# Appendix for Model 03070105

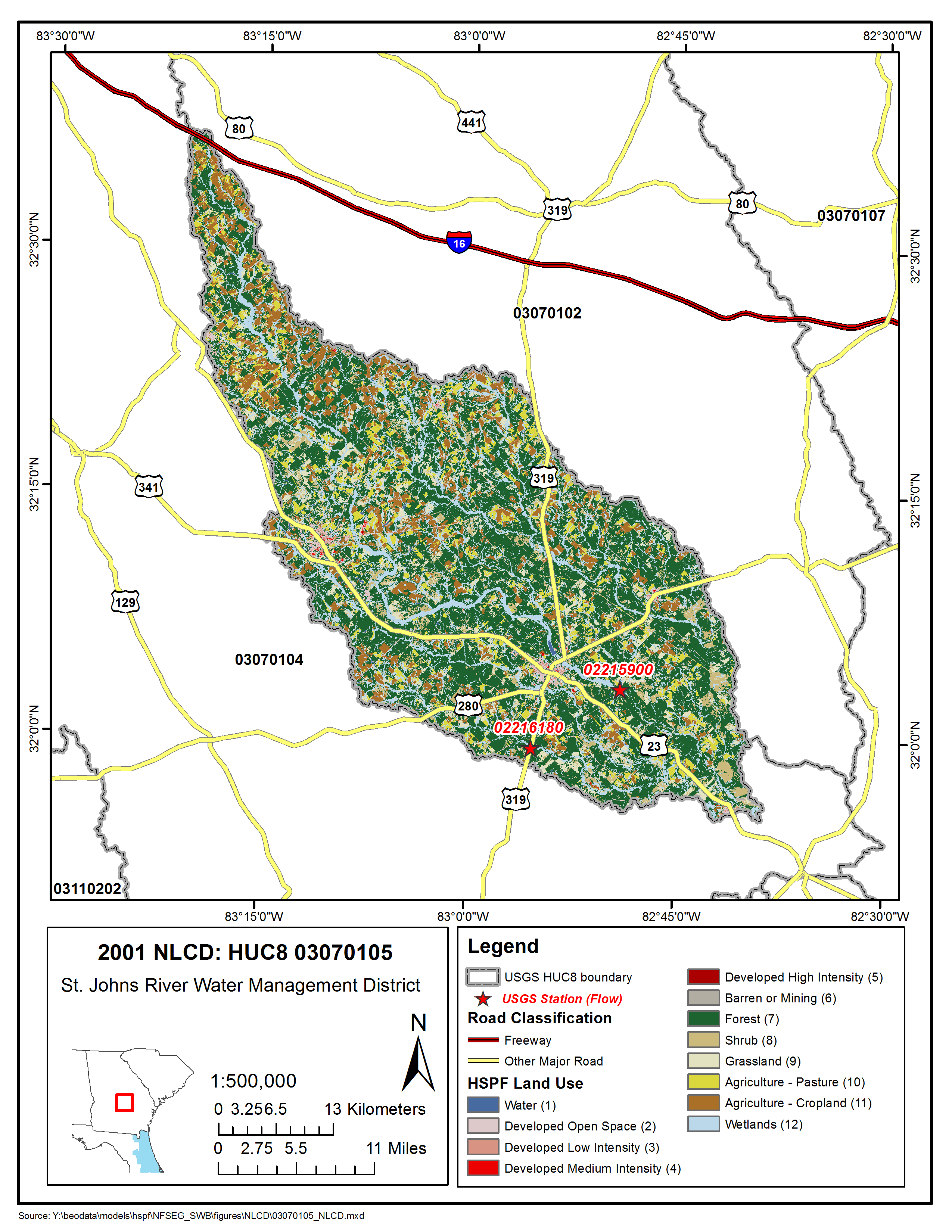


Figure 03070105-1: Land Cover from the National Land Cover Database.

