



## **CLEARWATER CHAPTER OF TROUT UNLIMITED**

### **TEMPERATURE MONITORING DWAAS KILL / BEAR BROOK Clifton Park, NY Summer 2009**

#### **PURPOSE:**

During the period April 30, 2009 to October 2, 2009 temperature loggers were placed in Bear Brook, a tributary of the Dwaas Kill in Clifton Park, NY. The purpose was to monitor the effects of storm water runoff into Bear Brook and the impact on wild brook trout known to be present and spawn in the stream. The headwaters of Bear Brook receive storm water runoff from Shopper's World, a complex with approximately 22 acres of impervious surface consisting of parking lots and flat roof tops. Water temperatures above 70 degrees will stress brook trout and temperatures of 80 degrees can be lethal.

#### **METHODOLGY:**

Temperature loggers set to record temperatures in one hour intervals were placed in Bear Brook at three locations. The first logger (Logger #1) was placed approximately 20 yards downstream from Maxwell Road<sup>1</sup>. Storm drainage from the Shoppers World complex flows into Bear Brook at Maxwell Road. The second logger (Logger #2) was placed .56 miles downstream from the first logger<sup>2</sup>. The stream between the first two loggers flows through undeveloped land with a well developed riparian zone and good overhead cover. Below the second logger are springs that drain into Bear Brook. The third logger (Logger #3) was placed .17 miles downstream from the second and downstream from the springs<sup>3</sup>. The last section includes brook trout spawning beds. Data was analyzed for temperature spikes. Weather data was reviewed to determine if temperature elevations were associated with rain events resulting in storm water runoff.

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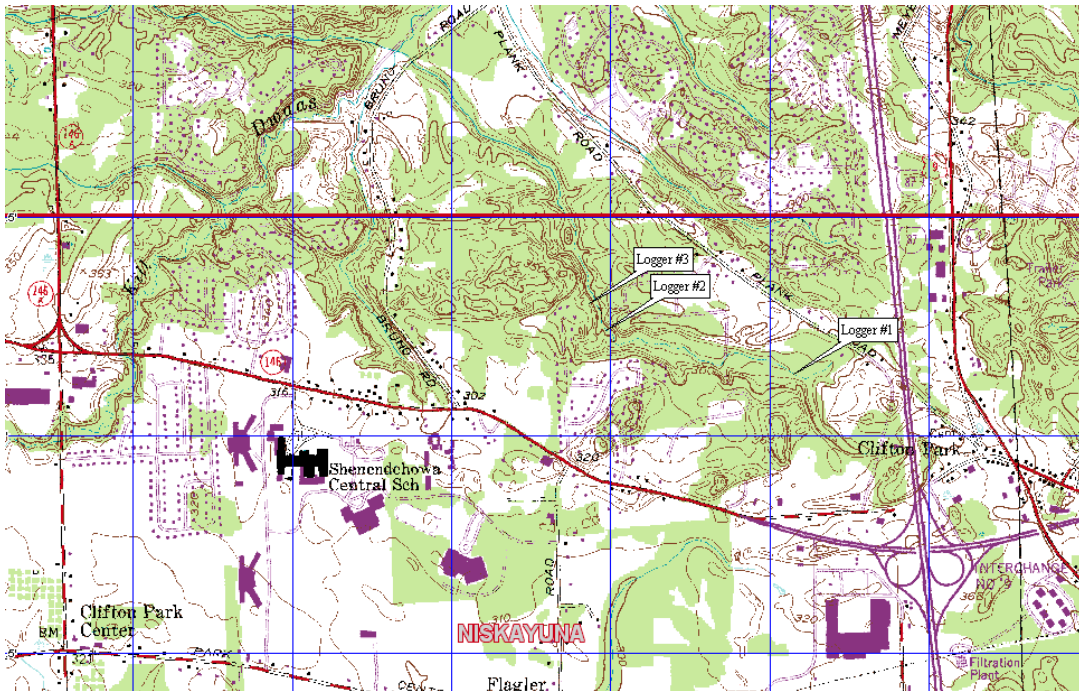
<sup>1</sup> N42.52.148-W073.46.936

