

**Davis Creek
Watershed Restoration Plan
(Claiborne and Campbell Counties, TN)
January 2021**



ABSTRACT

This document was jointly prepared by the Claiborne County Soil Conservation District, Natural Resources Conservation Service, Clinch-Powell Resource Conservation and Development Council and The Nature Conservancy as a plan for restoring the biological integrity of Davis Creek Watershed, located in Claiborne and Campbell Counties, Tennessee. This plan identifies those stressors, and sources of stress which threaten and Davis Creek and its tributaries. The information attained through this study has resulted in the establishment of goals and objectives designed to return Davis Creek and its tributaries, back to the classification of fully supporting their designated uses. This document was created following the EPA and Tennessee Department of Agriculture – Non-Point Source program guidelines for a Watershed-Based Plan and includes each of its nine key components.

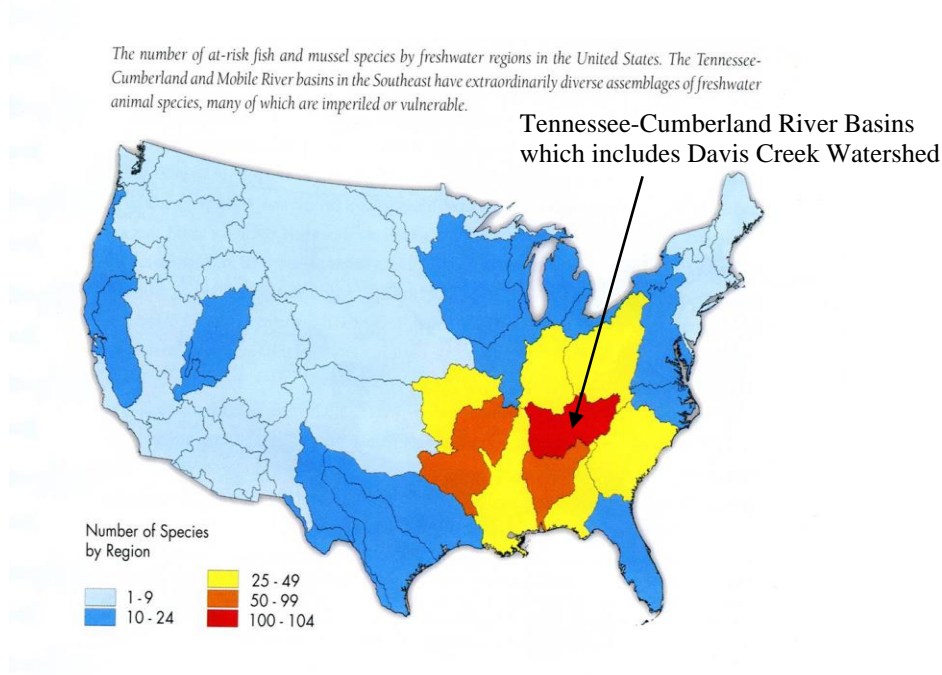
Portions of this document were provided by:

- **PROPOSED TOTAL MAXIMUM DAILY LOAD (TMDL) for E. coli in the Powell River Watershed (HUC 06010206) Campbell, Claiborne, Hancock, and Union Counties, Tennessee (Submitted September 18, 2008, Approved by EPA Region 4 – October 15, 2008)**
- **FINAL VERSION YEAR 2020 303(D) LIST OF IMPAIRED and THREATENED WATERS of TENNESSEE (April 2020)**
- **POWELL RIVER WATERSHED (06010206) OF THE TENNESSEE RIVER BASIN, WATERSHED WATER QUALITY MANAGEMENT PLAN (October 2007)**
- **2014 305(B) REPORT, The Status of Water Quality in Tennessee (December 2014)**

EXECUTIVE SUMMARY

Davis Creek and its main tributary Cawood Branch forms near the Kentucky-Tennessee state line in Claiborne and Campbell Counties, TN and drains 40,800 acres of land in the unincorporated area of Speedwell before entering Norris Lake, TN- a Tennessee Valley Authority (TVA) impoundment. Davis Creek resides within the Powell River Watershed which is among the most important freshwater bodies for rare species and biodiversity in North America (Figure 1). Due to the river's national importance, and the sensitive nature of its globally rare species, the EPA, the state of Tennessee, and the Commonwealth of Virginia have a specific Memorandum of Understanding (2008) in place to prioritize the Powell River along with the Clinch River systems for protection and coordinate their efforts at monitoring, TMDL development, river restoration, and water quality improvement. The result of this MOU was the creation of the Clinch Powell Clean Rivers Initiative (CPCRI). The CPCRI is an ambitious two-state river coalition that works to protect and restore water quality in North America's most important river for rare and imperiled freshwater animals. They are a diverse group of agencies, research scientists, conservation organizations, and industry leaders, biologists, hydrogeologists, water quality specialists, stream restoration practitioners, education and outreach professionals, coal mining reclamation professionals and coal mining process professionals. Members of the CPCRI include: Tennessee Dept. of Environment and Conservation, Virginia Dept. of Environmental Quality, Virginia Dept. of Game and Inland Fisheries, Tennessee Wildlife Resources Agency, Virginia Dept. of Conservation and Recreation, Virginia Dept. of Mines, Minerals, and Energy, US Environmental Protection Agency Regions 3 & 4, US Office of Surface Mining Reclamation and Enforcement, US Fish and Wildlife Service, US Geological Survey, US Army Corps of Engineers, Tennessee Valley Authority, Alpha Natural Resources, Arch Coal, The Nature Conservancy, Upper Tennessee River Roundtable, Virginia Tech, Virginia Water Resources Research Center, North Carolina State University, Clinch-Powell RC&D and the Tennessee Healthy Watersheds Initiative.

FIGURE 1: Regional Concentration of At-Risk Fish and Mussel Species



I. Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan. Sources that need to be controlled should be identified at the significant subcategory level along with estimates of the extent to which they are present in the watershed (e.g., X number of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; Y acres of row crops needing improved nutrient management or sediment control; or Z linear miles of eroded streambank needing remediation).

The globally important Powell Watershed (which included the Davis Creek Watershed) is located in the Appalachian Mountains of Virginia and Tennessee. Part of the Tennessee River headwaters, these free-flowing rivers are a leading national hotspot for biodiversity and imperiled species. Surrounding the rivers is a rural landscape that includes forests containing an amazing variety of wildlife and timber resources, coal mining areas that provide jobs and energy but stress the environment, sensitive caves which are critical to groundwater, working farms which support local communities, and small Appalachian towns struggling to remain economically viable.

The Lower Powell River Watershed (USGS 8-digit Hydrologic Unit Code, 06010206) has a long history of watershed degradation from Nonpoint Source (NPS) pollution. Pollutants from abandoned mined lands (e.g. high levels of acidity, suspended heavy metals including iron, suspended solids, etc.), agriculture runoff (suspended solids, high levels of nutrients and pathogens, and low levels of dissolved oxygen), and runoff from developed areas (dissolved solids, contaminants, illegal straight pipes, etc.) continue to threaten these species rich waters. These stressors combine to impact water quality and human uses, as well as compromise the natural habitat of threatened and endangered species.

The Davis Creek Watershed is a generally rural area located in the Appalachian Ridge and Valley geographic provinces. Agricultural production comprises the dominant land use and is the largest contributor to nonpoint source pollution. Due to the loss of the vegetation and their vital root systems, the riverbanks are eroding actively, contributing many tons of sediment to the river annually, robbing landowners of valuable, productive soil and increasing treatment costs for local water utilities.

Claiborne and Campbell Counties are among the most isolated and impoverished areas of Tennessee. Containing an array of mountainous terrain, this area is an example of natural beauty and rural isolation. The Davis Creek Primary Project Area This area has very few business opportunities, with agriculture being the major employer and land use. This has resulted in a significant amount of nonpoint source pollution. There is one CAFO in the watershed (Hickory Corner Dairy) and two TSMP permits (Hopper Logging and Lumber and Lakeside Wood Products)

Table 1: Stream Assessments from the “*Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007*”. These figures are based on 222 total miles of streams in the Davis Creek (TN06010206026_1000, TN06010206026_2000, TN06010206026_3000, TN06010206026_4000 and TN06010206026_5000) watershed including the sub watersheds of Cawood Branch (TN06010206026_0100), Russell Branch (TN06010206026_0200), Carr Branch (TN06010206026_0210)

