# Appendix for Model 03060103

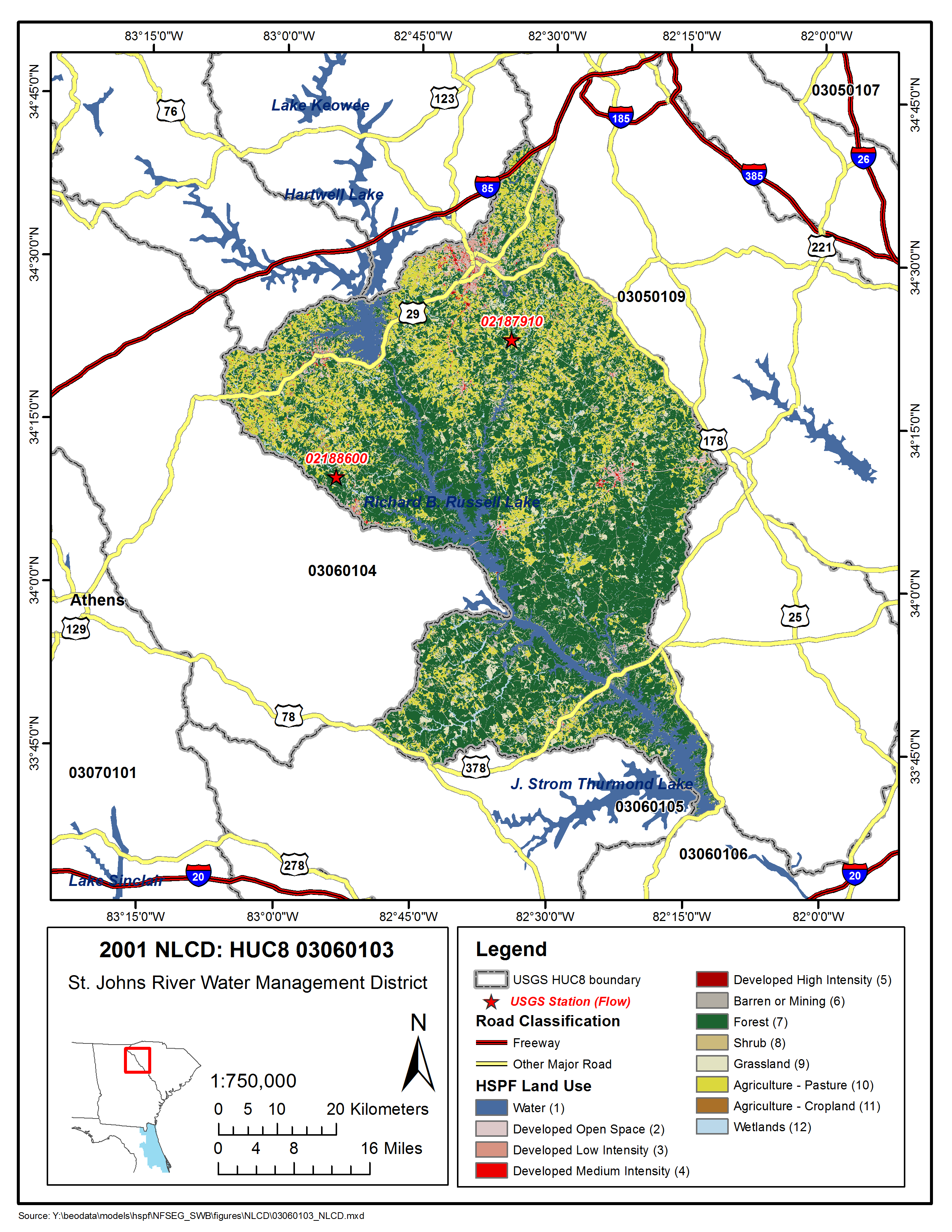


Figure 03060103-1: Land Cover from the National Land Cover Database.

