

## Introduction

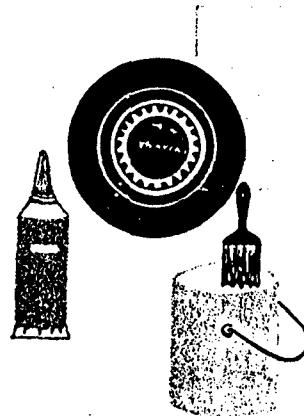
Increasingly, PCBs make news: What are they? Are they a health hazard? What is being done about them? How is the government addressing the concerns of Housatonic valley residents? What studies are being made, and what do these studies show?

PCBs, which are listed in the U.S. Toxic Substances Control Act of 1976, are currently found throughout the Housatonic River ecosystem in the river sediment, and in river fish and wildlife. The PCBs were discharged into the Housatonic for over 40 years by the General Electric Company, Pittsfield plant, as well as other industries along the river in both Massachusetts and Connecticut.

The State of Connecticut, along with the U.S. Geological Survey and the Connecticut Agricultural Experiment Station, has worked for many years to determine the extent and significance of PCB contamination. These studies have analyzed river sediment, fish, and blood of people who consume Housatonic River fish.

General Electric Company has, in recent years, invested millions of dollars in cleaning up PCBs at its Pittsfield site, and in studying river contamination. The company has also agreed to study and report on two major local PCB problem areas: hazardous waste disposal practices and Housatonic River contamination.

Many other agencies—federal, state, local, private, industrial—are also studying the possible effects of PCBs on animals and humans. A few of the most recent studies are summarized later in this brochure, particularly those concerning the Housatonic valley.

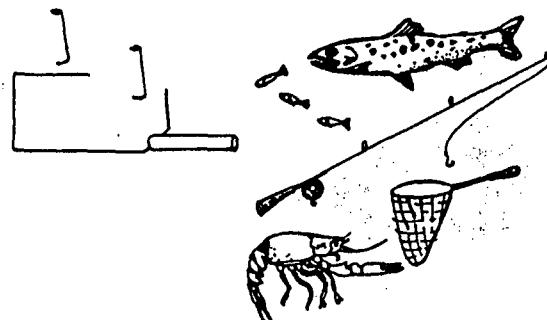


This brochure is a progress report regarding PCB investigations and potential future action. While the concerns about PCBs are extensive, we are encouraged to find that cooperation in resolving the problem is evident and we note that this brochure was written through the mutual interest and cooperation of government agencies and citizen-supported watershed associations.

As the PCB issue continues to be evaluated, Housatonic valley residents have a right to be kept informed of any study results and action, or inaction, which may affect us and our use of the river.

### For additional information contact:

Berkshire County Regional Planning Commission  
413/442-1521  
Connecticut Department of Environmental Protection  
203/566-3245 and 203/566-4630  
Housatonic River Watershed Association  
413/637-1342  
Housatonic Valley Association  
203/927-4649  
Mass. Dept. of Environmental Quality Engineering  
413/785-5327  
Mass. Department of Public Health  
617/727-2660  
U.S. Environmental Protection Agency  
617/223-5600



Superfund Records Center  
SITE: GE-Housatonic  
BREAK: 12,5  
OTHER: 211731

## Where did PCBs come from?

PCBs, or polychlorinated biphenyls, are a family of stable and persistent chemical compounds manufactured in the United States from 1929 to 1977. They were used chiefly as a coolant in electrical transformers, capacitors, and heat exchangers. Other uses included the production of paints, adhesives, auto parts, carbonless copy paper, rubber products, printing ink, and plastic wrappers. It is also known that waste oil containing PCBs was used as a road covering to control dust.

The manufacture and use of PCBs, other than in certain electrical equipment, has been banned in the United States since 1977. Other than some possible leaching from landfill disposal sites, there is currently little flow of PCBs into the river.