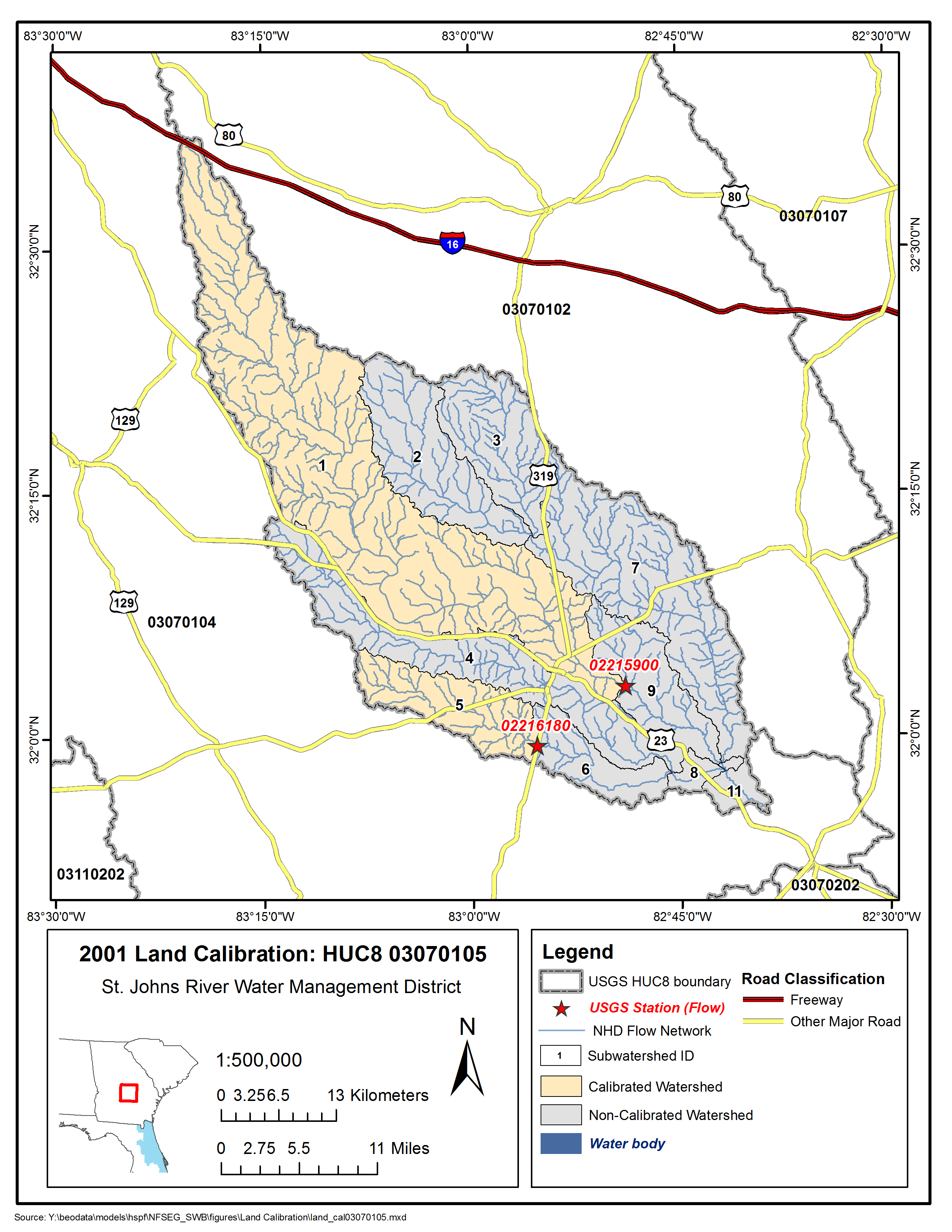


Figure 03070105-2: Calibrated sub-watersheds.

