

## INDICATOR: OIL POLLUTION OF THE DETROIT AND ROUGE RIVERS

### Background

Industrial pollution of the Detroit and Rouge rivers dates back to the end of the nineteenth century. However, the problem did not become a priority until the late 1940s when oil pollution resulted in massive winter duck kills (Hartig and Stafford 2003). Historically, the lower half of the Detroit River froze from bank-to-bank during the winter. The southward spread of industry resulted in effluent along the western banks of the river which caused it to warm in pockets, leaving small patches of open water by the mid-1930s (Miller and Whitlock 1948). The lower half of the river is distinct from the upper half in that it is divided and separated with shoals and islands, which provide an increased abundance of food for waterfowl (Hartig and Stafford 2003). The combination of open water and food availability soon provided resting and feeding grounds for migrant waterfowl, which began to spend most or all of winter in these areas. However, given their proximity to the industries, the open patches of water also contained high concentrations of oil. The result was waterfowl mortality which occurred in varying degrees beginning in the mid-1930s. Oil spills continue to occur, including the largest oil spill in the Great Lakes in the last twelve years that occurred in 2002 (Figure 1).



Figure 1. Oil spill on the Rouge River in 2002  
(Photo credit: U.S. Coast Guard, Sector Detroit).

Waterfowl are affected by oil in a number of ways. External feather oiling causes loss of buoyancy which can result in drowning (Michigan Department of Natural Resources 2005). In addition, feather insulating properties are lost when feathers become matted (Figure 2), which can result in death due to exposure of the skin to cold water (Hartig and Stafford 2003). Reduced swimming or flying mobility may result in starvation. Ingestion of oil can result in internal pathological changes, causing sickness and/or mortality. If eggs are contaminated, the result is decreased hatchability and increased embryonic mortality (Michigan Department of Natural Resources 2005).



Figure 2. Oil-soaked ducks from the lower Detroit River brought to the Michigan Capitol to protest oil pollution in 1948 (Photo credit: State Archives of Michigan).

In years of heavy ice cover, the impact of oil on waterfowl was magnified due to limited availability of open water (Hartig and Stafford 2003). In 1948 the situation climaxed when approximately 11,000 ducks were killed due to oil pollution in the Detroit River (Table 1). Sportsmen were outraged and collected the oil-soaked waterfowl and put them on the lawn of the State Capitol building in Lansing, in hopes that policymakers would address the overlooked issue (Cowles 1975). This event marked the commencement of industrial pollution control programs in Michigan.

*Table 1. Waterfowl mortality in the Detroit River due primarily to oil pollution (Hartig and Stifler 1979; U.S. Department of Health, Education, and Welfare 1962).*

Year	Estimated Waterfowl Mortality
1948	11,000
1949	76
1950	871
1951	250
1952	1,000
1953	345
1954	238
1955	2,600
1956	191
1960	12,000
1967	5,400

## Status and Trends

A series of relevant legislative events followed the massive 1948 winter duck kill. In 1949, the Michigan legislature amended the water pollution control statute to establish the Michigan Water Resources Commission (Cowles 1975). In addition, the definition of pollution was broadened and state approval was required for all new uses of state waters. However, oil slicks were still reported on the Detroit River approximately one-third of the time during winter and spring between 1950 and 1955 by the U.S. Department of Health, Education, and Welfare (1962).

Other sources of oil pollution in the Detroit River not associated with industrial activities were soon recognized. Some of these include municipal wastewater treatment plants, government installations, combined sewer overflows, and shipping (International Joint Commission 1968). As these sources were identified, pollution control efforts became increasingly effective. According to the U.S. Department of Health, Education, and Welfare (1962), there was a 97.5% reduction in oil discharges to the Detroit River between the late 1940s and early 1960s (Figure 3). The Michigan Department of Natural Resources (1977) reported that there was an additional 80% decrease in point source discharges of oil between 1963 and 1976. As would be predicted, winter duck kills associated with oil pollution also decreased dramatically.