## Why are PCBs a concern?

Long-term health implications of PCBs are not yet known, though recent studies have shown no direct link between PCBs and cancer in humans. However, additional concerns include:

- PCBs at elevated levels in the blood have been linked to two health effects, chloracne and liver enzyme changes, particularly among industrially exposed workers.
- PCBs have been shown to cause adverse health effects in laboratory animals, including cancer, skin disorders, gastric disorders, and serious reproductive complications.
- PCBs decompose slowly in the environment, creating a long-lasting concern.
- PCBs build up in the food chain. As PCB-contaminated fish and insects are eaten by other fish, fowl, turtles or frogs, concentrations increase and, at the end of the food chain, man may consume significant amounts of PCBs.
- PCBs are difficult and expensive to dispose of safely. One method of destroying virtually all PCBs is by incinerating them at temperatures of at least 2200 degrees F. Another safe disposal method is burial in specially designed landfills. In the past, a major disposal method was burial in town dumps, which is now illegal. G.E. has been incinerating low concentrations (less than 500 ppm) of PCBs in Pittsfield for several years, and has recently started incinerating higher concentrations (up to 200,000 ppm) of PCBs, one of only three high-concentration PCB incinerators in the United States.

## PCDFs—a new concern

As more sophisticated technology is used to study PCBs and their occurrence in the environment, scientists now believe that very toxic impurities associated with PCBs, particularly PCDFs (polychlorinated dibenzofurans), are a major concern. Since traces of PCDFs have been found in fish caught in Woods Pond, it is important that the health hazards of these even more toxic chemicals be evaluated.



The following is known about PCDFs:

- PCDFs can form when PCBs are burned at temperatures too low to destroy them.
- PCDFs are up to 1000 times more toxic than PCBs.
- PCDFs probably entered the Housatonic River in PCB mixtures discharged by General Electric.
- PCDFs are found in minute concentrations in Housatonic River fish.

## Where are PCBs found in the Housatonic River?

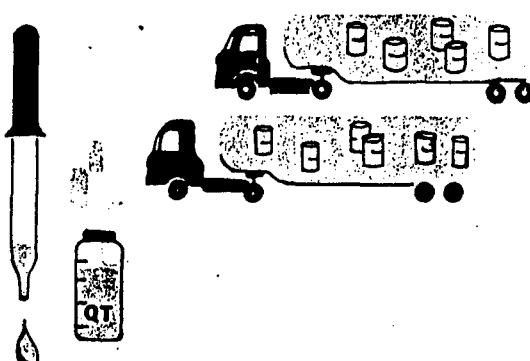
PCBs in the Housatonic are found in aquatic life (particularly fish and aquatic insects on the bottom), water, and sediments. PCBs are essentially insoluble in water, are heavier than water, and tend to accumulate in river sediments. PCB levels in the river are high among sediment samples and show a strong relation to the distribution of fine sediments. The State of Connecticut has found that the concentration of PCBs in river sediments increases gradually with increasing distance upstream in Connecticut, and then increases sharply in Woods Pond in Massachusetts, the first impoundment below Pittsfield.

- The principal source of continued flow of PCBs in the Housatonic River into Connecticut appears to be from the sediments in Woods Pond in Massachusetts.
- Although PCBs are found mainly in the Massachusetts portion of the river, particularly Woods Pond, they are also found in the downstream river impoundments, including Lakes Zoar and Lillinonah in Connecticut.
- In the New Milford Bay area of Candlewood Lake, where water is pumped into the lake from the Housatonic River, PCBs have been detected in fish and sediment at levels quite low compared to Lakes Zoar and Lillinonah.

## How are PCB concentrations measured?

PCBs are commonly measured in parts per million (ppm) or parts per billion (ppb). One ppm is the equivalent of one drop of dye in 64 quarts of Housatonic River water, and one ppb is the equivalent of one drop of dye in 400 barrels of river water.

Current allowable human exposure levels for PCB consumption are set by the Federal Food and Drug Administration at five parts of PCBs per million (5ppm) parts of fish, shellfish, and the fat portion of poultry, and 2.5 ppm in the fat portion of milk and dairy products.



