Lower Byrds Creek Watershed Management Plan

Stream Recovery Project
Obed Watershed Community Association
January 2010

1. Introduction

Lower Byrds Creek Watershed: The Lower Byrds Creek Watershed is defined as the watershed that feeds Byrds Creek below US Hwy 127. It lies primarily to the south and east of the City of Crossville, with most of the watershed outside the city limits but within its planning area. With the exception of the Three Mile Creek watershed which is roughly defined by Pigeon Ridge Road, Lantana Road and 127 S, the remainder of the Lower Byrds Creek is defined by 127 S on the southwest, Hwy 68 and Deep Draw Rd on the south, Milo Lehmert Hwy on the northwest, and US 70 on the north and northeast. It encompasses about half of the Cumberland Mountain State Park, a concentrated residential area in the Homesteads, some commercial development near the Peavine Rd exit on the interstate, and a large number of both active and inactive rock harvesting areas. A large portion of the watershed is still in agriculture (primarily pasture and hay fields) and forest, but there are clear impacts from human activities.

The Stream Restoration Project: The Stream Restoration Project (SRP) of the Obed Watershed Community Association began in February 2007 with initial funding through the TN Department of Environment and Conservation (TDEC). It continues its work with a small grant from the World Wildlife Fund (WWF). The project develops watershed management plans to restore and protect streams. The watershed plans reflect the values and concerns of watershed stakeholders, the results of watershed assessments, and current regulatory recommendations. Watershed Councils are organized for streams that flow into the Obed or its major tributary, Daddys Creek. Volunteers are recruited and trained to serve as citizen monitors (the Stream Team) to provide ongoing monitoring of water quality.
Technical Advisory Council: The SRP's Technical Advisory Committee (TAC) includes university researchers, watershed-management related state agencies and local government agencies. The TAC meets quarterly to guide the development of the watershed plans.

2. Management Practices

The methods and assessments used to develop the watershed plan included the following:

- Existing data was collected to determine the watershed boundary, 303(d) listings, existing water quality monitoring stations, and existing NPDES permit holders.
- The City of Crossville's aerial photos were used to determine existing land uses.
- A windshield survey of upland areas was conducted where neighborhoods and businesses are located to identify land use and problem areas. Roads within the watershed were driven to note its land uses and stream conditions at road crossings.
- A Visual Stream Assessment, using the Maryland protocol (adopted and approved by TDEC), was conducted for the entire watershed. This stream assessment is a semi-quantitative method that asks an investigator to assign a numeric score to various stream habitat or channel parameters by comparing what is seen at points along the stream to a series of descriptions. The numeric score is then used as a basis for classifying the stream's habitat quality.
- Baseline water quality data will be collected by a trained citizen Stream Team volunteer to determine water quality during base flow and storm events. Data will be collected on the water's temperature, pH, turbidity, conductivity and flow. Information from this sampling will be used to further develop the plan.

3.0 Watershed Goals and Recommendations

Byrds Creek is currently listed with the TN Department of Conservation and Environment (TDEC) as an impaired stream. However, detailed analysis had not been done by TDEC of the Lower Byrds Creek section to identify particular causes of impairment. This identification and analysis work by the Obed Watershed Community Association allows the development of this plan to target specific problems that were uncovered and actions that can be taken to reduce these impacts.

Goals

1. Reduce peak stormwater volumes to reduce bank erosion.
2. Improve and protect the stream buffers in certain areas to protect stream banks from erosion.
3. Repair and protect stream sections where banks are eroding.
4. Educate landowners about regulations regarding waste disposal and storage of old vehicles and toxic materials within the stream buffer zone.
5. Educate landowners about their responsibilities and rights regarding maintaining the stream banks on their property.
6. Work with landowners and TDEC to explore how to minimize sediment run-off from both active and abandoned rock harvesting sites.

The County and City Planning Commissions have responsibility for approving subdivision developments, using the minimum criteria required by the state which does not include watershed protection regulation. However, developments larger than five acres are required by TDEC to address stormwater issues during development. In addition, new Stormwater Ordinances within the City require both construction buffers and post-construction stormwater controls for new construction. Most of this watershed is outside the city limits and not subject to these regulations. There is no building permits or land-use regulations outside the city, so actions of individual property owners, unless specifically permitted by TDEC are unregulated.

