

# INJURIES TO HUDSON RIVER FISHERY RESOURCES: FISHERY CLOSURES AND CONSUMPTION RESTRICTION

## HUDSON RIVER NATURAL RESOURCE DAMAGE ASSESSMENT

### HUDSON RIVER NATURAL RESOURCE TRUSTEES

U.S. DEPARTMENT OF THE INTERIOR  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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APRIL 2015

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### UPDATED FINAL REPORT

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Hudson River NRDA, Lead Administrative Trustee  
Damage Assessment Center, N/ORR31  
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Silver Spring, MD 20910-3281



Department of  
Environmental  
Conservation



**HUDSON RIVER**

**INJURIES TO HUDSON RIVER FISHERY RESOURCES:  
FISHERY CLOSURES AND CONSUMPTION RESTRICTIONS**

# EXECUTIVE SUMMARY

The Hudson River Natural Resource Trustees have concluded that a natural resource, the Hudson River fishery, has been injured as a result of the closures and health advisories that have been in place for many years. The Hudson River fishery is an important natural resource that provides significant recreational, economic, cultural and ecological services to the public. This report examines: 1) the past and present injuries to fishery resources resulting from the accumulation of polychlorinated biphenyls (PCBs) in Hudson River fish, and 2) the subsequent actions taken by New York state officials to limit use of the resource in order to protect public health. Since 1974, numerous studies have documented high concentrations of PCBs in the water, sediments, and fish of the Hudson River, and the United States Environmental Protection Agency (EPA) has designated approximately 200 miles of the Hudson River, from Hudson Falls to the Battery in New York City, as a Superfund site.

This injury report is a component of a broader investigation being carried out by three governmental agencies: the New York State Department of Environmental Conservation (NYSDEC), the U.S. Department of the Interior (DOI), and the National Oceanic and Atmospheric Administration (NOAA). These agencies, which act on the public's behalf as trustees of the Hudson River's natural resources, are conducting a "natural resources damages assessment" to determine whether the Hudson's natural resources have been injured as a result of releases of PCBs to the River. The Trustees will then evaluate how best to restore those resources and the services they provide.

Since 1975, the presence of high concentrations of PCBs in the fish has led New York State officials to close various recreational and commercial fisheries and to issue advisories restricting the consumption of fish taken from the Hudson. Recreational fishing in the 40 mile reach of the upper Hudson between Hudson Falls and the Troy Dam was prohibited from 1976 until 1995. The recreational fishery in this reach was then designated as catch and release, and possession of fish remains illegal except for anadromous river herring.<sup>1</sup> In addition, a number of important commercial fisheries below Troy Dam have been closed or severely restricted for nearly forty years. At the same time, advisories against consumption of Hudson River fish have been in effect over the entire ~200 mile stretch of the river from Hudson Falls to the Battery (see Exhibit ES-1). This report documents the events that led to the imposition of these restrictions, their changing scope over time, and the nature of the restrictions that still exist today.

This report updates an earlier fish consumption advisory report issued by the Trustees (U.S. DOI et al., 2001). Like the original report, the current report confirms that the public's use of the Hudson River fishery, whether for a livelihood, a source of recreational enjoyment, or for nutrition, has been and continues to be severely curtailed as a result of the closures and health advisories detailed in this report. The Trustees conclude that this constitutes an injury to this natural resource within the meaning of federal regulation. Additional reductions in PCB concentrations will be necessary to bring about the removal of these restrictions. It is the Trustees' intention to prepare a future report that will present their evaluation of the type and amount of restoration that may be necessary to compensate the public for these losses.

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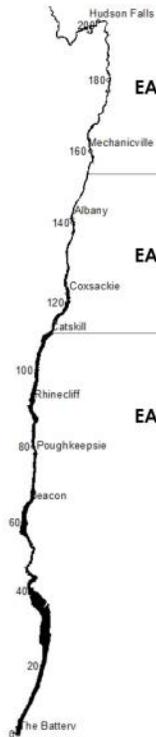
<sup>1</sup> An exception exists for anadromous river herring, which may be taken between Lock 1 and the Troy Dam (see <http://www.dec.ny.gov/outdoor/31427.html>, accessed 31 July 2014). Herring are considered to be a baitfish (<http://www.dec.ny.gov/outdoor/47282.html>, accessed 25 September 2014), and their take was subject to further restrictions in 2012 ([http://www.dec.ny.gov/docs/fish\\_marine\\_pdf/rhregchangesum.pdf](http://www.dec.ny.gov/docs/fish_marine_pdf/rhregchangesum.pdf), accessed 25 September 2014).

**EXHIBIT ES-1: CURRENT HUDSON RIVER FISH CONSUMPTION ADVISORIES**

How much fish should a **child under 15** eat from the Hudson River?

How much fish should a **woman under 50** eat from the Hudson River?

How much fish should a **man over 15 or a woman over 50** eat from the Hudson River?



EAT NONE



EAT NONE



EAT NONE



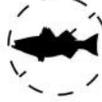
EAT NONE



EAT NONE



LIMITED CONSUMPTION



EAT NONE



EAT NONE



LIMITED CONSUMPTION



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# ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
GE	General Electric
HRNRT	Hudson River Natural Resource Trustees
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCBs	Polychlorinated biphenyls
ppb	Parts per billion (for example, one microgram per kilogram, or $\mu\text{g}/\text{kg}$ )
ppm	Parts per million (for example, one milligram per kilogram, or $\text{mg}/\text{kg}$ )
ppt	Parts per trillion (for example, one nanogram per kilogram, or $\text{ng}/\text{kg}$ )
USFDA	U.S. Food and Drug Administration
USFWS	U.S. Fish and Wildlife Service

**HUDSON RIVER**

**INJURIES TO HUDSON RIVER FISHERY RESOURCES:  
FISHERY CLOSURES AND CONSUMPTION RESTRICTIONS**

## 1. INTRODUCTION

Since 1975, New York State has restricted fishing in the Hudson River and the consumption of fish taken from the Hudson because of the presence of high concentrations of polychlorinated biphenyls (PCBs) in the fish. The Hudson River fishery is an important natural resource that provides significant recreational, economic, cultural and ecological services. Both the freshwater and estuarine portions of the river support diverse fish populations. The river is home to resident, anadromous, and marine species and has, in the past, supported both a commercial and a recreational fishery (Hetling et al., 1978). However, the presence of high concentrations of PCBs in the fish has led New York State officials to restrict the public's use of this resource. This report documents the events that led to the imposition of these restrictions, their changing scope over time, and the nature of the restrictions that still exist today.

This report is a component of a broader investigation of the impacts of PCBs on the Hudson River ecosystem being carried out by three governmental agencies: the New York State Department of Environmental Conservation (NYSDEC), the U.S. Department of the Interior (DOI), and the National Oceanic and Atmospheric Administration (NOAA). These agencies act on the public's behalf as trustees of the Hudson River's natural resources.<sup>2</sup> The trustee agencies (the Trustees) initiated this investigation, called a "natural resources damages assessment," in 1997.<sup>3</sup> The goals of the assessment are to determine whether natural resources have been injured as a result of releases of PCBs to the Hudson River and, if so, to determine how to restore those resources.

In 2001, the Trustees issued a report determining injuries to fishery resources based on fishery closures and consumption restrictions from PCBs (DOI et al., 2001). The current report updates that document, and like the original, confirms that the public's use of and access to the Hudson River fishery have been severely curtailed because of the PCB contamination in the fish. A number of important commercial fisheries have been closed or severely restricted for nearly forty years. Recreational fishing in the upper reaches of the Hudson between Hudson Falls and Troy was prohibited for 20 years (1976-1995) and then limited to catch-and-release (1995-present). At the same time, advisories against consumption of Hudson River fish due to PCBs have been in effect over the entire ~200-mile length of the river from Hudson Falls in the north to New York Harbor in the south. Based on these facts, the Trustees conclude that this natural resource, the Hudson River fishery, has been injured. It is the Trustees' intention to prepare a future report that will present their evaluation of the type and amount of restoration that may be necessary to make the public whole for the loss of this injured resource.

## 2. REGULATORY BACKGROUND

Regulations promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) by DOI define the injury that is the subject of this investigation. The regulations provide that a natural resource injury exists whenever a hazardous substance, such as PCBs, is present in the fish flesh at concentrations sufficient to "exceed action or tolerance levels established by the Food and Drug Administration (FDA) under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. §342, in edible portions of

<sup>2</sup> The Trustees act under authority granted to them in section 107(f) of the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9607(f), section 311(f)(5) of the Federal Clean Water Act (CWA), as amended, and other applicable Federal and state laws.

<sup>3</sup> The Trustees' decision to proceed with this investigation is documented in the *Preassessment Screen Determination for The Hudson River, New York*, issued by the State of New York, the National Oceanic and Atmospheric Administration, and the United States Department of the Interior, on October 1, 1997. The *Preassessment Screen* is available (as of 15 August 2014) at the following website: <http://www.dec.ny.gov/lands/32758.html>. The Trustees have also published a description of the assessment process in the *Hudson River Natural Resource Damage Assessment Plan* (HRTC 2002).

organisms...” or “exceed levels for which an appropriate State health agency has issued directives to limit or ban consumption of such organism.”<sup>4</sup>

This report focuses on the New York State regulations and New York State Department of Health (NYSDOH) consumption advisories restricting fishing and fish consumption in the Hudson River that were triggered beginning in 1975 by high concentrations of PCBs in Hudson River fish. The Trustees are also reviewing contaminant data to assess injury associated with exceedances of the FDA tolerance level for PCBs. The results of that effort will be presented in a separate report.

### 3. PCB CONTAMINATION OF THE HUDSON RIVER

#### 3.1 HISTORICAL RELEASES OF PCBs TO THE HUDSON RIVER

Since 1974, numerous studies have documented high concentrations of PCBs in the water, sediments, and fish of the Hudson River (e.g., Horn et al., 1979; Armstrong and Sloan, 1988; Sloan and Armstrong, 1988; Brown et al., 1985; Sloan et al., 1983; Sloan et al., 1984; EPA, 1991; Sloan et al., 2002; Sloan et al., 2005; HRNRT 2013).<sup>5</sup> Because of this contamination, the United States Environmental Protection Agency (EPA) designated a 200-mile stretch of the Hudson River, from Hudson Falls to the Battery in New York City, as a Superfund site (EPA, 1984; EPA, 1991).<sup>6</sup>

The primary contributors of PCBs to the Hudson River are two electrical capacitor manufacturing plants located at Hudson Falls and Fort Edward, NY, which are owned by the General Electric Company (EPA, 1984). General Electric (GE) began using PCBs in its manufacturing processes at the Fort Edward and Hudson Falls plants in 1947 and 1952, respectively (Hetling et al., 1978). Both plants discharged manufacturing process wastewater containing PCBs directly to the Hudson River until 1977 (EPA, 1991). Investigations of plant discharges by NYSDEC staff in 1975 also revealed PCB discharges from the Hudson Falls plant to the sanitary sewer system leading to the Hudson Falls Village Sewage Treatment Plant, and PCB-contaminated storm water discharges to the Hudson River from both plants (NYSDEC, 1975a).

From 1977 to 1995, production of capacitors continued at the Hudson Falls site using substitute fluids (NYSDEC 2004). After 1977, the Fort Edward facility also continued to operate using substitute fluids, but the plant has now been scheduled for closure in 2015 (Nearing 2014). In 1991, EPA estimated that the amount of PCBs released from these plants to the sediments and waters of the Hudson River between 1947 and 1977 ranged from 209,000 to 1,330,000 pounds (EPA, 1997b).

