City of Berkley
Urban Tree Canopy (UTC) Study

Prepared by the City of Berkley Tree Board
November 2022

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Urban Tree Canopy Study

🌿 An Urban Tree Canopy (UTC) assesses how much of a defined geographic area is covered by trees' crowns

🌿 The objective of a UTC assessment is to help decision makers understand their urban forest resources to establish canopy goals and to strategically focus tree planting efforts and resources

🌿 The UTC Study utilizing satellite data assesses the entire urban forest within a geographic area and includes all private and public trees

City of Berkley Urban Tree Canopy Study

🌿 Considering the cost and benefits, the Tree Board recommended that the City contract for this type of study. The cost was estimated to be about $15,000-$20,000.

🌿 The City approved adding $10,000 to the 2022-23 Budget, with the assumption that the City receives matching funds from the State of Michigan Community Forest Grant.

🌿 Then this summer, the Tree Board became aware of no cost tools (The Tree Equity and i-Tree Landscape) publicly available to assess Berkley's tree canopy. Therefore, this study was completed by Tree Board volunteers and without cost to the City.

  🌿 The Tree Equity provides the basis for assessing the canopy cover

  🌿 i-Tree Landscape provides additional detail to support tree benefits

City of Berkley Urban Tree Canopy Study

🌿 This study was completed by the City of Berkley Tree Board in September 2022 canopy data using data from Tree Equity Score .

🌿 American Forests launched The Tree Equity Score in 2021. Tree Equity Score is a metric to help cities assess how well they are delivering equitable tree canopy to cover all residents.

🌿 Tree Equity Score synthesizes data to calculate a score to measure how much tree canopy and surface temperature align with income, employment, race, and health factors in the U.S. for 150,000 neighborhoods and 486 municipalities.

🌿 American Forests has developed the Tree Equity Score Analyzer (TESA) for cities and states that want to dive deep into decision-making around Tree Equity Scores.

🌿 It is free and available to the public to use. https://treeequityscore.org/

American Forests

City of Berkley Urban Tree Canopy Study

- This Study also utilized i-Tree Landscape.

- i-Tree Landscape did not have as high of resolution capability as The Tree Equity Score so the canopy itself was later determined to be underreported by this tool.

- However, i-Tree Landscape provided useful information on the benefits derived from Berkley's existing canopy.

- i-Tree Landscape provided the following tree benefits:

  - Carbon – the amount of carbon and carbon dioxide equivalent that is sequestered and stored by tree in each selected region and its associated economic value.

  - Air Pollution – the amount and economic value of the air pollution that is removed by the trees in each selected region.

  - Hydrology – includes transpiration, rainfall interception, and avoided runoff estimates provided by the trees in each selected region.

- So the benefits reported by i-Tree Landscape are included in this study, even though the canopy and benefits are likely understated.

- This link was provided by the Michigan DNR. It is free and available to the public to use. https://landscape.itreetools.org/maps/

City of Berkley Urban Tree Canopy Study

🌿 Greater Detroit including the City of Berkley is a "Featured Place" in The Tree Equity Score.

🌿 The Greater Detroit Tree Canopy data was provided to The Tree Equity by the University of Vermont Spatial Analysis Lab utilizing 2016 data. This data is provided with 1 foot resolution, allowing individual trees to be mapped.

🌿 The UVM Spatial Analysis Lab is currently working with American Forests to update their study utilizing 2022 data.
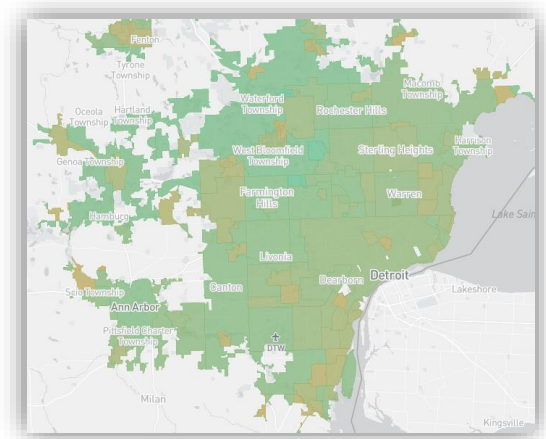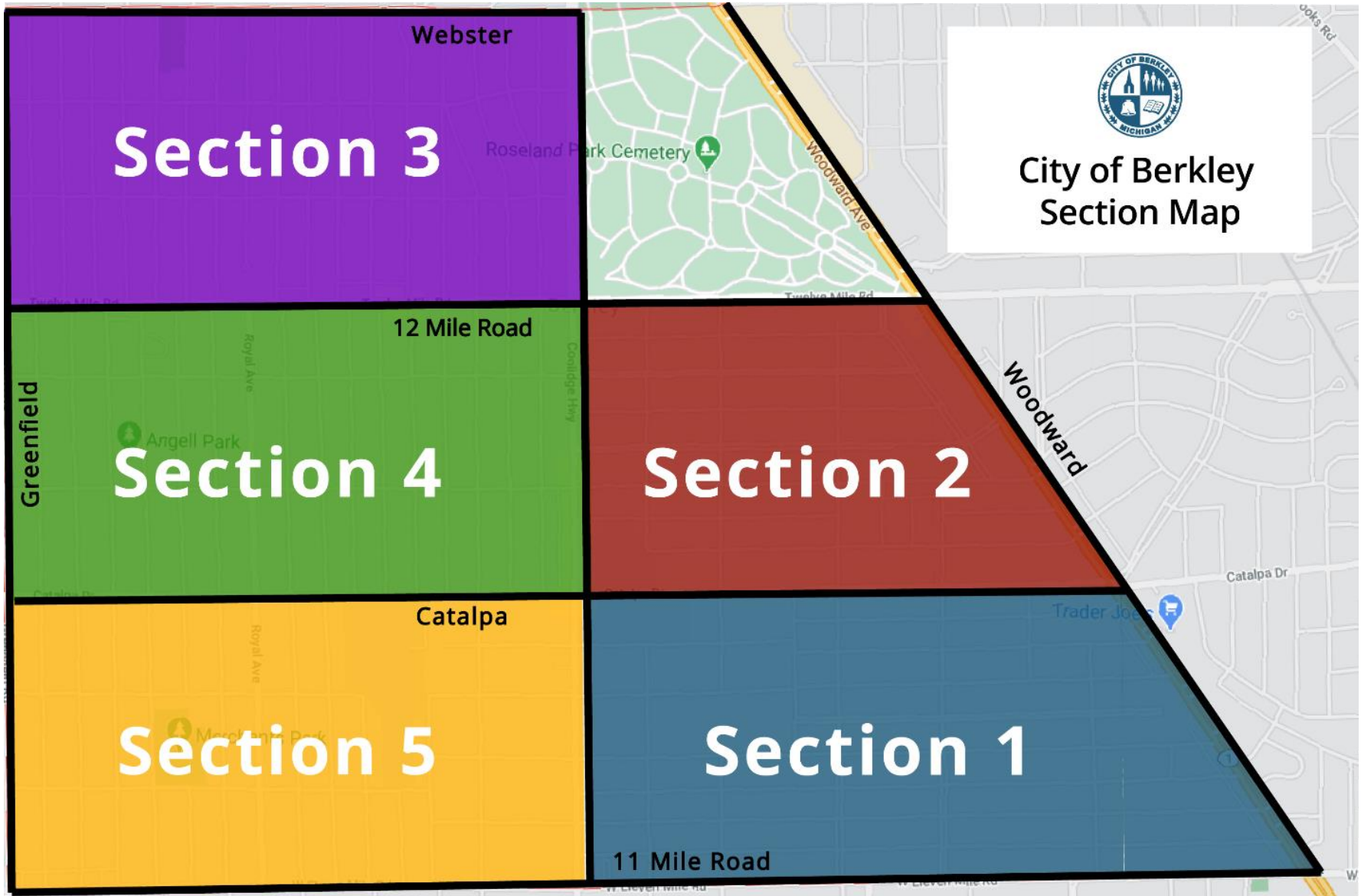
City of Berkley
Section Map

Census Blocks for City of Berkley

- Both The Tree Equity and i-Tree Landscape used Census Blocks to define the neighborhoods of Berkley

- These Census blocks can be aligned with the City's Section designation except for Section 3, where St. Johns Woods is combines with Roseland Park Cemetery in Census Block "0001"

