Evaluation of Metals in Fish from Virginia Watersheds in 2024

Multiple Watersheds Statewide

VIRGINIA

November 17, 2025

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November 17, 2025

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Dear Gabriel Darkwah,

Thank you for providing the metals concentrations in fish tissue results for fish collected from multiple waterways in Virginia in 2024. The Virginia Department of Health (VDH) has finished reviewing the results for public health implications as requested.

BACKGROUND AND DISCUSSION

The 2024 dataset reviewed includes 410 edible fish tissue fillet samples, which were tested for metals as part of the Virginia Department of Environmental Quality's (DEQ's) statewide sampling and analyses of residual chemical contaminants in fish tissue. Fish collected were tested for beryllium (Be), aluminum (Al), vanadium (V), chromium (Cr), manganese (Mn), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), selenium (Se), silver (Ag), cadmium (Cd), antimony (Sb), barium (Ba), mercury (Hg), thallium (Tl), and lead (Pb). The 2024 annual statewide fish tissue monitoring primarily targeted the James River, Shenandoah River, and Roanoke River watersheds.

In October 2000, pursuant to § 32.1-248.01 of the Code of Virginia, VDH published guidelines for issuance of a fish consumption advisory when mercury is detected in edible fillets. The most up-to-date guidelines are available at Virginia Regulatory Town Hall.[1,2] The 2024 fish tissue data that exceeded VDH's lower screening value, 0.5 parts per million (ppm), are presented in Table 1 and were evaluated further. The number of fish, size, species, and frequency of exceedance of the screening value were considered in determining the need for a mercury fish consumption advisory. Some fish species tested already have a consumption advisory in effect for the sampling location.

A summary of findings evaluated further

- In 2024, mercury concentrations in four largemouth bass collected from North Fork Pound River Lake were 0.52 ppm. In 2022, two composites of largemouth bass consisting of five fish each were analyzed, and the concentration of mercury was 0.42 and 0.31 ppm.

[1] https://law.lis.virginia.gov/vacode/title32.1/chapter6/section32.1-248.01/
[2] https://www.townhall.virginia.gov/L/ViewGDoc.cfm?gdid=3057

- In 2024, mercury concentrations in four spotted bass collected from North Fork Pound River Lake were 0.64 ppm. There are no previous analyses of spotted bass from the North Fork Pound River for mercury.

- Mercury concentrations in a composite of three smallmouth bass collected from the Shenandoah River near Lockes Landing were 0.63 ppm. In addition, a composite sample from three smallmouth bass near the Route 50 Bridge at Berrys showed a mercury concentration of 0.62 ppm. Both sampling locations are located downstream of the existing mercury advisory but fall within the zone covered by the polychlorinated biphenyls (PCBs) advisory.

