



Rouge River

WATERSHED REPORT CARD



MICHIGAN'S ROUGE RIVER

The Rouge River watershed is part of the Great Lakes Basin, one of the largest freshwater ecosystems in the world. It is the most urbanized watershed in Michigan, home to 1.35 million people in Oakland, Washtenaw, and Wayne counties. Historically, this area was inhabited by the three Anishinaabe nations: the Ojibwe, Ottawa, and Potawatomi. The river has four major branches that cover 127 miles. Most of the watershed is located within a former lake bed, with glacial moraines forming the headwaters of the Main, Upper, and Middle branches. The headwaters of all four branches contain most of the remaining natural land and the healthiest portions of the watershed. Johnson Creek, a cold water tributary to the Middle branch, is home to sensitive aquatic insects, brown trout, and redbreast sunfish, which is endangered in Michigan. Tributaries and upper portions of the Lower Branch are protected by nature preserves and farmland and contain rare insects and fish. The last undeveloped areas of the Middle and Lower headwaters are undergoing massive land development. These changes will greatly impact the river.

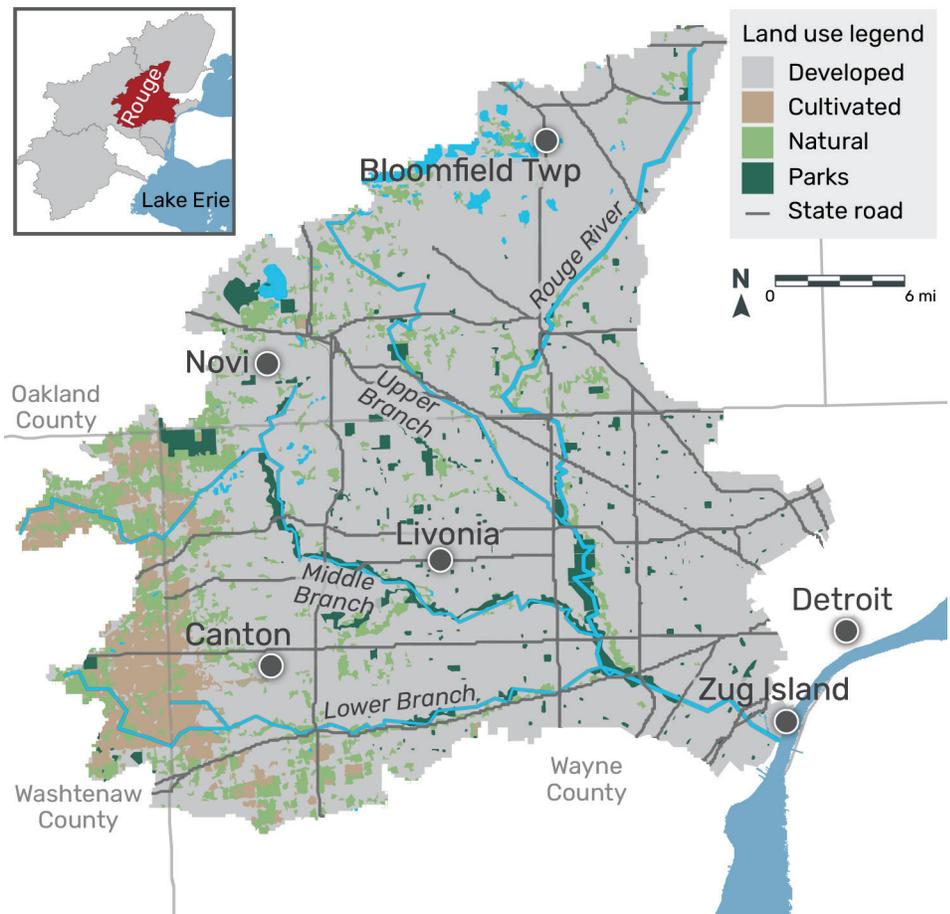


The Upper Branch has the steepest gradient (drops 21 feet/mile) in its major tributaries and is home to many sensitive fish like the redbreast sunfish. The Lower Branch has the lowest gradient (drops 10.9 feet/mile) and low baseflow; dissolved oxygen levels often dropped to zero in the summer until the Ypsilanti Wastewater Treatment Plant began discharging treated effluent into the Lower Branch in 1996. The increased flow (25 million gallons per day) led to better dissolved oxygen levels and a subsequent growing fish population. This allowed for the development of a water trail for paddlers to enjoy the river.

The lower portion of the Rouge River, known as the Main Stem, has long been treated as a working river and has suffered pollution over time. A shortcut channel created Zug Island at the mouth of the river before the beginning of the 19th century; industrial development continued into the twentieth century with the creation of the Ford Rouge Complex. In 1969, the Rouge River ran so thick with oil it caught on fire. In the 1970s, six miles of the river were straightened and encased in concrete to prevent flooding. Combined sewers, constructed as the area developed, reached capacity quickly, and sewage overflows into the river became common occurrences. Stormwater runoff is now responsible for over 70% of the river's pollution problems.