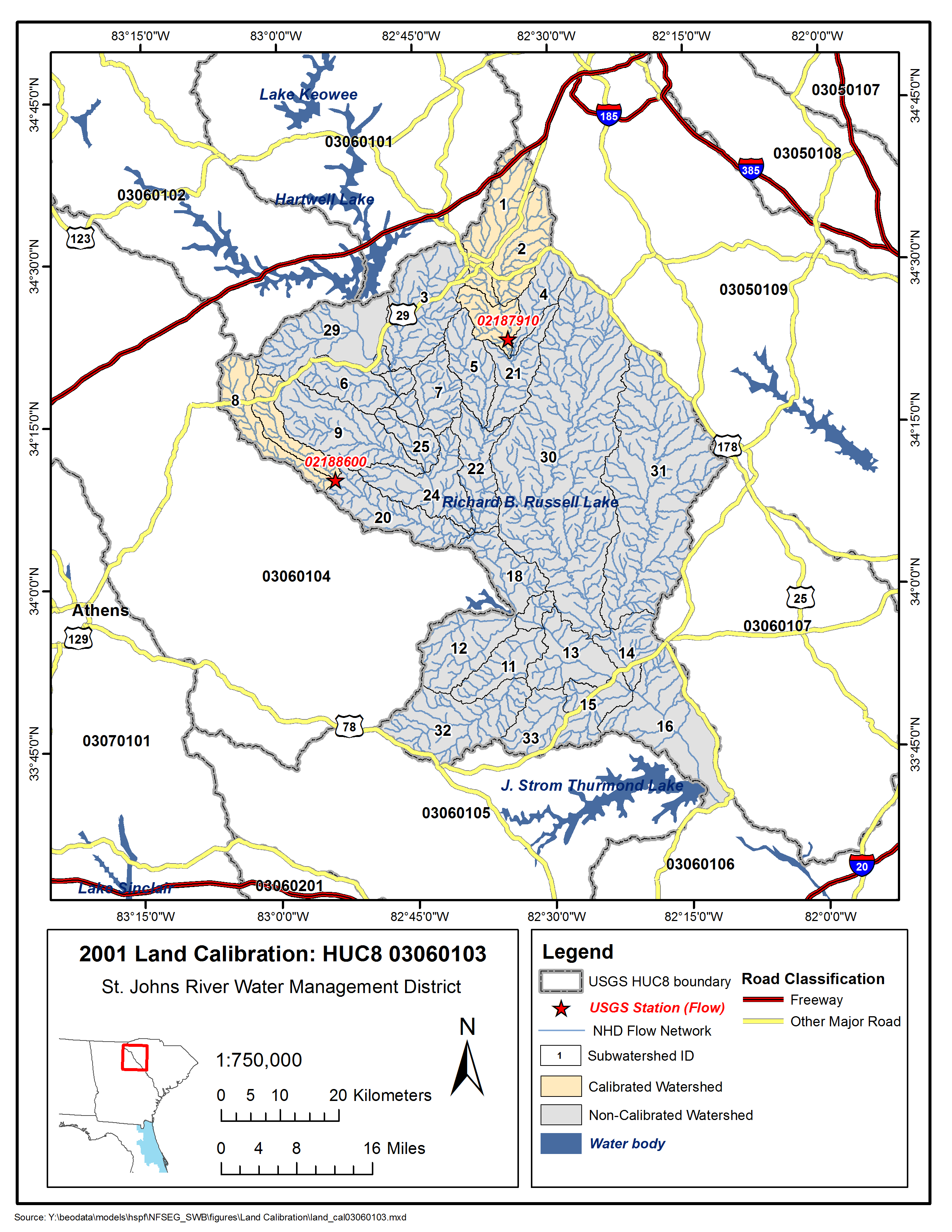


Figure 03060103-2: Calibrated sub-watersheds.