MENU

UVM SPATIAL ANALYSIS LAB
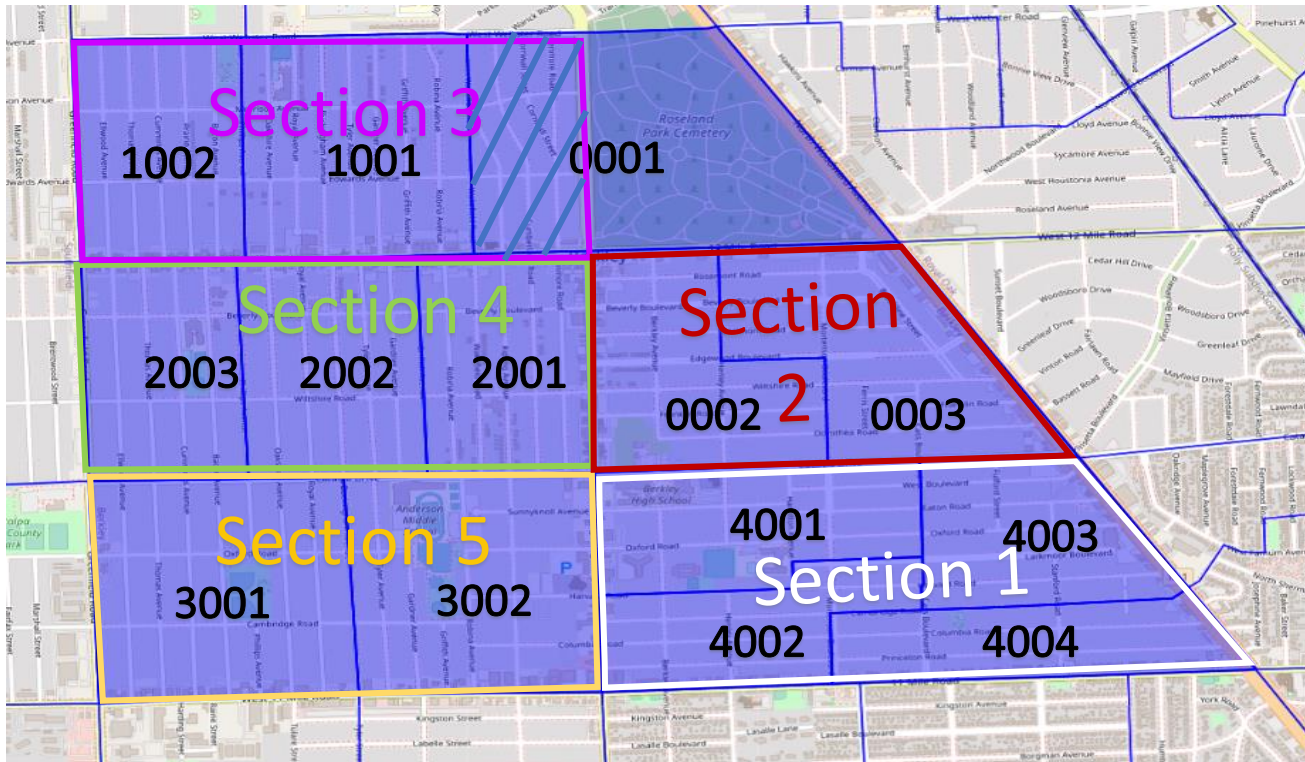
UVM SPATIAL Analysis Lab supplied the tree canopy data used by The Tree Equity for the Greater Detroit Area.

The Spatial Analysis Laboratory (SAL) is a cutting-edge Geographic Information System (GIS) research facility in the Rubenstein School of Environment & Natural Resources at the University of Vermont (UVM). As the pioneer of GIS technology in Vermont, the SAL operates as a non-profit in partnership primarily with private industry, government organizations, and other non-profits, applying innovative techniques in GIS, remote sensing, and spatial statistics to solve the unique problems brought to us by these organizations. The scope of our work includes ecosystem assessments, biodiversity analysis, land-cover mapping, conserved lands planning, scenario modeling, LiDAR processing, web-based mapping, and even transportation analysis.

The SAL has also developed a national reputation for its expertise in employing UAS technology for disaster response, agricultural assessment, archeological site mapping, aquatic resource mapping, transportation decision support, and urban planning. Notable projects have included more than 75 tree-canopy assessments in the United States and Canada, high-resolution land-cover mapping at state and regional scales, automated mapping of wetlands and other ecological features, and UAS missions for flooding events, stream-channel mapping, train derailments, and road-construction monitoring.

Throughout all of our work, we aim to train some of the most knowledgeable and technologically-adept spatial analysts in the country by providing hands-on work opportunities on real-life projects. Our students have gone on to work at global tech companies including Google, senseFly, and Uber, as well as non-profits including the Chesapeake Conservancy, and Research Institutes like Duke University Marine Lab. Many of our former student UAS pilots have established careers in the commercial drone industry throughout the United States.

City of Berkley Canopy Study
Prioritization Based on Canopy %

Block #	Canopy %	Prioritization
2612151701002	33	Medium
2612151701001	30	High
2612151700001	37	Medium
2612151702003	38	Medium
2612151702002	33	Medium
2612151702001	30	High
2612151700002	40	Low
2612151700003	41	Low
2612151703001	35	Medium
2612151703002	27	High
2612151704001	30	High
2612151704002	36	Medium
2612151704003	26	High
2612151704004	30	High

Priority Legend*

(red)	High ≤ 30%
(yellow)	Medium >30% <40%
(green)	Low ≥ 40%

*Based on Canopy %

Red = Highest Priority   Green = Lowest Priority

City of Berkley Urban Tree Canopy Study
Priority by Canopy % Only

Priority Legend*

⚠⚠⚠	High ≤ 30%
⚠⚠	Medium >30% <40%
⚠	Low ≥ 40%

*Based on Canopy %

Map blocks:
- 1002 — 33%
- 1001 — 30%
- 0001 — 37%*
- 2003 — 38%
- 2002 — 33%
- 2001 — 30%
- 0002 — 40%
- 0003 — 41%
- 3001 — 35%
- 3002 — 27%
- 4001 — 30%
- 4002 — 36%
- 4003 — 26%
- 4004 — 30%
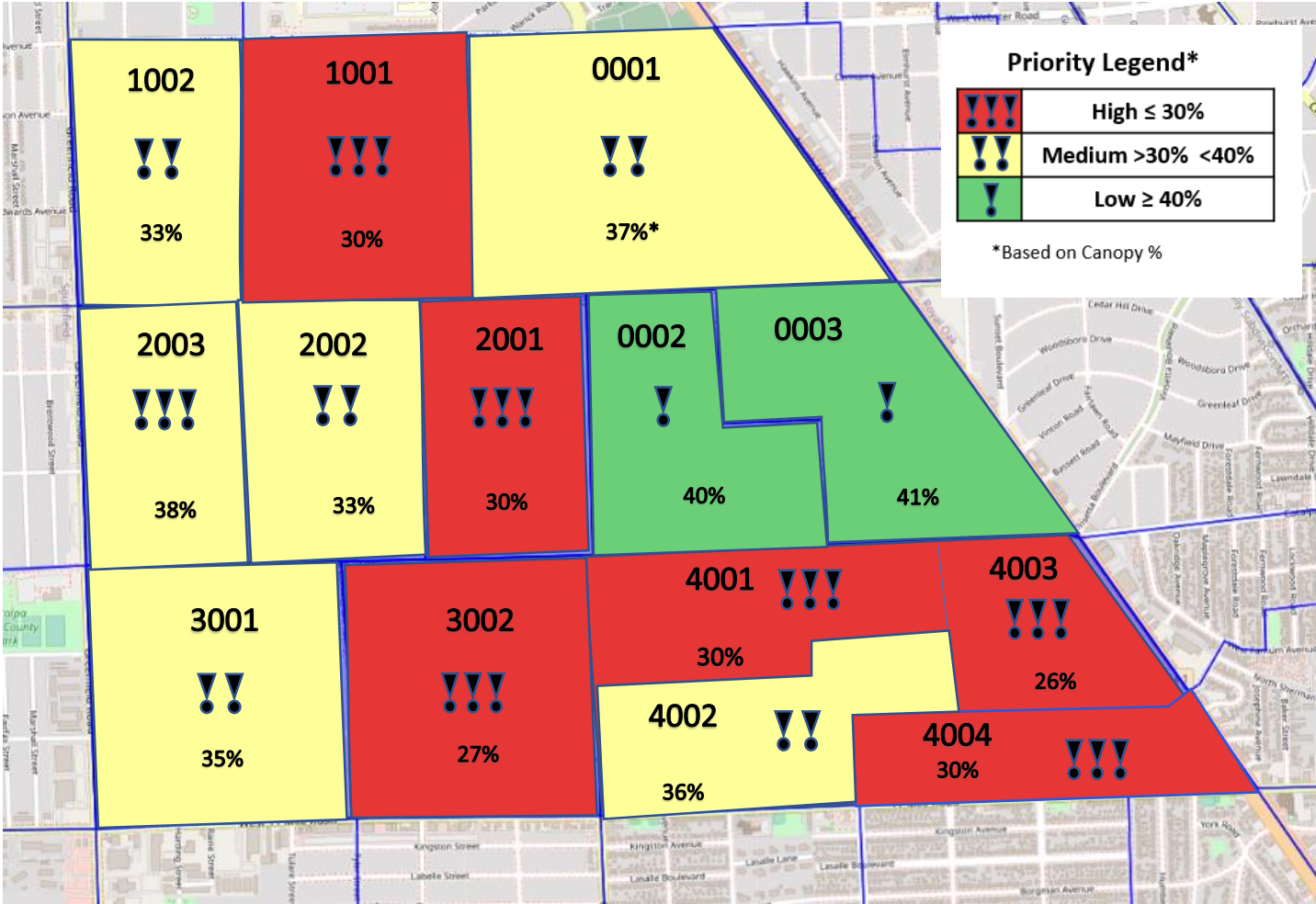
- *Census Block 0001 includes Roseland Park Cemetery*

Tree Equity Scores

What do the Scores mean?

Each score indicates whether there are enough trees in a neighborhood for everyone to experience the health, economic and climate benefits that trees provide. Scores are based on tree canopy, surface temperature, income, employment, race, age and health factors. A 0-to-100-point system makes it easy to understand how a community fares.

City Planning

Urban land-use planners and others can use the scores to decide where and how to invest in forestry and infrastructure. The Tucson City Council and Mayor Regina Romero agreed in April 2021 to adopt the Tucson Tree Equity Score as the primary tool to prioritize investments for the city's urban forestry initiative and infrastructure projects.

Priority Indicators

- Health Index
- Temperature
- People in Poverty %
- Seniors (65+) %

- Children (0-17) %
- People of color %
- Unemployment %

Municipality Tree Equity Score Map

TREE EQUITY SCORE

Berkley

100 75 94

96 89 83 99 86

88 51 69 63

91 80

City of Berkley Canopy Study
Prioritization Based on The Tree Equity (TTE) Score

Block #	Canopy %	TTE Score	TTE Prioritization
2612151701002	33	100	green ▼
2612151701001	30	75	red ▼▼▼
2612151700001	37	94	green ▼
2612151702003	38	96	green ▼
2612151702002	33	89	yellow ▼▼
2612151702001	30	83	yellow ▼▼
2612151700002	40	99	green ▼
2612151700003	41	86	yellow ▼▼
2612151703001	35	88	yellow ▼▼
2612151703002	27	51	red ▼▼▼
2612151704001	30	69	red ▼▼▼
2612151704002	36	91	green ▼
2612151704003	26	63	red ▼▼▼
2612151704004	30	80	yellow ▼▼

TTE Priority Legend

▼▼▼ (red)	High ≤ 79
▼▼ (yellow)	Medium ≥ 80 <90
▼ (green)	Low ≥ 90%

Red = Highest Priority   Green = Lowest Priority

City of Berkley Tree Equity Score Prioritization

🌿 Besides the Priority Indicators used to develop the Tree Equity Scores for each Census Block neighborhood, Canopy Targets also affected the results.

