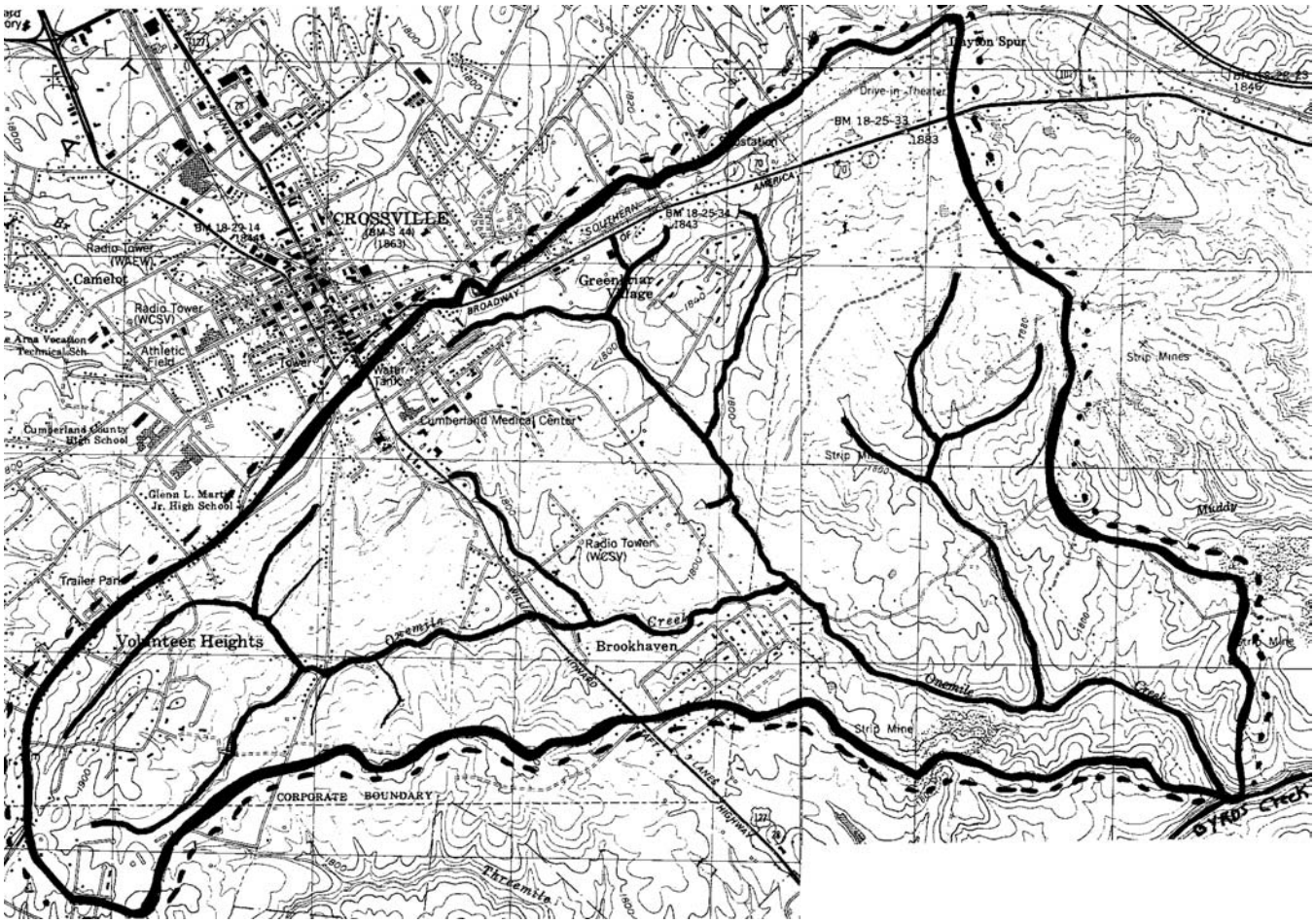
One Mile Creek Watershed Development Plan

No. 11 **Obed Watershed Community Association** **September 2007**

1. Introduction

One Mile Creek Watershed: The One Mile Creek Watershed lies within the southeastern quadrant of the City of Crossville and is totally within the City's planning area. This largely urban watershed has such county landmarks as the Cumberland Medical Center, the Art Circle Public Library, the Justice Center, and the Old High School. Landuses include sections of undisturbed forests, open farmland, rock quarries, small commercial development, concentrated urban development, powerline right-of-ways, and many older neighborhoods.



