Health Consultation

Public Health Evaluation of Fish Contamination Data in the Housatonic River

LAKE ZOAR, LAKE LILLINONAH, WEST CORNWALL, FALL'S VILLAGE, AND BULL'S BRIDGE IN KENT, CONNECTICUT

GE-Housatonic River
Pittsfield, Berkshire County, Massachusetts

EPA FACILITY ID: MAD002084093

MAY 24, 2006

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

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Connecticut Department of Public Health
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The conclusions and recommendations in this health consultation are based on the data and information made available to the Connecticut Department of Public Health (CTDPH) and the Agency for Toxic Substances and Disease Registry (ATSDR). CTDPH and ATSDR will review additional information when received. The review of additional data could change the conclusions and recommendations listed in this document.

BACKGROUND AND STATEMENT OF ISSUE

The Housatonic River is approximately 130 miles long, beginning in the Berkshire mountains in western Massachusetts and flowing south, through western Connecticut into the Long Island Sound (Appendix A). The General Electric (GE) facility, which produced and handled polychlorinated biphenyls (PCBs) from the 1930s to 1977 in its Pittsfield, Massachusetts facility, caused significant contamination of Housatonic River sediments and fish in the Massachusetts portion of the river. PCB-contaminated sediments have been transported into the Connecticut portion of the river over the years. This has resulted in fish becoming contaminated with PCBs to the extent that fish consumption advisories have been in place in several parts of the Housatonic River in Connecticut since 1977. The Patrick Center for Environmental Research, Academy of Natural Sciences of Philadelphia (Philadelphia Academy) samples fish in the Housatonic River for GE on a biennial basis and reports this information to the Connecticut Department of Public Health (CTDPH) and Connecticut Department of Environmental Protection (CTDEP) Fisheries Program. The sampling locations were chosen in the 1970s and remain in place for the purpose of evaluating temporal trends. CTDPH reviews new fish tissue data sampled by the Philadelphia Academy from the Housatonic River biennially and evaluates whether the current fish consumption advisory needs to be modified to protect public health based on the level of PCB contamination. This sampling program has been in place since 1984 (EPA 2005). CTDPH has evaluated fish sampling data from 2004 and the results of this evaluation are the focus of this document.

Demographics

Since the area surrounding the Housatonic River in Connecticut is very large, the demographics described here include only the towns surrounding the five stations where fish sampling occurred: West Cornwall, Bull's Bridge, Fall's Village, Lake Zoar, and Lake Lillinonah (Appendix A). As seen in Table 1, some of the nearby populations are large because the Lakes are surrounded by several towns. However, this is a very conservative estimate of a population that may be affected. We do not expect a large number of people to fish in these five sampling areas along the Housatonic River.

The Housatonic River is a popular fishing destination from people across all of Connecticut and even for people from out of state. Therefore, these demographics for local towns do not reflect the true nature of the people fishing on the river.

Table 1. Demographics for Fish Sampling Locations along the Housatonic River[^]

Sampling Station	Surrounding Towns	Total Population	Area (square miles)
West Cornwall	West Cornwall	1,434	46
Bull's Bridge	Kent	2,858	50
Fall's Village	Fall's Village	1,052	33
Lake Zoar	Monroe, Oxford, Newtown, Southbury	72,666	194.39
Lake Lillinonah	Brookfield, Bridgewater, Newtown, Southbury, New Milford	88,207	156.02

[^]United States Census Bureau 2000

Health Comparison Values and Fish Tissue Contaminant Levels

In August and October 2004, thirty brown trout were sampled from West Cornwall and analyzed for PCB content as part of the Housatonic River's biennial fish monitoring program described previously. In addition, 45 smallmouth bass from the five stations along the Housatonic River (West Cornwall, Bull's Bridge, Lake Zoar, and Lake Lillinonah) were also sampled. All of the fish fillets (brown trout and smallmouth bass) contained PCB levels that exceeded CTDPH's Modified Great Lakes Protocol PCB value for fish consumption which is described below (Patrick Center for Environmental Research 2005).

In addition, 211 panfish (bluegill, pumpkinseed, redbreast sunfish, and yellow and white perch), brown and yellow bullheads, northern pike, white catfish, and largemouth bass were sampled as part of a supplemental fish sampling effort for the Housatonic River. These fish species were sampled from 4 stations (Fall's Village, Bull's Bridge, Lake Lillinonah, and Lake Zoar) along the Housatonic River. The number of composite samples and individual fish caught varied with each sampling station. Several of the fish fillets contained PCB levels that exceeded CTDPH's Modified Great Lakes Protocol PCB value for fish consumption which is described below.

1. Health Comparison Values

In order to set safe levels of PCBs in fish, CTDPH uses a modified version of the Protocol for a Uniform Great Lakes Sport fish Consumption Advisory (GLP) (1993). The GLP is a framework for setting risk-based fish consumption advisories in the Great Lakes states. Using the GLP, the Great Lakes Task Force developed a Health Protective Value

(HPV) for PCBs of 0.05 µg/kg/day by using a "weight of evidence" approach which considered all of the existing toxicological values and studies (mostly human and monkey). The "weight of evidence " approach differs from a reference dose which typically uses a single critical study. The HPV is a unique value developed specifically for the Great Lakes sport fish advisory process. The development of the HPV was based on some key assumptions: average meal size for a 70 kg adult of one-half pound (227 grams) and a 50% reduction in PCB fish fillet content (skin on, scales off fillet) through trimming and cooking losses of fatty portions of the fish. The goal of the advisory program was to limit PCB exposure to 3.5 µg/day (0.05 µg/kg/day *70 kg = 3.5 µg/kg/day). At this exposure level, cancer risks would not be expected to exceed 1 cancer in 10,000 exposed people, and non cancer health effects would not be likely.

Concerning non-cancer health effects, there are several animal and human studies that resulted in a variety of adverse health effects from exposure to PCBs. The main effects from exposure to PCBs in animals include hepatic, dermal, immunological, and neurobehavioral development. Because the most sensitive effects are immunological and neurobehavioral development, the GLP Task Force tended to weigh more heavily on these studies when developing its HPV (Great Lakes Sport Fish Advisory Task Force 1993).

Cancer risks associated with the HPV were evaluated using a Cancer Slope Factor (CSF) of 2 $(mg/kg/day)^{-1}$. If a population was exposed to PCB levels of 0.05 µg/kg/day (HPV) every day for 70 years (a lifetime), there would be a theoretical excess cancer risk of 1 person in a population of 10,000. This theoretical excess cancer risk is on the upper end of a generally acceptable range (1 in 10,000 to 1 in 1,000,000). The cancer slope factor of 2 $(mg/kg/day)^{-1}$ is derived from rat studies resulting in liver cancer from oral exposure to PCBs.

CTDPH's version of the GLP takes into account detection limit issues and the somewhat greater concern for higher risk individuals (Ginsberg and Toal, 1999). CTDPH allows for unlimited consumption at PCB levels up to 0.1 ppm (parts per million), the point where practical quantification of PCBs in fish becomes certain whereas the GLP allows unlimited consumption only up to 0.05 ppm.

