



MORRISVILLE LAND COVER ANALYSIS & TREE CANOPY ASSESSMENT: 2022 UPDATE

Community Report | Town of Morrisville
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**The Morrisville Land Cover Analysis and Tree Canopy Assessment:
2022 Update was funded and produced by the Town of Morrisville,
in consultation with Davey Resource Group, Inc.**

**This report is a compendium to a series of reports produced by the
Wake County Land Cover Analysis and Tree Canopy Assessment,
a countywide initiative led by Wake County Government, in
consultation with Davey Resource Group, Inc.**





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Introduction



FOREWORD

The Town of Morrisville 2022 Land Cover Analysis & Tree Canopy Assessment (2022 LCA/TCA) utilized geospatial analysis to identify and measure land cover, throughout the town planning jurisdiction, as it existed in 2022. The project also measured the change in tree canopy cover over the two-year period from 2020–2022.

This is not a policy document; it is a summary report offering a visual, high-level overview of the project, the analysis and the results.

This document is an addendum requested by the Town of Morrisville to update the data provided to the town by the Wake County Land Cover Analysis & Tree Canopy Assessment (Wake LCA/TCA). Further information can be found within the Morrisville Land Cover Analysis & Tree Canopy Assessment (2020 LCA/TCA) summary report.

PROJECT PURPOSE

Provide additional and updated data to guide and support town planning, implementation and policy evaluation efforts.

STUDY AREA

The primary study area of the analysis is the Morrisville planning jurisdiction, which spans a total area of approximately 6,353 acres, calculated via GIS using boundary files provided by the town.¹

Map 1 exhibits the differences in the planning jurisdiction boundary utilized in the 2022 analysis as compared to the 2020 analysis.

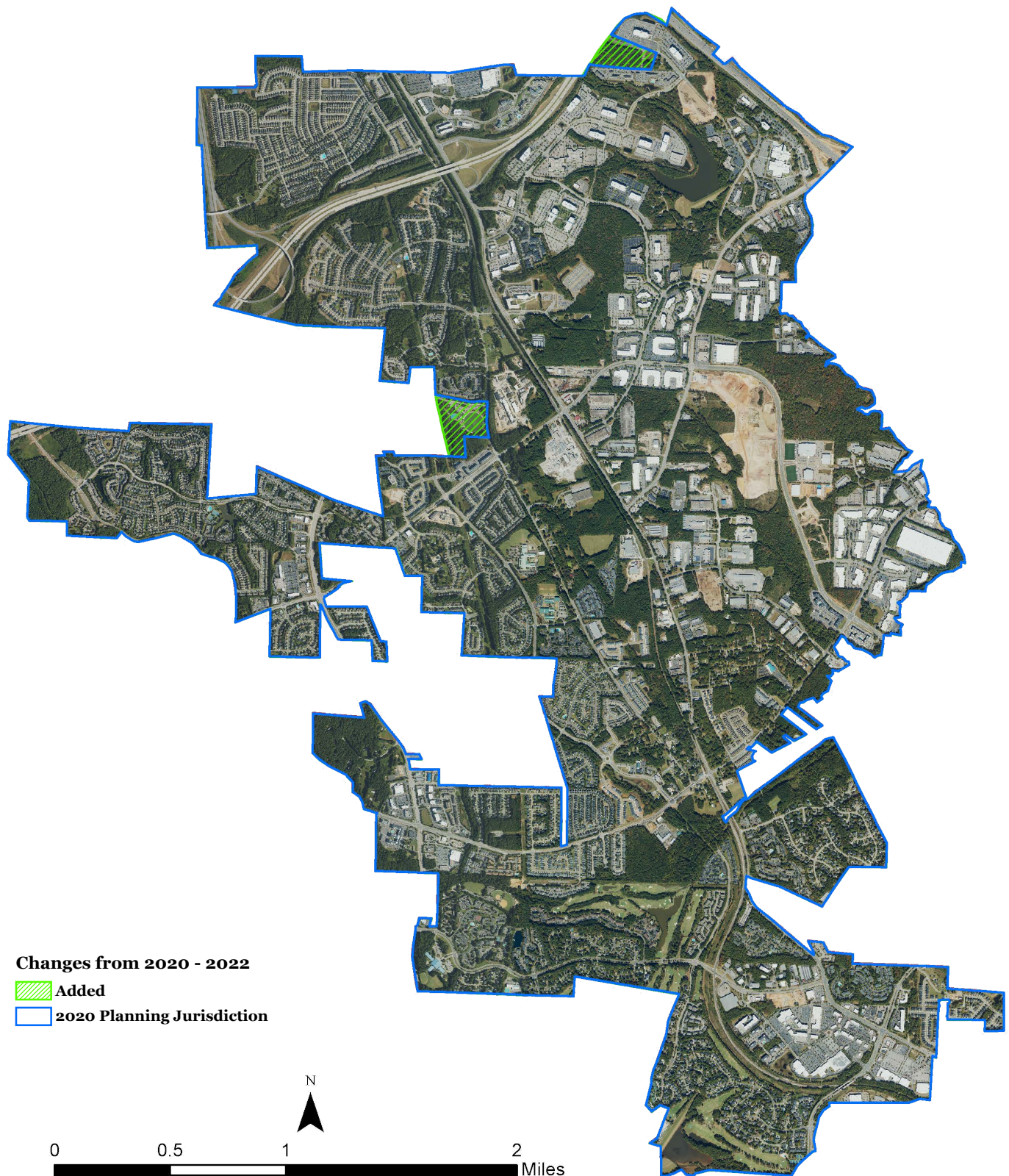
To make a direct comparison between the two analyses, this report uses the same planning jurisdiction and corporate limit boundaries as the 2020 report.

