# Appendix for Model 03060203

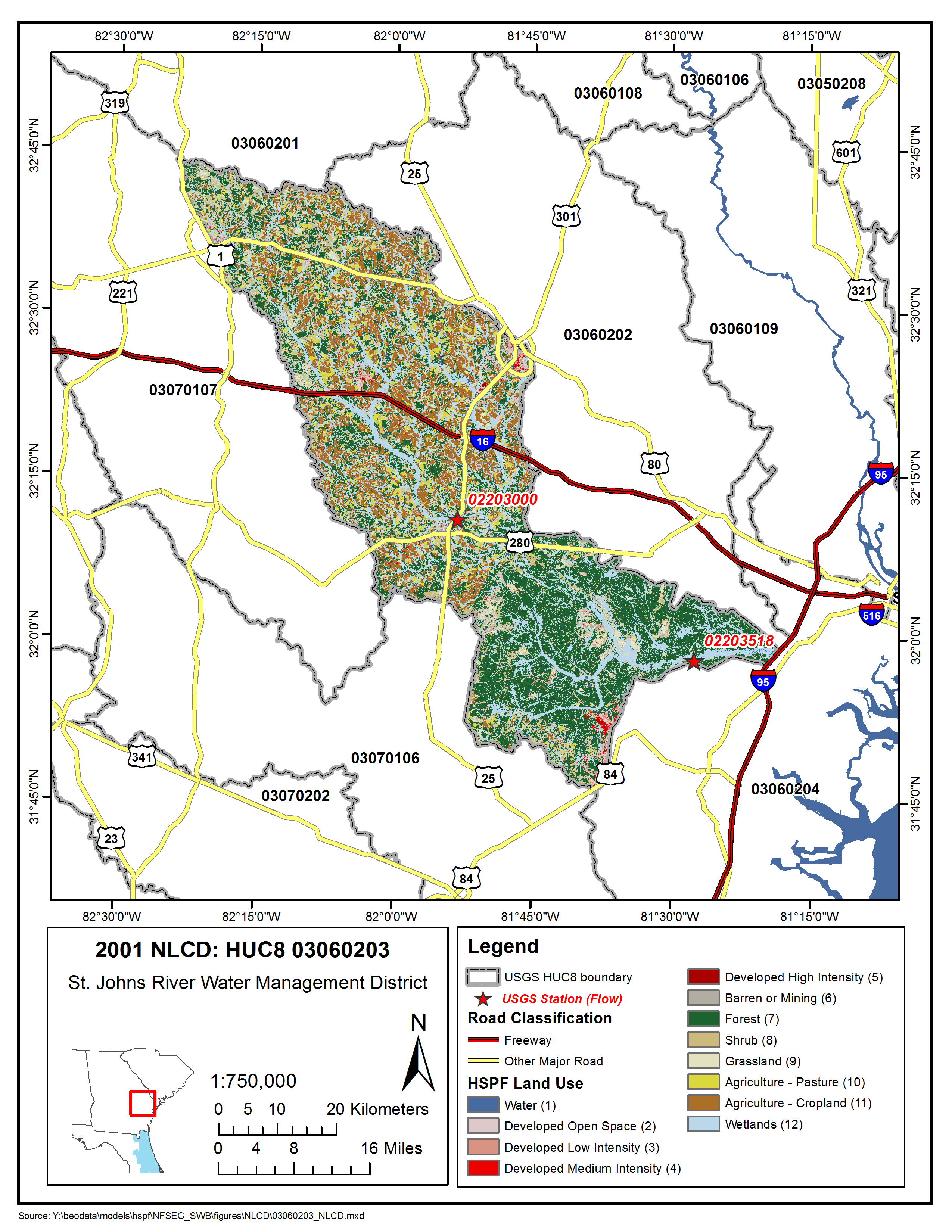


Figure 03060203-1: Land Cover from the National Land Cover Database.