🌿 Based on the Census Data, the Tree Equity Score develops canopy targets based on population density. The intent is to make for more achievable targets, while recognizing plantable areas suitable for tree canopy.

🌿 In Berkley, this resulted in three different Canopy Targets: 32%; 40%; 48%

| Population Density (ppl/km2)		Target Canopy Adjustment factor	
Very low (<2k)	1.2	X 40% = 48%	1 neighborhood
Low (2k-4k)	1	X 40% = 40%	10 neighborhoods
Moderate (4k-8k)	0.8	X 40% = 32%	3 neighborhoods
High (>8k)	0.5	(n.a. for Berkley)	

City of Berkley Tree Equity Score Prioritization

- These various canopy targets seem to distort the scores for the City of Berkley

- For example, the only Census Block to achieve a The Tree Equity Score of 100 was Census Block 1002. While Canopy % was in the middle of the pack, and the priority factors suggest perhaps a lower score, apparently this neighborhood is more dense, and thus has a lower Canopy Target of only 32% .

- At the other end, Census Block 0002 while having the highest Canopy % in the Berkley of 41%, has TTE Score of only 86 due to this neighborhood having the higher Canopy Target of 48%.

- Census Block 3002 has the lowest TTE Score of 51 for Berkley. This area also has one of the lowest Canopy % but this score is also negatively affected by this neighborhood having the higher Canopy Target of 48%.

- Therefore, it is recommended to set priority based on Canopy % and not by The Tree Equity Scores

Census Block	TTE Score	Canopy Target	Canopy %
1002	100	32%	33%
0001	94	48%	37%
0002	86	48%	41%
3002	51	48%	27%
The Rest	63-96	40%	26%-38%

Comparison of UTC to Other Michigan Cities

Comparison of UTC% Across Various Michigan Cities
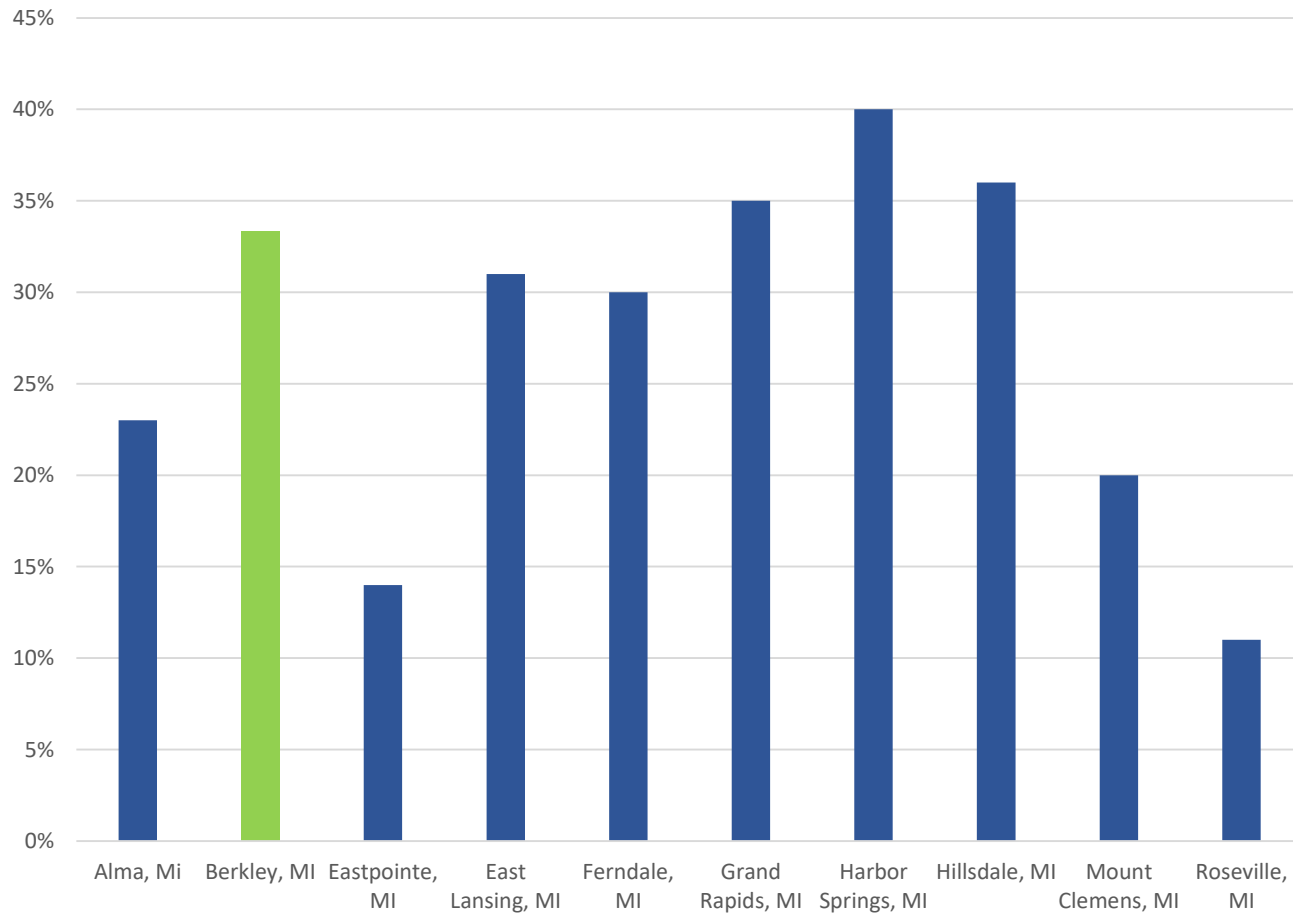
Sources: Davey Resource Group Tree Canopy Assessment for City of East Lansing (June 2017), the City of Ferndale website (Urban Forestry Program) and this study for Berkley

Tree Benefits
i-Tree Landscape

City of Berkley Urban Tree Canopy Study
i-Tree Landscape

🌿 Using the i-Tree Landscape Tool – appropriate US Census Blocks were selected to select analyze data within the city's boundaries.
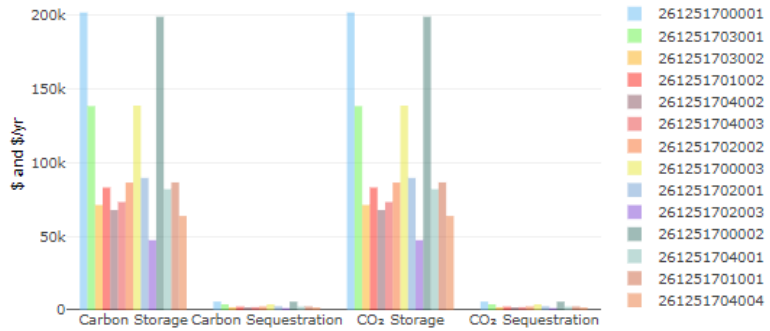

Hint: Need to click on the "eye" icon 👁 *next to US Census Blocks to show the census blocks on the map and then need to click on the Select button* 🖑 *for each block to include in the study*
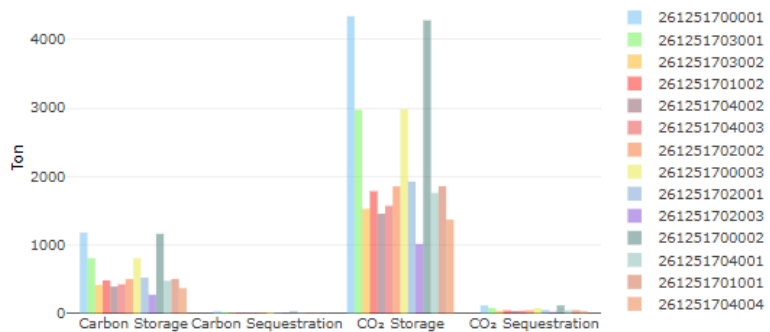
Tree Benefits
Carbon and CO$_2$

Data Tools | Carbon | Air Pollution Removal | Hydrology

Monetary Benefits

Physical Benefits

The Carbon and CO$_2$ benefits from trees are calculated only using the MRLC NLCD 2011 and 2001 data. The system cannot currently account for the HiRes data.

