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PCB problems in Lake Michigan continue to worsen

By PEYTON SMITH and JEAN LANG

PCB levels as high as 50 parts per million (ppm) have been found in some Lake Michigan salmon and trout recently. Even young fish may have levels in excess of 15 ppm says Paul Degurse, microbiologist with the Wisconsin Department of Natural Resources. These PCB concentrations are well above the safe level of 5 ppm set by the U.S. Food and Drug Administration.

PCBs, or polychlorinated biphenyls, are chlorinated hydrocarbons similar to DDT. However, PCBs are not used as pesticides but rather as industrial compounds.

Degurse, who discovered the high PCB levels, has been studying chlorinated hydrocarbons in Wisconsin fish for ten years. He and other researchers first noticed the presence of PCBs several years ago when analyzing fish for DDT content.

(Earthwatch-Wisconsin is a service of the Sea Grant Program and the Institute for Environmental Studies at the University of Wisconsin)

At that time the State Department of Health warned Wisconsin fishermen to eat no more than one meal per week of fish caught in waters with known high levels of PCBs. And in 1971 Governor Patrick Lucey ordered a halt to the commercial sale of some Lake Michigan fish that contained high PCB levels.

"Since then, the PCB problem in Lake Michigan has worsened," says Degurse. Most large lake trout now have levels in excess of 5 ppm, Degurse reports, though he also notes that some Lake Michigan coho salmon analyzed are below the 5 ppm mark.

Part of the reason that PCBs are such a problem is that they do not break down very rapidly and remain in the biological environment a long time.

"Consequently, their persistence probably makes them much more toxic than DDT," says Degurse.

But just how much more toxic is not fully known. Monkeys and mink, given steady diets containing PCB concentrations of less than 5 ppm, suffered from reproductive failures and other abnormal conditions. Mink fed a diet containing 2 ppm of PCBs for 90 days died. In addition, PCBs are suspected of causing egg shell thinning and abnormal offspring in some birds.

Degurse points out that there are marked differences between the toxic levels for one species and another. Nevertheless, he feels that PCBs would probably damage the health of anyone making a steady diet of Lake Michigan fish over a long period.

Though PCBs can be partially eliminated from fish by removing the fatty tissues, Degurse warns that some samples of Lake Michigan fish had high PCB levels even after being gutted and cleaned.

There are many sources of PCBs. They have been used in this country since the 1930s as insulating fluids, plasticizers, adhesives and in fire resistant electrical fluids and hydraulic fluids. One hundred tons of the substance were manufactured and distributed in various forms before the magnitude of PCB pollution became apparent.

Monsanto Chemical, Ltd., the sole PCB manufacturer in the U.S., voluntarily cut back its sales in 1970. PCBs are now used only in closed systems by the electrical industry. However, other countries are still manufacturing this substance.

"The way PCBs were used ten years ago, you would have thought the materials were as safe as water," says Degurse. "PCBs make good plastic coatings for everything from seat covers to copy paper, and that's the problem. When you use PCBs in everything and then throw everything away, you end up with PCBs leaking out all over. We have never found a fish in the state of Wisconsin that did not contain some PCBs."

"In Lake Michigan PCB levels are still going up," adds Degurse. "But we don't know if it is because of PCBs that entered the lake 20 days ago or 20 years ago." Degurse adds that the picture may look worse because of our increased knowledge of PCB effects and our better methods of detecting it.

Currently, one of the largest sources of PCBs appears to be paper mills that are recycling PCB-coated papers. Other sources are seepage from land-fill sites, leaking hydraulic fluids and airborne dust containing PCBs. Because the pollutant can enter the lake in so many different ways, effluent discharge standards will not solve the problem, says Degurse.

However, Degurse feels the Lake Michigan PCB problem is serious enough to merit strong government action. Simply limiting sales of PCB chemicals is not enough, he says. Degurse notes that Sweden in 1973, faced with similar PCB problems, banned all PCB use except where it was absolutely esaential and then only under a permit with very tight controls.

Besides recommending similar measures for Wisconsin, Degurse also suggests that PCB hydraulic fluids be replaced with other materials and that some limitations be put on the recycling of PCB-coated paper.

On a rather discouraging note, Degurse adds that PCBs are not the only persistent hydrocarbons in Lake Michigan and that others, not yet analyzed, may be just as harmful as the PCBs.