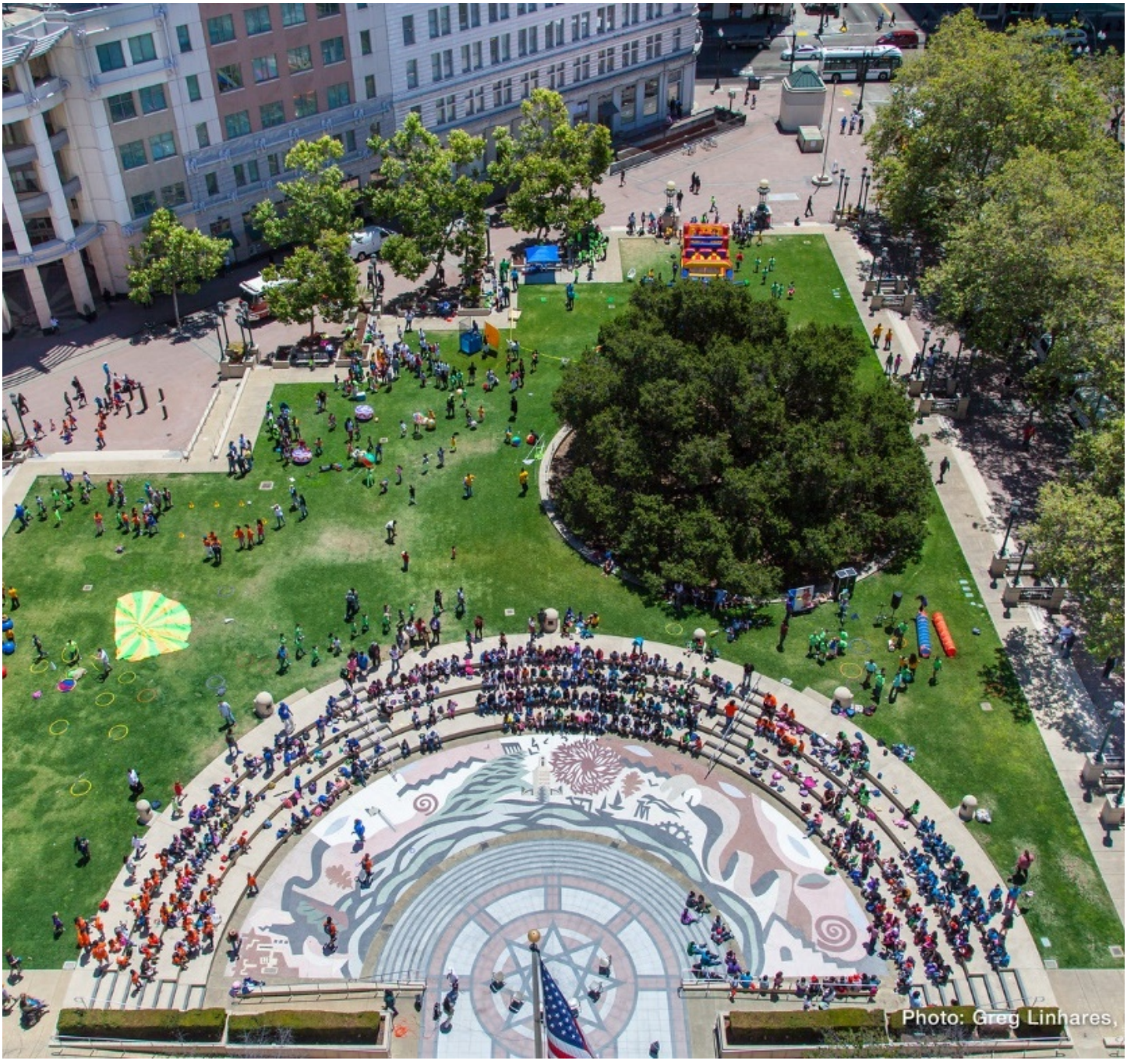
Oakland, CA

Tree Canopy & Land Cover Assessment

CITY OF OAKLAND

2020



DAVEY Resource Group

Oakland, CA

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2020

CITY OF OAKLAND

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Table of Contents

Figures

Tables

Maps

Executive Summary

The amount and distribution of leaf surface area is the driving force behind the urban forest's ability to produce benefits for the community (Clark et al, 1997). As canopy cover increases, so do the benefits contributed by leaf area. These benefits, which include energy savings, air quality, water quality, stormwater interception, aesthetic and other socioeconomic benefits can be quantified for their value to the community. Understanding the location and extent of tree canopy is key to developing and implementing sound management strategies that promote the sustainability and growth of Oakland's urban forest resource and the benefits it provides.

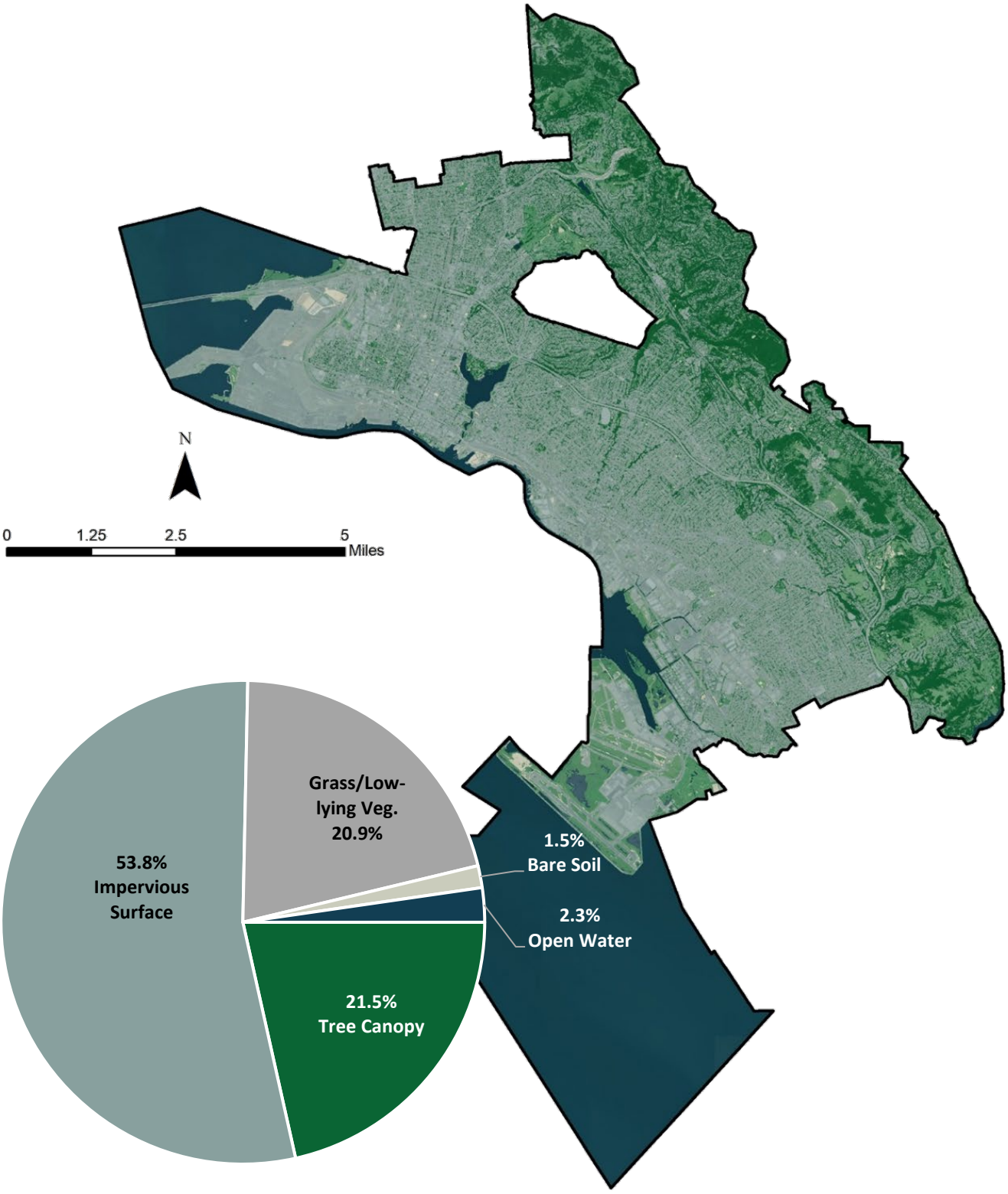
To evaluate tree canopy and its relationship with other primary land cover, The City of Oakland contracted with Davey Resource Group (DRG) in 2019 to conduct a comprehensive Land Cover Assessment. The Assessment, based on 2018 NAIP imagery, provides a birds-eye view of the entire urban forest and establishes a tree canopy baseline of known accuracy and classification methodology. This information provides important benchmark values for the urban forest, including the amount and distribution of tree canopy as well as the benefits to air quality, stormwater, and carbon storage, which allows urban forest managers and planners to make informed decisions on canopy goals, maintenance, preservation, and planting plans. This report provides a summary and discussion on the key findings of this assessment.

Land Cover

Oakland encompasses 78 square miles (49,909 acres), including 21.2 square miles (13,536 acres) of the San Francisco Bay. As tree cover cannot be expanded in areas of open water, this report focuses on land area (36,372 acres). Excluding the bay, the following information summarizes land cover in Oakland:

- 21.5% (7,819 acres) tree canopy, including trees and woody shrubs on both public and privately-owned land
- 53.8% (19,578 acres) impervious surfaces, including roads and structures
- 22.4% (8,141 acres) pervious surfaces, including bare soils and low-lying vegetation
- 2.3% (833.3 acres) open water
- 70.9% of Oakland's tree canopy is on privately owned property (5,545 acres) and private properties have an average canopy cover of 21.5%
- 2,274.3 acres of tree canopy on public property, an average canopy cover of 21.6%
- 308 parks (2,167 acres), including 987.1 acres of tree canopy for an average park canopy cover of 45.6%
- 21,456 acres zoned residential, including 5,782.6 acres of tree canopy and an average canopy cover of 27%
- The highest canopy cover is in areas zoned open space (4,449.5 acres), which include 1,752 acres of tree canopy and an average canopy cover of 39.4%
- Areas zoned industrial (19,635.7 acres) have the lowest average canopy cover (0.3%)

Map 1: Land Cover in Oakland



Management Applications

Understanding the location and extent of tree canopy is key to developing and implementing sound management strategies that promote the sustainability of Oakland's urban forest resource. The data, combined with existing and emerging research, enables managers to balance urban growth with tree preservation and aids in identifying and assessing urban forestry opportunities. A spatial understanding of tree canopy can help urban forest managers and city leadership align urban forestry objectives with community vision. Identifying priority planting areas that yield the most return on investment is especially important.

Oakland has an existing tree canopy cover of 21.5%. Based on the 2015 Urban Tree Canopy Assessment, Oakland has the potential for approximately 48.5% canopy (American Forests). Although the 2015 assessment did not distinguish areas where additional trees would be undesirable (e.g. cemeteries, sports fields and golf courses), it does indicate greater capacity for canopy expansion in Oakland. Recommendations for maintaining existing canopy and promoting growth include:

- Establish canopy goals for the future urban forest based on zoning, land cover distribution, and community values.
- Create a planting plan and identify and prioritize planting spaces that increase environmental benefits, promote environmental justice, and complement the existing urban infrastructure
- Expand canopy by incorporating large-statured shade trees in parks and other public properties with adequate space.
- Incorporate trees into stormwater management strategies to capture and reduce runoff and lessen the impact of flood events on existing infrastructure.
- Encourage tree planting and preservation on private property by incentivizing tree planting, expanding community education, and supporting activities and programs related to urban trees.
- Conduct a land cover assessment every 10 years to track changes in canopy.
- Preserve and protect existing trees and forest stands to sustain the stream of environmental benefits.

Trees canopy covers 7,819 acres or 21.5% of land cover in Oakland.

Introduction

Oakland is located in the Bay Area of northern California in Alameda County. The City adopted their motto "love life" in memory of 16-year-old LoEshe Lacy and all murder victims. In Nigerian Igbo, Lo'Eshe translates to "love life" and represents the community's stand against violence. Oakland is known as a progressive and diverse City with a thriving art scene, historic buildings, and rich cultural history (City of Oakland, 2020). Approximately 433,000 residents live in Oakland (U.S. Census Bureau, 2019).

The community experiences a moderate climate with an average of 24 inches of rainfall each year, most of which occurs in the spring and winter months. The climate is characterized by summer daytime temperatures in the 70s and winter daytime temperatures in the 40s. There are 261 days of sunshine each year and temperatures do not typically drop below freezing (Sperling's Best Places, n.d.).

Individual trees and canopy play an essential role in the community of Oakland by providing many benefits, tangible and intangible, to residents, visitors, and neighboring communities. Research demonstrates that healthy urban trees can improve the local environment and lessen the impact resulting from urbanization and industry (Center for Urban Forest Research, 2017). Trees improve air quality, reduce energy consumption, help manage stormwater, reduce erosion, provide critical habitat for wildlife, and promote a connection with nature.

Urban Tree Canopy and Geographic Information Systems

Urban Tree Canopy is the layer of leaves, branches, and stems that cover the ground when viewed from above. Since trees provide benefits to the community that extend beyond property lines, the assessment includes all tree canopy within the borders of the community and does not distinguish between publicly-owned and privately-owned trees. To place tree canopy in context and better understand its relationship within the community, the assessment included other primary landcover classifications, including impervious surfaces, pervious surfaces, bare soils, and water.

As more communities focus attention on environmental sustainability, community forest management has become increasingly dependent on geographic information systems (GIS). GIS is a powerful tool for urban tree canopy mapping and analysis. Understanding the extent and location of the existing canopy is key to identifying various types of community forest management opportunities, including:

- Future planting plans
- Stormwater management
- Water resource and quality management
- Impact and management of invasive species
- Preservation of environmental benefits
- Outreach and education

Using high-resolution aerial imagery (2018) and infrared technology, DRG remotely mapped tree canopy and land cover (Map 2). The results of the study provide a clear picture of the extent and distribution of tree canopy within Oakland. The data developed during the assessment becomes an important part of the City's GIS database and provides a foundation for developing community goals and urban forest policies. With this data, managers can determine:

- Oakland's progress towards local and regional canopy goals
- Changes in tree canopy over time and in relation to growth and development
- The location and extent of canopy at virtually any level, including land use, zoning, parks
- The location of available planting space to develop strategies for increased canopy in underserved areas

Figure 1: Land Cover Mapping: High-resolution aerial imagery (left) is used to remotely identify existing land cover. Infrared technology delineates living vegetation including tree canopy (middle). Remote sensing software identifies and maps tree canopy and other land cover (right).

