

DEPARTMENT OF ECOLOGY

July 7, 1994

TO: Larry Goldstein, ^{LG}Toxics Investigations Section Head

FROM: ^{DD}Dale Davis, Surface Water Unit

SUBJECT: 1994 Spokane River Survey - Fish Tissue and Sediment Sampling Plan.

Project Description: Fish tissue and sediment samples collected in 1993 just above the Up-River Dam in the Spokane River contained high concentrations of PCBs and lead. The number of samples collected in 1993 were not sufficient to evaluate possible risks to human health and impacts to wildlife. This plan describes an intensive survey of the Spokane River scheduled to take place the first two weeks in August 1994. The primary objective is to thoroughly evaluate the risk of PCBs and lead in fish tissue to human health. Secondary objectives are to identify the source of PCBs and to evaluate impacts to wildlife.

Study Design: Risks to human health will be assessed from three composite samples that will be collected for each selected sport fish species. Selected species were identified as popular sport fish and those that are heavily consumed by the public. Each composite will be composed of six to eight individuals. Impacts to wildlife will be assessed from a single composite of five largescale suckers from each site. Sediments will be collected from selected sites above the Monroe Street Dam. All samples will be analyzed for PCBs. Only selected sport fish samples will be analyzed for lead.

Lead: Dale Davis

Estimated Analytical Costs: \$30,865

Target Completion Dates:

Field sampling	August 1-12, 1994
Sample processing	August 15-26, 1994
Analytical results available	October 28, 1994
Draft report	December 5, 1994
Final report	January 30, 1995

DD:krc

Fish Tissue and Sediment Sampling Plan for the 1994 Spokane River Survey

Sampling Design

Sampling is scheduled to take place from August 1 to August 12, 1994. This is approximately the same time period as the sample collection in 1993. Lipid concentrations in most fish are generally highest in August and September (USEPA, 1993). In addition, low summer flows allow safe access to the river by boat and allow particulates to settle out.

Fish tissue collection and processing procedures will follow the USEPA (1993) guidance document for assessing chemical contaminant data for use in fish advisories. Selection of target species was based on information from the Washington State Department of Fish and Wildlife (Hisata 1994a, 1994b) and an angler survey for the Spokane River (Johnson *et al.*, 1992). Preference was given to species that are known to be popular sport fish and to species that are most heavily consumed by the public. Other considerations were species that are present in nearly all reaches of the river that will be sampled, those that are abundant enough to easily obtain samples, and fish that are resident within the selected sampling reaches.

Sport fish fillets and crayfish will be used to assess human health impacts. Skin-on fillets with scales removed will be resected from each fish, removing muscle tissue from the gill arch to the caudal peduncle. Only the tail meat from crayfish will be used for analyses. Whole largescale suckers will be used to assess impacts to wildlife.

Three composites of each sport fish species and crayfish, and one composite of suckers will be collected. Composites of sport fish and crayfish will be prepared from a minimum of six, but ideally eight individuals selected at random for each sample. Sucker composites will consist of five fish. Fish collected will be restricted to legal sizes.

Sediment samples will be collected to assess possible impacts to aquatic biota, to determine the extent of contamination, and to help identify the source of contamination. To the extent possible, sediment composites will consist of at least five grabs, cores, or dredges. Sediment sampling is expected to be difficult due to a lack of fine material throughout the upper section of the river. In each area, the bottom will be searched for fine sediment and samples will not be representative of typical bottom material.

All fish, crayfish, and sediment will be analyzed for PCBs. Only sport fish above Nine Mile Dam and brown trout from the Spokane Arm and Long Lake will be analyzed for lead. Extra tissue and sediment will be archived from each composite for any necessary future analyses. Sediment from popular beaches used by the public will be collected and archived, but not analyzed at this time.

Sampling Sites

The Spokane River will be sampled from the Spokane Arm to the Post Falls Dam in Idaho for fish and from the Monroe Street Dam to the Post Falls Dam for sediment. For fish collection, the river will be divided into seven reaches (Table 1), most being delimited by dams. Two fish samples will be collected from the Little Spokane River to assess fish movement between the rivers and possible PCB sources.

Sediment sampling locations are listed in Table 2.

Sampling Methods

Fish will be collected using a number of methods. Where ever possible, an electroshocking boat will be used. Gill nets may be used in the Spokane Arm and Long Lake. A Fike net may also be used at these sites, as well as in slow sections of the river above Nine Mile Dam. Backpack shocking may be necessary in the Little Spokane River. Crayfish will be collected with crayfish traps baited with salmon heads or cat food.

After collection, all fish and crayfish will be measured for length and weighed. Scales will be collected from sport fish for age determination. Fish and crayfish will be wrapped in aluminum foil, placed on ice in the field, and then frozen at the laboratory prior to processing.

When possible, sediment samples will be collected with a stainless steel 0.05m² Ponar grab sampler. However, this sampler only works well in soft sediments. Other sediment sampling devices include a pipe dredge and a core sampler. Cores would be collected by hand, wading or free diving in slow and shallow pools. Scuba divers may be used if other methods prove impracticable.