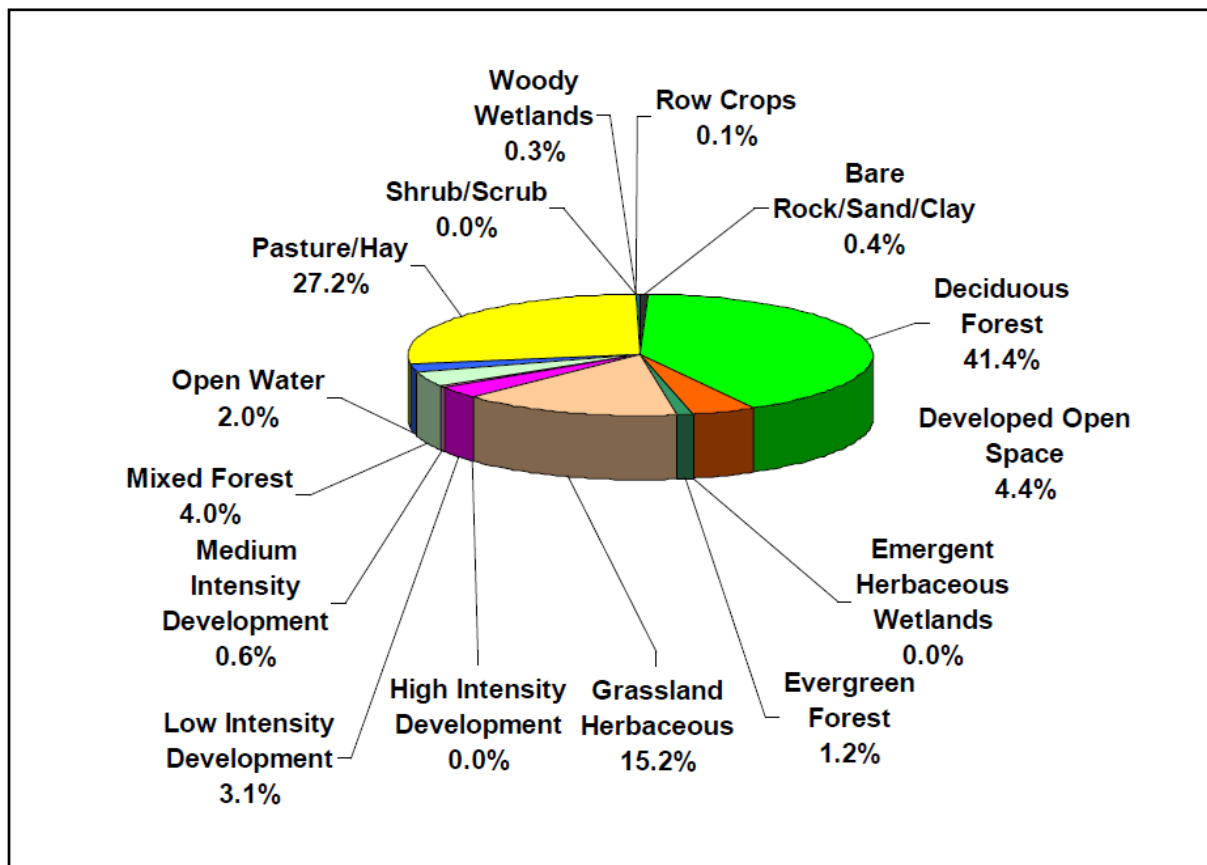
Watershed Name	Davis Creek 1000	Davis Creek 2000	Davis Creek 3000	Davis Creek 4000	Davis Creek 5000	Cawood Branch	Russell Branch	Carr Branch
Fully Supporting Aquatic Life Designated Use					1.5 miles	5.2 miles		
Not supporting Fish and Aquatic Life Designated Use			3.6 miles	2.6 miles				
Not assessed for fish and aquatic life Designated Use								1.4 miles
Fully Supporting Recreational Designated Use					1.5 miles			
Not Supporting Recreational Designated Use	8 miles	5.1 miles	3.6 miles	2.6 miles		5.2 miles	3.5 miles	
Not Assessed for Recreational Designated Use	25.9 miles							1.4 miles

With little money to feed their families these landowners do not have the resources to focus on environmental concerns. This project has a goal of addressing the needs of the landowners and environment while providing funding to the local economy. An effective cost-share program goes far beyond assistance to the landowners and funding provided through this project will: (1) alleviate the financial burden of installing BMP practice in an already impoverished region, (2) support local business as the landowners purchase supplies needed to install BMPs and (3) support local contractors who will install the BMP practices. For this area of southern Appalachia, this funding will be greatly appreciated and needed for entire community.

“Currently, six stream systems in the Tennessee portion of the Powell River Watershed are known to have excessive pathogen contamination. Russell Creek (Tazewell) and Gap Creek (Cumberland Gap and Tipprell) are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff sewage collection system leaks, and treatment plant operation failures. Many streams in agricultural watersheds show elevated bacterial levels, including Mulberry Creek, Little Mulberry Creek, **Cawood Branch**, and **Russell Branch**. **Davis Creek**, in Claiborne and Campbell Counties, has been contaminated by

Concentrated Animal Feeding Operations.” (Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007)

Figure 2: Land Use Distribution in Davis Creek Watershed. (Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007)



Threats to the System:

- A. **Water Quality Degradation:** Given that imperiled freshwater mussels reach their highest North American density in the Clinch and Powell rivers, improving/maintaining water quality is critical. Freshwater mussels are known to be more sensitive to some contaminants, such as ammonia and copper, than commonly used freshwater test organisms. Therefore, achieving water quality greater than minimum standards is valuable for the conservation of this fauna. Adequate riparian buffers can help prevent contaminants from reaching the river and causing acute or chronic stress on native mussels and fish. A recent study by the USDA-NRCS determined that hay and pastureland were significant contributors of nitrogen and phosphorous loading to streams in the upper Tennessee River System, including the Powell river (USDA, 2011). The evidence that water quality is exerting stress on native freshwater fauna is mounting and continues to be investigated by Tennessee state water quality agencies, NGO’s, academic institutions, and federal agencies.

- B. **Inadequate Habitat for Fish and Wildlife:** Many studies identify excess sedimentation as a habitat degradation factor for stream systems in agricultural and urban settings. Limited indications of physical habitat impairment are documented in the mainstem Powell River (Ostby et al., 2014). However, numerous tributary streams historically supporting diverse

mussel and fish assemblages in the Powell River systems exhibit sediment loads and altered instream habitats. Sedimentation was identified as a widespread problem in many tributaries of the Powell River system by the USDA, potentially impacting benthic fish and mussel populations (1992). The EPA Risk Assessment for the Clinch and Powell rivers (2002) concluded that embeddedness and instream cover influenced biological conditions of both fish and macroinvertebrates and were correlated with riparian and overall land use. Collectively, these rivers specific and many other stream ecological integrity studies suggest that habitat alteration is problematic for instream fauna in watersheds with significant human uses such as agriculture, mining, and infrastructure development in close proximity to stream corridors.

“Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack any type of vegetated buffers along stream corridors is a problem in some areas of the Powell River Watershed, due both to agricultural and residential/commercial land uses. Impacted streams that could benefit from the establishment of more extensive riparian buffer zones include Cawood Branch, Russell Branch, and Davis Creek.” (Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007)

Agriculture continues to be the leading land use in the Davis Creek Watershed. These agricultural activities are a significant source of coliform bacteria loading to surface waters and the activities of greatest concern are typically those associated with livestock operations:

- Agricultural livestock grazing in pastures deposit manure containing coliform bacteria onto land surfaces. This material accumulates during periods of dry weather and is available for washoff and transport to surface waters during storm events. The number of animals in pasture and the time spent grazing are important factors in determining the loading contribution.
- Processed agricultural manure from feeding operations is often applied to land surfaces and can provide a significant source of coliform bacteria loading. Guidance for issues relating to manure application is available through the University of Tennessee Agricultural Extension Service and the Natural Resources Conservation Service (NRCS).
- Agricultural livestock and other unconfined animals often have direct access to waterbodies and can provide a concentrated source of coliform bacteria loading directly to a stream and destroy the riparian vegetation holding the streambanks in place.

“Many streams within the Powell River Watershed suffer from varying degrees of streambank erosion. When stream channels are altered, banks can become unstable and highly erodible. Heavy livestock traffic can also severely disturb banks. When large tracts of land are cleared of vegetation (especially trees) and replaced with impermeable surfaces like asphalt and rooftops, the large increases in the velocities and volumes of storm water runoff can also overwhelm channel and bank integrity because destabilized banks contribute to sediment loadings and to the loss of beneficial riparian vegetation. Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams, like Davis Creek and its tributaries, could benefit from these types of projects. Some methods or controls that might be necessary to address common problems are:

- Re-establish bank vegetation (*Davis Creek, Russell Creek*).
 - Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry (*Davis Creek, Cawood Branch*).
 - Limit cattle access to streams and bank vegetation (*Cawood Branch, Russell Branch*).”
- (Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007)

Table 2: Estimated Population in the Watershed. (*Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007*)

County	COUNTY POPULATION			Portion of Watershed (%)	ESTIMATED POPULATION IN WATERSHED			% Change (1990-2000)
	1990	1997	2000		1990	1997	2000	
Campbell	35,079	37,878	39,854	6.15	2,156	2,328	2,450	13.6
Claiborne	26,137	28,963	29,862	7.22	1,888	2,093	2,157	14.2
Union	13,694	15,956	17,808	0.05	6	7	8	33.3
Total	74,910	82,797	87,524		4,050	4,428	4,615	14.0

Table 3: Livestock estimates in the Davis Creek Watershed. (*Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007*)

Livestock Counts					
Beef Cattle	Cattle	Milk Cows	Chickens (Layers)	Hogs	Sheep
4,133	7,974	177	7	5	23

From the information provided and the experience of the Claiborne County Soil Conservation District and its partners, we have set the following goals to make significant progress towards remediation of nonpoint source pollution in the Davis Creek Watershed including its main tributary Cawood Branch.