Tree Benefits
Carbon and CO$_2$ (High Resolution UTC)

Dataset	Type	Name	ID	Carbon Storage $	Carbon Storage Short Ton	Carbon Sequestration $/yr	Carbon Sequestration t/yr	CO$_2$ Equivalent Storage $	CO$_2$ Equivalent Storage Short Ton	CO$_2$ Equivalent Sequestration $/yr	CO$_2$ Equivalent Sequestration t/yr
NLCD 2011	Block Group	N/A	261251700001	201,796	1,183.2	5,773	33.8	201,796	4,338.4	5,773	124.1
NLCD 2011	Block Group	N/A	261251701002	83,113	487.3	2,378	13.9	83,113	1,786.8	2,378	51.1
NLCD 2011	Block Group	N/A	261251701001	86,603	507.8	2,477	14.6	86,603	1,861.9	2,477	53.2
NLCD 2011	Block Group	N/A	261251702001	89,630	525.6	2,564	15.0	89,630	1,927.0	2,564	55.1
NLCD 2011	Block Group	N/A	261251702002	86,467	507.0	2,474	14.6	86,467	1,858.9	2,474	53.1
NLCD 2011	Block Group	N/A	261251702003	47,398	277.9	1,356	7.9	47,398	1,019.0	1,356	29.1
NLCD 2011	Block Group	N/A	261251700003	138,658	813.0	3,967	23.3	138,658	2,981.0	3,967	85.3
NLCD 2011	Block Group	N/A	261251700002	198,959	1,166.6	5,692	33.4	198,959	4,277.4	5,692	122.4
NLCD 2011	Block Group	N/A	261251703001	138,303	811.0	3,957	23.1	138,303	2,973.4	3,957	85.1
NLCD 2011	Block Group	N/A	261251703002	71,272	417.9	2,039	11.9	71,272	1,532.3	2,039	43.9
NLCD 2011	Block Group	N/A	261251704001	81,962	480.6	2,345	13.8	81,962	1,762.2	2,345	50.4
NLCD 2011	Block Group	N/A	261251704002	67,851	397.8	1,941	11.4	67,851	1,458.7	1,941	41.8
NLCD 2011	Block Group	N/A	261251704003	73,270	429.6	2,096	12.2	73,270	1,575.2	2,096	45.1
NLCD 2011	Block Group	N/A	261251704004	63,818	374.2	1,826	10.7	63,818	1,372.0	1,826	39.2
Selection Total:				1,429,100	8,379.3	40,883	239.8	1,429,100	30,724.2	40,883	879.0

$1,429,100 – 30,724.2 short ton

Tree Benefits
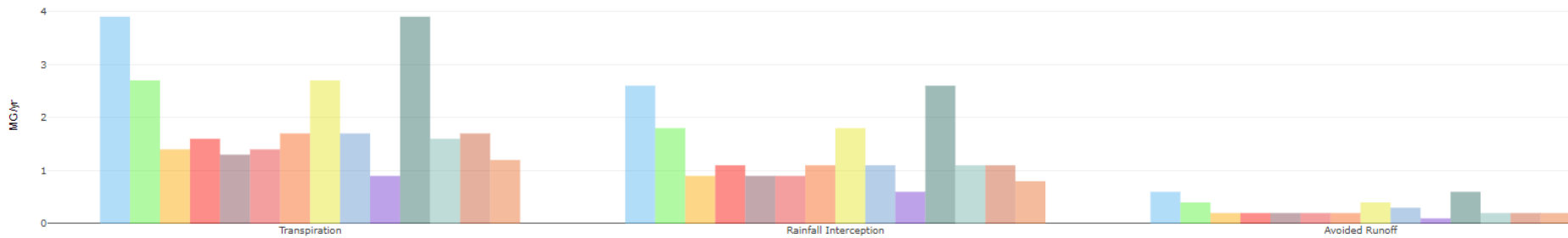## Total Air Pollution Removal

$49,070 / yr – 19,953.1 lb/yr

Tree Benefits
Hydrology

Data Tools Carbon Air Pollution Removal **Hydrology**

Quantity

Hydrology Quantity

Hydrology Quantity (High Resolution UTC)

Dataset	Type	Name	ID	Transpiration (MG/yr)	Rainfall Interception (MG/yr)	Avoided Runoff (MG/yr)	Avoided Runoff ($/yr)
NLCD 2011	Block Group	N/A	261251700001	3.9	2.6	0.6	5,055
NLCD 2011	Block Group	N/A	261251701002	1.6	1.1	0.2	2,082
NLCD 2011	Block Group	N/A	261251701001	1.7	1.1	0.2	2,169
NLCD 2011	Block Group	N/A	261251702001	1.7	1.1	0.3	2,245
NLCD 2011	Block Group	N/A	261251702002	1.7	1.1	0.2	2,166
NLCD 2011	Block Group	N/A	261251702003	0.9	0.6	0.1	1,187
NLCD 2011	Block Group	N/A	261251700003	2.7	1.8	0.4	3,473
NLCD 2011	Block Group	N/A	261251700002	3.9	2.6	0.6	4,984
NLCD 2011	Block Group	N/A	261251703001	2.7	1.8	0.4	3,464
NLCD 2011	Block Group	N/A	261251703002	1.4	0.9	0.2	1,785
NLCD 2011	Block Group	N/A	261251704001	1.6	1.1	0.2	2,053
NLCD 2011	Block Group	N/A	261251704002	1.3	0.9	0.2	1,700
NLCD 2011	Block Group	N/A	261251704003	1.4	0.9	0.2	1,835
NLCD 2011	Block Group	N/A	261251704004	1.2	0.8	0.2	1,599
Selection Total:				27.9	18.3	4.0	35,797

Data details are located in the references.

Transpiration: 27.9 MG/yr
Rainfall Interception: 18.3 MG/yr
Avoided Runoff: 4.0 MG/yr - $35,797

MG/yr=Million Gallons per year

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City of Berkley Urban Tree Canopy (UTC) Study
Tree Benefits

Reduce Carbon and CO_2

Trees reduce atmospheric carbon two ways:
- By storing CO2 in their leaves and stems
- By reducing demand for heating and cooling thus reducing emissions associated with power production

The UTC in Berkley stores 30,724 tons of carbon – valued at $1,429,100!

Improve Air Quality
- Absorb gaseous pollutants
- Intercept particulate matter (such as dust, ash pollen and smoke)
- Release oxygen as a product of photosynthesis – two healthy trees produce enough oxygen for one person for one year

Value of UTC Pollution Removal in Berkley: $49,070 / yr – 19,953.1 lb/yr

Reduce Stormwater Runoff*
- Trees draw moisture from the soil, thereby increasing soil water storage (evapotranspiration)
- Trees store water within the structure of the tree itself
- Root growth and decomposition increase the capacity and rate of soil infiltration from rainfall
- Tree canopies diminish the impact of raindrops on barren surfaces

One typical medium size tree can intercept as much as 2,380 gallons of rainfall per year!

* US Forest Service Fact Sheet #4-
https://www.fs.fed.us/psw/topics/urban_forestry/products/CUFR_182_UFfactsheet4.pdf

Reduce Energy Cost
- Shading provided by trees reduces the amount of heat absorbed and stored
- Greenspace provided by trees can lower air temperatures by 5 degrees F
- Evapotranspiration converts liquid water to water vapor and cools the air

Improve Property Value & Beautify Community
- One US study determined that large street trees were the single most important indicator of attractiveness in a community (Coder, 1996).
- Having large trees in yards along streets increases a home's value from 3 percent to 15 percent. **

** Wolf, Kathleen L, PhD, University of Washington (2007) City Trees and Property Values. Arborist News. 16, 4:34-36. https://www.arborday.org/trees/benefits.cfm

Recommendation

# City of Berkley Urban Tree Canopy (UTC) Study Recommendation

🌿 Recommend that a minimum 40% Tree Canopy Target be established for the City of Berkley and all its neighborhoods

🌿 The Urban Tree Canopy % can be used as a guide to focus tree planting efforts and resources

🌿 Efforts should be made to communicate to our community the benefits of trees and achieving a greater urban tree canopy
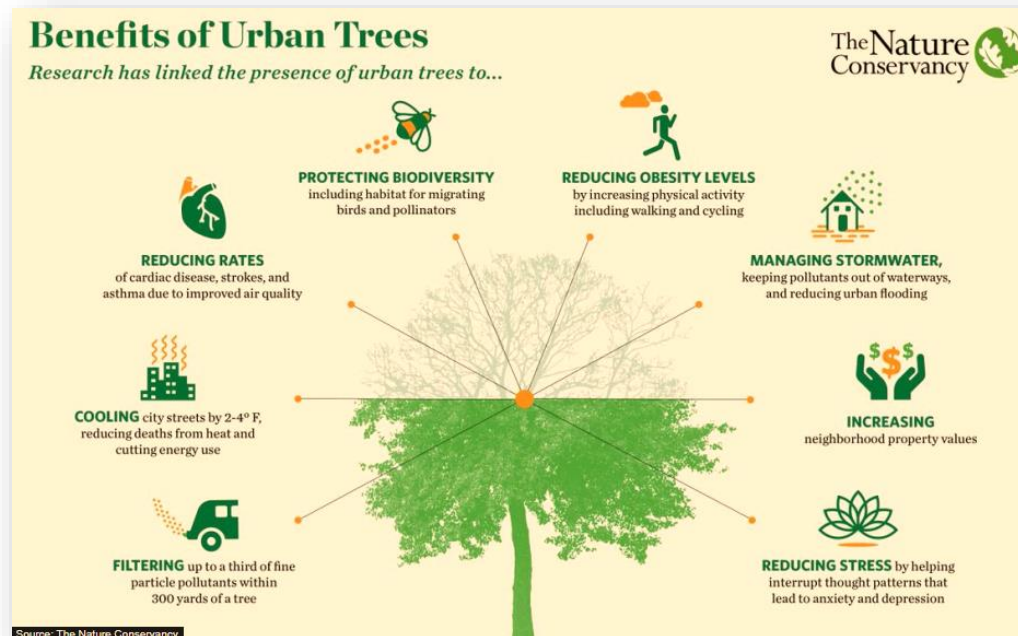
Additional Information -

State of Michigan Canopy Study Summary

MICHIGAN'S URBAN AND COMMUNITY FORESTS
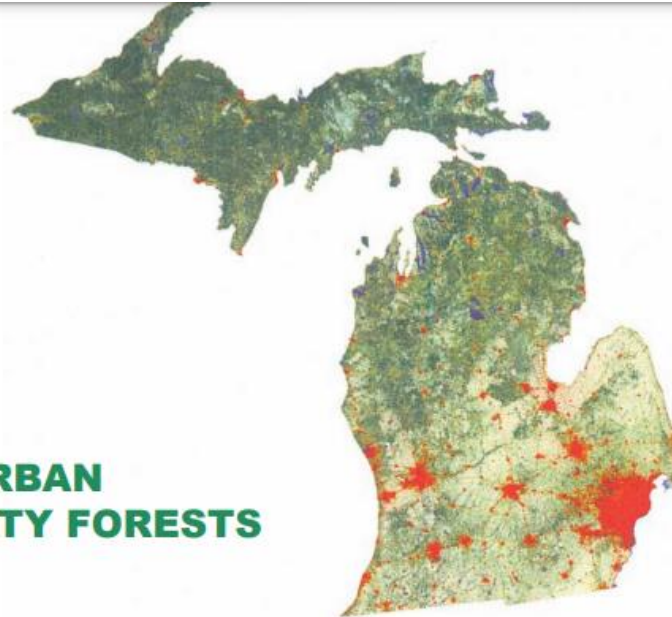
Statewide Summary

Urban or community land in Michigan comprises about 7.3 percent of the state land area in 2000, an increase from 6.5 percent in 1990. Statewide tree canopy cover averages 42.9 percent and tree cover in urban or community areas is about 21.0 percent, with 24.2 percent impervious surface cover and 27.8 percent of the total green space covered by tree canopy cover. Statewide, urban or community land in Michigan has an estimated 107.8 million trees, which store about 20.6 million metric tons of carbon ($469.7 million), and annually remove about 678,000 metric tons of carbon ($15.5 million) and 14,820 metric tons of air pollution ($121.7 million) (Table MI-1).