Benefits of Urban Tree Canopy

Urban forests continuously mitigate the effects of urbanization and development and protect and enhance the quality of life within the community. The amount and distribution of leaf surface area is the driving force behind the ability of the urban forest to produce benefits for the community (Clark et al, 1997). Healthy trees are vigorous, often producing more leaf surface area each year. Trees and urban forests provide quantifiable benefits to the community in the following ways:

Air Quality

Urban trees improve air quality in five fundamental ways:

- Reducing particulate matter (dust)
- Absorbing gaseous pollutants
- Providing shade and transpiration
- Reducing power plant emissions
- Increasing oxygen levels

Urban trees protect and improve air quality by intercepting particulate matter (PM_{10}), including dust, ash, pollen, and smoke. The particulates are filtered and held in the tree canopy. Trees and forests also absorb harmful gaseous pollutants like ozone (O_3), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). Shade and transpiration reduce the formation of O_3, which is created during higher temperatures. In fact, scientists are now finding that some trees may absorb more volatile organic compounds (VOC's) than previously thought (Karl et al, 2010). VOC's are a class of carbon-based particles emitted from automobile exhaust, lawnmowers, and other human activities. By reducing energy needs, trees also reduce emissions from the generation of power. Also, through photosynthesis, trees and forests increase oxygen levels.

Carbon Reduction

Trees and forests directly reduce CO_2 in the atmosphere through growth and sequestration of carbon as woody and foliar biomass. When trees die and decay, they release much of the stored carbon back to the atmosphere. In urban environments, most trees that die are removed and chipped or disposed of as firewood, releasing stored carbon. Thus, carbon storage is an indication of the amount of carbon that can be gained and lost over the course of a tree's lifecycle through growth and decomposition. Indirectly, trees and forests reduce CO_2 by lowering the demand for energy and reducing the CO_2 emissions from the consumption of natural gas and the generation of electric power.

Purchasing emission allowances (offsets) has led to the acceptance of carbon credits as a commodity that can be exchanged for financial gain. Thus, some communities are exploring the concept of planting trees to develop a carbon offset (or credit). UESPD and USDA Forest Service recently led the development of Urban Forest Greenhouse Gas Reporting Protocol (McPherson et al, 2008/2010). The protocol establishes methods for calculating reductions and provides guidance for accounting and reporting. These methods guide urban forest managers in developing tree planting and stewardship projects that could be registered for greenhouse gas reduction credits.

Stormwater Reduction

Trees and forests improve and protect the quality of surface waters, such as creeks, rivers, and lakes, by reducing the impacts of stormwater runoff through:

- Interception
- Increasing soil capacity and rate of infiltration
- Reducing soil erosion

Trees intercept precipitation in their canopy, which acts as a mini-reservoir (Xiao et al, 1998). During storm events, this interception reduces and slows runoff. In addition to catching stormwater, canopy interception lessens the erosive impact of raindrops on bare soil. Root growth and root decomposition increase the capacity and rate of soil infiltration by rainfall and snowmelt (McPherson et al, 2002). Each of these processes greatly reduces the flow and volume of stormwater runoff, avoiding erosion and preventing sediments and other pollutants from entering local creeks and waterways.

Surface runoff is a cause for concern in many urban areas as it contributes to the pollution and flooding of streams, wetlands, rivers, lakes, and oceans. Figure 2 illustrates the benefits of trees to reducing stormwater runoff. When rain falls on impervious surfaces it cannot permeate into the soil. Instead, it collects into flows and runoff. The runoff picks up sediment, trash, oil, bacteria, and other contaminants from paved surfaces and carries this non-point source pollution to bodies of water. Along with pollutants, stormwater runoff can produce flows with large volumes of water in a short period of time, causing flooding and erosion.

During precipitation events, some portion of the precipitation is intercepted by vegetation (trees, shrubs, grass, other vegetation). Some of the water is temporarily held by leaves and bark and later evaporates or gradually infiltrates the soil, which slows the movement of water off site. The portion of the precipitation that reaches the ground and does not infiltrate into the soil or falls on impervious surfaces, becomes surface runoff (Hirabayashi, 2012). In urban areas, the substantial extent of impervious surface increases the amount of surface runoff and the cost of infrastructure a community must invest to manage stormwater for the safety of residents and property.

A full explanation of stormwater value calculations can be found in Appendix B.

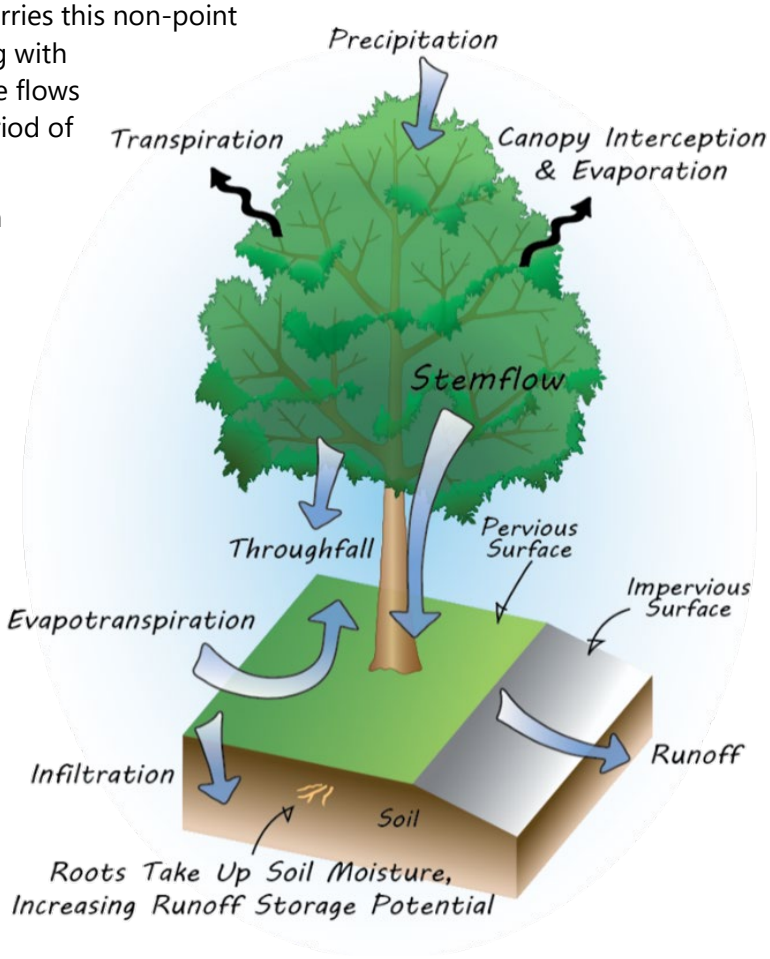


Figure 2: How Trees Reduce Stormwater Runoff

Energy Savings

Urban trees and forests modify climate and conserve energy in three principal ways:

- Shading dwellings and hardscape
- Transpiration
- Wind reduction

Shade from trees reduces the amount of radiant energy absorbed and stored by hardscapes and other impervious surfaces, thereby reducing the heat island effect, a term that describes the increase in urban temperatures in relation to surrounding locations. Transpiration releases water vapor from tree canopies, which cools the surrounding area. Through shade and transpiration, trees and other vegetation within an urban setting modify the environment and reduce heat island effects. Temperature differences of more than 9°F (5°C) have been observed between city centers without adequate canopy cover and more vegetated suburban areas (Akbari et al, 1997).

Trees reduce wind speeds relative to their canopy size and height by up to 50%. Trees also influence the movement of warm air and pollutants along streets and out of urban canyons. By reducing air movement into buildings and against conductive surfaces (e.g., glass and metal siding), trees reduce conductive heat loss from buildings, translating into potential annual heating savings of 25% (Heisler, 1986). Reducing energy needs has the bonus of reducing carbon dioxide (CO_2) emissions from fossil fuel power plants.

Aesthetics and Socioeconomics

While perhaps the most difficult to quantify, the aesthetic and socioeconomic benefits from trees may be among their greatest contributions, including:

- Beautification, comfort, and aesthetics
- Shade and privacy
- Wildlife habitat and ecosystem health
- Opportunities for recreation
- Creation of a sense of place and history
- Human health

Many of these benefits are captured as a percentage of property values, through higher sales prices where individual trees and forests are located.

Calculating Tree Benefits

While all these tree benefits are provided by the urban forest, it can be useful to understand the contribution of just one tree. Individuals can calculate the benefits of individual trees to their property by using the National Tree Benefit Calculator or with i-Tree *Design*. (design.itreetools.org).

Trees are vital to the community and provide numerous environmental and socioeconomic benefits.

Land Cover

Overall Canopy

Excluding the bay, Oakland encompasses an area of approximately 56.8 square miles (36,372 acres), of which approximately 12.2 square miles (7,819 acres) is tree canopy, for and average canopy cover of 21.5% over land area (Figure 5). In addition to tree canopy, Oakland's land cover includes 53.8% impervious surface, 20.9% grass and low-lying vegetation, 2.3% open water, and 1.5% bare soil (Table 2).

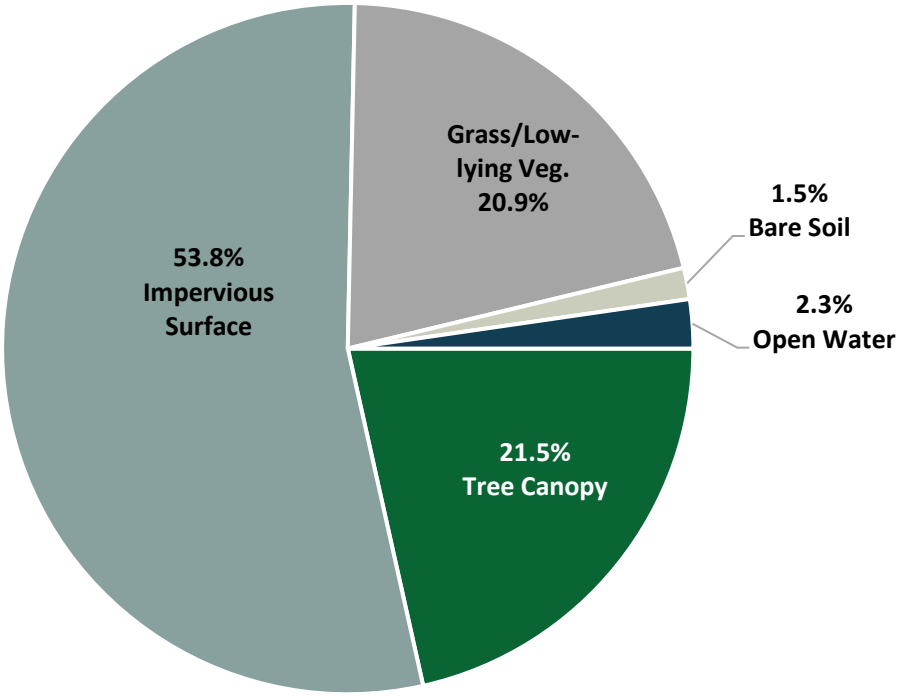
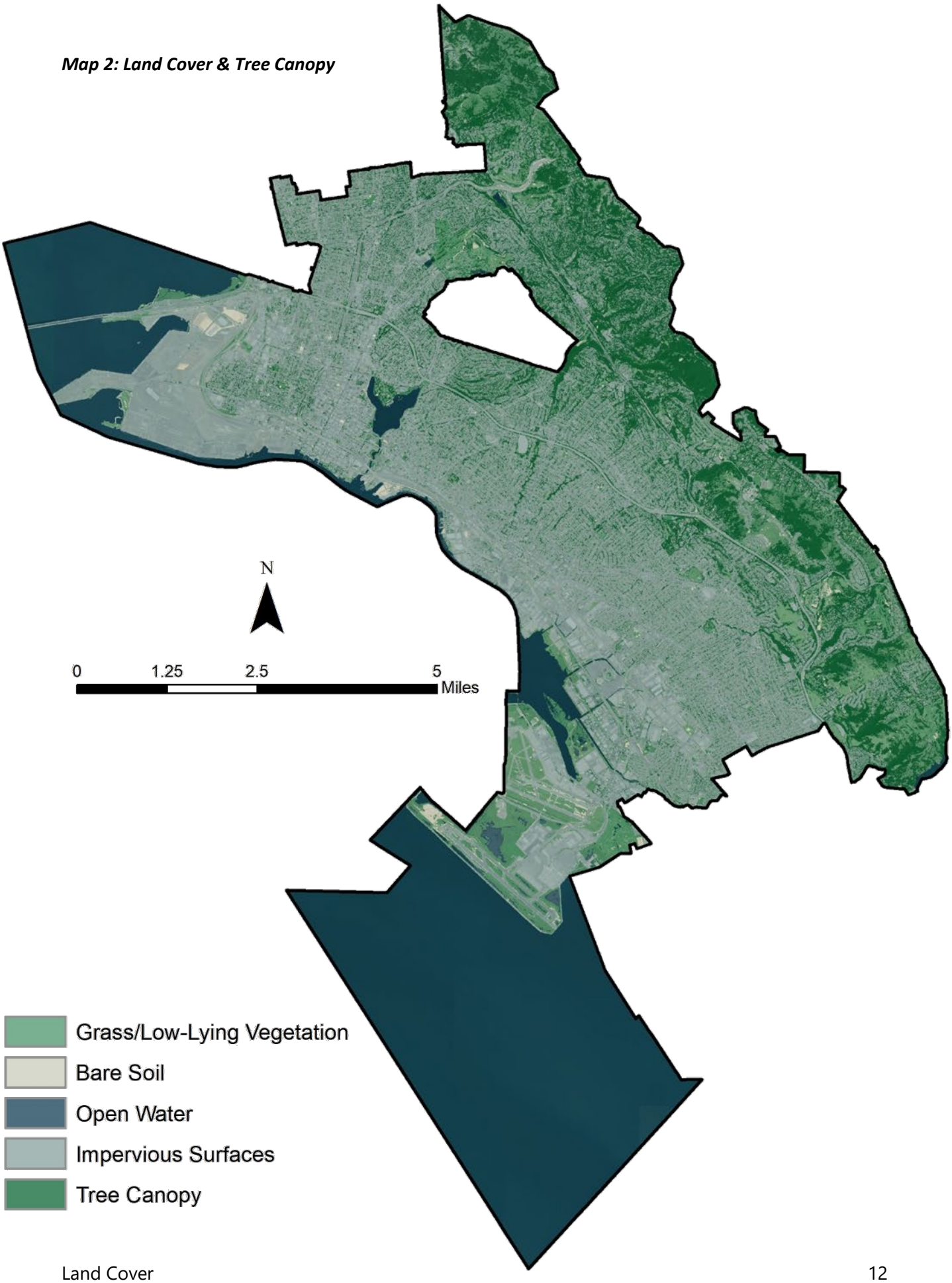


Figure 3: Oakland Land Cover

Table 1: Oakland Land Cover Classification Summary

Land Cover Class	Acres	% of Land Cover
Impervious Surfaces	19,578.29	53.8
Tree Canopy	7,819.16	21.5
Grass/Low-Lying Vegetation	7,608.02	20.9
Open Water	833.32	2.3
Bare Soil	533.43	1.5
Total	**36,372.21**	**100%**

