Appendix 1

Drainage Area and Land Use Methods and Results

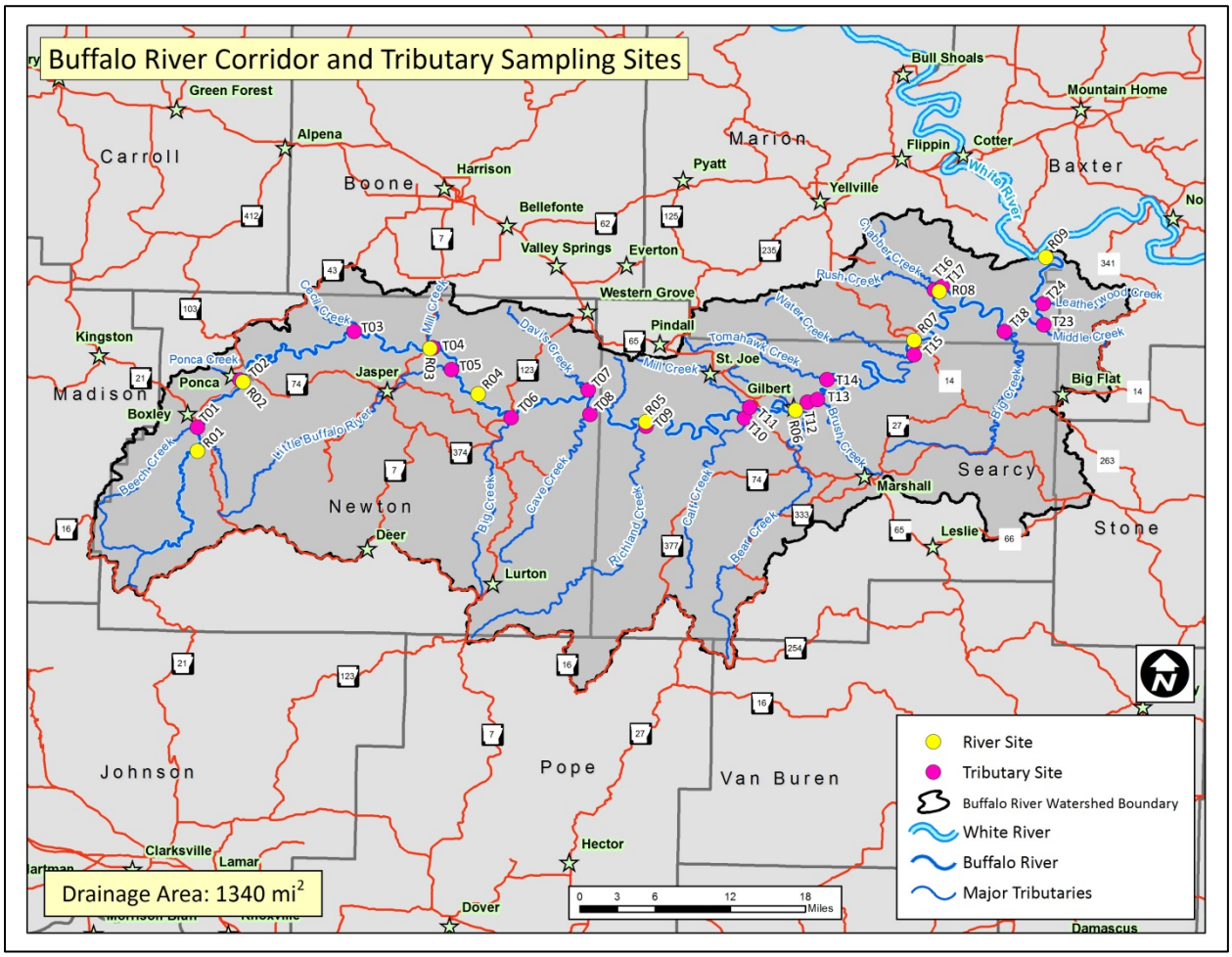


Figure 1 Buffalo River Watershed Overview Map with Sampling Sites

Buffalo River Drainage Area and Land Use Analysis Summary - The purpose of this analysis was to delineate the drainage areas contributing to each water quality monitoring site in the Buffalo River watershed. The calculated drainage areas were then used in a zonal analysis to determine land use statistics upstream of each site. This data will help in determining whether there is a correlation between land use and water quality in the Buffalo River watershed**.**

Data Sources:
USGS - National Elevation Dataset (10 meter Digital Elevation Model)
USGS - National Hydrography Dataset
National Park Service – Buffalo River Water Quality Monitoring Sites
USDA – HUC Watersheds
USDA - National Agricultural Imagery (NAIP) 1 meter aerial photography acquired in 2010
Arkansas State Highway and Transportation Department – State Highways
Center for Advanced Spatial Technologies – 2006 High Resolution Land Use (3 meter)

Software Used:
ESRI ArcGIS 9.3 (ArcInfo)
ESRI Spatial Analyst Extension
ESRI ArcHydro Tools 1.4

Process Steps:

Drainage Area Delineation:

1. DEM Reconditioning (Using NHD Flowlines and 10m DEM) - Burn streams into the DEM. This step exaggerates the DEM where flow lines occur to ensure that these paths are used during analysis
2. Fill Sinks - Fills sinks and smooths out the reconditioned DEM to make sure that any sinks that would stop the progress of a stream network are resolved.
3. Flow Direction – Creates a flow direction grid from the processed DEM. The 8 digit HUC watershed boundary was used as a wall feature during this process.
4. Flow Accumulation – Creates a flow accumulation grid from the flow direction grid.
5. Stream Definition – This process creates a stream grid from the flow accumulation grid which links various catchments within the watershed. A stream threshold must be set which will later affect the size of the catchments. This process was run using a 4.5 km^2 stream threshold which is the standard catchment threshold as defined by the USGS Elevation Derivatives for National Applications (EDNA). The resulting catchments were used to delineate the cumulative drainage areas for the river sites. The process was repeated

using a 2 km^2 stream threshold for which was the appropriate scale to delineate the contributing drainage area for the tributary sites.

6. Stream Segmentation – Using the stream and flow direction grids, creates a stream link grid (every link between two stream junction gets a unique identifier).
7. Catchment Delineation – Creates a catchment grid using the flow direction and stream link grids. The size of the catchments is determined by the stream thresholds that were used during the Stream Definition process.
8. Catchment Polygon Processing – Converts the catchment grid into a polygon feature.
9. Drainage Line Processing – Uses the stream link and flow direction grid and creates a drainage line feature. These lines connect the catchments.
10. Adjoint Catchment – Using the drainage line and catchment vectors this function creates a polygon feature with the aggregated upstream catchments. Adjoint catchment is total upstream area (if any) draining into a single catchment.
11. Drainage Point Processing – Using the flow accumulation grid, catchment grid and catchment polygons, creates a drainage point at the most downstream point in the catchment.
12. Manually edit the water quality monitoring points and snap them to the NHD flow lines. This ensures that the points will be on the drainage network when the upstream drainage areas are created.
13. Add appropriate schema to the water quality points so that they can be used as batch points during watershed processing. Name, Description, BatchDone, and SnapOn fields are added. BatchDone is set to 0 and SnapOn is set to 0 since we manually snapped the points to the flowlines.
14. Make sure that there are no special characters in the water quality points table which will be used for watershed processing. Dashes were removed from the names prior to processing.
15. Separate the river and tributary water quality monitoring points into two separate features
16. Batch Watershed Delineation – Using the flow direction grid, stream grid, catchment features, adjoint catchment features, and water quality points as batch points creates upstream watershed areas. This process was run twice, once for the river sites using the 4.5 km^2 stream threshold results as inputs, and then for the tributary sites using the 2 km^2 stream threshold results as inputs.

Land use statistics for the upstream drainage areas of the water quality monitoring sites:

1. The tributary drainage area features and the land cover/land use raster were used as inputs in the Tabulate Area function (Spatial Analyst Tools/Zonal toolset) which calculated the total area of each land cover type in the associated water quality site drainage area.

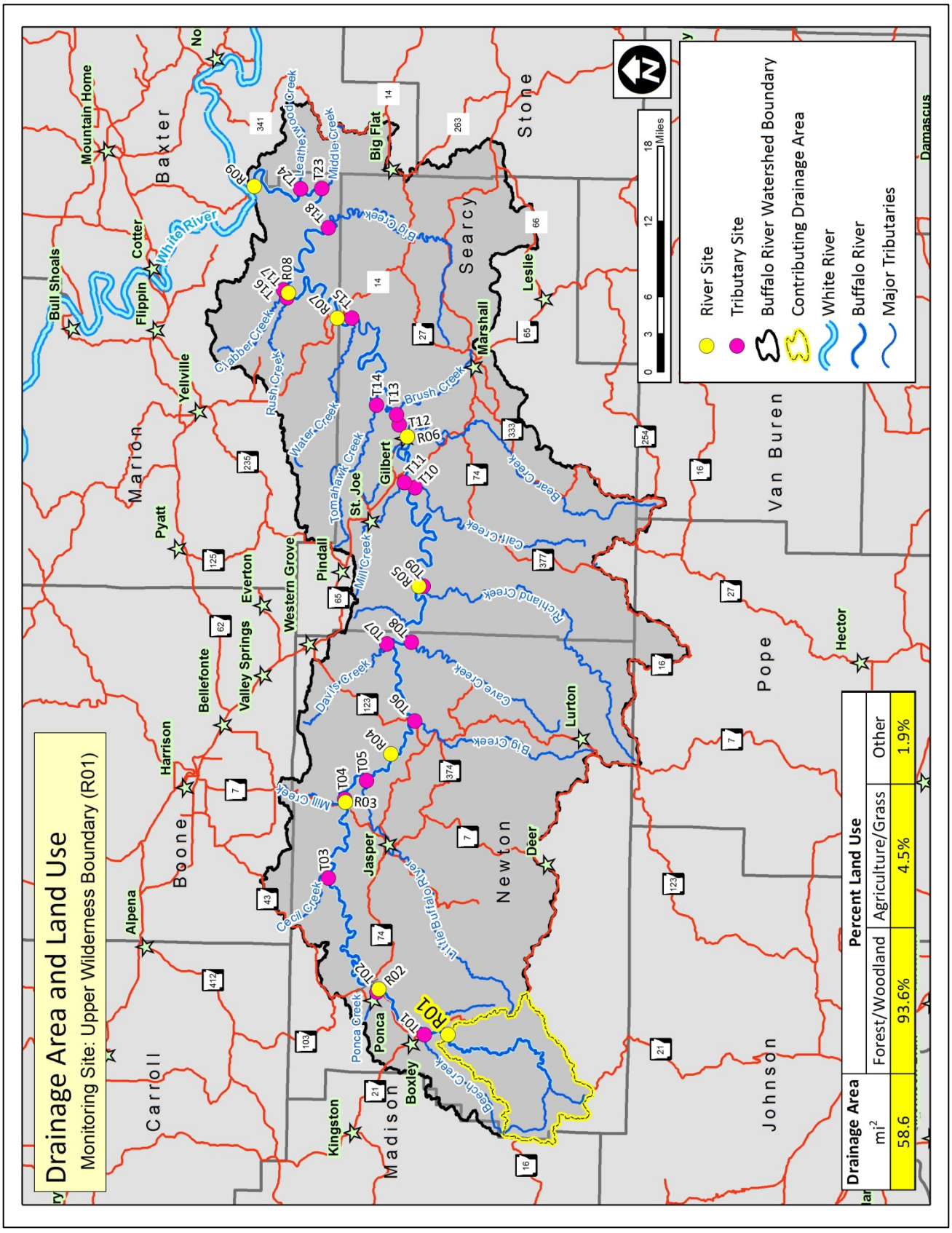
2. The river drainage areas were separated into individual features and used as an input with the land cover/land use raster in the Tabulate Area function (Spatial Analyst Tools/Zonal toolset) which calculated the total area of each land cover type in the associated water quality site drainage area.
3. The resulting tables were brought into excel and percentages were determined for each land cover type.
4. Land cover types were grouped into three primary categories: Forest/Woodland (sum of forest land cover types), Agriculture/Grass (sum of grassland, herbaceous, pasture/hay, and crop land cover types; also referred to as “pasture” in this report), and Other. Other is comprised of Roads, Water, Urban Low Intensity, Urban High Intensity, Transitional, and Barren and the individual percentages for these land cover types are included in the attached tables.
5. The results are included in the attached tables and maps.

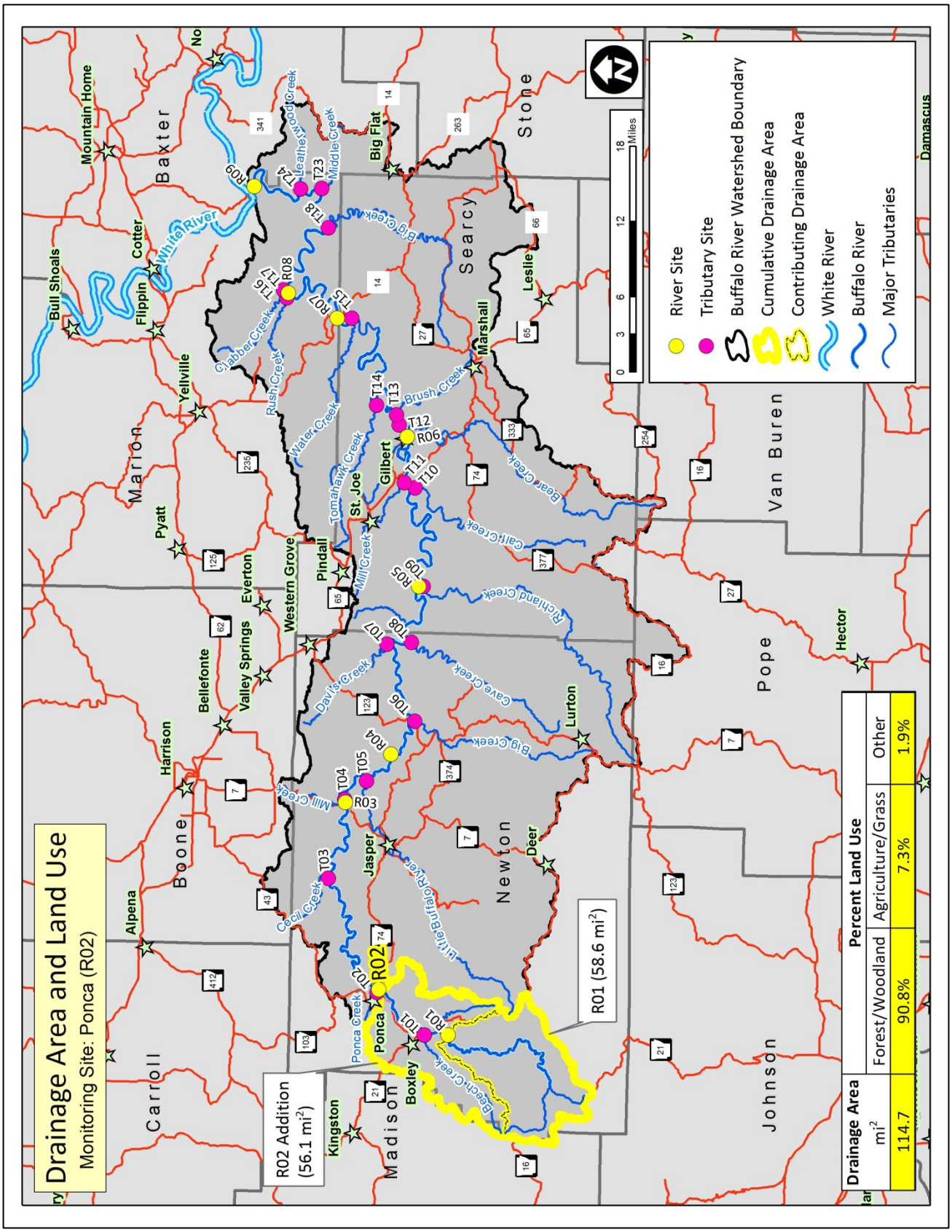
River Sampling Site Results – The following table and maps contain the results of the drainage area and land use analysis for the river corridor sampling sites. Drainage area calculations are cumulative and include all of the upstream catchments. This includes all upstream sampling site drainage areas. Contributing drainage areas are defined as the area added to the cumulative watershed since the last river monitoring site.

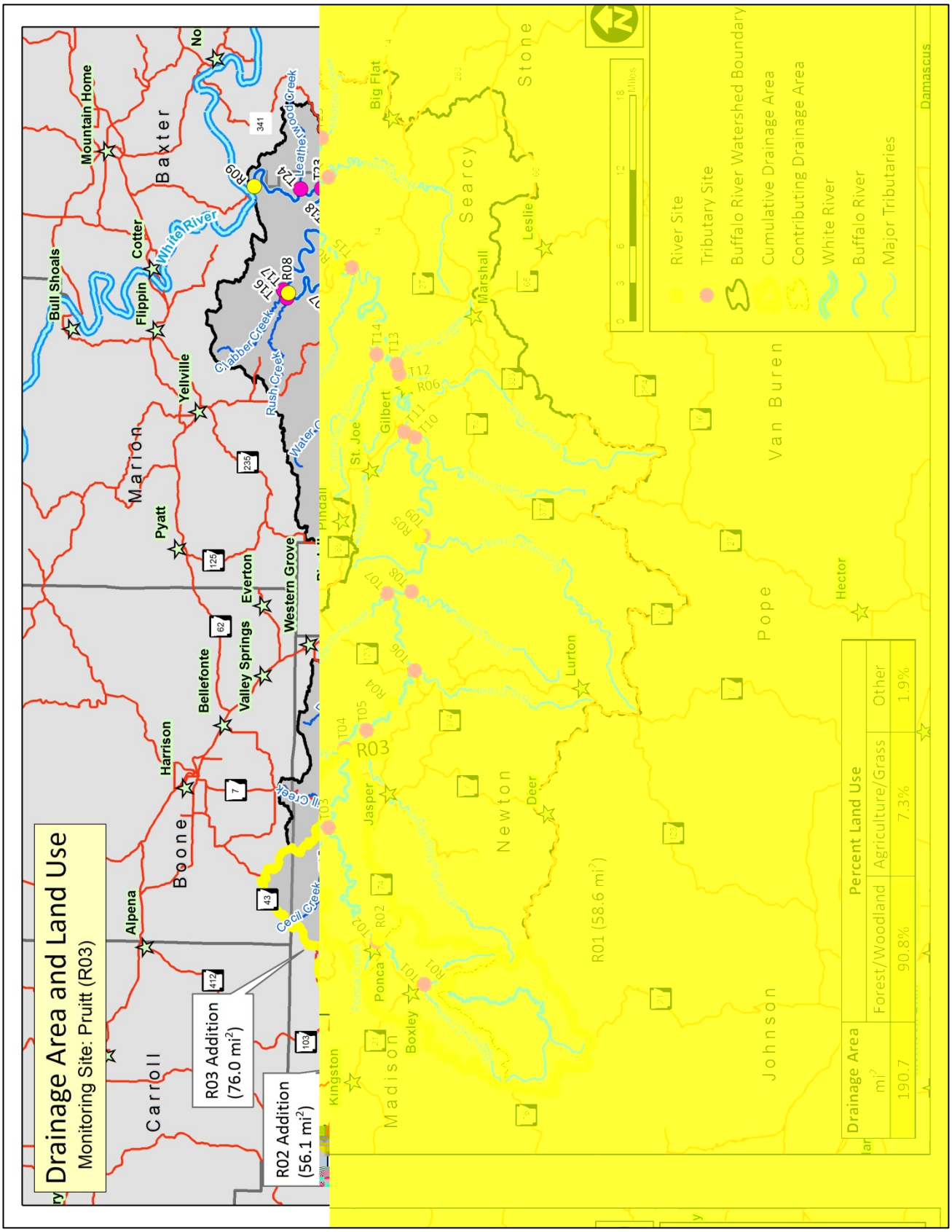
Land use percentages may not always sum to 100% because of rounding.

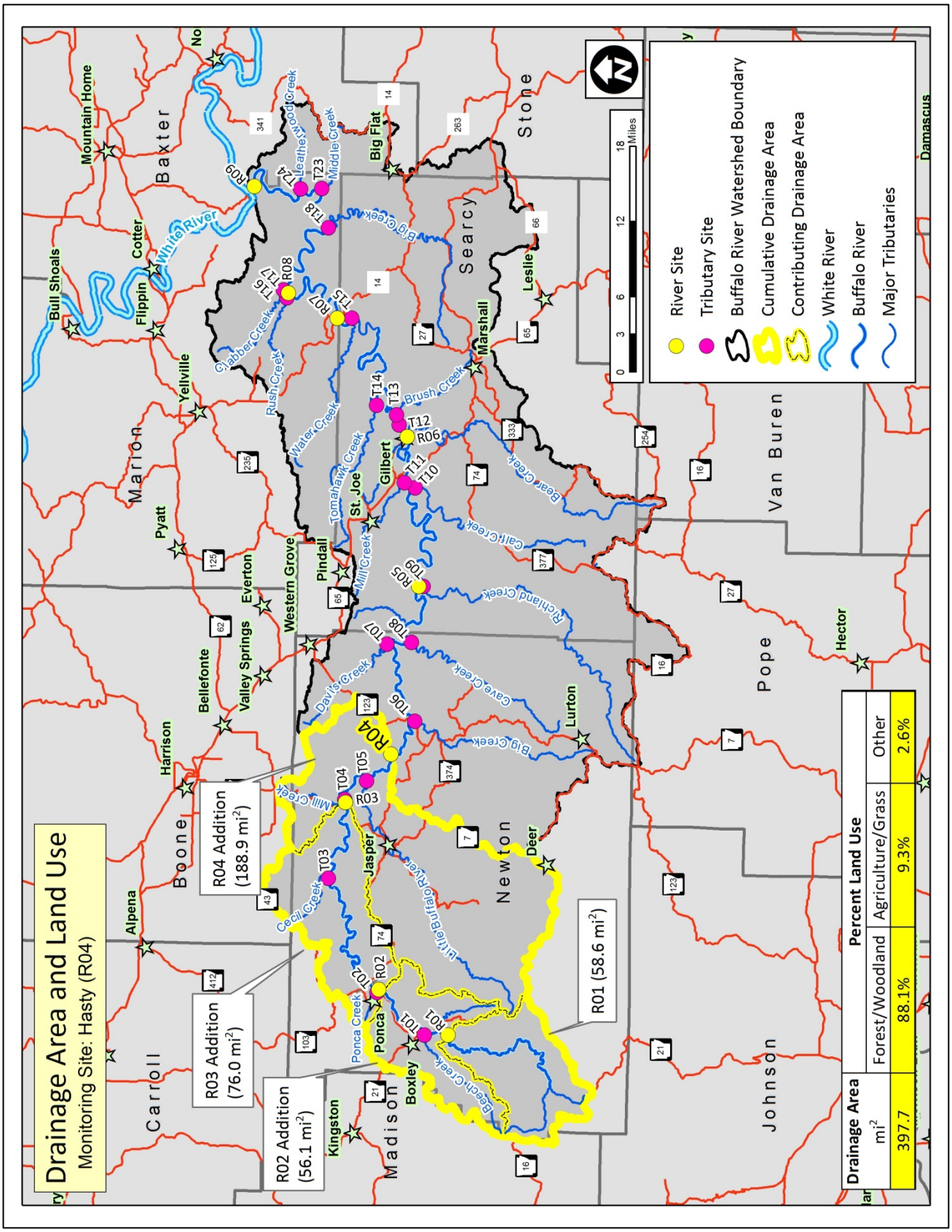
Table 1 - Land Use Statistics by Drainage Area for Buffalo River Corridor Sampling Sites

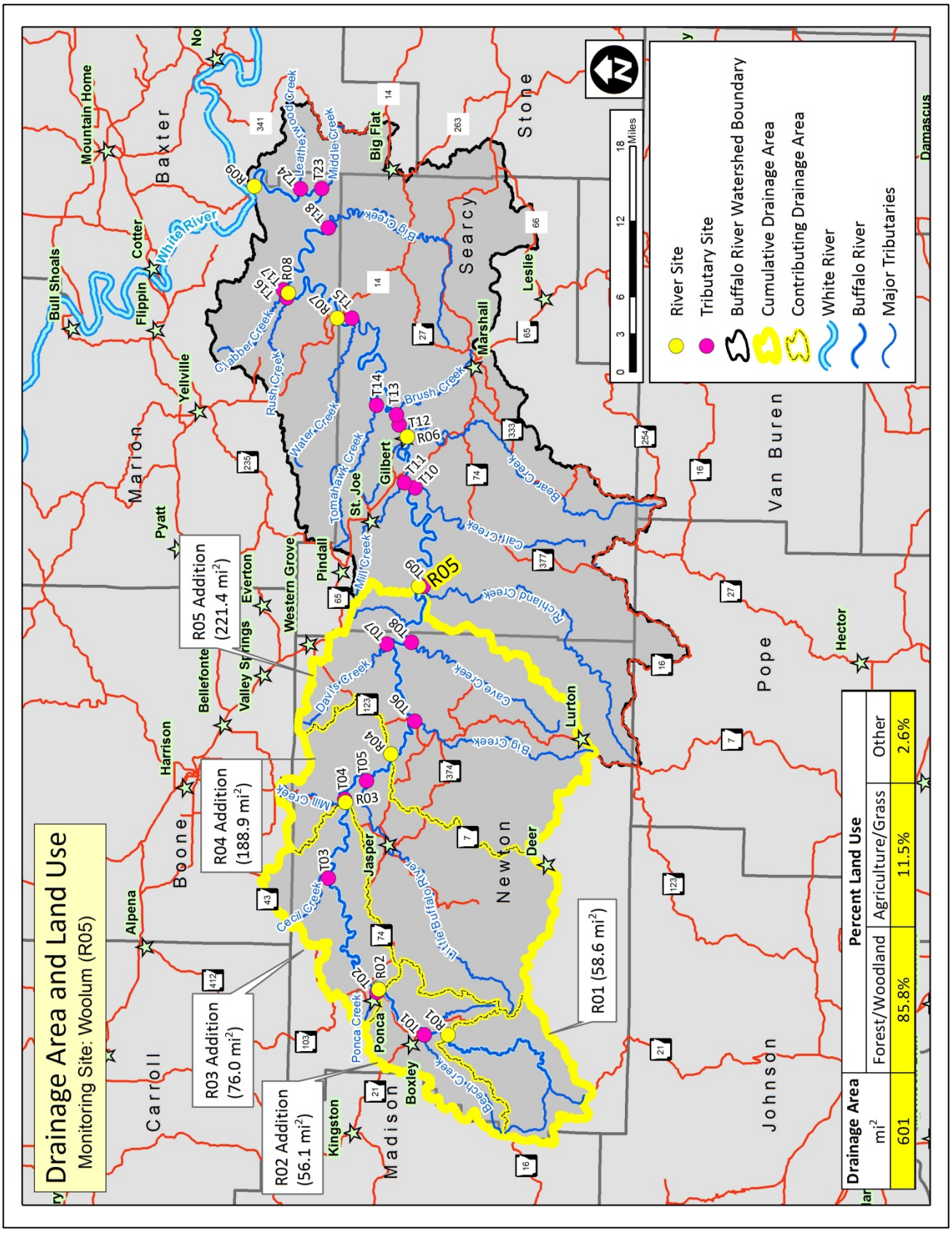
River Monitoring Sites	Site ID	Drainage Area mi^2	Dominant Land Uses %		Other Land Uses %						
			Forest/Woodland	Agriculture/Grass	Roads	Water	Urban Low Intensity	Urban High Intensity	Transitional	Barren	Other Total
	R01	58.6	93.6	4.5	1.2	0.0	0.0	0.0	0.6	0.0	1.9
	R02	114.7	90.8	7.3	1.5	0.1	0.0	0.0	0.3	0.0	1.9
	R03	190.7	90.8	7.3	1.6	0.1	0.0	0.0	0.2	0.0	1.9
	R04	397.7	88.1	9.3	2.3	0.1	0.0	0.0	0.1	0.0	2.6
	R05	601	85.8	11.5	2.3	0.2	0.0	0.0	0.1	0.0	2.6
	R06	841.1	84.6	12.8	2.2	0.2	0.0	0.0	0.2	0.0	2.6
	R07	1070.6	82.0	15.2	2.3	0.2	0.1	0.0	0.2	0.0	2.8
	R08	1094.8	82.2	15.0	2.3	0.3	0.1	0.0	0.2	0.0	2.8
	R09	1335.1	81.7	15.5	2.2	0.3	0.0	0.0	0.2	0.0	2.8


Drainage Area and Land Use
Monitoring Site: Upper Wilderness Boundary (R01)
River Site
Tributary Site
Buffalo River Watershed Boundary
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
58.6
93.6%
4.5%
1.9%
Baxter
Boone
Carroll
Madison
Marion
Newton
Searcy
Stone
Van Buren
Pope
Johnson
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Pyatt
Everton
Western Grove
Pindall
Valley Springs
Bellefonte
Harrison
Alpena
Kingston
Ponca
Boxley
Jasper
Deer
Lurton
Gilbert
St. Joe
Marshall
Leslie
Big Flat
Hector
Damascus
White River
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Brush Creek
Bear Creek
Cait Creek
Richland Creek
Mill Creek
Cave Creek
Davis Creek
Cecil Creek
Ponca Creek
Beech Creek
Little Buffalo River
Leatherwood Creek
Middle Creek
R01
R02
R03
R04
R05
R06
R07
R08
R09
T01
T02
T03
T04
T05
T06
T07
T08
T09
T10
T11
T12
T13
T14
T15
T16
T17
T18
T23
T24


Drainage Area and Land Use
Monitoring Site: Ponca (R02)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
114.7
90.8%
7.3%
1.9%
Baxter
Marion
Boone
Carroll
Madison
Searcy
Stone
Newton
Van Buren
Pope
Johnson
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Pyatt
Everton
Western Grove
Pindall
Bellefonte
Valley Springs
Harrison
Alpena
Ponca
Boxley
Kingston
Jasper
Deer
Lurton
Gilbert
St. Joe
Marshall
Leslie
Big Flat
Hector
Damascus
White River
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Mill Creek
Brush Creek
Bear Creek
Cave Creek
Richland Creek
Davis Creek
Cecil Creek
Ponca Creek
Little Buffalo River
Beech Creek
Leatherwood Creek
Middle Creek
R09
T24
T23
T18
R08
T17
T16
R07
T15
T14
T13
R06
T12
T11
T10
R05
T09
T08
T07
T06
R04
T05
T04
R03
T03
T02
R02
T01
R01


Drainage Area and Land Use
Monitoring Site: Pruitt (R03)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Percent Land Use
Drainage Area
Forest/Woodland
Agriculture/Grass
Other
190.7
90.8%
7.3%
1.9%
Carroll
Boone
Marion
Baxter
Searcy
Stone
Newton
Pope
Van Buren
Johnson
Madison
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Pyatt
Harrison
Bellefonte
Valley Springs
Everton
Western Grove
Alpena
Big Flat
Leslie
Marshall
St. Joe
Gilbert
Lurton
Deer
Jasper
Ponca
Boxley
Kingston
Hector
Damascus
White River
Clabber Creek
Rush Creek
Leatherwood Creek
Cecil Creek


Drainage Area and Land Use
Monitoring Site: Hasty (R04)
R04 Addition (188.9 mi²)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
397.7
88.1%
9.3%
2.6%
Baxter
Marion
Boone
Carroll
Madison
Searcy
Stone
Van Buren
Pope
Johnson
Newton
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Pyatt
Everton
Western Grove
Pindall
Bellefonte
Valley Springs
Harrison
Alpena
Kingston
Boxley
Ponca
Jasper
Deer
Lurton
Hector
Damascus
Big Flat
Leslie
Marshall
Gilbert
St. Joe
White River
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Mill Creek
Davis Creek
Cave Creek
Richland Creek
Bear Creek
Brush Creek
Middle Creek
Leatherwood Creek
Cecil Creek
Little Buffalo River
Beech Creek
Ponca Creek
Mill Creek


Drainage Area and Land Use
Monitoring Site: Woolum (R05)
R05 Addition (221.4 mi²)
R04 Addition (188.9 mi²)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
601
85.8%
11.5%
2.6%
Baxter
Marion
Boone
Carroll
Madison
Searcy
Stone
Newton
Van Buren
Pope
Johnson
White River
Buffalo River
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Mill Creek
Davis Creek
Cecil Creek
Ponca Creek
Beech Creek
Richland Creek
Cave Creek
Calf Creek
Bear Creek
Brush Creek
Middle Creek
Leatherwood Creek
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Pyatt
Everton
Western Grove
Pindall
Bellefonte
Valley Springs
Harrison
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Leslie
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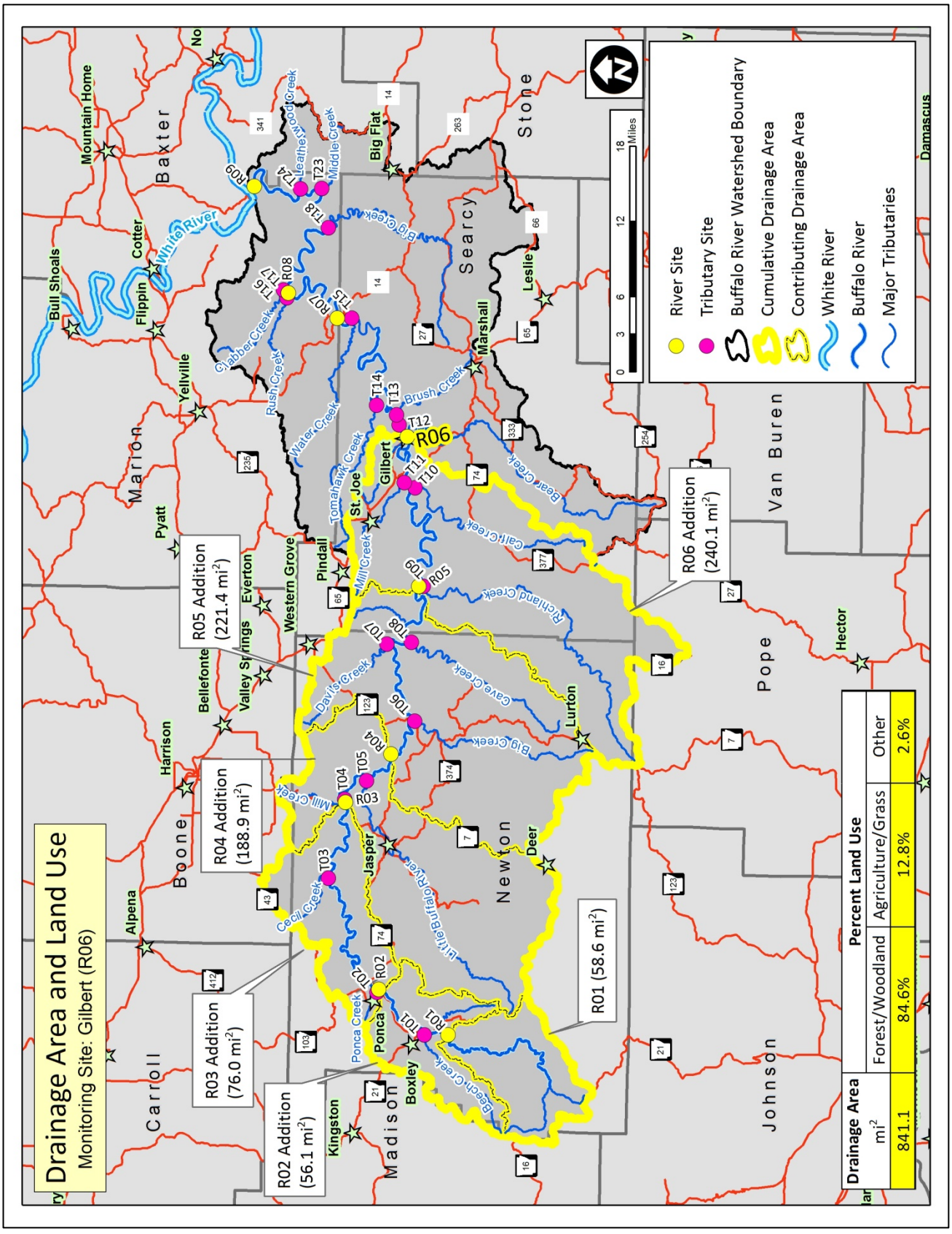
Deer
Hector
Damascus


