

# Metro Boston Municipal Trails, Bikeways & Greenways Inventory **2020 Rankings**

November 2021



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# Introductory Note

The data and analysis in this article are based on shared use path, bicycle lane, and foot trail data as of December 2020.

As the COVID-19 pandemic has progressed into 2021, many cities and towns have improved or added bicycling and pedestrian infrastructure, which might slightly alter the rankings included in this report. MAPC plans to release updates to this baseline ranking in the future.

## Credits

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Special thanks to MAPC's Data Services team for their continued roles in developing the GIS, online mapping, and analytical tools to allow this report to be produced.

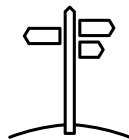
# Executive Summary

The Metropolitan Area Planning Council (MAPC) has developed a database of bicycle and pedestrian facilities throughout the 101 municipalities we serve. For this analysis, MAPC compared and ranked communities based on their range of shared use paths, bicycle lanes, and foot trails.

Each of the 101 municipalities were sorted into two classifications: roughly urban communities and suburban communities. The data was exported from our GIS database of trails in the fall of 2020.



**3,096 miles**  
of existing foot trails



**354 miles**  
of existing shared-use paths



**278 miles**  
of existing bike lanes





## SHARED USE PATHS

Shared use paths are paved trails that accommodate walkers, cyclists, and other users. The Charles River paths and rails to trail are typical examples.

**Cambridge** has the highest density of shared use paths of *urban* communities at 2.8 miles per square mile.

**Nahant** has the highest density of shared use paths among *suburban* communities at 1.8 miles per square mile.

**Belmont** and **Framingham** have the lowest density among *urban* communities at 0.2 miles per square mile.

The following 24 communities have little or no shared use paths (several of these communities have proposed shared use paths in either the planning or design phase):

Bolton

Canton

Duxbury

Essex

Franklin

Hamilton

Holbrook

Hull

Ipswich

Littleton

Lynnfield

Manchester

Marshfield

Medway

Middleton

Millis

Norfolk

Pembroke

Rockport

Sherborn

Stoughton

Walpole

Wilmington

Wrentham



## BICYCLE LANES

Bicycle lanes are striped spaces on the roadway for the exclusive use of bicycles. They may be adjacent to traffic lanes or parking, or physically separated.

**Cambridge** and **Somerville** have the highest percentage of arterial street miles with bike lanes (including protected bike lanes) among *urban* communities: over 70%.

**Boston** has the highest protected bike lane mileage, with over 18 miles.

**Milton** has by far the highest percent of arterial street miles with bike lanes among *suburban* communities, almost 35%. This is at least twice all other suburban communities, but half of the top group of urban communities.

**Wayland**, **Natick**, and **Milton** are the only *suburban* communities that have protected bike lanes.

The following 56 communities have no bicycle lanes:

Ashland	Franklin	Marblehead	Pembroke	Wakefield
Bellingham	Hamilton	Marshfield	Randolph	Walpole
Boxborough	Hanover	Medfield	Rockland	Wenham
Braintree	Hingham	Middleton	Rockport	Weston
Burlington	Holbrook	Milford	Scituate	Wilmington
Carlisle	Holliston	Millis	Sharon	Winthrop
Concord	Hopkinton	Nahant	Sherborn	Woburn
Danvers	Ipswich	Norfolk	Southborough	Wrentham
Dover	Lincoln	North Reading	Stoughton	
Duxbury	Littleton	Norwell	Stow	
Essex	Lynnfield	Norwood	Sudbury	
Foxborough	Manchester	Peabody	Topsfield	

## FOOT TRAILS

Foot trails are paved or natural surface trails that are primarily designed for walking, such as in parks and conservation areas.

**Medford** and **Cambridge** have the highest density of foot trails among *urban* communities, with over 5 miles of trails per square mile.