#### 3.2 ONGOING RELEASES OF PCBs TO THE HUDSON RIVER

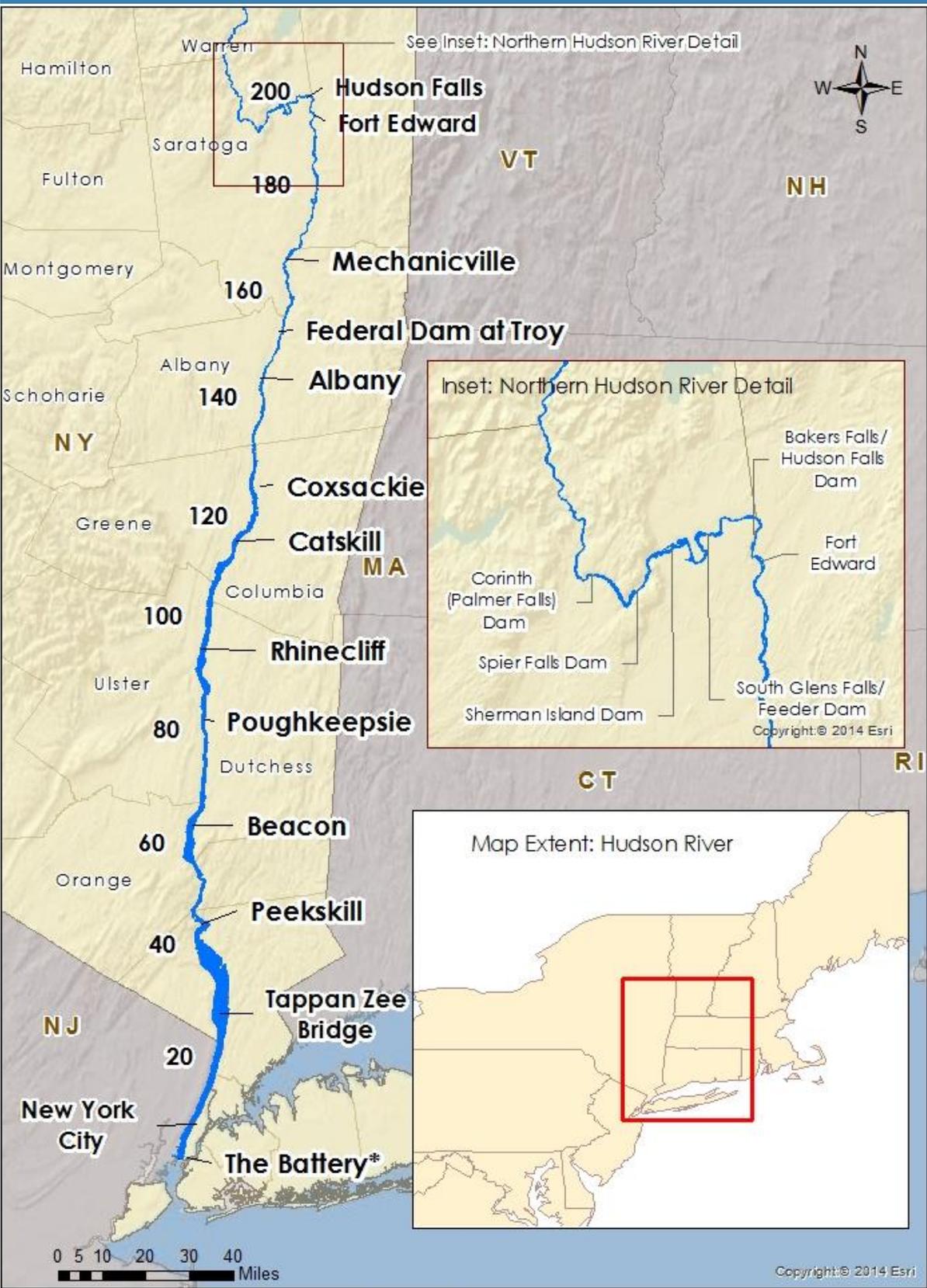
Even after GE ceased using PCBs at its plants in 1977, contamination at the plant sites continued to impact the river (NYSDEC, 1999). In 1991 and 1992, measured PCB concentrations in the waters of the Hudson River rose significantly (O'Brien and Gere, 1994). As a result of further investigation, a continuing source of PCB releases to the Hudson River was discovered at the Hudson Falls plant site in October 1992. Past spills of PCBs at the plant had saturated the bedrock beneath the plant with PCB oils. These oils were found to be migrating to the river through bedrock fractures. PCBs had also accumulated inside an abandoned mill located adjacent to the Hudson Falls plant known as the Allen Mill. In September 1991, it is believed that a

<sup>4</sup> The regulations can be found at 43 CFR §11.62(f)(1)(ii) and 43 CFR §11.62(f)(1)(iii).

<sup>5</sup> PCBs are listed as hazardous substances in Table 302.4, List of Hazardous Substances and Reportable Quantities under CERCLA (40 CFR §302.4(a)) and as toxic pollutants pursuant to 40 CFR §401.15, as amended, under the CWA. PCBs are thus a hazardous substance within the meaning of CERCLA Section 101(14), 42 U.S.C. §9601(14).

<sup>6</sup> Exhibit 1 depicts the location and geographic extent of the Superfund site.

**EXHIBIT 1: HUDSON RIVER FROM HUDSON FALLS TO THE BATTERY, NEW YORK CITY**



\*River miles begin at The Battery in New York City

gate on the mill's upper raceway failed, allowing water to flow through the mill and scour out a large quantity of PCBs, causing a dramatic increase of PCB concentrations in the river water (*ibid.*).

In 1994, as GE was conducting cleanup measures at the Allen Mill required by a NYSDEC Order, other seeps of PCB-contaminated oil from GE's Hudson Falls plant were discovered. After temporarily dewatering the river bed, PCB product was collected from these seeps at an estimated rate of five to nine gallons daily. An unknown quantity of PCBs had entered the river through fractured bedrock under the Hudson Falls plant site (O'Brien and Gere, 1997).

Also in the early 1990s, PCBs were found to be leaking into the Hudson River via the gravel bedding of an old discharge pipe at the Fort Edward site (NYSDEC, 2000). Estimates of ongoing discharges from both GE plant sites were approximately three ounces a day in 1999 (Schweiger, 1999).

Under Consent Orders with NYSDEC, GE has implemented a series of remedial measures at both the Hudson Falls and Fort Edward plant sites to curtail discharges of PCBs from the areas adjacent to those plants. These measures appear to have been largely successful: while Hudson River water PCB concentrations typically exceeded 30 parts per trillion (ppt) downstream of the plants in the mid-1990s, concentrations currently are less than 2 ppt (Arcadis 2014). This value, while much reduced from previously, remains higher than levels upstream of Bakers Falls (Louis Berger Group, Inc., 2010). Fish and invertebrates sampled in 2011 near and below the Fort Edward plant (Outfall 004, north of the targeted dredging area) had significantly higher PCB concentrations than did fish sampled above the outfall (Richter 2014).

Contaminated sediments also continue to contribute a significant amount of PCBs to the water column. EPA concluded that the contaminated sediments in the upper Hudson River are a major source of PCBs to the entire river environment at least as far as New York Harbor (EPA, 1997b). The Contaminant Assessment and Reduction Project identified the upper freshwater non-tidal portion of the Hudson River Superfund Site to be the dominant external source of PCBs to the New York/New Jersey Harbor Estuary, contributing about three-quarters of the PCB load below Troy Dam to the Atlantic Ocean, and modeling shows these PCBs are transported throughout the entire estuary, including Newark Bay (CARP 2008).

The extent and severity of sediment contamination led EPA to select dredging parts of the upper Hudson River as a remedy for the site (EPA 2002). GE began dredging the upper Hudson River in 2009, and dredging is scheduled to continue into 2015 (Louis Berger Group, Inc., 2010; GE, 2014a). Even after dredging is completed, significant quantities of PCBs will remain in unremediated surface and subsurface sediment, especially in River Sections 2 and 3 (from the Thompson Island Dam to the Troy Dam). The unremediated PCBs in the river sediments will continue to act as a source of ongoing contamination (Field et al. 2011).

Floodplain soils are contaminated with PCBs from the two GE plant sites. NOAA, EPA and GE have collected sediment samples in the floodplains documenting PCBs in surface and subsurface samples. Floodplain soils are a potential ongoing source of PCBs to the river. Floodplains serve as a pathway of PCBs to fish when contaminated floodplain soils erode into the river, when the floodplains become inundated during storms or when diurnal changes in water levels from hydroelectric production alter water stages and the shoreline. The EPA approved a Remedial Investigation / Feasibility Study Work Plan for the Upper Hudson River floodplains in September 2014 (GE, 2014b). Subsequently, EPA will evaluate existing data and select a remedy for the floodplains.

### **3.3 PCB CONTAMINATION OF HUDSON RIVER FISH**

Fish in the Hudson River accumulate PCBs in their tissues through exposure to contaminated sediment, water and food. Historical data establish a link between PCBs released and deposited to the upper Hudson River and PCBs in fish throughout the river (Sloan and Field, 1996; Skinner et al., 1996; NOAA, 1997).

New York State began assessing contaminant concentrations in fish flesh in the early 1960s. Elevated concentrations of PCBs were first discovered in Hudson River biota in 1969, but "their importance was not

recognized for several years” (Hetling et al., 1978). In the early 1970s, NYSDEC began collecting limited data on PCBs in New York waters and fish. In 1973, the federal FDA adopted a “tolerance” level for PCBs in food sold commercially, including fish, of 5 parts per million (ppm) in the edible portion (38 FR 18096); in 1984, this limit was lowered to 2 ppm (49 FR 21514).

In August 1974, EPA conducted an investigation of PCB contamination in the upper Hudson (Nadeau and Davis, 1974). Water column and sediment samples were taken in the vicinity of the Hudson Falls and Fort Edward plants, as well as composites of snails and samples of common shiners and rock bass. This preliminary field investigation revealed extremely high concentrations of PCB contamination in all media (2.8 ppm in water and 6,700 ppm in sediments at Fort Edward outfall; 45 ppm in snail composite; 78 ppm in common shiners; and 350 ppm in a rock bass) (Nadeau and Davis, 1976). EPA concluded that the PCB contamination of the Hudson River exceeded, in level and scope, any other area in the United States (EPA, 1975).

EPA reported these high PCB concentrations to NYSDEC. As a consequence, beginning in December 1974, NYSDEC undertook a systematic PCB sampling program in conjunction with EPA both to determine the concentrations and extent of PCB contamination in the waters and sediments of the upper Hudson in the area of GE’s plants and to identify sources and assess the significance of the contamination. NYSDEC found high levels of PCBs in upper Hudson River water and sediments resulting from the activities of the GE plants (NYSDEC, 1975a).

In 1975, NYSDEC initiated a systematic program of sampling fish for PCB analysis. The 1975 sampling results for the Hudson River were reported in NYSDEC (1976) and by Spagnoli and Skinner (1977). Nearly 100% of the samples taken from stations at and below Fort Edward exceeded the 5 ppm FDA tolerance level. Reviewing the sampling data from the Hudson River from 1970-75, Spagnoli and Skinner concluded that the “Hudson River below Hudson Falls contains fish with the highest level of total PCB’s [sic] of any waterway sampled” (Spagnoli and Skinner, 1977). Results above 50 ppm were not uncommon in the larger, oilier fish; the highest individual concentration recorded during this period was over 550 ppm in a large eel.

Since 1975, NYSDEC’s monitoring program has regularly measured PCB concentrations in fish from the Hudson River. Elevated PCB concentrations were found in collections of many fish species during the 1970s, with the highest concentration of 2,792 ppm found in a largemouth bass fillet from river mile 167 in 1978 (NOAA 2012). Initially, DEC targeted 660 fish for sampling with an emphasis on recreational and commercially important species, including striped bass, American shad, largemouth bass, brown bullhead, yellow perch, goldfish, white perch, Atlantic tomcod and American eel (NYSDEC, 1977). The current long term PCB monitoring project collects up to 490 fish and invertebrate samples from seven locations. The program primarily collects striped bass, largemouth bass, smallmouth bass, bullheads and catfish, American eel, white perch, yellow perch and carp. In addition to these sportfish, yearling pumpkinseed and shiners are collected in the fall, and small fish and invertebrates are collected in the vicinity of the Fort Edward plant outfall (Richter, 2011; Richter, 2013).

#### **4. STATE DIRECTIVES TO LIMIT OR BAN CONSUMPTION OF HUDSON RIVER FISH**

According to DOI’s NRDA regulations, fishery resources are injured if the fish contain concentrations of a hazardous substance that exceed levels for which a state health agency has issued directives to limit or ban consumption of such organism (43 CFR §11.62 (f)(1)(iii)). Between 1975 and the present, New York State public health and environmental officials have taken two types of action in response to the high concentrations of PCBs measured in Hudson River fish. NYSDEC has exercised its statutory authority to close commercial and/or recreational fishing for certain or all species in a water body or to restrict the

possession of fish. In addition, NYSDOH has issued advisories recommending that the public limit its consumption of contaminated fish species. Both agencies took these actions to protect public health by limiting or banning consumption of PCB-contaminated fish. These types of actions, “directives to limit or ban consumption,” fall within the definition of injury provided by the DOI regulations.