Tables MI-2 through MI-17 are not printed in this report but are available on the CD located on the inside back cover and at http://nrs.fs.fed.us/data/urban.

State of Michigan Impervious Surface Cover
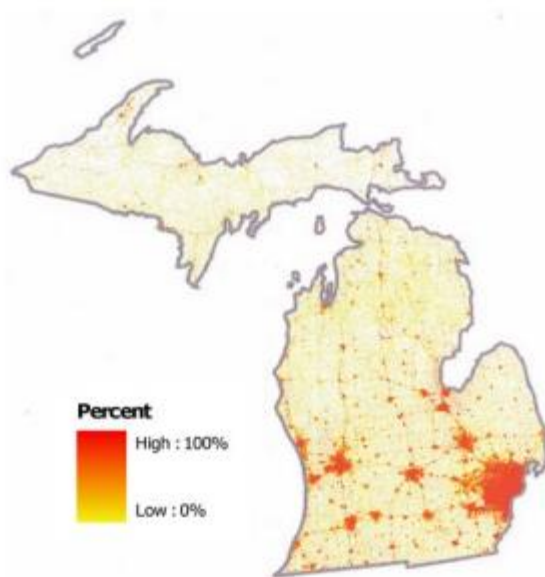
Figure MI-7.—Percentage impervious surface cover.

Percent
	0% - 6.7%
	6.8% - 18.6%
	18.7% - 32.2%
	32.3% - 49.4%
	49.5% - 79.9%
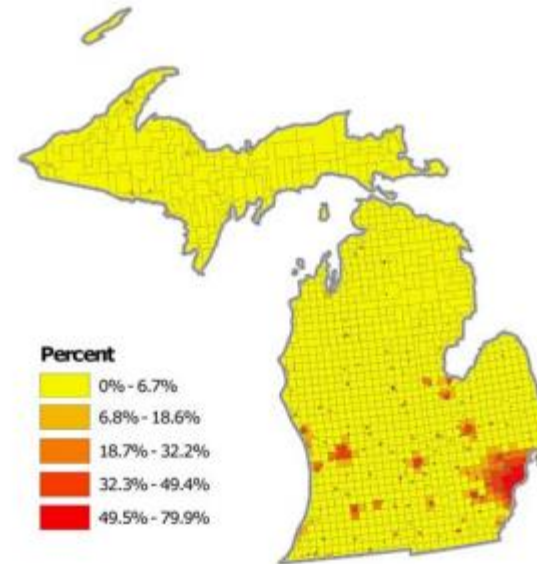
Figure MI-8.—Percentage impervious surface cover within county subdivisions.

Impervious Surface Cover Characteristics

Average impervious surface cover in Michigan is 2.7 percent of the land area (Fig. MI-7), with 400.2 m^2 of impervious surface cover per capita. Average impervious surface cover in urban areas was 27.7 percent, with 320.9 m^2 of impervious surface cover per capita. Within community lands in Michigan, average impervious surface cover was 28.4 percent with 331.6 m^2 of impervious surface cover per capita (Table MI-1). Impervious surface cover varied across the state (Fig. MI-8; Tables MI-5 through 7).

TREE EQUITY SCORE

Get all block groups to a Tree Equity Score of 75

3 of 14 have a Tree Equity Score below 75.

Drag to adjust target score

1,612 trees will be needed to get all block groups to a score of **75**. See the significant benefits to the community this will create.

Sources: i-Tree Landscape, American Forests. For more details, review our underlined methodology.

Total Canopy Added	Annual Ecosystem Service Value	Jobs Supported
1.3 %	**$11,442**	**12.0**

Annual Service Benefits

Carbon Sequestered	Carbon Monoxide	Nitrogen Dioxide
19.8 tons	0.0 tons	0.1 tons

Sulfur Dioxide	PM10* Pollution	PM2.5 Pollution
0.1 tons	0.2 tons	0.0 tons

Ozone	Runoff Avoided	Rain Interception
0.5 tons	$1,380 \, m^3$	$6,314 \, m^3$

City of Berkley Canopy Study
i-Tree Landscape

🌿 This study is based on 2016 datasets as provided by the U.S. Forest Service (USFS) Geospatial Technology and Applications Center.

What is Percent Tree Canopy Cover?

Tree canopy cover (TCC) is the layer of tree leaves, needles, branches, and stems that provide tree coverage of the ground, viewed from an aerial perspective. The TCC maps represent canopy cover values, ranging from 0 to 100, for a 30 meter cell.

EXAMPLE
TCC Value = 65% of 30 meter pixel or cell

30 m   30 m

https://www.mrlc.gov/sites/default/files/TCC_Project_Overview_Brochure-MRLC_2020-06-05.pdf
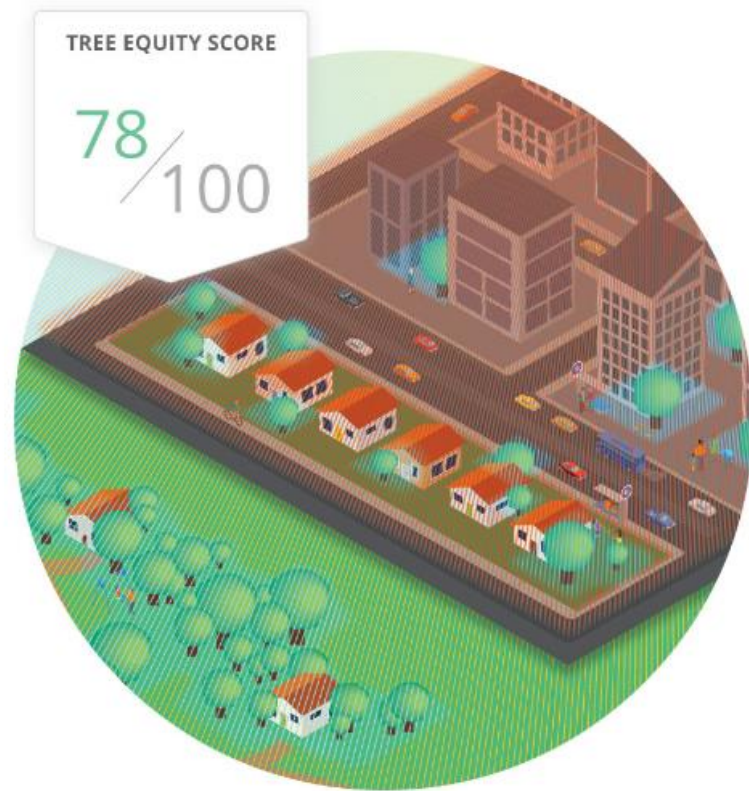
Tree Equity Score

A map of tree cover in any city in the United States is too often a map of race and income. This is unacceptable. Trees are critical infrastructure that every person in every neighborhood deserves. Trees can help address damaging environmental inequities like air pollution.

The score evaluates data from each neighborhood's:

Existing tree canopy

Population density

Income

Employment

Surface temperature

Race

Age

Health

These metrics are combined into a single score between 0 and 100. A score of 100 means that a neighborhood has achieved Tree Equity. To learn more, visit our methodology page.

TREE EQUITY SCORE

78/100

Tree Equity Score Methodology

Step 1: A Neighborhood Goal

Baseline canopy target for our region is 40%.

The target is then adjusted based on population density to estimate a neighborhood goal by utilizing Census data from each census block.

Population Density (ppl/km2)	Target Canopy Adjustment factor	
Very low (<2k)	1.2	X 40% = 48%
Low (2k-4k)	1	X 40% = 40%
Moderate (4k-8k)	0.8	X 40% = 32%
High (>8k)	0.5	(n.a. for Berkley)

Step 2: The Canopy Gap

The neighborhood canopy GAP is calculated by subtracting the existing neighborhood canopy from the neighborhood goal.

The canopy GAP is then normalized to a score from 0-100.

$GAP_{Score} = 100 * GAP / GAP_{max}$, where:

- GAP_{max} is the maximum GAP value citywide for that indicator; and

Notes: If the *GAP* is negative (i.e. Existing canopy is greater than the neighborhood goal), it is adjusted to 0 before normalizing to create the gap score.

Step 3: The Priority Index

The Priority Index is developed to help prioritize the need for planting to achieve Tree Equity. The priority index includes the following equally-weighted characteristics:
- *Income:* Percentage of population below 200% of poverty
- *Employment:* Unemployment rate
- *Race:* Percentage of people who are not white non-Hispanic
- *Age:* Ratio of seniors and children to working-age adults
- *Climate:* Urban Heat Island severity
- *Health:* Prevalence of poor mental, physical, respiratory, and cardiac health (composite index)

These measures are normalized and combined to create a simple priority index from 0 to 1, where 1 indicates a greater amount of inequity. The indices, N, are calculated as follows:

$N_i = (x_i - x_{i,min}) / (x_{i,max} - x_{i,min})$, where, for each indicator, N_i,

- x_i is the value for that neighborhood for that indicator, *i*;
- $x_{i,max}$ is the maximum value citywide for that indicator, *i*; and
- $x_{i,min}$ is the minimum value citywide for that indicator, *i*.

