

Bayou de Chien (0801020150)

Geography

Bayou de Chien arises in southwestern Graves County and flows generally westward to the Mississippi River at Hickman. The terrain in the upper portion of the watershed is rugged with narrow valleys that rise 50-100 feet along steep slopes to narrow ridges. Downstream of the Purchase Parkway the valley along the main stem and major tributaries becomes quite wide. However terrain along smaller tributaries remains rugged with steep slopes rising in excess of 100 feet to narrow ridges. In the lower portion of the watershed the slopes become less severe with elevation gains generally less than 50 feet. The north side of the watershed below Mud Creek is part of the Mississippi River floodplain where land is gently rolling with little elevation variance.

Waterways

This watershed drains about 210 square miles and contains about 567 total stream miles. There are 19 HUC 14 subwatersheds located in this HUC 11 watershed. Tributaries include South Fork of Bayou de Chien, Jackson Creek, Sand Creek, Cane Creek, Little Bayou de Chien, Mud Creek, Little Mud Creek, Rush Creek, and Hurricane Branch. Long segment of the Bayou de Chien and several tributaries have been channelized and straightened. Much of Bayou de Chien and its tributaries upstream of Highway 239 is Outstanding Resource Water due to the presence of the relict darter (*Etheostoma chienense*). Much of the valley along the main stem is wetland. There are 18 active KPDES permitted outfalls for this watershed, including the Hickman East wastewater treatment facility, the Fulton wastewater treatment facility, the Kentucky Transportation Cabinet Fulton County Maintenance Garage, Harold Coffey Construction Company, SGL Carbon LLC, Burke Parsons Bowlby Corporation, Ford Construction Company, and Boral Bricks Inc...

There are five special use waters in the Bayou de Chien watershed, including:

- Bayou de Chien source to mile 13.2 is an OSRW because of the presence of a federally listed threatened or endangered species, the relict darter.
- Cane Creek of Bayou de Chien basin is an OSRW because of the presence of a federally listed threatened or endangered species, the relict darter.
- Jackson Creek basin is an exceptional water, a reference reach water, and an OSRW because of the presence of a federally listed threatened or endangered species, the relict darter.
- Sand Creek basin is an OSRW because of the presence of a federally listed threatened or endangered species, the relict darter.
- South Fork Bayou de Chien basin is an OSRW because of the presence of a federally listed threatened or endangered species, the relict darter.

Land cover/land use

The watershed is dominated by agricultural production of row crops, swine, and poultry. There are 20 permitted AFOs in the watershed, including four for swine operations, one for a dairy operation, and 15 for poultry operations. There are also four permitted CAFOs in the watershed, all of which are for poultry operations. Forested areas are confined to wetlands and on the steeper slopes in the upper portion of the watershed. There is an active state Superfund site near Hickman. A federal Superfund site is located near Crutchfield. About 1200 acres of the Obion Creek Wildlife Management Area are located in the lower portion of the watershed. Residential, commercial, and industrial areas are located in and around Hickman. Residential areas are also located near Cayce, Crutchfield, and Water Valley. There is a clay pit and a gravel quarry located in the watershed.

2000 Agency Data Assessment

- During the 2000 water quality assessment two segments of Bayou de Chien were assessed for a total of 16.5 miles.
 - A 4.6-mile segment from Little Bayou de Chien to Cane Creek was assessed for water quality and fecal coliform bacteria. The segment was judged fully supporting for aquatic life and primary contact recreation.
 - An 11.9-mile segment upstream of Cane Creek was assessed for fish, macroinvertebrates, algae and fish tissue. The segment was judged fully supporting for aquatic life and fish tissue consumption.
- The lower 2.1 miles of Little Bayou de Chien were assessed for macroinvertebrates and were judged partially supporting for aquatic life. A 2.2-mile segment upstream of highway 1125 was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- The lower 1.8 miles of Little Mud Creek were assessed for fish and were judged partially supporting for aquatic life.
- The lower 2.6 miles of Jackson Creek were assessed for fish, macroinvertebrates, and algae. The segment was judged fully supporting for aquatic life.
- A 5.2-mile segment of the South Fork of Bayou de Chien was assessed for fish, macroinvertebrates, and algae. The segment was judged not supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Bayou de Chien mile 0.0 to 4.2 is fully supporting the fish consumption use.
- Bayou de Chien mile 8.8 to 14.3 is not supporting the aquatic life use and primary contact recreation use, with a cause of DO saturation, *E. coli*, iron, lead, and fecal

- coliforms, and a source of municipal point source discharge, agriculture, and unknown sources.
- Bayou de Chien mile 14.3 to 28.2 is fully supporting the aquatic life and fish consumption uses, but not supporting the primary contact recreation use, with a cause of fecal coliforms, and a source of agriculture. This segment has an approved TMDL from 2007 for pathogens.
 - Cane Creek mile 0.0 to 5.3 is partially supporting the aquatic life use with causes of alteration in stream-side or littoral vegetative covers, sedimentation/siltation, and nutrient/eutrophication biological indicators, and sources of loss of riparian habitat and non-irrigated crop production.
 - Jackson Creek mile 0.0 to 3.0 is fully supporting the aquatic life use.
 - Little Bayou de Chien mile 0.0 to 1.3 is partially supporting the aquatic life use with a cause of sedimentation/siltation, and sources of loss of riparian habitat and agriculture.
 - Little Bayou de Chien mile 10.0 to 12.3 is not supporting the aquatic life use with a cause of sedimentation/siltation, and sources of crop production (crop land or dry land) and agriculture.
 - Little Mud Creek mile 0.0 to 1.95 is partially supporting the aquatic life use with causes of sedimentation/siltation, and nutrient/eutrophication biological indicators, and sources of non-irrigated crop production.
 - Mud Creek mile 0.0 to 7.8 is not supporting the aquatic life use with causes of other flow regime alterations and sedimentation/siltation, and sources of channelization, loss of riparian habitat and non-irrigation crop production.
 - An unnamed tributary to Mud Creek mile 0.0 to 2.2 is not supporting the aquatic life use with causes of benthic macroinvertebrate bioassessments (streams), dissolved oxygen, particle distribution (embeddedness), sedimentation/siltation, and nitrate/nitrite (Nitrite + Nitrate as N), sources of channelization, loss of riparian habitat and non-irrigation crop production, crop production (crop land or dry land), and agriculture.
 - South Fork Bayou de Chien mile 0.0 to 2.0 is partially supporting the aquatic life use with causes of benthic macroinvertebrate bioassessments (streams), particle distribution (embeddedness), sedimentation/siltation, and nutrient/eutrophication biological indicators, and sources of channel erosion/incision from upstream hydro modifications, dredging (e.g. for navigation channels), impacts from hydrostructure flow regulation/modification, loss of riparian habitat, crop production (crop land or dry land), and agriculture.
 - South Fork Bayou de Chien mile 2.0 to 7.4 is not supporting the aquatic life use with a cause of sedimentation/siltation, and a source of crop production (crop land or dry land).

In 2007, a TMDL developed by the DOW was approved for Bayou de Chien mile 14.0 to 25.9, Central Creek mile 0.8 to 2.5, and Cooley Creek mile 0.7 to 2.3 for pathogens.

Past Watershed Ranking

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority due to a high need for restoration and a high concern for potential impacts. Potential impacts include a high potential for erosion from agricultural activities, a high potential contaminants score, and a high number of animal feeding operations.

Other Data

A stream flow gauge is maintained on Bayou de Chien near the city of Clinton. There are nine Four Rivers Watershed Watch sites located in the watershed, including three on Bayou de Chien, four on Cane Creek, one of Mud Creek, and one on Little Mud Creek. This area includes the project area for the Watershed Planning for Cane Creek project. This area is also included in the Obion Creek/Bayou de Chien project area for The Nature Conservancy.

Blood River (06040005290)

Geography

The Blood River arises in Henry County, Tennessee and flows generally northward into Calloway County where it joins the Tennessee River at Kentucky Lake. The terrain of the watershed is typical of the transitional region between the Pennyroyal and Jackson Purchase known as “the breaks”. The landscape is rugged with relatively wide valleys that rise sharply to narrow ridges. Elevations vary 75-175 feet between valleys and ridge tops.

Waterways

This watershed drains about 90 square miles and contains about 250 total stream miles. There are 29 HUC 14 subwatersheds within this HUC 11 watershed. Tributaries include McCullough Fork, Lax Creek, Dog Creek, Panther Creek, Wildcat Creek, Sugar Creek, Little Sugar Creek, Grindstone Creek, Tan Branch, and Beechy Creek. Kentucky Lake inundates the lower portion of the Blood River. There are no KPDES permits recorded for this watershed.

There are five special use waters in the Blood River watershed, including:

- Grindstone Creek from the mouth to the headwaters is an exceptional water and reference reach water.
- Sugar Creek from the Kentucky Lake backwaters to Buzzards Roost Road is an exceptional water.
- Wildcat Creek from Ralph Wright Road Crossing to the headwaters is an exceptional water and a reference reach water.
- Blood River from McCullough Fork to the Tennessee state line is an exceptional water and a reference reach water.
- Panther Creek from the mouth to headwaters is an exceptional use water and a reference reach water.

Land cover/land use

Much of the land around Kentucky Lake is covered with deciduous forest. There are large wetland areas around the lower section of the Blood River as well as the lower reaches of many of the tributaries. A large portion of the lower reach of the Blood River and Beechy Creek are part of the Kentucky Lake and Beechy Creek Wildlife Management Areas. Agriculture production occurs along the ridge tops on the western side of the watershed and in some of the wider valleys. There are no permitted AFOs and CAFOs. An active state Superfund site is located in the watershed. Residential developments are located around the Blood River embayment. A small gravel mine is located in the watershed.

2000 Agency Data Assessment

- During the 2000 water quality assessment the main stem of the Blood River was assessed from the backwaters of Kentucky Lake upstream to the Tennessee state line. This 7.4-mile segment was assessed for fish, macroinvertebrates, and algae. The segment was judged fully supporting for aquatic life.
- The tributaries of Beechy Creek, Panther Creek, Sugar Creek, and Wildcat Creek were also assessed and judged fully supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Beechy Creek mile 0.5 to 3.7 is fully supporting the aquatic life use.
- Sugar Creek mile 2.0 to 5.5 is fully supporting the aquatic life use.
- An unnamed tributary to Sugar Creek mile 0.0 to 3.0 is fully supporting the aquatic life use.
- Wildcat Creek mile 1.3 to 6.8 is fully supporting the aquatic life use.
- Panther Creek mile 0 to 5.2 is fully supporting the aquatic life use.
- Grindstone Creek mile 0.2 to 2.3 is fully supporting the aquatic life use.
- Blood River mile 10.7 to 18.7 is fully supporting the aquatic life use.

Past Watershed Ranking

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall low priority.

Other Data

There are three FRWW sites located within this watershed, including one on Wildcat Creek, one in the Sugar Creek Embayment, and one on Sugar Creek.