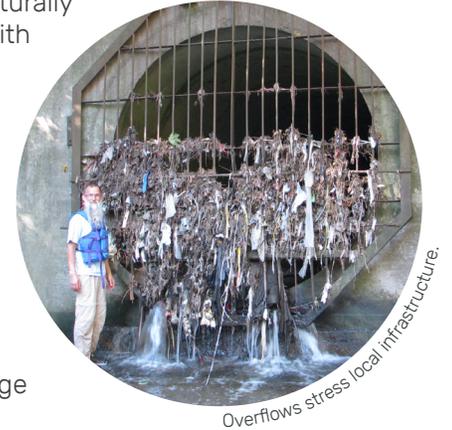
The Clean Water Act and public outcry led to the designation of the Rouge River as an Area of Concern in 1987, with nine beneficial use impairments, and the formation of Friends of the Rouge in 1986. The Rouge River National Wet Weather Demonstration Project provided much-needed funds to clean up the river. The Great Lakes Restoration Initiative in 2014 has provided further funding.

Friends of the Rouge has been working for 37 years to raise awareness about the state of the Rouge River and to restore, protect, and enhance the watershed through stewardship, education, and collaboration. They work in partnership with many entities in the watershed, including the Alliance of Rouge Communities and the Rouge River Advisory Council. Collaboration has been the historical key to success, and will continue to drive restoration efforts in the Rouge River's path to recovery.



HISTORICALLY **OVERBURDENED** COMMUNITIES CONTEND WITH **FAILING INFRASTRUCTURE**

The impervious clay soils and flat lake plain landscape of the Rouge River create a naturally quick, flashy flow. Bustling metropolitan communities have covered the watershed with impervious surfaces, channelized and encased miles of river in or under concrete, and blocked river flow with 62 dams. This has created a river with flow fluctuations that exceed 50 times the average summer flow following a normal rain event. These large fluctuations, known as flashiness, cause banks to erode and release sediment into the water, clogging the gills of fish and the mayflies they eat. Uncontrolled combined sewers compound the issue by releasing diluted raw sewage into the river. Larger storms can also cause sanitary sewer overflows into the river. Unpredictable, heavy rain events have led to flooding that has caused millions in property loss, road blockages, and damage to local infrastructure. Preventing these overflows requires huge infrastructure solutions that are difficult and costly to fund. However, infrastructure investment is necessary to address sewage and flooding issues.



UNCONTROLLED SPRAWL CONSUMES DWINDLING FARMLAND AND FORESTS

As the Detroit River's largest tributary, the Rouge made an ideal waterway for Great Lakes Shipping. The downstream end of the watershed exploded with industry when Henry Ford placed the world's largest integrated factory there, and development followed. Over time, people living in industrial areas moved out to the suburbs, and this movement continues today into the headwaters of the watershed where the last stands of forest, wetlands, and farmland remain. Developers target these areas due to continued demand for suburban sprawl fueled by incentives, regulations, legislation, funding priorities, and historic inequities. Today, more than 50% of the developed land consists of residential sprawl. Protecting undeveloped land will improve river health and increase human quality of life in the watershed.

GROWING RECREATION **OPPORTUNITIES**

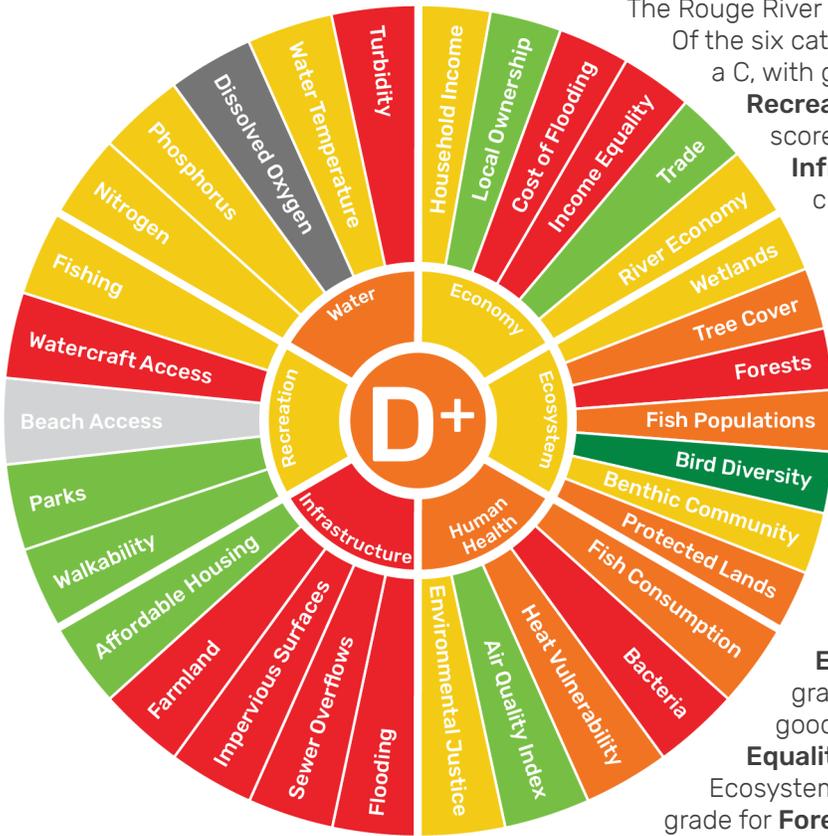
Environmentally-focused investments—including local, state and federal support—have greatly improved water quality. These transformations have created positive and tangible community outcomes including improvement of access to green spaces, plans for expanding non-motorized trails, and an interest in economic redevelopment.

