

# Rock Creek Advisor

## Rock Creek Conservancy District

### Water Monitoring Project

February 2011

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Number 1

The Rock Creek Conservancy District has collected biological monitoring data from 2002 to 2010. It gives Rock Creek a good benchmark to reference back to in the future. You may be asking what purpose or good is this doing the landowner who funds this practice? One of the first things that come to my mind is like being watched by an automatic radar gun in a speed zone. We tend to pay more attention to what we do if we know we are being watched. Second, it is a good insurance policy to have a standard of many years of testing to fall back on if something would happen to change the Rock Creek water quality in a big way, there is a benchmark of at least eight years of data collected to reference back to. But to me, the biggest reason is that we need to be in control of our own destination as a local government and not have state or federal mandate what we must or must not do. It is much easier to fix a problem early before it grows into a huge issue, so by actively doing water testing we can keep somewhat of a lookout for potential problems that may occur.

Taking samples of freshwater invertebrates and identifying the organisms present can reveal whether a body of water is healthy or ill, and the likely cause of the problem if one exists. This process, known as bio-monitoring, has become a significant activity for biologists and consulting companies, and universities, as well as volunteers trained for sampling water. There are four groups we divide the invertebrates into, group one-intolerant, two-moderately intolerant, three-fairly tolerant, four-very tolerant. More points are given to the intolerant invertebrates, meaning higher water quality.

Here is a sample biological monitoring data chart in which we track the pollution tolerance index (PTI). The macro invertebrates index is divided into pollution tolerance groups. These PTI groups represent the different levels of pollution tolerance. The higher the group number, the higher the pollution tolerance level. We record the number of macro invertebrates we find at each site.

| PT Group 1<br>Intolerant |   | PT Group 2<br>Moderately Intolerant |   | PT Group 3<br>Fairly Tolerant |   | PT Group 4<br>Very Tolerant |    |
|--------------------------|---|-------------------------------------|---|-------------------------------|---|-----------------------------|----|
| Stonefly Nymph           | 4 | Damselfly Nymph                     | 0 | Midges                        | 0 | Left-Handed Snails          | 3  |
| Mayfly Nymph             | 2 | Dragonfly Nymph                     | 1 | Black Fly Larvae              | 0 | Aquatic Worms               | 20 |
| Caddis Fly Larvae        | 0 | Sowbug                              | 0 | Planaria                      | 0 | Blood Midge                 | 12 |
| Dobsonfly Larvae         | 0 | Scud                                | 1 | Leech                         | 5 | Rat-tailed Maggot           | 0  |
| Riffle Beetle            | 0 | Crane Fly Larvae                    | 0 |                               |   |                             |    |
| Water Penny              | 0 | Clams/Mussels                       | 6 |                               |   |                             |    |
| Right-Handed Snail       | 0 |                                     |   |                               |   |                             |    |

The next row is the number of Taxa. Insects that have the same body shape belong to the same taxa. To find the total number of taxa for each pollution tolerance group you need to add the number of types of organisms. A lot of times when collecting invertebrates you will have groups with zero, giving your score a zero. Make sure you do not add the numbers of organisms together, and only total each invertebrate as one instead of how many were found at that site, weather you find ten or two, it only counts as one. Each group is worth different amounts of points. I'm now adding the groups from the chart above to figure my total PTI below.

|                        |   |                        |   |                        |   |                        |   |
|------------------------|---|------------------------|---|------------------------|---|------------------------|---|
| # Of Taxa              | 2 | # Of Taxa              | 3 | # Of Taxa              | 1 | # Of Taxa              | 3 |
| Weighting factor x 4=8 |   | Weighting factor x 3=9 |   | Weighting factor x 2=2 |   | Weighting factor x 1=3 |   |

Add the final index values for each group to get your Pollution Tolerance Index Rating for this site is = **22**

Pollution Tolerance Index Rating of 23 or more equals excellent, 17-22 has a rating of Good, 11-16 Fair, and 10 or less is Poor. The PTI rating from the Rock Creek Channel from 05/04/2002- 09/04/2010 has had ratings from excellent to poor, which is about average for our state's channels with a similar environment.

Site Locations- Site one (1000 S. between 100 E. & 200 E.) Site two (700 S. between 200 E. & 250 E.) Site three (500 S. on Hoosier Hwy) Site four (400 S. between 100 W. & 200 W.) Site five (300 S. between 200 W. & 300 W.) Site six (200 S. between 200 W and 300 W.) Site seven (400 W. between 100 S. & IN 124) Site eight (100 N between 400 W. & 500 W.) Site nine (200 N. between 400 W. & 500 W.) Site 10 (on St RD 3 in Huntington County).