High risk individuals include pregnant women, women planning to become pregnant within a year, breastfeeding women, or children under the age of six. Pregnant women or women planning to become pregnant are particularly sensitive because PCBs can be passed through the mother to the unborn fetus and can result in central nervous system (CNS) effects as well as others. Children under the age of six are also particularly vulnerable because they tend to eat more per body weight. In addition, the developing organs (brain and thyroid gland) of children can sustain permanent damage if exposure to PCBs occurs during critical growth stages. Breastfeeding women are also in the high risk group because PCBs can pass through breast milk and expose young children to PCBs. Low risk individuals include the remaining population. Table 2 gives the details of CTDPH's fish consumption advisory as it relates to PCB levels in fish samples.

Regarding the issue of higher risk individuals, the animal toxicology studies support an HPV that is in the same range for reproductive and other (immunological, dermal) endpoints. This suggests that in utero development is no more sensitive to PCBs than are endpoints seen in adult animals. However, the evidence of low dose effects in humans is strongest for in utero effects (central nervous system development). This creates a somewhat greater concern for pregnant women and women planning pregnancy. Additionally, while the cumulative PCB dose from long-term exposure may be the most critical determinant for immunological or dermal effects, the period of exposure needed for in utero effects is uncertain. Monkeys exposed to low doses of PCBs during pre-pregnancy over several years resulted in adverse health effects among offspring. Therefore, it is uncertain whether the accumulation of maternal PCB body burden prior to and during pregnancy is critical or a relatively short exposure period (during pregnancy) could also produce low dose developmental effects (Ginsberg and Toal 1999). Two short term studies in mink and rats also resulted in low dose developmental effects from exposure to PCBs. Therefore, CTDPH believes that there may be a greater sensitivity during in utero exposure such that recent exposures that do not involve a cumulative body burden (which is important to adult toxicity) could produce an adverse health effect. This uncertainty over PCBs pharmacokinetics and developmental outcomes supports a prudent avoidance (do not eat) approach for pregnant women for markedly elevated PCB concentrations (e.g. over 1 ppm). CTDPH's recommendation of "do not eat" for high risk groups for PCB levels in fish of 1.1-1.9 ppm differs from the GLP's approach which recommends a "1 meal per 2 months" restriction for fish consumption for all risk groups for PCB levels of 1.1-1.9 ppm (Ginsberg and Toal 1999). In addition, CTDPH's recommendation also differs from the GLF's approach which recommends a "one meal per week" restriction for all risk groups for PCB levels of 0.06-0.20 ppm (Table 2).

When using the HPV, setting limits based on cancer risk less than 1 in 10,000 would lead to virtually no fish consumption (local or commercial) due to the widespread occurrence of low levels of PCBs in fish. This would result in the benefit of fish consumption to be lost in the interests of minimizing cancer risks. Given that number of frequent consumers of locally caught fish in Connecticut may not large, the theoretical 1 in 10,000 cancer risk is of less concern than if this were a population-wide exposure (Ginsberg and Toal 1999). Therefore, CTDPH and the Great Lakes Protocol focus on prevention of non-cancer health effects of PCBs.

Table 2. CTDPH's Modified Great Lakes Protocol for Fish Consumption[^]

PCB Level (ppm[*])	Consumption Advisory	
	Low Risk[#]	**High Risk[@]**
< 0.1	Unlimited Consumption	Unlimited Consumption
0.1-0.2	One meal per week	One meal per month
0.21 - 1.0	One meal per month	One meal per month
1.1 - 1.9	One meal every 2 months	Do not eat
> 1.9	Do not eat	Do not eat

[^](Ginsberg and Toal, 1999)
*Parts Per Million
[#] Includes pregnant women, women planning to become pregnant within a year, nursing women, and children under 6 years old
[@]Includes all other groups not included in the low risk group

2. Fish Contaminant Levels

Average PCB concentrations in all of the fish fillet samples[1] (with three exceptions: pumpkinseed in Lakes Lillinonah and Zoar and Yellow Bullhead in Lake Zoar) from the five Housatonic River sampling locations were above the concentration limit for unlimited consumption (0.1 ppm). Average PCB levels in smallmouth bass, yellow bullhead and most panfish (pumpkinseed, yellow perch, and bluegill) levels tended to be lower in Lake Lillinonah and Lake Zoar than in Fall's Village and Bull's Bridge. Table 3 gives the average congener-based[2] PCB concentrations in five locations along the Housatonic River in the 12 fish species sampled in 2004.

Small and Largemouth Bass

The average PCB concentrations for Lake Lillinonah and Lake Zoar in smallmouth bass were 0.53 and 0.28 ppm, respectively, while the averages for West Cornwall, Fall's Village, and Bull's Bridge were higher at 0.99, 1.01, and 1.05 ppm, respectively, for the same species. Largemouth bass were only sampled at Bull's Bridge. The average PCB concentration in largemouth bass for this site was 0.57 ppm.

Brown Trout

Thirty brown trout were only sampled at the West Cornwall sampling station. The average PCB concentration in this fish species was 1.64 ppm.

Brown and Yellow Bullhead

The average PCB concentration in all bullhead is generally lower in Lakes Lillinonah and Zoar than in Bull's Bridge and Fall's Village. The average PCB concentration in

[1] For panfish, the number of composite samples and individual fish caught varied with each sampling station.
[2] The congener-based analysis method sums the concentrations of all individual congeners (up to 121) quantitated by the analytical method.

brown bullhead in Lake Lillinonah was 0.28 ppm, while the averages for Fall's Village and Bull's Bridge were higher at 0.32 and 0.37 ppm, respectively, for the same species. The average PCB concentrations in yellow bullhead in Lakes Lillinonah and Zoar were 0.18 and 0.05 ppm while the average for Bull's Bridge was higher at 0.36 ppm for the same species.

White Catfish

White catfish were only sampled in Lake Lillinonah and Lake Zoar. The average PCB concentration in white catfish in Lake Lillinonah was twice as high (1.26 ppm) than those fish sampled at Lake Zoar (0.59 ppm).

Northern Pike

The average PCB concentration in northern pike in Lake Lillinonah was 1.09 ppm, while the averages for Fall's Village and Bull's Bridge were higher at 11.14 and 0.45 ppm, respectively, for the same species. The very high average PCB level found in Fall's Village was skewed due to one fish's PCB level of 31.7 ppm.

Panfish (Redbreast Sunfish, Bluegill, and Pumpkinseed, Yellow and White Perch)

Panfish were sampled in 4 locations (Bull's Bridge, Fall's Village, Lake Lillinonah, and Lake Zoar). However, not every fish was sampled in every location.

The average PCB concentration in all panfish is generally lower in Lake Lillinonah and Zoar than in Bull's Bridge and Fall's Village. The average PCB concentrations for Lake Lillinonah and Lake Zoar in pumpkinseed were 0.04 and 0.08 ppm, respectively, while the averages for Fall's Village and Bull's Bridge were higher at 0.27 and 0.23 ppm, respectively, for the same species.

The average PCB concentrations in bluegill from Lake Lillinonah and Lake Zoar were 0.17 and 0.15 ppm, respectively, while the averages for Fall's Village and Bull's Bridge were higher at 0.41 and 0.27 ppm, respectively, for the same species. The average PCB concentrations for Lake Lillinonah and Lake Zoar in yellow perch were 0.14 and 0.17 ppm, respectively, while the averages for Fall's Village, and Bull's Bridge were higher at 0.49 and 0.36 ppm, respectively for the same species. PCB concentrations in redbreast sunfish were only sampled in Lake Lillinonah. The average PCB concentration was 0.13 ppm in this fish species.