Clarks River (06040006040)

Geography

The Clarks River arises in Henry County, Tennessee and flows north through Calloway, Marshall and McCracken Counties in Kentucky before reaching the Tennessee River near Paducah. The watershed terrain has wide valleys rising to ridges that are mostly wide but occasionally narrow. Elevations vary 150 feet or less between valleys and ridge tops. The ridges are underlain by unconsolidated Mesozoic and Cenozoic sand, gravel, and clay. The valley bottoms are underlain by Quaternary alluvium.

Waterways

This watershed drains over 303 square miles and contains about 888 total stream miles. There are 87 HUC 14 subwatersheds located in this HUC 11 watershed. The major tributary is the West Fork of the Clarks River, which is discussed as a separate hydrologic unit. Smaller tributaries include Middle Fork of Clarks River, Clayton Creek, Bee Creek, Rockhouse Creek, Wades Creek, East Fork of Clarks River, Ellison Creek, Beaverdam Slough, Elizabeth Creek, Middle Fork Creek, Chestnut Creek, Lick Creek, Elender Creek and numerous others. In many places the stream is split into multiple channels. There are several small impoundments on the tributaries but none on the main stem. Wastewater facilities discharge effluent into the Clarks River at Murray, Hardin, and Benton. There are 42 active KPDES permitted outfalls recorded for this watershed including wastewater facilities at Benton, Murray and Hardin, four elementary schools in Calloway and Marshall Counties, Bogard Trucking, BTM Excavating, the Kentucky Transportation Cabinet Calloway and Marshall County Maintenance Garages, Murray Mobile Home & RV Park, Parker Excavating LLC, RT Vanderbilt Co. Inc. in Murray, Welch Sand & Gravel, Aharts Hauling and Gravel Pit, Memory Lane Trailer Court, Texas Gas in Benton, Golden Acres Subdivision, and James Marine Inc. in Paducah.

There is one special use water in the Clarks River watershed, Clarks River from Persimmon Slough to Middle Fork Creek is an exceptional water.

Land cover/land use

The watershed is dominated by agricultural production of row crops, poultry, and beef cattle. There are nine permitted AFOs in the watershed, including seven for poultry operations, one for a beef operation, and one for a swine operation. There are two permitted CAFOs in the watershed, both of which are for poultry operations. Large residential areas have been developed around the cities of Murray, Benton, Reidland, and Paducah. Commercial and industrial developments also exist in and around these cities. Downstream of Highway 80 there are large tracts of wetlands along the main stem of the Clarks River. Much of this wetland area lies within the 18,000-acre Clarks River National Wildlife Refuge project boundary. Currently the US Fish and Wildlife Service own about

8,000 acres inside the refuge boundary. There are scattered areas of deciduous forest areas along ridges and around the wetlands. There are three surface mine quarries in the watershed. There are two active state Superfund sites near the city of Murray.

2000 Agency Data Assessment

During the 2000 water quality assessment the Clarks River watershed was officially assessed in 22 segments for a total of 74.3 miles. The main stem of the Clarks River was assessed in 8 eight segments.

- A 7.7-mile segment below the West Fork was assessed for fish and was judged partially supporting for aquatic life.
- Five segments upstream of the West Fork assessed for a total of 27.1 miles. All of these segments were judged fully supporting for aquatic life, primary contact recreation, and fish consumption.
- A 2.6-mile segment from milepoint 58.3 up to the Middle Fork of the Clarks River was assessed for fish and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and primary contact recreation.
- Two segments of the Middle Fork of Clarks River were assessed for a total of 4.9 miles.
 - A 2.7-mile segment from the mouth up to Fraley Branch was assessed for fish, macroinvertebrates, and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for primary contact recreation.
 - The next segment is from Fraley Branch upstream 2.2 miles to an unnamed tributary. This segment was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- Two segments of the East Fork of Clarks River were assessed for a total of 3.7 miles.
 - A 2.7-mile segment from the mouth to a point upstream was assessed for fish and macroinvertebrates and was judged fully supporting.
 - A one mile segment below the South 641 sewage treatment plant was assessed using Discharge Monitoring Report data and was judged partially supporting for primary contact recreation.
- Two segments of Clayton Creek were assessed for a total of 6.3 miles.
 - A 2.5-mile segment from East Fork up to an unnamed tributary was assessed for macroinvertebrates and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the partially supporting range due to poor bank stability and sediment deposition.
 - The remaining 3.8 miles upstream were assessed for fecal coliform bacteria and were judged not supporting for primary contact recreation.
- A 6.4-mile segment of Middle Fork Creek from Burkholder Deadening up to the reservoir was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for

primary contact recreation. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor bank stability and heavy sediment deposition.

- A 3.0-mile segment of Chestnut Creek from the mouth up to the reservoir was assessed for macroinvertebrates and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and primary contact recreation. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor riparian vegetation, poor bank stability, and sediment deposition.
- A 4.9-mile segment of Rockhouse Creek was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life.
- A 3.8-mile segment of Wades Creek was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life.
- A 1.8-mile segment of Bee Creek was assessed for fecal coliform bacteria and was judged not supporting for primary contact recreation.
- A 0.5-mile segment of an unnamed tributary to Old Beaver Dam Slough was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 0.9-mile segment of Martin Creek was assessed using Discharge Monitoring Report (DMR) data from Hardin sewage treatment plant. The segment was judged partially supporting for aquatic life and primary contact recreation.
- A 0.7-mile segment of an unnamed tributary to Chestnut Creek was assessed using Discharge Monitoring Report (DMRs) data from Draffenville sewage treatment plant. The segment was judged partially supporting for aquatic life and primary contact recreation.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- An unnamed tributary to Clarks River mile 0.0 to 3.0 is not supporting the aquatic life use with a cause of benthic macroinvertebrate bioassessments (streams), dissolved oxygen, particle distribution (embeddedness), sedimentation/siltation, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources of channel erosion/incision from upstream hydromodifications, channelization, municipal (urbanized high density area), non-irrigated crop production, crop production (crop land or dry land), agriculture, impervious surface/parking lot runoff, urban runoff/storm sewers.
- Clarks River mile 5.0 to 13.2 is partially supporting the aquatic life use with the cause unknown and the source unknown.
- Clarks River mile 13.2 to 20.6 is partially supporting the primary contact recreation use and not supporting the aquatic life use, with a cause of E. coli, iron, and lead, and the source identified as unknown.
- Clarks River mile 28.7 to 30.7 is fully supporting the aquatic life use.
- Clarks River mile 31.7 to 34.8 is fully supporting the aquatic life use.
- Clarks River mile 34.8 to 42.6 is partially supporting the aquatic life use, with causes of benthic macroinvertebrate assessments (streams), particle distribution

(embeddedness), sedimentation/siltation, nitrate/nitrite (Nitrite + Nitrate as N), and phosphorus (total), and source identified as channelization, non-irrigated crop production, streambank modifications/destabilization, crop production (crop land or dry land), and agriculture.

- Clarks River mile 42.6 to 48.6 is fully supporting the aquatic life use.
- Clarks River mile 50.9 to 55.6 is fully supporting the primary contact recreation use and partially supporting the aquatic life use, and a cause of sedimentation, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources identified as package plant or other permitted small flows discharges, agriculture, and urban runoff.
- Clarks River mile 55.6 to 64.7 is not supporting the primary contact recreation use with a cause of fecal coliform and unknown, and sources identified as unknown and agriculture. There is a proposed delisting for the aquatic life use.
- Clarks River mile 64.7 to 66.8 is partially supporting the primary contact recreation and aquatic life uses with causes of sedimentation/siltation, fecal coliforms, and nutrient/eutrophication biological indicators, and sources listed as unknown and agriculture.
- Bee Creek mile 0.0 to 0.7 is not supporting the primary contact recreation and aquatic life uses, with causes of sedimentation/siltation, fecal coliforms, and organic enrichment (sewage) biological indicators, and sources identified as municipal point source discharges and unknown.
- Bee Creek mile 0.7 to 2.0 is not supporting the primary contact recreation use and fully supporting the aquatic life use, with a cause of fecal coliforms and the source identified as unknown.
- Chestnut Creek mile 0 to 3 is partially supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of fecal coliform, unknown, and other, and the source identified as unknown.
- An unnamed tributary to Chestnut Creek mile 0.0 to 0.7 is partially supporting the aquatic life and primary contact recreation uses, with causes of ammonia (un-ionized), solids (suspended/bedload), fecal coliforms, and organic enrichment (sewage) biological indicators and a source of package plants or other permitted small flows discharges. A TMDL is not required for this segment.
- Middle Fork Creek mile 0.2 to 6.0 is not supporting the primary contact recreation use and partially supporting the aquatic life use with a cause of fecal coliforms and unknown, and the source identified as unknown.
- Middle Fork Clarks River mile 0 to 2.7 is not supporting the primary contact recreation use and partially supporting the aquatic life use with a cause of sedimentation and fecal coliforms, and a source identified as agriculture.
- Middle Forks Clarks River mile 2.7 to 4.8 is partially supporting the aquatic life use with causes of sedimentation/siltation, and nutrient/eutrophication biological indicators and a source of agriculture.
- Martin Creek mile 0 to 0.8 is partially supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of ammonia, fecal coliforms, and organic enrichment (sewage) biological indicators, and a source identified as package plant or other permitted small flows discharges. No TMDL is required for this segment.

- Clayton Creek mile 0.75 to 3.3 is partially supporting the aquatic life use with causes of benthic macroinvertebrate assessments (streams), phosphorus (total), and unknown, and sources listed as unknown and agriculture.
- Clayton Creek mile 3.3 to 7.7 is not supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of sedimentation/siltation, fecal coliforms, and nutrient/eutrophication biological indicators, and sources identified as loss of riparian habitat, unknown, agriculture, and rural (residential) areas.
- East Fork Clarks River mile 0.0 to 2.7 is fully supporting the aquatic life use.
- East Fork Clarks River mile 6.1 to 7.1 is partially supporting the primary contact recreation use with a cause of fecal coliforms and the source identified as package plant or other permitted small flow discharges. No TMDL is required for this segment.
- Farley Branch is partially supporting the aquatic life use with causes of sedimentation/siltation, and nutrient/eutrophication biological indicators and a source of agriculture.
- Rockhouse Creek mile 0.0 to 4.8 is fully supporting the aquatic life use.
- Wades Creek mile 0.0 to 4.0 is fully supporting the aquatic life use.

Past Watershed Ranking

The old data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority with a high need for restoration and a very high concern for potential impacts. Potential impact factors include a high number of KDPEs discharges, a high potential for erosion from agricultural practices, a very high number of potential contamination sites and a very high number of discharge violations.

Other Data

A stream flow gauge is maintained on the Clarks River near the community of Almo. This gauge has recently become stage only due to lack of funding. There are two wastewater treatment plants under sanction from the DOW. There are three wellhead protection areas, including one for Murray, Benton, and Reidland. This area includes the Clarks River Watershed Plan 319 project, and the Clarks River Watershed Plan Implementation 319 project.