Fishing closures (Section 4.1) differ from health advisories (Section 4.2): in a closure, any fishing or taking of the targeted fish is prohibited, or fishing is restricted to “catch and release”. In contrast, fishing advisories allow for fishing and the taking of fish but advise against the consumption of more than a certain amount. As indicated above, both closures and advisories can be motivated by human health-related concerns.

The following sections provide a detailed chronological history of fishing closures and health advisories for Hudson River fish imposed because of PCB contamination.

## **4.1 RECREATIONAL AND COMMERCIAL FISHING CLOSURES**

The New York Environmental Conservation Law was amended in May 1970 to give NYSDEC the authority to restrict the taking of fish or the sale or possession of fish in response to a threat to public health certified by either the NYSDOH or the New York State Department of Agriculture and Markets (NYSDAM). In the early 1970s, NYSDEC acted on the recommendation of an interagency committee of individuals representing each of the three agencies. In subsequent years, NYSDEC has taken action to regulate the taking, possession or sale of fish based on a NYSDOH certification of a danger to the health and welfare of the human population. NYSDEC issues specific regulations to establish these restrictions (see Exhibit 2 for an overview of regulatory closures from 1975 to 2014). The current version of these regulations can be found in the New York Code of Rules and Regulations (NYCRR), Title 6, Parts 10 and 11 (see, in particular, 6 NYCRR §§11.2 and 11.3 restricting the taking of certain Hudson River fish and the possession and sale of striped bass).

### **4.1.1 The First Regulatory Closure of the Fishery**

In October 1975, New York Governor Hugh Carey appointed a special commission to study the public health implications of elevated concentrations of PCBs in the Hudson River and to make recommendations for action. In December 1975, at the request of Dr. Kevin Cahill, Special Assistant to the Governor for Health Affairs, Dr. Merrill Eisenbud of New York University Medical Center’s Institute of Environmental Medicine headed a committee to study the public health implications of elevated PCB concentrations in the Hudson River. The committee found that most species of Hudson River fish were contaminated with PCBs, and that concentrations in several species exceeded the FDA guideline of 5 ppm “by a substantial margin” (Eisenbud, 1975). The committee recommended that no fish be taken from Fort Edward to the Troy Dam, and specifically indicated that “[t]his action is justified by the extraordinarily high levels of PCB’s [sic] found in all species of fish in this reach of the river.” In addition, it was recommended that no eels taken from the Hudson River be consumed, that the taking of eels be banned, and that, with the exception of shad, all commercial fishing in the reaches of the Hudson within New York State also be banned. Finally, the committee recommended that, while sportfishing could be allowed below the Troy Dam, the public should restrict their intake of Hudson River fish to one meal a week; infants and pregnant women should avoid eating any fish from the Hudson River; and the sale of such fish should be banned (*ibid.*).

New York acted quickly after receiving these recommendations. On February 24, 1976, NYSDOH Commissioner Robert P. Whalen certified to NYSDEC Commissioner Ogden Reid that “the health and welfare of the human population may be endangered by the consumption of fish taken from the Hudson River between Fort Edward and the Battery by reason of a concentration of polychlorinated biphenyls in such fish” (Whalen, 1976). Following the Eisenbud committee’s recommendations, NYSDOH Commissioner Whalen advised that no fish taken between Fort Edward and the Troy Dam be consumed, that no eels taken from the Hudson River be consumed, that public consumption of fish taken below the Troy Dam be limited

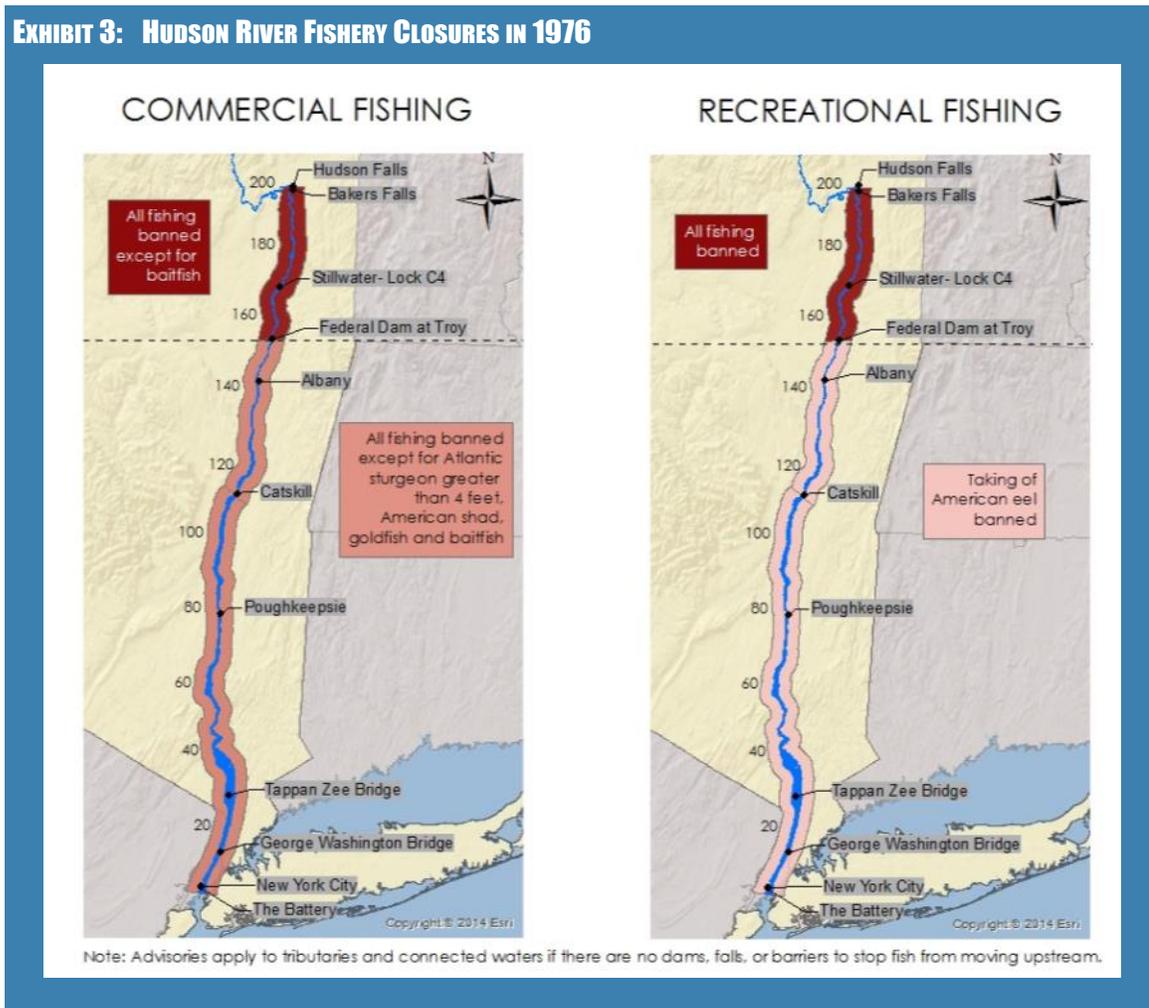


to one meal a week,<sup>7</sup> and that infants and pregnant women eat no fish from the Hudson (*ibid.*). The next day, NYSDEC Commissioner Reid issued an order and a set of regulations prohibiting: (1) all fishing and the taking of American eel between Fort Edward and the Troy Dam; (2) all commercial fishing, except for Atlantic sturgeon greater than four feet, goldfish and American shad, from Troy Dam to the Battery in New York City; (3) all taking of American eel; and (4) the sale of any fish or American eel taken from the Hudson River from Fort Edward to the Battery (Reid, 1976; 6 NYCRR §12.19). This event closed most of the commercial fisheries in the Hudson, prohibited recreational angling in the upper Hudson River, and thus severely restricted the public’s use of the resource (see Exhibit 3).

**4.1.2 Changes in the Regulatory Closures from 1976 to the Present**

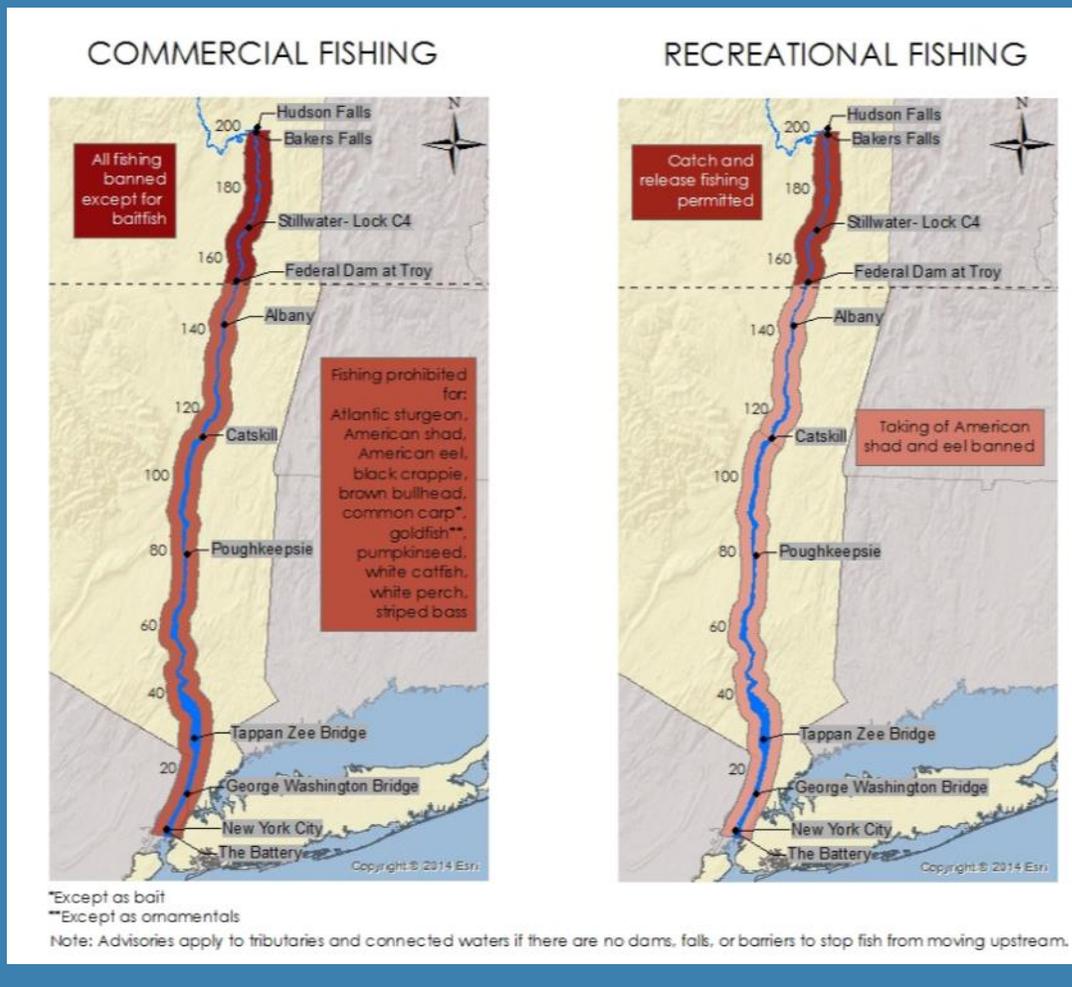
NYSDEC has adjusted the recreational and commercial fishery closures from time to time based on the accumulating contaminant data. This process was formalized in NYSDEC’s 1985 Policy on Contaminants in Fish, which provided that a closed recreational or commercial fishery could not be re-opened without a Health Department certification that the conditions requiring the closure were no longer present (NYSDEC, 1985). While there have been some modifications over time as set out below, most of the components of the initial closures remain in place to this day (see Exhibit 4). The closures also apply to tributaries and connected waters if there are no dams, falls or barriers to stop the fish from moving upstream.