Within the Davis Creek Watershed:

- Total Miles of Stream: 222
- Total Miles of Impaired Streams: 116 miles of impaired streams as defined by the Tennessee Department of Environment 303(d) lists of streams that violate water quality standards and/or don't meet their designated use.
- Total Estimated working farms: 300
- Desired participation level: 60 producers (20% of the total working farms)
- Linear miles of streambank that needs remediation: 116
- Watering Systems to be installed: 45
- Heavy Use Area Protection: 60,000 square feet (25 @ 2,400 square feet)
- Pipeline: 90,000 feet (45 watering systems x 2,000 feet per system)
- Fence: 52,000 feet
- Water Control Basins: 4 or 1,600 cu. yds. (based on 400 cubic yards per)
- Critical Area Plantings: 10 acres
- Streambank/Shoreline Protection: 40 feet
- Livestock Exclusion (Protected Riparian Buffer): 52,000 feet or 35.8 acres (based on an average width of 30 feet)
- Access Road: 2,000 feet

- Riparian Forest Buffer: 52,000 feet or 35.8 acres (based on an average width of 30 feet)
- Prescribed Grazing: 4,800 acres (30% of the estimated 4,978 acres of grassland and 11,098 acres of pasture/hay land in the Davis Creek Watershed).

II. An estimate of pollutant load reductions expected from management measures.

Due to the difficulties of precisely predicting the performance of management measures over time, we are using the Tennessee NPS Program – Pollutant Load Reduction Estimation Tool to predict the effect of our BMP implementation program on the system.

Table 4: Total estimated N reduction in pounds per year

BMP Name	NRCS Code	Amount	Unit	N Reduction Factor	Estimated Reduction in N per year	Unit
Watering System	614	45	each	70.23	3,160	lbs. N/unit/year
Heavy Use Area	561	60,000	sq. ft.	0.09	5,400	lbs. N/sq. ft/year
Pipeline	516	90,000	feet	0.13	11,700	lbs. N/foot/year
Fence	382	52,000	feet	0.25	13,000	lbs. N/foot/year
Water and Sediment Control Basin	638	4	each	199.41	798	lbs. N/basin/year
Critical Area Planting	342	10	Acres	100.04	1,000	lbs. N/acre/year
Streambank/Shoreline Protection	580	40	Feet	1.75	70	lbs. N/foot/year
Livestock Exclusion	472	52,000	Feet	0.11	5,720	lbs. N/foot/year
Access Road	560	2,000	Feet	0.37	740	lbs. N/foot/year
Riparian Forest Buffer	391	52,000	Feet	0.28	14,560	lbs. N/foot/year
Prescribed Grazing	528	4,800	acres	0.408	1,958	lbs. N/foot/year

Table 5: Total estimated P reduction in pounds per year

BMP Name	NRCS Code	Amount	Unit	P Reduction Factor	Estimated Reduction in P per year	Unit
Watering System	614	45	each	5.88	265	lbs. P/unit/year
Heavy Use Area	561	60,000	sq. ft.	0.01	600	lbs. P/sq. ft/year
Pipeline	516	90,000	feet	0.02	1,800	lbs. P/foot/year
Fence	382	52,000	feet	0.02	1,040	lbs. P/foot/year
Water and Sediment Control Basin	638	4	each	33.92	136	lbs. P/basin/year
Critical Area Planting	342	10	acres	13.56	136	lbs. P/acre/year
Streambank/Shoreline Protection	580	40	feet	0.17	7	lbs. P/foot/year
Livestock Exclusion	472	52,000	feet	0.01	520	lbs. P/foot/year
Access Road	560	2,000	feet	0.03	60	lbs. P/foot/year
Riparian Forest Buffer	391	52,000	feet	0.02	1,040	lbs. P/foot/year
Prescribed Grazing	528	4,800	acres	0.227	1,090	lbs. P/foot/year

Table 6: Total estimated Sediment reduction in tons per year

BMP Name	NRCS Code	Amount	Unit	Sediment Reduction Factor	Estimated Reduction in Sediment per year	Unit
Watering System	614	45	each	0.004	0	tons/unit/year
Heavy Use Area	561	60,000	sq. ft.	0.002	120	tons/sq. ft/year
Pipeline	516	90,000	feet	0.006	540	tons/foot/year
Fence	382	52,000	feet	0.006	312	tons/foot/year
Water and Sediment Control Basin	638	4	each	6.109	24	tons/basin/year
Critical Area Planting	342	10	acres	0.055	1	tons/acre/year
Streambank/Shoreline Protection	580	40	feet	0.047	2	tons/foot/year
Livestock Exclusion	472	52,000	feet	0.001	52	tons/foot/year
Access Road	560	2,000	feet	0.004	8	tons/foot/year
Riparian Forest Buffer	391	52,000	feet	0.002	104	tons/foot/year
Prescribed Grazing	528	4,800	acres	0.333	1,598	tons/foot/year

Based on our BMP goals and the outcomes in Tables 4, 5 & 6, we can eventually expect the following reductions once all goals are met.

- A. Total estimated N reduction: 58,107 lbs. /year
- B. Total estimated P reduction: 6,692 lbs. /year
- C. Total estimated Sediment reduction: 2,761 tons /year

III. A description of the nonpoint source management measures that will need to be implemented to achieve load reductions in element 2, and a description of the critical areas in which those measures will be needed to implement this plan.

The Claiborne County Soil Conservation District invasions a unique approach to watershed protection, through the use of resources available to strategically target the stresses and stressors of the Davis Creek system. Besides the BMP implementation goals we see the need to consider the following measures to achieve Davis Creek Watershed Aquatic Habitat Protection:

- **Effective Partner Coordination:** The Claiborne County Soil Conservation District (CCSCD), along with NRCS, Clinch Powell RC&D, The Nature Conservancy have committed their assistance in designing, implementing, and monitoring completion of BMP projects. Additionally, the CCSCD will draw support from partners on other important activities in the project area such as ambient water quality monitoring, TMDL development, stream bank stabilization and land protection. Some of the expected partners include: Clinch Powell Clean Rivers Initiative (CPCRI), Tennessee Healthy Watersheds Initiative (THWI), US Geological Survey (USGS), US Environmental Protection Agency (EPA), US Fish and Wildlife Service (USFWS), Tennessee Department of Environment and Conservation (TDEC), Tennessee Department of Agriculture- Division of Forestry (TDF), Tennessee Wildlife Resource Agency (TWRA), Tennessee Stream Mitigation Program (TSMP), Tennessee Valley Authority (TVA), Lincoln Memorial University (LMU), Clinch Powell Clean Rivers Initiative (CPCRI), and the Claiborne County Government.

- **Innovative Science:** Using the best science and spatial analyses available, we propose to identify *Priority Agricultural Restoration Zones & Priority Agricultural Restoration Areas* in the Davis Creek watersheds. These zones/areas will be incorporated with other identified priority parameters into a *BMP Implementation Priority Ranking System*, to strategically direct project funding to those lands with greatest restoration needs and/or greatest potential ecological benefits. The CCSCD will work with key partners to identify the best parameters and ranking system, but envision that these zones/areas will become the primary ranking parameter (where points are awarded based on proximity of each applicant's land to these zones), supplemented with field-based assessments, desktop GIS analyses, and/or expert knowledge of tract-level conditions and application logistics. This approach will allow us to rank the potential project on their contribution to the remediation of the resource concern and allow a more strategic approach to watershed protection through BMP implementation.
- **Local Economic Limitations:** Working in one of the poorest areas in the nation, poses a set of challenges for conservation. When a landowner is worried about feeding his/her families they have little time to be concerned about aquatic biodiversity or globally rare river species. This program will not only provide funding to assist the landowner, which would otherwise not have the means to complete these BMP practices, but also stimulate the local economies including farm supply and construction material vendors, equipment operators, and construction companies.
- **Local and Regional Outreach Potentials:** Being one of the last great strongholds for freshwater mussels, the Powell River and its tributaries have long been a focal area for habitat protection and sediment reduction. The project will have great exposure to both the scientific and public communities who spend time in the area and are very interested in the long-term protection of the watershed. Local educational opportunities will also allow us to inform the Davis Creek landowners on the ways and whys of BMP implementation.

