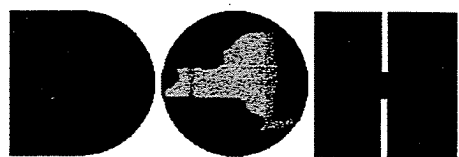


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New York State Department of Health  
Center for Environmental Health

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## Health Consultation

### 102<sup>nd</sup> STREET LANDFILL

Niagara Falls, Niagara County, New York

RECEIVED  
APR 14 2000  
NYCDOH/ES.9  
REL/CHNEL

February 3, 2000

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Prepared under a Cooperative Agreement with  
U.S. Department of Health & Human Services  
Public Health Service  
Agency for Toxic Substances and Disease Registry

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## **BACKGROUND AND STATEMENT OF ISSUE**

In April 1994, the New York State Department of Health (NYS DOH) issued a public health assessment (PHA) for the 102<sup>nd</sup> Street Landfill site (NYS DOH, 1994) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). Ingestion of fish caught in the Niagara River or Lake Ontario, which may have bioaccumulated contaminants originating from the 102<sup>nd</sup> Street Landfill and other sites, was identified as the major public health concern. However, the data were inadequate to assess the public health significance of exposure to site-related contaminants in fish. To help address this concern, the NYS DOH recommended that the New York State Department of Environmental Conservation (NYS DEC) collect fish from the Upper Niagara River and analyze them for organochlorine contaminants. The purpose of this health consultation is to evaluate these data to determine the possible public health significance of exposure to contaminants that may be originating from the 102<sup>nd</sup> Street Landfill site.

### **A. Site Description and History**

The 102<sup>nd</sup> Street Landfill site, which is on the National Priorities List (NPL), is an inactive landfill along the Niagara River in the City of Niagara Falls, Niagara County (Appendix A, Figure 1). The site is about 6 miles upstream of the Niagara Falls. Most of the 102<sup>nd</sup> Street Landfill site is owned by the Occidental Chemical Corporation (OCC) and the remainder is owned by the Olin Chemical Corporation (Olin). The owners and their predecessors disposed of industrial and hazardous wastes at this site.

The surrounding area is zoned for both residential and commercial use. To the west of the landfill is Griffon Park, a former municipal landfill (and currently a public park) and to the east is another landfill, known as the Belden site (Appendix A, Figure 1). The area around the site is lightly populated, due in part to the Love Canal site to the north, its associated Emergency Declaration Area One across the street, and the LaSalle Expressway. However, Cayuga Island located Southeast of the site and across the Little Niagara River from the site is a residential community. The Little Niagara River is a side channel of the Niagara River.

Many chemicals, such as chlorinated benzenes, pesticides and mercury were found during investigations at the 102<sup>nd</sup> Street Landfill site. Much of the contamination at the site is in underground layers of non-aqueous phase liquid (NAPL), which is a high concentration of a chemical or mixture of chemicals that frequently resembles liquid tar.

The site owners implemented a remedy at the 102<sup>nd</sup> Street Landfill with oversight by the United States Environmental Protection Agency (US EPA), the NYS DEC and the NYS DOH (US EPA, 1995). Construction of the remedy was completed in 1997. Off-site soils and river sediments were excavated and placed on-site. The wastes were encapsulated within a slurry wall and a

multimedia cap on-site. Groundwater will be pumped (to maintain an inward gradient) and treated. NAPL will be recovered and incinerated. The site will be monitored to evaluate the effectiveness of this remedy.

**B. Site Visit**

Ms. Dawn Hettrick of the NYS DOH visited the 102<sup>nd</sup> Street Landfill site on September 18, 1997. During that visit, Ms. Hettrick noted that landfill construction was nearing completion and the landfill cover material was being placed and graded. The site was secured by a chain-link fence around the perimeter of the site with a security check-in at the gates. Mr. Matt Forcucci of the NYS DOH visited the site on December 23, 1998. Mr. Forcucci noted that on-site remedial construction was complete.

**C. Demographics**

The NYS DOH estimated from the 1990 Census (U.S. Bureau of the Census 1991) that 4,783 people live within one mile of the site. This population is 97.7% white, 1.2% black and 1.1% of other races. The percent of persons of Hispanic origin is 0.6%. Based on the 1990 census 7.5% of the population is under 6 years of age, 16.4% is 6-19 years of age, 56.1% is 20-64 years of age, and 20% is 65 years or older. In 1990 there were 999 females of reproductive age (ages 15-44) in the area. The median household income for the area was \$29,152 in 1989, with 5.1% of the population living below the poverty level (U.S. Bureau of the Census 1992). The following chart compares these demographics with statewide averages. There is one school and no nursing homes in the area.

	New York State	Area within 1 mile of Landfill
<b>Age Distribution</b>		
<6	8.3%	7.5%
6-19	18.4%	16.4%
20-64	60.2%	56.1%
>64	13.1%	20%
<b>Race Distribution</b>		
White	74.4%	97.7%
Black	15.9%	1.2%
Native American	0.3%	0.8%
Asian	3.9%	0.3%
Other	5.5%	0.1%
<b>Ethnicity Distribution</b>		
Percent Hispanic	12.3%	0.6%
<b>1989 Median Income</b>	<b>\$32,965</b>	<b>\$29,152</b>
<b>% Below Poverty Level</b>	<b>13.0%</b>	<b>5.1%</b>

#### **D. Environmental Contamination and Exposure Pathways**

Before implementation of the remedy, site-related contaminants migrated into the Niagara River through shoreline bulkhead seeps and were found in river sediments adjacent to the site. These contaminants may bioaccumulate in fish in the Niagara River. Since people who catch fish from the Niagara River may consume the fish; the NYS DOH and ATSDR considered the ingestion of fish caught in the Niagara River to be a completed exposure pathway in the PHA.

In part to address these concerns, fish were collected in 1994 from the Niagara River above and below the Niagara Falls (NYS DEC, 1995). The falls are about 6 miles downstream of the 102<sup>nd</sup> Street site. These fish were analyzed for PCBs, DDT, mirex, chlordane, hexachlorocyclohexanes, hexachlorobenzene, dieldrin and mercury. Of these, hexachlorocyclohexanes, hexachlorobenzene and mercury are site-related contaminants. The results of these analyses are presented in the Discussion section below.

#### **E. Community Health Concerns and Current Issues**

The community is concerned that people may be exposed to site contaminants by swimming and wading in and eating fish from the Niagara River and Little Niagara River near the 102<sup>nd</sup> Street Landfill site. Since contamination was identified, Niagara River sediments next to the site were removed by the site owners. Although contamination was not found in the Little Niagara River and remediation was not required, the Little Niagara River was dredged. Therefore, potential future exposures to contaminants from swimming and wading near the site are not likely. This health consultation addresses the potential for people to be exposed to site contaminants through ingestion of fish. There are no known new health concerns.

#### **F. ATSDR Child Health Initiative**

The ATSDR Child Health Initiative emphasizes the ongoing examination of relevant child health issues in all of the agency's activities, including evaluating child-focused concerns through its mandated public health assessment activities. The ATSDR and NYS DOH consider children when we evaluate exposure pathways and potential health effects from environmental contaminants. We recognize that children are of special concern because of their greater potential for exposure from play and other behavior patterns. Children sometimes differ from adults in their susceptibility to hazardous chemicals, but whether there is a difference depends on the chemical. Children may be more or less susceptible than adults to health effects, and the relationship may change with developmental age.

At this site, we have no specific evidence that suggests that children would experience greater exposure to site-related contaminants than would adults. However, the NYS DOH Fish Advisory contains recommendations specific to children. The advisory recommends that women of

childbearing age, infants, and children under the age of 15 should not eat any fish from waters listed in the advisory, including the Niagara River above and below the falls (NYS DOH, 1998). These recommendations were because of potential exposures to chemicals that are not site-related.

## DISCUSSION

Hexachlorocyclohexanes, hexachlorobenzene and mercury are site-related contaminants for which fish collected from the Niagara River were analyzed. The results of these analyses are discussed below.

A review of data collected from Niagara River fish indicates that fish are not accumulating hexachlorocyclohexanes and mercury from the 102<sup>nd</sup> Street Landfill site at levels of health concern. Hexachlorocyclohexanes were not detected in any of the fish (at a detection limit of 0.005 milligrams per kilogram). Mercury concentrations in the fish ranged from non-detectable (at a detection limit of 0.05 milligrams per kilogram) to 0.630 milligrams per kilogram. These mercury levels are below the Food and Drug Administration (FDA) tolerance limits/action level for mercury of 1.0 milligram/kilogram.