**Pollution Tolerance Index Rating/ 23 or more Excellent / 17-21 Good / 11-16 Fair/ 10 Or Less Poor**

| Date                       | Site 1         | Site 2          | Site 3             | Site 4          | Site 5           |
|----------------------------|----------------|-----------------|--------------------|-----------------|------------------|
| Site Index Rating 09/4/10  | Site1=7 Poor   | Site2= 4 Poor   | Site3= 11 Fair     | Site4= 10 Poor  | Site5= 10 Poor   |
| Site Index Rating 07/27/10 | Site1=10 Poor  | Site2= 14 Fair  | Site3= 20 Good     | Site4= 19 Good  | Site5= 15 Fair   |
| Site Index Rating 09/05/09 | Site1=4 Poor   | Site2= 10 Poor  | Site3= 4 Poor      | Site4= 15 Fair  | Site5= 11 Fair   |
| Site Index Rating 07/24/09 | Site1=8 Poor   | Site2= 19 Good  | Site3= 15 Fair     | Site4= 18 Good  | Site5= 11 Fair   |
| Site Index Rating 06/27/09 | Site1=8 Poor   | Site2= 11 Fair  | Site3= 6 Poor      | Site4= 12 Fair  | Site5= 8 Poor    |
| Site Index Rating 04/04/09 | Site1=8 Poor   | Site2= 13 Fair  | Site3= 13 Fair     | Site4= 4 Poor   | Site5= 12 Fair   |
| Site Index Rating 12/30/08 | Site1=8 Poor   | Site2= 9 Poor   | Site3= 17 Good     | Site4= 10 Poor  | Site5= 12 Fair   |
| Site Index Rating 9/20/08  | Site1=7 Poor   | Site2= 8 Poor   | Site3= 8 Poor      | Site4= 17 Good  | Site5= 8 Poor    |
| Site Index Rating 08/20/08 | Site1=7 Poor   | Site2= 8 Poor   | Site3= 14 Fair     | Site4= 14 Fair  | Site5= 15 Fair   |
| Site Index Rating 07/28/08 | Site1=7 Poor   | Site2= 8 Poor   | Site3= 16 Fair     | Site4= 15 Fair  | Site5= 12 Fair   |
| Site Index Rating 06/21/08 | Site1=5 Poor   | Site2= 13 Fair  | Site3= 14 Fair     | Site4= 8 Poor   | Site5= 12 Fair   |
| Site Index Rating 04/12/08 | Site1=1 Poor   | Site2= 6 Poor   | Site3= 10 Poor     | Site4= 8 Poor   | Site5= 8 Poor    |
| Site Index Rating 11/10/07 | Site1=0 Poor   | Site2= 10 Poor  | Site3= 13 Fair     | Site4= 13 Fair  | Site5= 10 Poor   |
| Site Index Rating 09/03/07 | Site1=3 Poor   | Site2= 4 Poor   | Site3= 15 Fair     | Site4= 15 Fair  | Site5= 11 Fair   |
| Site Index Rating 08/23/07 | Site1=4 Poor   | Site2= 7 Poor   | Site3= 15 Fair     | Site4= 1 Poor   | Site5= 8 Poor    |
| Site Index Rating 07/07/07 | Site1=0 Poor   | Site2= 15Fair   | Site3= 17 Good     | Site4= 11 Fair  | Site5=17 Good    |
| Site Index Rating 6/8/07   | Site1=1 Poor   | Site2= 4 Poor   | Site3= 4 Poor      | Site4= 3 Poor   | Site5=8 Poor     |
| Site Index Rating 4/2/07   | Site1=8 Poor   | Site2= 12 Fair  | Site3= 18 Good     | Site4= 16 Fair  | Site5=15 Fair    |