IV. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

Agriculture continues to be the main source of income for many of the residents in the Davis Creek Watershed. Historically, burley tobacco was the large source of farm revenue but recently less tobacco is being cultivated. The steep hilly topography is unsuited for large scale crop production resulting in a large portion of the land area being utilized for livestock operations. In attempts to subsidize the income from tobacco, many farmers are increasing their beef cattle herds and some even converting over to horses, sheep and goats. From a water quality standpoint, these agricultural trends have resulted in a reduction of tobacco related chemical loading and an increase in pathogen loading. An effective BMP implementation program can help alleviate many of these threats to this sensitive aquatic system.

Table 7: Agricultural BMP installation needs and cost based on project goals.

BMP	Amount	Unit	Cost per Unit *	Total Cost
Watering System	45	Each	\$5,000/each	\$225,000
Heavy Use Area	60,000	Sq. ft.	\$3.89/sq. ft.	\$233,400
Pipeline	90,000	Feet	\$3.74/ft.	\$336,600
Fence	52,000	Feet	\$2.44/ft.	\$126,880
Water and Sediment Control Basin	1,600	Cu. yds.	\$3.22/cu. yd.	\$5,152
Critical Area Planting	10	Acres	\$692.88/acre	\$6,928
Streambank/Shoreline Protection	489	Square Feet	\$54.78/sq. ft.	\$26,787
Access Road	2,000	Feet	\$13.73/ft.	\$27,460
Riparian Forest Buffer	35.8	Acres	\$1,117.33/ft.	\$40,000
Prescribed Grazing	4,800	Acres	\$12.04/acre	\$57,793

* Cost rates are based on 2021 NRCS EQIP Cost list for Historically Underserved Producers.

Table 8: Total estimated cost for remediation of nonpoint source pollution in the Davis Creek Watershed.

POLICY 03 Object Line-item Reference	EXPENSE OBJECT LINE-ITEM CATEGORY ¹	TOTAL PROJECT
3	Salaries Benefits & Taxes ² – of grantee employees	50,000
4, 15	Professional Fee, Grant & Award ² – for subcontracted work and BMP materials purchased by others	1,086,000
5, 6, 7, 8, 9, 10	Supplies (including BMP materials purchased by the grantee), Telephone, Postage & Shipping, Occupancy, Equipment Rental & Maintenance, Printing & Publications ²	10,000
11, 12	Travel, Conferences & Meetings	5,000
13	Interest ²	0.00
14	Insurance	0.00
16	Specific Assistance to Individuals	0.00
17	Depreciation	0.00
18	Other Non-Personnel	0.00
20	Capital Purchase	0.00
22	Indirect Cost	108,600
24	In-Kind Expense	0.00
25	GRAND TOTAL	1,259,600

Many of the organizations working in the Davis Creek watershed do not have secured yearly budgets, so a full accounting of available funding for this project is difficult to attain. A continued dialog needs to be maintained with these additional supporting partners, to make sure the Davis Creek Watershed continues to be a priority for funding. Although some of the funding is secure, others are still uncertain, but each one is important for the protection of the Davis Creek Watershed.

Current Conservation Efforts in the Clinch-Powell Watershed (which includes Davis Creek):

- Tennessee Department of Agriculture- Agriculture Resources Division (TDA-AR) – Agriculture Resources has been one of the most stable partners in watershed protection. Each year the Claiborne County Soil Conservation Districts receive approx. \$70,000 in funding and a large portion of this is spent in the Clinch-Powell Watershed.
- Natural Resource Conservation Service, Environmental Quality Incentives Program (EQIP) – Over the past couple years, NRCS has provided over \$500,000 for BMP implementation in the Clinch-Powell Watershed. Given the uncertainty of government funding we are unsure what allocations will be available, but we trust similar numbers in the years to come.
- Natural Resource Conservation Service, Regional Conservation Partnership Program (RCPP) – Over the past four years, NRCS has provided over \$4.2 million for BMP implementation in the Clinch-Powell Watershed. Additionally, in 2021 the area has been awarded another \$2 million to continue the efforts.
- Tennessee Wildlife Resources Agency (TWRA): TWRA has a history of investments into the protection of the Clinch-Powell Watershed. Through funding to the RC&D they have annually contributed \$9,000 per year in a per year agreement.
- The Nature Conservancy (TNC): TNC has a long history of working with partners in the Upper Clinch-Powell Watershed and beyond. They are involved in various endeavors to protect the Clinch and Powell Watershed and continue to invest resources into the protection of the Clinch-Powell aquatic biodiversity.
- US Fish and Wildlife Service (USFWS): They have made great investments in the Clinch-Powell Watersheds over the years. Currently they have a long-term agreement with the Clinch-Powell RC&D which is amended yearly to provide additional funds. This is a non-matching federal agreement which could allow for non-federal matching funds to the 319 program through landowner cost-share investments in the projects.

Potential Conservation Efforts in the Davis Creek Watershed:

- Natural Resource Conservation Service: Regional Conservation Partnership Program (RCPP) - RCPP promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements. Currently there is an RCPP application under review for the Clinch-Powell Watershed of Tennessee and Virginia. Over the past four years, NRCS has provided over \$4.2 million for BMP implementation in the Clinch-Powell Watershed. Additionally, in 2021 the area has been awarded another \$2 million to continue the efforts.

Over the years the Davis Creek Watershed has benefited from the expertise and assistance of various organizations working in the watershed. These are other agencies involved in some aspect of Clinch-Powell Watershed protection.

- US Geological Survey (USGS)
- US Environmental Protection Agency (EPA)
- Tennessee Department of Environment and Conservation- Division of Water Pollution Control (TDEC-WPC)
- Tennessee Department of Agriculture- Division of Forestry (TDF)
- Tennessee Wildlife Resource Agency Landowners Incentives Program (TNLIP)

- Tennessee Stream Mitigation Program (TSMP)
- Tennessee Valley Authority (TVA)
- Lincoln Memorial University (LMU)
- Virginia Tech (VT)
- Clinch Powell Clean Rivers Initiative (CPCRI)
- Clinch-Powell Resource Conservation and Development Council, Inc. (RC&D)
- The Nature Conservancy (TNC)
- The Natural Resources Conservation Service (NRCS)
- Claiborne County Soil Conservation District (CCSCD)
- Claiborne County Government

V. An information and education component used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

There is a great need to educate the public concerning the reasons for and ways of protecting the resources of the Davis Creek Watershed. Strategies for completing the educational goals of this Watershed Based Plan will include development and distribution of informative fliers, advertisement of the program through local avenues, and participation in educational events.

There are several existing educational opportunities at the local and regional level that include the Davis Creek Watershed. We anticipate the continued support of these events and plan to administer others as needed. Current educational endeavors include:

- Food City Farm Day – As a sponsor of the event, the Claiborne County Soil Conservation District helps educate elementary school children on the needs for farming and ways to protect clean water.
- Public information fliers - are distributed as funds allow and help to inform the public concerning watershed protection and pollution prevention.
- Adult Leadership Classes - The purpose of these events is to educate adults, in leadership roles in Claiborne County, concerning aspects of the community which are deemed vital for position as community leaders. Each one-day session includes various topical discussions including law enforcement, healthcare, business development and environmental resources. Our role will be to demonstrate the benefits of BMP placement on water quality and their effects on the biological community. Approximately 30 community leaders take part in each of the events each year.
- Farm Tours –The Claiborne County Soil Conservation District hosts farm field days throughout the year. This one-day event allows local landowners to visit a farm where BMP practices have been previously implemented and see the final results along with the benefits to the environment and farming operations.
- There are various websites dedicated to informing the public about protection of the Clinch-Powell Watershed. These could be used to report on the concerns and accomplishments of the Davis Creek Watershed Restoration Program. Some of the Web sites are:
 - Clinch-Powell RC&D: (<http://www.clinchpowell.net>)
 - The Nature Conservancy: (<http://Nature.org>)
 - The Clinch Powell Clean Rivers Initiative: (<http://cpcri.net/>)

- Tennessee Healthy Watersheds Initiative:
(<http://www.tn.gov/environment/article/wr-ws-tennessee-healthy-watershed-initiative>)

VI. *Schedule for implementing the nonpoint source management measures identified in this plan that is reasonably expeditious.*

Drawing on the experience of various organizations, working in the watershed, we plan to implement a series of BMP projects designed to reduce or eliminate sedimentation, pathogens, and/or other non-point source pollution loading into the Davis Creek Watershed. All applications, for this program, must show direct water quality improvement and will be graded on a competitive base in accordance with their overall cost, complexity; and their benefits to water quality, in-stream habitat, and the aquatic biodiversity.