PARCEL-LEVEL DATA

The 2022 LCA/TCA added a new geography of study: tax parcels. With parcel-level data, land cover can be considered in context with other parcel-specific attributes such as zoning and land use. At the time of analysis, the Morrisville planning jurisdiction contained 8,017 parcels.

¹ In the 2020 LCA/TCA, the planning jurisdiction comprised approximately 6,304 acres, calculated via GIS using boundary files provided by Wake County. The 49-acre difference is primarily accounted for by the addition of new land area to the town planning jurisdiction: Church Street Park on the western edge of the town (approximately 25 acres) and four undeveloped wood lots in the north along Slater Road (approximately 17 acres). The remaining difference (approximately 7 acres) is negligible and accounted for by slight variations along the perimeter of the planning jurisdiction between the town-provided boundary used in the 2022 analysis and the county-provided boundary used in the 2020 analysis.

MAP 1. PLANNING JURISDICTION BOUNDARY CHANGE (2020–2022)



Land Cover (2022)

DRG employed geospatial analysis and remote-sensing methods to identify the land cover composition throughout the planning jurisdiction of Morrisville. The analysis utilized 2022 imagery made available by the United States Department of Agriculture's National Agriculture Imaging Program (NAIP). Imagery analysis is cost-effective and attains a high degree of accuracy.

The snapshot analysis presented here, and illustrated by Map 2, reflects land cover as of 2022 within the 6,304 acres comprising the town planning jurisdiction.

The analysis classified the entire land area within the planning jurisdiction into five distinct types of land cover (Figure 1).

Tree Canopy — 2,298 acres

Land area that is covered by tree trunks, branches and leaves, as seen from above.

Vegetation — 1,366 acres

Shrubs, grasses and other low-lying vegetation that allow rainfall to infiltrate soil.

Impervious Surface — 2,396 acres

Buildings, roads, sidewalks and other paved or built areas that do not allow rainfall to infiltrate the soil.

Bare Soil — 172 acres

Exposed soil that lacks vegetation, such as vacant lots, construction sites, agricultural fields and baseball infields.

Open Water — 74 acres

Lakes, ponds, streams, wetlands and other water features.