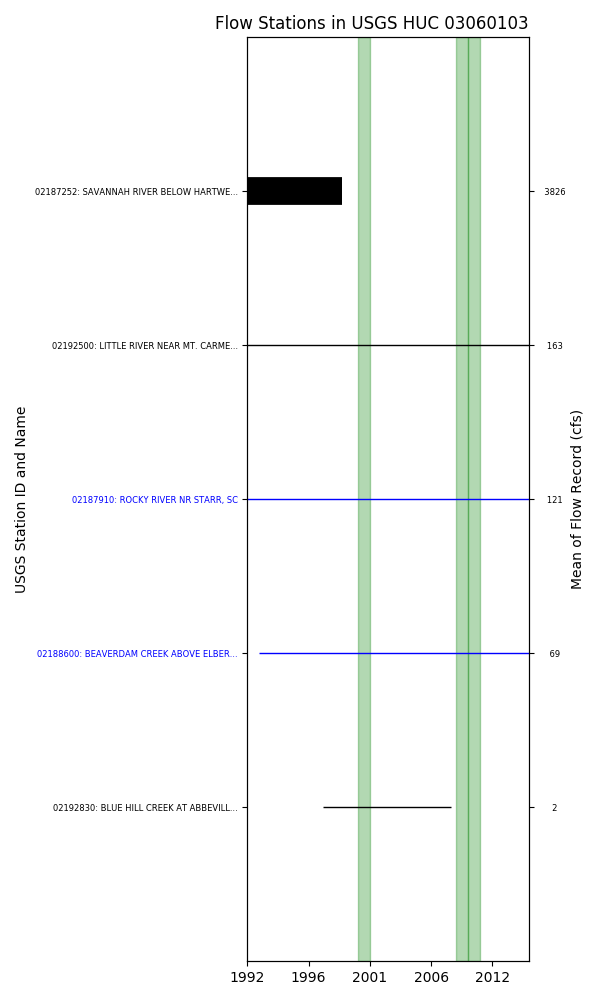


Figure 03060103-3: Station period of record. Blue color identifies gauges used for calibration.

## HSPF Reach 08, USGS Gauge 02188600

Table 03060103-1: Comparison Statistics Between HSPF Reach 08 and USGS Gauge 02188600.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -18.41 |
| Standard error | 34.96 |
| Relative bias | -0.25 |
| Relative standard error | 0.53 |
| Nash-Sutcliffe coefficient | 0.72 |
| Coefficient of efficiency | 0.57 |
| Index of agreement | 0.76 |