The primary natural resource concerns to be addressed will be Water Quality Degradation and Inadequate Habitat for Fish and Wildlife. Within these broad categories, we will more specifically focus on reducing sedimentation and pathogen loading into the system. The partners involved in this project identified these concerns through a review of multiple watershed studies including but not limited to: (1) Clinch Powell Clean Rivers Initiative Science Plan results (CPCRI, 2008-2015), (2) Clinch-Powell Healthy Watersheds Assessment (EPA, 2015), (3) Clinch-Powell Ecological Risk Assessment (Diamond et. al, 2001), and multiple Total Maximum Daily Load plans published for sub-sections of the watershed.

Following is the sequence of events envisioned for successful administration of the Davis Creek/Cawood Branch Watershed Restoration Project:

1. GIS Based Model – Using the best science and spatial analyses available, we will identify *Priority Agricultural Restoration Areas* in the Davis Creek Watershed. These zones/areas will be incorporated with other parameters into a BMP Implementation Priority Ranking System, to strategically direct project funding to those lands with greatest restoration needs and potential. Supplemented with field-based assessments, desktop GIS analyses, and expert knowledge of tract-level conditions and application logistics, TNC will provide these results to the Project Partners, via a GIS database and hard copy maps. The results of the GIS model will drive selection of individual landowner projects funded by this 319 project.
2. Develop Priority NRCS Conservation Practices – The RC&D and the project partners will identify those practices that contribute greatest to the alleviation of agriculturally related stressors to the Davis Creek Watershed. These practices will be the focus of our outreach efforts and project selection.
3. Priority Area Development – Using the results of the GIS model, current TMDL information, 303d lists for impaired waterways, guidance from the project partners, and other pertinent information, the CC SCD will rank stream drainages within the Primary Project Area. A set of the highest-ranking stream drainages will become our priority areas (i.e. “*Priority Agricultural Restoration Areas*”) for implementation of agriculture BMP projects funded by the 319 grant.
4. Priority Area Material Development – Once the priority areas are established, the CC SCD will develop maps and other information to be distributed to the local NRCS office. These maps will support landowner recruitment and outreach endeavors.
5. Landowner Recruitment – the CC SCD will actively pursue landowner involvement throughout the Primary Project area with emphasis and focus on the *Priority Agricultural Restoration Areas*.

6. Farm Plan Development – When a landowner becomes interested in the program, the CC SCD and NRCS will assist in the development of a whole farm plan which will address our primary resource concerns of water quality degradation and inadequate habitat for fish and wildlife.
7. Contract and Approval Documentation– the CC SCD will assist the landowner in applying for required permits and completing all paperwork associated with pre-project approval.
8. BMP Project Implementation – the CC SCD will monitor the progress of the landowner’s BMP implementation making sure the landowner adheres to the plans and goals of the Whole Farm Plan.
9. Post-Project Documentation – the CC SCD will assist the landowner with project closeout including BMP installation measurements, documentation, photographs, etc. This will lead to the landowner’s request for reimbursement and project completion.
10. BMP Monitoring – The CC SCD will coordinate with NRCS, Division of Forestry, Farm Service Agency, TN Valley Authority, The Nature Conservancy, US Fish and Wildlife Service, and others implementing Agricultural BMPs in the Davis Creek Primary Project Area, and record the placement of BMPs by all our partners and update our Primary Project Area Maps. As possible, we will analyze available ambient water quality data collected by Tennessee water quality monitoring organizations to assess the collective level of positive impact Agricultural BMPs are having in our priority areas.

Table 9 –Proposed timeline of the Davis Creek Watershed Based Plan.

Fiscal Year	FY21				FY22				FY23				FY24				FY25				
	Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Develop BMP Priority Ranking System																					
A) Develop GIS model																					
B) Identify Priority Aquatic Habitat Zones																					
C) Solicit partner review of GIS model																					
D) Export Results of GIS model to partners																					
E) Annually Review the GIS model and modify as needed																					
2. Organize Partners																					
A) Organize a diverse set of partners																					
B) Review final GIS model including priority areas																					
C) Identify Priority Agriculture Restoration Zones																					
D) Develop Priority BMP Implementation List																					
E) Identify Priority Land Parcels for protection/restoration																					
F) Identify additional conservation efforts																					
3. Agricultural BMP Installation																					
A) Develop outreach materials																					
B) Distribute outreach materials																					
C) Participate in farm visits																					
D) Assist landowners with project enrollment																					
E) Enroll farms into the 319 or another Farm Bill Program																					
4. Communicate Program Progress and Results																					
A) Submit Reports as specified by 319 program																					
B) Report progress through partner resources																					
C) Report to and update CPCRI partners through website and/or annual meeting																					

VII. A description of interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

Milestone #1- Review BMP Implementation Priority Ranking System: Using the Nature Conservancies GIS Priority Ranking System as a guide, we will begin the prioritization and recruitment of the specific landowner projects.

- A. Review GIS Model - Collect and analyze available, relevant biological, land use, aquatic species, and water quality data.

Milestone #2- Organize Partner Resources: Organize a diverse set of partners (i.e. NRCS, USFWS, TWRA, TNC, RC&D etc.), which may assist with the implementation of agricultural BMPs.

- A. Organize a diverse set of partners which will assist in the planning and implementation of the BMP projects which meet the goals of this project.
- B. Identify Priority Agriculture Restoration Zones – those areas of the primary project areas that are in greatest need of agriculture BMP implementation.
- C. Develop a Priority BMP Implementation List – Those BMPS which show the greatest potential for remediation of our NPS targets.
- D. Identify Priority Land Parcels - Using the BMP Priority Ranking System, and guidance from local partners, identify those land parcels which show the greatest need for the installation, enhancement and/or protection of riparian buffer areas and other BMPs.

Milestone #3- Agricultural BMP Installation: Drawing on the BMP experience of various organizations working in the watershed, we plan to implement a series of BMP projects designed to reduce or eliminate NPS loading into the Davis Creek watershed and its tributaries located in the Priority Project Area.

- A. Conduct targeted landowner outreach including distribution of fliers, farm tours, and individual landowner visits.
- B. Distribute outreach materials throughout the watershed to solicit landowner involvement in the program.
- C. Install BMPs with 319 funding with willing landowners in high priority areas as defined by our GIS model.
- D. Within the Primary Project Area, enroll farms into this or another Farm Bill program.

Milestone #5- Communication of Project Progress and Results: The CC SCD will periodically be reporting on BMP project implementation and results as defined by the final 319 contract.

- A. Submit Progress Reports as specified in the 319 contract.
- B. Annually Report (from October 1 of the previous year to September 30 of the present calendar year) on the progress of the grant through the standard 319 “2x4” report.
- C. Annually report the progress of the program through the local resources. (NRCS, SCD BOD, RC&D BOD, etc.)
- D. Submit Final Closeout Report as specified in the 319 contract.

VIII. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.
Public Education

The Davis Creek Watershed Restoration Project is a multi-year, multi-agency endeavor to improve the water quality and aquatic habitat throughout the watershed. Since this is a long-term endeavor, and conditions change, we have developed the following criteria to be implemented on a per year basis so success can be effectively measured. Numbers also reflect the use of all resources available including EPA 319 funds, partner funds and other Farm Bill Program funding.

A. Agricultural BMP Cost-Share Program

Drawing on our BMP experience along with that of the Clinch-Powell RC&D, The Nature Conservancy, NRCS, we plan to implement a series of BMP projects designed to reduce pathogen loading into the Davis Creek Watershed. All applications will be graded on a competitive base in accordance with their overall cost, complexity, and benefit to the objectives of this watershed-based plan. Each project must show direct water quality improvement, with strategies to measure effectiveness and long-term success.

Success Indicators - Per Year	Target
Contact landowners concerning the benefits of agricultural and residential BMP implementation.	80 landowners
Conduct landowner visits to complete needs assessments and negotiate BMP implementation to reduce NPS pollution.	80 landowners
Complete BMP projects to reduce NPS pollution in the Davis Creek Watershed.	60 landowners
Watering System	45 systems
Heavy Use Area Protection	60,000 Sq. Ft.
Pipeline	90,000 Ft.
Fence	52,000 Ft.
Water Control Basin	1,600 cu. Yds.
Critical Area Planting	10 acres
Streambank/Shoreline Protection	40 Ft.
Access Road	2,000 Ft.
Riparian Forest Buffer	35.8 acres
Prescribed Grazing	4,800 acres

B. Education and Outreach

There is a great need to educate the public concerning the reasons for and ways of protecting the resources of the Davis Creek Watershed. Strategies for completing the educational goals of the MCRWRP will include development and distribution of informative fliers, advertisement of the program through local avenues, and participation in educational events.

Success Indicators - Per Year	Target
Develop and distribute educational fliers to target audiences throughout the watershed.	50 Fliers
Educational programs for Adults about the importance and ways of watershed protection.	50 Adults
Educational programs for Children about the importance and ways of watershed protection.	200 Children

C. *Water Quality Improvements*

Water has many uses which are in the public interest are reasonable and necessary. Using the Tennessee NPS Program – Pollutant Load Reduction Estimation Tool to predict the effect of our BMP implementation program on the system, the following indicators will be used to determine success.