Hexachlorobenzene was not detected (at a detection limit of 0.002 milligrams per kilogram) in any fish collected from the Niagara River above the falls. The 102<sup>nd</sup> Street Landfill site is located adjacent to the Niagara River about 6 miles above the falls. Therefore, fish collected from the Niagara River above the falls are not accumulating hexachlorobenzene at levels of health concern.

In the Niagara River below the falls, hexachlorobenzene was detected in some fish, at levels up to 0.096 milligrams per kilogram. The hexachlorobenzene concentrations were compared to NYS DOH-derived health-based comparison values since there is no applicable FDA tolerance/action level for hexachlorobenzene. The average concentration of hexachlorobenzene in American eels, at 0.031 milligrams per kilogram, and carp, at 0.011 milligrams per kilogram, exceeded health-based comparison values for individuals who eat one meal per week of these fish (for cancer health comparison values only). Hexachlorobenzene causes cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 1996). Chemicals that cause cancer in laboratory animals may also increase the risk of cancer in humans who are exposed to lower levels over long periods of time. It is unknown whether hexachlorobenzene causes cancer in humans. Based on the results of animal studies and limited sampling of fish, chronic exposure to hexachlorobenzene at the highest concentration detected in fish would pose a low increased risk for developing cancer (for additional information on how the NYS DOH determined and qualified health risk applicable to this health consultation, see Appendix B).

Although the implementation of a remedy at the 102<sup>nd</sup> Street Landfill has eliminated current and future migration of contaminants to the Niagara River, contaminant migration from the site may

have contributed to the levels of site-related chemicals in the river in the past. Several other hazardous waste sites and contaminant sources located down river from the 102<sup>nd</sup> Street Landfill site may have contributed and continue to contribute contaminants to the river. These additional sources may explain the higher levels of contaminants in fish collected below the falls. Specifically, not only is hexachlorobenzene a site-related chemical, but it is also a site-specific indicator chemical of the S-Area Landfill, another heavily contaminated OCC waste landfill downstream of the 102<sup>nd</sup> Street Landfill site.

In addition to the chemicals discussed above, other site-related chemicals were discharged into the Niagara River and were measured in river sediments. These include chlorinated toluenes, chlorinated phenols and other chlorinated benzenes (other than hexachlorobenzene). The fish samples collected for this investigation were not analyzed for these contaminants. However, based on their chemical/physical properties and/or measured bioconcentration factors, we expect that these contaminants will bioconcentrate in fish at a rate less than or equal to hexachlorobenzene. The data that are available indicate that the remediated site is not currently contributing contaminants to the river.

The levels of the site-related contaminants in fish in the Niagara River above the falls do not warrant any additions to the health advisory. The NYS DOH recommends that women of childbearing age and children under 15 not eat fish taken from the Niagara River. Other anglers should eat no more than one meal per month of carp from the Niagara River above the falls and no American eel or carp from the Niagara River below the falls. This is because of PCBs, mirex and dioxin found in fish from this area. A copy of the complete health advisory for chemicals in sportfish and game is attached in Appendix D.

## CONCLUSIONS

The 102<sup>nd</sup> Street Landfill site currently presents no apparent public health hazard (see Appendix C for ATSDR's public health hazard category classification). Contaminant migration from the site has been eliminated, contaminated sediments were removed, and sediments of the Little Niagara River were dredged. Site-related contaminants in fish do not exceed FDA action levels or levels of health concern in the upper Niagara River. However, one site-related contaminant, hexachlorobenzene, exceeds levels of health concern in American eel and carp in the river below the Niagara Falls. The 102<sup>nd</sup> Street Landfill site may have contributed to this contamination in the past, but other sources are more likely to have contributed to the contamination downstream of the site. Previous to this sampling, the NYS DOH health advisory had recommended and continues to recommend that anglers eat no American eel or carp from the Niagara River below the falls; the original advisory was based upon the levels of PCBs, mirex and dioxin that were found in the fish from this area.

## **RECOMMENDATIONS**

Health advisories for chemicals in sportfish and game should remain in effect for the Niagara River and Lake Ontario for as long as contaminant levels warrant.

No further action at the 102<sup>nd</sup> Street Landfill site is needed at this time other than continued operation, maintenance and monitoring of remedial measures. However, if new environmental, toxicological or health outcome data become available that indicate that follow-up is warranted, additional actions may be taken at this site.

## **PUBLIC HEALTH ACTION PLAN**

The Public Health Action Plan for the 102<sup>nd</sup> Street Landfill site contains a description of the actions to be taken by the US EPA, ATSDR, and/or the NYS DOH at or near the site subsequent to the completion of this health consultation. The purpose of the PHAP is to ensure that this health consultation not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of the ATSDR/NYS DOH to follow-up on this plan to ensure that it is implemented. The public health action to be implemented follows:

1. The NYS DOH will continue to evaluate new data regarding contaminants in fish and issue appropriate health advisories as needed. Chemical data, whether site-related or not, from fish which were collected for this health consultation, were included in the data used to develop the attached NYS DOH health advisory for chemicals in sportfish and game.
2. The NYS DOH will work with NYS DEC and USEPA to make sure that operation and monitoring of remedial measures continue for as long as necessary to protect public health.



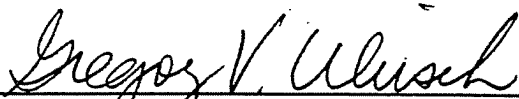
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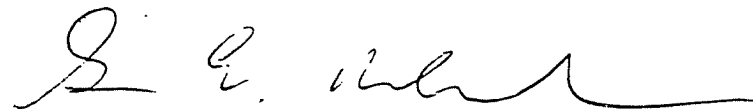
Thomas Johnson  
Research Scientist  
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## CERTIFICATION

The Health Consultation for the 102<sup>nd</sup> Street Landfill site was prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

  
\_\_\_\_\_  
Technical Project Officer, SPS, SSAB, DHAC

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

  
\_\_\_\_\_  
Acting Chief, SSAB, DHAC, ATSDR

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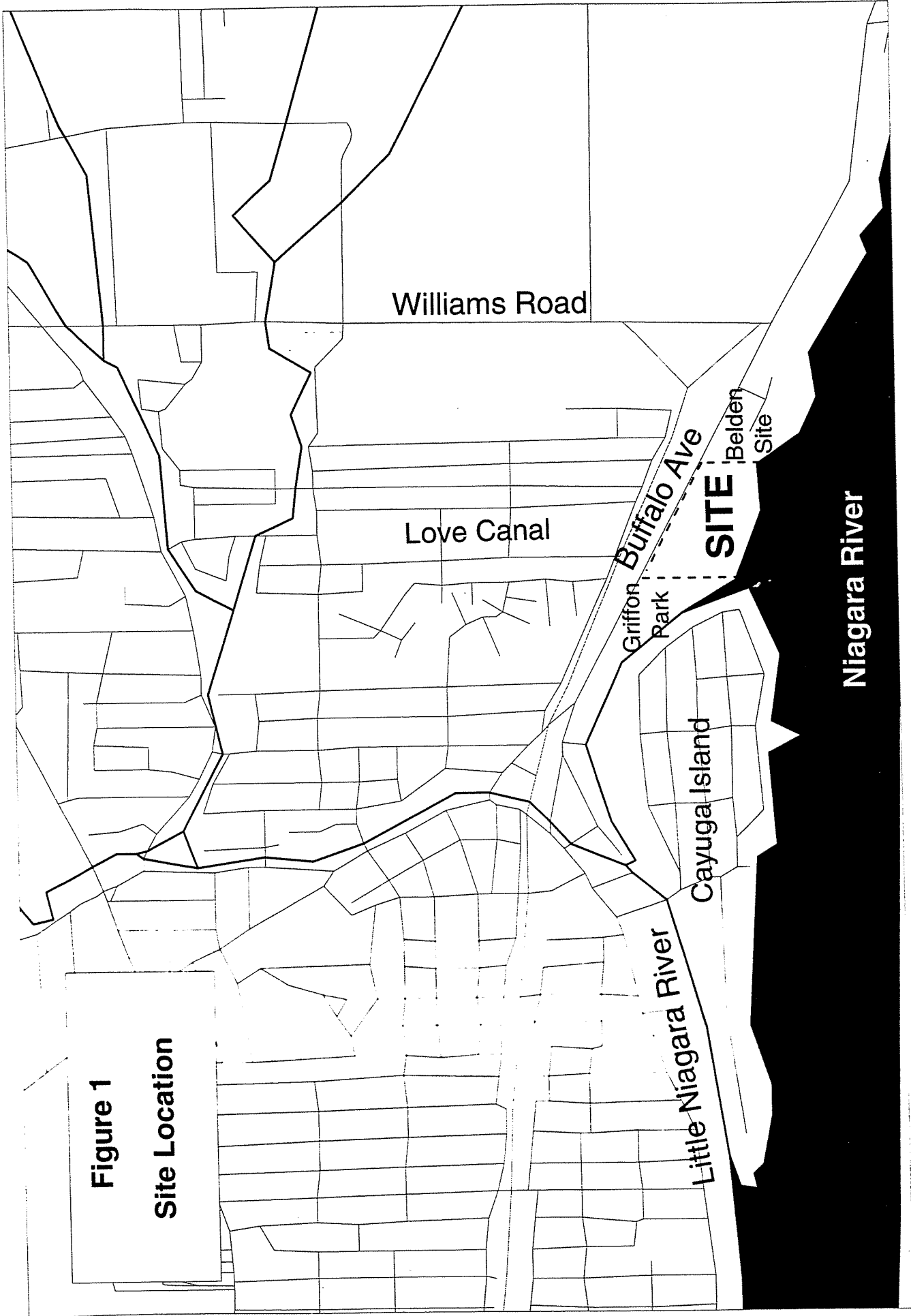
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**APPENDIX A**