## How are Housatonic valley residents directly affected by PCBs?

- Persons who consume Housatonic River fish have shown above-average PCB levels in their bodies. Many fish in the river are contaminated with PCBs at levels which exceed federal standards for human consumption.
- Fishing, frog hunting and waterfowl hunting are popular sports in many areas of the Housatonic. PCBs concentrate in the food chain, with fish having higher PCB levels than their water environment. Fish accumulate PCBs through their gills and while feeding; as other fish, birds and mammals consume PCB-contaminated aquatic life, each acquires a higher level of PCB concentration, finally ending up in the bodies of persons consuming such fish and wildlife.
- Frog hunting and the sale of frog legs is a minor industry in the Woods Pond area. While tests show high PCB concentrations in frogs, PCB levels have not been studied in people who have consumed the frogs.
- The states of Massachusetts and Connecticut continue to recommend that Housatonic River fish not be eaten (except at Candlewood Lake and below Stevenson Dam).
- Industrial workers exposed daily to high levels of PCBs generally have higher PCB concentrations in their bodies than those exposed to low level PCBs by eating fish. The health effects of occupationally exposed workers range from virtually no apparent ill effects to skin eruptions and internal disorders.
- PCBs disposed of in the ground and in landfills have the potential to contaminate groundwater and wells.

## Conclusion

PCBs may or may not be dangerous to your health; the jury is still out. The only well-documented adverse health disorder is chloracne, a skin ailment associated with occupational exposure. Both industrially exposed workers and persons who consumed PCB-laden fish have higher than average levels of PCBs in their bodies, but have not shown a higher rate of cancer and other serious illnesses.

PCBs and PCDFs may be a substantial danger to health and the environment, and are currently being studied in the Housatonic. Clearly, progress is being made on determining the effect of PCBs and PCDFs on the Housatonic River and its watershed. When the studies are completed, we will know more about the extent of PCB contamination in the river, what to do about it, and what additional studies are needed.

More than 1000 studies on various aspects of PCBs have been made worldwide, nationally, and locally since PCBs were first recognized to be a public health hazard in the 1960s. Government agencies on all levels, industry, health commissions, and private groups are studying the problems. The major findings of a few of the most important Housatonic River basin studies and other pertinent studies follow on the reverse side.

This brochure was prepared by the Berkshire County Regional Planning Commission, the Housatonic River Watershed Association, and the Housatonic Valley Association, in Cooperation with the U.S. Environmental Protection Agency, the Connecticut Department of Environmental Protection, and the Massachusetts Department of Environmental Quality Engineering.

Although this report has been funded in part by the U.S. EPA through grant #P00105201-8 to the Berkshire County Regional Planning Commission, it has not been subjected to EPA's required peer and policy review, and it does not necessarily reflect the views of the agency and no official endorsement should be inferred.

November, 1982

## PCB studies and findings

Over a quarter million dollars has been spent by the State of Connecticut to study PCBs in Housatonic River sediment, to analyze PCB levels in Housatonic River fish, and to study blood samples and the health of people who consumed Housatonic River fish. The results of these studies have provided some of the most useful information on the Housatonic PCB problem, and are of particular local interest. Now the PCB study effort has shifted to General Electric, in cooperation with the U.S. Environmental Protection Agency and Massachusetts Department of Environmental Quality Engineering.

### Question: Where are the highest concentrations of PCBs in the Housatonic River?

**Findings:** Of the estimated 22,200 total pounds of PCBs in the river sediments, roughly 60% are in the Massachusetts portion, and are located primarily in Woods Pond. About 40% of the PCB total is found in Connecticut, with roughly 30% in Lake Lillinonah and 10% in Lake Zoar. Samples from Woods Pond sediments range from 20-75 ppm, with up to 2 ppm in Zoar and Lillinonah. Downstream movement of PCBs occurs primarily during high flow periods of the river.

**Source:** Connecticut Agricultural Experiment Station, the U.S. Geological Survey and the Connecticut Department of Environmental Protection, 1982.