**EXHIBIT 3: HUDSON RIVER FISHERY CLOSURES IN 1976**



<sup>7</sup> As noted previously, in 1971, NYSDOH, NYSDEC, and NYSDAM established a general, statewide advisory to eat no more than one meal of fish per week from any waters of the state (State of New York, 1971). The Commissioner’s recommendation of limiting consumption to no more than one meal per week is not shown in Exhibit 3 because it is not more restrictive than this general advisory already in place.

## EXHIBIT 4: HUDSON RIVER FISHERY CLOSURES FOR 2014-2015



### 4.1.3 Hudson Falls to the Troy Dam

NYSDEC's February 25, 1976 order closed *all* fishing from Hudson Falls to the Troy Dam, an expanse of more than 40 river miles. The prohibition applied to both recreational and commercial fishing.<sup>8</sup> This ban remained in place until 1995, when NYSDEC modified the regulations to permit "catch and release" recreational fishing within this reach (6 NYCRR §§10.3 and 11.2).<sup>9</sup> Despite the fact that New York State Commissioner of Health Barbara A. DeBuono certified she had no objection to a "catch and release" designation, she conditioned her opinion upon the requirement that an *eat none* advisory remain in effect, as discussed below at 4.2.5 (DeBuono, 1995). Commercial fishing is still prohibited in this reach.

<sup>8</sup> An exception exists for anadromous river herring, which may be taken between Lock 1 and the Troy Dam (see <http://www.dec.ny.gov/outdoor/31427.html>, accessed 31 July 2014). Herring are considered to be a baitfish (<http://www.dec.ny.gov/outdoor/47282.html>, accessed 25 September 2014), and their take was subject to further restrictions in 2012 ([http://www.dec.ny.gov/docs/fish\\_marine\\_pdf/rhregchangesum.pdf](http://www.dec.ny.gov/docs/fish_marine_pdf/rhregchangesum.pdf), accessed 25 September 2014).

<sup>9</sup> Also see "Upper Hudson River Catch-and-Release Fishing" (<http://www.dec.ny.gov/outdoor/9233.html>, retrieved 18 June 2014).

#### 4.1.4 Commercial Fishing Below the Troy Dam

Beginning on February 25, 1976, *all* commercial fishing, with exceptions for baitfish, Atlantic sturgeon greater than four feet,<sup>10</sup> American shad, and goldfish used for ornamental purposes, was banned in the Hudson River between the Troy Dam and the Battery in New York City (6 NYCRR §12.19). The commercial fishing ban, with periodic adjustments, has remained in effect to the present. For example, in 1982 NYSDEC re-opened this reach for certain species, but continued the ban on commercial fishing for striped bass, American eel, common carp, goldfish, white catfish and white perch (6 NYCRR §§11.2 and 11.4). In 1985, the commercial fishing closure below Troy was again expanded to include black crappie, brown bullhead and pumpkinseed (*ibid.*). These closures have remained unchanged since 1985 (6 NYCRR §11.2).

#### 4.1.5 Recreational Fishing Below the Troy Dam

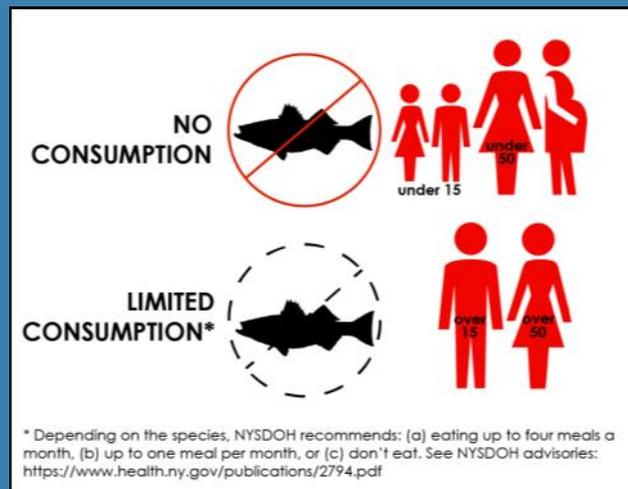
The state banned recreational striped bass fishing from May 6, 1986 until April 27, 1987, based in large part on the elevated PCB concentrations found in Hudson River striped bass (6 NYCRR §11.3). NYSDEC has also banned the taking of American eel from 1976 until the present (with certain exceptions for use as bait; 6 NYCRR §12.19, renumbered §11.3 and then §11.2). NYSDEC and NYSDOH have also issued fish consumption advisories warning the public to either avoid or limit consumption of Hudson River fish taken from this reach because of the excessive PCB concentrations found in them. These advisories are discussed below.

## 4.2 FISH CONSUMPTION ADVISORIES

In addition to the regulatory closures of the fishery described above, New York State health officials have also acted to protect the public by issuing fish consumption advisories (Exhibit 5). These warnings have been continuously in effect on the Hudson River, from Hudson Falls<sup>11</sup> to the Battery in New York City, with the earliest advisory beginning in 1975 (see Exhibits 6 through 8). Initially issued through NYSDEC and NYSDOH press releases, the state has also published these health advisories in NYSDEC's *Fishing Regulations Guide* since 1978, as a two-three page NYSDOH health

advisory document from 1983 to 1989, and in an annual NYSDOH Health Advisory publication titled *Chemicals in Sportfish and Game* from 1990 to 2010. In 2011, NYSDOH began issuing advisories as *Health Advice on Eating Sportfish and Game*. The following section provides an overview of New York's advisory program and then describes the nature and extent of the advisories for Hudson River fish.

#### EXHIBIT 5: HUDSON RIVER PCB-BASED RECREATIONAL FISH CONSUMPTION ADVISORIES SOUTH OF HUDSON FALLS, 1976-PRESENT



<sup>10</sup> The Atlantic States Marine Fisheries Commission (ASMFC) is a deliberative body of the Atlantic coastal states, coordinating the conservation and management of 25 nearshore fish species including Atlantic sturgeon. In 1998, the ASMFC issued a coast-wide moratorium on fishing for this species (<http://www.asmfc.org/species/atlantic-sturgeon>, retrieved 20 June 2014). In 2012, the Gulf of Maine, New York Bight, and Chesapeake Bay Distinct population segments of Atlantic sturgeon in the northeast region were listed as federally endangered (<http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm>, retrieved 20 June 2014).

<sup>11</sup> In 2002-2003, the northern boundary of the advisory area was expanded from Hudson Falls to the dam at the Rt. 9 bridge in South Glens Falls (NYSDOH 2002).







**EXHIBIT 7: HUDSON RIVER PCB-BASED FISH CONSUMPTION ADVISORIES: WOMEN OVER 50 AND MEN OVER 15 (CONTINUED)****NOTES**

Sources: NYSDOH Health Advisories (1983-2014); New York Comp. Codes R. & Regs. Title 6 (1976-1982); USDOL et al. (2001); New York State Press Release and Communications (1975-1985).

\* First advisory in 1984 from 6/24/84 until 11/20/84. Second advisory from 11/20/84 until 5/24/85 (NYSDOH 1984a, 1984b).

**Advisory Notes**

1. The "don't eat" advisory in 1975 applies to striped bass; for all other species, the DOH commissioner recommended no more than one serving per week (NYSDEC 1975b).
2. Harvesting/possession of American eel for food, and the fishing for/possession of American shad are prohibited by NYSDEC for the entire Hudson River. American shad are only listed in the "Troy Dam to Catskill" region of this chart because they are explicitly excluded from the blanket advisory for this region. The regulatory closure applies to the entire Hudson River (NYSDOH 2008-2014).
3. The eat no more than 4 meals/month blanket advisory does not apply to American shad in 1976-1977 (Whalen 1976).
4. In 1994, EAT NO MORE THAN ONE MEAL PER MONTH for all species except American shad, Atlantic sturgeon, blueback herring, bluegill, pumpkinseed, and yellow perch south of Catskill (NYSDOH 1994).
5. Advisory for American eel taken between Dobbs Ferry and Greystone: EAT NONE (NYSDOH 1999-2007).
6. Blue crab advisory applies only south of Poughkeepsie (NYSDOH 1983, 1984a, 1984b).
7. Advisory on cooking liquids and hepatopancreas includes lobsters as well as blue crab (NYSDOH 2013, 2014).
8. South of the Tappan Zee Bridge, up to four meals per month (NYSDOH 2010-2014).
9. The 1975 advisory (NYSDEC 1975b) states the EAT NONE advisory is in effect until further notice. The next public mention of striped bass in an advisory is in 1982 (NYSDOH 1982).
10. Advisory for striped bass: Troy Dam south to Tappan Zee Bridge, EAT NONE; South of Tappan Zee Bridge, EAT NO MORE THAN ONE MEAL PER MONTH (NYSDOH 1992, 1993).

**Reach Boundary Notes**

Advisories apply to tributaries and connected waters if there are no dams, falls, or barriers to stop fish from moving upstream.

- A. In 1996-1997 the advisory area narrowed to Niagara Mohawk Boat Launch to Sherman Island Dam (NYSDOH 1996, 1997). From 2001-2012, the area was extended north to the Carinth Dam (NYSDOH 2001-2014).
- B. Advisory from Palmer Falls Dam at Carinth to Dam at Route 9 Bridge in South Glens Falls in 2013 and 2014 (NYSDOH 2013, 2014).
- C. Northern boundary of advisory area expanded to Dam at Rt. 9 bridge in South Glens Falls in 2002-2014 (NYSDOH 2002-2014).
- D. Southern boundary of advisory area: 1976-1995, to lower New York Harbor; 1995-2006, to and including the Upper Bay of New York Harbor (north of Verrazano-Narrows Bridge); 2006, to the Battery in New York City; 2007-2014 to the Upper Bay of New York Harbor (advisories split between north and south of the Tappan Zee Bridge but combined and denoted in this table) (NYSDOH 1983-2014).





## EXHIBIT 8: HUDSON RIVER PCB-BASED FISH CONSUMPTION ADVISORIES: BY GEOGRAPHIC AREA (CONTINUED)

Sources: NYSDOH Health Advisories (1983-2014); New York Comp. Codes R. & Regs. Title 6 (1976-1982); USDOI et al. (2001); New York State Press Release and Communications (1975-1985).

\* First advisory in 1984 from 6/24/84 until 11/20/84. Second advisory from 11/20/84 until 5/24/85 (NYSDOH 1984a, 1984b).

### Advisory Notes

1. Defined as infants and pregnant women (1976-1982); as women of childbearing age, infants, and children under age 15 (1982-2009); and women under 50 and children under 15 (Axelrod 1982; NYSDOH 1983-2014).
2. The "don't eat" advisory in 1975 applies to striped bass; for all other species, the DOH commissioner recommended no more than one serving per week (NYSDEC 1975b).
- more than one serving per week (NYSDEC 1975b).
3. Harvesting/possession of American eel for food, and the fishing for/possession of American shad are prohibited by NYSDEC for the entire Hudson River. American shad are only listed in the "Troy Dam to Catskill" region of this chart because they are explicitly excluded from the blanket advisory for this region. The regulatory closure applies to the entire Hudson River (NYSDOH 2008-2014).
4. The eat no more than 4 meals/month blanket advisory does not apply to American shad in 1976-1977 (Whalen 1976).
5. In 1994, EAT NO MORE THAN ONE MEAL PER MONTH for all species except American shad, Atlantic sturgeon, blueback herring, bluegill, pumpkinseed, and yellow perch (NYSDOH 1994).
6. Advisory for American eel taken between Dobbs Ferry and Greystone: EAT NONE (NYSDOH 1999-2007).
7. Blue crab advisory applies only south of Poughkeepsie (NYSDOH 1983, 1984a, 1984b).
8. Advisory on cooking liquids and hepatopancreas includes lobsters as well as blue crab (NYSDOH 2013, 2014).
9. South of the Tappan Zee Bridge, up to four meals per month (NYSDOH 2010-2014).
10. The 1975 advisory (NYSDEC 1975b) states the EAT NONE advisory is in effect until further notice. The 1975 advisory (NYSDEC 1975b) states the EAT NONE advisory is in effect until further notice.
- The next public mention of striped bass in an advisory is in 1982 (NYSDOH 1982).
11. Advisory for striped bass: Troy Dam south to Tappan Zee Bridge, EAT NONE; South of Tappan Zee Bridge, EAT NO MORE THAN ONE MEAL PER MONTH (NYSDOH 1992, 1993).
12. From 1994-2009, NYSDOH advised that a few meals of American shad meat and roe is not an unacceptable risk as long as it is the person's only significant exposure to PCBs. From 2007-2009, this advice also applied to blue crab meat (NYSDOH 1994-2010).

