

By Phil and Charlotte Lucas.

Approximately two and a half miles south of Williamsville along Route 678 is a very interesting karst spring. One day while Googling the net, I saw a note about an ebbing spring on a 19th century map of Bath County. Being curious about ebb and flow springs, Charlotte and I decided to see if this type of spring indeed existed here in Bath County. On January 20, 2006 we met with Bob Lockridge, the spring owner, and asked if it was an ebb and flow spring. He said he remembered that his mother would tell of the spring's erratic behavior. She said that for no apparent reason there would come a surge of water down the spring branch and then after awhile it would diminish. But these days he thought the spring no longer did this, that after a hurricane (in the fifties?) caused a flood, the spring stopped flowing in this peculiar action. But he admitted, he really didn't give the spring a lot of attention and really didn't know. He then took us up the spring branch, first to a pond where ducks and trout swam over our way looking for hand outs. Upstream was another older pond in disrepair and still further up was the "permanent" spring that supplies his home. He says in dry weather there would be no flow beyond this point. But after heavy rains or wet periods, the water could sometimes be seen flowing. In fact, he said, that in times of flooding, the head of the spring would flow strongly from a hole in the rocks at the base of a large tree. It had been wet so on this day we saw a large stream flowing out of the ground just below the tree.

At this time Ben Schwartz had completed his experiment using data loggers to record pressure and temperature in Aqua Cave's lift tubes. So on January 27th, I installed two of these data loggers in the spring branch in two different locations to see if different flow rates would be recorded. The download from the instruments did show different flow rates although there were problems with the upstream dam that I had constructed. During visits to the site, I would often find the dam's reservoir dry as the stream flowed underground above and then resurged below the dam. But there were enough data that we became excited that the spring was still ebbing and flowing.

In March 27, Bill Jones, Bob Lockridge, Frank Marks, Charlotte and I joined forces and installed a flume that Bill Jones provided, at an upstream point that would hopefully show an accurate flow rate. Bill also measured the springs flow at 1.06 cubic feet a second. At first this flume arrangement seemed satisfactory (before it rained) but later we saw the flow would exceed the flume's capacity many times over. So on August 28th, Ben, Cori, and Zach Schwartz, Bill Jones, Keith Wheeland, and I, constructed a large weir at the site of the old dam and constructed a new weir upstream. This was quite an undertaking that took most of the day, lots of plastic sheeting, board supports and the moving of rocks. But it was all finished before dark. After the next rain event, Al Grimm helped me move the upper weir yet again because the stream seemed to be shy of weirs and dams. It decided to disappear beneath the weir again. There is a lot of rock in this stream bed. Darn if it didn't happen again after the next rain, so Bill Royster, Bob Lockridge and I moved it again. End of the story - no. We had to attend to the weir two more times (with Al Grimm's help) before we managed to keep it from leaking below the weir's basin.

There is another saga of keeping the pond weir intact. This includes rushing down to install more bracing to help hold the dam in place to withstand a flow rate much larger than anticipated, digging an emergency spillway, and filling in a large scoured out hole from beneath the weir. The latest of these repairs were done on December 6 when Ben Schwartz, Bill Jones, Frank Marks and I, did a major upgrade to the weir. The heavy rain storm on November 23rd, had torn the plastic sheeting by digging yet another hole that undermined the weir. So on this day, we replaced the sheeting and put an additional sheet of pool liner below the weir's spillway to keep future flood waters from "eating" another hole. We also installed additional bracing under the

weir to support the sheeting in place and not the pond's soft bottom. This newest rebuild was extensive and should last for a long time.

So why have we gone to so much trouble? It turns out that this spring is certainly no ordinary spring. In fact, we think this is no ordinary ebb and flow spring. For instance, this spring has many different periods of flow. Some of these (maybe most) are prominent only during certain base flow rates. Short cycle ebbing is especially pronounced during dry weather while some of the big flows happen during more average rainfall periods. Anticipating your question, no, there is not a direct correlation to rainfall. In fact, one day I got a call from Bob Lockridge that I ought to come down and see the spring that it was really flowing big. I did and it was! Wow, it had overflowed the weir and there had not been any rain for quite a spell.

This recording of data from the data loggers will continue at least into next summer. We will be installing a tipping-bucket gage near the spring in order to get good rainfall records on that side of the mountain. What started as a little project keeps getting more and more interesting. One of the exciting aspects for me is that Ben Schwartz has taken a keen interest in this study and has engaged an undergraduate student to help with analyzing the vast amount of data that is being and will be collected. I think you can expect a paper or two out of this effort.

Ben has put together some of the data collected, in graphs that you will find interesting. He promises to update and expand on this information as the project progresses. The graphs cover large periods of time and don't show the short periods very well but take a look and you'll see why this is one weird spring.