| Site Index Rating 12/17/06 | Site1=5 Poor   | Site2= 16 Fair  | Site3= 18 Good     | Site4= 5 Poor   | Site5=14 Fair    |
| Site Index Rating 10/28/06 | Site1=4 Poor   | Site2= 7 Poor   | Site3= 12 Fair     | Site4= 17 Good  | Site5=12 Fair    |
| Site Index Rating 09/04/06 | Site1=5 Poor   | Site2= 9 Poor   | Site3= 17 Good     | Site4= 13 Fair  | Site5=10 Poor    |
| Site Index Rating 06/17/06 | Site1=11 Fair  | Site2= 12 Fair  | Site3=13 Fair      | Site4= 8 Poor   | Site5=10 Poor    |
| Site Index Rating 04/08/06 | Site1=3 Poor   | Site2= 10 Poor  | Site3= 5 Poor      | Site4= 8 Poor   | Site5= 16 Fair   |
| Site Index Rating 11/26/05 | Site1=1 Poor   | Site2= 10 Poor  | Site3=11 Fair      | Site4= 9 Poor   | Site5=7 Poor     |
| Site Index Rating 9/06/05  | Site1=4 Poor   | Site2= 7 Poor   | Site3=16 Fair      | Site4= 9 Poor   | Site5=16 Fair    |
| Site Index Rating 7/14/05  | Site1=8 Poor   | Site2=15 Fair   | Site3=26 Excellent | Site4= 22 Good  | Site5=10 Poor    |
| Site Index Rating 5/16/05  | Site1= 15 Fair | Site2=14 Fair   | Site3=10 Poor      | Site4=14 Fair   | Site5=11 Fair    |
| Site Index Rating 12/4/04  | Site1=1 Poor   | Site2=13 Poor   | Site3=15 Fair      | Site4=18 Good   | Site5=11 Fair    |
| Site Index Rating 9/6/04   | Site1=4 Poor   | Site2=10 Poor   | Site3=21 Good      | Site4=15 Fair   | Site5=11 Fair    |
| Site Index Rating 06/21/04 | Site1=4 Poor   | Site2=15 Fair   | Site3=8 Poor       | Site4=14 Fair   | Site5=8 Poor     |
| Site Index Rating 04/09/04 | Site1=15 Fair  | Site2=19 Good   | Site3=25 Excellent | Site4=10 Poor   | Site5=7 Poor     |
| Site Index Rating 12/7/03  | Site 1=5Poor   | Site2=4 Poor    | Site3=8 Poor       | Site4=7 Poor    | Site5=5 Poor     |
| Site index rating 9/6/03   | site 1=1 Poor  | site 2 = 3 Poor | site 3 = 1 Poor    | site 4 = 4 Poor | site 5 = 0 Poor  |
| Site Index Rating 6/10/03  | Site 1=4Poor   | Site2=12Fair    | Site3=19Good       | Site4=9 Poor    | Site5=3 Poor     |
| Site Index Rating 4/18/03  | Site 1=1Poor   | Site2=11Fair    | Site3=17Good       | Site4=4 Poor    | Site5=9 Poor     |
| Site Index Rating 12/16/02 | Site1=2 Poor   | Site2=13 Fair   | Site3=13 Fair      | Site4=7 Poor    | Site5=6 Poor     |
| Site Index Rating 9/02/02  | Site 1= 4 Poor | Site 2= 4 Poor  | Site 3= 9 Poor     | Site 4 =0 Poor  | Site 5 = 10 Poor |
| Site Index Rating 6/13/02  | Site1= 8 Poor  | Site2=16 Fair   | Site3=17 Good      | Site 4=20 Good  | Site 5=11 Fair   |
| Site Index Rating 5/4/02   | Site1=10 Poor  | Site2=14 Fair   | Site3=16 Fair      | Site4=13 Fair   | Site5=8 Poor     |

