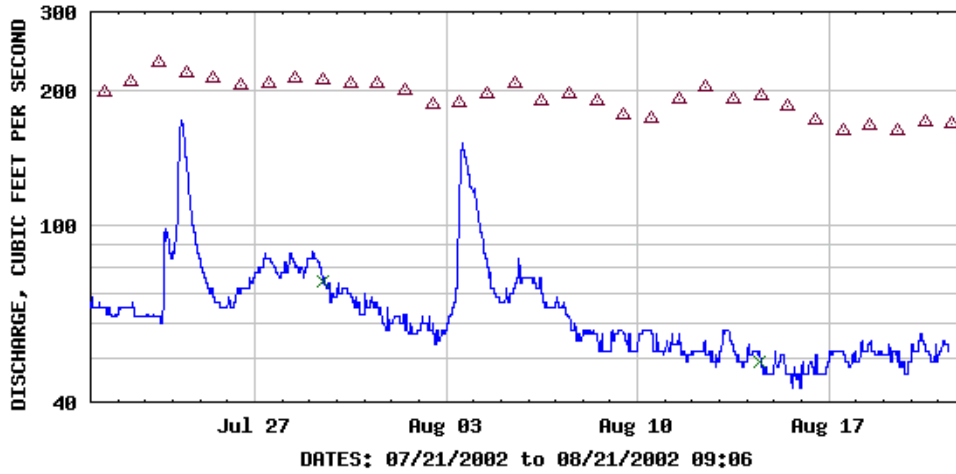
Rainfall for the past year in most of southeast and southcentral PA are running 10 to 18 inches or 26 to 50% below average for the period August 21, 2001 to August 22, 2002. Rainfall is 75% below average for the past month in portions of the same area. The deficit is 2.5 inches in Cumberland County for the past month. Despite all the record low streamflows and rainfall deficits, conditions nationwide are still not as bad as in the dust bowl 1930's.

Stream Flows and Drainage Areas for Area Pennsylvania Streams and Rivers							
Stream	Gage Location	County	Basin size	Flow cfs	Rank	Flow cfs	Rank
			Sq mi.	2/25/02		8/15/02	
Conodoguinet Creek	Hogestown	Cumberland	470	94	RL	49	RL
Yellow Breeches	Camp Hill	Cumberland	216	88	RL	82	RL
Letort Spring Run	Carlisle	Cumberland	21.6	16	NR	14	NR

Basin size is measured at gage location. RL= Record Low for date; <10%= less than 10% of average for date; 10-24%= 10-24% of percent of average; etc. Information from USGS website at www.usgs.gov. The complete table with more southeastern and southcentral PA streams can be viewed on the CCWA website.



USGS 01570000 Conodoguinet Creek near Hogestown, PA

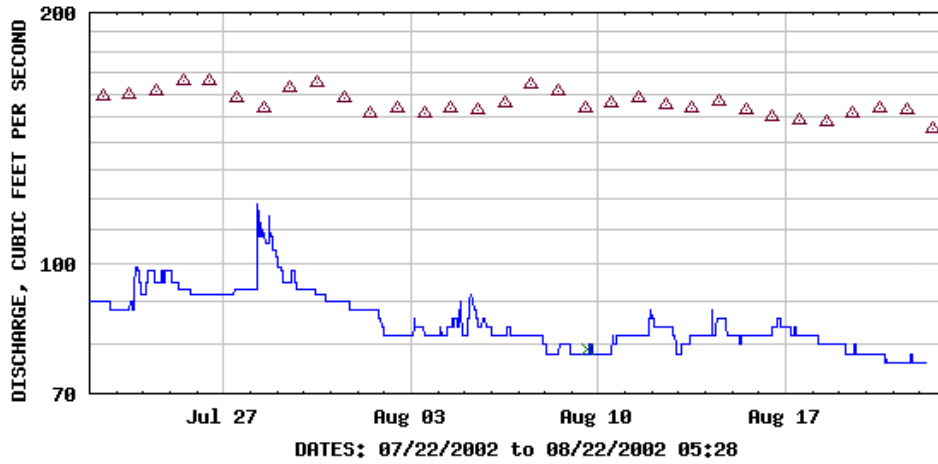


- EXPLANATION
- DISCHARGE
 - MEDIAN DAILY STREAMFLOW BASED ON 70 YEARS OF RECORD
 - MEASURED DISCHARGE

Provisional Data Subject to Revision



USGS 01571500 Yellow Breeches Creek near Camp Hill, PA



- EXPLANATION
- DISCHARGE
 - MEDIAN DAILY STREAMFLOW BASED ON 58 YEARS OF RECORD
 - MEASURED DISCHARGE

Provisional Data Subject to Revision

**Where does the water go when it rains?
Or why is the drought worse this year than last year?
Adapted from an article by Gary Fleeger,
PA Topographic and Geologic Survey¹**