Drainage Area and Land Use
Monitoring Site: Gilbert (R06)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
R01 (58.6 mi²)
R02 Addition (56.1 mi²)
R03 Addition (76.0 mi²)
R04 Addition (188.9 mi²)
R05 Addition (221.4 mi²)
R06 Addition (240.1 mi²)
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
841.1
84.6%
12.8%
2.6%
Boone
Carroll
Madison
Newton
Searcy
Stone
Marion
Baxter
Van Buren
Pope
Johnson
Harrison
Alpena
Bellefonte
Valley Springs
Everton
Western Grove
Pyatt
Yellville
Mountain Home
Bull Shoals
Flippin
Cotter
Pindall
St. Joe
Gilbert
Marshall
Leslie
Big Flat
Jasper
Deer
Lurton
Hector
Damascus
Kingston
Ponca
Boxley
White River
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Brush Creek
Bear Creek
Mill Creek
Cave Creek
Richland Creek
Davis Creek
Cecil Creek
Little Buffalo River
Beech Creek
Leatherwood Creek
Middle Creek
R01
R02
R03
R04
R05
R06
R07
R08
R09
T01
T02
T03
T04
T05
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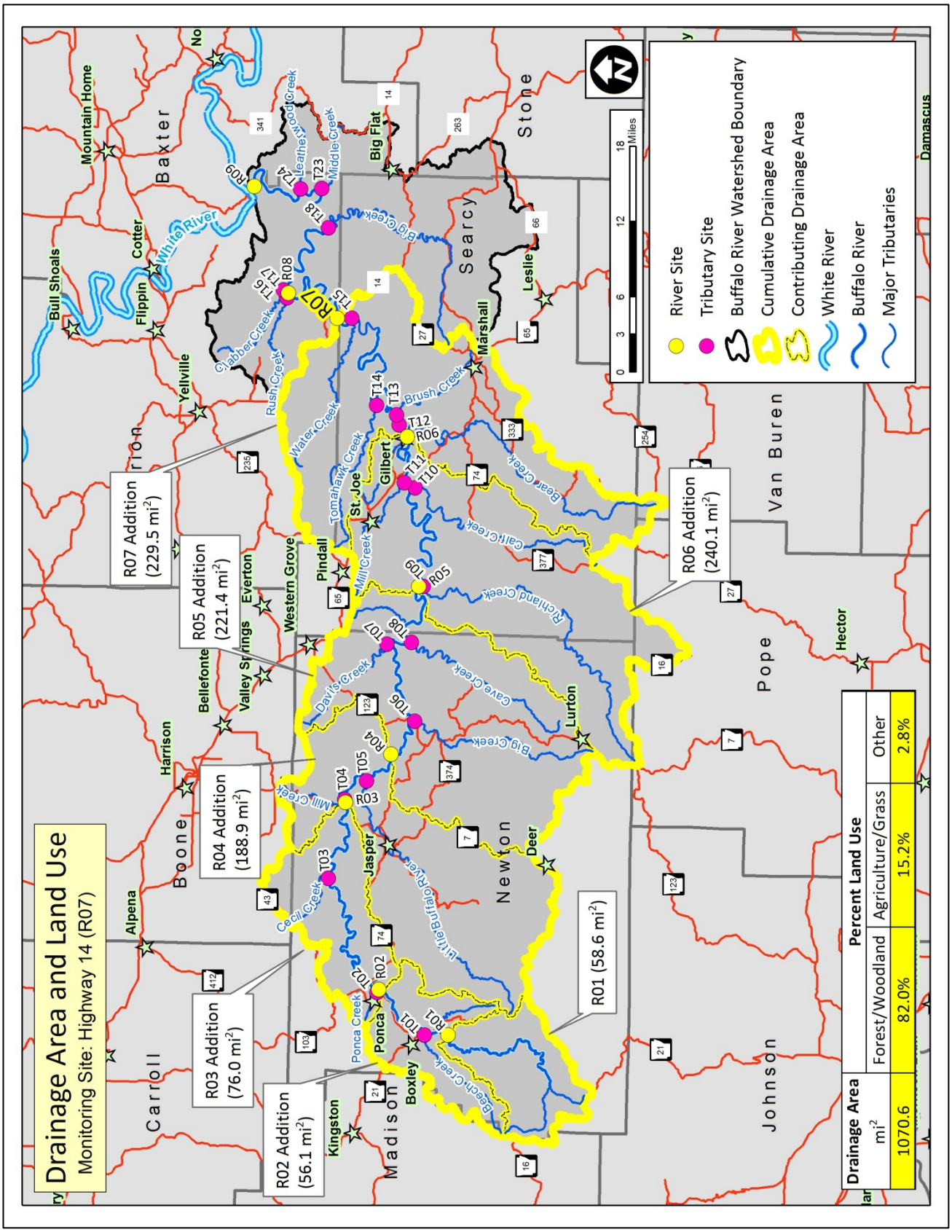
T23
T24


Drainage Area and Land Use
Monitoring Site: Highway 14 (R07)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
R07 Addition (229.5 mi²)
R05 Addition (221.4 mi²)
R06 Addition (240.1 mi²)
R04 Addition (188.9 mi²)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
1070.6
82.0%
15.2%
2.8%
Baxter
Boone
Carroll
Madison
Newton
Searcy
Stone
Van Buren
Pope
Johnson
Marion
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Harrison
Alpena
Bellefonte
Valley Springs
Everton
Western Grove
Pindall
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Leslie
Big Flat
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Big Creek
Leatherwood Creek
Middle Creek
Clabber Creek
Rush Creek
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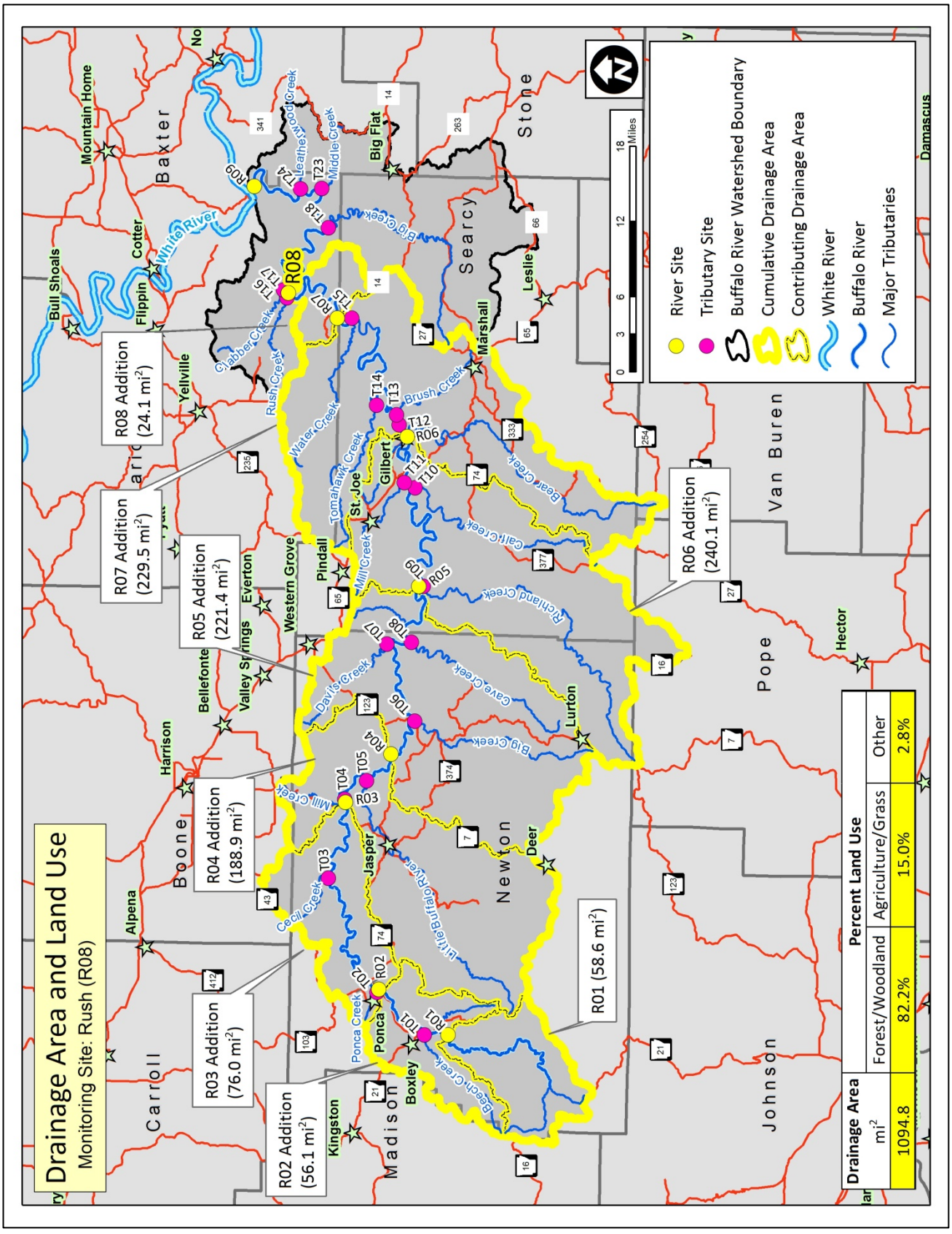
Mill Creek
Cave Creek
Richland Creek
Davis Creek
Cecil Creek
Little Buffalo River
Beech Creek
Ponca Creek


Drainage Area and Land Use
Monitoring Site: Rush (R08)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
R08 Addition (24.1 mi²)
R07 Addition (229.5 mi²)
R05 Addition (221.4 mi²)
R06 Addition (240.1 mi²)
R04 Addition (188.9 mi²)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
1094.8
82.2%
15.0%
2.8%
Baxter
Boone
Carroll
Madison
Newton
Searcy
Stone
Van Buren
Pope
Johnson
Marion
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Harrison
Alpena
Bellefonte
Valley Springs
Everton
Western Grove
Pindall
St. Joe
Gilbert
Marshall
Leslie
Big Flat
Lurton
Deer
Jasper
Ponca
Boxley
Kingston
Hector
Damascus
White River
Leatherwood Creek
Middle Creek
Big Creek
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Brush Creek
Bear Creek
Mill Creek
Cait Creek
Richland Creek
Davis Creek
Cave Creek
Big Creek
Mill Creek
Cecil Creek
Little Buffalo River
Ponca Creek
Beech Creek
R01
R02
R03
R04
R05
R06
R07
R08
R09
T01
T02
T03
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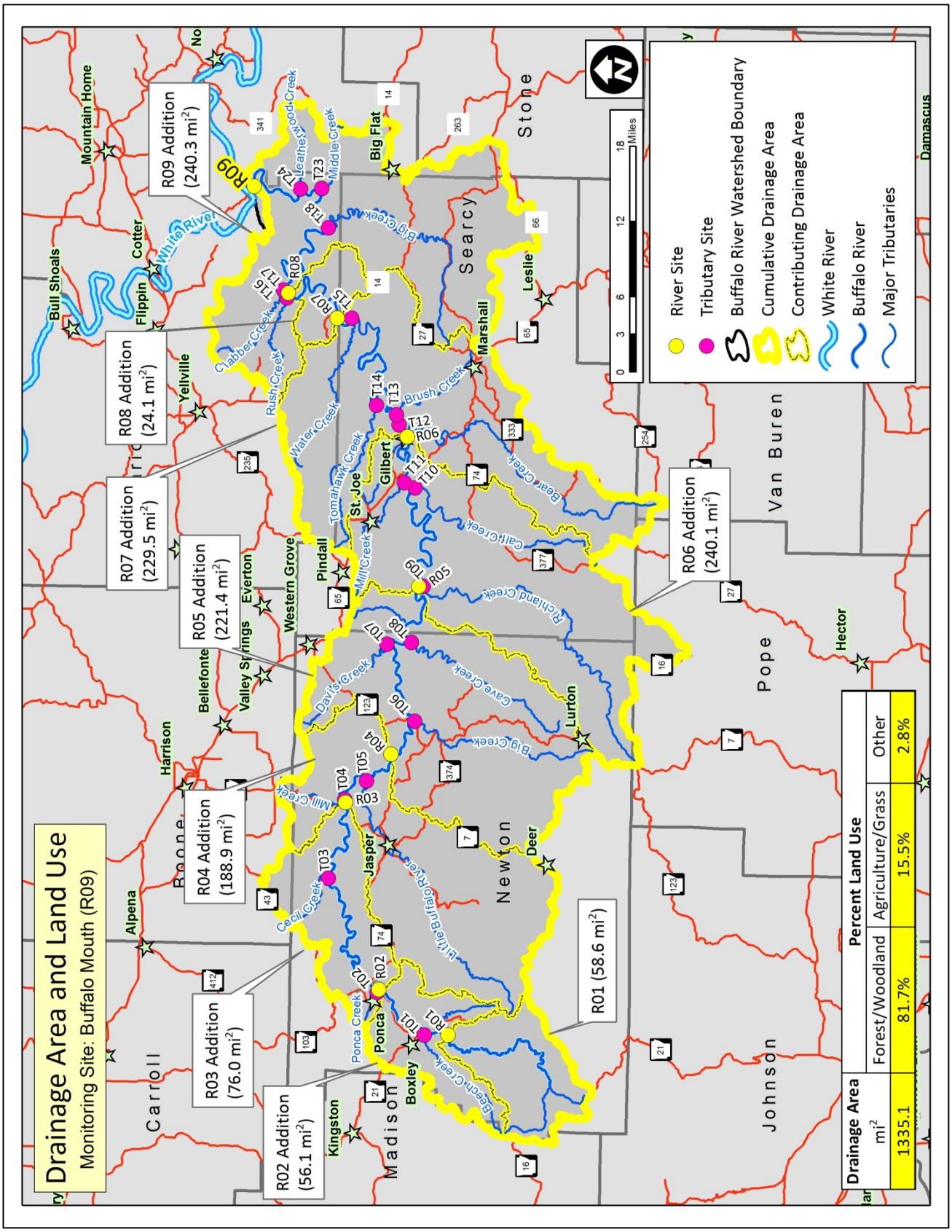
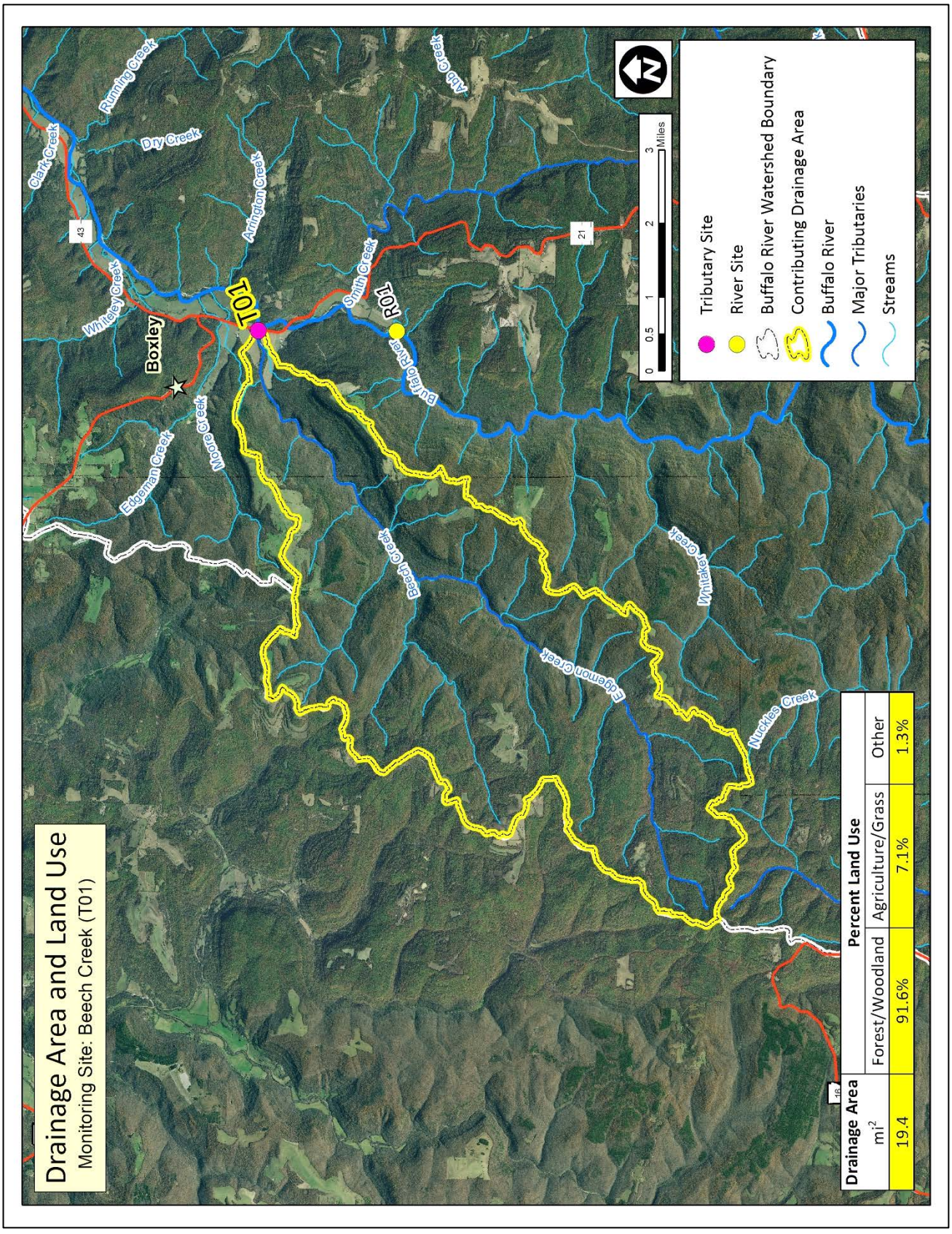
T23
T24

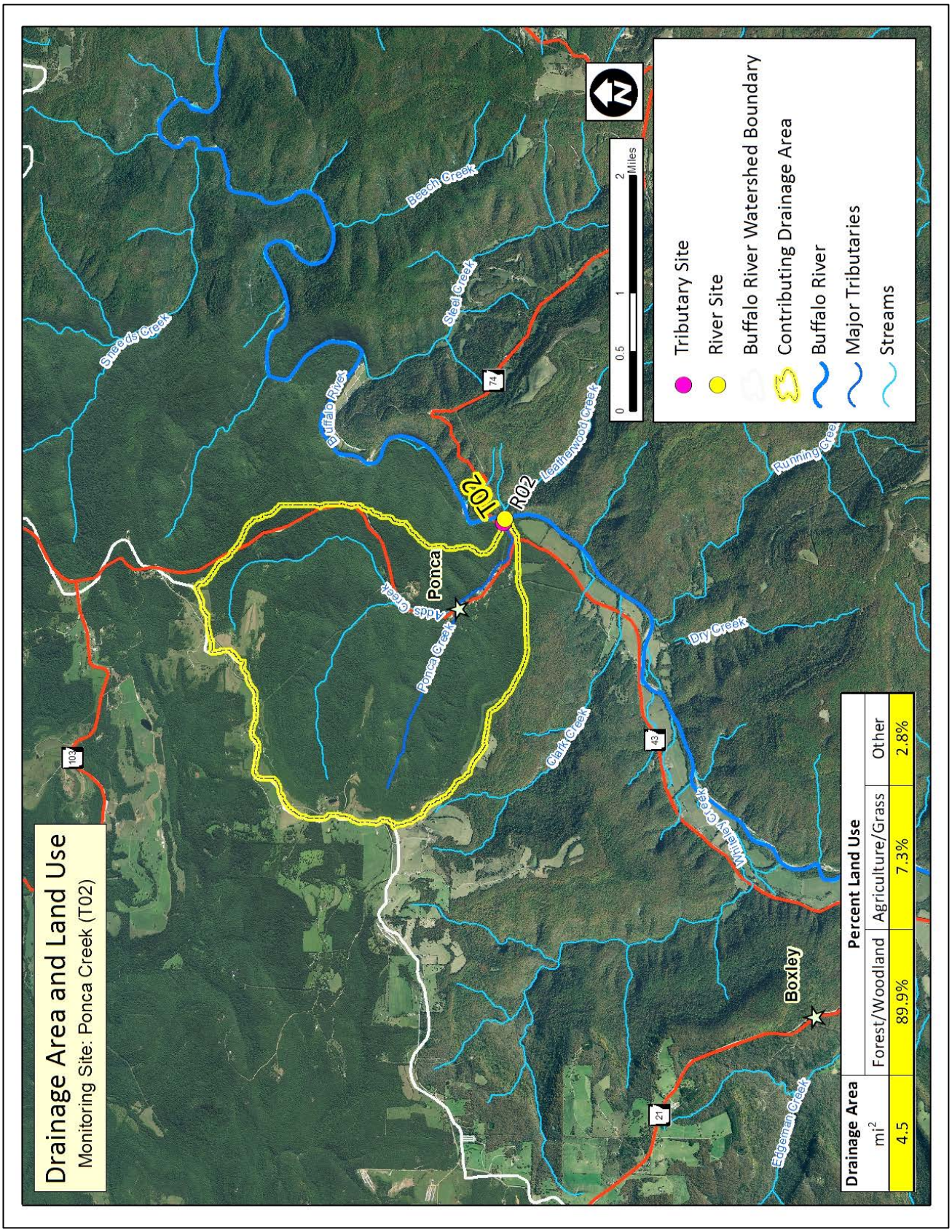

Drainage Area and Land Use
Monitoring Site: Buffalo Mouth (R09)
R09 Addition (240.3 mi²)
R08 Addition (24.1 mi²)
R07 Addition (229.5 mi²)
R06 Addition (240.1 mi²)
R05 Addition (221.4 mi²)
R04 Addition (188.9 mi²)
R03 Addition (76.0 mi²)
R02 Addition (56.1 mi²)
R01 (58.6 mi²)
River Site
Tributary Site
Buffalo River Watershed Boundary
Cumulative Drainage Area
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Miles
Drainage Area mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
1335.1
81.7%
15.5%
2.8%
Mountain Home
Bull Shoals
Flippin
Cotter
Yellville
Harrison
Alpena
Bellefonte
Valley Springs
Everton
Western Grove
Pindall
St. Joe
Gilbert
Big Flat
Leslie
Marshall
Searcy
Stone
Van Buren
Pope
Hector
Damascus
Lurton
Deer
Jasper
Newton
Boxley
Ponca
Kingston
Madison
Carroll
Johnson
White River
Buffalo River
Clabber Creek
Rush Creek
Water Creek
Tomahawk Creek
Mill Creek
Brush Creek
Bear Creek
Cait Creek
Richland Creek
Cave Creek
Davis Creek
Big Creek
Cecil Creek
Ponca Creek
Beech Creek
Leatherwood Creek
Middle Creek

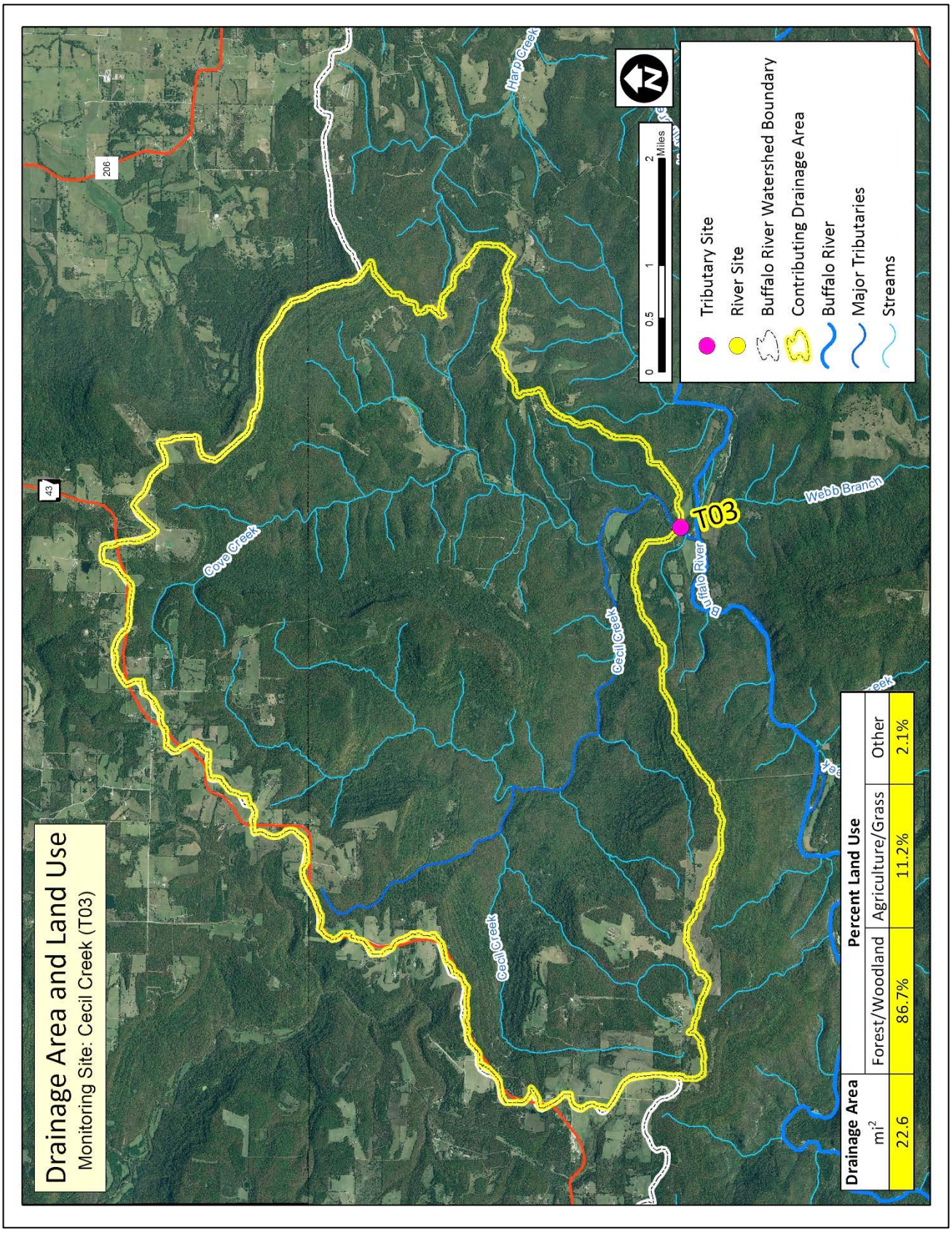
Tributary Sampling Site Results – The following table and maps contain the results of the drainage area and land use analysis for the tributary sampling sites. Drainage areas for the tributary sites are the assemblage of upstream catchments within the Buffalo River watershed. This can consist of one or many catchments depending on the location of the site in relation to the drainage network.

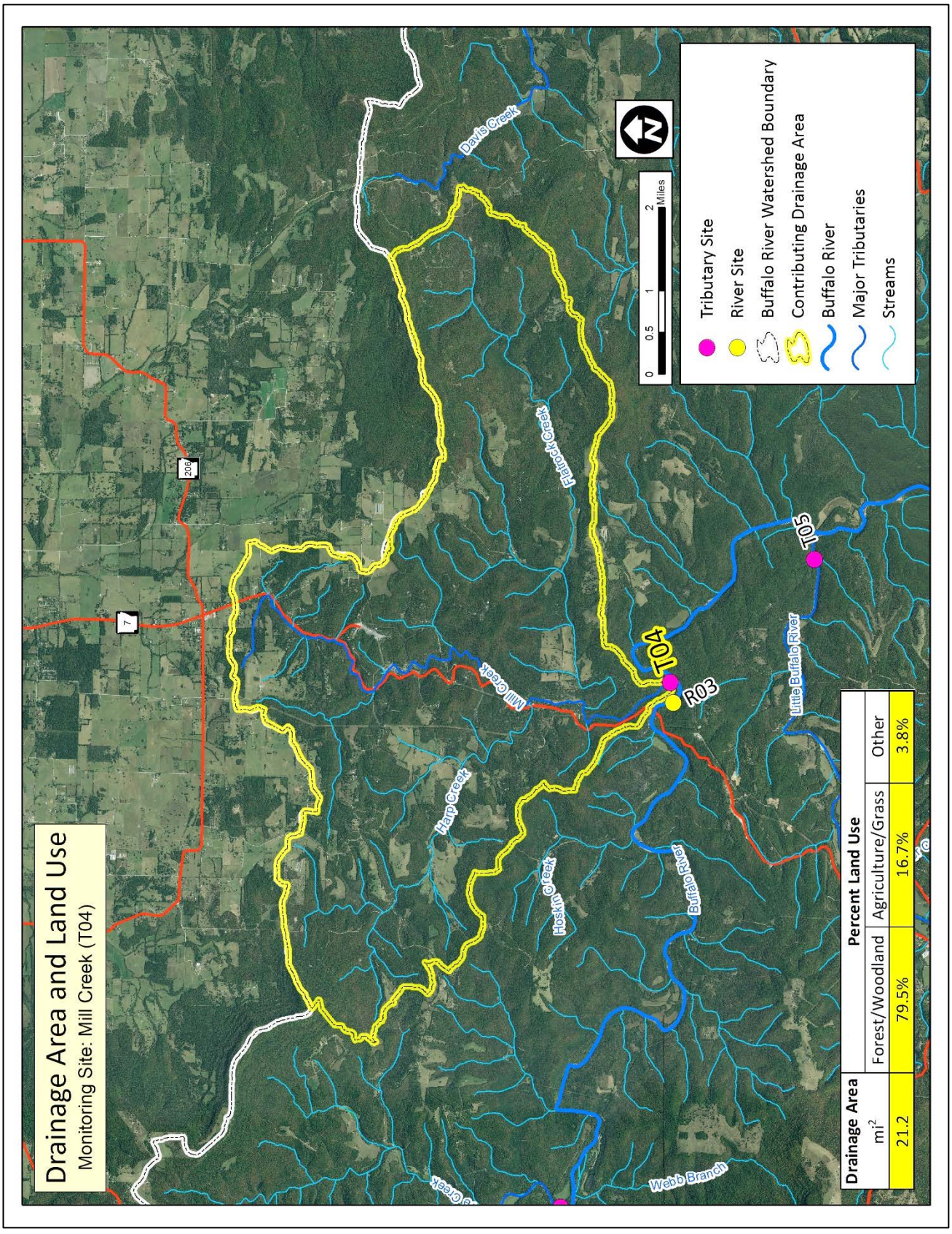
Table 2 - Land Use Statistics by Drainage Area for Buffalo River Tributary Sampling Sites

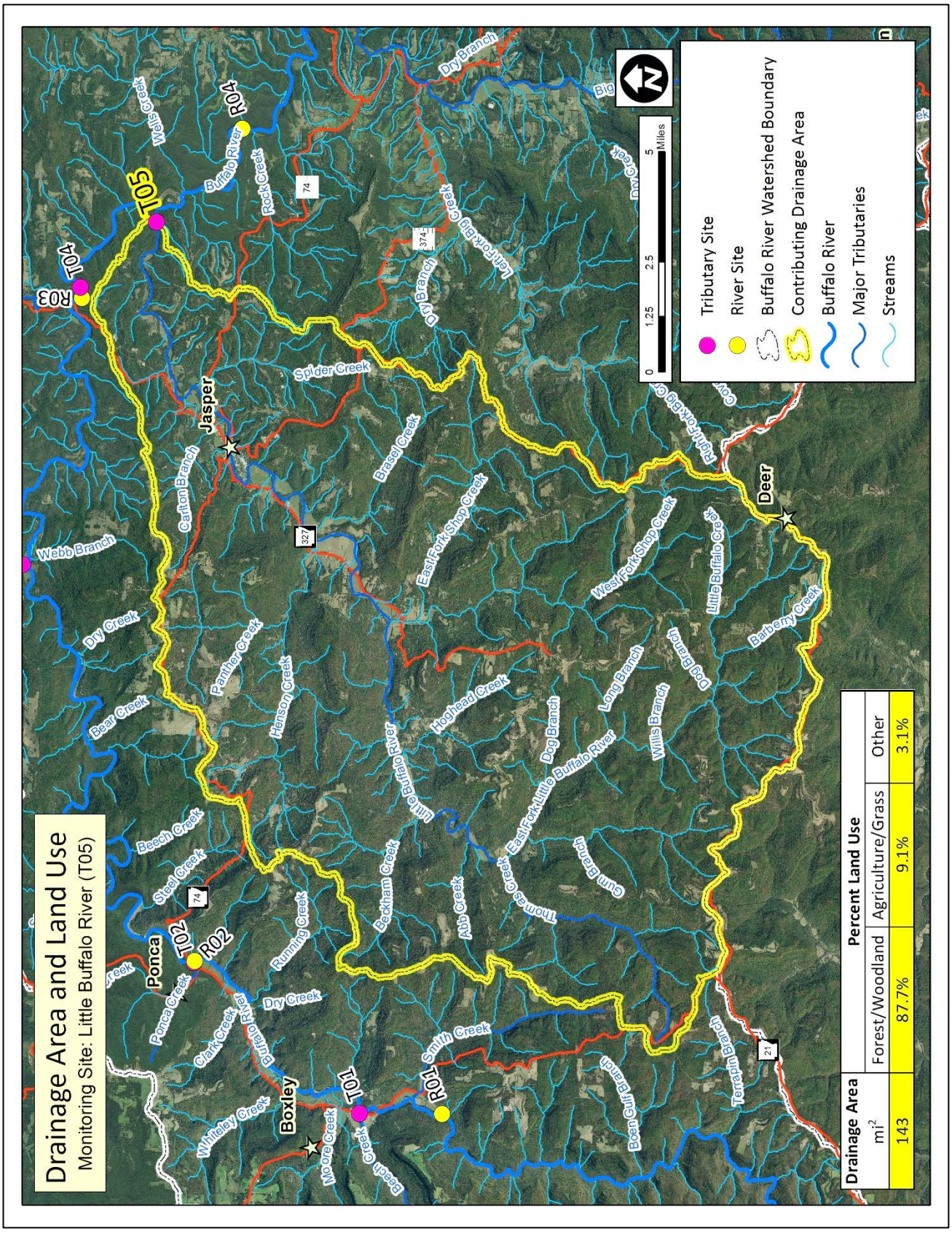
	Site ID	Drainage Area mi^2	Dominant Land Uses %		Other Land Uses %						
			Forest/Woodland	Agriculture/Grass	Roads	Water	Urban Low Intensity	Urban High Intensity	Transitional	Barren	Other Total
Tributary Monitoring Sites	T01	19.4	91.6	7.1	1.2	0.1	0.0	0.0	0.0	0.0	1.3
	T02	4.5	89.9	7.3	2.7	0.0	0.0	0.0	0.0	0.0	2.8
	T03	22.6	86.7	11.2	2.0	0.1	0.0	0.0	0.0	0.0	2.1
	T04	21.2	79.5	16.7	3.8	0.0	0.0	0.0	0.0	0.0	3.8
	T05	143	87.7	9.1	2.9	0.1	0.1	0.0	0.0	0.0	3.1
	T06	89.8	82.2	15.3	2.2	0.0	0.0	0.0	0.3	0.0	2.5
	T07	27.9	70.4	26.8	2.8	0.0	0.0	0.0	0.0	0.0	2.8
	T08	52.2	84.8	13.1	2.0	0.1	0.0	0.0	0.1	0.0	2.1
	T09	130.2	91.6	6.3	1.4	0.1	0.0	0.0	0.5	0.0	2.1
	T10	49.3	67.7	29.7	2.5	0.1	0.0	0.0	0.1	0.0	2.6
	T11	14.2	72.3	24.5	2.8	0.1	0.3	0.0	0.0	0.0	3.1
	T12	91.8	67.6	29.0	2.4	0.1	0.3	0.3	0.4	0.0	3.5
	T13	20	69.5	25.7	3.5	0.0	1.0	0.3	0.0	0.0	4.8
	T14	36.6	66.1	31.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4
	T15	38.3	79.0	18.1	2.9	0.0	0.0	0.0	0.0	0.0	2.9
	T16	15.1	89.2	8.2	2.6	0.0	0.0	0.0	0.0	0.0	2.6
	T17	26.4	74.3	23.9	1.8	0.0	0.0	0.0	0.0	0.0	1.9
	T18	133.8	71.4	25.3	2.6	0.2	0.0	0.0	0.4	0.0	3.3
	T23	11.1	98.7	0.0	1.3	0.0	0.0	0.0	0.0	0.0	1.3
	T24	12.6	98.0	0.7	1.3	0.0	0.0	0.0	0.0	0.0	1.3

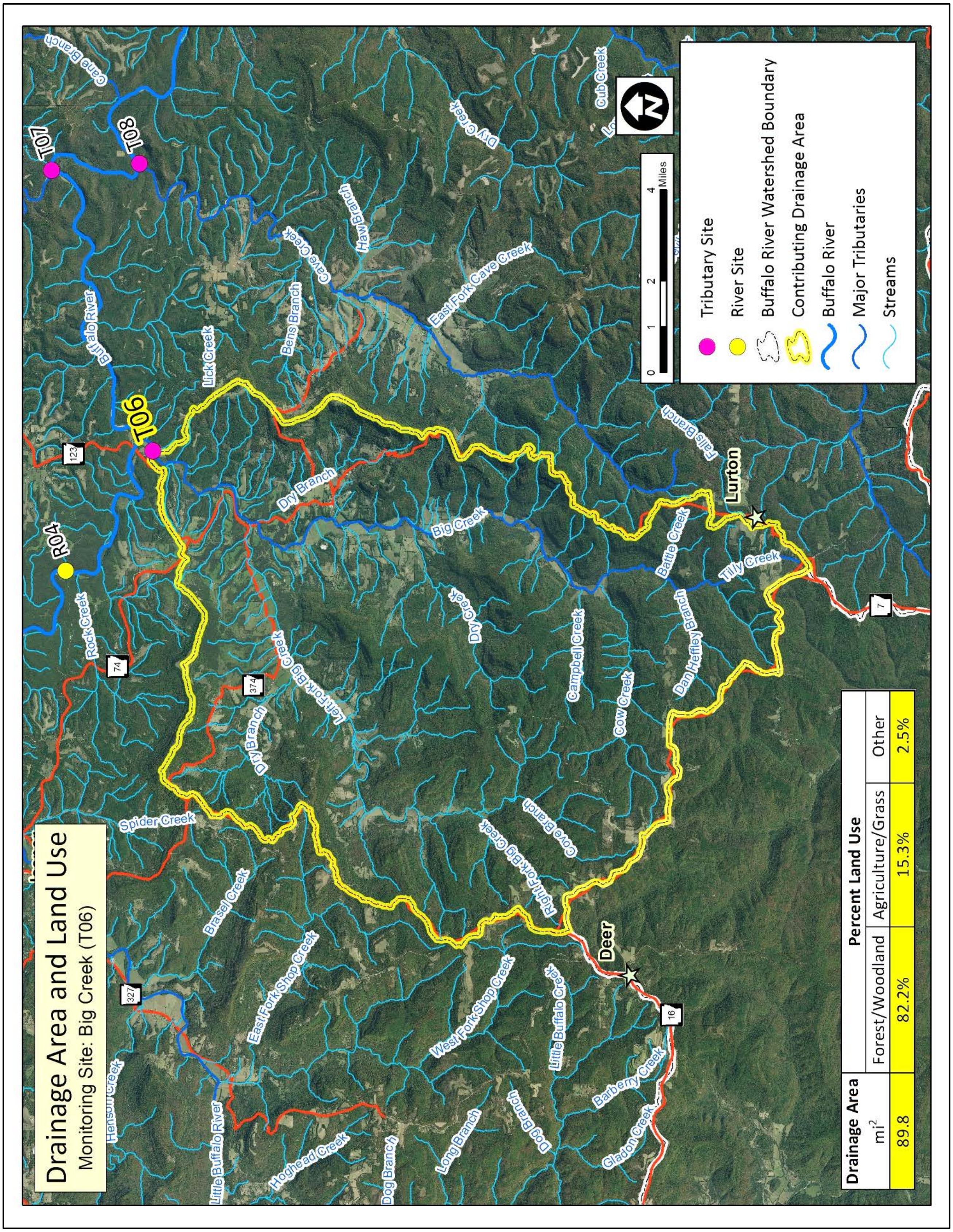

Drainage Area and Land Use
Monitoring Site: Beech Creek (T01)
Drainage Area
mi²
19.4
Percent Land Use
Forest/Woodland
91.6%
Agriculture/Grass
7.1%
Other
1.3%
T01
R01
Boxley
Clark Creek
Running Creek
Dry Creek
Arlington Creek
Ash Creek
Whiteley Creek
Smith Creek
Buffalo River
Edgeman Creek
Moore Creek
Beech Creek
Whitaker Creek
Edgemon Creek
Nuckles Creek
43
21
16
0 0.5 1 2 3 Miles
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams


