

Canopy Assessment and Tree Planting Prioritization

City of Ecorse, Michigan

2021 iTree Academy

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Prepared for:
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ReLeaf Michigan, Inc. is Michigan's only statewide tree planting non-profit organization, working with communities and organizations throughout Michigan to protect and restore our urban tree canopies.

Our mission is to educate the public on the value of trees and how to properly select, plant, and maintain them.

Founded by some of the most respected arborists in the state and building on lifetimes of green expertise, ReLeaf Michigan plants the *Right Tree in the Right Place at the Right Time* to ensure each tree thrives for generations to come.

Since 1988, ReLeaf Michigan has worked with over 400 communities across the state. Working with community volunteers, we have planted nearly 30,000 trees on public property in Michigan's cities, townships, and villages.

Unlike most other volunteer-driven tree planting organizations, ReLeaf Michigan plants trees that are already substantial in size, approximately six-foot tall and 1.5" to 2" trunk caliper, resulting in much higher rates of survival and a more immediate environmental impact.

Project Overview

The purpose of the following report is to inform the City of Ecorse of its current tree canopy and the benefits provided by the existing urban forest. This information will be used to support planning decisions and to prioritize tree planting locations based on the existing tree canopy, minority population density, and population below poverty line. The aerial assessment was completed of Ecorse proper using 250 sample data points.

To further the mission of ReLeaf Michigan Inc., which is to educate the public on the value of trees and how to properly select, plant, and maintain them, our organization has partnered with the City of Ecorse, with funding from the Detroit Zoological Society, in June 2021 to plant fifteen 1.5" -2" caliper trees in Beach Street Park. It is our hope that this partnership with the City will continue and we can work together to increase tree canopy in the City of Ecorse, providing more equitably distributed tree-related benefits to all Ecorse residents.

Ecorse, Michigan

The City of Ecorse, population 9,570, is a downriver suburban city in Wayne County, Michigan, nearby the Detroit River. Known historically for its logging and steel industry, Ecorse is still closely connected to its industrialized neighbors, including Detroit to the north.

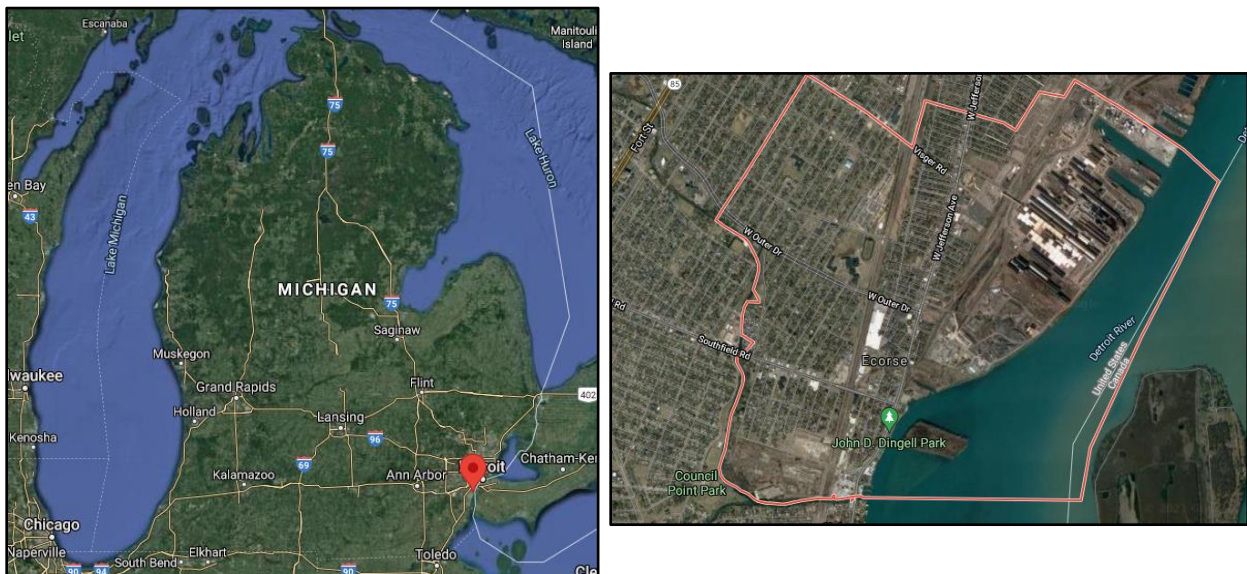


Figure 1. City of Ecorse, MI.