<sup>2</sup> N42.52.242-W073.47.516

<sup>3</sup> N42.52.301-W073.47.568



Shopper's World, Maxwell Drive and Bear Brook

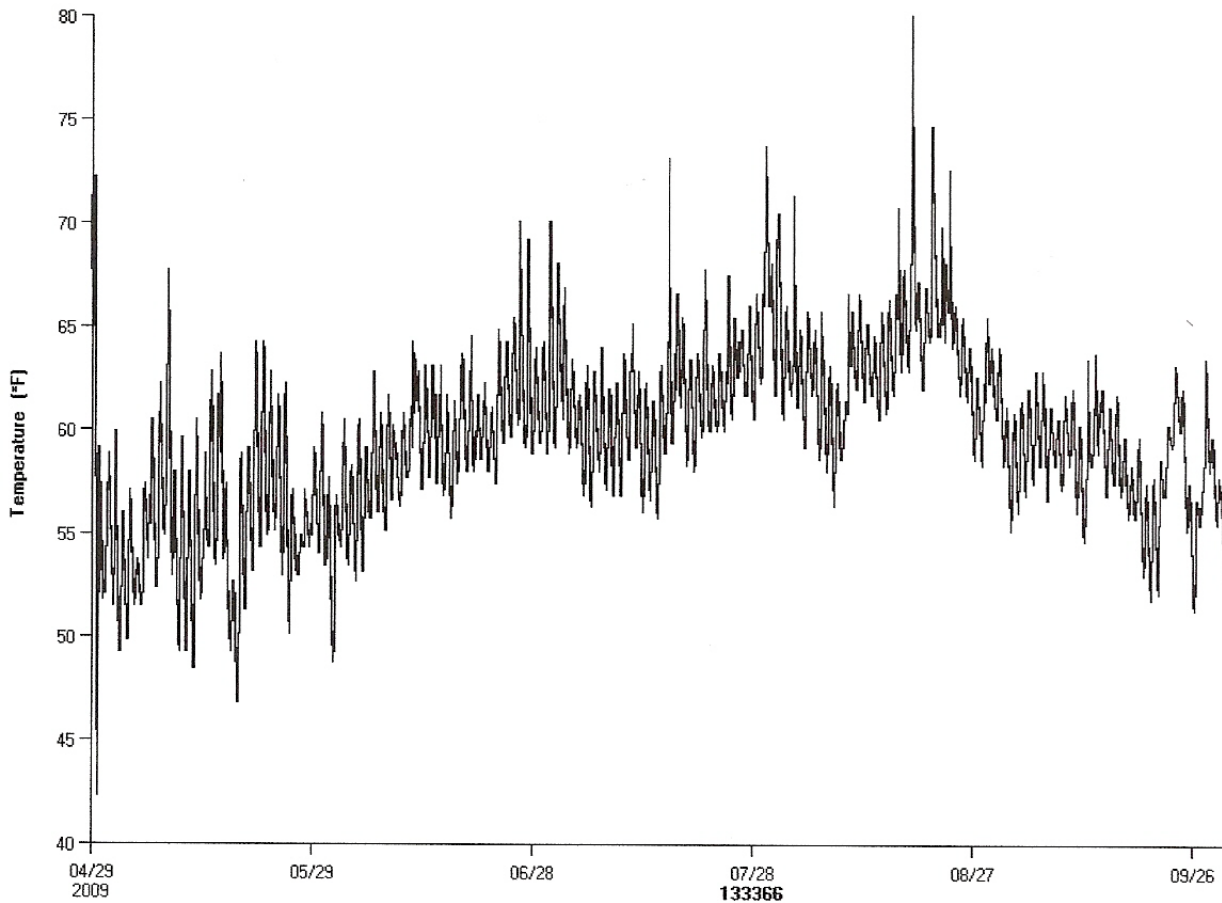


Temperature Logger Locations

**FINDINGS:**

Water temperature loggers placed in Bear Brook at Maxwell Road recorded ten temperature elevations exceeding 70 degrees<sup>4</sup>. Every occasion of elevated water temperature was associated with a rain event. Storm water runoff, especially from Shopper’s World, resulted in elevated stream temperatures.