Quality Assurance/Quality Control

A portion of one fish and one sediment sample will be used for matrix spike (MS) and matrix spike duplicate (MSD) analyses to detect bias due to interferences from the sample matrix. Field replicate samples are taken to estimate overall precision. Three replicates will be collected for all sport fish from the Spokane River. Selected samples will be analyzed in duplicate to estimate analytical precision. Standard reference material (SRM) will be analyzed in duplicate to estimate analytical accuracy and precision. Surrogate spikes will be performed on each sample as an estimate of laboratory performance.

Table 1. Target Species List for the 1994 Spokane River Survey

River Reach	Selected Species	Tissue	Analyses	Composites	Alternate
Spokane Arm	Walleye	Fillet	PCB	3	Yellow Perch
	Brown Trout	Fillet	PCB, Lead	3	
	Rainbow Trout	Fillet	PCB	3	
	Kokanee	Fillet	PCB	3	
Long Lake	Yellow Perch	Fillet	PCB	3	Black Crappie
	Largemouth Bass	Fillet	PCB	3	
	Mt. Whitefish	Fillet	PCB	3	
	Brown Trout	Fillet	PCB, Lead	3	
	Crayfish	Tail	PCB	3	
	Largescale Sucker	WF	PCB	1	
Little Spokane River	Mt. Whitefish	Fillet	PCB	3	
	Largescale Sucker	WF	PCB	1	
Nine Mile Dam to Monroe St. Dam	Rainbow Trout	Fillet	PCB, Lead	3	Brown Trout
	Mt. Whitefish	Fillet	PCB, Lead	3	
Monroe St. Dam to Upriver Dam	Rainbow Trout (wild)	Fillet	PCB, Lead	3	Brown Trout
	Rainbow Trout (plants)	Fillet	PCB, Lead	3	
	Squawfish	Fillet	PCB, Lead	3	
	Crayfish	Tail	PCB, Lead	3	
	Largescale Sucker	WF	PCB	1	
Upriver Dam to Myrtle Point	Rainbow Trout	Fillet	PCB, Lead	3	Brown Trout
	Crayfish	Tail	PCB, Lead	3	
	Largescale Sucker	WF	PCB	1	
Myrtle Point to State Line	Rainbow Trout	Fillet	PCB, Lead	3	Brook Trout
	Largescale Sucker	WF	PCB	1	
State Line to Post Falls Dam	Rainbow Trout	Fillet	PCB	3	Brook Trout

	<u>PCBs</u>	<u>Lead</u>
Total fish samples	65	33
SRM samples	4	2
Duplicates	4	2
MS/MSD	2	2

Total analyses 75 39

Table 2. Sediment Collection Locations for the 1994 Spokane River Survey (PCBs only)

River Reach	Purpose	Number of Composite Samples
Upriver Dam to Boulder Beach	Confirmation of hot spot concentrations Assessment of possible sources from Felts Airfield along south shore	2 2
Boulder Beach to Post Falls Dam	Upstream concentrations at selected intervals	12 total 6 below Kaiser 6 above Kaiser
Monroe St. Dam to Upriver Dam	Assessment of other possible sources within the City of Spokane	5
Right bank drainages	Investigate possible sources	1 above Kaiser 1 below Kaiser
Total sediment samples		23
SRMs		4
Duplicates		2
MS/MSD		2
		31

Table 3. Analytical Costs

Fish Tissue

	<u>PCBs</u>	<u>Lead</u>
Total analyses	75	39
Cost per sample	\$210	\$85
Total cost	\$15,750	\$3,315
Cost for lipid analysis	\$3,375	
Overall cost of fish tissue analyses		\$22,440

Sediment

Total number of samples	31
Cost per sample for PCB analysis	\$175
Total cost for PCB analyses	\$5,425
Cost for TOC analyses (\$50/sample, 25 samples)	\$1,250
Cost for grain size analyses (\$70/sample, 25 samples)	\$1,750
Overall cost for sediment analyses	<hr/> \$8,425

Total cost for fish tissue and sediment analyses **\$30,865**

REFERENCES

- Hisata, J., 1994a. Memorandum to Dave Serdar regarding fishery data from the Spokane River. Washington State Department of Fish and Wildlife, May 13, 1994.
- Hisata, J., 1994b. Memorandum to Larry Goldstein regarding a review of available information on the Spokane River fishery and fish populations. Washington State Department of Fish and Wildlife, May 25, 1994.
- Johnson, E., R. Smith, and D. Selle. 1992. 1992 Angler Survey for the Spokane River, Washington. Washington Water Power Company, Environmental Affairs, Spokane, Washington.
- USEPA, 1993. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1 - Fish Sampling and Analysis. U.S. Environmental Protection Agency, Office of Science and Technology, Office of Water, Washington, D.C. EPA 823-R-93-002.