



**Missouri
Department of
Natural Resources**

WATER QUALITY COORDINATING COMMITTEE

DNR Conference Center
Roaring River Conference Room
1730 E. Elm
Jefferson City, Missouri

December 15, 2009
10:00 a.m.

MEETING AGENDA

Overview of Mercury in Missouri Water,
Mandy Sappington, DNR, Water Protection Program

Mercury in Missouri Fish: Spatial and Temporal Trends,
Mike McKee, Missouri Department of Conservation

Other

Agency Activities

Meetings & Conferences

MISSOURI WATER QUALITY COORDINATING COMMITTEE

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MINUTES

Attendees:

Greg Anderson	DNR, Water Protection Program	Keith Bertels	DNR, Div. of Env. Quality
Brittany Barrients	Newman Comley & Ruth PC	Jane Davis	DNR, Water Protection Program
Ben Frissell	DNR, ESP	Tucker Fredrickson	DNR, Water Protection Program
Aaron Basham	DNR, APCP	Ken Tomlin	DNR, Water Protection Program
Angel Kruzen	Missouri Water Sentinel	Daniel Hedrick	City Utilities
Valerie Hentges	DNR, Water Protection Program	Ted Salveter	City Utilities
Brian Kelly	USGS	Scott Robinett	DNR, ESP
Bart Hawcroft	MO Dept. of Agriculture	David Gullic	DNR, ESP
Kevin Perry	REGforM	Rich Burdge	DNR, Water Protection Program
Georganne Bowman	Boone County Public Works	Larry Lehman	DNR, ESP
Cindy DiStefano	MDC, Resource Science	Mandy Sappington	DNR, Water Protection Program
Mike McKee	MDC	Susie Higgins	DNR, Water Protection Program
		Darlene Schaben	DNR, Water Protection Program

Introductions were made.

Overview of Mercury in Missouri Water, Mandy Sappington, DNR, Water Protection Program
PowerPoint Presentation; Handout: Missouri Electric Power Plants and Utility Service Areas in Missouri

Mandy has been involved with the Mercury Task Force for about a year. She is the project manager for the Mercury Deposition Network project with the University of Illinois. A graph from EPA showed human-caused mercury emissions. Several sources have been addressed in the U.S. With coal boilers being the exception, emissions have been trending downward. Due to improper disposal, there have been mercury releases related to thermometers, electrical switches, and smaller uses of mercury that can be released into water. There are natural sources of mercury in the environment, i.e., volcanoes contribute about one-third. Two-thirds are human-caused emissions, 1/3 of that is being re-emitted. Once mercury has been emitted, it stays in the environment where it can be stirred back up. The largest part of mercury is from air emissions. It will then return into waterways when it rains. Joint efforts of several agencies are then required.

Missouri's Task Force is an informal group of Department of Natural Resources employees working on mercury issues in Missouri. They started in 2002. By 2003 they had established goals and objectives for the ad hoc Mercury Task Force. In 2005, Rep. David Sater of Cassville requested the group to comment on draft mercury legislation. There are now existing model legislation and two executive orders with suggestions on how to state procurement of mercury-containing products and remove mercury from schools. These documents remain at the ready for consideration, should the opportunity arise. The Task Force also developed and distributed a technical bulletin/checklist for schools, developed a Web site



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(<http://www.dnr.mo.gov/env/mercury.htm>), facilitated participation in the National Vehicle Switch Program, and implemented a thermometer take-back from schools. The Department's Environmental Emergency Response staff have worked to collect mercury from schools and citizens. Richard Allen said the funds for reimbursement of vehicle switches have been depleted except for those states that have legislation in place that has mandates. Vehicle switches are still being accepted but no reimbursement is given.

States that have developed TMDLs have concluded that the take-back program and vehicle switches reimbursement are just band-aid solutions. The Department of Energy currently projects a continued increase in mercury emissions.

The 2002 303(d) list contained the first listing of a water body with mercury. Others were added on the 2004/2006 list. Water Protection Program staff are working on a mercury statewide TMDL. It will cover 15 streams and 24 reservoirs that are impaired statewide. Looking to see what other states have done, Mandy talked about what Minnesota has in their mercury TMDL. Another approach discussed was a regional TMDL, the Northeast Region Mercury TMDL.

The Department has one atmospheric monitoring deposition station, Mingo National Wildlife Refuge. It was installed in 2002. The sampler was designed specifically to look at mercury in rainfall. All samples across the country are analyzed at one lab in Seattle, Washington. Modeling is done with all the data. To continue to monitor trends, they are looking to expand the network to a site in Ashland. The contract for the Mingo site is awarded every two years, which is not totally secure funding. The estimated cost to set up a second site is approx. \$15,000, and \$15,000 each year thereafter. Mandy showed maps where there are mercury concentrations and wet deposition, 2004-2008. Kansas passed legislation requiring deposition monitoring. This will enhance deposition modeling estimates for Missouri.

In conclusion, a sustainable solution has to cross political and disciplinary boundaries. It is a "Tragedy of the Commons" that will likely require federal legislation to bring states such as ours on board. But every day we stall - relying on others to monitor and/or legislate - more mercury is emitted. Mercury that will persist in water, soil, sediment, and fish.

Richard Allen talked about mercury emissions from power plants. He thought the technology is available to control the mercury emissions from power plants up to about 90%. Companies were gearing up for this with the Clean Air Mercury Rule and have the technology. Steep reductions were planned for 2018. Even though it cost a lot to get equipment installed, he thought that technologically they are further along at capturing the mercury than carbon dioxide. EPA is working on updating their map.