OWCA Stream Restoration Project Recommendations

1. Work with rock harvesting companies to increase stormwater detention and infiltration methods to reduce sediment in run-off.
2. Work with existing property owners to increase infiltration and/or detention of stormwater on their properties, and/or establish vegetative buffer strips along streams.
3. Work with selected landowners to repair and stabilize sections where stream banks are actively eroding.
4. Work with and educate landowners to protect the buffer areas along the streams, tributaries, and drainageways and plant vegetation and repair banks where necessary.
5. Educate landowners and businesses about regulations regarding disposal of trash in or near streams.

Implementation Needs

- Voluntary actions by landowners.
- Funding to provide incentives to landowners to remediate conditions through cost-sharing and donated plant material.

4.0 Watershed Characterization

Geographic Setting: The Lower Byrds Creek (Waterbody ID: TN 06010208015-0800) is a continuation of the Byrds Creek watershed that begins in Lake Mohawk in Tansi. Running on the other side of Pigeon Ridge from Byrds Creek is Three Mile Creek which drains Fairyland Acres, Heritage Estates, and the Foxfire subdivision. After that it travels through farm and forested land, with its two main branches meeting within the Cumberland Mountain State Park. With the exception of Fairyland Acres and Heritage Estates, it drains everything north of Pigeon Ridge, east of Old Mail Rd, and southwest of 127S. After Byrds Creek crosses 127S, the watershed runs west to east until it joins Daddy's Creek, just south of US 70. There are five named tributaries to Lower Byrds Creek: Three Mile Creek, One Mile Creek (which has its own management plan and was assessed in 2007), Lead Branch (which has a named tributary itself, Muddy Branch), Ward Branch (which has a named tributary, Baker Branch), and Long Branch. Each of these named tributaries have tributaries themselves and there are also additional unnamed tributaries that flow directly into Byrds Creek. The watershed is located approximately between 84.919492 degrees and 85.050756 degrees West longitude and 35.905231 degrees and 35.964586 degrees North latitude. The watershed is located primarily south and east of downtown Crossville. Because One Mile Creek has its own plan, that subwatershed is excluded from discussion here and the stream miles and area of the watershed are similarly not included here.

Regulatory Status:

Lower Byrds Creek is not listed separately as a stream segment by TDEC, but Byrds Creek as a whole is listed as an impaired stream on the state 303(d) list.

Watershed Metrics:

Lower Byrds Creek and its four primary tributaries (excluding One Mile Creek) have 50.92 stream miles. This includes the stream measurements for the tributaries to the named tributaries as well as the small unnamed tributaries to Byrds Creek directly. It has a total watershed area of about 16.57 square miles.

Land Use Analysis

Using the aerial photography available through the City of Crossville, the following land use estimates were made:

	Forest	Grassland	Residential	Farm	Commercial	Mining	Roads	Water
% Watershed	80.26%	12.75%	1.67%	0.17%	0.71%	1.13%	2.2%	1.10%

* Note: There are many "farms" in this watershed, but they are primarily a mixture of pasture and forested areas. The acreage in each was estimated and put into those categories. The category Farm above refers to row crop agriculture. Also many of the residents in this watershed are located on larger tracts of land that include either forest or grassland fields. These tracts were also divided into the various current use categories. "Water" refers to ponds and lakes.

Impervious Cover Analysis

The Upper Byrds Creek watershed has an estimated watershed impervious cover of 4.9% which means that about 4.9% of the rain hitting the surfaces is not absorbed and contributes to storm run-off under normal rain conditions. This level of run-off means that most of the water is

absorbed and makes its way into the stream beds or underground. This is extremely important for maintaining flows throughout the year and supporting aquatic life. While the watershed as a whole is well buffered in this way, that does not mean that there are not areas where roads and concentrated developments aren't causing concentrated flows leading to erosion. Both the four concentrated residential areas as well as the rock harvesting areas concentrate impervious surfaces and can have local impacts on the tributaries to Byrds Creek. In fact, sediment deposits were found in Byrds Creek below where these tributaries met the main channel. As additional lots are developed in these subdivisions, and additional subdivisions are created, special care needs to be taken to minimize the storm run-off. Good planning and design can go a long way, along with buffers along both the main body of Byrds Creek and its tributaries.