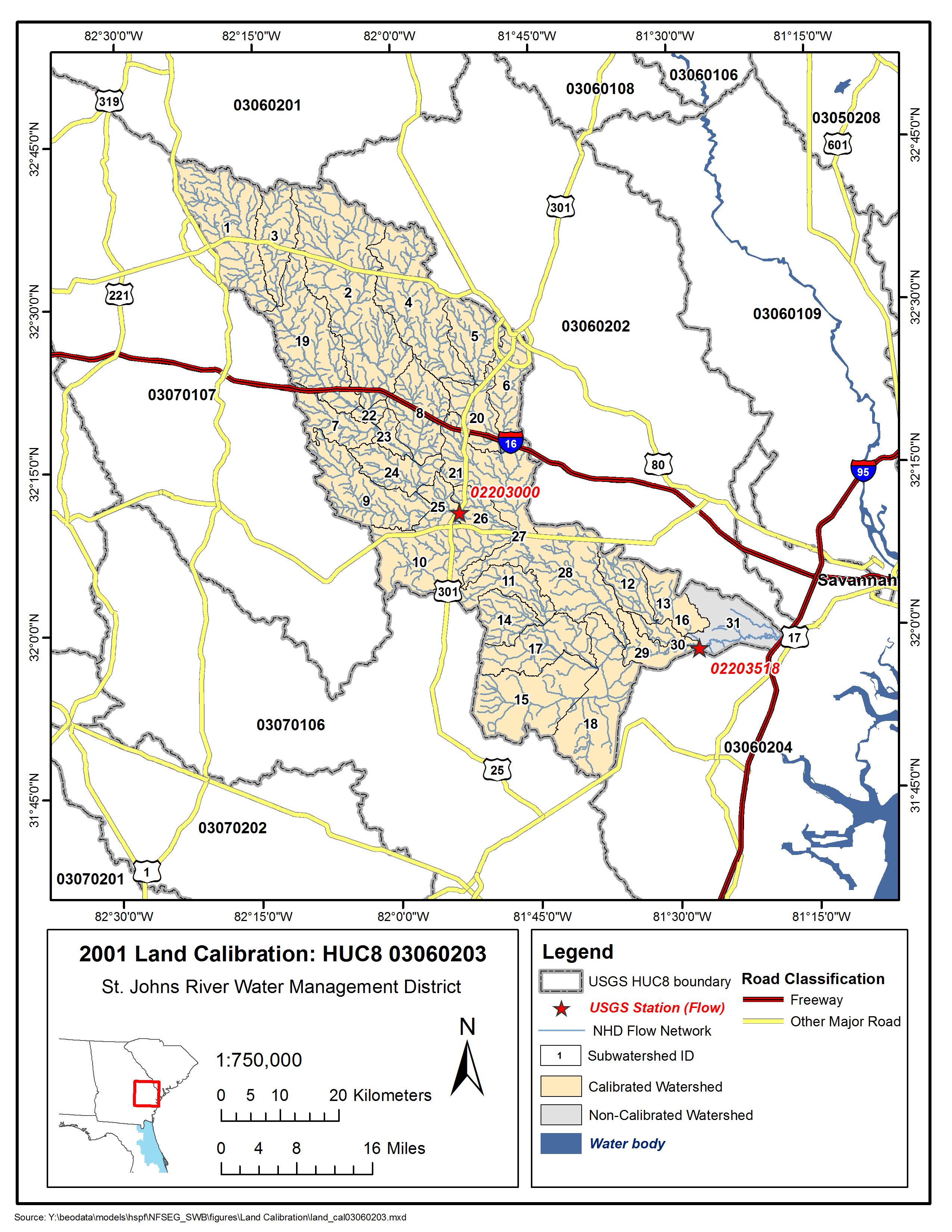


Figure 03060203-2: Calibrated sub-watersheds.