In **Medford**, the Middlesex Fells Reservation encompasses the largest portion of the city's foot trails; while in **Cambridge**, numbers include the extensive walkways through the Massachusetts Institute of Technology and Harvard University campuses.

**Norwood** has the lowest density of foot trails among *urban* communities, with less than .25 miles per square mile

**Rockport, Stoneham, Lincoln, and Weston** have over 5 miles of trails per square mile, the highest of *suburban* communities

**Stoughton, Wilmington, Bellingham, and Millis** have less than .20 miles of trails per square mile, the lowest amount among *suburban* communities.



# Data Collection

MAPC has developed and maintains a comprehensive Geographic Information Systems (GIS) database of bicycle and walking facilities throughout the Metro Boston region and beyond. This inventory of facilities will be referred to as “Trailmap data” and includes infrastructure dedicated to cycling and walking.

This report summarizes the Trailmap data by municipality within the 101 MAPC communities.

The goal is to identify how “complete” each street segment within the MAPC region is and compare the rankings between similarly sized communities.

The term “complete street” is used to describe streets that are planned and operated to prioritize pedestrian and cyclist safety, comfort, and access to destinations for all people. A complete street will allow for easy crossings, have infrastructure for walking to necessary destinations, and allow users to commute safely using adaptive devices.

Furthermore, we aim to provide a comparison and ranking between similar communities. In providing this comparison, we hope to encourage each community to see these rankings as a call to action. The rankings will help demonstrate the need for improved infrastructure, ensuring that all roadways are safe and providing affirmative places to walk and bike.

The MAPC Trailmap data may be viewed in map form here: <https://trailmap.mapc.org>. We encourage readers of this report to view the map and provide MAPC with feedback, errors, and missing data. As an agency, we aim to issue this report on an annual basis.

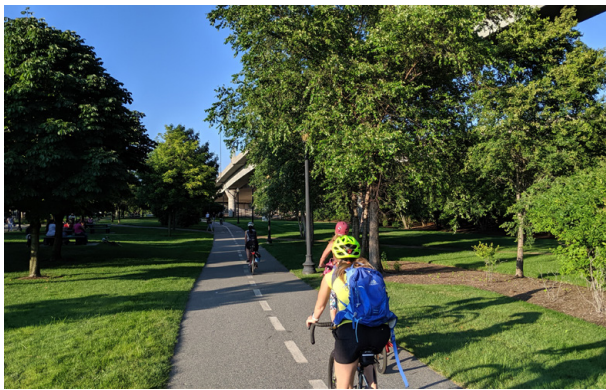


## DATA COLLECTION

The data in Trailmap is divided into three main categories: shared use paths, bicycle lanes, and foot trails. There are some important distinctions to be made with the data that we have collected. These distinctions are described in detail below.

### SHARED USE PATHS

Shared use paths are hard surface paths that allow for multiple uses, such as walking, cycling, and wheelchair use. To be categorized as shared use, a path is generally at least 10 feet wide, and paved in asphalt, concrete, stone dust, or stabilized soil. Most bicycles, wheelchairs, and strollers can comfortably use these paths.



### BICYCLE LANES

Bicycle lanes are dedicated spaces on a roadway for bicycle travel. Bicycle lanes are adjacent to the travel lanes and bifurcated using pavement markings. Some bicycle lanes are “protected” meaning that they are physically separated from motor vehicles by a curb or other barrier, such as parking. The lane types are shown using the images below.



## DATA COLLECTION

### FOOT TRAILS

Foot trails are typically hard surface or natural surface trails designated for bicycle and pedestrian use. These trails have been established by the conservation of natural areas, city parks, college campuses, and other spaces separate from the road right-of-way. Foot trails are primarily designed for walking; however, some trails allow for bicycle use, depending on the context and location. Trail widths may vary from single track (about 18 inches), to 5-foot sidewalk, to double track/cart path, to forest road.