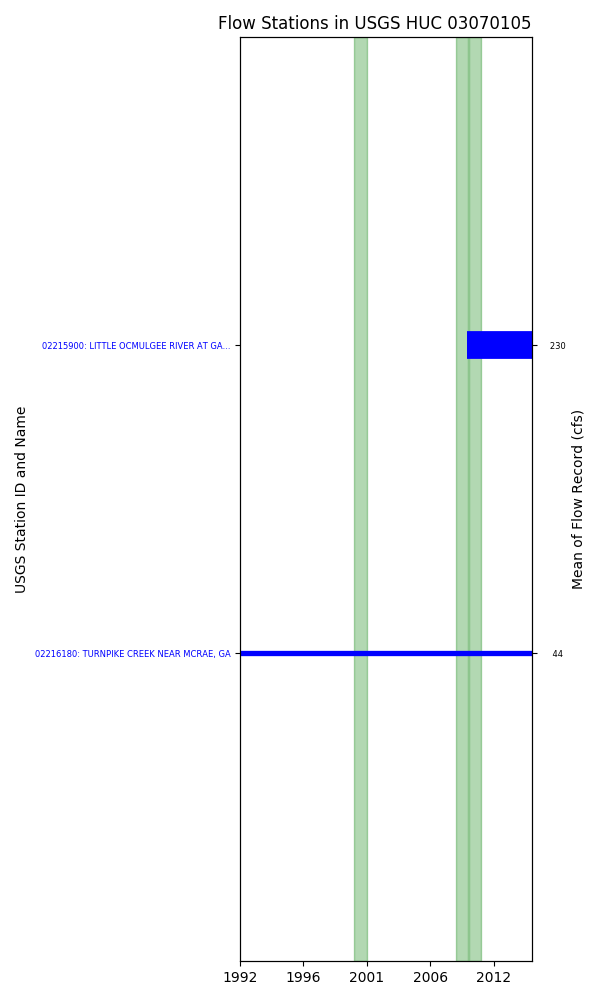


Figure 03070105-3: Station period of record. Blue color identifies gauges used for calibration.

## HSPF Reach 01, USGS Gauge 02215900

Table 03070105-1: Comparison Statistics Between HSPF Reach 01 and USGS Gauge 02215900.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -5.66 |
| Standard error | 117.93 |
| Relative bias | -0.03 |
| Relative standard error | 0.32 |
| Nash-Sutcliffe coefficient | 0.90 |
| Kling-Gupta coefficient | 0.83 |
| Coefficient of efficiency | 0.75 |
| Index of agreement | 0.87 |

