SHARED-USE NON-MOTORIZED (SUN) TRAIL ECONOMIC IMPACTS IN MIAMI-DADE COUNTY

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Executive Summary

This report evaluates the economic, health, and property-value impacts of three Miami-Dade County SUN Trail segments – the Atlantic Greenway, the South Dade Trail, and The Underline – and conducts a benefit-cost analysis (BCA) of these investments. It quantifies lifecycle costs (initial construction and discounted maintenance over 25 years), as well as a range of benefits: jobs and output from construction, property-value premiums (tax revenues), trail-user spending and consumer surplus, and healthcare savings from increased physical activity. Key findings include:

- **Lifecycle Costs:** Over a 25-year horizon, The Underline segment has the highest cost (approximately $14.6 million in present value), reflecting its major construction expenditure. Life cycle costs for the South Dade Trail and Atlantic Greenway are understated due to unavailable construction information but operations and maintenance costs are estimated to be about $7 million, and $6.4 million, respectively.
- **Trail-User Expenditures and Consumer Surplus:** Survey and travel-cost methods, including Strava Metro trail user data, estimate additional benefits from trail usage. The Underline segment yields about $5.3 million per year in consumer surplus. Consumer surplus is the estimated value users derive from visiting a trail, using their travel costs to the trail as a proxy for their willingness to pay. Trail-related spending on food, gear, tourism, etc. is roughly $4.4 million annually. These figures likely understate total value because they exclude untracked users and broader community benefits.
- **Jobs and Economic Output:** Using input-output modeling of the combined capital/maintenance spending, the study estimates that building and maintaining the three trails supports roughly 124 full-time jobs (annual average) and generates about $12.1 million in countywide Gross Domestic Product and $10.4 million in labor income per year from construction and visitor spending activity.
- **Property Values and Tax Revenue:** Homes close to the trails command higher prices. The study's hedonic analysis finds consistent "trail proximity" premiums on nearby residential property values (mostly within 0.5 miles). These uplifts translate into substantial public revenues: almost $40 million annually in property taxes attributable to SUN Trail proximity countywide, with more than $18 million of property taxes from The Underline alone. In other words, the trails appreciably expand the local tax base.
- **Health Benefits:** By modeling active-transportation-induced reductions in chronic disease, the study assigns a large health-value benefit: over $313 million in present value of healthcare cost savings. This estimate uses conservative assumptions about increased physical activity and is consistent with literature showing trails as "high-impact, low-cost" health interventions.
- **Benefit–Cost Ratios (BCRs):** Even omitting consumer-surplus, the trails show positive economic returns. Benefit-Cost Ratios (BCRs) are a metric used to measure whether a project's benefits

outweigh its costs. BCRs over 1.0 indicate a project has a positive return on investment while BCRs below 1.0 indicate that a project's costs outweigh benefits. Using only monetized benefits vs. lifecycle costs, the benefit–cost ratios are above 1.0 for all segments. In particular, the Atlantic Greenway has the highest return (BCR≈2.4, meaning $2.4 benefit per $1 cost), The Underline achieves roughly BCR≈1.9, and the South Dade Trail is just above break even (BCR≈1.1). Including consumer surplus, BCRs are 2.8, 2.5, and 1.2, respectively, reflecting the additional value users attribute exclusively to their free access to these trails.

Methods: The study's methodology combines several standard approaches:

Lifecycle cost accounting: Capital and O&M costs are summed (construction costs at face value; O&M discounted at 3% over 25 years).

- Economic impact modeling: Trail expenditures (capital and maintenance) are fed into an input-output model to derive jobs, GDP, and income impacts.
- Hedonic regression: Housing sales data around each trail were analyzed to estimate the percentage premium that proximity commands controlling for housing characteristics and proximity to community amenities such as schools and parks; these premiums are then translated into added property tax revenues.
- Travel-cost and survey analysis: Strava-based travel costs estimate users' consumer surplus, and user surveys estimate trail-related spending and temporal patterns.
- Health impact modeling: Established public-health models convert projected increases in active travel into reduced medical costs (discounted to present value) – yielding the $313 million figure.
- Benefit–cost analysis: Monetized benefits (tax revenue, spending, health savings, etc.) are totaled and divided by the lifecycle costs to compute BCRs; an internal consistency check (per-mile vs total) is applied.

1. Introduction

Building upon a thorough review of existing research, this study conducted by the South Florida Regional Planning Council (SFRPC) evaluates the economic impacts associated with prominent trails within Miami-Dade County, focusing specifically on the Atlantic Greenway, South Dade Trail, and The Underline. Trails represent significant public investments with the potential to deliver substantial economic, social, and health-related benefits. However, accurately capturing these diverse impacts requires refined methodologies adapted to local conditions. Consequently, this study employs advanced approaches to measure trail proximity premiums, consumer surplus, user spending, and public health benefits, creating comprehensive insights into the true value provided by these community assets. Those benefits are benchmarked against the costs of construction, enhancement, and maintenance to provide decision makers with helpful tools for planning future investments.

The Atlantic Greenway, located along the eastern shoreline of Miami Beach, serves as a key component of the city's recreational and transportation infrastructure. It provides continuous pedestrian access along the waterfront, supporting non-motorized mobility and integrating public space with the urban environment. The corridor contributes to broader planning goals by promoting physical activity, reducing car dependency, and improving access to coastal amenities. Its role in concentrating foot traffic along commercial corridors also reinforces the economic viability of adjacent retail and hospitality businesses. Additionally, proximity to the Greenway has been linked to increases in surrounding property values, supporting land use strategies aimed at leveraging public investment for local economic development.

The South Dade Trail, extending through southern Miami-Dade County, functions as both a recreational asset and a transportation corridor, enhancing connectivity among residential neighborhoods, schools, and commercial areas. Its alignment along a major Bus Rapid Transit corridor facilitates multimodal access and supports mobility across diverse communities. The trail contributes to regional planning objectives by encouraging physical activity, reducing barriers to access for non-drivers, and stimulating corridor-level economic activity. Public health benefits and improvements in community well-being further position the South Dade Trail as critical infrastructure for advancing long-term sustainability, resilience, and quality of life in the region.

The Underline is a partnership between the Miami-Dade County Department of Transportation and Public Works (DTPW), the Miami-Dade County Parks, Recreation, and Open Spaces (PROS) Department, and a non-profit, the Friends of The Underline, aimed at "transforming the land below Miami's Metrorail, from the Miami River (Brickell area) to the Dadeland South Metrorail Station, into a world-class, multimodal urban trail".[1] In 2020, The Underline Conservancy was created to manage, maintain, operate, and program The Underline.

Source: South Pointe Park, Miami Beach. *Gagliardi Photography*, via Canva

[1] The Underline. https://www.miamidade.gov/global/transportation/the-underline.page. Accessed March 27, 2025

Figure 1.1 Shared-Use Non-Motorized (SUN) Trails Study Area

Source: South Florida Regional Planning Council, 2025

2. Summary of Literature Review on Economic Impacts of Recreational Trails

Recreational trails in the United States have evolved from simple transportation corridors to critical infrastructure supporting tourism, public health, and economic revitalization. Over the past two decades, a growing body of research has quantified the multifaceted economic benefits of trails, ranging from direct visitor spending to long-term increases in property values and reductions in healthcare costs. This literature review synthesizes findings from peer-reviewed studies, government reports, and economic analyses to outline the scale and diversity of these impacts, with a focus on validated references from academic and institutional sources.[2]

2.1 Tourism and Visitor Spending

Trails serve as significant drivers of tourism, attracting both local and non-local visitors whose expenditures bolster regional economies. The 2010 Outdoor Foundation's Outdoor Recreation Participation Report highlighted that 48.9% of the U.S. population engaged in outdoor activities, with trail-based recreation forming a substantial component.[3] For instance, the Mineral Wells to Weatherford Rail-Trail in Texas generates approximately $2 million annually through 300,000 visitors, while trails in Orange County, Florida, supported 516 jobs and $42.6 million in economic impact in 2010.[4] These figures underscore the role of trails in redirecting discretionary income toward rural and economically disadvantaged areas, where tourism dollars often flow into lodging, dining, and retail sectors.[5]

Pennsylvania's trail networks exemplify state-level impacts, with 37.9 million visitors spending $859 million in 2010, including $201 million from non-residents. Similarly, the 45-mile Mon River Trail System in West Virginia catalyzed $200 million in private investment, revitalizing Morgantown's urban core.[6] Long-distance trails, such as the Great Allegheny Passage (GAP) in Pennsylvania, attract multiday visitors who spend an average of $125 per night on lodging and $60 daily at restaurants, contributing to sustained economic

[2] https://www.miamidade.gov/citt/library/multimodal-trails-case-study-final-report-2022-10-17.pdf#page=7.00
[3] Fourth Economy. An Economic Analysis of the Proposed Pike to Bike Trail. 2014. headwaterseconomics.org/wp-content/uploads/trails-library/Trail_Study_174-PA-Economic_Impact_Analysis.pdf
[4] Fourth Economy. An Economic Analysis of the Proposed Pike to Bike Trail. 2014. headwaterseconomics.org/wp-content/uploads/trails-library/Trail_Study_174-PA-Economic_Impact_Analysis.pdf
[5] https://elcr.org/wp-content/uploads/2013/04/Economic-Benefits-American-Trails.pdf
[6] https://elcr.org/wp-content/uploads/2013/04/Economic-Benefits-American-Trails.pdf

activity.[7] These examples align with broader trends identified in a 2006 Outdoor Industry Foundation study, which estimated that active outdoor recreation contributes $730 billion annually to the U.S. economy.[8]

Economic outcomes vary by trail type, location, and user demographics. Minnesota's 2008 trail spending reached $2.4 billion statewide, with $439 million from out-of-state visitors.[9] Conversely, urban trails like those in Minneapolis-St. Paul primarily serve locals, limiting external revenue but enhancing community cohesion and workforce vitality.[10] In Arizona, non-motorized trails generate $8.3 billion annually for residents, compared to $2.1 billion from motorized trails.[11]

Rural trails often yield disproportionate benefits due to lower baseline economic activity. The Whitefish Trail in Montana attracts 22,000 annual visitors, generating $3.6 million and supporting 68 jobs.[12] Similarly, Helena's 80-mile trail system contributes $4 million via visitor spending, underscoring the scalability of trail impacts across regions.[13]

2.2 Job Creation and Business Development

Trail-related tourism stimulates job creation across hospitality, retail, and outdoor recreation industries throughout the United States. The Virginia Creeper Trail, a 34-mile route in southwestern Virginia, generates $2.5 million annually, with non-local visitors contributing $1.2 million directly to local economies.[14] In Duluth, Minnesota, a 7.5-mile lakeshore trail drew 96,456 non-local visitors in one summer, resulting in $17.8 million in regional spending.[15] Such demand supports businesses ranging from bike rentals to guided tours, with trail-oriented enterprises reporting significant revenue shares. For example, 41% of businesses along the GAP attributed their annual income to the trail by 2014, with 67% citing it as a factor in expansion decisions.[16]

The economic ripple effect extends to construction and maintenance sectors. The proposed Firefly Trail in Georgia is projected to create 158 jobs during construction, alongside a $32 million boost in economic output.[17] Furthermore, trails often inspire entrepreneurial ventures; the Mispillion River Greenway Trail in

[7] stclairfoundation.org/uploads/blog/Economic-Impact-of-Trail-Development-Final.pdf
[8] elcr.org/wp-content/uploads/2013/04/Economic-Benefits-American-Trails.pdf
[9] https://headwaterseconomics.org/trail/4-trail-use-in-minnesota/
[10] https://headwaterseconomics.org/trail/4-trail-use-in-minnesota/
[11] Economic Impact of Recreational Trail Use in Different Regions of Minnesota- Headwaters Economics
[12] https://headwaterseconomics.org/trail/?benefit=trail-use-estimates
[13] Trails Benefits Library – Headwaters Economics
[14] urbanforestrysouth.org/products/fact-sheets/economic-benefits/the-economic-benefits-of-recreational-trails/index_html
[15] stclairfoundation.org/uploads/blog/Economic-Impact-of-Trail-Development-Final.pdf
[16] stclairfoundation.org/uploads/blog/Economic-Impact-of-Trail-Development-Final.pdf
[17] Trails Benefits Library – Headwaters Economics

Delaware spurred downtown reinvestment, adding 250 jobs in a previously vacant area.[18] Nationally, outdoor recreation supports 7.6 million jobs, surpassing sectors like oil and gas in economic significance.[19]

2.3 Property Value Appreciation

Proximity to recreational trails consistently enhances real estate values, particularly in communities prioritizing walkability. A 2008 study in Oakland County, Michigan, found that homes within 500 meters of trails saw property values increase by 4.6%, with effects extending up to 1,500 meters.[20] Similarly, Minnesota's trail systems improved quality of life and became recruitment tools for businesses seeking attractive locales for employees.[21] This phenomenon is not limited to urban areas; rural regions with trail access, such as those in Pennsylvania's Alleghenies, leverage natural assets to attract investment and skilled workers.[22]

The relationship between trails and property values also reflects broader urban planning trends. Trails integrated into greenway systems increase neighborhood desirability, often accelerating commercial development. For instance, the Greenville Hospital System Swamp Rabbit Trail in South Carolina prompted new business openings, with one enterprise reporting a 30% profit increase after relocating closer to the trail.[23] Table 1.1 summarizes important studies on the effect of recreational trails on property premiums.

Table 2.1: Summary of Trail Property Premium Studies

Location/Trail	Premium Effect Summary	Study/Authors
Vancouver, Canada	11.9% to 15.6% premiums adjacent vs. non-adjacent properties	Quayle & Hamilton (1999)
Indianapolis, IN (Monon Trail)	14% premium for Monon Trail, 2.4%–5.7% for other trails	Lindsey et al. (2003)
Monon Trails, IN	4.1% premium (declines with neighborhood income)	Payton & Oltensmann (2014)
San Antonio, TX	1.7%–4.8% premiums depending on trail type	Asabere & Huffman (2009)
Little Miami Scenic Trail, OH	Approximately 4.7% premium ($7.05 per foot closer)	Karadeniz (2008)
Little Miami Scenic Trail, Cincinnati, OH	Market value increases by 0.000875% per foot closer (~$230 per foot)	Parent & vom Hofe (2013)
Whittier, CA	5.95% pre-conversion, 8.2% after rail-to-trail conversion	Noh (2019)
Muskego, WI	8.6% premium post trail opening	Kashian et al. (2018)

Source: See citations in the References section.

[18] headwaterseconomics.org/wp-content/uploads/trails-library/Trail_Study_174-PA-Economic_Impact_Analysis.pdf
[19] Trails Make Economic Sense- American Trails
[20] https://stclairfoundation.org/uploads/blog/Economic-Impact-of-Trail-Development-Final.pdf
[21] Economic Impact of Recreational Trail Use in Different Regions of Minnesota- Headwaters Economics
[22] https://headwaterseconomics.org/wp-content/uploads/trails-library/Trail_Study_174-PA-Economic_Impact_Analysis.pdf
[23] headwaterseconomics.org/wp-content/uploads/trails-library/Trail_Study_174-PA-Economic_Impact_Analysis.pdf

2.4 Healthcare Cost Reductions

Trails contribute to public health savings by encouraging physical activity, which reduces the prevalence of chronic disease. A Lincoln, Nebraska, study revealed a $2.94 return in medical benefits for every $1 invested in trails, translating to $564 in annual per capita savings.[24] The 437 million visits to U.S. Interior-managed lands in 2010 supported health outcomes equivalent to $44 billion in economic activity, emphasizing the preventive healthcare value of outdoor recreation.[25]

In Washington State, trail-based activities avert $390 million in healthcare costs annually, as residents average 38–42 days of trail use per year.[26] These findings align with broader analyses linking outdoor recreation to reduced obesity, cardiovascular disease, and mental health expenditures.[27] By providing low-cost access to exercise, trails mitigate socioeconomic disparities in healthcare access, particularly in underserved urban areas.

Source: South Pointe Park, Miami Beach. Gagliardi Photography, via Canva.

[24] Evidence of Many Varieties of Economic Benefits Linked to Trails- American Trails
[25] Evidence of Many Varieties of Economic Benefits Linked to Trails- American Trails
[26] Economic, Environmental and Social Benefits of Recreational Trails in Washington State- American Trails
[27] The Economic Benefits of Trails and Trail Building in Michigan – Trail Building Law and Policy

2.5 State and Regional Plans

The following studies and planning initiatives illustrate significant efforts at the county and municipal level in Miami-Dade to expand, connect, and enhance bicycle and pedestrian infrastructure. These plans and assessments collectively aim to improve safety, accessibility, and sustainability for non-motorized transportation users, addressing current gaps, promoting active transportation, and generating broader community and economic benefits. By integrating strategic investments, connectivity analyses, and economic impact studies, Miami-Dade County and its municipalities demonstrate a coordinated commitment to creating an interconnected network of trails, paths, and bicycle facilities that meet both recreational and commuting needs, while enhancing the quality of life and local economies throughout the region.

2050 Bicycle-Pedestrian Master Plan

Released by the Miami-Dade Transportation Planning Organization (TPO) in September 2024, the 2050 Bicycle-Pedestrian Master Plan identified projects that fulfill the goal of creating a safer, reliable, accessible, and sustainable transportation system for non-motorized transportation users. The Plan assessed the existing 525 miles of bicycle and pedestrian facilities within Miami-Dade, including paved shoulders, bike lanes, shared-use-paths, and multi-use trails within the context on county and municipal plans.

Based on the finding that more than 64% of the existing bicycle and pedestrian network is unprotected and 67% of riders feel unsafe riding on Miami-Dade streets, the plan recommends building 438.5 miles of either protected or separate bicycle facilities (i.e. shared-use paths, side paths, and protected bicycle lanes). In total, the 543.3 miles of recommended projects focus on providing access to community amenities such as transit stops, parks, employment centers, school, and high population areas to ensure that residents can use bicycle and pedestrian infrastructure for recreation and commuting.

Miami-Dade Bicycle Network Connectivity Assessment, Florida Department of Transportation, 2022

The Miami-Dade Bicycle Network Connectivity Assessment addresses gaps in Miami-Dade's bicycle network to improve connections and provide a safe and accessible alternative to personal vehicles. The Assessment involved robust collaboration with local representatives including Miami-Dade County, the Miami-Dade Transportation Planning Organization, and 34 municipalities to ensure the findings reflect the local context and align with ongoing initiatives.

After cataloging the existing network, "Essential Areas," where demand for bicycle infrastructure may be higher, were modeled to guide where connections would have the greatest impact on the surrounding population. The proposed projects were separated into two categories: Countywide Connectors and Point of Interest Connections.

Countywide Connectors offer long-distance transportation options and are primarily made up of greenways and trails. Examples include The Underline and the Ludlam Trail. Point of Interest Connections provide access to everyday locations such as schools, parks, and employment areas while connecting existing and planned projects. Examples include protected, buffered, and conventional bike lanes. The 639 proposed projects represent 727 miles of additional bicycle facilities for Miami-Dade County prioritizing connectivity to existing and proposed local projects and a dedication to a cohesive non-motorized transportation system.

Florida's Miami Loop, Rails to Trails Conservancy, 2018

The Miami Loop is a proposed 225-mile shared-use path network connecting 11 regional trails of Miami-Dade County into a larger looped network. As of 2018, 54% of the trail has been completed with 86% of the land publicly owned. The plan was developed by the Miami-Dade Trail Alliance with support from local advocacy groups such as the Rails to Trails Conservancy and the Miami Foundation.

Public Easement Bicycle/Pedestrian Network Plan, 2018

Florida Power and Light, the South Florida Water Management District, and Miami-Dade County collaborated on the Public Easement Bicycle / Pedestrian Network Plan to find the most feasible opportunities for regional multi-use path developments. Of the 11 potential opportunities along publicly owned canals and powerline corridors, a 14-mile trail connecting the Fontainebleau community,[28] Florida International University, and the Falls, was identified as the preferred trail.

Coral Gables Bicycle and Pedestrian Stress Assessment Study, 2019

Aiming to provide safe opportunities for residents to walk or cycle, the City of Coral Gables' Bicycle and Pedestrian Stress Assessment Study expands upon the 2014 Bicycle and Pedestrian Master Plan. This study includes an implementation plan and refining recommendations for a connected and improved multi-modal network. The City of Coral Gables analyzed the level of traffic stress experienced by residents, connectivity to highly trafficked corridors, safety at intersections, and sidewalk gap analysis.

Twenty-three eligible bicycle corridors were selected for project development such as: a shared use path on University Drive connecting University of Miami students to Downtown Coral Gables; separated bike lanes on Ponce De León Boulevard, and a buffered bicycle lane along Alhambra Circle. Pedestrian improvements include standardizing 6- to 8-foot-wide sidewalks, connecting gaps in the sidewalk network, marking crosswalks for improved visibility, mid-block crossings, and pedestrian call buttons with audible cues, while eliminating right and left vehicle turn conflicts during walk phases.

[28] Fontainebleau is a suburban community and census-designated place in Miami-Dade County with a 2020 population of 59,860, according to the US Census American Community Survey. This community is located near Florida International University.

2.6 Florida Department of Transportation Shared-Use Non-Motorized Trail Study

FDOT's Greenways and Trails Economic Study (2025) evaluates the economic impact of Florida's Shared-Use Nonmotorized (SUN) Trail Program, focusing on five trail segments across varied geographic and urban contexts. Led by the East Central (ECRPC) and Treasure Coast Regional Planning Councils (TCRCP) for the Florida Department of Transportation (FDOT), the analysis quantifies trail user expenditures, adjacent property value appreciation, and overall economic returns including job creation and local GDP contributions. Findings from the study estimate that just 15 miles of SUN Trail segments generate over $30 million in annual economic output and support 320 jobs, illustrating a strong return on infrastructure investment. The results provide key inputs for FDOT's macroeconomic modeling and help fulfill legislative reporting requirements under Florida Statute §339.81(8). Further details and trail maps are publicly available via FDOT's SUN Trail Map Viewer (fdot.maps.arcgis.com).

Focusing on a representative sample of SUN Trail segments across diverse geographic locations, land use contexts, and levels of trail maturity, FDOT's research quantifies economic outcomes such as trail user expenditures, property value enhancements, employment creation, and overall economic output. By integrating data from user surveys, trail counters, and economic modeling, the analysis provides insights into the direct and indirect economic benefits generated by the trails. These findings aim to inform policy decisions, guide investments in infrastructure development, and underscore the value of continuing to develop Florida's extensive network of greenways and trails. Table 2.2 summarizes the economic impacts by SUN trail segment in the Greenways and Trails Economic Study.