**Figure**



**Figure 1**  
**Site Location**

**APPENDIX B**

**New York State Department of Health  
Procedure for Evaluating Potential Health Risks  
for Contaminants of Concern**

**NEW YORK STATE DEPARTMENT OF HEALTH  
PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS  
FOR CONTAMINANTS OF CONCERN**

To evaluate the potential health risks from contaminants of concern associated with the 102<sup>nd</sup> Street Landfill site, the New York State Department of Health assessed the risks for cancer and noncancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

<u>Risk Ratio</u>	<u>Qualitative Descriptor</u>
equal to or less than one in a million	very low
greater than one in a million to less than one in ten thousand	low
one in ten thousand to less than one in a thousand	moderate
one in a thousand to less than one in ten	high
equal to or greater than one in ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant. There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk is acceptable. An increased lifetime cancer risk of one in one million or less is generally not considered a significant increase in cancer risk.

For noncarcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for  
Noncarcinogenic Health Risks

<u>Ratio of Estimated Contaminant Intake to Risk Reference Dose</u>	<u>Qualitative Descriptor</u>
equal to or less than the reference dose or minimal risk level	minimal
greater than one to five times the reference dose or minimal risk level	low
greater than five to ten times the reference dose or minimal risk level	moderate
greater than ten times the reference dose or minimal risk level	high

Noncarcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number which reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive subpopulations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for noncancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. If exposure to the



contaminant exceeds the risk reference dose, there may be concern for potential noncancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. This level of concern depends upon an evaluation of a number of factors such as the actual potential for exposure, background exposure and the strength of the toxicologic data.

**APPENDIX C**

**Public Health Hazard Categories**

## INTERIM PUBLIC HEALTH HAZARD CATEGORIES

CATEGORY / DEFINITION	DATA SUFFICIENCY	CRITERIA
<p><b>A. Urgent Public Health Hazard</b></p> <p>This category is used for sites where short-term exposures (&lt; 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.</p>	<p>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.</p>	<p>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.</p>
<p><b>B. Public Health Hazard</b></p> <p>This category is used for sites that pose a public health hazard due to the existence of long-term exposures (&gt; 1 yr) to hazardous substance or conditions that could result in adverse health effects.</p>	<p>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.</p>	<p>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.</p>
<p><b>C. Indeterminate Public Health Hazard</b></p> <p>This category is used for sites in which <i>Acritical</i>@ data are <i>insufficient</i> with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.</p>	<p>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.</p>	<p>The health assessor must determine, using professional judgement, the <i>Acritical</i>@ 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.</p>
<p><b>D. No Apparent Public Health Hazard</b></p> <p>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.</p>	<p>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.</p>	<p>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.</p>
<p><b>E: No Public Health Hazard</b></p> <p>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.</p>	<p>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</p>	

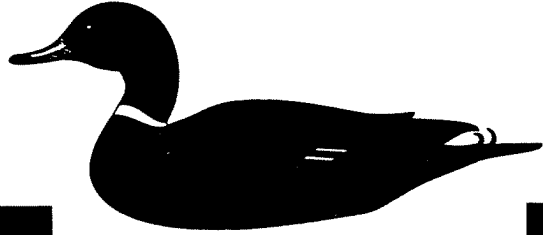
\* Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data; monitoring and management plans.

**APPENDIX D**

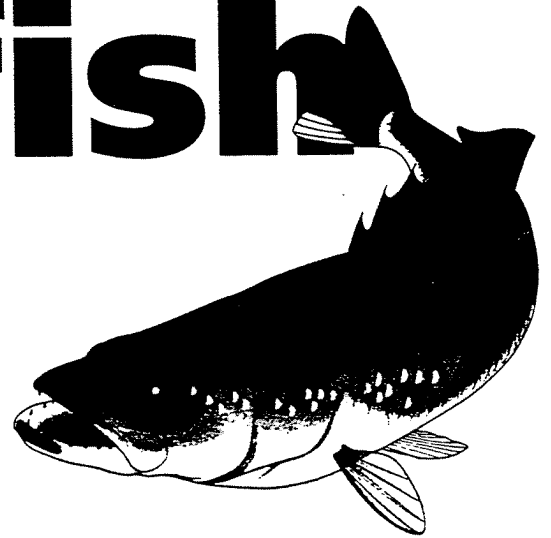
**New York State Department of Health**

**Health Advisories for  
Chemicals in Sportfish and Gamefish**

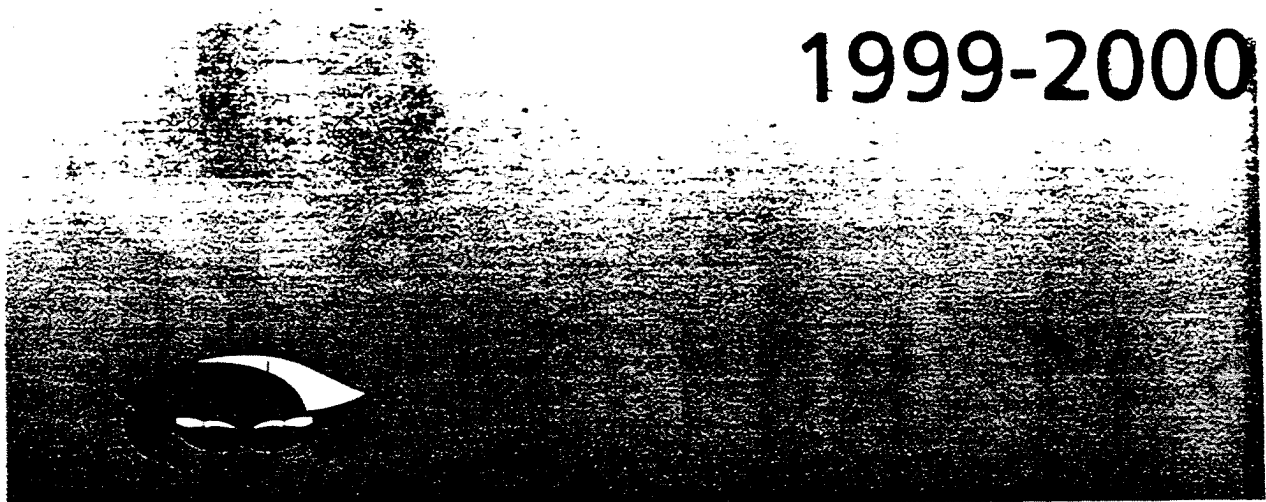
New York State Department of Health  
Health Advisories



# Chemicals in Game and Sportfish



1999-2000



These advisories are also available from the New York State Department of Health Web site on the Internet: <http://www.health.state.ny.us/nysdoh/environ/fish.htm>

In an effort to reduce the costs of printing, please notify us if you wish your name to be deleted from our mailing list or if your address has changed. Comments regarding the format or content of this booklet are welcome. Use the telephone number for Environmental Health Information listed on page 18 or e-mail: [BTSA@health.state.ny.us](mailto:BTSA@health.state.ny.us)

## 1999-2000 Health Advisories: Chemicals in Sportfish and Game

### Summary

The New York State Department of Health (DOH) issues advisories on eating sportfish and game because some of these foods contain chemicals at levels that may be harmful to your health. These advisories are for sportfish and game that people take and are not for fish and game sold in markets. The health advisories are: (1) general advice on sportfish taken from waters in New York State; (2) advice on sportfish from specific waterbodies; and (3) advice on eating game. The advisory tells you how to minimize your exposure to contaminants in sportfish and game and reduce whatever health risks are associated with them. The advisories are updated yearly.

