# Appendix for Model 03120002

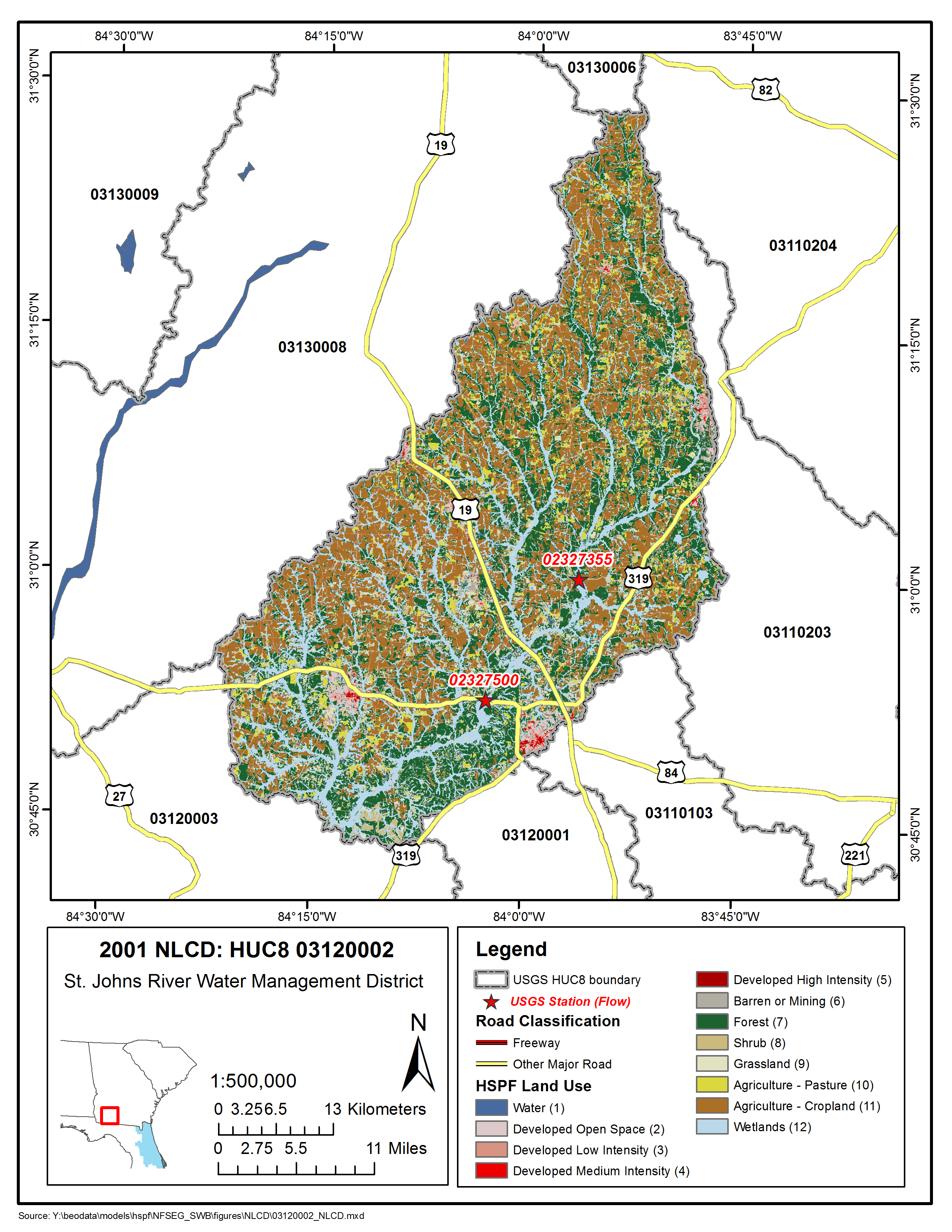


Figure 03120002-1: Land Cover from the National Land Cover Database.

