Evaluation of Heavy Metal Concentrations in Fish from the Dan River in 2014, 2015, and 2016

Dan River

DANVILLE, VIRGINIA

Letter Health Consultation

August 2017

Virginia Department of Health
Division of Environmental Epidemiology
109 Governor Street
Richmond, Virginia 23219

COMMONWEALTH of VIRGINIA

Department of Health – Office of Epidemiology

MARISSA J. LEVINE, MD, MPH
INTERIM STATE HEALTH COMMISSIONER

PO BOX 2448
RICHMOND, VA 23218

TTY 7-1-1 OR
1-800-828-1120

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Gabriel Darkwah
Lab Data Coordinator
Virginia Department of Environmental Quality
629 E. Main Street
Richmond, VA 23219

Dear Gabriel Darkwah,

Thank you for providing the analysis results for metal contaminants in fish tissue from fish collected along the Dan River, Virginia in 2014, 2015, and 2016. The Virginia Department of Health (VDH) has finished reviewing the results for public health implications, as requested. VDH concludes that current fish consumption advisories should remain in effect for the Dan River and its tributaries, and that no additional fish consumption advisories are needed.

BACKGROUND

In 2014, 2015, and 2016, the Virginia Department of Environmental Quality (DEQ) collected fish along the length of the Dan River, from the Virginia/North Carolina border to the Clarksville Marina. A map of this area showing the fish sampling locations can be found in the attachment (**Figure 1**). This was done to evaluate whether the coal ash release at Duke Energy in North Carolina has resulted in changes in heavy metal concentrations in fish tissue from the Dan River upstream of Danville. Fish collection, laboratory analysis, and how screening values (SVs) were derived are not discussed in this health consultation.

DISCUSSION

In 2014, 160 fish samples were collected from nine different sites[1] along the Dan River and were analyzed for 17 different metal analytes including: aluminum (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), manganese (Mn), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), vanadium (V), zinc (Zn), and mercury (Hg). There were 160 fish samples collected from eight of the original sites in both 2015 and 2016, which were analyzed for the same metals as in 2014. In all of the samples tested,

[1] Figure 1 shows a map of collection sites

Al, As, Ba, Cr, Cu, Mn, Hg, Se, Ag, and Zn were detected at measurable levels. For those samples in which the analytes were detected at measurable levels, all except for Hg were below the VDH SV of 0.5 ppm, and are therefore of no concern.[2,3] Table 1 contains a summary of fish tissue samples that exceeded the SVs for mercury. Of all samples, 13 samples in 2014, 2 samples in 2015, and 9 samples in 2016 contained concentrations of Hg above the screening values.

Table 1: 2014, 2015, and 2016 summary of fish tissue samples that exceed VDH SVs for mercury.*

Collection Site	Fish Species	Year	Hg Conc. (ppm)	Mass of Fish (g)
1	Largemouth Bass	2014	0.53	760
2	Largemouth Bass	2014	0.54	946
4	Walleye	2014	0.65	1367
4	**Flathead Catfish**	**2016**	**0.84**	**-**
4	**Flathead Catfish**	**2016**	**0.64**	**-**
4	**Striped Bass**	**2016**	**0.74**	**-**
4	**Striped Bass**	**2016**	**0.62**	**-**
5	Flathead Catfish	2014	1.23	17,000
5	Flathead Catfish	2014	0.96	14,400
5	Flathead Catfish	2014	0.82	14,200
5	Flathead Catfish	2014	0.65	11,200
5	Flathead Catfish	2014	0.63	5700
5	Blue Catfish	2015	0.56	-
6	**Largemouth Bass**	**2016**	**0.55**	**-**
7	Flathead Catfish	2014	0.83	14,200
7	**Flathead Catfish**	**2016**	**0.69**	**-**
8	Flathead Catfish	2014	0.56	6500
8	Smallmouth Bass	2014	0.71	1581
8	Spotted Bass	2015	0.70	-
8	White Bass	2014	1.25	428
8	Walleye	2014	0.51	1434
8	**Walleye**	**2016**	**0.90**	**-**
8	**Walleye**	**2016**	**0.54**	**-**
8	**Flathead Catfish**	**2016**	**0.59**	**-**

*Sites 1 and 2 are upstream of Danville. Samples collected in 2016 are in bold.

[2] http://www.townhall.virginia.gov/

[3] Dwight D. Flammia, Rebecca LePrell, Matthew F. Skiljo, Egbe Egiebor. Metal Concentration in Fish Tissue: Implications for Public Health Following Coal Ash Release to Dan River. Presented at the 2014 National Fish Forum on Contaminants in Fish. Alexandria, VA. September2014.

CONCLUSION

VDH concludes that the existing fish consumption advisory for the Dan River is protective of health.

RECOMMENDATIONS

VDH recommends that current fish consumption advisories remain in effect for the Dan River and that monitoring of fish in the Dan River should continue.

VDH also recommends that pregnant women, nursing mothers, and young children should not consume fish contaminated with methylmercury at concentrations equal or exceeding 0.5 ppm.

Rachel Ellick, M.S.
Health Assessor
Virginia Department of Health
Richmond, VA 23219

Dwight Flammia, Ph.D.
State Public Health Toxicologist
Virginia Department of Health
Richmond, VA 23219

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Figure 1. Map of fish collection sites.

