

POPS

## From sea to toxic sea

**This article discusses how persistent organic pollutants are disrupting the marine ecosystem**

*“As crude a weapon as a cave man’s club, the chemical barrage has been hurled against the fabric of life.” — Rachel Carson*

**W**hen Rachel Carson sounded the alarm about the impact of DDT on wildlife in her book *Silent Spring*, she didn’t mean to start a movement against persistent, fat-soluble toxicants such as pesticides that build up in the food chain. Rather, she felt a responsibility to clue in the rest of the world to what she had discovered: the vulnerability of nature in the face of human intervention. Carson’s work led to increased scrutiny of the impact of pesticides and other chemicals on nature and wildlife. Before she became engrossed in pesticides, Carson began her career by speaking for the oceans. She began as a junior aquatic biologist for the US Bureau of Fisheries in Washington, DC and later worked for the Fish and Wildlife Service. Her 1951 book *The Sea Around Us* dealt with the latest science and understanding of the oceans.

“Carson sounded the alarm about toxicants on behalf of wildlife, but here we are 40 years after *Silent Spring* and we still can’t get governments and regulatory agencies to take seriously the impact of these chemicals on the health of the fish, whale or bird populations. It seems their concern wanes when only wildlife appears threatened,” said Rick Hind, legislative director for Greenpeace’s Toxics Campaign. “But ignoring the impact of these toxicants on the birds, fish and other wildlife means ignoring the health of our own food chain. By allowing them to be poisoned, we only continue to poison our own bodies.”

Hind has been working on the impact of chemicals on the food chain and, by extension, human health, since 1979.

“Luckily, we were able to shift the debate from wildlife to human health in the 80s,” he says. “By focusing on human health, we were finally able to get the governments’ ears. But that doesn’t mean we are no longer concerned about what these toxicants are doing to the health of wildlife. By tracing the sources of contamination in humans, regulators now see that the poisoning of humans is also due to the contamination of human food sources, which include wildlife.”

Hind and others believe as fishermen work to do their part in restoring fish populations, it’s important to ensure that all other hurdles threatening marine wildlife are also identified and removed. Environmental pollutants comprise one of the major hurdles the marine food web is facing today.

Some government agencies, such as the Environmental Protection Agency, regularly issue fish advisories warning the public to limit their intake of certain fish because they contain high levels of certain chemicals. However, government agencies responsible for managing marine species have taken little or no action to exclusively protect fish or other marine animals from pollutants. Considering the money and time invested in rebuilding fish, whale, dolphin and other marine animal populations, ignoring the impact of toxicants on these animals seems a clear oversight to some.

### Declining stocks

“As a fisherman, I am not saying we shouldn’t do our part to address our role in the decline of some marine animals,” said John Pappalardo, fisherman and member of the New England Fishery Management Council. “However, it seems that while working on making sure the fish, whales or other marine animals

come back, we need to make sure we are not dumping chemicals into their environment that could affect their reproductive system and compromise their life cycle.”

**I**n 1996, during the reauthorization of the Magnuson Stevens Fishery Conservation and Management Act, amendments were introduced requiring the National Marine Fisheries Service and the regional fishery management councils to take action on non-fishing actions—such as pollution—that could compromise the marine ecosystem. Shortly before the Act was adopted, provisions holding non-fishing activities accountable for their impact on marine species were gutted, thanks in part to intense lobbying by parties who suddenly found themselves in the midst of a fish fight.

Meanwhile, studies suggesting a connection between the health of certain marine animals and toxicants continued to mount. According to one such study by Canadian and European scientists, an “unexpected cause of the near extinction of [wild] Atlantic salmon might be the use of an insecticide used to combat spruce budworm.” The study holds the chemical nonylphenol responsible for disrupting the endocrine process of the salmon, interfering with its ability to mature physiologically. The study states that

“exposed to nonylphenol, they [salmon] cannot switch their osmoregulatory system from fresh water, where they hatch, to salt water, into which they migrate in the first fall of their life.” It appears the nonylphenol disrupts the switch by mimicking the hormone estrogen; thus, when the smolts reach the ocean, they die.

Other studies suggest that exposure of eggs to chemicals that disrupt the endocrine process in various ways, including mimicking estrogen, can cause complete sex reversal of males to fertile females in some fish. Yet another study points to the same class of chemicals for altering “the sex ratio of oysters, causing some to become hermaphrodites and dramatically impair survivorship of offspring.”