Table 03060103-2: Hydrologic Indices Between USGS Gauge 02188600 and HSPF Reach 08.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02188600 | Simulated Reach 08 | Percent Difference |
| MA1: Mean, all daily flows | 152.32 | 109.02 | -28.43 |
| MA2: Median, all daily flows | 120.00 | 88.32 | -26.40 |
| MA3: CV, all daily flows | 12.19 | 10.21 | -16.27 |
| MA4: CV, log of all daily flows | 53.67 | 52.20 | -2.73 |
| MA5: Mean daily flow / median daily flow | 1.27 | 1.23 | -2.76 |
| MA9: (Q10 - Q90) / median daily flow | 1.60 | 1.65 | 2.97 |
| MA10: (Q20 - Q80) / median daily flow | 0.76 | 0.90 | 19.78 |
| MA11: (Q25 - Q75) / median daily flow | 0.57 | 0.75 | 29.88 |
| MA12: Mean monthly flow, January | 28.23 | 19.59 | -30.58 |
| MA13: Mean monthly flow, February | 21.45 | 16.55 | -22.84 |
| MA14: Mean monthly flow, March | 30.86 | 20.91 | -32.22 |
| MA15: Mean monthly flow, April | 22.29 | 16.13 | -27.63 |
| MA16: Mean monthly flow, May | 19.04 | 14.35 | -24.65 |
| MA17: Mean monthly flow, June | 3.36 | 4.60 | 36.75 |
| MA18: Mean monthly flow, July | 0.00 | 0.00 |  |
| MA19: Mean monthly flow, August | 0.00 | 0.00 |  |
| MA20: Mean monthly flow, September | 0.00 | 0.00 |  |
| MA21: Mean monthly flow, October | 0.00 | 0.00 |  |
| MA22: Mean monthly flow, November | 0.00 | 0.00 |  |
| MA23: Mean monthly flow, December | 22.91 | 15.14 | -33.90 |
| ML1: Mean minimum monthly flow, January | 90.50 | 65.65 | -27.46 |
| ML2: Mean minimum monthly flow, February | 84.50 | 67.09 | -20.60 |
| ML3: Mean minimum monthly flow, March | 87.00 | 64.37 | -26.01 |
| ML4: Mean minimum monthly flow, April | 79.00 | 57.89 | -26.72 |
| ML5: Mean minimum monthly flow, May | 69.00 | 56.25 | -18.48 |
| ML6: Mean minimum monthly flow, June | 26.00 | 39.56 | 52.15 |
| ML7: Mean minimum monthly flow, July | 0.00 | 0.00 |  |
| ML8: Mean minimum monthly flow, August | 0.00 | 0.00 |  |
| ML9: Mean minimum monthly flow, September | 0.00 | 0.00 |  |
| ML10: Mean minimum monthly flow, October | 0.00 | 0.00 |  |
| ML11: Mean minimum monthly flow, November | 0.00 | 0.00 |  |
| ML12: Mean minimum monthly flow, December | 76.00 | 66.96 | -11.89 |
| ML13: CV of minimum monthly flows | 29.58 | 35.09 | 18.62 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.06 | 0.07 | 10.74 |
| ML15: Mean minimum annual flow / mean annual flow | 0.05 | 0.06 | 9.59 |
| ML16: Median minimum annual flow / median annual flow | 0.00 | 0.00 |  |
| ML20: Ratio of baseflow volume to total flow volume | 0.62 | 0.63 | 0.52 |
| ML22: Mean annual minimum flow divided by catchment area | 83333.41 | 83333.39 | -0.00 |
| RA1: Mean of positive changes from one day to next (rise rate) | 88.73 | 54.82 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 186.52 | 180.22 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 32.72 | 17.99 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 202.41 | 203.23 |  |
| RA5: Ratio of days that are higher than previous day | 0.26 | 0.25 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.20 | 0.16 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.09 | 0.07 |  |
| RA8: Number of flow reversals from one day to the next | 8.50 | 7.67 |  |
| RA9: CV, number of flow reversals from one day to the next | 233.60 | 233.81 |  |