Map 2: Land Cover & Tree Canopy



Tree Canopy by Council District

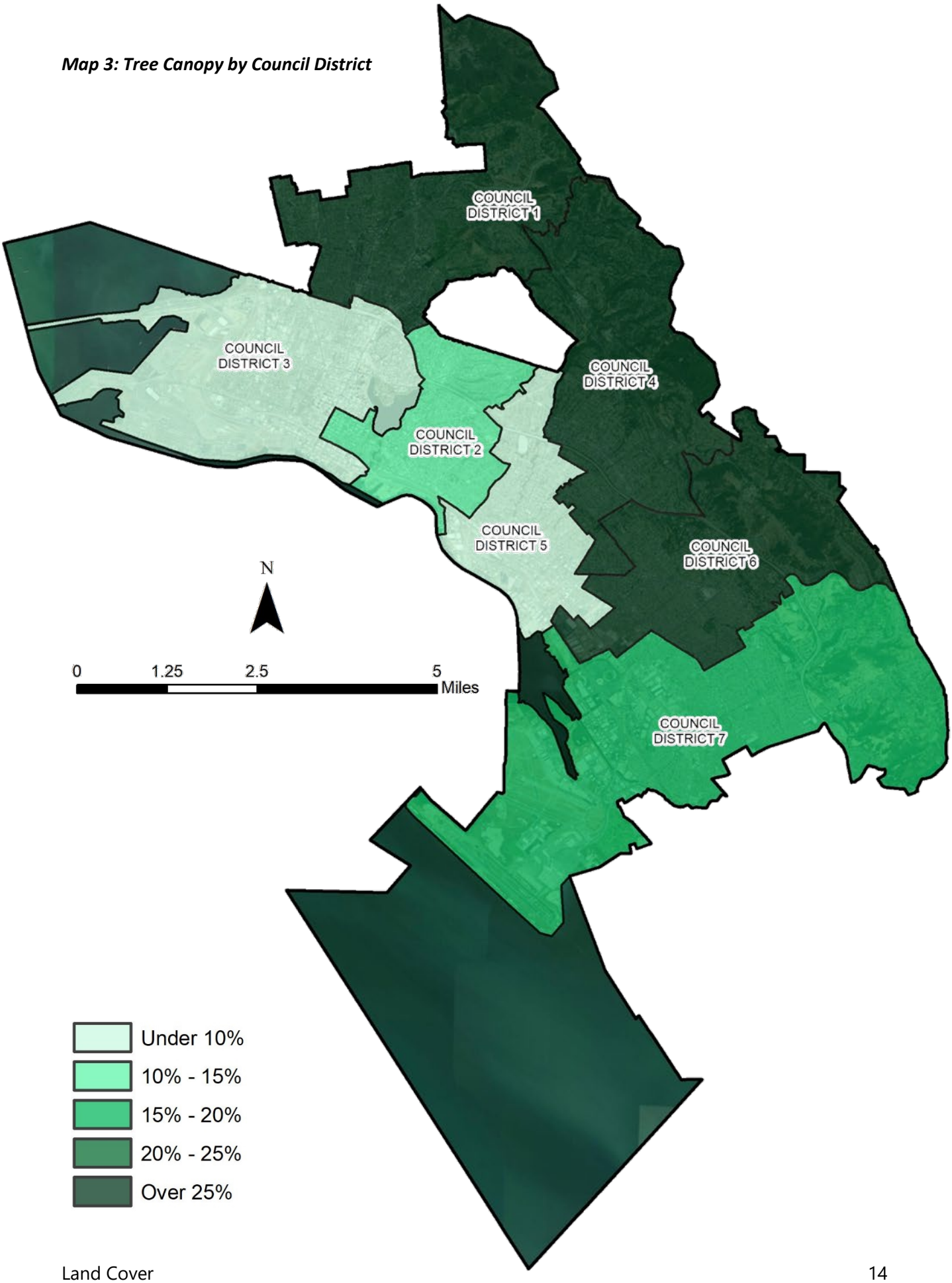
Understanding the spatial distribution of canopy across the community can help inform planting plans and canopy goals. Oakland is divided into seven Council Districts that vary in size and amount of tree canopy (Map 6). Together, the seven Council Districts cover 36,376 acres with 7,818 acres of tree canopy and an average canopy cover of 21.5% (Table 2).

Council District 4 has the highest canopy cover (43.2%) which can be partially attributed to the high proportion of park land, including Joaquin Miller Park (427 acres and 356 acres of canopy). District 7 is the largest Council District, encompassing 9,708 acres with 1,485 acres of tree canopy and an average canopy cover of 15.29%. District 3 has the lowest average canopy cover at 5.3%, which may be partially attributed to the Port of Oakland (Table 2). Council Districts 3 and 7 have a greater amount of industrial parcels when compared to other Council Districts.

Table 2: Tree Canopy by Council District

Council District	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Council District 1	5,619.65	1,745.16	31.05	2,374.96	1,421.98	59.58	17.97
Council District 2	2,504.86	327.11	13.06	1,735.21	319.03	35.94	87.57
Council District 3	5,503.81	288.8	5.25	4,329.87	424.4	133.85	326.89
Council District 4	5,450.00	2,350.18	43.12	2,087.26	984.99	26.51	1.07
Council District 5	2,650.88	238.7	9.00	2,060.97	292.29	7.94	50.98
Council District 6	4,929.88	1,382.92	28.05	2,326.18	1,169.74	47.17	3.87
Council District 7	9,708.04	1,484.76	15.29	4,661.88	2,994.14	222.4	344.86
Total	**36,367.13**	**7,817.62**	**21.50%**	**19,576.33**	**7,606.55**	**533.40**	**833.22**

Map 3: Tree Canopy by Council District



Canopy by Land Ownership

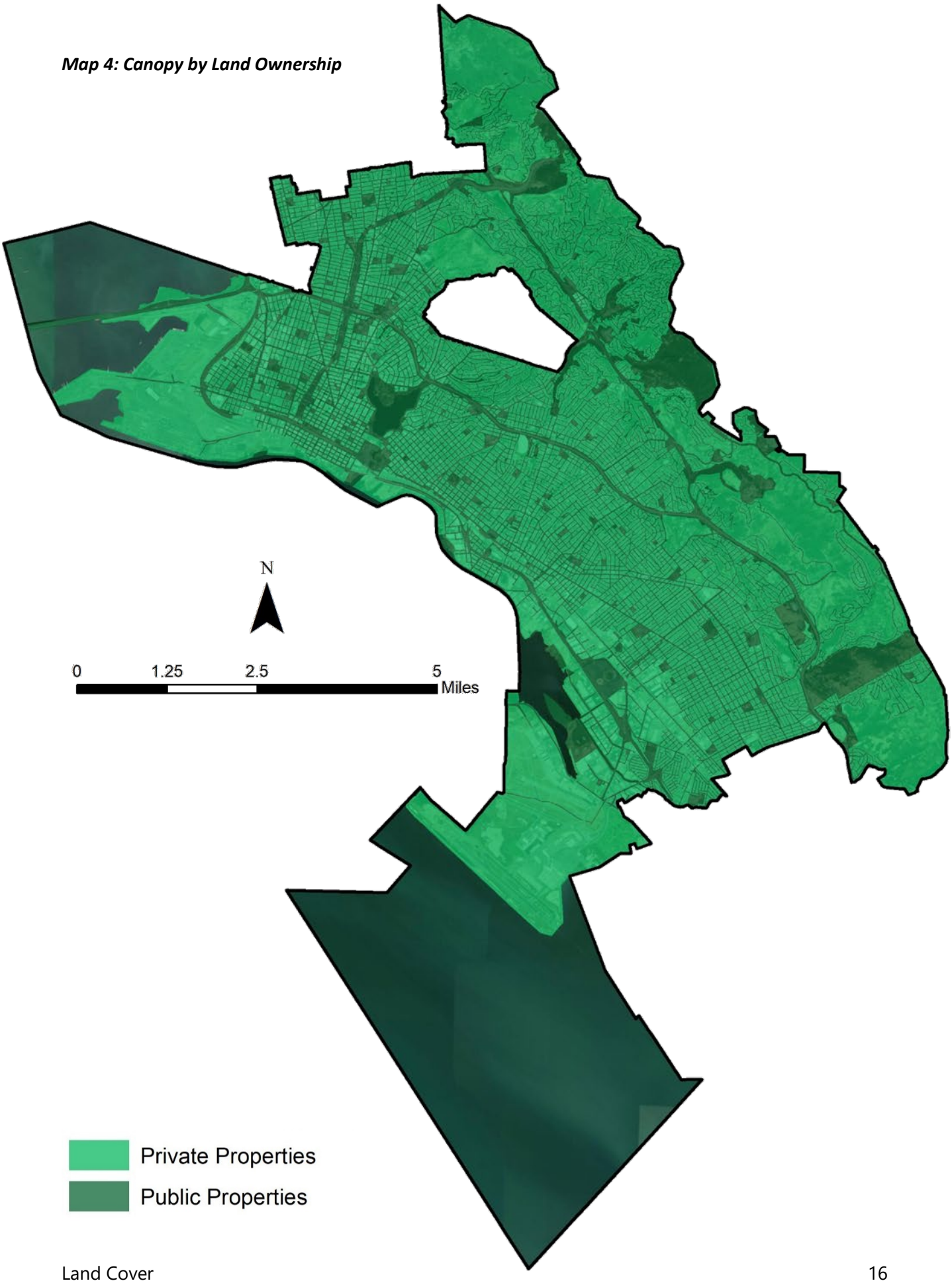
The urban forest is comprised of all trees in the City, including trees on publicly and privately owned properties. Mapping tree canopy by land ownership can help managers better understand the distribution of the urban forest and serve as a benchmark to determine where canopy changes are occurring. More than 70% of Oakland's tree canopy is on privately owned property (5,545 acres) (Table 3). Overall, the level of canopy cover between privately and publicly owned lands in Oakland is nearly the same.

Table 3: Canopy Cover in Public and Private Land

Land Ownership	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Private Properties	25,844.17	5,544.90	21.46	13,347.26	6,024.75	420.24	507.02
Public Properties	10,528.04	2,274.26	21.60	6,231.03	1,583.27	113.19	326.30
Total	**36,372.22**	**7,819.16**	**21.50%**	**19,578.29**	**7,608.02**	**533.43**	**833.32**

Publicly- and privately-owned lands have a similar percentage of tree canopy, around 21.5%.

Map 4: Canopy by Land Ownership



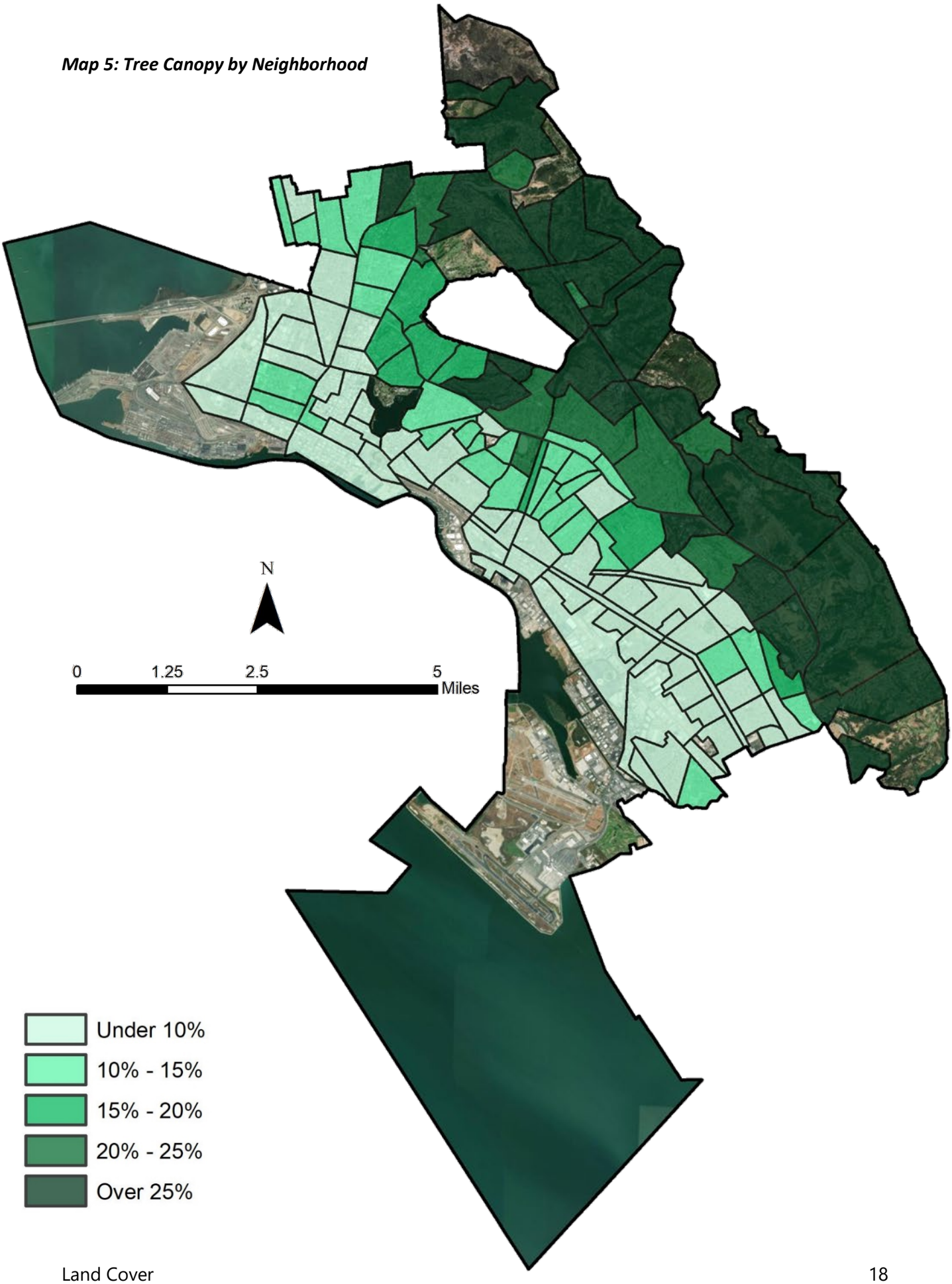
Tree Canopy by Neighborhood

There are 130 neighborhoods in Oakland, that cover a total of 26,943 acres (Table 11, Appendix C). Together, Oakland's neighborhoods include 6,288 acres of tree canopy for average canopy cover of 23.3%. Of Oakland's top 10 largest neighborhoods, Piedmont Pines has the highest canopy cover of 59.7% (382.6 acres) followed by Claremont (48.7%) (Table 4). Oakland's largest neighborhood, Coliseum Industrial Complex has the lowest canopy cover of 2.65%. The next largest neighborhood, Sequoyah, has 676 acres of tree canopy and an average canopy cover of 39.9%.

Table 4: Canopy Cover in Oakland's Top 10 Largest Neighborhoods

Neighborhood	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Coliseum Industrial Complex	1,179.34	31.20	2.65	1,026.80	93.05	15.82	12.47
Sequoyah	1,696.38	676.28	39.87	337.10	643.82	38.99	0.18
Caballo Hills	1,035.53	458.13	44.24	166.49	389.80	21.11	0.00
Upper Rockridge	726.84	218.60	30.08	322.81	165.86	10.06	9.51
Piedmont Pines	641.24	382.60	59.67	155.81	101.05	1.78	0.00
Montclair	635.78	295.83	46.53	211.49	126.39	2.07	0.00
Claremont	633.66	308.45	48.68	127.38	196.75	1.08	0.01
Redwood Heights	622.09	154.18	24.78	345.76	119.21	2.52	0.42
Chabot Park	609.89	201.08	32.97	197.11	207.83	3.87	0.00
Skyline-Hillcrest Estates	517.29	234.63	45.36	129.83	148.38	4.44	0.00
All other Neighborhoods	18,645.08	3,326.55	17.84	12,294.97	2,823.67	131.48	68.40
Total	**26,943.12**	**6,287.55**	**23.33%**	**15,315.57**	**5,015.80**	**233.21**	**90.99**

Map 5: Tree Canopy by Neighborhood



Canopy by Parks

Oakland has 308 parks, that cover a total of 2,167 acres (Table 5). Together, Oakland's parks include 987.1 acres of tree canopy and an average canopy cover of 45.6%. Of Oakland's top 10 largest parks, Joaquin Miller Park has the highest level of canopy cover at 83.4% followed by Dimond Canyon (81.9%) and Leona Heights (81.4%). Lakeside Park has the lowest level of canopy cover less than 1%. Joaquin Miller Park has the most canopy acres (356.2 acres). Oakland's largest park, Knowland Park (476.5 acres) has nearly 207 acres of tree canopy and an average canopy cover of 43.4%.

