



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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MEMORANDUM
December 28, 1983

To: Clar Pratt
Through: Dick Cunningham *DC*
From: Joe Joy *JJ* and Art Johnson *AJ*
Subject: DDT Concentrations in Fish Taken from the Yakima River
below Birchfield (Moxee) Drain

In response to a request from your office, tissue samples from three species of fish collected August 2, 1983 from the Yakima River, approximately 50 feet below its confluence with Birchfield Drain, were analyzed for pesticides at the EPA Manchester laboratory. We recently received the DDT data, and have briefly reviewed them before sending them on to you. Analyses for other types of pesticides have not yet been completed.

The DDT results are presented in Table 1. Also included for comparison are data for samples from the Yakima River 10 miles below Kiona.

The FDA action level for Σ DDT (DDT+DDE+DDD) is 5 ppm (wet-weight basis) and applies only to edible tissue; i.e., muscle. None of the three muscle samples below Birchfield exceeded this limit. However, all tissue samples, including those from Kiona, exceeded the 1.0 ppm Σ DDT limit recommended for the protection of wildlife (NAS, 1973). The samples are not unusual in this respect. Most fish taken from the lower Yakima River over the past 10 years have exceeded this limit, as was pointed out in the July 2, 1983 memorandum to Dick Cunningham (Joy, 1983). The 1.0 ppm limit has been only occasionally exceeded in BWMP and EPA tissue samples collected from other drainages in Washington.

Table 2 shows Σ DDT concentrations for all BWMP whole-fish samples taken from the Yakima at Kiona. Sufficient data for suckers are available for a comparison between Kiona and Birchfield. Assuming that these data are normally distributed, Σ DDT concentration of the Birchfield Drain sucker is outside the range of values that would be expected 96 percent of the time (0.01 - 4.34 mg/Kg). Converted to lipid weight, the Birchfield Drain value is outside the expected range for 99.9 percent of the values (0 - 72 mg/Kg) (Table 2).

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Not enough samples are available to compare whitefish and squawfish samples between the sites.

In summary, it appears that: (1) there is no evidence of a human health hazard from eating coarse fish caught in the Yakima River; (2) birds, and perhaps other animals, could suffer adverse effects from a diet of Yakima River fish; and (3) very limited evidence -- and here we include the water and sediment data in the July 8, 1983 memorandum -- suggests Birchfield drainage has the highest DDT levels in the state.

We would recommend doing one or both of the following:

1. Continue to monitor DDT levels in Yakima fish below Birchfield Drain to assure they remain below the FDA limit. Perhaps test gamefish species as well as coarse fish.
2. Conduct a survey during the 1984 irrigation season, measuring DDT concentrations and loads from the major tributaries and returns to the Yakima. With sufficient samples, this would show us whether or not Birchfield Drain is a unique, high-level source and, therefore, worth further study.

It is probable that low-level DDT contamination is a basin-wide phenomenon caused by widespread use many years ago. The fact that much of the pesticide was in the degraded (DDE, DDD) states suggests that this might be the case. Assuming that this is the case, our preference would be the first recommendation, particularly since our other studies are taxing our priority pollutant analytical capacity to the limit. In any case, the levels are high enough to warrant some additional study. You may also want to inform the regional Washington Department of Game manager of these findings and work out a cooperative study with them.

Let us know what you would like us to do.

JJ:AJ:cp

Attachments

REFERENCES

- Joy, J., 1983. "Review of available DDT data, especially as related to the Yakima River and recent elevated residues found in samples from Birchfield (Moxee) Drain." A memorandum to Dick Cunningha, WDOE, July 8, 1983. 6 pp.
- NAS, 1973. Section III "Freshwater aquatic life and wildlife, water quality criteria." Ecological Research Series, EPA-R3-73-033/March 1973. pp. 106-113.

Table 1. 1983 BWMP fish tissue collection DDT and metabolite results for samples taken from Birchfield (Moxee) Drain and Yakima at Kiona. DDT concentrations mg/Kg, wet weight.

Location	Fish Species (Number)	Portion	Weight (gm)	Percent Solids	Percent Lipid	DDT	DDE	DDD	ΣDDT	Percent DDE
Yakima River below Birchfield Drain	Bridgelip Sucker (1)	Edible	561.37	22.1	4.5	0.490	1.630	0.428	2.548	64.0
		Inedible	270.4	31.7	6.4	2.320	5.120	1.310	8.750	58.5
		Total*	832.27	25.2	5.1	1.085	2.764	0.715	4.564	60.6
	Mountain Whitefish (2)	Edible	315.98	31.6	11.2	0.307	0.765	0.104	1.176	65.1
		Inedible	96.73	33.4	3.3	0.420	1.240	0.170	1.830	67.8
		Total*	412.71	32.0	9.3	0.333	0.876	0.119	1.328	66.0
	Northern Squawfish (2)	Whole	--	27.1	0.8	0.230	2.820	0.310	3.360	83.9
Yakima River 10 miles below Kiona	Bridgelip Sucker (1)	Whole	--	28.5	10.4	0.528	1.330	0.210	2.068	64.3
	Catfish (2)	Whole	--	30.5	14.6	0.917	3.180	0.572	4.669	68.1

*Recalculated from edible and inedible portions.

Table 2. Wet weight and lipid weight Σ DDT (DDT + DDE + DDD) concentrations of fish collected at two sites in the Yakima River.

Location	Year	Fish Species	mg/Kg wet weight	mg/Kg lipid weight
Yakima River below Birchfield Drain	1983	Sucker	4.56	89.4
	1983	Whitefish	1.33	14.3
	1983	Squawfish	3.36	420
Yakima River at Kiona	1983	Sucker	2.07	19.9
	1983	Catfish	4.67	32.0
	1982	Whitefish	1.43	17.7
	1982	Sucker	2.70	31.51
	1981	Squawfish	1.26	17.0
	1981	Sucker	3.08	23.7
	1980	Sucker	0.90	12.9