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WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES

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TO: Carl Neuchterlein
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THROUGH: Bill Yake BY

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SUBJECT: Survey of Mercury and Dioxin in Lake Roosevelt Sportfish -1989: Preliminary Results for Mercury

In response to concerns expressed by the Colville Tribes and the Lake Roosevelt Water Quality Group, Environmental Investigations conducted a survey of mercury concentrations in muscle tissue of walleye (Stizostedion vitreum) and white sturgeon (Acipenser transmontanus) collected from Lake Roosevelt during May through July of this year. Although our previous analysis of mercury in sportfish collected in September, 1986 (Johnson et al. 1988) showed uniformly low concentrations (0.04 - 0.4 ug/g, wet weight*), elevated concentrations in the lake's bottom sediments (1.0 - 2.7 ug/g, dry weight) and continued discharge of mercury by the Cominco Ltd. lead-zinc smelter and refinery in Trail, British Columbia justified a re-survey. In light of data recently published by Environment Canada (Mah et al., 1989) showing elevated 2,3,7,8-tetrachlorodibenzodioxin and 2,3,7,8-tetrachlorodibenzofuran in Columbia River whitefish (Coregonus clupeaformis) below the Celgar pulp mill in Castlegar, B.C., selected walleye and sturgeon samples were also analyzed for polychlorinated dioxins (PCDD) and polychlorinated furans (PCDF).

In the interest of providing timely information to those concerned with these issues, preliminary results for mercury are described in this memorandum. The PCDD/PCDF data are currently being reviewed and will be released once their accuracy has been established. A final report presenting all data should be available by February 1990.

Figure 1 shows where the fish were collected. The sampling sites were selected to coincide with popular sportfishing areas for the target species. Except for a few walleye, all samples were of legal size fish.

Walleye were collected July 17-18 by electroshocking in the lower lake off Hawk Creek Campground (8 fish) and in the upper lake off the Colville River (16 fish). These samples were obtained with the help of Tim

