

## **Maintaining cleaner embayments possible**

Christine Stevens – published 10/21/20 in The Connection

One of the great joys of living at or near Tellico Lake is the fun of jumping into the water for a swim on a hot sunny day. Several popular recreational areas for swimming and boating in Tellico Lake are small shallow bays, sometimes called embayments, which are near populated areas. While the Tellico Reservoir is one of the cleaner lakes in the TVA system of lakes throughout the Tennessee Valley, several watersheds of creeks flowing directly into Tellico Reservoir are primarily located on agricultural land, much of which includes livestock grazing areas. Because of runoff from these pastures and direct access to the creeks by livestock, these streams that enter the lake were found to have elevated concentrations of *Escherichia coli* (*E. coli*) bacteria. *E. coli* is used as an indicator of fecal contamination. Consequently, many streams flowing into the Tellico Reservoir have been classified by the Tennessee Department of Environment and Conservation (TDEC) as environmentally impaired.

While water quality samples periodically collected in Tellico Lake itself have consistently revealed exceptionally low concentrations of *E. coli* bacteria, samples from tributary creeks flowing through rural agricultural areas into the lake have revealed levels of *E. coli* well in excess of the limit specified for recreational use. Thus, the safety of swimming in these areas has been questioned. Therefore, it was important to investigate possible contamination in these areas where polluted streams flow into Tellico Lake.

WATeR, an organization devoted to protecting the water quality of the entire Tellico watershed, recognized that no data were available to evaluate bacteria levels in these transition zones from polluted creeks to the clean lake water. To provide residents and boaters with guidance regarding water contact in these embayments, the Water Quality Improvement Committee (WQIC) of WATeR designed a plan to sample for bacteria in a variety of conditions throughout the recreational boating season. Volunteers from WQIC sampled several embayments in 2016 and 2017. These areas included

Baker Creek Embayment (Foothills Pointe), Bat Creek Embayment (Rarity Bay), and Fork Creek Embayment (Tellico Village).

In 2016, WQIC volunteers collected samples monthly for seven months at three locations in each of the above three embayments. The areas sampled during the summer of 2016 showed very low levels of E.coli in a period with little rain, indicating that the quality of the water was excellent for recreational use. Even with heavy rains of 1 and ½ inches or more, most of the reservoir had acceptable E coli levels. However, rain events did show an increase of E.coli entering each of the shallow embayments from the polluted streams.

In order to determine the duration and extent of possible E. coli contamination of these shallow water areas following a heavy upstream rain event, WQIC members collected samples at five sites for five consecutive days in the Fork Creek Embayment immediately after a heavy thunderstorm in 2017. The findings indicated that during these heavy rains, some water with high E. coli levels does enter embayments of the reservoir. During the spring and early summer, this water transport not only E. coli, but frequently causes the shallow bays to become muddy. Fortunately, except during heavy rain events, these creeks do not have sufficient flow into the reservoir to cause measurable contamination with E. coli.

Based on these data, WQIC advises that after a rain event, people should be cautious about coming into contact with water in the shallow end of embayments, where polluted creeks enter the reservoir. This is because swallowing or swimming in water with unacceptable levels of pathologic strains of E. coli can lead to a serious infection. Typically these areas will have muddy water with poor visibility, and should be avoided for three days following a heavy rain event. TDEC and Tennessee Valley Authority (TVA) scientists explain that E.coli cannot survive when exposed to direct sunlight. As water from polluted creeks flow into the Tellico reservoir, the water slows and spreads in the shallow areas, exposing the bacteria to sunlight and quickly killing them. The

main body of the lake and coves not receiving creek runoff, however, are safe for swimming and boating, as they are not subject to a rise in unacceptable levels of E.coli.

The Water Quality Improvement Committee of WATeR is supporting various local agencies in obtaining and administering cost-share grants to implement agricultural best management practices. These efforts have contributed to local government agencies receiving cost-share grants from the TVA totaling \$1.43 million to assist farmers to modernize farming methods which will improve the water quality of Fork, Baker, and Bat Creeks. Farmers will be given help in removing fenced lanes extended into the lake for watering cattle and converting to better methods of providing water for cattle that do not create a danger to boaters and cattle alike. These actions will prevent pollution from reaching the creeks and will help to eliminate this health concern, eventually restoring these creeks to pristine conditions.

Additional information on WATeR's sampling of the bacteria of these embayments can be found in the report on the website [tellicowater.org](http://tellicowater.org). The article is entitled *Water Quality Investigation of Three Embayments of Tellico Reservoir, March 2017, Addendum April 2018*.

WATeR is an all-volunteer not-for-profit organization. To learn more about WATeR and become a member to help sustain WATeR's efforts to protect and improve the water quality of the Tellico watershed, contact us at [tellicowater@aol.com](mailto:tellicowater@aol.com)