

**From:** Brown, Robin  
**Sent:** Wednesday, November 19, 2008 11:35 AM  
**To:** Richards, Laura <Laura.Richards@dfo-mpo.gc.ca>; D'Amours, Denis <Denis.DAmours@dfo-mpo.gc.ca>  
**Cc:** Ross, Peter (Pacific) <Peter.S.Ross@dfo-mpo.gc.ca>; Macdonald, Robie <Robie.Macdonald@dfo-mpo.gc.ca>  
**Bcc:** Sumsion, Philippa <Philippa.Sumsion@dfo-mpo.gc.ca>  
**Subject:** RE: Issues Management- Effect of Pesticide Spraying on Pacific Salmon

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This is an area of active research in DFO Science. A bit of context.

1) This is a direct DFO issue. DFO has an agreement (and funding) to work with Health Canada's Pest Management Regulatory Agency to provide scientific research and advice to support the regulation of pesticides.

2) This is an area of complex jurisdiction. Health Canada/PMRA regulates the use of pesticides. EC focuses on "point source" deposition of deleterious substances under the Fisheries Act. DFO worries about more subtle ecosystem impacts of (primarily) non-point sources (like surface run-off) and complex mixtures of contaminants that are poorly addressed with EC's primary emphasis on point sources. This is exactly the kind of problem that is likely to slip through the research and regulatory "cracks".

3) DFO Science has a CoE on Pesticide impacts - [http://www.dfo-mpo.gc.ca/science/coe/index\\_e.htm](http://www.dfo-mpo.gc.ca/science/coe/index_e.htm)

The **Centre for Environmental Research on Pesticides (CERP)** is located at the Freshwater Institute in Winnipeg. CERP carries out effects-based research related to the potential impacts of pesticides on fish and fish habitat in marine and freshwater ecosystems. Research is conducted in collaboration with other federal departments and the results are presented to the agency responsible for regulating the use of pesticides in Canada, the Pest Management Regulatory Agency (PMRA).

4) This is a known issue and the subject of ongoing research, albeit at quite modest levels with the cancellation of the Toxic Chemical program within Environmental Science. It is highly likely that at least some DFO research (some of which is listed below) is cited by the NOAA Fisheries investigators referred to in the article. Recent activities have included:

- Review of Current Use Pesticides (286) and setting priorities for research.

Verrin,S., Begg,S., and **Ross,P.S.** 2004. Pesticides in British Columbia and the Yukon: An assessment of types, applications and risks to aquatic biota. *Can.Tech.Rep.Fish.Aquat.Sci.* **2517**: 1-200.

- Review of environmental contaminants in the Fraser River and possible implications for the "late run sockeye" problem Johannessen,D.I. and **Ross,P.S.** 2002. Late-run sockeye at risk: An overview of environmental contaminants in Fraser river salmon habitat. *Can.Tech.Rep.Fish.Aquat.Sci.* **2429**.
- Direct research on the impacts of current use pesticides on salmonids (collaborative with SFU). In these studies (mostly lab-based), rainbow trout are used as a surrogate for coho salmon.

Tierney,K.B., **Ross,P.S.**, Jarrard,H.E., Delaney,K.R., and Kennedy,C.J. 2006. Changes in juvenile coho salmon electro-olfactogram during and after short-term exposure to current-use pesticides. *Environ.Toxicol.Chem.* **25**: 2809-2817.

Tierney,K.B., **Ross,P.S.**, and Kennedy,C.J. 2006. Linuron and carbaryl differentially impair baseline amino acid and bile salt olfactory responses in three salmonids. *Toxicology*

Tierney,K.B., Singh,C.R., **Ross,P.S.**, and Kennedy,C.J. 2006. Relating olfactory neurotoxicity to altered olfactory-mediated behaviours in rainbow trout exposed to three currently-used pesticides.

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Tierney,K.B., Taylor,A.L., **Ross,P.S.**, and Kennedy,C.J. 2006. The alarm reaction of coho salmon parr is impaired by the carbamate fungicide IPBC. *Aquat.Toxicol.* **79**: 149-157.

5) This laboratory exposure work was followed up by further collaborative research (DFO, SFU and EC) to simulate environmentally-realistic concentration/conditions. This research verified that impairment of salmon olfaction is a realistic concern and environmentally realistic levels in the lower Fraser River valley system.