5.0 Summary of Monitoring Data

Hydrology: 2009 has been an above normal year following two drought years. There have been a number of extreme rain events, which allowed us to see bank-full conditions. Examination of the stream showed extreme bank erosion in a few places, causing the loss of large mature trees and displacing significant amounts of soil. There are a large number of surface impoundments which have little effect in the winter or in a normal rainfall year as 2009 was, but may contribute to a lower flow during the summer or dryer months. The numerous ponds throughout the watershed can trap run-off during dry conditions and may also serve as settling ponds for larger sediments. On a number of the tributaries as well as in the main branch, there is significant sedimentation, affecting aquatic life.

Water quality: Water quality monitoring has just begun for this section. There are a limited number of easy access points, some bridges near the bottom of Three Mile Creek and on a couple of the tributaries, as well as near the bottom of Byrds Creek. Visual observations of muddy water after rains underlined the importance of collecting the data to decide on the most critical areas to address.

Biological: Field observations were made as part of the visual assessment. The presence of invasive species and the various types of bottom habitat as well as riparian corridor habitat was noted. A benthic assessment will be conducted in May of 2010 at a number of key points to determine the relative health of the different sections.

6.0 Sensitive Areas Analysis

- No threatened or endangered species were found in the Lower Byrds Creek watershed, but a detailed survey was not conducted.
- There were two major tornados that hit this area around Three Mile Creek in the past ten years. This stream was impacted by blowdowns caused by the tornados. Exposed roots along the stream bank are obvious sources of erosion, but the turned up trees anywhere near the streams is a source of loose soil that gets carried to the streams. Blowdowns in residential areas have been addressed. Large trees partially blocking the streams divert flows and cause bank erosion. A stream-clearing effort along Three Mile Creek would speed stabilization.
- The Three Mile Creek subwatershed is largely protected by the State Park, and thus protects wildlife habitat, but streambank stabilization work in some sections would be helpful.
- Cattle farming is widespread in the watershed. In some areas, cattle are not restricted from streams and are impacting the banks and stimulating erosion. Buffers are not complete in some pasture or hay fields.

- Buffers are not present in many residential areas as well. Property owners need to be encouraged to cease mowing and/or using herbicides along stream banks.
- There are two relatively "natural" segments of Byrds Creek. The first is from the junction of Three Mile Creek to the junction of One Mile Creek, and the second is from the road crossing at Deep Draw Rd to the junction with Daddy's Creek. While there is some bank erosion, sediment deposition, and debris dams in these areas, the overall riparian habitat is intact.

Stakeholder Involvement:

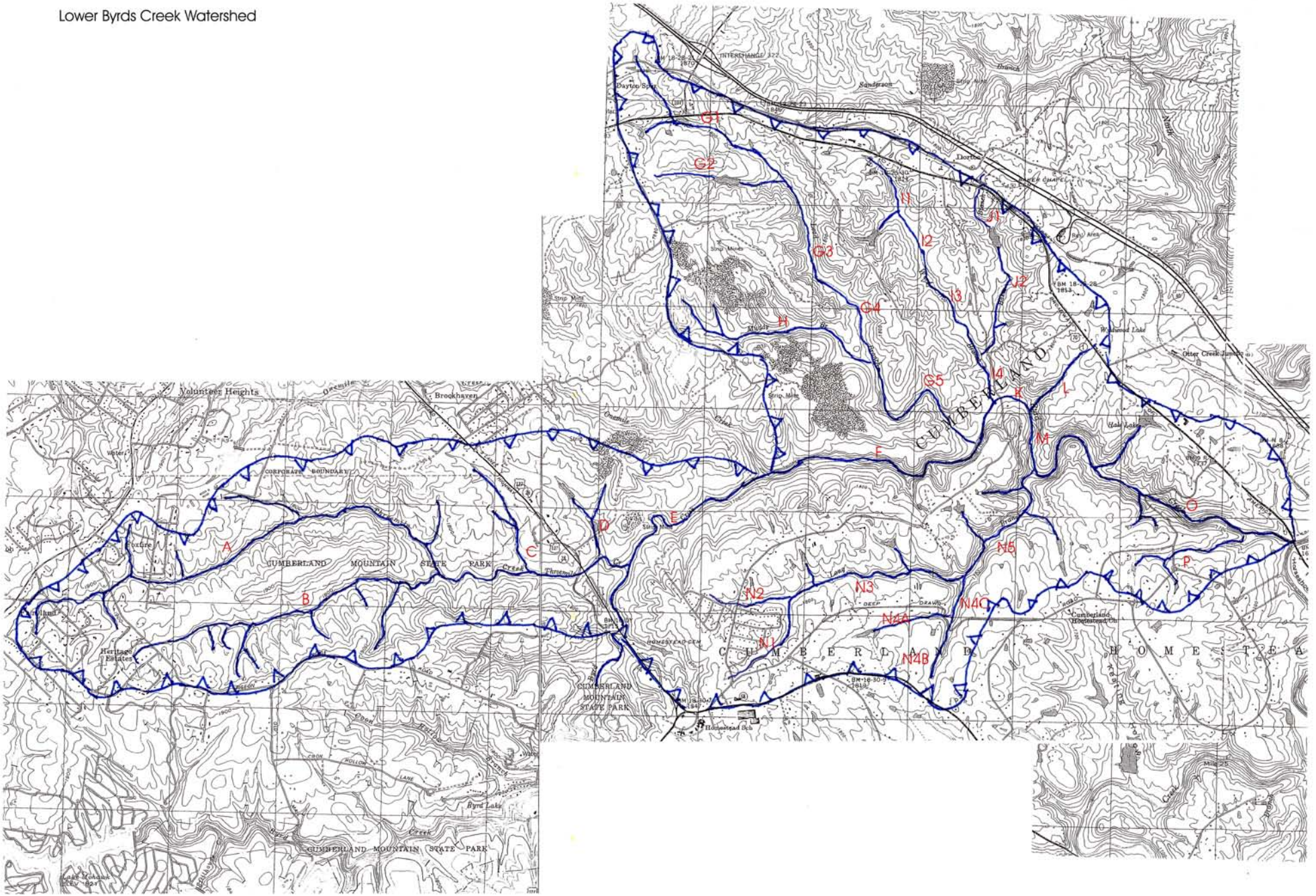
The property owners along Lower Byrds Creek received by mail a description of the project and were asked to respond if they did not want our project volunteers to cross their property. The letter also invited landowners to come to an informational meeting. Three meetings were held and a few people came to learn more. A follow-up meeting will be held to present the watershed management plan.