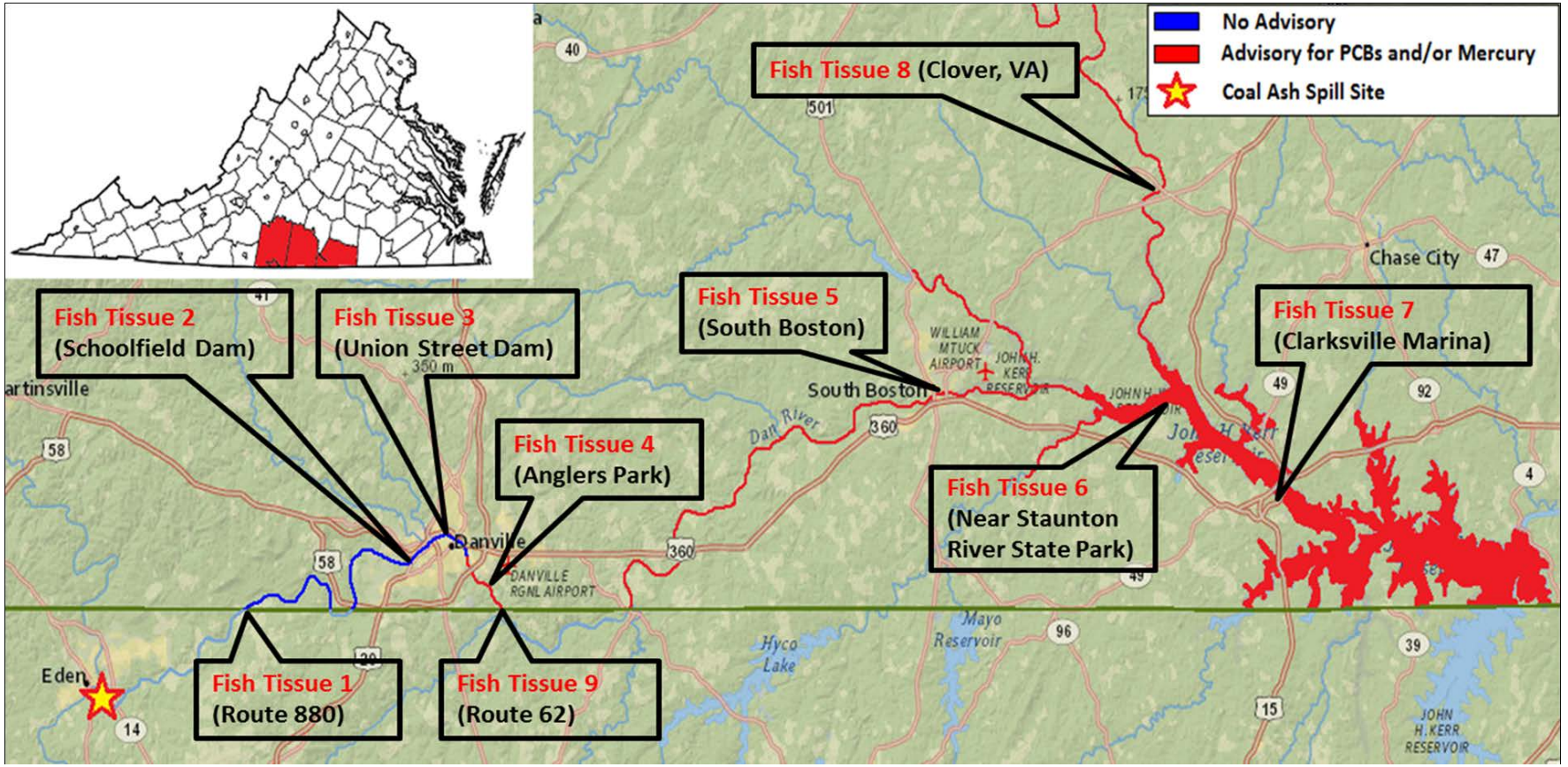

Figure 2. Current fish consumption advisories for the Dan River.

WATERBODY AND AFFECTED BOUNDARIES	AFFECTED LOCALITIES	CONTAMINANT	SPECIES	ADVISORIES/RESTRICTIONS
Dan River (within the state of Virginia from the Brantley Steam Plant Dam in Danville downstream to the confluence with Roanoke River on John. H. Kerr Reservoir, including its tributaries Hyco River up to Rt. 738 bridge and Banister River up to the Banister Dam. These river segments comprise ~67 miles).	Danville City, Pittsylvania Co., Halifax Co., Mecklenburg Co.	PCBs, Mercury	Flathead Catfish ≥ 32 inches 	**DO NOT EAT**
		PCBs, Mercury	Flathead Catfish <32 inches 	No more than two meals/ month
		PCBs	Carp 	
		PCBs	Redhorse Sucker 	
		PCBs	Channel Catfish 	
		PCBs, Mercury	Striped Bass 	
		PCBs, Mercury	White Bass 	
		PCBs	White Perch 	
		PCBs, Mercury	Blue Catfish 	
		PCBs	Walleye 	
		PCBs, Mercury	Longnose Gar 	
		Mercury	Large mouth Bass