Drainage Area and Land Use
Monitoring Site: Ponca Creek (T02)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
0.5
1
2
Miles
T02
R02
Ponca
Boxley
Beech Creek
Steel Creek
Sneeds Creek
Buffalo River
Leatherwood Creek
Running Creek
Dry Creek
Clark Creek
Whitley Creek
Edgeman Creek
Adds Creek
Ponca Creek
Drainage Area
mi²
4.5
Percent Land Use
Forest/Woodland
89.9%
Agriculture/Grass
7.3%
Other
2.8%

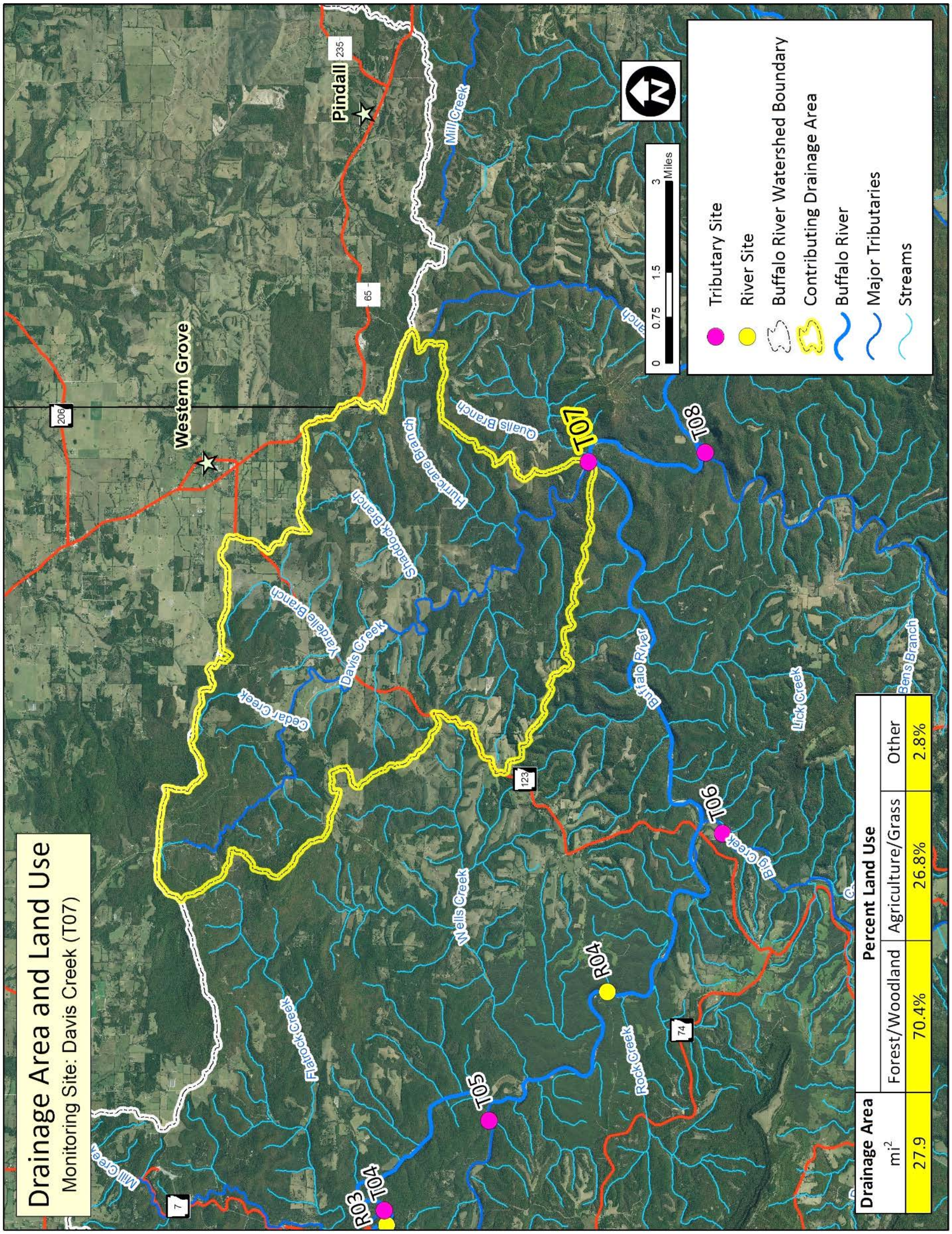

Drainage Area and Land Use
Monitoring Site: Cecil Creek (T03)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
0.5
1
2
Miles
T03
Cove Creek
Cecil Creek
Webb Branch
Harp Creek
Buffalo River
206
43
Drainage Area
mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
22.6
86.7%
11.2%
2.1%


Drainage Area and Land Use
Monitoring Site: Mill Creek (T04)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0 0.5 1 2 Miles
N
T04
R03
T05
Davis Creek
Flatrock Creek
Mill Creek
Harp Creek
Hoskin Creek
Buffalo River
Little Buffalo River
Webb Branch
206
7
Drainage Area
mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
21.2
79.5%
16.7%
3.8%

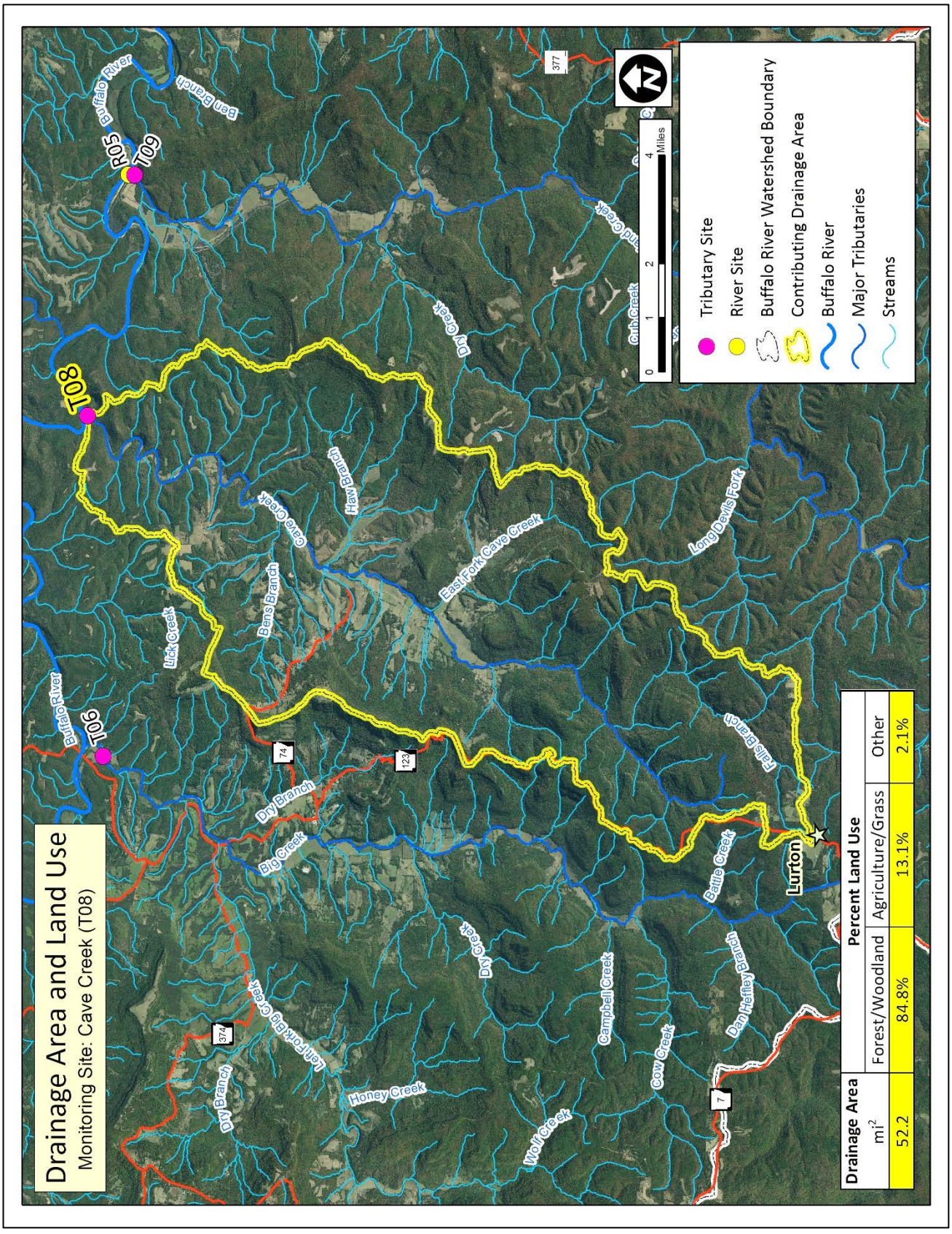

Drainage Area and Land Use
Monitoring Site: Little Buffalo River (T05)
Drainage Area
mi²
143
Percent Land Use
Forest/Woodland
87.7%
Agriculture/Grass
9.1%
Other
3.1%
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
1.25
2.5
5
Miles
T01
T02
T03
T04
T05
R01
R02
R04
Boxley
Ponca
Jasper
Deer
Buffalo River
Little Buffalo River
East Fork Little Buffalo River
Webb Branch
Dry Creek
Bear Creek
Carlton Branch
Panther Creek
Henson Creek
Spider Creek
Brasel Creek
East Fork Shop Creek
West Fork Shop Creek
Little Buffalo Creek
Barberry Creek
Hogshead Creek
Long Branch
Dog Branch
Willis Branch
Beckham Creek
Abb Creek
Thomas Creek
Gum Branch
Beech Creek
Steel Creek
Running Creek
Ponca Creek
Clark Creek
Whiteley Creek
Moore Creek
Smith Creek
Been Gulf Branch
Terrapin Branch
Rock Creek
Wells Creek
Left Fork Big Creek
Dry Branch
74
327
374
21

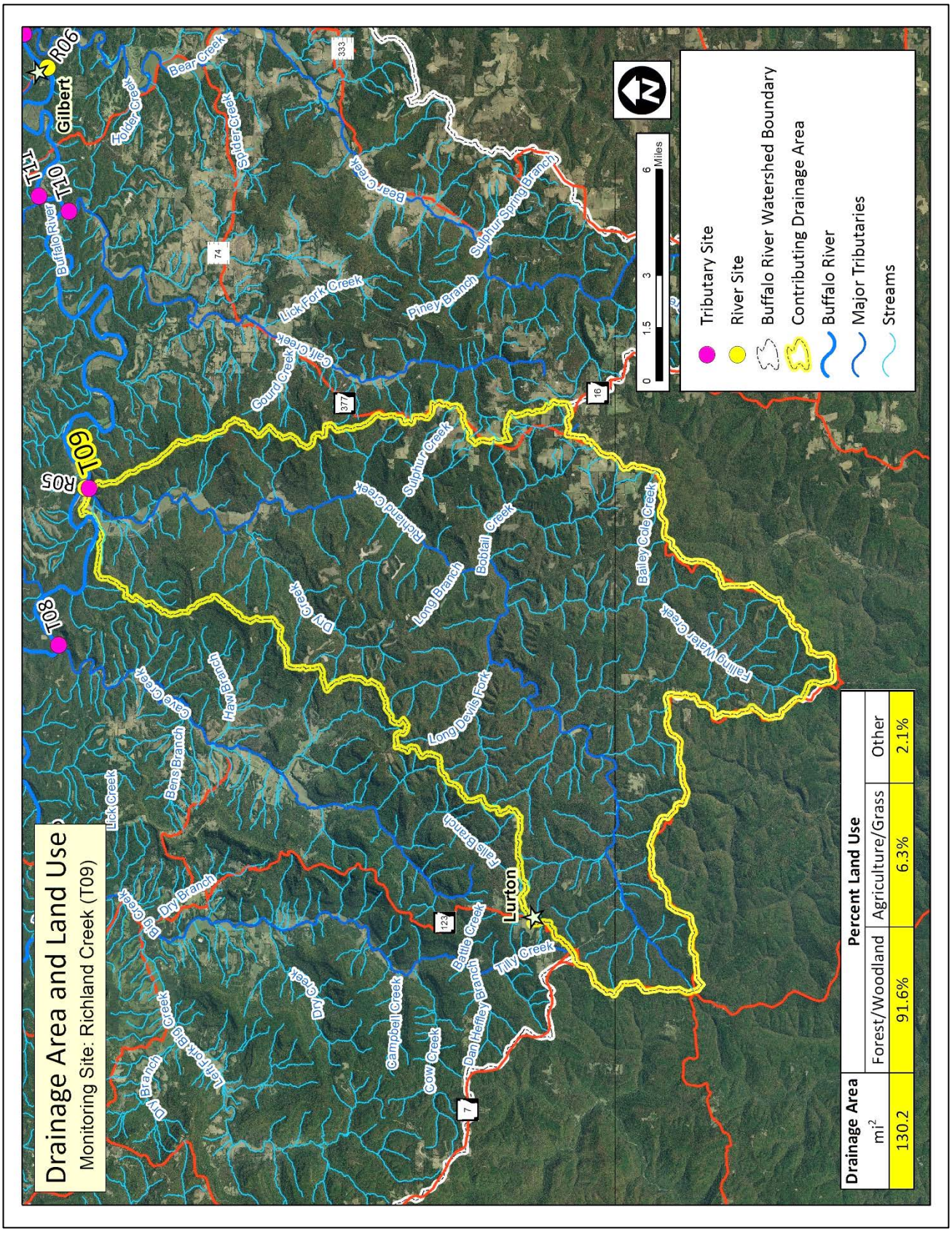

Drainage Area and Land Use
Monitoring Site: Big Creek (T06)
T06
T07
T08
R04
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
1
2
4
Miles
Lurton
Deer
Buffalo River
Big Creek
Left Fork Big Creek
Right Fork Big Creek
Dry Branch
Lick Creek
Bens Branch
Cave Creek
Haw Branch
East Fork Cave Creek
Dry Creek
Cub Creek
Cane Branch
Falls Branch
Battle Creek
Tilly Creek
Dan Heffley Branch
Campbell Creek
Cow Creek
Cove Branch
Rock Creek
Spider Creek
Brasel Creek
East Fork Shop Creek
West Fork Shop Creek
Little Buffalo Creek
Little Buffalo River
Henson Creek
Hoghead Creek
Dog Branch
Long Branch
Barberry Creek
Gladon Creek
7
16
74
123
327
374

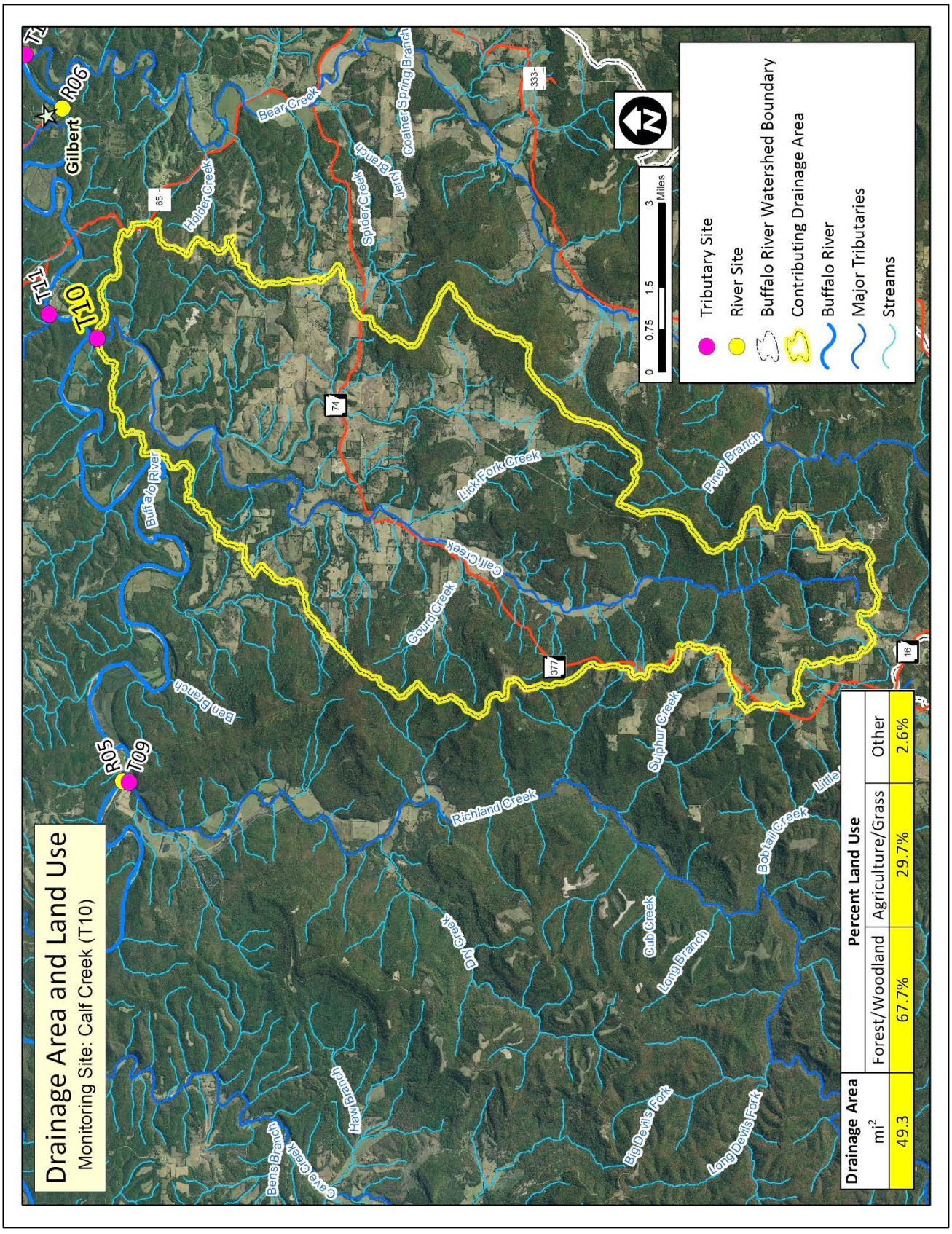
Drainage Area	Percent Land Use		
mi²	Forest/Woodland	Agriculture/Grass	Other
89.8	82.2%	15.3%	2.5%

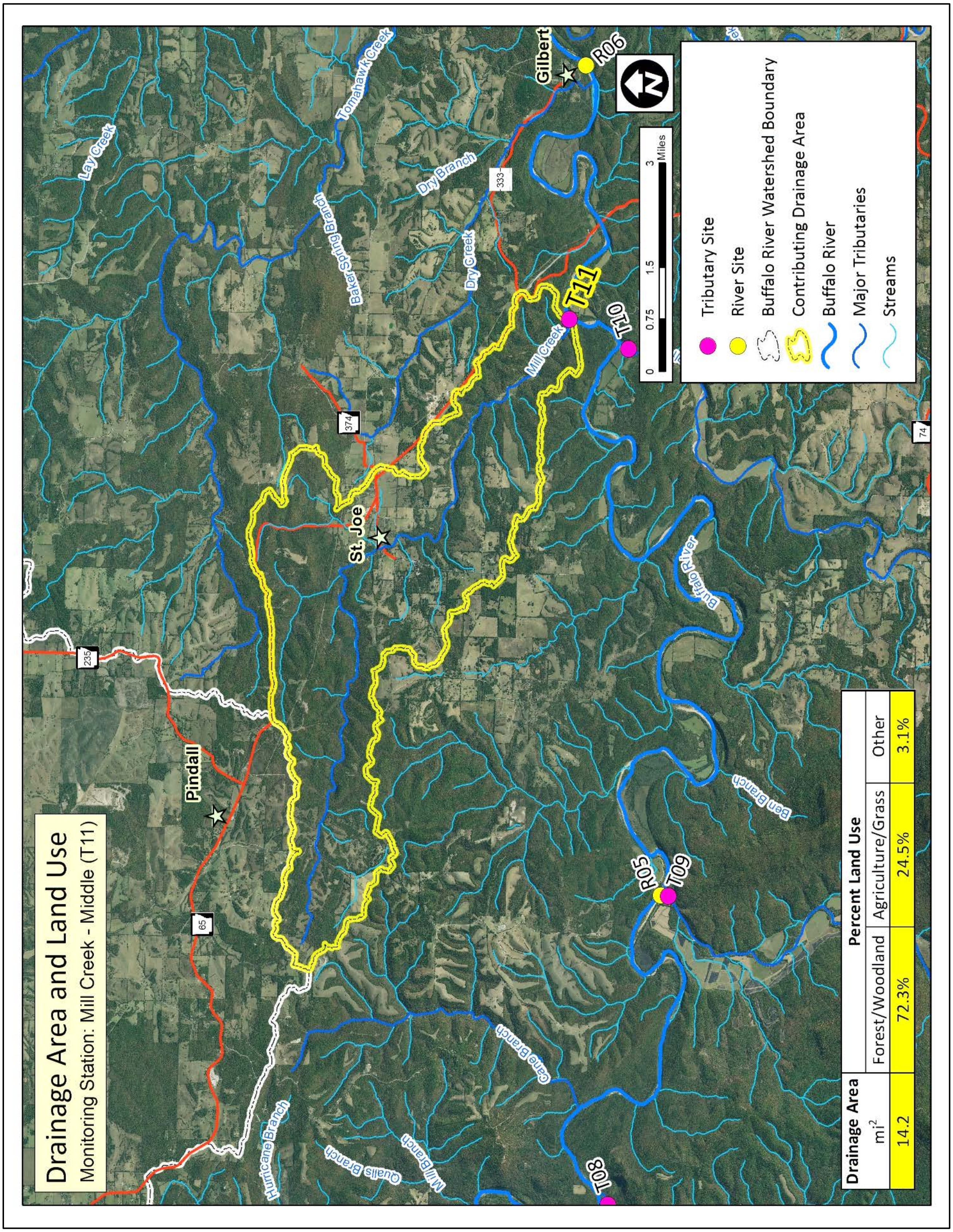

Drainage Area and Land Use
Monitoring Site: Davis Creek (T07)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0 0.75 1.5 3 Miles
Western Grove
Pindall
T07
T08
T06
T05
T04
R03
R04
Davis Creek
Cedar Creek
Yardelle Branch
Shaddock Branch
Hurricane Branch
Qualls Branch
Buffalo River
Lick Creek
Bens Branch
Big Creek
Wells Creek
Rock Creek
Flatrock Creek
Mill Creek
206
65
235
123
74
7

Drainage Area mi^2	Percent Land Use		
	Forest/Woodland	Agriculture/Grass	Other
27.9	70.4%	26.8%	2.8%

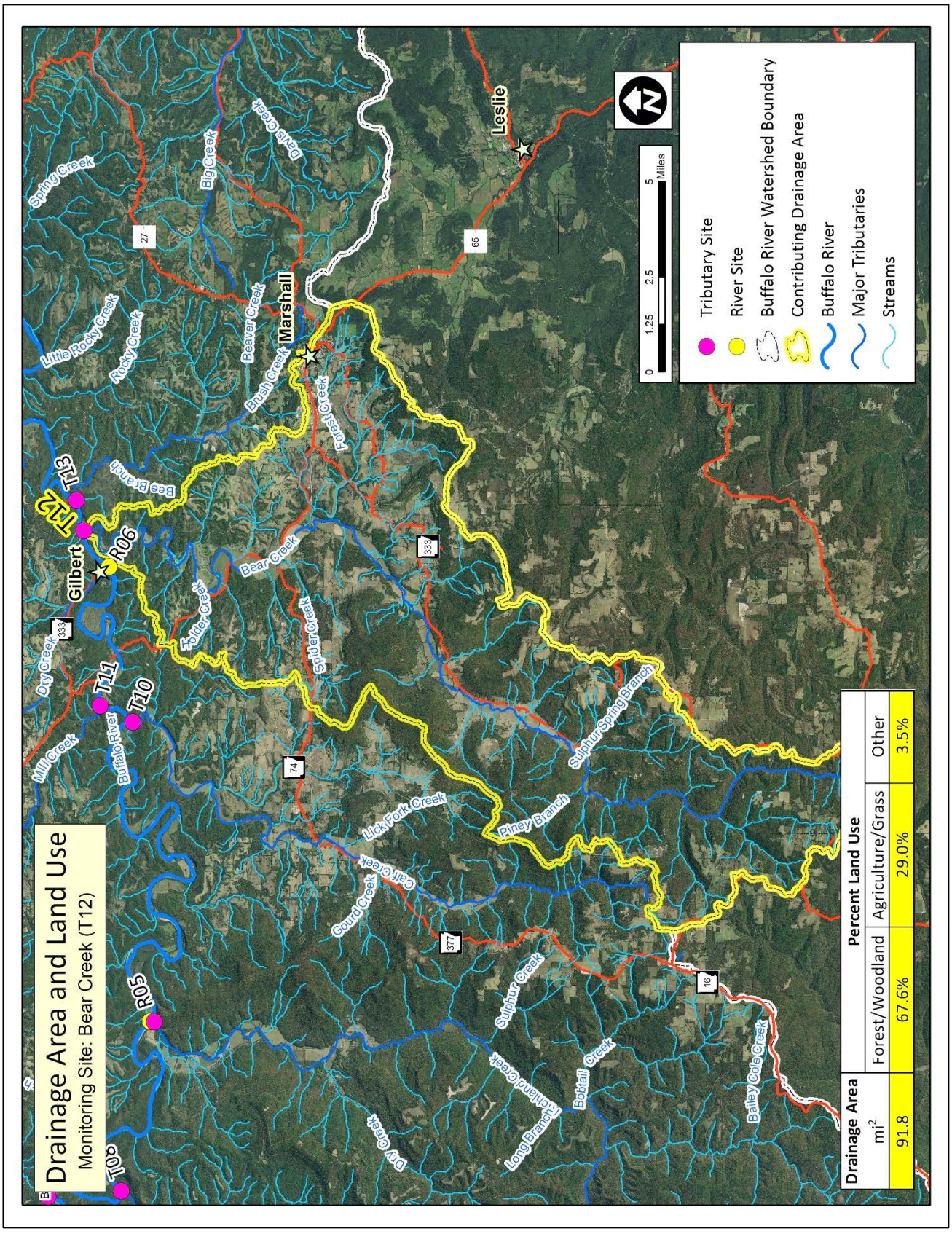

Drainage Area and Land Use
Monitoring Site: Cave Creek (T08)
T06
T08
R05
T09
Buffalo River
Ben Branch
Lick Creek
Bens Branch
Cave Creek
Hawg Branch
Dry Creek
East Fork Cave Creek
Long Devils Fork
Fall Branch
Dry Branch
Big Creek
Battle Creek
Lurton
Dry Creek
Campbell Creek
Cow Creek
Dan Heffley Branch
Wolf Creek
Honey Creek
Left Fork Big Creek
Dry Branch
Crib Creek
74
123
374
7
377
0 1 2 4 Miles
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
Drainage Area mi²
52.2
Percent Land Use
Forest/Woodland
84.8%
Agriculture/Grass
13.1%
Other
2.1%

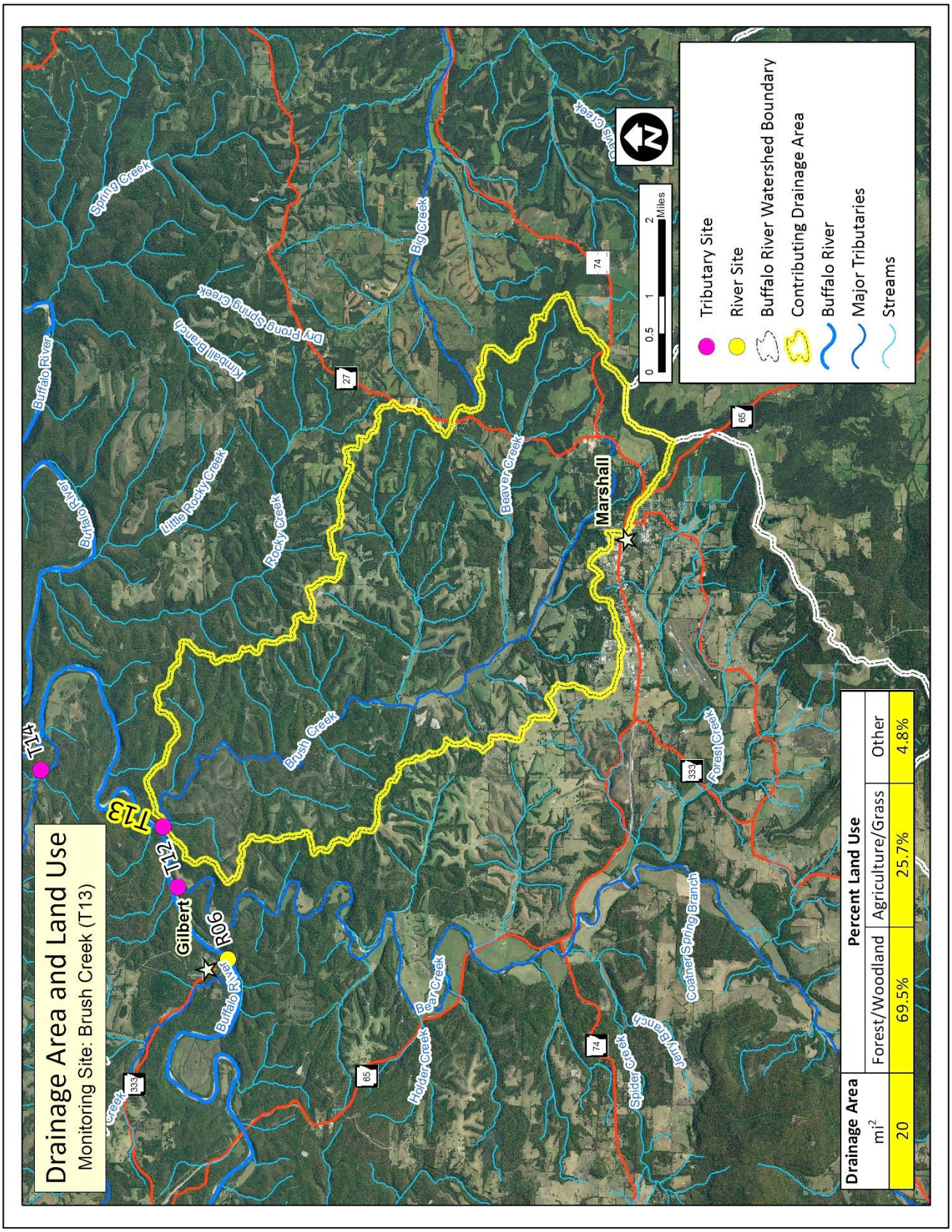

Drainage Area and Land Use
Monitoring Site: Richland Creek (T09)
Drainage Area
mi²
130.2
Percent Land Use
Forest/Woodland
91.6%
Agriculture/Grass
6.3%
Other
2.1%
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
1.5
3
6
Miles
N
R06
T11
T10
Gilbert
R05
T09
T08
Lurton
Buffalo River
Bear Creek
Holder Creek
Spider Creek
Bear Creek
Sulphur Spring Branch
Lick Fork Creek
Piney Branch
Gulf Creek
Gourd Creek
Sulphur Creek
Richland Creek
Bobtail Creek
Bailey Cate Creek
Dry Creek
Long Branch
Falling Water Creek
Hawg Branch
Cave Creek
Long Devils Fork
Bens Branch
Lick Creek
Falls Branch
Big Creek
Dry Branch
Battle Creek
Tully Creek
Dry Creek
Campbell Creek
Cow Creek
Dan Heifley Branch
Left Fork Big Creek
Dry Branch
74
333
377
16
123
7

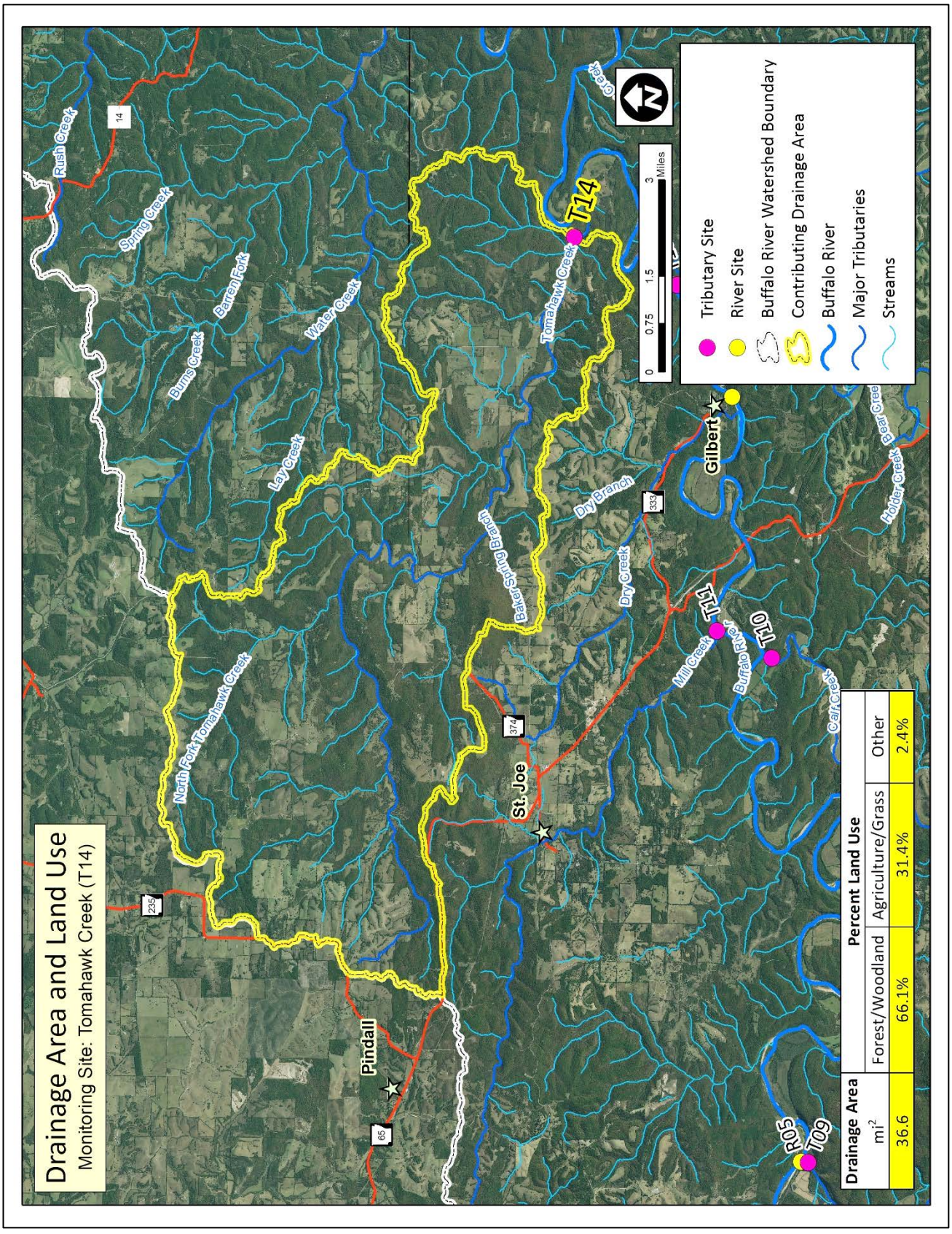

Drainage Area and Land Use
Monitoring Site: Calf Creek (T10)
Gilbert
R06
T11
T10
R05
T09
Bear Creek
Holder Creek
Spider Creek
Jerry Branch
Coatner Spring Branch
Buffalo River
Lick Fork Creek
Gall Creek
Gourd Creek
Piney Branch
Ben Branch
Richland Creek
Sulphur Creek
Bobtail Creek
Cub Creek
Long Branch
Big Devils Fork
Long Devils Fork
Haw Branch
Bens Branch
Cave Creek
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0 0.75 1.5 3 Miles
Drainage Area mi²
49.3
Percent Land Use
Forest/Woodland 67.7%
Agriculture/Grass 29.7%
Other 2.6%