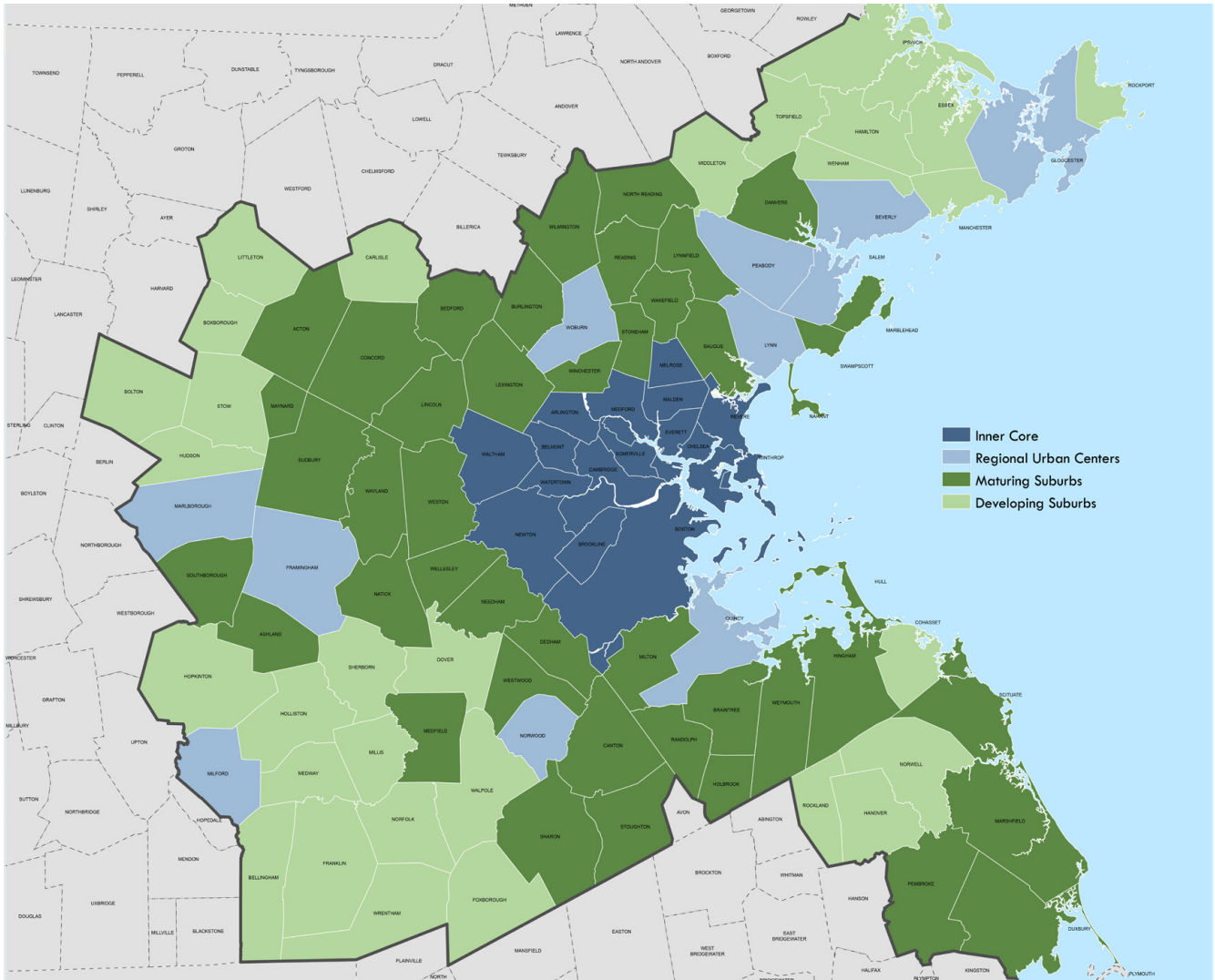
Bicycle lanes are typically within the road right-of-way, but shared use paths and foot trails are on a separate right-of-way—in parks and open spaces or along former railroad corridors, for example.