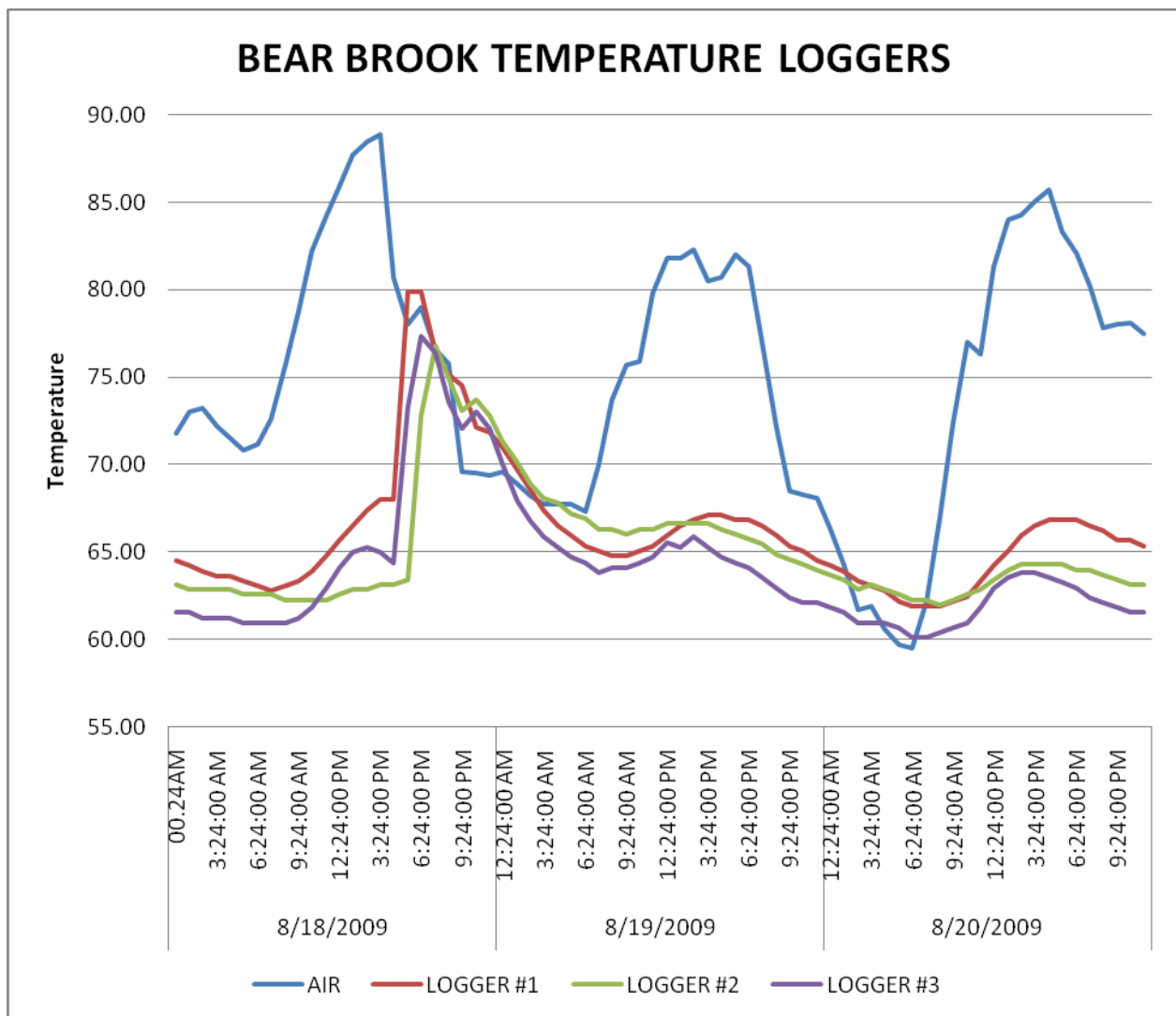
**BEAR BROOK TEMPERATURE LOGGER – MAXWELL ROAD**



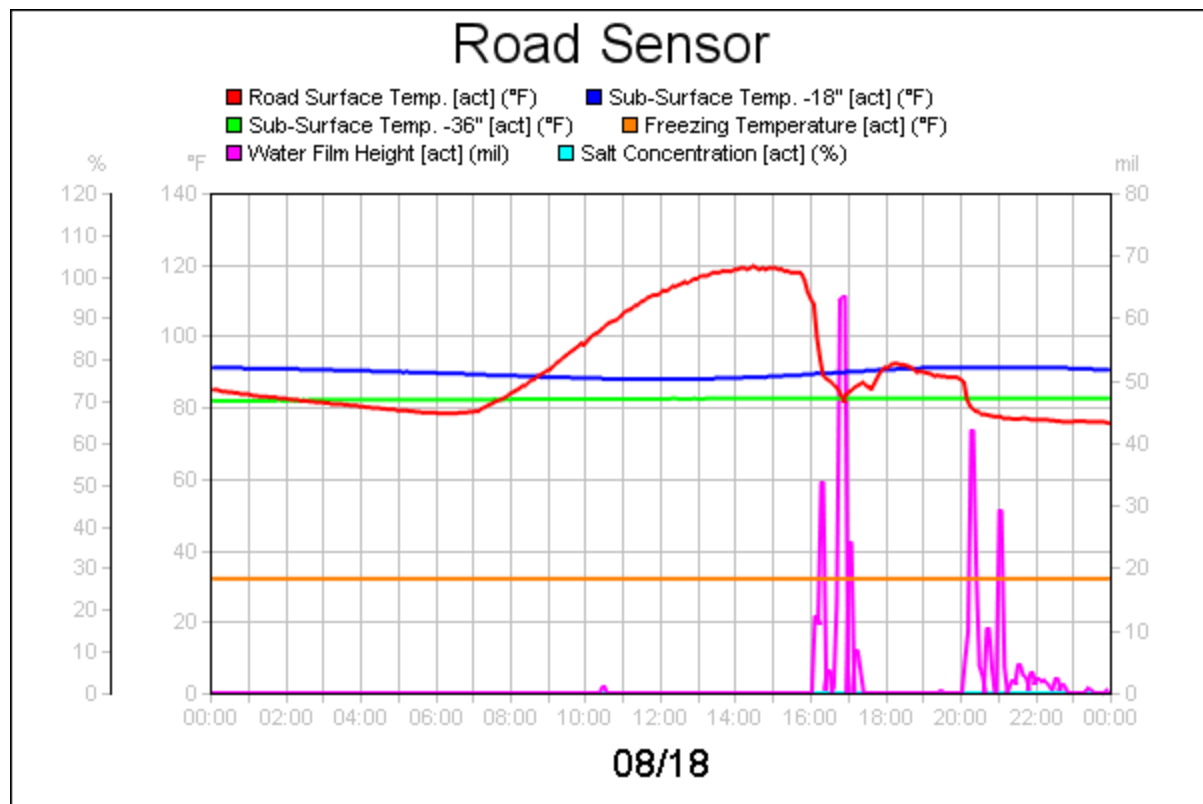
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<sup>4</sup> June 26, 30, July 16, 29, 31, August 2, 16, 18, 21, 23.