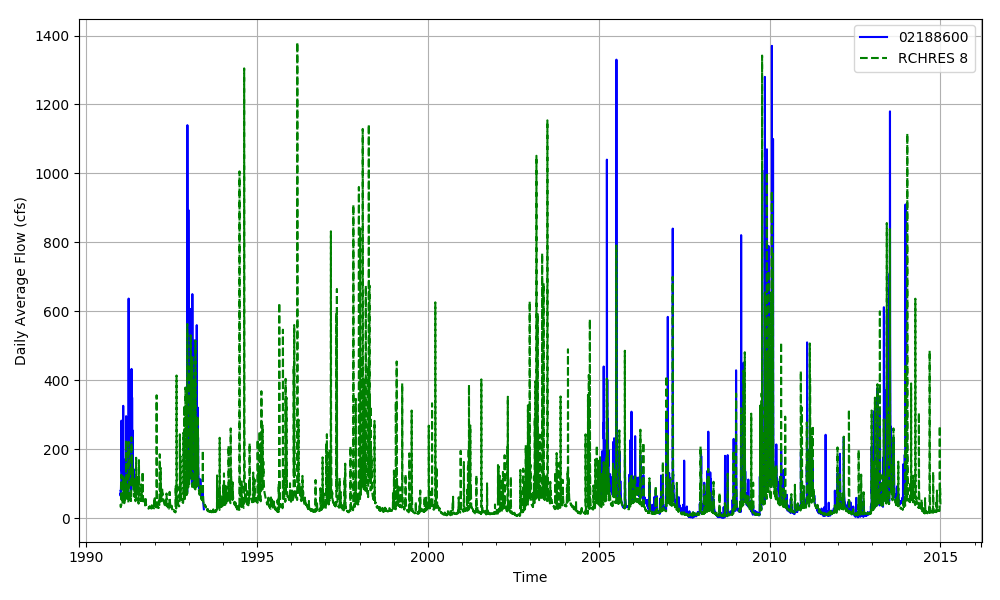


Figure 03060103-4: Daily flow for HSFP reach 08 and USGS station 02188600.

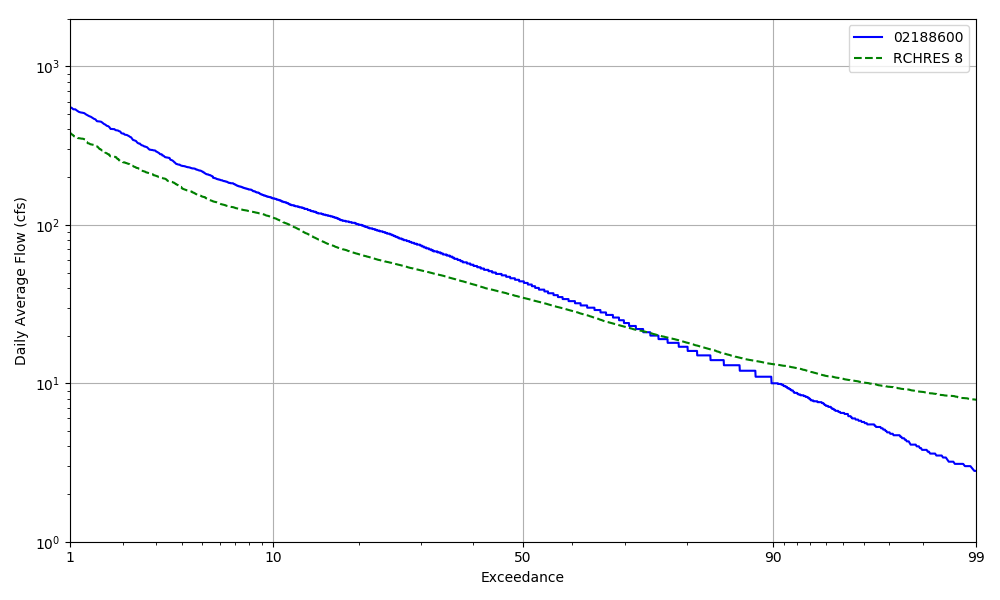


Figure 03060103-5: Daily exceedance for HSFP reach 08 and USGS station 02188600.