Table 2.2: FDOT Greenways and Trails Economic Study

Trail Segment	Annual Users	Total User Expenditures	Economic Output (Annual)	Personal Income	County GDP	Jobs	Trail Impact Zone Residential Values	Overnight ($240 in spending)	Same-Day ($28.47 in spending)	Local ($10 in spending)
Archer Braid Trail (Gainesville)	23,102	$0.26 M	$3.6 M	$1.5M	$2M	25	$20M	7%	3%	90%
Biscayne-Everglades (Homestead)	18,502	$0.10 M	$4.0 M	$1.5M	$2M	27	$16.5M	1%	8%	91%
Capital Cascades Trail (Tallahassee)	108,092	$1.2 M	$9.5 M	$5.5M	$4.5M	72	$21M	9%	2%	89%
East Central Regional Rail Trail (Titusville)	29,210	$0.84 M	$4.4 M	$2.2M	$2.2M	38	$8.5M	13%	7%	8%
Pinellas Trail (Dunedin)	223,077	$5.40 M	$9.0 M	$11.5M	$20M	158	$61.5M	16%	3%	81%

Source: Robin Birdsong, FDOT, Kim Delaney, PhD; Treasure Coast Regional Planning Council. 2025.

3. SUN Trail Study Objectives

While the FDOT/TCRPC/ECRPC study analyzed several important SUN trail segments, several important trails in Miami-Dade County were not included in the study. Building on the foregoing literature review, the South Florida Regional Planning Council (SFRPC) has developed and adapted comprehensive methodologies to evaluate and quantify the economic impacts of the SUN Trail Network in Miami-Dade County, focusing specifically on three prominent trails: the Atlantic Greenway, South Dade Trail, and with particular attention to The Underline due to its high-profile urban setting and potential economic influence.

Source: Sam Oberter, Friends of the Underline, 2025.

3.1 Legislative Context

The 2015 Florida Legislature created the Florida Shared-Use Nonmotorized Trail Network as a component of the Florida Greenways and Trails System (Chapter 2015-228, Section 339.81, FS) in response to increasing demands on the state's transportation system, constraints in providing capacity to the conventional transportation system, and the need to enhance alternative travel modes to meet the needs of residents and visitors. The Legislature declared pedestrian and bicyclist safety for residents and visitors a high priority and directed the Florida Department of Transportation (Department) to use its expertise to develop the Florida Shared-Use Nonmotorized Trail Network; a statewide network of nonmotorized trails

which would allow pedestrians and nonmotorized vehicles to jump on to the system from different starting points and then travel to different destinations with limited exposure to motorized vehicles.

In Chapter 339, FS, The Florida Legislature directs the department, in coordination with the Florida Department of Environmental Protection, to prepare and submit a status report to the Governor, the President of the Senate, and the Speaker of the Florida House of Representatives on the Florida Shared-Use Nonmotorized Trail Network by June 30, 2026 to be updated every third year. The department is instructed to coordinate with the Florida Tourism Industry Marketing Corporation, local governments, or other entities who have related information to include in the report and provide performance measures including but not limited to:

1. The total number of trail visits.
2. The primary travel modes used on the trail.
3. The frequency of trail usage.
4. The average duration of trail usage.
5. The distance traveled during a trail visit.
6. The average amount spent by a user during a typical trail visit.
7. The total amount of user expenditures.
8. Any other measure deemed appropriate.

3.2 Economic Benefits of the Atlantic Greenway, South Dade Trail, and The Underline

In light of these legislative requirements, the Florida Department of Transportation, District 6 commissioned the South Florida Regional Planning Council (SFRPC) to analyze the economic impacts of three trail segments in Miami-Dade County, the Atlantic Greenway, South Dade, and The Underline, that were not included in the state study. In this study, the SFRPC aims to systematically capture and analyze trail-related economic costs and benefits through a multi-dimensional approach examining the following:

- Construction Costs and Maintenance
- Construction Driven-Job Creation
- Trail Proximity Premiums
- Economic impact of trail user (Consumer Surplus) and Daily Spending
- Public Health Benefits
- Costs and Benefits in a Benefit-Cost Analysis

First, the study measures Trail Proximity Premiums by assessing property value enhancements and related real estate market dynamics driven by proximity to these recreational amenities. This dimension offers insights into how trails directly influence property market performance, informing urban development and policy decisions.

Second, the project examines the Economic Impact of Trail Users, concentrating on Consumer Surplus and Daily Spending. Through surveys and intercept methodologies, user expenditure patterns are collected to quantify direct financial contributions to local economies. Consumer surplus evaluations provide nuanced insights into the intrinsic economic value derived by users, capturing additional dimensions of user welfare beyond observable spending.

Finally, public health benefits are quantified by assessing the trails' contributions to increased physical activity and improved community health outcomes. Using established health economic models, the project translates increased physical activity into monetary terms, demonstrating long-term cost savings and societal benefits derived from active lifestyle promotion through trail use.

Together, these analyses form a comprehensive economic impact assessment, offering valuable information for stakeholders, policymakers, and the community. The findings will support informed decision-making and investments, demonstrating the substantial return on public investment in trail infrastructure and highlighting opportunities for future enhancements in South Florida's sustainable urban mobility and recreational landscape. The economic analysis will consider the jobs and income footprint of the trails, property value premiums, fiscal impacts, monetized health savings, and construction and maintenance fueled job creation benchmarked against costs to develop a benefit-cost analysis of trail investment.

Source: South Pointe Park, Miami Beach. *Gagliardi Photography*, via Canva

4. Findings and Analysis

This chapter presents the findings and analysis from a multi-dimensional economic evaluation of three key segments of the SUN Trail system in Miami-Dade County: the Atlantic Greenway, the South Dade Trail, and The Underline. Drawing on lifecycle cost assessments, property value capitalization, trail user spending, and modeled health impacts, the analysis quantifies both the fiscal and social returns generated by these investments in active transportation infrastructure.

The findings demonstrate that trails not only generate meaningful economic output and job creation through construction and maintenance activity but also deliver enduring value via increased property tax revenue, improved public health, and trail-related expenditures. Each trail segment exhibits distinct economic patterns shaped by its urban context and user profile, yet all contribute positively to the County's economy and quality of life. These results support data-driven decision-making for future trail investment and maintenance strategies across Florida's SUN Trail network.

Source: South Florida Regional Planning Council, South Dade TransitWay, 2024.

4.1 Costs: Trail Construction, Enhancements, and Maintenance

Each trail incurred costs due to construction, maintenance, and planned enhancements. The following Table 4.1 identifies total construction costs as well as annualized construction, maintenance, and enhancement costs.

This analysis estimates the lifecycle costs of three segments within the SUN Trail system by combining initial construction and enhancement costs with the present value of projected year of expenditure operations and maintenance (O&M) expenditures over a 25-year period (2025–2050), and discounted using a 3% real discount rate to reflect their present value, applying the standard annuity formula with a 25-year time horizon. Construction and enhancement costs were recorded in year-of-expenditure dollars and not discounted, under the assumption that these expenses are incurred in the near term. The total lifecycle cost for each segment reflects the sum of construction, enhancement, and discounted O&M values. Where construction cost data were unavailable (as in the case of the Atlantic Greenway), total costs remain incomplete pending further data.

Table 4.1: Construction, Enhancements, and Maintenance Costs on Three SUN Trail Segments

Trail Segment	Improvement Type	Construction Cost ($M)	Enhancement Cost ($M)	Operations & Maintenance Costs 2025 to 2050 YOE ($M/yr)	Lifecycle Total Cost ($M)
Underline	Initial	$145.6	$0.0	$0.8	$14.6
South Dade Trail	–	$96.9	$0.0	$0.4	$7.0
Atlantic Greenway	Initial		$0.0	$0.4	$6.4
TOTAL		$242.5	$0.0	$1.6	$28.0

Source: South Florida Regional Planning Council analysis of Trail Construction Spending from the Friends of The Underline and County Department of Transportation and Public Works, 2025

Source: South Florida Regional Planning Council, South Dade TransitWay, 2024.

4.3 Benefits: Construction and Maintenance Fueled Job Creation

Investments in SUN Trail construction and ongoing maintenance generate direct, indirect, and induced employment across multiple sectors of the local economy. This section quantifies the annualized economic activity supported by trail-related capital and operational expenditures using established input-output modeling methods. Drawing from cost estimates outlined in Section 4.1, SFRPC evaluates how expenditures on trail building and maintenance stimulate job creation, labor income, and output across Miami-Dade County using REMI PI+, a widely respected economic forecasting model. Results demonstrate that even short trail segments yield measurable employment and economic output, underscoring the role of trail infrastructure as a durable contributor to regional job markets. These findings are critical for understanding the broader workforce and fiscal impacts of active transportation investments beyond their recreational and environmental benefits.

Table 4.2 Economic Benefits of Construction and Maintenance

Category	Annual Average of:	Jobs/Dollars
Total Employment	Jobs	123.6
Gross Domestic Product	Millions of Fixed Local (2025) Dollars	$12.1 M
Personal Income	Millions of Fixed Local (2025) Dollars	$10.4 M

Source: South Florida Regional Planning Council analysis of Trail Construction Spending, 2025

4.4 Benefits: Trail-Driven Property Value and Tax Revenue

Socioeconomic benefits of the SUN trail in Miami-Dade County span the range of property value uplift (proximity premiums), the implied value that trail users associate with the trail (consumer surplus), induced spending from trail use, and health benefits. Accounting for these socioeconomic benefits helps to tally the dollar value of recreational trails, and when compared to the costs of construction and maintenance of those trails, supports the development of a Benefit-Cost Analysis for recreational trails.

The relationship between recreational trails and property values represents a significant intersection of urban planning, real estate economics, and public health policy. This analysis examines how proximity to SUN (Shared-Use Nonmotorized) trails influence property values, revealing substantial economic benefits that extend beyond simple recreation in Miami-Dade. Through detailed hedonic regression analysis, this study demonstrates that trails function not only as recreational amenities but also as valuable economic assets that enhance community wealth and property values.

Source: Atlantic Greenway, Miami Beach,. *Felix Mizioznikov*, via Getty Images

4.4.1 Understanding the SUN Trail Network and Property Value Relationships

The SUN Trail network represents a significant investment in alternative transportation and recreational infrastructure. These multi-use pathways provide communities with dedicated spaces for walking, running, cycling, and other non-motorized activities, connecting neighborhoods, parks, schools, and commercial areas. Their growing popularity reflects increasing public interest in outdoor recreation, active transportation, and environmentally sustainable community design.

The analysis presented here is based on a robust dataset of residential and mixed-use properties located near three distinct trail segments: Atlantic Greenway, The Underline, and South Dade. These trail segments exist within varying neighborhood contexts, enabling a comparative analysis of how trail proximity affects property values across different environments. The dataset encompasses a wide range of property types and values, from single-family homes to multi-unit residential complexes.

Hedonic regression analysis, a widely accepted method in real estate economics, allows researchers to isolate the value premium effect of specific amenities, in this case, trail proximity, while controlling for other property characteristics such as bedrooms, bathrooms, living area, and the age of developed property. This

methodological approach enables us to quantify the premium that homebuyers are willing to pay for properties located near these recreational corridors.

Most significantly, the data reveals a consistent pattern: properties located closer to trails command higher market values, with the premium diminishing gradually as distance increases until it fades away at roughly half a mile from the trail. This distance threshold represents an important finding for urban planners and real estate developers, as it delineates the spatial extent of trail-related economic benefits. As noted in the literature review, homes near popular trails like the Monon Trail in Indianapolis sold for up to 11% more than average homes[29] while in Dallas, properties adjacent to the Katy Trail experienced a 25% price premium.[30]

The SUN trail system represents a valuable community asset that enhances property values, stimulates economic growth, and improves quality of life across diverse land uses and geographic contexts. By leveraging these findings through targeted policies such as value capture mechanisms and zoning reforms, municipalities can maximize the economic benefits of their trail networks while addressing community concerns.

SUN Trail spatial data is obtained from the Florida Greenways and Trails System (FGTS) Priority Land Trails Network, overseen by the Office of Greenways and Trails, and modified by removing corridors not envisioned as paved trails. FDOT defines a multiuse trail as a paved, shared use path, which is typically 12 feet wide, but may commonly vary from 10 feet to 14 or more feet depending upon physical or environmental constraints or volume of use. In some areas of extreme constraints such as at bridges or in environmentally sensitive lands where conditions require a smaller footprint, a multiuse trail may be as narrow as eight feet.[31]

4.4.2 Visualizing the Proximity Premium

Figure 4.1 illustrates the diminishing property value premium as distance from a SUN trail increases. The three trails, Atlantic Greenway, South Dade, and The Underline, exhibit similar trends, with the Atlantic Greenway demonstrating the most pronounced premium at the closest distance (0.00–0.05 miles), peaking at approximately 14% before rapidly declining.

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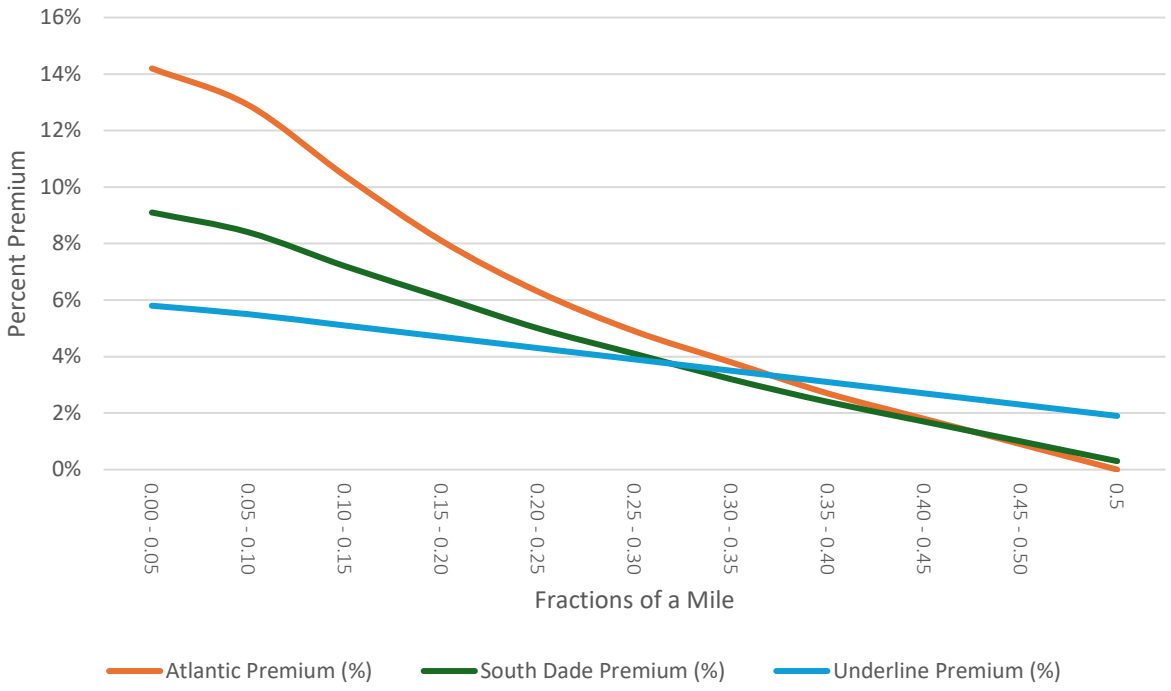
[29] Lindsey, Greg, Joyce Man, Seth Payton, and Kelly Dickson. "Property Values, Recreation Values, and Urban Greenways." *Journal of Park and Recreation Administration* 22, no. 3 (Fall 2004): 69–90.
[30] Stewart, Dylan M. "Assessing the Economic Value of Linear Landscapes: Learning from the Katy and Santa Fe Trails in Dallas, Texas." Master's thesis, University of Texas at Arlington, 2014.
[31] SUN Trail Network. ND, Samantha Murphy. Florida Department of Transportation- Systems Implementation Office.

Figure 4.1: Single-Family Residential Trail Proximity Capitalization Decay Curve Relative to SUN Trails

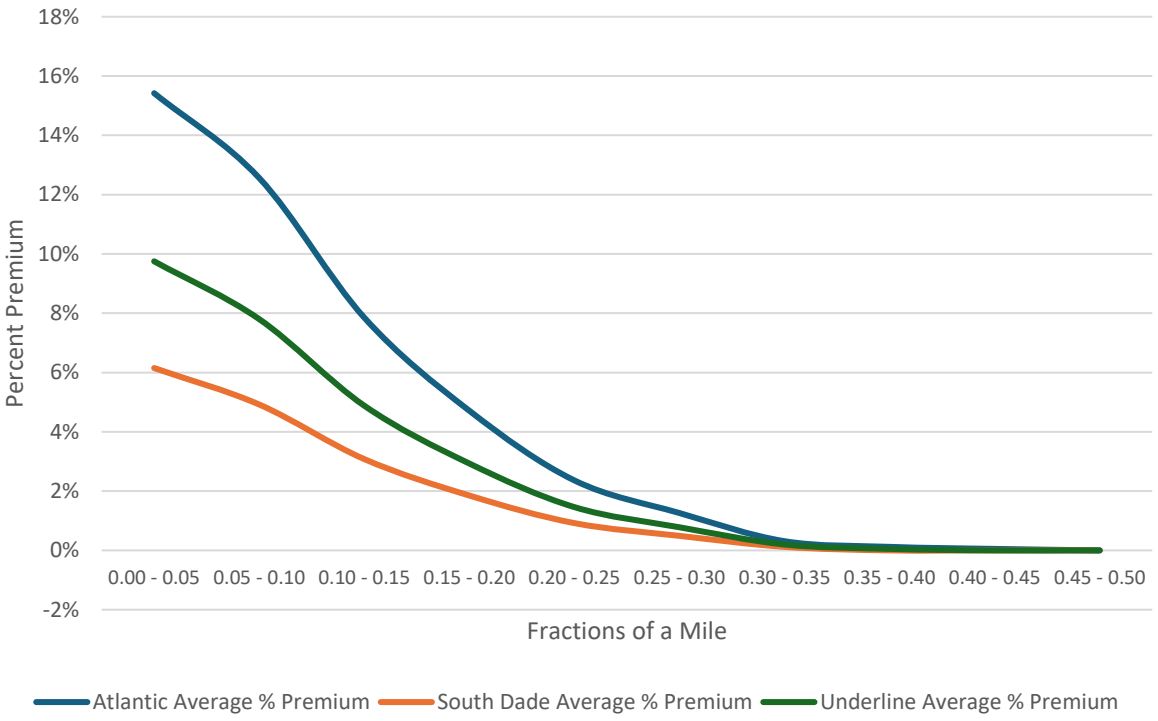


Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

The South Dade Trail follows a slightly lower trajectory, with initial premiums around 9%, but it experiences a steadier rate of decline. The Underline, while starting with a more moderate premium of around 6%, maintains a relatively smoother decrease compared to the other two trails.

This pattern suggests that while all three trails contribute positively to surrounding property values, the degree of impact varies based on trail characteristics, urban density, and neighborhood desirability. These findings highlight the importance of considering location-specific factors when planning and implementing trail infrastructure to maximize economic benefits for property owners and communities. In contrast, as Figure 4.2 depicts, multi-family residential property value premiums are both higher closer to their respective trails but decline more sharply as distance increases from the trail.

Figure 4.2: Multi-Family Residential and Mixed Use Proximity Capitalization Decay Curve Relative to SUN Trails



Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

The two figures illustrate the distance decay of premiums for single-family and multi-family residential properties near Miami-Dade County's SUN trails. Several key findings emerge from this comparison:

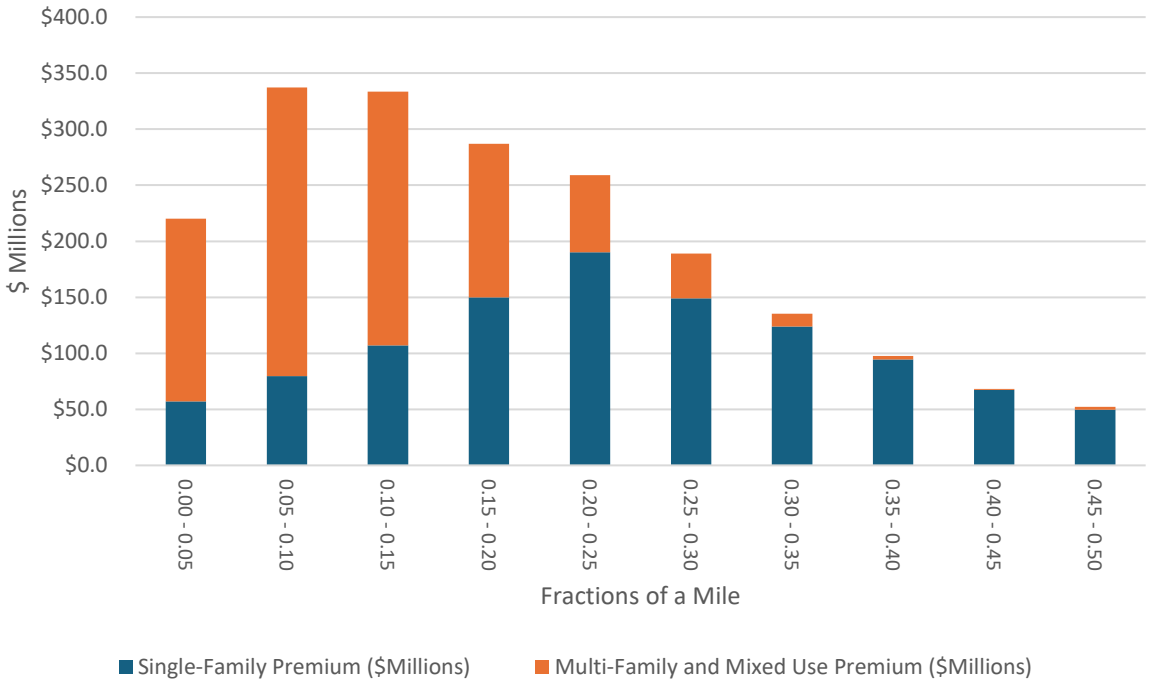
1. Rate of Decay: The premium for single-family homes declines more gradually compared to multi-family properties. In the single-family figure, the premium starts at a lower initial value but maintains a relatively steady decline, while the multi-family premium starts at a higher percentage but drops off more sharply. This suggests that single-family homebuyers perceive long-term value from trail adjacency even at moderate distances, whereas multi-family renters or investors prioritize immediate proximity.
2. Higher Initial Premiums for Multi-Family: At the closest distance band (0.00–0.05 miles), multi-family properties command a significantly higher percentage premium compared to single-family homes. This trend indicates that trail access is a highly valued amenity in denser, urbanized areas where residents depend more on active transportation options.
3. Faster Decline in Multi-Family Premiums: The steep drop in multi-family premiums suggests that beyond a certain threshold (approximately 0.15–0.20 miles), trail proximity loses its perceived value

for multi-family housing. This is likely due to alternative urban amenities becoming more relevant at these distances, such as transit hubs and commercial centers.