### Question: What concentrations of PCBs are found in Housatonic River fish?

**Findings:** Fish from the Housatonic River in Connecticut contain high levels of PCBs, with the largest values at 25 ppm in a smallmouth bass, 28 ppm in a carp, and 28 ppm in a white sucker. Of the fourteen different species caught and analyzed for PCBs, all but largemouth bass, black crappie, pickerel and sunfish had PCB levels which exceed the Federal standard of 5.0 ppm. Species with higher levels of PCBs include smallmouth bass, carp, white catfish, American eel, white perch, brown trout and rainbow trout. Fish caught further upstream in Connecticut tend to have higher levels of PCBs, although carp exhibited high levels in all locations. In tests conducted in 1977 and 1979 by the State of Connecticut, PCB levels were found as high as 43 ppm and 38 ppm respectively. In the trout sampled, average levels in the 15-20 ppm range were common.

**Source:** "PCBs In Housatonic River Fish—Statistical Analysis," Connecticut Department of Health Services, 1982.

### Question: What is the danger of eating fish caught in the Housatonic River?

**Findings:** Persons who consumed Housatonic River fish are likely to have higher PCB levels in their blood than those who do not consume the fish. No acute health effects were discovered in the persons who had eaten fish from the Housatonic, although long-term effects remain unknown. The Connecticut Department of Health Services and Massachusetts DEQE recommend that Housatonic fish not be eaten.

**Source:** "Housatonic River PCB Study—Statistical Analysis," Connecticut Department of Health Services, 1981.

### Question: Have the PCBs in the sediments of Woods Pond moved into nearby groundwater as the result of well pumping?

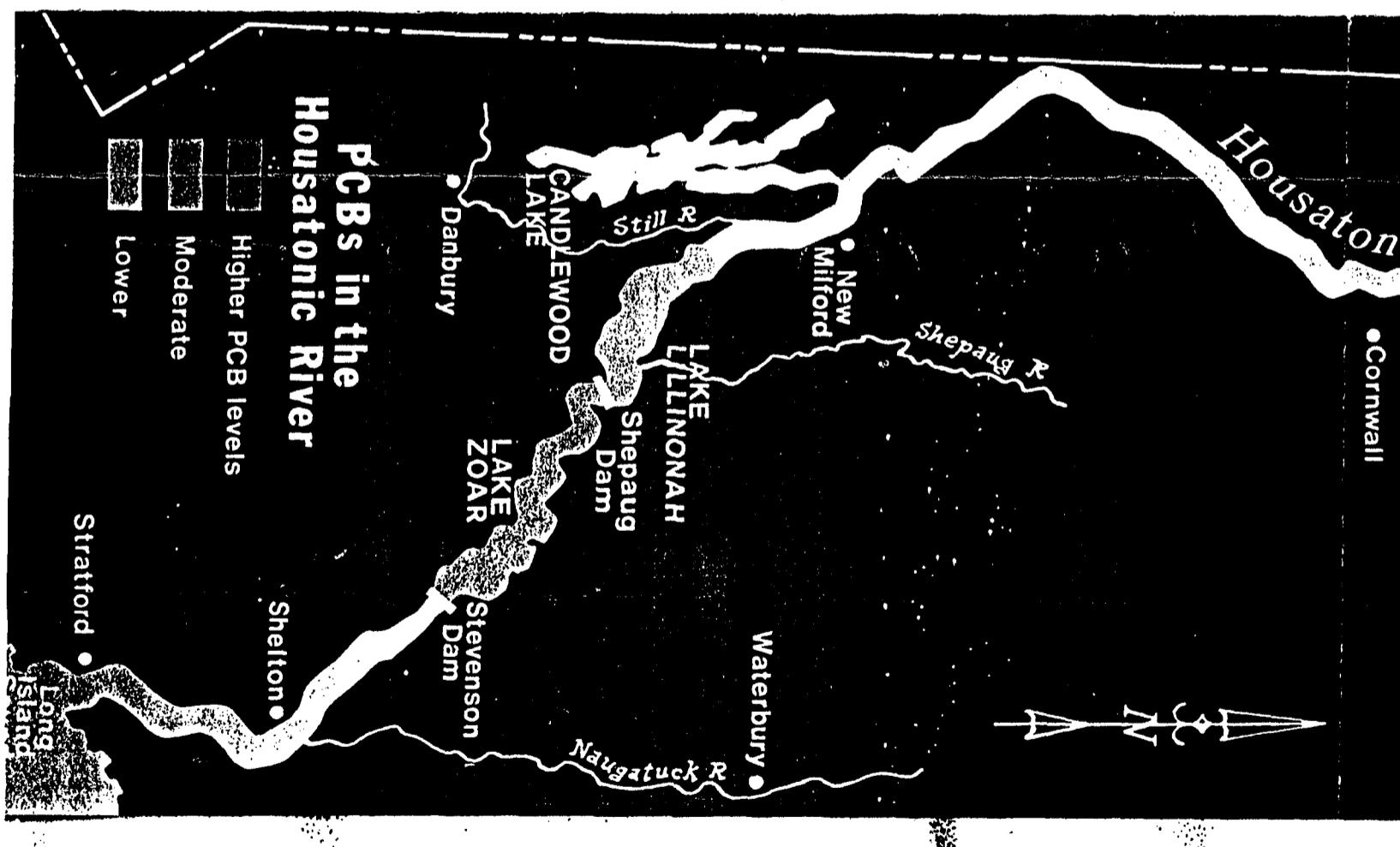
**Findings:** An industrial well located within 50 feet of Woods Pond has been used since the late 1960s. Eleven monitoring wells were installed between the well and Woods Pond to withdraw water at depths ranging from 6 to 63 feet below the surface of Woods Pond.