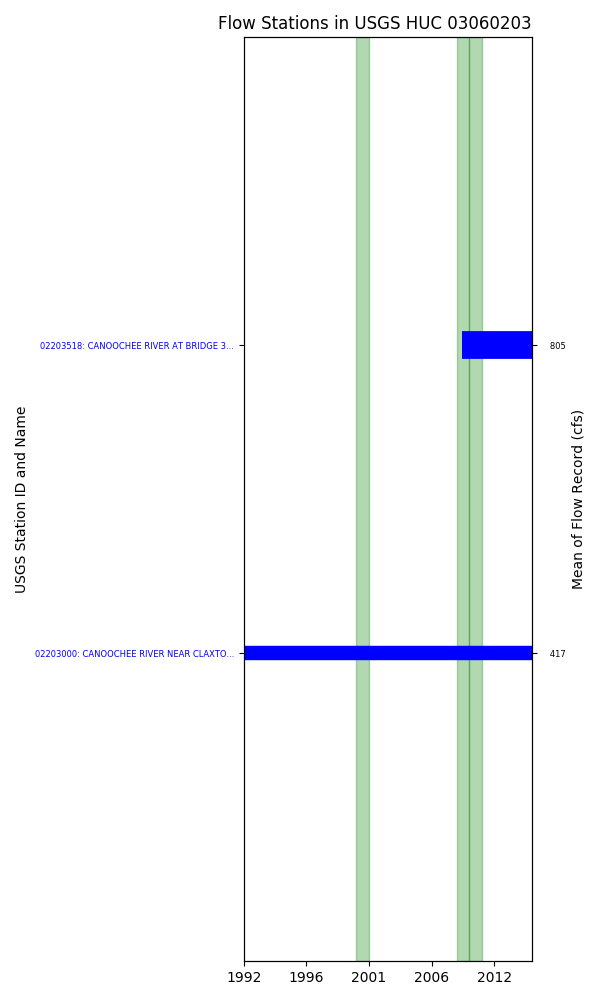


Figure 03060203-3: Station period of record. Blue color identifies gauges used for calibration.

## HSPF Reach 25, USGS Gauge 02203000

Table 03060203-1: Comparison Statistics Between HSPF Reach 25 and USGS Gauge 02203000.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | 21.65 |
| Standard error | 150.19 |
| Relative bias | 0.05 |
| Relative standard error | 0.26 |
| Nash-Sutcliffe coefficient | 0.93 |
| Coefficient of efficiency | 0.77 |
| Index of agreement | 0.88 |