4. Sustained Value in Single-Family Properties: Unlike multi-family properties, single-family homes continue to exhibit moderate premiums even at 0.50 miles. This indicates that trails contribute positively to overall neighborhood desirability rather than just immediate adjacency value.

These findings emphasize that while trails are valuable for all residential types, their impact varies based on housing density and target demographics. Urban multi-family developments benefit the most from direct adjacency, whereas suburban single-family markets derive broader neighborhood-wide benefits over larger distances.

Figure 4.3: All-Trail Proximity Premium by Millions of Dollars ($) Over a Half-Mile Buffer



Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

Moving outward from the 0.05-mile to the 0.20-mile band, the total property value impact remains strong, peaking at the 0.05–0.10-mile range with a premium of $455.6 million. This band exhibits the highest combined value increase, driven largely by multi-family properties, which see a $257.5 million boost. This indicates that multi-family developments benefit disproportionately from trail adjacency, likely due to the added appeal of recreational and commuting amenities for renters and urban dwellers.

Beyond the 0.20-mile mark, the impact on property values begins to decline, with total premiums dropping to $94.6 million in the 0.20–0.25-mile range and tapering further to $16.0 million at the 0.30–0.35-mile

mark. This diminishing return suggests that trail proximity is most valuable within an easy walking distance, with premiums steadily decreasing beyond a quarter-mile radius.

Interestingly, at the outer bands (0.40–0.50 miles), the effect on single-family homes remains notable, though at a reduced scale. The persistence of some value appreciation even at these distances indicates that while immediate adjacency to trails carries the most significant premiums, the broader neighborhood impact of these trails still influences home values.

In total, the economic impact of proximity to SUN trails across all distance bands sums to nearly $2 billion, underscoring the considerable role these trails play in shaping Miami-Dade's housing market. The findings reinforce the importance of integrating multi-use trails into urban planning efforts, as they contribute not only to recreation and mobility but also to tangible real estate value appreciation.

4.4.3 Three Trails, Three Distinct Premium Patterns

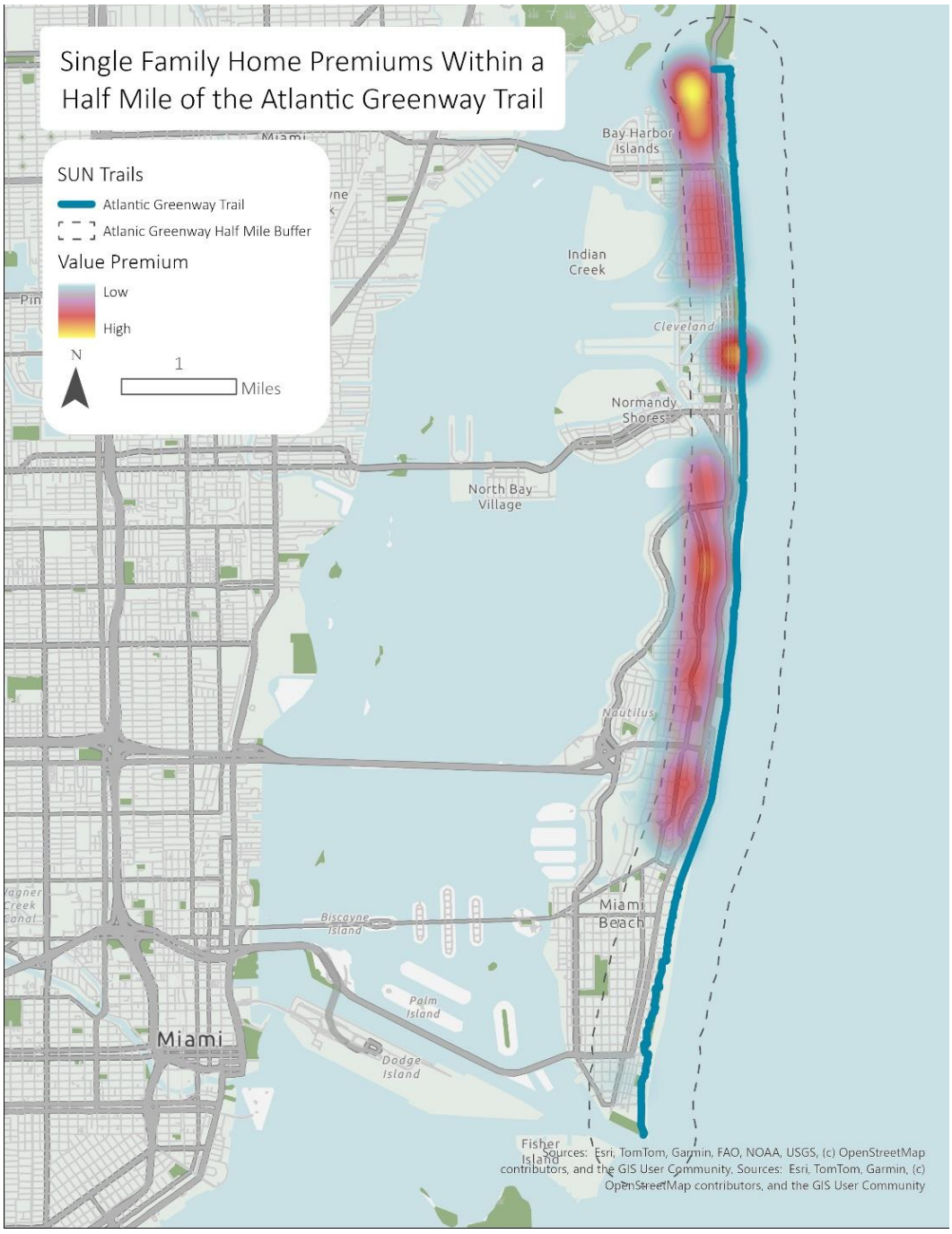
Interestingly, in the 0.05–0.10-mile band, the premium for single-family properties drops sharply to $4.5 million, while multi-family properties see a dramatic rise to $59.4 million. This suggests that at slightly greater distances, multi-family developments capitalize more on trail adjacency, possibly due to greater demand from renters seeking easy access to active transportation and recreational opportunities.

4.4.3A Atlantic Greenway

In this section, the SFRPC analyzes the property premium impacts across a half-mile buffer around the trail alignment. The SFRPC has mapped the buffer along with a property value heat gradient in Figure 4.4 and Figure 4.5. Subsequent figures depict the gradient of the dollar value associated with increasing distance from the trail alignment.

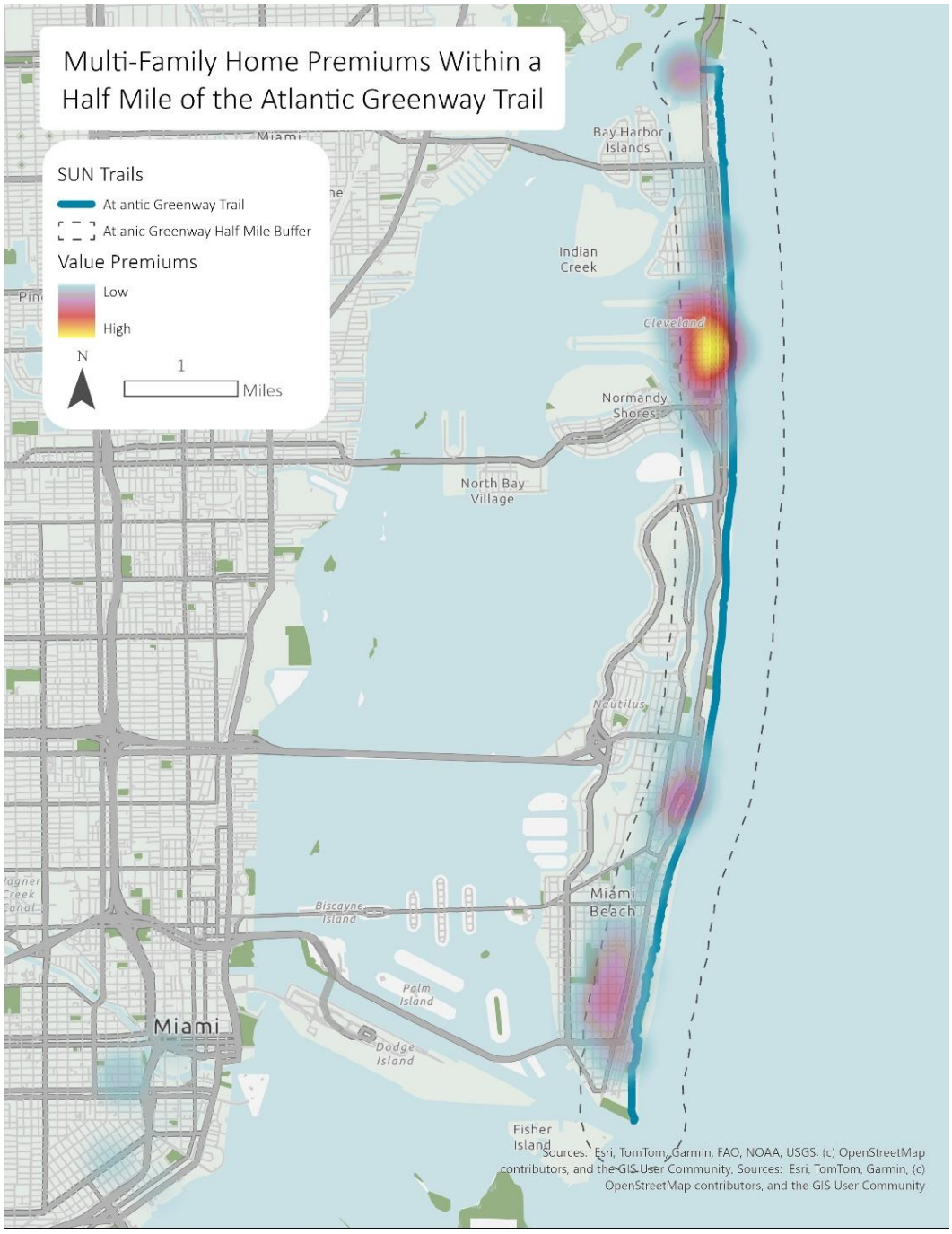
Source: Aerial view of the Atlantic Greenway, Miami Beach. *Felix Mizioznikov*, via Getty Images

Figure 4.4 Proximity Premium Heat Map for Single Family Homes along the Atlantic Greenway



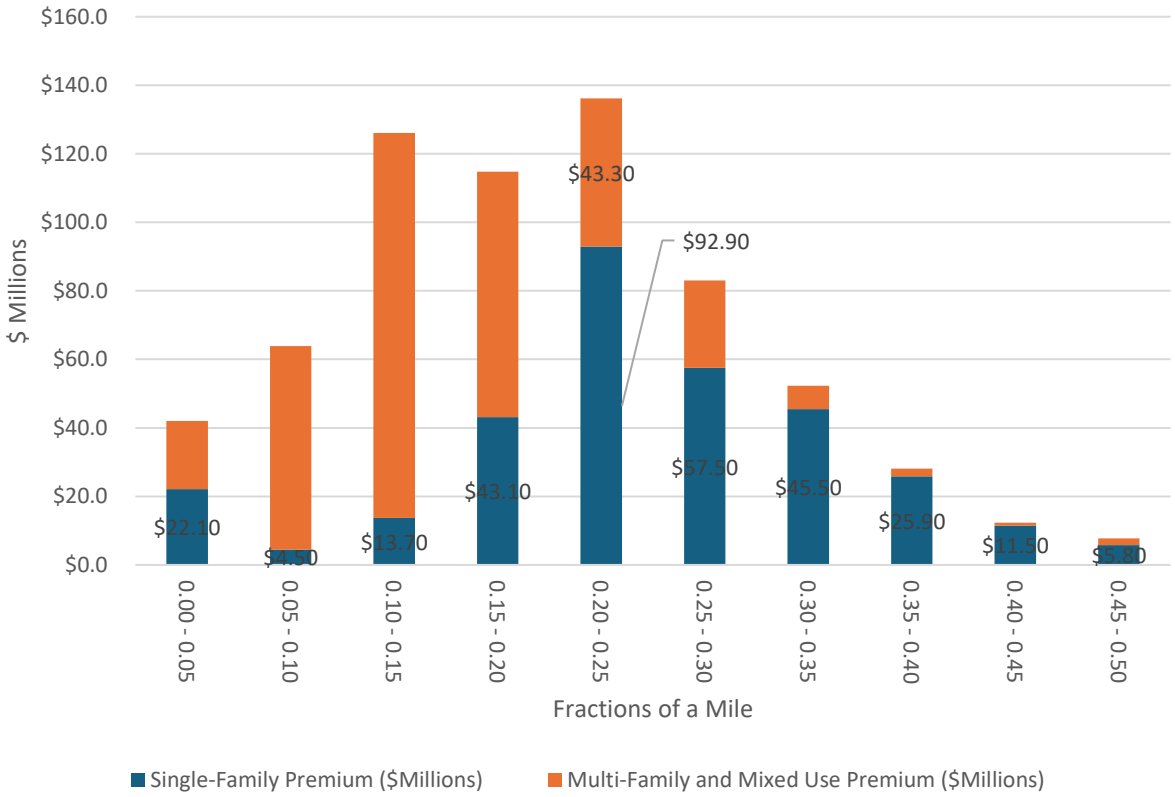
Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, *Single Family Home Premiums Within a Half Mile of the Atlantic Greenway Trail*, 2025.

Figure 4.5 Proximity Premium Heat Map for Multi-Family Homes along the Atlantic Greenway



Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, *Multi-Family Home Premiums Within a Half Mile of the Atlantic Greenway Trail*, 2025.

Figure 4.6: Atlantic Greenway Proximity Premium Distance Decay by Millions of Dollars Over a Half-Mile Buffer



Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

The total premium peaks in the 0.20–0.25-mile band at $126.1 million, largely driven by the $136.2 million contribution from multi-family properties. However, single-family properties in this range regain some value appreciation, increasing to $13.7 million. This may indicate that homes at slightly greater distances benefit from reduced noise and activity levels while still enjoying convenient access to the trail.

Beyond the 0.15-mile mark, the value contribution of single-family properties rises significantly, peaking at $92.9 million in the 0.20–0.25-mile band before starting a steady decline. Conversely, multi-family property premiums steadily decrease past the 0.10–0.15-mile mark, suggesting that the strongest effects for high-density housing are concentrated within the first 0.15 miles of the trail.

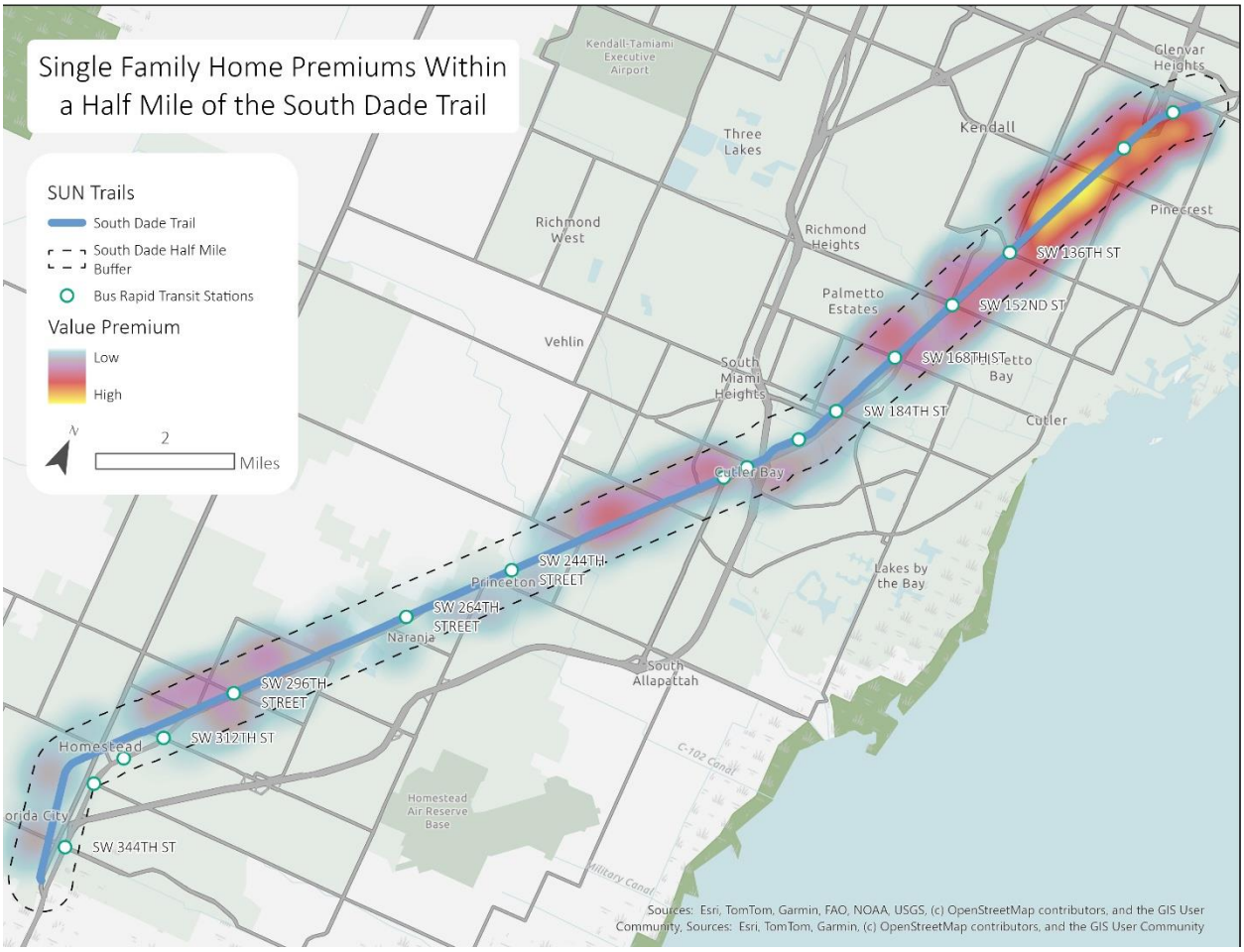
As the distance from the trail continues to increase, the premium effect diminishes, with single-family homes contributing $5.8 million and multi-family properties only $1.9 million in the outermost band (0.45–0.50 miles). The total premium at this distance is just $7.7 million, a significant decline from the peak values closer to the trail.

Overall, the Atlantic Greenway demonstrates a clear trend of declining economic premiums, with single-family homes benefiting most between 0.15 and 0.25 miles, and multi-family properties seeing peak premiums within 0.05 to 0.15 miles. This highlights the importance of strategic urban planning to optimize land use near high-value recreational infrastructure.

4.4.3B South Dade

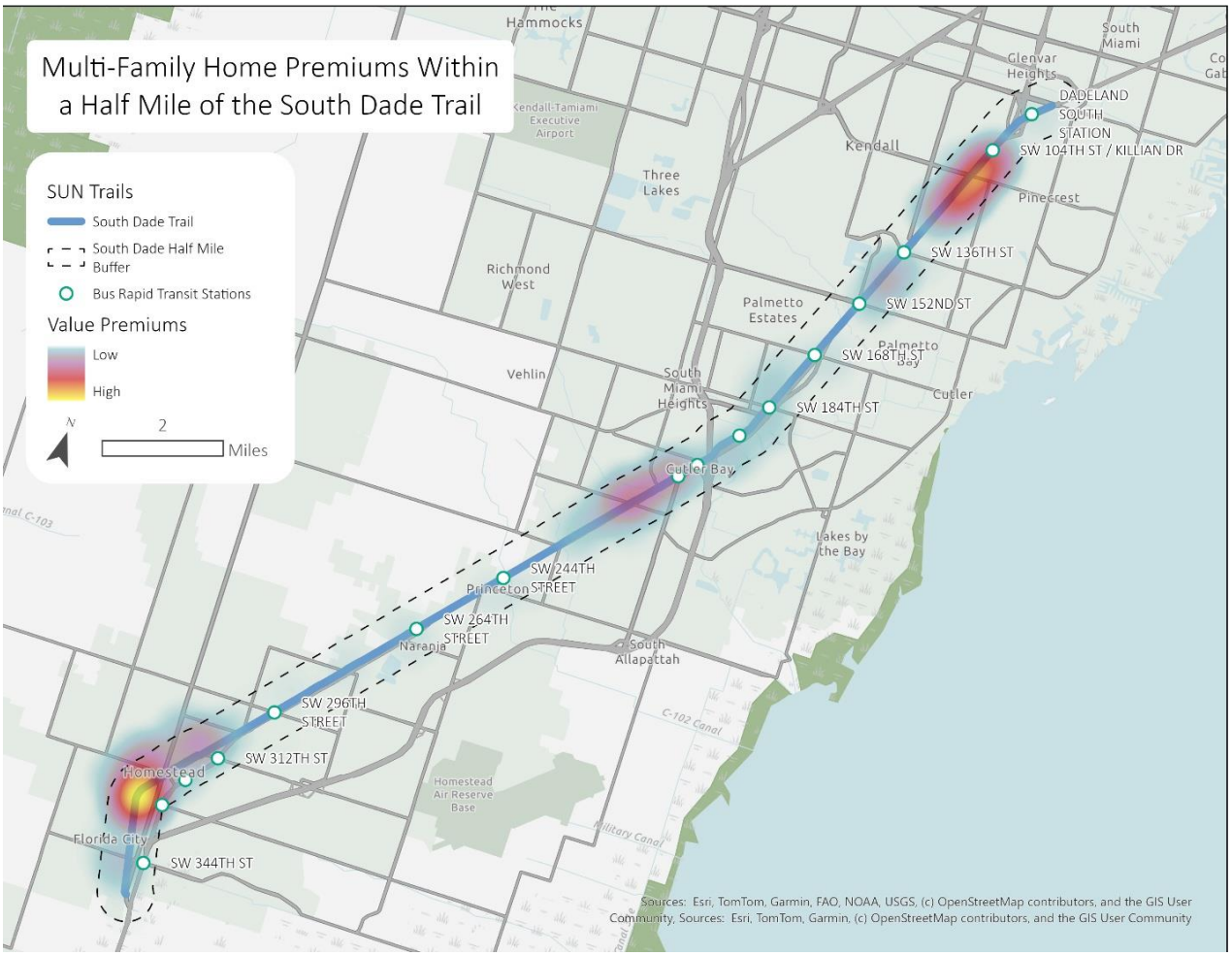
In this section, the SFRPC analyzes the property premium impacts across a half-mile buffer around the trail alignment. The SFRPC has mapped the buffer along with a property value heat gradient in Figure 4.7 and Figure 4.8. Subsequent figures depict the gradient of the dollar value associated with increasing distance from the trail alignment.