There are 18 Four Rivers Watershed Watch sites, including five on the East Fork Clarks River, five on the mainstem of Clarks River, three on the Middle Fork Clarks River, one on Farley Branch, one on Clayton Creek, one on Bee Creek, one on Wades Creek, and one on Rockhouse Creek. The focus study performed by Dr. Loganathan's service learning course in the fall of 2009 is also located within this watershed.

Elk Fork, below Allensville (05130206190)

Geography

This hydrologic unit represents the Elk Fork and its tributaries from the mouth of Dry Branch downstream to the Tennessee State Line. The Elk Fork arises in central Todd County and flows generally southward into Robertson County, Tennessee where it joins the Red River. The terrain of this hydrologic unit is typical of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary only 100-175 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography.

Waterways

This hydrologic unit drains about 61 square miles and contains about 36 total stream miles. There are two HUC 14 subwatersheds in this HUC 11 watershed. Dry Branch is the only named tributary. Due to the karst topography many tributaries disappear underground and reappear at lower elevations as springs or glades. Several wetland areas are present including a large area around Mosley Pond in southwestern Logan County. There are no KDPEs permits recorded for this watershed.

There is one special use water in the Elk Fork below Allensville watershed, Elk Fork from the Tennessee state line to Dry Branch (at the top of the watershed) is an exceptional water and a reference reach water.

Land cover/land use

Row crop agriculture dominates the watershed. However, there are also a number of dairies and swine operations. There are 20 permitted AFOs in the watershed, including 12 swine operations, and eight dairy operations. There is one permitted CAFO, a swine operation. Very little of the watershed is forested except in wetland areas and immediately along the main stem of the Elk Fork. There are a few small residential areas around the community of Allensville.

2000 Agency Data Assessment

During the 2000 water quality assessment a 14.4-mile segment of the Elk Fork, from Dry Branch downstream to the Tennessee state line, was assessed for fish, macroinvertebrates, and algae. This segment was judged fully supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Elk Fork mile 7.5 to 22.3 is fully supporting the aquatic life use; primary contact recreation was not assessed.

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall low priority.

Other Data

There are four Four Rivers Watershed Watch sites located in the watershed, including two on Elk Fork, one at Duck Spring, and one at a spring to Elk Fork.

Island Creek (06040006070)

Geography

Island Creek arises in southeastern McCracken County and flows generally northward to the Tennessee River near Paducah. The terrain of the upper portion of the watershed consists of wide valleys that rise gradually 75-125 feet to ridges. The lower portion has wide valleys that rise only slightly above the floodplain.

Waterways

This watershed drains about 30 square miles and contains about 71 total stream miles. There are three HUC 14 subwatersheds within this HUC 11 watershed. Tributaries include Champion Creek and Bee Branch. There are a couple of large wetland areas in the watershed. There are 17 KPDES permitted outfalls, including five combined sewer overflows (CSO's) recorded for this watershed. Other permits include John Fox, Kentucky Transportation Cabinet McCracken County Maintenance Garage, Paducah & Louisville Railway, Transmontaigne Terminaling, Inc., and VMV PaducahBilt.

Land cover/land use

Most of the watershed is in or near the city of Paducah and is heavily developed. Much of the development is residential with areas of industrial or commercial use intermingled. There are some small agricultural areas of row crop and poultry production. There is one permitted AFO in the watershed, for poultry production. There are two active state Superfund sites in the watershed. A small clay and gravel quarry is located in the watershed near Clear Creek. Wooded areas are mostly confined to wetland areas along the southern and eastern perimeters of the watershed.

2000 Agency Data Assessment

- During the 2000 water quality assessment a 4.5-mile segment of the main stem of Island Creek was assessed for fish, macroinvertebrates, and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for primary contact recreation. An aquatic habitat survey was conducted on this segment and yielded a score in the not supporting range due to poor bank stability, minimal riparian vegetation, and sedimentation.
- A 1.5-mile segment of Champion Creek was assessed for fish and macroinvertebrates. The segment was judged not supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Champion Creek mile 0.0 to 1.5 is not supporting the aquatic life use with the cause unknown, and a source of site clearance (land development or redevelopment).
- Island Creek mile 0 to 5.6 is not supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of fecal coliforms and unknown, and a source identified as unknown.
- Island Creek mile 5.6 to 10.3 is partially supporting the aquatic life use with the cause unknown and the source unknown.

Past Watershed Ranking

The past data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority due a very high need for restoration and protection. Factors for restoration include flooding, unsafe fecal coliform bacteria levels, and poor aquatic habitat. Factors for protection include a high percentage of wetlands and the entire watershed being within the Paducah source water protection area, including a portion of the “critical” protection zone. The watershed also has a high toxic release inventory score.

Other Data

This area is part of the Paducah Water Zone 1 and Zone 2 source water protection area. There is one Four Rivers Watershed Watch site located on Island Creek. This area has had grant money in the past to perform cleanup activities. Island Creek has a controlled outlet at its confluence with the Tennessee River

Little River (05130205200)

Geography

The Little River arises from the confluence of the North and South Forks of the Little River near Hopkinsville. The stream flows generally northwestward to join the Cumberland River at Lake Barkley near Cadiz. In the upper portion of the watershed the terrain is typical of the Western Pennyroyal region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations generally vary less than 100 feet between valleys and ridge tops. This region is underlain by Mississippian limestone rock resulting in widespread karst topography. In the lower portion of the watershed the terrain is typical of the transitional region between the Pennyroyal and Jackson Purchase known as “the breaks”. The landscape is rugged with valleys rising quickly to narrow ridges. Elevations vary 75-150 feet between valleys and ridge tops. Valleys are narrow on tributaries and wider along main stems. There is less karst topography in the lower portion of the watershed.

Waterways

This hydrologic unit drains about 207 square miles and contains about 379 total stream miles. There are 19 HUC 14 subwatersheds located in this HUC 11 watershed. The major tributaries of the North, South, Sinking, and Muddy Forks of the Little River are discussed as separate hydrologic units. (The total drainage area of the Little River and its tributaries is over 600 square miles and contains over 1000 total stream miles) Other tributaries include Casey Creek, Potts Creek, Grigsby Creek, Burge Creek, and Caney Creek. Due to the karst topography many tributaries disappear underground and reappear at lower elevations as springs or glades. Named springs include Belford Spring, Garrett Spring, and Swallow Spring. There are several wetland areas scattered throughout the watershed. The river receives effluent from the wastewater treatment plant at Cadiz. Lake Barkley inundates the lower portion of the Little River during seasons when the lake levels are highest. There are eight KPDES permitted outfalls recorded for this hydrologic unit, including the Cadiz wastewater treatment plant, Lake Barkley State Resort Park, Kentucky Transportation Cabinet Trigg County Maintenance Garage, Park View Court, and Moon River Marina & Resort.

There is one special use water in the Little River watershed; Casey Creek from the source to the Little River has a designated use of cold water aquatic habitat.

Land cover/land use

The rugged lower portion of the watershed is mostly deciduous forest. Lake Barkley State Resort Park is located in this part of the watershed. Around the city of Cadiz, land is used for residential, commercial, and industrial purposes. Further upstream the land becomes less rugged and agriculture begins to dominate the land use. Agriculture production is

mostly row crops, swine and dairy production. There are 19 permitted AFOs in the watershed, including 15 for dairy operations and four for swine operations. A portion of the watershed around the Casey Creek tributary is part of the Fort Campbell Military Reservation. Interstate 24 crosses the watershed but the corridor is not heavily developed.

2000 Agency Data Assessment

During the 2000 water quality assessment the main stem of the Little River was assessed in six segments for a total of 40.6 miles. The segments are discussed in consecutive order from the backwaters of Lake Barkley upstream to the confluence of the North and South Forks.

- A 3.2-mile segment was assessed for macroinvertebrates and was judged not supporting for aquatic life due to flow alterations.
- A 9.5-mile segment upstream of the mouth of the Sinking Fork was assessed for fish, macroinvertebrates, algae, water quality, fish tissue, and fecal coliform bacteria. This segment was judged fully supporting for primary contact recreation but only partially supporting for aquatic life and fish tissue consumption due mercury.
- A 1.3-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for primary contact recreation and not supporting for aquatic life.
- A 14.0-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for primary contact recreation, but macroinvertebrate data collected was judged inconclusive for support of aquatic life. This stream will be revisited during the next monitoring cycle.
- A 5.4-mile segment was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 7.2-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for primary contact recreation.
- The lower 3.6 miles of Casey Creek were assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged fully supporting for primary contact recreation and partially supporting for aquatic life.
- Skinner Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Casey Creek mile 0 to 3.6 is fully supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of

sedimentation/siltation and a source identified as sources outside state jurisdiction or borders.

- Little River mile 14.7 to 20.6 is partially supporting the aquatic life use, with causes of particle distribution (embeddedness) and nutrient/eutrophication biological indicators and source identified as dam or impoundment and agriculture.
- Little River mile 20.6 to 30 is fully supporting the primary contact recreation use, and partially supporting the aquatic life and fish consumption uses, with causes identified as methylmercury, nitrate/nitrite (Nitrate + Nitrite as N), and phosphorus (total) and sources identified as municipal point source discharges, source unknown, and agriculture.
- Little River mile 30.0 to 31.4 is partially supporting the primary contact recreation use and not supporting the aquatic life use, with causes of habitat assessments (streams), sedimentation/siltation, fecal coliforms, and nutrient/eutrophication biological indicators, and sources identified as agriculture and habitat modification – other than hydromodification.
- Little River mile 31.4 to 45.5 is partially supporting the primary contact recreation and aquatic life uses, with the causes identified as sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators and organic enrichment (sewage) biological indicators and sources identified as municipal point source discharges, source unknown, crop production (crop land or dry land), and agriculture. This segment has a TMDL in development for pathogens.
- Little River mile 45.5 to 57.7 is not supporting the primary contact recreation and aquatic life uses, with the causes identified as habitat assessments (streams), sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators and organic enrichment (sewage) biological indicators and sources identified as municipal point source discharges, source unknown, and crop production (crop land or dry land). This segment has a TMDL in development for pathogens.
- Skinner Creek mile 0.0 to 5.8 is not supporting the aquatic life use with causes unknown, and the source unknown.

A TMDL is in the process of gaining approval by the DOW for the stream segments in the Little River Watershed in the Lower Cumberland Basin, including the Little River (mile 30.0 to 31.4, mile 31.4 to 45.5, mile 45.5 to 57.7), the North Fork Little River (mile 0.0 to 0.3, mile 0.3 to 7.0, mile 7.0 to 10.9, mile 10.9 to 16.1), and the South Fork Little River (mile 0.0 to 10.3, mile 10.3 to 20.3). Additional sampling to confirm this TMDL has just been completed.