Nevertheless, recent data collected by the U.S. Coast Guard National Response Center (2005) indicate that there are still years in which total volume of oil and other petroleum products spilled in the Detroit and Rouge rivers is comparable to estimated oil releases in 1961 (Figure 4). In April 2002, a 378,541 liter (100,000 gallon) oil spill occurred in the

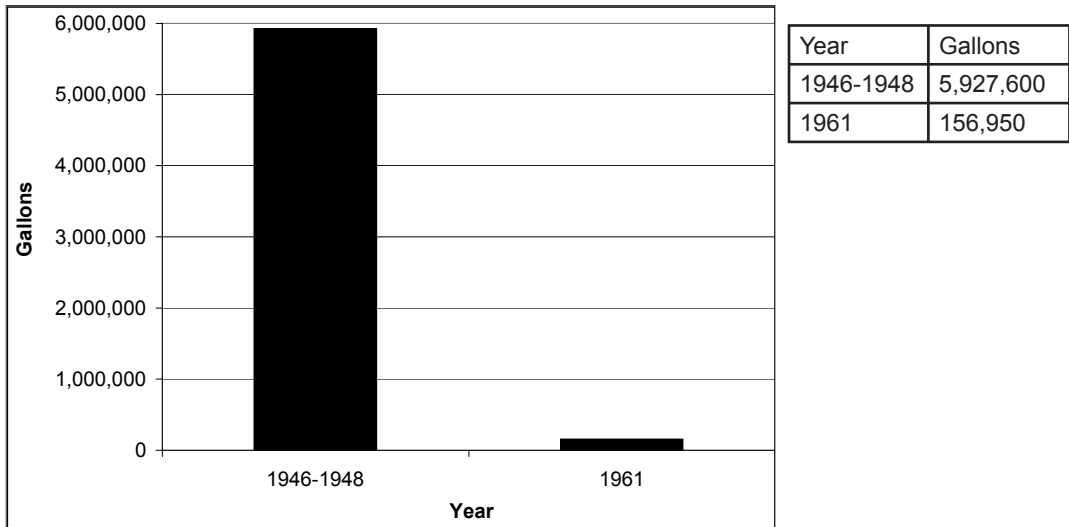


Figure 3. Total volume of oil/other petroleum products spilled in the Detroit River in gallons per year (1946-1948 and 1961). Note: One gallon = 3.79 liters.

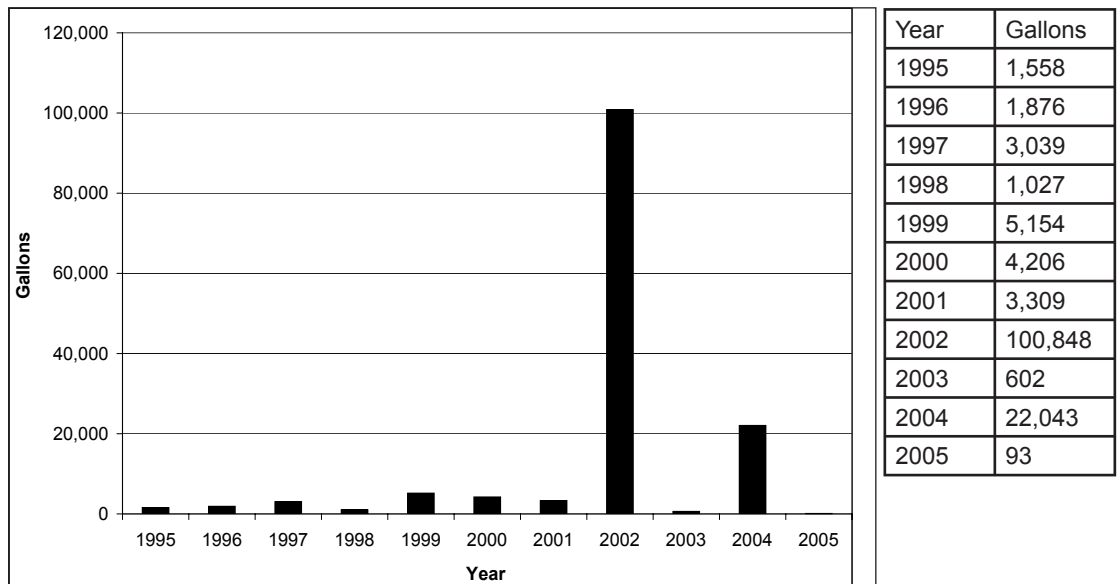


Figure 4. Total volume of oil/other petroleum products spilled in the Detroit River in gallons per year (1995-2005). Note: One gallon = 3.79 liters.