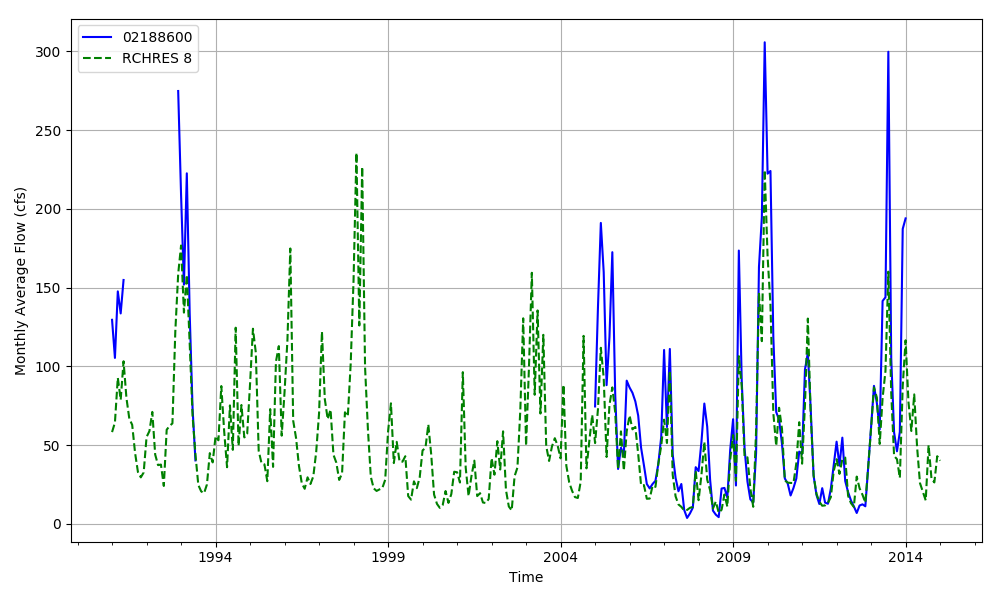


Figure 03060103-6: Monthly flow for HSFP reach 08 and USGS station 02188600.

## HSPF Reach 16, USGS Gauge 02187910

Table 03060103-3: Comparison Statistics Between HSPF Reach 16 and USGS Gauge 02187910.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | 3.61 |
| Standard error | 41.02 |
| Relative bias | 0.03 |
| Relative standard error | 0.43 |
| Nash-Sutcliffe coefficient | 0.82 |
| Coefficient of efficiency | 0.64 |
| Index of agreement | 0.82 |

Table 03060103-4: Hydrologic Indices Between USGS Gauge 02187910 and HSPF Reach 16.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02187910 | Simulated Reach 16 | Percent Difference |
| MA1: Mean, all daily flows | 120.75 | 124.14 | 2.80 |
| MA2: Median, all daily flows | 79.00 | 77.79 | -1.53 |
| MA3: CV, all daily flows | 122.65 | 117.02 | -4.60 |
| MA4: CV, log of all daily flows | 77.83 | 84.45 | 8.51 |
| MA5: Mean daily flow / median daily flow | 1.53 | 1.60 | 4.40 |
| MA9: (Q10 - Q90) / median daily flow | 2.44 | 2.98 | 21.80 |
| MA10: (Q20 - Q80) / median daily flow | 1.32 | 1.54 | 16.82 |
| MA11: (Q25 - Q75) / median daily flow | 1.00 | 1.18 | 18.04 |
| MA12: Mean monthly flow, January | 171.33 | 164.75 | -3.84 |
| MA13: Mean monthly flow, February | 168.92 | 167.33 | -0.94 |
| MA14: Mean monthly flow, March | 171.82 | 168.62 | -1.87 |
| MA15: Mean monthly flow, April | 132.29 | 131.34 | -0.72 |
| MA16: Mean monthly flow, May | 86.19 | 87.96 | 2.06 |
| MA17: Mean monthly flow, June | 74.29 | 80.75 | 8.70 |
| MA18: Mean monthly flow, July | 62.36 | 85.60 | 37.26 |
| MA19: Mean monthly flow, August | 73.08 | 75.84 | 3.78 |
| MA20: Mean monthly flow, September | 43.61 | 52.47 | 20.33 |
| MA21: Mean monthly flow, October | 60.84 | 73.16 | 20.26 |
| MA22: Mean monthly flow, November | 82.79 | 87.02 | 5.11 |
| MA23: Mean monthly flow, December | 128.98 | 119.08 | -7.68 |
| ML1: Mean minimum monthly flow, January | 87.00 | 85.95 | -1.21 |
| ML2: Mean minimum monthly flow, February | 95.18 | 92.81 | -2.49 |
| ML3: Mean minimum monthly flow, March | 82.29 | 89.41 | 8.66 |
| ML4: Mean minimum monthly flow, April | 80.95 | 74.84 | -7.55 |
| ML5: Mean minimum monthly flow, May | 58.75 | 55.67 | -5.24 |
| ML6: Mean minimum monthly flow, June | 44.22 | 43.03 | -2.68 |
| ML7: Mean minimum monthly flow, July | 36.25 | 45.13 | 24.49 |
| ML8: Mean minimum monthly flow, August | 30.98 | 38.06 | 22.84 |
| ML9: Mean minimum monthly flow, September | 29.95 | 38.17 | 27.46 |
| ML10: Mean minimum monthly flow, October | 36.86 | 41.99 | 13.92 |
| ML11: Mean minimum monthly flow, November | 49.57 | 51.68 | 4.26 |
| ML12: Mean minimum monthly flow, December | 68.05 | 65.40 | -3.88 |
| ML13: CV of minimum monthly flows | 58.75 | 69.12 | 17.66 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.33 | 0.37 | 11.21 |
| ML15: Mean minimum annual flow / mean annual flow | 0.24 | 0.27 | 10.23 |
| ML16: Median minimum annual flow / median annual flow | 0.32 | 0.33 | 4.05 |
| ML20: Ratio of baseflow volume to total flow volume | 0.55 | 0.55 | -0.82 |
| ML22: Mean annual minimum flow divided by catchment area | 0.27 | 0.31 | 16.21 |
| RA1: Mean of positive changes from one day to next (rise rate) | 72.72 | 76.23 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 257.15 | 328.07 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 33.07 | 32.74 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 349.05 | 399.86 |  |
| RA5: Ratio of days that are higher than previous day | 0.29 | 0.30 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.17 | 0.11 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.08 | 0.08 |  |
| RA8: Number of flow reversals from one day to the next | 97.12 | 100.25 |  |
| RA9: CV, number of flow reversals from one day to the next | 36.85 | 35.75 |  |