Table 03060203-2: Hydrologic Indices Between USGS Gauge 02203000 and HSPF Reach 25.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02203000 | Simulated Reach 25 | Percent Difference |
| MA1: Mean, all daily flows | 436.29 | 458.08 | 5.00 |
| MA2: Median, all daily flows | 123.00 | 198.68 | 61.53 |
| MA3: CV, all daily flows | 138.31 | 118.06 | -14.64 |
| MA4: CV, log of all daily flows | 141.08 | 124.15 | -12.00 |
| MA5: Mean daily flow / median daily flow | 3.55 | 2.31 | -35.00 |
| MA9: (Q10 - Q90) / median daily flow | 9.73 | 6.00 | -38.38 |
| MA10: (Q20 - Q80) / median daily flow | 5.67 | 3.62 | -36.13 |
| MA11: (Q25 - Q75) / median daily flow | 4.30 | 2.76 | -35.73 |
| MA12: Mean monthly flow, January | 656.49 | 693.86 | 5.69 |
| MA13: Mean monthly flow, February | 913.60 | 926.92 | 1.46 |
| MA14: Mean monthly flow, March | 943.60 | 886.50 | -6.05 |
| MA15: Mean monthly flow, April | 527.24 | 497.96 | -5.55 |
| MA16: Mean monthly flow, May | 199.06 | 183.62 | -7.75 |
| MA17: Mean monthly flow, June | 241.50 | 245.60 | 1.70 |
| MA18: Mean monthly flow, July | 233.43 | 302.67 | 29.66 |
| MA19: Mean monthly flow, August | 386.36 | 405.14 | 4.86 |
| MA20: Mean monthly flow, September | 187.58 | 247.64 | 32.02 |
| MA21: Mean monthly flow, October | 210.99 | 240.70 | 14.08 |
| MA22: Mean monthly flow, November | 173.54 | 242.27 | 39.60 |
| MA23: Mean monthly flow, December | 389.88 | 440.25 | 12.92 |
| ML1: Mean minimum monthly flow, January | 255.76 | 273.73 | 7.03 |
| ML2: Mean minimum monthly flow, February | 385.87 | 384.68 | -0.31 |
| ML3: Mean minimum monthly flow, March | 355.19 | 321.79 | -9.40 |
| ML4: Mean minimum monthly flow, April | 156.36 | 156.79 | 0.28 |
| ML5: Mean minimum monthly flow, May | 48.18 | 52.88 | 9.77 |
| ML6: Mean minimum monthly flow, June | 31.18 | 47.33 | 51.77 |
| ML7: Mean minimum monthly flow, July | 69.65 | 130.57 | 87.47 |
| ML8: Mean minimum monthly flow, August | 61.62 | 129.18 | 109.64 |
| ML9: Mean minimum monthly flow, September | 27.74 | 52.20 | 88.17 |
| ML10: Mean minimum monthly flow, October | 32.42 | 55.33 | 70.68 |
| ML11: Mean minimum monthly flow, November | 72.25 | 113.66 | 57.32 |
| ML12: Mean minimum monthly flow, December | 162.37 | 200.44 | 23.44 |
| ML13: CV of minimum monthly flows | 160.20 | 142.41 | -11.11 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.05 | 0.04 | -20.02 |
| ML15: Mean minimum annual flow / mean annual flow | 0.01 | 0.02 | 38.52 |
| ML16: Median minimum annual flow / median annual flow | 0.03 | 0.01 | -69.27 |
| ML20: Ratio of baseflow volume to total flow volume | 0.47 | 0.53 | 12.99 |
| ML22: Mean annual minimum flow divided by catchment area | 0.07 | 0.12 | 72.01 |
| RA1: Mean of positive changes from one day to next (rise rate) | 113.39 | 108.92 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 269.12 | 307.38 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 64.34 | 48.28 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 283.39 | 235.93 |  |
| RA5: Ratio of days that are higher than previous day | 0.35 | 0.31 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.15 | 0.16 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.12 | 0.09 |  |
| RA8: Number of flow reversals from one day to the next | 80.62 | 69.71 |  |
| RA9: CV, number of flow reversals from one day to the next | 21.45 | 23.50 |  |

