DETROIT RIVER CANADIAN CLEANUP
www.DetroitRiver.ca

March 2007

Report Card #1 -
Fish Consumption Advisories

DRCC Public Advisory Council Report Card

This document is a summary of a larger report of the same name. Please contact the DRCC if you would like a copy of the complete report.

Under the *Great Lakes Water Quality Agreement* (GLWQA), the governments of Canada and the United States and the International Joint Commission identified the Detroit River as one of 44 "Areas of Concern" or "AOCs". AOCs are locations where the quality of the aquatic ecosystem is poor enough to cause an impairment of one or more listed "beneficial uses" of the ecosystem. The GLWQA identifies 14 Beneficial Use Impairments (BUIs) that must be considered when assessing the status of each Area of Concern. Fish consumption advisories are one of the listed BUIs in the Detroit River.

Fish consumption represents the greatest exposure pathway for bioaccumulative contaminants in humans. In the Great Lakes region, chemical body burdens of at-risk populations (sport anglers, members of First Nations, pregnant women, fetuses, children, and lower-income urban residents) are 2-4 times greater than in the general population. In order to minimize the potential risks posed by fish contamination, it is important for fish consumers to be aware of consumption advisories and eat only the recommended number and species of fish. Currently, no consumption guidelines exist in Canada for wildlife such as wild ducks or game birds.

In order to alert the public to the potential risks of fish consumption, the Sport Fish Contaminant Monitoring Program was initiated in Ontario in 1976. In 1977, the first edition of the "Guide to Eating Ontario Sport Fish" was distributed to the public. A new version of the Guide is now published every other year and distributed by government offices as well as at beer and liquor stores. The guides are printed in English and French, and a two-page paper on how to use the Guide is prepared in nineteen other languages. However, although the Guide has been published biennially for 25 years, many consumers of Great Lakes fish are still unaware of the Guide or its information. A study in the mid-1990s found that only 27% of individuals interviewed who were fishing along the Detroit River claimed to use the Guide. Another survey in 2004 found that although 81.6% of respondents were aware that mercury makes fish unsafe to eat, only 39.1% of respondents were aware of the guidelines that exist for Detroit River fish consumption.

Inside this report:

Fish Consumption Advisories in the Detroit River

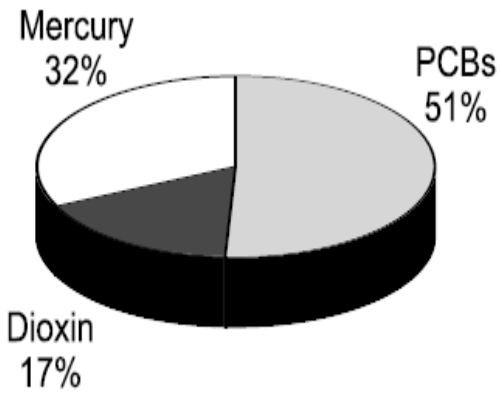
According to the Ontario guidelines, the strictest fish consumption recommendations in the Detroit River are for carp. In the Lower Detroit River, it is recommended that no carp should be consumed by anyone (general or sensitive population). In the Upper Detroit River, no one should consume carp larger than 45 cm (18 inches) in length. White bass restrictions are also fairly strict: white bass larger than 30 cm (12 inches) caught anywhere in the river should not be consumed by anyone (general or sensitive populations).

There are several species that should not be consumed at all by those within the sensitive population once the fish reach a certain size. For example, walleye larger than 60 cm (24 inches) and channel catfish larger than 30 cm (12 inches) caught anywhere in the river should not be consumed by the sensitive population. In the Upper Detroit River, the sensitive population should not consume rock bass larger than 20 cm (8 inches) or freshwater drum larger than 45 cm (18 inches).

It is difficult to compare the Michigan fish consumption restrictions for the Detroit River with the Ontario restrictions because the two regions do not always include the same fish species in their consumption tables. In general, the Michigan fish consumption restrictions are less strict than the Ontario restrictions.

Trends Over Time

A comparison of data from 1991 with those from 2000/2001 showed that PCB concentrations in various types of fish from the Detroit River did not change markedly or consistently during that decade. As well, maximum PCB concentrations in carp and forage fish collected in 1999-2001 were similar to PCB concentrations observed in the same species in 1985. These results indicate that the level of contamination of fish in the Detroit River has not been noticeably reduced over time.



Percentage of consumption restrictions caused by various contaminants in the Huron-Erie Corridor

Chemicals Responsible for Advisories

Although sport fish are tested for many different contaminants such as PCBs, pesticides, and heavy metals, there are a few chemicals that are most often responsible for fish consumption restrictions. In fish from the Lake Huron to Lake Erie Corridor, most of the Canadian consumption restrictions (51%) are due to polychlorinated biphenyls (PCBs), while mercury is responsible for 32% of restrictions, and dioxin causes 17% of restrictions.