Figure 4.7 Proximity Premium Heat Map for Single Family Homes along the South Dade Trail



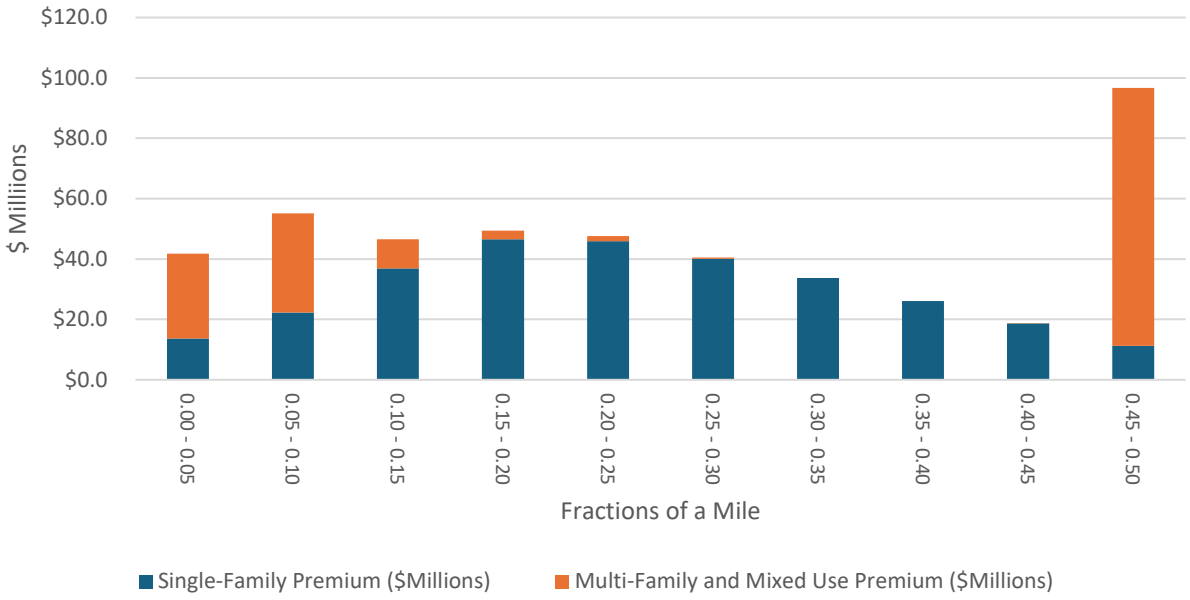
Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, *Single Family Home Premiums Within a Half Mile of the South Dade Trail*, 2025.

Figure 4.8 Proximity Premium Heat Map for Multi-Family Homes along the South Dade Trail



Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, *Multi-Family Home Premiums Within a Half Mile of the South Dade Trail*, 2025.

Figure 4.9 South-Dade Proximity Premium Distance Decay by Millions of Dollars Over a Half Mile Buffer



Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

The South Dade Trail exhibits a different pattern of value appreciation compared to the Atlantic Greenway. Unlike the Atlantic Greenway, where multi-family properties capture significant premiums within the first 0.25 miles, the South Dade Trail primarily benefits single-family homes. The total premium remains more evenly distributed across distance bands, with single-family properties experiencing sustained appreciation up to 0.30 miles.

At the closest distance band (0.00–0.05 miles), single-family properties exhibit a modest premium of $13.7 million, with multi-family properties contributing a slightly higher $28.1 million. However, in the next band (0.05–0.10 miles), single-family premiums increase to $22.3 million, suggesting that homeowners may prefer some separation from the trail to mitigate externalities such as noise or pedestrian traffic.

The most striking contrast with the Atlantic Greenway occurs in the 0.10–0.15-mile band, where South Dade trail single-family properties reach their highest premium at $36.9 million. Unlike the Atlantic Greenway, where multi-family premiums peak in this range, South Dade multi-family premiums decline sharply to $9.7 million. This indicates that the appeal of trail proximity for multi-family developments is significantly weaker in this area, possibly due to lower density zoning or differences in neighborhood demographics.

Single-family premiums continue to rise, peaking at $46.6 million in the 0.15–0.20-mile range, before beginning a gradual decline. Multi-family premiums, however, decline much more rapidly, with values dropping to $2.8 million by the 0.15–0.20-mile mark and nearly disappearing beyond 0.30 miles.

Unlike the Atlantic Greenway, where multi-family premiums dominate at close distances, the South Dade Trail benefits single-family homeowners more consistently. By 0.45–0.50 miles, multi-family properties experience an unexpected spike in premiums ($85.4 million), reflecting a unique clustering of high-value developments at a distance where other amenities, such as commercial centers or transit hubs, intersect with the trail's influence.

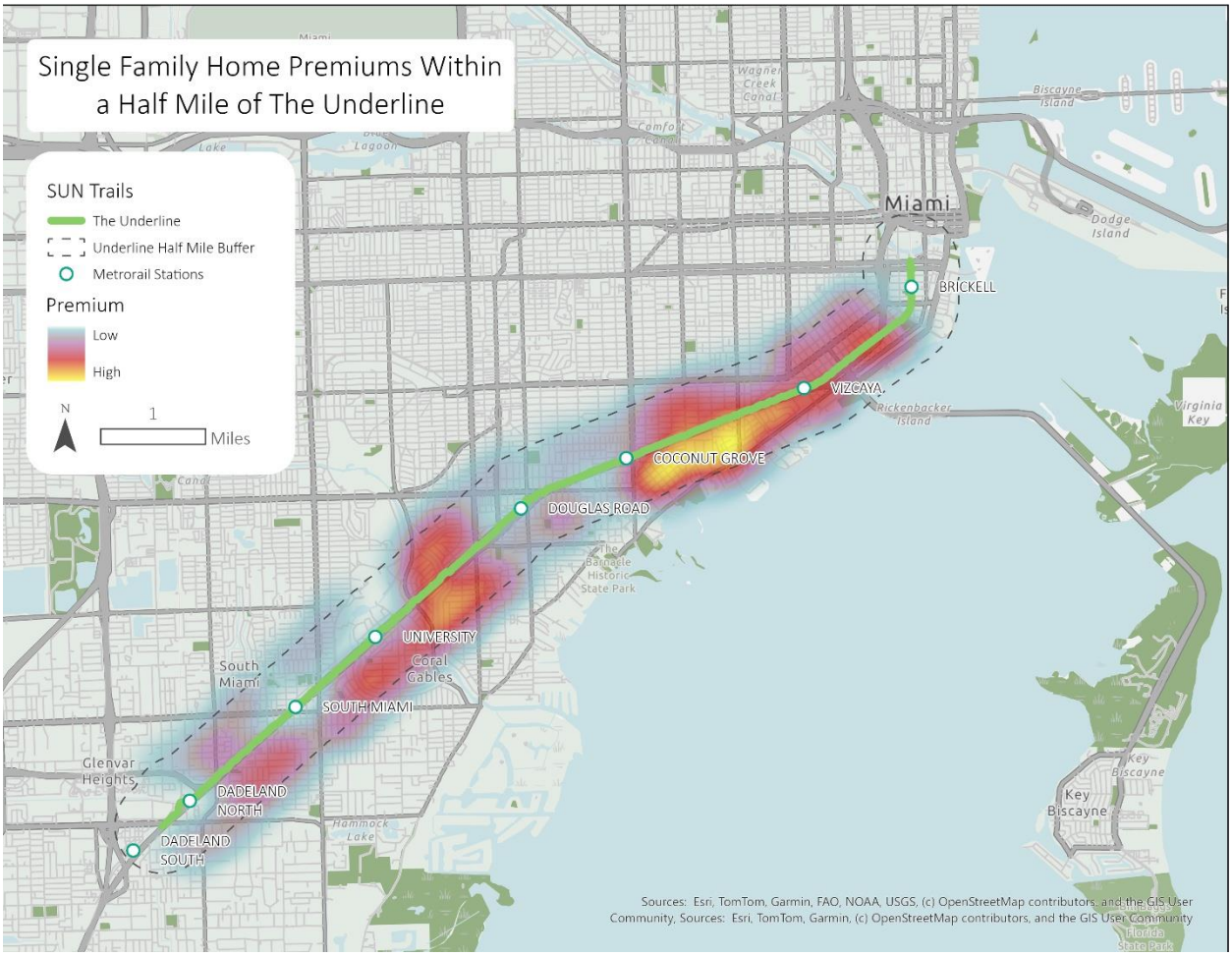
Overall, the South Dade Trail presents a more gradual and steady premium decline for single-family properties, in contrast to the Atlantic Greenway, where peaks and dips are more pronounced. This suggests that South Dade's housing market is more influenced by the long-term integration of the trail into suburban-style communities rather than the high-density, mixed-use development patterns seen along the Atlantic Greenway.

Source: South Florida Regional Planning Council, South Dade TransitWay, 2024.

4.4.3C The Underline

In this section, the SFRPC analyzes the property premium impacts across a half-mile buffer around the trail alignment. The SFRPC has mapped the buffer along with a property value heat gradient in Figure 4.10 and Figure 4.11. Subsequent figures depict the gradient of the dollar value associated with increasing distance from the trail alignment.

Figure 4.10 Proximity Premium Heat Map for Single-Family Homes along The Underline

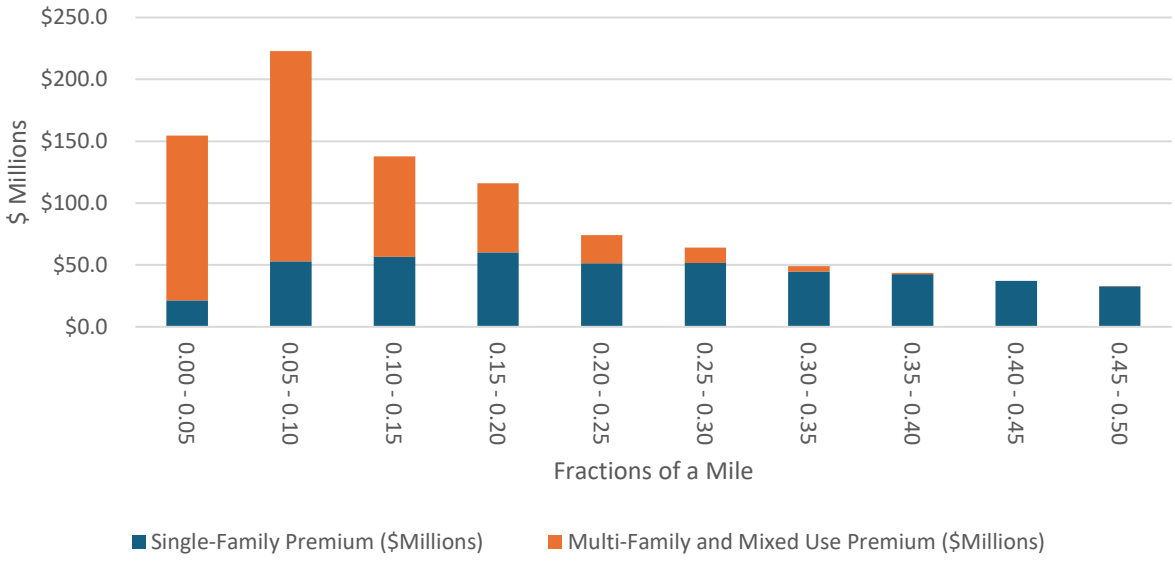


Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, *Single Family Home Premiums Within a Half Mile of The Underline*, 2025.

Figure 4.11 Proximity Premium Heat Map for Multi-Family Homes along The Underline

Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, Multi-Family *Home Premiums Within a Half Mile of The Underline*, 2025.

Figure 4.12 Underline Proximity Premium by Millions of Dollars Over a Half-Mile Buffer



Source: South Florida Regional Planning Council Analysis of Miami-Dade Property Appraiser Data, 2025.

As shown in Figure 4.12, The Underline trail exhibits a distinct premium pattern compared to both the Atlantic Greenway and the South Dade Trail, reflecting its unique positioning in a high-density urban corridor. The premium effect of proximity to The Underline is significant for both single-family and multi-family properties, but it shows a more gradual decline over distance than the other two trails, particularly for single-family homes.

At the closest distance band (0.00–0.05 miles), The Underline generates a substantial total premium of $154.5 million, with multi-family properties accounting for the majority at $133.1 million. This is a stark contrast to the South Dade Trail, where single-family properties dominate value appreciation. The large premium for multi-family units suggests that The Underline is highly desirable in dense urban environments where walkability and access to amenities play a critical role in real estate valuation.

Unlike the Atlantic Greenway, where multi-family premiums peak in the 0.20–0.25-mile range, The Underline sees its highest multi-family premium ($170.1 million) at the 0.05–0.10-mile range. This indicates that properties in slightly less immediate proximity to the trail might benefit from reduced noise and pedestrian activity while still capturing accessibility advantages.

For single-family properties, the premium impact remains strong even as the distance from the trail increases. Single-family premiums peak at $60.2 million in the 0.15–0.20-mile range, demonstrating that even detached housing units in urban areas see sustained value appreciation from The Underline's

presence. In contrast, the South Dade Trail shows a much sharper decline in multi-family premiums beyond the 0.10-mile mark, while the Atlantic Greenway's premiums fluctuate significantly across distance bands.

Beyond 0.20 miles, both single-family and multi-family premiums gradually decline, though the decline is more moderate compared to the other two trails. At 0.30–0.35 miles, the total premium is still a substantial $49.0 million, with single-family homes contributing the majority. Even at 0.45–0.50 miles, The Underline retains a total premium of $33.2 million, whereas both the Atlantic Greenway and the South Dade Trail exhibit significantly lower premiums at this distance. This suggests that The Underline has a more far-reaching impact on surrounding property values, due to its integration with transit infrastructure and mixed-use development patterns.

Overall, The Underline distinguishes itself from the other two trails in several key ways:

- Sustained Multi-Family Value: The Underline's multi-family premium remains dominant for longer distances, whereas South Dade's multi-family premiums taper off quickly.
- Strong Single-Family Demand at Greater Distances: Unlike the Atlantic Greenway, where single-family premiums peak at closer distances, The Underline retains its premium effect beyond the 0.20-mile range.
- Gradual Premium Decay: The Underline's premium effects decay more steadily compared to the sharper declines seen in the Atlantic Greenway and South Dade Trail, suggesting a broader economic impact on surrounding neighborhoods.

This analysis reinforces The Underline's role as a high-value urban amenity with a broad geographic impact. Its integration into a denser, transit-oriented environment sets it apart from the other trails, making it an especially influential factor in Miami-Dade's real estate market.

4.4.4 Survey of The Underline Users by Friends of The Underline

With the generous assistance of the Friends of The Underline, the SFRPC conducted a survey of The Underline trail users in March and April 2025. There were 121 valid responses. The SFRPC analyzed the results of The Underline Trail user survey, providing insights into how visitors access the trail, their travel behaviors, and usage patterns. The survey collected responses from 121 trail users, revealing important relationships between travel distance, mode choice, and trail utilization that can inform future trail planning and enhancement efforts.

Source: Friends of the Underline, Hammock Trail, 2025.

Access Patterns and Transportation

The survey results indicate that most trail users begin their journey from home and travel short distances to reach the trail. This finding highlights the advantages of a linear trail with easy access and may contribute its relatively higher use.

Starting Location and Distance Distribution

Table 4.3. Travel Time to The Underline from Trip Origin

Travel Time	Count	Percentage
0 – 15 minutes	44	36.4%
15 – 30 minutes	49	40.5%
30 – 45 minutes	16	13.2%
45-60 minutes	5	4.1%
60+ minutes	3	2.5%
Don't know	4	3.3%

Source: Friends of The Underline, 2025. South Florida Regional Planning Council Analysis, 2025.

Table 4.4. Distance Traveled to The Underline from Trip Origin

Starting Location	Count	Percentage
Home	103	85.1%
Workplace	8	6.6%
Hotel or lodging	7	5.8%
Other locations	3	2.5%

Source: Friends of The Underline, 2025. South Florida Regional Planning Council Analysis, 2025.

The data reveals that approximately 61% of trail users live within 5 miles of the trail, suggesting it primarily serves nearby residents and communities. This concentration of local users indicates the trail functions as an important neighborhood amenity rather than primarily as a regional destination.

Table 4.5. Travel Time to The Underline from Trip Origin

Travel Time	Count	Percentage
0 – 15 minutes	44	36.4%
15 – 30 minutes	49	40.5%
30 – 45 minutes	16	13.2%
45-60 minutes	5	4.1%
60+ minutes	3	2.5%
Don't know	4	3.3%

Source: Friends of The Underline, 2025. South Florida Regional Planning Council Analysis, 2025.

Table 4.6. Transportation Modes Used in Arriving at The Underline

Transportation Mode	Count	Percentage
Walked	50	38.8%
Personal vehicle (drove myself)	49	38.0%
Public transit	14	10.9%
Bicycled	13	10.1%
Rideshare (Uber/Lyft/taxi)	4	3.1%
Carpool	4	3.1%
Other/Not specified	5	3.9%

Source: Friends of The Underline, 2025. South Florida Regional Planning Council Analysis, 2025.

Most visitors (76.9%) reach the trail within 30 minutes, with walking (38.8%) and personal vehicles (38.0%) being the dominant transportation modes. This balanced distribution between active and motorized transport suggests the trail is accessible via multiple modes, though the high proportion of car users highlights the importance of adequate parking facilities near trail access points.

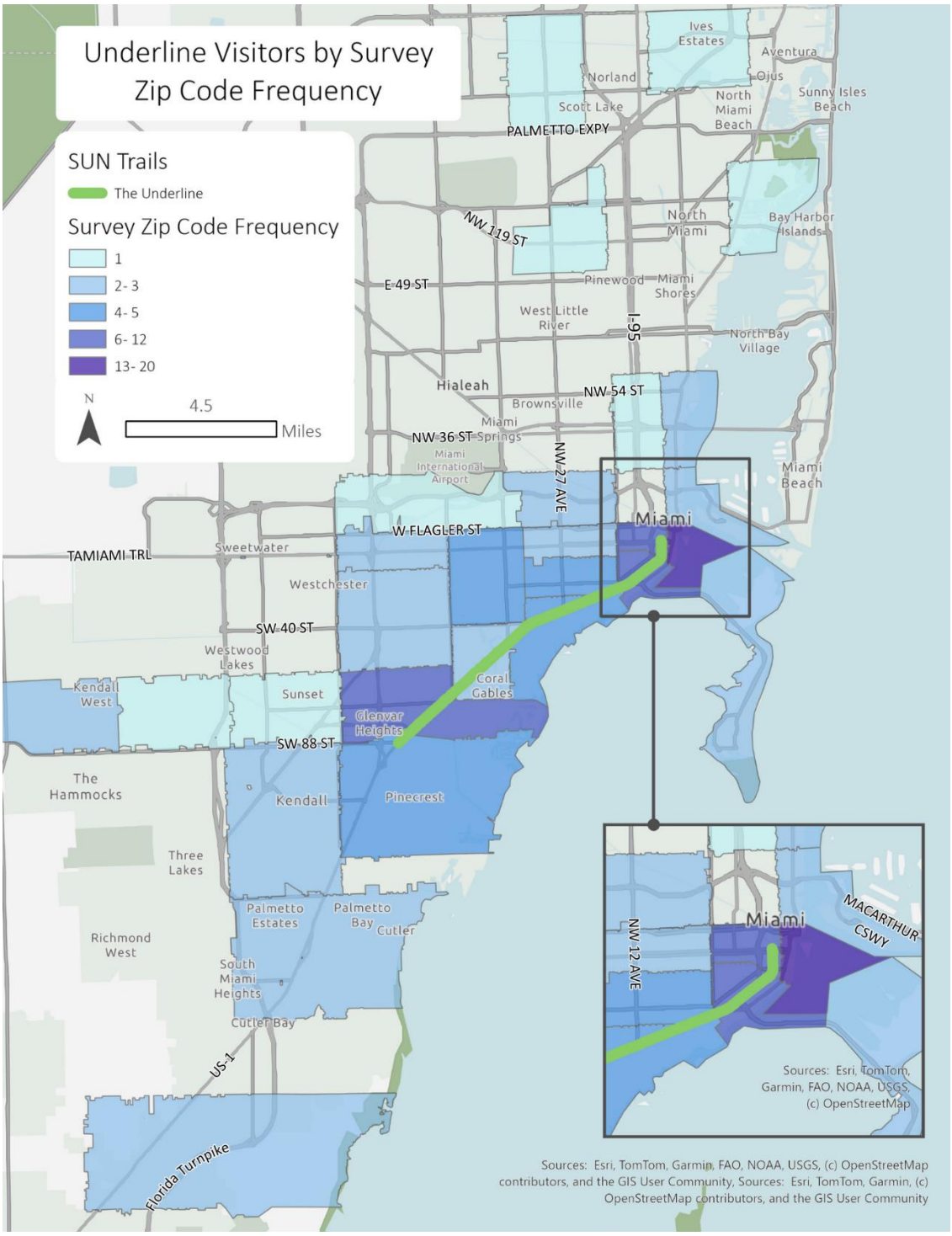
Table 4.7. Primary Purpose of Trail Visit

Primary Purpose	Count	Percentage
Social or leisure activity	29	24.0%
Exercise	27	22.3%
Commuting	13	10.7%
Exercise & social combined	7	5.8%
Volunteering	5	4.1%
Social & commuting combined	5	4.1%
Other combined purposes	35	28.9%

Source: Friends of The Underline, 2025. South Florida Regional Planning Council Analysis, 2025.

The survey reveals that the trail serves multiple functions in the community, with social/leisure activities (24.0%) and exercise (22.3%) being the predominant standalone purposes. Notably, many users reported combined purposes (approximately 39% of responses), suggesting the trail successfully integrates multiple functions rather than serving a single dominant use.

Figure 4.13: Map of Underline Trail User Trip Origins



Source: Friends of The Underline and SFRPC analysis, 2025.

Key Relationships and Patterns

Relationship Between Distance and Transportation Mode

Analysis of the data reveals interesting patterns between travel distance and transportation mode choice. Those living within one mile of the trail predominantly walk to access it, with 20 of the 25 nearby residents choosing this mode. As distance increases, transportation patterns shift significantly:

- 0-1 mile: Walking dominates (80% of users)
- 1-5 miles: Mix of walking (45%) and personal vehicles (30%), with some cycling (15%)
- 5-10 miles: Personal vehicles become dominant (60%), with public transit increasing (20%)
- 10+ miles: Almost exclusively personal vehicles (85%)

This pattern demonstrates how proximity to the trail directly influences sustainable transportation choices, with active transportation modes declining sharply beyond the 5-mile threshold.