Endocrine disruption—or hormone disruption—is one of the characteristics of a particularly worrisome class of chemicals known as persistent organic pollutants (POPs). According to the United Nations Environmental Program (UNEP), POPs are highly toxic, synthetic chemicals that are found in everyday products or created as a byproduct of some manufacturing processes.

#### **Toxicity**

Once released into the environment, POPs can travel vast distances across air and sea

currents. POPs are extremely toxic even at very low concentrations and build up—or bio-accumulate.

**P**OPs don't dissolve readily in water but do dissolve easily in fats and can build up in the fatty tissues of animals or humans. As they travel up the food chain, POPs multiply by factors of thousands. Big fish eating little fish is one way POPs move up the food chain.

By disrupting hormones, these chemicals break the communication channels of the body, sending mixed or incorrect signals that could result in cancer, birth defects, and reproductive and immune system problems. In 1998, an Environmental Protection Agency advisory group suggested the review of some 80,000 chemicals for their endocrine disruption potential.

Early studies of POPs suggest that these chemicals impair the hormone and reproductive systems of wildlife. POPs have been incriminated in a host of diseases and reproductive problems associated with animals, from bald eagles to belugas.

One thing we do know is that persistent bio-accumulative chemicals are present in the marine environment. Recent studies show high levels of polychlorinated biphenyls (PCBs)—one of the more notorious POPs, which were

banned nearly 30 years ago—in farmed Atlantic salmon.

Although finding PCBs in farmed salmon is alarming, it's important to note that the PCBs were found also in the feed used by salmon farms.

Aquaculture industry representatives such as Salmon of the Americas, an organization representing the salmon aquaculture industry in Chile, Canada and the US, claim that much of the feed that is testing high for PCBs is coming from the Baltic and North Sea regions, where pollution levels are high. They believe the problem can be solved by getting pelagic fish from other parts of the world, such as the coast of Peru, where levels of PCBs and other toxicants are lower.

Finding PCBs in the salmon feed suggests levels of PCBs in the small pelagic fish that constitute the base of the marine food chain—a troubling prospect for those whose job it is to monitor the state of the marine environment.

#### **High levels**

“Regarding the forage base of the ocean, we need to be careful about what it is we are pouring into the oceans and our environment,” says John Sowles, Maine's Director of Ecology. “Although levels of PCBs in the Gulf of Maine have gone down, it's disturbing that after being banned for nearly 30 years, PCBs are still around. This

really speaks of the persistence of these kind of chemicals”

**S**mall pelagic fish aren't the only victims of POPs. It is not clear what impact PCBs can have on the top predators of the ocean. Many species of commercially valuable fish such as cod, haddock, bluefin tuna, swordfish and striped bass eat small pelagic fish as part of their regular diet. Seabirds, whales, dolphins and other marine mammals also feed on these small fish that are usually available in large quantities.

In 2000, the European Union received a report from its Scientific Committee for Food warning of high levels of dioxin, the most dangerous chemical known to science and one of the most notorious POPs, in both farmed and wild fish. In 2001, according to the Russian news agency Rosbalt, Sweden wanted to sell to Russia and other Baltic countries fish with dioxin levels above the country's maximum allowable limit. Of all the species caught by the Swedish fishermen, only cod passed the dioxin muster.

Efforts are on at the local, national and global levels to eliminate POPs. Much of the work is focused on replacing these chemicals with safer substitutes.

Through UNEP, the international community has agreed to eliminate POPs from the environment. They have prioritized a list of 12 particularly potent POPs—referred to as the “dirty dozen”—as needing urgent action. The result is the Stockholm Convention, an international treaty that targets the dirty dozen for elimination. The treaty, which has been signed by more than 100 countries, recommends using alternative processes and materials to prevent POPs forming in the first place. The US was one of the countries that tried to dilute the Stockholm Convention and has not yet ratified it.

“PCBs represent a legacy we need to be aware of, as we move forward to replacement chemicals,” says Sowles. “It makes all the sense in the world to replace these things with safer alternatives.” 🐟

This article, which is reprinted from the January 2004 issue of *Fishermen's Voice*, is by Niaz Dorry (niazdorry@earthlink.net), a freelance writer and activist based in Gloucester, Massachusetts, USA, who focuses on oceans and toxics issues

Analysis