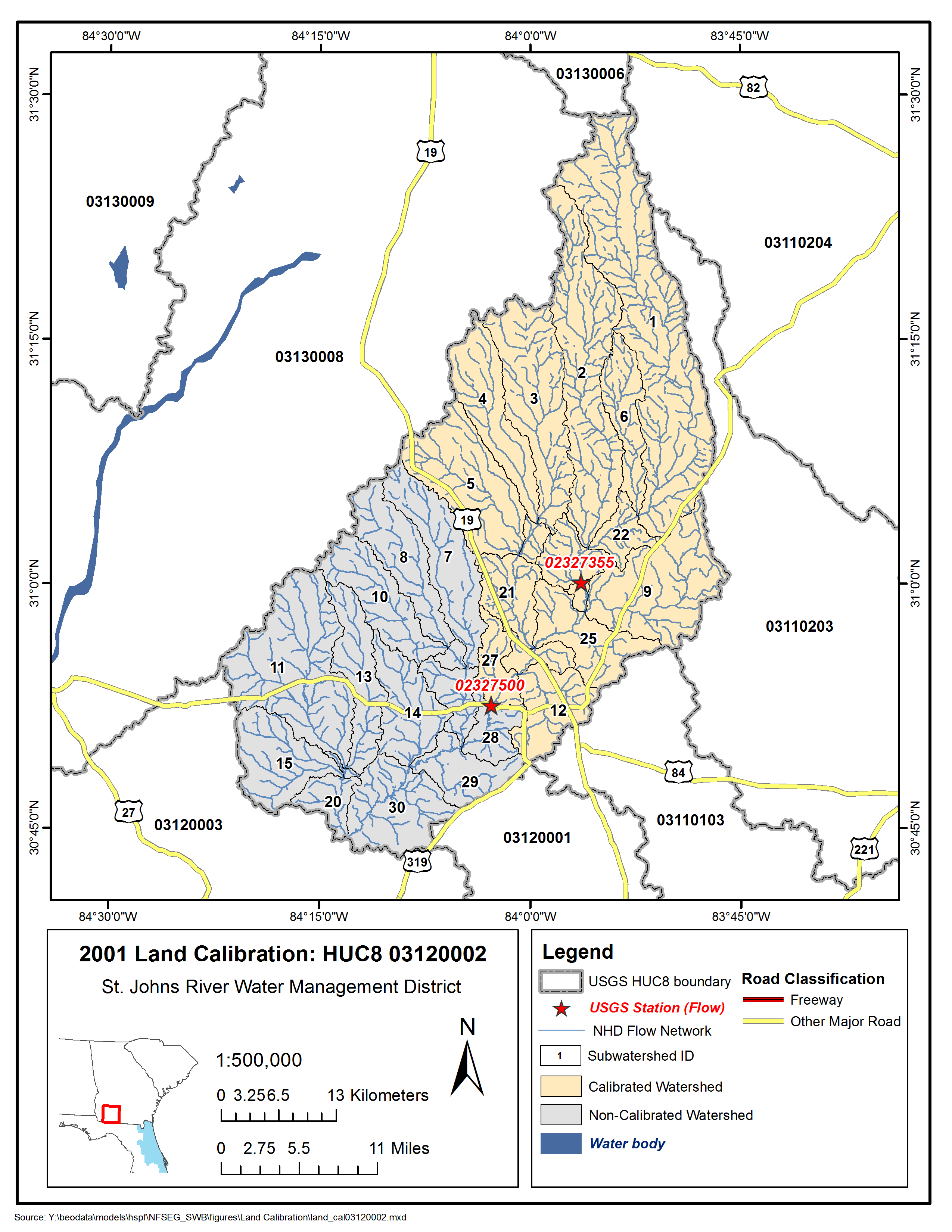


Figure 03120002-2: Calibrated sub-watersheds.