The Priority index, *E*, is then calculated as follows: $E = (N_1 + N_2 + N_3 + N_4 + N_5 + N_6) / 6$, where N_i refers to each indicator value (income, employment, race, age, or climate)

Tree Equity Score Methodology (cont.)

Step 4: Tree Equity Score

Tree Equity Score, TES, is calculated by multiplying the Baseline Gap Score by the Priority Index.

A lower Tree Equity Score indicates a greater priority for closing the tree canopy gap.

$$TES = 100 \, (1 - GAP_{Score} \, E)$$

City of Berkley Tree Equity Score
Data Sources

INDICATOR	SOURCE	DATASET
Tree Canopy Cover	USFS, University of Vermont Spatial Analysis Lab	Detroit 7-class Landcover, 2016 Resolution: 1 foot
Percent in Poverty (pop with income less than 200% federal poverty level)	U.S. Census Bureau American Community Survey 2014-2018	Block Group Table C17002
Percent of People of Color (all people who are not white non-Hispanic)	U.S. Census Bureau American Community Survey 2014-2018	Block Group Table B03002
Unemployment Rate	U.S. Census Bureau American Community Survey 2014-2018	Block Group Table B23025
Seniors (Age 65+)	U.S. Census Bureau American Community Survey 2014-2018	Block Group Table B01001
Children (Age 0-17)	U.S. Census Bureau American Community Survey 2014-2018	Block Group Table B01001
Urban heat island and surface temperature	USGS Earth Explorer	USGS Landsat 8 imagery, thermal bands
Health Index: self-reported poor mental health, poor physical health, asthma, and coronary heart disease	Center for Disease Control CDC PLACES	Census Tract Estimates

Feedback from UVM Spatial Analysis Lab:

Sean MacFaden
to Jarlath, me, tricia, Dennis, Shawn ▾

Wed, Sep 7, 1:43 PM (1 day ago) ☆ ↩ ⋮

HI Kathy,

Thanks very much for your inquiry. I did not contribute to the land-cover project for Detroit but I can tell you that most of our mapping efforts rely on a combination of high-resolution LiDAR and multispectral imagery, providing the ability to map tree canopy at the scale of individual trees. As you suggest, the level of detail available in such products greatly exceeds that of NLCD and other moderate- to coarse-scale datasets, often resulting in very different summary statistics. Without knowing the full details of the UVM-produced Detroit map, I assume that its high resolution (1 ft) facilitated capture of trees that were not mapped by other projects, hence the higher proportion of tree canopy overall.

My colleague Jarlath O'Neil-Dunne (CCed here) coordinated the Detroit project and, if you have any further questions, will be better able to contextualize its methods and results relative to other products. Thanks again for contacting me, and good luck with your tree planting efforts!

Regards,

Sean

Note: Sean's Title at UVM is Senior Geospacial Analyst

Jarlath Patrick O'Neil-Dunne
to me, Sean, tricia, Dennis, Shawn ▾

Sep 7, 2022, 8:39 PM (18 hours ago) ☆ ↩ ⋮

Hi Kathy,
I am pleased to report that we are working with American Forests to update our 2016 work. We hope to use the newly acquired 2022 imagery if it is available in time. We anticipate the results to be ready in early 2023.

Best,
Jarlath

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Jarlath O'Neil-Dunne
*Director, Spatial Analysis Laboratory*
University of Vermont | USDA Forest Service R&D
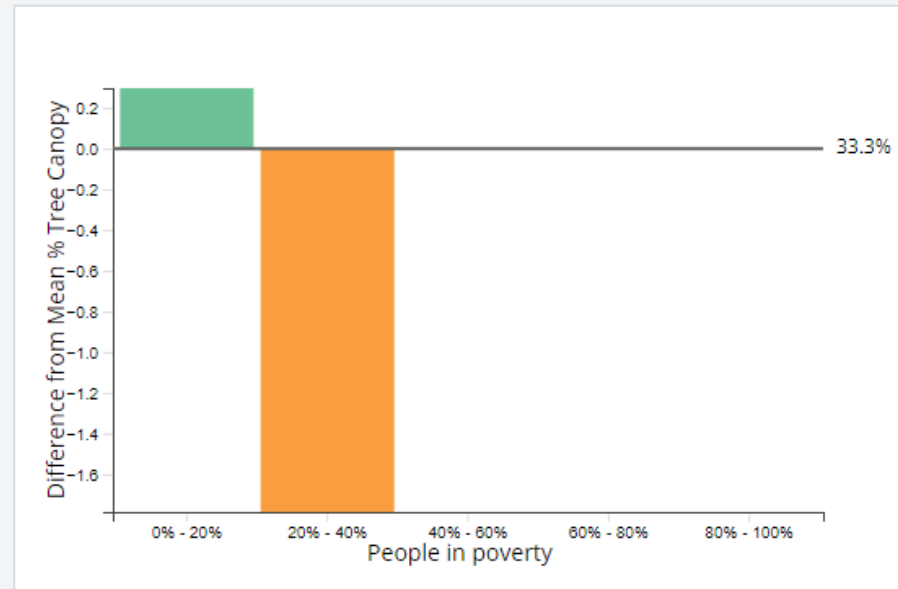
Berkley

Tree Equity Score: 83

Urbanized Area Summary

Urbanized area population	15,360	Seniors	12%
People of color	12%	Children	21%
People in poverty	13%	Unemployment rate	2%

Distribution of Tree Equity Scores

Tree Equity Score

% Tree Canopy vs. % People in Poverty

33.3%

Difference from Mean % Tree Canopy
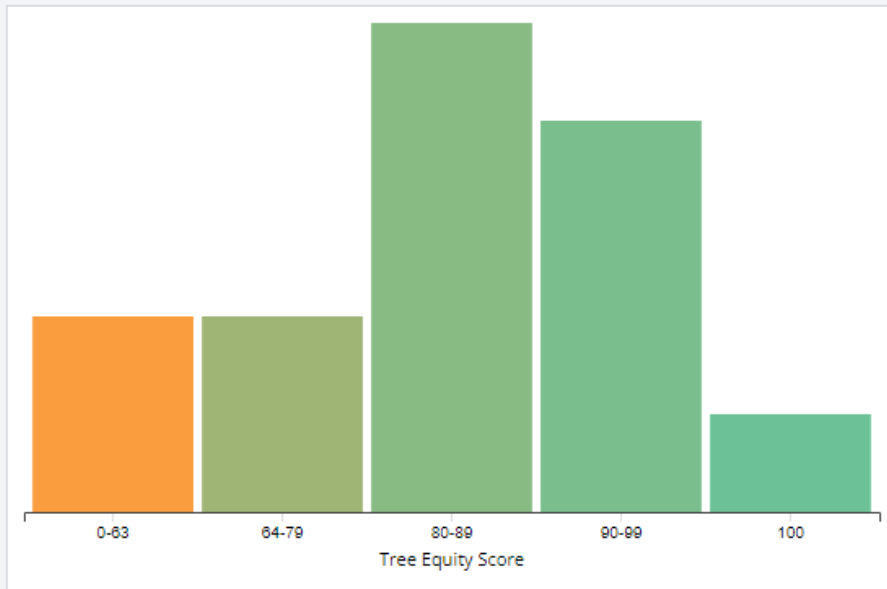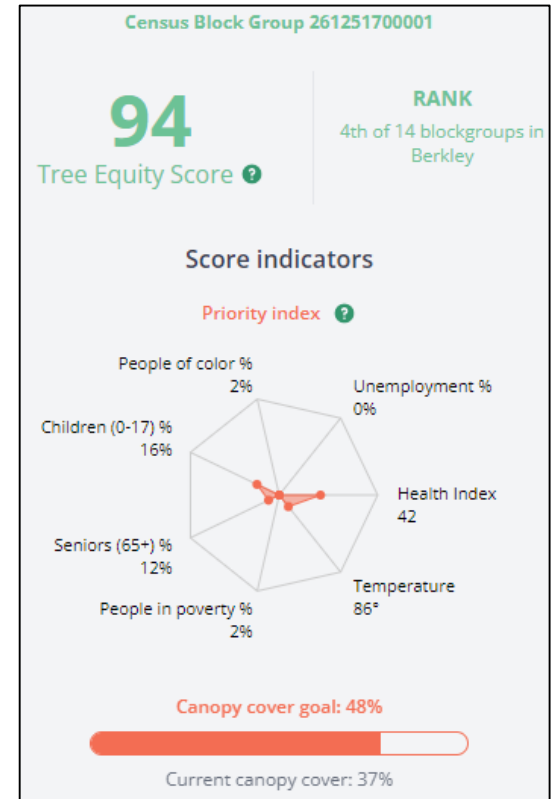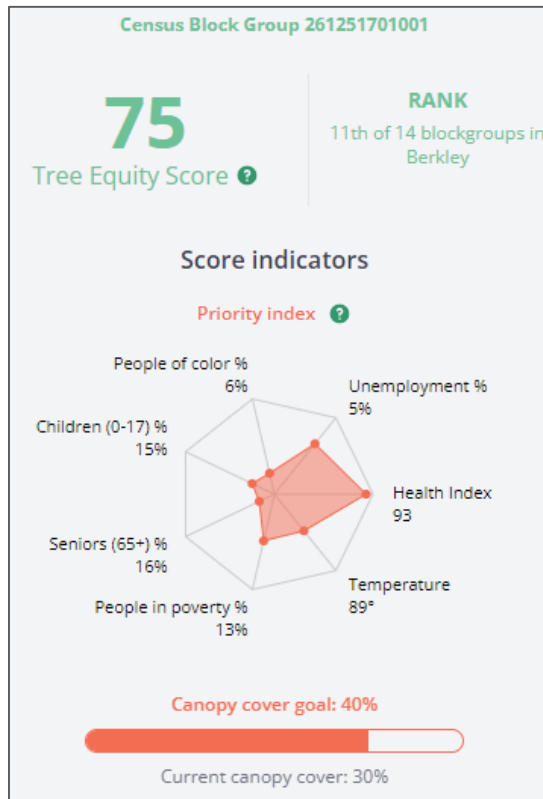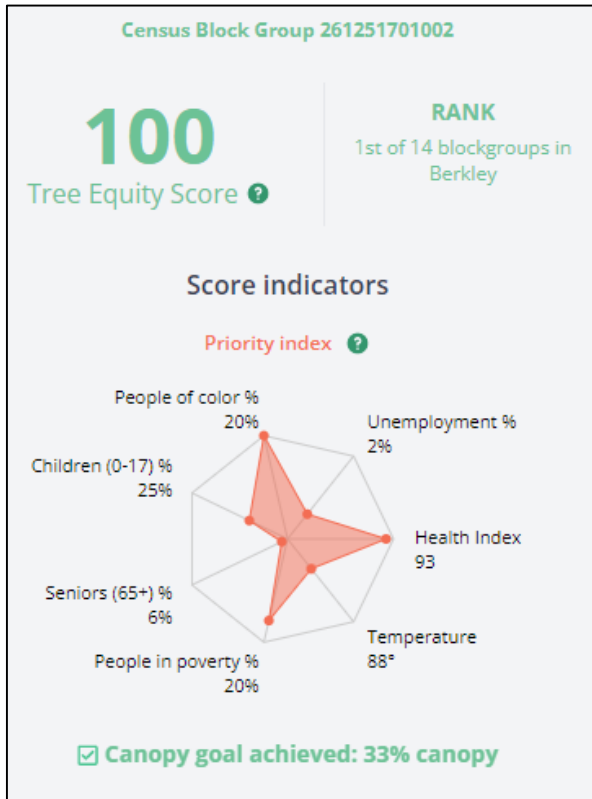
People in poverty

