City of Holland

Urban Tree Canopy (UTC) Assessment

What is the Urban Forest and Urban Tree Canopy?

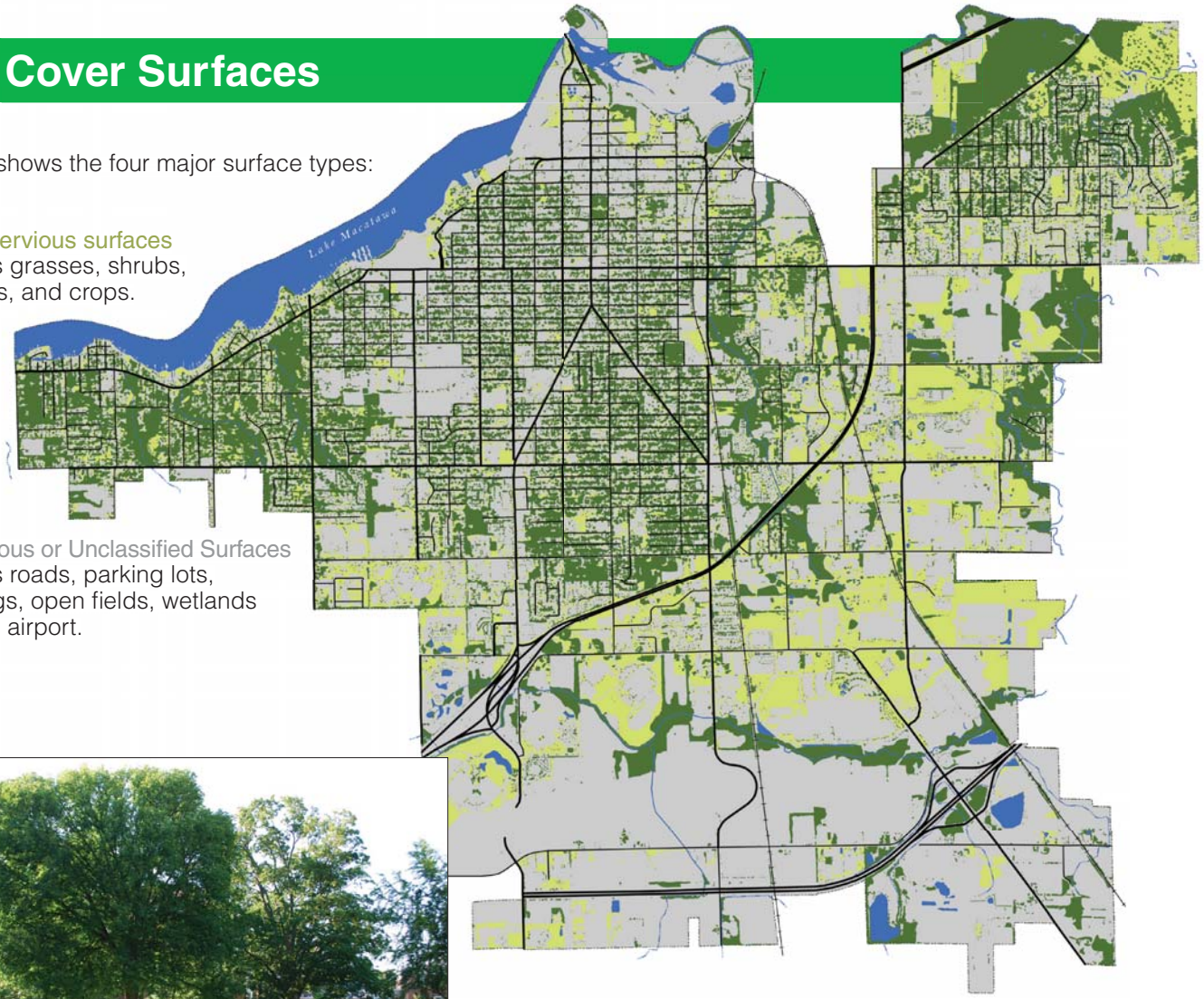
The Urban Forest consists of all public and private trees and shrubs in our community. This includes trees in yards, parks, open spaces, along streets and other land where trees are present. One way to understand the value of urban forests is by envisioning the layer of leaves, branches and tree stems when viewed from above. This layer is called Urban Tree Canopy (UTC).

Urban Tree Canopy along Euna Vista Drive.

Land Cover Surfaces

This map shows the four major surface types:

1. Trees
2. Other pervious surfaces such as grasses, shrubs, gardens, and crops.
3. Water
4. Impervious or Unclassified Surfaces such as roads, parking lots, buildings, open fields, wetlands and the airport.



Surface Types

Tree Canopy | Pervious Surfaces | Water | Impervious or Unclassified Surfaces

Urban Tree Canopy at Hope College.

