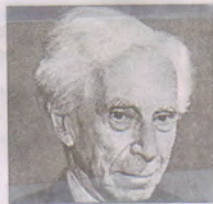


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# SCIENCE



University of Victoria wildlife toxicologist Jennie Christensen (left) and Misty MacDuffee of the Raincoast Conservation Society at Kooeye River, where they are investigating persistent contaminants in grizzly bears and their effect on the bears during hibernation. Christensen documents a juvenile grizzly bear (below) before taking hair samples for chemical analysis.

## B.C. GRIZZLIES SHOW SIGNS OF POLLUTION FROM ASIA

ENVIRONMENT | Chemicals banned in Canada turn up in salmon



# B.C. GRIZZLIES SHOW SIGNS OF POLLUTION FROM ASIA

ENVIRONMENT | Chemicals banned in Canada turn up in salmon

BY NICHOLAS READ  
VANCOUVER SUN

In case another cautionary tale is needed about how small the world is, and how what we do here can affect others elsewhere in ways we can't always predict, here is one about Asia, British Columbia and grizzly bears.

Two years ago, University of Victoria wildlife toxicologists Jennie Christensen and Peter Ross showed that grizzly bears were being contaminated with PCBs — plasticizers used in a variety of products — and DDT, a type of pesticide, when they fed on salmon that had returned to B.C. to spawn.

Canada and the U.S. had banned these chemicals 30 years earlier, but Asia had not. So there they were, turning up again in B.C. bears that had eaten B.C. salmon.

Now Christensen and Ross have taken that research a step further. By examining the hair and fat of grizzlies that were shot by sport hunters or conservation officers, they set out to determine what happens to these chemicals in bears when they hibernate.

And what they've found is that because grizzlies don't urinate or defecate during hibernation — instead they feed on their fat reserves until they emerge the following spring — everything they consume before entering their dens stays in them. And in the case of some chemical pollutants, that means they get more concentrated.

Two to three times more concentrated, it turns out, when it comes to PCBs, Chris-

tensen said. In fact, dioxin-like PCBs, the most toxic form of PCB, ended up being 3.3 times more concentrated in grizzlies that were finished hibernating compared to grizzlies that hadn't begun.

By contrast, DDT was metabolized into more elemental compounds, called metabolites, but that doesn't mean it was removed from the bears' systems, Christensen said. It just means its composition was changed.

"So it will continue to accumulate in the fat or circulate in the blood and be re-distributed to other tissues, such as the liver, the kidney and so forth," she explains.

What most concerns her and Ross is that hibernation is also the time when grizzlies give birth, and mother bears feed their young with fat-rich milk. So it stands to reason, they say, that if foreign chemicals remain in a mother bear's system during hibernation, she might unwittingly pass those chemicals, through her milk, to her young.

"She is delivering to them a mixture of chemicals that mimic endocrine disrupters and hormones, and what does that do to them?" said Ross.

Neither he nor Christensen can say for sure, but they do know from experiments in laboratory animals and observations of wild marine mammals that high chemical concentrations can impair an animal's reproductive, immune and brain functions. So, they venture, such impairments could occur in grizzlies, too.

But it isn't just PCBs and DDT that are of concern. Bears living in the interior of B.C.

that never go near coastal salmon were found to contain chemicals as well. Except in their case, many of these chemicals were flame retardants — substances that are still legal in Canada and the U.S.

These retardants are flushed into the environment following their industrial use in upholstery, computers and textiles, and then carried away into nature, including, it turns out, the remotest parts of the B.C. wilderness.

Some of these retardants also become concentrated in grizzlies during hibernation, and, as a consequence, could lead to the same kinds of deleterious effects that PCBs cause. All of which leads Ross, who also works for the federal Department of Fisheries and Oceans, to wonder about the need to regulate them.

"We're a player in the global village," he said. "We should be working internationally to adopt policies that will protect the biosphere from these chemicals. But we can't be leaders in the world if we're not taking care of our own backyard."

Misty MacDuffee of the Raincoast Conservation Society, an environmental organization that partnered with Christensen and Ross on their research, preferred to be more straightforward.

"Given the growing understanding of chemical pollutants and their potential impact, the provincial government should be taking every step to reduce the stress on threatened species," she said. "Ending sport hunting and protecting their habitat would be obvious choices for immediate action."

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