

Appendix 3B. Reach-scale stream-habitat data for study sites in Surry County, North Carolina August 2004-2006 [m<sup>3</sup>/s, cubic meter per second; min., minimum; max., maximum; N, number of observations; m, meter; m<sup>2</sup>, square meter; m<sup>3</sup>, cubic meter, CV, coefficient of variation; %, percent; >, greater than; <, less than; mm, millimeter; SR, secondary road; algorithms used in this appendix are defined in Appendix 3A]

| Station Name                                  | Station number | Date      | Geomorphic channel unit type |                               |                                 |          |            |         |                      | Wetted Channel Width |      |      |          |
|---|----------------|-----------|------------------------------|-------------------------------|---------------------------------|----------|------------|---------|----------------------|----------------------|------|------|----------|
|   |                |           | Reach Length (m)             | Number of transects per reach | Stream-flow (m <sup>3</sup> /s) | Pool (%) | Riffle (%) | Run (%) | Pool plus Riffle (%) | N                    | min. |      |          |
|   |                |           |                              |                               |                                 |          |            |         |                      |                      | (m)  | max. | mean (m) |
| Hogan Creek at SR 2038 near Siloam, NC        | 0211351575     | 8/26/2004 | 150                          | 11                            | 0.055                           | 35.8     | 37.5       | 26.7    | 1.0                  | 11                   | 1.13 | 6.1  | 4.08     |
| Hogan Creek at SR 2038 near Siloam, NC        | 0211351575     | 8/18/2005 | 150                          | 11                            | 0.079                           | 0.0      | 32.7       | 67.3    | 0.0                  | 11                   | 3.8  | 7.4  | 5.32     |
| Hogan Creek at SR 2038 near Siloam, NC        | 0211351575     | 8/21/2006 | 150                          | 11                            | 0.034                           | 11.1     | 44.4       | 44.5    | 0.3                  | 11                   | 1.52 | 6.1  | 4.38     |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0211371675     | 8/27/2004 | 150                          | 11                            | 0.501                           | 0.0      | 43.7       | 56.3    | 0.0                  | 11                   | 5.6  | 10.2 | 7.28     |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0211371675     | 8/19/2005 | 150                          | 11                            | 0.685                           | 0.0      | 50.0       | 50.0    | 0.0                  | 11                   | 6.1  | 9.6  | 7.52     |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0211371675     | 8/22/2006 | 150                          | 11                            | 0.467                           | 0.0      | 28.0       | 72.0    | 0.0                  | 11                   | 5.49 | 9.75 | 8.01     |
| Bull Creek at Ash Hill, NC                    | 0211397263     | 8/26/2004 | 150                          | 11                            | 0.054                           | 11.3     | 45.3       | 43.4    | 0.3                  | 11                   | 2.2  | 7.7  | 4.44     |
| Bull Creek at Ash Hill, NC                    | 0211397263     | 8/19/2005 | 150                          | 11                            | 0.091                           | 4.8      | 40.1       | 55.1    | 0.1                  | 11                   | 3.3  | 6.4  | 4.75     |
| Bull Creek at Ash Hill, NC                    | 0211397263     | 8/22/2006 | 150                          | 11                            | 0.041                           | 7.0      | 36.7       | 56.4    | 0.2                  | 11                   | 3.35 | 5.79 | 4.18     |