Plan for Indicator Monitoring

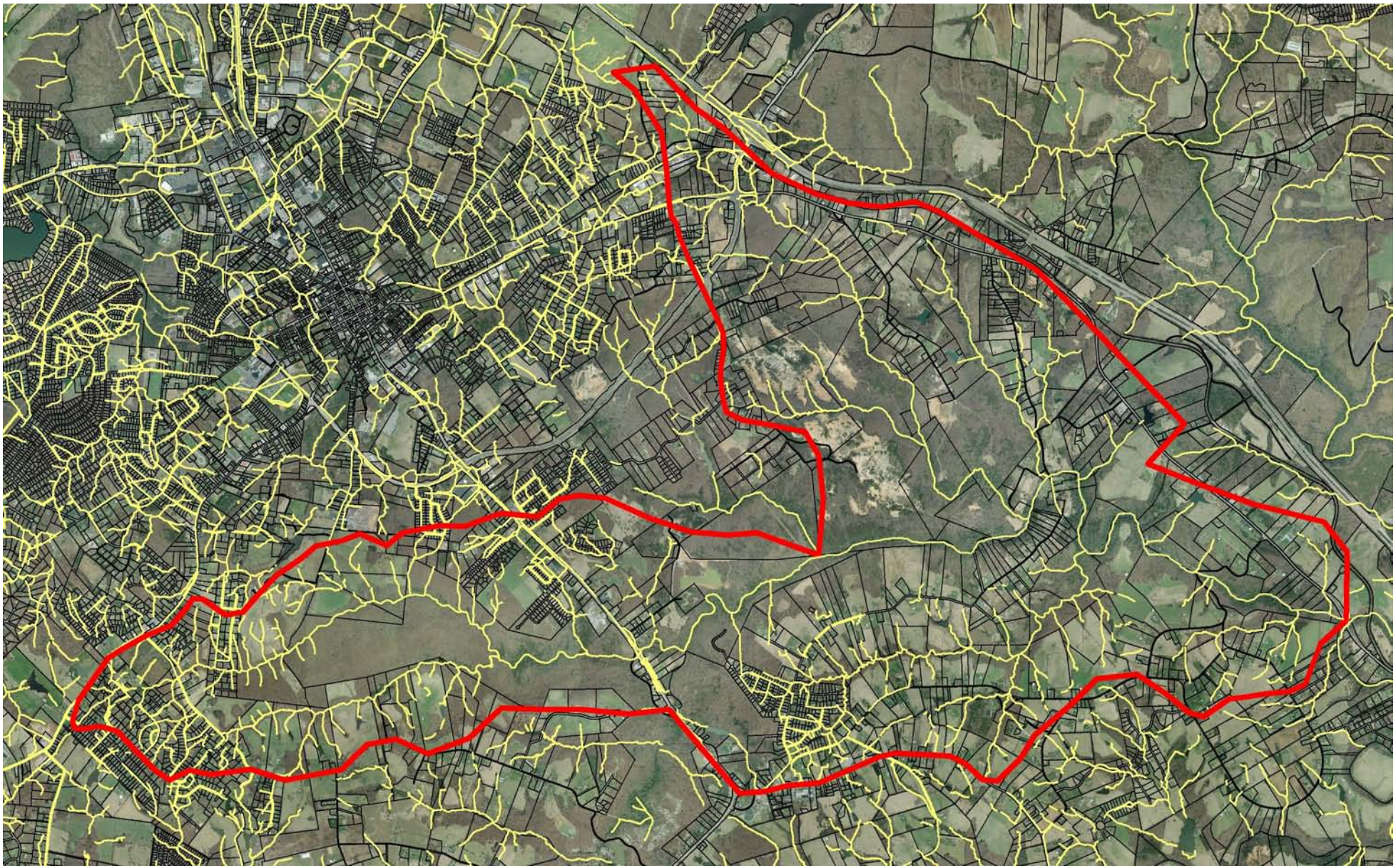
- Annual visual assessment of problem stream areas or new disturbances will be conducted by staff and trained volunteers.
- Regular monitoring or water quality (turbidity, pH, temperature, flow) will be conducted by the trained volunteers at various monitoring sites throughout the watershed. Results will be collected and analyzed by staff.
- An annual benthic assessment will be conducted.