Table 1. 2024 Fish tissue results with mercury ≥ 0.5 ppm*

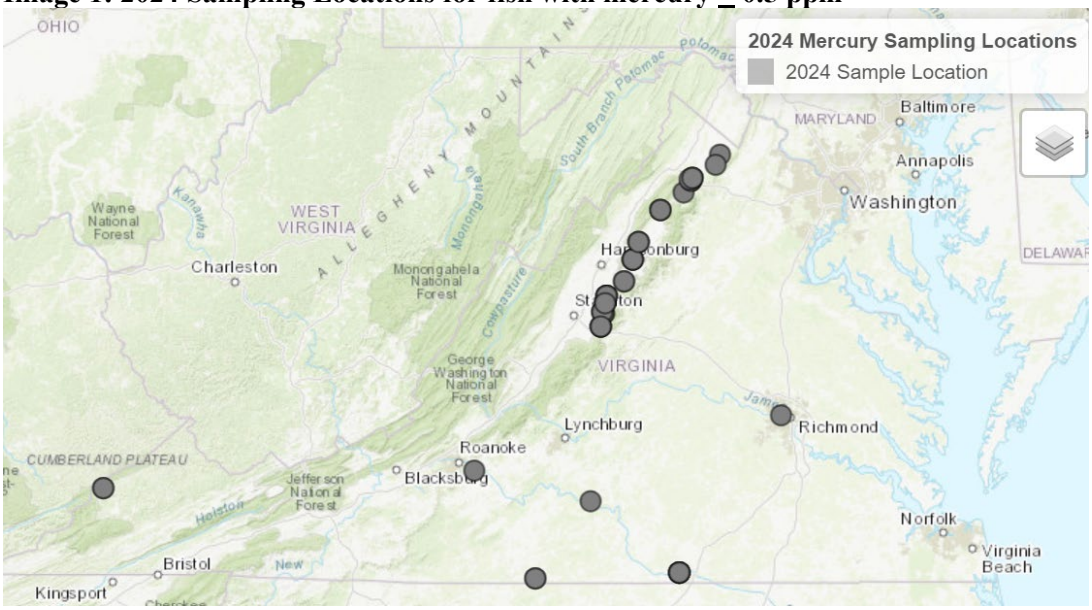
Station Location	Species name	Length (cm)	No. of fish	Mercury (ppm)	Advisory in Place
Dan River near Anglers Park	Flathead Catfish	102	1	0.82	Yes
Dan River near Anglers Park	Flathead Catfish	89	1	0.59	Yes
James River near Pony Pasture	Blue Catfish	89	1	0.50	No**
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	55 - 60	2	0.92	Yes
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	52 - 56	3	0.81	Yes
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	49 - 51	3	0.67	Yes
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	51 - 54	3	0.66	Yes
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	54 - 55	2	0.59	Yes
Lake Gaston downstream of Kerr Dam near Boat Ramp (Buggs Island)	Walleye	51 - 52	3	0.51	Yes
North Fork Pound River Lake	Spotted Bass	27- 29	4	0.64	No
North Fork Pound River Lake	Largemouth Bass	30 - 33	4	0.52	No
North Fork Shenandoah River near DGIF Boat Launch downstream of Rt. 340 bridge	Smallmouth Bass	28 - 32	2	0.60	Yes
Roanoke River near Rt. 501, Brookneal	Walleye	46 - 51	3	0.58	Yes
Roanoke River near Rt. 634 at Hardy	Flathead Catfish	82	1	0.50	No**
Shenandoah River downstream of I-66	Channel Catfish	62 - 66	4	1.20	Yes
Shenandoah River downstream of I-66	Smallmouth Bass	32 - 37	4	0.92	Yes
Shenandoah River downstream of I-66	Largemouth Bass	30 - 37	4	0.65	Yes
Shenandoah River downstream of I-66	White Sucker	41 - 48	5	0.56	Yes
Shenandoah River near Lockes Landing Boat Launch	Smallmouth Bass	35 - 37	3	0.63	No**
Shenandoah River near Rt. 50 bridge Berrys	Smallmouth Bass	32 - 36	3	0.62	No**
South Fork Shenandoah River downstream Rt. 340/522 bridge	Smallmouth Bass	31 - 38	5	1.12	Yes
South Fork Shenandoah River downstream Rt. 340/522 bridge	Channel Catfish	64 - 68	2	1.12	Yes