The Stream Restoration Project: The Stream Restoration Project (SRP) of the Obed Watershed Community Association began in February 2007 and is funded through the TN Department of Environment and Conservation (TDEC). The project develops watershed development 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 water quality 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 GIS resources were used to determine existing landuses.
- Natural resource inventories of reference watersheds and streams were used.
- 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. Observations were recorded and photographed.
- A Visual Stream Assessment, using the Maryland protocol, was conducted for the entire stream. The basic 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 was collected by trained citizen Stream Team volunteers to determine water quality during base flow and storm events. Data was collected on the water's temperature, pH, turbidity, and flow. Spot testing was also done for iron and conductivity.

3.0 Watershed Goals and Recommendations

While the regulatory goals of the TN Department of Conservation and Environment and the City of Crossville are to reduce siltation within the watershed and control stormwater runoff, more specific goals have been developed based on the observations and data collected.

Goals

1. Decrease siltation loads from known sources and new construction
2. Conserve existing vegetated riparian buffers and encourage appropriate planting where buffers are inadequate
3. Recommend ordinances to restrict 4-wheelers from riding in streams and in buffer areas.
4. Protect sensitive areas from degradation.
5. Reduce peak flows from stormwater through adoption of retention and detention practices.
6. Increase the tree canopy across the watershed by planting trees.
7. Increase stakeholder involvement in water management and stream preservation efforts.
8. Increase public awareness of watershed management concerns and practices that will help restore the stream.

Regulatory Recommendations

TN Department of Environment and Conservation:

- The TMDL for Siltation and Habitat Alteration in the Emory Watershed (TDEC August 2006) requires an overall sediment reduction load of 84%, from the existing daily sediment load of 732 pounds/acre to 135.5 pounds/acre.
- TDEC presently has seven NPDES permitted sites (two ready mix concrete facilities and five quarries) and regulates the runoff from these sites.

The City Planning Commission has responsibility for approving subdivision developments, using the minimum criteria required by the state which does not include watershed protection regulation. The city has no zoning regulations.

The City of Crossville must implement the following control measures upon the implementation of its Storm Water Management (SWM) Plan by July 2008:

- Reach out to the public for education on storm water impacts.

- Involve the public in the implementation of the SWM Plan.
- Detect and eliminate illicit discharges into the streams.
- Control construction site storm water runoff.
- Monitor post-construction stormwater management in new development and redevelopment.
- Ensure pollution prevention and good housekeeping practices for municipal and TDOT operations.

OWCA Stream Restoration Project Recommendations

1. Reduce silt loads from four identified sites through adoption of BMPs
2. Reduce silt loads from construction through adoption and enforcement of Stormwater Ordinance by the City of Crossville
3. Reduce stormwater runoff volumes by 20% from the most impervious areas through adoption of natural and engineered retention and detention strategies
4. Reduce 4-wheeler caused erosion by eliminating active 4-wheeler activity in streams and buffer areas.
5. Stabilize areas damaged by 4-wheeler traffic through revegetation and diversions.
6. Reduce runoff from dirt roads through the use of diversion channels and check dams.
7. Replant stream bank buffers under powerline right-of-ways.
8. Encourage property owners and TN Department of Transportation to repair minor areas of active erosion.