Table 5: Canopy Cover in Oakland's Top 10 Largest Parks

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Knowland Park	476.49	206.83	43.41	24.57	240.33	4.75	0.00
Joaquin Miller Park	427.16	356.22	83.39	15.61	51.80	3.53	0.00
Lakeside Park	143.65	0.14	0.10	1.43	0.09	0.34	141.65
Lake Chabot Golf Course	135.62	32.96	24.30	6.23	96.31	0.13	0.00
King Estates Open Space	77.42	11.90	15.37	1.08	64.44	0.00	0.00
Lakeside Park - Lakeside Proper	68.85	22.36	32.47	14.11	22.25	1.69	8.44
Grizzly Peak Open Space	67.06	29.15	43.46	0.41	37.46	0.04	0.00
Dimond Canyon	60.92	49.91	81.93	1.71	7.67	1.62	0.00
Dunsmuir Estate Park	53.67	29.44	54.85	2.24	21.98	0.01	0.00
Leona Heights	51.59	42.01	81.43	0.42	8.96	0.19	0.00
All other Parks	604.25	206.19	27.55	128.56	235.81	29.13	4.57
Total	**2,166.68**	**987.09**	**45.56%**	**196.38**	**787.10**	**41.44**	**154.66**

Map 6: Oakland Parks

Tree Canopy by Watershed

There are 9 watersheds in Oakland, encompassing a total of 28,665 acres and with 6,570 acres of tree canopy and an average canopy cover of 22.9%. The largest watershed, 14th Avenue Creek and San Antonio has 7,336 acres with 446.8 acres of tree canopy for a total canopy cover of 6.1% (Table 7). Sausal Creek has the highest canopy cover at 44.7% (Figure 4).

Table 6: Tree Canopy by Watershed

Watershed	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
14th Avenue Creek & San Antonio	7,336.02	446.76	6.09	5,935.84	664.32	142.22	146.87
Lion Creek, Arroyo Viejo Creek & Damon Slough	6,295.07	1,976.48	31.40	2,382.72	1,838.33	84.19	13.34
Temescal Creek	3,943.25	1,458.70	36.99	1,493.52	947.70	33.82	9.51
54th Avenue, Peralta, Courtland & Seminary Creeks	3,687.71	628.38	17.04	2,461.67	583.58	10.64	3.43
Sausal Creek	2,962.57	1,324.66	44.71	1,187.78	437.42	11.16	1.56
Elmhurst Creek	1,743.75	121.10	6.94	1,378.78	219.94	15.71	8.22
Rockridge & Glen Echo Creeks	1,573.37	321.12	20.41	870.42	347.86	22.24	11.73
Wildwood & Trestle Glen Creeks	752.95	220.24	29.25	379.20	152.01	1.47	0.02
Pleasant Valley Creek	370.37	72.58	19.60	239.19	55.93	2.00	0.67
Total	**28,665.04**	**6,570.02**	**22.92%**	**16,329.12**	**5,247.09**	**323.46**	**195.35**

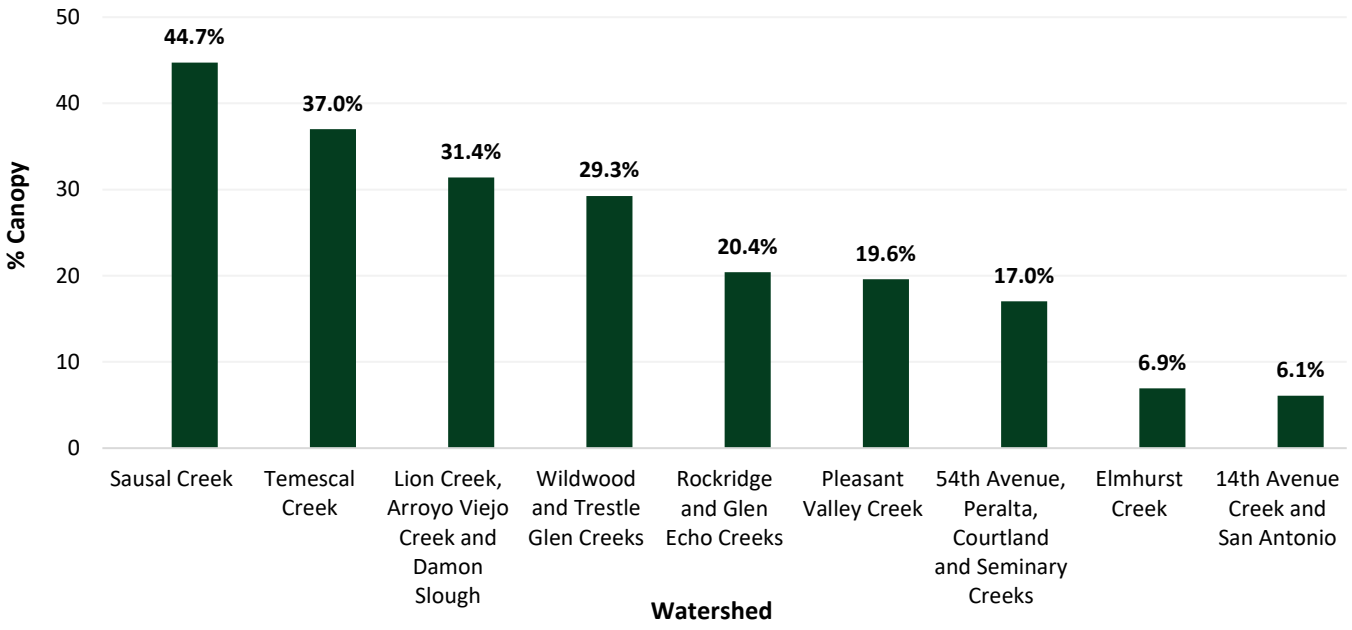
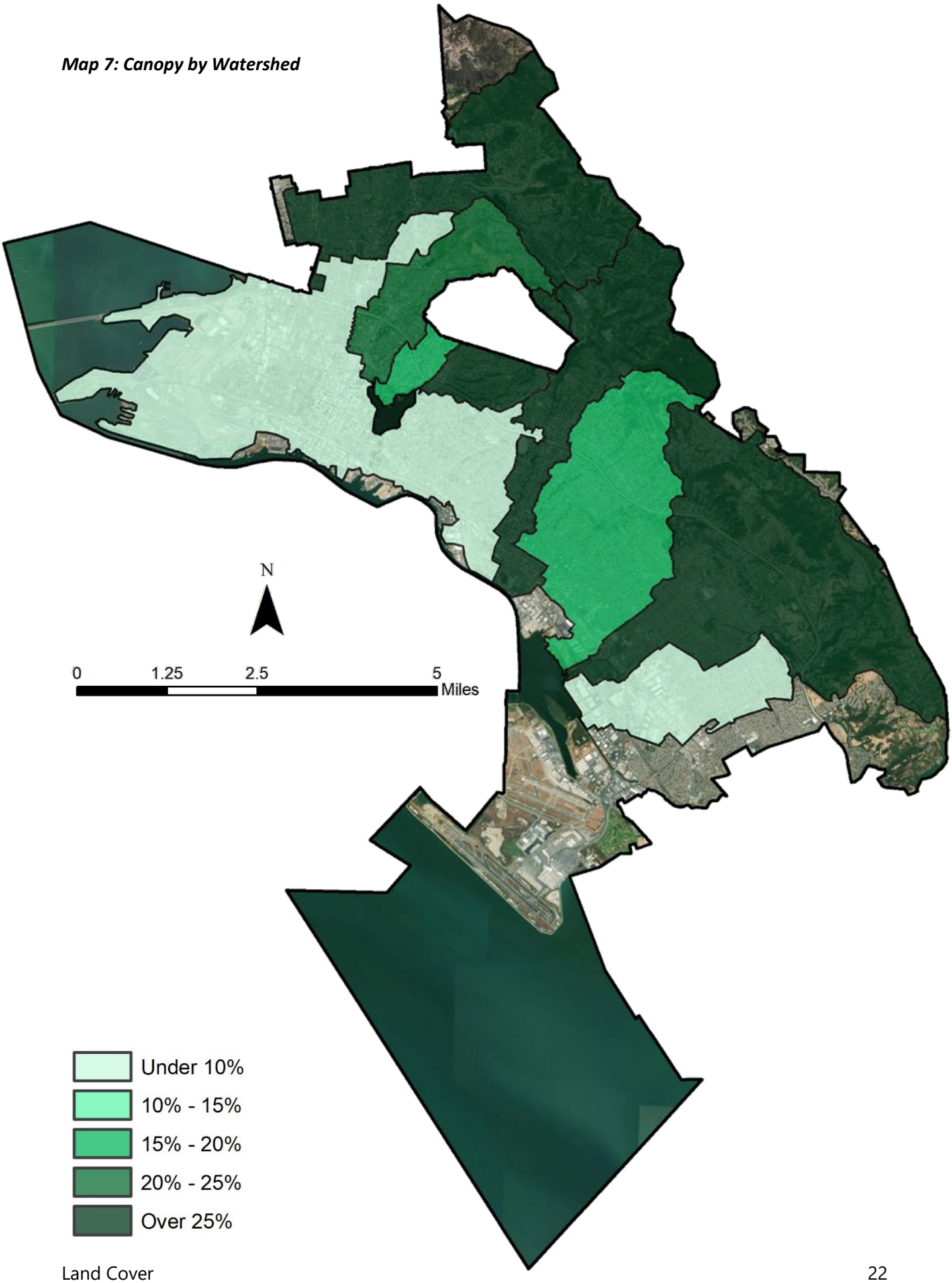


Figure 4: Canopy by Watershed

Map 7: Canopy by Watershed



Tree Canopy by Zoning

Oakland includes nearly 36,350 acres with designated zoning and tree canopy cover varies widely across these designations. Areas zoned as open space have the highest average canopy cover at 44.0%. Areas zoned industrial have less than 1% canopy cover. Residential zoning covers the largest area (21,444 acres) and includes 5,783 acres of tree canopy and an average canopy cover of nearly 27%.

Table 7: Tree Canopy by Zoning

Zone	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Residential	21,443.76	5,782.51	26.97	11,041.34	4,439.29	162.32	18.30
Industrial	6,590.64	55.24	0.84	4,545.17	1,396.83	191.11	402.29
Open Space	3,977.74	1,751.58	44.03	337.33	1,487.42	56.04	345.38
Commercial	1,922.04	117.40	6.11	1,654.51	112.70	22.14	15.29
Coliseum Area District	743.30	33.41	4.49	597.51	93.97	8.89	9.52
Special and Combining	571.86	25.33	4.43	437.84	25.88	82.48	0.33
Central Estuary District	440.52	10.02	2.28	369.88	18.53	1.60	40.49
Central Business District	408.35	23.66	5.79	365.03	15.93	3.55	0.18
Lake Merritt District	251.70	14.60	5.80	223.07	9.52	4.49	0.01
Total	**36,349.91**	**7,813.76**	**21.50%**	**19,571.67**	**7,600.06**	**532.63**	**831.78**

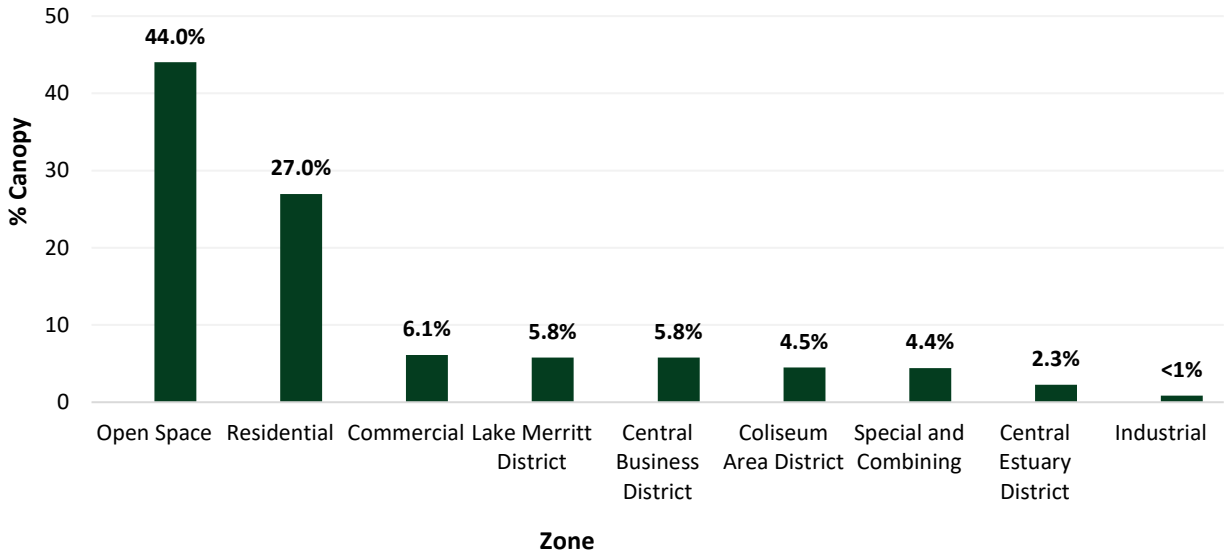
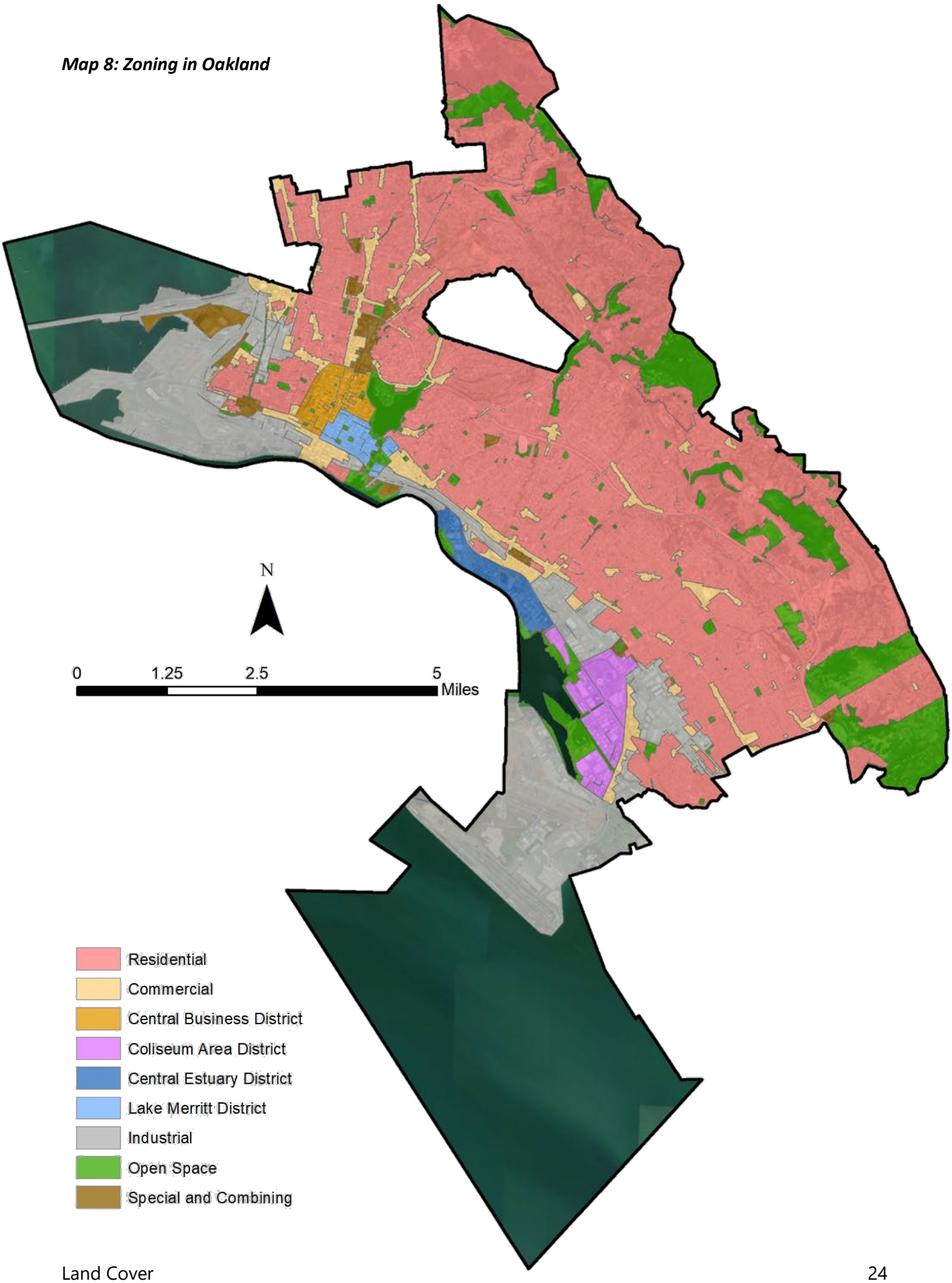