Past Watershed Rankings

The previous data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority due restoration needs. The main factor for restoration was observed impacts that indicated 50.0 miles of streams were not fully supporting their designated uses. The watershed also scored high for groundwater sensitivity.

Other Data

A stream flow gauge is maintained on the Little River near Cadiz. The northern part of the watershed around Cadiz is located in a zone one wellhead protection area for Cadiz Municipal utilities. There are 17 Four Rivers Watershed Watch sites in the area, including 13 around the Lake Barkley area, two on Casey Creek, one at Lake Barkley Blue Spring Cove, and one on the Little River in Christian County. The Cumberland River Compact has submitted a 319 project proposal to perform capacity building work in this watershed.

Livingston Creek (05130205250)

Geography

Livingston Creek arises along the border between Crittenden and Caldwell Counties and flows generally southwestward into the Cumberland River near Dycusburg. In the uppermost portion of the watershed the terrain is rugged with steep slopes or bluffs rising 100-200 feet to ridge and knob formations. This terrain is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyryle and the Western Kentucky Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones. There are limited karst features in this transition area. The lower portion of the watershed terrain is typical of the Western Pennyryle region with fairly wide stream valleys rising quickly to ridges and rolling hills. Elevations generally vary less than 100 feet between valleys and ridge tops. This region is underlain by Mississippian limestone rock resulting in widespread karst topography.

Waterways

The Livingston Creek watershed drains about 128 square miles and contains about 250 total stream miles. There are 24 HUC 14 subwatersheds located within this HUC 11 watershed. Tributaries include Skinframe Creek, Panther Creek, Spring Creek, Crab Creek, Cruce Branch, Dry Fork, and Caldwell Spring Creek. Named springs include Larping Spring, Bogard Spring, Caldwell Spring, and Sulphur Spring. Brushy Pond and Maple Sink Lake are located in the lower portion of the watershed. There are two KPDES permits recorded for this watershed, the Kentucky Transportation Cabinet Lyon County Maintenance Garage and the Kentucky Transportation Cabinet Crittenden County Maintenance Garage.

Land cover/land use

Most of the watershed is dominated by row crop agriculture. There are six permitted AFOs within the watershed, include four for dairy operations and two for swine operations. There are 2 permitted CAFOs within the watershed, both for swine operations. Forested areas remain on the rugged knobs and ridges of the escarpment region. A state Superfund site is located near the community of Mexico. A limestone quarry is located near the Fredonia community.

2000 Agency Data Assessment

- During the 2000 water quality assessment, the main stem of Livingston Creek was assessed between Spring Creek and Crab Creek for macroinvertebrates and fecal coliform. This 2.4-mile segment was judged not supporting for aquatic life and

- primary contact recreation. An aquatic and riparian habitat survey also yielded a score in the not supporting range.
- The other main stem segment assessed is between Skinframe Creek and Dry Fork. This 3.8-mile segment was assessed for macroinvertebrates and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey also yielded a score in the not supporting range.
 - The tributary of Skinframe Creek was assessed from the mouth upstream to Horseapple Creek. This 4.8-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The macroinvertebrate survey yielded fair results and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range. The segment was also judged not supporting for primary contact recreation due to elevated fecal coliform levels.
 - A short 0.7-mile segment of Spring Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the fully supporting range.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Crab Creek mile 0.0 to 5.38 is partially supporting the aquatic life use with causes of alteration in stream-side or littoral vegetative covers, sedimentation/siltation, nutrient/eutrophication biological indicators, and sources identified as grazing in riparian or shoreline zones and agriculture.
- Livingston Creek mile 4.6 to 7.0 is partially supporting the primary contact recreation, secondary contact recreation, and aquatic life uses with causes of fecal coliforms, pH, and nutrient/eutrophication biological indicators and sources identified as unknown and agriculture. A TMDL has been approved for this segment for pathogens.
- Livingston Creek mile 11.6 to 15.5 is not supporting the aquatic life use with causes of benthic macroinvertebrate assessments (streams), particle distribution (embeddedness), sedimentation/siltation, nitrate/nitrite (Nitrite + Nitrate as N) and phosphorus (total), and sources listed as channelization, loss of riparian habitat, non-irrigated crop production, crop production (crop land or dry land), and agriculture.
- Skinframe Creek mile 0.0 to 4.8 is not supporting the primary contact recreation use and partially supporting the aquatic life use with causes of fecal coliforms and cause unknown and sources identified as unknown and agriculture. A TMDL has been approved for this segment for pathogens.
- Spring Creek mile 3.0 to 3.5 is not supporting the aquatic life use with causes of habitat assessments (streams) and cause unknown, and the source identified as loss of riparian habitat.

In 2009, the DOW approved a TMDL for the Lower Cumberland River Basin stream segments in Caldwell, Crittenden, Livingston, and Lyon Counties. This includes Claylick Creek into the Cumberland River (mile 1.9 to 4.8), Eddy Creek into the Cumberland River (mile 8.4 to 10.5, mile 13.0 to 15.7), Dry Creek into Eddy Creek (mile 0.0 to 3.6), Ferguson Creek into the Cumberland River (mile 0.0 to 1.2), Hickory Creek into the Cumberland River (mile 0.0 to 3.9), Livingston Creek into the Cumberland River (mile 4.6 to 7.0), Richland Creek into the Cumberland River (mile 0.7 to 5.4), Sandy Creek into the Cumberland River (mile 0.0 to 2.3), Skinframe Creek into Livingston Creek (mile 0.0 to 4.8) and Sugar Creek into the Cumberland River (mile 2.2 to 6.9). This TMDL is for pathogens.

Past Watershed rankings

The old data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority due to a very high need for restoration and protection. The main factors for restoration are observed impacts that indicate streams not fully supporting their designated uses. These impairments are due to intensive agricultural production activities such as animal feeding operations and row crop agriculture. The activities have resulted in poor riparian areas, heavy sediment deposition, and unsafe levels of fecal coliform bacteria. The main factor for protection is the Crittenden-Livingston County water supply protection area, which is located in the watershed.

Other Data

There are three Four Rivers Watershed Watch sites located within this watershed, including one on Skinframe Creek, one on Livingston Creek, and one on Mill Bluff Creek. The Nature Conservancy has an active presence in the watershed, as it is part of the Grand Rivers Corridor. TNC has been working with landowners in the Grand Rivers Corridor to protect endangered species and declining habitats.

Mayfield Creek (08010201010)

Geography

Mayfield Creek arises in southeast Graves County and southwest Calloway County and flows northward into McCracken County where the stream turns to the west and eventually empties into the Mississippi River. Once the stream leaves McCracken County it forms the boundary between Carlisle County and Ballard County for the rest of its flow. The watershed terrain upstream of Mayfield is comprised of narrow valleys that rise gradually about 50 feet to ridges. Around Mayfield the valley along the main stem becomes quite wide with contrasting terrain on each side of the stream. On the west side the terrain has many narrow tributary valleys that rise gradually 50-75 feet to ridges. On the east side there are few tributaries and the terrain rises sharply 50-100 feet to the watershed perimeter. Once the stream turns westward it continues this contrast in terrain. On the north side there are few tributaries and the terrain rises sharply 50-150 feet to the watershed perimeter. On the south the terrain has narrow tributary valleys and rises much more gradually 50-75 feet to ridges. The valley along the main stem remains very wide. Note: The geography of the lower section of Mayfield Creek below the West Fork of Mayfield Creek is also discussed with the Stovall Creek hydrologic unit.

Waterways

The Mayfield Creek hydrologic unit drains about 300 square miles and contains over 866 total stream miles. There are 59 HUC 14 subwatersheds within this HUC 11 watershed. The tributaries of Stovall Creek and West Fork of Mayfield Creek are discussed as separate hydrologic units. (The three hydrologic units combined drain over 434 square miles and contain over 1225 total stream miles.) Other tributaries include Bacon Creek, Leech Creek, Kurk Creek, Ford Creek, Perry Creek, Torian Creek, Kess Creek, Little Mayfield Creek, Vulton Creek, Key Creek, Crowley Branch, Gilbert Creek, Carney Creek, Morris Creek, Sugar Creek, Billington Creek, Buckler Creek, Brush Creek, and Wilson Creek. Nearly all of Mayfield Creek downstream of the city of Mayfield has been channelized or straightened. The Mayfield wastewater treatment facility discharges effluent into Mayfield Creek. Much of the main stem valley downstream of Boaz is wetland.

There are 27 KPDES permitted outfalls recorded for this hydrologic unit, including Highland Club Estates Subdivisions, County Living Mobile Home Court, Thomas Country Estates Subdivision, Autumn Ridge Personal Care, Lambs Earth Moving, Inc., Four Rivers Contracting, Inc., Mayfield Sewage Treatment Plant, YEC Properties, Mayfield Concrete and Block, Kentucky Transportation Cabinet Graves County Maintenance Garage, Old Hickory Clay Company, including Mine #1, Mine #2, and Lamkin Mine, Kentucky Tie and Timber Company, Lazy Acres Mobile Home Park, Kentucky Tennessee Clay Company, Pilgrims Pride, Presson Trucking, JL Dublin Trucking Company, and C&L Farms.

Land cover/land use

Agricultural production of row crops, poultry, and swine is the major land use. There are 53 permitted AFOs in the watershed, including 35 for poultry operations, 13 for swine operations, and three for dairy operations. Forested areas remain on the rugged slopes of the north and east side of the watershed and in wetland areas. Commercial, industrial, and residential areas are prevalent in and around the city of Mayfield. Smaller residential areas exist around Sedalia, Hickory, and Lovelaceville. An active state Superfund site is located near Mayfield. Twelve quarries are located in the watershed including a couple of large clay, sand and gravel operations.

2000 Agency Data Assessment

During the 2000 water quality assessment the Mayfield Creek hydrologic unit was assessed in fourteen segments for a total of 52.4 stream miles.

- The main stem of Mayfield Creek was assessed in five segments for a total of 28.8 miles.
 - A 5.3-mile segment from the mouth of the West Fork upstream to the mouth of Wilson Creek was assessed for fish, macroinvertebrates, algae, water quality and fish tissue. The segment was judged fully supporting for fish tissue consumption but not supporting for aquatic life.
 - A 1.2-mile segment above the mouth of Wilson Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.
 - A 15.5-mile segment above the mouth of Sugar Creek was assessed for fish and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor riparian vegetation and sediment deposition.
 - A 2.0-mile segment was assessed for fish and was judged partially supporting for aquatic life.
 - A 2.7-mile segment was assessed for water quality and fecal coliform bacteria and was judged fully supporting for primary contact recreation and not supporting for aquatic life.
 - A 2.1-mile segment was assessed for macroinvertebrates and was judged not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor riparian vegetation and sediment deposition.
- Wilson Creek was assessed in two segments for a total of 8.0 miles.
 - A 2.2-mile segment from the mouth to Herlin Creek was assessed for water quality and fecal coliform bacteria. The segment was judged fully supporting for aquatic life and primary contact recreation.
 - A 5.8-mile segment from Herlin Creek to Goose Creek was assessed for fish and was judged fully supporting for aquatic life.
- A 4.4-mile segment of Goose Creek was assessed for fish and was judged partially supporting for aquatic life.

