

**FISH AND SNAPPING TURTLE CONSUMPTION
ADVISORIES AND RELATED NATURAL RESOURCE
INJURIES IN THE OTTAWA RIVER
Lucas County, Ohio**

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Prepared for:

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1.0 Introduction – Authority and Legal Requirements

The Ottawa River watershed lies principally in northern Ohio and empties into Lake Erie's North Maumee bay near the city of Toledo. Decades of manufacturing activity and improper waste disposal practices have resulted in the release of hazardous substances to the Ottawa River and its watershed. Hazardous substances have migrated from landfills along the banks of the Ottawa River and from industrial facilities in the watershed, contaminating water, fish and wildlife in the Ottawa River and adjacent North Maumee Bay. Most of the landfills which were sources of hazardous substances to the Ottawa River have been, or are being, remediated under CERCLA and other authorities. Hazardous substances released into the lower Ottawa River watershed include, but are not limited to, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and heavy metals such as lead (Ohio EPA 1991, 2002 and US FWS 2004).

The U. S. Fish and Wildlife Service (Service) of the U.S. Department of the Interior (DOI) and the Ohio Environmental Protection Agency (Ohio EPA) are conducting a natural resource damage assessment (NRDA) of the Ottawa River and North Maumee Bay as defined under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601, *et seq.* (CERCLA, more commonly known as the federal "Superfund" law) and the Federal Water Pollution Control Act, 33 U.S.C. § 1251, *et seq.* Clean Water Act (CWA).

Each of the above Agencies is a designated natural resources trustee under Section 107(f) of CERCLA, 42 U.S.C. § 9607(f), Section 311 of the CWA, 33 U.S.C. § 1321, and other applicable law, including Subpart G of the National Contingency Plan (NCP), 40 C.F.R. § 300.600-300.615. As a trustee, each Agency is authorized to act on behalf of the public to assess natural resource injuries and recover damages for losses of natural resource services attributed to releases of hazardous substances. The Secretary of the Interior acts as trustee for natural resources managed or controlled by the DOI, including their supporting ecosystems (40 C.F.R. 300.600(b), (b)(2), and (b)(3)). In accordance with 42 U.S.C. § 9607(f)(2)(B), the Director of the Ohio EPA has been designated the natural resource trustee of Ohio by the Governor of Ohio pursuant to several Executive Orders, the latest being issued on 20 July 2007.

The DOI regulations for conducting NRDAs are found in 43 C.F.R. Part 11. There are three phases to a Type B NRDA, injury determination, injury quantification and damage determination. The purpose of the first phase, the injury determination phase, is to establish injury to one or more natural resources. As defined in the DOI, NRDA regulations at 43 CFR 11.14(v), injury means "a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance, or exposure to a product of reactions resulting from the discharge of oil or release of a hazardous substance. . ." The DOI regulations, at 43 CFR 11.62, define a number of specific injuries to natural resources. These specific injury definitions include two that are related to the effects of chemical concentration on human use and consumption of fish or wildlife. This report documents the effects of chemical concentration on human use

and consumption of fish or wildlife from the Ottawa River. In pertinent part, 43 CFR 11.62 states that: “injury to a biological resource has resulted from the ...release of a hazardous substance if concentration of the substance is sufficient to...”

- exceed levels for which an appropriate State health agency has issued directives to limit or ban consumption of such organism [43 C.F.R. § 11.62 (f)(1)(iii)]
- exceed action or tolerance levels established under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. 342, in edible portions of organisms [43 C.F.R. § 11.62 (f)(1)(ii)]

1.1 Purpose

This report describes the history and the basis for the fish and snapping turtle consumption advisory in the Ottawa River resulting from the accumulation of polychlorinated biphenyls (PCBs) in fish tissue, turtle tissue and turtle eggs. The purpose of this report is to: 1) document the issuance of fish and turtle consumption advisories by the Ohio Department of Health, Ohio EPA or other authorized agencies, and 2) document exceedance of U.S. Food and Drug Administration (FDA) tolerances and/or action limits in edible tissues of fish and how these advisories and exceedances of action/tolerance levels are used in a NRDA. This report does not present data and/or information related to the releases of PCBs, transport/exposure pathways, or biological/toxicological effects; that information is being or will be addressed in other NRDA reports.