This analysis includes only MAPC-collected data, so does not include sidewalk data, which is collected by MassDOT and available through MassGIS. Future inventories may include sidewalk analysis.

### COMMUNITY TYPES

The community types rankings are categorized and sorted by municipality and community type, as defined by MAPC and noted in the map below. Sorting by community type allowed for a stronger assessment of communities based on geographic location and characteristics.

# DATA COLLECTION



## Inner Core

- High-density inner cities
- Historic, high-density suburbs near the urban core

## Regional Urban Centers

- Large, high-density urban centers not proximate to Boston
- Small/mid-sized urban downtowns, diverse neighborhoods

## Maturing Suburbs

- Moderate density, nearly built out
- Lower density, approaching build out

## Developing Suburbs

- Well-defined town center, mixed densities, room to grow
- Very low density, room to grow, country character

# TRAIL INVENTORY

TRAILS, BIKEWAYS, & GREENWAYS



## SHARED-USE PATHS



## SHARED USE PATHS

MAPC defines shared use paths as two-way hard-surfaced corridors dedicated for active transportation use, including walking, cycling, running, skiing, and other compatible purposes. Class 1 E-bikes (Max speed of 20 mph) and electric wheelchairs are generally allowed on these corridors, while other motorized vehicles are prohibited. Shared use paths are generally 10 to 12 feet wide, with 2 feet of clearance on either side. They are generally paved with asphalt, concrete, stone dust, or stabilized soil.

In the past, shared use paths have been focused along former rail beds and rivers—the Charles River in particular. More recently, communities are constructing these paths within the road right-of-way, particularly along busy arterial streets.

The Trailmap database categorizes shared use paths into the following categories

- **Shared Use Path** – completed, in-use trail with a paved surface; either asphalt, concrete, stone dust, stabilized soil, or another accessible surface.
- **Unimproved Path** – this describes a future shared use path corridor (often a former rail bed) that is passable via a foot path or wider, but is not an improved accessible surface. This category is not used in the calculations for this report.
- **Envisioned or Under Construction** – future shared use paths may be under construction, design, or just an idea that has yet to advance.