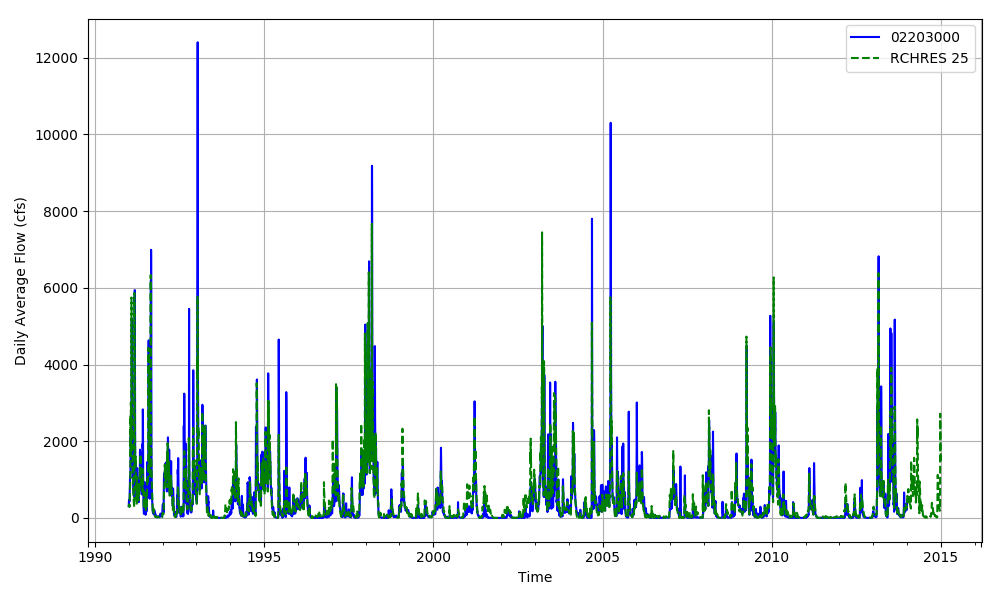


Figure 03060203-4: Daily flow for HSFP reach 25 and USGS station 02203000.

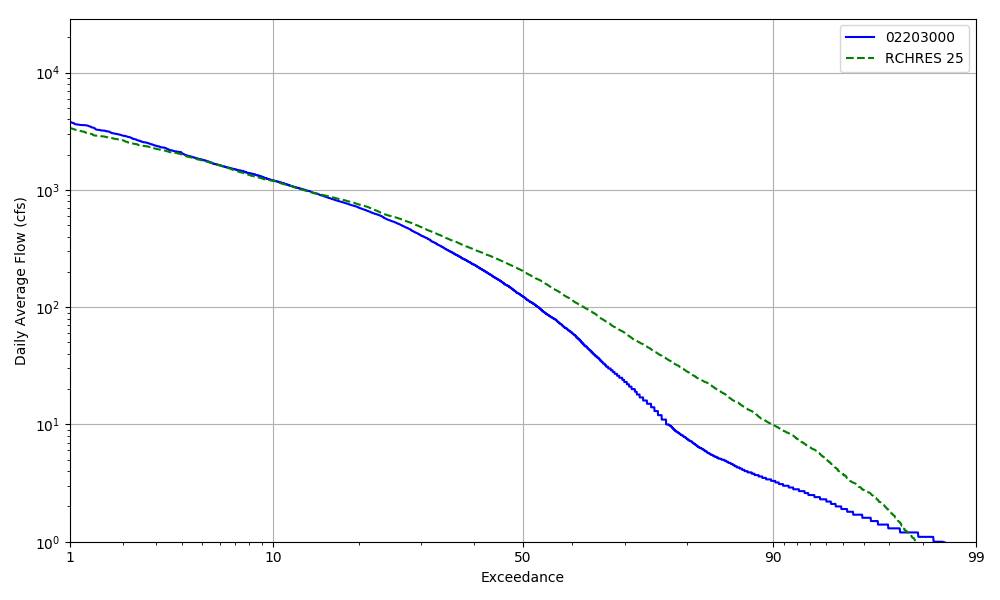


Figure 03060203-5: Daily exceedance for HSFP reach 25 and USGS station 02203000.