- A 3.7-mile segment of Hurricane Creek was assessed for fish and was judged partially supporting for aquatic life.
- A 2.4-mile segment of an unnamed tributary to Mayfield Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 1.7-mile segment of Gilbert Creek upstream of US Highway 45 was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 1.6-mile segment of Cooley Creek was assessed for fecal coliform bacteria and was judged not supporting for aquatic life.
- A 1.0-mile segment of an unnamed tributary of Mayfield Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 0.8-mile segment of Torian Creek was assessed from Thomas Country Estates sewage treatment plant discharge monitoring reports (DMRs). The segment was judged not supporting for aquatic life and primary contact recreation.
- Segments of Lick Creek, Key Creek, and Sugar Creek were assessed for fish, but the data was judged to be inconclusive for support of aquatic life. These streams will be revisited during the next monitoring cycle.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Mayfield Creek mile 11.1 to 16.5 is partially supporting the primary contact recreation use and not supporting the aquatic life and secondary contact recreation uses with causes of benthic macroinvertebrate bioassessments, copper, *E. coli*, iron, lead, other flow regime alterations, pH, and nutrient/eutrophication biological indicators, and sources identified as channelization, loss of riparian habitat, unknown, and agriculture.
- Mayfield Creek mile 20.4 to 36.1 is partially supporting the aquatic life use with causes of other flow regimen alterations and sedimentation/siltation, and sources of channelization and loss of riparian habitat.
- Mayfield Creek mile 36.1 to 38.2 is partially supporting the aquatic life use with causes of habitat assessments (streams), other flow regimen alterations, and sedimentation/siltation, and sources of channelization and loss of riparian habitat.
- Mayfield Creek mile 38.2 to 40.8 is not supporting the primary contact recreation and aquatic life uses with causes of copper, *E. coli*, iron, and nitrogen (total), and sources identified as unknown and agriculture.
- Mayfield Creek mile 40.8 to 43.7 is not supporting the aquatic life or primary contact recreation uses, with causes of copper, *E. coli*, iron, and nutrient/eutrophication biological indicators, and sources of unknown, agriculture, and rural (residential areas).
- Mayfield Creek mile 59.6 to 62.3 is not supporting the aquatic life use with a cause of sedimentation/siltation, and a source of crop production (crop land or dry land).
- Relict (Natural Channel) Mayfield Creek mile 17.4 to 20.4 is not supporting the aquatic life use with a cause of sedimentation/siltation and a source of agriculture.

- An unnamed tributary of Mayfield Creek mile 0.0 to 1.0 is not supporting the aquatic life use with a cause of physical substrate habitat alterations and sedimentation/siltation, and a source of agriculture.
- An unnamed tributary of Mayfield Creek mile 1.1 to 3.5 is not supporting the aquatic life use with a cause of habitat assessment (streams) and sedimentation/siltation, and sources of loss of riparian habitat and agriculture.
- Little Mayfield Creek mile 0.0 to 10.6 is partially supporting the aquatic life use with causes of nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources of package plant or other permitted small flow discharges, agriculture, and rural (residential areas).
- Wilson Creek mile 0 to 2.1 is not supporting the primary contact recreation and aquatic life uses with causes of *E. coli* and iron, and sources identified as unknown and agriculture.
- Wilson Creek mile 2.1 to 8.0 is fully supporting the aquatic life use.
- Gilbert Creek mile 1.7 to 3.5 is not supporting the aquatic life use with a cause of sedimentation/siltation and a source of loss of riparian habitat.
- Goose Creek mile 0.0 to 4.4 is partially supporting the aquatic life use with causes of other flow regime alterations and sedimentation/siltation, and sources of channelization and loss of riparian habitat.
- Key Creek mile 0.0 to 1.9 is not supporting the aquatic life use with causes of other flow regime alterations and unknown, and sources of highway/road/bridge runoff (non-construction related) and unknown.
- Lick Creek mile 0.0 to 2.2 is partially supporting the aquatic life use with causes of oil and grease, other flow regime alterations, and nutrient/eutrophication biological indicators, and sources of channelization, loss of riparian habitat, unknown, and crop production (crop land or dry land).
- Sugar Creek mile 0.0 to 1.3 is partially supporting the aquatic life use with a cause of sedimentation/siltation and a source of loss of riparian habitat.
- Cooley Creek mile 0.65 to 2.3 is not supporting primary contact recreation with a cause of fecal coliforms and sources identified as industrial point source discharge and package plant or other permitted small flow discharges. A TMDL has been developed and approved for this segment.
- Torian Creek mile 0.0 to 0.8 is partially supporting the primary contact recreation and aquatic life uses with causes of ammonia and fecal coliforms, and sources identified as package plant or other permitted small flow discharges. No TMDL is required for this segment.

In 2007, a TMDL developed by the DOW was approved for Bayou de Chien mile 14.0 to 25.9, Central Creek mile 0.8 to 2.5, and Cooley Creek mile 0.7 to 2.3 for pathogens.

Past Watershed Ranking

The old data-driven watershed ranking process for the 4 Rivers region indicated the watershed is an overall high priority due to a high need for restoration and a very high concern for potential impacts. Factors for restoration are observed impacts indicating

39.1 miles of streams not fully supporting their designated uses in 2000. There are also a high number of contamination sites in the watershed. Potential impacts include high erosion potential from agricultural activities, a very high potential fertilizer and pesticide usage, a high number of potential contamination sites, and a high number of animal feeding operations.

Other Data

There two Four Rivers Watershed Watch sites located in the Mayfield Creek watershed, one on Mayfield Creek and one on the Middle Fork of Mayfield Creek. There are nine wellhead protection areas in the watershed, including Trails End Ranch, Lovelaceville Water District, Cunningham Water District, Pilgrim's Pride, Hickory Water District, Hardeman Water District, Mayfield Electric and Water, Consumers Water District and Sedalia Water District.

North Fork of the Little River (05130205190)

Geography

The North Fork of the Little River arises in central Christian County and flows generally southward to its confluence with the South Fork of the Little River. In the upper portion of the watershed the terrain is rugged with steep slopes rising 75-150 feet to ridges and knob formations. This terrain is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyryle and the Western Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones. There are very few karst features in this transition area. The terrain begins to change once the stream nears the city of Hopkinsville. At this point the terrain is characteristic of the Western Pennyryle region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary 50-125 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography.

Waterways

The North Fork of the Little River watershed drains about 58 square miles and contains about 120 total stream miles. There are seven HUC 14 subwatersheds within this HUC 11 watershed. Tributaries include White Creek, Upper Branch, Lower Branch, and Middle Branch. Lake Blythe, Lake Morris, Lake Boxley, and Lake Tandy impound these tributaries respectively. The city of Hopkinsville withdraws drinking water from the North Fork. As a result a portion of the watershed is part of the source water protection area, including the “critical” protection zone. There are 20 KPDES permitted outfalls recorded for this watershed, including the Hopkinsville Landfill, Hopkinsville Northside wastewater facility, Hopkinsville Hammond Wood wastewater facility, Hopkinsville Water Treatment Plant, Seay Oil Company, Inc., and Max Arnold & Sons LLC.

Land cover/land use

Agriculture is a significant land use in the upper portion of the watershed. However most of the watershed is affected by the Hopkinsville and surrounding suburbs. Most of urbanized downtown Hopkinsville is in this watershed. Areas outside of downtown are used for residential, commercial, and industrial purposes. A landfill is located in the northwest corner of the watershed. There is an active state Superfund site located near Hopkinsville.

2000 Agency Data Assessment

- During the 2000 water quality assessment the entire 18.6 miles of the main stem of the North Fork of the Little River was assessed in five separate segments. The segments are discussed in order from the mouth upstream to Lake Morris.
 - A 0.3-mile segment was assessed for macroinvertebrates, water quality, and fecal coliform bacteria. The segment was judged partially supporting for primary contact recreation and not supporting for aquatic life.
 - A 6.6-mile segment was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
 - A 4.7-mile segment was assessed for macroinvertebrates and water quality. The segment was judged not supporting for aquatic life.
 - A 0.7-mile segment was assessed for macroinvertebrates and was judged not supporting for aquatic life.
 - A 6.3-mile segment was assessed for fecal coliform bacteria and drinking water quality. The segment was judged not supporting for primary contact recreation and fully supporting as a drinking water source.
- The Upper Branch of the North Fork below Lake Morris was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- The Lower Branch of the North Fork above Lake Boxley was assessed for macroinvertebrates and was judged partially supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Lower Branch mile 3.4 to 9.3 is partially supporting the aquatic life use with the cause unknown and source unknown.
- Middle Branch of North Fork Little River mile 1.3 to 3.9 is partially supporting the aquatic life use with causes of benthic macroinvertebrate bioassessments (streams), sedimentation/siltation, and nitrate/nitrite (Nitrite + Nitrate as N), and sources identified as channelization, loss of riparian habitat, non-irrigated crop production, crop production (crop land or dry land), and agriculture.
- North Fork Little River mile 0.0 to 0.3 is partially supporting the primary contact recreation use and not supporting the aquatic life use, with causes of habitat assessments (streams), sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources of municipal point source discharges, unknown, agriculture, and urban runoff/storm sewers. A TMDL has been developed for this segment.
- North Fork Little River mile 0.3 to 7.0 is partially supporting the primary contact recreation and aquatic life uses, with causes of sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources of municipal point source discharges and agriculture. A TMDL has been developed for this segment.

- North Fork Little River mile 7.0 to 10.9 is not supporting the primary contact recreation and aquatic life uses, with causes of sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources of municipal point source discharges and agriculture. A TMDL has been developed for this segment.
- North Fork Little River mile 10.9 to 16.1 is not supporting the primary contact recreation and aquatic life uses, with causes of habitat assessment (streams), other flow regime alterations, fecal coliforms, and cause unknown, and sources identified as channelization, source unknown, and habitat modification – other than hydromodification. A TMDL has been developed for this segment.
- Upper Branch mile 0.0 to 2.8 is partially supporting the aquatic life use with the cause unknown and the unknown.
- Lake Blythe, an 89 acre freshwater reservoir, is fully supporting the aquatic life and secondary contact recreation uses.
- Lake Morris, a 170 acre freshwater reservoir, is fully supporting the aquatic life use.

A TMDL is in the process of gaining approval by the DOW for the stream segments in the Little River Watershed in the Lower Cumberland Basin, including the Little River (mile 30.0 to 31.4, mile 31.4 to 45.5, mile 45.5 to 57.7), the North Fork Little River (mile 0.0 to 0.3, mile 0.3 to 7.0, mile 7.0 to 10.9, mile 10.9 to 16.1), and the South Fork Little River (mile 0.0 to 10.3, mile 10.3 to 20.3). Additional sampling to confirm this TMDL has just been completed.