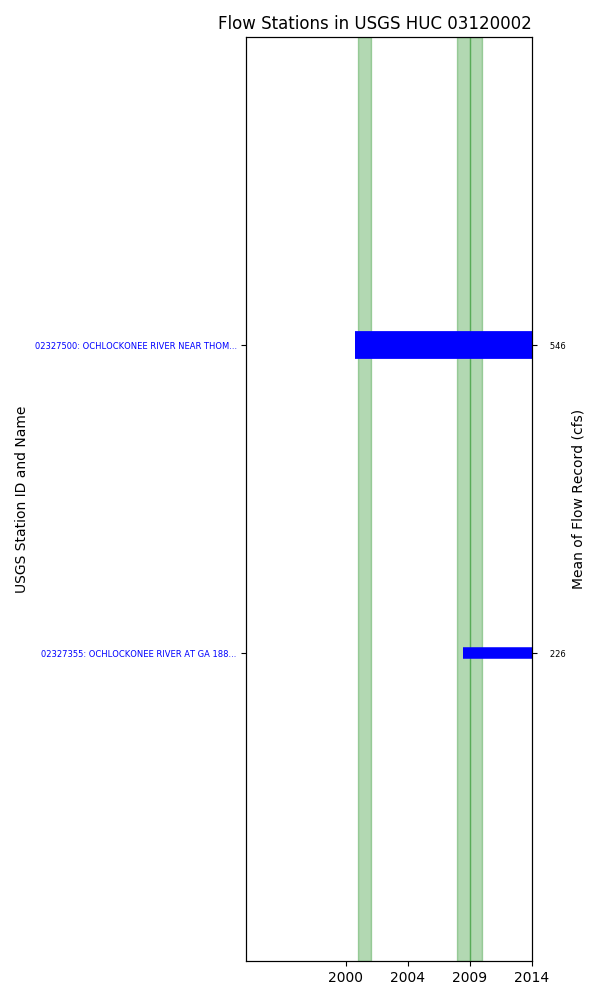


Figure 03120002-3: Station period of record. Blue color identifies gauges used for calibration.

## HSPF Reach 23, USGS Gauge 02327355

Table 03120002-1: Comparison Statistics Between HSPF Reach 23 and USGS Gauge 02327355.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -5.27 |
| Standard error | 82.88 |
| Relative bias | -0.03 |
| Relative standard error | 0.25 |
| Nash-Sutcliffe coefficient | 0.94 |
| Coefficient of efficiency | 0.78 |
| Index of agreement | 0.89 |

