

Publication No.  
99-03-001

## DEPARTMENT OF ECOLOGY

December 23, 1999

To: John Roland, ERO  
From: Art Johnson, EAP  
Subject: Reconnaissance Survey of Sediments Behind Upriver Dam, Spokane River

This memorandum summarizes results from the reconnaissance survey you and I conducted October 14, 1999 in the impoundment behind Upriver Dam. The objective was to identify depositional areas of possible importance for the ongoing U.S. EPA Spokane River Basin-wide Remedial Investigation and Feasibility Study.

Sediment samples were collected along nine bank-to-bank transects between river mile 80.2 to 83.4 (Figure 1). Along each transect, samples of the river bed were inspected from a series of 0.02 m<sup>2</sup> Ponar grabs. When fine material was found, a larger 0.06 m<sup>2</sup> Ponar was used to take a sample to archive for possible chemical analysis.

The chemistry samples were of the top-10 cm surface layer. The material was removed with stainless steel scoops and homogenized by stirring in stainless steel bowls. Subsamples of the homogenized sediment were placed in 8-oz glass jars with teflon lid liners, cleaned to EPA QA/QC specifications (EPA, 1990), or Whirl-Pak bags for grain size. Two 8-oz jars were prepared for each chemistry sample.

Stainless steel scoops and buckets used to manipulate the sediments were cleaned by washing with Liquinox detergent, followed by sequential rinses with tap water, dilute nitric acid, deionized water, and pesticide-grade acetone. The equipment was then air-dried and wrapped in aluminum foil. The grabs were cleaned similarly and wrapped in aluminum foil before going into the field. The grabs were washed by brushing with site water between samples.

The samples were put in individual polyethylene bags and placed on ice immediately after collection. The grain size samples were analyzed by Rosa Environmental & Geotechnical Laboratory in Seattle. The chemistry samples were frozen in a secure freezer at Ecology headquarters. Chain-of-custody was maintained.

The locations of samples saved for chemistry are marked on Figure 1. Table 1 summarizes the field notes indicating the transect coordinates, the number of sites where grabs were taken, location of chemistry samples, water depths, and type of material encountered.

Most of the grabs brought up gravel or cobble, or hit hard surfaces and came up empty. Finer material consisting of primarily sand, with some silt, was found on the right side of the channel (facing downstream) in the lower part of the study reach. Sand was also found in a backwater area on the right bank side of the most upstream transect (#9).

Six samples were saved for chemistry. These were selected as being representative of the fine material encountered in this reach. The grain size data for these samples are in Table 2. Complete results from the grain size analysis showing the phi size breakdown are attached.

A depositional area was found just above Upriver Dam in 26 feet of water off the right bank. The material at this site was dark grey/brown in color and organic-rich. It appeared generally similar in character to a sediment sample previously collected in 1994 further upstream, close to the right bank in the vicinity of transect #4 (EILS, 1995). That sample contained high concentrations of zinc, lead, cadmium, and PCBs, with elevated levels of polyaromatic hydrocarbons (PAH). It was toxic in bioassays with the amphipod *Hyaella* and in the Microtox test (Table 3). We failed to re-locate this material during the present survey.

At a minimum, sample number 418080 from transect #1 should be analyzed for metals, PCBs, PAH, and total organic carbon.

#### Acknowledgments:

Field work was done with the assistance of Dave Serdar and Norm Glenn (EAP).

#### References:

EILS. 1995. Department of Ecology 1993-94 Investigation of PCBs in the Spokane River. Environmental Investigations and Laboratory Services Program, Washington State Dept. Ecology, Olympia, WA. Pub. No. 95-310.

EPA. 1990. Specifications and Guidance for Obtaining Contaminant-Free Sample Containers. OSWER Directive #9204.0-05.

