



Detroit River

WATERSHED REPORT CARD



MICHIGAN'S DETROIT RIVER: A LEGACY OF BOTH BEAUTY AND POLLUTION

The Detroit River is a 32-mile international strait, situated between Southeast Michigan and Southwest Ontario, linking Lake St. Clair to Lake Erie. With a long history as a transportation corridor, fishery and recreation venue, and a source of drinking water for millions of Metro Detroiters, this water body is known to be the most important economic driver in Southeast Michigan. Over 300 years ago, the first Europeans came through the Detroit River, which was inhabited by the three Anishinaabe nations: the Ojibwe, Ottawa, and Potawatomi. The Detroit River valley was rich in wildlife and natural resources. Because of these resources, water transportation accessibility, and strategic location, the population around what is now the City of Detroit grew rapidly. In the 1940s, with the onset of World War II, industry to support the war effort expanded exponentially along with impacts to the river.

By the late 1960s, the river was suffering severe effects from decades of unregulated industrial and municipal pollution, combined sewer overflows, excessive stormwater runoff, and contaminated sediments. These impacts resulted in fish and wildlife consumption concerns, tainting of fish and wildlife flavor, degradation of fish and wildlife populations, fish tumors and other deformities, bird and animal deformities or reproductive problems, degradation of benthos, restrictions on dredging activities, restriction on drinking water consumption or taste and odor problems, beach closings, degradation of aesthetics, and loss of fish and wildlife habitat. Each of these issues that have impacted the river's water and coastal habitats for many decades are now designated as Beneficial Use Impairments (BUIs) for the Detroit River.



Belle Isle offers a nature escape for urban residents.



Michigan's industrial history has come at a cost to its watersheds.

FORTY YEARS OF STRONG RESTORATION

In 1987, through an amendment to the Great Lakes Water Quality Agreement, the Detroit River was designated an Area of Concern around the Great Lakes. This designation helped form the Detroit River Public Advisory Council (PAC), which is tasked to implement the Detroit River Remedial Action Plan. Since 2005, the Friends of the Detroit River (FDR) has been acting fiduciary for the Detroit River PAC. As part of the implementation, a list of over a dozen habitat restoration projects was created to address two of the river's BUIs—the degradation of fish and wildlife populations and the loss of fish and wildlife habitat.

These projects include construction of fish spawning reefs, removal and reclamation of hardened shorelines, and re-establishment of natural vegetation and wetlands. Rocky shoals around the outer perimeter of some of the river's uninhabited islands were also designed and constructed to reduce erosion and protect and improve existing coastal wetlands' fish and wildlife populations. Progress in adaptation and restoration has improved water quality and will protect valuable natural resources in Detroit for decades to come. Setting and attaining conservation goals is no small feat in a heavily urbanized watershed, but great progress has been made.



THRIVING WILDLIFE IN URBAN LANDSCAPES

Habitat projects on Belle Isle included restoration of Lake Okonoka, the South Fishing Pier, and Blue Heron Lagoon. These projects opened up the Blue Heron Lagoon and Lake Okonoka to the Detroit River, creating a calm spawning and nursery habitat for Great Lakes fish. The restoration covered over 280 acres and provided revitalized habitat for fish, amphibians, migrating birds, and will within a dense urban area.



Belle Isle restorations are great for turtles!



Working to improve water quality and public access to the water.



More fish nurseries mean more food for the birds.

COLLABORATION KEY TO CONSERVATION

With years of urbanization, Ecorse Creek's historical floodplain and wetland areas have been lost, and communities have become overburdened with environmental injustices. As a conduit of potential contaminated sediments, excessive stormwater and combined sewer overflow constituents, there is evidence that Ecorse Creek is impacting the water quality of the Detroit River at its discharge point, and in turn is impacting the ability to remove several of the Detroit Area of Concern Beneficial Use Impairments. FDR engages with communities to identify and implement projects that can be done to improve water quality and wetland habitat, reduce flashy flows and flooding conditions, address public access, and expand recreational opportunities within the Ecorse Creek watershed.

