



TOXIC POLLUTANTS: THE HUMAN-MARINE WILDLIFE CONNECTION

Over the past 50 years, the widespread introduction of industrial and agricultural chemicals in the global environment has resulted in the deposition of persistent organic pollutants (POPs) such as PCBs, dioxins, and chlorinated pesticides in the fatty tissues and organs of virtually all wildlife and humans. Although PCBs and DDT were banned by industrial nations in the late 1970s, large PCB reservoirs remain and DDT is still used in many parts of the world. Thousands of new chemicals with similar structures and



toxic properties continue to be marketed as products in our everyday lives. Many, like PCBs and dioxins are developmental toxins and human carcinogens. Dioxins are suspected to cause testicular cancer, reduce sperm count in men and cause endometriosis in women. Recent studies in the Great Lakes and The Netherlands found that babies exposed to high doses of PCBs and dioxins in the womb and in breast milk suffered reduced mental capacities compared with children fed formulated diets. In spite of such emerging evidence, very few toxic chemicals in use today are adequately tested for their effects in animals or people.



Sea Mammals at Risk

The world's oceans are a sink and reservoir for the most toxic POPs. With increasing coastal development, environmental deterioration from land-to sea pollution by POPs has become a critical issue for the regulatory community worldwide. Marine mammals such as seals, dolphins, and whales accumulate large amounts of these compounds and store them in their ample layers of blubber. Not surprisingly, numerous health problems have surfaced in sea mammals since in the early 1970s when Baltic seals with high tissue levels of PCBs and DDE were found to have skeletal deformities and uterine stenosis (closure of the uterine canal), causing widespread infertility and population declines. Since that time, seals in polluted waters of Europe, Asia, and North America have suffered from a wide range of health problems including large-scale disease outbreaks and mass mortalities.



At the top of the ocean food chain, marine mammals such as seals are important sentinels for the health of the ocean and for pollutant-related effects in people. Despite obvious species-related differences, seals are “real world” wildlife models for humans: they are long-lived, biologically similar to people, attain similar body weights as adults (~150-220 lbs), eat many of

the same fish (major items in the seal diet are hake, herring, cod, redfish, butterfish), and breast-feed their pups. Over our lifetimes, we are exposed to similar dietary “cocktails” of toxic contaminants, pass them on in large quantities to our young in the womb and in breast milk, and show similar responses to toxic chemicals.

Pollutants in Atlantic Coast Seals

A recent study conducted by the Marine Environmental Research Institute (MERI) research revealed that Atlantic coast harbor seals carry an average of 65 pollutants in their bodies including 55 organic chemicals and 10 heavy metals (see attached Maps). Compounds detected in the seals' blubber included 27 organochlorine pesticides, 28 individual PCBs, and the metals mercury, arsenic, cadmium, chromium, lead, silver, copper, zinc, and selenium. It is likely that more than 100 chemicals would have been detected had the study tested for dioxins, furans, brominated flame retardants, and phthalates.

Many of these chemicals are carcinogens and "endocrine disruptors" (compounds that interfere with the body's natural hormones) and are linked with cancers, immune suppression, abnormal development (body and brain), and birth defects in people or animals. Levels of some compounds, such as PCBs were high enough to place them at risk for serious health effects. PCB and DDE levels in Atlantic harbor seal pups were 10 times higher than levels found in harbor seal pups from the Pacific coast around San Francisco Bay. Mercury levels in the livers of adult seals exceeded international standards for injury in mammals. Seals from Long Island Sound had the highest PCB loads, almost 3 times higher than levels known to cause health problems in adult harbor seals.

These findings are of concern because they imply that seals and people who eat fish from our coast may be at risk for pollutant-related health problems from their diet.

Pollutants in People

In a recent medical study of body burdens in people led by Mount Sinai School of Medicine in New York, researchers found that the participants contained an average of 91 industrial compounds, pollutants, and other chemicals in their bodies, with a total of 167 chemicals found in the group. Most of these compounds did not exist 75 years ago. In total, the subjects' body burdens included:

- 76 chemicals linked to cancer in humans or animals
- 94 chemicals toxic to the brain nervous system
- 79 chemicals associated with birth defects or abnormal development

The Mount Sinai study, as well as a recent CDC study, tested participants for a range of chemicals including PCBs, furans, dioxins, organophosphate pesticide metabolites, organochlorine pesticides and metabolites, heavy metals, and phthalates. The health risks of exposure to such chemicals in combination has never been studied.

Bill Moyers, a participant in the Mount Sinai study, found out that 84 distinct chemicals were residing in his body, none of which would have been there 50 years ago except lead. In his March 2001 PBS special entitled "Trade Secrets," Moyers used this data to raise awareness about chemical body burdens we most likely all carry and cannot trace back to their original sources. He describes the pervasive journey of industrial chemicals like PCBs up the food chain, and raises specific concerns about the impacts of accumulating toxins on developing babies and children. As Moyers illustrates, the current regulatory system unquestioningly allows synthetic chemicals into our lives unless they are proven beyond doubt to be dangerous.