Table 03120002-2: Hydrologic Indices Between USGS Gauge 02327355 and HSPF Reach 23.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02327355 | Simulated Reach 23 | Percent Difference |
| MA1: Mean, all daily flows | 183.27 | 178.05 | -2.85 |
| MA2: Median, all daily flows | 25.00 | 27.15 | 8.61 |
| MA3: CV, all daily flows | 170.91 | 174.79 | 2.27 |
| MA4: CV, log of all daily flows | 186.59 | 169.22 | -9.31 |
| MA5: Mean daily flow / median daily flow | 7.33 | 6.56 | -10.55 |
| MA9: (Q10 - Q90) / median daily flow | 18.13 | 15.80 | -12.86 |
| MA10: (Q20 - Q80) / median daily flow | 6.80 | 6.71 | -1.35 |
| MA11: (Q25 - Q75) / median daily flow | 4.94 | 4.26 | -13.73 |
| MA12: Mean monthly flow, January | 232.21 | 220.85 | -4.89 |
| MA13: Mean monthly flow, February | 425.95 | 429.98 | 0.95 |
| MA14: Mean monthly flow, March | 259.04 | 321.57 | 24.14 |
| MA15: Mean monthly flow, April | 105.28 | 87.47 | -16.92 |
| MA16: Mean monthly flow, May | 76.42 | 61.71 | -19.24 |
| MA17: Mean monthly flow, June | 65.42 | 21.44 | -67.23 |
| MA18: Mean monthly flow, July | 123.46 | 102.26 | -17.17 |
| MA19: Mean monthly flow, August | 247.58 | 257.15 | 3.87 |
| MA20: Mean monthly flow, September | 34.62 | 38.71 | 11.80 |
| MA21: Mean monthly flow, October | 19.55 | 13.36 | -31.62 |
| MA22: Mean monthly flow, November | 13.40 | 12.05 | -10.06 |
| MA23: Mean monthly flow, December | 132.70 | 119.87 | -9.67 |
| ML1: Mean minimum monthly flow, January | 108.68 | 108.81 | 0.12 |
| ML2: Mean minimum monthly flow, February | 111.00 | 122.30 | 10.18 |
| ML3: Mean minimum monthly flow, March | 135.50 | 133.83 | -1.23 |
| ML4: Mean minimum monthly flow, April | 39.88 | 31.17 | -21.84 |
| ML5: Mean minimum monthly flow, May | 6.43 | 7.19 | 11.75 |
| ML6: Mean minimum monthly flow, June | 9.11 | 2.39 | -73.80 |
| ML7: Mean minimum monthly flow, July | 46.48 | 19.92 | -57.15 |
| ML8: Mean minimum monthly flow, August | 12.87 | 25.88 | 101.04 |
| ML9: Mean minimum monthly flow, September | 9.46 | 6.69 | -29.32 |
| ML10: Mean minimum monthly flow, October | 5.31 | 2.60 | -51.05 |
| ML11: Mean minimum monthly flow, November | 8.56 | 6.21 | -27.39 |
| ML12: Mean minimum monthly flow, December | 20.62 | 21.56 | 4.56 |
| ML13: CV of minimum monthly flows | 204.13 | 196.97 | -3.51 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.14 | 0.04 | -70.23 |
| ML15: Mean minimum annual flow / mean annual flow | 0.07 | 0.02 | -71.62 |
| ML16: Median minimum annual flow / median annual flow | 0.01 | 0.01 | -13.15 |
| ML20: Ratio of baseflow volume to total flow volume | 0.29 | 0.28 | -2.79 |
| ML22: Mean annual minimum flow divided by catchment area | 0.04 | 0.01 | -67.56 |
| RA1: Mean of positive changes from one day to next (rise rate) | 82.89 | 75.64 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 457.43 | 518.75 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 45.65 | 31.25 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 430.26 | 603.14 |  |
| RA5: Ratio of days that are higher than previous day | 0.34 | 0.29 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.20 | 0.20 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.16 | 0.11 |  |
| RA8: Number of flow reversals from one day to the next | 61.33 | 57.83 |  |
| RA9: CV, number of flow reversals from one day to the next | 45.16 | 50.13 |  |

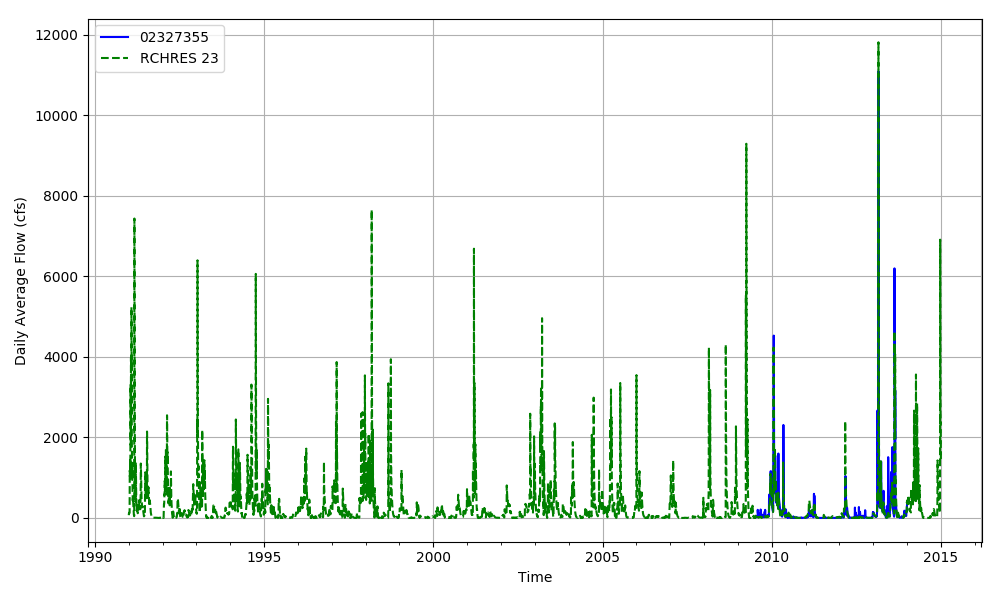


Figure 03120002-4: Daily flow for HSFP reach 23 and USGS station 02327355.

