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## Poison feast of salmon contaminates B.C. grizzlies

Tests show elevated levels of PCBs and pesticides in Pacific Coast bears



By MARK HUME



Vancouver — Grizzly bears feasting on Pacific salmon provide iconic images of natural bounty that wildlife photographers have captured for generations.

But a new study suggests something is wrong with this picture. The grizzly bears in British Columbia that feed heavily on salmon each fall are doing more than loading up on nutrients for hibernation.

Research from the Department of Fisheries and Oceans and the University of Victoria shows that the annual feast of salmon is also loading the bears with pollutants -- including concentrations of chemicals that could affect the reproductive abilities of young females.

"These bears are eating seven or eight adult salmon a day, so they can really gorge themselves," said Peter Ross, a marine mammal toxicologist with DFO at the Institute of Ocean Sciences on Vancouver Island and one of the co-authors of the report.

"What we found is that the salmon are delivering pollutants from the ocean . . . [and they] are delivering quite a load. They are delivering most of the contaminants in these bears."

Dr. Ross said researchers looked at the differences between grizzlies with and without a salmon diet. They compared fat and hair samples from bears on the coast with those farther inland, where the omnivorous diet does not include salmon.

The coastal grizzlies, which eat spawning salmon almost exclusively from late summer through the fall, showed markedly higher levels of PCBs, organochlorine pesticides and a group of chemicals that are used as fire retardants in everything from foam cushions to building materials.

"The North Pacific is a sink for these contaminants, which are probably introduced through the atmosphere . . . from Asia. It reminds us once again that our planet is a

small one," said Dr. Ross, who several years ago produced research showing that killer whales had become polluted through their rich salmon diets.

The paper states that salmon deliver 70 per cent of all organochlorine pesticides, 85 per cent of the polybrominated diphenyl ethers, or PBDEs, and 90 per cent of the PCBs found in the bears.

The levels of chemicals in a gram of fat ranged from trace amounts to up to 20 parts per billion for DDT, 43 ppb for PCBs and 53 ppb for PBDEs.

Dr. Ross said levels of pollutants in grizzly bears are not as high as those in orcas or polar bears and it is unclear what harm, if any, they might do.

"The total overall picture was that of bears that were not terribly contaminated. The salmon-eating bears had significantly higher levels of contaminants and they had a different pattern of contaminants. . . but I don't think the levels are of significant concern for the health of the animals."

But he said questions are unanswered about the possible reproductive impact some of the chemicals might have if they are concentrated in offspring.

Dr. Ross noted that some of the chemicals found in fat samples of salmon-eating bears are endocrine disrupters or hormone mimics.

"With low reproductive rates and seasonal cycles of fasting [hibernation], adult female grizzly bears may supply elevated concentrations of endocrine-disrupting chemicals to their young," states the research paper, which is to be published next month in the journal *Environmental Science and Technology*.

Dr. Ross said the research project, the first to look at chemical pollutants in grizzly bears, was suggested by the studies he did a few years ago on contaminants in orcas, seals and other marine mammals.

"We discovered that B.C.'s killer whales were the most polluted animals on the planet," he said. "We thought if killer whales are exposed to contaminants through eating a lot of fish, then grizzly bears might be, too."

Dr. Ross said wild salmon carry very low levels of pollutants, and the findings raise no health concerns for humans.

Researcher Jennie Christensen, a PhD student at the University of Victoria and the lead author, obtained fat and hair samples from 12 B.C. grizzly bears killed by hunters or wildlife control officers. She found a distinct isotope signature of carbon and nitrogen in the coastal bears that signalled their shift to a heavy salmon diet in the fall.

"That was key to us being able to interpret the contaminant results," Dr. Ross said.

The other authors of the paper were Misty MacDuffee, a biologist with the Raincoast Conservation Society, and Robie MacDonald and Michael Whiticar, both of the School of Earth and Ocean Sciences.