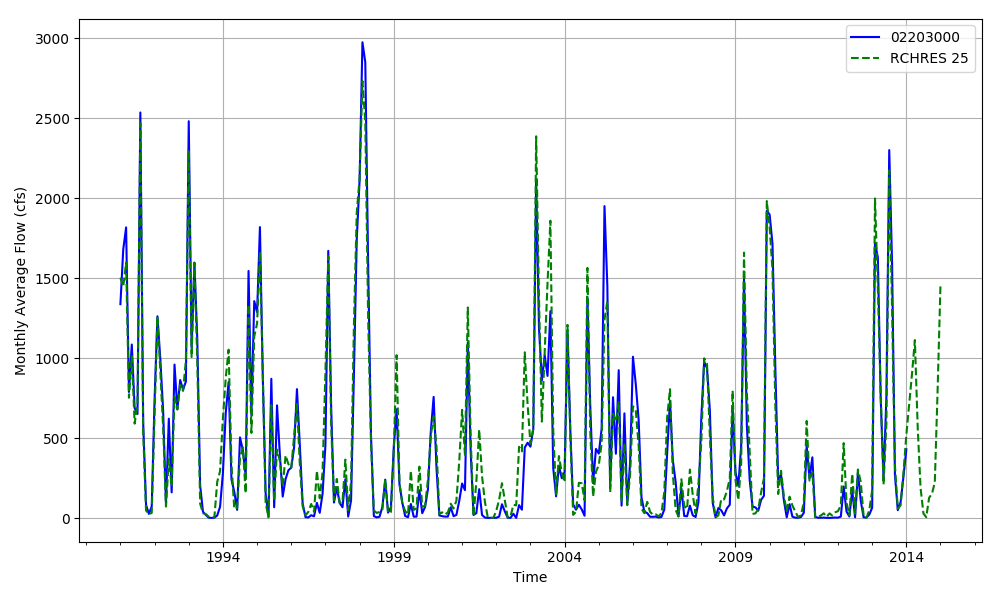


Figure 03060203-6: Monthly flow for HSFP reach 25 and USGS station 02203000.

## HSPF Reach 30, USGS Gauge 02203518

Table 03060203-3: Comparison Statistics Between HSPF Reach 30 and USGS Gauge 02203518.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -6.65 |
| Standard error | 310.38 |
| Relative bias | -0.01 |
| Relative standard error | 0.27 |
| Nash-Sutcliffe coefficient | 0.93 |
| Coefficient of efficiency | 0.79 |
| Index of agreement | 0.89 |

Table 03060203-4: Hydrologic Indices Between USGS Gauge 02203518 and HSPF Reach 30.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02203518 | Simulated Reach 30 | Percent Difference |
| MA1: Mean, all daily flows | 759.97 | 750.40 | -1.26 |
| MA2: Median, all daily flows | 162.00 | 184.85 | 14.11 |
| MA3: CV, all daily flows | 118.58 | 118.94 | 0.31 |
| MA4: CV, log of all daily flows | 158.92 | 160.08 | 0.73 |
| MA5: Mean daily flow / median daily flow | 4.69 | 4.06 | -13.47 |
| MA9: (Q10 - Q90) / median daily flow | 13.98 | 10.50 | -24.88 |
| MA10: (Q20 - Q80) / median daily flow | 6.19 | 5.14 | -17.03 |
| MA11: (Q25 - Q75) / median daily flow | 4.15 | 3.70 | -10.69 |
| MA12: Mean monthly flow, January | 792.27 | 875.61 | 10.52 |
| MA13: Mean monthly flow, February | 1198.27 | 1383.33 | 15.44 |
| MA14: Mean monthly flow, March | 1104.38 | 1008.47 | -8.69 |
| MA15: Mean monthly flow, April | 577.14 | 440.79 | -23.63 |
| MA16: Mean monthly flow, May | 236.81 | 186.20 | -21.37 |
| MA17: Mean monthly flow, June | 508.41 | 460.39 | -9.45 |
| MA18: Mean monthly flow, July | 793.24 | 723.78 | -8.76 |
| MA19: Mean monthly flow, August | 823.58 | 651.18 | -20.93 |
| MA20: Mean monthly flow, September | 273.35 | 312.87 | 14.46 |
| MA21: Mean monthly flow, October | 103.44 | 120.11 | 16.12 |
| MA22: Mean monthly flow, November | 91.83 | 103.85 | 13.09 |
| MA23: Mean monthly flow, December | 636.11 | 810.18 | 27.36 |
| ML1: Mean minimum monthly flow, January | 559.20 | 408.29 | -26.99 |
| ML2: Mean minimum monthly flow, February | 664.00 | 518.24 | -21.95 |
| ML3: Mean minimum monthly flow, March | 647.00 | 622.77 | -3.74 |
| ML4: Mean minimum monthly flow, April | 322.25 | 314.64 | -2.36 |
| ML5: Mean minimum monthly flow, May | 120.00 | 72.61 | -39.49 |
| ML6: Mean minimum monthly flow, June | 115.80 | 98.44 | -14.99 |
| ML7: Mean minimum monthly flow, July | 363.00 | 254.40 | -29.92 |
| ML8: Mean minimum monthly flow, August | 241.20 | 206.83 | -14.25 |
| ML9: Mean minimum monthly flow, September | 103.20 | 90.12 | -12.68 |
| ML10: Mean minimum monthly flow, October | 47.20 | 45.64 | -3.29 |
| ML11: Mean minimum monthly flow, November | 61.20 | 50.69 | -17.17 |
| ML12: Mean minimum monthly flow, December | 207.20 | 206.96 | -0.12 |
| ML13: CV of minimum monthly flows | 171.93 | 159.42 | -7.28 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.25 | 0.09 | -63.27 |
| ML15: Mean minimum annual flow / mean annual flow | 0.11 | 0.04 | -59.74 |
| ML16: Median minimum annual flow / median annual flow | 0.28 | 0.07 | -75.16 |
| ML20: Ratio of baseflow volume to total flow volume | 0.55 | 0.49 | -10.80 |
| ML22: Mean annual minimum flow divided by catchment area | 0.43 | 0.17 | -61.52 |
| RA1: Mean of positive changes from one day to next (rise rate) | 147.11 | 162.84 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 299.26 | 388.64 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 93.21 | 81.76 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 256.98 | 344.97 |  |
| RA5: Ratio of days that are higher than previous day | 0.35 | 0.33 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.09 | 0.10 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.07 | 0.08 |  |
| RA8: Number of flow reversals from one day to the next | 39.67 | 41.67 |  |
| RA9: CV, number of flow reversals from one day to the next | 45.93 | 50.93 |  |