Landcover Classification

Ecorse's tree canopy is estimated to cover 161 acres and accounts for 7% of the city's total land cover (Table 1). Approximately 23% of the city's land cover consists of grass and/or low-lying

vegetation, and impervious surfaces such as buildings, roads, and other types of pavement cover 32% of total land area. Soil and/or bare ground includes area alongside railroad tracks and non-paved industrial grounds, covering 14% of total land area.

Table 1. Ecorse, MI Landcover Classes by Percent Coverage and Area		
Landcover Class	%	Acres
Tree Canopy	7	161
Impervious Surfaces	32	757
Grass/Herbaceous	23	539
Soil/Bare Ground	14	340
Open Water	24	567
Total		2364



Figure 2. Ecorse, MI existing tree canopy.

A more detailed analysis, such as a complete urban tree canopy assessment, or a tree inventory, would provide a more accurate evaluation of the true urban tree canopy cover in the

City of Ecorse. However, this assessment provides a baseline for setting future ambitions for the urban forest.

Ecosystem Benefits Analysis

Community forests are important components of the ecosystem and provide quantifiable benefits. In total, Ecorse realizes an annual benefit of \$54,771 from its trees (Table 2). These annual benefits include \$17,334 in reduction of air pollution and carbon sequestration equivalent to \$37,425. Additionally, the city’s trees are estimated to have stored 5,511 tons of carbon over the course of their lifetime for an estimated total value of \$939,880.

Table 2. Ecorse, MI Estimated Annual Ecosystem Benefits		
Ecosystem Benefits	Annual Ecosystem Benefits	
	Quantity	Value
Air: CO (carbon monoxide) removed	182 lbs	\$121
Air: NO2 (nitrogen dioxide) removed	1,003 lbs	\$219
Air: O3 (ozone) removed	7,750 lbs	\$10,067
Air: SO2 (sulfur dioxide) removed	493 lbs	\$33
Air: PM10 particulate matter (dust, soot, etc.) removed	2,200 lbs	\$6,894
Carbon sequestered	219 tons	\$37,425
Stormwater: reduction in runoff	1.33 Kgal	\$12
Total Annual Benefits		\$54,771
Current stored carbon	5,511 tons	\$939,880

Water Quality Improvement

Trees intercept rainwater by capturing water droplets on their leaves and bark, and absorption of rainwater through their expansive root system. These processes result in reducing or slowing the amount of stormwater runoff that reaches the ground or impervious surfaces and, by virtue, improving water quality. Without trees, communities would have to invest significantly more in stormwater infrastructure to handle the additional water flow that would otherwise have been captured by trees. In fact, many municipalities are utilizing trees as part of a comprehensive approach to updating their stormwater systems and achieving compliance with local and federal regulations.

Ecorse’s trees capture nearly 133,000 gallons of stormwater annually.

Air Quality Improvement

Trees improve a community's air quality by capturing fine pollutants and particulate matter on the surfaces of their leaves. Recent studies have shown a strong correlation between total tree canopy and reduced rates of lower respiratory and cardiovascular disease.

Every year, the community forests Ecorse collectively remove over 11,628 pounds of pollutants from the air. These include: 182 pounds of carbon monoxide (CO), 1,003 pounds of nitrogen dioxide (NO₂), 7,750 pounds of ozone (O₃), 493 pounds of sulfur dioxide (SO₂), and 2,200 pounds of dusts, soot, and other particulate matter. This equates to an annual monetary value of \$17,334.

Carbon Reduction

Trees store a massive amount of carbon in their woody tissue. Both urban and rural forests are an important carbon sink and help mitigate climate change. In total, the community forests of Ecorse store 5,511 tons of carbon for an estimated value over \$939,880. Each year, an additional 219 tons are sequestered at an annual value over \$37,425.

Future Planting Sites Identified and Prioritized

Communities are often interested in expanding tree canopy to optimize the suite of benefits provided by its trees, particularly stormwater management and equitable ecosystem benefits across all neighborhoods. To support community tree planting and canopy expansion efforts, this assessment identified and prioritized potential planting locations. This analysis calculated and prioritized potential planting areas based on census data and existing tree canopy information from NLCD2011 data.

Vacant planting sites present opportunities to plant trees, however, not all open spaces are candidates for tree plantings - like roads or sports/agricultural fields. Conversely, not all impervious areas remain impervious forever. Trees can be added in areas with impervious surface, for example by adding tree wells in sidewalks or landscape islands in parking lots. Since some locations are clearly better suited to meet community tree planting goals than others, this study attempted to eliminate areas unsuitable for planting and prioritize planting locations based on optimizing the ecosystem benefits that trees can provide to the community.