PCBs are human-made chemicals which were used as lubricants and cooling fluids in industrial equipment because they are non-flammable and very stable. However, their chemical stability also means that when they are released into the environment, they do not break down easily. PCBs were also found to be toxic and bioaccumulative (i.e., PCB concentrations in organisms tend to be higher than concentrations in the surrounding environment). Because PCBs are persistent, bioaccumulative, and toxic, they were banned in the U.S. In Canada, their production is banned, and their disposal and storage are strictly regulated. Even though PCBs are no longer produced in either country, these chemicals still enter the environment from sources such as leaking chemical dumps, storage facilities, and contaminated sediments.

MERCURY is a naturally-occurring metal; however most mercury in the environment is due to anthropogenic (human-caused) sources. Mercury causes serious neurological problems, particularly in developing fetuses. The main pathway of mercury into aquatic ecosystems is now from the atmosphere. The primary sources of emissions are coal-fired power plants and waste incineration.

DIOXINS can be formed by natural processes such as forest fires and volcanos. However, the main sources of dioxins in the environment are industrial. Like PCBs and mercury, dioxins are persistent, bioaccumulative, and toxic. Thus, various countries have taken steps to control the levels of dioxins released during industrial processes, although there are still releases taking place, especially as a result of pulp and paper production.

Sources of Contamination in the Detroit River

Point Sources

Most of the chemicals responsible for fish consumption advisories in the Detroit River originate (or originated) on the U.S. side of the river. Although the vast majority of industrial activity along the Detroit River is on the U.S. side, which continues to report discharges of PCBs, mercury and dioxins, there are also Canadian direct discharges into the River. In addition to the municipal sewage treatment plants in Windsor and Amherstburg, there are currently three government-permitted industrial dischargers: Ford of Canada, Canada Salt Company, and General Chemical. However, none of these industries report discharges of PCBs, and only General Chemical reports any discharges of mercury. General Chemical has ceased operations, but its waste site is under a monitoring order from the Ontario Ministry of the Environment.

At the time of the last assessment for both PCBs and mercury, the largest point source is the Detroit Wastewater Treatment Plant. For PCBs, the second largest point source is the Wayne County-Wyandotte Wastewater Treatment Plant, whereas for mercury, the second largest point source is National Steel.

Non-Point Sources

Non-point sources of contamination are those that are diffuse and cannot easily be attributed to output from a specific location, and therefore it is very difficult to quantify how much contamination originates from these sources. Non-point source (NPS) pollution is often due to rainfall or snowmelt which carries chemicals from surrounding land into waterways. Examples of NPS contaminants include fertilizers and pesticides from lawns and agricultural lands, and oil and toxic chemicals from urban runoff. Atmospheric deposition of contaminants into the water is also considered NPS pollution, although the extent of these deposits in the river is unknown. Leaking chemical dumps on the US side of the river are another non-point source of contamination. On the Canadian side, there is evidence that there is an ongoing source of mercury and/or PCBs in Turkey Creek. Government scientists have worked with the DRCC and others to attempt to track down the sources of these contaminants, but the findings are not yet publicly available.

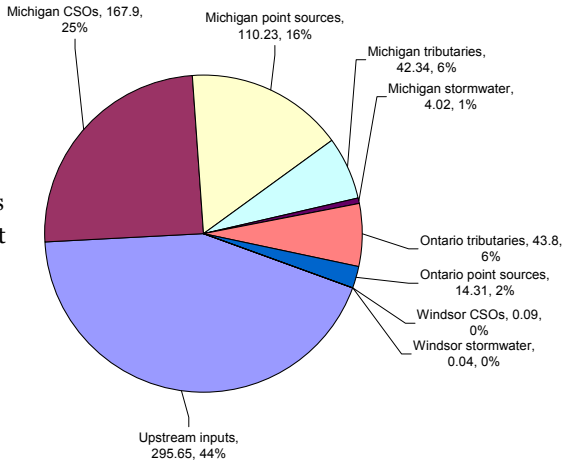
Combined Sewer Overflows

In the past, sewer systems were built to collect stormwater runoff and sanitary sewage in the same pipe. When the weather is dry, these combined sewer systems transport wastewater to the sewage treatment plant. However, during storms or periods of rapid snowmelt, the volume of water entering a combined sewer system can exceed the capacity of the sewer system or treatment plant. In order to prevent sewage from backing up and flooding basements, combined sewer systems are designed to overflow during storm events and discharge excess wastewater directly to nearby streams, rivers, or lakes. These "combined sewer overflows" (CSOs) are hazardous because they contain untreated human and industrial waste, toxic materials, and other objectionable debris.