**Salmon Olfaction is Impaired by an Environmentally Realistic Pesticide Mixture.** Keith B. Tierney, Jessica L. Sampson, Peter S. Ross, Mark A. Sekela, Christopher J. Kennedy *Environmental Science & Technology* **2008** 42 (13), 4996-5001

This journal article did attract the attention of this high -profile journal. In the July 1, 2008 edition of ES&T, the editors did a "news story" on the article. The news story was entitled "Real-world pesticide mixtures harm salmon". A quote from the news article is"

"Research published in *ES&T* (pp 4996–5001) is the first laboratory study to simulate the low-level pesticide brew in an actual stream and to examine its effects on fish. The study looked at rainbow trout, a member of the salmon family, and found that the pesticide mix can deaden the trout's sense of smell. This could harm the fish's ability to avoid predators, find mates, and migrate back to sea, the researchers

say, and could contribute to the threatened and endangered status of salmon species."

6) On a more specific regulatory topic, Dr. Ross (through CERP) provided provided scientific/technical advice to Health Canada's Pest Management Regulatory Agency on their re-evaluation of the herbicide Atrazine. Atrazine is a pesticide that is commonly used in the production cycle of corn. A fair amount of corn is grown in the lower Fraser Valley to support the dairy industry and there are salmon-bearing/salmon rearing streams throughout the lower valley area. In his review of Atrazine, Dr. Ross combined results from the laboratory and field studies (including those above) and Habitat Sensitivity mapping information prepared by OHEB to point out the specific hazards associate with this chemical and this environment. Following his review, the manufacturer voluntarily withdrew the product Atrazine from use in British Columbia.

7) This research is continuing, with an "ecosystem focus" as is shown in the following recent publication:

**Partitioning of Current-use and Legacy Pesticides in Salmon Habitat in British Columbia, Canada.** KATE A. HARRIS, NEIL DANGERFIELD, MILLION WOUNDNEH, TOM BROWN, STACEY VERRIN and PETER S. ROSS. *Environmental Toxicology and Chemistry*, Vol. 27, No. 11, pp. 2253–2262, 2008

8) I am following up with NOAA Fisheries in Seattle and Environment Canada locally to get further information.

Others who may be interested in this response include:

- Patrice Simon - Director, Environmental Science Ottawa
- Brian Riddell - SAFE
- Al Colodey - EC
- Vince Palace - CERP CoE (FWI)
- Serge Gosselin - LEACA CoE (IML)

Regards

*Robin*

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**From:** D'Amours, Denis **On Behalf Of** Richards, Laura  
**Sent:** November 19, 2008 9:08 AM  
**To:** Brown, Robin  
**Subject:** FW: Issues Management- Effect of Pesticide Spraying on Pacific Salmon

-----Original Message-----

**From:** Poirier, Julie  
**Sent:** Wednesday, November 19, 2008 8:59 AM  
**To:** Richards, Laura  
**Cc:** Johal, Sharan  
**Subject:** FW: Issues Management- Effect of Pesticide Spraying on Pacific Salmon

Laura, Do we have any information and or thoughts we could share with MO.  
Your help appreciated  
Julie

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**From:** Winstan, Jules  
**Sent:** November 19, 2008 8:56 AM  
**To:** Johal, Sharan; Poirier, Julie  
**Cc:** Sprout, Paul; Ashley, Sharon; Laplante, Alanna; Leblanc, Julie; Michaud, Mariette; Mutchmore, Manon; Breton, Mimi  
**Subject:** Issues Management- Effect of Pesticide Spraying on Pacific Salmon

Hi,  
Kym Purchase has asked the following question. Please provide a response today.  
Thank you.

Please provide to the department. In the strict sense it would be an environment Canada issue but if there is anything the department has to share I'd like to know. Thanks

**PUBLICATION:** The Guardian (Charlottetown)  
**DATE:** 2008.11.19  
**SECTION:** World

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**PAGE:** B8  
**COLUMN:** Around the globe  
**SOURCE:** AP  
**DATELINE:** GRANTS PASS, Oregon  
**WORD COUNT:** 114

## **Biologists say three pesticides jeopardizing salmon in West**

U.S. biologists say three pesticides common on farms and orchards in the West jeopardize the survival of Pacific salmon. The chemicals interfere with salmon's sense of smell, making it harder to avoid predators, find food, and even find their native spawning streams.

NOAA Fisheries Service, the federal organization in charge of saving salmon from extinction, is sending its findings to the Environmental Protection Agency to draw up guidelines.

The findings are the result of a lawsuit brought by anti-pesticide groups and salmon **fishermen**. The fisheries service is recommending bans on aerial spraying within 300 metres of streams, and ground spraying within 150 metres, as well as broad strips of grass or brush for added protection.

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### ***Kym Purchase***

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