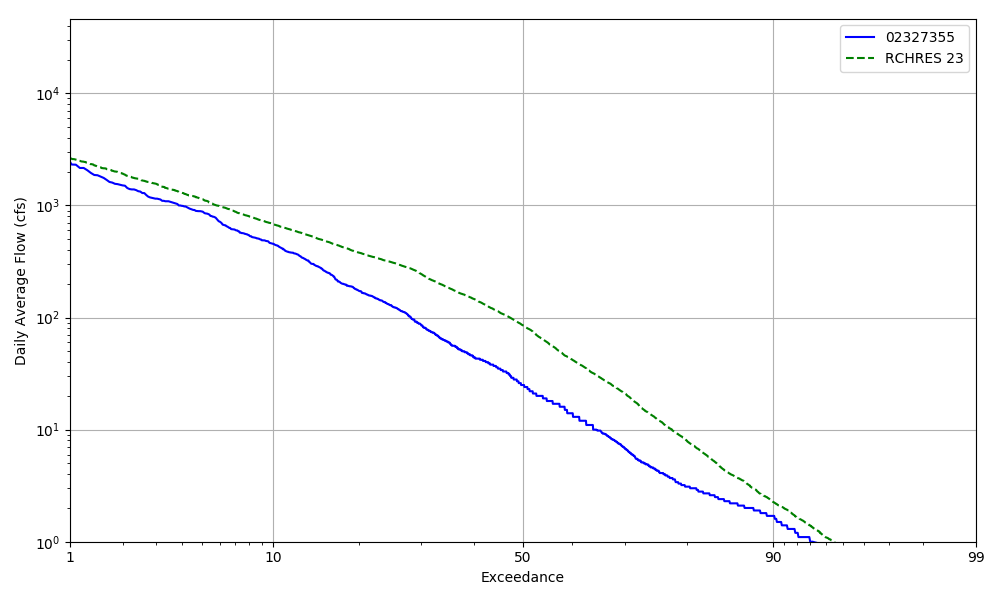


Figure 03120002-5: Daily exceedance for HSFP reach 23 and USGS station 02327355.

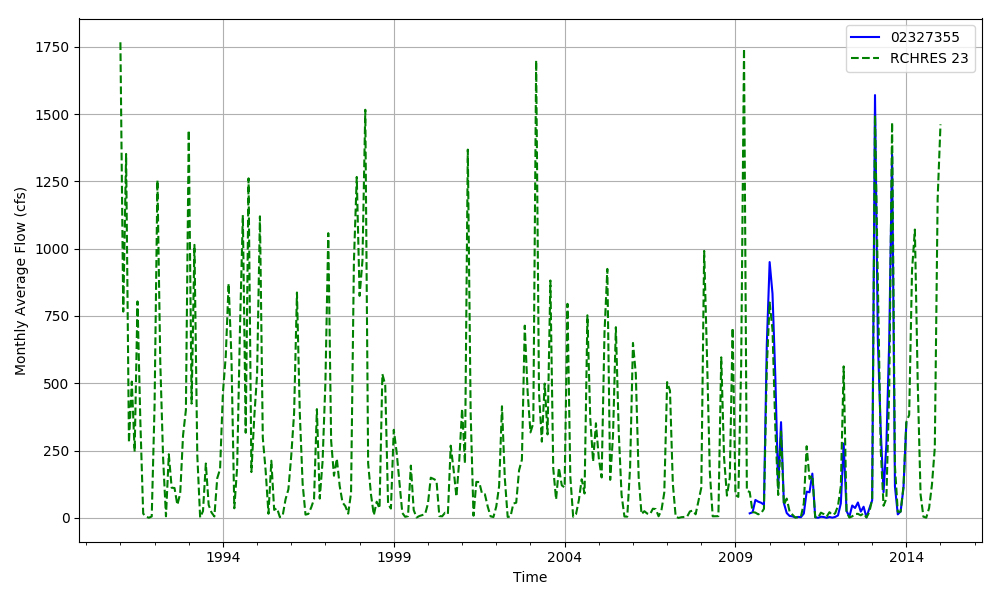


Figure 03120002-6: Monthly flow for HSFP reach 23 and USGS station 02327355.