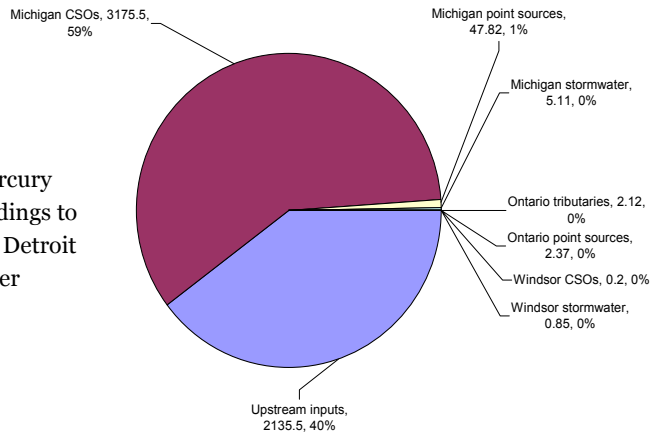
Sediments

There are several areas of the Detroit River in which sediments contain high levels of mercury. Analyses of the data using statistical models show that the high PCB concentrations in fish are due to contamination of sediments, not water. In particular, contaminated sediments in the lower U.S. reaches of the Detroit River contribute most heavily to restrictions on fish consumption in the Detroit River. However, even if contaminated sediments in the Detroit River were remediated, fish consumption advisories (based on the most stringent guideline value of 50 µg/kg total PCB) would not be completely eliminated because PCB concentrations in water coming from Lake St. Clair are high enough that some fish would still attain hazardous levels of PCBs through their gills from water alone.

PCB loadings to the Detroit River



Mercury loadings to the Detroit River



These graphs were compiled in 1991 using data collected between 1979 and 1990. It is the best overall summary of comparative loadings from both Michigan and Ontario sources. However, because the data are not current, they must be interpreted with caution. An updated summary should be undertaken to reflect current patterns of loadings.

Conclusions: Assessment of Progress Towards Restoration

Of all of the Beneficial Use Impairments (BUIs) in the Detroit River Area of Concern, BUI #1, Restrictions on Fish and Wildlife Consumption, will be one of the most difficult to resolve. It has been designated by the DRCC as one of the "primary" BUIs, which means that it is necessary to address that impairment in order to make progress on other BUIs.

More than $120 million has been spent on sediment remediation projects in the Detroit River, and over $1 billion has been spent on reducing discharges from combined sewer overflows. However, a comparison of data from 1991 and 2000/2001 showed that PCB concentrations in various types of fish from the Detroit River did not change during that decade. As well, maximum PCB concentrations in carp and forage fish collected in 1999-2001 were similar to PCB concentrations observed in the same species in 1985. These results indicate that the level of contamination of fish in the Detroit River has not been noticeably reduced over time. There are many aspects of fish contamination that are not well understood, such as the contribution of sediment contamination hot spots to fish consumption advisories and the relative importance of point sources versus non-point sources of pollution.

On the Canadian side of the River, both the City of Windsor and the Town of Amherstburg are upgrading their sewage treatment plants. The Windsor upgrade will be complete in 2007, and the Amherstburg upgrade should be complete within the next several years. Although these upgrades are not likely to substantially impact fish consumption advisories because their loadings are greatly exceeded by those from the U.S. side, they are important to the overall health of the river.

Research and modelling efforts must be continued in order to determine the relative importance of various sources of PCBs and mercury to the Detroit River. An understanding of the sources and movement of contaminants within the river is necessary to ensure that remediation funds are spent effectively.

Recommendations

1) Identify the causes of fish consumption advisories in the Detroit River by determining the relative role of sediment contamination (legacy contamination and hot spots) and water contamination in various zones of the river.

2) For those hot spots that are shown to be contributing most heavily to fish consumption advisories, source trackdown programs must be implemented to determine the causes of the contamination.

3) Revise sewer use by-laws and adopt pre-treatment standards .

4) Eliminate existing non-point sources of mercury and PCBs (e.g. leaking chemical waste dumps, old industrial sites, etc.).

5) Remove and dispose of sediments from the most highly contaminated areas of the river after active sources have been eliminated (to prevent re-contamination).

6) Continue to implement CSO control measures on both sides of the river. A key Canadian priority should be the construction of a Retention and Treatment Basin in Windsor.

7) Improve contaminant discharge tracking programs so that accurate loadings estimates can be made.

8) Ensure that the public is aware of the potential risks associated with fish consumption by making information easily accessible and understandable.

Detroit River Canadian Cleanup

Suite 311
360 Fairview Avenue West
Essex, Ontario N8M 1Y6

Phone: 519-982-DRCC (3722)
Alt phone: 776-5209, ext 356
E-mail: postmaster@detroitriver.ca

www.detroitriver.ca

The DRCC PAC gratefully acknowledges the support of Environment Canada for the research and production of this report.