In answer to a question of what the APCP is doing for mercury in Missouri, Aaron Basham said they are waiting on the Mercury MACT to come out. It includes more information than just mercury. Power Plants are required to report air emissions and are including mercury emissions. They are waiting on EPA Region 7 to send out information so they can regulate it at a state level. Mandy said coal powered power plants are the major source to be addressed.

Rich Burdge said they do have strict guidelines on how much data is required for fish tissue in order to be evaluated for consideration before being put on the 303(d) list. It makes sense to do one statewide TMDL. The 2008 303(d) list should be out soon. They expect to see an increased number of waters listed for mercury.

It was mentioned that nationally new power plants being built are including mercury controls. Existing plants are putting monitoring equipment on so as to have a better sense of what is currently being emitted.



Mercury in Missouri Fish: Spatial and Temporal Trends, Mike McKee, Missouri Department of Conservation
PowerPoint Presentation

Mike showed a diagram of the mercury transformation process. The bulk of the input to the aquatic systems is estimated to be 60-70% from aerial deposition. Once down, mercury goes through a process of transformation to methyl mercury. Most of the mercury in fish tissue is methyl mercury. Studies show 90% is in the methylated form. Methyl mercury accumulates in muscle tissue as opposed to a lot of the traditional and organic contaminants more in the lipid phase.

Relative to the toxicology of mercury, methyl mercury is more toxic than inorganic mercury. The developmental and neuronal effects are more pronounced and more sensitive than reproductive effects and renal effects. In order to translate this information into an effective dosage for restricting dietary intake, EPA created a reference dose to monitor exposures (0.0001 mg/kg/day). Mike said the good thing about methyl mercury is that there is a lot of good toxicological information (lab data and epidemiological studies). In the epidemiological studies, the most sensitive end point that floats out is learning disabilities. As an example using the Risk Assessment Calculation, it showed a consumption rate of one meal per month could equal 304 ug Hg/g fish tissue. The Missouri Fish Consumption Statewide Advisory is one meal per month limit for black bass and walleye, and one meal per week for all fish species if there is no local data. This information is based on over 25 years of data from both MDC and DNR/EPA. Mike showed a state map depicting fish collection sites across the state. There are over 350 sites.

Mike said they divided the different species of fish by habits and found that as thought, fish predators (fish that eat the smaller fish) have the higher amount of mercury. Mercury bioaccumulates up the food chain. He used the data to create a top ten list of fish that contain mercury (bowfin, sauger, walleye, largemouth bass, chain pickerel, blue catfish, spotted bass, smallmouth bass, flathead catfish, and white bass). Catfish, bluegill, crappie, and bass are found to be the most consumed fish in Missouri.

In a graph showing mean mercury concentrations in fillets from largemouth bass by lake in Missouri for 2007, approx. 30% of the water bodies were over the limit for a meal per month and 75% were over the limit for a meal per week. Those water bodies were from different parts of the state and not from one general area. Mike thought the reasons for this could include mercury aerial deposition, aquatic point source discharges, increase in phosphorus concentration (increased algae can bind methyl mercury), increase in sulfate concentrations (can lead to increased methyl mercury), and many other reasons. What happens in a particular water body can effect how methyl mercury accumulates.

Mike had read an article that indicated higher levels of mercury appear in fish tissue (largemouth bass) along coastal areas.

Mike said there wasn't enough data available on bass to show temporal trends. In the DNR dataset, using whole fish, seven sites had greater than ten separate years of carp data. It looked like mercury may have been leveling off in the 1990s. From a USGS 2002 Fact Sheet, deposition rates for mercury were described in a glacial core sampling in Wyoming. They cored the glacier, associated it with different year spans, then measured the amount of mercury. The timeframes ranged from the 1700s – 2000. This and other information matched with their thought of a decline of mercury in the 1990s.

(<http://pubs.acs.org/doi/abs/10.1021/es8027378>) A paper that came out in 2009 from Minnesota showed a comprehensive look at their fish data concluded there was a trend reversal but in the mid-1990s the trend is showing an increase in mercury. The global pool of mercury may be going up.



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They speculated the decline was because of some of the equipment that utilities had added to control air pollution due the requirements of the Clean Air Act. They weren't targeting mercury but thought they were inadvertently controlling mercury.

In conclusion, they need more data. They will continue the carp monitoring and need to strengthen long-term bass data. As a result, MDC put together a long-term data collection package for bass and walleye. They will utilize a non-lethal tissue plug method. They plan to select three water bodies from each region and monitor one water body per region per year. Monitoring started this year. Data collection will occur at eight sites per year with six fish checked per site. These sites will be on a three-year rotation. Rich Burdge has incorporated the MDC data into the DNR data. Contact Rich or Mike if interested in any information regarding the data.

Agency Activities

Angel Kruzen said there will be a Jack's Fork Watershed meeting tonight (Dec. 15). They hired a part-time person to start working on the educational side of the grant. Next step is to hire a facilitator.

Georganne Bowman said they are working to get a stormwater ordinance passed for Boone County within the next couple of months. They are looking forward to reviewing the Hinkson Creek TMDL, which they expect to see again soon. A Stream Team event is being planned for March. All Boone County Stream Teams have been invited to participate. They are planning to teach them how to report an illegal discharge if they see something while on the streams. Stream Buffer Training is also being planned. Boone County and the City of Columbia just enacted a stream buffer setback, depending on the size of the stream. They just completed the training for contractors and engineers last week.

Ken Tomlin said although not internally approved yet, the Public Drinking Water Branch will be offering the well plugging grants again in 2010. Target date for applications is April. More information will be shared later.

Rich Burdge said EPA should be issuing the 2008 303(d) List soon.

Greg Anderson reminded the group that the 2008-2009 319 Nonpoint Source grant applications are due Jan. 15. Contact Greg or Darlene if you know of any topics for future WQCC meetings.

Meeting adjourned.