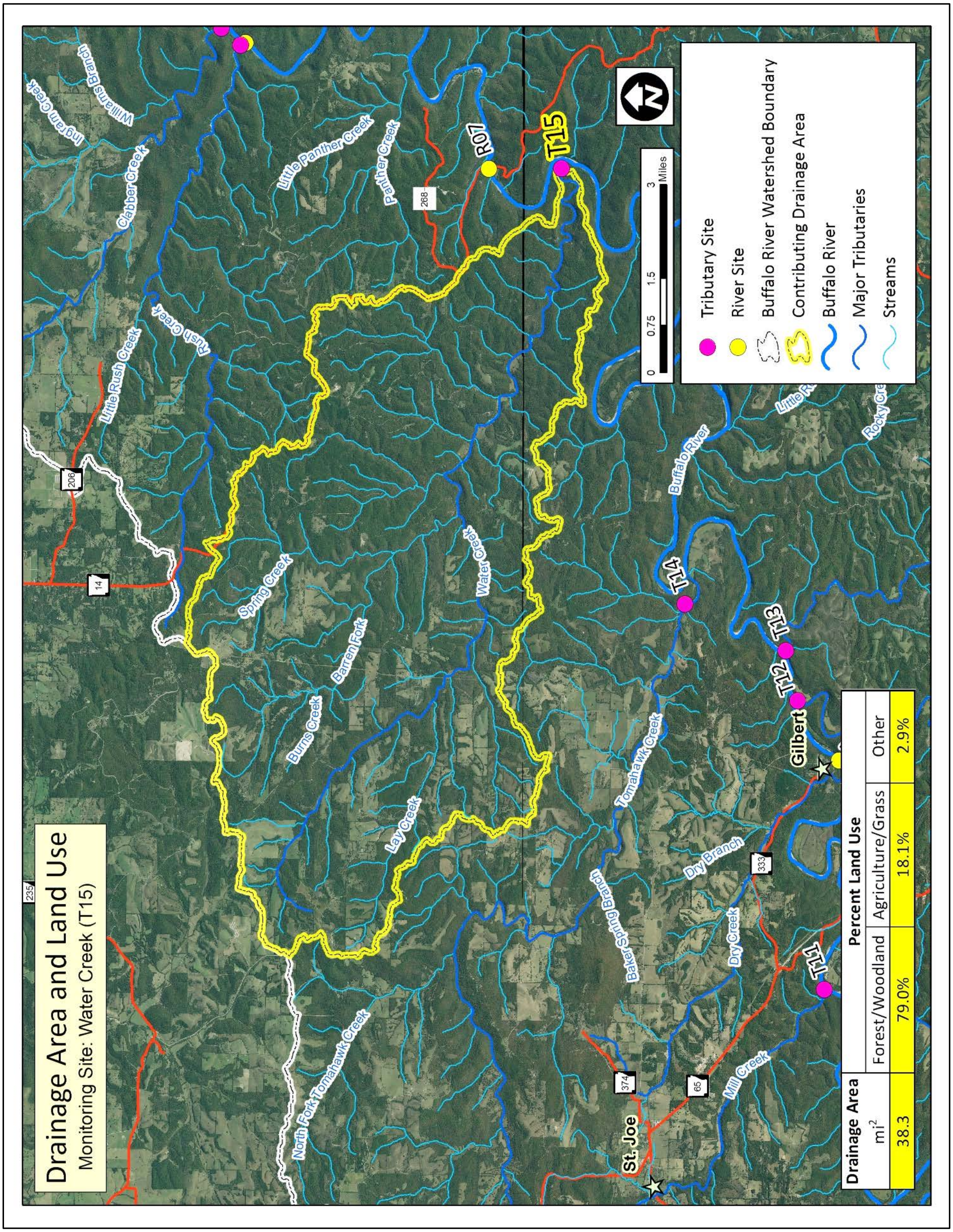

Drainage Area and Land Use
Monitoring Station: Mill Creek - Middle (T11)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0 0.75 1.5 3 Miles
T11
T10
T09
T08
R05
R06
St. Joe
Gilbert
Pindall
Mill Creek
Dry Creek
Dry Branch
Baker Spring Branch
Tomahawk Creek
Lay Creek
Buffalo River
Ben Branch
Cane Branch
Hurricane Branch
Qualls Branch
Mill Branch
65
235
374
333
74

Drainage Area mi²	Percent Land Use		
	Forest/Woodland	Agriculture/Grass	Other
14.2	72.3%	24.5%	3.1%

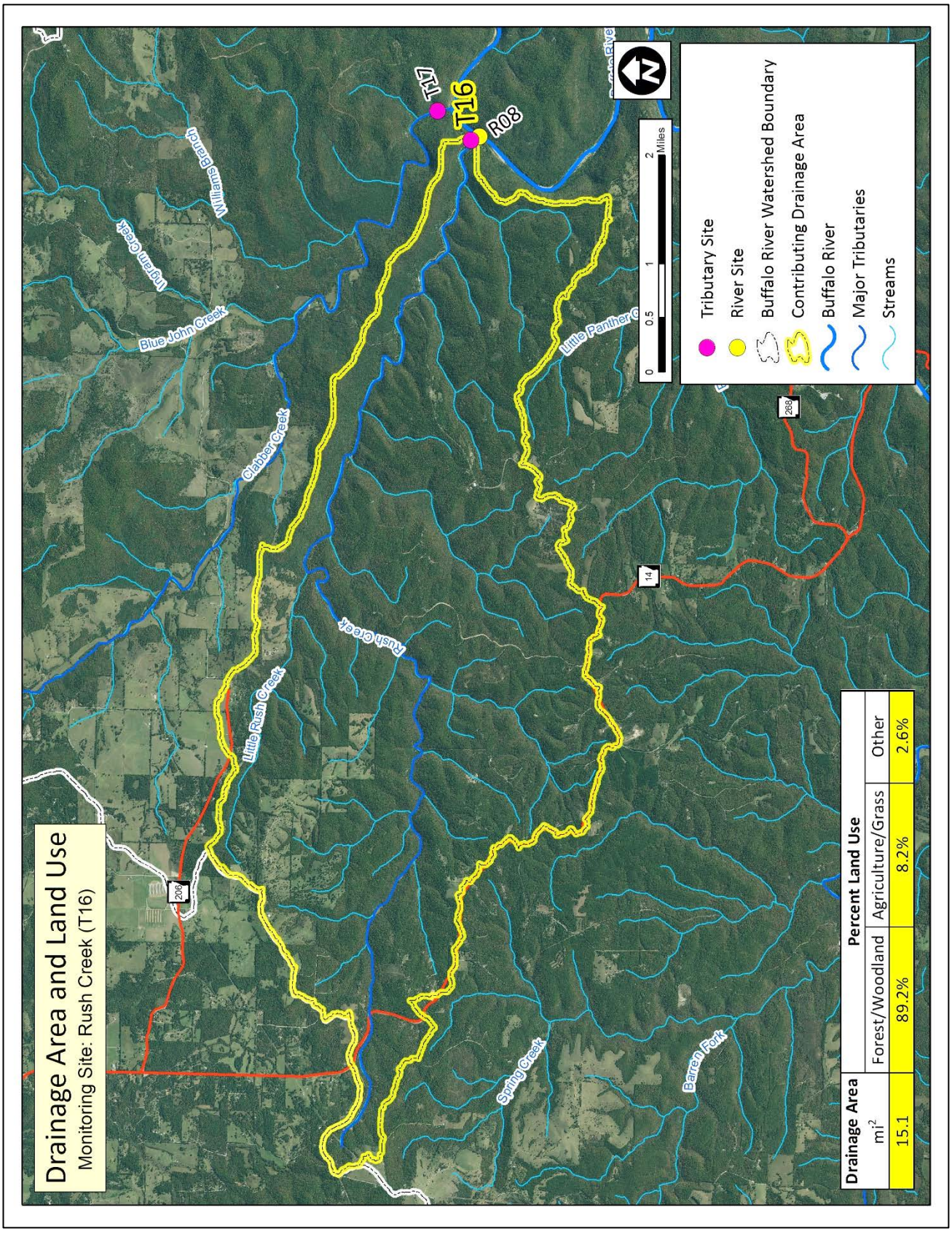

Drainage Area and Land Use
Monitoring Site: Bear Creek (T12)
T05
R05
T10
T11
R06
T12
T13
Gilbert
Marshall
Leslie
Buffalo River
Mill Creek
Dry Creek
Bee Branch
Little Rocky Creek
Rocky Creek
Spring Creek
Big Creek
Davis Creek
Beaver Creek
Brush Creek
Forest Creek
Bear Creek
Spider Creek
Holder Creek
Lick Fork Creek
Gourd Creek
Calf Creek
Piney Branch
Sulphur Spring Branch
Sulphur Creek
Bobtail Creek
Long Branch
Dry Gap
Bailey Cole Creek
27
65
74
333
377
16
0 1.25 2.5 5 Miles
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
Drainage Area
mi²
91.8
Percent Land Use
Forest/Woodland
67.6%
Agriculture/Grass
29.0%
Other
3.5%

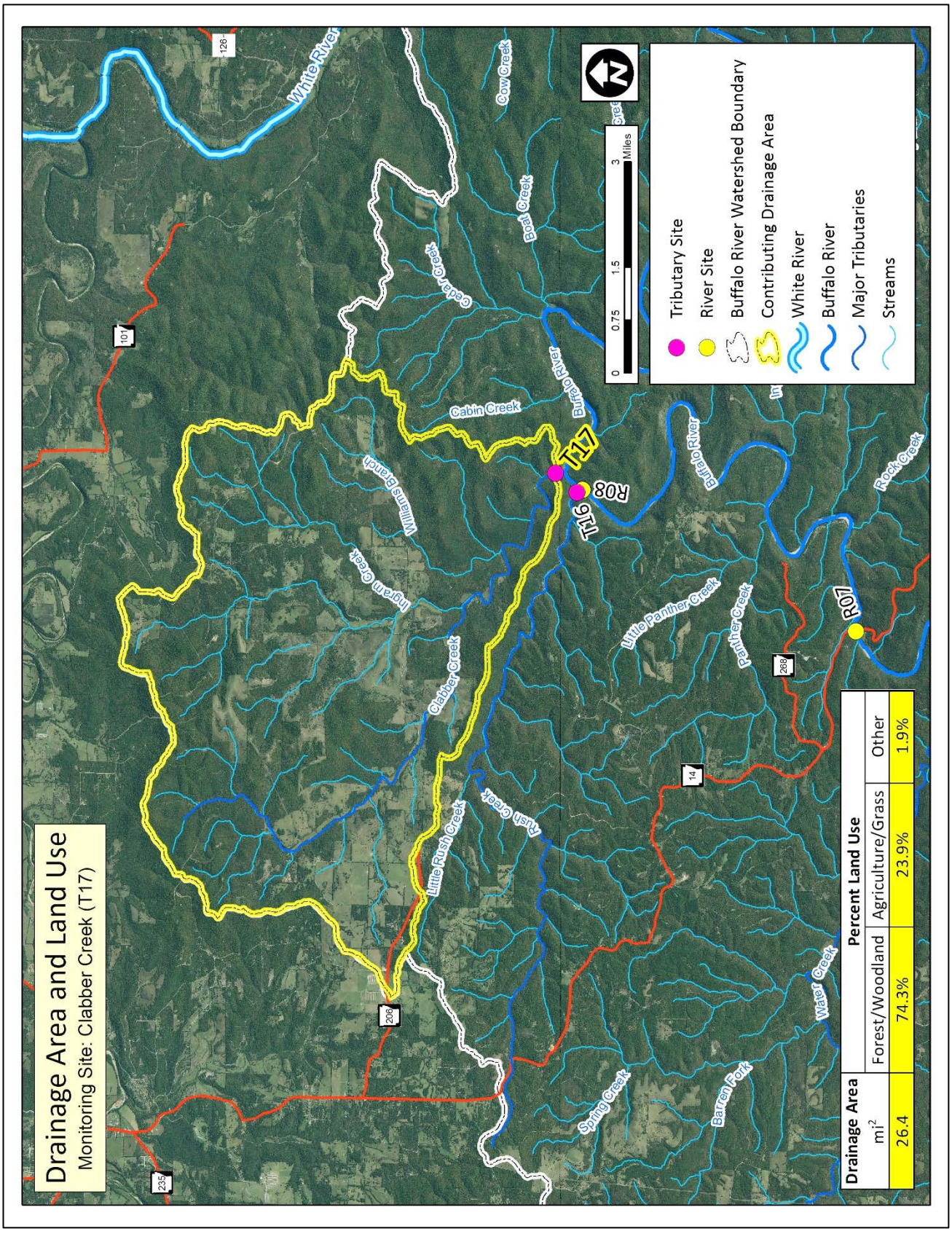

Drainage Area and Land Use
Monitoring Site: Brush Creek (T13)
T14
T13
T12
R06
Gilbert
Marshall
Buffalo River
Spring Creek
Big Creek
Dry Prong Spring Creek
Kimball Branch
Little Rocky Creek
Rocky Creek
Brush Creek
Beaver Creek
Forest Creek
Bear Creek
Holder Creek
Spider Creek
Coalner Spring Branch
Jerry Branch
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
Miles
Drainage Area
mi²
20
Percent Land Use
Forest/Woodland
69.5%
Agriculture/Grass
25.7%
Other
4.8%

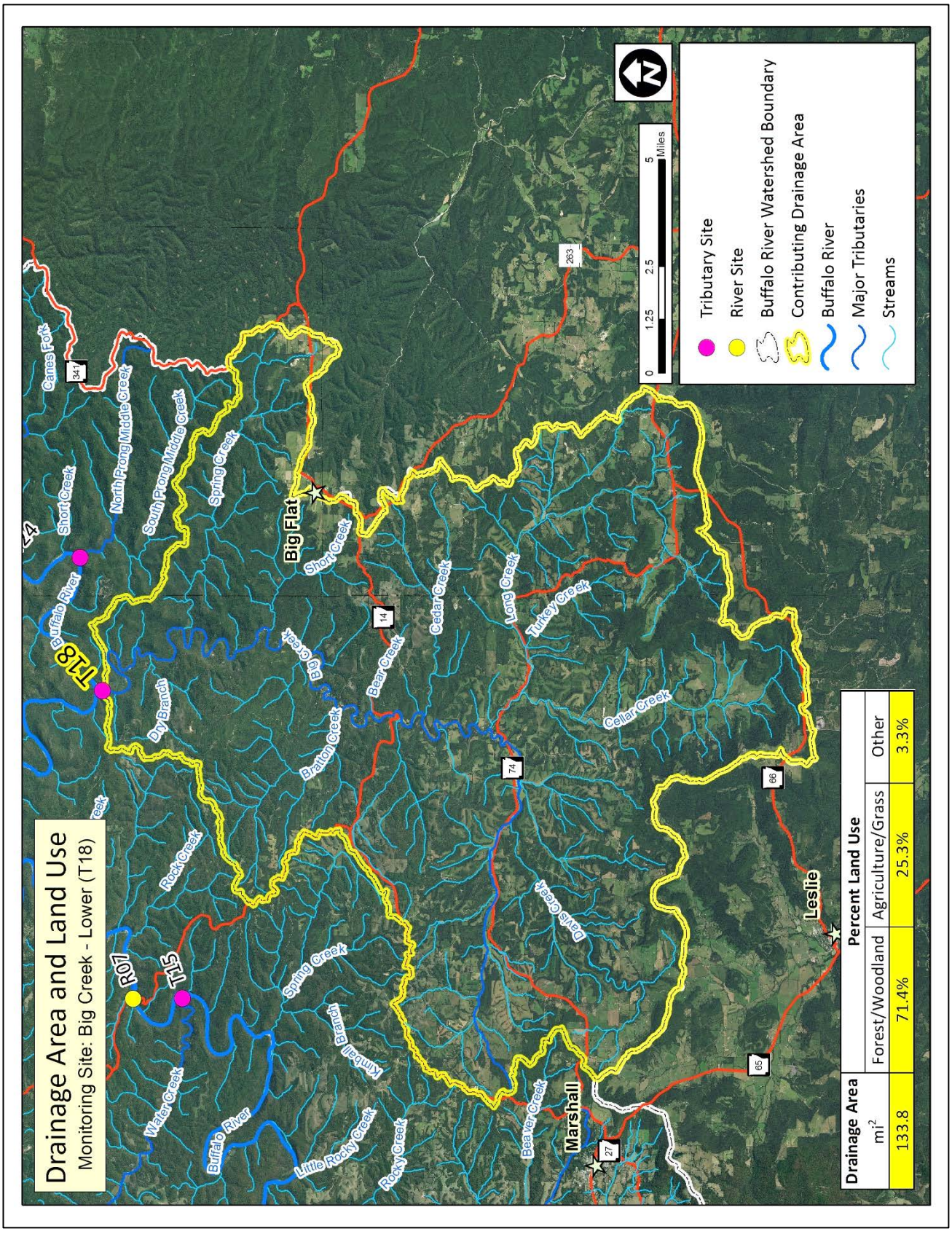

Drainage Area and Land Use
Monitoring Site: Tomahawk Creek (T14)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
0.75
1.5
3
Miles
N
Drainage Area
mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
36.6
66.1%
31.4%
2.4%
T14
T11
T10
T09
R05
Pindall
St. Joe
Gilbert
Rush Creek
Spring Creek
Barren Fork
Burns Creek
Water Creek
Lay Creek
Tomahawk Creek
North Fork Tomahawk Creek
Baker Spring Branch
Dry Branch
Dry Creek
Mill Creek
Buffalo River
Carr Creek
Bear Creek
Holder Creek
14
235
65
374
333

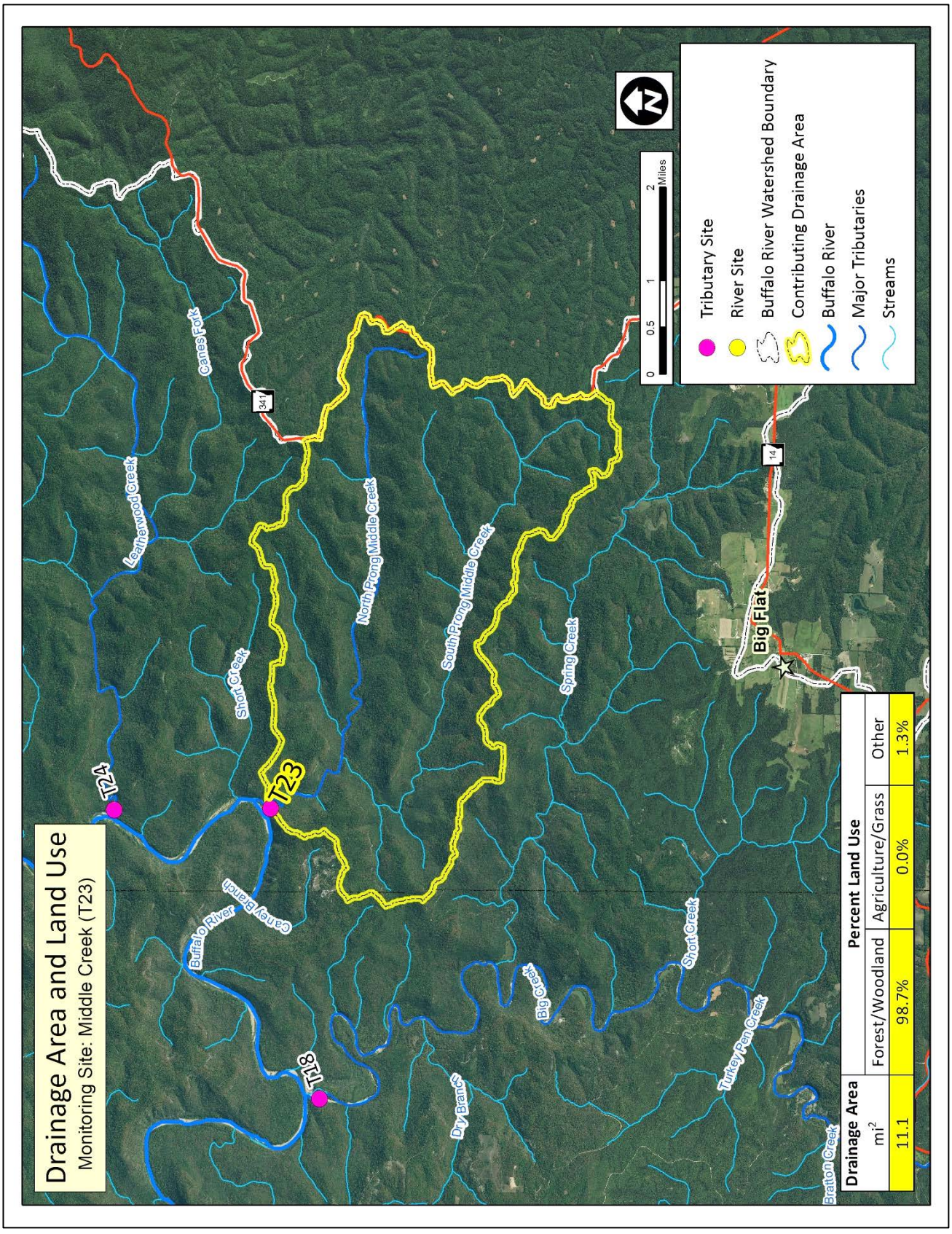

Drainage Area and Land Use
Monitoring Site: Water Creek (T15)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
0.75
1.5
3
Miles
T15
R07
T14
T13
T12
T11
Gilbert
St. Joe
Water Creek
Spring Creek
Barren Fork
Burns Creek
Lay Creek
Tomahawk Creek
North Fork Tomahawk Creek
Baker Spring Branch
Dry Branch
Dry Creek
Mill Creek
Buffalo River
Rush Creek
Little Rush Creek
Clabber Creek
Ingram Creek
Williams Branch
Little Panther Creek
Panther Creek
235
206
14
268
333
374
65

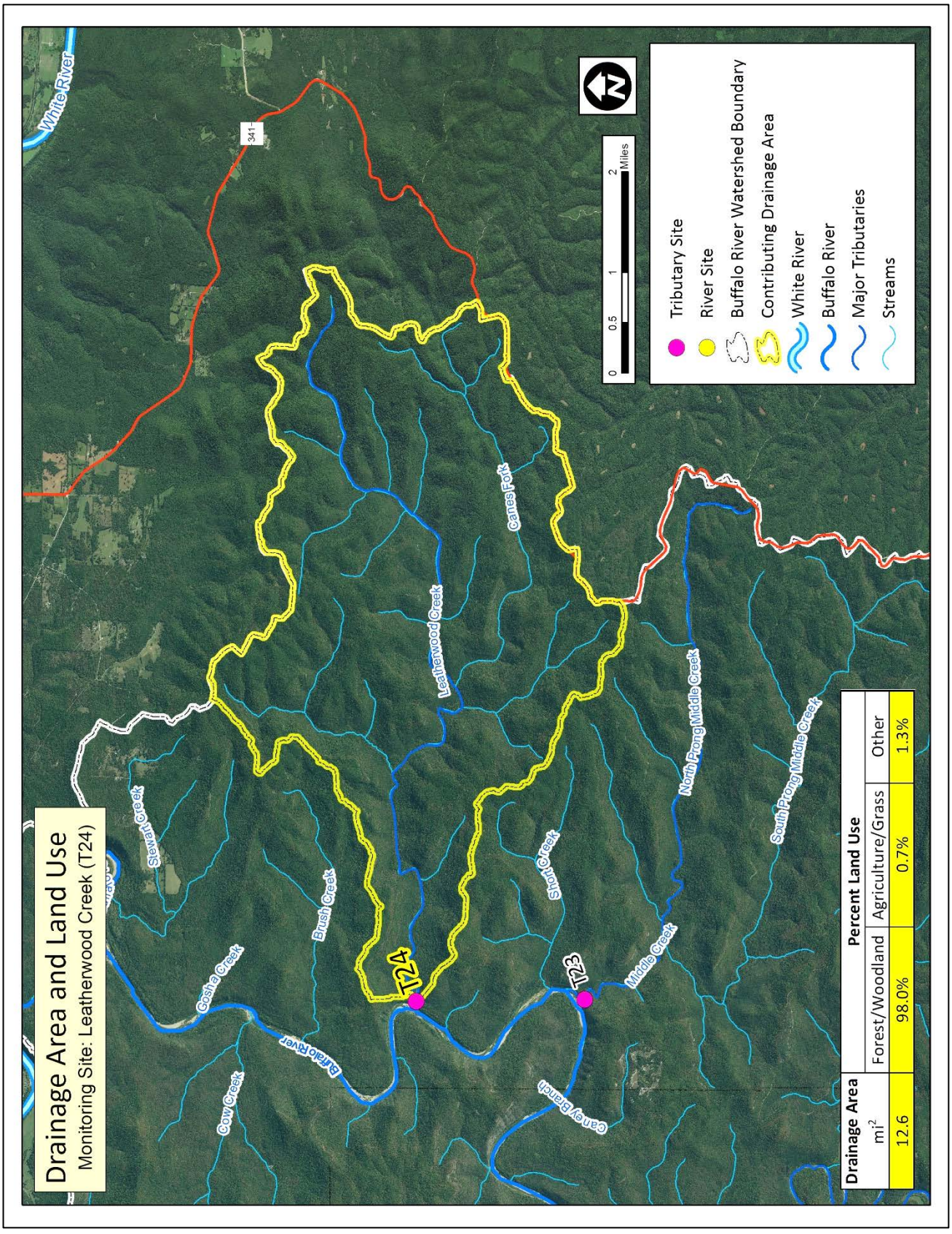
Drainage Area	Percent Land Use		
mi²	Forest/Woodland	Agriculture/Grass	Other
38.3	79.0%	18.1%	2.9%


Drainage Area and Land Use
Monitoring Site: Rush Creek (T16)
T17
T16
R08
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0
0.5
1
2
Miles
Drainage Area
mi²
15.1
Percent Land Use
Forest/Woodland
89.2%
Agriculture/Grass
8.2%
Other
2.6%
Rush Creek
Little Rush Creek
Clabber Creek
Blue John Creek
Ingram Creek
Williams Branch
Spring Creek
Barren Fork
Little Panther C
206
14
288


Drainage Area and Land Use
Monitoring Site: Clabber Creek (T17)
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Streams
0 0.75 1.5 3 Miles
T17
R08
T16
R07
White River
Cow Creek
Boat Creek
Cedar Creek
Buffalo River
Cabin Creek
Williams Branch
Ingram Creek
Clabber Creek
Little Rush Creek
Rush Creek
Little Panther Creek
Panther Creek
Rock Creek
Water Creek
Spring Creek
Barren Fork
126
101
206
235
14
268
Drainage Area
mi²
Percent Land Use
Forest/Woodland
Agriculture/Grass
Other
26.4
74.3%
23.9%
1.9%


Drainage Area and Land Use
Monitoring Site: Big Creek - Lower (T18)
T18
T15
R07
Big Flat
Marshall
Leslie
Buffalo River
Big Creek
Short Creek
North Prong Middle Creek
South Prong Middle Creek
Spring Creek
Dry Branch
Bratton Creek
Bear Creek
Cedar Creek
Long Creek
Turkey Creek
Cellar Creek
Davis Creek
Rock Creek
Water Creek
Kimball Branch
Little Rocky Creek
Rocky Creek
Beaver Creek
Canes Fork
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
0 1.25 2.5 5 Miles
N
Drainage Area mi²
133.8
Percent Land Use
Forest/Woodland
71.4%
Agriculture/Grass
25.3%
Other
3.3%


Drainage Area and Land Use
Monitoring Site: Middle Creek (T23)
T24
T23
T18
Big Flat
Leatherwood Creek
Canes Fork
Short Creek
North Prong Middle Creek
South Prong Middle Creek
Spring Creek
Buffalo River
Caney Branch
Big Creek
Dry Branch
Turkey Pen Creek
Bratton Creek
341
14
0 0.5 1 2 Miles
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
Buffalo River
Major Tributaries
Streams
Drainage Area mi²
11.1
Percent Land Use
Forest/Woodland 98.7%
Agriculture/Grass 0.0%
Other 1.3%


Drainage Area and Land Use
Monitoring Site: Leatherwood Creek (T24)
White River
341
Stewart Creek
Brush Creek
Goshia Creek
Buffalo River
Cow Creek
Leatherwood Creek
Canes Fork
Short Creek
Middle Creek
North Prong Middle Creek
South Prong Middle Creek
Caney Branch
T24
T23
0
0.5
1
2
Miles
Tributary Site
River Site
Buffalo River Watershed Boundary
Contributing Drainage Area
White River
Buffalo River
Major Tributaries
Streams
Drainage Area
mi²
12.6
Percent Land Use
Forest/Woodland
98.0%
Agriculture/Grass
0.7%
Other
1.3%

Appendix 2

Additional Water Quality Graphs:

Dissolved Oxygen, Water Temperature, pH

Specific Conductance, Sulfate, Chloride, Alkalinity

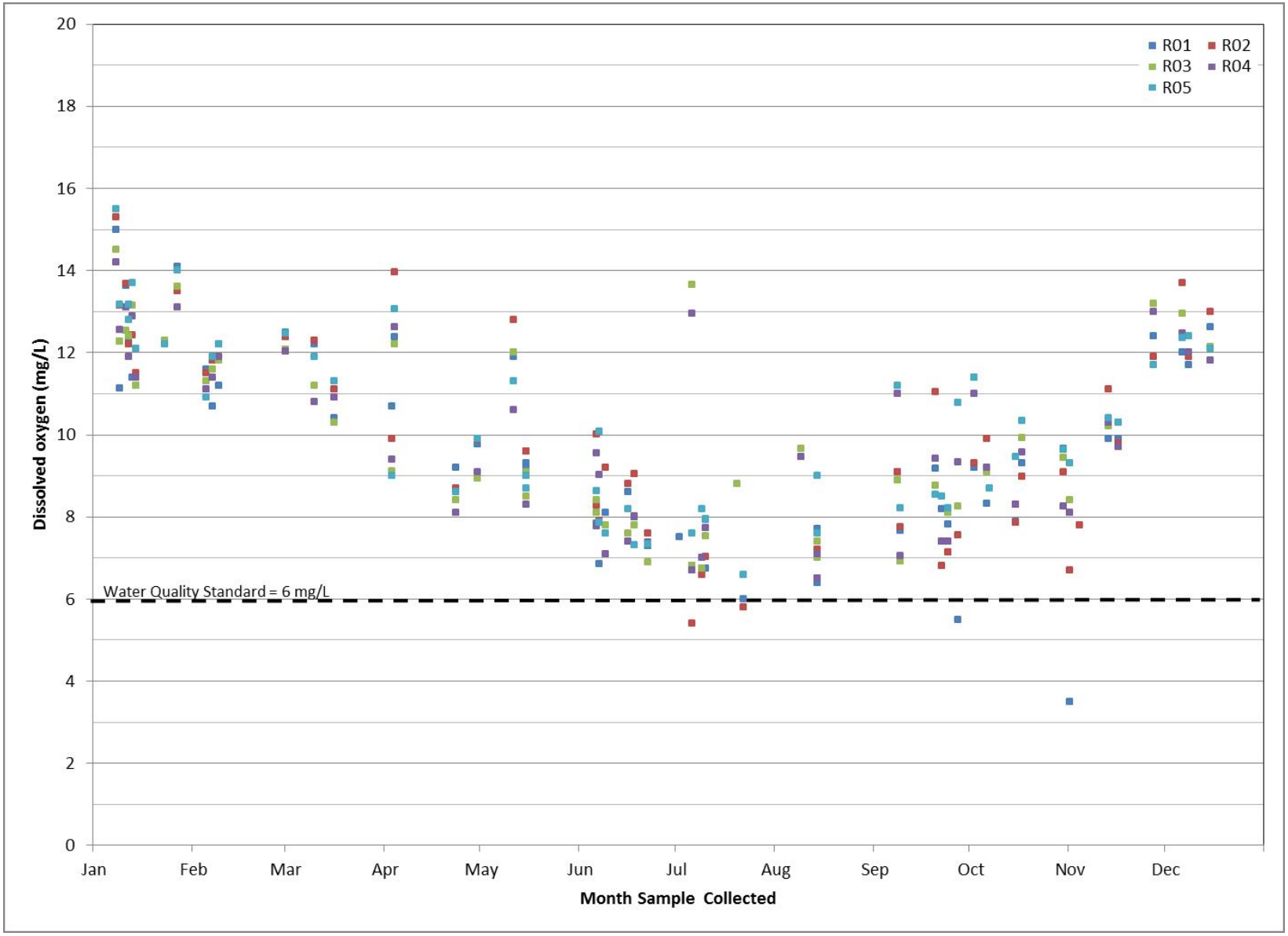


Figure A2.1 Dissolved oxygen for Boston Mountains Buffalo River corridor sites from 1995-2011.

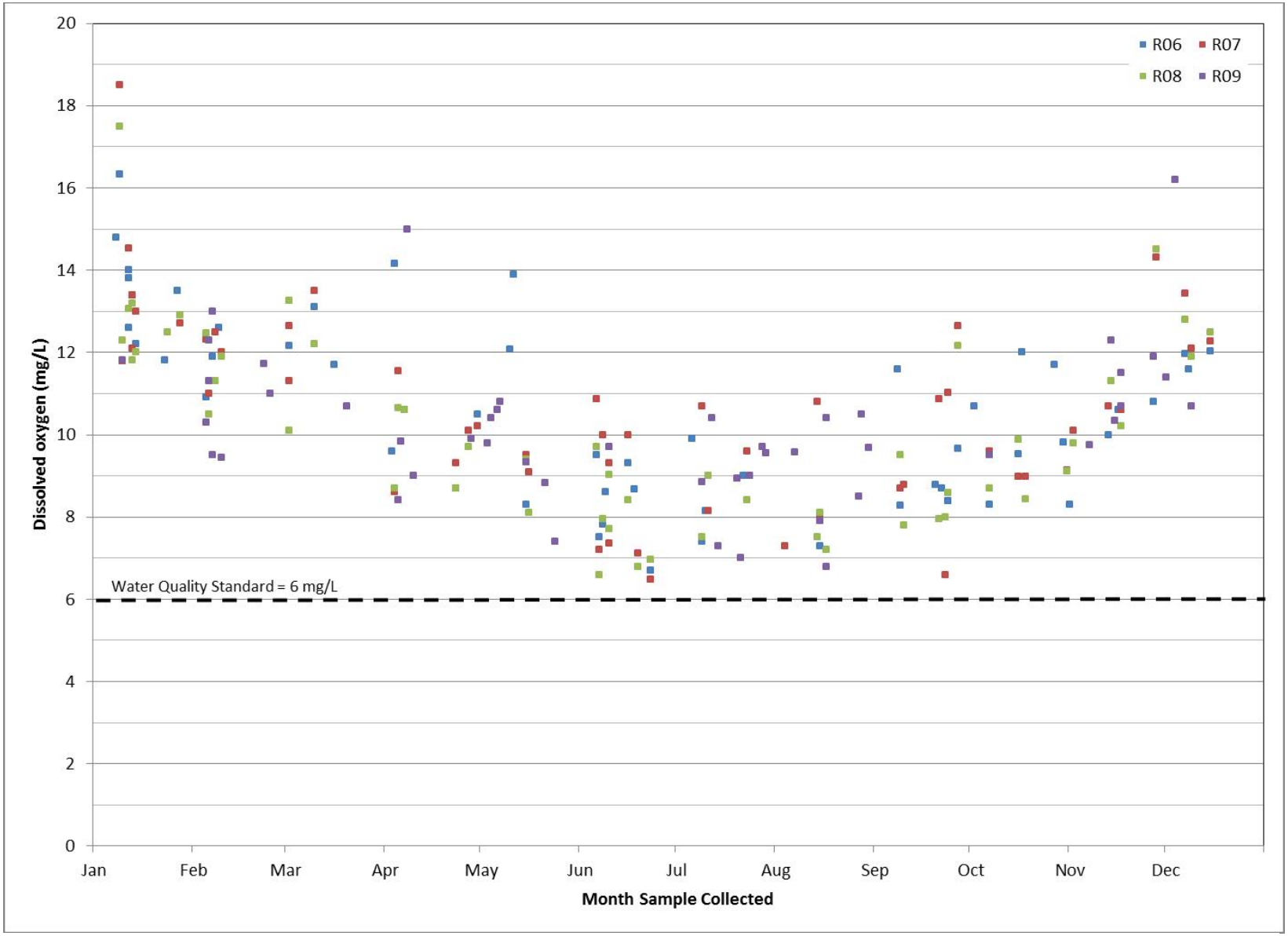


Figure A2.2 Dissolved oxygen for Ozark Highlands Buffalo River corridor sites from 1995-2011.

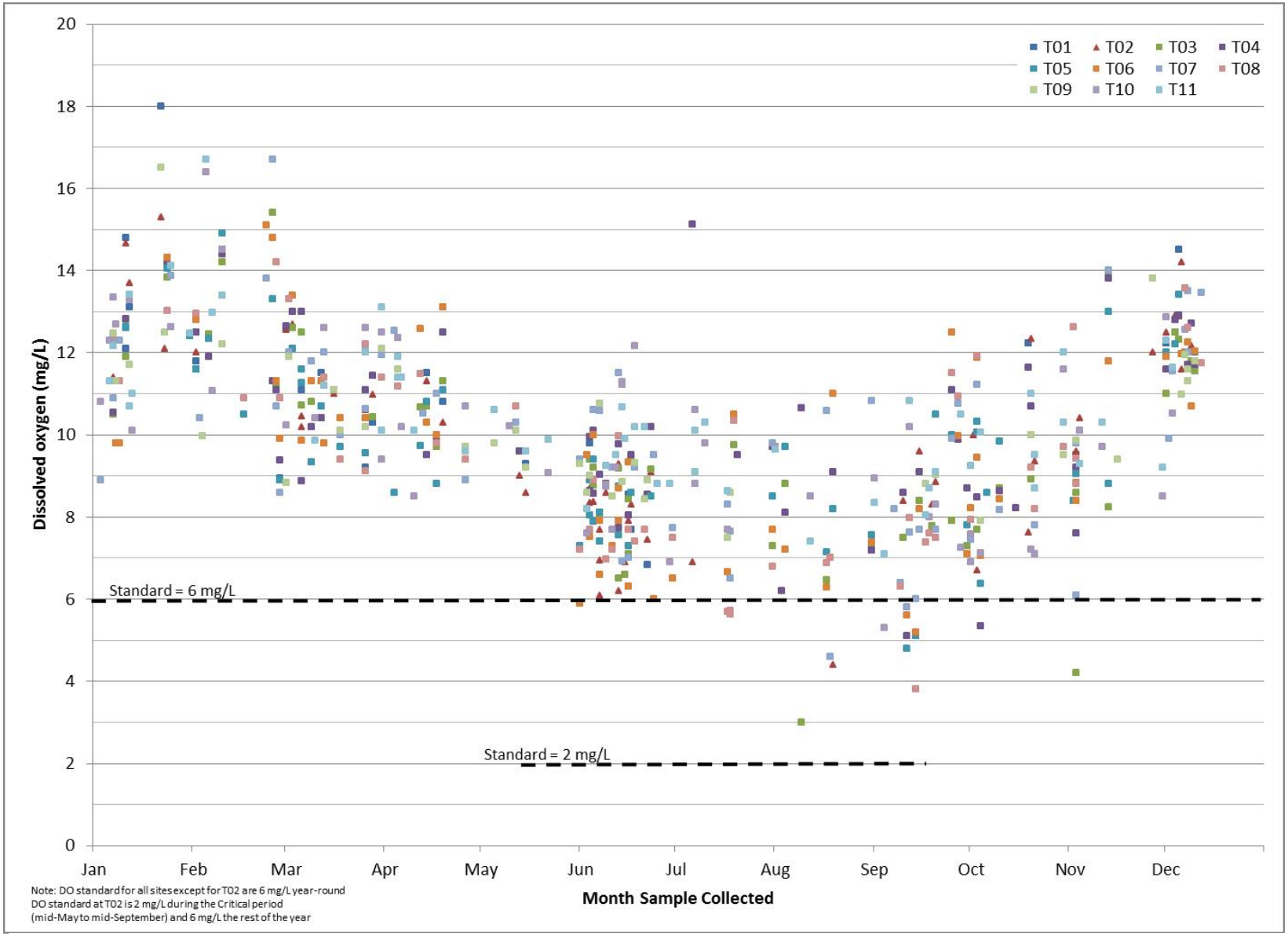


Figure A2.3 Dissolved oxygen for Boston Mountains Buffalo River tributary sites from 1995-2011.