To fully understand what causes droughts and how they end, you need to understand the terms “**Water Budget**” and “**Groundwater**”. A water budget includes groundwater, surface water, and atmospheric components. The groundwater component includes recharge, discharge, and storage. **Groundwater** is the water that is stored underground within the rocks. Groundwater is recharged through infiltration of precipitation (rainfall and snowfall). Groundwater is removed by a variety of natural and artificial (man-made) ways: (1) discharge to the surface through springs and seeps, (2) **evapotranspiration** (removal by vegetation), and (3) water wells. The difference between the amount of water input into groundwater and the amount removed is the groundwater storage. If more water leaves or is removed than is stored, groundwater levels drop.

The amount of water recharged and discharged varies through the year. We usually get a lot of rain in the summertime, but very little of it becomes part of groundwater storage. Because Pennsylvania is very green in the summer, most of the rainfall is taken up by plants and transpired back into the atmosphere. Groundwater recharge occurs primarily from fall through spring, when plants are dormant. The extremely low rainfall of fall 2001 and the very low amount of snow during winter 2001-2002, especially in southeastern and southcentral PA, has led to a decrease in groundwater storage and very low water table levels- (the top of the groundwater level).

There are three types of drought: Meteorological drought or reduced rainfall over an extended period, **Agricultural drought** or dry soil conditions, and **Hydrological drought** or significantly reduced groundwater levels. As you might suspect, we are now in a hydrological drought. When a hydrological drought occurs, shallow wells may go dry as the groundwater level drops below the bottom of the well. This is what happened this spring in many parts of Cumberland County. As groundwater levels drop, streamflow is also reduced since the majority of streamflow comes from groundwater discharge. During a meteorological drought, virtually all streamflow is from groundwater. Because water flows more slowly through groundwater, there is a lag between precipitation and recharge into groundwater storage. Therefore, meteorological and agricultural droughts are more common and may happen relatively quickly. A hydrological drought takes much longer to occur and much longer to break. A meteorological drought in the fall, winter or spring is more likely to cause lower groundwater levels than a summer drought. We have been experiencing record low streamflows and record low groundwater levels this year because last year’s late spring and summer drought extended through the fall and winter.

Increased stormwater runoff contributes to drought in developed areas. High percentages of paving can significantly reduce the amount of rainfall reaching the groundwater. Instead of reaching the groundwater, water runs off the paving, flooding streets, buildings and causing creeks and rivers to rise. Of course, surface runoff does occur naturally, but impervious surfaces can exacerbate the runoff.

¹ Dry Wells, Streams, Soil: Groundwater and the Drought, Gary M. Fleeger, 2002, Pennsylvania Geology, 32: 2-6.

The scattered thundershowers we have been getting lately, therefore, are contributing little to groundwater replenishment. Some areas of PA had not fully recovered from the hydrological drought of 1998-1999 before the drought of fall-winter 2001-2002 was upon us. We will need a lot more rain this fall and a normal to heavier than usual snowfall this winter to help us out of this year's water crisis. **Rain Dances anyone?**

Conodoguinet Creek Watershed Association Announces Environmental Grants

By Gil Freedman

The Conodoguinet Creek Watershed Association has awarded education grants to four Cumberland County schools. The schools will enhance their environmental education efforts, particularly emphasizing water resources. Educating young people about creek resources and their importance to the quality of life will assure a healthy, productive waterway in the future.

Awards were given to Frankford Elementary School, Plainfield Elementary School and Big Spring High School and East Pennsboro Area Senior High School. Wilbur Wolf saluted the teachers, Wendi Hair, Patricia Crouse, Aaron Knapp, Amber Sim and Janelle Riekert, stating that by planning and submitting the grant applications, these teachers are making an extra effort to better inform their students and enrich their learning experience.

Two of the grants will enable Frankford and Plainfield Elementary to involve their fifth grade classes in the Jason Project. The Jason Project is an integrated, multimedia program that incorporates biology, chemistry, ecology, geology, physics, math, technology, geography, history, language arts and fine art. Online exercises, research, live expeditions, and hands-on activities are all used to challenge and enhance students' learning. These online activities will bring together students and experts in an interactive learning experience, even if physically separated by great distances.