### Background

Fish and game are nutritious and good to eat. But some fish may take in contaminants from the water they live in and the food they eat. Game, too, may take in contaminants from their food and water. Some of these contaminants build up in fish and game--and in people--over time. These contaminants could harm people, so it is important to keep your exposure to these contaminants as low as possible.

The federal government sets standards for chemicals in food that is sold commercially, including fish. The decision to eat sportfish or game that you take is not regulated by government. Instead, state governments issue advisories. In New York State, the Department of Environmental Conservation (DEC) routinely monitors contaminant levels in fish and game and DOH issues advisories when sportfish have contaminant levels greater than federal standards.

These advisories are not intended to discourage you from eating fish or game, but should be used as a guide to minimize your exposure to contaminants.

### Health Benefits

When properly prepared, fish provide a diet high in protein and low in saturated fats. Almost any kind of fish may have real health benefits if it replaces a high-fat source of protein in the diet. You can get the health benefits of fish and reduce unwanted contaminants by following the guidelines in these advisories.

### Contaminants in Fish and Game

Long-lasting contaminants, such as PCBs, DDT and cadmium, build up in your body over time. It may take months or years of regularly eating contaminated fish or game to build up amounts that are a health concern. Health problems that may result from the contaminants found in fish or game range from small changes in health that are hard to detect to birth defects and cancer. Mothers who eat highly contaminated fish and game before becoming pregnant may have children who are slower to develop and learn. The meal advice in this advisory is also intended to protect children from these potential developmental problems. Women beyond their childbearing years and men face fewer health risks from contaminants than children do. People in this group should follow the advisory to reduce their total exposure to contaminants.

Some contaminants cause cancer in animals. We cannot predict with certainty your risks of cancer from eating contaminated fish or game. Cancer currently affects about one in every three people, primarily due to smoking, diet and hereditary risk factors. Exposure to contaminants in the fish and game you eat may not increase your cancer risk at all. If you follow this advisory over your lifetime, you will minimize your exposure and reduce whatever cancer risk is associated with these contaminants.

More information about the chemicals that have led to advisories in New York State sportfish and game and potential health effects

can be found on page 15. When the federal government sets standards for fish, it generally assumes that people eat about a half-pound of fish each month. The contaminant levels are measured in a skin-on fillet which has not been trimmed; this sample is used in determining whether or not the fish exceeds standards. Fish cannot be legally sold if they contain a contaminant at a level greater than its standard. When sportfish from a waterbody contain contaminants at levels greater than the federal standards, DOH issues a specific advisory.

### **General Advisory for Eating Sportfish**

The general health advisory for sportfish is that you eat no more than one meal (one-half pound) per week of fish taken from the state's freshwaters and some marine waters at the mouth of the Hudson River. These include the New York waters of the Hudson River, Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill, Kill Van Kull, Harlem River and the East River to the Throgs Neck Bridge (see map on page 13). This general advisory is to protect against eating large amounts of fish that have not been tested or may contain unidentified contaminants. The general advisory does not apply to most marine waters.

### **Specific Advisories for Freshwater, the Hudson River and the Upper Bay of New York Harbor**

Fish from more than 60 waterbodies in New York have contaminant levels that are greater than federal standards. For these waters, DOH recommends either limiting or not eating a specific kind of fish (see pages 5 to 11). In some cases, enough information is available to issue advisories based on the length of the fish. Older (larger) fish are often more contaminated than younger (smaller) fish.

The contaminants that led to the advisory (mercury, cadmium, PCBs, chlordane, dioxin, DDT and mirex) are listed next to each advisory. If you eat fish from more than one water body with these advisories, you should limit consumption from all of the waters you fish. For example, if you eat a meal of Saw Mill River carp, you should not eat American eel from Kinderhook Lake for the rest of that month since both of these fish species

have EAT NO MORE THAN ONE MEAL PER MONTH advisories and both are based on PCB contamination.

### **Advisory for Women, Infants and Children**

Health advice is also given for infants, children under the age of 15 and women of childbearing age. DOH recommends that these groups not eat any fish from the specific waterbodies listed in the advisory. The reason for this specific advice is that chemicals may have a greater effect on developing organs in young children or in the fetus. They also build up in women's bodies and are often passed on in mother's milk. Waters that have specific advisories have at least one species of fish with an elevated contaminant level, which means that a contamination source is or was in or near the water.

When eating fish from waters where cadmium or mercury are listed as primary contaminants, it is important to space out fish meals according to the specific advisory for that waterbody. For example, if you eat a meal of yellow perch from Moshier Reservoir, you should not eat any more fish with the same mercury advisory for the rest of that month. However, for other contaminants, the total number of meals that you eat during the year is important and many of those meals can be eaten during a few months of the year. If most of the fish you eat are from the ONE MEAL PER WEEK category, you should not exceed 52 meals per year. Likewise, if most of the fish you eat are in the ONE MEAL PER MONTH category, you should not exceed 12 meals per year. Remember, eating one meal of fish from the ONE MEAL PER MONTH group is the same as eating four meals from the ONE MEAL PER WEEK group.

### **Advisories for Other Marine Waters**

DOH also issues specific advisories for Long Island Sound, Block Island Sound, Peconic/Gardiners Bays, the Lower Bay of New York Harbor, Jamaica Bay and other Long Island south shore waters (see maps on pages 13 and 14). These apply to striped bass, bluefish and American eels and are the only fish advisories that apply to these waters. Ocean fish, although tested less often, are generally less contaminated than freshwater fish.



However, striped bass, bluefish and eels have specific habits or characteristics that make them more likely to have contaminants than other marine species (see page 14).

### **Advisories for Chemical Contaminants in Crabs and Lobsters**

DOH has a special advisory to eat no more than six Hudson River blue crabs per week and to avoid consuming crab cooking liquid due to cadmium and PCB contamination. DOH also recommends that you not eat the soft green substance (mustard, tomalley, liver or hepatopancreas) found in the body section of crabs and lobsters from any waters, because cadmium, PCBs and other contaminants concentrate there.

### **Advisories for Eating Game**

DOH also issues advisories about eating some game. These are on page 14 of this booklet and include advisories for eating snapping turtles and waterfowl statewide because they contain PCBs and other contaminants. Because these contaminants concentrate in fat, you can minimize your exposure by not eating fat from these game and by following the cooking and eating advice on page 14.

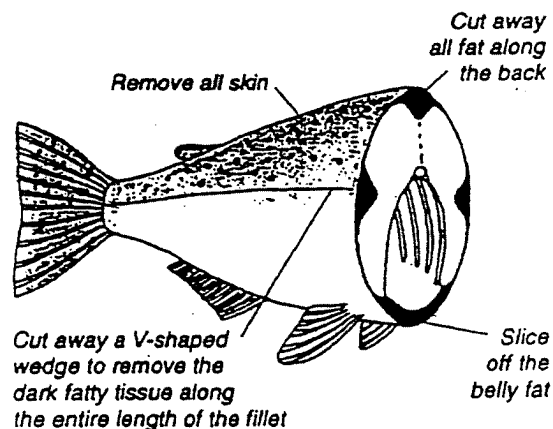
### **Deformed or Abnormal Fish**

The health implications of eating deformed or abnormal fish are unknown. Any obviously diseased fish (marked by tumors, lesions or other abnormal condition of the fish skin, meat or internal organs) should be discarded.

### **Cleaning and Cooking Your Fish**

Many contaminants are found at higher levels in the fat of fish. You can reduce the amount of these contaminants in a fish meal by properly trimming, skinning and cooking your catch. Remove the skin and trim all the fat from the belly flap, the line along the sides, the fat along the back and under the skin (see the diagram at the top of the next column).

**Cooking or soaking fish cannot eliminate the contaminants, but heat from**



cooking melts some of the fat in fish and allows some of the contaminated fat to drip away. Broil, grill or bake the trimmed, skinned fish on a rack so that the fat drips away. Do not use drippings to prepare sauces or gravies.

These precautions will not reduce the amount of mercury or other metals. Mercury is distributed throughout a fish's muscle tissue (the part you eat), rather than in the fat and skin. Therefore, the only way to reduce mercury intake is to reduce the amount of contaminated fish you eat.

**Good sanitary practices should be followed when preparing any fish.** Fish should be kept iced or refrigerated until cleaned and filleted and then refrigerated until cooked. Hands, utensils and work surfaces should be washed before and after handling any raw food, including fish. Seafood should be cooked to an internal temperature of 140°F.