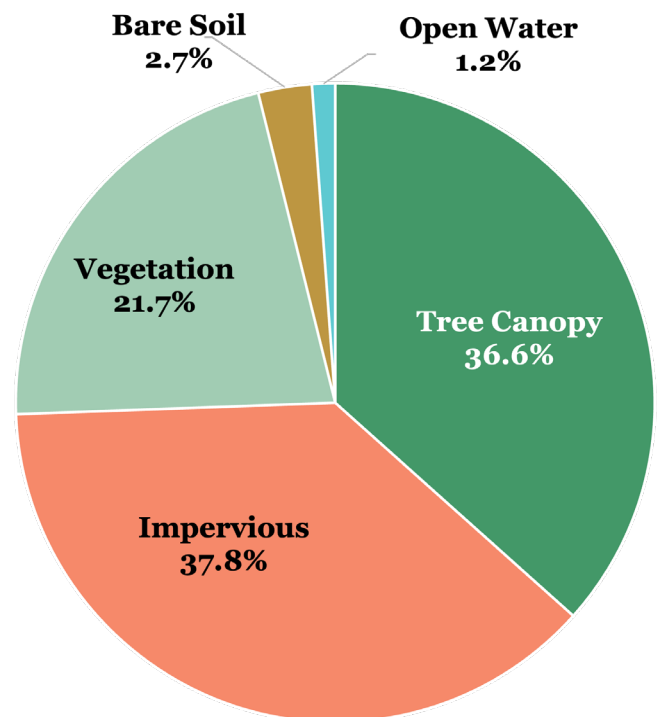
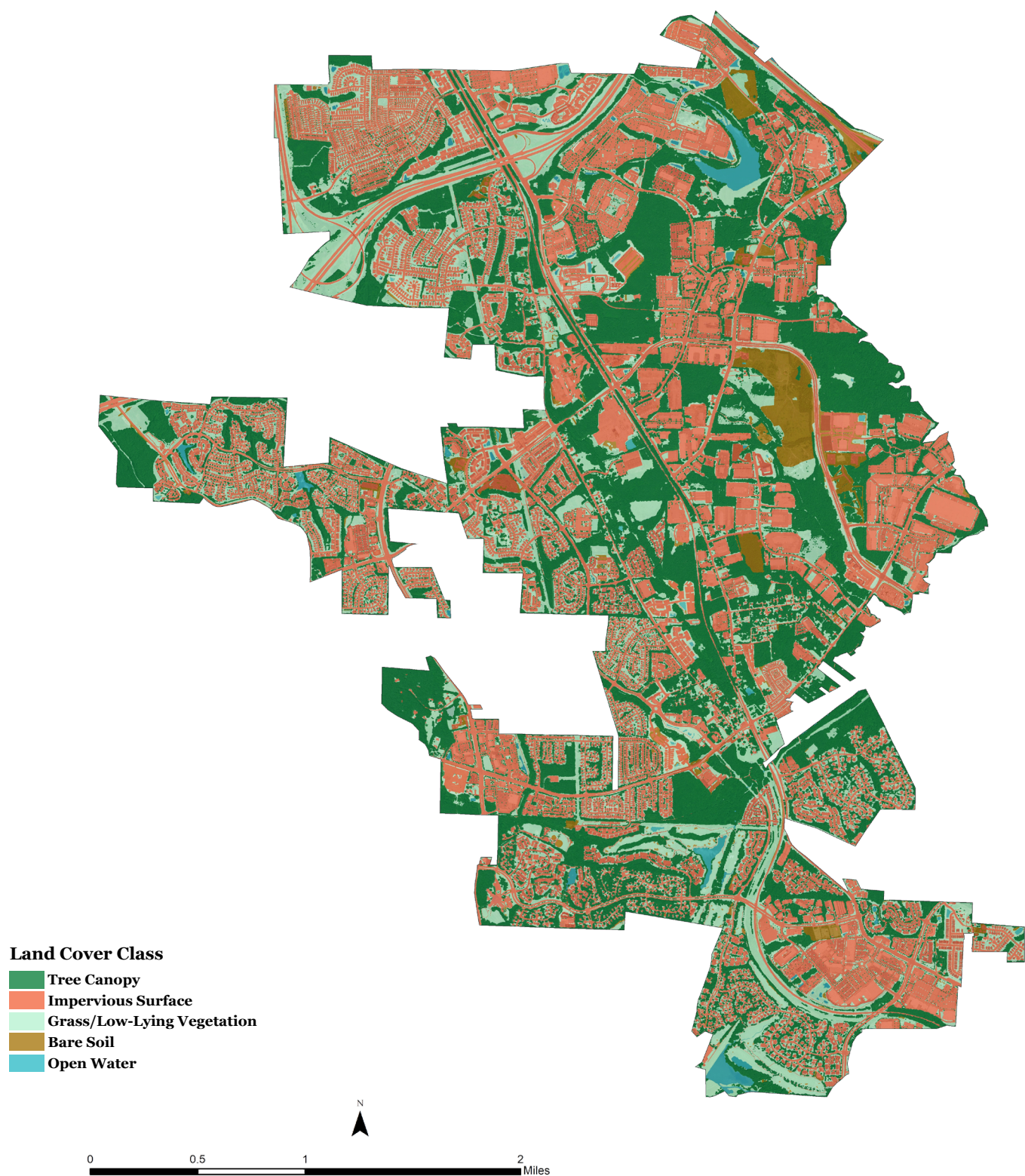