PCB concentrations in white perch were only sampled in Lake Zoar. Historically, average PCB concentrations in white perch tend to be higher than other panfish. The average PCB concentration was 0.51 ppm.

Table 3. PCB Concentrations in Twelve Species of Fish Caught in Five Locations along the Housatonic River in 2004.

Location	Species	Number of Samples	Number of Individuals	Average (Congener Based*) PCBs (ppm^) in 2004	Range (Congener Based) PCB (ppm)
West Cornwall	Smallmouth Bass	10	10	0.99	0.38-1.98
Bull's Bridge	Smallmouth Bass	10	10	1.05	0.62-1.63
Fall's Village	Smallmouth Bass	1	5	1.01	No range
Lake Lillinonah	Smallmouth Bass	10	10	0.53	0.21-1.47
Lake Zoar	Smallmouth Bass	10	10	0.28	0.13-0.65
Bull's Bridge	Largemouth Bass	1	5	0.57	No range
West Cornwall	Brown Trout	30	30	1.64	0.98-2.95
Bull's Bridge	Brown Bullhead	2	10	0.37	0.13-0.42
Fall's Village	Brown Bullhead	4	4	0.32	0.13-0.42
Lake Lillinonah	Brown Bullhead	2	2	0.28	0.16-0.40
Bull's Bridge	Yellow Bullhead	1	5	0.36	No range
Lake Lillinonah	Yellow Bullhead	5	5	0.18	0.08-0.28
Lake Zoar	Yellow Bullhead	1	1	0.05	No range
Lake Lillinonah	White Catfish	1	5	1.26	No range
Lake Zoar	White Catfish	2	8	0.59	0.40-0.78
Bull's Bridge	Northern Pike	3	3	0.45	0.16-0.64
Fall's Village	Northern Pike	3	3	11.14	0.75-31.74
Lake Lillinonah	Northern Pike	3	3	1.09	0.76-1.54

Location	Species	Number of Samples	Number of Individuals	Average (Congener Based*) PCBs (ppm^) in 2004	Range (Congener Based) PCB (ppm)
Bull's Bridge	Bluegill	3	15	0.27	0.21-0.32
Fall's Village	Bluegill	3	15	0.41	0.33-0.47
Lake Lillinonah	Bluegill	3	15	0.17	0.12-0.26
Lake Zoar	Bluegill	3	15	0.15	0.08-0.25
Bull's Bridge	Pumpkinseed	3	6	0.23	0.20-0.27
Fall's Village	Pumpkinseed	3	15	0.27	0.23-0.33
Lake Lillinonah	Pumpkinseed	1	4	0.04	No Range
Lake Zoar	Pumpkinseed	2	10	0.08	0.07-0.08
Lake Lillinonah	Redbreast Sunfish	1	7	0.13	0.12-0.14
Bull's Bridge	Yellow Perch	3	15	0.36	0.30-0.43
Fall's Village	Yellow Perch	1	5	0.49	No range
Lake Lillinonah	Yellow Perch	3	15	0.14	0.12-0.15
Lake Zoar	Yellow Perch	3	15	0.17	0.12-0.21
Lake Zoar	White Perch	1	5	0.51	No range

*The congener-based analysis method sums the concentrations of all individual congeners (up to 121) quantitated by the analytical method.

^Parts per Million

3. Time Trends

It is also informative to evaluate trends in contaminate levels in fish tissue over time. Table 4 gives the trend over time for average PCB contamination in the five locations in all 12 species of fish sampled. Except for northern pike and yellow bullhead which were sampled for the first time in 2004, the average PCB levels have decreased greatly in all of the locations from a high of 7.25 ppm in West Cornwall in brown trout in 1992 to a low of 0.04 ppm in pumpkinseed in Lake Lillinonah in 2004. Overall, there has been a large decrease in PCB levels in all of the locations from the 1980's to the mid 1990's and the PCB levels in some fish have now stabilized.

4. Data Evaluation Issues

In calculating average congener-based PCB concentrations, CTDPH used average concentrations for each species and sampling location rather than 95% upper confidence limits (UCLs). A 95% UCL provides a conservative estimate of the average concentration and is unlikely to underestimate the "true" average. However, there is a tendency to sample larger fish (an intentional bias) in the Housatonic River Sampling Program which is the source of the data used in this health consultation This provides conservatism because larger fish tend to have higher PCB concentrations. For this reason, CT DPH decided that it was not necessary to calculate 95% UCLs. CTDPH is confident that the average PCB concentrations provides a conservative estimate of the "true" average.

Table 4. PCB Level History along the Housatonic River in Five Locations in 2004

Location	**Fish Species**	**Highest Average (Congener Based[#]) PCBs Before 2002 (ppm[@]) (Year)**	**Average (Congener Based) PCBs (ppm) (Previous Year Sampled)**	**Average (Congener Based) PCBs (ppm) in 2004**
West Cornwall	Smallmouth Bass	3.77 (1988[*])	1.10 (2002)	0.99
Bull's Bridge	Smallmouth Bass	2.33 (1988)	0.80 (2002)	1.05
Fall's Village	Smallmouth Bass	NPS[^]	NPS	1.013
Lake Lillinonah	Smallmouth Bass	1.41 (1992)	0.37 (2002)	0.53
Lake Zoar	Smallmouth Bass	1.41 (1992)	0.36 (2002)	0.28
Bull's Bridge	Largemouth Bass	2.09 (1988)	2.09 (1988)	0.57
West Cornwall	Brown Trout	7.25 (1992)	1.78 (2002)	1.64

Location	Fish Species	Highest Average (Congener Based) PCBs Before 2002 (ppm) (Year)	Average (Congener Based) PCBs (ppm) (Previous Year Sampled)	Average (Congener Based) PCBs (ppm) in 2004
Bull's Bridge	Brown Bullhead	1.68 (1988)	0.34 (2000)	0.37
Fall's Village	Brown Bullhead	NPS	0.95 (2000)	0.32
Lake Lillinonah	Brown Bullhead	1.99 (1984)	1.42 (1988)	0.28
Bull's Bridge	Yellow Bullhead	NPS	NPS	0.36
Lake Lillinonah	Yellow Bullhead	NPS	NPS	0.18
Lake Zoar	Yellow Bullhead	NPS	NPS	0.05
Bull's Bridge	Northern Pike	NPS	NPS	0.45
Fall's Village	Northern Pike	NPS	NPS	10.01
Lake Lillinonah	Northern Pike	NPS	NPS	1.09
Lake Lillinonah	White Catfish	6.27 (1986)	4.33 (1988)	1.26
Lake Zoar	White Catfish	3.40 (1988)	3.40 (1988)	0.59
Bull's Bridge	Bluegill	1.85 (1988)	0.49 (2000)	0.27
Fall's Village	Bluegill	NPS	0.68 (2000)	0.41
Lake Lillinonah	Bluegill	0.48 (1984)	0.45 (1992)	0.17
Lake Zoar	Bluegill	0.89 (1984)	0.25 (1992)	0.15
Bull's Bridge	Yellow Perch	1.14 (1984)	0.27 (2000)	0.36
Fall's Village	Yellow Perch	NPS	0.36 (2000)	0.49
Lake Lillinonah	Yellow Perch	0.58 (1984)	0.11 (1998)	0.14
Lake Lillinonah	Yellow Perch	0.58 (1984)	0.11 (1998)	0.14
Bull's Bridge	Pumpkinseed	NPS	0.73 (2000)	0.23

Location	Fish Species	Highest Average (Congener Based) PCBs Before 2002 (ppm) (Year)	Average (Congener Based) PCBs (ppm) (Previous Year Sampled)	Average (Congener Based) PCBs (ppm) in 2004
Fall's Village	Pumpkinseed	NPS	0.21 (2000)	0.27
Lake Lillinonah	Pumpkinseed	0.20 (1990)	0.18 (1992)	0.04
Lake Zoar	Pumpkinseed	0.22 (1992)	0.22 (1992)	0.08
Lake Lillinonah	Redbreast Sunfish	1.26 (1984)	0.09 (1998)	0.13
Lake Zoar	White Perch	1.26 (1988)	1.01 (1992)	0.51

[#]The congener-based analysis method sums the concentrations of all individual congeners (up to 121) quantitated by the analytical method.