2.0 Fish Consumption Advisories for Ohio

Fish consumption advisories have been issued for various waters in Ohio since the early 1980s. Data are collected and analyzed, and advice issued through a cooperative program among Ohio Department of Health (ODH), Ohio EPA, and Ohio Department of Natural Resources (ODNR). The fish tissue monitoring program was managed by ODH until 2002, at which time the program was assigned to the Ohio EPA, Division of Surface Water (DSW) (Ohio Environmental Protection Agency 2003). Fish tissue concentrations change slowly in response to changes in sediment and water column concentration. Therefore, sampling does not occur every year, but is conducted on a revolving schedule, or after a significant change in the watershed, such as the remediation of contaminated sediments.

From 1983 through 1993 ODH issued advisories based on comparisons of fish tissue data with U. S. Food and Drug Administration tolerances and action levels for PCBs and other hazardous substances. In 1994 Ohio adopted the “Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory” (Great Lakes Sport Fish Advisory Task Force 1993) for fish consumption advisories resulting from PCB contamination. ODH also has, and continues to issue advisories based on State derived trigger concentrations and “best

professional judgment” when multiple hazardous substances are present below trigger values for individual hazardous substances.

2.1 Great Lakes Sport Fish Advisory Task Force Protocol

The State of Ohio adopted the “Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory” (September 1993) on 10 January 1994, developed by the Great Lakes Sport Fish Advisory Task Force for the Great Lakes’ Governors. Five advisory levels are used in Ohio’s risk assessment procedure for fish consumption advice for each chemical evaluated. The five consumption advisory categories are:

- 1) Unrestricted
- 2) One meal/week
- 3) One meal/month
- 4) 6 meals/year
- 5) No Consumption

The Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory and procedure uses a Total Polychlorinated Biphenyl (PCB) Health Protection Value (HPV) to protect sensitive populations, defined as women of childbearing age and children fifteen years old and younger, against reproductive health effects (Ohio EPA 2008).

The Protocol uses a Health Protection Value (HPV) of 0.050 ug (microgram) PCBs/kg body weight/day. This corresponds to a daily intake of 3.5 ug PCBs per day for a 70 Kg (154 lb) human. A 50 percent reduction in PCB concentration (due to trimming and cooking) and a meal size of 227 g (1/2 lb) is assumed. Species and sizes of fish are assigned to one of the five advisory categories based on their PCB concentration as described in Table 1 (Great Lakes Sport Fish Advisory Task Force 2008).

Table 1. Fish Advisory Categories and Corresponding Ranges of PCB Concentration in Fish

Consumption Advice	Unrestricted	1 meal/week	1 meal/month	6 meals/year	Do not eat
PCB (mg/kg)	<0.050	0.05 to 0.220	0.220 to 1.0	1.0 to 1.999	>1.999

3.0 Ottawa River Consumption Advisories

3.1 Fish Consumption Advisory from 1991-2009

Ohio EPA collected subsequent fish tissue samples from the Ottawa River in 1993, 1995, and 1996. Those samples substantiated the Do Not Eat advisory. The initial fish consumption advisory for the Ottawa River (Toledo) was issued in 1991 by ODH. The advisory has remained the same through the present time. The advisory is “Do Not Eat”

for all species of fish from Interstate 475 north of Wildwood Preserve, Toledo to Maumee Bay, Lake Erie due to PCB contamination. A copy of Ohio EPA's report upon which the advisories are based can be found at:

<http://www.epa.state.oh.us/dsw/documents/ottawa91.pdf>

Figure 1. Fish and Contact Advisory Sign Located on the Ottawa River



3.2 Snapping Turtle Consumption Advisory

Ohio EPA in 2002 initiated a consumption advisory for snapping turtles in the Ottawa River waters. This advisory was modified to “Do Not Eat” in 2003 for all waters of the Ottawa River due to PCB contamination found in fatty tissue and turtle eggs. In addition, snapping turtle body fat and eggs showed elevated total PCBs concentrations. On a wet-weight basis, mean concentrations ranged from 2.1 to 18 mg/kg in fat and 0.2 to 3.7 mg/kg in eggs (Dabrowska *et. al.* 2006).¹