FIGURE 1. PLANNING JURISDICTION
LAND COVER (2022)

MAP 2. MORRISVILLE PLANNING JURISDICTION LAND COVER (2022)

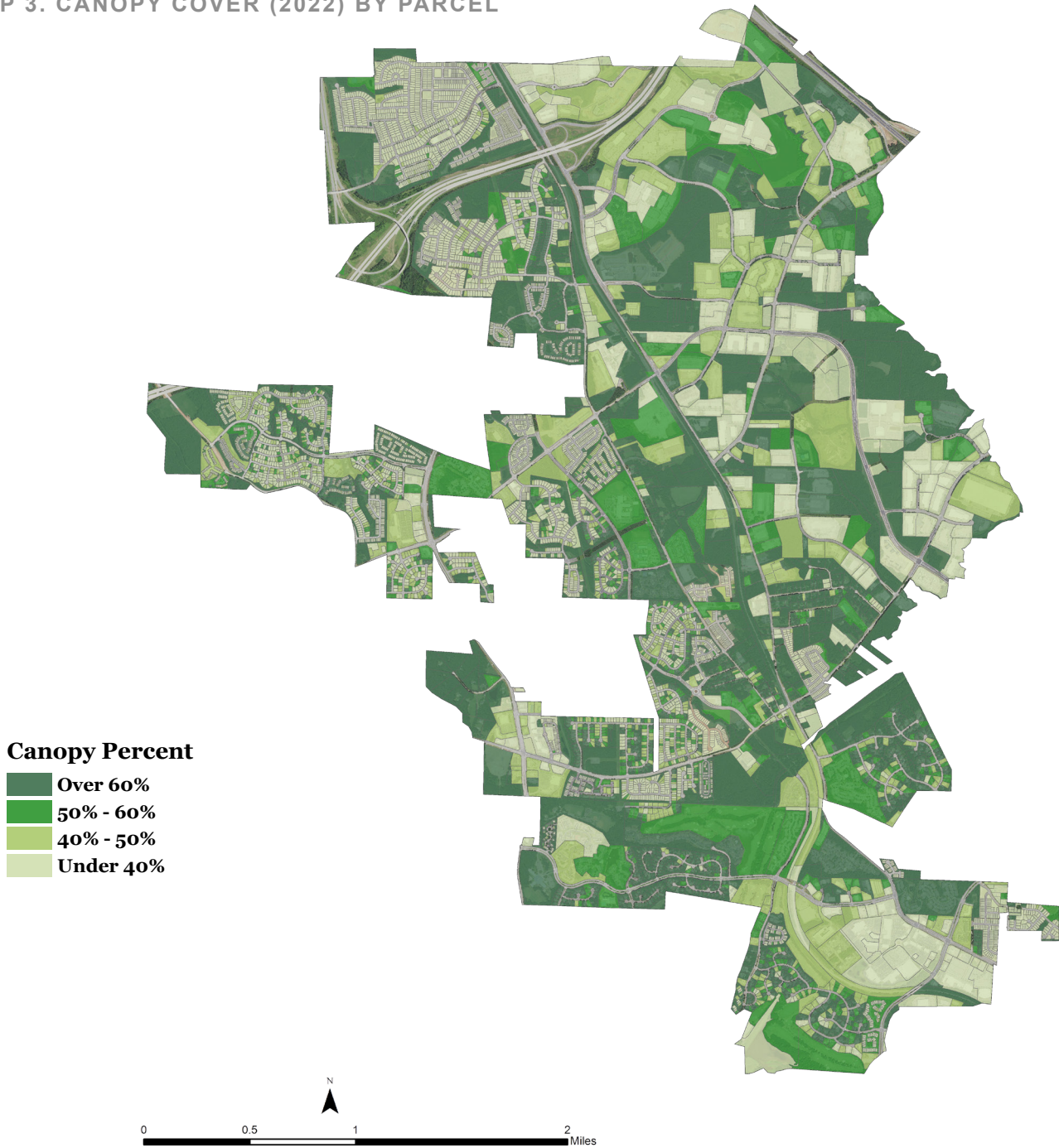


Canopy Cover (2022) by Parcel

Map 3 presents the distribution of 2022 tree canopy cover by parcel. As the smallest unit of geographical analysis in the study, mapping at the parcel level offers the most detailed view of the distribution of canopy cover throughout the planning jurisdiction.

Parcels with the highest percent canopy cover generally were undeveloped lots and greenspaces. Many of these are located in the southwest corner of Morrisville and the central