Close examination of the rain event on August 18, 2009 reveals the impact of a storm water surge into Bear Brook. Between 4:30 pm and 5:30 pm a rain event started. During that same period the temperature logger at Maxwell Road (Logger #1) registered a 12 degree increase in water temperature from 68 degrees to 80 degrees. The water temperature remained at 80 degrees for one hour and then began a gradual decline taking 8 hours to go back below 70 degrees. The other two temperature loggers downstream (Logger #2 & Logger #3) showed a similar 12 degree increase in temperature and a similar recovery period. This demonstrates that the impact of this storm surge affected the stream for more than .73 miles, the distance between Logger #1 and Logger #3. It also generated water temperatures above 70 degrees that stressed brook trout populations and for a period at the Maxwell Road location reached 80 degrees which is potentially lethal to brook trout.



NYS DOT maintains a monitoring station at Northway Exit 9. This station monitors Road Surface temperature. The DOT road surface temperature data is probably a reasonable proxy for roof top and parking lot temperatures in Shopper's World which is 0.25 miles distant. The heat transfer from roof tops and parking lots to storm water is demonstrated by the direct correlation between the drop in pavement temperature and the increase in stream temperature as storm water drainage from Shopper's World flows into the stream at the time of a rain event. At 4:00 p.m., August 18, 2009, just prior to the rain event, the road surface temperature was 120 degrees. After the rain, the road surface temperature dropped approximately 35 degrees and during the same period the stream temperature rose 12 degrees.



NYS DOT Northway I-87, Exit 9, August 18, 2009

**STORM WATER MANAGEMENT:**

Bear Brook flows through one of the most heavily developed sections of Clifton Park. As a consequence, the stream is subjected to the effects of storm water drainage from impervious surfaces in surrounding developments, in addition to Shopper's World and other commercial properties. There is no question that Bear Brook and its wild brook trout are imperiled by the existing situation. The effect of this storm water has an impact downstream perhaps as far as the Dwaas Kill in the Nature Preserve section.

Storm water infrastructure in the residential developments consists of culverts directing water into Bear Brook. Although there are no retention ponds, most of Bear Brook passes through a well developed riparian zone which filters storm water sediment and pollutants, cools the water and reduces the

volume and velocity of storm water entering the stream. Options to further mitigate the impact of drainage from residential developments would probably be limited and expensive.

Drainage from Shopper's World appears to flow into a very large storm water retention pond. Unfortunately a large culvert at the bottom of the pond allows storm water to drain unrestricted. The existing pond could be improved by the construction of a simple structure over the effluent pipe to restrain the flow of water, thereby containing water in the pond. This would be relatively inexpensive and highly effective. A newly constructed retention pond at the site of the Round Lake Bypass uses this design. The upper portal is 3 – 4 feet above the pond bottom. Although the Round Lake facility is precast concrete, the same structure could be inexpensively constructed of cement block.



An improved storm water retention facility would have the following beneficial effects:

- Water retention would reduce the flow and volume of heated water released into Bear Brook.
- Slow release would preclude the sudden and far reaching effects of storm water.
- Water retention would permit percolation of storm water into the aquifer.
- Pollutants would be contained in the retention pond.

**CONCLUSIONS:**

Bear Brook and its wild brook trout population are imperiled by the extreme water conditions imposed by storm water.

Due to the heavily developed environment, storm water will always have a detrimental effect on Bear Brook. For this reason it is imperative that any opportunities to mitigate the impact of storm water be acted upon to enhance the survival of wild brook trout and their environment.

Revised 2-22-2010