



## Briefing Paper for the Okanogan Watershed WRIAs 48, 49, 50

### Toxics

#### Introduction

The purpose of this briefing paper is to provide additional information on EAP studies related to toxic chemical contamination conducted since the June 1995 *Needs Assessment for the Okanogan Watershed* was prepared. Studies were conducted or are underway in three subject areas: 1) pesticides in Osoyoos Lake and the Okanogan River; 2) metals and other contaminants in the Similkameen River; and 3) metals impacts in mining districts.

#### Summary of New Information

##### Osoyoos Lake/Okanogan River

Serdar et al. (1998) obtained data on DDT, DDE, and DDD in 18 composite fillet samples from five Osoyoos Lake fish species – yellow perch, smallmouth bass, mountain whitefish, carp, and lake whitefish. A few whole largescale sucker and smallmouth bass were also screened for other bioaccumulative pesticides and PCBs. Mean concentrations of total DDT (DDT+DDE+DDD) ranged from 60 ug/Kg (parts per billion) in yellow perch to 1,110 ug/Kg in lake whitefish. Low concentrations of PCBs, hexachlorobenzene, and DDMU, a further breakdown product of DDT, were detected in the whole fish samples.

The concentrations in fish fillets fall between the 50<sup>th</sup> and 90<sup>th</sup> percentile of fish analyzed statewide and exceed the EPA National Toxics Rule (NTR) criterion of 32 ug/Kg on which the 303(d) water quality limited listing of the lake was based. T-DDT in four of the five species analyzed from Osoyoos Lake also exceed an action level for DDT+DDE of 61 ug/Kg determined by the Washington State Dept. of Health for fish consumption in the Yakima River (Marien and Laflamme, 1995).

Environment Canada is planning to conduct more fish tissue pesticide analyses in Osoyoos Lake next year and has some reconnaissance type data from previous years not reviewed for this briefing paper. Environment Canada also plans to do similar fish sampling in the Similkameen River next year. (Bev McNaughton, 1999).

Davis and Serdar (1996) report data on pesticides and PCBs in one carp fillet composite and two whole largescale sucker composites collected from the lower Okanogan River in 1994. The DDT concentrations were substantially higher than in fish from Osoyoos Lake. T-DDT in the carp fillet, 2,853 ug/Kg, was two orders of magnitude higher than the above-mentioned EPA and WDOH human health values. The level in whole suckers was well above recommended wildlife criteria. PCB concentrations in carp fillets also exceeded the EPA NTR criterion (45 ug/Kg vs. 1.4 ug/Kg). The finding for edible fish tissue put the Okanogan River on the 1996 303(d) list. Patti Stone, Water Quality Coordinator for the Colville Confederated Tribes, has submitted a project request to EAP for a study of DDT residues in Okanogan River fish.

In an effort to locate sources of DDT to Osoyoos Lake and the Okanogan River, Johnson et al. (1997) collected water samples from 12 tributaries in July and August, 1995. DDT or its breakdown products were detected in seven of the tributaries. Concentrations substantially exceeded the state chronic water quality standard of 0.001 ug/L (parts per billion) in Tallant Creek (0.19 - 0.50 ug/L), Nine-Mile Creek (0.0055- 0.0064 ug/L), and an unnamed creek in Omak (0.0055 - 0.0080 ug/L). As a result, these streams are on the 1998 303(d) list for DDT. Except for the unusually high levels in Tallant Creek, the concentrations observed in the seven tributaries were similar to other state waters contaminated with DDT from historical use. The Colville Tribe has also submitted a project request to EAP for an "in-depth" investigation of DDT sources to Osoyoos Lake and the Okanogan River.

## Similkameen River

Johnson (1997) surveyed metals concentrations in water and sediment samples from five sites on the Similkameen River during low flow and spring runoff in 1995/96. The primary finding of interest was moderately elevated concentrations of copper and arsenic. Although state water quality standards were not exceeded, the arsenic concentrations in water were higher than typically encountered. The arsenic concentrations in some of the sediment samples had the potential to adversely effect benthic macroinvertebrates.

The Similkameen was placed on the 1998 303(d) list for arsenic exceeding the NTR human health criterion in water. As stated in the 303(d) list "there is significant uncertainty regarding the accuracy of the current arsenic criteria for human health."

Follow-up sampling of the Similkameen was conducted by EAP during the summer of 1998 to better determine if there is significant contamination. Cyanide was also analyzed. Preliminary results indicate a moderate to low level of metals contamination and no cyanide detectable (Johnson et al., in prep).

EAP conducted a test to simulate the potential release of metals and cyanide to the Similkameen River during placer dredging for gold. The Department of Natural Resources has traditionally allowed recreational dredging in the Similkameen under mineral prospecting leases. Results showed state water quality standards could be exceeded for copper and lead, but that dilution would be rapid (Johnson, 1999).