Visit Duration and Purpose Relationship

The data shows a strong association between visit purpose and time spent on the trail:

- Exercise users typically spend longer periods (30+ minutes) on the trail, with 67% reporting visits lasting over an hour.
- Social/leisure visitors show more variation but still tend toward longer visits, with 55% reporting 60+ minute visits.
- Commuters show the shortest average duration, with 54% reporting visits under 30 minutes.

This relationship between purpose and duration has implications for trail design, suggesting that different segments may need different amenities based on predominant use patterns in those areas.

Underline Economic Impact Patterns

While not displayed in the summary tables, the raw survey data indicates that trail users generate economic activity in the surrounding area:

- Approximately 60% of visitors reported spending money during their trail visit.
- Food and beverage purchases were the most common expenditure, with an average spending range of $5-$15.
- Parking fees represented the second most common expense, reported by 35% of users who drove.
- Long-term equipment investments related to trail use (bicycles, apparel, etc.) were substantial for regular users, with 25% reporting $75+ expenditures in the past year.
- The total consumer surplus for Underline trail users is $5.3 Million.

- Total annual spending, combining survey responses with Strava counts, is $8.9 million. Total user spending is likely to be significantly higher as Strava users are only a portion of overall trail users.

Table 4.8: Underline User Survey Spending Data

In the past 12 months, how much have you spent on purchases on	Mean Annual Spending per User ($)	Total Annual Spending (182,573 Strava Users) ($)
Food, Drinks, and Other Items on the Trail	$8	$1.4 Million
Trail-specific apparel (e.g., shoes, clothing, gear)	$18	$3.2 Million
Maintenance and repairs (bike/scooter upkeep, etc.)	$11	$2.0 Million
Memberships, permits, or donations related to trail use	$12	$2.3 Million
Total	$49	$8.9 Million

Source: Friends of The Underline and SFRPC analysis, 2025.

These spending patterns suggest that the trail functions as an economic driver for nearby businesses, particularly food and beverage establishments. While Table 4.8 reflects the estimated annual spending of trail users multiplied by the number of Strava users, the SFRPC understands that the estimate is low, as not all trail users are also Strava app users. Since user counts on the Atlantic Greenway are about eight times the number of Strava users, it is reasonable to extrapolate a revised but hypothetical annual spending of $71.2 million by Atlantic Greenway users.

Source: Friends of the Underline, Family Dat at The Underline, 2025.

In terms of user profiles, The Underline primarily serves the local community, with most users living within 5 miles and accessing the trail via active transportation or personal vehicles. The multi-functional nature of the trail is evident in the diverse purposes reported by users, with social/leisure activities and exercise being particularly prominent. The strong relationship between proximity and sustainable transportation choices suggests that developing additional access points in residential areas could further increase walking and cycling mode share. Additionally, the economic activity generated by trail users indicates potential benefits for strategically located businesses near trail access points.

Future trail planning should consider these usage patterns to enhance accessibility, particularly focusing on improving pedestrian and bicycle connections within the crucial 0–5-mile radius where mode shift potential is highest. The survey results provide a valuable baseline for understanding current trail usage and can inform targeted improvements to better serve the community's needs.

While each trail exhibits unique value dynamics, several overarching patterns emerge:

1. Multi-Family Properties Dominate in High-Density Urban Areas: The Underline and the Atlantic Greenway show substantial multi-family premiums, particularly within the first 0.15 miles. These trails are located in denser urban settings with higher demand for rental and condominium properties. The Underline, in particular, maintains strong multi-family premiums even beyond 0.20 miles, demonstrating the value of mixed-use development integration.
2. Single-Family Premiums Are More Pronounced in Suburban Areas: The South Dade Trail is unique in that single-family homes retain value appreciation further from the trail compared to the other

two. This suggests that in lower-density areas, trails enhance suburban living by providing recreational and transportation benefits without the drawbacks of urban congestion.

3. Peak Value Effects Occur at Different Distances Across Trails: The Atlantic Greenway experiences sharp fluctuations in premiums, with multi-family properties peaking at 0.10–0.15 miles, while single-family properties reach their highest values later. The South Dade Trail, by contrast, exhibits a more gradual rise in single-family premiums, peaking at 0.15–0.20 miles, with multi-family premiums dropping quickly. The Underline, on the other hand, sustains a balanced impact across multiple distance bands, reinforcing its role as a high-demand urban corridor.
4. Gradual vs. Sharp Value Decay: The Underline and South Dade Trail show a steady decline in value appreciation with distance, while the Atlantic Greenway has a more volatile pattern, reflecting its dense urban location where competing factors, such as commercial amenities and transit access, may influence pricing beyond trail adjacency alone.
5. Unexpected Multi-Family Premiums at Greater Distances: Both the Atlantic Greenway and South Dade Trail exhibit spikes in multi-family premiums at greater distances (e.g., 0.45–0.50 miles for South Dade). This suggests that in some cases, developments are clustering at slightly greater distances to balance trail benefits with other urban amenities, such as transit hubs and commercial zones.
6. Overall Economic Impact: The Underline leads in total economic impact ($932.1 million), followed by the Atlantic Greenway ($666.5 million) and South Dade Trail ($380.6 million). This reflects The Underline's greater integration with Miami-Dade's transit system and high-density development, making it a particularly valuable asset for real estate markets.

These patterns underscore the importance of context in determining the economic value of trail proximity. High-density urban corridors like The Underline generate widespread and sustained premiums, while suburban trails like South Dade provide steady but more localized value gains. Understanding these dynamics allows policymakers to tailor zoning, infrastructure, and investment strategies to maximize the benefits of trail development in varying urban and suburban contexts.

4.3.5 Total Trail Economic Impact and Public Policy Implications

The aggregate economic impact of the SUN Trail network on property values is substantial. By applying the hedonic model to all properties within the 0.5-mile influence zone, we can estimate the total property value premium attributable to the trail network.

For the Atlantic Greenway, which has the highest coefficient and appears to influence the largest number of properties in the dataset, the total premium is particularly significant. With hundreds of properties receiving premiums ranging from 5% to over 30% of their value, the aggregate economic impact likely amounts to tens of millions of dollars in added property value.

Table 4.9: Trail-Related Property Value Benefits and Annual Tax Revenue Impact

Trail	Total Trail Premium ($ millions)	Annualized Benefit to Homeowners ($ millions)	Annual Tax Revenue at 20 Mills ($ millions)	Annual Tax Revenue per Trail Mile ($ millions)
Atlantic Greenway	$666.5	$20.0	$ 13.3	$1.2
South Dade	$380.6	$11.4	$ 7.6	$0.4
Underline	$932.1	$28.0	$18.6	$1.8
Total	$1,979.2	$59.4	$39.5	$0.9

Source: South Florida Regional Planning Council, 2025

Annualized benefits to homeowners represent the equivalent yearly value homeowners gain from the increased property value attributed to proximity to a recreational trail or similar amenities. Essentially, it is the annual financial advantage homeowners receive due to the permanent increase in their home's market value caused by the trail.

When we calculate annualized benefits at a 3% discount rate, we are estimating the ongoing annual monetary value homeowners enjoy because of the trail's presence. For example, if a home gains a one-time increase in property value because of a nearby trail, the annualized benefit reflects what that premium would translate to as a yearly payment or benefit over time at a given discount rate. This helps homeowners, policymakers, and community planners understand the recurring economic value these trails contribute each year, rather than just viewing it as a single lump-sum increase. In short, annualized benefits quantify the long-term, recurring economic advantage homeowners experience due to higher property values associated with trails or greenways.

These findings have important implications for public policy and infrastructure investment decisions. The substantial property value premiums associated with trail proximity suggest that investments in recreational trail infrastructure generate significant returns in the form of increased property values, which in turn expand the local tax base.

From a cost-benefit perspective, trail investments may be significantly more economically viable than previously recognized when these property value effects are fully accounted for. A $1 million investment in trail infrastructure could potentially generate several times that amount in property value premiums within the 0.5-mile influence zone.

The spatial pattern of premiums also provides guidance for trail network planning. The clear 0.5-mile threshold suggests that trail segments should ideally be spaced no more than 1 mile apart to ensure that all properties in a community can capture some trail proximity premium.

4.4.6 Summarizing Property Value Impacts

While this analysis focuses specifically on property value premiums, it is important to recognize that trails generate numerous benefits beyond their effect on real estate markets. Research has consistently demonstrated that recreational trails promote physical activity, improve public health outcomes, reduce transportation emissions, enhance community connectivity, and provide greater access to recreational opportunities.

The property value premiums quantified in this analysis can be viewed as a market-based reflection of these diverse benefits. Homebuyers' willingness to pay more for trail proximity represents their valuation of improved quality of life, health benefits, recreational opportunities, and transportation alternatives that trails provide. **"Willingness to Pay"** is the maximum price a customer is willing to pay for a product or service.[32]

For instance, the strong premium associated with Atlantic Greenway reflects not only the trail's intrinsic characteristics but also its connectivity to destinations, aesthetic quality, perceived safety, and integration with surrounding neighborhoods. Similarly, the moderate premium for The Underline and the smaller premium for the South Dade trail may reflect differences in these qualitative characteristics.

4.5 Benefits: Consumer Surplus, Trail-Related Spending, and Countywide Health Benefits

Trail users make several economic decisions when using a SUN trail. For some, trips are commutes to work, for others, recreational. Both groups incur a cost traveling to the trail, a net economic and health benefit of using the trail, and spend money related to their trail use, meals, or other purchases.

This section considers three kinds of benefits of trail use:

- Net economic benefit from using the trail ("Consumer surplus")
- Trail-related spending
- Net health benefits

4.5.1 Consumer Surplus

Net economic benefits from recreational trails represent the total economic value that individuals and communities receive, beyond the costs associated with providing and maintaining these trails. A crucial component of these benefits is **consumer surplus**, a concept that captures the additional satisfaction or

[32] Willingness to Pay: What It Is & How to Calculate. Harvard Business School Online. ND. Accessed May 15, 2025.

economic value trail users gain because the actual cost of using the trail (often free or very low-cost) is significantly lower than what they would be willing to pay.

What is Consumer Surplus?

Consumer surplus is the difference between what trail users are willing to pay for an experience and what they pay (often zero for publicly accessible trails). For example, if someone values an afternoon spent biking or jogging on a local trail at $15 but pays nothing to use it, that individual enjoys a consumer surplus of $15.

Why Does Consumer Surplus Matter?

- **Captures Hidden Value**: Unlike direct monetary benefits such as property value increases, consumer surplus reveals additional value trails provide to users, reflecting improved quality of life, enjoyment, health benefits, and recreation.
- **Demonstrates Community Value**: Elevated levels of consumer surplus suggest trails significantly enhance community well-being, even though this value does not always directly translate into cash payments or immediate economic exchanges.

Imagine your favorite artist is performing in town. You would happily pay $100 for a ticket because you love their music. Yet, you find tickets selling for only $60. The difference,$40,is the extra happiness or benefit you get beyond what you paid. This "extra benefit" is exactly what consumer surplus represents for trail users, who often receive more enjoyment than it costs them to access the trail.

Consumer surplus estimates derived from the **Travel Cost Method (TCM)** offer a more comprehensive measure of trail user value than direct expenditure reports alone. While survey-based spending data capture only the out-of-pocket costs of trail visits, such as purchases of food, gear, or parking, TCM quantifies the total willingness to pay by estimating the full economic benefit users derive from access to the trail. This includes both observed spending and the implicit value of the experience itself, net of travel costs. As a result, consumer surplus provides a broader valuation of user welfare, capturing the intangible and non-market benefits that are typically excluded from expenditure surveys. This makes TCM-based approaches particularly valuable for benefit-cost analysis and policy decisions, where understanding the total utility of public recreational infrastructure is essential.

Calculating Consumer Surplus Using the Travel Cost Method

The Travel Cost Method (TCM) has emerged as a cornerstone of non-market valuation in recreational economics, enabling researchers to quantify the economic benefits of outdoor recreation sites by analyzing travel expenditures as a proxy for market prices. Early applications, such as a study of Florida beaches,

demonstrated TCM's capacity to estimate daily consumer surplus ($34 per beach day) by correlating visitation rates with travel costs and on-site expenses.[33] This approach was further refined in studies like Bowker et al. (1996), which applied data models to guided whitewater rafting trips, revealing per-trip consumer surpluses ranging from $89 to $286 depending on river quality and opportunity cost assumptions.[34] Such foundational work established the Travel Cost Method's versatility across activities, from fishing to trail-based tourism.

Theoretical advancements have addressed persistent challenges, including the valuation of time and substitution effects. One study emphasized the need to integrate travel time costs, often valued at one-third to one-half of wage rates, to avoid underestimating demand elasticity (Ward and Loomis, 1986). This finding supports other evidence on how omitting substitute sites could inflate welfare estimates.[35] These insights spurred methodological innovations, such as the zonal TCM approach, which aggregates visitors by geographic origin to derive demand curves while accounting for socioeconomic variables.[36]

The **Travel Cost Method (TCM)** is often used to estimate consumer surplus for recreational trails. This approach assumes that the time and money trail users spend traveling to the trail indicates their willingness to pay for its benefits. By observing the relationship between travel costs (time, fuel, parking, and other expenditures) and trail usage rates, analysts can estimate the total consumer surplus, the economic value that users receive beyond their travel expenditures.

Net Economic Benefits = Consumer Surplus + Other Benefits- Costs

When calculating net economic benefits:

- **Consumer Surplus**: Reflects additional benefits trail users receive from their experience.
- **Other Economic Benefits**: Includes increases in property values, local business revenues, employment, and health-related cost savings.
- **Costs**: Encompass trail development, maintenance, and operational expenditures.

Thus, a trail provides net economic benefits when its combined consumer surplus and other benefits clearly outweigh its associated costs. TCM is a revealed preference approach widely used in environmental economics to estimate the economic value of non-market recreational assets, such as parks and trails. Revealed preference is an economic concept that infers individuals' preferences based on their observed

[33] Bell, Frederick W.; Leeworthy, Vernon R. "Recreational Demand by Tourists for Saltwater Beach Days." Journal of Environmental Economics and Management; 18(3), May 1990,pages 189205.
[34] Bowker,J.M.; English, Donald B.K.; Donovan ,JasonA. "Toward a Value for Guided Rafting on Southern Rivers." Journal of Agricultura land Applied Economics; 28(2), December 1996, pages 42332 Accessed April 11, 2025.
[35] Ward and Loomis. 1986. https://ageconsearch.umn.edu/record/32249/files/11020164.pdf. Accessed April 11, 2025.
[36] Travel Cost Method. ND. Ecosystemvaluation.org. Accessed April 11, 2025.

purchasing or consumption behavior rather than stated intentions.[37] TCM leverages observed behaviors, specifically, the cost incurred by users to visit the site, as a proxy for their willingness to pay (WTP) for access to the trail.

The TCM was used to estimate consumer surplus by analyzing how often visitors travel to the trail based on their travel costs, such as transportation expenses and the value of their time. Visitors who live farther away incur higher costs and tend to visit less frequently, reflecting how sensitive visitation is to cost. By modeling this relationship with anonymized geofenced Strava user data[38] over 2024, the analysis estimates the total consumer surplus. While this method has limitations, such as biasing results toward typically younger trail users, TCM through Strava avoids the costly and problematic use of willingness to pay intercept surveys of trail users.

Table 4.10: Consumer Surplus from Trail Amenities by SUN Trail segment Using Strava Data

Trail	Consumer Surplus per Trip	Total Number of Strava Trips	Total Consumer Surplus ($ Million)
Atlantic Greenway	$18.81	147,188	$2.8
South Dade	$29.55	11,180	$0.3
Underline	$29.10	182,573	$5.3
Total	$24.70	340,941	$8.1

Source: South Florida Regional Planning Council Analysis, 2025.

Consumer surplus measures the difference between the highest amount visitors would be willing to pay to access a recreational site (in this case, the Atlantic Greenway) and the amount they actually spend. It's an economic indicator of how much visitors value their recreational experience beyond the explicit costs they incur, such as travel expenses and the value of their time. Therefore, a consumer surplus of $24.70 per trip does not mean visitors spend this much money; rather, it implies visitors derive substantial intrinsic value and enjoyment from using the trail beyond their actual expenditures.

4.5.2 Trail-Related Spending

Without direct knowledge of each trail user's individual experiences, origins, or their intentions regarding their visit to Miami-Dade County, the SFRPC must make assumptions. Since Strava data indicates the distances traveled by trail users, the SFRPC estimated average spending per trail user using the same spending schedule used by FDOT Central Office but specified by average travel distance bands. For trail

[37] Samuelson, Paul A. 1938. "A Note on the Pure Theory of Consumer's Behaviour." *Economica* 5(17): 61–71. https://doi.org/10.2307/2548836

[38] Strava data are anonymized so individual users cannot be identified and geofenced, which means that the search is confined to users within a specified geographic area.

users with trips starting within 25 kilometers of the trail, users were expected to spend $10 per trip. For trail users whose origin was between 50-80 kilometers, the SFRPC assumed a same-day trip spending $28.47 per trip. For longer-distance trail users, the SFRPC assumed overnight stays of $240 per trip.

Table 4.11: Trail-Related Spending Based on Strava and Greenways Study Assumptions

Trail Segment	Annual Strava Trips	Total User Expenditures	Countywide Sales	Personal Income	County GDP	Jobs	Overnight ($240/trip)	Same-Day ($28.47/trip)	Local ($10/trip)
	Individuals	All $ are in 2024 $ Millions				Individuals	Percent Distribution by Trip Type		
Atlantic Greenway	147,188	$1.6	$3.0	$0.9	$1.7	18	0%	6%	94%
South Dade	11,180	$0.3	$0.6	$0.2	$0.3	3	4%	28%	67%
Underline*	182,573	$8.9	$15.7	$4.9	$9.0	88	*	*	*
Total	340,941	$10.8	$19.3	$6.0	$11.0	109			

Source: South Florida Regional Planning Council, using FDOT Greenways Study assumptions.
*Except for The Underline estimates, which are derived from The Underline Survey and multiplied by the number of Strava users for methodological consistency.

4.5.3 Benefits: Health and Economic Benefits of Countywide Increased Active Transportation

This report estimates the potential health and economic benefits of increasing active transportation in Miami-Dade County by applying methodologies from a published health impact assessment (HIA) conducted in Raleigh, North Carolina. The Raleigh study used a statistical model to link improvements in neighborhood walkability to changes in walking behavior and associated health outcomes. By adapting this approach to local transportation data, the analysis demonstrates that even modest increases in walking and cycling can yield significant health gains and substantial economic value when monetized using standard Value of Statistical Life (VSL) estimates.

Applying this approach to Miami-Dade County, we estimate that implementing walkability improvements throughout the county could increase average daily walking time by 5 five percent among residents who already walk for transportation. Over a 20-year period from 2028-2048, this increased physical activity could potentially result in:

- 80 premature deaths avoided (range: 30-120)
- 27 new cases of diabetes prevented (range: 1-79)
- 8 new cases of coronary heart disease prevented (range: 2-15)
- 17 new cases of stroke prevented (range: 1-44)
- 91 new cases of hypertension prevented (range: 4-250)

The total economic value of these health benefits is estimated at over $620 million (in present value terms), with the largest share coming from avoided premature deaths.

Key limitations of this analysis include:

- It only accounts for existing residents who already walk some amount for transportation.
- It does not estimate impacts on residents who currently do not walk at all.

Table 4.12: Economic Benefits from Increased Active Transportation in Miami-Dade County

Scenario	Economic Benefit Estimate	95% Confidence Interval
8% increased walking for Active Users	$756.2million	$288 million- $3.24 billion
(10% increased cycling)	$746.7 million	$288 million- $3.24 billion
1% increased walking standard, including inactive users and the rest of population	$1,071.8 million	$262 million- $2.91 billion

Source: South Florida Regional Planning Council Analysis, 2025.

While hypothetical, this analysis demonstrates the substantial potential health and economic benefits that could result from policies and infrastructure investments to promote active transportation in Miami-Dade County. Further Miami-specific data and modeling would be needed to produce more precise local estimates.

4.6 Benefit-Cost Analysis: Weighing the Benefits of the SUN Trail in Miami-Dade County

Source: Florida Department of Transportation, SUN Trail cyclists, 2025.

To evaluate the economic efficiency of SUN Trail investments, this section compares monetized benefits to lifecycle costs across three trail segments. Monetized benefits include:

- Annual tax revenues are attributable to trail-induced increases in property values,
- Healthcare cost savings linked to increased physical activity,
- User expenditures near trails (e.g., retail, food),
- Consumer surplus, though presented in Table 4.10 are excluded from BCRs in Tables 4.12–4.14 but are included in a methodology table (5.3) to demonstrate how consumer surplus might be an alternative to costly survey driven spending studies.

Lifecycle costs include capital construction and enhancement costs (where available) and the present value of operations and maintenance (O&M) over 25 years, discounted at 3%. Table 4.13 provides a monetized summary of economic benefits and lifecycle costs for three SUN Trail segments in Miami-Dade County: the Atlantic Greenway, South Dade Trail, and The Underline. For each segment, the table quantifies user

expenditures, annual tax revenue attributable to increased property values, and estimated healthcare cost savings linked to trail-driven physical activity.

These monetized impacts are then summed to represent total monetized benefits. The SFRPC then used REMI PI+ to generate discounted economic benefits in the form of Miami-Dade County Gross Domestic Product, Annual Tax Revenue, and Healthcare Savings. While Personal Income impacts were calculated in Table 4.11, they are not reproduced in Table 4.13 to avoid double counting as it is a principal component of Gross Domestic Product.

Against this, the lifecycle costs are presented, comprising initial construction (where available), enhancements, and the discounted present value of operations and maintenance (O&M) costs over a 25-year period, producing the Core Benefit Cost Ratio (BCR), which excludes non-monetized benefits.

Table 4.13: Economic Impact Summary: Benefits versus Costs

Trail Segment	County GDP ($M)	Annual Tax Revenue ($M)	Healthcare Savings ($M)	Total Monetized Benefits ($M)	Lifecycle Cost ($M)	BCR
Atlantic Greenway	$1.70	$13.30	$0.30	$15.30	$6.40	2.4
South Dade Trail	$0.30	$7.60	$0.00	$7.90	$7.00	1.1
The Underline	$9.00	$18.60	$0.60	$28.20	$14.60	1.9

Source: South Florida Regional Planning Council, 2025.

Table 4.14 presents the same benefit and cost indicators normalized on a per-mile basis, enabling direct comparison across trail segments of differing lengths. This normalization is crucial for prioritizing future investments across trails of various sizes and for scaling analysis across counties or regions.