| Date                       | Site 6          | Site 7          | Site 8              | Site 9              | Site 10           |
|----------------------------|-----------------|-----------------|---------------------|---------------------|-------------------|
| Site Index Rating 09/4/10  | Site6= 13 Fair  | Site7= 13 Fair  | Site8= 25 Excellent | Site9= 20 Good      | Site10= 18 Good   |
| Site Index Rating 07/27/10 | Site6= 11 Fair  | Site7= 11 Fair  | Site8= 13 Fair      | Site9= 16 Fair      | Site10= 11 Fair   |
| Site Index Rating 09/05/09 | Site6= 16 Fair  | Site7= 15 Fair  | Site8= 15 Fair      | Site9= 15 Fair      | Site10= 14 Fair   |
| Site Index Rating 07/24/09 | Site6= 1 Poor   | Site7= 12 Fair  | Site8= 9 Poor       | Site9= 18 Good      | Site10= 10 Poor   |
| Site Index Rating 06/27/09 | Site6= 3 Poor   | Site7= 10 Poor  | Site8= 18 Good      | Site9= 11 Fair      | Site10= 7 Poor    |
| Site Index Rating 04/04/09 | Site6= 10 Poor  | Site7= 8 Poor   | Site8= 11 Fair      | Site9= 17 Good      | Site10= 7 Poor    |
| Site Index Rating 12/30/08 | Site6= 12 Fair  | Site7= 12 Fair  | Site8= 27 excellent | Site9= 21 Good      | Site10= 11 Fair   |
| Site Index Rating 9/20/08  | Site6= 15 Fair  | Site7= 17 Good  | Site8= 18 Good      | Site9= 18 Good      | Site10= 15 Fair   |
| Site Index Rating 08/20/08 | Site6= 15 Fair  | Site7= 18 Good  | Site8= 18 Good      | Site9= 22 excellent | Site10= 10 Poor   |
| Site Index Rating 07/28/08 | Site6= 5 Poor   | Site7= 15 Fair  | Site8= 20 Good      | Site9= 22 Good      | Site10= 17 Good   |
| Site Index Rating 06/21/08 | Site6= 7 Poor   | Site7= 8 Poor   | Site8= 19 Good      | Site9= 11 Fair      | Site10= 10 Poor   |
| Site Index Rating 04/12/08 | Site6= 14 Fair  | Site7= 9 Poor   | Site8= 14 Fair      | Site9= 11 Fair      | Site10= 8 Poor    |
| Site Index Rating 11/10/07 | Site6= 8 Poor   | Site7= 8 Poor   | Site8= 18 Good      | Site9=7 Poor        | Site10= 7 Poor    |
| Site Index Rating 09/03/07 | Site6= 11 Fair  | Site7= 18 Good  | Site8= 18 Good      | Site9=16 Fair       | Site10= 8 Poor    |
| Site Index Rating 08/23/07 | Site6= 15 Fair  | Site7= 13 Fair  | Site8= 16 Fair      | Site9=15 Fair       | Site10= 11 Fair   |
| Site Index Rating 07/07/07 | Site6= 8 Poor   | Site7= 11 Fair  | Site8= 10 Poor      | Site9=14 Fair       | Site10= 10 Poor   |
| Site Index Rating 6/8/07   | Site6= 10 Poor  | Site7= 8 Poor   | Site8= 7 Poor       | Site9=12 Fair       | Site10= 7 Poor    |
| Site Index Rating 4/2/07   | Site6= 4 Poor   | Site7= 12 Fair  | Site8= 6 Poor       | Site9=8 Poor        | Site10= 9 Poor    |
| Site Index Rating 12/17/06 | Site6= 4 Poor   | Site7= 14 Fair  | Site8= 9 Poor       | Site9=7 Poor        | Site10= 10 Poor   |