eastern portion. Those with the lowest canopy coverage tended to be large commercial developments east of the airport.

MAP 3. CANOPY COVER (2022) BY PARCEL



Land Cover Change (2020–2022)

Table 1 compares land cover from the 2020 analysis to the 2022 analysis. Figure 2 looks specifically at the change in Tree Canopy and Impervious Surface from 2020 to 2022.

CANOPY INCREASED BY 8.2%

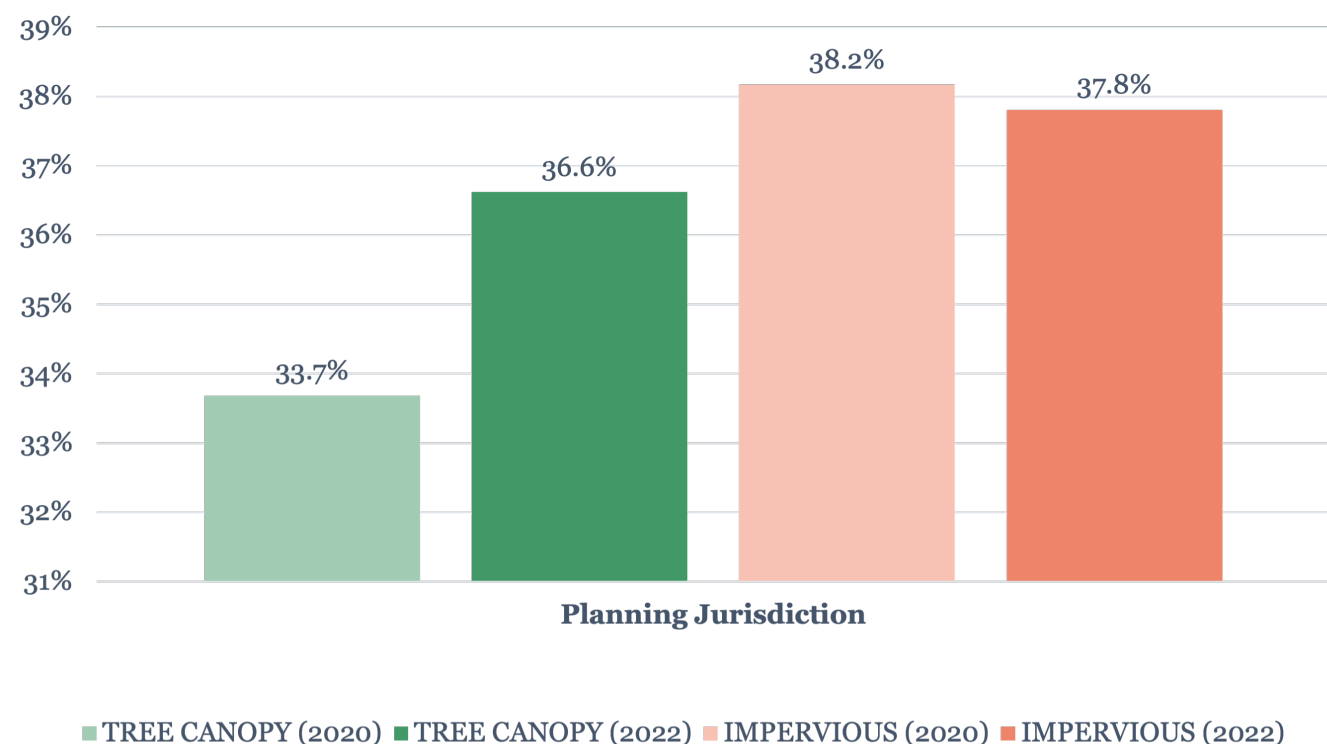
From 2020–2022, the Morrisville planning jurisdiction gained 174.41 canopy acres, amounting to an 8.2% increase in the total amount of tree canopy throughout the planning jurisdiction.