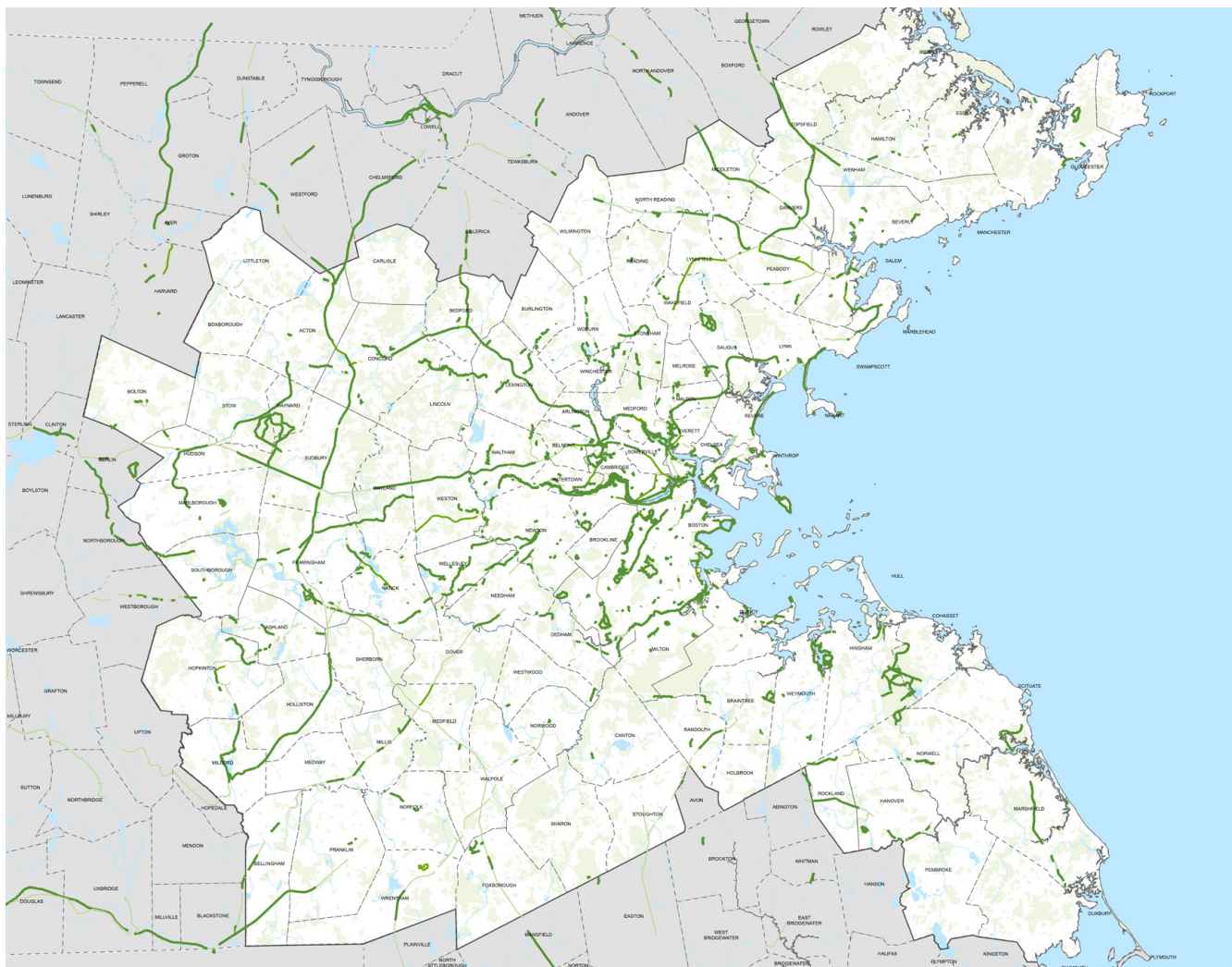
## SHARED USE PATHS

# Analysis

There are 81 municipalities (out of 101) in the MAPC region that have shared use paths. Most of the remaining 20 municipalities have proposals, designs, or the potential to develop shared use paths.

As of December 2020, there are 354 miles of completed shared use paths in the MAPC region, and many more miles under design or construction.

Shared use paths are ranked by density, or length of path per square mile. Urban communities generally have the highest density of paths in the region, with the highest by a significant margin in Cambridge. Beyond that, only Watertown, Boston, Woburn, and Nahant have more than 1.5 linear miles of shared use paths per square mile.