## HSPF Reach 27, USGS Gauge 02327500

Table 03120002-3: Comparison Statistics Between HSPF Reach 27 and USGS Gauge 02327500.

|  |  |
| --- | --- |
| Statistic | Value |
| Bias | -5.55 |
| Standard error | 236.23 |
| Relative bias | -0.01 |
| Relative standard error | 0.31 |
| Nash-Sutcliffe coefficient | 0.91 |
| Coefficient of efficiency | 0.73 |
| Index of agreement | 0.86 |

Table 03120002-4: Hydrologic Indices Between USGS Gauge 02327500 and HSPF Reach 27.

|  |  |  |  |
| --- | --- | --- | --- |
| Hydrologic Index and description (Olden and Poff, 2003) | Observed 02327500 | Simulated Reach 27 | Percent Difference |
| MA1: Mean, all daily flows | 522.11 | 515.84 | -1.20 |
| MA2: Median, all daily flows | 134.00 | 137.80 | 2.84 |
| MA3: CV, all daily flows | 190.16 | 182.84 | -3.85 |
| MA4: CV, log of all daily flows | 147.63 | 140.59 | -4.77 |
| MA5: Mean daily flow / median daily flow | 3.90 | 3.74 | -3.93 |
| MA9: (Q10 - Q90) / median daily flow | 9.44 | 8.81 | -6.69 |
| MA10: (Q20 - Q80) / median daily flow | 4.57 | 4.79 | 4.69 |
| MA11: (Q25 - Q75) / median daily flow | 3.25 | 3.65 | 12.20 |
| MA12: Mean monthly flow, January | 544.19 | 599.14 | 10.10 |
| MA13: Mean monthly flow, February | 974.79 | 1029.04 | 5.56 |
| MA14: Mean monthly flow, March | 1215.62 | 1251.77 | 2.97 |
| MA15: Mean monthly flow, April | 823.02 | 704.40 | -14.41 |
| MA16: Mean monthly flow, May | 195.23 | 152.09 | -22.10 |
| MA17: Mean monthly flow, June | 263.92 | 198.52 | -24.78 |
| MA18: Mean monthly flow, July | 470.58 | 329.69 | -29.94 |
| MA19: Mean monthly flow, August | 553.68 | 553.20 | -0.09 |
| MA20: Mean monthly flow, September | 238.33 | 280.23 | 17.58 |
| MA21: Mean monthly flow, October | 113.86 | 158.23 | 38.97 |
| MA22: Mean monthly flow, November | 195.95 | 230.50 | 17.63 |
| MA23: Mean monthly flow, December | 416.05 | 455.04 | 9.37 |
| ML1: Mean minimum monthly flow, January | 232.00 | 247.72 | 6.78 |
| ML2: Mean minimum monthly flow, February | 269.92 | 258.55 | -4.22 |
| ML3: Mean minimum monthly flow, March | 279.46 | 246.41 | -11.83 |
| ML4: Mean minimum monthly flow, April | 128.54 | 85.52 | -33.47 |
| ML5: Mean minimum monthly flow, May | 39.12 | 15.28 | -60.94 |
| ML6: Mean minimum monthly flow, June | 32.25 | 31.82 | -1.36 |
| ML7: Mean minimum monthly flow, July | 96.59 | 96.50 | -0.10 |
| ML8: Mean minimum monthly flow, August | 96.80 | 103.50 | 6.92 |
| ML9: Mean minimum monthly flow, September | 41.54 | 38.42 | -7.50 |
| ML10: Mean minimum monthly flow, October | 37.21 | 53.35 | 43.36 |
| ML11: Mean minimum monthly flow, November | 53.58 | 88.45 | 65.09 |
| ML12: Mean minimum monthly flow, December | 122.94 | 126.99 | 3.30 |
| ML13: CV of minimum monthly flows | 142.58 | 148.22 | 3.95 |
| ML14: Mean minimum daily flow / mean median annual flow | 0.14 | 0.04 | -68.04 |
| ML15: Mean minimum annual flow / mean annual flow | 0.04 | 0.02 | -59.33 |
| ML16: Median minimum annual flow / median annual flow | 0.11 | 0.03 | -73.24 |
| ML20: Ratio of baseflow volume to total flow volume | 0.35 | 0.37 | 5.42 |
| ML22: Mean annual minimum flow divided by catchment area | 0.18 | 0.07 | -59.91 |
| RA1: Mean of positive changes from one day to next (rise rate) | 229.86 | 230.31 |  |
| RA2: CV, mean of positive changes from one day to next (rise rate) | 423.48 | 445.41 |  |
| RA3: Mean of negative changes from one day to next (fall rate) | 105.72 | 89.08 |  |
| RA4: CV, mean of negative changes from one day to next (fall rate) | 466.83 | 453.64 |  |
| RA5: Ratio of days that are higher than previous day | 0.30 | 0.28 |  |
| RA6: Median of difference in log of flows over two consecutive days of rising | 0.18 | 0.15 |  |
| RA7: Median of difference in log of flows over two consecutive days of falling | 0.11 | 0.10 |  |
| RA8: Number of flow reversals from one day to the next | 74.50 | 70.50 |  |
| RA9: CV, number of flow reversals from one day to the next | 27.37 | 21.52 |  |