Implementation Needs

- Voluntary actions by landowners.
- Funding to provide incentives to landowners to remediate conditions through cost-sharing and donated plant material.
- Activation and implementation of the City of Crossville Stormwater ordinances within the city.
- Watershed education for resident and commercial owners.
- Further development of the One Mile Creek Watershed Council to raise stewardship awareness within the watershed.

Watershed Characterization

Geographic Setting: One Mile Creek watershed (HUC-12060102080202) flows into the Byrds Creek, a tributary of the Daddys Creek which flows into the Obed River.

Regulatory Status:

- The TDEC regulatory status of One Mile Creek is a 303(d) listed stream with a TMDL. Stream uses are impaired as TDEC found it to have a loss of biological integrity due to siltation and found land development the cause of the pollution.
- The City of Crossville has a Phase II MS4 status which takes effect in July 2008. The entire watershed will be subject to the City's storm water management program.

Watershed Metrics:

- Much of the One Mile Creek watershed lies within the southeastern quadrant of the City of Crossville (population 10,000) and totally within the City's urban growth boundary.
- One Mile Creek has 8.5 stream miles. It has a watershed area of 65.1 square miles (41,679 acres.)
- One Mile Cree has three unnamed branches which flow year-round. The branches and their intermittent tributaries can carry large volumes of water. In addition, some drainage ways have been dug, some coming off a single property, others gathering runoff from a number of properties. Cumulatively, these drainages add a great deal of stormwater volume after rainfalls.

Land Use Analysis

Using the landuse GIS map generated by the City of Crossville, the following landuse estimates were made:

	Forest	Farm	Residential	Commercial	Quarry	Roads
% Watershed	11.5%	23.8%	47.4%	11.4%	1.7%	4.2%

Impervious Cover Analysis

The One Mile Creek has an estimated watershed impervious cover of 25% which means that rainfall runs off one-quarter of the land because of pavement, rooftops, parking lots, or other impervious land uses. Streams have impacted water quality in watersheds with an impervious cover ranging from 10% - 25%. A stream is considered non-supporting of aquatic life when its watershed has an impervious cover from 25% to 40%. Above 40%, the stream is considered an urban drain.

Summary of Monitoring Data

Hydrology: Because 2007 has been a drought year, the monitoring has not yielded enough data to determine One Mile Creek's baseline parameters. Clearly, the stream functions as a stormwater drain. Volume increases during and immediately after a rain are dramatic. Flooding after a major storm (3 inches in a 24-hour period) was extensive, the stream rising out of banks and the stream flow exceeding the capacity of culverts at road crossings to handle the volume.

Water quality: Stream Team volunteers have monitored monthly two stream sites located at the downstream end of the western branch and on the central branch. An average pH of 8 has been measured. Turbidity is directly related to flow. When the flow is low, the water is clear; when the flow is high, the water appears muddy.

Biological: Field observations were made as part of the visual assessment for diversity of the plant community, the presence of invasive species, wetland species, and the nature of the plant community (forest or grass or pasture). A benthic assessment will be conducted in the fall of 2007.

Sensitive Areas Analysis

- No threatened or endangered species have been found in the One Mile Creek watershed.
- Several wetlands have been identified
- Isolated pockets of native, undisturbed natural riparian zones survive.
- Sections of the stream have rapidly eroding stream banks

Stakeholder Involvement: The property owners along the stream received by mail an invitation to attend one of three community meetings to identify what they valued about One Mile Creek and their concerns for it. A PowerPoint presentation was produced that summarized the results of these meetings. Those who attended the community meetings were invited to a summary meeting in July 2007 and the organizational meeting of the One Mile Creek Watershed Council The watershed council was presented the results of the community meeting and approved the One Mile Creek Watershed Development 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 trained volunteers at fixed monitoring stations established at the points along the stream, either homeowner sites or bridge crossings. 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 and volunteer involvement in ongoing research of the natural and cultural heritage of the Obed River watershed within Cumberland County. Those wanting to join this membership organization or more information may contact OWCA at 484-2633 or at 185 Hood Drive, Crossville, TN 38555.