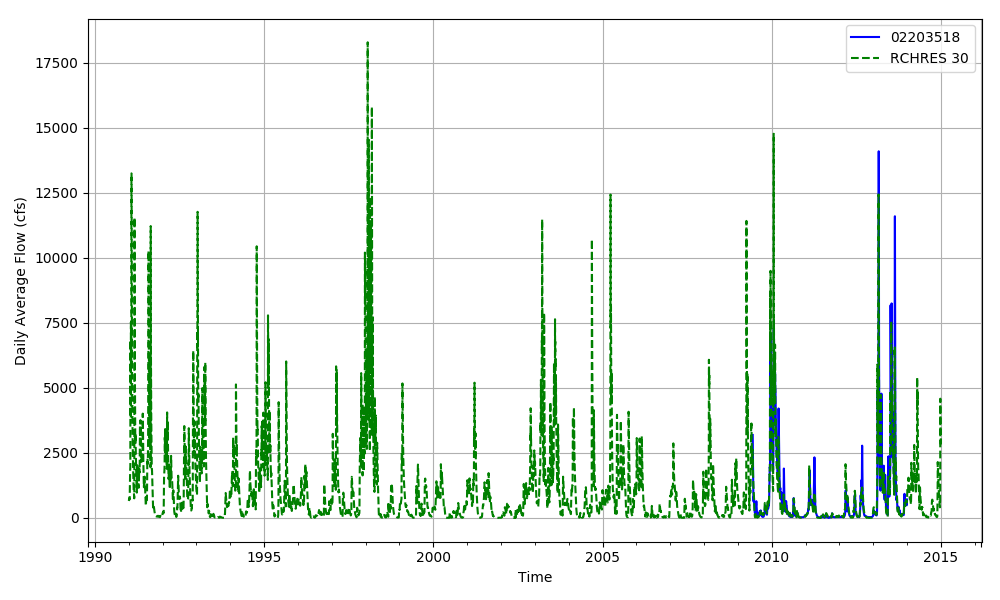


Figure 03060203-7: Daily flow for HSFP reach 30 and USGS station 02203518.