### **Advice on Eating Raw or Partially Cooked Fish, Shellfish and Other Meats**

Foods of animal origin, such as pork, poultry, beef, dairy products, fish and shellfish, can be contaminated with bacteria, viruses or parasites that can cause illness. Persons at high risk (for example, those who are immunocompromised, suffer from liver disease or other chronic diseases) can be more susceptible to and more severely affected by these infectious diseases. This is why the Department of Health recommends that all of these foods be thoroughly cooked before eating. Government agencies, universities and the food industry have active programs that strive to minimize contamination of raw animal foods and assure safe food products.

Information on rules and regulations,

<b>Water (County)</b>	<b>Species</b>	<b>Recommendations</b>	<b>Chemical(s) of Concern</b>
<b>Cranberry Lake [30]</b> (St. Lawrence)	Smallmouth bass	Eat no more than one meal per month	Mercury
<b>Delaware Park Lake [5]</b> (Erie)	Carp	Eat no more than one meal per month	PCBs
<b>East River [51]</b> (NYC)	American eel	Eat none	PCBs
	Atlantic needlefish, bluefish, striped bass and white perch	Eat no more than one meal per month	PCBs
<b>Eighteen Mile Creek [3]</b> (Niagara)	All species	Eat none	PCBs
<b>Ferris Lake [20]</b> (Hamilton)	Yellow perch over 12"	Eat none	Mercury
	Smaller yellow perch	Eat no more than one meal per month	Mercury
<b>Fourth Lake [21]</b> (Herkimer & Hamilton)	Lake trout	Eat none	DDT
<b>Francis Lake [23]</b> (Lewis)	Yellow perch	Eat no more than one meal per month	Mercury
<b>Freeport Reservoir [62]</b> (Nassau)	Carp	Eat no more than one meal per month	Chlordane
<b>Grant Park Pond [57]</b> (Nassau)	Carp	Eat no more than one meal per month	PCBs
<b>Grasse River [34]</b> Mouth to Massena Power Canal (St. Lawrence)	All species	Eat none	PCBs
<b>Halfmoon Lake [22]</b> (Lewis)	Yellow perch	Eat no more than one meal per month	Mercury
<b>Hall's Pond [58]</b> (Nassau)	Carp and goldfish	Eat none	Chlordane
<b>Harlem River [50]</b> (NYC)	American eel	Eat none	PCBs
	Atlantic needlefish, bluefish, striped bass and white perch	Eat no more than one meal per month	PCBs

Waters with changes from the 1998-99 Health Advisories are underlined.

Numbers in brackets refer to map on page 12.

Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

<b>Water (County)</b>	<b>Species</b>	<b>Recommendations</b>	<b>Chemical(s) of Concern</b>
<b>Herrick Hollow Creek [44]</b> (Delaware)	Brook trout	Eat no more than one meal per month	PCBs
<b><u>Hoosic River [39]</u></b> (Rensselaer)	Brown trout over 14"	Eat no more than one meal per month	PCBs
<b><u>Hudson River [43]</u></b> Sherman Island Dam downstream to Feeder Dam at South Glens Falls	Carp	Eat no more than one meal per month	PCBs
Hudson Falls to Troy Dam	All species	Eat none	PCBs
Troy Dam south to bridge at Catskill	All species except Alewife, American shad, blueback herring, rock bass and yellow perch	Eat none	PCBs
	Alewife, blueback herring, rock bass and yellow perch	Eat no more than one meal per month	PCBs
	American shad (general advisory)	Eat no more than one meal per week	PCBs
Bridge at Catskill south to and including the Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill and Kill Van Kull	American eel, Atlantic needlefish, bluefish, carp, goldfish, largemouth bass, smallmouth bass, rainbow smelt, striped bass, walleye, white catfish and white perch	Eat no more than one meal per month	PCBs
	Blue crab	Eat no more than six crabs per week	Cadmium, PCBs
	--hepatopancreas (mustard, tomalley, or liver)	Eat none	Cadmium, PCBs
	--cooking liquid	Discard	Cadmium, PCBs
Dobbs Ferry south to Greystone	American eel	Eat none	PCBs
	Other species	See advisories for Hudson River south of Catskill (above)	

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<b>Water (County)</b>	<b>Species</b>	<b>Recommendations</b>	<b>Chemical(s) of Concern</b>
<b>Indian Lake [29]</b> (Lewis)	All species	Eat no more than one meal per month	Mercury
<b>Irondequoit Bay [8]</b> (Monroe)	Carp	Eat none	PCBs, Mirex
<b>Keuka Lake [11]</b> (Yates & Steuben)	Lake trout over 25"	Eat no more than one meal per month	DDT
<b>Kill Van Kull [53]</b> (Richmond)	See Hudson River (south of Catskill)		PCBs
<b>Kinderhook Lake [42]</b> (Columbia)	American eel	Eat no more than one meal per month	PCBs
<b>Koppers Pond [12]</b> (Chemung)	Carp	Eat no more than one meal per month	PCBs
<b>Lake Capri [65]</b> (Suffolk)	Carp	Eat no more than one meal per month	Cadmium
<b>Lake Champlain [36]</b> Whole Lake	Lake trout over 25" and walleye over 19"	Eat no more than one meal per month	PCBs, Mercury
Bay within Cumberland Head to Crab Island	American eel, brown bullhead and yellow perch	Eat no more than one meal per month	PCBs
<b>Lake Ontario [7]</b> Including Niagara River below Niagara Falls (see Niagara River for additional advice)	American eel, channel catfish, carp, lake trout over 25", brown trout over 20" and chinook salmon	Eat none	PCBs, Mirex, Dioxin
	White sucker, rainbow trout, smaller lake trout, smaller brown trout and coho salmon over 25"	Eat no more than one meal per month	PCBs, Mirex, Dioxin
West of Point Breeze	White perch	Eat none	PCBs, Mirex, Dioxin
East of Point Breeze	White perch	Eat no more than one meal per month	PCBs, Mirex, Dioxin
<b>Loft's Pond [60]</b> (Nassau)	Carp and goldfish	Eat no more than one meal per month	Chlordane

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Water (County)	Species	Recommendations	Chemical(s) of Concern
<b>Long Pond-Croghan [27]</b> (Lewis)	Splake over 12"	Eat none	Mercury
<b>Upper Massapequa Reservoir [63]</b> (Nassau)	White perch	Eat no more than one meal per month	Chlordane
<b>Massena Power Canal [33]</b> (St. Lawrence)	Smallmouth bass	Eat no more than one meal per month	PCBs
<b>Meacham Lake [35]</b> (Franklin)	Yellow perch over 12"	Eat none	Mercury
	Smaller yellow perch	Eat no more than one meal per month	Mercury
<b>Mohawk River [18]</b> Between Oriskany and West Canada Creeks (Oneida & Herkimer)	Carp	Eat none	PCBs
	Largemouth bass and tiger muskellunge	Eat no more than one meal per month	PCBs
<b>Moshier Reservoir [26]</b> (Herkimer)	Yellow perch	Eat no more than one meal per month	Mercury
<b>Nassau Lake [41]</b> (Rensselaer)	All species	Eat none	PCBs
<b>Neversink Reservoir [45]</b> (Sullivan)	Smallmouth bass	Eat no more than one meal per month	Mercury
<b>New York Harbor [54]</b>	See Hudson River (south of Catskill) and marine waters advice on page 14		PCBs
<b>Niagara River [1]</b> Above Niagara Falls	Carp	Eat no more than one meal per month	PCBs
	White perch	Eat none	PCBs, Mirex, Dioxin
	Smallmouth bass	Eat no more than one meal per month	PCBs, Mirex, Dioxin
<b>Onondaga Lake [14]</b> (Onondaga)	Walleye	Eat none	Mercury
	All other species	Eat no more than one meal per month	Mercury

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Numbers in brackets refer to map on page 12.