Figure 5: Canopy by Zoning

Map 8: Zoning in Oakland



Tree Canopy Comparison with Neighboring Communities

Among communities in the San Francisco Bay Area with known canopy cover, Oakland has the highest canopy cover at 21.5% (Figure 6). When looking at the East Bay region, Oakland has canopy cover similar to Alameda (21%) and substantially higher than Richmond's 12.7%. Although communities vary in acreage and population, comparison can be beneficial for providing context to the expanse and distribution of canopy cover in Oakland.

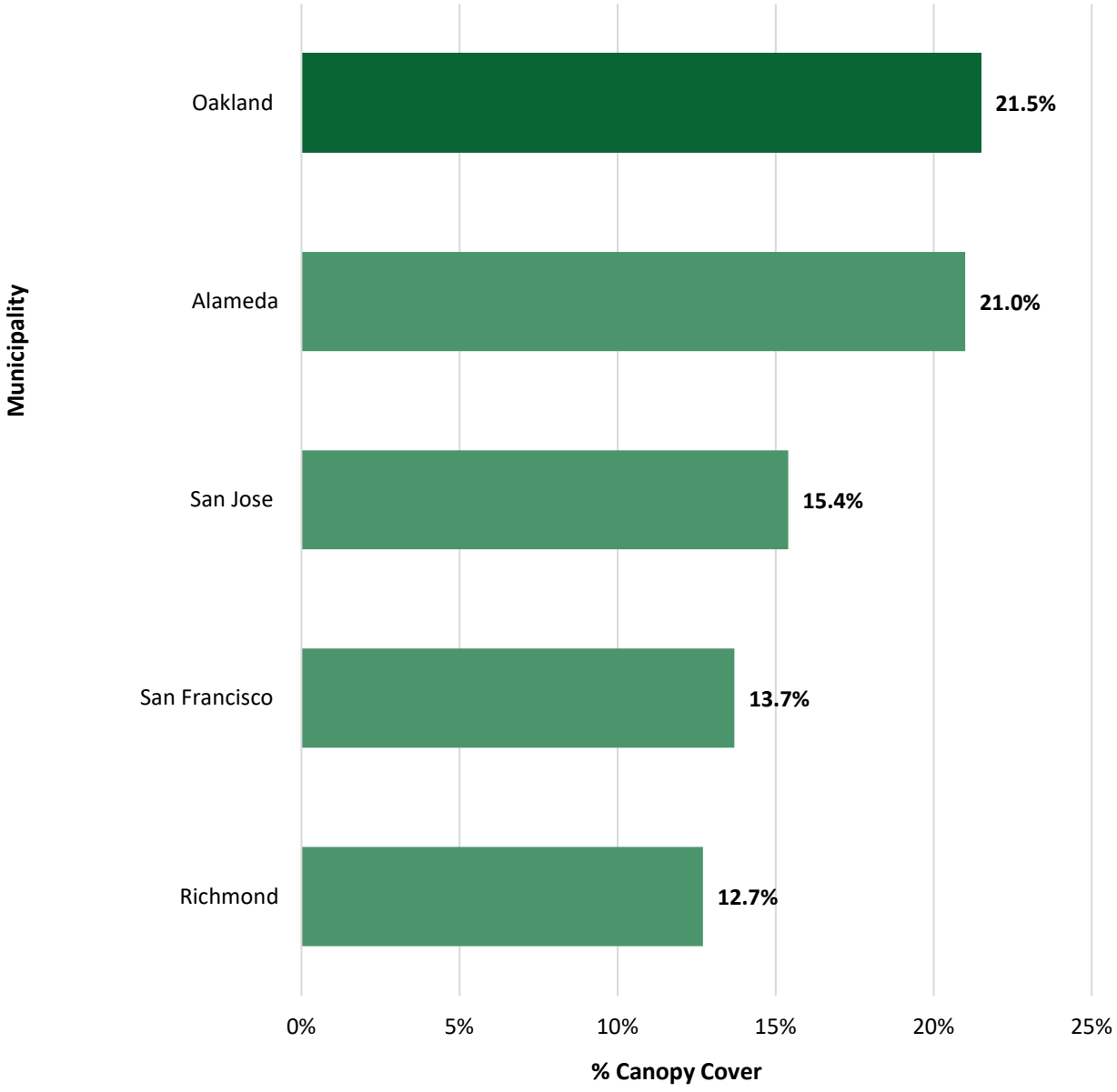


Figure 6: Neighboring Communities Canopy Cover

Tree canopy in Oakland is slightly higher than neighboring communities in the East Bay Region.

Conclusion

Oakland's Tree Canopy and Land Cover Assessment establishes a new baseline for monitoring overall tree canopy cover throughout the community and augments the City's GIS database with a landcover layer that identifies the location and extent of existing canopy. This data layer can be used in conjunction with other infrastructure layers to further prioritize planting plans and increase canopy cover strategically by subdivision, parks, land use, or other geographic considerations. This assessment provides a foundation for developing urban forest management strategies and measuring the success of those strategies over time.

Oakland has average overall canopy of 21.5% and opportunities to expand the urban forest. In 2015, Oakland's potential for tree canopy was estimated at 48.5% (American Forests, 2015). Although this may not be a feasible goal, the study indicates there is ample opportunity for canopy expansion. Community engagement and support are vital to a successful urban forestry program and canopy expansion across the City.

Based on this assessment, urban forest managers have the following opportunities:

- Considering that 53.8% of Oakland is covered by impervious surface and that the current canopy cover is 21.5% with 20.9% cover by grass and low-lying vegetation and 1.5% by bare soil, set canopy goals based on zoning, land cover distribution, and community values.
- Encourage tree planting and preservation on private property by incentivizing tree planting, expanding community education, and supporting activities and programs related to urban trees.
    - Incentivize tree planting on private property through tree planting campaigns and other activities / programs aimed at increasing tree canopy.
    - Provide outreach and education that highlights the benefits of private trees.
    - Support volunteer activities and initiatives that increase tree canopy or tree protections on private property.
    - Support policies that protect private trees.
- Expand canopy through the planting of trees in Oakland parks and other public properties which may provide an opportunity for adding large-stature shade trees.
- Develop planting plans to increase trees and canopy that will increase environmental benefits, promote social equity, and complement the existing urban infrastructure for the greatest impact and return on investment.
    - Create planting plans based on planting budgets and available space, planting large-stature species where space and design allow.
    - Incorporate the use of tree plantings in floodways with lower canopy cover to mitigate "peak flows" for future flood events.
    - Incorporate trees into stormwater management strategies to capture and reduce runoff.
    - Strive for proportional tree canopy across Oakland to give all residents equal access to the benefits of the urban forest.

    - Develop a program to assist with urban forestry funding and involve the public with volunteer planting opportunities or tree donations (e.g. pre-identified high priority planting locations, allow donators to choose locations for tree plantings).
    - Prioritize planting in sites that contribute most to reducing heat island effects and promoting environmental justice.
- Conduct a land cover assessment every 10 years to evaluate canopy expansion and loss.
- Preserve and protect existing trees to increase benefits and to sustain the stream of environmental benefits.

Tree canopy in Oakland varies by zoning and open space the highest canopy cover at 44%.

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Council District 3 has 288.8 acres of tree canopy cover (5.3%).

Appendix B: Methodology

Land Cover Extraction and Accuracy Assessment

Davey Resource Group, Inc. utilized an object-based image analysis (OBIA) semi-automated feature extraction method to process and analyze current high-resolution color infrared (CIR) aerial imagery and remotely-sensed data to identify tree canopy cover and land cover classifications. The use of imagery analysis is cost-effective and provides a highly accurate approach to assessing your community's existing tree canopy coverage. This supports responsible tree management, facilitates community forestry goal-setting, and improves urban resource planning for healthier and more sustainable urban environments.

Advanced image analysis methods were used to classify, or separate, the land cover layers from the overall imagery. The semi-automated extraction process was completed using Feature Analyst, an extension of ArcGIS®. Feature Analyst uses an object-oriented approach to cluster together objects with similar spectral (i.e., color) and spatial/contextual (e.g., texture, size, shape, pattern, and spatial association) characteristics. The land cover results of the extraction process was post-processed and clipped to each project boundary prior to the manual editing process in order to create smaller, manageable, and more efficient file sizes. Secondary source data, high-resolution aerial imagery provided by each UTC city, and custom ArcGIS® tools were used to aid in the final manual editing, quality checking, and quality assurance processes (QA/QC). The manual QA/QC process was implemented to identify, define, and correct any misclassifications or omission errors in the final land cover layer.

Classification Workflow

1. Prepare imagery for feature extraction (resampling, rectification, etc.), if needed.
2. Gather training set data for all desired land cover classes (canopy, impervious, grass, bare soil, shadows). Water samples are not always needed since hydrologic data are available for most areas. Training data for impervious features were not collected because the City maintained a completed impervious layer.
3. Extract canopy layer only; this decreases the amount of shadow removal from large tree canopy shadows. Fill small holes and smooth to remove rigid edges.
4. Edit and finalize canopy layer at 1:2000 scale. A point file is created to digitize-in small individual trees that will be missed during the extraction. These points are buffered to represent the tree canopy. This process is done to speed up editing time and improve accuracy by including smaller individual trees.
5. Extract remaining land cover classes using the canopy layer as a mask; this keeps canopy shadows that occur within groups of canopy while decreasing the amount of shadow along edges.
6. Edit the impervious layer to reflect actual impervious features, such as roads, buildings, parking lots, etc. to update features.
7. Using canopy and actual impervious surfaces as a mask; input the bare soils training data and extract them from the imagery. Quickly edit the layer to remove or add any features. Davey Resource Group tries to delete dry vegetation areas that are associated with lawns, grass/meadows, and agricultural fields.

8. Assemble any hydrological datasets, if provided. Add or remove any water features to create the hydrology class. Perform a feature extraction if no water feature datasets exist.
9. Use geoprocessing tools to clean, repair, and clip all edited land cover layers to remove any self-intersections or topology errors that sometimes occur during editing.
10. Input canopy, impervious, bare soil, and hydrology layers into Davey Resource Group's Five-Class Land Cover Model to complete the classification. This model generates the pervious (grass/low-lying vegetation) class by taking all other areas not previously classified and combining them.
11. Thoroughly inspect final land cover dataset for any classification errors and correct as needed.
12. Perform accuracy assessment. Repeat Step 11, if needed.

Automated Feature Extraction Files

1. The automated feature extraction (AFE) files allow other users to run the extraction process by replicating the methodology. Since Feature Analyst does not contain all geoprocessing operations that Davey Resource Group utilizes, the AFE only accounts for part of the extraction process. Using Feature Analyst, Davey Resource Group created the training set data, ran the extraction, and then smoothed the features to alleviate the blocky appearance. To complete the actual extraction process, Davey Resource Group uses additional geoprocessing tools within ArcGIS®. From the AFE file results, the following steps are taken to prepare the extracted data for manual editing.
2. Davey Resource Group fills all holes in the canopy that are less than 30 square meters. This eliminates small gaps that were created during the extraction process while still allowing for natural canopy gaps.
3. Davey Resource Group deletes all features that are less than 9 square meters for canopy (50 square meters for impervious surfaces). This process reduces the number of small features that could result in incorrect classifications and also helps computer performance.
4. The Repair Geometry, Dissolve, and Multipart to Singlepart (in that order) geoprocessing tools are run to complete the extraction process.
5. The Multipart to Singlepart shapefile is given to GIS personnel for manual editing to add, remove, or reshape features.

Table 8: Classification Matrix

Reference Data	Classification Data								
	Classes	**Tree Canopy**	**Impervious**	**Grass/ Low Veg.**	**Bare Soils**	**Open Water**	**Row Total**	**Producer's Accuracy**	**Errors of Omission**
	Tree Canopy	133	4	18	0	0	155	**85.81%**	**14.19%**
	Impervious	4	376	9	0	0	389	**96.66%**	**3.34%**
	Grass/Low Veg.	10	16	123	1	0	150	**82.00%**	**18.00%**
	Bare Soils	0	1	0	14	0	15	**93.33%**	**6.67%**
	Open Water	0	0	1	0	290	291	**99.66%**	**0.34%**
	Column Total	147	397	151	15	290	1,000		
	User's Accuracy	**90.48%**	**94.71%**	**81.46%**	**93.33%**	**100.00%**		**Overall Accuracy**	**93.60%**
	Errors of Commission	**9.52%**	**5.29%**	**18.54%**	**6.67%**	**0.00%**		**Kappa Coefficient**	**1.5018**

Accuracy Assessment Protocol

Determining the accuracy of spatial data is of high importance to Davey Resource Group and our clients. To achieve to best possible result, Davey Resource Group manually edits and conducts thorough QA/QC checks on all urban tree canopy and land cover layers. A QA/QC process will be completed using ArcGIS® to identify, clean, and correct any misclassification or topology errors in the final land cover dataset. The initial land cover layer extractions will be edited at a 1:2000 quality control scale in the urban areas and at a 1:2500 scale for rural areas utilizing the most current high-resolution aerial imagery to aid in the quality control process.