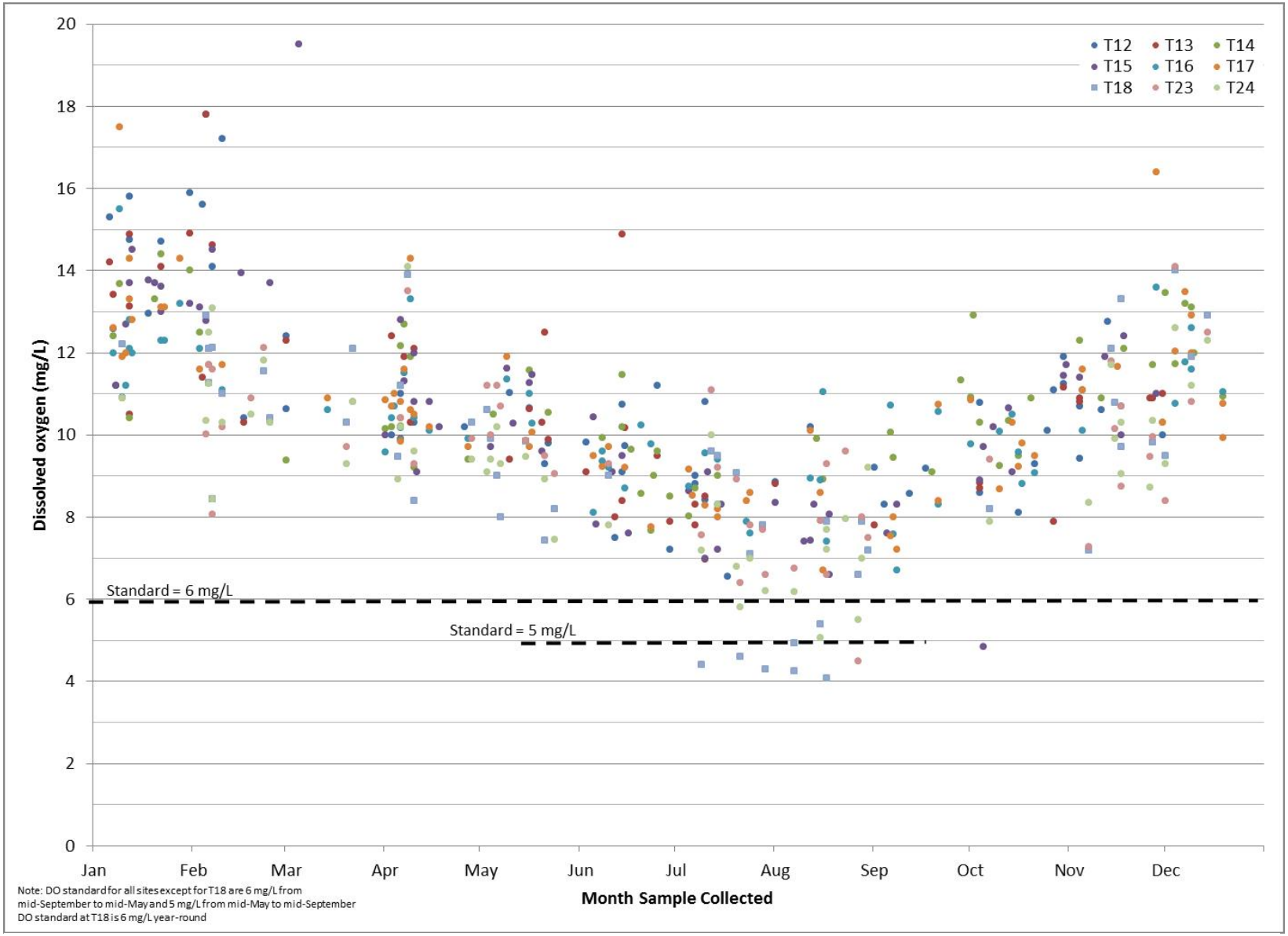


Figure A2.4 Dissolved oxygen for Ozark Highlands Buffalo River tributary sites from 1995- 2011.

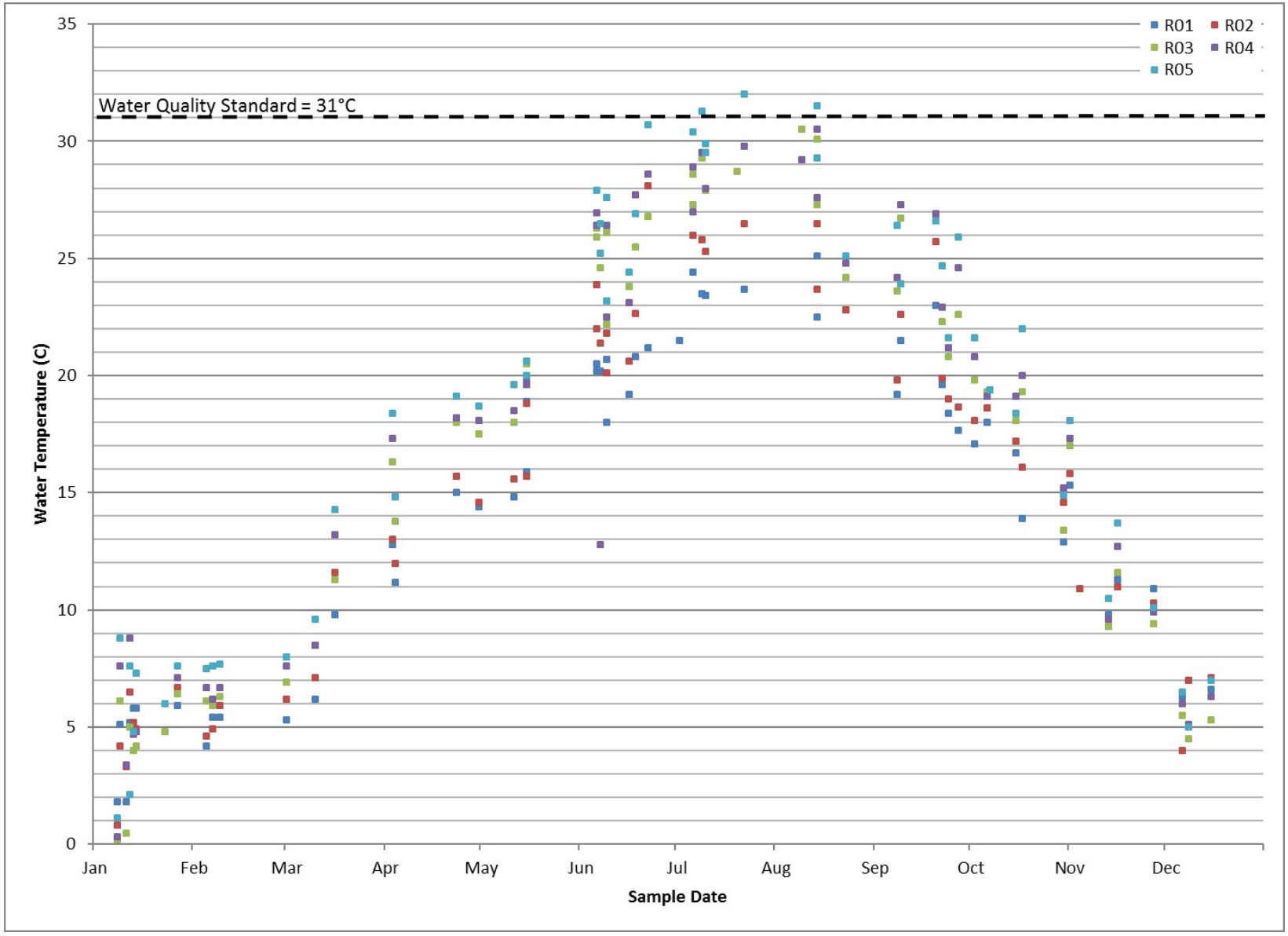


Figure A2.5 Water temperature for Boston Mountains Buffalo River corridor sites from 1995- 2011.

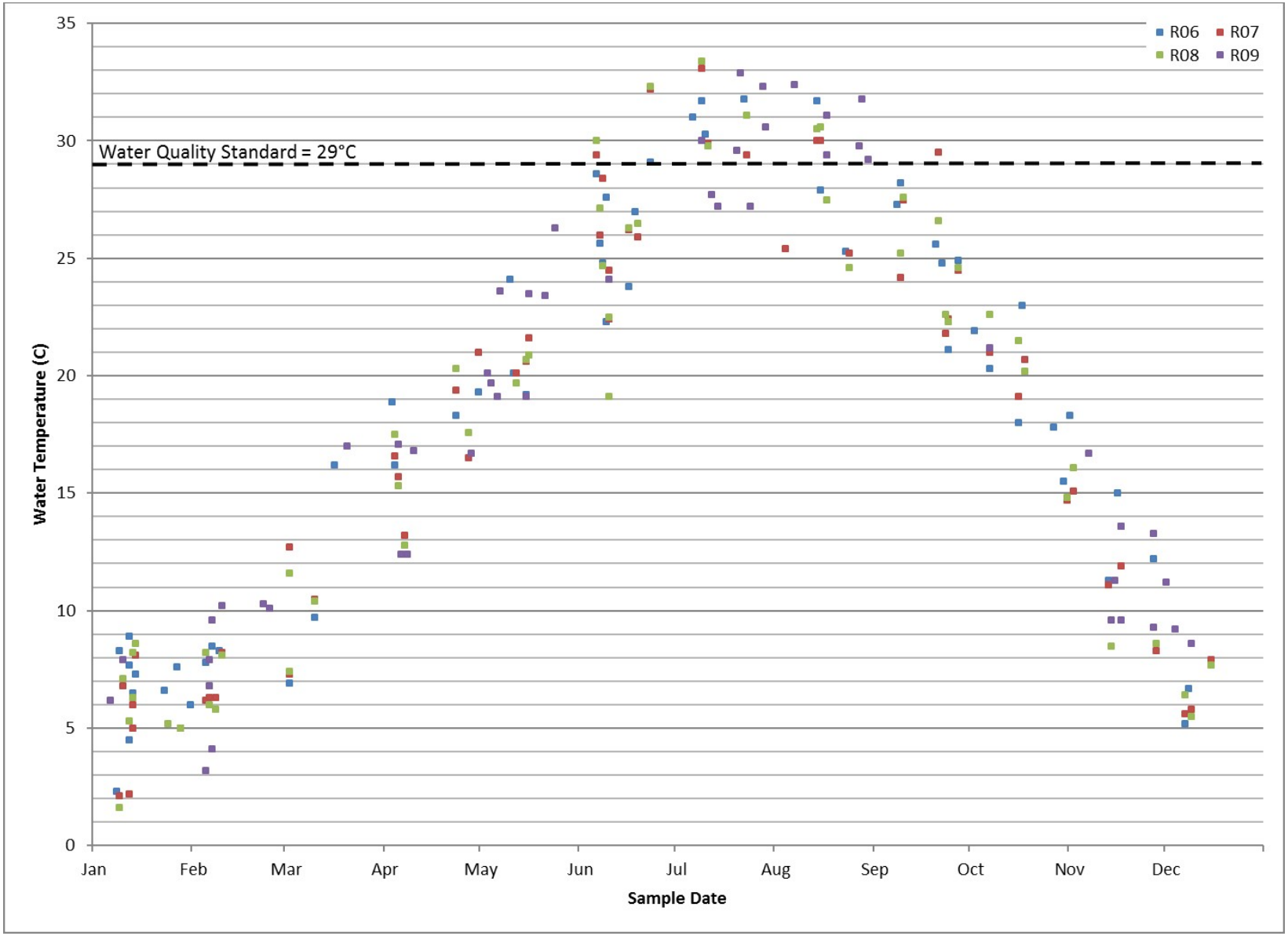


Figure A2.6 Water temperature for Ozark Highlands Buffalo River corridor sites from 1995-2011.

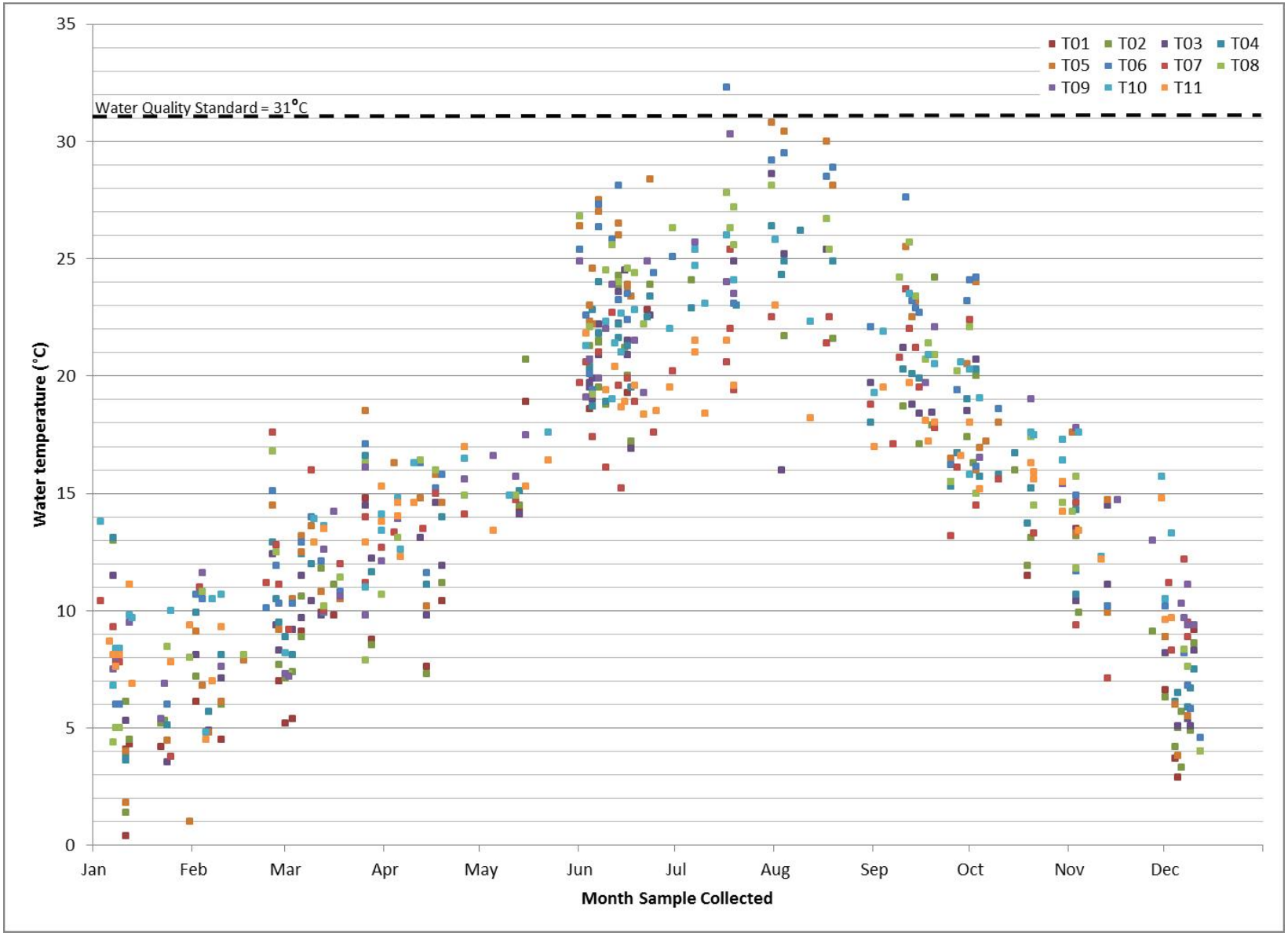


Figure A2.7 Water temperature for Boston Mountains Buffalo River tributary sites from 1995-2011.

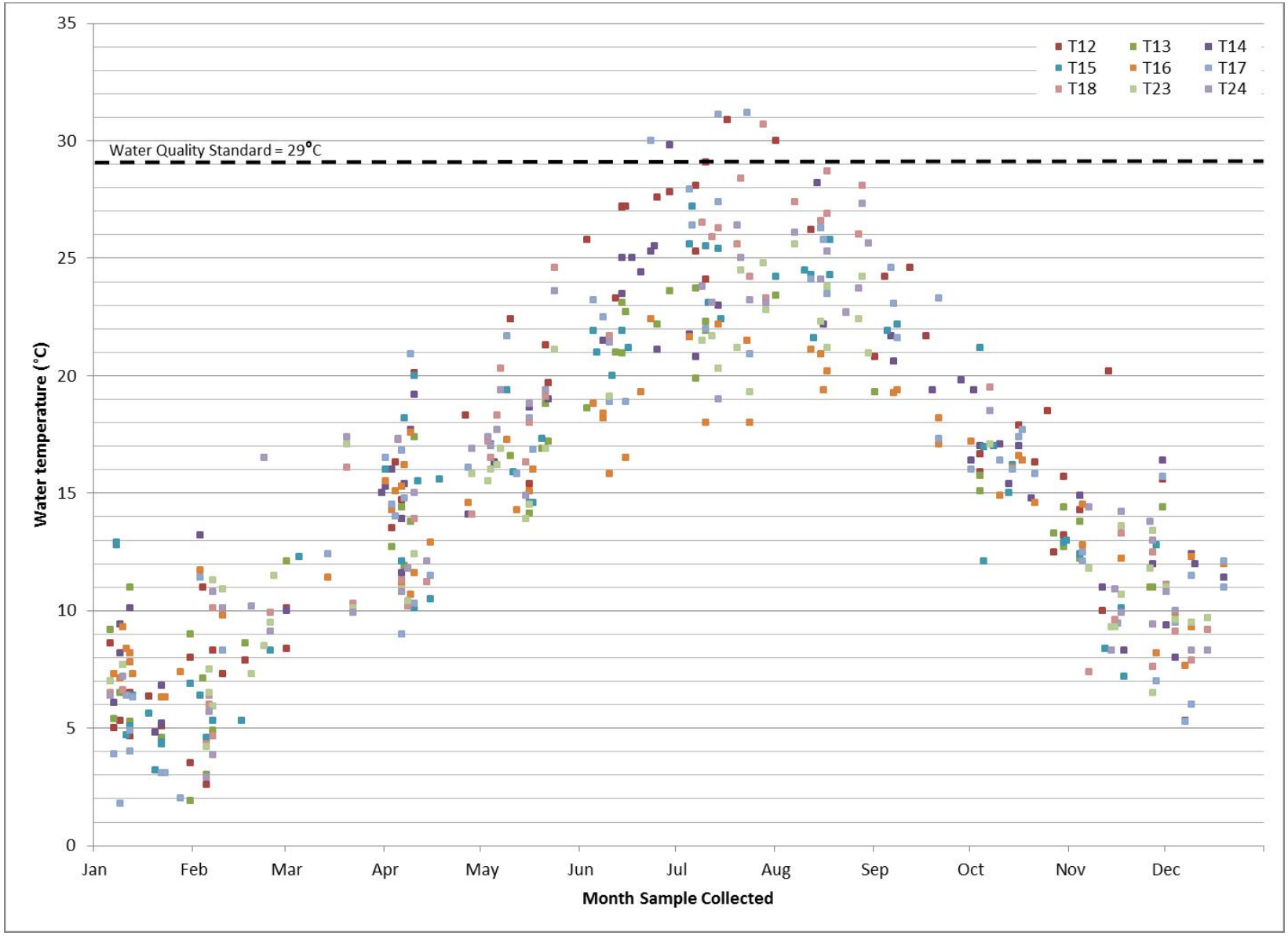


Figure A2.8 Water temperature for Ozark Highlands Buffalo River tributary sites from 1995-2011.

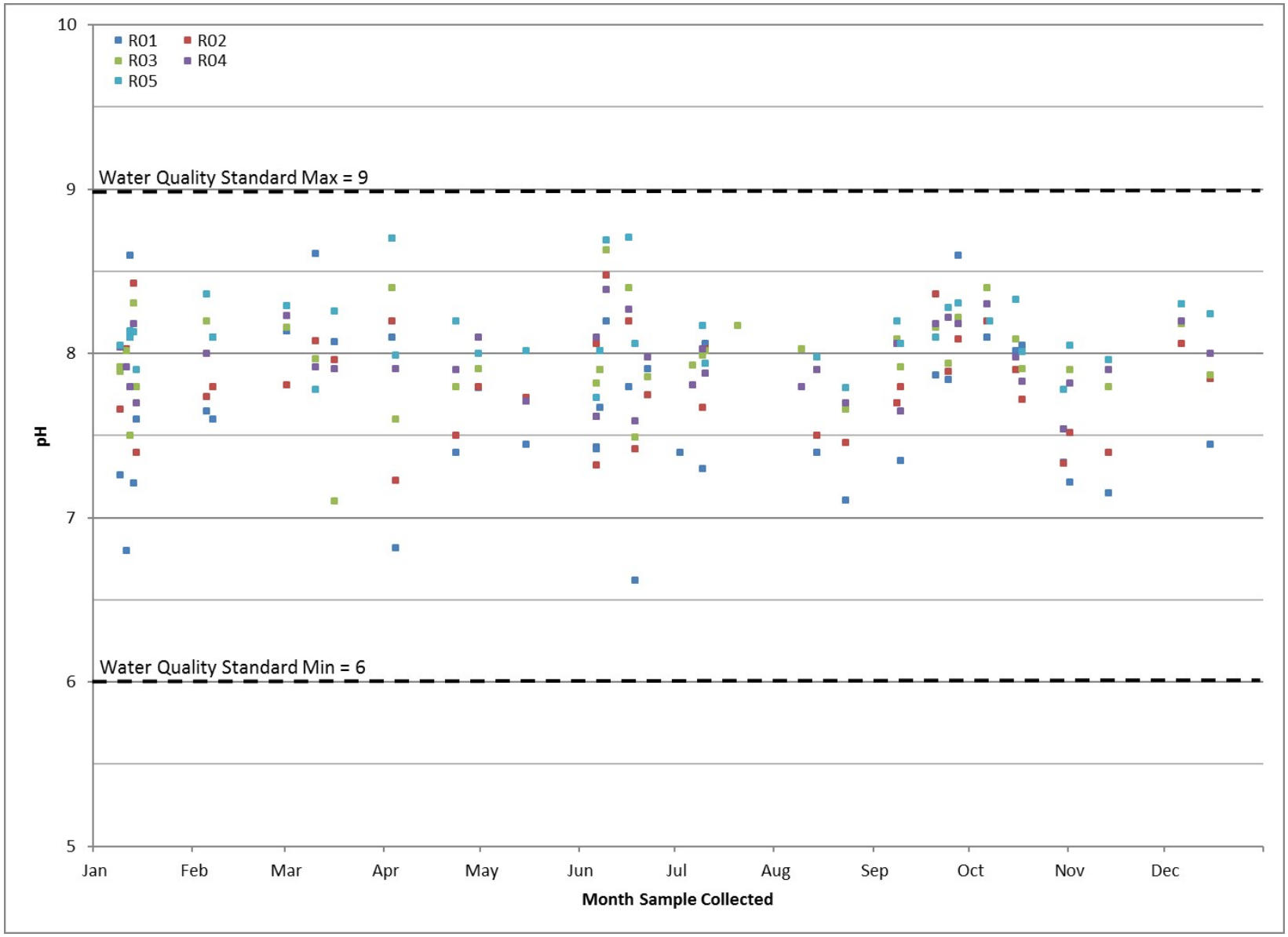


Figure A2.9 pH for Boston Mountains Buffalo River corridor sites from 1999-2011.

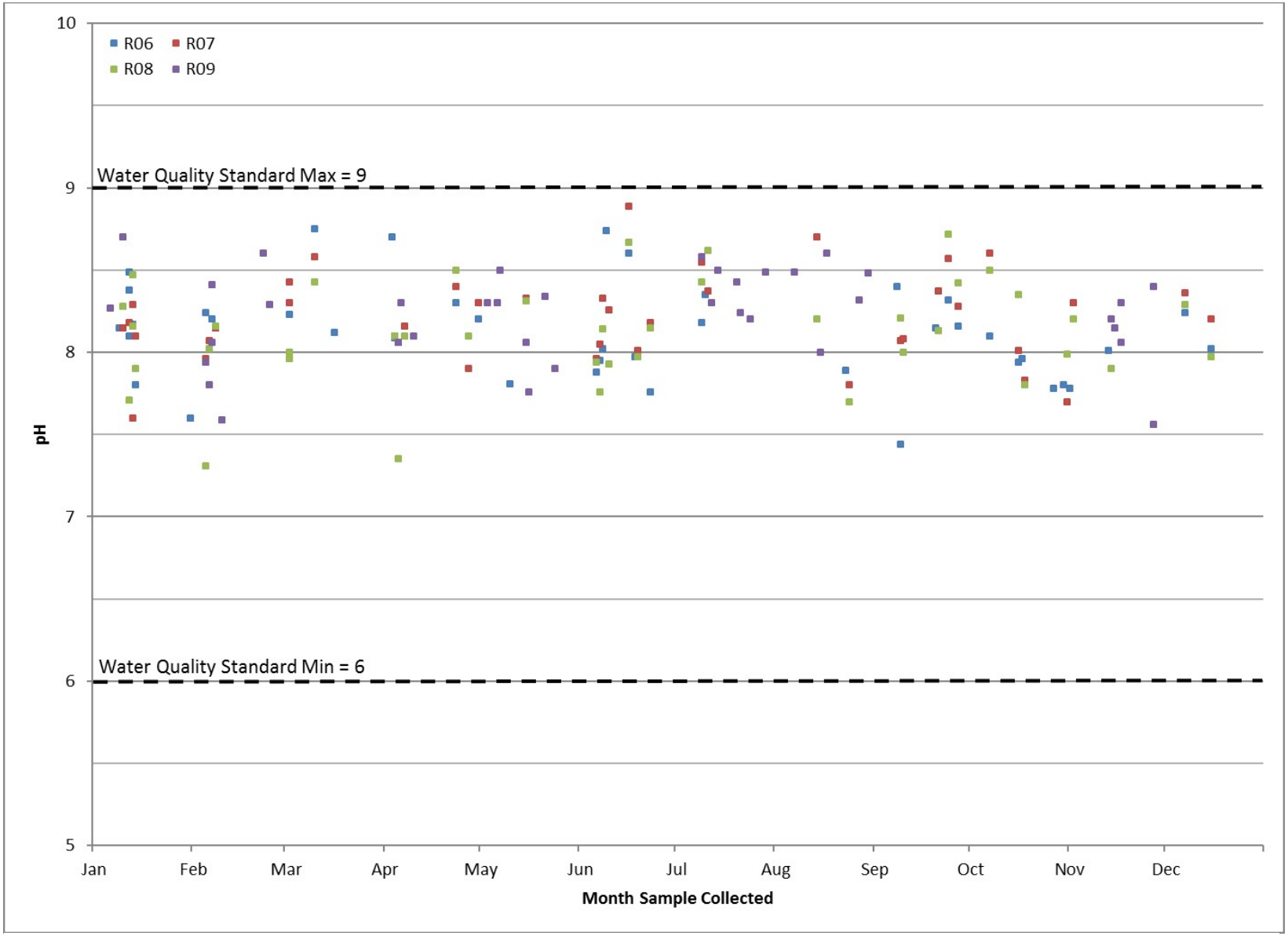


Figure A2.10 pH for Ozark Highlands Buffalo River corridor sites from 1999-2011.

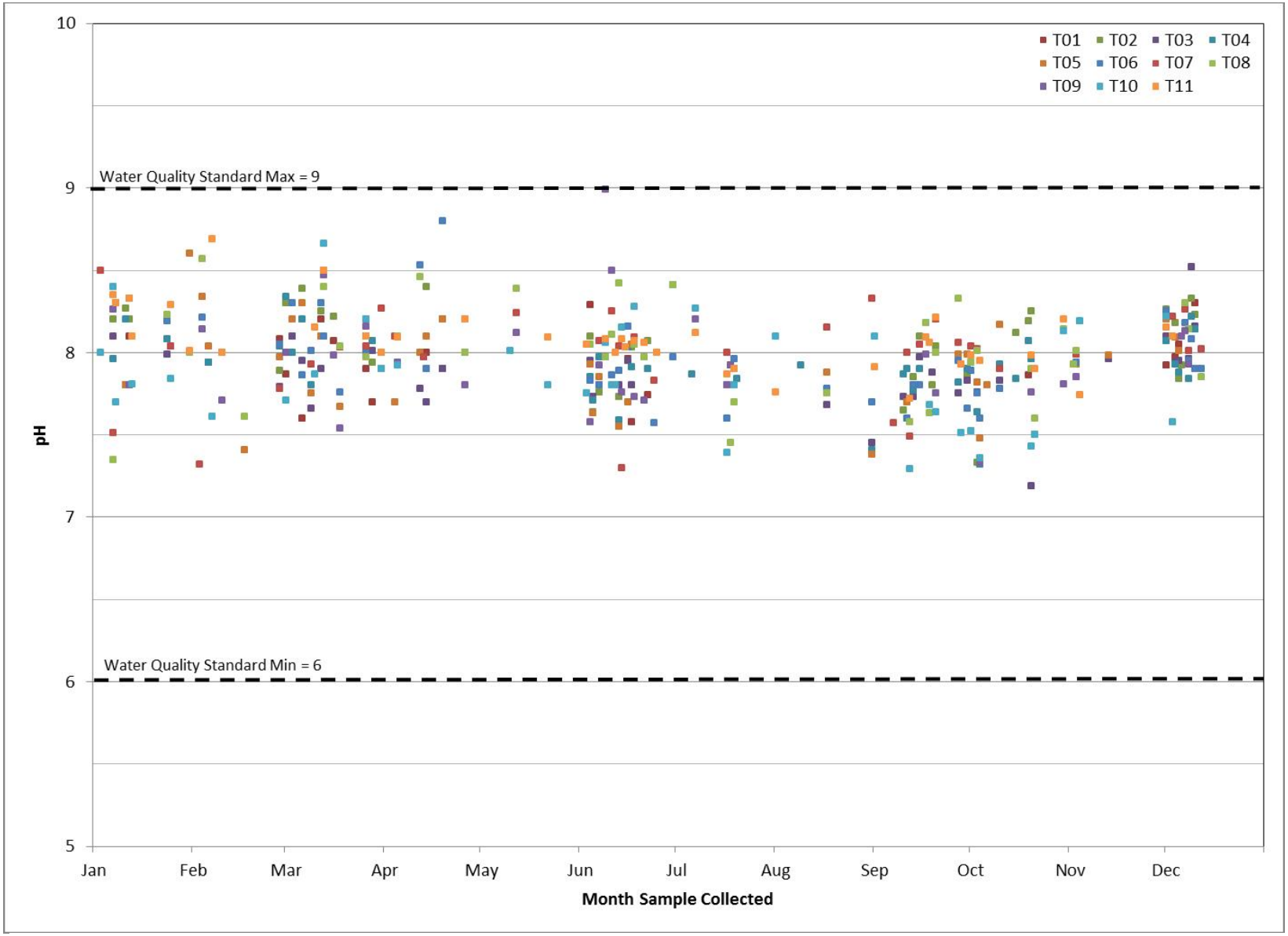


Figure A2.11 pH for Boston Mountains Buffalo River tributary sites from 1999-2011.

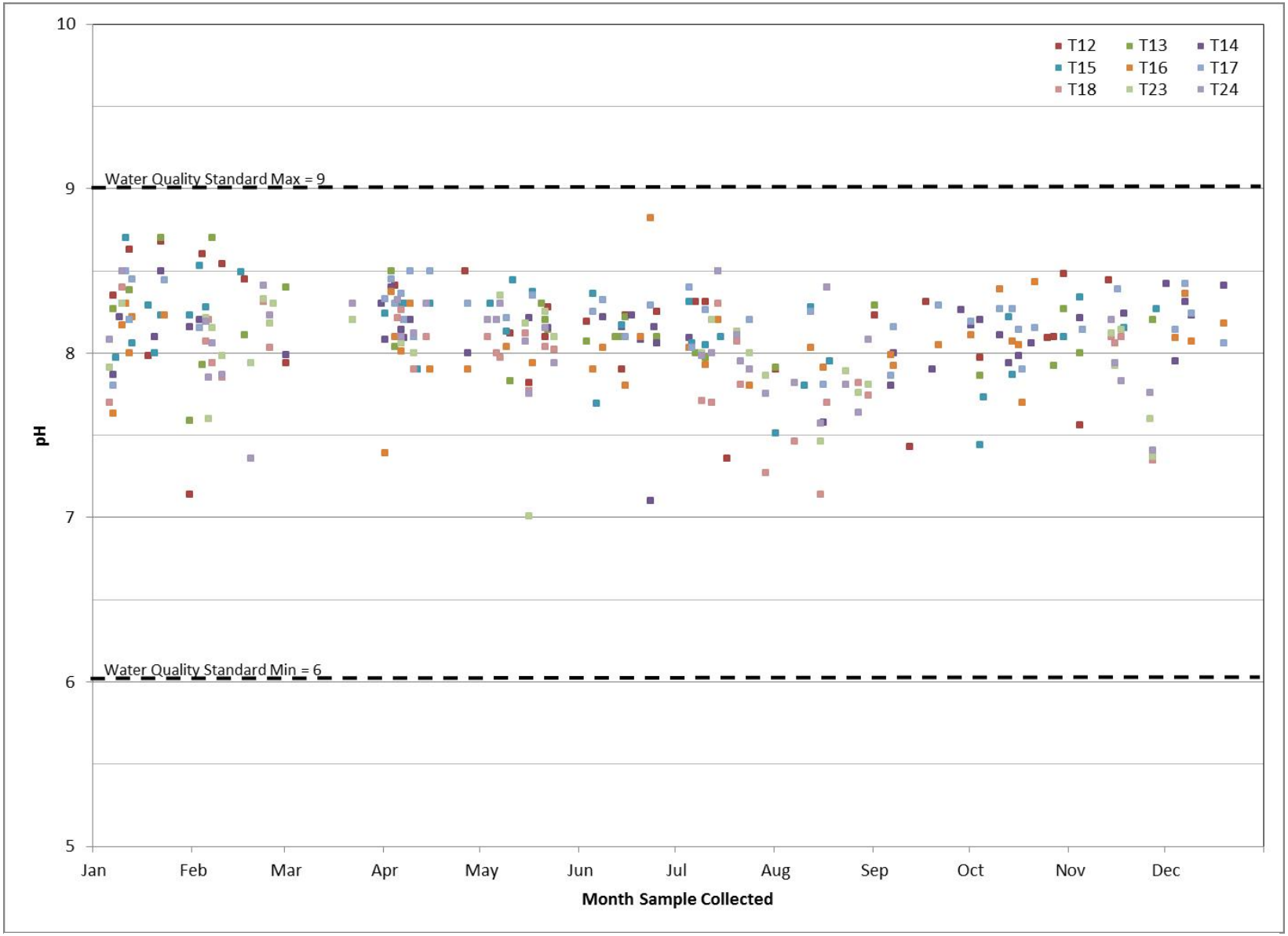


Figure A2.12 pH for Ozark Highlands Buffalo River tributary sites from 1999-2011.