4.0 U.S. Food and Drug Administration Action and Tolerance Levels

The Federal Food, Drug, and Cosmetic Act (FFDCA) (21 U.S.C. 301 *et seq.*) authorizes the FDA to protect the public health by regulating food shipped via interstate commerce. Sections 402 and 406 of the Act prohibit food from entering interstate commerce, if the food contains any added poisonous or deleterious substance that is unsafe, unless the presence of the poisonous or deleterious substances cannot be avoided. A primary purpose of Section 406 is to authorize the FDA to regulate levels of environmental contaminants that enter food. Under this section, the FDA may limit the quantities of such substances by using formal rulemaking to set legal limits called tolerances. The tolerances are set at the level necessary to protect the public health, taking into account the extent to which the substance is unavoidable and the ways that a consumer may be affected by deleterious substances (44 FR 38330).

Biological resources, including fishery resources, are injured if they contain concentrations of a hazardous substance sufficient to exceed action levels or tolerances established by the FDA [43 CFR § 11.62 (f)(1)(ii)]. The FDA established a tolerance of 5 mg/kg for total PCBs in fish and shellfish in 1973. New toxicity data for PCBs, as well as an evaluation of levels of PCB contamination in food, led the FDA to propose reducing the tolerance level for PCBs from 5 mg/kg to 2 mg/kg in fish and shellfish (42 FR 17487). In 1984, the reduced PCB tolerance level of 2 mg/kg took effect [21 CFR 109.30 (a)(7)].

4.1 Exceedance of the U.S. FDA PCB tolerance in Fish Tissue from the Ottawa River

Fish tissue PCB data from the Ottawa River (OEPA 1991, table 3) demonstrate that, in 1986 and 1990, common carp, goldfish, largemouth bass and freshwater drum exceeded the 2 ppm (mg/kg) PCB tolerance level that took effect in 1984 (Table 2). Additional fish tissue data collected from the lower 9 miles of the Ottawa River in 2007 (Ohio EPA

¹ In 2002 as part of its Ohio Sport Fish Consumption Advisory, ODH stated that turtle meat could be eaten from the Ottawa River. The basis for this statement was that contaminant concentrations were low in turtle meat because of the low fat content. However, elevated contaminant concentrations in the fat bodies, livers and eggs of the same turtles prompted Ohio EPA to issue its consumption advisory.

2007) demonstrates that fish tissue from common carp and pumpkinseed sunfish (whole body) continue to exceed the 2ppm (mg/kg) (wet weight) PCB tolerance level (Table 3).

Table 2. Summary of PCB contamination in the Ottawa River 1990

<u>Sample River Mile (Location)</u>	<u>Fish Type</u>	<u>Total PCB's (mg/kg) wet weight</u>
FISH FILLETS		
Ottawa River		
7.2 (Detroit Ave.)	Common carp	17.277
7.2 (Detroit Ave.)	Goldfish	3.227
5.2 (Adj. Dura Landfill)	Channel catfish	5.515
5.2 (Adj. Dura Landfill)	Common carp	65.075
2.9 (Suder Ave.)	Largemouth bass	2.041
2.9 (Suder Ave.)	Freshwater drum	2.581
1.0 (Dst. Summit St.)	Largemouth bass	0.803
1.0 (Dst. Summit St.)	Pumpkinseed	0.767
FISH - WHOLE BODY		
Ottawa River		
9.8 (E. Circle Lane)	White sucker	2.497
7.2 (Detroit Ave.)	Common carp	20.244
5.2 (Adj. Dura Landfill)	Common carp	84.177
2.9 (Suder Ave.)	Common carp	8.398
1.0 (Dst. Summit St.)	Common carp	9.255

Table 3. Summary of tissue contaminants detected in fillet and whole body fish collected from the Ottawa River, 2007. PCB values above the Ohio 'Do Not Eat' level are highlighted in red. NA= not analyzed. All values are in mg/kg wet weight.