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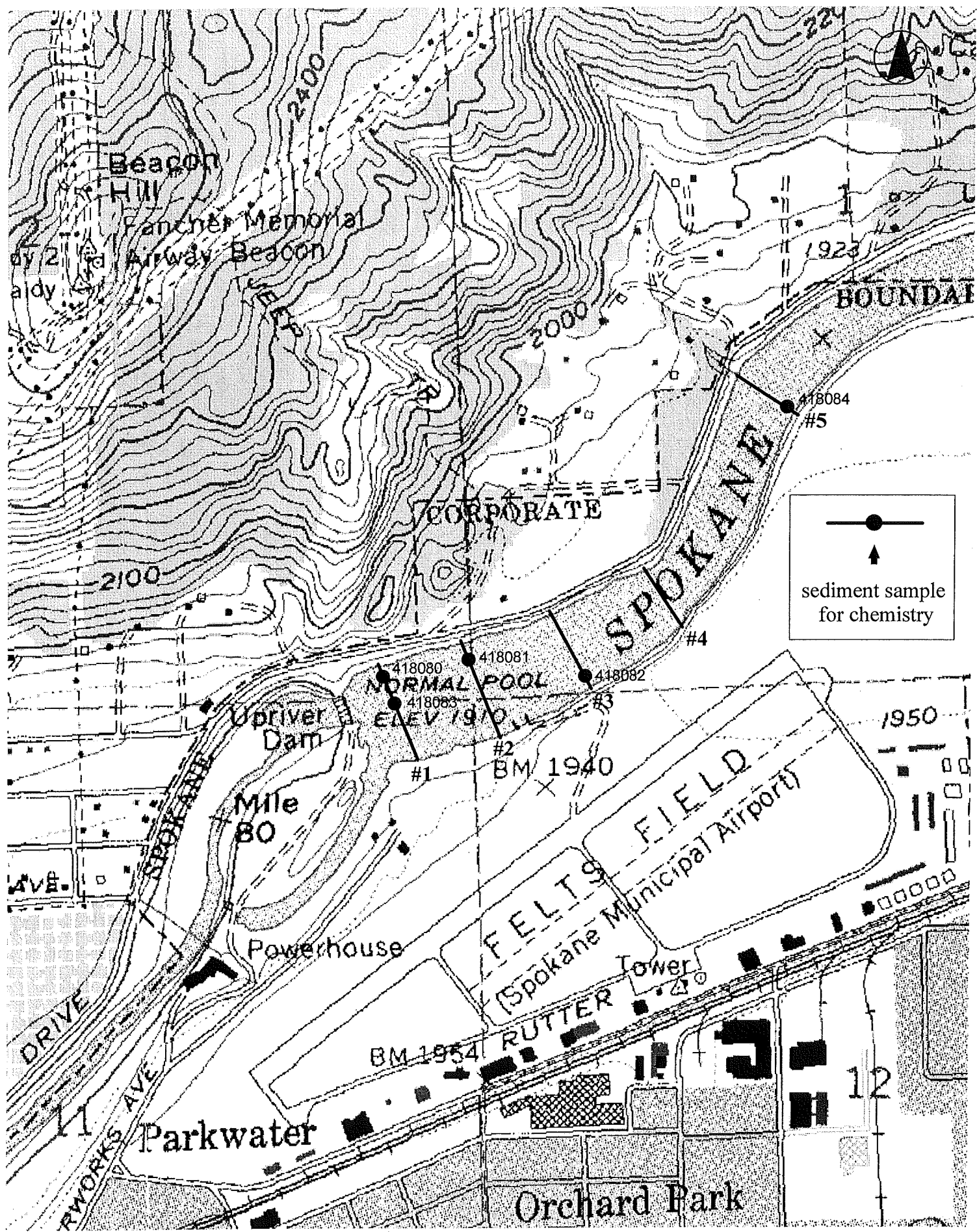
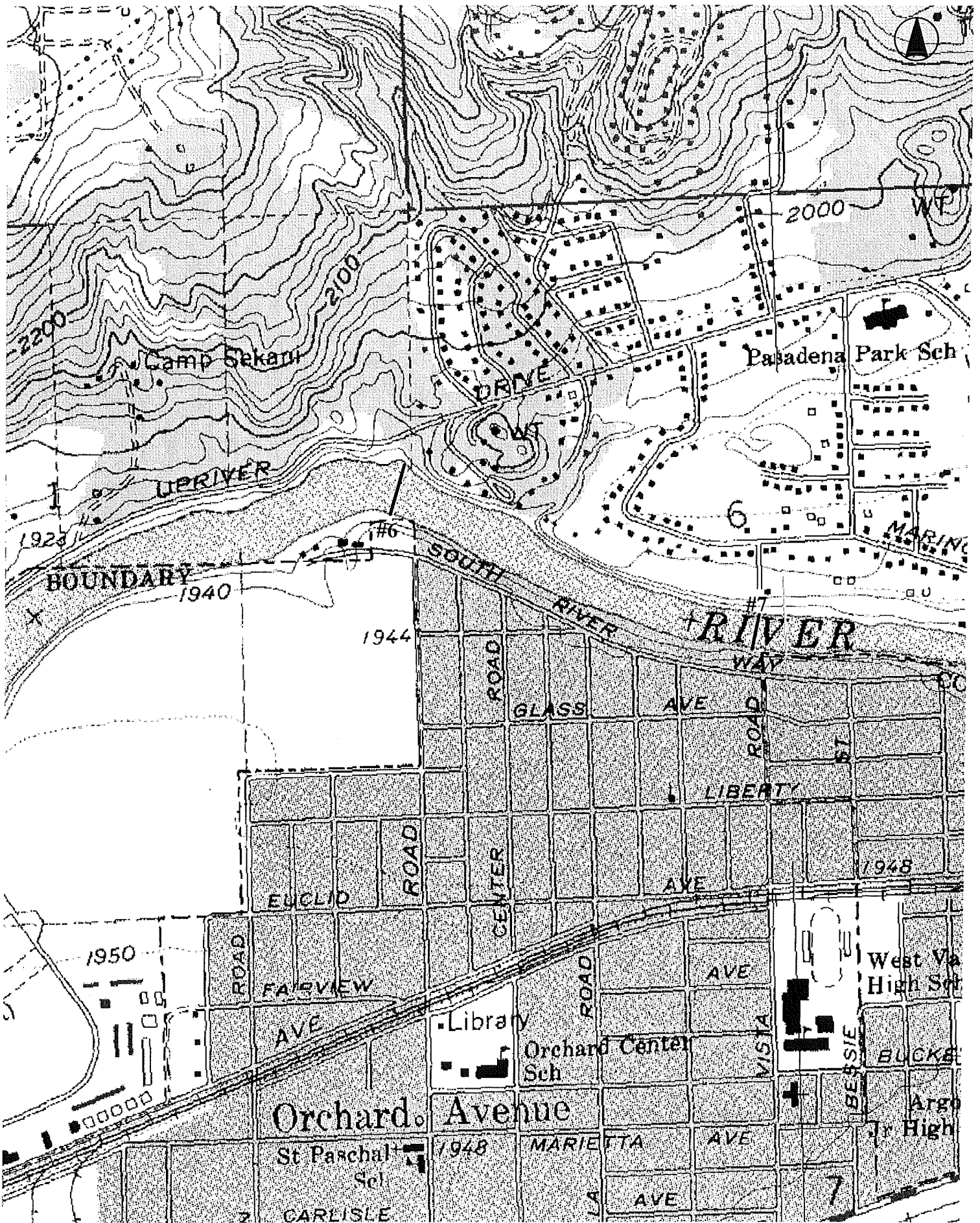