To test for accuracy, random plot locations are generated throughout the city area of interest and verified to ensure that the data meet the client standards. Each point will be compared with the most current NAIP high-resolution imagery (reference image) to determine the accuracy of the final land cover layer. Points will be classified as either correct or incorrect and recorded in a classification matrix. Accuracy will be assessed using four metrics: overall accuracy, kappa, quantity disagreement, and allocation disagreement. These metrics are calculated using a custom Excel® spreadsheet.

Land Cover Accuracy

The following describes Davey Resource Group's accuracy assessment techniques and outlines procedural steps used to conduct the assessment.

1. ***Random Point Generation***—Using ArcGIS, 1,000 random assessment points are generated
2. ***Point Determination***—Each point is carefully assessed by the GIS analyst for likeness with the aerial photography. To record findings, two new fields, CODE and TRUTH, are added to the accuracy assessment point shapefile. CODE is a numeric value (1–5) assigned to each land cover class (Table 9) and TRUTH is the actual land cover class as identified according to the reference image. If CODE and TRUTH are the same, then the point is counted as a correct classification. Likewise, if the CODE and TRUTH are not the same, then the point is classified as incorrect. In most cases, distinguishing if a point is correct or incorrect is straightforward. Points will rarely be misclassified by an egregious classification or editing error. Often incorrect points occur where one feature stops and the other begins.

3. ***Classification Matrix***—During the accuracy assessment, if a point is considered incorrect, it is given the correct classification in the TRUTH column. Points are first assessed on the NAIP imagery for their correctness using a "blind" assessment—meaning that the analyst does not know the actual classification (the GIS analyst is strictly going off the NAIP imagery to determine cover class). Any incorrect classifications found during the "blind" assessment are scrutinized further using sub-meter imagery provided by the client to determine if the point was incorrectly classified due to the fuzziness of the NAIP imagery or an actual misclassification. After all random points are assessed and recorded; a classification (or confusion) matrix is created. The classification matrix for this project is presented in Table 9. The table allows for assessment of user's/producer's accuracy, overall accuracy, omission/commission errors, kappa statistics, allocation/quantity disagreement, and confidence intervals (Table 10).
4. Following are descriptions of each statistic as well as the results from some of the accuracy assessment tests.

Overall Accuracy – Percentage of correctly classified pixels; for example, the sum of the diagonals divided by the total points ((133+376+123+14+290)/1,000 = 93.60%).

User's Accuracy – Probability that a pixel classified on the map actually represents that category on the ground (correct land cover classifications divided by the column total [133/137 = 90.48%]).

Producer's Accuracy – Probability of a reference pixel being correctly classified (correct land cover classifications divided by the row total [133/155 = 85.81%]).

Kappa Coefficient – A statistical metric used to assess the accuracy of classification data. It has been generally accepted as a better determinant of accuracy partly because it accounts for random chance agreement. A value of 0.80 or greater is regarded as "very good" agreement between the land cover classification and reference image.

Errors of Commission – A pixel reports the presence of a feature (such as trees) that, in reality, is absent (no trees are actually present). This is termed as a false positive. In the matrix below, we can determine that 9.52% of the area classified as canopy is most likely not canopy.

Errors of Omission – A pixel reports the absence of a feature (such as trees) when, in reality, they are actually there. In the matrix below, we can conclude that 14.19% of all canopy classified is actually classified as another land cover class.

Allocation Disagreement – The amount of difference between the reference image and the classified land cover map that is due to less than optimal match in the spatial allocation (or position) of the classes.

Quantity Disagreement – The amount of difference between the reference image and the classified land cover map that is due to less than perfect match in the proportions (or area) of the classes.

Confidence Intervals – A confidence interval is a type of interval estimate of a population parameter and is used to indicate the reliability of an estimate. Confidence intervals consist of a range of values (interval) that act as good estimates of the unknown population parameter based on the observed probability of successes and failures. Since all assessments have innate error, defining a lower and upper bound estimate is essential.

Table 9: Confidence Intervals

95% Confidence Intervals

Landcover Assessment

Class	Acreage	Percentage	Lower Bound	Upper Bound
Tree Canopy	7,819.6	15.7%	15.5%	15.8%
Impervious	19,579.6	39.2%	39.0%	39.4%
Grass/Low Veg.	7,608.5	15.2%	15.1%	15.4%
Bare Soils	533.4	1.1%	1.0%	1.1%
Water	14,367.7	28.8%	28.6%	29.0%
Total	**49,909.0**	**100.0%**		

Statistical Metrics Summary:

Overall Accuracy = 93.60%
Kappa Coefficient = 1.5018
Allocation Disagreement = 6%
Quantity Disagreement = 1%

Accuracy Assessment

Class	User's Accuracy	Lower Bound	Upper Bound	Producer's Accuracy	Lower Bound	Upper Bound
Tree Canopy	90.5%	88.1%	92.9%	85.8%	83.0%	88.6%
Impervious	94.7%	93.6%	95.8%	96.7%	95.7%	97.6%
Grass/Low Veg.	81.5%	78.3%	84.6%	82.0%	78.9%	85.1%
Bare Soils	93.3%	86.9%	99.8%	93.3%	86.9%	99.8%
Water	100.0%	100.0%	100.0%	99.7%	99.3%	100.0%

Oakland's parks have 987.1 acres and an average canopy cover of 45.6%.