As noted in the Wake LCA/TCA, the same study area lost 623 canopy acres from 2010–2020. While the net change from 2010–2022 is a 449-acre decline, the last two years show that the trend may be reversing from net loss to net gain.

TABLE 1. LAND COVER CHANGE (2020–2022)

	2020 Acres	2020 Percent	2022 Acres	2022 Percent	Change (Acres)	Percent Change (Relative)
Tree Canopy	2,123.50	33.68%	2,297.91	36.45%	174.41	8.21%
Impervious Surface	2,406.24	38.17%	2,395.51	37.99%	-10.73	-0.45%
Vegetation	1,422.60	22.57%	1,365.66	21.66%	-56.93	-4.00%
Bare Soil	266.23	4.22%	171.98	2.73%	-94.25	-35.40%
Open Water	85.60	1.36%	73.79	1.17%	-11.81	-13.79%

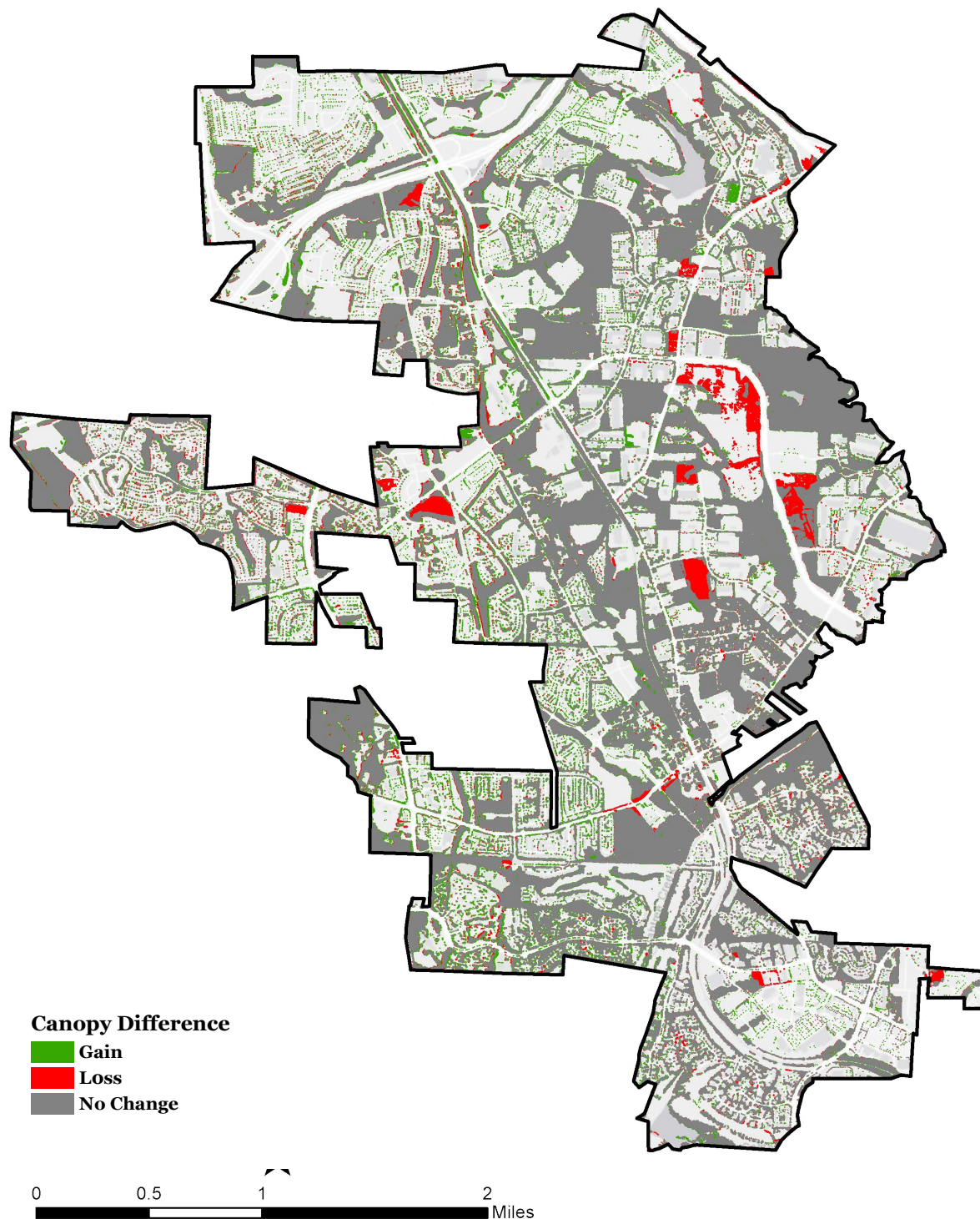
FIGURE 2. TREE CANOPY AND IMPERVIOUS SURFACE CHANGE (2020–2022)