Table 03070105-2: Hydrologic Indices Between USGS Gauge 02215900 and HSPF Reach 01.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02215900 | Simulated Reach 01 | Percent Difference |
| MA1: Mean, all daily flows | 216.53 | 210.53 | -2.77 |
| MA2: Median, all daily flows | 6.05 | 48.01 | 693.60 |
| MA3: CV, all daily flows | 139.34 | 136.60 | -1.97 |
| MA4: CV, log of all daily flows | 194.49 | 153.91 | -20.87 |
| MA5: Mean daily flow / median daily flow | 35.79 | 4.38 | -87.75 |
| MA9: (Q10 - Q90) / median daily flow | 121.38 | 11.38 | -90.63 |
| MA10: (Q20 - Q80) / median daily flow | 48.14 | 6.10 | -87.33 |
| MA11: (Q25 - Q75) / median daily flow | 31.32 | 4.36 | -86.08 |
| MA12: Mean monthly flow, January | 323.33 | 295.23 | -8.69 |
| MA13: Mean monthly flow, February | 456.50 | 490.32 | 7.41 |
| MA14: Mean monthly flow, March | 383.11 | 301.92 | -21.19 |
| MA15: Mean monthly flow, April | 162.91 | 141.26 | -13.29 |
| MA16: Mean monthly flow, May | 98.24 | 95.14 | -3.15 |
| MA17: Mean monthly flow, June | 51.54 | 96.41 | 87.06 |
| MA18: Mean monthly flow, July | 242.70 | 218.60 | -9.93 |
| MA19: Mean monthly flow, August | 165.89 | 152.83 | -7.87 |
| MA20: Mean monthly flow, September | 26.07 | 57.28 | 119.70 |
| MA21: Mean monthly flow, October | 4.09 | 22.69 | 455.01 |
| MA22: Mean monthly flow, November | 47.21 | 45.81 | -2.96 |
| MA23: Mean monthly flow, December | 292.77 | 279.18 | -4.64 |
| ML1: Mean minimum monthly flow, January | 176.08 | 149.00 | -15.38 |
| ML2: Mean minimum monthly flow, February | 188.65 | 156.51 | -17.04 |
| ML3: Mean minimum monthly flow, March | 227.95 | 219.31 | -3.79 |
| ML4: Mean minimum monthly flow, April | 69.27 | 97.47 | 40.72 |
| ML5: Mean minimum monthly flow, May | 18.84 | 39.43 | 109.34 |
| ML6: Mean minimum monthly flow, June | 7.64 | 24.96 | 226.51 |
| ML7: Mean minimum monthly flow, July | 86.08 | 42.66 | -50.44 |
| ML8: Mean minimum monthly flow, August | 17.29 | 45.03 | 160.47 |
| ML9: Mean minimum monthly flow, September | 2.81 | 37.90 | 1248.71 |
| ML10: Mean minimum monthly flow, October | 0.81 | 11.72 | 1347.50 |
| ML11: Mean minimum monthly flow, November | 13.32 | 33.62 | 152.45 |
| ML12: Mean minimum monthly flow, December | 41.86 | 38.22 | -8.69 |
| ML13: CV of minimum monthly flows | 221.66 | 159.42 | -28.08 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.03 | 0.10 | 224.12 |
| ML15: Mean minimum annual flow / mean annual flow | 0.01 | 0.06 | 459.21 |
| ML16: Median minimum annual flow / median annual flow | 0.01 | 0.01 | 54.70 |
| ML20: Ratio of baseflow volume to total flow volume | 0.45 | 0.42 | -6.01 |
| ML22: Mean annual minimum flow divided by catchment area | 0.01 | 0.06 | 766.95 |
| RA1: Mean of positive changes from one day to next (rise rate) | 64.88 | 77.27 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 309.86 | 302.37 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 32.94 | 29.33 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 300.50 | 297.97 |  |
| RA5: Ratio of days that are higher than previous day | 0.32 | 0.28 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.20 | 0.14 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.17 | 0.07 |  |
| RA8: Number of flow reversals from one day to the next | 86.00 | 53.00 |  |
| RA9: CV, number of flow reversals from one day to the next | 39.59 | 45.65 |  |