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority due to restoration and protection needs. The main factor for restoration is observed impacts that indicate 27.6 miles of streams not fully supporting their designated uses. The main factor for protection is the Hopkinsville source water protection area.

Other Data

There are five Four Rivers Watershed Watch sites located in the watershed, all on the main stem of the North Fork Little River. The entire watershed is part of a source water protection area for the Hopkinsville Water and Environmental Authority.

Obion Creek (08010201040)

Geography

Obion Creek arises in south-central Graves County and flows northwestward into Hickman County before turning southwestward to join the Mississippi River near Hickman. The uppermost portion of the watershed has narrow valleys that gradually rise 25-50 feet to ridge tops. Downstream of Stubblefield the valley of the main stem widens but the surrounding terrain remains rugged with steep slopes that rise 50-150 feet to narrow ridges. At Waynes Corner the watershed becomes part of the Mississippi River floodplain. The terrain is gently rolling with very little elevation variance.

Waterways

The Obion Creek watershed drains about 321 square miles and contains more than 917 total stream miles. There are 46 HUC 14 subwatersheds located within this HUC 11 watershed. Tributaries include Little Cypress Creek, Cane Creek, Brush Creek, Little Creek, Little Joe Creek, Cypress Creek, Hopewell Creek, Guess Creek, Bowles Creek, Long Creek, Hollingsworth Creek, and Wayne Branch. There are several small impoundments on tributaries in the upper portion of the watershed. Long segments of Obion Creek have been straightened or channelized. There are 18 KPDES permitted outfalls recorded for this watershed, including wastewater facilities at Wingo, and Clinton, the Kentucky Transportation Cabinet Hickman County Maintenance Garage, TJ Shepherd Oil, Inc., the West Kentucky Landfill, Kentucky Tennessee Clay Company, Old Hickory Clay Marshall Mine, and Ingram Barge ISS Columbus.

There are two special use waters in the Obion Creek watershed:

- Obion Creek from Hurricane Creek to Little Creek is an exceptional water and a reference reach water.
- Murphy's Pond preserve area is an exceptional water and an outstanding state resource water.

Land cover/land use

The watershed is dominated by agricultural production of row crops, poultry, and swine. There are 44 permitted AFOs within the watershed, including 37 poultry operations and seven swine operations. There are four permitted CAFOs within the watershed, all of which are poultry operations. Residential areas exist around Clinton, Arlington, and Wingo. Industrial and commercial use occurs at Clinton and along the Highway 51 corridor. Forested areas are limited to wetlands and steeper slopes. The main stem valley downstream of the Purchase Parkway is mostly wetlands. Five quarries are located in the upper portion of the watershed including a large clay quarry. About 1400 acres of the Obion Creek Wildlife Management Area are located in the watershed.

2000 Agency Data Assessment

During the 2000 water quality assessment the Obion Creek watershed was officially assessed in fourteen segments for a total of 66.7 miles.

- The main stem was assessed in four segments for a total of 32.4 miles.
 - The lower most segment, from the backwaters of the Mississippi River upstream to Cane Creek, was assessed for fish and fecal coliform bacteria. This segment was judged fully supporting for primary contact recreation and but not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range because of poor riparian area and bank stability.
 - A 10.1 mile segment between Hurricane Creek and Little Creek was assessed for fish, macroinvertebrates, and algae. This segment was judged fully supporting for aquatic life.
 - A 3.4-mile segment from Little Joe Creek upstream to Brush Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.
 - A 4.4-mile segment upstream from Brush Creek was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- A 10.1-mile segment of Little Creek was assessed for fish and was judged not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range due to inadequate riparian vegetation, poor bank stability, and heavy sediment deposition.
- An 8.3-mile segment of Brush Creek in Graves County was assessed for fish, macroinvertebrates, and algae. The segment was judged partially supporting for aquatic life.
- A 6.0 mile segment of Brush Creek in Hickman County was assessed for fish and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey in this segment yielded a score in the not supporting range due to inadequate riparian vegetation, channelization, and heavy sediment deposition.
- Little Cypress Creek was assessed in two segments for a total of 5.5 miles. The lower most segment was 2.0 miles long and was assessed for fish. This segment was judged not supporting for aquatic life. The remaining segment was assessed for fish, macroinvertebrates, and algae and was judged fully supporting for aquatic life.
- A 2.2-mile segment of Opossum Creek was assessed for fish and was judged not supporting for aquatic life.
- A 0.6-mile segment of an unnamed tributary located off of State Highway 808 was assessed for macroinvertebrates and was judged not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range due to channelization and poor riparian zone vegetation.
- Two segments were assessed utilizing Discharge Monitoring Reports from permitted discharges.

- The lower most 0.8 miles of Long Creek in Carlisle County was judged partially supporting for aquatic life and primary contact recreation as a result of effluent from the Arlington sewage treatment plant.
- A 0.8-mile segment in the upper portion of Cane Creek in Graves County was judged partially supporting for aquatic life and primary contact recreation as a result of effluent from the Wingo sewage treatment plant.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Obion Creek mile 0 to 16.5 is not supporting the primary contact recreation and aquatic life uses with causes of copper, *E. coli*, habitat assessment (streams), iron, other flow regime alterations, and sedimentation/siltation, and sources identified as channelization, impacts from hydrostructure flow regulation/modification, loss of riparian habitat, non-irrigated crop production, unknown sources, and agriculture.
- Obion Creek mile 26.7 to 37.1 is fully supporting the aquatic life use.
- Obion Creek mile 40.8 to 44.2 is not supporting the aquatic life use with causes of habitat assessment (streams) and unknown, and sources of channelization and unknown.
- Obion Creek mile 44.2 to 49.8 is partially supporting the aquatic life use with a cause of habitat assessment (streams) and sedimentation/ siltation, and sources of channelization and crop production (crop land or dry land).
- Obion Creek mile 49.8 to 55.7 is partially supporting the aquatic life use with causes of sedimentation/siltation and unknown, and sources listed as unknown and agriculture.
- An unnamed tributary of Obion Creek mile 1.6 to 2.2 is not supporting the aquatic life use with causes of habitat assessments (streams), other flow regime alterations, and unknown, and source of channelization, loss of riparian habitat, streambank modification/destabilization, and unknown.
- Hurricane Creek mile 0.0 to 3.7 is partially supporting the aquatic life use with causes of benthic macroinvertebrate assessments, particle distribution (embeddedness), and sedimentation/siltation, and sources identified as channelization, highway/road/bridge runoff (non-construction related), loss of riparian habitat, and non-irrigated crop production.
- Brush Creek mile 0.0 to 6.3 is partially supporting the aquatic life use with causes of other flow regime alterations, physical substrate habitat alterations, sedimentation/siltation, and total dissolved solids, and sources of channelization, loss of riparian habitat, and non-irrigated crop production.
- Brush Creek mile 0.0 to 8.4 is partially supporting the aquatic life use with a cause of sedimentation/siltation, and sources of channelization, dredging (e.g. for navigation channels), and agriculture.
- An unnamed tributary of Brush Creek mile 0.0 to 1.9 is not supporting the aquatic life use with causes of benthic macroinvertebrate bioassessments (streams),

- sedimentation/siltation, total Kjeldahl nitrogen (TKN), and phosphorus (total) and sources of loss of riparian habitat, non-irrigated crop production, crop production (crop land or dry land), and agriculture.
- Cane Creek mile 3.3 to 4.1 is partially supporting the primary contact recreation and aquatic life uses, with causes of ammonia, chlorine, fecal coliforms, and organic enrichment (sewage) biological indicators, and sources identified as municipal point source discharges. No TMDL is required for this segment.
 - Cane Creek mile 0.0 to 4.4 is not supporting the aquatic life use with causes of habitat assessment (streams), sedimentation/siltation, and nutrient/eutrophication biological indicators, and sources of grazing in riparian or shoreline zones, loss of riparian habitat, non-irrigated crop production, and agriculture.
 - Little Creek mile 0.0 to 5.3 is not supporting the aquatic life use with causes of other flow regime alterations and sedimentation/siltation, and sources of channelization and loss of riparian habitat.
 - Little Cypress Creek mile 0.0 to 2.0 is not supporting the aquatic life use with a cause of sedimentation/siltation, and the source unknown.
 - Little Cypress Creek mile 0.0 to 2.6 is partially supporting the aquatic life use with causes of benthic macroinvertebrate bioassessments (streams), dissolved oxygen saturation, particle distribution (embeddedness), and sedimentation/siltation, and sources of channelization, non-irrigated crop production, crop production (crop land or dry land), and agriculture.
 - Little Cypress Creek mile 5.8 to 9.2 is fully supporting the aquatic life use.
 - Long Creek mile 0.0 to 0.8 is partially supporting the aquatic life and primary contact recreation uses, with causes of ammonia (un-ionized), chlorine, fecal coliforms, total suspended solids (TSS), and organic enrichment (sewage) biological indicators, and a source of package plant or other permitted small flow discharges. A TMDL is not required for this segment.
 - Opossum Creek mile 0.0 to 2.3 is not supporting the aquatic life use with causes of other flow regime alterations and sedimentation/siltation and sources of channelization.

Past Watershed Ranking

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority. The watershed ranked as only a medium need for restoration but received a very high ranking for concerns from potential impacts. The main factors affecting the ranking are intensive animal and row crop agricultural practices. The watershed ranked at the very top for number of animal feeding operations in the basin. Destruction of riparian habitat, channelization, poor bank stability, heavy sediment loading, and runoff of animal waste are prevalent throughout the watershed. In addition, the watershed also ranked near the top with a very high number of permitted discharge violations.

Other Data

There are five Four Rivers Watershed Watch sites within the watershed, including three on Obion Creek, one on Cane Creek, and one on Hurricane Creek. There are nine wellhead protection zones in the watershed, including Nicky's BBQ, Columbus Water, US Utilities in Clinton, Wingo Water & Sewer, South Graves Water, Cuba Water Works, Fancy Farm Water District, Arlington Water District, and Harper Hams. This watershed contains two water quality related projects, Obion Creek Stream Restoration Phase I and Phase II.

Red River, at Oakville (05130206090)

Geography

This hydrologic unit represents the Red River and its tributaries from the mouth of Little Whippoorwill Creek downstream to the mouth of Whippoorwill Creek. Most of the watershed terrain is typical of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. There are some small cliffs along the main stem of the river. Elevations vary only 100-175 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography. Along the northern perimeter of the watershed the terrain is more rugged with features like Lockett Knob rising to more than 800 feet in elevation. This change is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyrile and the Western Kentucky Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones.

Waterways

This hydrologic unit drains about 36 square miles and contains about 25 total stream miles. There are two HUC 14 subwatersheds within this HUC 11 watershed. The major tributaries of Little Whippoorwill Creek and the South Fork of the Red River are discussed as separate hydrologic units. The only other major tributary is Pleasant Grove Creek. However, the river drains a large area north of Pleasant Grove Creek along Highway 96 where an unnamed stream disappears and reappears several times in the karst topography. There are no KPDES permits recorded for this watershed.