Success Indicators - Per Year	Target
Total estimated N reduction	58,107 lbs. /year
Total estimated P reduction	6,692 lbs. /year
Total estimated Sediment reduction	2,761 tons /year

D. *Habitat Improvement*

Much of the sediment loss throughout the watershed can be attributed to the poor health of the streamside riparian areas. As a goal of this Restoration Plan, we will attempt to restore or enhance riparian areas throughout the watershed, through the enhancement and/or protection of streamside riparian areas.

“Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack any type of vegetated buffers along stream corridors is a problem in some areas of the Powell River Watershed, due both to agricultural and residential/commercial land uses. Impacted streams that could benefit from the establishment of more extensive riparian buffer zones include Cawood Branch, Russell Branch, and Davis Creek.” (Powell River Watershed of the Tennessee River Basin, Water Quality Management Plan, TDEC 2007)

Success Indicators - Per Year	Target
Install Livestock Exclusion Fencing to prevent damage to streamside riparian areas.	52,000 Ft.
Install, protect and/or enhance Riparian Forest Buffers to stabilize streambanks and reduce sediment loading into the aquatic system.	35.8 acres
Enroll riparian areas into long term conservation programs (i.e. TN Healthy Watersheds easement program, wetland mitigation, streambank mitigation, CRP, etc.)	30 acres

IX. *A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under element 8 immediately above.*

The Claiborne County Soil and Water Conservation District will coordinate with TDEC as they continue to monitor Davis Creek Watershed. As information is available, the CC SCD will update our Primary Project Area Maps to ensure we are working in the most critical areas of the watershed.

Information taken from the Powell River TMDL.

These tables only include the portions of the watershed that pertain to Davis Creek or its tributaries.

Table 10: STORET Water Quality Monitoring Stations in the Powell River Watershed.

NPSWRD, National Park Service Water Resources Division; TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	POWEL067.8CL	Powell River @ RM 67.8	060102060304
TDECWPC	CAWOO000.2CL	Cawood Branch @ RM 0.2	060102060307
TDECWPC	DAVIS011.6CL	Davis Creek @ RM 11.6	060102060307
TDECWPC	DAVIS014.6CL	Davis Creek @ RM 14.6	060102060307
TDECWPC	DAVIS016.2CL	Davis Creek @ RM 16.2	060102060307
TDECWPC	DAVIS018.0CL	Davis Creek @ RM 18.0	060102060307
TDECWPC	DAVIS020.5CL	Davis Creek @ RM 20.5	060102060307
TDECWPC	DAVIS022.6CL	Davis Creek @ RM 22.6	060102060307
TDECWPC	DAVIS024.1CL	Davis Creek @ RM 24.1	060102060307

Table 11: CAFO Sites in the Tennessee Portion of the Powell River Watershed.

FACILITY NUMBER	PERMITEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000006	Hickory Corner Dairy	Claiborne	Dairy	Davis Creek	060102060304

Table 12: Tennessee Rivers Assessment Project, Stream Scoring in the Powell River Watershed.

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Davis Creek	3			Martin Creek			
Dossett Creek				Mulberry Creek	3		
Gap Creek	2		2	Old Town Creek	2		
Indian Creek	1		2	Powell River	1	2	2
Leadmine Bend creek				Russell Creek	2		

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Powell River Watershed.

Categories: NSQ, Natural and Scenic Qualities
 RB, Recreational Boating
 RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
 2. Regional Significance; Good Fishery
 3. Local Significance; Fair Fishery
 4. Not a significant Resource; Not Assessed

Information taken from the Powell River TMDL (continued).

Table 13: Streams Not Supporting Fish and Aquatic Life designated use in the Tennessee Portion of the Powell River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Davis Creek	TN06010206026_3000	3.6
Davis Creek	TN06010206026_4000	2.6
Russell Branch	TN06010206026_0200	3.5

Table 14: Streams Fully Supporting Fish and Aquatic Life designated use in the Tennessee Portion of the Powell River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Blairs Creek	TN06010206006_0300	6.2
Canoe Branch	TN06010206007_0200	2.8
Cawood Branch	TN06010206026_0100	5.2
Cedar Creek	TN06010206028_1000	13.3
Davis Creek	TN06010206026_5000	1.5

Table 15: FY 2018 NRCS Conservation Stewardship Program (CSP) Priority Areas for TN.

Powell (06010206) Watersheds:

12-Digit HUC	Watershed Name	County(s)
060102060302	Wallen Creek	Hancock
060102060304	Yellow Creek-Powell River	Hancock
060102060305	Martin Creek	Hancock
060102060306	Mulberry Creek	Claiborne, Hancock
060102060307	Fourmile Creek-Powell River	Claiborne, Hancock
060102060401	Russell Creek	Claiborne
060102060402	Cox Creek-Powell River	Claiborne, Hancock
060102060403	Indian Creek	Claiborne, Hancock
060102060404	Gap Creek-Powell River	Claiborne
060102060405	Slate Creek-Norris Lake	Claiborne
060102060406	Big Branch-Norris Lake	Campbell, Claiborne, Union
060102060407	Davis Creek	Campbell, Claiborne
060102060408	Powell River-Norris Lake	Campbell, Union

Table 16: Rare Species of the Davis Creek Watershed.

Mollusks

Species	Common Name	Global Rank	Tennessee State Rank
<i>Villosa vanoxemensis</i>	Mountain Creekshell	G4	S4

Gastropod

Species	Common Name	Global Rank	Tennessee State Rank
<i>Triopopsis claibornesis</i>	Claiborne Threetooth	G2	S2

Mammals

Species	Common Name	Global Rank	Tennessee State Rank
<i>Sorex cinereus</i>	Cinereus Shrew	G5	S4
<i>Sorex fumeus</i>	Smoky Shrew	G5	S4
<i>Mustela nivalis</i>	Least Weasel	G5	S2

Birds

Species	Common Name	Global Rank	Tennessee State Rank
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	G5	S1
<i>Tyto alba</i>	Barn Owl	G5	S3

*Information in Table 1.1 is based on various sources and was accumulated by TNC. The global, state and federal status for each species was compiled from NatureServe.(2006). Information concerning Mollusks and Fish are known to be at specific locations within this proposals area of work, while the other organisms are known from the area but due to their range we are unsure of their exact locations, and have historical sightings in the Davis Creek Watershed.

**Natural Heritage ranking system: G1 = 1 to 5 occurrences remaining, G2 = 6 to 20 occurrences remaining, G3 = 21 to 100 occurrences remaining, G4 = common and secure globally, TX = genus and species remain but subspecies is believed to be extinct, T2 = genus and species remain but the subspecies has 5-15 occurrences and could become extinct in 100 years.