LOWER DETROIT RIVER FISH NURSERIES

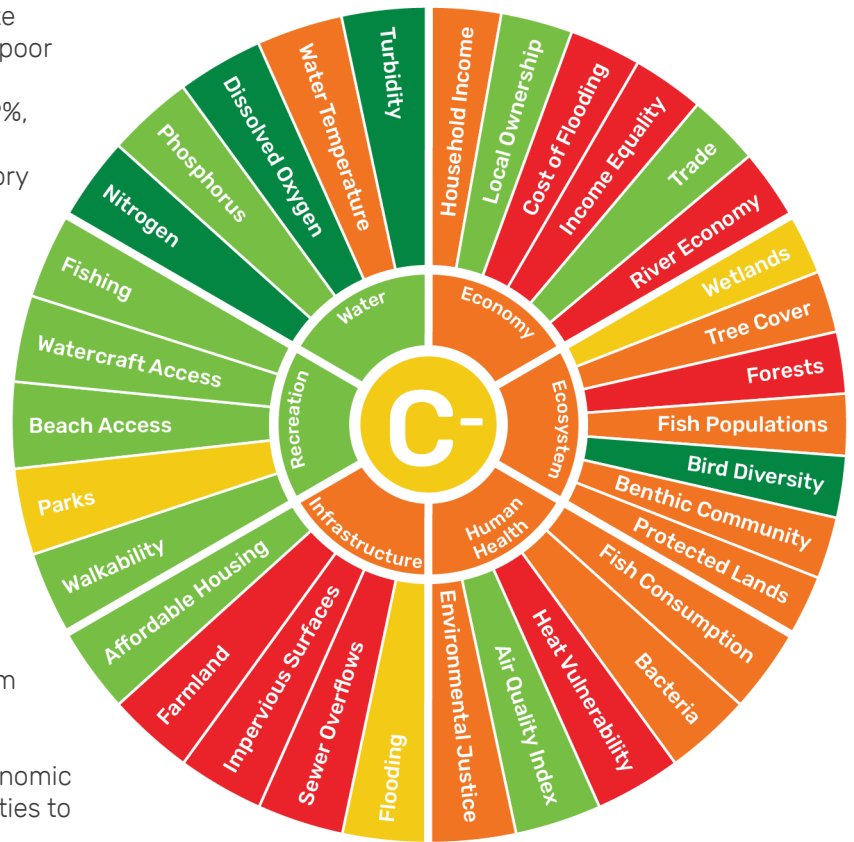
The Celeron Island, Sugar Island, Stony Island, and Hennepin Habitat Restoration projects created 12,740 linear feet of rock shoals that support vegetation and aquatic habitat, while protecting and promoting growth of 146 acres of backwater habitat—a calm, vegetated water zone suitable for fish spawning and nursery activity. Over 70 new habitat structures provide homes for fish, turtles, snakes, and amphibians. Access to the restoration site also greatly benefits birders, anglers, and hunters using the island and surrounding waters for recreation.

THE DETROIT RIVER AND ITS WATERSHED ARE IN MODERATE CONDITION

The Detroit River and its watershed are in moderate condition (44%, C-). Category scores ranged from poor (**Infrastructure**, 22%) to good (**Water**, 74%). The highest-scoring **Water** indicator was **Nitrogen** (99%, A+), while the lowest-scoring indicator was **Water Temperature** (39%, D+). In the **Ecosystem** category (37%, D+), indicator scores ranged from very poor (**Forests**, 0%) to very good (**Bird Diversity**, 92%). **Wetlands** received a moderate score (49%, C).

Human Health was in poor condition (36%, D+). The lowest-scoring indicator in this category was **Heat Vulnerability** (18%), and the highest was **Air Quality** (76%, B+). **Infrastructure** was in poor condition (22%, D-). **Flooding** received a moderate score (45%, C), while **Affordable Housing** received a good score (60%, B-).

Recreation was in good condition (66%, B). The lowest-scoring indicator was **Parks** (48%, C), while the highest-scoring indicator is **Watercraft Access** (79%, B+). **Economy** indicators in this region were poor (29%, D), with scores ranging from very poor (**Cost of Flooding**, 0%) to good (**Local Ownership**, 70%), demonstrating that residents in the watershed need more equitable access to economic opportunities. This would better prepare communities to respond to natural disasters like flooding.