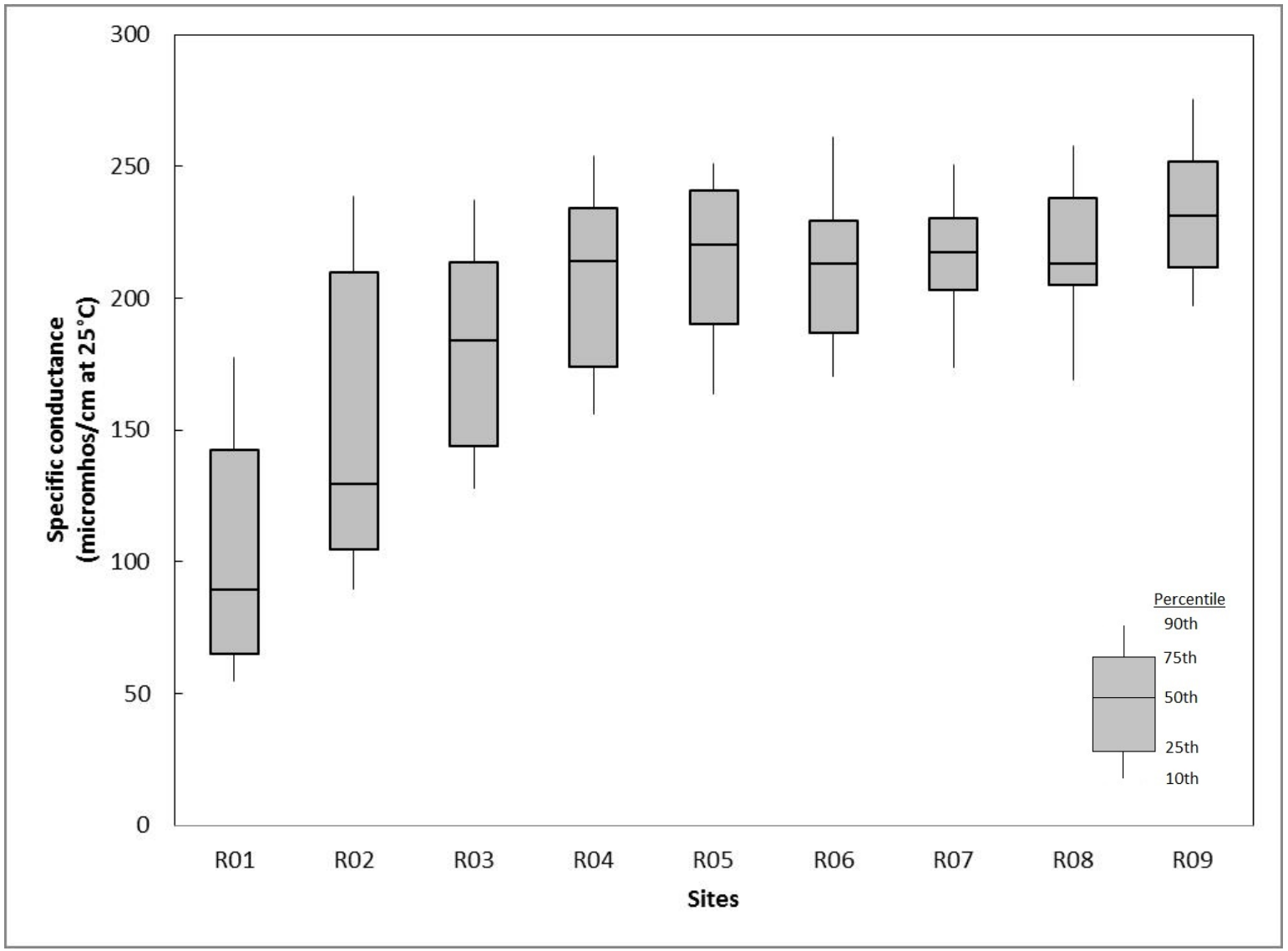
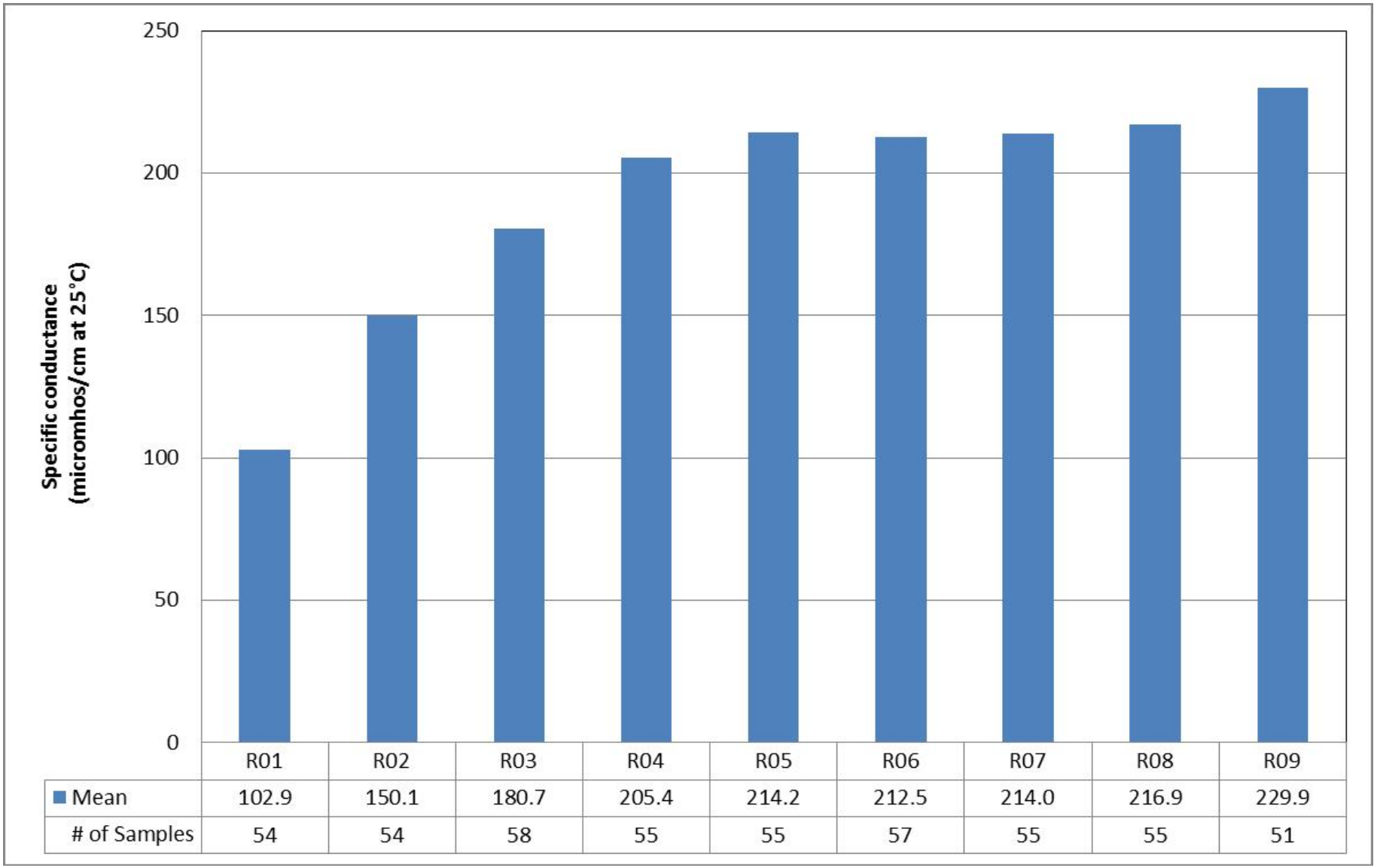
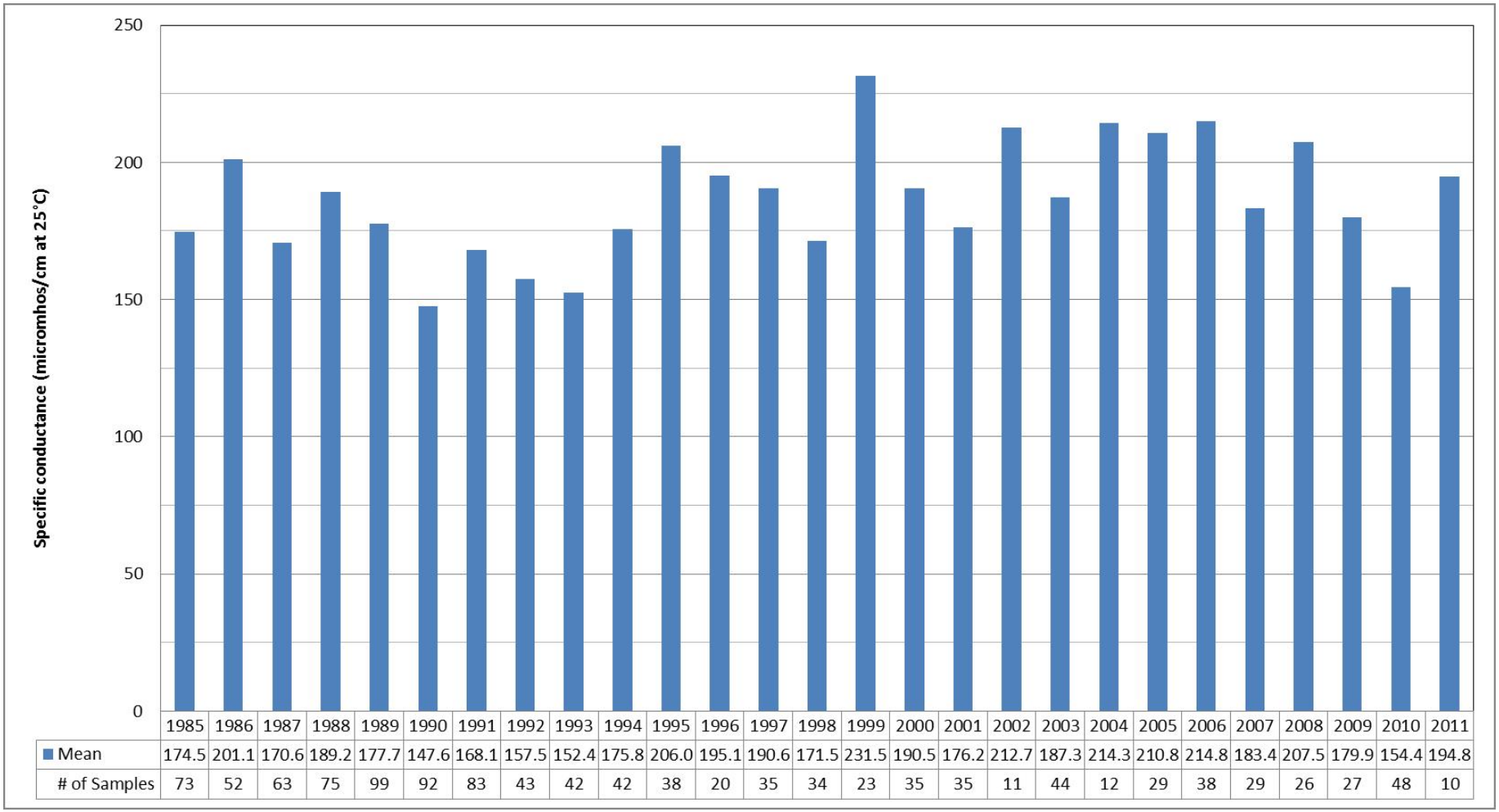


Figure A2.13 Specific conductance box plots for Buffalo River corridor sites sampled from 1999-2011.



	R01	R02	R03	R04	R05	R06	R07	R08	R09
Mean	102.9	150.1	180.7	205.4	214.2	212.5	214.0	216.9	229.9
# of Samples	54	54	58	55	55	57	55	55	51

Figure A2.14 Mean specific conductance for Buffalo River corridor sites sampled between 1995-2011 during base-flow conditions.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	174.5	201.1	170.6	189.2	177.7	147.6	168.1	157.5	152.4	175.8	206.0	195.1	190.6	171.5	231.5	190.5	176.2	212.7	187.3	214.3	210.8	214.8	183.4	207.5	179.9	154.4	194.8
# of Samples	73	52	63	75	99	92	83	43	42	42	38	20	35	34	23	35	35	11	44	12	29	38	29	26	27	48	10

Figure A2.15 Mean annual specific conductance for Buffalo River corridor sites sampled from 1985-2011 during base-flow conditions.

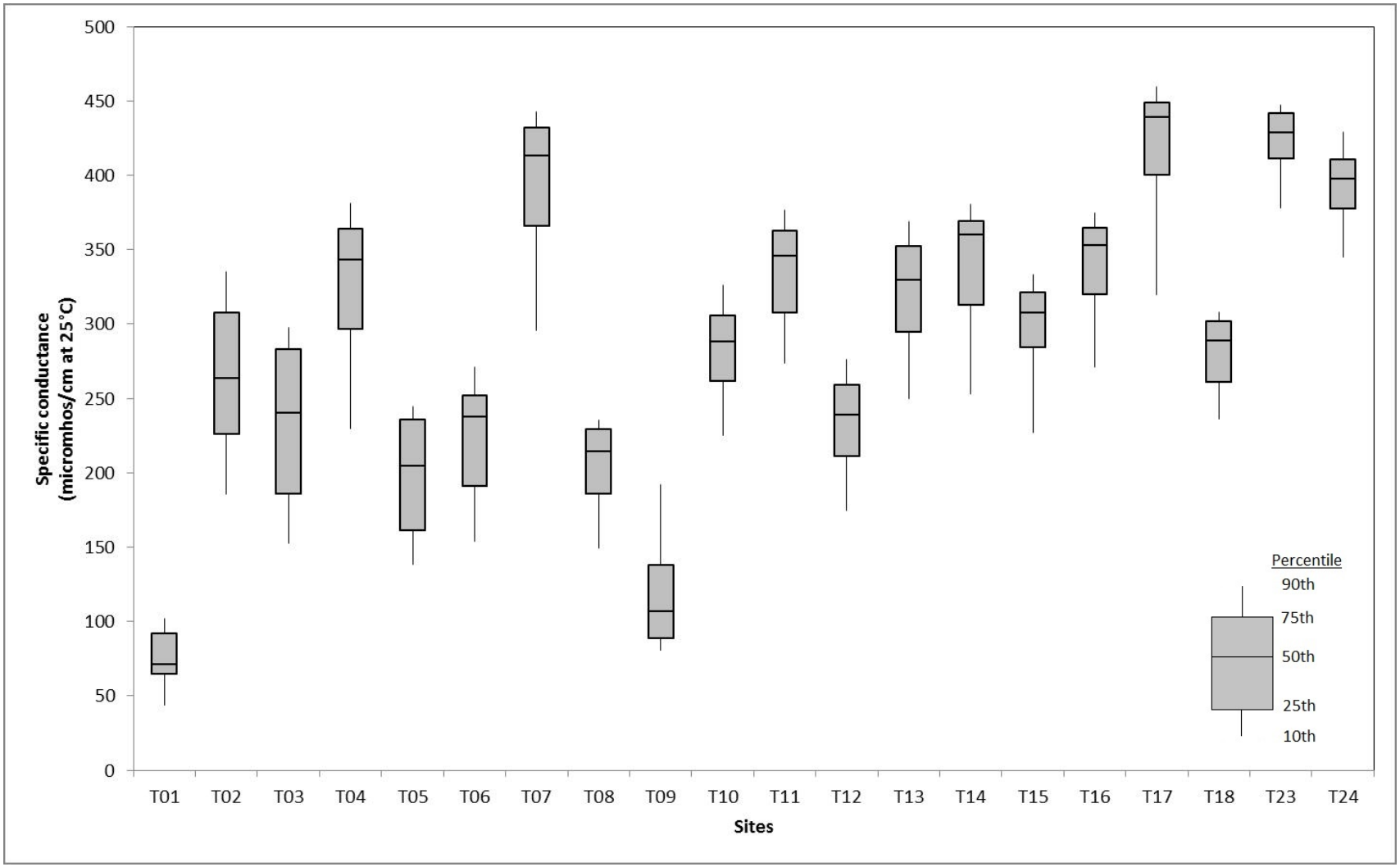
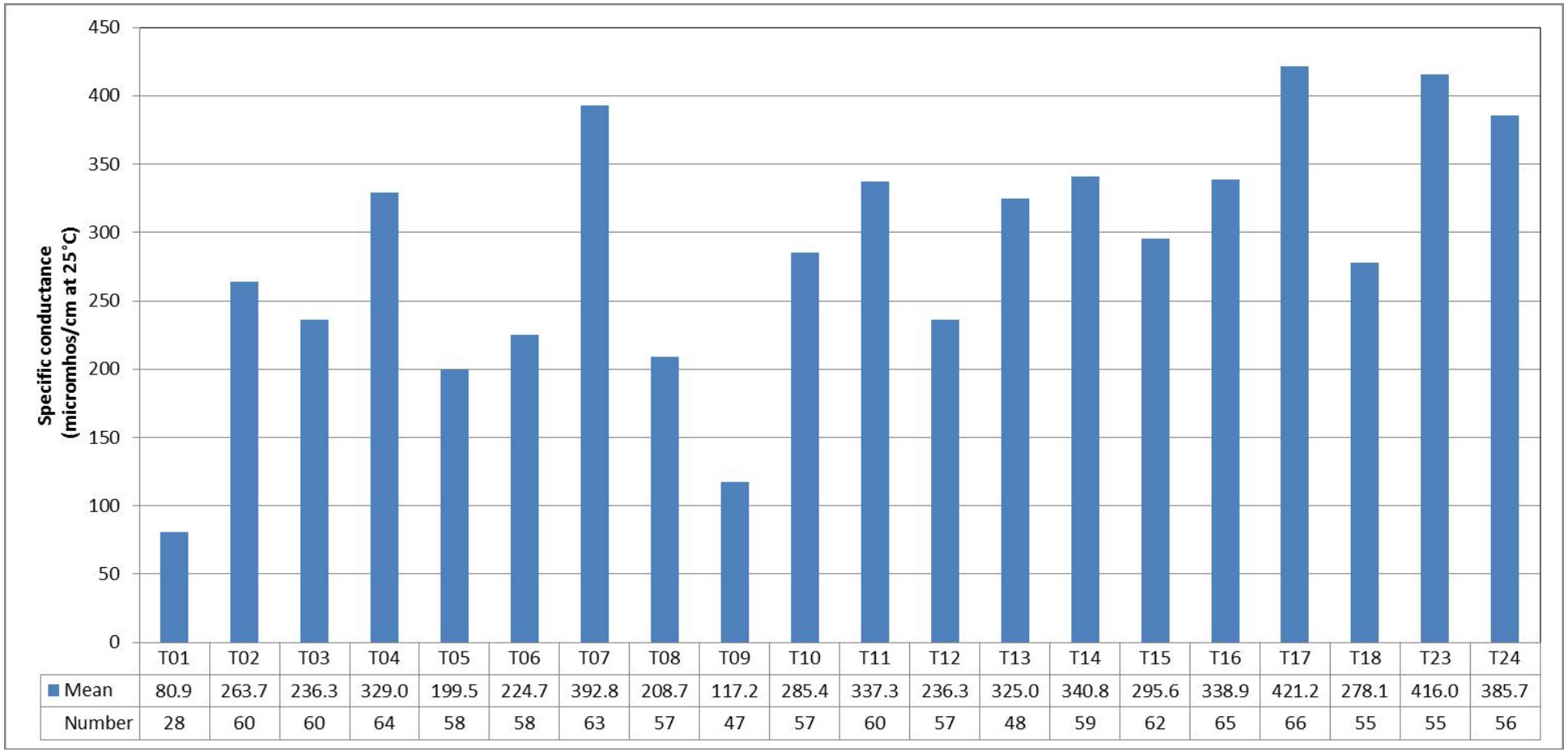
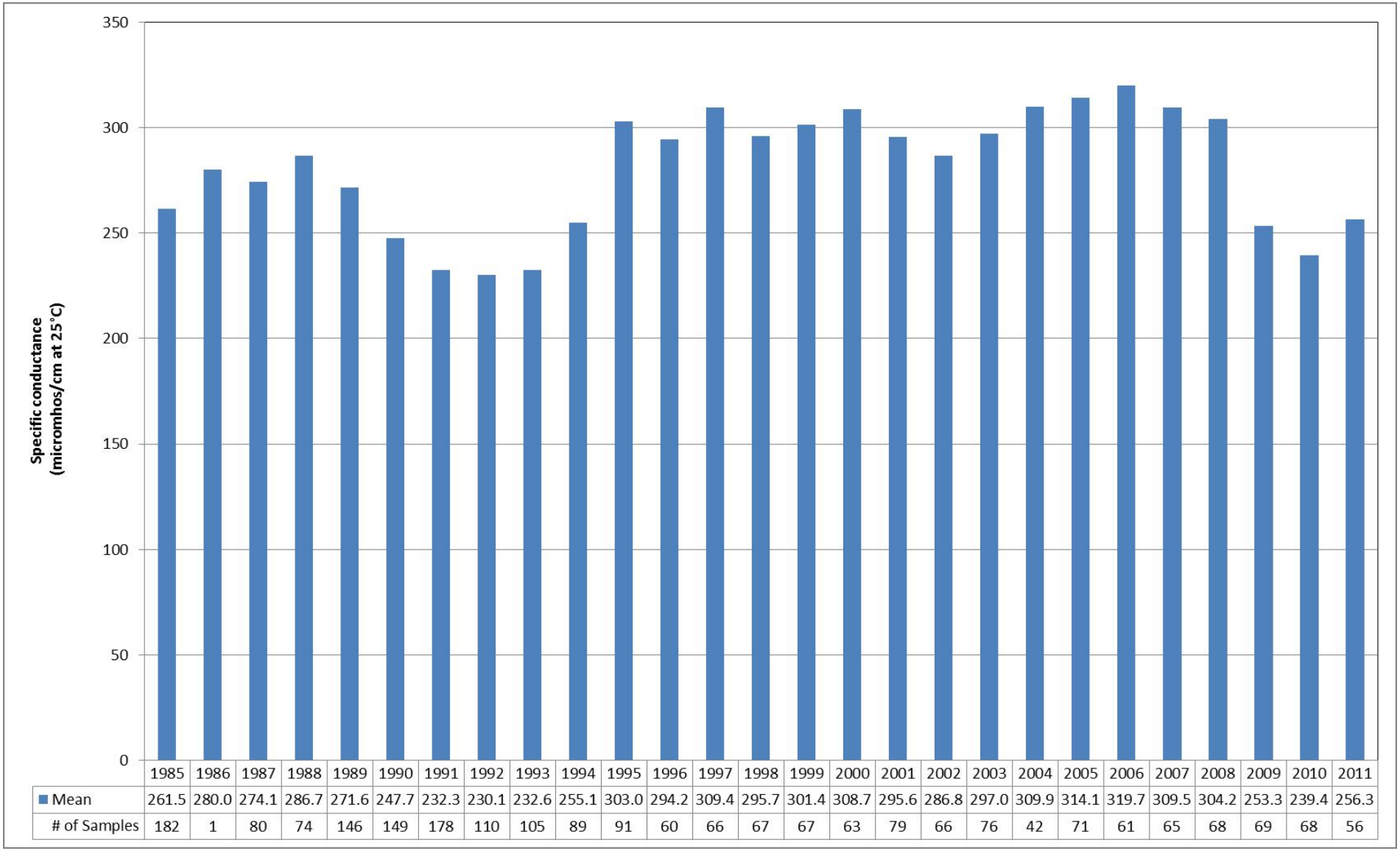


Figure A2.16 Specific conductance box plots for Buffalo River tributary sites sampled from 1999-2011.



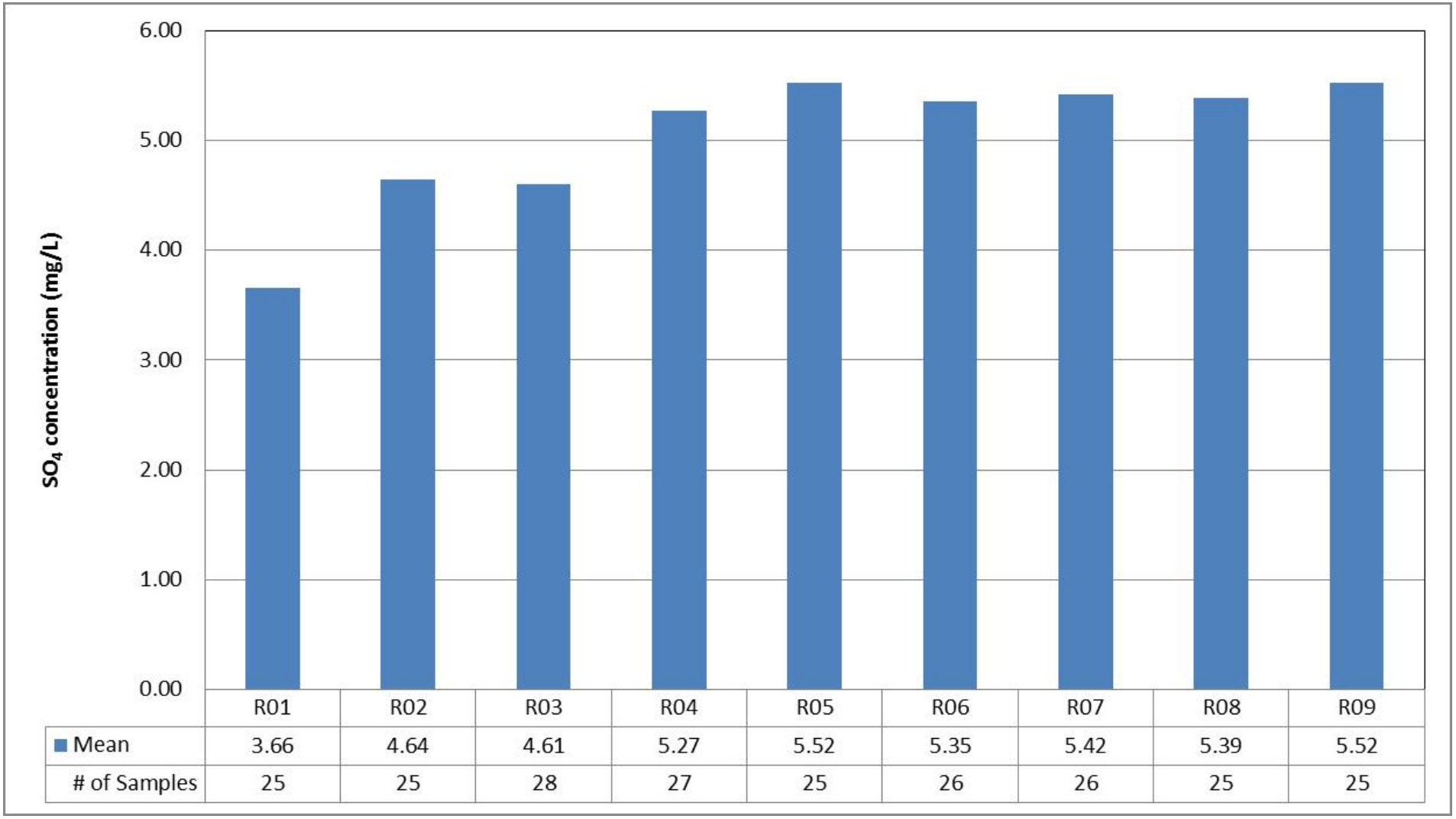
	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T23	T24
Mean	80.9	263.7	236.3	329.0	199.5	224.7	392.8	208.7	117.2	285.4	337.3	236.3	325.0	340.8	295.6	338.9	421.2	278.1	416.0	385.7
Number	28	60	60	64	58	58	63	57	47	57	60	57	48	59	62	65	66	55	55	56

Figure A2.17 Mean specific conductance for Buffalo River tributary sites sampled between 1995-2011 during base-flow conditions.



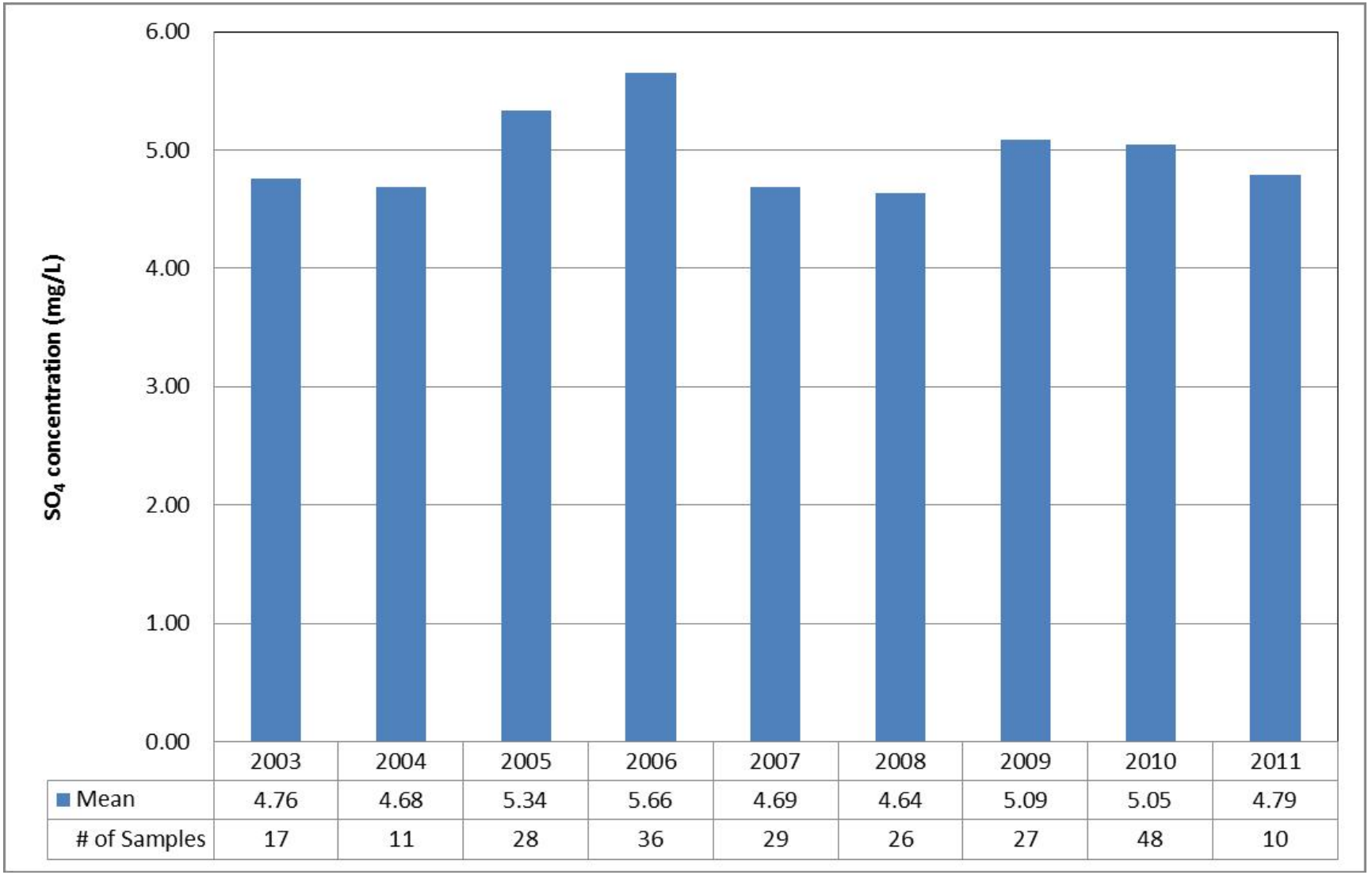
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	261.5	280.0	274.1	286.7	271.6	247.7	232.3	230.1	232.6	255.1	303.0	294.2	309.4	295.7	301.4	308.7	295.6	286.8	297.0	309.9	314.1	319.7	309.5	304.2	253.3	239.4	256.3
# of Samples	182	1	80	74	146	149	178	110	105	89	91	60	66	67	67	63	79	66	76	42	71	61	65	68	69	68	56

Figure A2.18 Mean annual specific conductance for Buffalo River tributary sites sampled from 1985-2011 during base-flow conditions.



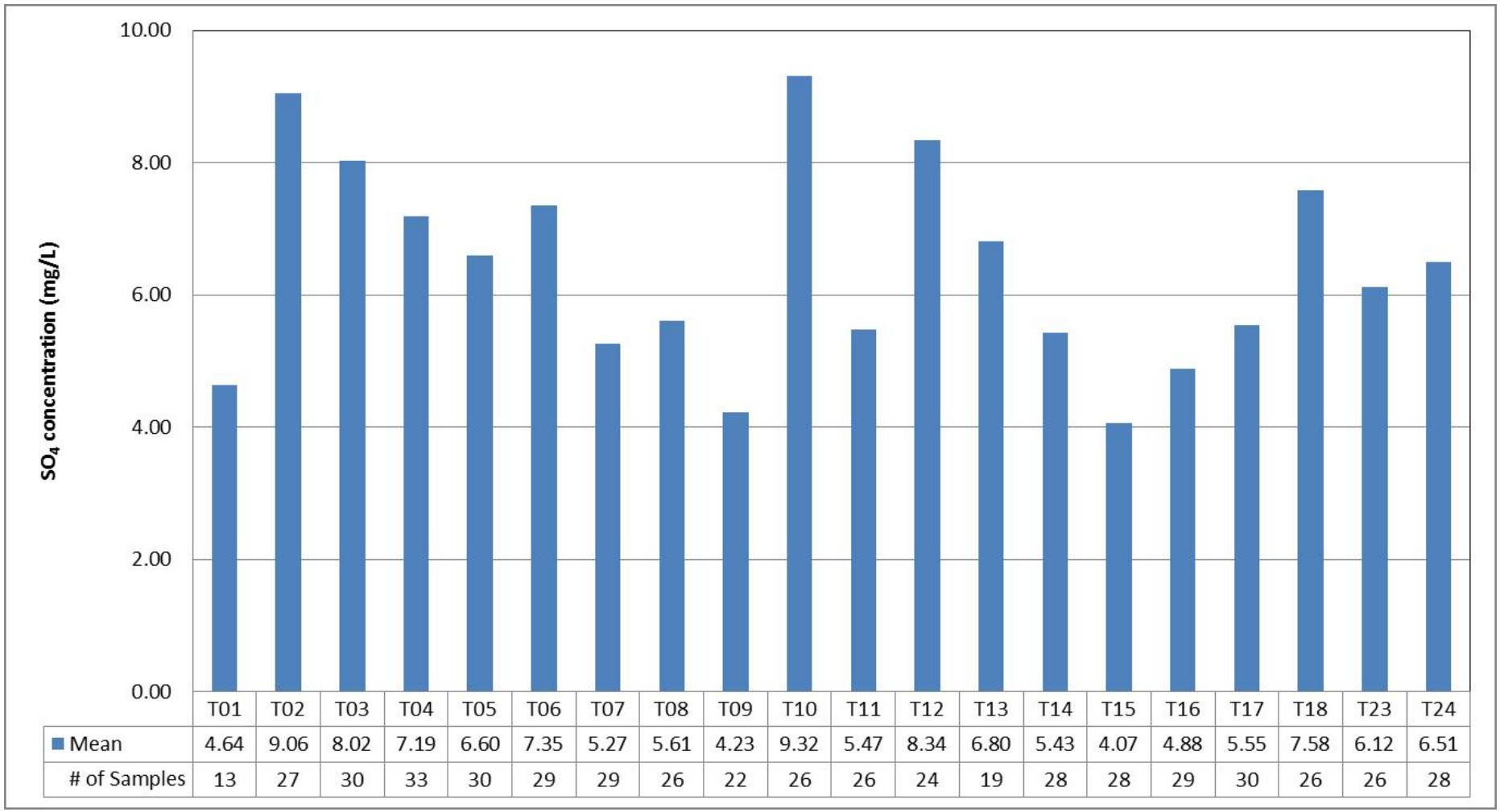
	R01	R02	R03	R04	R05	R06	R07	R08	R09
Mean	3.66	4.64	4.61	5.27	5.52	5.35	5.42	5.39	5.52
# of Samples	25	25	28	27	25	26	26	25	25

Figure A2.19 Mean sulfate concentration for Buffalo River corridor sites sampled between 2003-2011 during base-flow conditions.



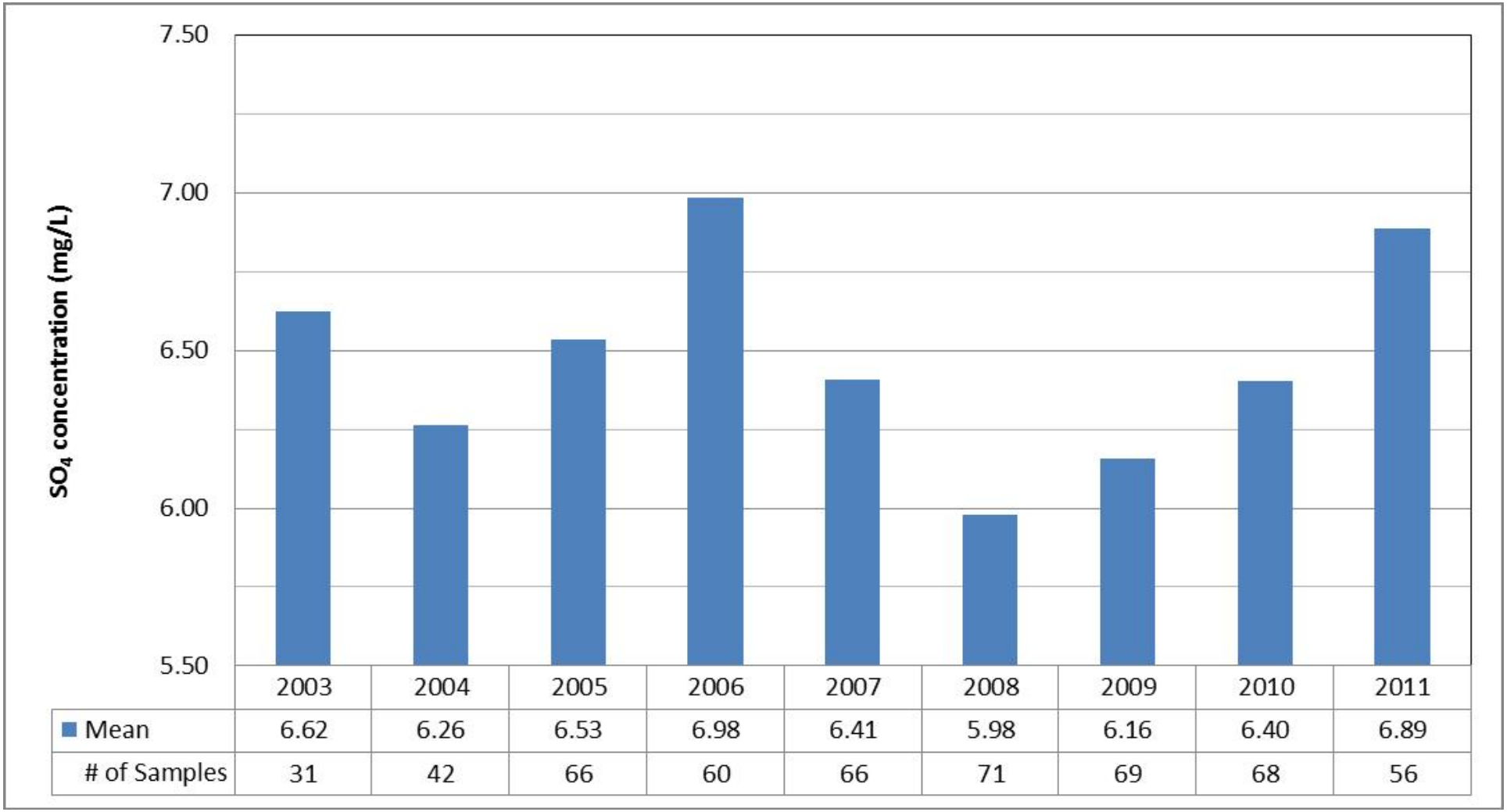
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	4.76	4.68	5.34	5.66	4.69	4.64	5.09	5.05	4.79
# of Samples	17	11	28	36	29	26	27	48	10

Figure A2.20 Mean annual sulfate concentration for Buffalo River corridor sites sampled from 2003-2011 during base-flow conditions.