^E Federally listed as endangered

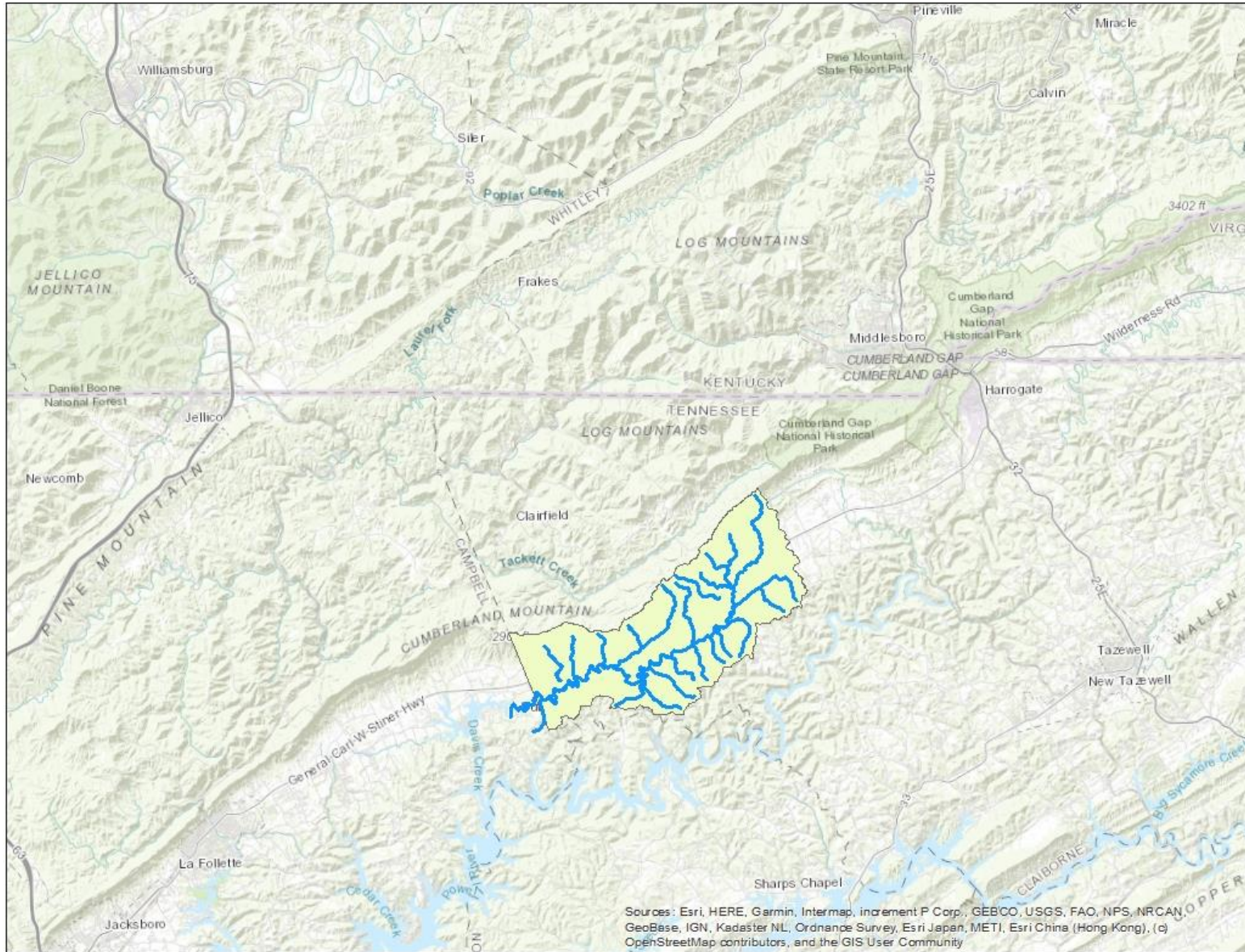
^T Federally listed as threatened

^C Candidate species for listing

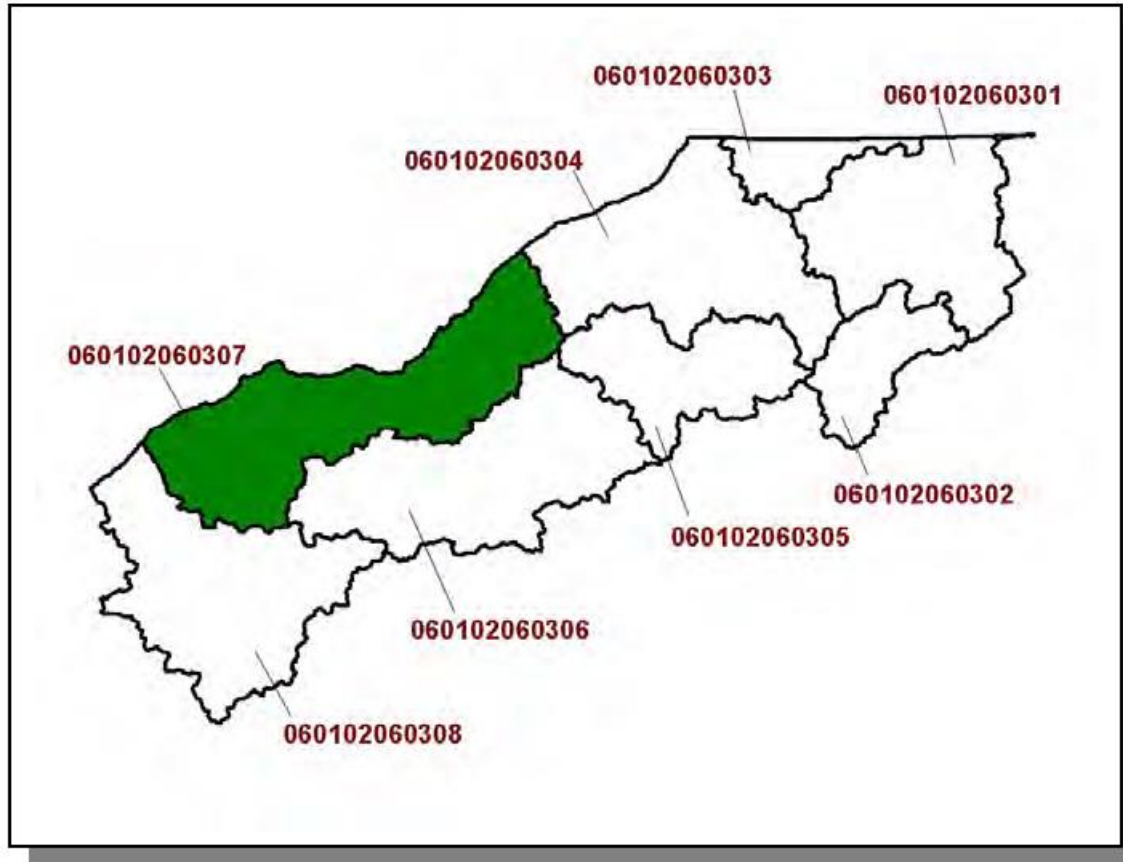
Table 17: Final 2020 List of Impaired and Threatened Waters. TDEC 2020

Stream segment ID	Stream Name	Waterbody Size	Cause of Impairment	TMDL Priority	Potential Source of Impairment
TN06010206026_0100	Cawood Branch	5.2	PHOSPHORUS, TOTAL	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0100	Cawood Branch	5.2	NITRATE/NITRITE (NITRITE + NITRATE AS N)	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0100	Cawood Branch	5.2	ALTERATION IN STREAM-SIDE OR LITTORAL VEGETATIVE COVERS	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0100	Cawood Branch	5.2	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0200	Russell Branch	3.5	NITRATE/NITRITE (NITRITE + NITRATE AS N)	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0200	Russell Branch	3.5	SEDIMENTATION/SILTATION	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0200	Russell Branch	3.5	PHYSICAL SUBSTRATE HABITAT ALTERATIONS	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_0200	Russell Branch	3.5	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_1000	Davis Creek	8	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_2000	Davis Creek	5.1	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_3000	Davis Creek	3.6	SEDIMENTATION/SILTATION	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_3000	Davis Creek	3.6	NITRATE/NITRITE (NITRITE + NITRATE AS N)	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_3000	Davis Creek	3.6	ESCHERICHIA COLI (E. COLI)	NA	ANIMAL FEEDING OPERATIONS (NPS)
TN06010206026_3000	Davis Creek	3.6	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_4000	Davis Creek	2.6	NITRATE/NITRITE (NITRITE + NITRATE AS N)	Low	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_4000	Davis Creek	2.6	NITRATE/NITRITE (NITRITE + NITRATE AS N)	Low	ANIMAL FEEDING OPERATIONS (NPS)
TN06010206026_4000	Davis Creek	2.6	SEDIMENTATION/SILTATION	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_4000	Davis Creek	2.6	ESCHERICHIA COLI (E. COLI)	NA	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN06010206026_5000	Davis Creek	1.5	ESCHERICHIA COLI (E. COLI)	Low	ANIMAL FEEDING OPERATIONS (NPS)

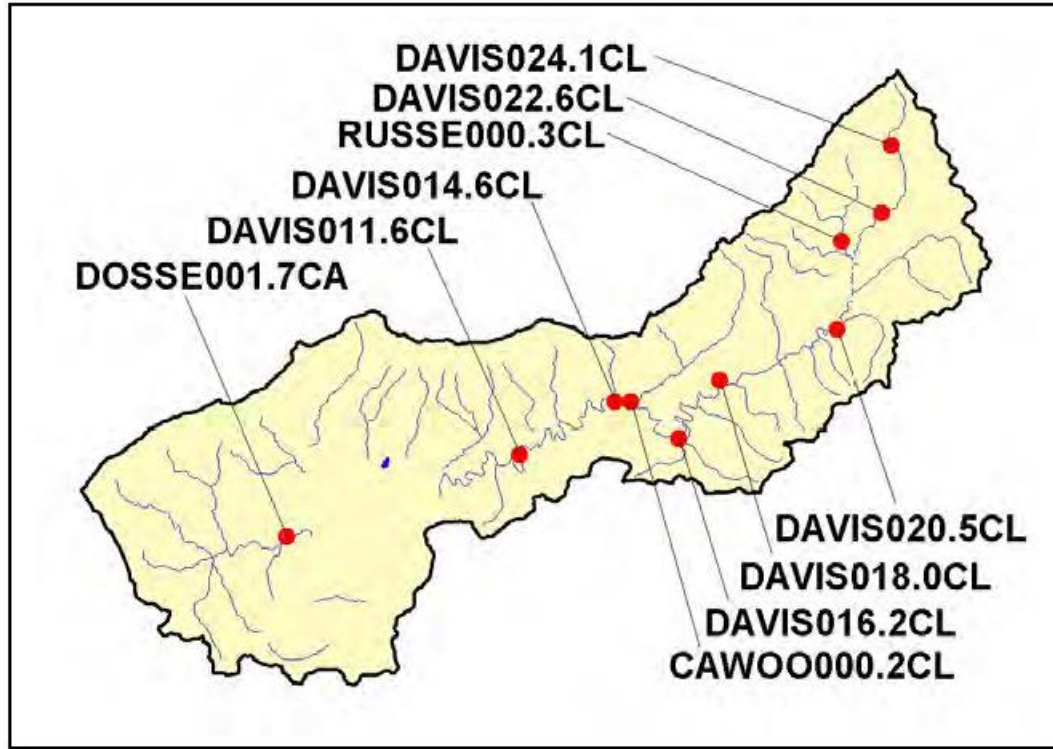
Map 1: Davis Creek/Cawood Branch Primary Project Area location.