Each bar represents the mean tree canopy % for block groups within the specified range of people in poverty . The amount above or below the thick horizontal line indicates the difference from the area-wide mean canopy %.

The Tree Equity Score Detail for each Census Block

City of Berkley Tree Equity Score Indicators
Census Blocks: '1002; '1001; '0001

Census Block Group 261251701002

100
Tree Equity Score ❓

RANK
1st of 14 blockgroups in Berkley

Score indicators

Priority index ❓

- People of color % 20%
- Unemployment % 2%
- Children (0-17) % 25%
- Health Index 93
- Seniors (65+) % 6%
- Temperature 88°
- People in poverty % 20%

☑ **Canopy goal achieved: 33% canopy**

Census Block Group 261251701001

75
Tree Equity Score ❓

RANK
11th of 14 blockgroups in Berkley

Score indicators

Priority index ❓

- People of color % 6%
- Unemployment % 5%
- Children (0-17) % 15%
- Health Index 93
- Seniors (65+) % 16%
- Temperature 89°
- People in poverty % 13%

Canopy cover goal: 40%

Current canopy cover: 30%

Census Block Group 261251700001

94
Tree Equity Score ❓

RANK
4th of 14 blockgroups in Berkley

Score indicators

Priority index ❓

- People of color % 2%
- Unemployment % 0%
- Children (0-17) % 16%
- Health Index 42
- Seniors (65+) % 12%
- Temperature 86°
- People in poverty % 2%

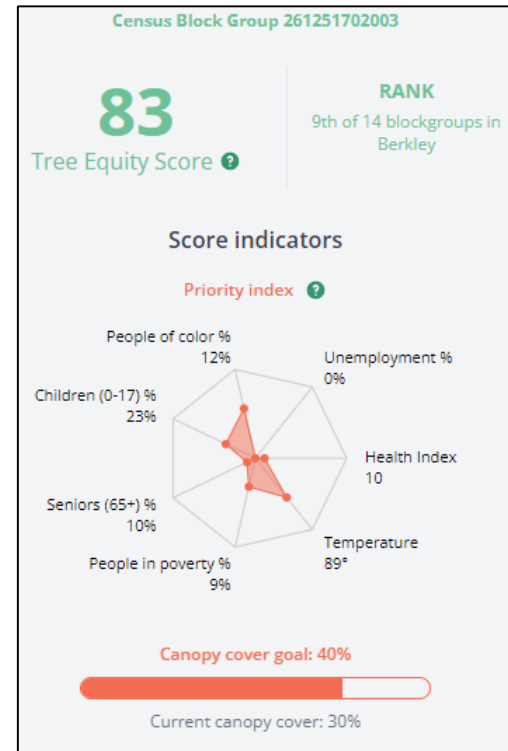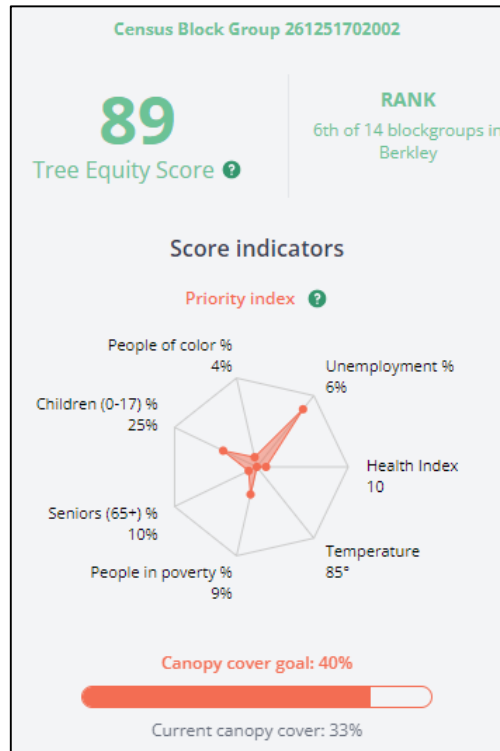**Canopy cover goal: 48%**
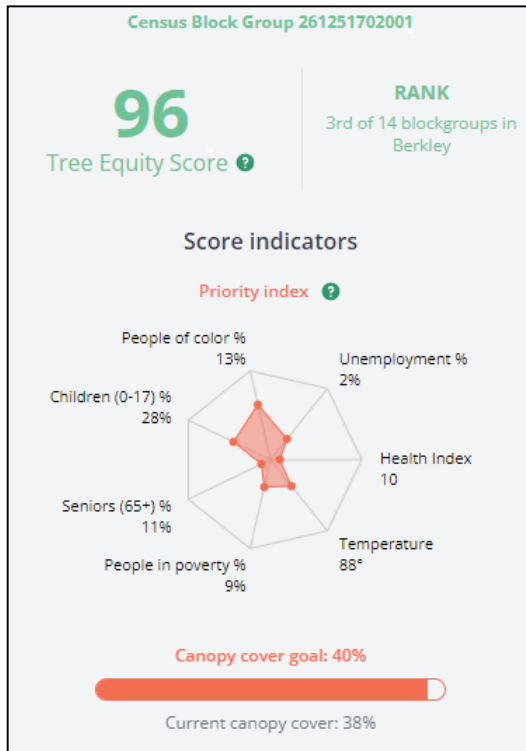
Current canopy cover: 37%

Note: Census Block "1002" is the only neighborhood with Canopy Goal <40%, which means this neighborhood is more dense but may not have less plantable space

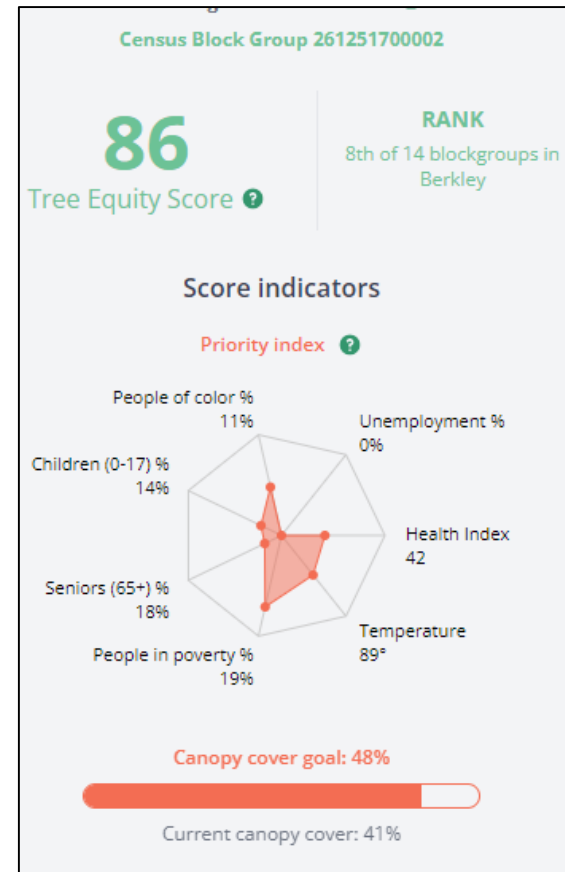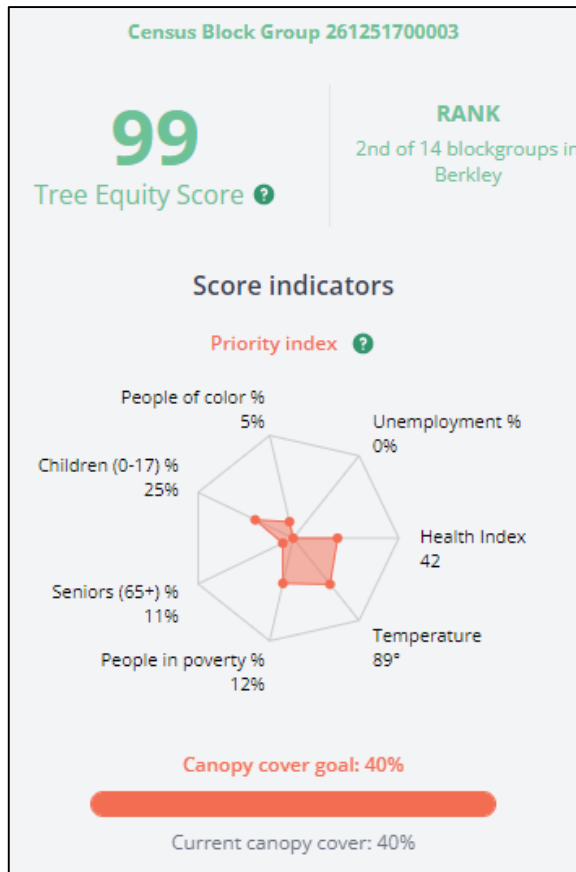Note: Census Block "0001" is one of only 3 neighborhoods with Canopy Goal of 48%