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<b>Water (County)</b>	<b>Species</b>	<b>Recommendations</b>	<b>Chemical(s) of Concern</b>
<b>Oswego River [15]</b> Oswego power dam to upper dam at Fulton (Oswego)	Channel catfish	Eat no more than one meal per month	PCBs
<b>Ridders Pond [56]</b> (Nassau)	Goldfish	Eat none	Chlordane
<b>Rondout Reservoir [46]</b> (Sullivan and Ulster)	Smallmouth bass over 16"	Eat no more than one meal per month	Mercury
<b>Round Pond [37]</b> Town of Long Lake (Hamilton)	Yellow perch over 12"	Eat no more than one meal per month	Mercury
<b>St. James Pond [66]</b> (Suffolk)	All species	Eat no more than one meal per month	Chlordane, DDT
<b>St. Lawrence River [32]</b> Whole River	American eel, channel catfish, lake trout over 25", carp, brown trout over 20" and chinook salmon	Eat none	PCBs, Mirex, Dioxin
	White perch, white sucker, rainbow trout, smaller lake trout, smaller brown trout and coho salmon over 25"	Eat no more than one meal per month	PCBs, Mirex, Dioxin
Bay at St. Lawrence/ Franklin Co. line	All species	Eat none	PCBs
<b>Salmon River [16]</b> Mouth to Salmon Reservoir (also see Lake Ontario) (Oswego)	Smallmouth bass	Eat no more than one meal per month	PCBs, Mirex
<b>Sauquoit Creek [19]</b> Between dam at Clayville and Mohawk River (Oneida)	Brown trout	Eat none	PCBs
<b>Saw Mill River [48]</b> (Westchester)	American eel	Eat no more than one meal per month	Chlordane

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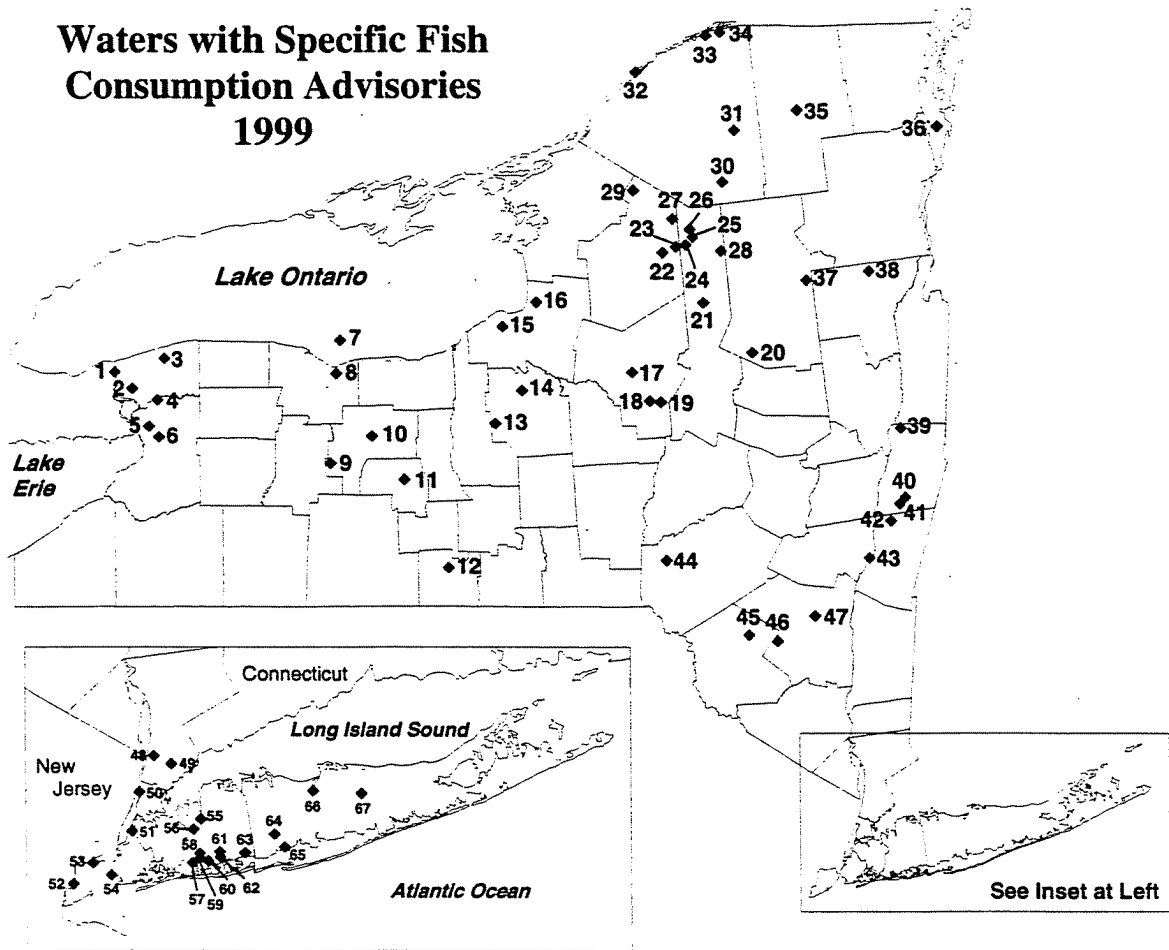
<b>Water (County)</b>	<b>Species</b>	<b>Recommendations</b>	<b>Chemical(s) of Concern</b>
<b>Schroon Lake [38]</b> (Warren & Essex)	Lake trout over 27"	Eat no more than one meal per month	PCBs
<b>Sheldrake River [49]</b> (Westchester)	American eel	Eat none	Chlordane, PCBs
	Goldfish	Eat no more than one meal per month	Chlordane
<b>Skaneateles Creek [13]</b> From dam at Skaneateles to Seneca River (Onondaga)	Brown trout over 10"	Eat no more than one meal per month	PCBs
<b>Smith Pond - Rockville Centre [59]</b> (Nassau)	White perch	Eat no more than one meal per month	Chlordane
<b>Smith Pond - Roosevelt Park [61]</b> (Nassau)	American eel	Eat none	Chlordane
	Carp and goldfish	Eat no more than one meal per month	Chlordane
<b>Spring Pond - Middle Island [67]</b> (Suffolk)	Carp and goldfish	Eat none	Chlordane
<b>Stillwater Reservoir [25]</b> (Herkimer)	Yellow perch over 9", smallmouth bass and splake	Eat no more than one meal per month	Mercury
<b>Sunday Lake [24]</b> (Herkimer)	Yellow perch	Eat no more than one meal per month	Mercury
<b>Threemile Creek [17]</b> (Oneida)	White sucker	Eat no more than one meal per month	PCBs
<b>Valatie Kill [40]</b> Between County Rt. 18 and Nassau Lake (Rensselaer)	All species	Eat none	PCBs
<b>Whitney Park Pond [55]</b> (Nassau)	Carp and goldfish	Eat no more than one meal per month	Chlordane

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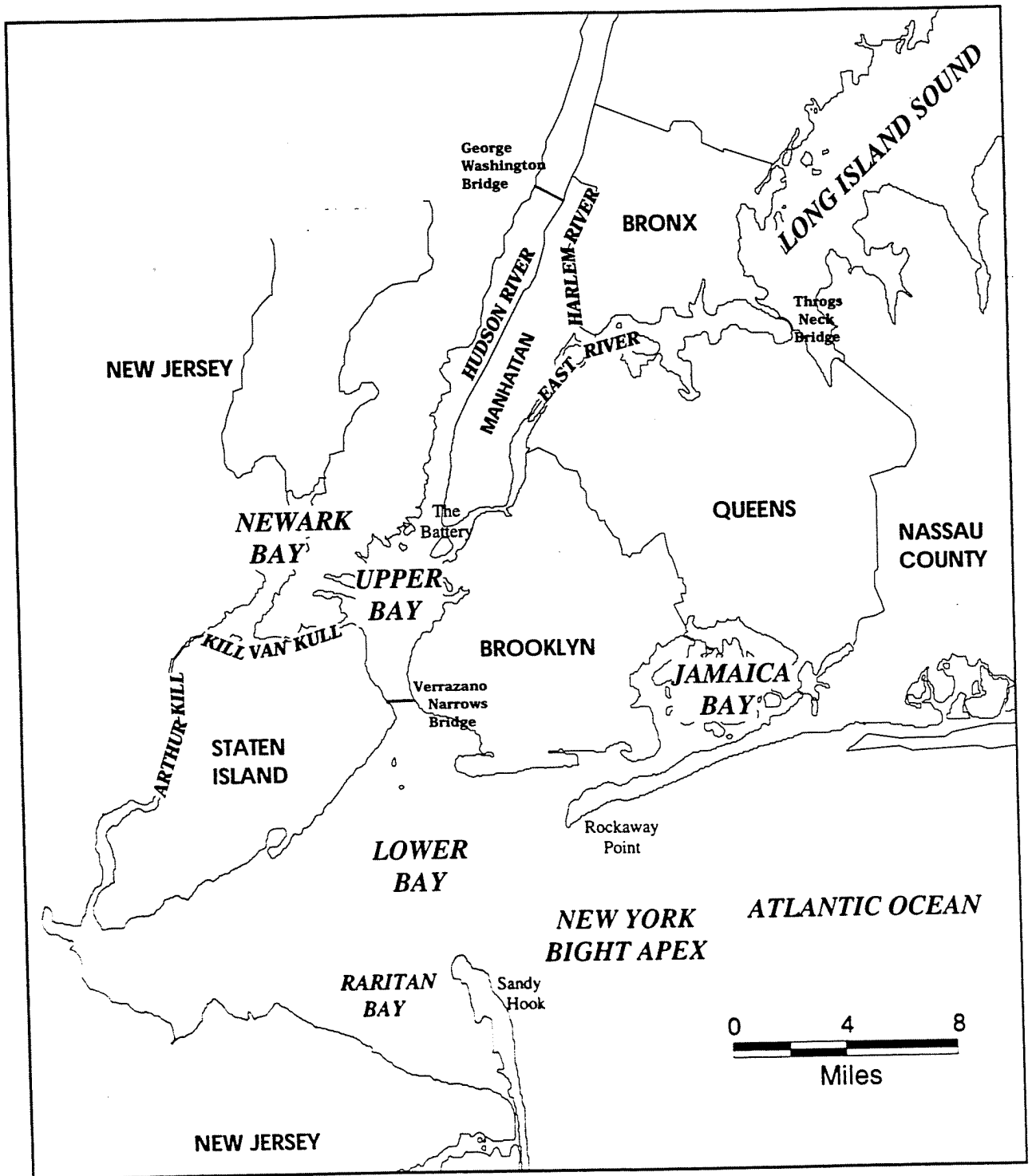
# Waters with Specific Fish Consumption Advisories 1999