Canopy Gains (2020-2022)

Map 4 demonstrates that most canopy gain occurred in small areas throughout the planning jurisdiction; this pattern suggests canopy may be “bouncing back” on more recent development sites where newly-installed trees may have been too small to be picked up by the 2020 analysis.

MAP 4. CANOPY CHANGE (2020-2022)



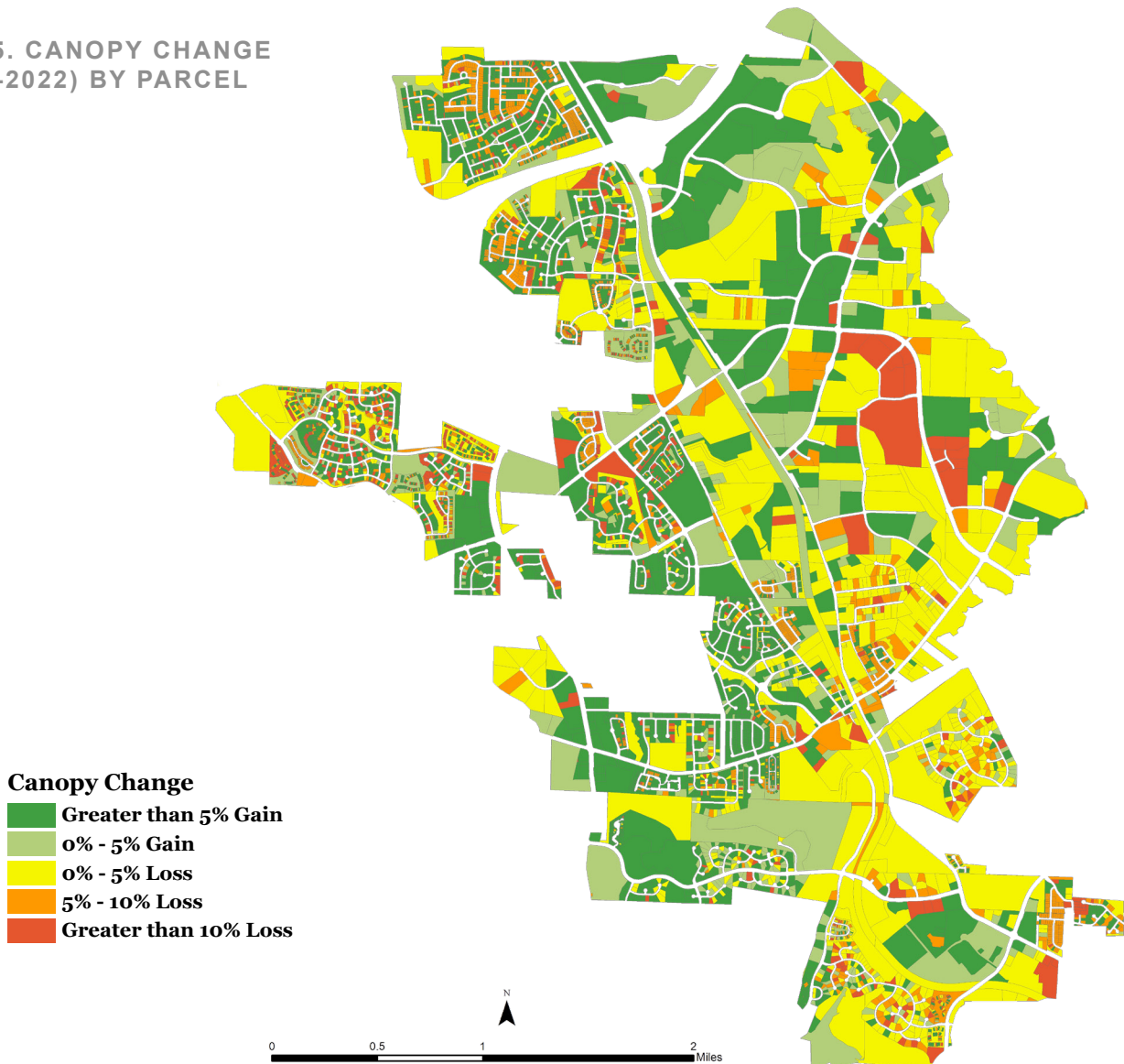
Canopy Change by Parcel (2020–2022)