| Site Index Rating 10/28/06 | Site6= 4 Poor   | Site7= 19 Good  | Site8= 14 Fair      | Site9=22 Good       | Site10= 8 Poor    |
| Site Index Rating 09/04/06 | Site6=10 Poor   | Site7= 12 Fair  | Site8= 18 Good      | Site9=11 Fair       | Site10= 10 Poor   |
| Site Index Rating 06/17/06 | Site6=5 Poor    | Site7= 4 Poor   | Site8= 8 Poor       | Site9=13 Fair       | Site10= 7 Poor    |
| Site Index Rating 04/08/06 | Site6=5 Poor    | Site7= 15 Fair  | Site8= 16 Fair      | Site9=10 Poor       | Site10= 18 Good   |
| Site Index Rating 11/26/05 | Site6=4 Poor    | Site7=9 Poor    | Site8= 13 fair      | Site9=13 Fair       | Site10= 4 Poor    |
| Site Index Rating 9/06/05  | Site6=10Poor    | Site7=8 Poor    | Site8= 16 fair      | Site9=16 Fair       | Site10=12 Fair    |
| Site Index Rating 7/14/05  | Site6=6Poor     | Site7=17 Good   | Site8= 15 fair      | Site9=14 Fair       | Site10=11 Fair    |
| Site Index Rating 5/16/05  | Site6=16 Fair   | Site7=11 Fair   | Site8=19 Good       | Site9=14 Fair       | Site10=11 Fair    |
| Site Index Rating 12/4/04  | Site6=13 Fair   | Site7=22 Good   | Site8=10 Poor       | Site9=17 Good       | Site10=9 poor     |
| Site Index Rating 9/6/04   | Site6=0 Poor    | Site7=1 Poor    | Site8=14 Fair       | Site9=21 Good       | Site10=10 poor    |
| Site Index Rating 06/21/04 | Site6=0 Poor    | Site7=1 Poor    | Site8=6 Poor        | Site9=5 Poor        | Site10=15 Fair    |
| Site Index Rating 04/09/04 | Site6=4 Poor    | Site7=6 Poor    | Site8=7 Poor        | Site9=16 Fair       | Site10=15 Fair    |
| Site Index Rating 12/7/03  | Site6=3 Poor    | Site7=5 poor    | Site8=12 Fair       | Site9=19 Good       | Site10=18 Good    |
| Site index rating 9/6/03   | site 6 = 0 Poor | site 7 = 0 Poor | site 8 = 11 Fair    | site 9 = 18 Good    | site 10 = 11 Fair |
| Site Index Rating 6/10/03  | Site6=5 Poor    | Site7=4 poor    | Site8=18 Good       | Site9=15 Fair       | Site10=7 Poor     |
| Site Index Rating 4/18/03  | Site6=0 Poor    | Site7=9 poor    | Site8=22 Good       | Site9=20 Good       | Site10=10 Poor    |
| Site Index Rating 12/16/02 | Site6=10 Poor   | Site7=12 Fair   | Site8=8 Poor        | Site9=14 Fair       | Site10=7 Poor     |
| Site Index Rating 9/02/02  | Site 6 = 3 Poor | Site 7 = 7 Poor | Site 8 =11 Fair     | Site 9 = 14 Fair    | Site 10=11 Poor   |
| Site Index Rating 6/13/02  | Site 6=5 Poor   | Site7=4 Poor    | Site8=12 Fair       | Site9=22 Good       | Site 10=16 Fair   |
| Site Index Rating 5/4/02   | Site6=5 Poor    | Site7=8 Poor    | Site8=15 Fair       | Site9=19 Good       | Site10=11 Fair    |