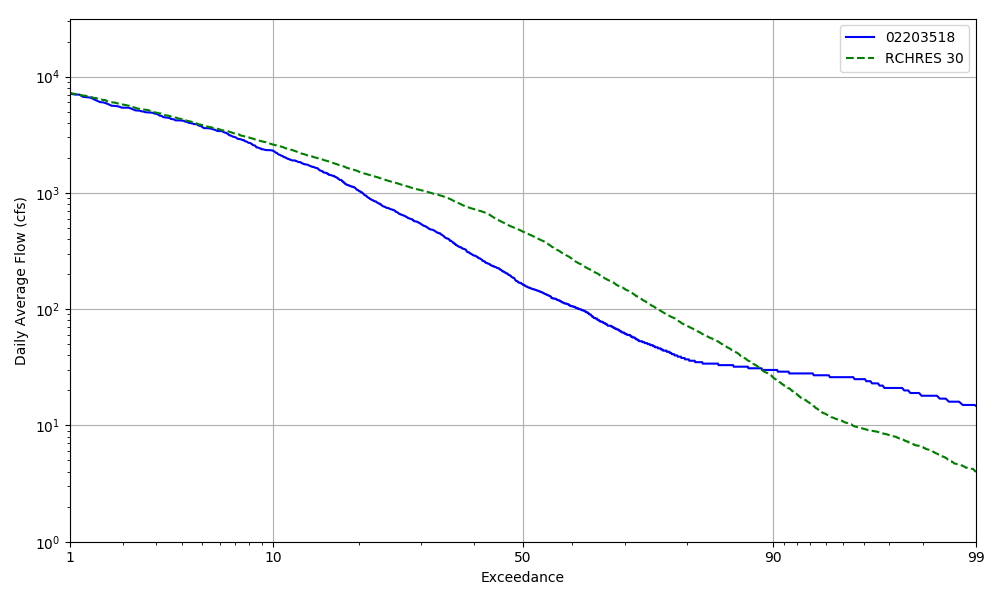


Figure 03060203-8: Daily exceedance for HSFP reach 30 and USGS station 02203518.

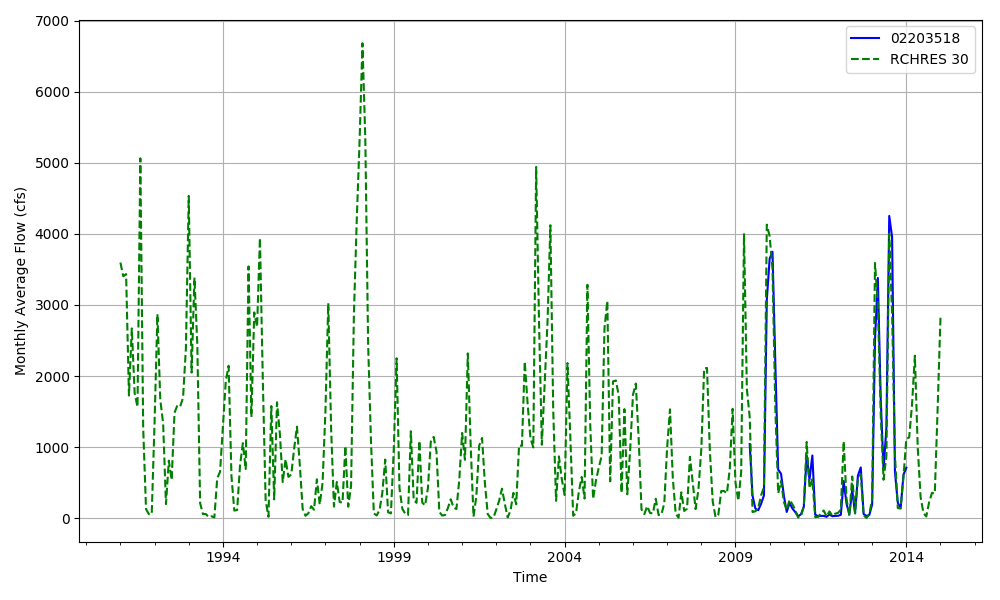


Figure 03060203-9: Monthly flow for HSFP reach 30 and USGS station 02203518.