The Obed Community Association has as its purpose community appreciation of the cultural, historical and environmental resources of the watershed and sponsors ongoing research and restoration projects within Cumberland County. For more information, you may contact OWCA at 931/484-9033 or at 185 Hood Drive, Crossville, TN 38555.

Lower Byrds Creek Watershed



Lower Byrds Creek Watershed aerial photo with watershed boundary



Lower Byrds Creek and its Tributaries

Watershed Details by Section

Tributary A (Three Mile Creek)

This section begins in two residential areas then moves through a wooded area that is mainly within the Cumberland Mountain State Park. There is some erosion in the residential areas as well as bank erosion within the park. The lower section was affected by tornados in the past five years and still has a lot of blow-down and debris dams that are contributing to the bank erosion. Other than that, the wooded stream banks provides excellent habitat.

Tributary B (Three Mile Creek)

This trib also begins in a residential area, but drains a lot of pasture and hay land before entering the Park. Many of the pastures and hay fields have long unbuffered areas on the small drainageways that begin in these fields. Most of this trib is on private land, though there are good forested buffers along most of the stream course. There are many farm ponds of various sizes that feed this tributary.

Tributary C (Three Mile Creek)

This final section of Three Mile Creek, upstream of Hwy 127 is entirely within the Cumberland Mountain State Park. It was heavily affected by the tornadoes and has numerous erosion sites because of the disrupted bank structure. This section also has one major tributary that drains a number of new developments, as well as some commercial development along 127 itself. The upper part of this trib is most impacted by the development, the lower section flows through a forested area. As the housing is built out in the new subdivisions, the impact of stormwater will increase.

Tributary D

This unnamed tributary to Three Mile Creek is impacted by both a new subdivision and by the old county landfill. The new subdivision is in larger lots and has only begun to be built out but there is some erosion below this where the increased run-off is having an impact. The branch that drains the old landfill is showing orange floc (a common indicator of iron) as well as a large tire dump that may be leaching additional substances. These tires need to be disposed of properly.

Section E

This section of Byrds Creek runs from Hwy 127 to the junction with One Mile Creek. It contains the junction with Three Mile Creek. Much of it is in excellent condition with a well developed old forest along the banks. There is one section, however where there has been recent logging on one side, though a buffer has been left. There is a small trib that is fed by a woodland pond that joins Byrd Creek, just after is crosses Hwy 127.

Section F

This section runs from the confluence with One Mile Creek to the confluence with Lead Branch. It was not assessed because of restricted access. However, the confluence with Lead Branch was assessed and the water quality from this section, including the sediment load was noticeably impacted by the waters coming down Lead Branch.