### Reach Boundary Notes

Advisories apply to tributaries and connected waters if there are no dams, falls, or barriers to stop fish from moving upstream.

- A. In 1996-1997 the advisory area narrowed to Niagara Mohawk Boat Launch to Sherman Island Dam (NYSDOH 1996, 1997).
- B. Advisory from Palmer Falls Dam at Corinth to Dam at Route 9 Bridge in South Glens Falls in 2013 and 2014 (NYSDOH 2013, 2014).
- C. Northern boundary of advisory area expanded to Dam at Rt. 9 bridge in South Glens Falls in 2002-2014 (NYSDOH 2002-2014).
- D. Southern boundary of advisory area: 1976-1995, to lower New York Harbor; 1995-2006, to and including the Upper Bay of New York Harbor (north of Verrazano-Narrows Bridge); 2006, to the Battery in New York City; 2007-2014 to the Upper Bay of New York Harbor (advisories split between north and south of the Tappan Zee Bridge but combined and denoted in this table) (NYSDOH 1983-2014).

INJURIES TO HUDSON RIVER FISHERY RESOURCES:  
FISHERY CLOSURES AND CONSUMPTION RESTRICTIONS

HUDSON RIVER

## 4.2.1 Overview of New York's Advisory Program

Since the 1970s, the New York State Department of Health has issued health advisories recommending that people restrict their consumption of contaminated sportfish. The origin of health consumption advisories in New York State was the emerging evidence, in the early 1970s, of the presence of contaminants in sportfish from some New York waters, including Lake Ontario, Lake Champlain and Onondaga Lake. As a result, to be protective of human health across the state, NYSDOH, NYSDEC and NYSDAM established a general, statewide advisory to eat no more than one meal of fish per week from any waters of the state (State of New York, 1971). This step marked the beginning of the Department of Health's fish consumption advisories. The general advisory was not based on a specific, known contaminant, but rather was intended to protect the public against unlimited consumption of fish from waters "that are as yet untested or which may contain unidentified contaminants" (e.g., NYSDOH, 1989). This general statewide freshwater advisory remains in place today<sup>12</sup> (NYSDOH, 2014).

In addition to the general advisory, NYSDOH applies more restrictive advisories to water bodies that have been determined to be contaminated with specific contaminants. These advisories may be to *eat up to one meal a month* or *don't eat* a specific species of sportfish from a specific water body. NYSDOH further advises women under 50 and children under the age of 15 to avoid eating *any* fish from many of the water bodies subject to one of these more restrictive advisories. Since 1971, NYSDOH has issued multiple advisories on sportfish from New York State waters because of their contamination with toxic chemicals. Over time, advisories have been imposed, revised and removed to reflect current data and the developing understanding of the health hazards posed by those contaminants.

## 4.2.2 Hudson River Advisories

New York first issued advisories based on the elevated PCB concentrations in Hudson River fish in 1975. In an August 1975 press release, the Commissioners of both NYSDOH and NYSDEC joined in warning the public against consumption of any striped bass from the Hudson River and in recommending that people limit their consumption of other species of Hudson River fish because of the excessive concentrations of PCBs in those fish (NYSDEC, 1975b).<sup>13</sup> Following this initial advisory, on February 24, 1976, NYSDOH Commissioner Whalen wrote to letter to NYSDEC Commissioner Reid, certifying that the health and welfare of the human population could be endangered by the consumption of fish taken from the Hudson River between Fort Edward and the Battery because of the concentration of PCBs in the fish (Whalen, 1976). He specifically advised that no fish taken between Fort Edward and the Troy Dam be consumed, that eels taken from the Hudson River not be consumed, and that infants and pregnant women eat no fish from the Hudson River (*ibid.*).

Since 1976, Hudson River advisories have remained in place with periodic modifications, such as when new fish contaminant data became available and when the FDA lowered the tolerance for PCBs in fish from 5 ppm to 2 ppm (49 FR 21514). Contaminant data collected by NYSDEC are regularly communicated to NYSDOH staff. NYSDOH then reviews the data and determines whether any updates or revisions to existing

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<sup>12</sup> This language has been refined in more recent years to recommend: "eat up to four one-half pound meals a month (which should be spaced out to about a meal a week) of fish from New York State fresh waters and some marine waters near the mouth of the Hudson River."

<sup>13</sup> As stated in the 1975 and 1976 press releases (NYSDEC 1975b, State of New York 1976) and the 1976 NYSDOH certification letter which established the first advisories (Whalen 1976), the basis for the Hudson River fish advisories was PCB contamination. The NYSDOH Health Advisory publications from 1993 to the present specifically list PCB as the sole chemical of concern for Hudson River fish south of Hudson Falls to the bridge at Catskill; south of this point, PCBs and other chemicals are included as contaminants of concern (see, for example, NYSDOH 2014).

advisories are required. NYSDOH notifies the public of any changes in the advisories through a NYSDOH press release and through the publication of the current health advisories for all New York water bodies in NYSDOH's annual health advisory/advice booklet, in NYSDEC's annual fishing regulations guide, in NYSDOH's Hudson River regional fish advice brochures, and on the NYSDOH website.<sup>14</sup> Exhibits 6 and 7 show Hudson River advisories in tabular form by population group. Exhibit 8 shows the same information, organized by geographic region. Exhibits 9 through 11 provide overviews of these advisories in map form. The details of these advisories are discussed below, with information presented both by population group and by location.

#### 4.2.3 Hudson River Advisories for Women Under 50 and Children Under 15

As noted above, NYSDOH sets more stringent consumption protocols for women of childbearing age and for children (Exhibits 6 and 10). The reason for this specific advice is the concern that environmental contaminants such as PCBs can accumulate in a mother's body and be passed on to a fetus or to a nursing infant through the mother's milk, or can accumulate in a young child, with the potential to cause adverse effects to developing systems of the fetus or child (NYSDOH, 1985a). The exact language used to describe these groups has been refined over the years. In 1975, no specific population sub-groups were called out for additional protections. In 1976, state health officials specifically advised that infants, young children and pregnant women avoid eating any fish from the Hudson River because of PCB contamination (State of New York, 1976). In 1982, the warning was broadened to include all women of childbearing age along with infants and children under the age of 15, a definition that remained unchanged through the 2009-2010 advisory (Axelrod, 1982; NYSDOH 2009). In the 2010-2011 advisory, this language was refined to specify women under 50 years and children under 15 years old, and this language remains in place today (NYSDOH 2010; NYSDOH 2014).<sup>15</sup> Furthermore, the *don't eat* (i.e., "eat none") advisory for these groups remains in effect for all species and for all portions of the Hudson River below Hudson Falls (Exhibits 9 and 10).<sup>16</sup>

#### 4.2.4 Hudson River Advisories for Women Over 50 and Men Over 15

Exhibits 7 and 11 depict the geographic and species extent of the PCB-based fish consumption advisories that state health officials have put in effect for the Hudson River from the mid-1970s to the present, as applicable to men and to women not of child-bearing age. For these groups, there are three key advisories that have persisted throughout the entire period: first, the *don't eat* advisory for all fish in the upper river from Hudson Falls to Troy Dam. (More specifically, since 2006, NYSDOH's health advice for the upper river has referenced NYSDEC's catch and release fishing regulations, and since 2011, the advice further emphasized "Take no fish. Eat no fish.") Other advisories that have persisted through this period include the *don't eat* advisories for striped bass and American eel from Hudson Falls to Catskill.

DOH has changed its consumption advisories over time. For example, one change occurred in 1983 when NYSDOH added an advisory for white perch north of Catskill (NYSDEC, 1983). The lowering of the FDA tolerance limit for PCBs from 5 ppm to 2 ppm in August of 1984 caused New York to significantly

<sup>14</sup> The documents are available at: <http://www.dec.ny.gov/outdoor/7917.html>, <https://www.health.ny.gov/publications/2794.pdf>, and [http://www.health.ny.gov/environmental/outdoors/fish/health\\_advisories/](http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/), available as of 12 February 2015. NYSDOH also publishes consumption advisories at: [www.health.ny.gov/fish](http://www.health.ny.gov/fish).

<sup>15</sup> In 2010, these groups represented approximately 43% of the population of New York State. This estimate is based on the number of all children under the age of 15 plus all females between ages 15 and 50 (New York State Statistical Yearbook, 2013).

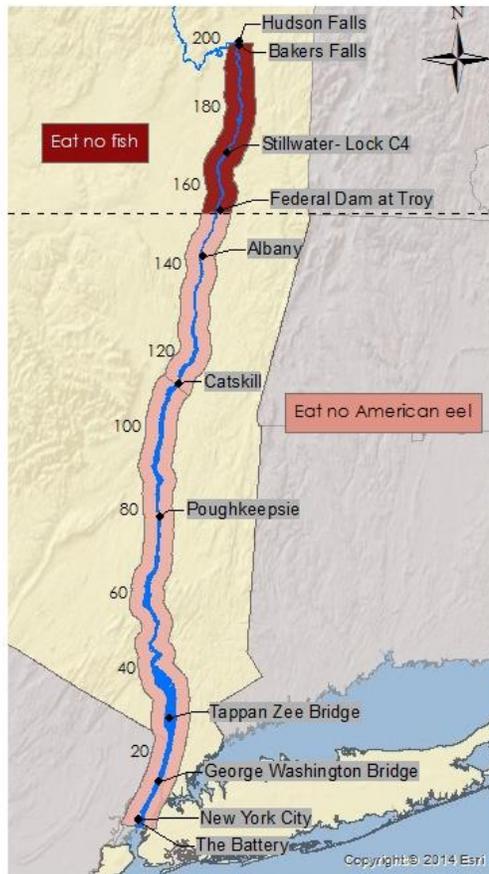
<sup>16</sup> The only exception to this broad advisory occurred from 1994 to 2009, when NYSDOH advised that a few meals a year of Hudson River American shad would not pose an unacceptable risk to children and to women of childbearing age, assuming that this is their only significant exposure to PCBs. Also of note, NYSDOH changed some of the language it uses. Up through the 2009-2010 issuance, NYSDOH described advisories using the phrases "eat none", "eat no more than one meal per month", and "eat no more than one meal per week." Starting in 2010-2011, NYSDOH refined its language to become "don't eat", "eat up to one meal per month" and "eat up to four meals per month" (NYSDOH 2010).

modify its advisories in 1984 for the middle and lower reaches of the Hudson River (NYSDEC, 1984b). Because of the timing of the change in the FDA tolerance, NYSDOH in fact issued two sets of advisories in 1984: one in June and a second in November.

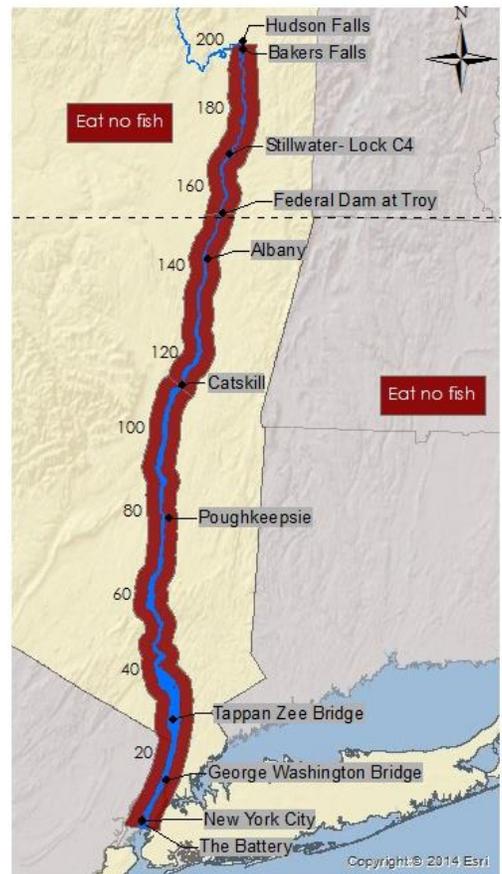
Another shift in advisories occurred in the early 1990s as a result of an increase in PCB concentrations in fish detected beginning in 1992. By the mid-1980s, PCB concentrations in fish from the Hudson River had declined, although average PCB concentrations in many species still exceeded the 2 ppm FDA tolerance level (Sloan, 1999; NYSDEC, 2001). However, fish taken from the upper Hudson River in May and June of 1992 and 1993 had PCB concentrations as high as those reported in the early 1980s (Sloan, 1999). As discussed in Section 3.2, additional releases from the area of the Hudson Falls plant (the Allen Mill event), discovered in the early 1990s, contributed to the increased PCB concentrations detected in the fish. As a result, in 1994, NYSDOH substantially revised its advisories for the Troy Dam to Catskill reach of the lower river from species-specific advice to *eat none* for all species except American shad (NYSDOH, 1994).