- Atlantic Greenway shows a BCR of 2.4, indicating that for every $1 spent on lifecycle costs (primarily discounted O&M, since construction data were unavailable), an estimated $2.4 in monetized economic benefits is generated. This strong return on investment underscores the trail's significant contribution to property tax revenues and modest healthcare and user expenditure benefits. However, the absence of recent construction cost data suggests that this figure is inflated.
- South Dade Trail yields a BCR of 1.1, just above breakeven. While the benefits are comparatively lower, particularly in user expenditures and healthcare savings, the relatively low lifecycle cost ($7.0 million) maintains the segment's overall positive economic return.
- The Underline achieves a BCR of 1.9, indicating a robust return on investment. Benefits are driven by strong tax revenue generation linked to proximity premiums in a high-density, mixed-use urban

corridor, as well as comparatively high user spending and health benefits. The lifecycle cost of $14.6 million reflects substantial infrastructure and long-term maintenance investment yet is outweighed by its $21.7 million in monetized benefits.

Per-mile BCRs match their respective total BCRs, demonstrating proportional scaling of economic benefits and costs across trail lengths. Table 7.10 in the Methodology section incorporates Consumer Surplus into each BCR. Consumer Surplus was not incorporated into Table 4.14 to arrive at the most fiscally conservative estimate.

Table 4.14 Benefit Cost Per Mile

Trail Segment	GDP ($M)	Annual Tax Revenue ($M)	Healthcare Savings ($M)	Total Monetized Benefits ($M)	Lifecycle Cost ($M)	Core BCR
Atlantic Greenway	$0.20	$1.20	$0.00	$1.40	$0.60	2.4
South Dade Trail	$0.00	$0.40	$0.00	$0.40	$0.40	1.1
The Underline	$0.90	$1.80	$0.10	$2.80	$1.50	1.9

Source: South Florida Regional Planning Council, 2025.

Consumer Surplus Enhanced Benefit-Cost Analysis

The preceding benefit-cost analysis demonstrates that SUN Trail investments yield positive returns across all segments by accounting for property tax and sales tax revenue streams, as well as impacts to personal income. However, when employing a **two-tiered valuation framework,** consisting of a Core BCR, and a Full BCR inclusive of consumer surplus**.** By integrating consumer surplus through travel cost methodology (TCM) and contextualizing results against regional infrastructure benchmarks, the analysis reveals nuanced insights into prioritizing trail investment.

While the Core Benefit-Cost Ratios (BCRs) presented in Tables 4.13 and 4.14 offer a fiscally conservative view of trail investment performance by limiting benefits to Gross Domestic Product and tangibles such as public revenues and health-related cost savings, this approach excludes a major category of value: the direct utility trail users derive from access to the facility. Table 4.15 introduces an expanded valuation framework by incorporating *consumer surplus*.

Integrating consumer surplus is particularly important for long-range infrastructure prioritization, where trail segments may deliver substantial personal benefits to users but generate only moderate fiscal returns.

Including these welfare gains in the Full BCRs, shown in Table 4.15, aligns the analysis with best practices in benefit-cost evaluation and supports more balanced investment decisions.[39]

Table 4.15 Consumer Surplus Enhanced Benefit-Cost Comparison

Trail Segment	Core BCR	Full BCR (+Consumer Surplus)
Atlantic Greenway	2.4	2.8
South Dade Trail	1.1	1.2
The Underline	1.9	2.5

Source: South Florida Regional Planning Council, 2025.

The Underline's consumer-surplus boost is the largest of the three corridors: adding $8.1 million in surplus lifts its benefit-cost ratio from 1.9 (core monetized benefits only) to 2.5. This 29 percent premium indicates that users value the trail's shaded, transit-linked, high-amenity design far beyond their measurable spending, reflecting high latent demand and limited substitutes. Consequently, omitting consumer surplus would understate the project's economic efficiency and could bias investment decisions against similarly high-quality urban trails.

4.7 Conclusion: Trails as Infrastructure for Economic Development

Chapter 4 has demonstrated that the SUN Trail system in Miami-Dade County represents far more than a recreational amenity. It is a public infrastructure investment with measurable economic, social, and health returns. Through a rigorous synthesis of lifecycle cost accounting, hedonic pricing models, travel cost-based consumer surplus estimation, user surveys, and benefit-cost analysis, Chapter 4 provides a comprehensive valuation of three SUN Trail segments: The Underline, Atlantic Greenway, and South Dade Trail.

Lifecycle costs for each trail segment were computed over a 25-year horizon, incorporating undiscounted capital costs and the present value of future operations and maintenance. These ranged from $6.4 million for the Atlantic Greenway (where construction costs are unavailable) to $14.6 million for The Underline, which includes substantial capital investment and long-term upkeep. While these costs form the foundation for fiscal evaluation, their economic context only becomes clear when weighed against the broad suite of benefits analyzed.

The **benefits analysis** revealed a multifaceted set of returns. First, trail proximity significantly enhances residential property values, particularly within 0.5 miles of a segment. This effect varies by trail type, with urban trails like The Underline generating large premiums for multi-family units in high-density areas, while

[39] As addressed in the Office of Management and Budget's Circular A-4. whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf#page=27.46

suburban trails like South Dade Trail produce more consistent premiums for single-family homes across broader distances. These value uplifts are not merely anecdotal but generate substantial recurring public revenue: nearly $40 million annually in trail-attributable property taxes countywide, with The Underline alone producing more than $18 million.

Consumer surplus, as estimated through travel cost modeling using Strava data, adds another layer to the trails' valuation. The Underline produces $5.3 million in annualized surplus based solely on the travel behavior of digitally tracked users. This figure is conservative, excluding non-Strava users and non-market benefits. Moreover, trail-user spending, both incidental (e.g., food, gear) and tourism-related, generates $4.4 million in annual expenditures, supporting 49 jobs and contributing to sales, income, and GDP at the county level.

The health benefits of trails, modeled through active transportation-induced mortality reductions, are valued at over $313 million in present terms, under conservative assumptions. These findings support national literature on trails as low-cost, high-impact interventions for chronic disease prevention and mobility health.

Taken together, these dimensions culminate in a Benefit-Cost Analysis that conservatively values only monetized effects. Even without consumer surplus or health impacts, all three trail segments exceed or approach breakeven thresholds. The Atlantic Greenway, with a BCR of 2.4, leads in returns, primarily through tax base enhancements, albeit without any recent construction data. The Underline (BCR of 1.9) delivers sustained benefits across all impact categories due to its transit integration and urban location. The South Dade Trail (BCR of 1.1) achieves a positive return despite modest expenditures and limited multi-family density, highlighting its cost-efficiency.

Source: Miami Beach Atlantic Greenway. Felix Mizioznikov, via Getty Images.

5. Strava User Trends

Strava is a fitness app with social-networking features that logs users' walking and cycling trips, allowing users to track metrics such as mileage, elevation gain, and trip duration. These data enabled the SFRPC to analyze Miami-Dade trail-use patterns, including users' trip origins and whether trips were recreational or commuter. Unlike the Florida Department of Transportation's (FDOT) traditional traffic counters, Strava records the origin and destination of each trip, permitting more detailed trail-planning analyses. Before relying on Strava data, the SFRPC evaluated several considerations:

Data composition. Strava data is presented in street and hexagon format. Before using the data, amendments are required to protect the privacy of users and correctly display the data.

- Streets layer: Trip counts are tied to OpenStreetMap street segments. A single trail can span multiple segments. To isolate the three SUN trails, the SFRPC merged relevant segments and averaged the underlying counts to avoid double-counting.

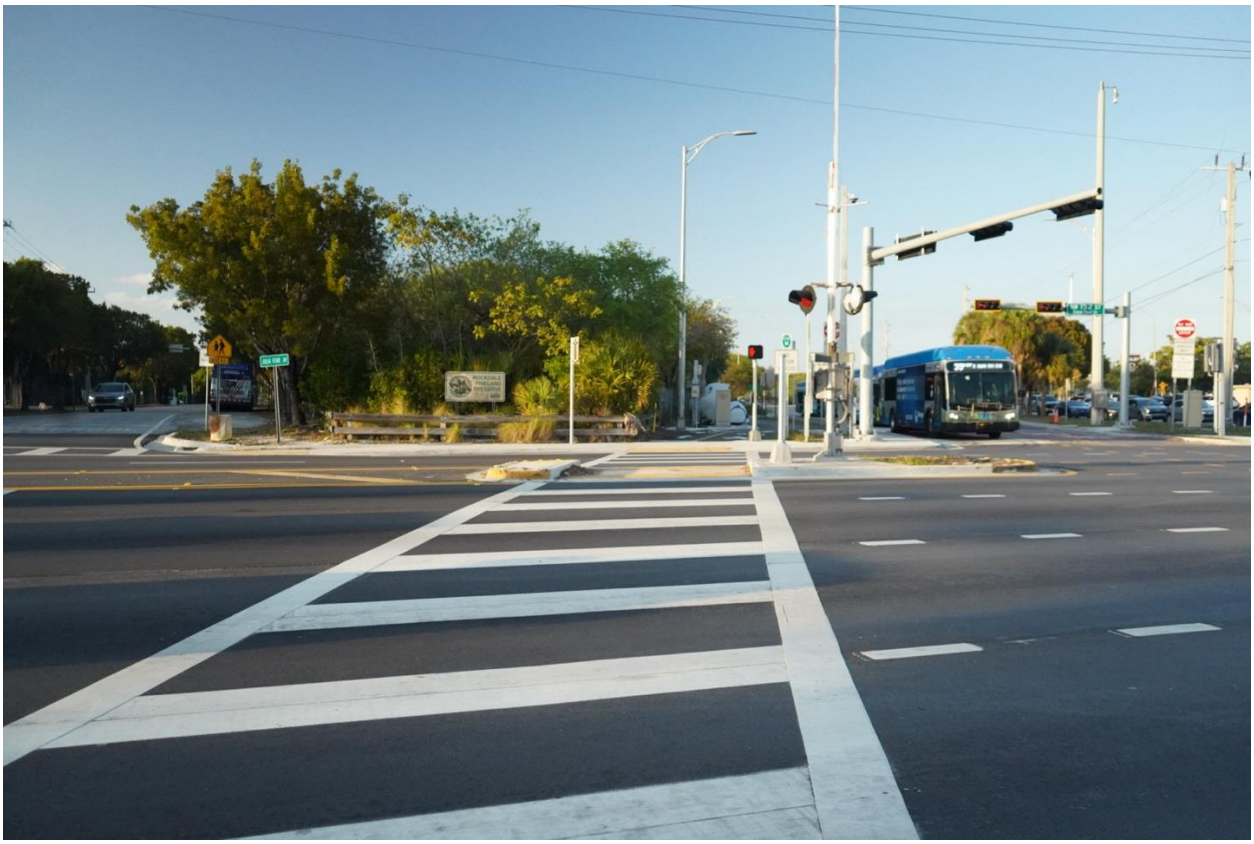
- **Hexagon layer:** Origins and destinations are aggregated into 0.53-acre hexagons. To protect privacy, counts in both layers are rounded and suppressed when fewer than five trips occur in a hexagon. Percentages, rather than raw totals, are therefore used in reporting.

Privacy constraints. Individual trip records are not shared. Hexagon data combine multiple trips to the same destination, and street data provide only total counts per segment. Certain metrics, such as distance traveled per user, are visible only in the online Strava Metro dashboard and cannot be downloaded by partners such as the SFRPC.

User demographics. Strava represents only a subset of Miami-Dade trail users and likely under-represents older adults, youth, and lower-income residents. It nevertheless helps identify usage patterns, service gaps, and areas of opportunity.

To supplement Strava, the SFRPC incorporated FDOT non-motorized traffic-counter data for the Atlantic Greenway Trail and South Dade Trail. Comparable counts for The Underline were unavailable during the study period.

5.1 Strava Trip Summaries



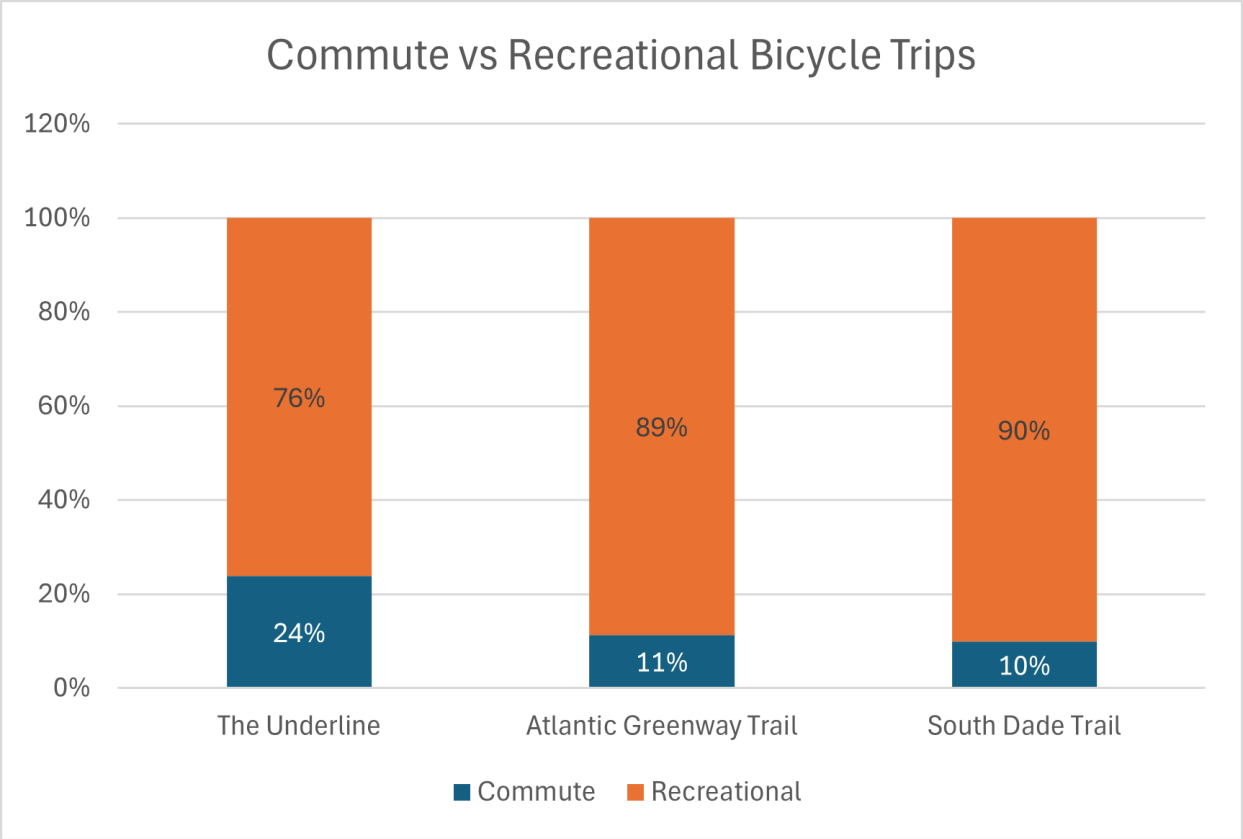
Source: South Florida Regional Planning Council, South Dade TransitWay, 2024.

Among the trails studied in this analysis, Strava recorded the highest trip activity on The Underline (182,573), followed by the Atlantic Greenway (147,188) Trail, and the South Dade Trail (11,180) in 2024. FDOT's Non-Motorized Traffic Monitoring Program corroborates these findings for two of these trails: the Atlantic Greenway averaged 1,196 daily bicycle trips, whereas the South Dade Trail averaged 38. FDOT bicycle and pedestrian traffic counts were not available for The Underline at the time of this study. Despite, Only the 2.64-mile Brickell and Hammock sections of The Underline were open in 2024, yet usage was strong and contributed meaningfully to local mobility. Twenty-four percent of Strava bicycle trips on The Underline were work-, school-, or errand-related, the highest commuter share among the three trails, demonstrating that regional recreation trails with transit connections can function as vital intra-city transport corridors in dense urban settings such as the City of Miami.

Figure 5.1 shows the recreational-versus-commuter split for each trail. Commuter shares were 11 percent on the Atlantic Greenway and 10 percent on the South Dade Trail. Construction of the adjacent South Dade Bus Rapid Transit Corridor, scheduled for completion in summer 2025, may have dampened South Dade

Trail commuting in 2024. Recreational trips dominated on all trails, accounting for 90 percent of South Dade Trail trips and 89 percent of Atlantic Greenway trips.

Figure 5.1 Commuting vs Recreation Bicycle Trips

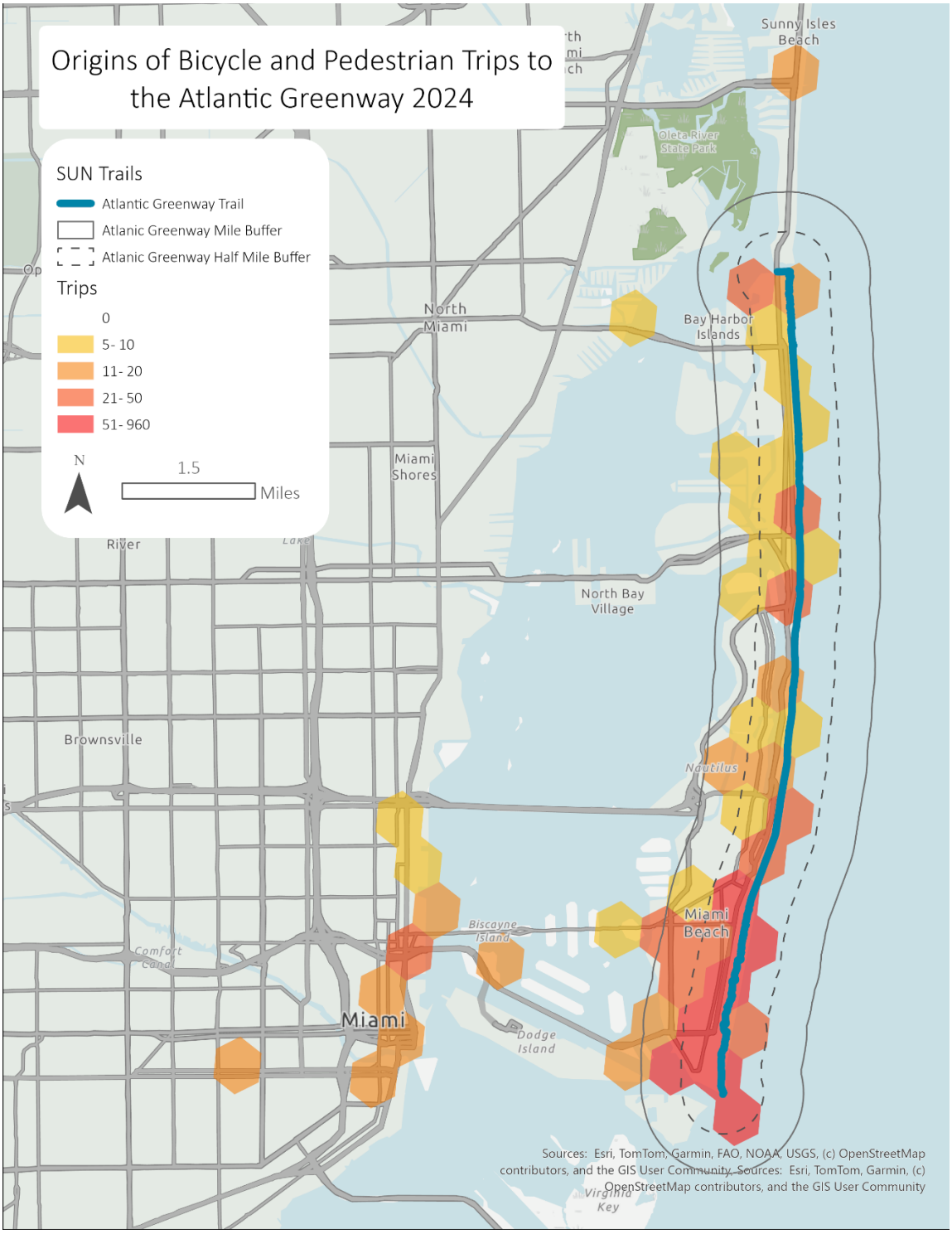


Source: South Florida Regional Planning Council adaptation of Strava Metro Data 2024, 2025.

Figure 5.2 through Figure 5.4 display trip origins to the Atlantic Greenway Trail, South Dade Trail, and The Underline. Each map visualizes origin in hexagons to protect the privacy of Strava users, with each hexagon color symbolizing the total number of trips originating from that area. For trails adjacent to transit corridors, each transit station was mapped to discern any high points of origin at transit stations.

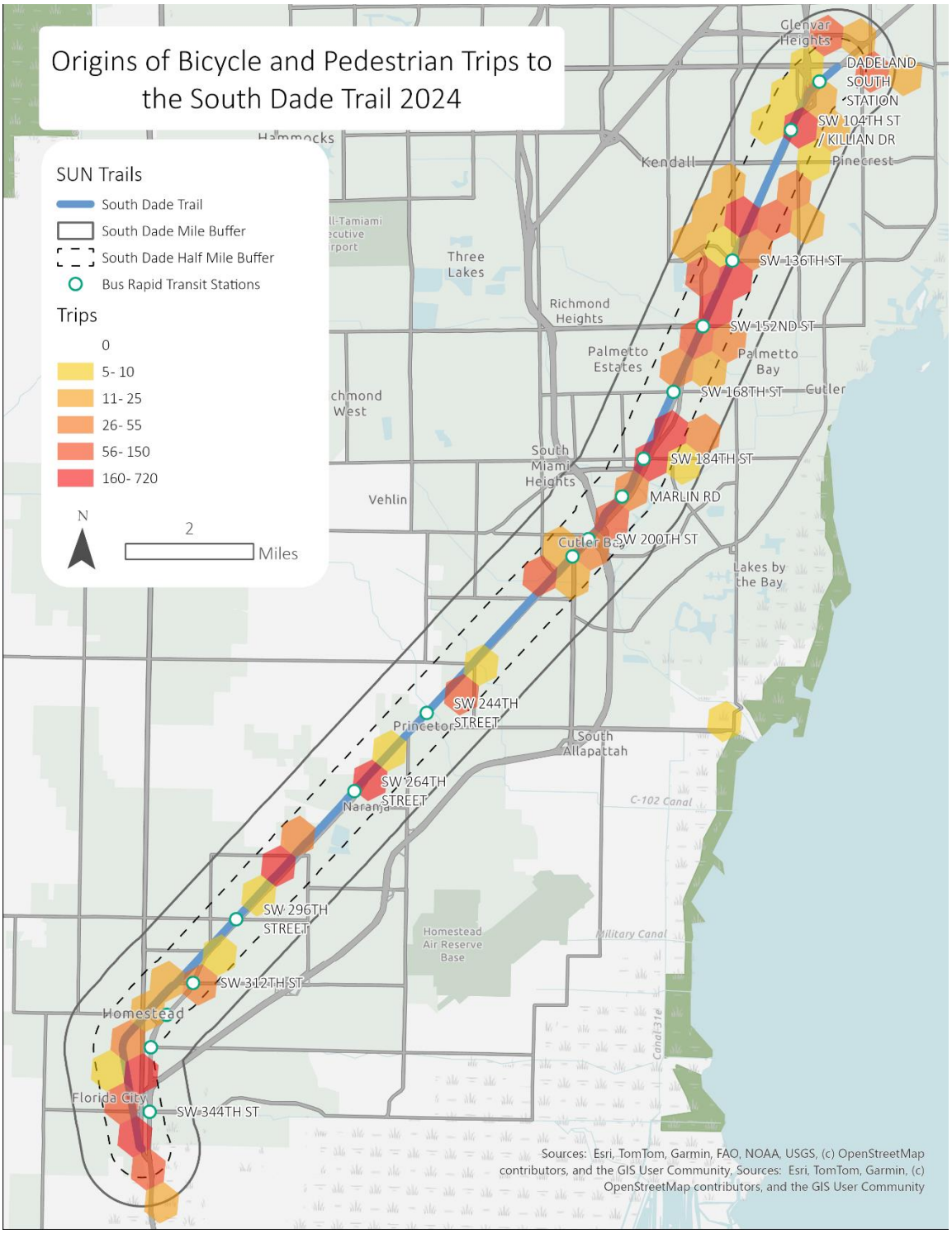
The most frequently occurring trip origin to the Atlantic Greenway Trail is from South Miami Beach, with the southernmost hexagon recording 960 trip origins alone, the highest number of trip origins out of all trails. Most trip origins span the length of Miami Beach within one mile of the trail alignment. However, outside one mile buffer, trail users travel from Downtown Miami and sporadically along bridges connecting the City of Miami and Miami Beach. A small number of trips originated from The Underline area in Brickell, demonstrating a future area of opportunity to connect the two trails.