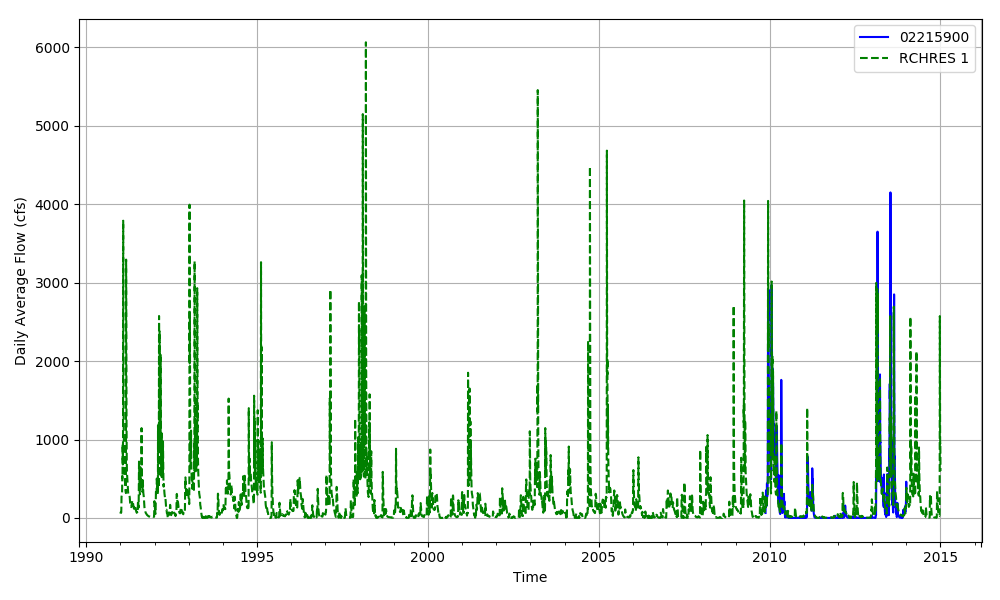


Figure 03070105-4: Daily flow for HSFP reach 01 and USGS station 02215900.

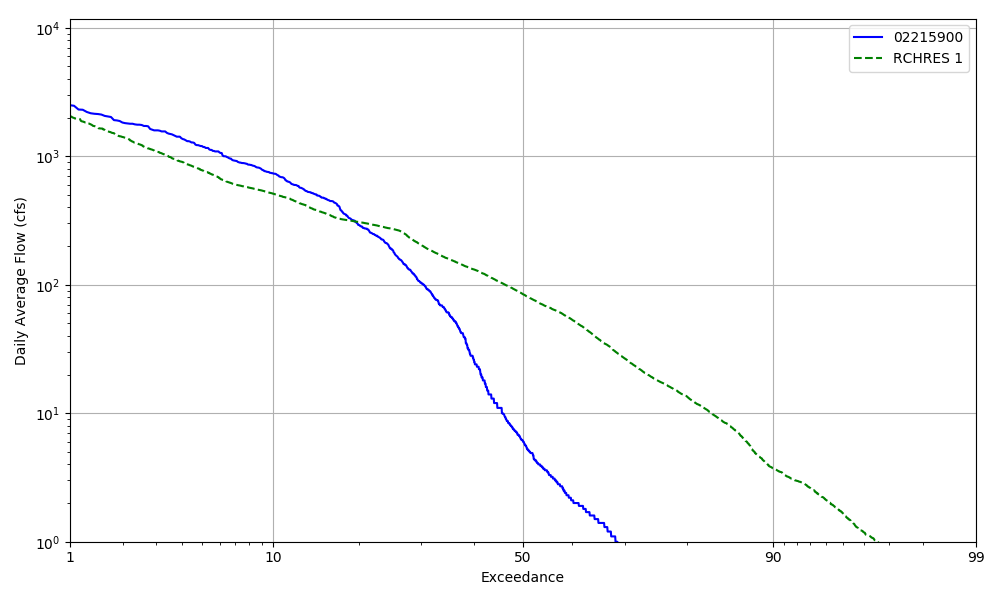


Figure 03070105-5: Daily exceedance for HSFP reach 01 and USGS station 02215900.