**EXHIBIT 9: HUDSON RIVER FISH CONSUMPTION ADVISORIES IN 1976**

**GENERAL ADVISORIES**

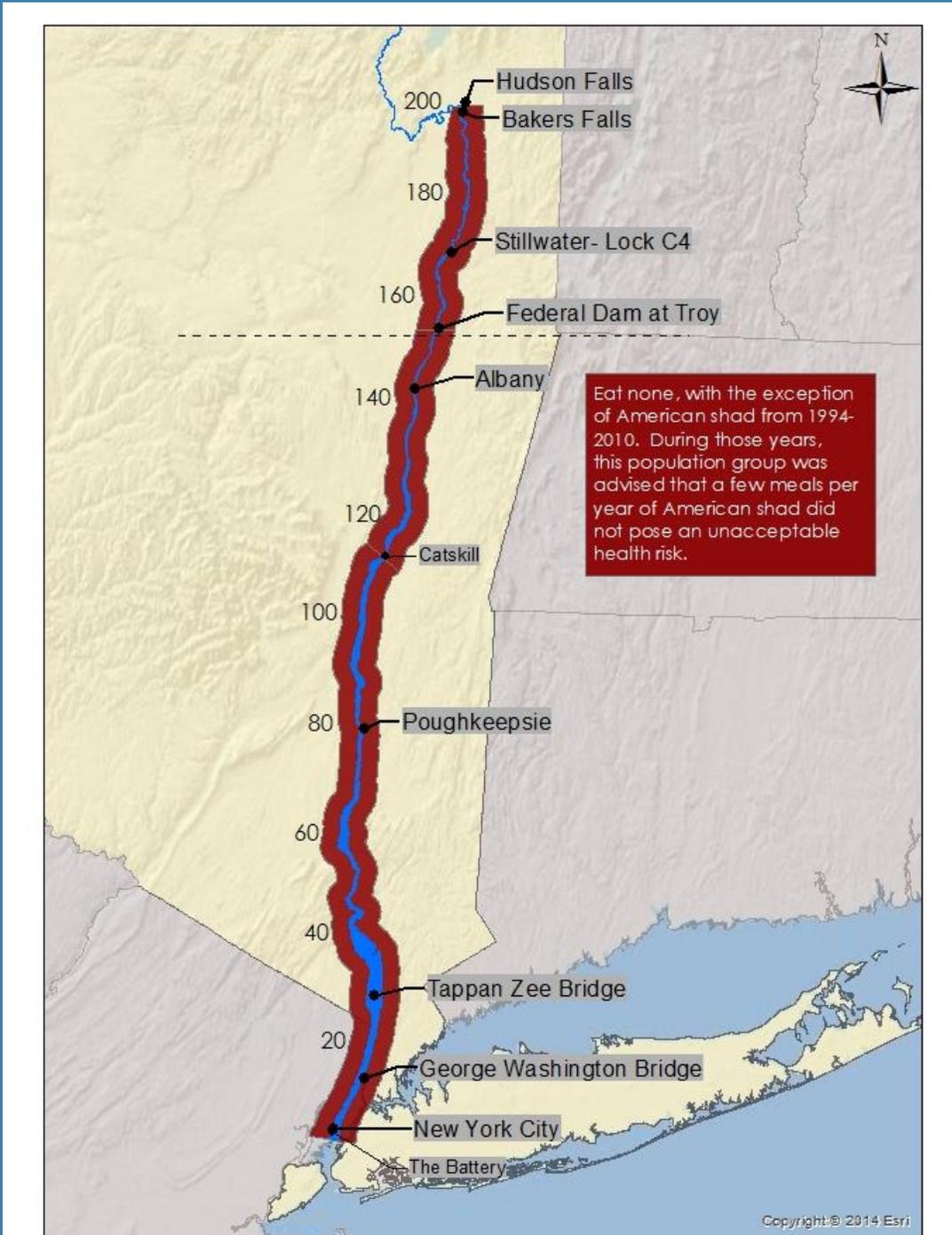


**ADVISORIES FOR INFANTS AND PREGNANT WOMEN**



Note: Advisories apply to tributaries and connected waters if there are no dams, falls, or barriers to stop fish from moving upstream.

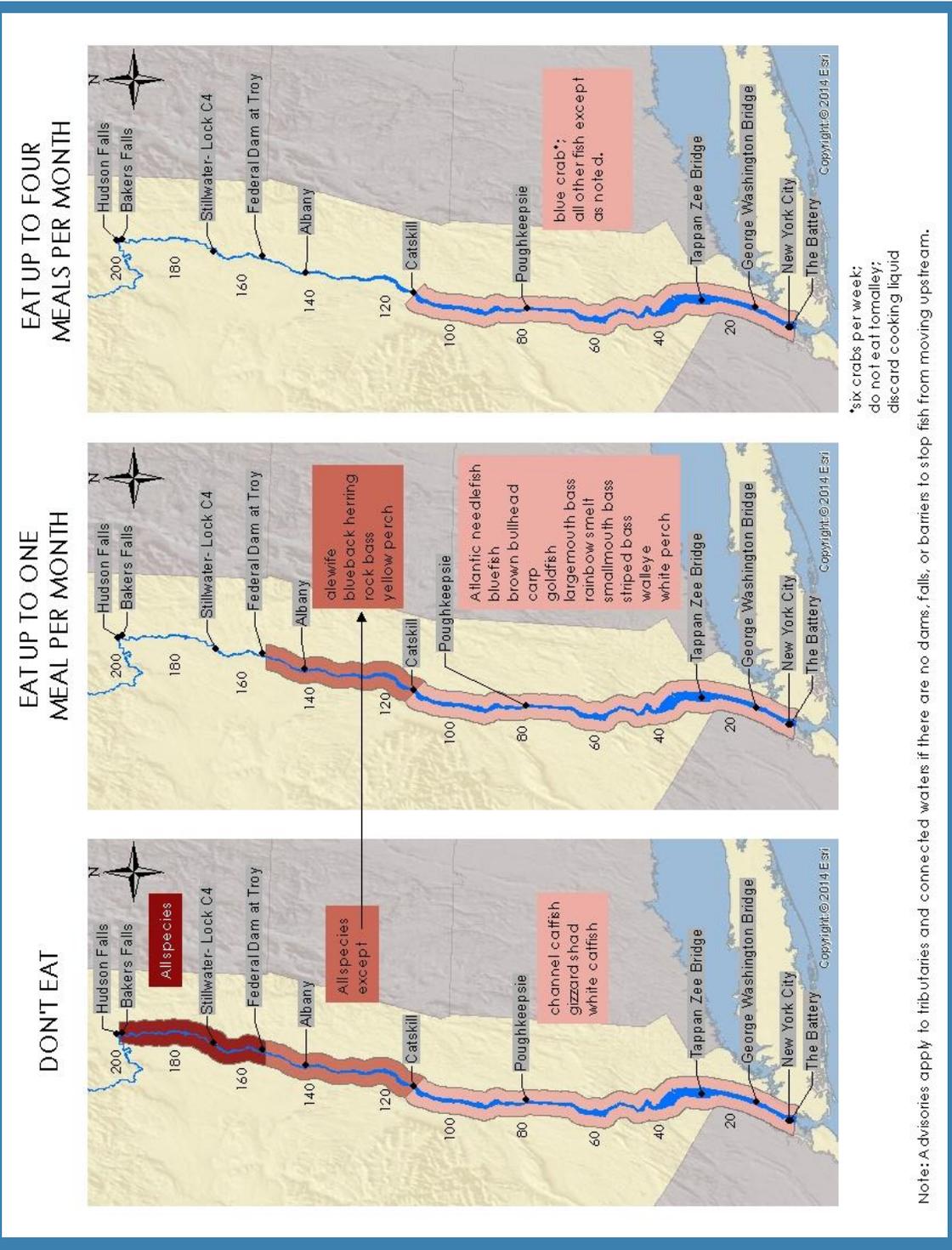
**EXHIBIT 10: FISH CONSUMPTION ADVISORIES FOR WOMEN UNDER 50 AND CHILDREN UNDER 15, 1976 TO PRESENT\***



\*From 1976-1982, these advisories applied to infants, young children, and pregnant women. From 1982-2009, these advisories applied to women of childbearing age, infants, and children under age 15. Subsequently, these advisories have applied to women under 50 and children under age 15 (Axelrod 1982; NYSDOH 1983-2014).  
Note: Advisories apply to tributaries and connected waters if there are no dams, falls, or barriers to stop fish from moving upstream.

**INJURIES TO HUDSON RIVER FISHERY RESOURCES:  
FISHERY CLOSURES AND CONSUMPTION RESTRICTIONS**

**EXHIBIT 11: CURRENT HUDSON RIVER FISH CONSUMPTION ADVISORY FOR WOMEN OVER 50 AND MEN OVER 15, 2014-2015**



\*six crabs per week;  
do not eat tomalley;  
discard cooking liquid

Note: Advisories apply to tributaries and connected waters if there are no dams, falls, or barriers to stop fish from moving upstream.

PCB concentrations in upper Hudson River fish gradually returned to pre-1992 concentrations as the Allen Mill release was brought under control (EPA, 2000b). Despite these declines, the fish remain contaminated with PCBs. PCB-based consumption advisories continue for many species of fish in the Hudson River estuary, the most recent of which were issued for 2014 to 2015 (see Exhibit 11).<sup>17</sup>

#### 4.2.5 Hudson Falls to the Troy Dam

Between 1976 and 1995, fishing (with the exception of baitfish) was banned in this section of the river due to elevated PCBs. Since February 24, 1976 to the present, NYSDOH has advised against consumption of any species within the 40 mile reach of the Hudson River from Hudson Falls to the Troy Dam. Since 2006, NYDOH's health advice has referenced NYSDEC's catch and release fishing regulations, and since 2011, the advice further emphasized "Take no fish. Eat no fish." This advice applies to all fish caught within this section of the river and is based on the excessive PCB concentrations that have been found in all species of fish from this reach. The *don't eat* advice remains in effect despite the lifting of the regulatory ban on recreational fishing from Hudson Falls to Troy Dam in 1995. While fishing is now permitted, it is still illegal to possess fish from this section of the river. In fact, the Health Department's concurrence in re-opening a "catch and release" fishery in the upper Hudson River was predicated on a continued *eat none* advisory (DeBuono, 1995).

#### 4.2.6 Troy Dam to Catskill

In 1975, NYSDOH advised against eating striped bass from the Hudson River, further noting that this recommendation would be in effect until further information was available (NYSDEC 1975b). As noted previously, in 1976, for the section of the Hudson from the Troy Dam to Catskill, NYSDOH issued an *eat none* advisory for infants, young children, and pregnant women, and a similar advisory remains in place today, although as described previously, this group was broadened to include women under age 50 and children under age 15.<sup>18</sup> Also in 1976, NYSDOH issued a limited consumption advisory for the general population, and added an *eat none* advisory for American eel (Whalen, 1976). Between 1982 and 1994, NYSDOH issued advisories for a number of additional specific fish species (e.g., NYSDEC, 1983 and 1984; also see Exhibit 8).

In 1994, with the exception of American shad, NYSDOH shifted all advisories in this area to *eat none* (NYSDOH, 1994). In 1999, however, four species—alewife, blueback herring, rock bass, and yellow perch—were upgraded to the recommendation that *no more than one meal per month* be eaten (NYSDOH, 1999). With the exception of those four, for the fifteen years since 1999, all fish species in this area remain covered by the *eat none* (or *don't eat*) advisory.

As can be seen in Exhibit 8, for white catfish, carp, white perch, and goldfish, a *don't eat* advisory has been in effect for approximately 30 years. For the striped bass and American eel, a *don't eat* advisory has been in effect continuously since 1975, a total of 39 years.