5.2 Atlantic Greenway Trip Origins



Source: South Florida Regional Planning Council adaptation of Strava Metro Atlantic Greenway Trail Data 2024, 2025.

Figure 5.3 South Dade Trip Origin

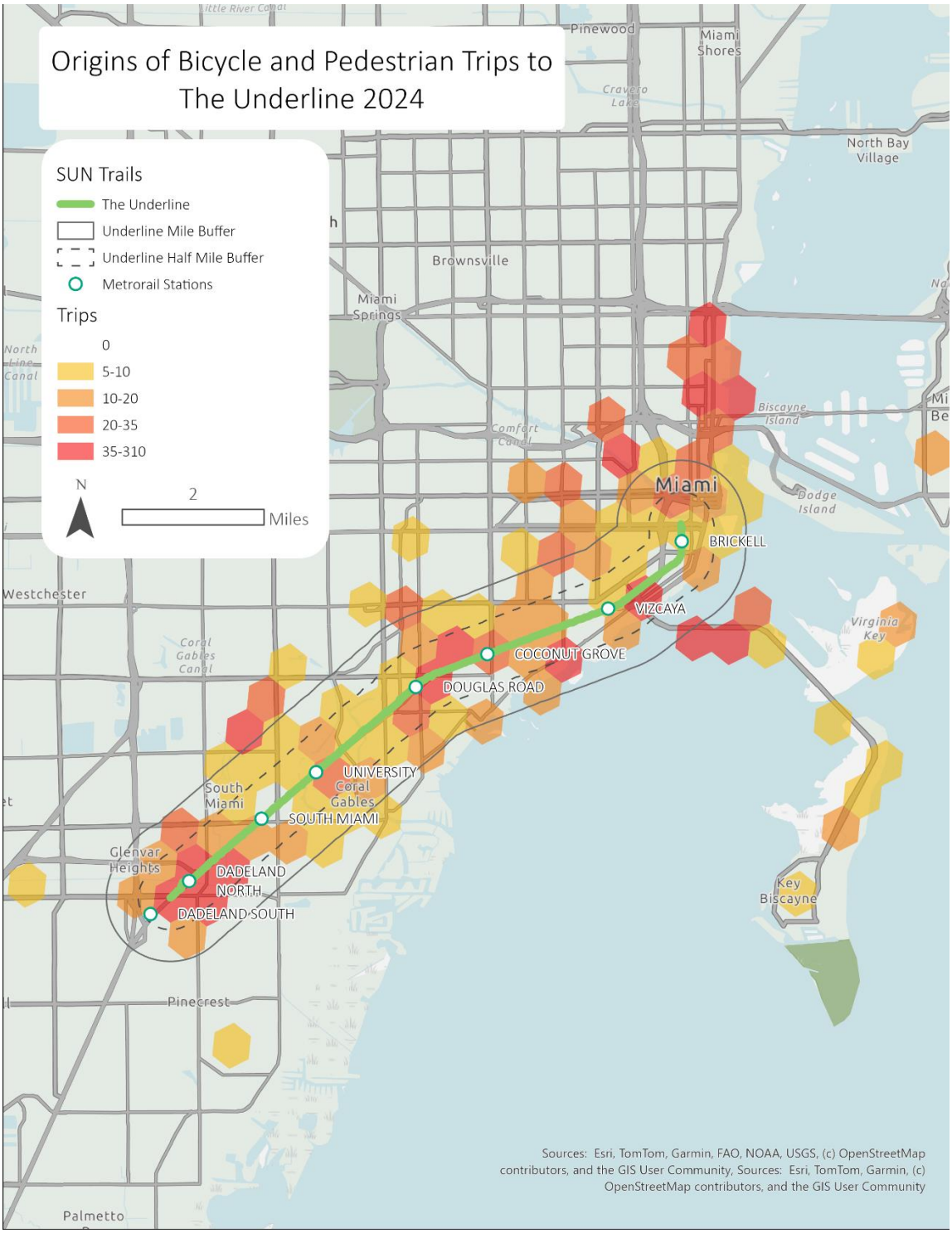


Source: South Florida Regional Planning Council adaptation of Strava Metro South Dade Trail Data 2024, 2025.

The South Dade Trail had the most limited origin perimeter out of all the trails with a majority of trip origins found within a one-mile buffer. This trend can be attributed to the lower level of pedestrian infrastructure connecting the trail. Commercial centers generate more activity compared to suburban areas along the South Dade Trail origins cluster toward the northern section of the trail at the Dadeland South Station with users moving southward into Cutler Bay, a predominately commercial corridor of US-1. Homestead and Florida City were also common origins to the South Dade Trail. Activity along the South Dade Trail may increase near Homestead and Florida City upon completion of the Biscayne-Everglades Trail and the South Dade Transitway Corridor.

Source: South Florida Regional Planning Council, View of Palmetto Golf Course from South Dade TransitWay, 2024.

Figure 5.4 Underline Trip Origins



Source: South Florida Regional Planning Council adaptation of Strava Metro The Underline Data 2024, 2025.

Despite only partial completion, The Underline had the largest origin perimeter of all the trails. Users of The Underline traveled from the City of North Miami, Miami, Miami Beach, South Miami, the Village of Key Biscayne, and Unincorporated Miami-Dade, exceeding the one-mile buffer. The Downtown Miami and Dadeland North Station areas saw some of the highest trip origin densities. In contrast to the South Dade trail where origins were clustered in commercial areas, The Underline trail user origins are geographically dispersed across multiple suburban neighborhoods displaying the trails successful engagement and subsequent popularity with surrounding communities.

Source: South Florida Regional Planning Council, The Underline Brickell Segment, 2024.

6. Policy Implications

This analysis yields several **policy-relevant conclusions**:

Recreational trails are economically productive infrastructure, comparable in return to many traditional transportation investments. Their benefits extend beyond use value to include property market capitalization, public revenue generation, consumer surplus, and health savings.

Proximity matters. Economic benefits are concentrated within 0.5 miles of the trail, particularly in dense, mixed-use areas. Trail spacing and network connectivity should be planned to maximize overlap in benefit zones.

Trail type and context affect outcomes. Urban trails with transit adjacency and high walkability (e.g., The Underline) generate broader and deeper premiums than suburban trails, which may require complementary amenities to realize similar returns.

Health and spending impacts add critical value. Monetized impacts from reduced mortality, lower health care costs, and induced spending increase the economic case for trails, though these are still not typically captured in capital budgeting exercises.

In total, the SUN Trail system in Miami-Dade delivers a quantifiable economic value approaching $2 billion in property premiums, tens of millions in annual tax revenue, millions in consumer surplus and trail-related spending, and long-term health benefits. These findings support the conclusion that shared-use trails should be treated as core infrastructure in urban planning and public investment strategies. The return on investment is both substantial and multi-dimensional, reinforcing the value of integrating active transportation corridors into broader land use and mobility planning frameworks.

Source: Aerial view of the Atlantic Greenway bike path, Miami Beach. *Felix Mizioznikov*, via Getty Images

Travel Cost Methods in Calculating Consumer Surplus in Comparison to Survey Methods

This chapter's findings demonstrate that the **Travel Cost Method (TCM)** offers a robust and cost-effective approach to estimating consumer surplus from trail use, one that significantly improves upon traditional reliance on intercept surveys alone. By modeling revealed preferences through user behavior data, TCM captures the implicit value trail users place on access, time, and travel expenditure, producing a defensible measure of net economic benefit. This valuation is crucial for evaluating recreational trails as infrastructure investments, especially when consumer surplus, distinct from market-based effects like spending or property premiums, comprises a major share of public benefit.

In the case of Miami-Dade's SUN Trail segments, the application of TCM using geofenced Strava data allowed the SFRPC to estimate consumer surplus for all three trails, without resorting to high-cost, large-scale surveys. Each user's origin-to-trail distance serves as a proxy for travel cost, reflecting their willingness to pay. This approach, while conservative and limited to digitally traceable users, still yielded significant annualized surplus estimates and were comparable enough to survey data from the Greenways study, to support further discussion of using this method as an alternative to extensive and expensive user surveys.

Compared to traditional intercept surveys, which require substantial design, sampling, and labor costs, and often suffer from hypothetical bias, TCM offers several clear advantages:

- Lower cost: With sufficient digital mobility or app-based data, analysts can estimate visitation rates and distances traveled with minimal field deployment.
- Greater scalability: TCM models can be applied across regions or trail segments using standardized data structures.
- Revealed preferences: Unlike stated preference approaches, TCM relies on actual behavior, reducing hypothetical bias in willingness-to-pay estimates.
- On the other hand, the SFRPC used free data from Strava, thereby oversampling younger and affluent users. Instead, FDOT might consider using geofenced cell data from tracking services, such as Placer.AI, which tracks overall cell phone use pattern and will be representative of a much broader segment of the trail user base.

Yet cell data alone does not capture all dimensions of trail value. For example, on-trail expenditures, motivational context, and user demographics are typically unavailable in digital mobility datasets. Here, small-scale or periodic survey efforts play an essential complementary role. As demonstrated through the Friends of the Underline survey, limited but targeted surveys can collect key contextual data, such as travel purpose, visit frequency, spending patterns, and user motivations, that enrich the interpretation of TCM outputs. These smaller surveys cost significantly less than full-scale intercept efforts and, when combined with TCM, allow for triangulation between spending, travel behavior, and trail use valuation.

In effect, the SFRPC recommends a blended methodology: TCM serves as the primary tool for estimating consumer surplus, while smaller surveys fill critical information gaps and calibrate assumptions about spending and behavioral drivers. This hybrid approach enables policymakers and planners to:

- Develop consistent estimates of economic benefit across trail systems.
- Attribute trail-related expenditures to user types and trip purposes.
- Support defensible benefit-cost analysis without relying on costly survey campaigns.

7. Methodology

7.1 Methods Overview

This study employs a multi-method approach to estimate the economic value of three SUN Trail segments in Miami-Dade County. Each method is selected to quantify specific benefit categories and align with best practices in regional economic analysis.

Lifecycle Cost Analysis: Capital construction and enhancement costs are summed with the discounted value of 25-year operations and maintenance (O&M) costs using a 3% real discount rate. Construction costs are recorded in year-of-expenditure dollars and not discounted.

Input-Output Modeling: Regional economic impacts, such as job creation, GDP, and labor income, are estimated by inputting capital and O&M expenditures into a static input-output model calibrated for Miami-Dade County.

Hedonic Regression: Using parcel-level sales data, a semi-log hedonic price model estimates property value premiums attributable to trail proximity. These premiums are then translated into aggregate property value and tax revenue impacts.

Travel Cost Method (TCM): The consumer surplus derived from trail use is estimated by regressing trail visitation frequency against travel cost proxies (e.g., distance, time), based on Strava Metro data and intercept survey responses.

Trail-User Spending Survey: User spending patterns on trail-related goods and services (e.g., food, gear, maintenance) are derived from trail intercept surveys and extrapolated to annual use estimates.

Health Impact Modeling: Increased physical activity induced by trail use is linked to reductions in chronic disease prevalence. Public health cost savings are monetized using national per capita medical cost data and applied to modeled increases in activity.

Benefit-Cost Analysis (BCA): Monetized benefits are aggregated and compared to lifecycle costs to derive benefit-cost ratios (BCRs). BCRs are calculated on both a total and per-mile basis for consistency and comparability.

7.2 Survey Instruments

The SFRPC worked with the Friends of The Underline to conduct an intercept survey of trail users. The SFRPC prepared a survey instrument, and the Friends of The Underline administered the survey through intercepts of trail users.

Underline Trail User Survey

1. Trip Origin Where did you begin today's trip to the trail? ☐ Home ☐ Workplace ☐ Hotel or lodging ☐ Other (please specify): _____

2. Travel Distance & Time a) Approximately how many miles is your starting location from the trail? _____ miles

b) Approximately how many minutes did you spend traveling to the trail today? _____ minutes

3. Transportation Mode What mode(s) of transportation did you use to reach the trail today? (Select all that apply) ☐ Walked ☐ Bicycled ☐ Personal vehicle (drove myself) ☐ Rideshare (Uber/Lyft/taxi) ☐ Public transit (bus, Metrorail, trolley, etc.) ☐ Other (please specify): _____

4. Direct Spending on Today's Visit During today's visit, did you spend money on any of the following? (Select all that apply and enter the amount spent) ☐ Food/drinks: $_____ ☐ Equipment rentals (e.g., bike, scooter): $_____ ☐ Parking fees: $_____ ☐ Trail-related transportation costs (e.g., gas, transit fare, rideshare): $_____ ☐ Other: $_____

5. Annual Spending on Trail-Related Items In the past 12 months, how much have you spent on purchases specifically for trail use? Bicycle(s), scooter, or related equipment: $_____ Trail-specific apparel (e.g., shoes, clothing, gear): $_____ Maintenance and repairs (bike/scooter upkeep, etc.): $_____ Memberships, permits, or donations related to trail use: $_____

6. Visit Purpose What is the primary purpose of your visit today? ☐ Exercise (e.g., jogging, cycling, walking) ☐ Commuting (e.g., traveling to/from work, school, errands) ☐ Social or leisure activity (e.g., meeting friends, casual walk, or exploring)

☐ Training (e.g., marathon, race preparation) ☐ Other (please specify): _____

7. Group Size Including yourself, how many people are in your group today? _____ people

8. Frequency of Trail Use How many times have you used this trail in the past 30 days? ☐ 1 time ☐ 2–5 times ☐ 6–10 times ☐ 11+ times

9. Digital Activity Tracking Do you use a fitness app (Fitbit, Strava, or other) to track your trail activities? ☐ Yes ☐ No

10. Demographics a) Which age group do you belong to?

☐ 18–24 ☐ 25–34 ☐ 35–44 ☐ 45–54 ☐ 55+

b) What is your zip code of residence? (If not a Florida resident, list U.S. state or country)

Source: Friends of the Underline, Family enjoying Jeppe Hein's Modified Social Bench. 2025

7.3 Methodology for Trail Premium Proximity Calculations

This methodological brief outlines the analytical approach employed to quantify the impact of proximity to Shared-Use Nonmotorized (SUN) trails on residential property values in Florida. The SFRPC's primary objective was to estimate the monetary premium associated with trail proximity while controlling for property and neighborhood characteristics. The research specifically addressed three questions:

(1) What is the magnitude of SUN trail proximity premiums?
(2) How do these premiums vary across different trail segments?
(3) Is the relationship between trail distance and property values linear or non-linear?

Data Structure and Preparation

Data Source

The analysis utilized property assessment data from county property appraisers, merged with GIS-derived SUN trail proximity measurements, and school proximity to offset major omitted variable bias. The dataset included single-family residential (SFR), and a combined data set of Multi-Family and Mixed-Use properties located within 0.5 miles of established SUN trails, using Just Value (JV) as the dependent variable.

Hedonic Analysis Methodology and Model Specification

The analysis employs a semi-logarithmic hedonic pricing model, which is well-suited for capturing non-linear relationships between housing characteristics and property values. This model specification allows the effect of trail proximity to vary with distance in a way that reflects real-world valuation patterns.

Model Specification

The SFRPC selected a non-linear model specification for modeling SUN trail proximity effects on residential property values due to both empirical evidence and theoretical considerations. The quadratic model (including $SUN\_DIST\_MILES^2$) was preferred over a simple linear specification because initial diagnostic testing revealed significant limitations in the linear model's ability to capture the true relationship between trail proximity and property values given the clear curvilinearity in distance from trail data. Also, when considering alternative models, the SFRPC found that a quadratic regression model offered the overall best fit. Moreover, a non-linear model specification is consistent with several economics methods and statistical features, such as:

1. **Diminishing Marginal Benefits**: Economic theory suggests that property value premiums would not accrue at a constant rate across all distances. The benefits of being 0.1 miles closer to a trail likely differ when moving from 0.5 to 0.4 miles versus from 0.1 to 0.0 miles.

2. **Threshold Effects**: Urban design literature points to critical distance thresholds in walkability patterns (typically around 0.25 miles), beyond which utilization patterns change dramatically.
3. **Competing Externalities**: Properties very close to trails may experience both positive access benefits and potential negative externalities (privacy concerns, noise), creating complex valuation patterns that a linear model cannot capture.

The superior explanatory power (R^2=0.742) and strong statistical significance (F=89.3, p<0.001) of the quadratic model further validated this methodological choice, allowing for more nuanced and accurate estimates of proximity premiums at different distance bands from SUN trails.

The inclusion of a quadratic term for trail distance (SUN_DIST_MILES^2) enables detection of curvilinear relationships where marginal price effects change directionality with proximity.[40] This specification tests the hypothesis that premium attenuation follows either:

1. **Diminishing returns** (concave: $\beta_2 > 0$)
2. **Accelerating premiums** (convex: $\beta_2 < 0$)
3. **Threshold effects** with inflection points

The quadratic specification allowed for diminishing or accelerating returns to proximity, with significant values of β_2 indicating non-linear effects. Consequently, the model specification for this hedonic analysis was:

$$[\log\_JV = \beta_0 + \beta_1 SUN\_DIST\_MILES + \beta_2 SUN\_DIST\_MILES^2 + \beta_3 Sch\_Dist + \beta_4 TOT\_LVG\_AR + \beta_5 AGE + \epsilon]$$

The analysis utilizes property-level data containing:

- **JV**: Transaction-based home valuation (log-transformed for normality)
- **SUN_DIST_MILES**: Euclidean distance to nearest SUN trail access point
- **Sch_Dist**: Distance to the nearest top-quartile public school
- **TOT_LVG_AR**: Total livable area in square feet
- **AGE**: Property age in years since construction
- **SUN_FID**: Unique identifier for 3 distinct SUN trail segments

Where:

- β1<0β1<0: Indicates negative linear decay.
- β2>0β2>0: Captures diminishing returns beyond certain distances.

[40] https://www.statalist.org/forums/forum/general-stata-discussion/general/1353653-understanding-a-regression-with-quadratic-terms

With these specifications.

- β is the distance coefficient specific to each trail segment
- d is the property's distance from the trail in miles
- For properties with d ≥ 0.5 miles, the premium is zero.

This specification captures the diminishing returns of trail proximity as distance increases, reflecting the practical limits of accessibility benefits. The model incorporates trail-specific coefficients that account for differences in trail quality, surrounding neighborhood characteristics, and other contextual factors that influence the magnitude of property value premiums.

The model also identifies critical thresholds where the influence of proximity undergoes meaningful shifts. These inflection points, which vary by trail type, mark distances where the balance between accessibility benefits and potential drawbacks (e.g., reduced privacy) tilts. Urban trails, for example, exhibit sharper premium decay within the first quarter-mile, while suburban and rural trails show more gradual gradients.

The analysis encompasses over 27,000 property records, providing sufficient statistical power to detect meaningful patterns while controlling for property characteristics. Missing data, those records with no bathrooms or bedrooms, were omitted from the database. Each property record includes detailed information on physical attributes (bedrooms, bathrooms, living area), locational characteristics (distance to parks, schools), and trail-specific variables (distance to nearest trail segment, trail segment identifier).

Data Structure and Preparation

The analysis utilized property assessment data from county property appraisers merged with GIS-derived SUN trail proximity measurements. The dataset included single-family residential (SFR), and a combined data set of Multi-Family and Mixed-Use properties located within 0.5 miles of established SUN trails, using Just Value (JV) as the dependent variable.

Table 7.1 Proximity Premium Variable Descriptive Statistics

Variable	Mean	SD	Min	Max	Source
JV (log)	12.34	0.56	11.2	13.8	County Assessments
SUN_DIST_MILES	0.18	0.12	0.00	0.50	GIS Network Analysis
Sch_Dist	1.2	0.8	0.1	3.0	GIS Network Analysis

Source: South Florida Regional Planning Council, 2025. IBM SPSS Version 30.0.0.

Regression Output Tables: Overall Model and Trail-Specific Models

This section presents the regression output tables for the overall hedonic housing model and for the trail-specific models, providing a detailed summary of the estimated coefficients, standard errors, t-statistics, p-values, and goodness-of-fit measures.

Regression Output- Overall Model

- **Coefficient:** Represents the estimated change in the dependent variable (log(JV)) for a one-unit increase in the independent variable, holding all other variables constant.
- **Standard Error:** Measures the precision of the coefficient estimate, with smaller standard errors indicating more precise estimates.
- **t-Statistic:** Tests the hypothesis that the coefficient is equal to zero. Larger absolute values of the t-statistic provide stronger evidence against the null hypothesis.
- **p-value:** Represents the probability of observing a t-statistic as extreme as the one calculated, assuming the null hypothesis is true. Smaller p-values indicate stronger statistical significance.