Project Funded By:

Macatawa Area Coordinating Council
A Cooperative Effort Among Units of Government

Department of Natural Resources DNR Michigan

Forest Service US Department of Agriculture

Macatawa Watershed Project

Grand Valley State University
Robert B. Annis Water Resources Institute

City of Holland

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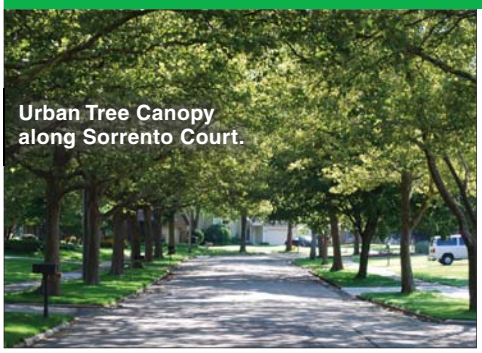
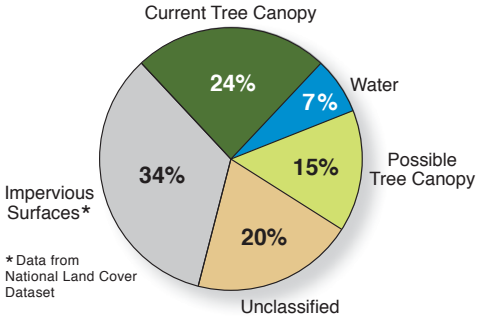

Urban Tree Canopy along Sorrento Court.

Holland Land Cover Surfaces



Street Tree Canopy in the City of Holland

STREET NAME	% TREE CANOPY
Midway Avenue	77.0%
Sorrento Court	74.2%
Princeton Court	71.2%
37th Street	67.9%
Knowlcrest Drive	66.0%
Euna Vista Drive	63.2%
Thomas Street	63.1%
39th Street	60.0%
Elmdale Court	59.4%
Crestview Street	58.0%
Brookfield Drive	56.5%
Hazel Avenue	53.4%
Prospect Avenue	52.9%
Viaduct Road	49.0%
Franklin Street	48.5%
Bellwood Drive	47.4%
29th Street	47.0%
Pleasant Avenue	46.9%
Timberwood Lane	46.5%
Dartmouth Avenue	46.4%
Graafschap Road	35.1%
State Street	30.4%
Paw Paw Drive	29.7%
17th Street	28.0%
Van Raalte Avenue	24.9%
S. Shore Drive	22.1%
Pine Avenue	20.9%
32nd Street	18.1%
16th Street	15.1%
Ottawa Avenue	14.1%

UTC Benefits to City of Holland

Trees Reduce Atmospheric Carbon Dioxide in Two Ways:

- By directly storing CO_2 in their stems and leaves as they grow
- By reducing demand for heating and cooling, thereby reducing emission associated with power production

The UTC in Holland captures 26,270,000 lbs. of CO_2 each year.
Total value of these services are valued at $254,900 annually!

The UTC in Holland currently stores approximately 796,000,000 lbs. of CO_2.
Total value of these services are valued at $7,731,000!

Trees Improve Air Quality

- They absorb gaseous pollutants (such as ozone and nitrogen oxides)
- They intercept particulate matter (such as dust, ash, pollen and smoke)
- They freshen the air we breath by releasing oxygen in the air as a byproduct of photosynthesis (two healthy trees produce enough oxygen for one person for one year)

The UTC in Holland removed the following pollutants annually!

Pollution Removal Services	Annual Pounds	Dollar Value of Services
Carbon Monoxide (CO)	1,662	$1,205
Nitrogen Dioxide (NO_2)	25,682	$131,137
Ozone (O_3)	67,195	$343,106
Sulfur Dioxide (SO_2)	11,188	$13,986
Particulate Matter < 10 microns	50,740	$172,979
Total Value of Pollution Removal		$662,413

Trees Reduce Stormwater Runoff and Improve Water Quality

- Leaves and bark surfaces intercept and store rainfall, reducing runoff volumes
  - A mature deciduous tree can intercept 500 to 760 gallons of water per year
  - A mature coniferous tree can intercept for than 4,000 gallons of water per year
- Roots increase the rate at which rainfall infiltrates into the soil, and increases the soil's capacity to store water, reducing overland runoff and potential erosion
- Tree canopies reduce soil erosion by diminishing the impact of raindrops on barren surfaces
- Transpiration, or the expelling of moisture from a tree through the leaves, reduces soil moisture, thereby increasing the soil's capacity to store rainfall
  - A mature deciduous tree can transpire 100 gallons of water a day under hot, dry conditions

Trees Save Energy in Several Ways

- Shading provided by trees reduces the amount of heat absorbed and stored in built surfaces
  - Greenspace provided by trees can lower air temperatures by 5 degrees F
  - Trees that shade east and especially west walls help keep buildings coolest
- Evapotranspiration converts liquid water to water vapor and cools the air
- Windspeed reduction reduces the infiltration of outside air into interior spaces, reducing heating and cooling costs

i-Tree

Atmosphere carbon and gaseous pollutant removal information provided by: i-Tree Vue model using the UTC data developed for this project. i-Tree is a cooperative initiative of the USDA Forest Service, Davey Tree Expert Company, the Arbor Day Foundation, Society of Municipal Arborists, the International Society of Arborculture, and Casey Trees.