[@]parts per million

* Results for 1984-1990 were estimated by the Patrick Center for Environmental Research (2005) from aroclor-based data using regressions of the natural logarithm (ln) of the congener-based PCB concentration versus the ln of the aroclor-based PCB concentration of each fish species that were established with data from 1992 and 1994. The aroclor-based analysis method is a measurement of commercial mixtures of PCB compounds. Congener analysis was not measured before 1992.
^Not previously sampled.

DISCUSSION

Exposure Pathway Analysis

To evaluate potential exposures to the contaminated fish in the Housatonic River and its Lakes, CTDPH evaluated the fish tissue data and considered how people may come into contact with contaminants in the fish. The possible pathways of exposure are by ingestion (eating) the fish.

Environmental data show that fish in the 5 locations sampled along the Housatonic River and its Lakes (Zoar and Lillinonah) are contaminated with PCBs. Individuals who catch and eat fish in these water bodies would likely be exposed to PCBs in the fish fillets. In addition, their families would also be exposed to PCBs if they eat the fish.

Public Health Implications for Adults and Children

When determining the public health implications of exposure to hazardous contaminants, CTDPH considers how people might come into contact with contaminants and compares contaminant concentrations with health protective levels. When contaminant levels are below health-based comparison values, health impacts from exposure to those levels are unlikely. Contaminant levels exceeding comparison values do not indicate that health

impacts are likely, but instead warrant further investigation. In this health consultation, CTDPH used a modified Great Lakes Protocol for fish consumption to set a health protective value (HPV) for PCBs in fish as described in the Environmental Contamination section of this document. As stated previously, this modified protocol is a risk-based protocol which takes into account detection limit issues and the somewhat greater concern for higher risk individuals.

Ingestion of twelve species of fish in the upper part of the Housatonic River and its Lakes which contain elevated levels of PCBs is a completed exposure pathway and is evaluated in this health consultation. Using CTDPH's Modified Great Lakes Protocol for Fish Consumption, we have classified each fish species according to its appropriate consumption category. CTPH has concluded that the twelve fish species from Lake Lillinonah, Lake Zoar, Bull's Bridge, Fall's Village, and West Cornwall contain elevated PCB levels where adverse health effects from ingestion of these fish can not be ruled out. Ingestion of these fish present a public health hazard to individuals who do not follow the consumption advisory. However, if community members adhere to the current consumption advisory, exposure to PCBs in fish would not be significant enough to cause adverse health effects. CTDPH believes that this updated consumption advisory is necessary to protect public health while allowing community members to benefit from the nutritional advantages of eating fish.

Table 5 gives the updated CTDPH fish consumption advisory in response to the 2004 PCB data from the five sampling locations along the Housatonic River and compares it to the previous advisory.

1. Small and Largemouth Bass

Environmental data indicate the average PCB levels in smallmouth bass from all 5 stations are above the concentration limit for unlimited consumption according to CTDPH's modified Great Lakes Protocol for fish consumption (Table 2). The average PCB levels in Lake Lillinonah (0.53 ppm), and Lake Zoar (0.28 ppm), are within the "1 meal per month-everyone " restriction level (Table 5). However, average PCB levels in Bull's Bridge (0.81 ppm), Fall's Village (1.01 ppm), and West Cornwall (0.99 ppm) are about twice the average PCB level in the two Lakes. The average PCB levels in these 3 sampling stations border between "1 meal per month-everyone " consumption restriction and "1 meal per two months, high risk group-do not eat" consumption restrictions. Since the levels of PCBs over time in smallmouth bass have remained generally the same from 2002, the CT DPH advisory of "1 meal per month-everyone " will remain in the Lakes (Lillinonah, Housatonic, and Zoar) on the Housatonic River and "1 meal per month, do not eat-high risk" for the upper part of the Housatonic River.

Largemouth bass were only sampled in Bull's Bridge. The average PCB level was in the "one meal per month-everyone " restriction range. There is a decreasing trend over time of PCB levels. However CT DPH has decided to maintain the advisory at "1 meal per month-everyone" for the Lakes on the Housatonic River and "1 meal per month, do not

eat-high risk" for the upper part of the Housatonic River (which is the same for smallmouth bass) for the following reasons:

1. Past fish sampling has indicated moderately high levels of PCB contamination on this river.

2. Further sampling is necessary to show that PCB levels in bass are low enough to allow more consumption.

3. Many fishermen are unable to distinguish between large and smallmouth bass.

2. Brown Trout

The brown trout in the West Cornwall station had a high average PCB level (1.64 ppm) in the 2004 sampling session and was within the "1 meal per 2 months, do not eat-high risk" restriction level. However, CTDPH has decided to maintain the advisory at "do not eat-everyone" for the following reasons:

1. Although the average PCB level is within the restriction levels of " 1 meal per 2 months, do not eat-high risk," the average PCB level approaches the "do not eat-everyone" consumption advisory category.

2. Past fish sampling has indicated high levels of PCB contamination on this river.

3. Further sampling is necessary to show that PCB levels in brown trout are low enough to allow some consumption (samples were only taken in one station).

3. Northern Pike

2004 is the first year that PCB levels in northern pike were sampled. While levels from Fall's Village and Lake Lillinonah ranged between the "1 meal per month-everyone" restriction level to the "1 meal per 2 months/do not eat-high risk," the average PCB levels in Fall's Village are several times higher than the "do not eat –everyone" consumption advisory action level of > 1.9 ppm. This relatively high average PCB concentration was due to one fish with very high levels of PCBs (30 ppm). CT DPH believes this particular fish does not represent the fish in this sampling station, but may have been a fish from the Pittsfield, Mass area. Even so, CT DPH has issued an advisory based on these high PCB levels of "do not eat-everyone." Further sampling is needed to more fully understand PCB levels in northern pike.

4.Yellow and Brown Bullhead

Average PCB concentrations in brown bullhead have decreased over time from a high of 1.94 ppm in 1984 (Bull's Bridge) to a low of 0.28 ppm in 2004 (Lake Lillinonah).

Average 2004 PCBs levels were all in the "1 meal per month-everyone" consumption advisory.

2004 is the first year that yellow bullhead were sampled. Average 2004 PCB levels in yellow bullhead ranged from 0.36 ppm in Bull's Bridge to 0.05 ppm in Lake Zoar. Average 2004 PCBs levels ranged from the "1 meal per month-everyone" restriction level to concentrations below the limit for unlimited consumption.

Because of the decreasing trend of PCB levels in bullheads over time in the upper part of the Housatonic River, CT DPH has loosened the bullhead advisory in the upper Housatonic River from "1 meal per 2 months/do not eat-high risk" to "one meal per month-everyone." The current consumption advisory on the Lakes on the Housatonic River is "1 meal per month-everyone" and will remain unchanged.