Appendix C: Tables

Table 10: Tree Canopy by Parks

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Knowland Park	476.49	206.83	43.41	24.57	240.33	4.75	0.00
Joaquin Miller Park	427.16	356.22	83.39	15.61	51.80	3.53	0.00
Lakeside Park	143.65	0.14	0.10	1.43	0.09	0.34	141.65
Lake Chabot Golf Course	135.62	32.96	24.30	6.23	96.31	0.13	0.00
King Estates Open Space	77.42	11.90	15.37	1.08	64.44	0.00	0.00
Lakeside Park - Lakeside Proper	68.85	22.36	32.47	14.11	22.25	1.69	8.44
Grizzly Peak Open Space	67.06	29.15	43.46	0.41	37.46	0.04	0.00
Dimond Canyon	60.92	49.91	81.93	1.71	7.67	1.62	0.00
Dunsmuir Estate Park	53.67	29.44	54.85	2.24	21.98	0.01	0.00
Leona Heights	51.59	42.01	81.43	0.42	8.96	0.19	0.00
Shepherd Canyon Park	46.94	38.44	81.88	1.57	6.75	0.18	0.00
Redwood Creek Open Space	23.22	18.68	80.43	0.67	3.87	0.00	0.00
Arroyo Viejo Park	18.80	4.64	24.66	3.84	9.46	0.86	0.00
Brookfield Park	15.83	1.64	10.33	6.52	7.19	0.49	0.00
Channel Park	14.95	2.55	17.04	4.82	6.60	0.65	0.33
Dimond Park	14.32	8.59	60.02	1.82	3.86	0.05	0.00
Caldecott Park	13.83	4.46	32.25	0.13	8.46	0.78	0.00
Garber [John] Park	13.82	13.45	97.28	0.01	0.37	0.00	0.00
Mandela Parkway	12.98	1.59	12.22	5.18	5.39	0.83	0.00
Bancroft Median	11.62	3.52	30.27	1.02	2.06	5.03	0.00
Estuary Channel Park	10.95	0.37	3.34	7.56	2.93	0.08	0.02
Mosswood Park	10.88	4.36	40.03	1.91	4.21	0.40	0.00
Skyline & Stables Median	10.71	6.92	64.62	0.51	3.24	0.04	0.00
San Antonio Park	10.62	3.44	32.39	2.27	4.91	0.00	0.00
Bushrod Park	10.22	1.27	12.43	1.47	6.40	1.08	0.00
Lakeside Park -12th Street Dam Area	9.90	1.01	10.18	4.72	3.85	0.04	0.28
Raimondi Park	9.66	0.28	2.87	2.92	6.16	0.31	0.00
DeFremery Park & Pool	9.42	1.89	20.05	2.93	4.25	0.36	0.00
Castle Canyon	9.03	6.45	71.39	0.00	2.58	0.00	0.00
Lowell Park	8.82	1.68	19.03	0.81	5.65	0.68	0.00
Montclair Railroad Trail	7.70	5.28	68.56	1.15	1.17	0.11	0.00
City Stables	7.44	1.50	20.19	1.36	4.01	0.57	0.00
Oakport Field	7.34	0.31	4.27	1.30	5.72	0.00	0.00
Union Point Park	7.15	0.66	9.18	2.78	3.38	0.27	0.06
Otis Spunkmeyer Field	6.72	0.00	0.00	0.41	6.30	0.02	0.00
Morcom Rose Garden	6.67	3.43	51.40	1.07	2.17	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Greenman Field	6.65	0.07	1.07	0.89	3.71	1.98	0.00
Lakeside Park - Lakeside Perimeter	6.59	0.70	10.64	3.13	1.62	0.95	0.18
Montclair Park	6.54	1.96	30.00	1.37	2.25	0.31	0.65
Lakeside Park - Lakeshore Perimeter	5.87	1.27	21.61	2.09	2.40	0.02	0.09
66th Ave Overlook	5.31	0.36	6.74	0.38	4.01	0.00	0.55
Shepherd Canyon Park (Improved)	5.20	2.69	51.69	0.01	2.44	0.06	0.00
Lion Creek Park	5.00	0.36	7.15	1.24	3.03	0.00	0.37
Peralta Park	4.85	0.74	15.23	0.89	1.53	0.26	1.43
Sobrante Park	4.72	0.34	7.18	0.26	3.63	0.49	0.00
Eastshore Park	4.43	0.72	16.36	0.74	2.97	0.00	0.00
Skyline & Joaquin Miller Median	4.32	0.67	15.52	0.15	3.47	0.03	0.00
Lyons Field	4.30	0.21	4.81	1.04	2.86	0.19	0.00
Brookdale Park	4.26	1.04	24.42	0.65	2.33	0.25	0.00
South Prescott Park	4.19	0.71	17.03	0.45	3.03	0.00	0.00
Beaconsfield Canyon	4.15	3.22	77.61	0.00	0.93	0.00	0.00
Snow Park	4.13	1.15	27.94	1.33	1.36	0.29	0.00
Peralta Hacienda Park	4.11	1.49	36.13	1.16	1.46	0.00	0.00
Stonehurst Park	3.71	0.46	12.45	0.96	1.86	0.42	0.00
Golden Gate Park	3.66	0.40	10.99	1.15	1.55	0.56	0.00
Chabot Park	3.58	0.54	15.02	0.63	2.16	0.26	0.00
Concordia Park	3.47	0.43	12.44	0.80	2.04	0.20	0.00
Burckhalter Park	3.44	1.61	46.81	0.56	1.09	0.18	0.00
William D Wood Park	3.43	1.41	41.10	0.06	1.95	0.00	0.00
Pinto Park	3.35	0.62	18.63	0.18	1.91	0.64	0.00
Curt Flood Field	3.32	0.09	2.77	0.34	2.28	0.61	0.00
E 12th St Median	3.26	0.41	12.69	1.39	1.35	0.10	0.00
Central Reservoir Park	3.20	1.43	44.58	0.34	1.23	0.21	0.00
Verdese Carter Park	3.08	0.18	5.99	0.82	2.08	0.00	0.00
Hellman Park	3.04	1.63	53.55	0.12	1.11	0.18	0.00
Marston Campbell Park	2.99	0.33	11.17	0.25	2.32	0.09	0.00
Allendale Park	2.93	0.31	10.66	0.64	1.40	0.57	0.00
Oak Glen Park	2.88	2.08	72.13	0.54	0.27	0.00	0.00
McCrea Park	2.84	2.16	76.03	0.13	0.19	0.00	0.36
Hegenberger Median	2.69	0.17	6.43	1.00	1.31	0.17	0.03
Frontage Road Streetscape (along 880)	2.64	0.40	15.21	0.47	1.73	0.04	0.00
Tassafaronga Park	2.60	0.19	7.46	0.93	1.27	0.22	0.00
Stanford Ave Median	2.53	1.32	52.13	0.27	0.95	0.00	0.00
Redwood Heights Park	2.52	0.79	31.35	0.54	1.09	0.10	0.00
Sheffield Village Park	2.50	1.73	69.13	0.23	0.54	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Rainbow Park	2.43	0.57	23.40	1.59	0.04	0.23	0.00
Wade Johnson Park	2.41	0.40	16.70	0.17	1.82	0.01	0.00
Grove Shafter Park 3	2.39	0.51	21.31	0.71	1.10	0.07	0.00
12th Street Dam Area	2.39	0.11	4.56	1.24	0.34	0.69	0.01
Ostrander Park	2.37	1.82	76.58	0.10	0.45	0.00	0.00
Columbian Gardens	2.36	0.10	4.28	0.39	1.84	0.00	0.02
Martin Luther King Jr Way Median	2.29	0.05	2.36	2.20	0.00	0.03	0.00
Courtland Creek	2.10	0.91	43.63	0.67	0.49	0.03	0.00
Josie de la Cruz Park	2.08	0.63	30.51	0.97	0.47	0.00	0.00
Franklin Park	2.06	0.02	0.79	0.57	1.21	0.26	0.00
Grove Shafter Park 1	2.04	0.78	38.42	0.52	0.74	0.00	0.00
Lookout Point	2.03	0.59	29.28	0.22	1.05	0.17	0.00
Officer Willie Wilkins Park	2.01	0.40	19.86	0.47	1.14	0.00	0.00
Poplar Park	2.01	0.35	17.29	0.67	0.81	0.18	0.00
Marjorie Saunders Park	2.00	1.78	88.88	0.00	0.22	0.00	0.00
Clinton Square Park	1.99	0.72	36.27	0.49	0.78	0.00	0.00
Railroad Avenue Median	1.80	0.01	0.77	0.67	1.02	0.09	0.00
Butters Land Trust	1.72	1.64	95.38	0.00	0.08	0.00	0.00
Foothill Meadows Park	1.67	0.29	17.66	1.00	0.38	0.00	0.00
FM Smith Park	1.56	0.48	30.73	0.41	0.67	0.00	0.00
Hardy Park (Dog Park)	1.54	1.09	70.55	0.13	0.33	0.00	0.00
Garfield Park	1.51	0.08	5.13	0.04	1.13	0.26	0.00
Joaquin Miller Rd Median	1.43	0.72	50.24	0.25	0.44	0.02	0.00
Keller Ave Median	1.41	0.40	28.23	0.58	0.26	0.17	0.00
Cryer Site	1.40	0.07	4.95	0.82	0.49	0.00	0.02
Lincoln Square Park	1.39	0.26	18.59	1.07	0.06	0.00	0.00
Lafayette Square Park	1.38	0.38	27.36	0.51	0.49	0.00	0.00
Jefferson Square	1.38	0.46	33.48	0.28	0.41	0.23	0.00
Madison Square Park	1.38	0.06	4.51	0.82	0.49	0.00	0.00
Grove Shafter Park 2	1.37	0.21	15.30	0.26	0.90	0.00	0.00
Chinese Garden Park	1.34	0.30	22.17	0.29	0.67	0.09	0.00
Pine Knoll Park	1.32	0.20	14.83	0.05	1.07	0.00	0.00
Lazear Field	1.31	0.04	3.07	0.03	1.23	0.02	0.00
Park Blvd Island	1.27	0.19	15.30	0.57	0.51	0.00	0.00
Maxwell Park	1.25	0.81	64.41	0.08	0.37	0.00	0.00
Fremont Plaza	1.15	0.42	36.65	0.24	0.48	0.01	0.00
Martin Luther King Jr Plaza (Dover Park)	1.14	0.23	20.44	0.27	0.63	0.00	0.00
Splash Pad Park	1.10	0.27	24.42	0.44	0.40	0.00	0.00
Frank Ogawa Plaza	1.07	0.15	14.27	0.45	0.47	0.00	0.00
23rd Ave Median	1.06	0.00	0.00	0.35	0.06	0.65	0.00
40th St Island	1.04	0.21	19.76	0.65	0.19	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Bella Vista Park	1.04	0.12	11.35	0.65	0.27	0.00	0.00
Redwood Rd Above Hwy 13 Median	1.01	0.23	22.71	0.24	0.18	0.37	0.00
Athol Plaza Park	1.01	0.13	13.39	0.39	0.48	0.00	0.00
Glen Echo Park	1.00	0.88	88.24	0.02	0.10	0.00	0.00
Grass Valley Field	0.97	0.00	0.03	0.03	0.94	0.00	0.00
7th St Streetscape	0.96	0.11	11.47	0.55	0.20	0.11	0.00
Pleasant Valley Ave Median	0.96	0.40	42.04	0.28	0.21	0.06	0.00
880 Fwy / 98th Ave Streetscape	0.95	0.24	25.20	0.18	0.29	0.24	0.00
14th St Pocket Park	0.94	0.02	2.22	0.84	0.07	0.00	0.00
Avenue Terrace Park	0.93	0.25	27.20	0.25	0.43	0.00	0.00
Harrison St Median	0.92	0.06	6.00	0.53	0.00	0.34	0.00
Willow Mini Park	0.91	0.37	40.67	0.28	0.26	0.00	0.00
Fontaine Median	0.89	0.13	14.80	0.71	0.05	0.00	0.00
International Median - Tassaforanga	0.89	0.14	15.35	0.66	0.04	0.05	0.00
Manzanita Park	0.88	0.24	26.85	0.42	0.22	0.00	0.00
73rd Ave Median	0.87	0.33	38.01	0.37	0.18	0.00	0.00
23rd Ave Overpass	0.84	0.01	1.61	0.41	0.42	0.00	0.00
Santa Rita Land Trust	0.83	0.31	37.26	0.05	0.47	0.00	0.00
73rd Ave Median	0.82	0.18	21.37	0.15	0.39	0.11	0.00
7th St & Channel Park Median	0.72	0.27	37.22	0.18	0.17	0.11	0.00
High St Median	0.70	0.25	35.01	0.11	0.35	0.00	0.00
Market St (Lower) Median	0.70	0.36	51.96	0.25	0.08	0.01	0.00
Elmhurst Plaza Tennis	0.68	0.02	2.39	0.65	0.02	0.00	0.00
Mandela Pkwy Median	0.66	0.05	6.86	0.18	0.36	0.08	0.00
98th Ave Median	0.66	0.14	21.30	0.41	0.10	0.00	0.00
51st St Island	0.65	0.15	22.41	0.37	0.14	0.00	0.00
Linden Park	0.63	0.20	31.79	0.37	0.05	0.02	0.00
Vantage Point Park	0.63	0.13	20.15	0.05	0.46	0.00	0.00
Park Blvd Plaza Park	0.63	0.23	37.26	0.01	0.38	0.00	0.00
35th Ave Median	0.60	0.22	36.81	0.18	0.20	0.00	0.00
Redondo Park	0.60	0.37	61.84	0.05	0.18	0.00	0.00
Moss Way & W MacArthur Median	0.58	0.40	68.49	0.12	0.06	0.00	0.00
14th St Median	0.53	0.15	27.41	0.14	0.04	0.21	0.00
E 8th St Island	0.53	0.18	33.69	0.15	0.14	0.06	0.00
San Leandro Blvd. Landscape	0.53	0.21	38.67	0.30	0.02	0.00	0.00
Oak Park	0.49	0.18	36.62	0.15	0.17	0.00	0.00
Fontaine / Mountain Median	0.48	0.04	8.75	0.01	0.05	0.38	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Driver Plaza	0.47	0.11	22.96	0.10	0.26	0.00	0.00
Gateway Gardens Park	0.47	0.02	3.33	0.01	0.44	0.00	0.00
Lakeshore Ave Median	0.47	0.02	4.18	0.37	0.07	0.00	0.00
Oakland Army Base Median	0.46	0.00	0.00	0.28	0.00	0.17	0.00
Bishop Begin Plaza	0.45	0.08	17.37	0.29	0.00	0.07	0.00
Butters Dr Median	0.44	0.26	59.36	0.01	0.17	0.00	0.00
Broadway Median	0.43	0.15	33.94	0.23	0.01	0.05	0.00
Peralta Oaks Park	0.43	0.11	24.41	0.01	0.05	0.26	0.00
Oakland Army Base Median	0.43	0.00	0.00	0.43	0.00	0.00	0.00
Tyrone Carney Park (closed)	0.43	0.16	37.97	0.24	0.03	0.00	0.00
Mandana Plaza Park	0.42	0.17	41.24	0.01	0.23	0.00	0.00
San Pablo Ave Median (North)	0.42	0.02	4.47	0.11	0.24	0.05	0.00
Fruitvale Bridge Park	0.40	0.09	22.17	0.01	0.16	0.00	0.15
W MacArthur Blvd Median	0.40	0.08	18.91	0.25	0.03	0.04	0.00
12th St Dam Median	0.39	0.02	5.57	0.36	0.02	0.00	0.00
San Pablo Ave Median (Central)	0.39	0.09	24.24	0.23	0.03	0.04	0.00
Morgan Plaza Park	0.39	0.16	40.56	0.02	0.21	0.00	0.00
Oakland Army Base Median	0.38	0.00	0.00	0.28	0.01	0.09	0.00
Richmond Blvd	0.38	0.36	94.43	0.00	0.02	0.00	0.00
Airport Access Median	0.37	0.04	11.81	0.22	0.04	0.07	0.00
San Leandro Underground	0.37	0.07	20.14	0.08	0.21	0.00	0.00
Joaquin Miller Park (Improved)	0.36	0.21	57.19	0.05	0.10	0.00	0.00
27th St Median	0.36	0.14	38.51	0.15	0.03	0.04	0.00
FROG Park	0.35	0.15	42.39	0.02	0.18	0.00	0.00
Cleveland Cascade	0.34	0.28	80.01	0.03	0.04	0.00	0.00
Holly Mini Park	0.34	0.02	6.54	0.01	0.25	0.05	0.00
Oakland Army Base Median	0.33	0.00	0.00	0.31	0.00	0.03	0.00
14th Ave Median	0.33	0.06	18.85	0.27	0.00	0.00	0.00
88th Ave Mini Park	0.33	0.14	41.44	0.09	0.01	0.09	0.00
Durant Mini Park	0.32	0.02	5.64	0.21	0.09	0.00	0.00
Colby Park	0.32	0.17	53.50	0.00	0.15	0.00	0.00
Moraga Ave Median	0.31	0.05	16.06	0.07	0.19	0.00	0.00
							0.00
14th Street Pocket Park (aka Wood St)	0.29	0.01	2.68	0.24	0.04	0.00	0.00
42nd Ave Median	0.28	0.11	38.60	0.04	0.13	0.00	0.00
29th Ave Median	0.28	0.00	0.00	0.28	0.00	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Rockridge Median	0.28	0.09	33.60	0.02	0.16	0.00	0.00
Foothill Meadows Park Extension	0.27	0.06	20.22	0.15	0.07	0.00	0.00
Union Plaza	0.27	0.15	57.85	0.00	0.11	0.00	0.00
Broadway Median	0.25	0.12	47.85	0.07	0.00	0.06	0.00
Bay Pointe Park	0.24	0.03	12.85	0.02	0.14	0.06	0.00
San Pablo Ave Median (Central)	0.24	0.07	27.02	0.07	0.05	0.07	0.00
Eula Brinson Mini Park	0.24	0.07	29.40	0.04	0.13	0.00	0.00
Tompkins Ave Median	0.24	0.15	63.24	0.04	0.05	0.00	0.00
Calcot Place Median	0.24	0.00	0.00	0.03	0.21	0.00	0.00
40th St Way Median	0.24	0.17	72.44	0.00	0.06	0.00	0.00
25th St Mini Park (closed)	0.23	0.06	25.11	0.13	0.04	0.00	0.00
Redwood Rd Below Hwy 13 Median	0.22	0.08	33.74	0.05	0.10	0.00	0.00
Helen McGregor Plaza	0.22	0.12	52.23	0.02	0.09	0.00	0.00
W Grand Ave Median	0.22	0.08	37.37	0.14	0.00	0.00	0.00
Bertha Port Park	0.22	0.10	47.29	0.09	0.02	0.00	0.00
Nicol Mini Park	0.21	0.10	48.81	0.04	0.07	0.00	0.00
5th St Median	0.21	0.00	0.00	0.18	0.00	0.03	0.00
San Leandro St Median	0.21	0.03	14.80	0.18	0.00	0.00	0.00
McClymond's Mini Park	0.19	0.08	39.51	0.07	0.05	0.00	0.00
Market St Island	0.18	0.07	39.48	0.11	0.00	0.00	0.00
Alameda Ave Trail	0.18	0.01	6.91	0.15	0.02	0.00	0.00
Broadway Median	0.18	0.11	60.23	0.07	0.00	0.00	0.00
Fitzgerald Park	0.17	0.15	87.65	0.00	0.02	0.00	0.00
14th St (Lower) Median	0.17	0.05	32.19	0.03	0.00	0.08	0.00
Courtland Ave Median	0.16	0.01	8.56	0.11	0.03	0.01	0.00
Seminary Ave Median	0.16	0.01	7.99	0.15	0.00	0.00	0.00
Baldwin St Median	0.15	0.03	20.66	0.03	0.09	0.00	0.00
Doolittle Dr Median	0.15	0.00	0.00	0.06	0.09	0.00	0.00
Mountain Blvd / Park Blvd Median	0.15	0.01	3.82	0.02	0.00	0.12	0.00
Glenwood Glade Median	0.15	0.09	61.38	0.04	0.02	0.00	0.00
Chester Street Park	0.14	0.02	11.92	0.12	0.01	0.00	0.00
Beaumont Ave Island	0.14	0.04	29.93	0.08	0.02	0.00	0.00
Tomas Melero-Smith Park	0.14	0.00	0.00	0.07	0.07	0.00	0.00
5th Ave & E 8th St Island	0.13	0.00	0.00	0.04	0.09	0.00	0.00
Dolphin Mini Park	0.13	0.05	38.70	0.05	0.02	0.00	0.00
Peralta Oaks Dr Median	0.12	0.06	51.59	0.04	0.02	0.00	0.00
International Median - Fruitvale	0.11	0.01	10.29	0.09	0.01	0.00	0.00
Thermal St & 90th Ave Median	0.11	0.01	11.37	0.01	0.00	0.08	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
8th St Streetscape	0.11	0.05	49.42	0.05	0.00	0.00	0.00
Oakland Ave Median	0.10	0.08	72.68	0.02	0.01	0.00	0.00
Franklin Fountain	0.10	0.06	55.58	0.05	0.00	0.00	0.00
Mountain Blvd / Seminary Median	0.10	0.00	0.00	0.05	0.06	0.00	0.00
Lakeshore at Longridge Mini Park	0.10	0.07	68.55	0.03	0.00	0.00	0.00
West St & 17th St Median	0.10	0.04	46.08	0.01	0.04	0.00	0.00
E 18th St Median	0.09	0.04	39.36	0.06	0.00	0.00	0.00
International Median - Durant	0.09	0.00	0.27	0.09	0.00	0.00	0.00
Bay Pl Island	0.09	0.03	29.16	0.06	0.00	0.00	0.00
Lake Park Ave Median	0.09	0.00	4.95	0.08	0.00	0.00	0.00
Hamilton St Median	0.09	0.00	0.00	0.02	0.07	0.00	0.00
Glenview Median	0.09	0.02	28.69	0.04	0.02	0.00	0.00
Lazear Mini Park	0.09	0.03	39.66	0.01	0.05	0.00	0.00
Collins Plaza Park	0.09	0.04	46.53	0.05	0.00	0.00	0.00
Chestnut St Streetscape	0.09	0.02	22.09	0.03	0.04	0.00	0.00
Panoramic Hill	0.08	0.08	100.00	0.00	0.00	0.00	0.00
St. Andrews Park	0.08	0.05	61.36	0.03	0.00	0.00	0.00
Ayala Mini Park	0.08	0.08	93.22	0.00	0.01	0.00	0.00
Storer Ave Median	0.08	0.04	44.11	0.05	0.00	0.00	0.00
Fruitvale Plaza Park	0.08	0.01	14.89	0.02	0.05	0.00	0.00
Ardsley Median	0.08	0.07	82.41	0.00	0.01	0.00	0.00
Lagunitas Path	0.08	0.07	93.15	0.00	0.00	0.00	0.00
Lakeside Dr / 14th St Median	0.08	0.00	0.00	0.05	0.03	0.00	0.00
20th Street Median	0.08	0.00	0.00	0.08	0.00	0.00	0.00
Ridgeway Ave & Gilbert St Median	0.08	0.00	0.00	0.01	0.06	0.00	0.00
International Median - Arroyo	0.08	0.00	0.00	0.08	0.00	0.00	0.00
11th St & Oak St Harscape	0.07	0.03	35.55	0.05	0.00	0.00	0.00
Picardy Park	0.07	0.02	25.08	0.01	0.04	0.00	0.00
Calavaras Ave Median	0.07	0.05	64.73	0.01	0.01	0.00	0.00
16th Avenue Overpass	0.07	0.00	0.00	0.07	0.00	0.00	0.00
Eastlake Streetscape	0.07	0.02	28.16	0.05	0.00	0.00	0.00
Kennedy St Median	0.07	0.00	0.00	0.05	0.00	0.02	0.00
10th-11th-12th St Median	0.06	0.01	13.51	0.02	0.04	0.00	0.00
Latham Square	0.06	0.00	0.00	0.06	0.00	0.00	0.00
MacArthur / Foothill Median	0.06	0.02	32.10	0.01	0.00	0.03	0.00
Santa Clara Ave & Grand Ave Median	0.06	0.04	72.77	0.01	0.01	0.00	0.00
Piedmont Plaza	0.06	0.00	1.35	0.05	0.00	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Intercity Rail Station	0.05	0.00	8.68	0.05	0.00	0.00	0.00
Dennison St Median	0.05	0.00	0.00	0.01	0.04	0.00	0.00
Kingsland Ave Median	0.05	0.00	0.00	0.05	0.00	0.00	0.00
Highland Ave Median	0.05	0.01	15.15	0.01	0.04	0.00	0.00
12th St & West St Median	0.05	0.00	0.00	0.00	0.04	0.00	0.00
MacArthur Blvd Median	0.05	0.00	3.57	0.04	0.01	0.00	0.00
Center St / 12th St Island	0.04	0.01	28.57	0.01	0.02	0.00	0.00
McKinley AVe / Kenwyn Rd Island	0.04	0.00	0.00	0.00	0.04	0.00	0.00
Telegraph Ave Median	0.04	0.00	0.00	0.04	0.00	0.00	0.00
Valdez St Median	0.03	0.00	0.00	0.03	0.00	0.00	0.00
Racine St & Telegraph Ave Median	0.03	0.02	53.62	0.02	0.00	0.00	0.00
Burlington St Island	0.03	0.01	42.96	0.01	0.01	0.00	0.00
Chetwood St / Adams St Median	0.03	0.00	0.00	0.01	0.03	0.00	0.00
Foothill Blvd Median	0.03	0.01	20.17	0.02	0.00	0.00	0.00
Bayo Vista / Oakland Island	0.03	0.00	0.00	0.01	0.02	0.00	0.00
Capital St / Merritt Ave Island	0.03	0.02	68.18	0.00	0.01	0.00	0.00
Santa Clara Ave & Elwood Ave Median	0.02	0.00	0.00	0.01	0.01	0.00	0.00
International Median - Bancroft	0.02	0.00	0.00	0.02	0.00	0.00	0.00
Trestle Glen Median	0.02	0.00	0.00	0.01	0.01	0.00	0.00
Elysian Fields Median	0.02	0.00	0.00	0.01	0.01	0.00	0.00
Golden Gate Ave & Cross Rd Median	0.02	0.02	91.57	0.00	0.00	0.00	0.00
Fruitvale Ave Median	0.02	0.00	0.00	0.02	0.00	0.00	0.00
Miles Ave / College Ave Island	0.02	0.01	50.00	0.01	0.00	0.00	0.00
Hawley Median	0.02	0.00	0.00	0.01	0.00	0.00	0.00
Campus Dr Median	0.02	0.01	61.11	0.01	0.00	0.00	0.00
Urban Renewal Median	0.02	0.01	61.29	0.00	0.00	0.00	0.00
Aloha Median	0.01	0.00	8.47	0.00	0.01	0.00	0.00
Wesley Ave Median	0.01	0.00	26.32	0.00	0.01	0.00	0.00
Isabella St Island	0.01	0.00	0.00	0.01	0.00	0.00	0.00
E 7th St Median	0.01	0.00	0.00	0.01	0.00	0.00	0.00
Excelsior Ave & 13th Ave Median	0.01	0.01	60.47	0.00	0.00	0.00	0.00
Redding St Median	0.01	0.00	0.00	0.01	0.00	0.00	0.00
Aileen Median	0.01	0.00	0.00	0.00	0.01	0.00	0.00
Bayo Vista / Harrison Island	0.01	0.00	0.00	0.01	0.00	0.00	0.00
38th Ave Median	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Broadway Terrace Median	0.01	0.00	0.00	0.01	0.00	0.00	0.00