No PCBs were detected in any of the groundwater or sediment samples. However, according to the Final Environmental Impact Statement for the Washington Mountain Brook Watershed Project (1981), tests conducted in 1977 detected the presence of PCBs in some wells close to Woods Pond, and the Massachusetts Department of Environmental Quality Engineering has, accordingly, noted the possibility of PCB contamination of groundwater in this area. Because of the wide range of test results, the conclusions are in question and further tests will be made. Of further importance, USGS has determined that if the groundwater were pumped for over 180 days, water would eventually be drawn from Woods Pond, an area with contaminated sediments.

**Source:** U.S. Geological Survey in cooperation with Mass. Division of Water Pollution Control, 1981.

### Question: What effect has exposure to PCBs had on industrial workers?

**Findings:** Studies of three groups of workers occupationally exposed to PCBs showed significantly higher levels of PCBs in the blood than the general population. No adverse human health effects or



clinically detectable diseases were found in the workers, though high PCB blood levels in these workers correlates significantly with symptoms suggestive of mucous membrane and skin irritation, of systemic malaise, and of altered peripheral sensation. The liver was shown to be affected by PCB exposure, with long-term health significance unknown. Also, the study emphasized that changes in cholesterol levels in PCB-exposed workers may have adverse long-term cardiovascular significance.

**Source:** "Metabolic and Health Consequences of Occupational Exposure to PCBs," National Institute of Occupational Safety and Health, 1981.

**Question: What is the effect on reproduction and the newborn in rhesus monkeys exposed to low levels of PCB?**

**Findings:** The monkeys were fed a diet consisting of 2.5 ppm and 5.0 ppm PCB for seven months, and their health monitored.

Female rhesus monkeys were far more adversely affected by low level PCB exposure than male monkeys. The study shows a dramatic impact on reproductive health of the females, as well as severe effects on the newborn.

**Source:** "Reproductive Dysfunction in Rhesus Monkeys Exposed to Low Levels of PCBs," University of Wisconsin, 1975.

**Question: What is General Electric doing about the Housatonic PCB situation?**

**Study:** In 1981, General Electric signed an agreement with the Massachusetts Department of Environmental Quality Engineering and the U.S. Environmental Protection Agency. General Electric agreed to report on major PCB problems: past and present hazardous waste disposal practices, including estimates of the amount of PCBs stored on-site or disposed off-site, and amounts of PCBs discharged into the Housatonic River; future plans for PCB storage, treatment, and disposal; a study of the distribution of PCBs in the Housatonic River; an analysis of PCB transport; a sampling and testing program of PCB levels in fish, frogs, and other aquatic life normally consumed by humans; and an analysis of PCDF concentrations in three sediment and four fish samples from Massachusetts.

Based on the results of these studies, General Electric will submit a proposal of alternative courses of remedial action for Woods Pond. These alternatives include dredging, in-place containment, treatment, or no action.

# PCBs and the Housatonic River

a  
progress  
report