#### 4.2.7 Catskill South

This river reach begins at Catskill, and its southern border has changed over time. In particular (NYSDOH 1983-2014):

- From 1976-1995, the southern border extended to lower New York Harbor;
- From 1995-2006, the southern border extended to and included the Upper Bay of New York Harbor (north of Verrazano-Narrows Bridge);

<sup>17</sup> Exhibit 10 depicts the current extent of consumption advisories for Hudson River fish. The current health advisories are also available (as of 29 May 2014) at the following website: [http://www.health.ny.gov/environmental/outdoors/fish/health\\_advisories/](http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/).

<sup>18</sup> Between 1994 and 2008, the advisories stated that a few meals/year of American shad was an acceptable risk. In 2010, due to population concerns (as distinct from contaminant concerns), NYSDEC prohibited fishing for and possession of American shad from the Hudson River.

- In 2006, the southern border was limited to the Battery in New York City; and
- In 2007-2014, the southern border extended to the Upper Bay of New York Harbor.

As noted previously, in 1976, NYSDOH issued an *eat none* advisory for infants, young children, and pregnant women, and a similar advisory remains in place today, although as described previously, this group was broadened to include women under age 50 and children under age 15. For the general population, in 1976 NYSDOH issued an *eat none* advisory for the American eel. In addition, between the mid-1980s and the mid-1990s, NYSDOH issued *eat none* advisories for nine different fish species for periods ranging from five to 10 years (see Exhibit 8). These fish species include brown bullhead, carp, goldfish, largemouth bass, pumpkinseed, striped bass, walleye, white catfish, and white perch.

In the spring of 1994, in an attempt to make the Hudson River fish consumption advisories more easily understood, NYSDOH abandoned the species-by-species approach and issued a blanket advisory for Catskill downstream to New York City to eat no more than one meal per month for all species except American shad, Atlantic sturgeon,<sup>19</sup> blueback herring, bluegill, pumpkinseed and yellow perch (NYSDOH, 1994). This changed the advisory status of many fish, imposing consumption advisories on many unintended freshwater and marine species. Consequently, in May of 1995 NYSDOH switched back to a species- and reach-specific format in the lower river south of Catskill (NYSDOH, 1995a). The current health advisory between Catskill and the Tappan Zee Bridge recommends *don't eat* of three fish species and recommends the consumption of *up to one meal per month* for 11 additional fish species. All other fish are subject to an *eat up to four meals per month* advisory (see Exhibit 11). Blue crabs are also subject to an *eat up to four meals per month* advisory (consisting of six crabs per meal), in addition to which the cooking liquid and hepatopancreas (tomalley, or mustard) should not be consumed from crab or lobster. The current advisory south of the Tappan Zee Bridge is the same as between Catskill and the Tappan Zee except the *eat up to one meal a month* advisory is in place for seven species of fish.

## 5. BASELINE DETERMINATION

Baseline refers to the “condition or conditions that would have existed at the assessment area had the discharge of oil or release of the hazardous substance under investigation not occurred” (43 CFR 11.14(e)). For the Hudson River, the baseline condition is the condition of the river absent the PCB releases associated with GE’s Ford Edward and Hudson Falls plants. The Trustees have furthermore determined that, absent these releases, few or no PCB-based advisories would be in place between the South Glens Falls Dam at the Route 9 bridge through the Tappan Zee Bridge.

North of the Corinth (Palmer Falls) Dam, no PCB-based advisories are in place for any portion of the population. Between Corinth and the South Glens Falls Dam at the Route 9 Bridge, PCB-based population-wide advisories are limited to carp (NYSDOH, 2014); this advisory has been in place since 1996.<sup>20</sup> For other species in that reach, since 1994 women under 50 and children under 15 have been advised to eat none (due to both PCBs and mercury), while other people may eat up to four meals per month.

PCBs are the only listed chemical of concern for the Hudson River between the South Glens Falls Dam/Feeder Dam at the Route 9 Bridge and the Tappan Zee Bridge, with two exceptions. Dioxin and cadmium contribute (along with PCBs) to the advisory for tomalley in crabs/lobsters caught between the Rip Van Winkle Bridge at Catskill and south of the Tappan Zee Bridge. Also, cadmium contributes (along with PCBs) to the advisory on blue crab meat caught in this same area.

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<sup>19</sup> In 2012, the Atlantic sturgeon New York Bight distinct population segment was federally listed as endangered (77 FR 5880)

<sup>20</sup> Women under 50 and children under 15 are advised to eat none; others are advised to eat up to 1 meal per month.

## 6. SUMMARY OF DETERMINATION OF INJURY TO HUDSON RIVER FISHERY RESOURCES

The Hudson River Natural Resource Trustees have concluded that a natural resource, the Hudson River fishery, has been injured as a result of the closures and health advisories documented herein. Extensive fishing bans and fish consumption advisories have been and continue to be in place for multiple fish species downstream of Hudson Falls. These closures and advisories constitute directives to limit or ban consumption, and were issued by New York state officials from 1975 to the present because of the excessive PCB concentrations in Hudson River fish.

From 1976 to the present, all species from Hudson Falls south to New York City, including associated tributary reaches,<sup>21</sup> have been subject to a *don't eat* (or *eat none*) advisory directed to women of childbearing age and all children under age 15 (see Exhibit 6). Furthermore, in the 43 miles of the upper Hudson River, use of the fishery has been impacted by both regulatory fishing restrictions and a general population *eat none* advisory established in 1976 that continues to the present. For 19 years, fishing was banned in this reach of the river, and possession of any fish in this reach remains prohibited. Altogether, the *don't eat* (or *eat none*) advisory applicable to all species in the upper Hudson River has been in place for nearly 40 years.

Consistent with the recreational advisory, in the 41 miles from the Troy Dam to Catskill (plus associated tributary reaches<sup>22</sup>) from 1976 to 1981, all species except Atlantic sturgeon over four feet long, goldfish and American shad were subject to a commercial fishing ban. From 1982 to 1994, a minimum of six and as many as 17 species of fish in this reach were the subject of a commercial or recreational fishing ban, a general population consumption advisory, or both. The consumption advice for the majority of those species was *eat none*. From 1994 to the present, general population consumption advisories directed at all species except American shad<sup>23</sup> have been in place; in most instances, the recommendation has been *eat none*.

Finally, in the 113 river miles from Catskill to the Battery (including associated tributary reaches) from 1976 to 1981, a commercial fishing closure was in effect for all species except baitfish, Atlantic sturgeon over four feet long, goldfish and American shad. From 1982 to the present, between six and 19 fish species have been subject to a commercial or recreational fishing ban, a general population consumption advisory, or both. Currently, fourteen fish species continue to be subject to restrictive consumption advice (for men over 15 and women over 50). For all other fish species, NYSDOH currently recommends consumption of up to four meals per month (for men over 15 and women over 50).

The imposition of these restrictions on fishing and fish consumption by state officials is an injury as defined in the DOI regulations. Closures and other restrictions have been in effect for decades and continue to the present day (see Exhibits 4 and 9). The public's uses of the fishery, whether for a livelihood, a source of recreational enjoyment, or for nutrition, have been dramatically reduced or, in some cases, completely eliminated. Additional reductions in fish PCB concentrations will be necessary to bring about the removal of these restrictions. The injury to the resource is expected to continue into the future until that occurs. In a future report to the public, the Trustees will consider specific measures whereby the Hudson River fishery might be restored and the public might be compensated for the past and ongoing losses of this resource.

<sup>21</sup> Advisories also apply to tributaries and connected waters where there are no dams, falls or barriers to stop the fish from moving upstream.

<sup>22</sup> Fishing bans also apply to tributaries and connected waters where there are no dams, falls or barriers to stop the fish from moving upstream.

<sup>23</sup> In 2010, due to population concerns (as distinct from contaminant concerns), NYSDEC issued a regulatory closure for American shad, such that both recreational fishing for and possession of the species are prohibited.

## REFERENCES

- Arcadis. (2014). 2013 Annual Groundwater Monitoring Report: Hudson Falls Plant Site. Hudson Falls, NY. Prepared for General Electric Company. March.
- Armstrong, R.W. and R.J. Sloan. (1988). PCB patterns in Hudson River Fish. I. Resident freshwater species. Pp. 304-324. In C.L. Smith (ed.). Fisheries Research in the Hudson River. State University of New York Press, Albany, New York.
- Axelrod, D. (1982). Letter to Hon. Robert F. Flacke, Commissioner, NYS Department of Environmental Conservation from Dr. David Axelrod, Commissioner of Health, State of New York Department of Health. March 15.
- Berle, P.A.A. (1976). Press Release: "Commissioner of Environmental Conservation Peter A.A. Berle today announced a change in the overall ban against commercial fishing due to PCB's..." July 9.
- Brown, M.P., M.B. Werner, R.J. Sloan and S.W. Simpson. (1985). Polychlorinated Biphenyls in the Hudson River. *Environ. Sci. Technol.* 19(9): 656-661.
- Contaminant Assessment and Remediation Project (CARP). 2008. Summary of accomplishments and findings. Accessed 1 August 2014 at: < [http://www.hudsonriver.org/download/carp\\_05\\_08.pdf](http://www.hudsonriver.org/download/carp_05_08.pdf)>.
- DeBuono, B.A. (1995). Letter from NYSDOH Commissioner Barbara A. DeBuono to NYSDEC Commissioner Michael D. Zagata. May 1.
- Eisenbud, M. (1975). Letter to Dr. Kevin Cahill, the Governor's Special Assistant for Health Affairs. December 18.
- Federal Register (FR). 1973. 38 FR 18096-18106. July 6.
- Federal Register (FR). 1984. 49 FR 21514-21529. May 22.
- Field, J., L. Rosman, T. Brosnan, and R. Foley. (2011). Hudson River Remedy: Unremediated PCBs and the Implications for Restoration, Poster Presentation, Battelle Sixth International Conference on Remediation of Contaminated Sediments, February 7-10, 2011, New Orleans, LA. Accessed 2 October 2014 at: <[http://www.darrp.noaa.gov/northeast/hudson/pdf/Battelle1\\_Field.final1.pdf](http://www.darrp.noaa.gov/northeast/hudson/pdf/Battelle1_Field.final1.pdf)>.
- General Electric (GE). 2014a. Press Release: GE Preparing for 5th Season of Dredging. March 6. Accessed 29 May 2014 at: <<http://www.hudsondredging.com/2014/03/06/ge-preparing-for-5th-season-of-dredging/>>.
- General Electric (GE). 2014b. Remedial Investigation/Feasibility Study Work Plan Upper Hudson River Floodplain. September. Appendix 1 of the September 30, 2014 Administrative Settlement Agreement and Order on Consent for Remedial Investigation and Feasibility Study, U.S. EPA Index No. CERCLA-02-2013-2014.
- Hetling, L.J., E.G. Horn, and R.J. Tofflemire. (1978). Summary of Hudson River PCB Study Results. NYSDEC, Albany, NY. April 1978.
- Horn, E.G., L.J. Hetling and R.J. Tofflemire. (1979). The problem of PCBs in the Hudson River System. *Ann. NY Acad. Sci.* 320: 591-609.
- Hudson River Natural Resource Trustees (HRNRT). 2013. PCB Contamination of the Hudson River Ecosystem: Compilation of