- |                            |                          |                                  |
|----------------------------|--------------------------|----------------------------------|
| 1 Niagara River            | 23 Francis Lake          | 45 Neversink Reservoir           |
| 2 Cayuga Creek             | 24 Sunday Lake           | 46 Rondout Reservoir             |
| 3 Eighteen Mile Creek      | 25 Stillwater Reservoir  | 47 Ashokan Reservoir             |
| 4 Barge Canal              | 26 Moshier Reservoir     | 48 Saw Mill River                |
| 5 Delaware Park Lake       | 27 Long Pond (Croghan)   | 49 Sheldrake River               |
| 6 Buffalo River and Harbor | 28 Big Moose Lake        | 50 Harlem River                  |
| 7 Lake Ontario             | 29 Indian Lake           | 51 East River                    |
| 8 Irondequoit Bay          | 30 Cranberry Lake        | 52 Arthur Kill                   |
| 9 Canadice Lake            | 31 Carry Falls Reservoir | 53 Kill Van Kull                 |
| 10 Canandaigua Lake        | 32 St. Lawrence River    | 54 New York Harbor               |
| 11 Keuka Lake              | 33 Massena Power Canal   | 55 Whitney Park Pond             |
| 12 Koppers Pond            | 34 Grasse River          | 56 Ridders Pond                  |
| 13 Skaneateles Creek       | 35 Meacham Lake          | 57 Grant Park Pond               |
| 14 Onondaga Lake           | 36 Lake Champlain        | 58 Hall's Pond                   |
| 15 Oswego River            | 37 Round Pond            | 59 Smith Pond (Rockville Centre) |
| 16 Salmon River            | 38 Schroon Lake          | 60 Loft's Pond                   |
| 17 Threemile Creek         | 39 Hoosic River          | 61 Smith Pond (Roosevelt Park)   |
| 18 Mohawk River            | 40 Valatie Kill          | 62 Freeport Reservoir            |
| 19 Sauquoit Creek          | 41 Nassau Lake           | 63 Upper Massapequa Reservoir    |
| 20 Ferns Lake              | 42 Kinderhook Lake       | 64 Belmont Lake                  |
| 21 Fourth Lake             | 43 Hudson River          | 65 Lake Capri                    |
| 22 Halfmoon Lake           | 44 Herrick Hollow Creek  | 66 St. James Pond                |
|                            |                          | 67 Spring Pond (Middle Island)   |



# Map of New York City Harbor Region



## Additional Advice

**Advisories for Lake Erie** - Due to PCB contamination, women of childbearing age, infants and children under the age of 15 are advised to eat no more than one meal per week of chinook salmon less than 19 inches, burbot, freshwater drum, lake whitefish, rock bass and yellow perch and to EAT NO MORE THAN ONE MEAL PER MONTH of all other fish from Lake Erie. Other people should eat no more than one meal per week of any Lake Erie fish species.

**Marine Bluefish and Eels** - The general advisory {Eat no more than one meal (one-half pound) per week} applies to bluefish and American eels but not to most other fish (see Marine Striped Bass below) from Long Island Sound, Block Island Sound, Peconic/ Gardiners Bays, the Lower Bay of New York Harbor, Jamaica Bay and other Long Island south shore waters. (Contaminants of concern - PCBs)

**Marine Striped Bass** - Women of childbearing age and children under the age of 15 should eat no striped bass taken from Upper and Lower Bays of New York Harbor or Long Island Sound west of Wading River. Other people should EAT NO MORE THAN ONE MEAL PER MONTH of striped bass from these waters. Everyone should eat no more than one meal per week of striped bass taken from Jamaica Bay, Eastern Long Island Sound, Block Island Sound, Peconic/Gardiners Bay or Long Island south shore waters. (Contaminants of concern - PCBs)

**Crabs and Lobsters** - The hepatopancreas (sometimes called mustard, tomalley or liver) of

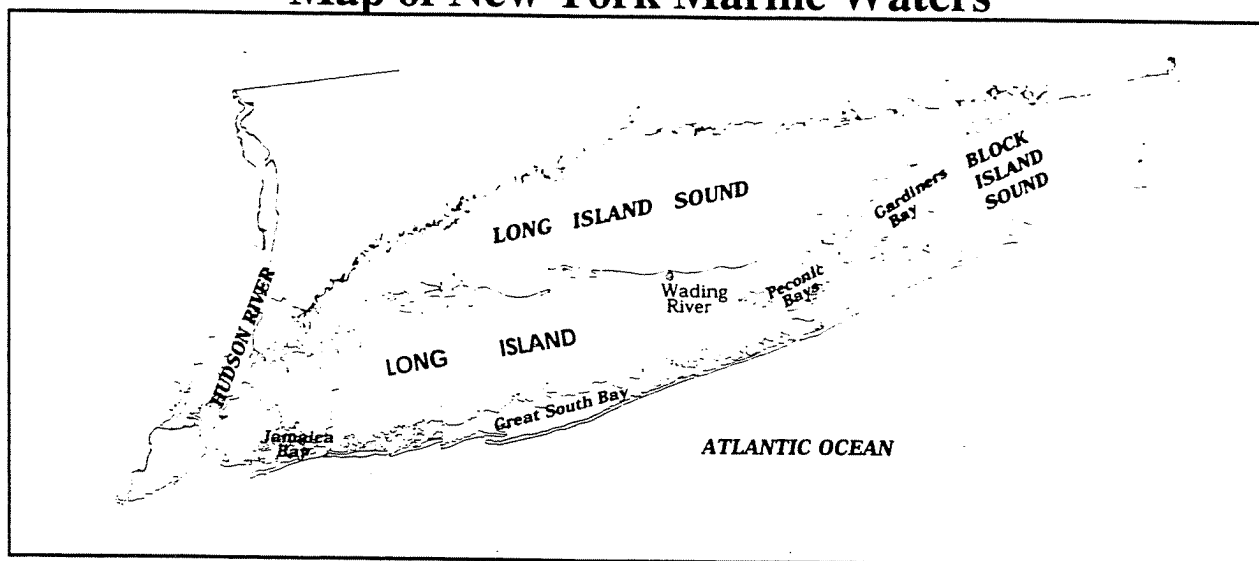
crabs and lobsters should not be eaten because it has high contaminant levels. (Contaminants of concern - PCBs, cadmium, dioxin)

**Hudson River Shad** - The advisory for women of childbearing age, infants and children under the age of 15 is EAT NONE for all fish from the lower Hudson River because of PCB contamination. However, shad have lower PCB levels than other species. A few meals of Hudson River shad meat and roe, especially using cooking and trimming methods that minimize PCB content, would not pose an unacceptable health risk for women of childbearing age and children, assuming this is their only significant exposure to PCBs.