	RM 8.6	RM 8.0	RM 6.8	RM 6.2	RM 5.8	RM 5.5	RM 5.3	RM 5.0	RM 4.6	RM 3.5
Parameter	Common Carp (fillet)									
PCB-1248	3.60	1.90	1.70	1.10	2.50	3.90	2.10	3.00	1.10	2.40
PCB-1254	1.60	<1.00	0.92	0.57	1.20	1.60	1.10	1.30	0.50	1.00
PCB-1260	<1.00	<1.00	0.61	0.40	0.52	<1.00	<0.50	<1.00	<0.20	<0.50
Total PCBs (calculated)	5.20	1.90	3.23	2.07	4.22	5.50	3.20	4.30	1.60	3.40
1% Lipid Normalized PCBs	0.94	0.50	0.92	0.83	1.05	0.71	1.14	1.48	0.84	0.85
delta-BHC	NA	NA	NA	NA	61	<25	<15	<25	NA	NA
4,4'-DDD	NA	NA	NA	NA	93	110	64	92	NA	NA
4,4'-DDE	NA	NA	NA	NA	140	150	100	130	NA	NA
4,4'-DDT	NA	NA	NA	NA	48	55	42	48	NA	NA
Percent Lipids	5.5	3.8	3.5	2.5	4.0	7.7	2.8	2.9	1.9	4.0
	Pumpkinseed Sunfish (whole body)									
PCB-1242	<0.28	<0.45	<0.35	<0.49	<1.20	1.60	1.60	<1.30	<1.20	<0.83
PCB-1248	0.48	0.63	0.65	0.87	1.20	<1.20	<1.20	1.50	1.40	1.30
PCB-1254	0.29	0.36	0.36	0.47	0.66	0.68	0.58	0.69	0.67	0.60
Total PCBs (calculated)	0.77	0.99	1.01	1.34	1.86	2.28	2.18	2.19	2.07	1.90
1% Lipid Normalized PCBs	0.33	0.35	0.50	0.79	0.98	1.14	1.09	1.15	1.22	0.59
4,4'-DDD	NA	NA	NA	NA	38	54	42	43	NA	NA
4,4'-DDE	NA	NA	NA	NA	82	66	57	67	NA	NA
4,4'-DDT	NA	NA	NA	NA	10	28	20	7.9	NA	NA
Dieldrin	NA	NA	NA	NA	13	21	20	15	NA	NA
Endrin	NA	NA	NA	NA	<5.0	<5.0	<5.0	5.4	NA	NA
Endrin aldehyde	NA	NA	NA	NA	5.0	<5.0	<5.0	<5.0	NA	NA
Heptachlor	NA	NA	NA	NA	5.2	6.8	5.6	5.9	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	7.7	7.6	6.2	6.5	NA	NA
Percent Lipids	2.3	2.8	2.0	1.7	1.9	2.0	2.0	1.9	1.7	3.2

5.0 Summary of Injury Determination and Findings

Data presented in this report demonstrate that multiple species of fish have been injured because of: (1) PCB levels for which Ohio has issued directives to limit or ban consumption [43 CFR 11.62(f)(1)(iii)]; and (2) Exceedances of tolerances for PCBs established by the FDA under the Food, Drug and Cosmetic Act [43 CFR 11.62(f)(1)(ii)]. In addition to injuries to fish, snapping turtles have a directive to limit or ban consumption [43 CFR 11.62(f)(1)(iii)].

5.1 Injury Determination – Biological Consumption Advisories

Biological resources have been injured if they contain concentrations of a hazardous substance sufficient to exceed levels for which an appropriate state health agency has issued directives to limit or ban consumption of such organisms [43 CFR § 11.62 (f)(1)(iii)]. The State of Ohio has issued a fish consumption advisory in 1991 and a snapping turtle consumption advisory in 2002. Neither of these advisories has been lifted since their placement. Ohio advised against consumption of all species of fish and snapping turtles because of contamination with PCBs. Therefore, injuries pursuant to 43 CFR § 11.62 (f)(1)(iii) are document for the Ottawa River Assessment Area from 1991 through the present day.

5.2 Injury Determination – Exceedance of FDA Tolerance for PCBs

Biological resources have been injured if they contain concentrations of a hazardous substance sufficient to exceed action or tolerance levels established under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. 342, in edible portions of organisms [43 C.F.R. § 11.62 (f)(1)(ii)]. Fish tissue residue data collected by the Ohio Environmental Protection Agency demonstrate exceedance of the applicable PCB tolerances by common carp and goldfish in 1986, common carp in 1994 and bluegill sunfish in 2002. Therefore, injuries pursuant to 43 CFR 11.62(f)(1)(ii) are documented for the Ottawa River Area between 1986 and 2007.

References:

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