Final planting decisions should be made by the municipality. This report does not claim that all open locations should be planted with trees, but rather encourages that the prioritized planting areas provided in this study can be used to serve as a starting point and guideline for determining where future plantings may have the most impact on human wellness and other tree benefits such as stormwater management.

The priority models used for this analysis are largely based on the impacts of trees to human health and wellness. Census data was assessed, including population density, relatively high

proportion of the population living below the poverty line, areas with a relatively high minority population density, potential for avoided runoff, rainfall interception, and air pollution. (Table 3)

Table 3. Inputs and Weights Prioritization Models Used for Planting Area		
Data Set	Source	Weight
Population Density	Census data	0.25
Tree Cover per capita	NLCD2011	0.25
Population below poverty line	NLCD2011	0.10
Avoided runoff	NLCD2011	0.10
Total air pollution removal	NLCD2011	0.10
Rainfall interception	NLCD2011	0.10

Overlapping these data produced a priority rating ranging from Minimum Impact to Maximum Impact based on a calculated average. The resulting community map (Figure 3) identifies areas that, if planted, have the highest potential impact on improving equitable tree canopy distribution in minority and low income regions, and that have the greatest opportunity to manage stormwater runoff through avoided runoff and rainfall interception.

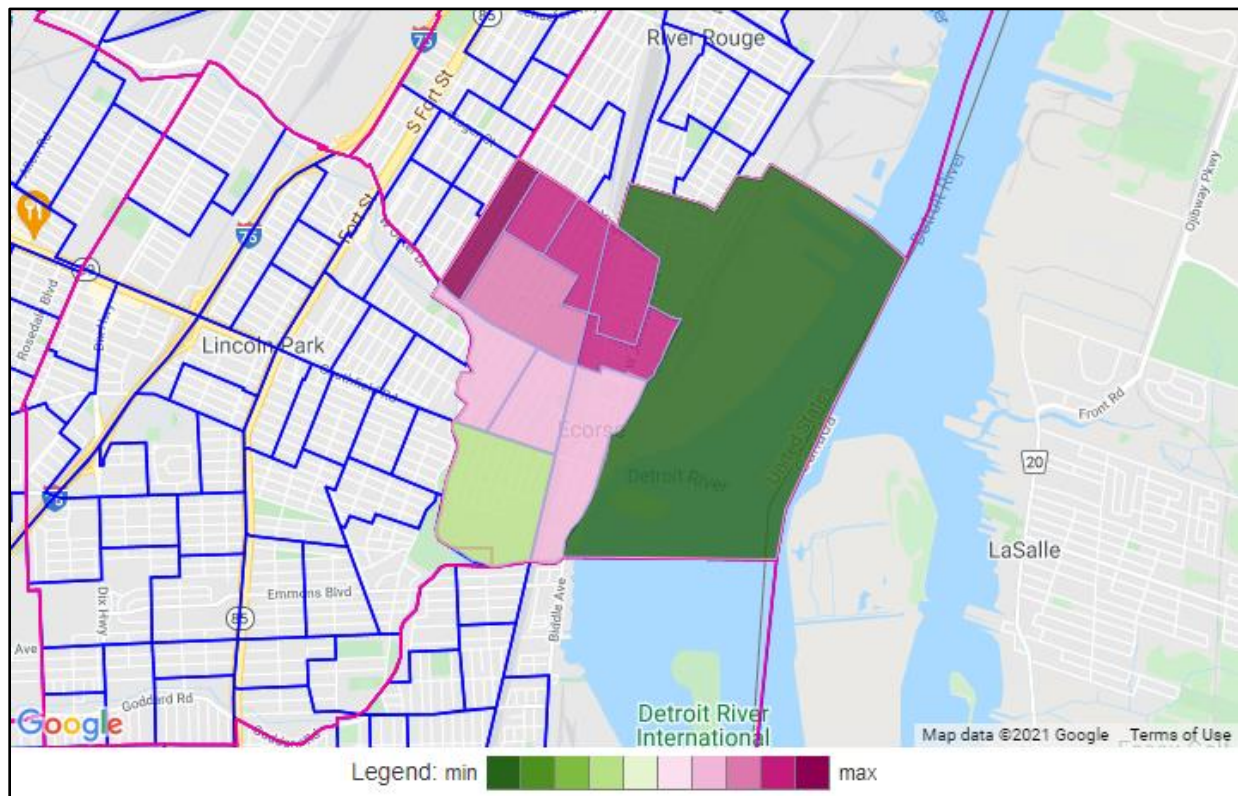


Figure 3. Ecorse prioritization planting map (max= highest priority areas).