Students at the East Pennsboro Area Senior High School will expand their stream monitoring activities using equipment and supplies purchased with grant money. The new equipment will allow them to enhance their ongoing monitoring program to more sites and by recording more details. Students in Big Spring High School will study water quality in Big Spring, a major tributary to the Conodoguinet Creek. The students will examine flow, turbidity and aquatic indicator species. The students will provide a public service in documenting changes to the Big Spring following the closing of the fish hatchery and will provide a base for monitoring change, should the hatchery reopen.

**Conodoguinet Creek Water Snapshot
April 21, 2001 and April 27, 2002**

Stream	Nitrate NO3-N		Phosphorus		Ammonia Nitrogen	
	2001	2002	2001	2002	2001	2002
Limestone Tributaries						
Rowe Run	3.04	7.00	0.00	<0.02	0.00	0.01
Middle Spring Creek	8.57	8.77	0.01	0.63	0.01	0.02
Green Spring Creek	10.85	5.79	0.03	0.04	0.00	0.12
Big Spring	6.54	3.39	0.03	0.04	0.00	<0.01
Mount Rock Spring	3.44	Dry	0.03	Dry	0.00	Dry
Alexander Spring	6.66	Dry	0.03	Dry	0.04	Dry
Letort Spring Run	6.09	4.28	0.00	<0.02	0.00	<0.01
Hogestown Run	8.16	4.16	0.01	<0.02	0.00	0.1
Trindle Spring Run	7.13	4.05	0.05	0.06	0.00	0.25
Average	6.72	4.16	0.02	0.09	0.01	0.06
Shale Tributaries						
Newburg Run	3.68	2.26	0.00	0.06	0.00	0.18
Three Square Hollow Run	1.28	0.32	0.03	0.06	0.00	<0.01
Brandy Run	1.64	0.70	0.03	<0.02	0.00	<0.01
Whiskey Run	2.11	1.16	0.00	<0.02	0.00	<0.01
Center Creek	2.62	0.58	0.03	<0.02	0.11	<0.01
Doubling Gap Run	1.03	0.56	0.00	<0.02	0.40	<0.01
Rock Run	3.63	1.29	0.01	0.04	0.00	<0.01
Bloser Creek	1.67	0.98	0.00	<0.02	0.00	<0.01
Opossum Creek	1.17	0.74	0.01	<0.02	0.00	<0.01
UNT Rt 74 N Middleton Park	1.53	1.61	0.01	<0.02	0.00	<0.01
Wertz Run	0.36	0.32	0.05	<0.02	0.00	<0.01
Spring Run	0.50	0.34	0.03	<0.02	0.09	<0.01
UNT before Ironstone Run	0.97	0.86	0.05	<0.02	0.00	<0.01
1st UNT W of I-81	1.02	0.58	0.00	<0.02	0.00	<0.01
Simmons Creek	1.01	0.66	0.00	<0.02	0.00	0.12
Sears Run	2.49	1.22	0.03	<0.02	0.13	<0.01
Holtz/Pine Run	1.58	1.29	0.05	<0.02	0.00	<0.01
Average	1.66	0.91	0.02	0.01	0.04	0.02

Notice that once again this year that **Nitrates** are much higher in the limestone spring creeks. This is due to the greater groundwater connection in the limestone springs and the easier transport of nutrients through the groundwater into the springs. The shale has greater potential for runoff, which could lead to higher instream concentrates of phosphates if sampled during storm events. Notice also that several of the spring runs that were sampled last year were dry this year – the drought hit early this year.

Volunteers Needed for National Water Monitoring Day!

The Conodoguinet Creek Watershed Association is looking for members as well as non-members interested in helping to plan and carry out local efforts to help with National Water Monitoring Day—October 18th. This nationwide event is designed to test streams, lakes and coastal areas throughout the United States by inviting citizen monitors to cooperate with established volunteer monitoring organizations and federal, state, and local monitoring program staff in checking on the health of their local watersheds.

This national monitoring effort is being coordinated by America's Clean Water Foundation (ACWF), in cooperation with several other environmental groups and government agencies across the country. The one-day event is part of the Year of Clean Water activities, recognizing thirty years of widespread efforts to protect America's water resources. This is the first time for this nationwide "snapshot" and it promises to be a great success!

Volunteers of all ages are needed to perform simple and fun tests in safe, accessible areas. **If you are interested in participating in National Water Monitoring Day, please contact Susan Parry, Conodoguinet Creek Watershed Association, at 717-234-7910.** We will spend approximately 2-3 hours collecting samples and several hours analyzing the samples collected. If you are able to help, you can decide which part of the process interests you. This is a great way to get more involved in your watershed! You can check out the CCWA website at: <http://www.ship.edu/~cjwolt/ccwa/>, or for more on the National Water Monitoring Day, check out these sites: www.acwf.org and www.tmdl.net .

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