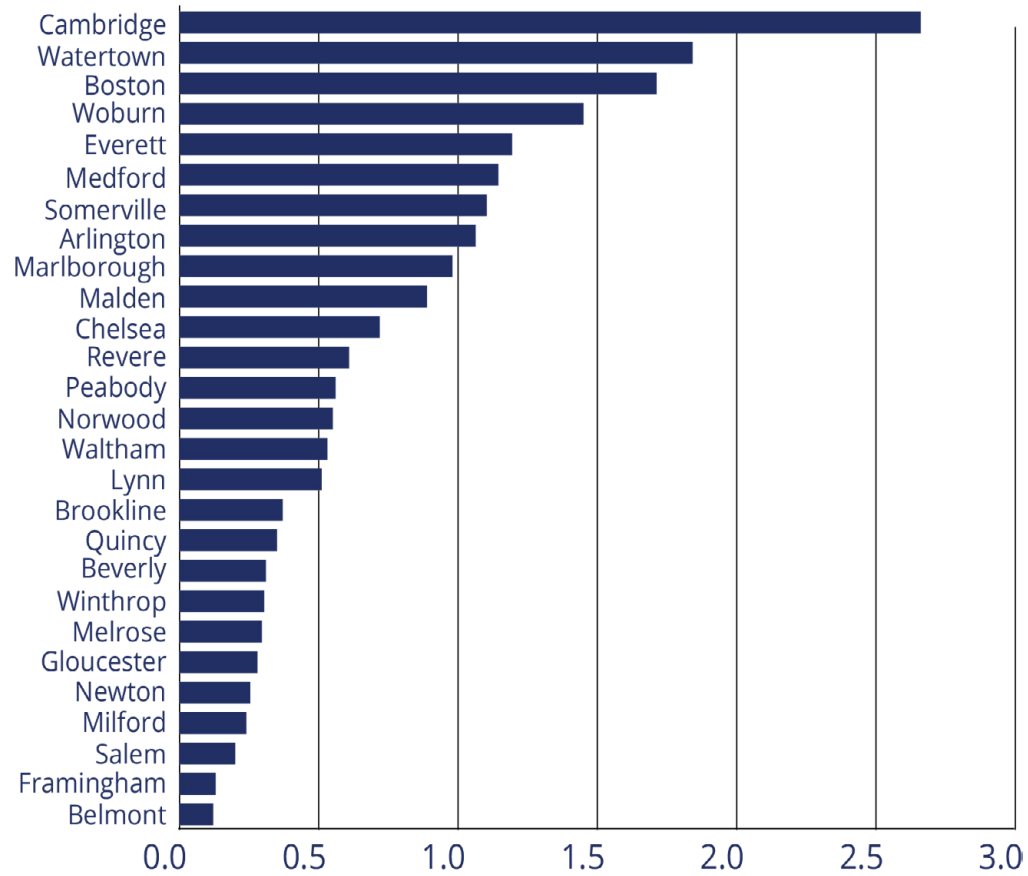


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## INNER CORE AND REGIONAL URBAN CENTERS