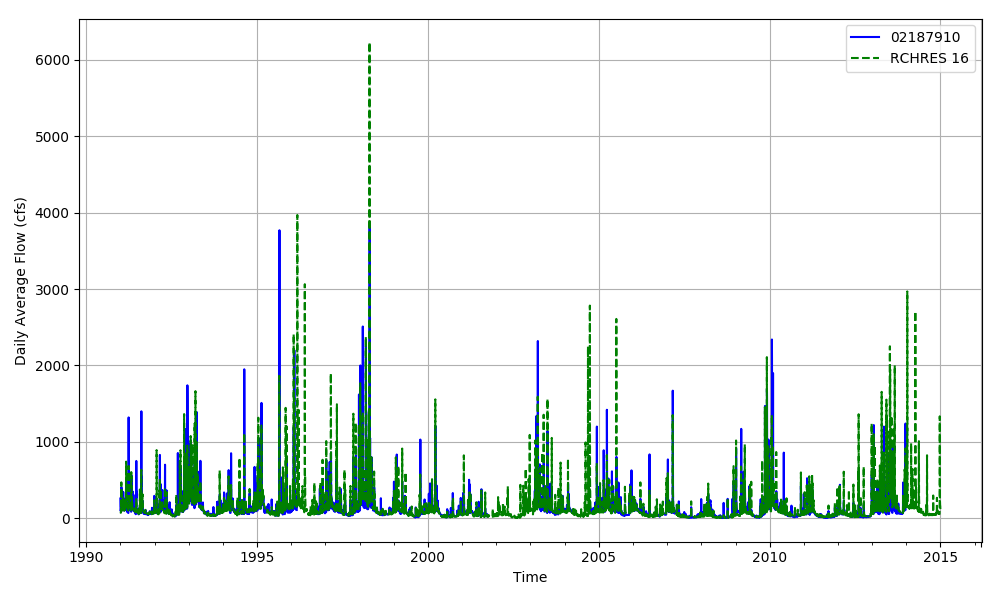


Figure 03060103-7: Daily flow for HSFP reach 16 and USGS station 02187910.