Map 5 presents the distribution of the change in change in tree canopy cover by tax parcel from 2020–2022.

Larger parcels with greater than 10% canopy loss are observed in east Morrisville along McCrimmon Parkway, which is the location of the Spark LS development, a 109-acre, mixed-use life sciences campus.

Significant concentrations of parcels experiencing greater than 10% loss are observed in western Morrisville, which include recent and in-progress development. This is in contrast to the northeast and southwest portions of Morrisville which appear to have the highest concentrations of parcels showing canopy gains; these areas roughly align with Crabtree Creek and Stirrup Iron Creek.

**MAP 5. CANOPY CHANGE
(2020–2022) BY PARCEL**



Conclusion

This addendum to the Morrisville 2020 LCA/TCA set out to provide the Town of Morrisville both an update to and an increase in granularity of the land cover data provided to the town by the Wake LCA/TCA.

The updated data can be utilized by Morrisville to guide and support planning and implementation efforts on both a county and municipal level.

RECOMMENDED NEXT ACTIONS

As a next step in leveraging the acquired land cover data, DRG recommends that Town staff consider and incorporate the data into the town's on-going implementation of the non-regulatory 2021 Land Use Plan. Town staff refers to the plan when recommending amendments to the Unified Development Ordinance (UDO) or zoning map, and Town Council is required by N.C. General Statutes to adopt a statement describing whether its actions are consistent or inconsistent with the Land Use Plan when considering zoning map or text amendments.

Due to rapid development in the Town and the greater Morrisville region, the 2021 Land Use Plan contained significant changes from the 2009 Land Use Plan. Some of the changes expanded on goals that were identified in the earlier plan, such as tree conservation and environmental protection. As a result of the 2021 Land Use Plan Adoption Implementation Project, an update to the Unified Development Ordinance (UDO) was adopted in June 2022. Key changes include new provisions designed to improve protections afforded to trees and tree canopy during development.





Tree Ordinance Evaluation

Evaluate the newly adopted UDO §5.4 Tree Protection through a formalized review process that benchmarks the UDO with urban forestry industry standards across multiple focus areas, including credentialing, public tree management and protection, private tree protection and preservation, and tree planting. The objective of the evaluation is to determine the efficacy of the newly adopted UDO and identify potential areas for future improvement.

Case Study Analyses

Data at the parcel level can be used to select sites based on key factors, such as land use or zoning, and utilize these sites as case studies to help gain insight into the historical effect of various types of development on land cover, model the impact of future development on existing land cover, and model future expected canopy growth on past, present, and future development sites.