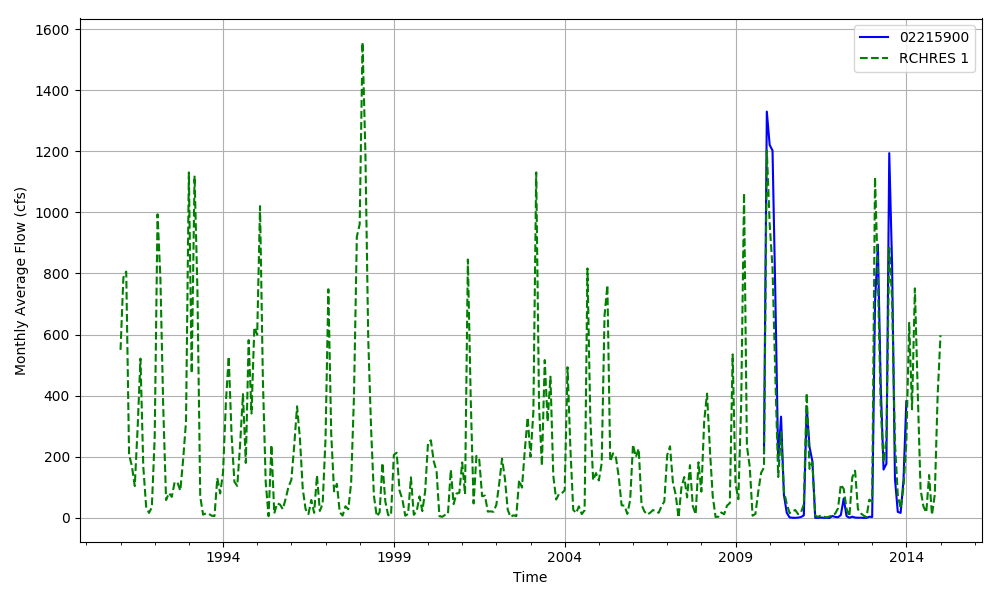


Figure 03070105-6: Monthly flow for HSFP reach 01 and USGS station 02215900.

## HSPF Reach 05, USGS Gauge 02216180

Table 03070105-3: Comparison Statistics Between HSPF Reach 05 and USGS Gauge 02216180.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -0.20 |
| Standard error | 30.64 |
| Relative bias | -0.00 |
| Relative standard error | 0.43 |
| Nash-Sutcliffe coefficient | 0.82 |
| Kling-Gupta coefficient | 0.84 |
| Coefficient of efficiency | 0.64 |
| Index of agreement | 0.81 |

Table 03070105-4: Hydrologic Indices Between USGS Gauge 02216180 and HSPF Reach 05.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02216180 | Simulated Reach 05 | Percent Difference |
| MA1: Mean, all daily flows | 44.77 | 44.61 | -0.36 |
| MA2: Median, all daily flows | 3.20 | 8.91 | 178.40 |
| MA3: CV, all daily flows | 210.41 | 205.23 | -2.46 |
| MA4: CV, log of all daily flows | 180.42 | 165.60 | -8.21 |
| MA5: Mean daily flow / median daily flow | 13.99 | 5.01 | -64.21 |
| MA9: (Q10 - Q90) / median daily flow | 37.19 | 13.28 | -64.28 |
| MA10: (Q20 - Q80) / median daily flow | 17.81 | 6.16 | -65.40 |
| MA11: (Q25 - Q75) / median daily flow | 12.50 | 4.54 | -63.65 |
| MA12: Mean monthly flow, January | 79.42 | 90.42 | 13.86 |
| MA13: Mean monthly flow, February | 101.64 | 110.59 | 8.81 |
| MA14: Mean monthly flow, March | 116.74 | 98.76 | -15.40 |
| MA15: Mean monthly flow, April | 56.26 | 39.80 | -29.26 |
| MA16: Mean monthly flow, May | 17.25 | 8.60 | -50.17 |
| MA17: Mean monthly flow, June | 15.55 | 17.57 | 12.95 |
| MA18: Mean monthly flow, July | 13.26 | 12.96 | -2.23 |
| MA19: Mean monthly flow, August | 17.89 | 19.76 | 10.41 |
| MA20: Mean monthly flow, September | 12.43 | 20.91 | 68.23 |
| MA21: Mean monthly flow, October | 16.51 | 20.08 | 21.62 |
| MA22: Mean monthly flow, November | 21.80 | 23.67 | 8.61 |
| MA23: Mean monthly flow, December | 54.18 | 57.49 | 6.12 |
| ML1: Mean minimum monthly flow, January | 21.65 | 20.39 | -5.82 |
| ML2: Mean minimum monthly flow, February | 30.42 | 26.86 | -11.70 |
| ML3: Mean minimum monthly flow, March | 25.07 | 21.73 | -13.34 |
| ML4: Mean minimum monthly flow, April | 6.21 | 5.97 | -3.95 |
| ML5: Mean minimum monthly flow, May | 1.06 | 0.64 | -39.66 |
| ML6: Mean minimum monthly flow, June | 0.32 | 0.44 | 37.69 |
| ML7: Mean minimum monthly flow, July | 0.18 | 1.45 | 720.44 |
| ML8: Mean minimum monthly flow, August | 1.13 | 2.55 | 125.34 |
| ML9: Mean minimum monthly flow, September | 0.52 | 1.05 | 103.98 |
| ML10: Mean minimum monthly flow, October | 1.38 | 1.44 | 4.26 |
| ML11: Mean minimum monthly flow, November | 4.65 | 4.79 | 2.92 |
| ML12: Mean minimum monthly flow, December | 11.31 | 11.18 | -1.13 |
| ML13: CV of minimum monthly flows | 205.85 | 184.14 | -10.55 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.00 | 0.00 | 239.81 |
| ML15: Mean minimum annual flow / mean annual flow | 0.00 | 0.00 | 1747.22 |
| ML16: Median minimum annual flow / median annual flow | 0.00 | 0.00 |  |
| ML20: Ratio of baseflow volume to total flow volume | 0.31 | 0.28 | -8.51 |
| ML22: Mean annual minimum flow divided by catchment area | 0.00 | 0.00 | 4157.98 |
| RA1: Mean of positive changes from one day to next (rise rate) | 52.96 | 30.80 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 248.30 | 329.82 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 21.83 | 11.25 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 336.75 | 311.23 |  |
| RA5: Ratio of days that are higher than previous day | 0.19 | 0.27 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.50 | 0.40 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.29 | 0.16 |  |
| RA8: Number of flow reversals from one day to the next | 61.38 | 77.54 |  |
| RA9: CV, number of flow reversals from one day to the next | 38.86 | 20.80 |  |