Another method used to measure the water body's health is habitat assessment. The condition of the substrate and the land within and adjacent to the stream channel is critical to the health of the stream and its ability to support aquatic life. The Citizens Qualitative Habitat Evaluation Index (CQHEI) utilizes land use, substrate, flow rate, depth, shape, riparian vegetation, and erosion to provide a measure of stream habitat that affects fish and other aquatic life. The purpose of the index is to provide a measure of the stream habitat and riparian health that generally corresponds to the physical factors affecting fish and other aquatic life, such as macro invertebrates. The CQHEI was designed to be used primarily in wade-able streams. Maximum total points for the CQHEI is 114. If the score is over 100 it is considered an exceptional high-quality stream. A set of ranges for excellent, medium, poor, and very poor has not yet been developed for this index, but scores over 60 are found to be generally conducive to the existence of warm water fauna.

| CQHEI totals | Site 1 | Site 2 | Site 3 | Site4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|--------------|--------|--------|--------|-------|--------|--------|--------|--------|--------|---------|
| 9/4/2010     | 18     | 21     | 29     | 35    | 28     | 38     | 45     | 48     | 43     | 48      |
| 7/27/2010    | 20     | 22     | 34     | 30    | 24     | 26     | 45     | 44     | 38     | 32      |
| 9/5/2009     | 19     | 25     | 30     | 29    | 40     | 43     | 45     | 51     | 54     | 44      |
| 7/24/2009    | 23     | 34     | 42     | 52    | 45     | 42     | 44     | 39     | 40     | 36      |
| 6/27/2009    | 26     | 29     | 39     | 43    | 45     | 51     | 54     | 58     | 55     | 41      |
| 4/4/2009     | 19     | 25     | 34     | 35    | 40     | 38     | 36     | 39     | 38     | 39      |
| 12/30/2008   | 18     | 21     | 34     | 35    | 38     | 37     | 36     | 48     | 47     | 41      |
| 9/20/2008    | 18     | 25     | 29     | 29    | 41     | 43     | 45     | 54     | 55     | 56      |
| 8/20/2008    | 18     | 21     | 34     | 35    | 38     | 37     | 36     | 48     | 47     | 41      |
| 7/28/2008    | 26     | 29     | 34     | 35    | 34     | 38     | 35     | 36     | 38     | 37      |
| 6/21/2008    | 32     | 34     | 42     | 43    | 40     | 48     | 41     | 51     | 54     | 41      |
| 4/12/2008    | 26     | 34     | 46     | 47    | 49     | 51     | 54     | 51     | 54     | 56      |
| 11/10/2007   | 26     | 29     | 34     | 35    | 34     | 38     | 35     | 36     | 38     | 37      |
| 9/3/2007     | 28     | 31     | 39     | 48    | 41     | 37     | 33     | 39     | 31     | 40      |
| 8/23/2007    | 23     | 36     | 42     | 40    | 45     | 51     | 45     | 58     | 48     | 56      |
| 7/7/2007     | 18     | 34     | 42     | 43    | 40     | 48     | 41     | 51     | 54     | 41      |
| 6/8/2007     | 23     | 36     | 42     | 40    | 45     | 51     | 35     | 48     | 48     | 37      |
| 4/2/2007     | 33     | 34     | 46     | 43    | 49     | 60     | 41     | 55     | 55     | 56      |
| 12/17/2006   | 26     | 37     | 48     | 49    | 40     | 57     | 45     | 58     | 47     | 37      |
| 10/28/2006   | 28     | 36     | 49     | 44    | 54     | 57     | 47     | 54     | 47     | 48      |
| 9/4/2006     | 26     | 41     | 47     | 47    | 45     | 49     | 35     | 51     | 43     | 41      |
| 6/17/2006    | 39     | 37     | 57     | 41    | 49     | 51     | 45     | 58     | 58     | 41      |
| 4/8/2006     | 19     | 25     | 29     | 29    | 32     | 38     | 26     | 29     | 38     | 30      |
| 11/26/2005   | 29     | 40     | 44     | 40    | 43     | 43     | 45     | 47     | 55     | 37      |
| 9/6/2005     | 18     | 21     | 48     | 49    | 43     | 41     | 35     | 73     | 73     | 51      |
| 7/14/2005    | 15     | 26     | 30     | 30    | 25     | 32     | 34     | 36     | 36     | 37      |
| 5/16/2005    | 20     | 27     | 40     | 40    | 40     | 50     | 36     | 54     | 47     | 36      |
| 12/4/2004    | 29     | 36     | 49     | 44    | 54     | 57     | 47     | 54     | 71     | 55      |
| 9/6/2004     | 23     | 27     | 40     | 40    | 38     | 48     | 35     | 53     | 34     | 36      |
| 6/21/2004    | 29     | 36     | 49     | 44    | 54     | 57     | 47     | 54     | 71     | 38      |
| 4/9/2004     | 28     | 36     | 40     | 43    | 44     | 37     | 40     | 48     | 48     | 48      |
| 12/7/2003    | 15     | 26     | 34     | 34    | 35     | 36     | 36     | 48     | 48     | 55      |
| 9/6/2003     | 14     | 29     | 35     | 35    | 38     | 35     | 35     | 54     | 51     | 56      |
| 6/10/2003    | 9      | 25     | 34     | 32    | 34     | 39     | 36     | 48     | 49     | 55      |
| 12/16/2002   | 10     | 23     | 21     | 20    | 24     | 38     | 34     | 39     | 37     | 38      |
| 9/2/2002     | 10     | 23     | 21     | 20    | 24     | 38     | 34     | 39     | 37     | 39      |
| 6/13/2002    | 9      | 25     | 30     | 30    | 28     | 38     | 34     | 39     | 37     | 38      |