5. White Catfish

There is a decreasing trend in PCB levels over time in white catfish in the Housatonic River. Fish data from 2004 indicate that average PCB levels range from the "1 meal per month-everyone" restriction level to "1 meal per 2 months/do not eat-high risk " in Lakes Lillinonah and Zoar. CTDPH has decided to maintain the advisory for all catfish on the Housatonic River at "do not eat-everyone" for the following reasons:

1. Past fish sampling has indicated high levels of PCB contamination on this river.
2. Further sampling is necessary to show that PCB levels in white catfish are low enough to allow some consumption (sampling was only performed in Lake Lillinonah and Zoar).

6. Panfish (Redbreast Sunfish, Pumpkinseed, Yellow Perch, and Bluegill[3])

Environmental data indicate that panfish levels range from the restriction level of "1 meal per month-everyone" to below levels needed to issue a consumption advisory. The PCB levels in Lake Lillinonah and Zoar are generally less than half of those sampled from the upper part of the Housatonic River (Bull's Bridge and Fall's Village).

CTDPH has decided to maintain the advisory for panfish (except for white perch) on the Housatonic River of "1 meal per month-high risk, 1 meal per week-low risk" for the following reasons:

1. Although the average PCB levels in some panfish in Lakes Lillinonah and Zoar are below the concentration limits for unlimited consumption, for the sake of simplicity, all panfish (except white perch) will remain in the same advisory.

[3] White perch is evaluated separately because PCB concentrations tend to be higher in white perch than in other panfish along the Housatonic River.

2. Past fish sampling has indicated high levels of PCB contamination on this river.

3. Further sampling is necessary to show that PCB levels in panfish are low enough to allow more consumption.

7. White Perch

White perch were only sampled in Lake Zoar. The average PCB level was about half as high as the last sampling in 1992 and is currently within the "1 meal per month-everyone" restriction level. However, CTDPH has decided to maintain the advisory with white perch on the Housatonic River at "1 meal per 2 months/do not eat-high risk" on the upper Housatonic River and "1 meal per month-everyone" in Lake Lillinonah and Zoar for the following reasons:

1. Past fish sampling has indicated high levels of PCB contamination on this river.

2. Further sampling is necessary to show that PCB levels in white perch are low enough to allow more consumption (white perch were only sampled in one location).

CTDPH believes that this updated consumption advisory is necessary to protect public health while allowing community members to benefit from the nutritional advantages of eating fish.

Table 5. Updated 2006 Advisory for 12 Fish Species in the Housatonic River.

Location	Fish Species	Consumption Advisory	
		Previous (2005)	Updated (2006)
Housatonic River above Derby Dam^ (with exception below)	Large and Smallmouth Bass	1 Meal per 2 Months /Do Not Eat – High Risk	No Change
	Brown Trout	Do Not Eat-Everyone	No Change
	Northern Pike	None	Do Not Eat-Everyone
	Brown and Yellow Bullhead	1 Meal per 2 Months /Do Not Eat – High Risk	1 Meal/Month-Everyone
	White Perch	1 Meal per 2 Months /Do Not Eat – High Risk	No Change
	White Catfish	Do Not Eat-Everyone	No Change
	Panfish (Pumpkinseed, Bluegill, Yellow Perch, Redbreast Sunfish)	1 Meal per week/1 Meal per month-High Risk	No Change
Lakes Zoar and Lillinonah	Smallmouth Bass	1 Meal/Month-Everyone	No Change
	White Perch	1 Meal/Month-Everyone	No Change
	Other Species	See advice for River	No Change

^Includes West Cornwall, Fall's Village, and Bull's Bridge sampling locations.

EVALUATION OF COMMUNITY CONCERNS

The following is a list of general concerns that CTDPH has received in recent years through community meetings and inquiries from the public and community leaders:

1. I eat fish often in the Housatonic River. Why have I not gotten sick?

   The PCBs present in fish in the Housatonic River are not present at levels that will make you acutely (immediately) sick. They are chronic toxins (i.e. they take a long time to cause an effect). The health effects of concern for PCBs are potential cancers and developmental problems in children/fetuses. PCBs accumulate in your body over time. The more PCB contaminated fish you eat, the greater the PCB levels that will build up in your body. PCB exposure is a particular concern to pregnant women because the exposure their unborn child receives through the mother can cause development, behavioral, and learning problems in children.

2. I have eaten lots of fish from the Housatonic River. Is there medicine I can take to get rid of these chemicals?

   There is no medicine or other procedure to get rid of the chemicals your body has accumulated from eating fish. The chemicals will very slowly leave your body over time. If you follow the advisory you will decrease your exposure and allow your body the time needed to reduce the levels of the chemicals.

3. Are there areas along the Housatonic River that have less contaminated fish?

   The Housatonic River (below Derby Dam) as well as Lakes Lillinonah and Zoar are areas that are less contaminated. You can safely eat a greater amount of fish from these areas.

4. I am concerned that there are not enough signs along the river to alert people to this advisory. In addition, I am concerned that there may be a language barrier preventing people from understanding these signs.

   Signs are posted by conservation officers at every access point along the Housatonic River. If you need more signs, then contact your local health department to request signs. Consumption advisory signs in other languages have been prepared and are posted in areas where these populations are thought to fish. Recently, more signs have been placed in these areas in response to this concern.

CONCLUSIONS

Twelve different fish species from five locations along the Housatonic River were found to have elevated levels of PCBs. CTDPH uses this fish tissue data to issue a general fish consumption advisory for the northern section of the Housatonic River above Derby Dam. The PCB levels in 2004 are elevated enough to warrant a continued consumption advisory. However, a trend over time towards lower PCB levels throughout the Housatonic River and its Lakes in yellow and brown bullheads prompted CTDPH to loosen its consumption advisory from "1 meal per 2 months /do not eat –high risk" to "1 meal per month-everyone." First time samples indicated elevated PCB levels in northern pike that prompted CTDPH to issue an advisory of "do not eat-everyone" for the Housatonic River and its Lakes. A trend over time toward lower PCBs has been observed for all of the other fish species (except for the fish sampled for the first time this year) in all five locations; however, the levels have not decreased enough to loosen the consumption advisory. CTDPH did not modify the consumption advisory in 2004 for nine fish species in these locations along the Housatonic River.

ATSDR has a characterization scheme whereby the level of public health hazard at a site is assigned to one of five conclusion categories (Appendix B). CTPH has concluded that twelve fish species from West Cornwall, Lake Lillinonah, Lake Zoar, Bull's Bridge, Fall's Village, and West Cornwall present a public health hazard to individuals who do not follow the consumption advisory. If community members adhere to the current consumption advisory, exposure to PCBs in fish would not be significant enough to cause adverse health effects. CTDPH believes that this updated consumption advisory is necessary to protect public health while allowing community members to benefit from the nutritional advantages of eating fish.

RECOMMENDATIONS

1. CTDPH recommends that the Connecticut Department of Environmental Protection (CTDEP) and General Electric (GE) continue to work together with CTDPH on their biennial fish sampling plan for the Housatonic River.

2. CTDEP Fisheries and GE should continue to work with CTDPH to educate fishing populations along the Housatonic River about the consumption advisory.