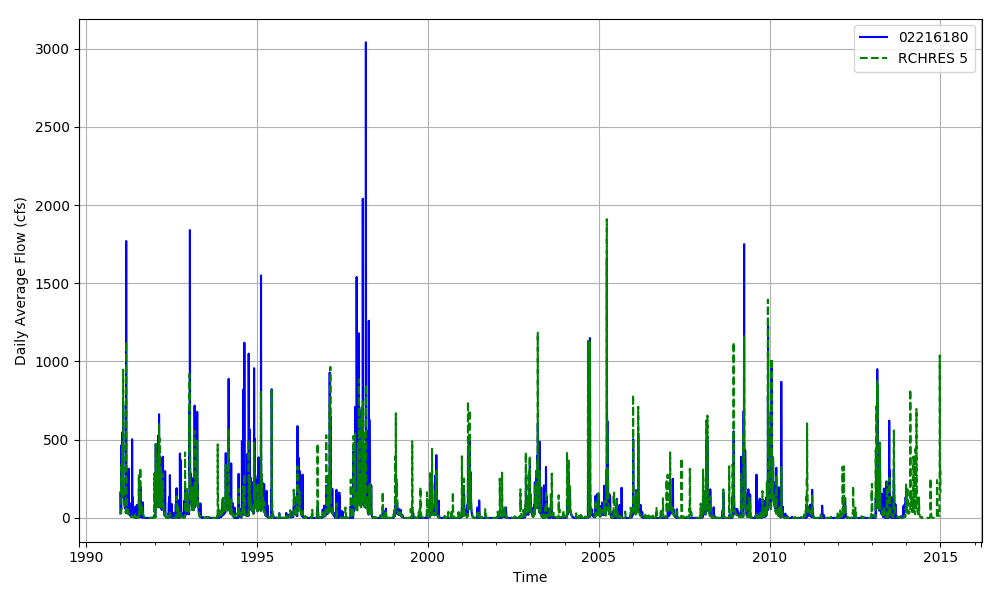


Figure 03070105-7: Daily flow for HSFP reach 05 and USGS station 02216180.