The B.C. Ministry of Environment reviewed water quality data on the Similkameen River from 1979 - 1997 (Stewart, 1998). The following were among their major conclusions:

1. "Arsenic [total recoverable] was above the criteria levels during spring freshet near the U.S. border but not upstream, indicating that the source of arsenic is between Hedley and the U.S. border, possibly abandoned mines. It was probably in particulate form as it was high during periods of high turbidity, and was probably not bioavailable."
2. "Copper [total recoverable] objectives were met except during spring freshet. As copper was high at all three Similkameen River sites during freshet, it appears to be a basin-wide phenomenon. It is probably in particulate form and thus not bioavailable."
3. "Cyanide objectives were met except on one or two occasions at each of the three sites. These exceedances were not due to the mines downstream from Hedley, and may have been due to unknown sources or artificial contamination."

EAP has routine monitoring data on dissolved metals in the Similkameen River at Oroville for October 1995 - September 1998 that further illustrate the spring peak in copper and arsenic. No violations of state water quality standards have been documented.

In response to a request from the Colville Confederated Tribes, cores of the sediment deposits behind Enloe Dam on the lower Similkameen are to be collected by EAP in September 1999 and analyzed for metals, cyanide, semivolatiles, pesticides, PCBs, dioxins and furans, and grain size. A draft report on this project is planned for February 2000.

## Mining Districts

In 1997, Raforth et al. (in prep.) analyzed water quality in an unnamed stream draining the Ruby Hill mining area in the Conconully District and in Alder Creek in the vicinity of Alder Mine near Twisp. This was part of a larger study of eastern Washington mining districts, with the focus being on metals, conducted cooperatively by the Ecology Central Regional Office, Department of Natural Resources, and EAP.

Water quality standards were exceeded for zinc in the Ruby Hill stream, and for zinc and cadmium in Alder Creek. Iron was a potential water quality problem in both areas. Zinc, copper, and cadmium substantially exceeded sediment quality guidelines in Alder Creek sediments. No sediment samples were analyzed for Ruby Hill. EPA is doing follow-up work in Alder Creek.

There are other mines in the Conconully District and elsewhere in the Okanogan watershed that have the potential to impact water quality in nearby streams but where little or no data have been collected. Information that could be used to identify these sites is available through the Okanogan County Health District, Bureau of Land Management, and U.S. Forest Service. (Bob Raforth, CRO, 1999)

## Recommendations

1. Retain Osoyoos Lake on the 303(d) list for DDT in edible fish tissue.
2. Conduct a site-specific health risk assessment for consumers of Osoyoos Lake fish.
3. Conduct a survey to assess current levels of DDT and PCBs in Okanogan River fish and implications for human health.
4. Investigate DDT sources to Osoyoos Lake and the Okanogan River in sufficient detail for control actions to be identified.
5. Conduct screening surveys for pesticides in other waterbodies with substantial agricultural land use, e.g., Whitestone and Spectacle Lakes.
6. Based on review of data from the coring project at Enloe Dam, previous EAP studies, and other available information, determine if there are contaminants of concern in the Similkameen River and work to control sources or conduct additional studies as appropriate.
7. Review available information to identify mines that may be having adverse water quality impacts and sample as appropriate;

## References

- Johnson, A. 1997. Survey of Metals Concentrations in the Similkameen River. Memorandum to J. Milton. Washington State Department of Ecology, Olympia, WA.
- Johnson, A. 1999. Dredging Simulation Test on Similkameen River Sediments. Washington State Department of Ecology, Olympia, WA. Ecology Report No. 99-318.
- Johnson, A., D. Serdar, and D. Davis. 1997. DDT Sources to the Okanogan River and Lake Osoyoos. Memorandum to J. Milton. Washington State Department of Ecology, Olympia, WA.
- Marien, K. and D. Laflamme. 1995. Determination of a Tolerable Daily Intake of DDT for Consumers of DDT Contaminated Fish from the Lower Yakima River. Risk Analysis 15:709-717.
- Raforth, R., D. Norman, and A. Johnson. (in prep.) Water and Sediment Quality of Creeks in Some Eastern Washington Mining Districts, with Emphasis on Metals. Washington State Department of Ecology and Department of Natural Resource.
- Serdar, D., Davis, and A. Johnson. 1998. DDT in Osoyoos Lake Fish. Washington State Department of Ecology, Olympia, WA. Publication No. 98-337.
- Stewart, A. 1998. State of Water Quality of Similkameen River, 1979 - 1997. Environment Canada and B.C. Ministry of Environment, Land, and Parks.

## **Contacts**

Art Johnson                      Washington State Department of Ecology  
   Environmental Assessment Program  
   (360) 407-6766

For additional copies of this publication, please contact Ecology's Publications Distribution Office at (360) 407-7472 and refer to publication number 99-340.

The Department of Ecology is an equal opportunity agency and does not discriminate on the basis of race, creed, color, disability, age, religion, national origin, sex, marital status, disabled veteran's status, Vietnam Era veteran's status or sexual orientation.

If you have special accommodation needs or require this document in alternative format, please contact Shirley Rollins at (360) 407-6696 (voice). Ecology's telecommunication device for the deaf (TDD) number at Ecology Headquarters is (360) 407-6006.