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| Depth of water                                |             |             |             | Bankfull width |             |             |             | Bankfull Depth |             |             |             | Stream velocity |               |              |               |       |
|---|-------------|-------------|-------------|----------------|-------------|-------------|-------------|----------------|-------------|-------------|-------------|-----------------|---------------|--------------|---------------|-------|
| Station Name                                  | min.<br>(m) | max.<br>(m) | mean<br>(m) | N.             | min.<br>(m) | max.<br>(m) | mean<br>(m) | N              | min.<br>(m) | max.<br>(m) | mean<br>(m) | N               | min.<br>(m/s) | max<br>(m/s) | mean<br>(m/s) | CV    |
| Hogan Creek at SR 2038 near Siloam, NC        | 0.05        | 0.43        | 0.17        | 11             | 7.5         | 14.5        | 10.4        | 22             | 0.34        | 2.2         | 1.55        | 33              | 0.00          | 0.79         | 0.16          | 104.3 |
| Hogan Creek at SR 2038 near Siloam, NC        | 0.03        | 0.62        | 0.23        | 11             | 7.4         | 15.0        | 10.6        | 22             | 1.26        | 7           | 2.56        | 33              | 0.00          | 0.79         | 0.16          | 103.7 |
| Hogan Creek at SR 2038 near Siloam, NC        | 0.03        | 0.59        | 0.19        | 11             | 6.7         | 14.0        | 10.3        | 22             | 0.54        | 1.11        | 0.78        | 33              | 0.00          | 0.84         | 0.15          | 128.6 |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0.06        | 0.84        | 0.3         | 11             | 11.5        | 18.6        | 15.2        | 22             | 1           | 2.6         | 1.89        | 33              | 0.04          | 0.71         | 0.34          | 60.4  |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0.05        | 0.85        | 0.32        | 11             | 10.0        | 21.5        | 17.1        | 22             | 1.34        | 4.33        | 2.27        | 33              | 0.13          | 0.87         | 0.44          | 44.5  |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 0.08        | 0.77        | 0.35        | 11             | 14.6        | 22.6        | 19.5        | 22             | 0.62        | 3.87        | 2.07        | 33              | 0.01          | 0.63         | 0.28          | 62.1  |
| Bull Creek at Ash Hill, NC                    | 0.06        | 0.53        | 0.16        | 11             | 6.2         | 10.4        | 8.2         | 22             | 1.1         | 2.1         | 1.61        | 33              | 0.03          | 0.65         | 0.21          | 76.6  |
| Bull Creek at Ash Hill, NC                    | 0.02        | 0.91        | 0.16        | 11             | 7.0         | 13.7        | 9.3         | 22             | 1.28        | 2.34        | 1.79        | 33              | 0.04          | 0.85         | 0.26          | 81.3  |
| Bull Creek at Ash Hill, NC                    | 0.04        | 0.44        | 0.16        | 11             | 7.3         | 10.7        | 9.2         | 22             | 0.6         | 2.39        | 1.79        | 33              | 0.01          | 0.41         | 0.16          | 73.9  |

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| Station Name                                  | Streambank vegetative cover |      |      |      |    |         | Dominant substrate type |             |         |             |          |         |           |                 |
|---|-----------------------------|------|------|------|----|---------|-------------------------|-------------|---------|-------------|----------|---------|-----------|-----------------|
|   | N.                          | min. | max. | mean | N. | bedrock | sand                    | fine-medium | coarse  | very coarse | small    | large   | small     | large boulders, |
|   |                             | (%)  | (%)  | (%)  |    |         | (<.062-2                | gravel      | gravel  | gravel      | cobble   | cobble  | boulders  | irregular       |
|   |                             |      |      |      |    |         | mm)                     | (>2-16      | (>16-32 | (>32-64     | (>64-128 | (>128-  | (>256-512 | bedrock (>512   |
|   |                             |      |      |      |    |         |                         | mm)         | mm)     | mm)         | mm)      | 256 mm) | mm)       | mm)             |
| Hogan Creek at SR 2038 near Siloam, NC        | 22                          | 10   | 70   | 27.3 | 33 | 0       | 45.5                    | 0           | 15.2    | 12.1        | 18.2     | 0       | 3         | 6.1             |
| Hogan Creek at SR 2038 near Siloam, NC        | 22                          | 10   | 80   | 30.0 | 55 | 0       | 50.9                    | 27.3        | 10.9    | 5.5         | 1.8      | 0       | 0         | 3.6             |
| Hogan Creek at SR 2038 near Siloam, NC        | 22                          | 0    | 80   | 31.8 | 33 | 0       | 45.5                    | 15.2        | 0       | 21.2        | 15.2     | 3       | 0         | 0               |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 22                          | 20   | 100  | 63.2 | 31 | 0       | 9.7                     | 0           | 22.6    | 3.2         | 6.5      | 41.9    | 12.9      | 3.2             |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 22                          | 0    | 100  | 74.1 | 55 | 7.3     | 38.2                    | 0           | 5.5     | 20          | 16.4     | 3.6     | 3.6       | 5.5             |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 22                          | 10   | 100  | 72.3 | 33 | 0       | 30.3                    | 0           | 0       | 6.1         | 15.2     | 36.4    | 9.1       | 3               |
| Bull Creek at Ash Hill, NC                    | 22                          | 10   | 100  | 49.1 | 33 | 0       | 42.4                    | 9.1         | 3       | 6.1         | 3        | 24.2    | 6.1       | 6.1             |
| Bull Creek at Ash Hill, NC                    | 22                          | 0    | 100  | 57.7 | 55 | 0       | 30.9                    | 10.9        | 9.1     | 10.9        | 5.5      | 21.8    | 1.8       | 9.1             |
| Bull Creek at Ash Hill, NC                    | 22                          | 10   | 100  | 75.5 | 31 | 0       | 29                      | 0           | 0       | 0           | 16.1     | 32.3    | 9.7       | 12.9            |