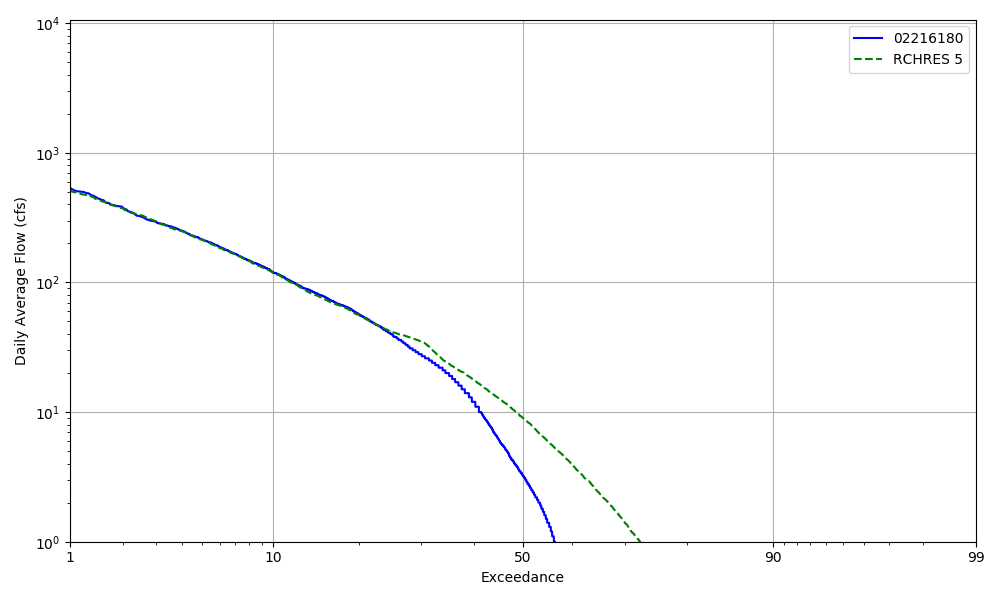


Figure 03070105-8: Daily exceedance for HSFP reach 05 and USGS station 02216180.

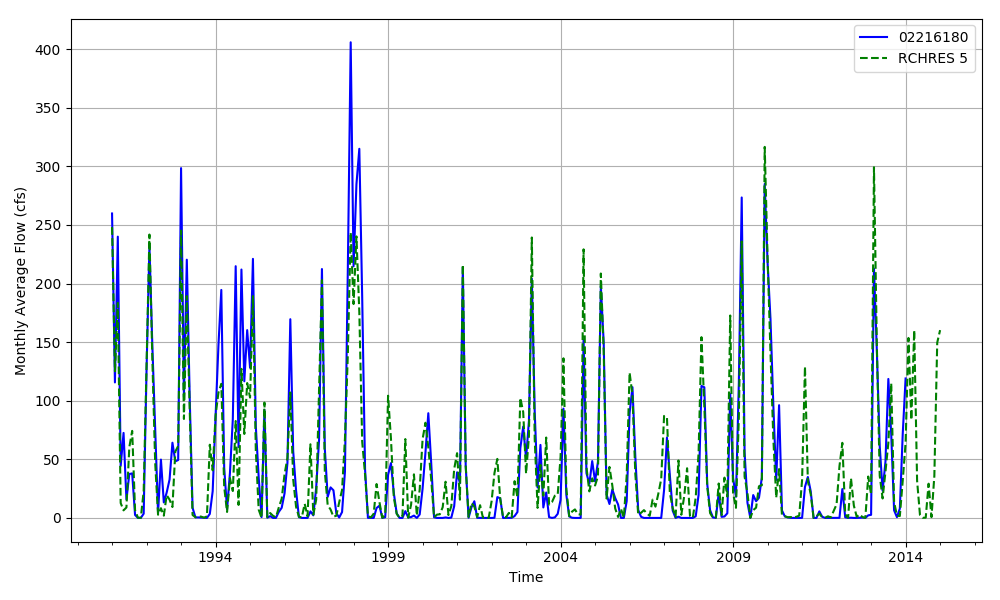


Figure 03070105-9: Monthly flow for HSFP reach 05 and USGS station 02216180.