Land cover/land use

The watershed is dominated by row crop agriculture along with a few small dairy and swine operations. There are four permitted AFOs within the watershed, one beef/dairy operation, two dairy operations and one swine operation. There are some residential areas in the northern portion of the watershed near the city of Russellville.

2000 Agency Data Assessment

- During the 2000 water quality assessment the entire 2.2 miles of Pleasant Grove Creek were assessed for macroinvertebrates and fecal coliform bacteria. The stream was judged partially supporting for aquatic life and not supporting for primary contact recreation.
- An 8.7-mile segment of the main stem of the Red River, from the South Fork to Little Whippoorwill Creek, was assessed for fish, macroinvertebrates, algae, and fish tissue consumption. The segment was judged fully supporting for aquatic life

- and fish tissue consumption. An aquatic and riparian habitat survey conducted on this segment yielded a score in the fully supporting range.
- An additional 2.1-mile segment of the main stem of the Red River from Whippoorwill Creek to the South Fork of the Red River was assessed for fish, but the data was judged to be inconclusive for support of aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Red River mile 54.5 to 56.9 is partially supporting the aquatic life use, with causes of sedimentation/siltation and nutrient/eutrophication biological indicators and sources identified as agriculture and rural (residential areas).
- Red River mile 57.0 to 65.8 is fully supporting the aquatic life and fish consumption uses, but not supporting the primary contact recreation use, with a cause of *E. coli*, and a source identified as agriculture.
- Pleasant Grove Creek mile 0.0 to 2.2 is not supporting the primary contact recreation use and partially supporting the aquatic life use, with causes of fecal coliforms, nutrient/eutrophication biological indicators, and organic enrichment (sewage) biological indicators, and sources identified as grazing in riparian or shoreline zones, managed pasture grazing, on-site treatment systems (septic systems and similar decentralized systems), and agriculture.

Past Watershed Ranking

The old data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority due to a high need for restoration. Restoration factors are driven by observed impacts that indicate 2.2 miles of streams not fully supporting their designated uses. The causes are likely related to agricultural runoff and failure of onsite wastewater treatment systems. The watershed also ranks very high for groundwater sensitivity.

Other Data

This watershed contains the project area for the Pleasant Grove Creek EPA 319 (h) project of watershed planning being conducted by Austin Peay State University.

South Fork of the Little River (05130205180)

Geography

The South Fork of the Little River arises in eastern Christian County and flows generally southwestward to its confluence with the North Fork of the Little River. In the upper portion of the watershed the terrain is rugged with steep slopes rising 75-150 feet to ridges and knob formations. This terrain is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyrile and the Western Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones. There are very few karst features in this transition area. The terrain begins to change downstream of Highway 68/80. At this point the terrain is characteristic of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary 50-125 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography.

Waterways

The South Fork of the Little River watershed drains about 67 square miles and contains about 100 total stream miles. There are five HUC 14 subwatersheds within this HUC 11 watershed. Tributaries include Rock Bridge Branch, Warrens Fork and Forbes Creek. There are 15 KPDES permitted outfalls recorded for this watershed, including Commonwealth Agri Energy LLC, Plymouth Tube Extrusion Mill, Pilot Travel Center, and Kentucky Transportation Cabinet Christian County Maintenance Garage.

Land cover/land use

Upstream of Hopkinsville the land is primarily agricultural with numerous dairy, poultry, beef, swine and row crop operations. There are 22 permitted AFOs within the watershed, including 16 dairy operations, five poultry operations and one beef operation. There is one permitted beef/swine CAFO operation. Many of the steeper slopes are covered with deciduous forest. Around Hopkinsville the land is primarily used for residential, commercial and industrial purposes. Downtown Hopkinsville, located in the northwest portion of the watershed, is heavily urbanized. A limestone quarry is located south of Hopkinsville. There is an active federal Superfund site located at Hopkinsville.

2000 Agency Data Assessment

During the 2000 water quality assessment the South Fork of the Little River was assessed in three segments for a total of 24.4 miles.

- The lowermost segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged not supporting for both aquatic life and primary contact recreation.
- The middle segment was also assessed for macroinvertebrates and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and not supporting for primary contact recreation.
- The upper segment was assessed for macroinvertebrates and was judged not supporting for aquatic life.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- South Fork of Little River mile 0.0 to 10.3 is not supporting the primary contact recreation or aquatic life uses, with causes of sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators, and other causes, and sources identified as municipal point source discharges, source unknown and agriculture. A TMDL has been developed for this segment.
- South Fork Little River mile 10.3 to 20.3 is not supporting the primary contact recreation use and partially supporting the aquatic life use, with causes of sedimentation/siltation, fecal coliforms, nutrient/eutrophication biological indicators, and other causes, and the source identified as agriculture. A TMDL has been developed for this segment.
- South Fork Little River mile 21.3 to 26.1 is not supporting the aquatic life use with causes listed as benthic macroinvertebrate bioassessments (streams) and unknown, and sources listed as unknown.

A TMDL is in the process of gaining approval by the DOW for the stream segments in the Little River Watershed in the Lower Cumberland Basin, including the Little River (mile 30.0 to 31.4, mile 31.4 to 45.5, mile 45.5 to 57.7), the North Fork Little River (mile 0.0 to 0.3, mile 0.3 to 7.0, mile 7.0 to 10.9, mile 10.9 to 16.1), and the South Fork Little River (mile 0.0 to 10.3, mile 10.3 to 20.3). Additional sampling to confirm this TMDL has just been completed.

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority due to restoration needs. The main factor for restoration is observed impacts that indicate 24.4 miles of streams not fully supporting their designated uses.

Other Data

There are two Four Rivers Watershed Watch sites located within this watershed, both of which are on the main stem of the South Fork Little River.

West Fork of the Clarks River (06040006050)

Geography

The West Fork of the Clarks River arises in west central Calloway County and flows generally northward through Marshall and Graves Counties before entering McCracken County where it meets the Clarks River. The watershed terrain has wide valleys rising to ridges that are mostly wide but occasionally narrow. The most rugged areas exist between Highway 212 and Highway 58/80. Elevations vary 150 feet or less between valleys and ridge tops. The ridges are underlain by unconsolidated Mesozoic and Cenozoic sand, gravel, and clay. The valley bottoms are underlain by Quaternary alluvium.

Waterways

This watershed drains over 222 square miles and contains about 691 total stream miles. There are 79 HUC 14 subwatersheds within the HUC 11 watershed. Tributaries include Darnell Creek, Sand Lick Branch, Watson Creek, Edwards Creek, Damon Creek, Duncan Creek, Soldier Creek, Panther Creek, Trace Creek, Spring Creek, Tucker Creek, Sugar Creek, Hodge Creek, Bear Creek, and Camp Creek. There are several small impoundments on tributaries but none on the main stem. A significant stretch of the West Fork has been straightened to improve drainage. This section is located between Highway 58/80 and Highway 348. As a result the stream is split into multiple channels along much of this stretch.

There are 15 KPDES permitted outfalls recorded for this watershed, including the Murray Landfill, Symsonia wastewater treatment facility, Gerald Chambers and Sons, Inc., Ermine Construction Company, Eddie Franklin LLC, L&R Company, Cooley Clay Company, Holcim (US) Inc., Joshuas Haven LLC, Lamberts Gravel and Excavation, Freemont Baptist Mission, and Great Oaks Subdivision.

There are six special use waters in the watershed, including:

- Sugar Creek from the mouth to an unnamed reservoir is an exceptional water.
- Panther Creek from the channelization to the impoundment is an exceptional water and a reference reach water.
- Trace Creek from the mouth to Neely Branch is an exceptional water and a reference reach water.
- West Fork Clarks River from Soldier Creek to Duncan Creek is an exceptional water and a reference reach water.
- Unnamed tributary to Panther Creek from the mouth to headwaters is an exceptional water and a reference reach water.
- Soldier Creek from the mouth to the South Fork Soldier Creek is an exceptional water and a reference reach water.

Land cover/land use

The watershed is dominated by agricultural production of row crops, poultry, swine, dairy, and beef cattle. There are 23 permitted AFOs in the watershed, including 20 poultry operations and three swine operations. There are six permitted CAFOs in the watershed, including one dairy operation, three swine operations, and two poultry operations. Deciduous forest remains on the more rugged terrain in the central portion of the watershed. There are extensive wetlands around the main stem of the West Fork, downstream of the Purchase Parkway. Included in this area is the 1700 acre Kaler Bottoms Wildlife Management Area. The Murray landfill is located in the upper portion of the watershed near Coldwater. There are two surface mine quarries located in the watershed. There are no significant residential, industrial, or commercial developments in this watershed.

2000 Agency Data Assessment

- During the 2000 water quality assessment the main stem of the West Fork of the Clarks River was assessed in six segments for a total of 26.1 miles.
 - A 7.5-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged fully supporting for aquatic life but only partially supporting for primary contact recreation.
 - A 4.0-mile segment below Panther Creek was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged fully supporting for aquatic life but not supporting for primary contact recreation.
 - A 2.9-mile segment between Panther Creek and Soldier Creek was assessed for macroinvertebrates and was judged fully supporting for aquatic life.
 - A 3.0-mile segment between Soldier Creek and Duncan Creek was assessed for fish, macroinvertebrates, algae and fish tissue. The segment was judged fully supporting for aquatic life but only partially supporting for fish tissue consumption.
 - A 4.6-mile segment from Duncan Creek to Watson Creek was assessed for fecal coliform bacteria and was judged partially supporting for aquatic life.
 - A 4.1-mile segment from Darnell Creek up to the headwaters was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- A 13.8-mile segment of a channelized section of the West Fork was assessed for fish and was judged partially supporting for aquatic life.
- The lower 3.7 miles of Blizzard Pond was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged not supporting for primary contact recreation, but the macroinvertebrate data was judged inconclusive for support of aquatic life.

- A 1.0-mile segment below Great Oaks Subdivision sewage treatment plant was assessed using discharge monitoring reports (DMRs). The segment was judged partially supporting for aquatic life and primary contact recreation.
- A 5.4-mile segment of Camp Creek was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for both aquatic life and primary contact recreation.
- A 1.8-mile segment of Duncan Creek below a reservoir was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged not supporting for aquatic life, but fecal coliform data collected was inconclusive for support of primary contact recreation. This stream will be revisited during the next monitoring cycle.
- A 1.8-mile segment of Spring Creek was assessed for fish and was judged partially supporting for aquatic life.
- A 0.3-mile segment Reeves Branch was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- The tributaries of Duncan Creek, Panther Creek, Pryor Branch, Soldier Creek, Sugar Creek, and Trace Creek were assessed and judged fully supporting for aquatic life. Panther Creek was also determined to be fully supporting for primary contact recreation.