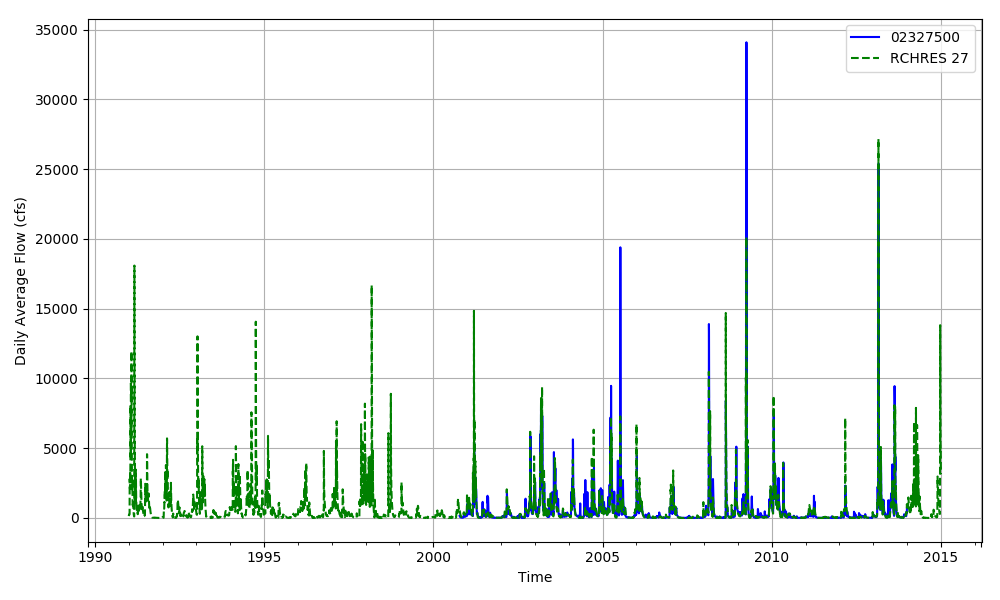


Figure 03120002-7: Daily flow for HSFP reach 27 and USGS station 02327500.