**Snapping Turtles** - Snapping turtles retain contaminants in their fat, liver, eggs and, to a lesser extent, muscle. If you choose to consume snapping turtles, you can reduce your exposure by carefully trimming away all fat and discarding the fat, liver and eggs prior to cooking the meat or preparing soup. Women of childbearing age, infants and children under the age of 15 should AVOID EATING snapping turtles or soups made with their meat. (Contaminants of concern - PCBs)

**Wild Waterfowl** - Mergansers are the most heavily contaminated waterfowl species and should NOT BE EATEN. Other wild waterfowl should be skinned and all fat removed before cooking, stuffing should be discarded after cooking and EAT NO MORE THAN TWO MEALS PER MONTH. Monitoring data indicate that wood ducks and Canada geese are less contaminated than other wild waterfowl species and diving ducks are more contaminated than dabbling ducks. (Contaminants of concern - PCBs, mirex, chlordane, DDT)

## Map of New York Marine Waters



## Information on Chemicals in Sportfish and Game

The following paragraphs give some basic information on chemicals in sportfish and game in New York State. Most of our knowledge of potential health effects comes from high dose animal studies or worker exposures. Chemicals that cause adverse health effects in humans and laboratory animals after high levels of exposure may increase the risk of adverse effects in humans exposed to lower levels for long periods of time. Following the suggestions in the advisory will minimize your exposure and any health risks from contaminants in fish.

### Chlordane

Chlordane is a man-made pesticide that was used widely to control agricultural and home/garden pests until most uses were banned in the United States during the mid-1970s. In New York State, chlordane was used for the underground control of termites until that use was banned in 1985. Chlordane generally gets into bodies of water after improper waste disposal or run-off from treated areas. Chlordane builds up in the fatty tissues of fish, birds and mammals and can be found in fish and shellfish caught in chlordane-contaminated waters. Since chlordane is present in the fatty tissues of fish, exposure to chlordane in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

People exposed to large amounts of chlordane may have nervous system damage. Exposure to high levels of chlordane damages the nervous system and liver of laboratory animals. Some animals exposed before birth and while nursing developed behavioral effects later. Chlordane causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether chlordane causes cancer in humans is unknown. For general information, see the first paragraph of this section.

### DDT

DDT is a man-made pesticide that was used widely to control insects on agricultural crops and biting insects, such as mosquitos and black flies. Its use was banned in New York in

1971 and throughout the United States in 1973. DDT generally gets into bodies of water after improper waste disposal, direct spraying of water bodies or run-off from treated areas. DDT builds up in the fatty tissues of fish, birds and mammals. It can be found in fish and shellfish caught in DDT-contaminated waters. Since DDT is present in the fatty tissues of fish, exposure to DDT in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

People who accidentally ingested large amounts of DDT had effects on the nervous system that went away once the exposure stopped. Exposure of laboratory animals to high levels of DDT damages the liver and can cause reproductive, developmental and nervous system effects. DDT causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether DDT causes cancer in humans is unknown. For general information, see the first paragraph of this section.

### Mirex

Mirex is a man-made chemical that was used as a pesticide to control fire ants until its use was banned in the United States in the late 1970s. It was also used as a flame retardant in plastics, rubber, paint, paper and electrical goods until the early 1970s. Mirex generally gets into bodies of water after improper waste disposal or run-off from treated areas. Mirex builds up in the fatty tissues of fish, birds and mammals and can be found in fish and shellfish caught in mirex-contaminated waters. Since mirex is present in the fatty tissues of fish, exposure to mirex in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Laboratory animals exposed to mirex had damage to the eyes, nervous system, reproductive system, liver, thyroid and kidneys. Mirex causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether mirex causes cancer in humans is unknown. For general information, see the first paragraph of this section.

## PCBs

PCBs are a family of man-made chemicals that were used in many commercial and electrical products until their manufacture was banned in the mid-1970s. Some electrical equipment still in use contains PCBs. In this country, most PCBs were sold as mixtures called Aroclors. PCBs build up in fatty tissues of fish, birds and mammals. Since PCBs are present in the fatty tissues of fish, exposure to PCBs in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Industrial workers exposed to large amounts of PCBs had skin damage. However, these workers were also exposed to other, more toxic chemicals that may have caused the skin effects. Some studies of pregnant women suggest a link between a mother's increased exposure to PCBs from eating contaminated fish or other environmental sources and slight effects on her child's birthweight, short-term memory and learning.

Exposure to high levels of PCBs damages skin, liver and the nervous, immune and reproductive systems of laboratory animals. It also reduces the birthweight and changes the behavior of offspring born to animals exposed before, during and after pregnancy. Certain types of PCBs cause birth defects in offspring born to animals exposed to high levels during pregnancy. Some types of PCBs cause cancer in laboratory animals exposed to high levels over their lifetime. Whether PCBs cause cancer in humans is unknown. For general information, see the first paragraph of this section.

## Polychlorinated dibenzo-*p*-dioxins (PCDDs, dioxins)

Polychlorinated dibenzo-*p*-dioxins (also known as PCDDs or dioxins) and chlorinated dibenzofurans (also known as PCDFs or furans) are two closely related families of chemical compounds. Some dioxins and furans are produced as unwanted by products in chemical manufacturing processes, such as in the production of certain herbicides and disinfectants. They are also found in the smoke or ash from motor vehicles, municipal waste incinerators and wood fires. Some dioxins and

furans are environmentally and biologically persistent. They are highly soluble in fats and are stored in the fatty tissue of fish and other animals. Since dioxins and furans are present in fatty tissues of fish, exposure to dioxins and furans in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Dioxins and furans are thought to produce similar health effects. TCDD (2,3,7,8-tetrachlorodibenzo-*p*-dioxin) is the most potent of the dioxins and furans, and much of what we know about the toxicity of dioxins and furans comes from studies of TCDD.

People exposed to high levels of dioxins and furans during industrial accidents have developed a condition called chloracne (a severe acne-like skin condition) and other skin disorders, as well as skin, eye and respiratory tract irritation, dizziness, headaches, nausea, vomiting and possibly disorders of the liver and nervous system. In men exposed to lower levels over longer times, there is some evidence that TCDD can cause small changes in the liver function, levels of sex hormones and may disrupt the metabolism of glucose (sugar). Some studies have found that workers in plants where products contaminated with dioxins and furans (for example, some herbicides) were made developed cancers which may have been caused by TCDD.

In laboratory animals, TCDD has damaged the liver, skin, blood and immune and reproductive systems. It also affects prenatal development in animals whose mothers were exposed to TCDD. TCDD causes cancer in animals exposed to high levels over their lifetime. For general information, see the first paragraph of this section.

## Mercury

Mercury is a metal that occurs naturally in the environment in several forms. The most common form, metallic or elemental, is a silvery, odorless liquid that can evaporate at room temperature to form a vapor. Mercury can also combine with other elements to form both inorganic and organic compounds. Mercury and mercury compounds can be found in air, soil and water. Most of the mercury that accumulates in the fleshy part of fish is

## Contacts for Additional Information

### New York State Department of Health

For more information on **health effects** from exposure to chemical contaminants or to provide comments on the format or content of this report contact:

Environmental Health Information: 1-800-458-1158 (toll-free from New York State telephones). Calls are taken from 8:00AM-4:30PM, Monday through Friday. After hours leave a voice mail message. The full advisories are also available from the Internet: <http://www.health.state.ny.us/nysdoh/environ/fish.htm> or can be requested by e-mail: [BTSA@health.state.ny.us](mailto:BTSA@health.state.ny.us)

### New York State Department of Environmental Conservation

For more information on **fishing inland waters**, contact:

#### **Region 1** Freshwaters

Loop Rd.  
Bldg. 40 SUNY  
Stony Brook, NY 11790  
(516) 444-0280

#### Marine waters

205 North Belle Mead Rd.  
Suite 1  
East Setauket, NY 11733  
(516) 444-0435

#### **Region 2**

1 Hunter Point Plaza  
4740 21st St.  
Long Island City, NY 11101-5407  
(718) 482-4900

#### **Region 3**

21 South Putt Corners Rd.  
New Paltz, NY 12561-1696  
(914) 256-3161

#### **Region 4**

Rt. 10, Jefferson Rd.  
Stamford, NY 12167-9503  
(607) 652-7366

#### **Region 5**

Rt. 86, P.O. Box 296  
Raybrook, NY 12977-0296  
(518) 897-1333

#### **Region 6**

317 Washington St.  
Watertown, NY 13601-3787  
(315) 785-2266

#### **Region 7**

1285 Fisher Ave.  
Cortland, NY 13045-1090  
(607) 753-3095

#### **Region 8**

6274 E. Avon-Lima Rd.  
Avon, NY 14414-9519  
(716) 226-2466

#### **Region 9**

270 Michigan Ave.  
Buffalo, NY 14203-2999  
(716) 851-7000

For more information on **fishing marine waters**, contact:

Bureau of Finfish and Crustaceans  
205 North Belle Mead Road, Suite 1  
East Setauket, NY 11733  
(516) 444-0435

For information on **contaminant levels**, in fish and shellfish and wildlife contact:

Bureau of Habitat  
50 Wolf Road  
Albany, NY 12233  
(518) 457-6178

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Division of Environmental Health Assessment  
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