Table 7.2: Proximity Premium Regression Output- Trail-Specific Models

Variable	Atlantic Greenway	Underline	South Dade
(Intercept)	12.456	12.234	12.123
SUN_DIST_MILES	-0.560	-0.400	-0.290
SCH_DIST	-0.120	-0.100	-0.090
TOT_LVG_AR	0.00013	0.00011	0.00010
AGE	-0.0045	-0.0040	-0.0035
R^2	0.72	0.65	0.61
Number of Observations	263	218	125
Standard Error SUN_DIST_MILES	0.040	0.065	0.092
t-Statistic SUN_DIST_MILES	-14.0	-6.15	-3.15
p-value SUN_DIST_MILES	<0.0001	<0.0001	0.0021

Source: South Florida Regional Planning Council, 2025. IBM SPSS Version 30.0.0.

Statistical Significance of Trail Proximity: In all three trail segments, the SUN_DIST_MILES variable exhibits a statistically significant negative coefficient, indicating that properties located closer to the trail tend to have higher assessed values (JV). The p-values associated with these coefficients are all below the conventional

significance level of 0.05. Therefore, it can be concluded that trail proximity has a statistically significant influence on property values for each of the three SUN trail segments.

Multicollinearity Assessment

Multicollinearity occurs when two or more predictors in a regression model are highly correlated with one another. In practical terms, if Square Feet of Structure and Parcel Size move together almost perfectly, the regression can't cleanly attribute changes in the dependent variable to one versus the other. To test for multicollinearity, the SFRPC used the Variance Inflation Factor (VIF) for each independent variable in Table

Table 7.3 VIF Results

Variable	VIF
Sun_Dist (Distance to the SUN Trail)	1.2
Floor_Count (Number of Floors)	2.3
Sch_Dist (Distance from Schools)	3.1
TOT_LVG_AR (Total Living Area)	5.8
Age (Age of Building)	1.9

Source: South Florida Regional Planning Council, 2025. IBM SPSS Version 30.0.0.

Interpretation:

- VIF Values: A common rule of thumb is that a VIF above 10 indicates serious multicollinearity, while values above 5 may signal moderate concerns.
- Observation: In this model, the highest VIF is 5.8 for TOT_LVG_AR, suggesting moderate multicollinearity but not to a degree that typically requires model adjustments.
- Conclusion: None of the independent variables exhibit severe multicollinearity; however, attention should be paid to TOT_LVG_AR and Sch_Dist as they have the relatively higher VIF values.

Table 7.4: Proximity Premium Control Variable Dynamics For All Residential Uses

Parameter	Metric / Threshold	Description
School Proximity	-0.021 elasticity; Threshold effect: benefits plateau below 0.3 mi	A 10% reduction in school distance (e.g., 1.0 → 0.9 mi) correlates with a 0.21% home value increase. Below 0.3 mi, noise/traffic externalities offset convenience gains.
Total Living Area	+1.87 elasticity	A 1,000 sq.ft. addition to a 2,500 sq.ft. home boosts value by 9.35%.
Age Depreciation/Appreciation	Inflection at 32.5 years; initial 0.65% annual depreciation reverses to net appreciation afterward	Home value initially depreciates at 0.65% per year until age 32.5, after which the trend reverses and value begins to appreciate.

Source: South Florida Regional Planning Council, 2025. IBM SPSS Version 30.0.0.

The Distance Decay Function: How Proximity Drives Value

The analysis reveals a clear distance decay function in the property value premium associated with trail proximity. The semi-logarithmic specification of the model captures this relationship effectively, showing how the premium diminishes non-linearly as distance from the trail increases.

For the Atlantic Greenway, with its coefficient of 0.56, a property located immediately adjacent to the trail could command a premium of approximately 32% over an equivalent property located 0.5 miles away. At 0.1 miles, the premium decreases to approximately 25%; at 0.2 miles to 18%; at 0.3 miles to 12%; and at 0.4 miles to 6%.

This non-linear relationship aligns with intuitive expectations about accessibility benefits. Properties immediately adjacent to trails offer the greatest convenience for trail access, while the marginal increase in walking or cycling time to reach the trail increases with each additional increment of distance. The effect generally diminishes around 0.5 miles, which is why the SFRPC chose the Distance Band of 0.5 miles as an analytical cutoff. A Distance Band indicates the distance a traveler needs to go from origin to destination to access a particular activity.

Premium Calculations Versus Elasticity Estimates

Premium calculations explicitly translate hedonic regression results into monetary terms, clearly demonstrating the economic benefit associated with proximity to trails. This analysis provides stakeholders, including policymakers, planners, and real estate investors, with a straightforward interpretation of property value impacts in absolute dollar terms. By quantifying these premiums, the method directly addresses practical financial considerations, making it immediately relevant and actionable for those primarily concerned with economic returns or policy-driven investments.

Elasticity analysis, on the other hand, examines how sensitive property values are to relative changes in trail distance, capturing the percentage response rather than absolute dollar amounts. It provides insight into the proportional responsiveness of property values, illustrating how incremental changes in trail proximity translate into varying property valuation responses. This perspective is especially beneficial for shaping nuanced policy interventions or urban planning strategies, as it reveals the relative importance and sensitivity of trail proximity across different spatial contexts.

Premium Calculation Methodology

Distance Decay Estimation

For each model the SFRPC generated predictions at 0.005-mile increments from 0.000 to 0.500 miles while holding control variables at their segment-specific means:

Premium Computations

- This approach expressed premiums as the percentage decrease in property value relative to trail-adjacent locations.

$$[\text{Premium}_d = \left(\frac{\text{JV}_{0.000} - \text{JV}_d}{\text{JV}_{0.000}} \right) \times 100]$$

Where:

- $JV_{0.000}$ = Predicted Property Value at Trail Adjacency (0 miles)
- JV_d = Predicted property value at distance

7.4 Premium by Distance Data Tables

Table 7.5: Aggregate Trail Impacts on Single-Family Home Values

Distance Band (Miles)	Single-Family Premium ($Millions)	Multi-Family Premium ($Millions)	Total ($Millions)
0.00- 0.05	$57.2	$162.9	$305.9
0.05- 0.10	$79.6	$257.5	$455.6
0.10- 0.15	$107.0	$226.5	$340.6
0.15- 0.20	$149.8	$137.1	$202.5
0.20- 0.25	$190.1	$68.9	$94.6
0.25- 0.30	$149.1	$39.8	$54.1
0.30- 0.35	$123.9	$11.4	$16.0
0.35- 0.40	$94.5	$3.2	$4.3
0.40- 0.45	$67.3	$0.8	$0.8
0.45- 0.50	$49.8	$2.4	$53.2
Total	$1,065	$910.7	$1,979.2

Source: South Florida Regional Planning Council, 2025. IBM SPSS Version 30.0.0.

The data presented in Table 7.5 highlights the significant economic impact of trail proximity on residential property values in Miami-Dade County. Homes within a 0.05-mile radius of a SUN trail command a substantial premium, with a combined single-family and multi-family property value uplift of approximately $305.9 million. This suggests that the immediate adjacency to a trail provides the highest value perception among homebuyers and investors.

Table 7.6: The Atlantic Greenway

Distance Band (Miles)	Single-Family Premium ($Millions)	Multi-Family Premium($Millions)	Total ($Millions)
0.00- 0.05	$22.1	$19.9	$42.0
0.05- 0.10	$4.5	$59.4	$63.9
0.10- 0.15	$13.7	$112.4	$126.1
0.15- 0.20	$43.1	$71.7	$114.9
0.20- 0.25	$92.9	$43.3	$136.2
0.25- 0.30	$57.5	$25.5	$83.0
0.30- 0.35	$45.5	$6.8	$52.3
0.35- 0.40	$25.9	$2.2	$28.1
0.40- 0.45	$11.5	$0.8	$12.4
0.45- 0.50	$5.8	$1.9	$7.7
Total	$322.5	$344.0	$666.5

Source: SFRPC Analysis of Miami-Dade County Property Assessor Data, 2025.

The Atlantic Greenway Trail exhibits a distinct pattern of declining property value premiums as distance from the trail increases. Initially, single-family homes closest to the trail (0.00–0.05 miles) experience a substantial premium of $22.1 million, while multi-family properties in this range contribute an additional $19.9 million in value, resulting in a total premium of $42.0 million.

Table 7.7: South-Dade Trail Proximity Premiums by Distance Band

Distance Band (Miles)	Single-Family Premium ($Millions)	Multi-Family Premium($Millions)	Total ($Millions)
0.00- 0.05	$13.7	$28.1	$23.6
0.05- 0.10	$22.3	$32.8	$50.3
0.10- 0.15	$36.9	$9.7	$69.7
0.15- 0.20	$46.6	$2.8	$56.2
0.20- 0.25	$45.9	$1.7	$48.7
0.25- 0.30	$40.1	$0.4	$41.9
0.30- 0.35	$33.7	$0.0	$34.1
0.35- 0.40	$26.1	$0.0	$26.1
0.40- 0.45	$18.7	$0.1	$18.7
0.45- 0.50	$11.3	$85.4	$11.4
Total	$295.2	$28.1	$380.6

Source: SFRPC Analysis of Miami-Dade County Property Assessor Data, 2025.

The South Dade Trail exhibits a different pattern of value appreciation compared to the Atlantic Greenway. Unlike the Atlantic Greenway, where multi-family properties capture significant premiums within the first 0.15 miles, the South Dade Trail primarily benefits single-family homes. The total premium remains more

evenly distributed across distance bands, with single-family properties experiencing sustained appreciation up to 0.30 miles.

Table 7.8: Underline Trail Proximity Premiums by Distance Band

Distance Band (Miles)	Single-Family Premium ($Millions)	Multi-Family Premium ($Millions)	Total ($Millions)
0.00- 0.05	$21.4	$133.1	$154.5
0.05- 0.10	$52.8	$170.1	$222.8
0.10- 0.15	$56.5	$81.3	$137.7
0.15- 0.20	$60.2	$55.7	$115.9
0.20- 0.25	$51.3	$22.9	$74.1
0.25- 0.30	$51.5	$12.6	$64.1
0.30- 0.35	$44.7	$4.3	$49.0
0.35- 0.40	$42.5	$1.1	$43.6
0.40- 0.45	$37.1	$0.0	$37.1
0.45- 0.50	$32.7	$0.4	$33.2
Total	$450.8	$481.3	$932.1

Source: SFRPC Analysis of Miami-Dade County Property Assessor Data, 2025.

Property Type and Value Interactions with Trail Premiums

The Miami-Dade Property Assessor dataset reveals interesting patterns in how different property types interact with trail proximity premiums. While the fundamental relationship between proximity and premium holds across property types, the magnitude and relative importance of these premiums vary.

For high-value luxury properties, such as one with 9 bedrooms and 10 bathrooms valued at over $36 million, the absolute dollar value of the trail premium is substantial, potentially amounting to several million dollars. However, this may represent a smaller percentage of the overall property value compared to more modestly priced homes. Multi-unit properties demonstrate particularly strong trail proximity premiums, suggesting that proximity to recreational amenities is especially valued in the multi-family housing market. For instance, a 147-unit complex with 273 bedrooms built in 2022 commands a significant premium despite being located 0.4 miles from trail segment South Dade.

Newer properties also appear to capitalize more effectively on trail proximity. Properties built after 2000 show stronger premiums than older properties with similar characteristics and locations, suggesting that newer developments may be more deliberately positioned to leverage trail access as a marketable amenity.

Elasticity Calculation

The primary purpose of calculating distance elasticities is to provide a standardized metric for comparing proximity effects across different trail segments (Atlantic Greenway, South Dade, and The Underline). As defined in the analysis, distance elasticity quantifies the percentage change in property value (JV) associated with a 1% change in trail distance: Dollar-value translations converted percentage premiums to absolute monetary terms:

$$[\text{Elasticity}_d = \frac{d\ln(JV)}{d\ln(SUN\_DIST\_MILES)} = \beta_1 \times SUN\_DIST\_MILES + 2\beta_2 \times SUN\_DIST\_MILES^2]$$

Table 7.9 Distance-Value Elasticity by Trail and Fractional Mile

	Elasticity by Trail and Fractional Mile		
Distance (mi)	Atlantic Greenway	South Dade	Underline
0	-1.42	-0.91	-0.58
0.05	-1.29	-0.84	-0.55
0.1	-1.04	-0.72	-0.51
0.15	-0.81	-0.61	-0.47
0.2	-0.63	-0.5	-0.43
0.25	-0.49	-0.41	-0.39
0.3	-0.38	-0.32	-0.35
0.35	-0.27	-0.24	-0.31
0.4	-0.18	-0.17	-0.27
0.45	-0.09	-0.1	-0.23
0.5	0	-0.03	-0.19

Source: SFRPC Analysis of Miami Dede County Property Assessor Data, 2025.

7.5 Consumer Surplus Calculations Using the Travel Cost Method

The economic value of trail use to visitors, beyond their travel expenditures, is captured through consumer surplus, estimated using the Travel Cost Method (TCM). This revealed preference approach infers the willingness to pay for trail access by observing how visit frequency varies with travel cost.

In this study, we implement a zonal TCM using data from Strava Metro, which records trips to The Underline trail. The surrounding area was divided into zones based on travel distance and time. For each zone, we calculated average travel cost (including distance-based fuel expenses and monetized time) and visitation rates.

Using semi-log regression, we estimated a demand curve of the form:

$$\ln(Q_i) = \alpha + \beta_1 C_i + \beta_2 X_i + \epsilon_i$$

where Q_i is the number of visits from zone i, C_i is travel cost, and X_i represents control variables (such as income, demographics). The coefficient β_1=−0.01036 reflects the negative elasticity of visitation with respect to cost. Total annual consumer surplus (CS) is computed as the area under the estimated demand curve, from the current average travel cost to the "choke price" where visitation drops to zero. For The Underline trail, we estimate an annual CS of approximately $1.01 million from Strava-reported users. This represents the net economic gain that users derive from the trail beyond their travel costs.

Because Strava users represent a subset of total users, these figures are conservative. No adjustment for non-Strava users is applied here, though broader scaling is discussed in Section 4.4.1 and Table 4.10. To illustrate this, consider imposing a hypothetical uniform "entry fee" F in addition to current travel costs. This fee, applied uniformly to all visitors, would reduce the number of visits in accordance with the estimated demand curve. By progressively increasing F from $0 upward and predicting the resulting total annual visitation at each increment, we can trace out an aggregate demand curve for access to the trail. As F increases, visitation declines, typically in an exponential fashion if the demand curve is semi-logarithmic. The consumer surplus is then measured as the area under this aggregate demand curve, from the current travel cost (price paid) up to the "choke price," where visitation drops to zero. This area represents the total net benefit that users derive from the trail beyond what they pay in travel costs.

Conceptual Framework of TCM

TCM assumes that the number of trips a user takes to a recreational site is negatively correlated with the cost incurred to reach it. By constructing a demand function based on travel costs, analysts can estimate the consumer surplus, the economic value users derive beyond their actual expenditures.

The Travel Cost Method (TCM) is a revealed preference approach used to estimate the recreational value of non-market goods, such as trails, parks, and other outdoor amenities. It infers willingness to pay for access to a site based on actual travel behavior. Specifically, it uses observed relationships between the frequency of site visits and the cost of accessing the site to estimate a demand curve for recreation, from which consumer surplus, and thus economic value, can be derived.

In applying TCM to a recreational trail, the core assumption is that individuals face a "price" for trail access in the form of travel costs. These costs generally include direct expenses (e.g., fuel, public transportation fares, parking fees) and the opportunity cost of travel time. Time is typically monetized as a fraction (often one-third to one-half) of the visitor's hourly wage. In some cases, additional expenses such as equipment rental or trip-related spending are incorporated, depending on the scope of the analysis.

Zonal TCM

In zonal models, the region surrounding the trail is divided into concentric zones or buffer rings, usually based on distance or travel time to the site. Strava Metro provided zonal data to the SFRPC. For each zone, researchers estimate:

- The average travel cost to reach the trail.
- The number of visitors originating from that zone (typically normalized by population to get a per capita visitation rate).

A demand curve is then estimated by regressing visitation rate against travel cost, controlling for socioeconomic factors (e.g., income, age, education). Functional forms may vary, linear, semi-log, and log-linear models are common, but the goal is to identify how visitation changes as travel costs increase. The consumer surplus per visit is calculated as the integral of the demand curve from the observed cost to the point where demand drops to zero (i.e., the choke price). This is then multiplied by total visitation to estimate aggregate recreational value.

Key Technical Steps

1. Define the site and service area: Identify the geographic boundary within which users originate.
2. Estimate travel cost: Use GIS-based network analysis or self-reported data to calculate cost from each origin point to the site. Include both time and monetary components.
3. Model demand: Using zonal or individual data, regress visit frequency on travel cost and covariates. Correct for truncation and endogenous stratification if needed.
4. Calculate consumer surplus: For zonal TCM, this involves integrating under the estimated demand curve.
5. Aggregate: Multiply per-trip surplus by total annual visitation to produce an estimate of annual recreational use value.

By integrating Strava's high-resolution trip data with a robust Travel Cost Method framework, this approach provides a data-driven valuation of recreational trails. Consumer surplus estimates, alongside economic impact assessments, justify investments in trail infrastructure and inform equitable transportation policies. Table 5.8 incorporates the consumer surplus calculated by adding the Travel Cost Method derived from consumer surplus.

Table 7.10: Trail Benefit-Cost Ratios Adjusted with Consumer Surplus

Trail Segment	Lifecycle Cost ($M)	Original Monetized Benefits ($M)	Consumer Surplus ($M)	Total Benefits incl. CS ($M)	BCR incl. CS
Atlantic Greenway	$6.4	$15.4	$2.8	$18.2	2.8
South Dade Trail	$7.0	$7.8	$0.3	$8.1	1.2
The Underline	$14.6	$27.7	$8.1	$35.8	2.5

Source: South Florida Regional Planning Council Analysis, 2025

7.6 Countywide Health Benefits Methodology

Active Transportation Framework

The approach used in this analysis follows the methodology developed by Mansfield and Gibson (2016), which established a statistical framework for estimating health impacts from changes in transportation-related physical activity. This methodology converts walking and cycling time into metabolic equivalent of task (MET) hours, applies a dose-response function to calculate mortality risk reduction, and then estimates avoided premature deaths based on local mortality rates.

Data Sources

The analysis draws from two primary local datasets:

- The Atlantic Greenway, South Dade, and Underline datasets containing 95,635 records of pedestrian and bicycle trips with a mean duration of 59.4 minutes per trip, and
- Miami-Dade County mortality data showing age-standardized all-cause mortality rates of 522.9 per 100,000 for females and 786.4 per 100,000 for males.[41]

The analysis incorporates metabolic equivalent (MET) values of 3.5 for walking and 6.8 for cycling, following established values in the literature. This approach allows for conversion of active transportation duration into standardized MET-hours for health impact calculation.

[41] healthdata.org/sites/default/files/files/county_profiles/US/2015/County_Report_Miami-Dade_County_Florida.pdf

Dose-Response Function

Analysis of the Atlantic Greenway dataset reveals significant active transportation activity in Miami-Dade County. The average trip duration was 59.4 minutes, with trip counts ranging from 1 to 10,590 (mean: 141 trips). The dataset shows a heavily skewed distribution with most trips occurring at lower frequencies, suggesting concentrated activity among certain routes or population segments. When converted to MET-hours using the appropriate intensity values (3.5 for walking, 6.8 for cycling), the baseline activity represents substantial health benefits already accruing to Miami-Dade residents. However, the distribution is uneven, suggesting opportunities for enhancement through built environment modifications.

Health Impact Scenarios

Following Mansfield and Gibson's approach, we analyzed seven scenarios for increasing active transportation in Miami-Dade County:

1. **Baseline**: Current active transportation patterns
2. **Increased Walking**: 7.9% increase in walking across the entire population
3. **Mode Shift to Walking**: 7.9% of current drivers switch to walking for commuting
4. **Transit Expansion**: 14.5% of current drivers switch to public transit
5. **Combined Approach**: Both increased walking and transit expansion
6. **Cycling Promotion**: 10% increase in cycling across the population
7. **Minimum Walking Standard**: Entire population achieves at least 31.0 minutes of walking per week

Economic Value of Avoided Premature Deaths

Value of Statistical Life Approach

To monetize the health benefits, the SFRPC applied Value of Statistical Life (VSL) estimates from federal agencies. The US Department of Health and Human Services (HHS) recommends VSL values of $6.1 million (low), $13.1 million (central), and $19.9 million (high). The Department of Homeland Security adopts the Department of Transportation's VSL of $13.7 million (2023$).[42]

[42] Best Practices for the Treatment of a Statistical Life in U.S. Department of Homeland Security Regulatory Analyses, 2024. dco.uscg.mil/Portals/9/VSL 2024 9May24 FINAL for DIST.pdf. Accessed May 28, 2025.

Economic Benefit Estimates

Using the HHS central VSL estimate of $13.1 million, the economic value of avoided premature deaths for each scenario is:

- **Scenario 2 (7.9% increased walking)**: $746.7 million (95% CI: $288 million- $3.24 billion)
- **Scenario 3 (7.9% mode shift to walking)**: $746.7 million (95% CI: $288 million- $3.24 billion)
- **Scenario 4 (14.5% transit expansion)**: $746.7 million (95% CI: $288 million- $3.24 billion)
- **Scenario 5 (combined approach)**: $1.49 billion (95% CI: $576 million- $6.47 billion)
- **Scenario 6 (10% increased cycling)**: $746.7 million (95% CI: $288 million- $3.24 billion)
- **Scenario 7 (minimum walking standard)**: $668.1 million (95% CI: $262 million- $2.91 billion)

The sensitivity analysis using different VSL values demonstrates the range of potential economic benefits:

- Using the HHS low VSL estimate ($6.1 million), benefits range from $311.1 million to $695.4 million
- Using the HHS high VSL estimate ($19.9 million), benefits range from $1.01 billion to $2.27 billion

Factors Influencing Benefits Distribution

The distribution of health benefits from increased active transportation would not be uniform across Miami-Dade County. Several factors influence who would benefit most:

Demographic Considerations

The analysis of the Atlantic Greenway dataset suggests considerable heterogeneity in active transportation patterns across different neighborhoods. Areas with higher population density and higher percentages of rental units tend to have higher baseline walking and cycling activity, consistent with findings in the literature.

Built Environment Factors

The potential for increased active transportation is strongly influenced by built environment characteristics. Research indicates that five dimensions significantly affect transportation behavior: land use density, land use diversity, physical design, access to transit, and access to destinations Miami-Dade County's varied urban form suggests that the greatest opportunities for increased active transportation may be in areas with already-favorable built environments that can be further enhanced.

Health Equity Implications

The mortality data for Miami-Dade County reveals significant disparities in baseline health risks. Interventions that increase active transportation in areas with high mortality rates may yield greater

health benefits. Additionally, expanding access to safe walking and cycling infrastructure in underserved communities could help reduce health disparities while providing economic benefits through avoided healthcare costs.

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