Station Location	Species name	Length (cm)	No. of fish	Mercury (ppm)	Advisory in Place
South Fork Shenandoah River downstream Rt. 340/522 bridge	Largemouth Bass	30 - 39	4	0.83	Yes
South Fork Shenandoah River near Fosters Landing near Rt. 684 bridge	Yellow Bullhead Catfish	16 - 23	6	0.69	Yes
South Fork Shenandoah River near Fosters Landing near Rt. 684 bridge	Rock Bass	14 - 20	5	0.64	Yes
South Fork Shenandoah River near Fosters Landing near Rt. 684 bridge	Redbreast Sunfish	15 - 18	12	0.50	Yes
South Fork Shenandoah River near Karo Boat Launch	American Eel	68	1	0.87	Yes
South Fork Shenandoah River near Newport DGIF Boat Launch	Smallmouth Bass	30 - 33	3	1.00	Yes
South Fork Shenandoah River near Newport DGIF Boat Launch	Northern Hogsucker	35 - 40	5	0.73	Yes
South Fork Shenandoah River near Newport DGIF Boat Launch	Smallmouth Bass	23 - 25	3	0.63	Yes
South Fork Shenandoah River near Rt. 602 bridge	Largemouth Bass	32 - 36	4	1.07	Yes
South Fork Shenandoah River near Rt. 602 bridge	White Sucker	43 - 49	5	1.06	Yes
South Fork Shenandoah River near Rt. 602 bridge	Carp	48 - 54	3	0.66	Yes
South Fork Shenandoah River near Rt. 602 bridge	Carp	56 - 64	3	0.64	Yes
South Fork Shenandoah River near Rt. 649 bridge, Island Ford Boat Ramp	Largemouth Bass	45	1	2.05	Yes
South Fork Shenandoah River near Rt. 649 bridge, Island Ford Boat Ramp	Rock Bass	14 - 18	6	0.85	Yes
South River near Grottoes, VA near Grand Caverns bridge	Largemouth Bass	31 - 33	3	2.75	Yes
South River near Grottoes, VA near Grand Caverns bridge	Largemouth Bass	22 - 26	2	2.03	Yes
South River near Grottoes, VA near Grand Caverns bridge	White Sucker	36 - 45	3	1.40	Yes
South River near Grottoes, VA near Grand Caverns bridge	White Sucker	31 - 34	2	1.13	Yes
South River near Grottoes, VA near Grand Caverns bridge	Redbreast Sunfish	12 - 18	10	1.05	Yes
South River near Rt. 612 bridge at Crimora	Smallmouth Bass	21 - 26	5	2.33	Yes
South River near Rt. 612 bridge at Crimora	White Sucker	32 - 41	5	1.95	Yes
South River near Rt. 612 bridge at Crimora	Redbreast Sunfish	14 - 18	10	1.09	Yes
South River near Rt. 778 at Harriston Gaging Station	Smallmouth Bass	25 - 28	2	3.22	Yes
South River near Rt. 778 at Harriston Gaging Station	Smallmouth Bass	32 - 33	3	3.09	Yes

Station Location	Species name	Length (cm)	No. of fish	Mercury (ppm)	Advisory in Place
South River near Rt. 778 at Harriston Gaging Station	White Sucker	31 - 41	5	1.81	Yes
South River near Rt. 778 at Harriston Gaging Station	Redbreast Sunfish	14 - 19	10	1.01	Yes
South River near Va. Dept. of Forestry river pumphouse	Smallmouth Bass	18 - 25	5	2.40	Yes
South River near Va. Dept. of Forestry river pumphouse	Northern Hog Sucker	32 - 35	5	1.85	Yes
South River near Va. Dept. of Forestry river pumphouse	Redbreast Sunfish	14 - 15	4	1.08	Yes
South River upstream Basic Park	Smallmouth Bass	25	1	1.70	Yes
South River upstream Basic Park	Rock Bass	15 - 18	7	1.32	Yes
South River upstream Basic Park	Largemouth Bass	27	1	1.22	Yes
South River upstream Basic Park	Fallfish	24 - 28	3	0.64	Yes

*Fish analyzed individually or as composite samples. The length of the fish has been truncated for readability.
Polychlorinated biphenyls advisory in effect for these fish. **cm – centimeters. **ppm** – parts per million.

Image 1: 2024 Sampling Locations for fish with mercury ≥ 0.5 ppm



Source: DEQ data presented using the R mapping program.

CONCLUSIONS

VDH concludes that additional mercury fish consumption advisories are not currently warranted.

VDH concludes that the polychlorinated biphenyls fish consumption advisories in place protect consumers from mercury in smallmouth bass outside of the current mercury advisory on the Shenandoah River.

RECOMMENDATION

VDH recommends additional sampling of smallmouth bass and other species of fish caught for consumption downstream of the Shenandoah River mercury advisory, which can be used to determine the need for an additional mercury fish consumption advisory.

Should you have any questions, please contact us at toxicology@vdh.virginia.gov or at 804 864-8182.

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