PUBLIC HEALTH ACTION PLAN

Actions Taken

1. CTDPH along with CTDEP Fisheries and GE have worked together to educate both the general public as well as minority fishing populations along the Housatonic River about the consumption advisory as well as other populations along the river. CTDPH has provided signs to the Local Health Departments along the river to inform the public about the consumption advisory.

2. CTDPH updated its Housatonic River fish consumption advisory in April 2006 in response to the 2004 fish sampling data (Appendix C). The advisory has been printed in our annual brochure and distributed to towns and local health departments along the Housatonic River.

Actions Planned

1. CTDPH along with CTDEP and GE will continue to work together to educate the general public as well as minority fishing populations along the Housatonic River about the consumption advisory as well as other populations along the river.

2. CTDPH will continue to evaluate new fish contaminant data and will update its current Housatonic River fish consumption advisory as needed.

3. CTDPH will continue to review its fishing sampling protocol periodically and modify it as appropriate.

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Great Lakes Sport Fish Advisory Task Force 1993. Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory. September 1993.

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CERTIFICATION

The Health Consultation for the Public Health Evaluation of Fish Contaminant Data in the Housatonic River, Lake Zoar, Lake Lillinonah, West Cornwall, Fall's Village, and Bull's Bridge in Kent, Connecticut was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the ATSDR Cooperative Agreement Partner.

_____

Gregory V. Ulirsch
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
Agency for Toxic Substances and Disease Registry (ATSDR)

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

_____

Team Leader-Coop Agreement Program
CAT, DHAC, ATSDR

Preparers of the Report

Sharee Major Rusnak, MSPH, ScD
Epidemiologist
Environmental Epidemiology and Occupational Health
Connecticut Department of Public Health

ATSDR Regional Representative:

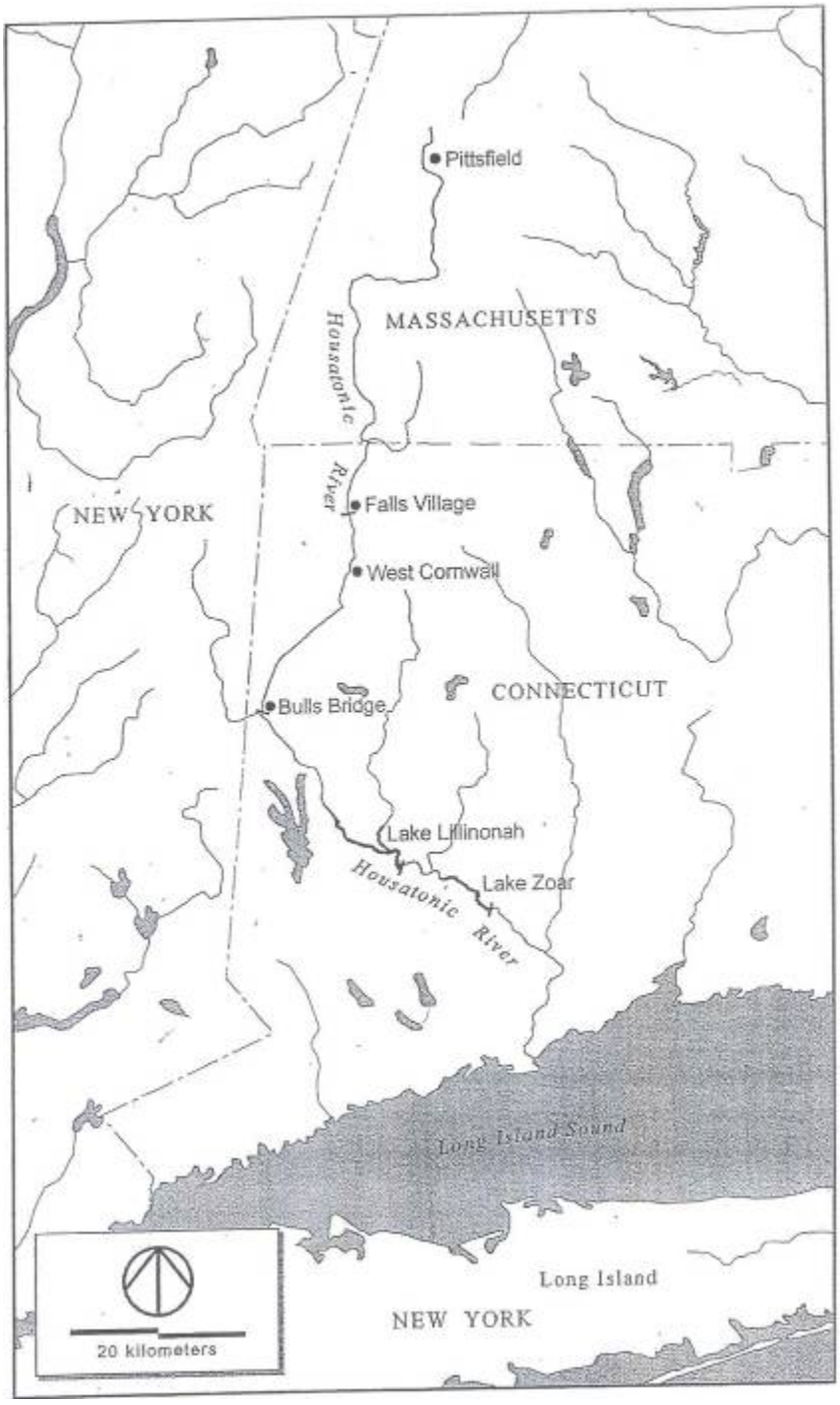
William Sweet
EPA/New England

ATSDR Technical Project Officer:

Greg V. Ulirsch
Superfund Site Assessment Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Appendix A

Map of Sampling Locations along the Housatonic River


Pittsfield
MASSACHUSETTS
Housatonic River
NEW YORK
Falls Village
West Cornwall
CONNECTICUT
Bulls Bridge
Lake Lillinonah
Lake Zoar
Housatonic River
Long Island Sound
Long Island
NEW YORK
20 kilometers

Appendix B. ATSDR Interim Public Health Categories

CATEGORY / DEFINITION	*DATA SUFFICIENCY*	*CRITERIA*
A. Urgent Public Health Hazard *This category is used for sites where short-term exposures (< 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.*	*This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.*	*Evaluation of available relevant information* indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards.*
B. Public Health Hazard *This category is used for sites that pose a public health hazard due to the existence of long-term exposures (> 1 yr) to hazardous substance or conditions that could result in adverse health effects.*	*This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.*	*Evaluation of available relevant information* suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.*
C. Indeterminate Public Health Hazard *This category is used for sites in which "critical" data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.*	*This determination represents a professional judgement that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.*	*The health assessor must determine, using professional judgement, the "criticality" of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.*
D. No Apparent Public Health Hazard *This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.*	*This determination represents a professional judgement based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.*	*Evaluation of available relevant information* indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.*
E: No Public Health Hazard *This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.*	*Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future*	

**Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data; monitoring and management plans*

Appendix C
2004 Connecticut Fish Consumption Guide
"If I Catch It, Can I Eat It?"
A Guide to Safe Eating of Fish Caught in Connecticut

What About Fish from the Store?

Many fish from the supermarket or restaurant are low in contaminants. Some of these fish are also high in omega-3 fatty acids, a nutrient oil from fish that enhances brain development and helps prevent heart disease. However, some fish from the market can contain elevated levels of contaminants, especially mercury.

