

## TENNESSEE 2011 SWPBA UPDATE

Greeting from Tennessee! We are looking forward to seeing everyone in November.

In the meantime, here is a taste of what we have been up to this year. Be sure and come to Montgomery Bell State Park for the rest of the story.

Floods!

Well we made it through the 2010 flood in Nashville just in time for the 2011 flood in Memphis. (Probably shouldn't have done so many rain dances during the drought).

Mercury!

In July 2010, the Columbia Field Office received a call from a concerned citizen who had noted an unusual material while panning for gold in Beech Creek, a tributary to the Tennessee River near Waynesboro, Tn. The man and his family were swimming and wading in Beech Creek near his home while he searched for gold by digging and sifting sediment from crevices within the rock bottomed stream. During this process he noted a shiny viscous material that formed round beads of varying sizes within his pan. Upon investigation by environmental field staff, the substance proved to be beads of mercury. The source of the mercury turned out to be old, typically one-lane bridges built on small public roads and private driveways throughout Wayne County. The mercury was found in material on the underside of the bridges that had characteristics similar to concrete. The bridges were constructed from former mercury cell parts from a nearby chemical company and purchased by the highway department. A total of 64 bridges were identified. Sampling of water, sediment, wells and fish tissue showed mercury to be restricted to areas in the vicinity of the bridges.



Figure 1: Bridge built from mercury fuel cells



Figure 2: Beech Creek fissures where mercury was deposited.

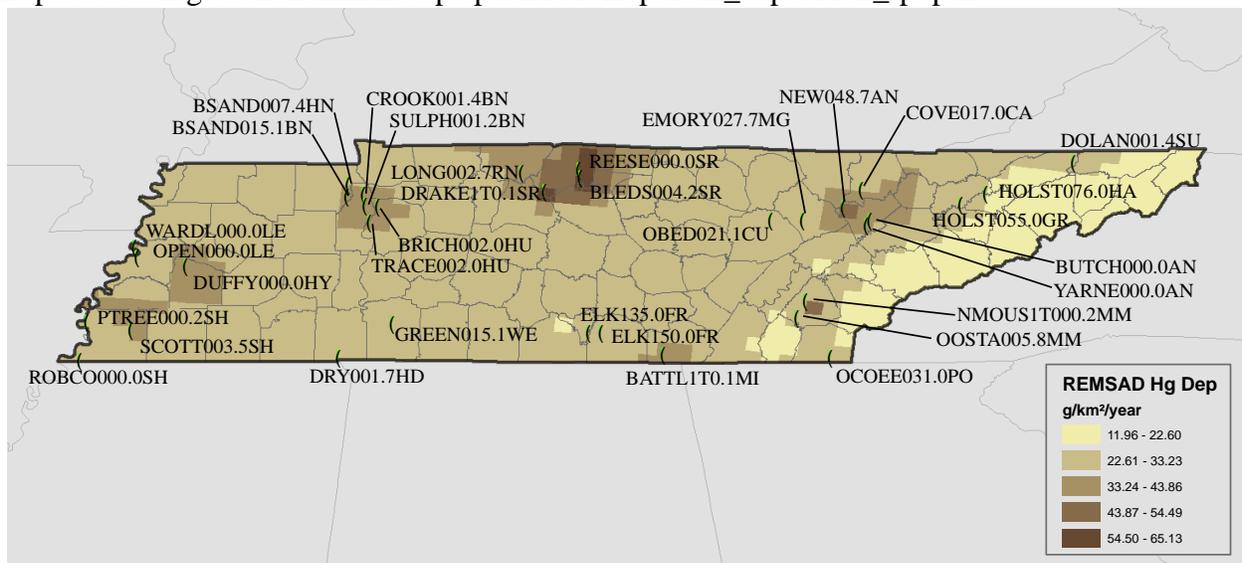
More mercury news, in December 2010 TDEC published a report on an air deposition study conducted in summer and fall 2009. The study was designed to field test the Regional Modeling System for Aerosols and Deposition (REMSAD) model's ability to accurately predict waterbody and fish tissue contamination from air deposition of mercury in Tennessee. Thirty three sites were targeted for this study. Sites were located in areas where fish had limited mobility and the model predicted various levels of mercury deposition. Additional sites were located in areas where the model did not predict elevated mercury, but where potential sources of airborne mercury were located in the vicinity. Fish tissue and water samples were collected at each site.

Mercury concentrations from the most elevated fish species at each site were mapped with the REMSAD model predictions. Results were variable, but in general, the model did not appear to be a good predictor of fish tissue contamination. Several fish taken from areas with predicted high levels of air deposition contained relatively little mercury. Fish with higher concentrations of mercury came from areas with low predicted air deposition. Six fish fillet composites had elevated mercury. None of these were in areas where the REMSAD mercury air deposition prediction was highest.

Mercury was undetected in the water samples at most sites. Five sites had mercury above Tennessee's water quality criterion for the classified use of recreation. None of the elevated water samples were collected where air deposition predictions were highest.

Selenium was also analyzed in fish and water at each site to help gain a better understanding of selenium levels throughout the state. Selenium in both fish and water was generally low. Only two sites had fish levels above the concentration suggested in EPA's 2004 draft guidance. Both are in areas of significant land disturbance due to historic mining activities. Selenium was not detected in any water samples.

Now that we've got you interested, you can read the whole report at [http://www.tn.gov/environment/wpc/publications/pdf/air\\_deposition\\_rpt.pdf](http://www.tn.gov/environment/wpc/publications/pdf/air_deposition_rpt.pdf)



Location of sampling stations in conjunction with predicted mercury deposition.

## Probabilistic Monitoring!

Well we finished our second year of probabilistic monitoring in wadeable streams. Our primary goal for probabilistic monitoring is trend analysis since we use a targeted monitoring approach for 305(b)/303(d) and other surveys. Our first survey was done in 2007 at 90 wadeable streams across the state. We had not intended to sample again for five years, but planned a second survey in 2010 since 2007 was a drought year and may not have provided a good baseline. Foiled again, flooding in 2010! Maybe if we averaged the two together ..... Anyway the samples are done and we are frantically processing data. The report should be published in September, so stay tuned!

## Coalfields!

We've started a new project this summer. TVA is helping us out with the sampling since we are short on available field staff. The report will be out next year. Tennessee has a history of surface coal mining in the Cumberland Plateau and Cumberland Mountain regions. Many of the streams draining these regions are on the 303(d) list for active or abandoned mining based on macroinvertebrate samples and appear to be improving. Fish tissue samples have not been collected at the majority of these sites. TDEC is proposing to collect fish tissue samples of native game fish to check for biological accumulation of metals in fillets. Ovaries will also be analyzed for selenium in accordance with EPA's draft criteria guidance. TVA is adding nutrient and macroinvertebrate sampling. Forty 3<sup>rd</sup> order or larger streams draining abandoned and active coalfields were selected for monitoring in addition to three reference streams.

## Headwaters!

We are in year 3 of our 5 year project to identify and monitor headwater reference streams in each of our 31 ecoregions. We have developed preliminary regional guidelines for some bioregions by calibrating the multi-metric index we use for larger streams. Once we have enough data, we hope to develop an index specific to headwater streams.