Rainfall totals data was collected at the official Bluffton station, by the Indiana State Climate Office, Purdue University. Rain fall flows play a large role in water quality, along with many others factors that influence water quality from the water bodies sampled.

| 1999              | 2000               | 2001               | 2002               | 2003               | 2004            | 2005              | 2006              | 2007               | 2008            | 2009               | 2010               |
|-------------------|--------------------|--------------------|--------------------|--------------------|-----------------|-------------------|-------------------|--------------------|-----------------|--------------------|--------------------|
| Jan. 3.68         | Jan.1.23           | Jan. .69           | Jan. 2.08          | Jan. 1.24          | Jan, 2.7        | Jan 6.96          | Jan. 2.29         | Jan 4.46           | Jan 3.55        | Jan 1.3            | Jan .88            |
| Feb. 1.85         | Feb. 1.72          | Feb. 2.91          | Feb. 2.93          | Feb. 1.92          | Feb. .42        | Feb. 7.11         | Feb. 2.17         | Feb 1.52           | Feb 4.56        | Feb 3.09           | Feb 1.35           |
| Mar. 1.55         | Mar. 2.31          | Mar. 1.05          | Mar. 3.35          | Mar. 1.68          | Mar. 1.87       | Mar. 7.23         | Mar. 2.22         | Mar 3.98           | Mar 3.38        | March 5.5          | March 2.59         |
| April .96         | April 1.95         | April 3.79         | April 3.47         | April 2.75         | April 1.2       | April 7.11        | April 5.33        | April 4.69         | April 2.83      | April 4.95         | April 6.01         |
| May 3.29          | May 4.26           | May 4.29           | May 4.27           | May 8.97           | May 5.92        | May1.95           | May 6.38          | May .63            | May 3.9         | May 4.08           | May 6.16           |
| June 1.65         | June 7.04          | June 3.2           | June 3.25          | June 3.32          | June 6.38       | June 2.37         | June 4.86         | June 1.65          | June 5.09       | June 4.08          | June 6.37          |
| July 1.26         | July 1.72          | July 4.15          | July 4.56          | July 6.74          | July 4.38       | July 3.89         | July 3.67         | July 3.17          | July 3.29       | July 2.77          | July 3.16          |
| Aug.5.9           | Aug. 4.93          | Aug. 3.5           | Aug. 3.15          | Aug 3.58           | Aug 6.77        | Aug 3.45          | Aug 2.65          | Aug 8.7            | Aug 1.73        | Aug 4.46           | Aug 3.47           |
| Sept. 1.95        | Sept. 2.89         | Sept. 4.41         | Sept. 2.43         | Sept 7.61          | Sept 1.23       | Sept 5.31         | Sept. 3.69        | Sept. 2.12         | Sept 4.94       | Sept 1.33          | Sept .41           |
| Oct. 1.96         | Oct. .93           | Oct. 6.99          | Oct. 2.37          | Oct. 1.57          | Oct 2.35        | Oct .98           | Oct. 3.82         | Oct 2.11           | Oct 2.3         | Oct 5.61           | Oct .82            |
| Nov. 1.17         | Nov. 1.51          | Nov. 2.73          | Nov. 2.6           | Nov. 2.49          | Nov 3.81        | Nov 4.35          | Nov. 1.58         | Nov 3.54           | Nov 2.03        | Nov 1.47           | Nov 4.05           |
| Dec. 2.1          | Dec. 1.27          | Dec. 2.58          | Dec. 1.82          | Dec. 2.61          | Dec .96         | Dec 1.67          | Dec. 5.6          | Dec. 3.36          | Dec 4.4         | Dec 3.07           | Dec .52            |
| <b>total27.32</b> | <b>total 30.25</b> | <b>total 40.29</b> | <b>total 36.28</b> | <b>total 44.50</b> | <b>total 40</b> | <b>total 52.4</b> | <b>total 44.3</b> | <b>total 39.93</b> | <b>total 42</b> | <b>total 41.69</b> | <b>total 35.79</b> |

**RETURN SERVICE REQUESTED**

Stream flow calculations are the last measurement conducted on the Rock Creek Channel. This measurement is important because it influences other physical, chemical, and biological factors in the stream. A high discharge rate may indicate recent rainfall or snowmelt events. When a large amount of rain runs off the land, it often carries sediments and nutrients into the stream. Very low discharge rates may indicate dry conditions, which also affect water quality and aquatic life. The discharge rate is obtained by multiplying the average width, depth, and velocity of the stream to get the discharge amount (volume) of water flowing in the stream per second.