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| Station Name                                  | Presence of Silt |       |      | Bank erosion |       |         | Substrate embeddedness |             |          |          | Total habitat cover |       |         |
|---|------------------|-------|------|--------------|-------|---------|------------------------|-------------|----------|----------|---------------------|-------|---------|
|   | N                | Count | %    | N            | Count | Percent | N                      | min.<br>(%) | max. (%) | Mean (%) | N                   | Count | Percent |
| Hogan Creek at SR 2038 near Siloam, NC        | 33               | 33    | 100  | 22           | 10    | 45.5    | 9                      | 10          | 50       | 31.11    | 55                  | 17    | 30.9    |
| Hogan Creek at SR 2038 near Siloam, NC        | 55               | 55    | 100  | 22           | 10    | 45.5    | 13                     | 20          | 60       | 42.31    | 55                  | 21    | 38.2    |
| Hogan Creek at SR 2038 near Siloam, NC        | 33               | 33    | 100  | 22           | 10    | 45.5    | 7                      | 30          | 70       | 45.71    | 55                  | 16    | 29.1    |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 35               | 35    | 100  | 22           | 6     | 27.3    | 18                     | 10          | 80       | 27.78    | 55                  | 33    | 60      |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 55               | 54    | 98.2 | 22           | 9     | 40.9    | 29                     | 2           | 80       | 43.86    | 55                  | 8     | 14.5    |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 29               | 8     | 27.6 | 22           | 3     | 13.6    | 21                     | 10          | 80       | 46.67    | 55                  | 13    | 23.6    |
| Bull Creek at Ash Hill, NC                    | 33               | 33    | 100  | 22           | 6     | 27.3    | 13                     | 10          | 50       | 22.31    | 55                  | 30    | 54.5    |
| Bull Creek at Ash Hill, NC                    | 55               | 55    | 100  | 22           | 9     | 40.9    | 35                     | 20          | 60       | 44.57    | 55                  | 32    | 58.2    |
| Bull Creek at Ash Hill, NC                    | 35               | 35    | 100  | 22           | 9     | 40.9    | 22                     | 40          | 60       | 47.27    | 55                  | 29    | 52.7    |