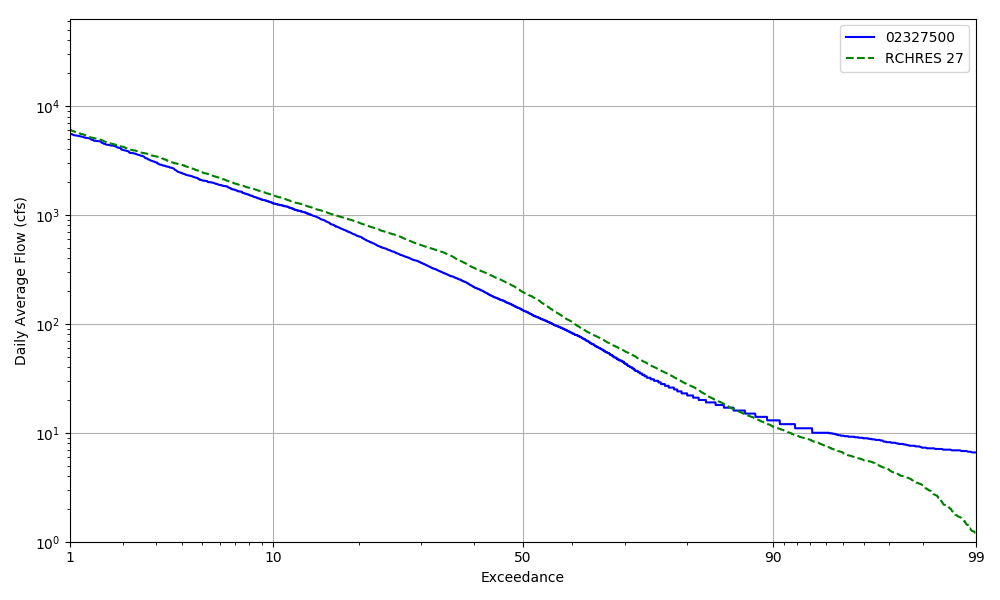


Figure 03120002-8: Daily exceedance for HSFP reach 27 and USGS station 02327500.

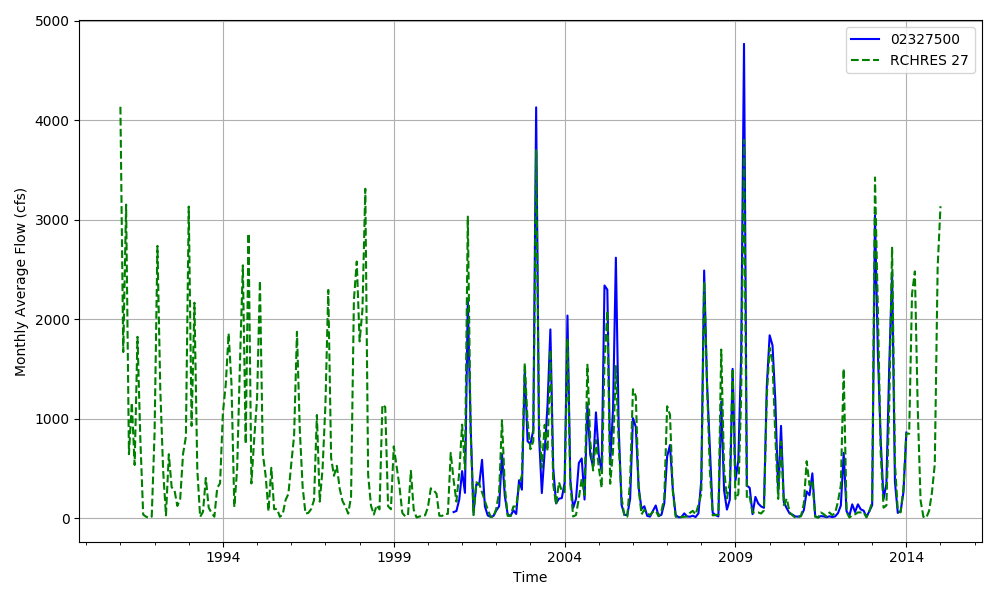


Figure 03120002-9: Monthly flow for HSFP reach 27 and USGS station 02327500.