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*ug/g = parts per million

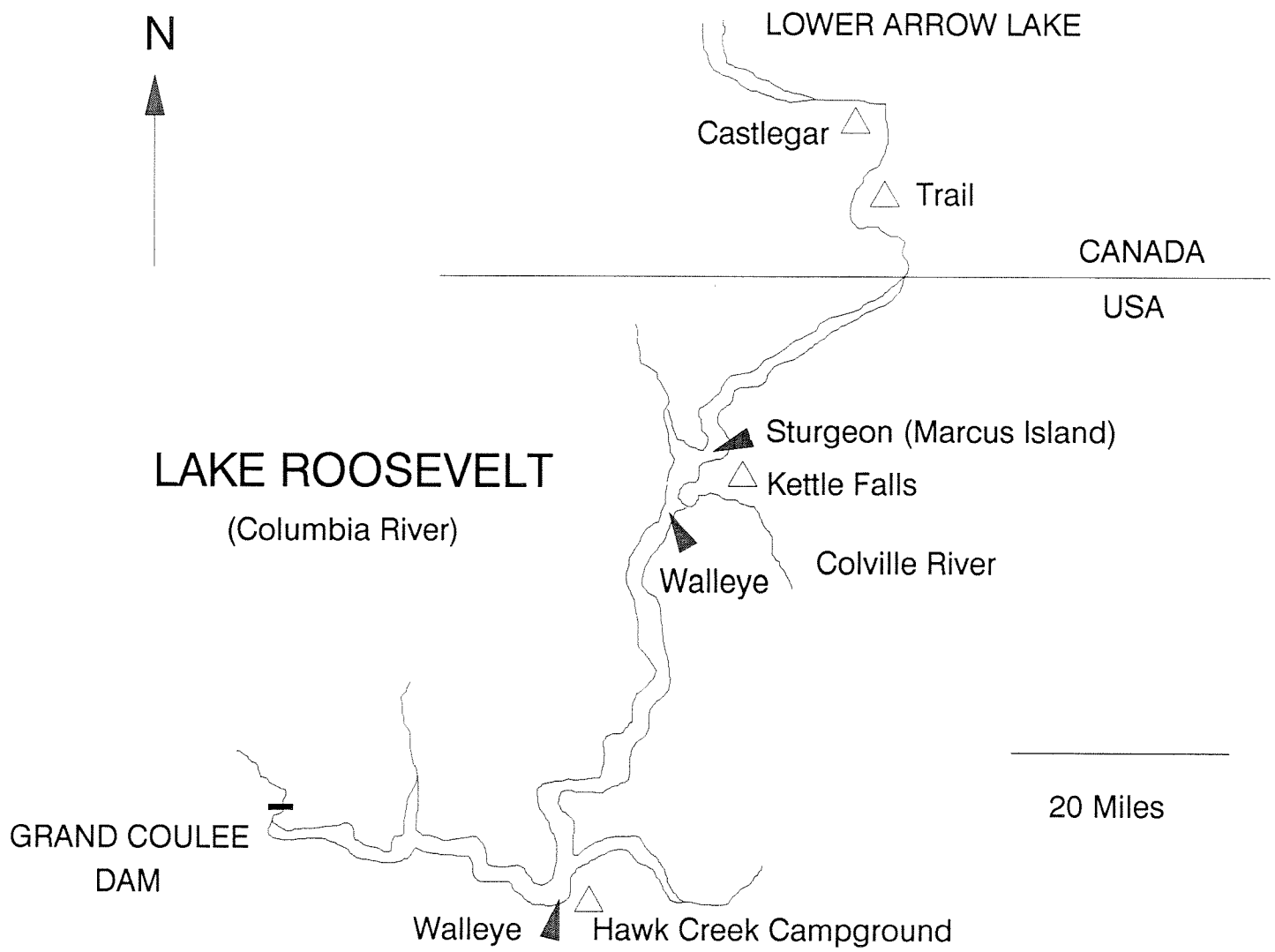

Figure 1. Location of fish sample collections

Peone, Del Brown, and Milo Thatcher of the Upper Columbia United Tribes Fisheries Research Center, through the courtesy of Dr. Al Schulz of Eastern Washington University. Sturgeon samples consisted of the heads from 11 fish (one analyzed for PCDD/PCDF only) caught in the sportfishery in the upper lake at Marcus Island between May 27 and July 3. Gig Lebret of the National Park Service arranged for collection of these samples by Jim Meskan of the Department of Wildlife. Tissue exposed when the head was severed in the field was not included in the analysis.

The mercury concentrations measured in Lake Roosevelt walleye and sturgeon are summarized in Table 1. A standard reference material - National Research Council of Canada DORM-1 (dogfish muscle tissue) - containing a known amount of mercury was analyzed in conjunction with the Lake Roosevelt samples to determine the accuracy of the data. The mean and standard deviation from triplicate analysis of the reference material was 0.77 +/- 0.01 ug/g which compares closely with the certified value of 0.798 +/- 0.074 ug/g indicating the analysis was accurate.

Table 1. Mercury Concentrations in Muscle Tissue of Lake Roosevelt Sportfish Collected in 1989 (ug/g, wet weight; ppm)

Location	Date	Species	Number of Samples	Average Concentration (Range)
Off Hawk Creek	July 17	Walleye	8	0.15 (0.05 - 0.22)
Off Colville R.	July 18	Walleye	16	0.16 (0.09 - 0.24)
Marcus Island	May 27-July 3	Sturgeon	10	0.05 (0.02 - 0.10)

Mercury concentrations measured in walleye ranged from 0.05 - 0.24 ug/g. The overall average for the lake was 0.16 ug/g. Lower concentrations were found in sturgeon which ranged from 0.02 - 0.10 ug/g and averaged 0.05 ug/g.

These concentrations should be considered low. Concentrations in this range are encountered in lakes that have not received discharges of mercury (Eisler, 1987). None of the Lake Roosevelt fish approached the FDA action level of 1.0 ug/g for mercury in fish marketed commercially. The concentrations are also below the more stringent criterion of 0.5 ug/g that has been adopted by Canada. These results are consistent with those of the 1986 survey and show that mercury concentrations in Lake Roosevelt walleye and sturgeon continue to pose no threat to human health. Comparable, or lower, concentrations of mercury would be expected to be occurring in other other of the lake's sportfish.

REFERENCES

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Johnson, A., D. Norton, and B. Yake. 1988. An assessment of metals contamination in Lake Roosevelt. Wash. Dept. Ecology, Olympia, WA.

Mah, F.T.S., D.D. MacDonald, S.W. Sheehan, T.M. Tuominen, and D. Valiela. 1989. Dioxins and furans in sediment and fish from the vicinity of ten inland pulp mills in British Columbia. Environment Canada, Vancouver, B.C.

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