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| Station Name                                  | Habitat cover by category count (percent) |            |                           |                   |              |    | Canopy Closure along streambanks |                                |                                |
|---|---|------------|---------------------------|-------------------|--------------|----|----------------------------------|--------------------------------|--------------------------------|
|   | N   | Boulders   | Overhanging<br>vegetation | Undercut<br>banks | Woody debris | N  | min.<br>densiometer<br>reading   | max.<br>densiometer<br>reading | mean<br>densiometer<br>reading |
| Hogan Creek at SR 2038 near Siloam, NC        | 11  | 2 (3.6%)   | 6 (10.9%)                 | 3 (13.6%)         | 12 (21.8%)   | 22 | 35.29                            | 100                            | 93.32                          |
| Hogan Creek at SR 2038 near Siloam, NC        | 11  | 4 (7.3%)   | 11(20%)                   | 3 (13.6%)         | 13 (23.6%)   | 21 | 47.06                            | 100                            | 96.08                          |
| Hogan Creek at SR 2038 near Siloam, NC        | 11  | 2(3.6%)    | 7 (12.7%)                 | 4 (18.2%)         | 11(20%)      | 21 | 64.71                            | 100                            | 96.92                          |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11  | 25 (45.5%) | 5 (9.1%)                  | 2 (9.1%)          | 7 (12.7%)    | 21 | 0                                | 100                            | 68.35                          |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11  | 2(3.6%)    | 5 (9.1%)                  | 3 (13.6%)         | 5 (9.1%)     | 22 | 5.88                             | 100                            | 64.97                          |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11  | 10(18.2%)  | 4 (7.3%)                  | 3 (13.6%)         | 1 (1.8%)     | 22 | 0                                | 100                            | 70.05                          |
| Bull Creek at Ash Hill, NC                    | 11  | 14(25.5%)  | 9 (16.4%)                 | 2 (9.1%)          | 9 (16.4%)    | 22 | 11.77                            | 100                            | 90.64                          |
| Bull Creek at Ash Hill, NC                    | 11  | 7 (12.7%)  | 13 (23.6%)                | 1 (4.5%)          | 17 (30.9%)   | 22 | 11.77                            | 100                            | 89.84                          |
| Bull Creek at Ash Hill, NC                    | 11  | 20(36.4%)  | 8 (14.5%)                 | 4 (18.2%)         | 3 (5.5%)     | 22 | 11.77                            | 100                            | 87.17                          |

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| Open canopy angle                             |    |      |      |      | Reach                                      |   |
|---|----|------|------|------|--|---|
| Station Name                                  | N  | min. | max. | mean | wetted channel<br>volume (m <sup>3</sup> ) | wetted channel surface area (m <sup>2</sup> ) |
| Hogan Creek at SR 2038 near Siloam, NC        | 10 | 0    | 30   | 3.0  | 94   | 553   |
| Hogan Creek at SR 2038 near Siloam, NC        | 10 | 0    | 20   | 2.5  | 183  | 798   |
| Hogan Creek at SR 2038 near Siloam, NC        | 11 | 0    | 50   | 4.6  | 126  | 657   |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11 | 0    | 130  | 59.6 | 326  | 1092  |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11 | 0    | 100  | 58.0 | 365  | 1128  |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11 | 0    | 110  | 64.1 | 426  | 1201  |
| Bull Creek at Ash Hill, NC                    | 11 | 0    | 60   | 17.7 | 107  | 665   |
| Bull Creek at Ash Hill, NC                    | 11 | 0    | 75   | 10.5 | 107  | 682   |
| Bull Creek at Ash Hill, NC                    | 11 | 0    | 85   | 16.4 | 98   | 628   |