Rouge River. The U.S. Coast Guard and other governmental and industrial partners undertook a \$7.5 million cleanup on 27 miles of the lower Rouge River and U.S. and Canadian sides of the Detroit River (Hartig and Stafford 2003). Ten ducks and geese died as a result of the oil pollution. While this number may seem insignificant to years past, it reminds us that oil pollution continues to be a threat to waterfowl and other wildlife.

It is important to note that the data presented in Figure 4 merely reflect reported incidents. In addition, there are undoubtedly many unreported spills and releases through combined sewer overflow events that are not accounted for in these data. These figures are therefore conservative. Figure 5 shows that 16-41 spills of unknown volume have occurred each year since 1995. Although these spills are probably small in volume,

they are still a concern because of their frequency. Figure 6 demonstrates that more sheens were reported in some years than were total spills reported with volume, further documenting the ongoing release of oil of unknown volume into the Rouge and Detroit rivers.

Oil pollution continues to be an important issue because of combined sewer overflow events and industrial releases. Figure 7 shows that since 1995, 17-40% of all the reported oil spills in Michigan occurred in the Detroit and Rouge rivers.

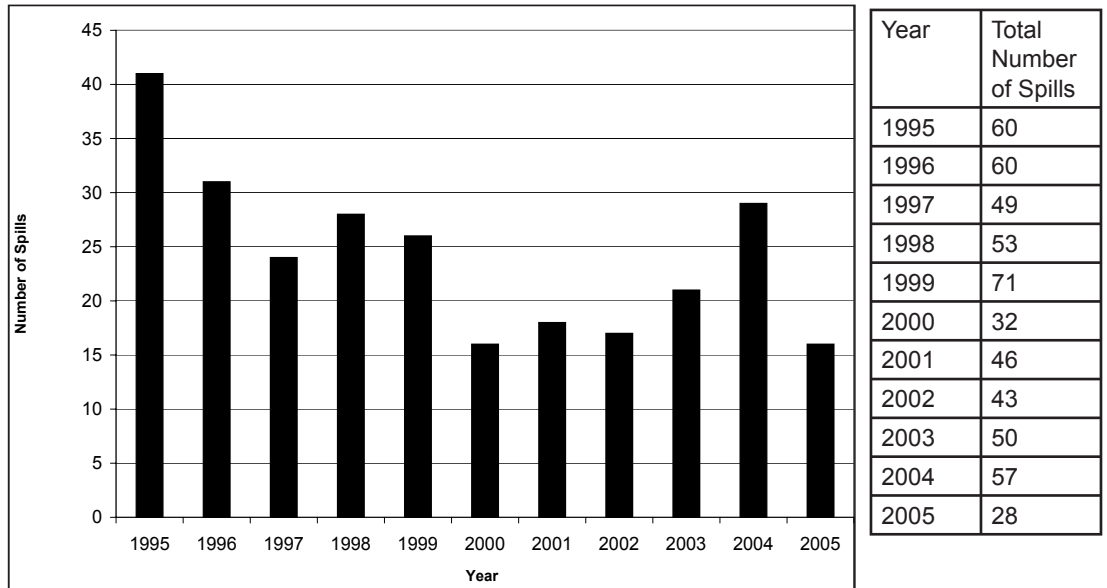


Figure 5. Number of spills with an unknown volume (1995-2005).

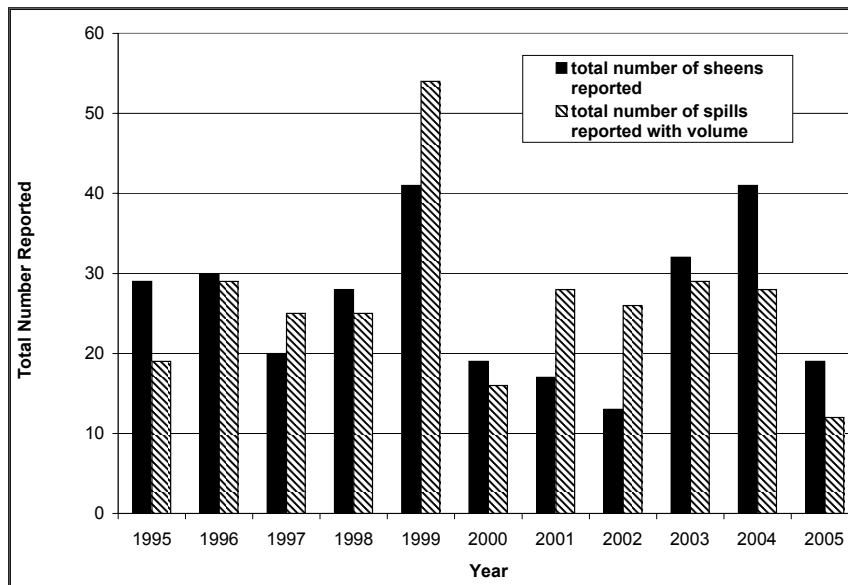


Figure 6. A comparison of total number of spills reported with volume to total number of sheens reported (1995-2005).