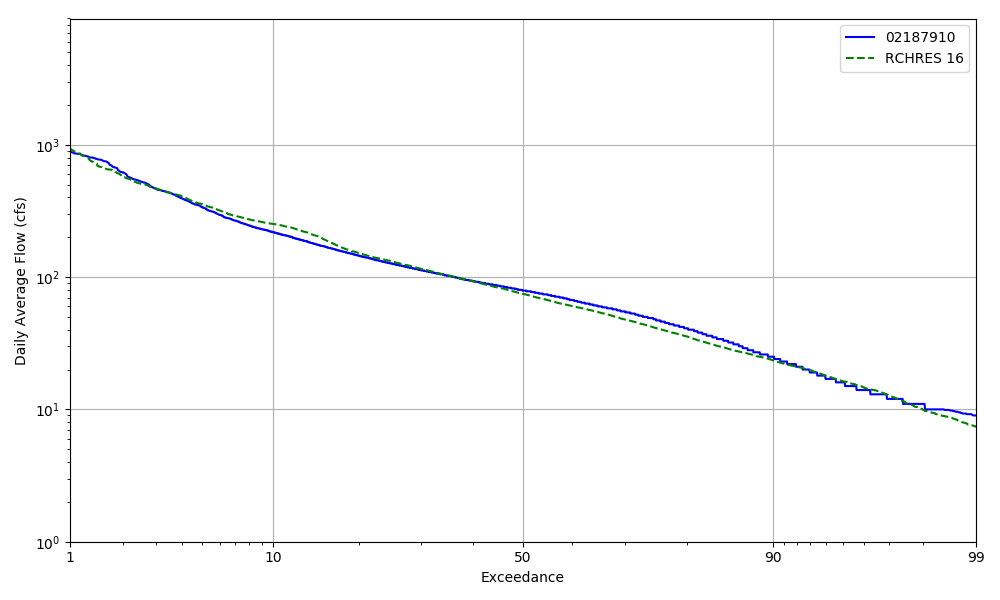


Figure 03060103-8: Daily exceedance for HSFP reach 16 and USGS station 02187910.

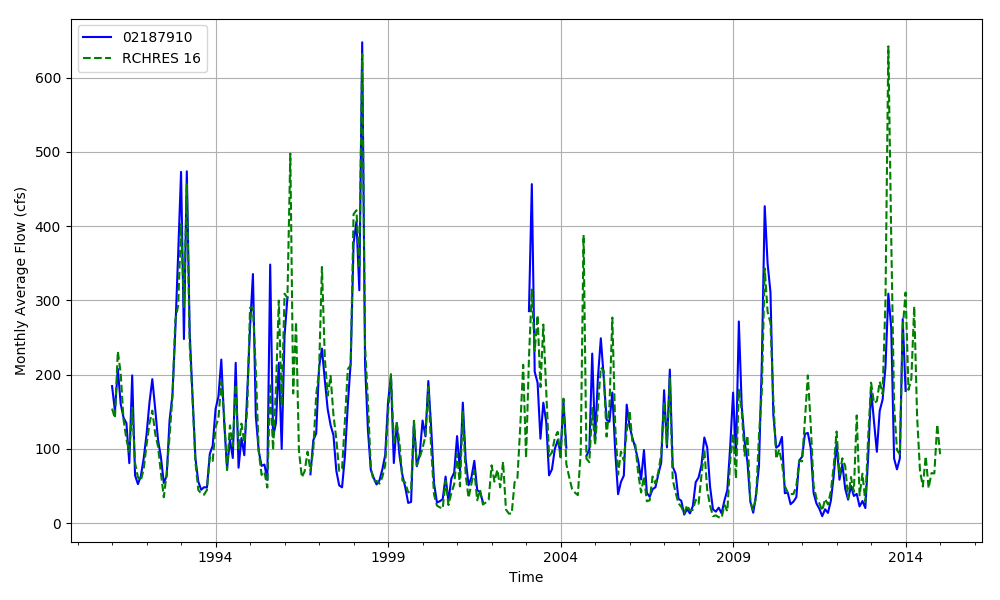


Figure 03060103-9: Monthly flow for HSFP reach 16 and USGS station 02187910.