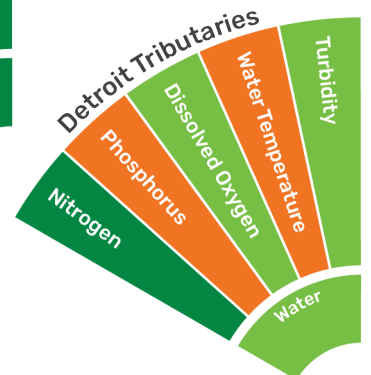
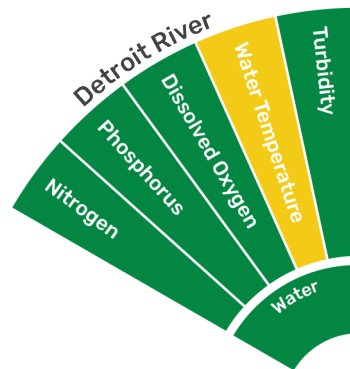


DETROIT WATER QUALITY

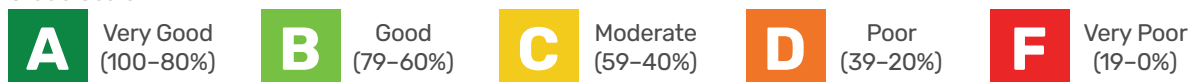
The Detroit River and its watershed were divided into two sub-regions: the Detroit River and Detroit Tributaries. Using sub-regions for the **Water** indicators clarifies the different conditions between these distinct areas. Overall, the Tributaries region is in worse condition than the River because of slow-moving, shallow water in a heavily urbanized area.

Overall, for **Water**, the River had a very good score (86%, A). The Tributaries, on the other hand, had a good score (62%, B-). In the River, **Nitrogen** (99%) and **Phosphorus** (100%) indicators were in very good condition.

Water Temperature (44%) condition was moderate in the river. In the Tributaries, the **Dissolved Oxygen** (68%) indicator was in good condition, but the **Phosphorus** (34%) and **Water Temperature** (34%) indicators both received poor scores. There was insufficient data on total **Nitrogen** and **Turbidity** in the Tributaries, so nitrate-nitrite data and total suspended solids data were used instead.



Grade Scale



REPORT CARD INDICATORS EVALUATE HEALTH

The indicators used in this report card were carefully selected by a group of diverse stakeholders. The thresholds for each indicator are based on existing goals and determined by input from experts. Indicators are separated into six categories; each category score is the average of its component indicator scores. Category scores are averaged together to obtain the overall score for the Detroit River and its watershed. For detailed information on indicator thresholds and scoring, please visit MichiganReportCards.org



WATER

The **Water** category includes five indicators. **Nitrogen** measures the amount of total nitrogen in the water; nitrate-nitrite data were used in the Detroit tributaries. **Phosphorus** measures the amount of total phosphorus in the water. High nutrient levels in a river lead to overgrowth of algae. **Dissolved Oxygen** measures the amount of oxygen dissolved in the water, which is good for animals. **Water Temperature** measures the temperature of the water; fish are sensitive to extreme temperatures. **Turbidity** measures the amount of light that passes through the water; total suspended solids data were used in the Tributaries.



ECONOMY

The **Economy** category includes six indicators. **Household Income** measures the median household incomes in a community, while **Income Equality** measures the economic gap between the richest and poorest in a community. **Local Ownership** measures the locally owned businesses in a community by using company size as a proxy. **Cost of Flooding** measures the financial risk of flooding to a community. **Trade** measures the trade balance per capita, which assesses the amount of money leaving the local economy. **River Economy** measures the jobs and income generated by river-related businesses.



ECOSYSTEM

The **Ecosystem** category includes seven indicators. **Wetlands**, **Tree Cover**, and **Forests** evaluate the change in different types of land cover over time. Loss of natural land cover reduces available habitat, and often increases pollutant runoff. **Fish Populations** evaluates five metrics of the fish community structure based on different species types. **Bird Diversity** calculates the Simpson's Diversity Index for all bird species in the region; a higher number of bird species in an area means that there is adequate habitat available. **Benthic Community** evaluates the health of benthic macroinvertebrate species living on the stream beds, which reflects the overall health of the stream. **Protected Lands** measures the amount of land area protected in the region.



HUMAN HEALTH

The **Human Health** category includes five indicators. **Fish Consumption** assesses the type and severity of fish consumption advisories in the region. **Bacteria** assesses the amount of *E. coli* in the water, a proxy for other bacteria that can cause human illness. **Heat Vulnerability** is an index that assesses a community's vulnerability to climate change-driven heat waves. **Air Quality** assesses air pollutants and includes particulate matter (PM_{2.5}) and ozone (O₃). The **Environmental Justice** indicator is an index developed by the CDC that integrates environmental, social, and health factors to assess the impacts of environmental inequality on human health. Environmental and economic inequality are often linked.