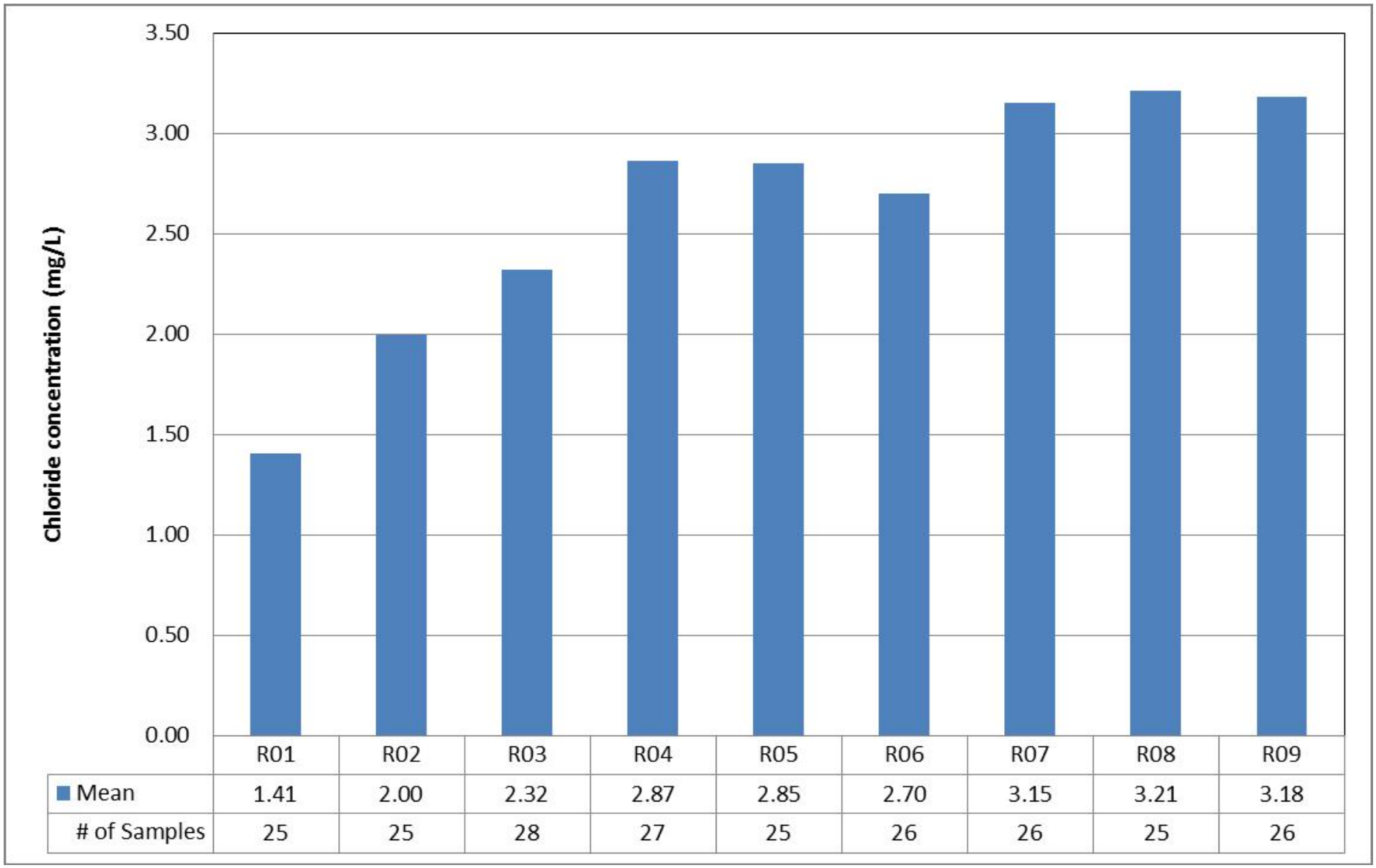
	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T23	T24
Mean	4.64	9.06	8.02	7.19	6.60	7.35	5.27	5.61	4.23	9.32	5.47	8.34	6.80	5.43	4.07	4.88	5.55	7.58	6.12	6.51
# of Samples	13	27	30	33	30	29	29	26	22	26	26	24	19	28	28	29	30	26	26	28

Figure A2.21 Mean sulfate concentration for Buffalo River tributary sites sampled between 2003-2011 during base-flow conditions.



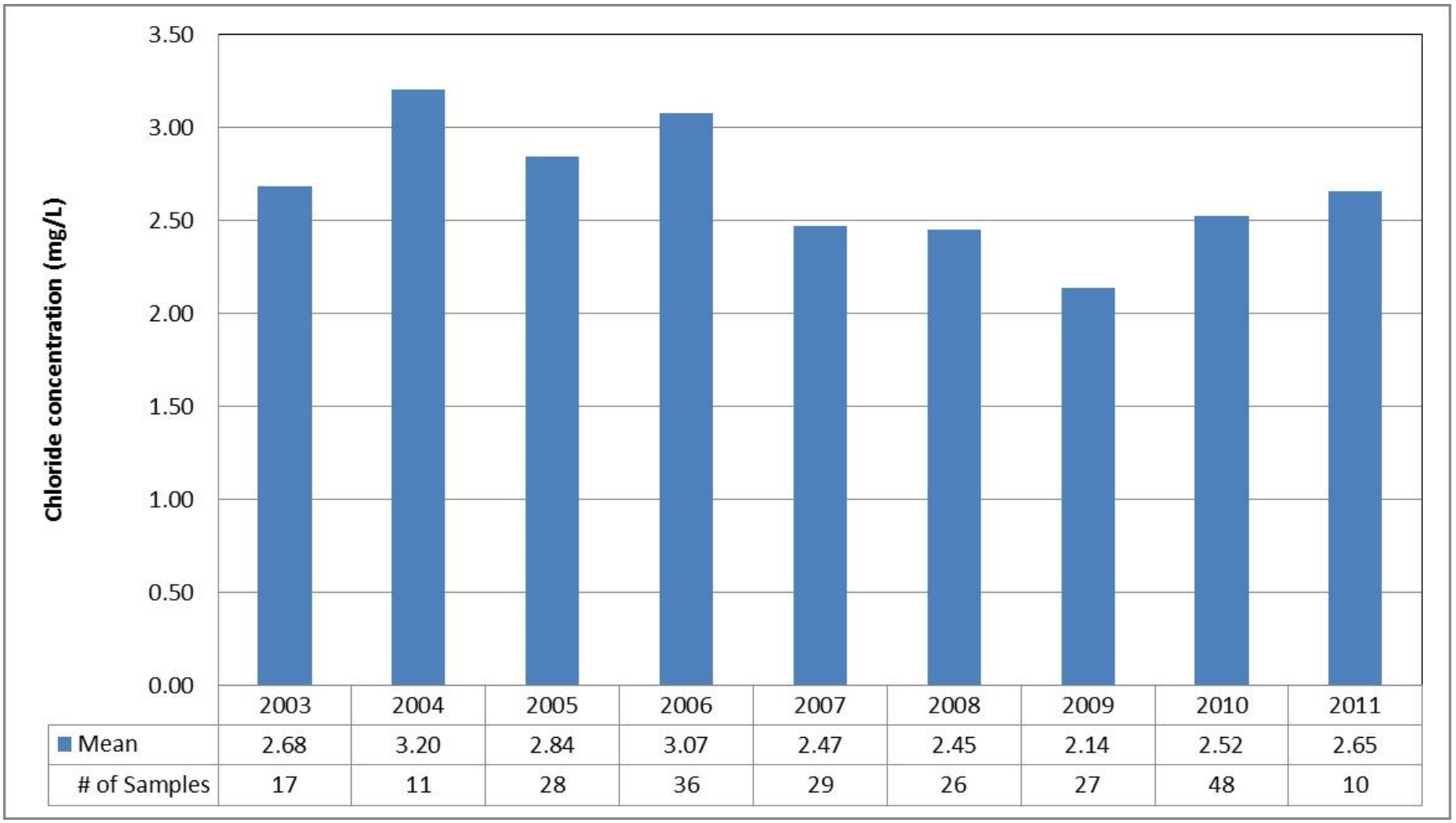
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	6.62	6.26	6.53	6.98	6.41	5.98	6.16	6.40	6.89
# of Samples	31	42	66	60	66	71	69	68	56

Figure A2.22 Mean annual sulfate concentration for Buffalo River tributary sites sampled from 2003-2011 during base-flow conditions.



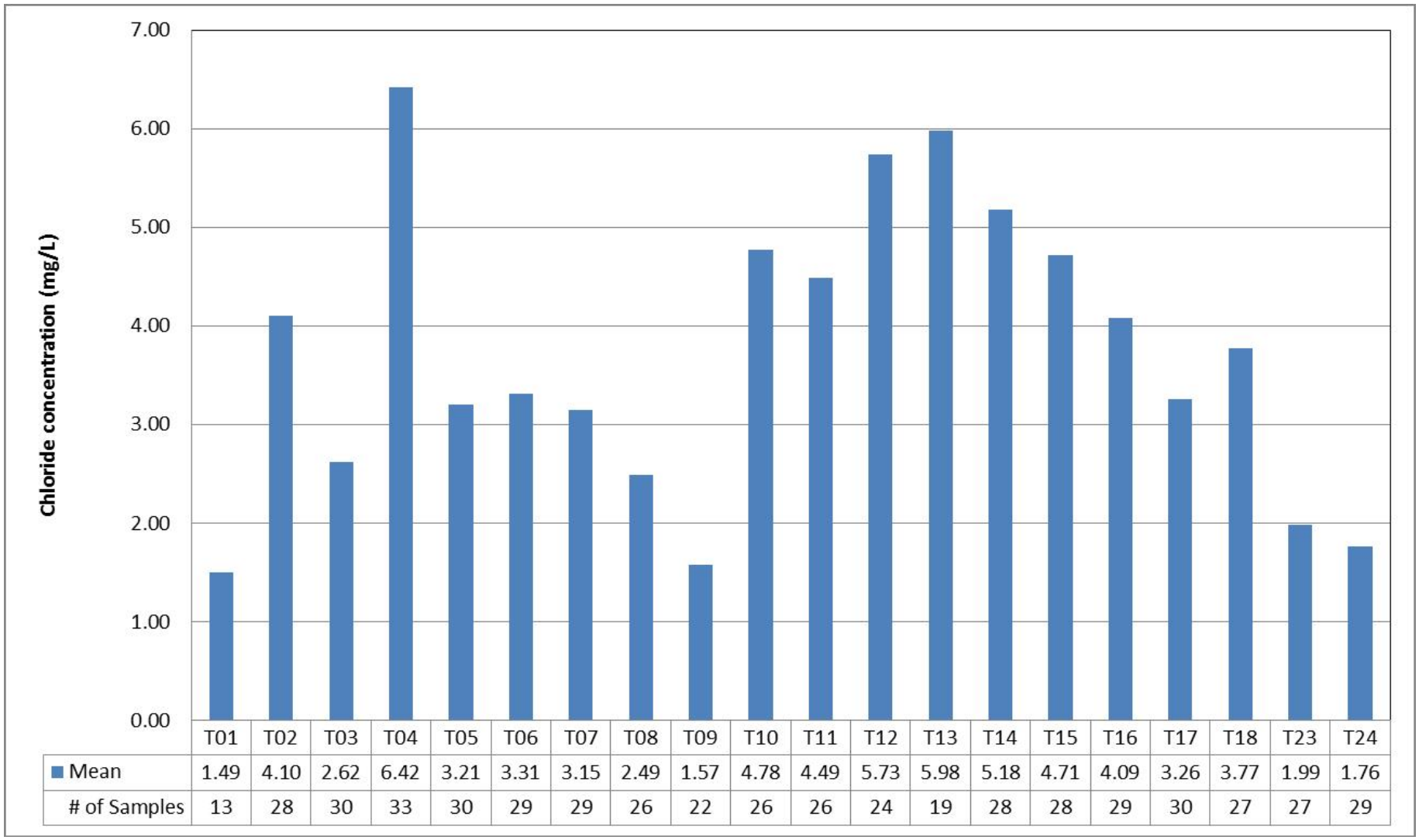
	R01	R02	R03	R04	R05	R06	R07	R08	R09
Mean	1.41	2.00	2.32	2.87	2.85	2.70	3.15	3.21	3.18
# of Samples	25	25	28	27	25	26	26	25	26

Figure A2.23 Mean chloride concentration for Buffalo River corridor sites sampled between 2003-2011 during base-flow conditions.



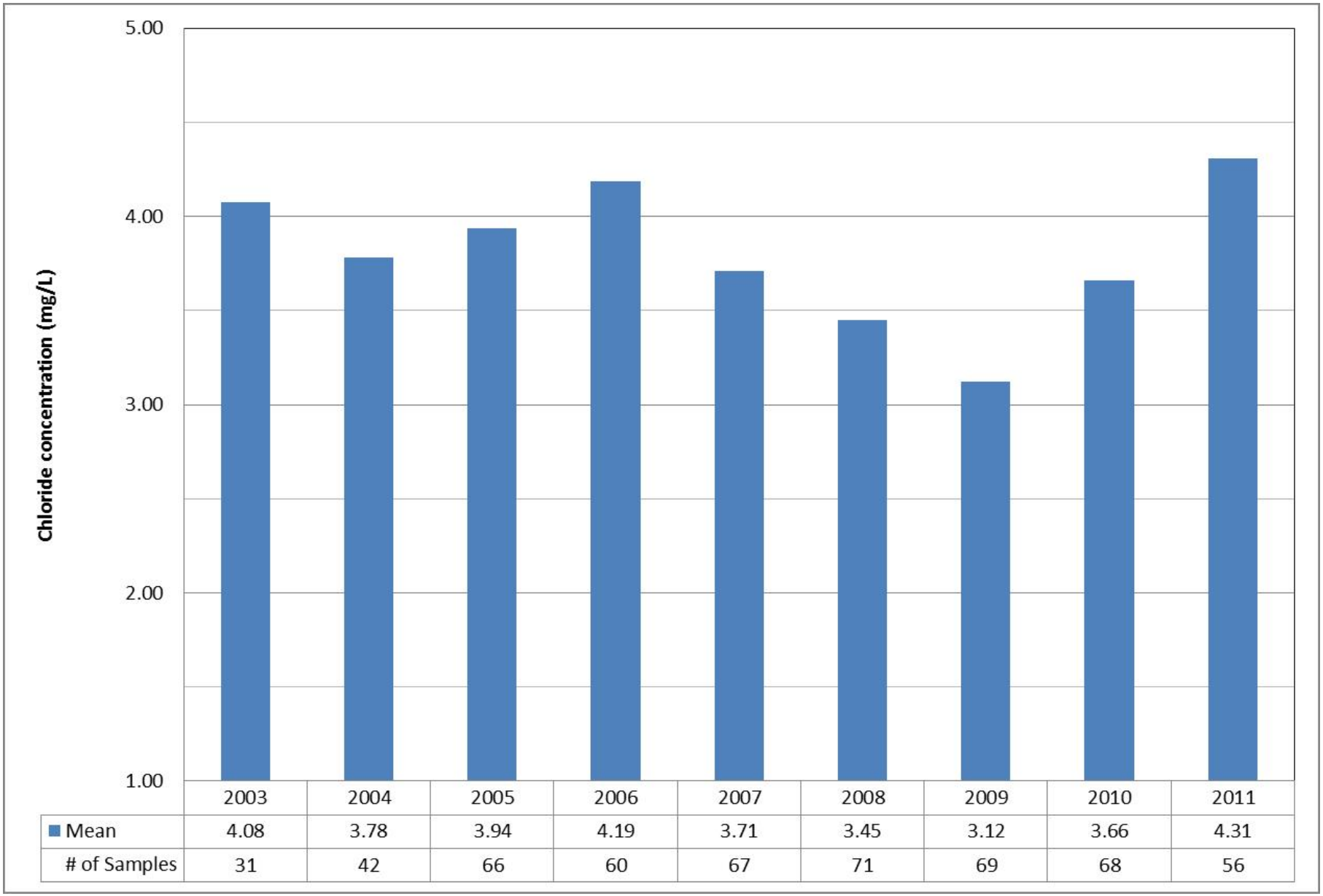
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	2.68	3.20	2.84	3.07	2.47	2.45	2.14	2.52	2.65
# of Samples	17	11	28	36	29	26	27	48	10

Figure A2.24 Mean annual chloride concentration for Buffalo River corridor sites sampled from 2003-2011 during base-flow conditions.



	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T23	T24
Mean	1.49	4.10	2.62	6.42	3.21	3.31	3.15	2.49	1.57	4.78	4.49	5.73	5.98	5.18	4.71	4.09	3.26	3.77	1.99	1.76
# of Samples	13	28	30	33	30	29	29	26	22	26	26	24	19	28	28	29	30	27	27	29

Figure A2.25 Mean chloride concentration for Buffalo River tributary sites sampled between 2003-2011 during base-flow conditions.



	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	4.08	3.78	3.94	4.19	3.71	3.45	3.12	3.66	4.31
# of Samples	31	42	66	60	67	71	69	68	56

Figure A2.26 Mean annual chloride concentration for Buffalo River tributary sites sampled from 2003-2011 during base-flow conditions.

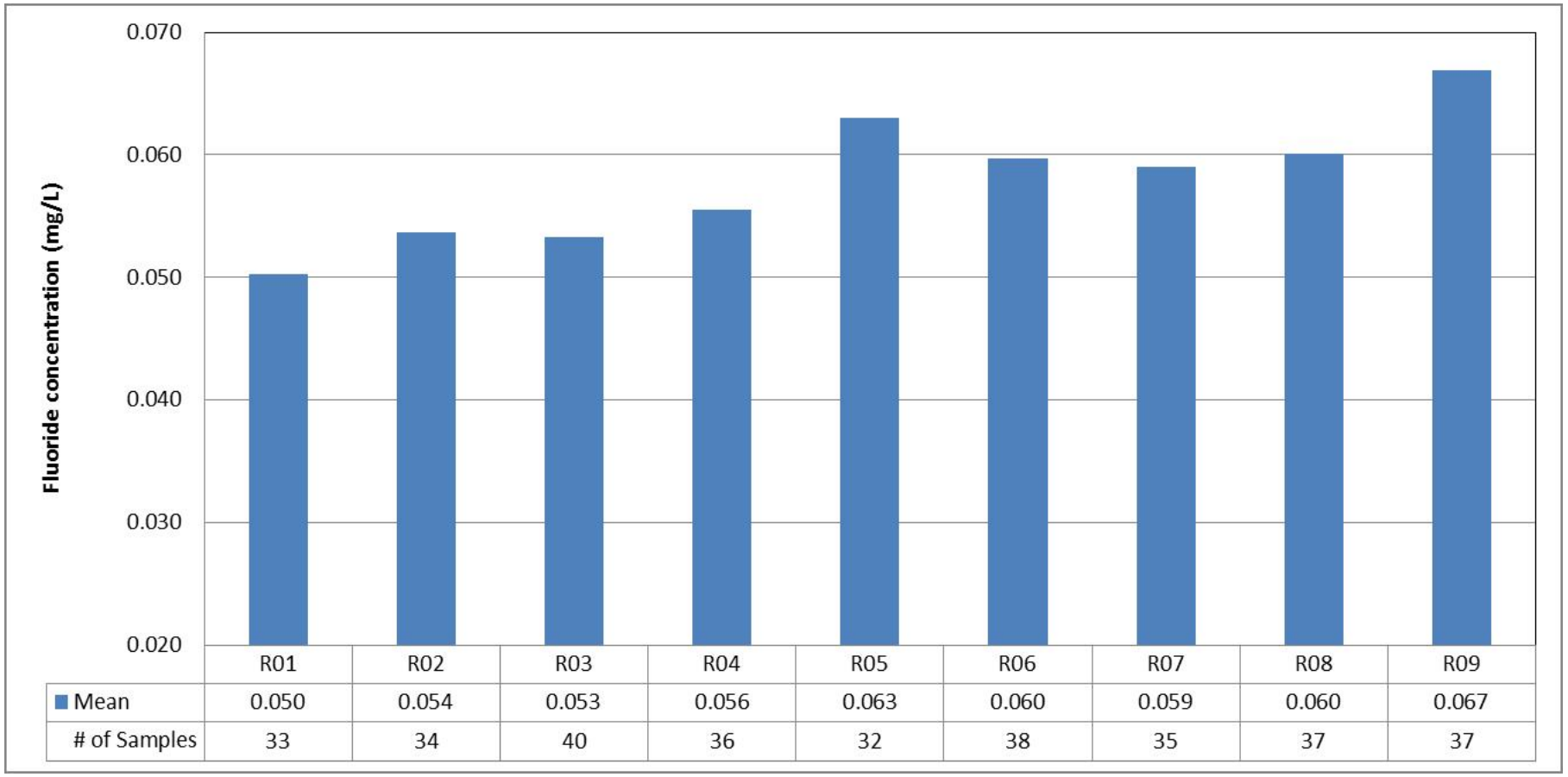
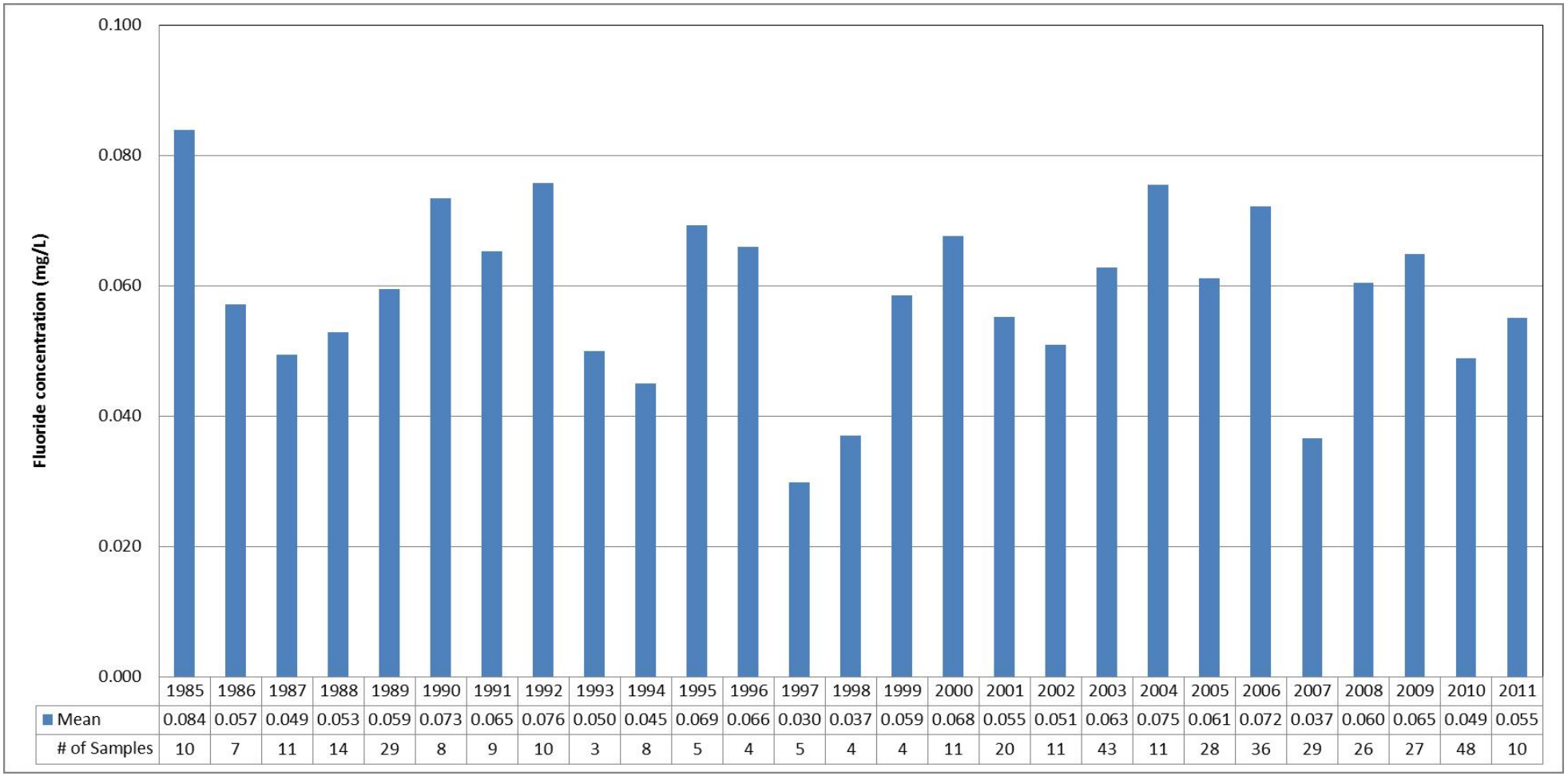
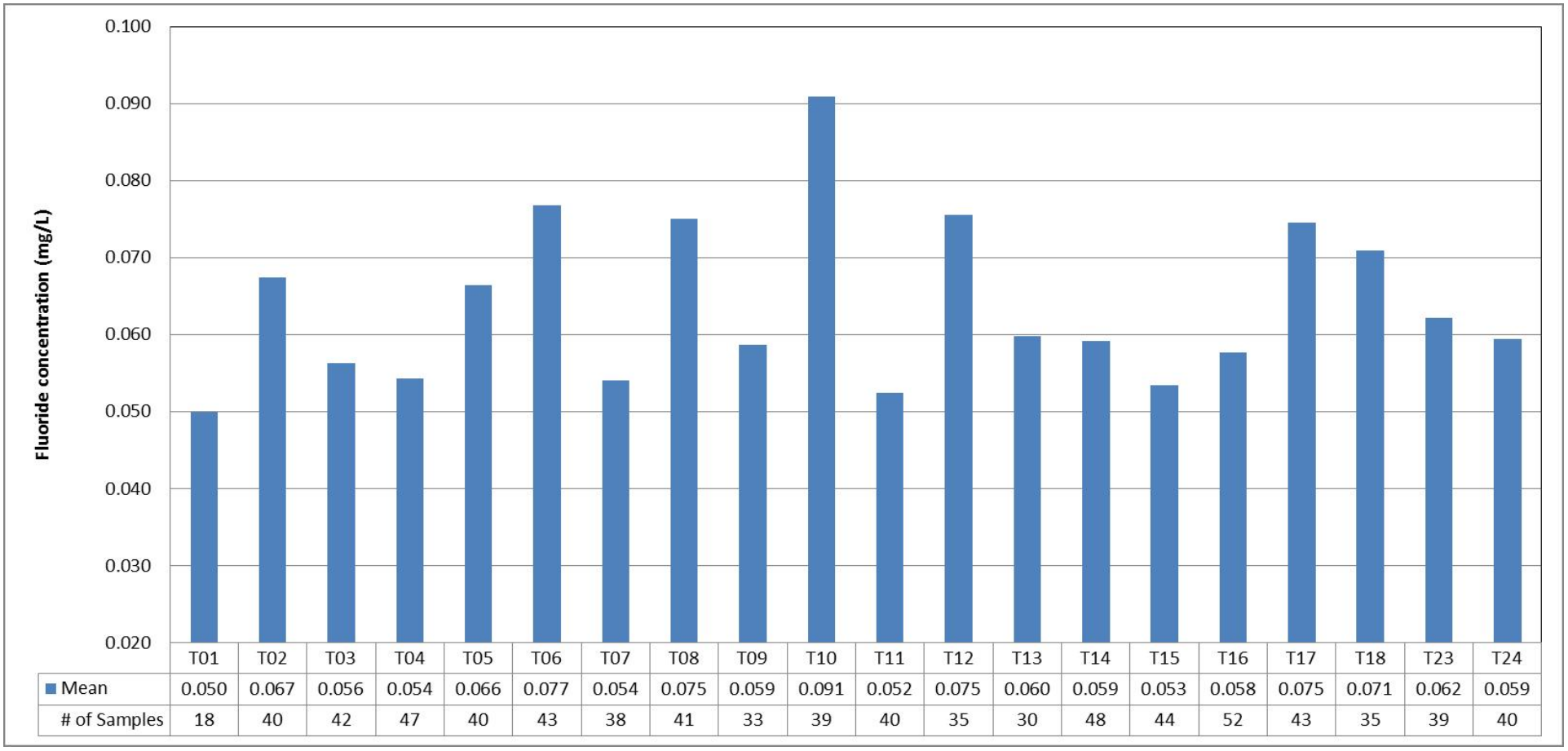


Figure A2.27 Mean fluoride concentration for Buffalo River corridor sites sampled between 1995-2011 during base-flow conditions.



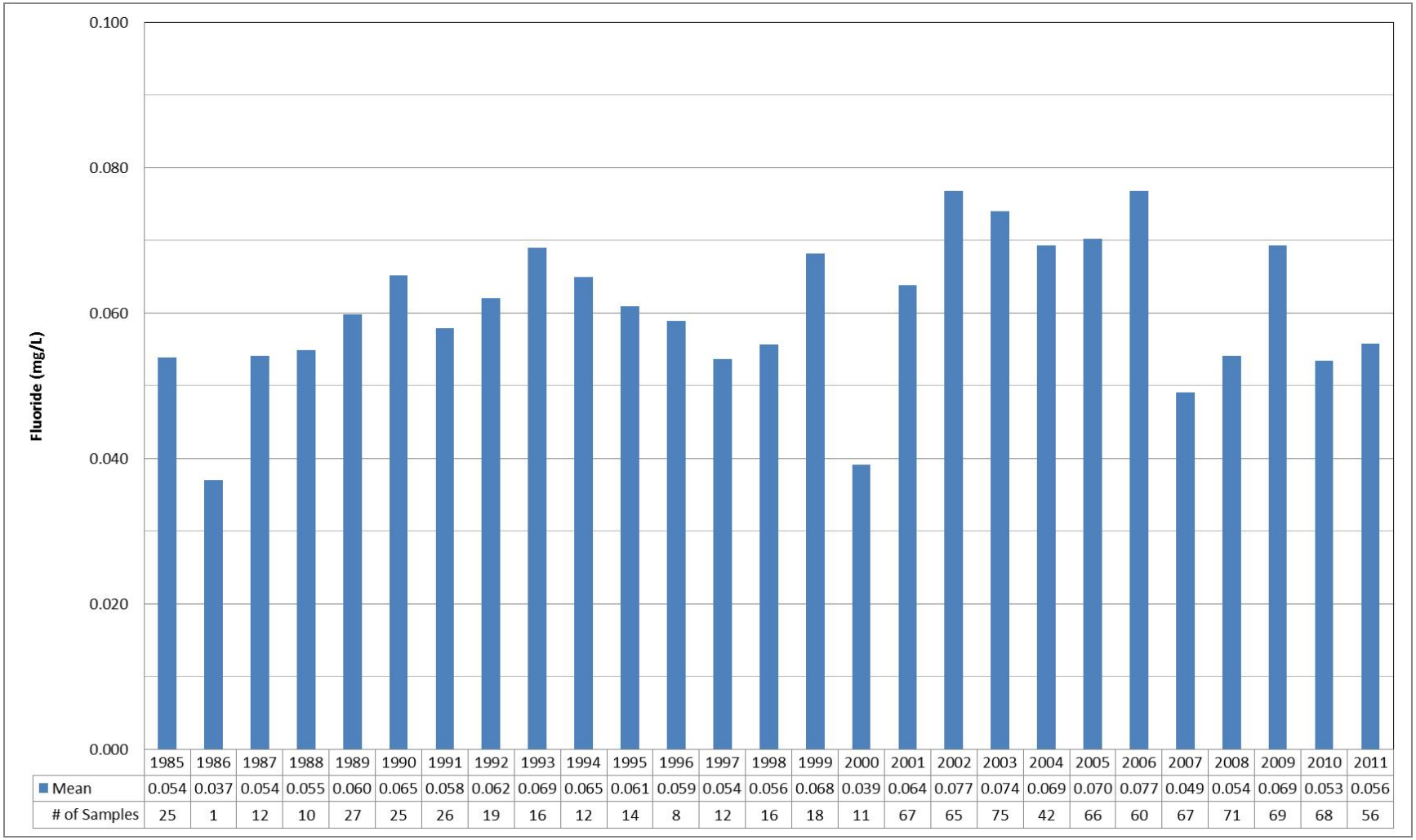
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	0.084	0.057	0.049	0.053	0.059	0.073	0.065	0.076	0.050	0.045	0.069	0.066	0.030	0.037	0.059	0.068	0.055	0.051	0.063	0.075	0.061	0.072	0.037	0.060	0.065	0.049	0.055
# of Samples	10	7	11	14	29	8	9	10	3	8	5	4	5	4	4	11	20	11	43	11	28	36	29	26	27	48	10

Figure A2.28 Mean annual fluoride concentration for Buffalo River corridor sites sampled from 1985-2011 during base-flow conditions.



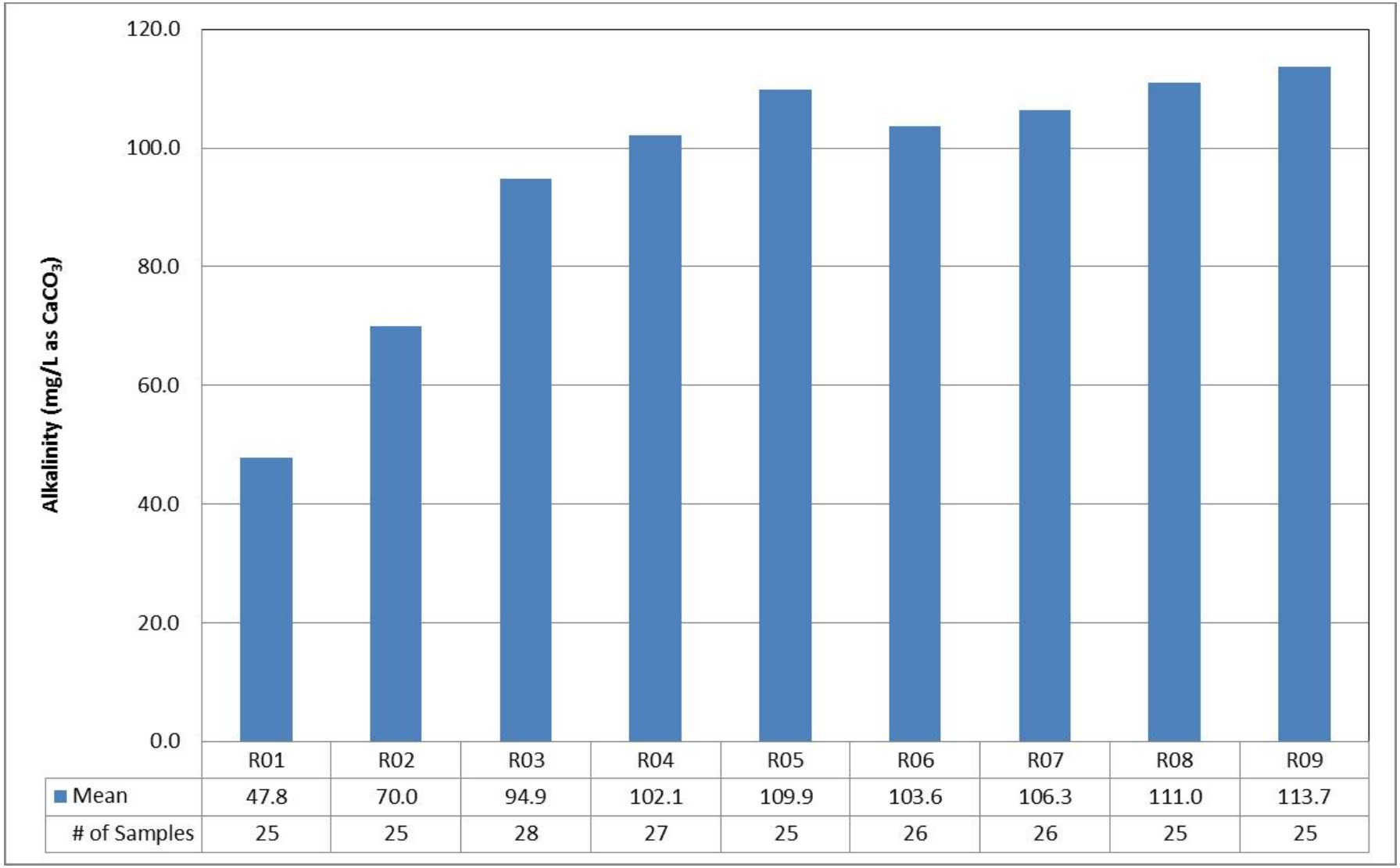
	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T23	T24
Mean	0.050	0.067	0.056	0.054	0.066	0.077	0.054	0.075	0.059	0.091	0.052	0.075	0.060	0.059	0.053	0.058	0.075	0.071	0.062	0.059
# of Samples	18	40	42	47	40	43	38	41	33	39	40	35	30	48	44	52	43	35	39	40

Figure A2.29 Mean fluoride concentration for Buffalo River tributary sites sampled between 1995-2011 during base-flow conditions.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	0.054	0.037	0.054	0.055	0.060	0.065	0.058	0.062	0.069	0.065	0.061	0.059	0.054	0.056	0.068	0.039	0.064	0.077	0.074	0.069	0.070	0.077	0.049	0.054	0.069	0.053	0.056
# of Samples	25	1	12	10	27	25	26	19	16	12	14	8	12	16	18	11	67	65	75	42	66	60	67	71	69	68	56

Figure A2.30 Mean annual fluoride concentration for Buffalo River tributary sites sampled from 1985-2011 during base-flow conditions.