In general, people in the High Risk Group should not eat any more than 2 fish meals a week from the market or restaurants. These meals should come from a variety of species, and includes canned tuna. The following are specific tips for those in the High Risk Group to choose healthy fish from the store:

- Canned tuna: Choose "light" tuna because it has less mercury than "white" tuna.
- Lobster and other shellfish are generally low in chemical contaminants. The tomalley portion of lobster (the green gland) can be high in contaminants and should not be eaten. This applies to lobster from Long Island Sound and elsewhere.
- Swordfish and Shark: these contain high levels of mercury and **should not be eaten.**

People in the Low Risk Group can safely eat higher amounts of market seafood. For example, swordfish or shark - once per month; tuna steak or halibut - twice per week.

The Chart below provides general guidance on which fish to choose more often:

Eat More of These	Eat Less or None of These
Haddock	Swordfish **
Sardines	Shark **
Salmon †	King Mackerel**
Atlantic Mackerel	Tilefish**
Flounder	Halibut
Cod	Tuna Steak
Light tuna (canned)	White Tuna (canned)
Pollock	Striped Bass**
Shellfish (oysters, shrimp, clams, scallops, lobster)	Bluefish**

****High Risk Group should not eat any of these species.**

† Salmon: Canned salmon is low in contaminants and so is a good choice. Fresh or frozen salmon fillets are typically from farm-raised fish. These can contain more contaminants than wild salmon and so should be eaten only once per week.

Please call the Connecticut Health Department (860-509-7742) if you would like to know about any fish species not listed in the above chart.

It is important to keep in mind that the High Risk Group should eat no more than 2 fish meals per week, regardless of whether they come from local waters or from the market. This means that if you are in the High Risk Group and have already eaten one locally caught fish meal that week, you should eat only 1 additional fish meal, either from the store or local waters.

Please unfold for more information

If I Catch It, Can I Eat It?

A Guide to Safe Eating of Fish Caught in Connecticut

Contains Updated Information About Store-Bought Fish

STATE OF CONNECTICUT
DEPT. OF PUBLIC HEALTH
410 Capitol Ave.
Hartford, CT 06134-0308
860-509-7742
www.dph.state.ct.us
M. Jodi Rell, Governor
J. Robert Galvin, MD, MPH, Commissioner

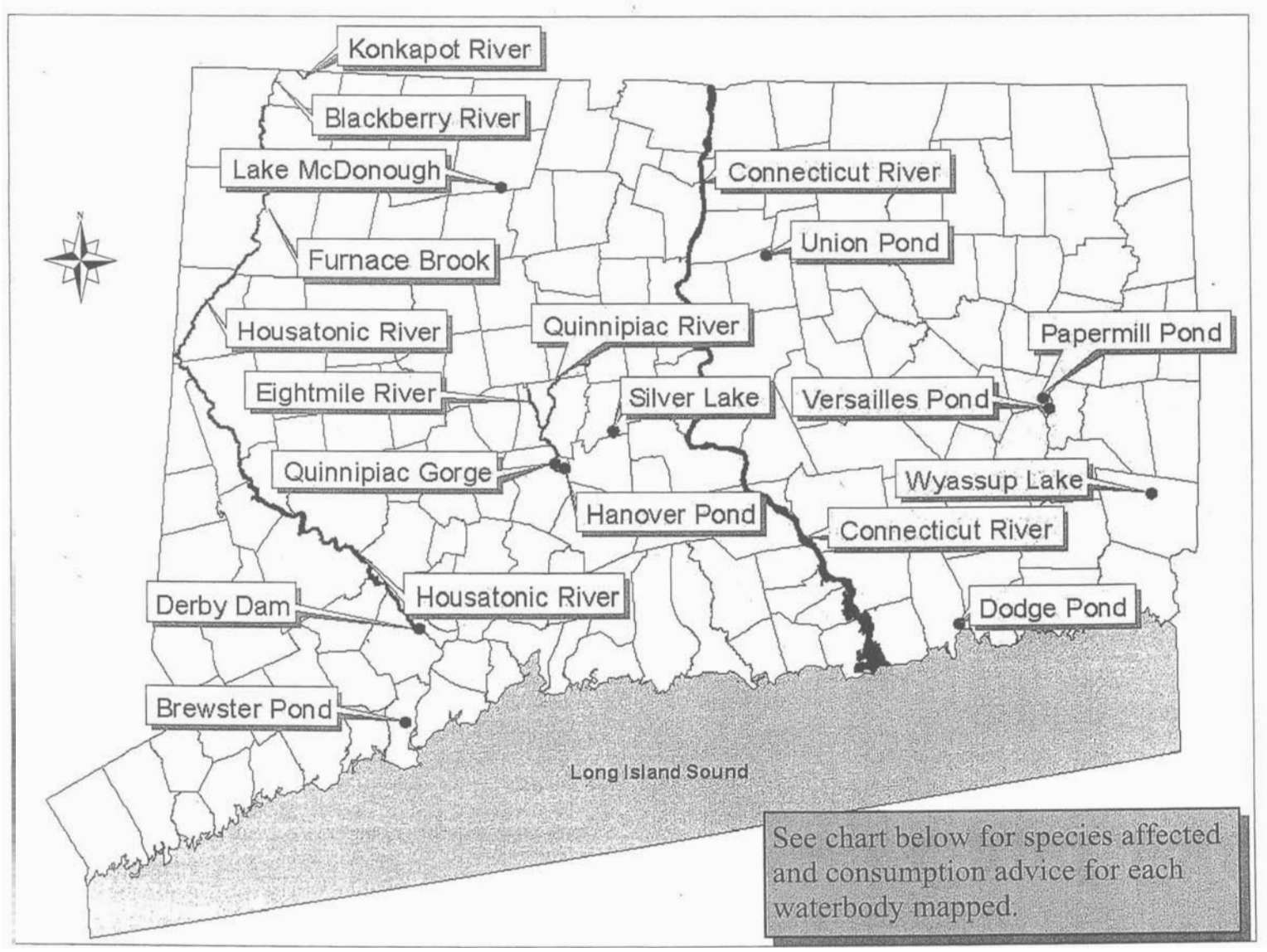
CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

Keeping Connecticut Healthy

Pamphlet Based Upon 2006 Fish Advisory

Connecticut Safe Fish Consumption Guide

Waterbodies of Specific Concern in Connecticut's 2006 Fish Consumption Advisory
(All other freshwater bodies fall under the general statewide advisory)