Residents of the Rouge River watershed enjoy over 300 parks covering 20,000 acres and 27 nature preserves. As Rouge River water quality improves, opportunities for water-based recreation have increased. Friends of the Rouge is leading the development of a 29-mile water trail along the Lower Rouge. Paddlers, anglers, and other passive recreationalists have started coming to the Rouge with the return of fish and improving water quality. There are growing regional efforts to create networks of interconnected greenways and blueways across the Rouge watershed and beyond.

For more than half a century, historically overburdened communities in the urban centers of the Rouge watershed have been walled off from their neighborhood rivers and adjacent greenspace as an outcome of historical redlining and disinvestment in urban centers. This reality continues to present challenges to water-based recreation including water quality concerns, logjams caused by flashy flows, lack of launches and amenities, negative perception of the river, contaminated fish, and lack of access—especially with underserved communities of color.



THE ROUGE RIVER AND ITS WATERSHED ARE IN POOR CONDITION



The Rouge River and its watershed are in poor condition (36%, D+). Of the six categories, **Recreation** received the highest grade, a C, with good **Parks** (72%) and **Walkability** (63%) scores.

Recreation would have scored higher without a failing score for the **Watercraft Access** indicator (10%, F).

Infrastructure is clearly the Rouge River's biggest challenge, receiving a failing grade overall (14%, F) and failing scores for four of the five indicators: **Farmland**, **Sewer Overflows**, **Flooding** (0%, F), and **Impervious Surfaces** (5%, F).

Human Health and **Water** quality are both in poor condition. **Bacteria** is the lowest-scoring indicator in the **Human Health** category (0%, F). **Heat Vulnerability** and **Fish Consumption** scores were in the poor range. **Water** was in poor condition (36%, D+) but could be even lower if data for **Dissolved Oxygen** were available. **Turbidity** was the lowest-scoring indicator in **Water** with a very poor score.

Economy and **Ecosystem** both received moderate grades of C-. **Local Ownership** and **Trade** received good scores while **Cost of Flooding** and **Income Equality** both failed, two indicators that are often linked.

Ecosystem overall had a moderate score but had a failing grade for **Forests** (16%, F) and poor scores for **Protected Lands**, **Fish Populations**, and **Tree Cover**. **Bird Diversity** had the highest score for any single indicator (89%, A) but as the river is along the Mississippi Flyway, migratory birds may be driving the scores more than local species.

Grade Scale



SOCIOENVIRONMENTAL REPORT CARDS ARE COLLABORATIVE TOOLS FOR ASSESSMENT

Watershed report cards are powerful tools used around the world to describe ecosystem status, increase public awareness, and inform and influence decision makers to act to improve the health of a watershed. This is the first holistic Rouge River Watershed Report Card, which assesses the condition of the river itself and 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 populations; rivers have recreational and economic value to the people who live in their watersheds.

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 Rouge 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. **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; some fish species are sensitive to extreme temperatures. **Turbidity** measures the amount of light that passes through the water.



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 Rouge, there are three Sanitary Sewers and eleven Combined Sewers 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.

LOCAL COMMUNITIES ARE DEDICATED TO RESTORING THE WATERSHED

Friends of the Rouge and other local stakeholders have worked together over the past three and a half decades to address these challenges with infrastructure, urban sprawl, and impervious surface. Some practices have included installation of rain gardens and bioswales, planting trees, disconnecting downspouts, and distributing rain barrels to reduce the amount of polluted stormwater running into the river.

WHAT CAN YOU DO?

Collaborative efforts between elected officials, regulatory agencies, municipal leaders, nongovernmental organizations, and community members improve the Rouge River watershed. Cumulative individual actions help protect your river and watershed. At home, you can plant rain gardens, reduce use of fertilizers and pesticides, and make use of local parks and recreation areas. In your community, you can volunteer with your watershed organization like Friends of the Rouge, participate in river restoration and monitoring, and work with elected officials, regulators, and land conservancies to protect land and rivers. For more information on the restoration and collaboration already happening the Rouge River, visit therouge.org



Volunteers replant native habitat.



Rain gardens protect us from flooding.



Removing trash helps the river.

ACKNOWLEDGMENTS

This report card is a timely, transparent assessment of the Rouge 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 Rouge 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. All photos courtesy of Friends of the Rouge 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 Rouge; 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

**Friends
of
the ROUGE**



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE
INTEGRATION AND APPLICATION NETWORK

For more information visit
MichiganReportCards.org