City of Berkley Tree Equity Score Indicators
Census Blocks: '2001; '2002; '2003
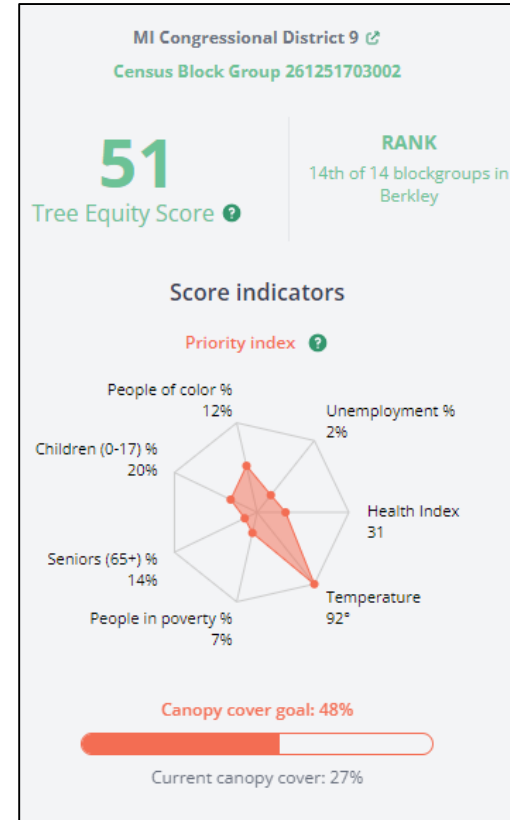
City of Berkley Tree Equity Score Indicators
Census Blocks: '0003; '0002

Census Block Group 261251700003

99
Tree Equity Score ❓

RANK
2nd of 14 blockgroups in Berkley

Score indicators

Priority index ❓

People of color %
5%

Unemployment %
0%

Children (0-17) %
25%

Health Index
42

Seniors (65+) %
11%

Temperature
89°

People in poverty %
12%

Canopy cover goal: 40%

Current canopy cover: 40%

Census Block Group 261251700002

86
Tree Equity Score ❓

RANK
8th of 14 blockgroups in Berkley

Score indicators

Priority index ❓

People of color %
11%

Unemployment %
0%

Children (0-17) %
14%

Health Index
42

Seniors (65+) %
18%

Temperature
89°

People in poverty %
19%

Canopy cover goal: 48%

Current canopy cover: 41%
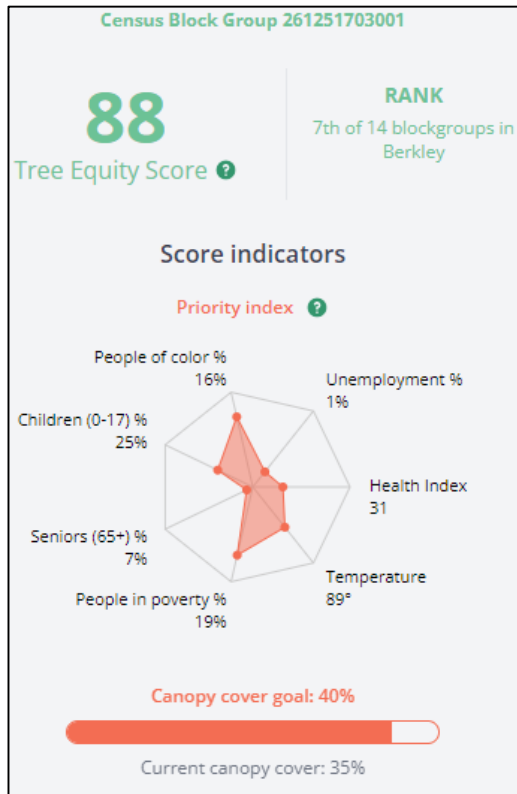
Note: Census Block "0002" is one of only 3 neighborhoods with Canopy Goal of 48%

City of Berkley Tree Equity Score Indicators

Census Blocks: '3001; '3002

Census Block Group 261251703001

88
Tree Equity Score ❓

RANK
7th of 14 blockgroups in Berkley

Score indicators

Priority index ❓

- People of color % 16%
- Unemployment % 1%
- Children (0-17) % 25%
- Health Index 31
- Seniors (65+) % 7%
- Temperature 89°
- People in poverty % 19%

Canopy cover goal: 40%

Current canopy cover: 35%

MI Congressional District 9 ⬈
Census Block Group 261251703002

51
Tree Equity Score ❓

RANK
14th of 14 blockgroups in Berkley

Score indicators

Priority index ❓

- People of color % 12%
- Unemployment % 2%
- Children (0-17) % 20%
- Health Index 31
- Seniors (65+) % 14%
- Temperature 92°
- People in poverty % 7%

Canopy cover goal: 48%

Current canopy cover: 27%

Note: Census Block "3002" is one of only 3 neighborhoods with Canopy Goal of 48%

City of Berkley Tree Equity Score Indicators

Census Blocks: '4001; '4003
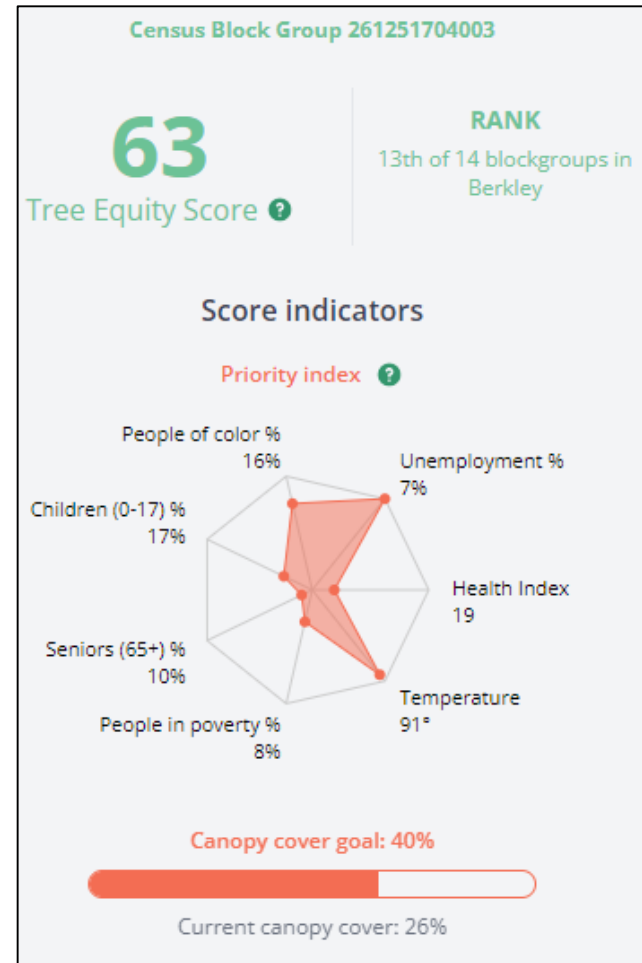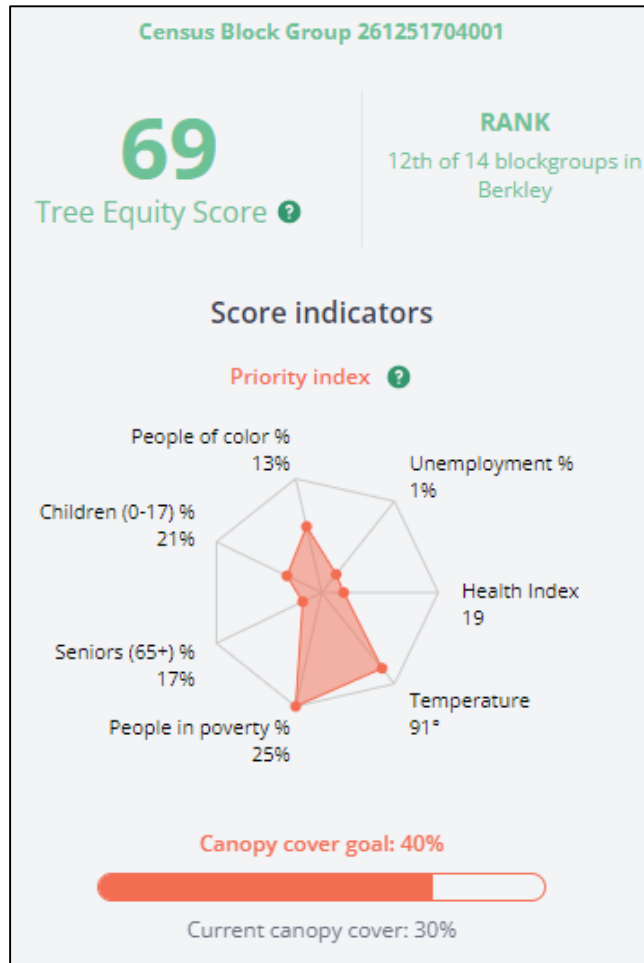
City of Berkley Tree Equity Score Indicators
Census Blocks: '4002; '4004