**Stream Flow Calculation for Rock Creek Channel**

| Dates      | Site 1 | Site 2 | Site3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|------------|--------|--------|-------|--------|--------|--------|--------|--------|--------|---------|
| 9/4/2010   | 0.025  | 1.9    | 7.7   | 10.3   | 11.48  | 12.9   | 18     | 22     | 42     | 110     |
| 7/27/2010  | 0.26   | 0.3    | 4.4   | 11.3   | 9.8    | 21     | 27.6   | 48.2   | 94     | 114     |
| 9/5/2009   | 3.5    | 9      | 17    | 24     | 35     | 40     | 52     | 64     | 93     | 115     |
| 7/24/2009  | 6.7    | 16.89  | 33.1  | 29.69  | 39.4   | 32.8   | 34     | 36     | 38.5   | 64.3    |
| 6/27/2009  | 6      | 14     | 18    | 22     | 26     | 32     | 47     | 68     | 110    | 135     |
| 4/4/2009   | 3.4    | 12     | 19    | 24     | 32     | 47     | 56     | 83     | 121    | 195     |
| 12/30/2008 | 6      | 13     | 18    | 22     | 26     | 36     | 48     | 52     | 72     | 86      |
| 9/20/2008  | 0.1    | 0.33   | 1.6   | 4.6    | 12     | 16     | 19     | 28     | 38     | 54      |
| 8/20/2008  | 0.2    | 0.53   | 2.2   | 5.4    | 14     | 18     | 22     | 34     | 42     | 62      |
| 7/28/2008  | 0.28   | 0.78   | 2.37  | 6      | 17     | 22     | 26     | 42     | 54     | 82      |
| 6/21/2008  | 3      | 14     | 16    | 23     | 31     | 46     | 54     | 82     | 115    | 165     |
| 4/12/2008  | 6      | 11.5   | 38    | 45     | 54     | 65     | 81     | 125    | 195    | 240     |
| 11/10/2007 | 0.25   | 0.52   | 0.97  | 4.3    | 4.7    | 8.2    | 9.8    | 12.3   | 22     | 38      |
| 9/3/2007   | 0.31   | 0.77   | 1.05  | 5.08   | 5.4    | 12.5   | 14     | 17     | 41     | 62      |
| 8/23/2007  | 0.39   | 0.72   | 1.8   | 3.8    | 5.7    | 18.6   | 22.4   | 42     | 48     | 64      |
| 7/7/2007   | 0      | 0.75   | 3.8   | 12.3   | 21     | 28     | 32     | 47     | 53     | 65      |
| 6/8/2007   | 1.15   | 5.3    | 3.9   | 20     | 25     | 40     | 45     | 52     | 58     | 78      |
| 4/2/2007   | 5.48   | 11.09  | 32.3  | 46     | 52     | 65     | 78.5   | 120    | 134    | 158     |
| 12/17/2006 | 3.5    | 10     | 18    | 25     | 36     | 41     | 63     | 95     | 120    | 148     |
| 10/28/2006 | 3      | 15     | 17    | 24     | 32     | 64     | 128    | 170    | 192    | 220     |
| 9/4/2006   | 0.87   | 1.3    | 3.38  | 3.6    | 5.6    | 12.6   | 5.9    | 16     | 24     | 32      |
| 6/17/2006  | 2      | 3.97   | 10.1  | 11     | 17     | 21     | 31     | 53     | 64     | 74      |
| 4/8/2006   | 0.85   | 3.38   | 31.95 | 39.7   | 41     | 44     | 47     | 52     | 63     | 74      |
| 11/26/2005 | 1.35   | 2.83   | 5.32  | 13.09  | 8.52   | 11.91  | 16     | 21.7   | 24     | 32      |
| 9/6/2005   | 0.3    | 2      | 5     | 6      | 17     | 14     | 18     | 23     | 17     | 16.8    |
| 7/14/2005  | 0.36   | 2.1    | 6.3   | 6.9    | 19.8   | 11.5   | 17     | 24     | 18.3   | 17.4    |
| 5/16/2005  | 0.39   | 3      | 12    | 33     | 43     | 46     | 48     | 37     | 58     | 69      |
| 12/4/2004  | 3.09   | 14     | 16    | 24     | 31     | 62     | 76     | 158    | 165    | 180     |
| 9/6/2004   | 0.86   | 4.3    | 11.25 | 14.3   | 19.5   | 27     | 20.5   | 26     | 45     | 78      |
| 6/21/2004  | 0.98   | 9.86   | 16.88 | 50.4   | 114    | 61.88  | 125    | 168    | 186    | 158     |
| 4/9/2004   | 0.88   | 1.56   | 4.13  | 5.87   | 12.5   | 11.7   | 10.9   | 13.4   | 18     | 17      |
| 12/7/2003  | 0.58   | 4.1    | 18    | 16     | 26.3   | 29.6   | 36     | 27.2   | 52     | 75.3    |
| 9/6/2003   | 0.37   | 2      | 10.25 | 30.6   | 76     | 43.2   | 43     | 32     | 61.3   | 62.2    |
| 6/10/2003  | 0.76   | 2.35   | 6.24  | 7.9    | 26.4   | 23.5   | 16.5   | 23.4   | 19.5   | 36.8    |

All of these measurements are used together to evaluate the water quality conditions of the Rock Creek Channel. If you have questions or want past data reports please contact the Rock Creek Conservancy District Clerk, Stacia Henderson or Water Quality Project Coordinator, Mark Grimm at 260-824-0624 ext.3.