INFRASTRUCTURE

The **Infrastructure** category includes five indicators. **Affordable Housing** measures the amount people spend on housing costs compared to their income. **Farmland** evaluates the change in farmland area over time. Farmland maintains plant-based ground cover but can still contribute to water quality issues. **Impervious Surfaces** measures the amount of surfaces that are impervious to water infiltration in the region. **Sewer Overflows** evaluates the number of overflow events from Sanitary Sewer and Combined Sewer Systems. In the Detroit, there were one Sanitary Sewer and one Combined Sewer that were assessed. **Flooding** evaluates the number of floods reported in a region.



RECREATION

The **Recreation** category includes five indicators. **Fishing** measures the number of fishing licenses that have been issued. **Watercraft Access** measures the number of watercraft launch points along stretches of navigable river. **Beach Access** assesses the time when beaches are closed during the beach season. **Parks** assesses the median park size and percentage of park land in an urban area. **Walkability** assesses if people in urban areas can walk to a park in 10 minutes.

LOOKING FORWARD TO THE FUTURE

The Detroit River watershed is vital to the prosperity of the Southeast Michigan and Southwest Ontario regions. It provides drinking water for many, water for industry, subsistence fishing, and opportunities for recreation. This watershed is an environmental treasure, but it also faces challenges. This report card outlines the current status of the Detroit River watershed; the grade reflects historical and ongoing demands on natural resources. Friends of the Detroit River, who contributed to this project, is actively tackling these challenges in their communities. Their work in water quality monitoring, ecosystem restoration, green infrastructure solutions, and deep community engagement is invaluable to the current and future health of the Detroit River watershed.

Facing the challenges of a dynamic and changing landscape in Southeast Michigan requires responsible management of natural resources. In addition to protecting existing habitats, current and future development must be mindful of environmental concerns that impact people and the environment. Management actions informed by science and the community will serve to protect and promote both humanity and the surrounding landscape, ensuring a sustainable and prosperous future. If you'd like to get involved, head to www.detroitriver.org.



SOCIOENVIRONMENTAL REPORT CARDS ARE EFFECTIVE TOOLS FOR ASSESSMENT

Watershed report cards are powerful tools used around the world to describe ecosystem status, increase public awareness, and inform decision makers. This is the first Detroit River Watershed Report Card, which assesses the condition of the river itself as well as the surrounding watershed. The development of a watershed report card is collaborative. Stakeholders from a variety of backgrounds—scientists, researchers, government officials, business owners, and interested civilians—come together to define what is valuable about an ecosystem and what threatens that value. The resulting report cards are “socioenvironmental” because they contain more than just environmental concerns. A river’s health is about more than its water quality and fish population; rivers have recreational and economic value to the people who live in their watersheds.

ACKNOWLEDGMENTS

This report card is a timely, transparent assessment of the Detroit River and its watershed, which is the traditional lands of the Ojibwe, Ottawa, and Potawatomi nations. This document was produced by the Friends of the Detroit River and the University of Maryland Center for Environmental Science (UMCES). Funding was provided by the Fred A. and Barbara M. Erb Family Foundation. Council Fire, LLC was integral to developing economic indicators and consulted on economic data analysis. Over 100 stakeholders contributed to this project. To learn more about Friends of the Detroit River, visit <https://www.detroitriver.org/>. All photos courtesy of Friends of the Detroit River unless otherwise specified.

Data sources include: Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry; Detroit Bird Alliance/Audubon Society; Federal Emergency Management Agency; Friends of the Detroit; Google Earth Engine; Huron River Watershed Council; Implan; Michigan Department of Environment, Great Lakes, and Energy; Michigan Department of Health and Human Services; Michigan Department of Natural Resources; Multi-Resolution Land Characteristics Consortium; National Oceanic and Atmospheric Administration; National Water Quality Monitoring Council; Trust for Public Land; U.S. Census Bureau; U.S. Environmental Protection Agency; U.S. Geological Survey; and Your Economy. To find more information about the data and analyses used, please refer to the methods report.



Fred A. and Barbara M.
Erb Family Foundation



For more information visit
MichiganReportCards.org