2005 Agency Data Assessment

During the 2005 monitoring cycle, assessments indicated:

- Blizzard Pond mile 4.8 to 5.8 is partially supporting the aquatic life and primary contact recreation uses, with causes of ammonia, fecal coliforms, total suspended solids and organic enrichment (sewage) biological indicators, and the source identified as package plant or other permitted small flow discharges. No TMDL is required for this segment.
- Blizzard Pond Drainage Canal mile 0.0 to 3.7 is not supporting the primary contact recreation use and partially supporting the aquatic life use, with causes identified as ammonia, fecal coliforms, nutrient/eutrophication biological indicators, and sources identified as channel erosion, channelization, loss of riparian habitat, on-site treatment systems (septic systems and similar decentralized systems), package plant or other permitted small flow discharges, sand/gravel/rock mining or quarries, unknown, and rural (residential areas).
- West Fork Clarks River mile 0 to 10.4 is not supporting the aquatic life and primary contact recreation uses, with causes of *E. coli*, iron and lead, and source identified as unknown, agriculture, and urban runoff/storm sewers.
- West Fork Clarks River mile 12.8 to 16.8 is fully supporting the aquatic life use, but not supporting the primary contact recreation use with a cause of fecal coliforms, and the source unknown.
- West Fork Clarks River mile 17.2 to 20.0 is fully supporting the aquatic life use.

- West Fork Clarks River mile 20.1 to 23.4 is fully supporting the aquatic life use and partially supporting the primary contact recreation and fish consumption uses, with causes of fecal coliforms and methylmercury, and the sources unknown.
- West Fork Clarks River mile 22.7 to 27.3 is partially supporting the primary contact recreation use with a cause of fecal coliforms, and the source unknown.
- West Fork Clarks River mile 34.2 to 38.2 is fully supporting the aquatic life use.
- West Fork Clarks River (Relict Channel) mile 0.0 to 13.8 is fully supporting the aquatic life use.
- Camp Creek mile 0 to 5.4 is partially supporting the aquatic life and primary contact recreation uses with causes of fecal coliforms, unknown and other, and sources unknown.
- Duncan Creek mile 0.0 to 2.5 is fully supporting the aquatic life use and partially supporting the primary contact recreation use with a cause of fecal coliforms and the source unknown.
- Haskell Branch mile 1.2 to 4.5 is partially supporting the aquatic life use with a cause of sedimentation/siltation, and a source of agriculture.
- Hominy Branch mile 2.3 to 3.8 is fully supporting the aquatic life use.
- Bear Creek mile 0.6 to 1.6 is partially supporting the aquatic life and primary contact recreation uses, with causes of ammonia, fecal coliforms, and organic enrichment (sewage) biological indicators, and sources identified as municipal point source discharge. A TMDL is not required for this segment.
- Sugar Creek mile 0 to 3.9 is fully supporting the aquatic life use.
- Trace Creek mile 1.1 to 5.8 is fully supporting the aquatic life use.
- Pryor Branch mile 0.0 to 2.9 is fully supporting the aquatic life use.
- Reeves Branch mile 0.0 to 0.3 is partially supporting the aquatic life use with the cause unknown and the source unknown.
- Spring Creek mile 0.0 to 2.0 is partially supporting the aquatic life use with causes of sedimentation/siltation and nutrient/eutrophication (biological) indicators, and sources of channelization and agriculture.
- Spring Creek mile 3.6 to 5.4 is not supporting the aquatic life use with a cause of sedimentation/siltation, and a source of agriculture.
- Turkey Creek mile 0.0 to 3.4 is partially supporting the aquatic life use with a cause of sedimentation/siltation, and a source of agriculture.
- An un-named tributary to Panther Creek mile 0.0 to 1.7 is fully supporting the aquatic life use.
- Panther Creek mile 0.0 to 3.0 is fully supporting the aquatic life use and not supporting the primary contact recreation use, with a cause of *E. coli*, and the source unknown.
- Panther Creek mile 1.1 to 6.0 is fully supporting the aquatic life use.
- Solider Creek mile 0.0 to 5.7 is fully supporting the aquatic life use.
- Damon Creek mile 0.0 to 1.8 is not supporting the primary contact recreation use and has been proposed for a delisting for the aquatic life use, with causes of fecal coliforms and unknown, and sources identified as animal feeding operations and unknown.

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall medium priority,

Other Data

There are six Four Rivers Watershed Watch sites located within the watershed, including three on Damon Creek, one on Patty Creek, one on Soldier Creek, and one on Camp Creek. The northern part of this watershed located in McCracken County is part of a source water protection area for Paducah Water. There are three wellhead protection areas, including one for Stella Trailer Park, Bendefield Water, and Symosonia Water District.

West Fork of the Red River (05130206230)

Geography

The West Fork of the Red River arises in western Todd County and flows southward into Montgomery County, Tennessee where it joins the Red River near Clarksville. Most of the watershed terrain is typical of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary only 100-175 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography. Upstream of Highway 68/80 the terrain becomes more rugged with steeper slopes rising to ridge and knob formations. This change is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyrile and the Western Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones. There are very few karst features in this transition area.

Waterways

The West Fork of the Red River drains about 180 square miles in Kentucky and contains about 182 total stream miles. There are five HUC 14 subwatersheds in this HUC 11 watershed. Tributaries include Bluehole Creek and Montgomery Creek. Spring Creek is a major tributary that joins the West Fork in Tennessee. Spring Creek is discussed as a separate hydrologic unit. Due to the karst topography, many tributaries disappear underground and reappear at lower elevations as springs or glades. There are wastewater discharges at Trenton and Oak Grove. There are 8 KPDES permitted outfalls recorded for this watershed including wastewater facilities at Trenton and Oak Grove, Pilot Travel Center, Fly J Travel Plaza, and Chevron Fuel Express. Nearly the entire watershed is part of the Oak Grove Water District source water protection area, including the “critical” protection zone.

There are two special use waters located in the West Fork of Red River watershed:

- West Fork Red River from mile 32.2 to Montgomery Creek is a special use water because it has cold water aquatic habitat.
- West Fork Red River from the Kentucky/Tennessee state line to Montgomery Creek is a special use water because it is cold water aquatic habitat.

Land cover/land use

Most of the watershed is dominated by agricultural production of row crops, dairy, beef, and swine. There are 49 permitted AFOs in the watershed, including five swine operations, two dairy/swine operations, 35 dairy operations, six beef operations, and one rabbit operation. Some deciduous forest remains in the rugged terrain of the headwaters.

There are also small wetland areas scattered around the watershed that remain forested. Interstate 24 crosses the southwest portion of the watershed but the corridor is not heavily developed. Southwest of the interstate is the city of Oak Grove and the Fort Campbell Military Reservation. Only a small portion of the Military Reservation is within the watershed boundary; however around the Oak Grove community are many residential areas associated with Fort Campbell. There are also residential areas around the communities of Pembroke and Trenton. A limestone quarry is located in the upper portion of the watershed.

2000 Agency Data Assessment

During the 2000 water quality assessment an 11.9-mile segment of the West Fork of the Red River was assessed for fish, macroinvertebrates, algae, water quality, and fecal coliform bacteria. The segment was judged fully supporting for aquatic life and primary contact recreation.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- West Fork Creek mile 0.6 to 2.0 is partially supporting the aquatic life use with causes of ammonia (un-ionized), total suspended solids (TSS), and organic enrichment (sewage) biological indicators, and the source identified as package plant or other permitted small flow dischargers. A TMDL is not required for this segment.
- West Fork Red River mile 14.2 to 26.4 is fully supporting the primary contact recreation use and partially supporting the aquatic life use, with a cause of sedimentation/siltation and nutrient/eutrophication biological indicators, and sources identified as agriculture and rural (residential areas).

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall low priority.

Other Data

There is one Four Rivers Watershed Watch sampling site in the West Fork Red River watershed, located on the West Fork Red River at Frederick Road. There is one wellhead protection zone for Cherry Grove GC. The entire watershed is part of a source water protection plan area for the Oak Grove Water Department.

Whippoorwill Creek (05130206150)

Geography

Whippoorwill Creek arises in northeastern Todd County and flows generally southward to the Red River in Logan County. Most of the watershed terrain is typical of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary only 100-175 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography. Upstream of Gordonville the terrain becomes more rugged with steeper slopes rising to ridges and knob formations. This change is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyrile and the Western Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones. There are very few karst features in this transition area.

Waterways

The Whippoorwill Creek watershed drains about 115 square miles and contains about 130 total stream miles. There are 11 HUC 14 subwatersheds in this HUC 11 watershed. Tributaries include Vicks Branch, Dry Fork, Garrett Branch, Bennett Branch, and North Fork of Whippoorwill Creek. Due to the karst topography, many tributaries disappear underground and then reappear at lower elevations as springs or glades. The North Todd Elementary School has the only KDPES permit recorded for this watershed.

There are two special use waters in this watershed:

- Whippoorwill Creek from the mouth to Vicks Branch is an exceptional water, a reference reach stream and an outstanding state resource water due to the presence of the littlewing pearl mussel (*Pegias fibula*), a federally listed or threatened species.
- Whippoorwill Creek from the source to Vicks Branch is an outstanding state resource water due to the presence of the littlewing pearl mussel (*Pegias fibula*), a federally listed or threatened species.

Land cover/land use

South of Highway 68/80 row crop agriculture, as well as a number of swine and dairy operations, dominates the watershed. There are 16 permitted AFOs in the watershed, including three swine operations, three poultry operations, and ten dairy operations. Upstream of the Highway 68/80 the terrain is generally too rugged for row cropping however dairy and poultry operations are common. Deciduous and mixed forests are still present on the rugged knobs and hills in the northern portion of the watershed.

2000 Agency Data Assessment

During the 2000 water quality assessment the lower 13.0 miles of Whippoorwill Creek were assessed for fish, macroinvertebrates, algae, water quality, and fecal coliform bacteria. The segment was judged fully supporting for both aquatic life and primary contact recreation.

2005 Agency Data Assessment

During the 2005 monitoring cycle, water quality assessments indicated:

- Dry Fork mile 0.0 to 7.3 is partially supporting the aquatic life use with causes listed as benthic macroinvertebrate assessments (streams), dissolved oxygen, particle distribution (embeddedness), sedimentation/siltation, nitrate/nitrite (Nitrite + Nitrate as N), and sources identified as grazing in riparian or shoreline zones, loss of riparian habitat, non-irrigated crop production, livestock (grazing or feeding operations), crop production (crop land or dry land), unrestricted cattle access.
- Whippoorwill Creek mile 0.0 to 13.2 is fully supporting the aquatic life and primary contact recreation uses.

Past Watershed Rankings

The old data-driven ranking process for the 4 Rivers region indicated the watershed as an overall medium priority.

Other Data

There are no Four Rivers Watershed Watch sampling sites, wellhead protection zones or source water protection plan areas located in this watershed.