Figure 1a. Transects for Sediment Reconnaissance Behind Upriver Dam



1b. Upriver Transects (cont'd)

0.08 0 0.08 0.16 Miles



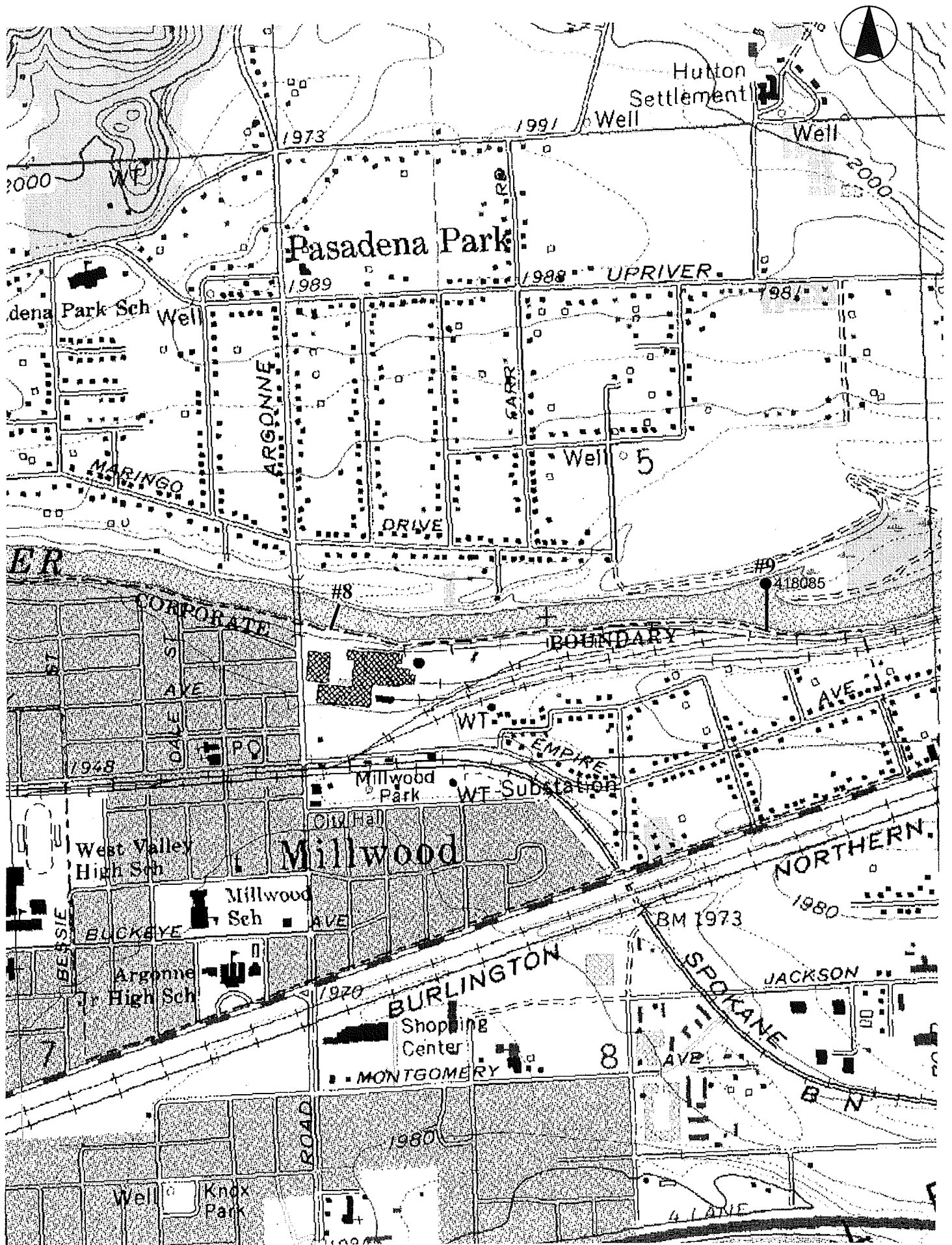


Figure 1c. Upriver Transects (cont'd)

0.06 0 0.06 0.12 Miles





**Table 2. Grain Size of Sediment Samples Collected Behind Upriver Dam, October 1999**

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Transect	Sample No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Solids (%)
#1	418080	5.1	77.6	17.3	0.0	30.4
#1	418083	23.2	75.3	1.5	0.0	81.4
#2	418081	1.8	92.5	5.7	0.0	54.7
#3	418082	12.8	74.6	12.7	0.0	14.8
#5	418084	38.8	60.3	0.9	0.0	76.8
#9	418085	5.7	92.1	2.2	0.0	69.1

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**Table 3. Summary of Chemistry and Bioassay Data on Spokane River Sediment Samples Collected in 1994 (EILS, 1995)**

	Location: Upriver Dam	Spokane Arm	Long Lake
Sample No.:	328001	328003	328002
<b>Chemistry</b>			
zinc (mg/Kg, dry)	4050	1180	520
lead "	542	81	42
cadmium "	40	9.1	3.9
PCB-1248 (ug/Kg, dry)	4500	35	21
total PAH "	2757	27	466
4-methylphenol "	3590	nd	599
retene "	6020	77	57
total organic carbon (%)	13	1.8	0.8
finest (% silt + clay)	33	94	19
<b>Bioassays</b>			
Hyaella (10-day survival)	50%	80%	92%
Microtox (EC50)	28%	41%	>53%

nd = not detected