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Contaminant

2006 Advisory for Eating Fish From Connecticut Waterbodies

Advisory Type	Waterbody	Fish Species	High Risk Group[a] Advice	Low Risk Group Advice	Contaminant
Statewide Freshwater Fish	All fresh waterbodies (See more restrictive advice for specific waterbodies listed below.)	Trout	No Limits on Consumption [b]	No Limits on Consumption	--
		All other fish	One meal per month	One meal per week	Mercury
More Restrictive Advice For Specific Freshwater Fish	Dodge Pond Lake McDonough Silver Lake Wyassup Lake	Largemouth Bass, Smallmouth Bass, Pickerel	Do not eat	One meal per month	Mercury
	Housatonic River above Derby Dam (except as listed below for lakes on Housatonic River)	Trout, Catfish, Eels, Carp, Northern Pike	Do not eat	Do not eat	PCBs
		Bass, White Perch	Do not eat	One meal per 2 months	PCBs
		Bullheads	One meal per month	One meal per month	PCBs
		Panfish [c] (yellow perch, sunfish, etc)	One meal per month	One meal per week	PCBs
	Lakes on Housatonic River: (Lillinonah, Zoar, Housatonic)	Bass, White Perch	One meal per month	One meal per month	PCBs
		Other Species	See advice for river	See advice for river	PCBs
	Furnace Brook (Cornwall)	Trout	One meal per month	One meal per month	PCBs
	Blackberry River Downstream of "Blast Furnace" (North Canaan)	Smallmouth Bass	One meal per month	One meal per month	PCBs
	Quinnipiac River above Quinnipiac Gorge	All Species	Do not eat	Do not eat	PCBs
	Q Gorge/Hanover Pond (Meriden)	All Species	One meal per month	One meal per month	PCBs
	Eight Mile River (Southington)	All Species	Do not eat	Do not eat	PCBs
	Connecticut River	Carp	Do not eat	One meal per 2 months	PCBs
		Catfish	Do not eat	One meal per month	PCBs
	Versailles, Papermill Ponds & connecting section of Little River (Sprague)	All Species	Do not eat	One meal per month	Mercury, PCBs
	Konkapot River (North Canaan)	White Suckers	Do not eat	One meal per month	Mercury
	Brewster Pond (Stratford)	Catfish & Bullheads	Do not eat	Do not eat	Chlordane
	Union Pond (Manchester)	Carp, Catfish, Bass	Do not eat	Do not eat	Chlordane
Specific Saltwater Fish	Long Island Sound and connected rivers	Striped Bass	Do not eat	One meal per 2 months	PCBs
		Bluefish over 25"	Do not eat	One meal per 2 months	PCBs
		Bluefish 13- 25 " [d]	One meal per month	One meal per month	PCBs

[a] **High Risk Group** includes pregnant women, nursing mothers, women planning to become pregnant within one year, and children under 6. Low risk group includes all others.
[b] It is prudent for the High Risk Group to eat no more than one large trout (over 15") from lakes and ponds per month.
See more restrictive trout advice above for sections of the Housatonic and Quinnipiac Rivers, and other waterbodies.
[c] For panfish (yellow perch, sunfish, Pumpkinseed, etc) refer to Statewide Freshwater Fish section above regarding mercury.
[d] Snappers, which are bluefish under 13", are not on the advisory because they are not contaminated.

REMEMBER

- Follow this advisory to make sure the fish you eat are safe for your family.
- While this advisory focuses on locally caught fish, you should also be selective about store bought fish. See advice on page 3.
- Most trout are not part of the advisory and are safe to eat.

  Long Island Sound: Most fish are safe to eat except for listed restrictions on Striped Bass and Bluefish.
- The *High Risk* group consists of pregnant women, women planning pregnancy within a year, nursing mothers, and children under age 6.
- The *High Risk Group* should eat no more than one fish meal per month of most freshwater fish. More restrictions apply to fish from certain waterbodies.
- The *Low Risk Group* should limit eating most freshwater fish to once a week.
- Your exposure to PCBs in fish can be further reduced by trimming away fat and cooking fish on a rack so that fat drips away.

WHERE CAN I GET MORE INFORMATION?

Health Questions?
Call CTDPH at 860-509-7742.

Questions about fishing in Connecticut?
Call CTDEP at 860-424-3474.

Background:

Fish from Connecticut's waters are a healthy, low-cost source of protein. Unfortunately, some fish tend to take up chemicals such as mercury and polychlorinated biphenyls (PCBs). These chemicals can build up in your body and damage your nervous system. The developing fetus and young children are most sensitive. Women who eat fish containing these chemicals before or during pregnancy may have children who are slow to develop and learn. PCBs can also cause cancer.

This pamphlet provides advice that will help your family avoid these chemicals and eat fish safely.

What Does The Fish Consumption Advisory Say?

The advisory tells you how often you can safely eat fish from Connecticut's waters and from the store or restaurant. In many cases, separate advice is given for the High Risk and Low Risk Groups. The next section will tell you which group you belong to. Advice is given for three different types of fish consumption:

1. Statewide Freshwater Fish Advisory: Most freshwater fish in Connecticut contain enough mercury to cause some limit to consumption. The statewide freshwater advice is that:

- High Risk Group: no more than 1 meal per month
- Low Risk Group: no more than 1 meal per week

2. Advisories for Specific Waterbodies: Certain waterbodies contain fish with higher levels of contaminants than seen elsewhere in the state. These waterbodies include the Housatonic River, parts of the Quinnipiac River, certain lakes, and certain species from Long Island Sound. The chart and map in the center of this pamphlet provides details on safe fish consumption from these waterbodies.

3. Advice for Fish Purchased from the Market: Most fish from the market are healthy to eat and contain essential nutrients such as omega-3 fatty acids. However, there are some fish that contain elevated levels of mercury or PCBs and so should be consumed less or not at all. This pamphlet points out which fish are healthy to eat and which ones to eat less of.

Am I In The High Risk Group?

- You are in the **High Risk Group** if you are a *pregnant woman*, a *nursing mother*, a *woman of childbearing age*, or a *child under the age of 6*.
- If you do not fit into the High Risk Group, you are in the **Low Risk Group**.

MORE SPECIFIC FACT SHEETS CAN BE OBTAINED BY CALLING THE CT DPH (860-509-7742), OR BY GOING TO OUR WEB SITE :

http://www.dph.state.ct.us/BCH/eeoh/webfsh.htm

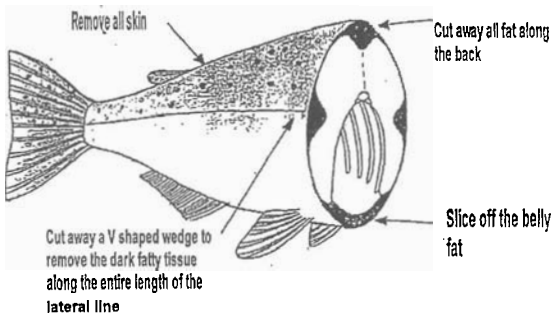
Are Trout Safe To Eat?

Most trout from Connecticut's rivers are safe to eat because they usually have little contamination. However, there are limits on trout from certain waterbodies due to PCBs and on large trout from lakes due to mercury (see chart).

What Else Can I Do To Eat Fish Safely?

PCBs are mostly in the fatty portions of fish. It is very important to remove skin and other fatty parts. Cook fish on a rack (broil) so that fat can drip away from the flesh.

Fatty portions to remove before cooking



Remove and do not eat the organs, head, skin and the dark fatty tissue along the back bone, lateral lines and belly.

Mercury is in the edible (fillet) portion of fish. Therefore, you cannot lower your exposure to mercury by cooking or cleaning the fish. Large fish tend to have the highest levels of PCBs and mercury. If you have a choice, eat smaller fish of any given species. In addition, certain smaller species generally have lower levels of contamination (perch, small trout, sunfish).

How Do These Contaminants Get Into Fish?

Mercury and PCBs can build up in fish to levels that are thousands of times higher than in the water. These contaminants enter the water from:

- Chemical spills that occurred in the past. Even though these spills have been stopped, it will take years for the mercury or PCB levels in the fish to drop to safe levels.
- Mercury in the air. Mercury travels long distances from where it is released. Much of it comes from air pollution outside of Connecticut.

The Connecticut Department of Environmental Protection (CTDEP) is working to improve water quality in Connecticut and is limiting the amount of mercury which can be released into the air.