Tributary G Lead Branch

G1. This first section is impacted by commercial development of a number of types. There are hotel, restaurants, gas stations, and other retail stores with lots of roofs and parking lots leading to increased stormwater run-off. There is a cement block manufacturer with a large storage area and few controls of run-off from this site. Trash was seen in or near the stream on a number of sites as well as evidence of trash burning within the riparian zone. Once the stream crosses the Hwy 70/Milo Lehmert intersection, it flows through a wooded area at a low gradient. Unfortunately, just below a lake is a trash dump and the stream has much trash in it.

G2 This section which contains two lakes is in relatively good condition. There is an area of bare ground where some rock was harvested a one time and erosion carried sediment into the stream. There are now erosion controls on this site and the two lakes provided settling for that sediment. The upper lake has some erosion at its outfall, but otherwise, this section is in good condition.

G3and G4 Because of the trash dump in the lower section of section G1, there is a lot of trash in the stream in this section. It is also affected in its upper portions by old rock harvesting sites and the stream has a lot of sediment in its bed. Fortunately, the section improves as it moves downstream. This section is forested.

G5 This is the section from the confluence with Muddy Branch down to Byrds Creek. It is good riparian habitat and the banks were stable, but there was a lot of bottom sediment.

Tributary H Muddy Branch

This trib was not assessed because of access issues, but it drains a large mining area and there was evidence of a large sediment load coming from this tributary.

Tributary I Ward Branch

I1 This first section is in good condition until past the the confluence with the trib from the lake on the right.

I2 One section of this has had clearcutting on the left bank. There is evidence of bank erosion in this area from the increased run-off.

I3 Downstream from I2, there is a lot of bottom sediment, including sediment bars, as well as evidence of active stream bank erosion.

I4 This section from the confluence with Baker Branch to Byrds Creek is in pretty good condition. The only negative is a large area of limestone gravel flushed down the stream from a road crossing.

Tributary J Baker Branch

J1 This upper section is impacted from the run-off of old rock harvesting sites.

J2 There is a major site with a bare, eroding area of sloping land with active erosion cutting delivering sediment to Bakers Branch. This area badly needs stabilization as well as the establishment of a stream buffer. The lower part of this section is in better shape, though there is a limited buffer near the confluence with Ward Branch.

Section K

This section of Byrds Creek from the confluence of Lead Branch to the confluence with an unnamed trib (L) is in pretty good shape except that there is a lot of sediment and a heavily embedded bottom. Sediment from both Lead Branch (primarily) and Ward Branch are the source of this sediment.

Tributary L

This trib starts in a farm pond, flows through an old rock yard, then through a wooded area, until it splits and joins Byrds Creek in two places. One of these outfalls is eroding.

Section M

This section from the unnamed trib (L) to the confluence with Long Branch, still has the embedded bottom and there is active erosion as it goes through the big bend.

Tributary N Long Branch

N1 This drains a highly residential area. Because of increased stormwater volumes, there is erosion at road crossings and some down-cutting of the channel.

N2 This section is also dominated by the residential development that it drains.

N3 The upper section is impacted by recent logging which removed the mature trees from the banks. There are eroding banks, the bottom is embedded and there are debris dams in the channel in a number of places. The lower portion of this section is impacted by an old rock quarry, though there is a buffer zone here.

N4A This section begins at an old breached dam with an eroding outfall. The middle section crosses a pasture without a buffer. Otherwise it is in pretty good shape.

N4B This section also has the remnant of an old dam that is not vegetated and is therefore a source for sediment. Otherwise the section is in decent shape except erosion above the junction with N4A.

N4C This section was not assessed because of access issues.

N5 The upper part of this section is impacted by a trib that drains an old rock quarry. Otherwise, this section is in pretty good shape with not notable erosion spots.

Section O

This final section of Byrds Creek runs from the confluence with Long Branch to the confluence with Daddys Creek at US 70 bridge. Bottom sediment continues to be a problem with heavy embeddedness and occasional sediment bars. There were also a number of debris dams in this section.

Tributary P

This final tributary has a number of branches. The main branch flows through a forested area, but is joined with a number of tribs that drain residential and pasture areas. The agricultural areas are mostly buffered. The main branch has some active bank erosion.

LOWER BYRDS CREEK VISUAL ASSESSMENT SUMMARY