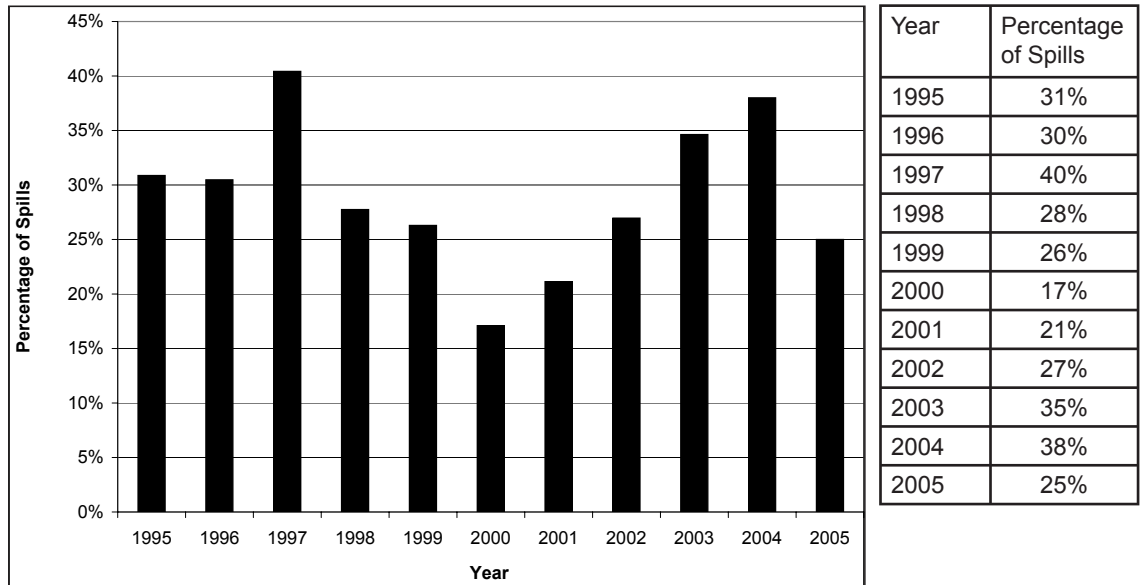


Figure 7. Percentage of Michigan oil spills that occurred in the Detroit and Rouge rivers (1995-2005).

## Management Next Steps

Even with state and federal enforcement programs, there are still frequent occurrences of small oil spills and even occasional large ones. Greater emphasis must be placed on prevention. Key management recommendations follow:

- Lower the allowable limits of oil and other contaminants from industrial contributors to Detroit and other municipal wastewater treatment plants;
- Identify high priority outfalls that empty into the Rouge and Detroit rivers and target them for implementing early warning systems;
- Heighten Michigan Department of Environmental Quality and U.S. Environmental Protection Agency enforcement of industrial pretreatment programs;
- Educate the business community that it shares the responsibility of preventing the problem and becoming a part of the solution to oil pollution;
- Encourage industrial companies pursuing the voluntary ISO 14000 certification to identify oil as a “significant environmental aspect” in order to prevent accidental release of oil; and
- Increase public awareness of the need to prevent pollution, notice changes in water quality, and report problems immediately.

## Research/Monitoring Needs

An early warning system is essential to protecting the Detroit and Rouge rivers from oil pollution and the wildlife that depends on these river ecosystems. It is recommended that governments pursue funding to expand implementation of early warning systems and monitoring devices for water systems.

## References

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### Links for More Information

U.S. Coast Guard National Response Center: <http://www.nrc.uscg.mil/foia.html>

U.S. Environmental Protection Agency: <http://www.epa.gov/oilspill/>

Pollution Emergency Alerting System: <http://www.michigan.gov/deq/0,1607,%207-135-3304-9820-,00.html>

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