	R01	R02	R03	R04	R05	R06	R07	R08	R09
Mean	47.8	70.0	94.9	102.1	109.9	103.6	106.3	111.0	113.7
# of Samples	25	25	28	27	25	26	26	25	25

Figure A2.31 Mean alkalinity for Buffalo River corridor sites sampled between 2003-2011 during base-flow conditions.

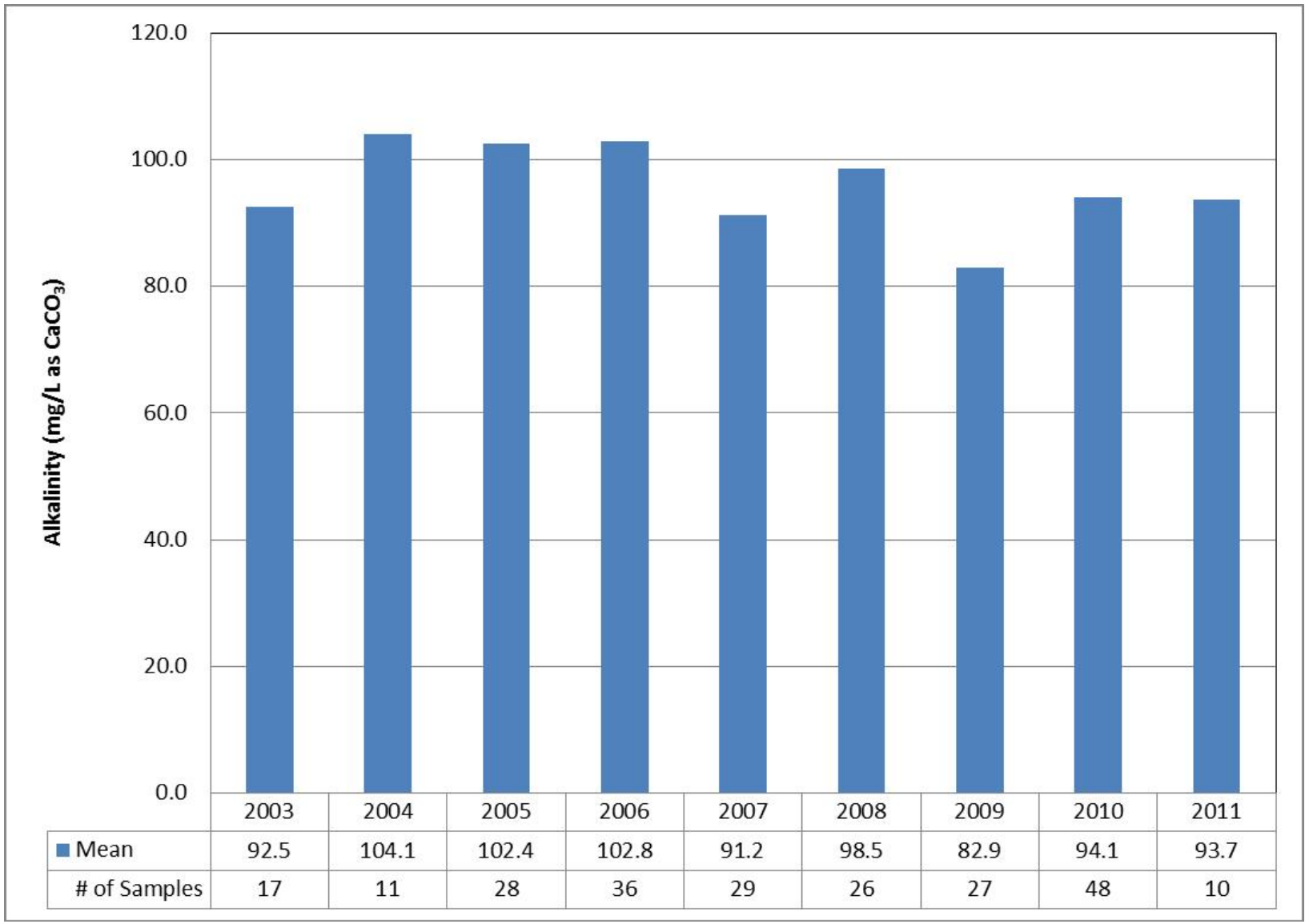
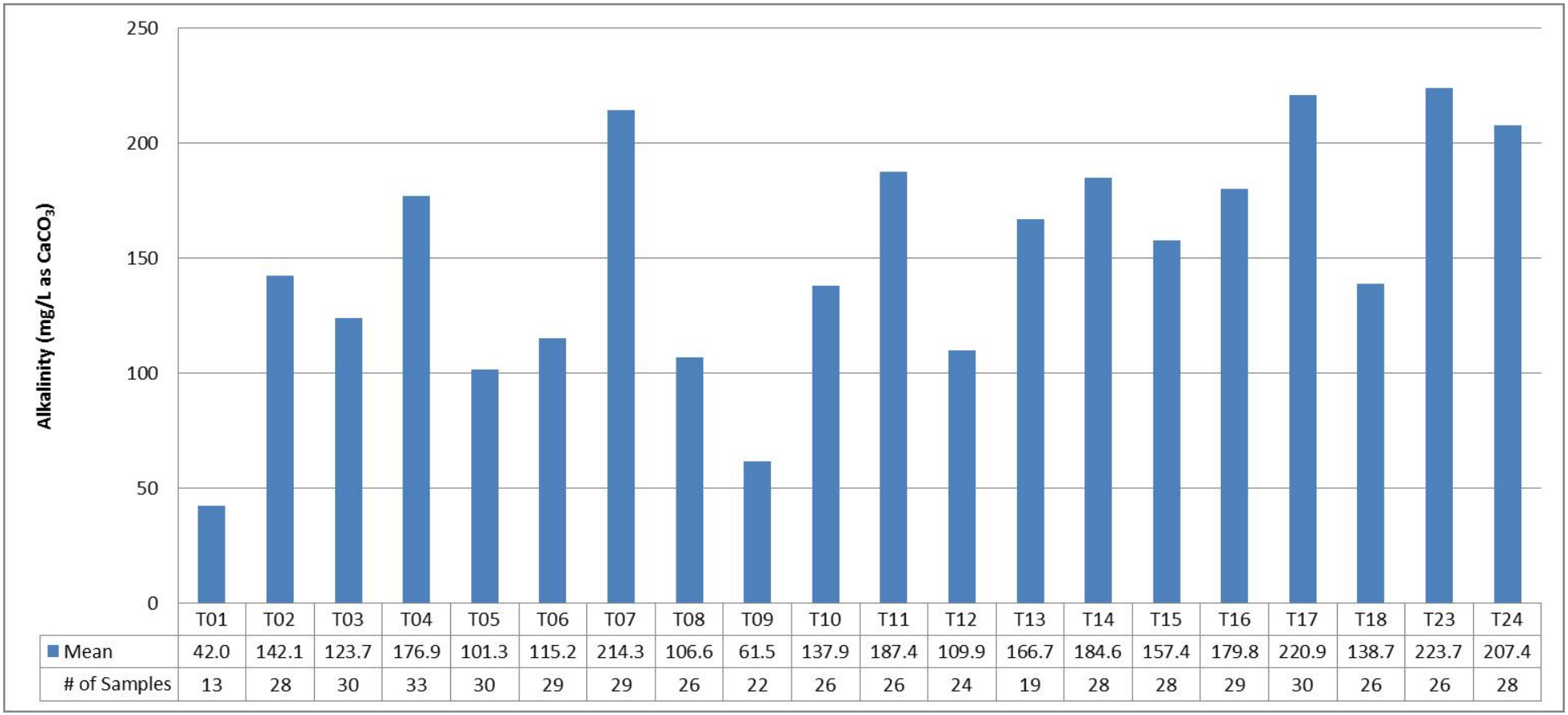
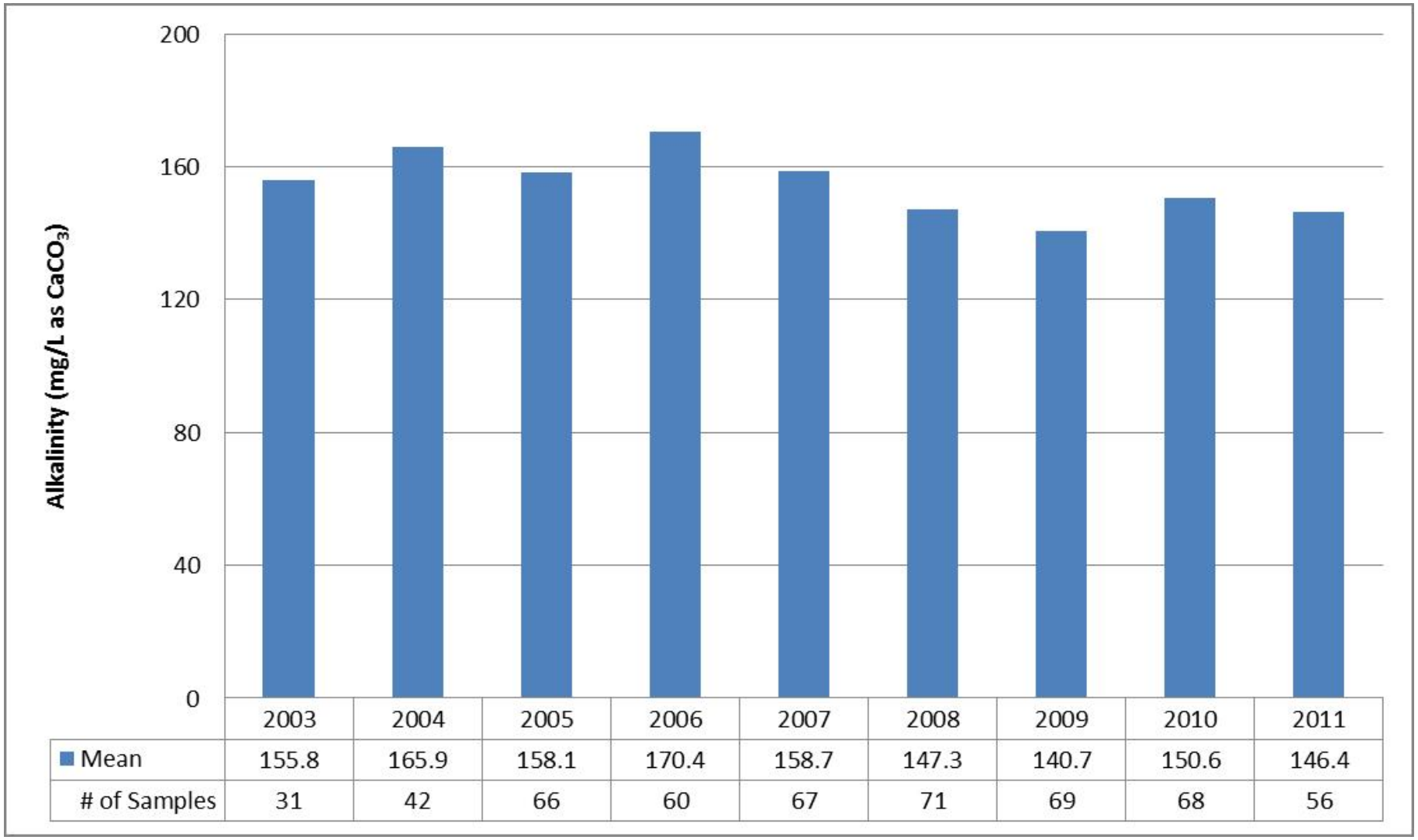


Figure A2.32 Mean annual alkalinity for Buffalo River corridor sites sampled from 2003-2011 during base-flow conditions.



	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T23	T24
Mean	42.0	142.1	123.7	176.9	101.3	115.2	214.3	106.6	61.5	137.9	187.4	109.9	166.7	184.6	157.4	179.8	220.9	138.7	223.7	207.4
# of Samples	13	28	30	33	30	29	29	26	22	26	26	24	19	28	28	29	30	26	26	28

Figure A2.33 Mean alkalinity for Buffalo River tributary sites sampled between 2003-2011 during base-flow conditions.

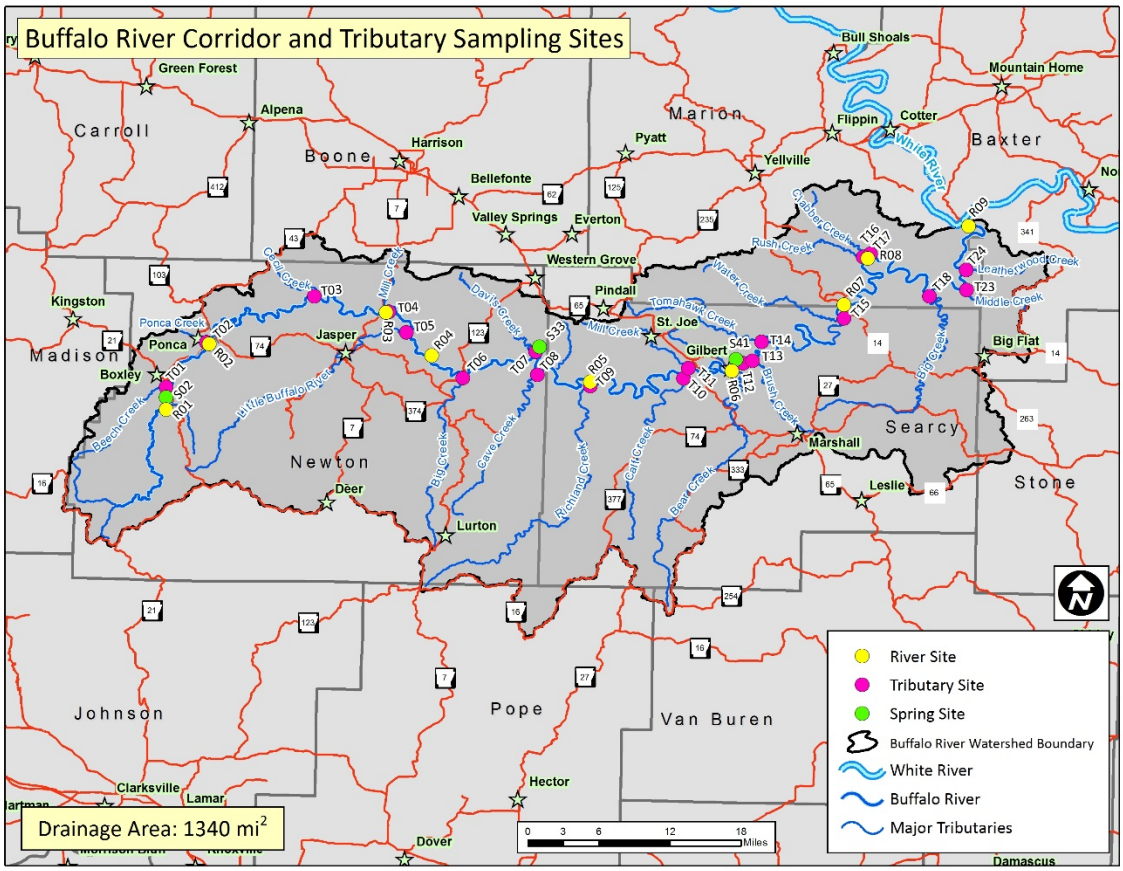


	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	155.8	165.9	158.1	170.4	158.7	147.3	140.7	150.6	146.4
# of Samples	31	42	66	60	67	71	69	68	56

Figure A2.34 Mean annual alkalinity for Buffalo River tributary sites sampled from 2003-2011 during base-flow conditions.

Appendix 3

Statistical Summary of Base-Flow Water Quality



Please note that the footnotes are only defined one time at the bottom of each page.

Table A3.1 Arkansas water quality standards and river corridor base-flow sample statistics at site R01 - Wilderness Boundary

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	128	27	161	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	103	2.61	2.16	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	83	0.044	0.066	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	28	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	25	1.41	0.52	20	
Sulfate (mg/L)	2003-2011	25	3.66	1.08	20	
Dissolved oxygen (mg/L)	1985-2011	112	9.41	2.13	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	128	15.2	7.3	31	29
pH	1999-2011	40	7.66	0.48	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	127	97	51	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	25	48	25	N/A	
Fluoride (mg/L)	1985-2011[8]	47	0.060	0.029	N/A	

Table A3.2 Arkansas water quality standards and river corridor base-flow sample statistics at site R02 - Ponca

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	134	46	86	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	110	1.94	1.93	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	101	0.070	0.071	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	29	0.006	0.002	N/A	
Chloride (mg/L)	2003-2011	25	2.00	0.69	20	
Sulfate (mg/L)	2003-2011	25	4.64	1.03	20	
Dissolved oxygen (mg/L)	1985-2011	115	9.72	2.13	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	134	15.9	7.6	31	29
pH	1999-2011	39	7.82	0.32	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	132	139	63	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	25	70	26	N/A	
Fluoride (mg/L)	1986-2011[8]	41	0.058	0.026	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.3 Arkansas water quality standards and river corridor base-flow sample statistics at site R03 - Pruitt

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	136	14	24	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	113	2.01	2.26	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	89	0.057	0.107	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	33	0.006	0.005	N/A	
Chloride (mg/L)	2003-2011	28	2.32	0.92	20	
Sulfate (mg/L)	2003-2011	28	4.61	0.94	20	
Dissolved oxygen (mg/L)	1985-2011	119	9.61	2.08	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	137	17.1	8.8	31	29
pH	1999-2011	43	7.95	0.28	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	136	169	57	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	95	32	N/A	
Fluoride (mg/L)	1987-2011[8]	52	0.053	0.023	N/A	

Table A3.4 Arkansas water quality standards and river corridor base-flow sample statistics at site R04 - Hasty

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	127	12	19	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	107	2.18	2.34	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	91	0.083	0.079	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	31	0.010	0.027	N/A	
Chloride (mg/L)	2003-2011	27	2.87	0.68	20	
Sulfate (mg/L)	2003-2011	27	5.27	0.99	20	
Dissolved oxygen (mg/L)	1985-2011	114	9.62	2.05	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	131	17.6	8.5	31	29
pH	1999-2011	41	7.98	0.24	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	131	189	57	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	27	102	18	N/A	
Fluoride (mg/L)	1985-2011[8]	52	0.059	0.024	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.5 Arkansas water quality standards and river corridor base-flow sample statistics at site R05 - Woolum

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	128	9	19	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	107	1.79	1.73	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	92	0.108	0.131	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	27	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	25	2.85	0.68	20	
Sulfate (mg/L)	2003-2011	25	5.52	1.09	20	
Dissolved oxygen (mg/L)	1985-2011	116	10.08	2.02	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	131	20.1	20.4	31	29
pH	1999-2011	38	8.13	0.23	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	130	201	54	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	25	110	17	N/A	
Fluoride (mg/L)	1985-2011[8]	44	0.059	0.024	N/A	

Table A3.6 Arkansas water quality standards and river corridor base-flow sample statistics at site R06 - Gilbert

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	133	14	38	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	109	2.14	2.21	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	90	0.114	0.132	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	29	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	26	2.70	0.58	20	
Sulfate (mg/L)	2003-2011	26	5.35	0.80	20	
Dissolved oxygen (mg/L)	1985-2011	117	10.31	2.13	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	135	18.4	8.3	31	29
pH	1999-2011	41	8.12	0.29	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	135	200	49	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	104	13	N/A	
Fluoride (mg/L)	1985-2011[8]	48	0.064	0.029	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.7 Arkansas water quality standards and river corridor base-flow sample statistics at site R07 - Highway 14

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	126	8	18	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	104	1.63	1.55	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	92	0.099	0.121	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	30	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	26	3.15	0.78	20	
Sulfate (mg/L)	2003-2011	26	5.42	0.74	20	
Dissolved oxygen (mg/L)	1985-2011	113	17.91	81.66	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	128	18.3	8.8	31	29
pH	1999-2011	41	8.21	0.27	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	128	204	43	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	106	13	N/A	
Fluoride (mg/L)	1985-2011[8]	46	0.059	0.024	N/A	

Table A3.8 Arkansas water quality standards and river corridor base-flow sample statistics at site R08 - Rush

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	125	7	11	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	105	1.71	1.76	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	89	0.102	0.134	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	31	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	25	3.21	0.88	20	
Sulfate (mg/L)	2003-2011	25	5.39	0.84	20	
Dissolved oxygen (mg/L)	1985-2011	113	9.86	2.16	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	128	18.3	8.8	31	29
pH	1999-2011	41	8.12	0.31	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	128	207	44	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	25	111	21	N/A	
Fluoride (mg/L)	1985-2011[8]	43	0.066	0.021	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.9 Arkansas water quality standards and river corridor base-flow sample statistics at site R09 - Mouth

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	111	8	28	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	91	1.81	1.93	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	65	0.107	0.153	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	31	0.008	0.007	N/A	
Chloride (mg/L)	2003-2011	26	3.18	0.87	20	
Sulfate (mg/L)	2003-2011	25	5.52	1.18	20	
Dissolved oxygen (mg/L)	1985-2011	97	10.09	1.91	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	112	19.1	8.7	31	29
pH	1999-2011	37	8.23	0.28	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	111	221	41	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	25	114	15	N/A	
Fluoride (mg/L)	1985-2011[8]	43	0.068	0.028	N/A	

Table A3.10 Arkansas water quality standards and tributary base-flow sample statistics at site T01 - Beech Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	60	21	40	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	50	4.34	2.84	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	41	0.067	0.173	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	17	0.008	0.004	N/A	
Chloride (mg/L)	2003-2011	13	1.49	0.35	20	
Sulfate (mg/L)	2003-2011	13	4.64	1.32	20	
Dissolved oxygen (mg/L)	1985-2011	50	11.02	2.03	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	59	12.4	7.4	31	29
pH	1999-2011	21	7.94	0.20	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	59	88	51	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	13	42	21	N/A	
Fluoride (mg/L)	1985-2011[8]	19	0.059	0.025	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.11 Arkansas water quality standards and tributary base-flow sample statistics at site T02 - Ponca Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	116	31	74	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	103	5.10	31.38	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	90	0.126	0.127	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	33	0.009	0.005	N/A	
Chloride (mg/L)	2003-2011	28	4.10	1.58	20	
Sulfate (mg/L)	2003-2011	27	9.06	2.02	20	
Dissolved oxygen (mg/L)	1985-2011	101	9.76	2.31	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	117	15.4	7.0	31	29
pH	1999-2011	43	8.09	0.26	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	118	243	66	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	142	20	N/A	
Fluoride (mg/L)	1986-2011[8]	38	0.070	0.020	N/A	

Table A3.12 Arkansas water quality standards and tributary base-flow sample statistics at site T03 - Cecil Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	117	32	52	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	104	2.62	2.63	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	71	0.052	0.054	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	40	0.008	0.004	N/A	
Chloride (mg/L)	2003-2011	30	2.62	0.66	20	
Sulfate (mg/L)	2003-2011	30	8.02	2.02	20	
Dissolved oxygen (mg/L)	1985-2011	103	9.56	2.14	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	119	16.4	6.8	31	29
pH	1999-2011	44	7.89	0.21	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	118	224	67	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	30	124	24	N/A	
Fluoride (mg/L)	1987-2011[8]	45	0.058	0.023	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.13 Arkansas water quality standards and tributary base-flow sample statistics at site T04 - Mill Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	124	36	47	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	114	2.03	1.57	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	99	0.583	0.264	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	36	0.010	0.005	N/A	
Chloride (mg/L)	2003-2011	33	6.42	1.04	20	
Sulfate (mg/L)	2003-2011	33	7.19	2.16	20	
Dissolved oxygen (mg/L)	1985-2011	110	9.90	1.96	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	129	17.2	6.8	31	29
pH	1999-2011	48	7.96	0.21	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	127	302	52	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	33	177	10	N/A	
Fluoride (mg/L)	1985-2011[8]	55	0.058	0.028	N/A	

Table A3.14 Arkansas water quality standards and tributary base-flow sample statistics at site T05 - Little Buffalo River

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	123	26	97	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	109	2.00	2.31	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	86	0.108	0.172	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	37	0.014	0.033	N/A	
Chloride (mg/L)	2003-2011	30	3.21	0.83	20	
Sulfate (mg/L)	2003-2011	30	6.60	1.46	20	
Dissolved oxygen (mg/L)	1985-2011	102	9.71	2.04	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	122	18.5	8.1	31	29
pH	1999-2011	44	7.97	0.28	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	120	195	50	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	30	101	26	N/A	
Fluoride (mg/L)	1985-2011[8]	50	0.068	0.017	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.15 Arkansas water quality standards and tributary base-flow sample statistics at site T06 - Big Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	122	16	24	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	108	2.13	1.71	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	90	0.147	0.173	N/A	
Orthophosphate, as phosphorus (mg/L)	1999-2011	34	0.017	0.034	N/A	
Chloride (mg/L)	2003-2011	29	3.31	0.66	20	
Sulfate (mg/L)	2003-2011	29	7.35	1.66	20	
Dissolved oxygen (mg/L)	1985-2011	102	9.51	2.25	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	120	19.4	7.3	31	29
pH	1999-2011	43	7.95	0.25	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	119	217	49	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	29	115	21	N/A	
Fluoride (mg/L)	1985-2011[8]	57	0.076	0.022	N/A	

Table A3.16 Arkansas water quality standards and tributary base-flow sample statistics at site T07 - Davis Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	128	31	69	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	113	0.83	0.94	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	94	0.366	0.228	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	34	0.010	0.005	N/A	
Chloride (mg/L)	2003-2011	29	3.15	0.65	20	
Sulfate (mg/L)	2003-2011	29	5.27	1.62	20	
Dissolved oxygen (mg/L)	1985-2011	110	9.63	2.17	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	129	16.6	5.1	31	29
pH	1999-2011	46	8.01	0.27	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	128	360	58	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	29	214	18	N/A	
Fluoride (mg/L)	1985-2011[8]	47	0.058	0.019	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.17 Arkansas water quality standards and tributary base-flow sample statistics at site T08 - Cave Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	116	33	159	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	104	1.55	1.58	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	73	0.100	0.100	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	33	0.011	0.007	N/A	
Chloride (mg/L)	2003-2011	26	2.49	0.50	20	
Sulfate (mg/L)	2003-2011	26	5.61	0.98	20	
Dissolved oxygen (mg/L)	1985-2011	99	9.46	2.11	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	118	18.9	7.3	31	29
pH	1999-2011	42	8.01	0.29	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	118	205	42	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	107	16	N/A	
Fluoride (mg/L)	1985-2011[8]	46	0.072	0.025	N/A	

Table A3.18 Arkansas water quality standards and tributary base-flow sample statistics at site T09 - Richland Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	105	39	89	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	90	3.00	2.49	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	64	0.052	0.061	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	32	0.009	0.008	N/A	
Chloride (mg/L)	2003-2011	22	1.57	0.70	20	
Sulfate (mg/L)	2003-2011	22	4.23	0.71	20	
Dissolved oxygen (mg/L)	1985-2011	87	10.18	1.55	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	109	18.1	6.9	31	29
pH	1999-2011	35	7.97	0.31	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	109	126	55	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	22	62	25	N/A	
Fluoride (mg/L)	1985-2011[8]	39	0.061	0.020	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.19 Arkansas water quality standards and tributary base-flow sample statistics at site T10 - Calf Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	117	75	471	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	104	2.31	7.07	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	75	0.338	0.275	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	26	0.032	0.030	N/A	
Chloride (mg/L)	2003-2011	26	4.78	1.02	20	
Sulfate (mg/L)	2003-2011	26	9.32	1.60	20	
Dissolved oxygen (mg/L)	1985-2011	99	9.88	1.99	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	118	18.4	5.5	31	29
pH	1999-2011	43	7.90	0.32	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	116	274	45	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	138	19	N/A	
Fluoride (mg/L)	1985-2011[8]	53	0.081	0.029	N/A	

Table A3.20 Arkansas water quality standards and tributary base-flow sample statistics at site T11 - Mill Creek - Middle

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	119	18	34	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	106	0.77	0.58	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	78	0.291	0.149	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	32	0.012	0.008	N/A	
Chloride (mg/L)	2003-2011	26	4.49	0.87	20	
Sulfate (mg/L)	2003-2011	26	5.47	1.59	20	
Dissolved oxygen (mg/L)	1985-2011	99	10.20	1.52	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	119	16.3	4.3	31	29
pH	1999-2011	43	8.08	0.18	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	118	311	49	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	187	28	N/A	
Fluoride (mg/L)	1985-2011[8]	45	0.053	0.019	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.21 Arkansas water quality standards and tributary base-flow sample statistics at site T12 - Bear Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	115	25	44	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	103	1.52	0.98	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	73	0.219	0.197	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	30	0.016	0.012	N/A	
Chloride (mg/L)	2003-2011	24	5.73	1.51	20	
Sulfate (mg/L)	2003-2011	24	8.34	1.46	20	
Dissolved oxygen (mg/L)	1985-2011	99	10.60	2.30	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	117	18.5	7.5	31	29
pH	1999-2011	38	8.17	0.36	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	115	230	42	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	24	110	15	N/A	
Fluoride (mg/L)	1985-2011[8]	48	0.075	0.024	N/A	

Table A3.22 Arkansas water quality standards and tributary base-flow sample statistics at site T13 - Brush Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	105	96	428	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	99	1.87	6.08	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	74	0.602	0.224	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	19	0.039	0.081	N/A	
Chloride (mg/L)	2003-2011	26	5.65	1.41	20	
Sulfate (mg/L)	2003-2011	26	7.14	1.93	20	
Dissolved oxygen (mg/L)	1985-2011	94	10.47	2.35	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	106	15.5	5.3	31	29
pH	1999-2011	44	8.13	0.26	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	106	297	54	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	164	18	N/A	
Fluoride (mg/L)	1985-2011[8]	41	0.065	0.018	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.23 Arkansas water quality standards and tributary base-flow sample statistics at site T14 - Tomahawk Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	125	85	120	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	109	0.96	0.64	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	90	0.347	0.238	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	36	0.009	0.004	N/A	
Chloride (mg/L)	2003-2011	28	5.18	0.99	20	
Sulfate (mg/L)	2003-2011	28	5.43	0.88	20	
Dissolved oxygen (mg/L)	1985-2011	107	10.52	1.84	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	126	18.1	6.2	31	29
pH	1999-2011	44	8.11	0.23	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	124	320	48	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	185	10	N/A	
Fluoride (mg/L)	1985-2011[8]	54	0.063	0.022	N/A	

Table A3.24 Arkansas water quality standards and tributary base-flow sample statistics at site T15 - Water Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	121	14	26	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	107	0.61	0.44	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	78	0.212	0.171	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	42	0.007	0.005	N/A	
Chloride (mg/L)	2003-2011	28	4.71	1.19	20	
Sulfate (mg/L)	2003-2011	28	4.07	0.67	20	
Dissolved oxygen (mg/L)	1985-2011	104	11.24	8.36	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	122	17.5	7.1	31	29
pH	1999-2011	46	8.14	0.26	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	121	274	50	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	157	12	N/A	
Fluoride (mg/L)	1985-2011[8]	48	0.055	0.018	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.25 Arkansas water quality standards and tributary base-flow sample statistics at site T16 - Rush Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	129	20	26	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	114	0.72	0.48	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	100	0.188	0.124	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	39	0.007	0.003	N/A	
Chloride (mg/L)	2003-2011	29	4.09	1.11	20	
Sulfate (mg/L)	2003-2011	29	4.88	0.60	20	
Dissolved oxygen (mg/L)	1985-2011	111	10.05	1.48	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	127	15.8	4.4	31	29
pH	1999-2011	47	8.08	0.23	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	126	307	52	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	29	180	11	N/A	
Fluoride (mg/L)	1985-2011[8]	56	0.059	0.019	N/A	

Table A3.26 Arkansas water quality standards and tributary base-flow sample statistics at site T17 - Clabber Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	128	55	164	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	115	0.83	1.22	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	91	0.152	0.266	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	42	0.007	0.004	N/A	
Chloride (mg/L)	2003-2011	30	3.26	0.91	20	
Sulfate (mg/L)	2003-2011	30	5.55	1.40	20	
Dissolved oxygen (mg/L)	1985-2011	112	10.35	1.89	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	130	17.8	7.8	31	29
pH	1999-2011	48	8.25	0.17	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	129	391	61	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	30	221	20	N/A	
Fluoride (mg/L)	1985-2011[8]	52	0.071	0.034	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.27 Arkansas water quality standards and tributary base-flow sample statistics at site T18 - Big Creek - Lower

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	97	19	43	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	91	0.85	0.70	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	69	0.162	0.189	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	28	0.014	0.010	N/A	
Chloride (mg/L)	2003-2011	27	3.77	0.88	20	
Sulfate (mg/L)	2003-2011	26	7.58	2.00	20	
Dissolved oxygen (mg/L)	1985-2011	85	9.31	2.41	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	100	18.8	7.9	31	29
pH	1999-2011	40	7.95	0.31	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	100	261	38	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	139	16	N/A	
Fluoride (mg/L)	1985-2011[8]	44	0.069	0.023	N/A	

Table A3.28 Arkansas water quality standards and tributary base-flow sample statistics at site T23 - Middle Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	99	18	38	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	92	0.57	0.76	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	53	0.028	0.025	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	37	0.007	0.007	N/A	
Chloride (mg/L)	2003-2011	27	1.99	0.52	20	
Sulfate (mg/L)	2003-2011	26	6.12	0.80	20	
Dissolved oxygen (mg/L)	1985-2011	86	9.47	2.01	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	101	16.5	6.0	31	29
pH	1999-2011	40	8.02	0.30	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	99	386	51	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	26	224	14	N/A	
Fluoride (mg/L)	1985-2011[8]	45	0.062	0.018	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.29 Arkansas water quality standards and tributary base-flow sample statistics at site T24 - Leatherwood Creek

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	96	28	43	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	90	0.77	0.93	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1985-2011	58	0.033	0.029	N/A	
Orthophosphate, as phosphorus (mg/L)	1998-2011	35	0.008	0.007	N/A	
Chloride (mg/L)	2003-2011	29	1.76	0.31	20	
Sulfate (mg/L)	2003-2011	28	6.51	1.32	20	
Dissolved oxygen (mg/L)	1985-2011	84	9.10	1.87	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	98	17.5	6.5	31	29
pH	1999-2011	42	8.04	0.27	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	98	362	50	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	207	16	N/A	
Fluoride (mg/L)	1985-2011[8]	51	0.060	0.024	N/A	

Table A3.30 Arkansas water quality standards and river corridor base-flow sample statistics at site S02 - Luallen Spring

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	127	26	137	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	103	2.44	2.55	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1989-2011	92	0.249	0.121	N/A	
Orthophosphate, as phosphorus (mg/L)	2003-2011	26	0.021	0.005	N/A	
Chloride (mg/L)	2003-2011	28	2.03	0.39	20	
Sulfate (mg/L)	2003-2011	28	10.36	5.02	20	
Dissolved oxygen (mg/L)	1985-2011	97	9.46	1.32	Primary season > 6 Critical season $>6^5/2^4$	Primary season >6 Critical season $>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	124	13.2	1.6	31	29
pH	1999-2011	45	7.55	0.37	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	124	216	47	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	28	128	14	N/A	
Fluoride (mg/L)	1985-2011[8]	52	0.071	0.028	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years

Table A3.31 Arkansas water quality standards and river corridor base-flow sample statistics at site S33 - Mitch Hill Spring

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1985-2011	127	9	16	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	115	0.95	0.79	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1987-2011	97	0.818	0.393	N/A	
Orthophosphate, as phosphorus (mg/L)	2002-2011	31	0.017	0.012	N/A	
Chloride (mg/L)	2003-2011	29	4.61	0.74	20	
Sulfate (mg/L)	2003-2011	29	5.67	0.81	20	
Dissolved oxygen (mg/L)	1987-2011	111	8.18	1.46	Primary season > 6	>6
					Critical season $>6^5/2^4$	$>6^7/5^6/2^4$
Water temperature (°C)	1985-2011	131	14.8	1.6	31	29
pH	1999-2011	47	7.31	0.20	6-9	
Specific conductance (µS/cm at 25 °C)	1985-2011	130	363	63	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	29	215	14	N/A	
Fluoride (mg/L)	1985-2011[8]	48	0.065	0.032	N/A	

Table A3.32 Arkansas water quality standards and river corridor base-flow sample statistics at site S41 - Gilbert Spring

[col/100 ml, colonies per 100 milliliters; NTU, nephelometric turbidity units; N/A, not applicable; mg/L, milligrams per liter; C, Celsius; µS, microsiemens; mi^2, square miles]

Parameter	Period of Record	Number of Samples	Mean	Standard Deviation	Current Standard[1] Boston Mountains Ecoregion	Current Standard[1] Ozark Highlands Ecoregion
Fecal coliform bacteria (col/100 mL)	1987-2011	126	44	118	200 - 400	
Turbidity (NTU) base/all flow	1988-2011	126	1.13	0.78	$10^2/19^3$	$10^2/17^3$
Nitrate, as nitrogen (mg/L)	1990-2011	99	0.894	0.252	N/A	
Orthophosphate, as phosphorus (mg/L)	2003-2011	29	0.028	0.007	N/A	
Chloride (mg/L)	2003-2011	29	5.65	1.00	20	
Sulfate (mg/L)	2003-2011	29	4.99	0.68	20	
Dissolved oxygen (mg/L)	1988-2011	120	8.90	1.18	Primary season > 6	>6
					Critical season $>6^5/2^4$	$>6^7/5^6/2^4$
Water temperature (°C)	1987-2011	128	14.7	2.4	31	29
pH	1999-2011	62	7.51	0.22	6-9	
Specific conductance (µS/cm at 25 °C)	1987-2011	129	368	61	N/A	
Alkalinity, as $CaCO_3$ (mg/L)	2003-2011	29	199	26	N/A	
Fluoride (mg/L)	1987-2011[8]	50	0.059	0.020	N/A	

[1] Arkansas Pollution Control and Ecology Commission (2015)

[2] Samples collected during base flow

[3] All collected samples

[4] Watershed is less than 10 mi^2

[5] Watershed is greater than 10 mi^2

[6] Watershed is greater than 10 mi^2 and less than 100 mi^2

[7] Watershed is greater than 100 mi^2

[8] Samples were not taken in all years