- Contamination Data Through 2008. Hudson River Natural Resource Damage Assessment. January. Accessed 29 May 2014 at < <http://www.fws.gov/contaminants/restorationplans/ HUDSONRIVER/docs/Hudson%20River%20Status%20Report%20Update%20January%202013.pdf> >.
- Hudson River Trustee Council (HRTC). 2002. Hudson River Natural Resource Damage Assessment Plan. September. Accessed 29 May 2014 at < <http://www.fws.gov/contaminants/restorationplans/HudsonRiverNRDASept2002.pdf> >.
- Louis Berger Group, Inc. (2010). Hudson River PCBs Site: EPA Phase 1 Evaluation Report. Prepared for U.S. Environmental Protection Agency, Region 2, and U.S. Army Corps of Engineers, Kansas City District. March.
- Nadeau, R.J., and R.P. Davis. (1974). Investigation of Polychlorinated Biphenyls in the Hudson River: Hudson Falls - Fort Edward Area. EPA, Region II.
- Nadeau, R.J., and R.P. Davis. (1976). Polychlorinated Biphenyls in the Hudson River (Hudson Falls to Fort Edward, New York State). Bulletin of Environmental Contamination and Toxicology. Vol. 16, No. 4, p. 436-444.
- Nearing, Brian. 2014. "Fort Edward GE Plant Closing Gets Temporary Reprieve." Times Union. Hearst, 24 March. Retrieved 20 June 2014.
- NOAA. (1997). Hudson River Congener-Specific Analysis, Data Summary and Analysis Report. Prepared by EVS Consultants, Seattle, WA, for National Oceanic and Atmospheric Administration Damage Assessment Center, Silver Spring, MD. July.
- NOAA. (2012). Hudson River QueryManager database, update 1/19/12.
- New York Code of Rules and Regulations (NYCRR). 1977. Title 6, §12.19. August 31.
- NYCRR. (1978a). Title 6, §11.3. April 30.
- NYCRR. (1978b). Title 6, §11.2. August 31.
- NYCRR. (1981). Title 6, §11.1. February 28.
- NYCRR. (1982). Title 6, §§11.2, and 11.4. October 31.
- New York State Department of Environmental Conservation (NYSDEC). (1975a). PCB Monitoring in the Upper Hudson River Basin. Division of Pure Waters. October.
- NYSDEC. (1975b). Press Release: "Commissioner of Environmental Conservation Ogden Reid today advised against eating fish taken from the Hudson River . . . ." August 7.
- NYSDEC. (1976). PCB Data in Hudson River Fish, Sediment, Water and Wastewater. New York State Department of Environmental Conservation, Albany, NY. March.
- NYSDEC. (1977). 1977 Fish Sampling and Analysis Program - Hudson River. New York State Department of Environmental Conservation, Albany, NY. 7 pp.
- NYSDEC (1981). Press Release: "Commissioner of Environmental Conservation Robert F. Flacke today reaffirmed a 1976 ban on commercial fishing...". October 9.
- NYSDEC. (1982). New York State Fishing, Small Game Hunting and Trapping Regulations Guide. October 1, 1982 - September 30, 1983.
- NYSDEC. (1983). New York State Fishing, Small Game Hunting and Trapping Regulations Guide. October 1, 1983 - September 30, 1984.

- NYSDEC. (1984a). New York State Fishing, Small Game Hunting and Trapping Regulations Guide. October 1, 1984 - September 30, 1985.
- NYSDEC. (1984b). Press Release: "New health advisories for fish consumption based on a reduction in the PCB tolerance level . . . ." November 15, 1984.
- NYSDEC. (1985). Final Environmental Impact Statement for Policy on Contaminants in Fish. October.
- NYSDEC. (1999). Proposed Remedial Action Plan: General Electric Hudson Falls Plant Site, Hudson Falls, Washington County, New York. Site No. 558013.
- NYSDEC. (2000). Record of Decision: GE Fort Edward Plant Site, Town of Fort Edward, Washington County. Site Number 558004: Operable Units 3 and 4.
- NYSDEC. (2001). Hudson River PCB Biota Database. Bureau of Habitat, Division of Fish, Wildlife and Marine Resources, Albany, NY. Updated March 13.
- NYSDEC. (2004). Record of Decision: Hudson Falls Plant Site Operable Units No. 2A-2D. Village of Hudson Falls, Town of Kingbury, Washington County, New York. Site Number 5-58-013. March.
- New York State Department of Health (NYSDOH). (1981). Joint Press Release: "The State Commissioners of Health and Environmental Conservation today advised against consumption . . . ." June 10.
- NYSDOH. (1982). Press Release: "Continuing evidence of toxic contamination in Hudson River striped bass was jointly announced today..." October 15.
- NYSDOH. (1984a). Press Release: "The State Health Department, based on data provided by the State Department of Environmental Conservation..." June 25.
- NYSDOH. (1984b). Interoffice memorandum. Subject: Revised 1984-85 Health Advisory. From: Dr. Nancy Kim, Director, Bureau of Toxic Substance Assessment. To: Regional, District, and County Health Offices. November 20.
- NYSDOH. (1985a). Press Release: "The State Health Department, based on recent monitoring of PCB levels . . ." April 17.
- NYSDOH. (1985b). Press Release. "The 1985-86 sportfish consumption advisory was announced today..." May 24.
- NYSDOH. (1986). 1986-1987 Health Advisory.
- NYSDOH. (1987). 1987-1988 Health Advisory.
- NYSDOH. (1988). 1988-1989 Health Advisory.
- NYSDOH. (1989). Health Advisories: Chemicals in Sportfish or Game.
- NYSDOH. (1990). Health Advisories: Chemicals in Sportfish or Game.
- NYSDOH. (1991). 1991-1992 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (1992). 1992-1993 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (1993). 1993-1994 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (1994). 1994-1995 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (1994). Press Release: "The State Health Department is issuing new health advisories on eating sportfish . . ." April 21.
- NYSDOH. (1995a). 1995-1996 Health Advisories: Chemicals in Sportfish or Game. Revised June.
- NYSDOH. (1995b). Press Release: "The State Health Department . . ." May 18.
- NYSDOH. (1996). 1996-1997 Health Advisories: Chemicals in Sportfish and Game.

- Environmental Programs. Letter to Mr. Kevin Ferrar, NYSDEC, April 26.
- Skinner, L.C., S.J. Jackling, G. Kimber, J. Waldman, J. Shastay, Jr., and A.J. Newell. (1996). Chemicals in Fish, Shellfish and Crustaceans from the New York-New Jersey Harbor Estuary: PCB, Organochlorine Pesticides and Mercury. NYSDEC, Albany, NY. November.
- Sloan, R. J., M.W. Kane, and L.C. Skinner. 2002. 1999 as a special spatial year for PCBs in Hudson River fish. New York State Department of Environmental Conservation, Albany, NY.
- Sloan, R. J., M.W. Kane, and L.C. Skinner. 2005. Of time, PCBs and the fish of the Hudson River. New York State Department of Environmental Conservation, Albany, NY.
- Sloan, R.J., S.W. Simpson, R.A. Schroeder and C.R. Barnes. (1983). Temporal trends toward stability of Hudson River PCB contamination. *Bull. Environ. Contam. Toxicol.* 31: 377-385.
- Sloan, R., M. Brown, R. Brandt and C. Barnes. (1984). Hudson River PCB relationships between resident fish, water and sediment. *NE Environ. Sci.* 3(3/4): 137-151.
- Sloan, R.J, and R.W. Armstrong. (1988). PCB Patterns in Hudson River Fish: II. Migrant and Marine Species. In *Fisheries Research in the Hudson River*. C. L. Smith (ed.). State University of New York, Albany, NY.
- Sloan, R.J. and J.L. Field. (1996). PCBs in Hudson River Fish: The Historical "Aroclor" Perspective. Poster presentation, 17th Annual SETAC Meeting: Washington D.C. November 21.
- Sloan, R.J. (1999). Striped bass PCB decline - reopening consideration. Memo to J. Colquhoun. Briefing on 1997 PCB results. Bureau of Habitat, Division of Fish, Wildlife and Marine Resources, New York State Department of Environmental Conservation, Albany, New York. Feb. 11.
- Sloan, R.J. (2000). Long Term Hudson River PCB Analysis Project. Bureau of Habitat, Division of Fish, Wildlife and Marine Resources, New York State Department of Environmental Conservation, Albany, New York. Revised November 21.
- Spagnoli, J.J., and L.C. Skinner. (1977). PCBs in Fish from Selected Waters of New York State. *Pesticides Monitoring Journal*, Vol.11, No. 2, 69.
- State of New York. (1971). Departments of Health, Agriculture and Markets, and Environmental Conservation. Press Release: "The State Commissioners of Health, Agriculture and Markets and Environmental Conservation today announced . . ." May 20.
- State of New York. (1976). State of New York, Executive Chamber, Hugh L. Carey, Governor. Press Release: "The Health Planning Commission, in a report to Governor Hugh L. Carey, has recommended sharp restrictions . . ." February 22.
- United States Department of the Interior (DOI), NOAA, and NYSDEC. 2001. Injuries to Hudson River Fishery Resources: Fishery Closure and Consumption Restrictions. Hudson River Natural Resource Damage Assessment. Final Report. Accessed 29 May 2014 at : < [http://www.darrp.noaa.gov/northeast/hudson/pdf/injuries\\_fish\\_resources.pdf](http://www.darrp.noaa.gov/northeast/hudson/pdf/injuries_fish_resources.pdf) >
- United States Environmental Protection Agency (EPA). (1975). Scientific and Technical Assessment Report on Polychlorinated Biphenyls. January.
- EPA. (1984). Record of Decision: Remedial Alternative Selection, Hudson River PCBs Site. Office of Solid Waste and Emergency Response. September.

- NYSDOH. (1997). 1997-1998 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (1998). 1998-1999 Health Advisories: Chemicals in Sportfish or Game.
- NYSDOH. (1999). 1999-2000 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2000). 2000-2001 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2001). 2001-2002 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2002). 2002-2003 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2003). 2003-2004 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2004). 2004-2005 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2005). 2005-2006 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2006). 2006-2007 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2007). 2007-2008 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2008). 2008-2009 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2009). 2009-2010 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2010). 2010-2011 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2011). 2011-2012 Health Advisories: Chemicals in Sportfish and Game.
- NYSDOH. (2012). Health Advice on Eating Sportfish and Game.
- NYSDOH. (2013). Health Advice on Eating Sportfish and Game.
- NYSDOH. (2014). Health Advice on Eating Sportfish and Game.
- New York State Statistical Yearbook. (2013). 37th edition. Published by The Nelson A Rockefeller Institute of Government, The Public Policy Research Arm of the State University of New York. Available June 4 2014 at: <[http://www.rockinst.org/nys\\_statistics/2013/A/](http://www.rockinst.org/nys_statistics/2013/A/)>.
- O'Brien & Gere Engineers, Inc. (1994). Bakers Falls Remedial Investigation Report: Operable Unit 3. Prepared for the General Electric Company: Fort Edward, NY. January.
- O'Brien & Gere Engineers, Inc. (1997). Fort Edward Remedial Investigation Report: Operable Units 2A and 2B. Prepared for the General Electric Company: Fort Edward, NY. January.
- Reid, O. (1976). Order Regulating the Taking of Fish and American Eel in the Hudson River and Their Sale or Offer for Sale. February 25.
- Richter, W. (2011). Long Term Hudson River Remedial Biota Evaluation: PCB Analysis Project, Lower Hudson River Quality Assurance Project Plan. Division of Fish, Wildlife and Marine Resources, New York State Department of Environmental Conservation, Albany, New York.
- Richter, W. (2013). Sampling Plan for PCBs in Biota from the Hudson River Near the 004 Outfall, Fort Edward, Division of Fish, Wildlife and Marine Resources, New York State Department of Environmental Conservation, Albany, New York.
- Richter, W. (2014). Review of the Feasibility Study for the GE Fort Edward Plant OU-5 (Former 004 Outfall). Division of Fish, Wildlife and Marine Resources, New York State Department of Environmental Conservation, Albany, New York. 7 February.
- Schweiger, M. B. (1999). PRAP Comments for Site No. 558004, GE's Fort Edward, N.Y., Facility. General Electric Corporate

- EPA. (1991). Phase I Report: Review Copy.  
Volume 1 - Interim Characterization and  
Evaluation. Hudson River PCBs  
Reassessment RI/FS. Region II, New York.  
August.
- EPA. (1997a). Guidance for Assessing Chemical  
Contaminant Data for Use in Fish  
Advisories. Volume 2 - Risk Assessment  
and Fish Consumption Limits. Second  
Edition. July.
- EPA. (1997b). Phase 2 Report: Review Copy.  
Volume 2C - Data Evaluation and  
Interpretation Report. Hudson River PCBs  
Reassessment RI/FS. Region II, New York.  
February.
- EPA. (2000). Phase 3 Report: Feasibility Study.  
Hudson River PCBs Reassessment RI/FS.  
Region II, New York. December 2000.
- EPA. (2002). Hudson River PCBs Site New  
York: Record of Decision. February.
- Whalen, R.P. (1976). Letter from NYSDOH  
Commissioner Robert P. Whalen to  
NYSDEC Commissioner Ogden Reid.  
February 24.



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