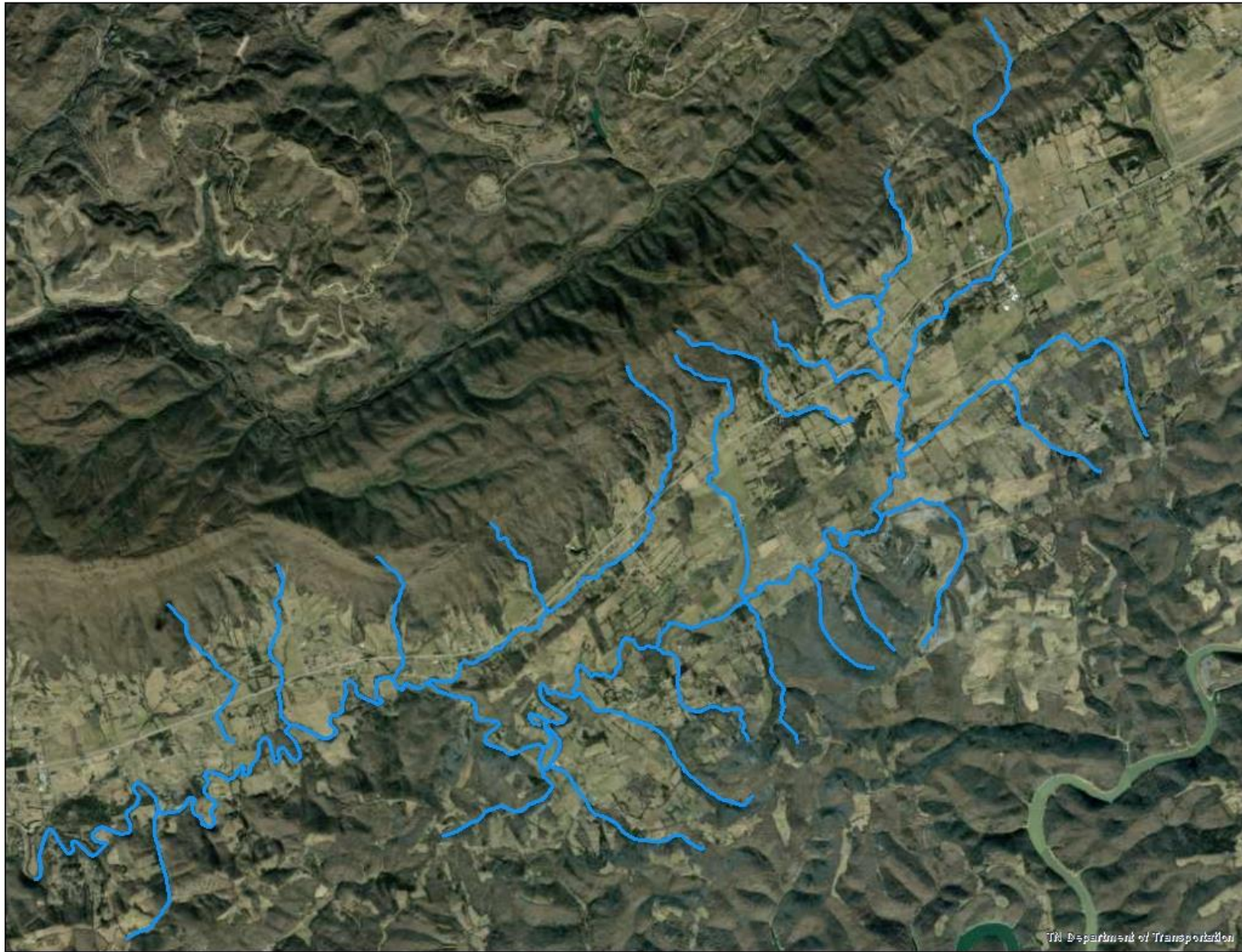
Map 2: Location of Davis Creek sub watershed (060102060307)



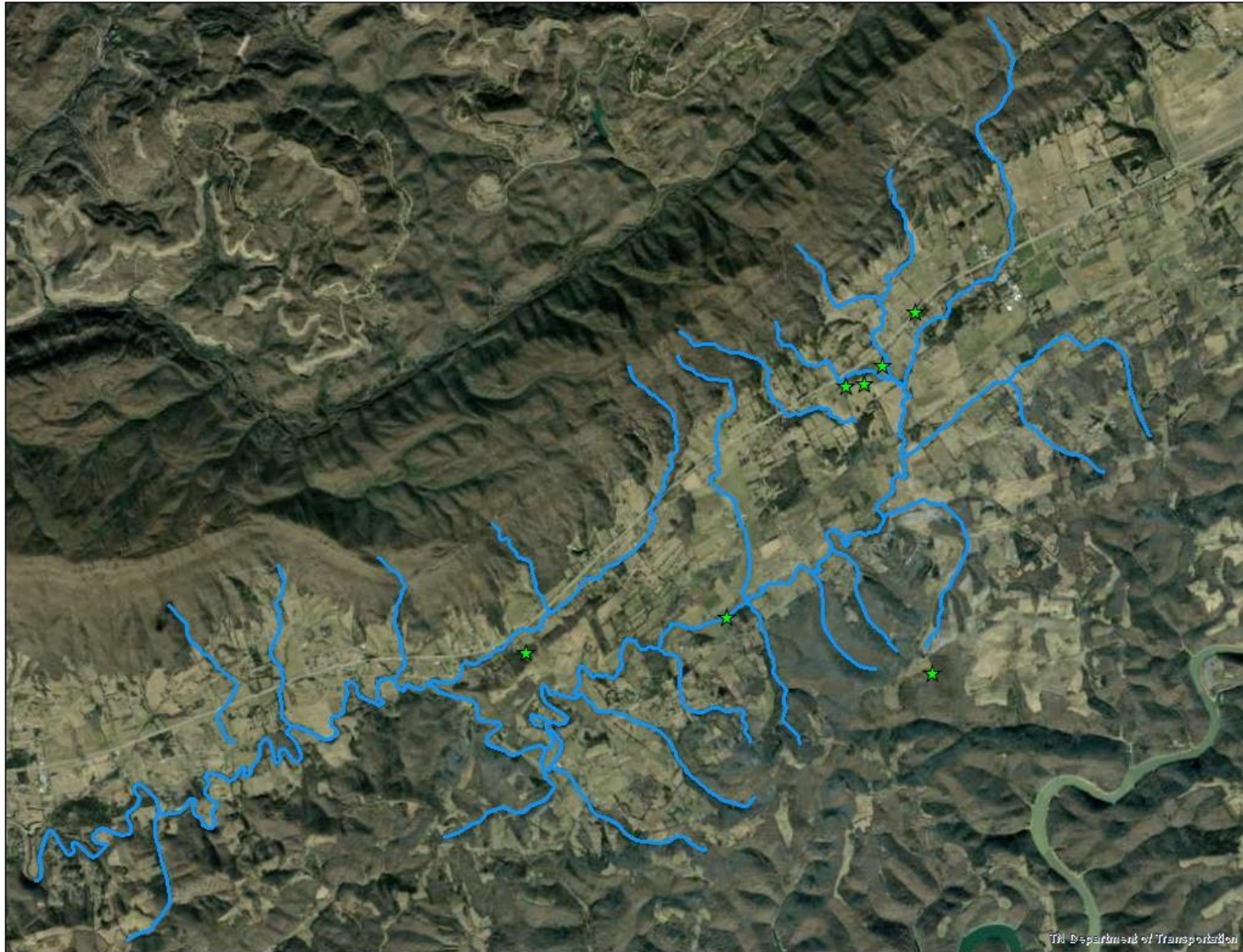
Map 3: Location of monitoring sites in the EPA STORET database in Davis Creek Watershed.



Map 4: Davis Creek/Cawood Branch Primary Project Area



Map 5: Davis Creek/Cawood Branch Watershed Element Occurrences (see Table 7 for details)



Map 6: Example of GIS based modeling.