Park	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Jean St Median	0.01	0.00	0.00	0.00	0.01	0.00	0.00
Haddon Rd / Prospect Ave Median	0.01	0.00	37.04	0.00	0.00	0.00	0.00
Grosvenor Pl & Holman Rd Median	0.00	0.00	88.89	0.00	0.00	0.00	0.00
Davie Tennis Stadium	0.00	0.00	92.31	0.00	0.00	0.00	0.00
Champion St & Lincoln Ave Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cypress Freeway Memorial Park	0.00	0.00	50.00	0.00	0.00	0.00	0.00
Skyline & Golf Links Rd Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glen Echo Creek Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 11: Tree Canopy by Neighborhood

Neighborhood	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Coliseum Industrial Complex	1,179.34	31.20	5.46	1,026.80	93.05	15.82	12.47
Sequoyah	1,696.38	676.28	39.87	337.10	643.82	38.99	0.18
Caballo Hills	1,035.53	458.13	44.24	166.49	389.80	21.11	0.00
Upper Rockridge	726.84	218.60	30.08	322.81	165.86	10.06	9.51
Piedmont Pines	641.24	382.60	59.67	155.81	101.05	1.78	0.00
Montclair	635.78	295.83	46.53	211.49	126.39	2.07	0.00
Claremont	633.66	308.45	48.68	127.38	196.75	1.08	0.01
Redwood Heights	622.09	154.18	24.78	345.76	119.21	2.52	0.42
Chabot Park	609.89	201.08	32.97	197.11	207.83	3.87	0.00
Skyline-Hillcrest Estates	517.29	234.63	45.36	129.83	148.38	4.44	0.00
Upper Diamond	426.82	106.39	24.93	239.64	80.43	0.37	0.00
Prescott	414.53	28.96	6.99	328.25	52.31	5.01	0.00
Produce and Waterfront	398.53	15.50	3.89	287.05	17.17	24.17	54.65
Merriwood	389.48	214.14	54.98	94.76	80.15	0.44	0.00
Forestland	386.53	225.68	58.39	73.08	85.34	2.43	0.00
Oak Knoll-Golf Links	371.81	106.31	28.59	138.38	126.08	1.05	0.00
Oakmore	356.87	168.85	47.32	117.94	67.65	2.42	0.00
Maxwell Park	338.60	59.33	17.52	220.49	58.64	0.15	0.00
Eastmont Hills	331.93	85.85	25.86	170.35	74.37	1.37	0.00
Glenview	305.23	61.89	20.28	189.86	53.16	0.32	0.00
Millsmont	298.19	68.46	22.96	171.85	57.12	0.75	0.00
Woodminster	291.48	144.50	49.58	78.67	65.53	2.78	0.00
Rockridge	287.91	63.08	21.91	188.83	34.88	0.98	0.15
Bushrod	287.48	39.31	13.67	200.18	45.87	2.12	0.00

Neighborhood	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Piedmont Avenue	286.50	49.53	17.29	203.82	28.15	1.01	4.00
Cleveland Heights	279.13	37.60	13.47	196.22	44.57	0.74	0.00
Trestle Glen	262.34	87.38	33.31	123.15	51.29	0.51	0.00
Longfellow	252.27	23.11	9.16	198.96	29.01	1.18	0.00
Brookfield Village	243.32	16.86	6.93	171.36	49.65	5.45	0.00
Havenscourt	221.46	16.30	7.36	175.34	29.50	0.33	0.00
Temescal	220.82	29.22	13.23	169.03	22.11	0.46	0.00
Shafter	218.90	40.02	18.28	155.36	22.66	0.86	0.00
Shepherd Canyon	218.25	140.15	64.22	42.52	34.49	1.08	0.00
Oak Center	215.06	30.02	13.96	144.49	36.80	3.75	0.00
Clinton	210.61	17.39	8.26	170.27	22.48	0.48	0.00
Grand Lake	209.84	33.51	15.97	150.21	25.71	0.41	0.00
McClymonds	200.71	9.37	4.67	173.96	14.24	3.15	0.00
Crestmont	195.56	48.65	24.88	82.66	60.14	4.12	0.00
Arroyo Viejo	191.62	18.31	9.56	138.21	33.89	1.21	0.00
Hoover/Foster	188.48	12.04	6.39	153.17	21.22	2.05	0.00
Leona Heights	187.36	91.10	48.62	58.23	36.54	1.49	0.00
Rancho San Antonio	185.92	13.98	7.52	147.26	24.23	0.46	0.00
Santa Fe	185.07	20.86	11.27	137.54	25.73	0.94	0.00
Downtown	183.67	7.46	4.06	169.40	3.86	2.78	0.18
Frick	183.28	18.32	9.99	124.37	40.18	0.41	0.00
Mills College	178.72	78.41	43.87	61.55	37.12	0.94	0.70
Oakland Avenue/Harrison Street	177.93	33.75	18.97	129.65	13.04	1.48	0.00
Lakeshore	175.19	29.36	16.76	112.00	33.67	0.16	0.00
Fairview Park	173.51	46.27	26.66	102.29	24.84	0.12	0.00
Webster	169.82	17.55	10.33	129.98	20.71	1.59	0.00
Sobrante Park	168.58	19.18	11.38	115.18	31.09	3.13	0.00
Clawson	166.40	11.50	6.91	133.87	19.12	1.91	0.00
Castlemont	163.20	19.28	11.81	123.83	18.97	1.12	0.00
Saint Elizabeth	163.14	11.96	7.33	135.02	16.15	0.00	0.00
Fremont	163.08	11.95	7.33	133.99	17.03	0.11	0.00
Allendale	160.27	15.60	9.73	122.38	21.60	0.69	0.00
Lincoln Highlands	160.26	56.84	35.47	69.90	32.91	0.62	0.00
Meadow Brook	159.75	17.64	11.04	119.04	23.07	0.00	0.00
Glen Highlands	153.57	54.75	35.65	65.28	33.32	0.21	0.00
Hiller Highlands	153.17	33.99	22.19	54.69	60.97	3.51	0.00
Adams Point	152.38	25.33	16.62	115.66	11.26	0.14	0.00
Sheffield	151.62	52.77	34.80	51.94	46.23	0.68	0.00
Seminary	149.32	10.15	6.79	121.41	17.52	0.25	0.00
South Prescott	148.56	6.55	4.41	128.96	12.62	0.43	0.00
North Stonehurst	147.87	11.23	7.59	116.34	20.11	0.20	0.00
Toler Heights	142.78	24.92	17.45	84.66	31.88	1.32	0.00

Neighborhood	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Eastmont	140.84	12.30	8.73	106.89	19.18	2.47	0.00
Pill Hill	140.83	13.98	9.92	116.64	9.38	0.83	0.00
Jefferson	139.68	15.45	11.06	99.42	24.49	0.34	0.00
Panoramic Hill	136.34	66.23	48.58	6.60	62.42	1.08	0.00
Cox	136.09	10.92	8.03	104.86	19.77	0.54	0.00
Iveywood	135.94	10.62	7.81	104.63	19.86	0.83	0.00
Acorn Industrial	134.92	3.59	2.66	127.25	2.96	1.12	0.00
Ralph Bunche	134.77	10.37	7.70	109.62	14.02	0.76	0.00
Mosswood	131.08	18.87	14.40	99.53	12.04	0.64	0.00
Highland Terrace	129.51	15.59	12.04	92.27	21.61	0.04	0.00
North Kennedy Tract	122.22	3.90	3.19	107.57	7.86	2.89	0.00
Highland	121.27	8.64	7.12	95.65	16.54	0.44	0.00
Coliseum	119.42	5.98	5.01	92.65	18.20	2.21	0.38
Acorn	117.85	14.32	12.15	87.71	13.20	2.63	0.00
Las Palmas	112.95	8.48	7.50	84.51	18.15	1.82	0.00
Harrington	110.61	12.52	11.32	80.99	16.66	0.44	0.00
Northgate/Waverly	109.91	6.30	5.73	98.65	4.53	0.43	0.00
Fruitvale Station	109.81	3.97	3.61	98.08	7.49	0.27	0.00
Paradise Park	108.97	10.69	9.81	80.81	16.82	0.65	0.00
East 14th Street Business	105.32	3.69	3.51	96.50	4.76	0.37	0.00
Peralta/Laney	105.01	6.93	6.60	79.37	11.72	1.87	5.11
Melrose	104.64	2.85	2.73	95.98	5.53	0.28	0.00
Fairfax	104.35	13.60	13.03	72.42	18.30	0.03	0.00
Reservoir Hill	103.63	21.89	21.12	62.16	19.25	0.33	0.00
East 14th Street Business	102.15	5.92	5.80	91.24	4.69	0.30	0.00
Foothill Square	101.40	10.56	10.42	74.89	15.85	0.10	0.00
Chinatown	97.84	4.77	4.88	90.33	2.26	0.48	0.00
Merritt	96.57	6.87	7.12	82.30	5.41	1.59	0.40
Hawthorne	95.67	8.08	8.44	79.83	7.47	0.30	0.00
Golden Gate	91.28	10.60	11.61	69.29	11.28	0.12	0.00
Crocker Highland	89.47	28.34	31.68	41.71	19.31	0.10	0.00
Upper Peralta Creek	89.13	11.18	12.54	63.24	14.53	0.18	0.00
Dimond	86.85	11.33	13.04	65.09	10.42	0.02	0.00
Elmhurst Park	86.56	8.22	9.49	63.46	14.74	0.15	0.00
Bancroft Business	86.54	3.05	3.52	78.15	4.25	1.10	0.00
Columbia Gardens	86.49	5.25	6.07	59.12	21.31	0.65	0.15
San Pablo Gateway	84.76	4.10	4.84	78.10	1.59	0.96	0.00
East Peralta	83.29	3.84	4.61	75.22	4.03	0.19	0.00
Fitchburg	82.71	4.82	5.83	67.64	9.11	0.51	0.63
Woodland	81.11	5.76	7.10	62.67	12.24	0.43	0.00
Gaskill	80.48	10.03	12.46	60.53	9.73	0.19	0.00
Ivy Hill	80.27	11.25	14.01	57.90	11.10	0.02	0.00
Laurel	77.85	9.35	12.02	60.14	8.11	0.24	0.00

Neighborhood	Acres	Canopy Acres	Canopy %	Impervious Acres	Grass/Low-lying Veg. Acres	Bare Soil Acres	Open Water Acres
Patten	75.41	8.27	10.97	57.41	9.73	0.00	0.00
Tuxedo	75.34	9.61	12.76	53.45	12.27	0.00	0.00
South Kennedy	74.15	2.41	3.24	67.04	4.70	0.00	0.00
School	74.07	8.61	11.62	52.90	11.95	0.61	0.00
South Stonehurst	73.48	3.71	5.05	60.04	8.52	1.21	0.00
Lockwood-Tevis	71.16	6.30	8.85	55.07	9.66	0.14	0.00
Peralta Hacienda	69.14	10.06	14.55	49.25	9.83	0.00	0.00
Oak Tree	68.90	4.61	6.69	58.06	6.08	0.15	0.00
Sausal Creek	64.48	9.76	15.14	45.69	9.03	0.00	0.00
Bartlett	64.01	8.99	14.04	46.38	8.64	0.00	0.00
Lakeside	63.28	4.57	7.22	53.61	4.24	0.78	0.07
Old City	59.34	6.54	11.02	49.43	2.97	0.41	0.00
Lynn	57.18	5.21	9.12	44.48	7.49	0.00	0.00
Civic Center	56.87	4.32	7.60	44.85	5.82	0.54	1.34
Durant Manor	55.79	3.59	6.43	44.32	7.61	0.28	0.00
Bella Vista	53.66	7.78	14.50	35.89	9.88	0.10	0.00
Wentworth Holland	52.62	3.14	5.97	42.68	6.80	0.00	0.00
Hegenberger	45.91	2.93	6.38	35.91	7.05	0.03	0.00
Montclair Business	39.17	8.15	20.81	25.85	4.11	0.41	0.65
Highland Park	30.08	3.89	12.92	20.86	5.27	0.06	0.00
Fairfax Business	19.98	0.76	3.80	17.77	1.46	0.00	0.00