

**Scope of Work for OWCA  
Budget Amount \$38,540**

OWCA will conduct a stream assessment for 350 stream miles within the Obed River Watershed in Cumberland County using the Maryland Protocol and additional assessments for critical habitat. These assessments will be conducted between March 2013 and February 2014. As part of this work, OWCA will develop a monitoring protocol that can be used. The assessment will lead to the identification of both areas meeting high quality designation as well as those that might be labeled environmental problem areas.

In addition to field work OWCA will conduct public meetings to inform landowners and the public about the purpose of the assessments.

The Maryland Protocol is concerned with stream condition only. However, this protocol will be supplemented during this project with additional rapid assessment methods looking at aquatic insects, mussels, specialized habitats preferred by T & E species, and, where possible, the presence of T & E species. These surveys will not be definitive in terms of the presence of T & E species, unless the species is sighted and photographed, but it will be able to confirm or deny the presence of the desired habitat in a way that aerial photography cannot. Further, it will provide a baseline against which to measure impacts of future land use changes, including road construction or expansion.

**Approach:** OWCA proposes to assess approximately 350 miles of Daddy's Creek and Clear Creek and the portion of the Obed system above the National Park Service area. These surveys are designed to apply the Maryland protocol to the complete system, exploring all tributaries of the system up to a zero-order stream with no discernible channels. The survey will not attempt to make formal determinations of where a stream legally begins or where the borders of a wetland are, but will note the presence of defined channels or hydrophilic vegetation. Because of the difficulty of access to many of these stream reaches, the survey will go beyond just the visual characteristics associated with the Maryland Protocol but will also note the presence of any rare or endangered plants, if detected and documented through photography. Water quality testing will also be incorporated, focusing primarily on pH, turbidity, dissolved oxygen, and conductivity. Benthic sampling will also be included, using the rapid assessment procedures based on family only. Likely reaches will be also be sampled for the presence of both native and non-native mussel species. Critical habitat, as defined by the Habitat Conservation Plan, will be noted within or visible from the stream corridor. Finally, the presence of invasive aquatic species will be noted. Additional sampling will occur with cooperating personnel from TWRA and TTU who have interest in specific sampling in specific areas.

All data will be recorded on an integrated, waterproof tablet computer with both photographic and GPS recording. Datasheets will be built into the device, so any observation will automatically be integrated with its location and photographic documentation. At the end of each survey session, the data will either be uploaded into the City of Crossville's GIS system or backed-up on suitable media to limit data loss if a recording unit were to be damaged. In any case, all data will end up in the Crossville GIS system and available for public use. This data

will also be provided to TTU for building their decision model and to the Habitat Conservation Plan to improve their maps and models of expected habitat.

Field investigations will be conducted by teams of two, with a leader who will be assigned a complete tributary system and a trained assistant, who will be a biologist capable of identifying benthic insects, mussels, and other aquatic species. It is expected that the assistant will be either a university student or graduate student, or an unpaid volunteer with appropriate skills.

In order to conduct these surveys, permission will need to be obtained from property owners along these watersheds. Property owners will be notified by mail and be given the option of refusing access to the assessment team. As streams are convenient property boundary lines, past experience suggests that little of the watershed will have to be skipped due to property owner refusals. Such refusals are relatively rare, and when they occur, it is often possible to simply travel down the other side of the stream on another property owner's land. However, the mailing cost to the many hundreds of property owners is significant. Public meetings will be held to answer any questions that people may have about the nature of the work and how the data might be used.

Most of the assessment work will occur during a one-year period from March 2013 through February 2014. Teams will not survey in the winter when the temperature is below freezing due to the obvious dangers, both in the water and on land, of hypothermia. Extreme heat (above 90°) limits the number of hours that a survey team will work. Safety is also a factor during high-water events, and the high water would make much data collection difficult. For obvious reasons, data collection in the rain is not desirable. Certain segments may be scheduled for specific seasons in order to have the best chance to find rare or threatened plants, which might be easily missed during winter. The combination of these factors makes total stream miles to be surveyed difficult to predict precisely. It is suggested that no more than two teams would operate from October through March, with the possibility of an additional team from April through September.

It is estimated that a minimum of 350 stream miles should be covered. As this is only a fraction of the 2,046 stream miles that have not been assessed, some prioritization is in order. The first priority will be the Daddy's Creek Watershed outside of the Catoosa Wildlife Management Area boundaries. This will capture impacts from agricultural and forestry practices as well as impacts from mining and quarrying in and around Crab Orchard as well as storm water impacts from Crab Orchard, Tansi, Fairfield Glade, and a number of significant roads. The second priority area is the Black Drowning Creek and Meadow Creek Watersheds that drain parts of the city and industrial, residential and agricultural areas. Black Drowning has a total of 147 stream miles, and Meadow Creek has a total of 50 stream miles. The third priority area is accessible stream segments on Clear Creek. These will be searched for possible sites that could be addressed with mitigation funds for a major road project that will be starting shortly. The final priority is sites on any of the streams where human impacts appear likely – downstream or near rock harvesting or quarry sites, below dams, near developments, and where agricultural impacts seems likely. Because access depends on landowner permission, not every site that is prioritized may be surveyed, but often there is a cooperative landowner further downstream where impacts may be detected.