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| Station Name                                  | Wetted channel perimeter |      |     |            |             | Wetted channel cross-sectional area |                           |                          | Wetted channel shape $[(d/d_{max})^{w/d}]$<br>where:<br>w = wetted channel width at transect<br>d = mean depth at transect<br>dmax = maximum depth at transect |    |      |       |       |
|---|--------------------------|------|-----|------------|-------------|-------------------------------------|---------------------------|--------------------------|--|----|------|-------|-------|
|   | N                        | min. | (m) | max<br>(m) | mean<br>(m) | N                                   | min.<br>(m <sup>2</sup> ) | max<br>(m <sup>2</sup> ) | mean<br>(m <sup>2</sup> )  | N  | min. | max.  | mean  |
| Hogan Creek at SR 2038 near Siloam, NC        | 11                       | 1.28 |     | 6.63       | 4.03        | 11                                  | 0.09                      | 1.61                     | 0.63   | 11 | 5.39 | 67.04 | 14.56 |
| Hogan Creek at SR 2038 near Siloam, NC        | 11                       | 4.34 |     | 8.04       | 5.78        | 11                                  | 0.2                       | 2.38                     | 1.24   | 11 | 5.66 | 34.27 | 14.72 |
| Hogan Creek at SR 2038 near Siloam, NC        | 11                       | 1.92 |     | 6.43       | 4.76        | 11                                  | 0.2                       | 2.59                     | 0.88   | 11 | 6.44 | 32.38 | 13.23 |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11                       | 6.28 |     | 10.53      | 7.88        | 11                                  | 1.22                      | 4.41                     | 2.16   | 11 | 5.99 | 39.61 | 14.81 |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11                       | 6.77 |     | 10.36      | 8.16        | 11                                  | 1.73                      | 3.78                     | 2.4  | 11 | 4.98 | 20.98 | 10.91 |
| Pauls Creek above SR 1625 near Pine Ridge, NC | 11                       | 6.36 |     | 10.24      | 8.72        | 11                                  | 1.42                      | 5.15                     | 2.75   | 11 | 6.43 | 21.22 | 11.85 |
| Bull Creek at Ash Hill, NC                    | 11                       | 2.4  |     | 7.91       | 4.76        | 11                                  | 0.22                      | 1.7                      | 0.7  | 11 | 5.8  | 49.88 | 20.69 |
| Bull Creek at Ash Hill, NC                    | 11                       | 3.52 |     | 6.54       | 4.86        | 11                                  | 0.34                      | 1.62                     | 0.7  | 11 | 2.48 | 29.98 | 13.57 |
| Bull Creek at Ash Hill, NC                    | 11                       | 3.58 |     | 5.96       | 4.5         | 11                                  | 0.33                      | 1.23                     | 0.64   | 11 | 6.16 | 52.32 | 17.89 |

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| Flow stability index<br>[DepthTranMax / BFDepthTran]<br>where:<br>DepthTranMax = maximum water depth recorded<br>for transect<br>BFDepthTran = average bankfull depth at transect |                          |                  |    |      |      |      |
|---|--------------------------|------------------|----|------|------|------|
| Station Name  | Average hydraulic radius | Froude<br>number | N  | min. | max. | mean |
| Hogan Creek at SR 2038 near Siloam, NC  | 0.16                     | 0.12             | 11 | 0.04 | 0.43 | 0.17 |
| Hogan Creek at SR 2038 near Siloam, NC  | 0.22                     | 0.1              | 11 | 0.01 | 0.32 | 0.15 |
| Hogan Creek at SR 2038 near Siloam, NC  | 0.18                     | 0.11             | 11 | 0.14 | 0.54 | 0.31 |
| Pauls Creek above SR 1625 near Pine Ridge, NC   | 0.27                     | 0.2              | 11 | 0.11 | 0.39 | 0.21 |
| Pauls Creek above SR 1625 near Pine Ridge, NC   | 0.29                     | 0.24             | 11 | 0.14 | 0.25 | 0.20 |
| Pauls Creek above SR 1625 near Pine Ridge, NC   | 0.32                     | 0.15             | 11 | 0.13 | 0.6  | 0.24 |
| Bull Creek at Ash Hill, NC  | 0.15                     | 0.17             | 11 | 0.05 | 0.34 | 0.13 |
| Bull Creek at Ash Hill, NC  | 0.14                     | 0.21             | 11 | 0.06 | 0.53 | 0.15 |
| Bull Creek at Ash Hill, NC  | 0.14                     | 0.13             | 11 | 0.05 | 0.24 | 0.12 |