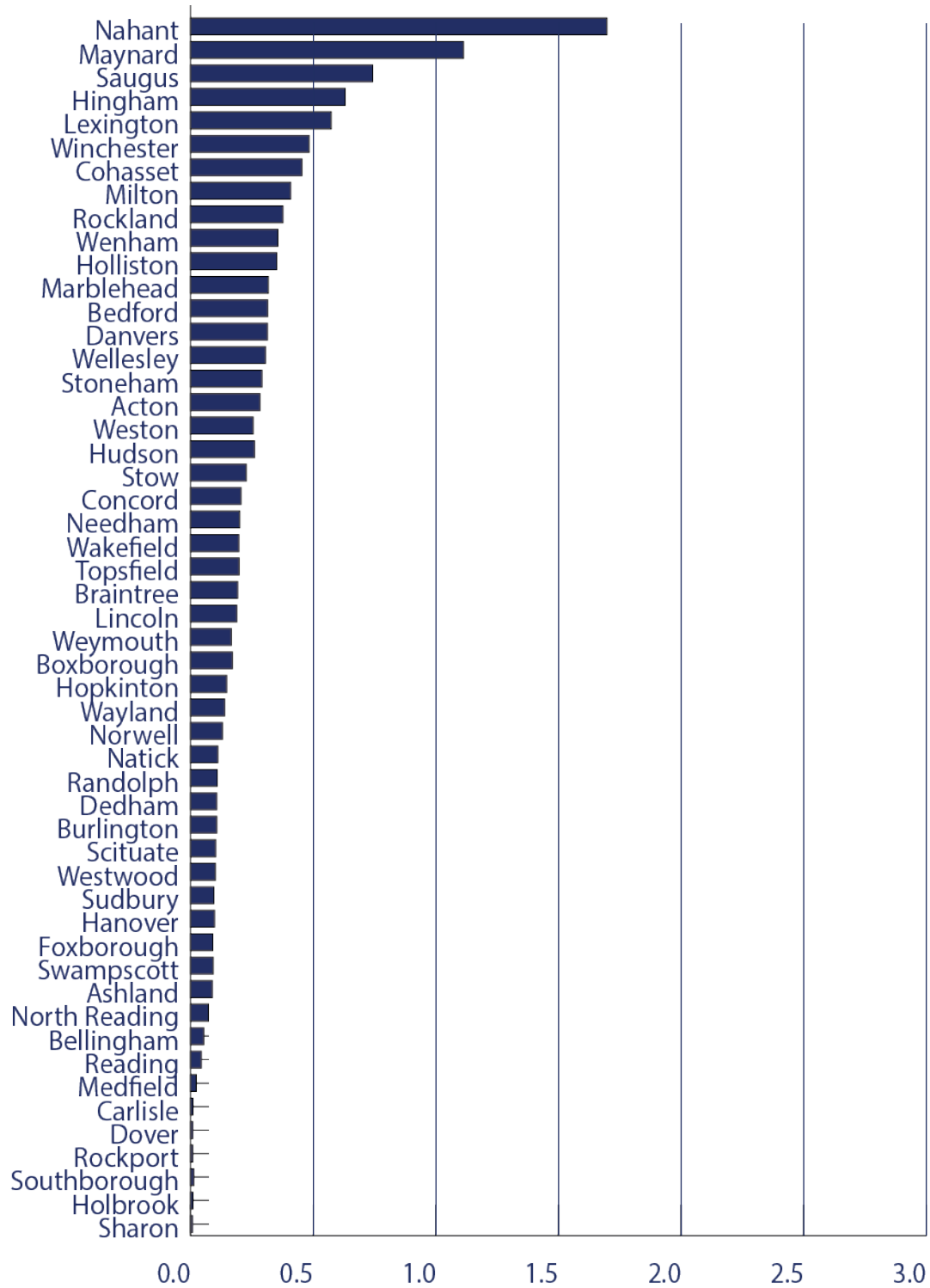
Existing Shared-Use Path Mileage/Square Mile



## SHARED USE PATHS

### MATURING SUBURBS AND DEVELOPING SUBURBS

Existing Shared-Use Path Mileage/Square Mile







## SHARED USE PATHS

### ANALYSIS

Urban core communities with environmental justice populations are generally well connected via a shared use path network. More trail corridors are built out or in design.

There are key projects in the inner core that are awaiting funding that would significantly improve access to EJ populations

- Swampscott Rail Trail (connecting Lynn and Salem)
- Mass Central Rail Trail in Waltham and Belmont.
- Peabody and Salem trail gaps
- Framingham: Design and acquisition is needed in South Framingham particularly.
- Randolph Rail Trail and connecting to Braintree. A feasibility study is the next step to evaluate alternatives.

# TRAIL INVENTORY

TRAILS, BIKEWAYS, & GREENWAYS



## BICYCLE LANES



## BICYCLE LANES

Bike lanes are marked lanes in the roadway right-of-way providing dedicated space for cycling. Bike lanes have varying designs, the most common being a 5-foot wide lane with a stripe separating the general travel lane and/or parking lane. Though this type of lane provides separation, it does not provide physical protection from motor vehicles.

More desirable from both a safety and comfort perspective are protected bike lanes, which attract more diverse users. Protected bike lanes are physically separated from motor vehicle traffic. Barriers may be horizontal—such as flex posts—or vertical—such as curbs placing the bike lane at the sidewalk level. Flex posts are often used as an interim solution until the street can be reconstructed to move curbs.

As noted below, not all communities have bike lanes and fewer have protected bike lanes. Still, the number of communities with bike lanes increases each year.

The maps below demonstrate the location of all bike lanes within the MAPC region, mostly concentrated within the inner core, and protected bike lanes (2nd map).



## BICYCLE LANES

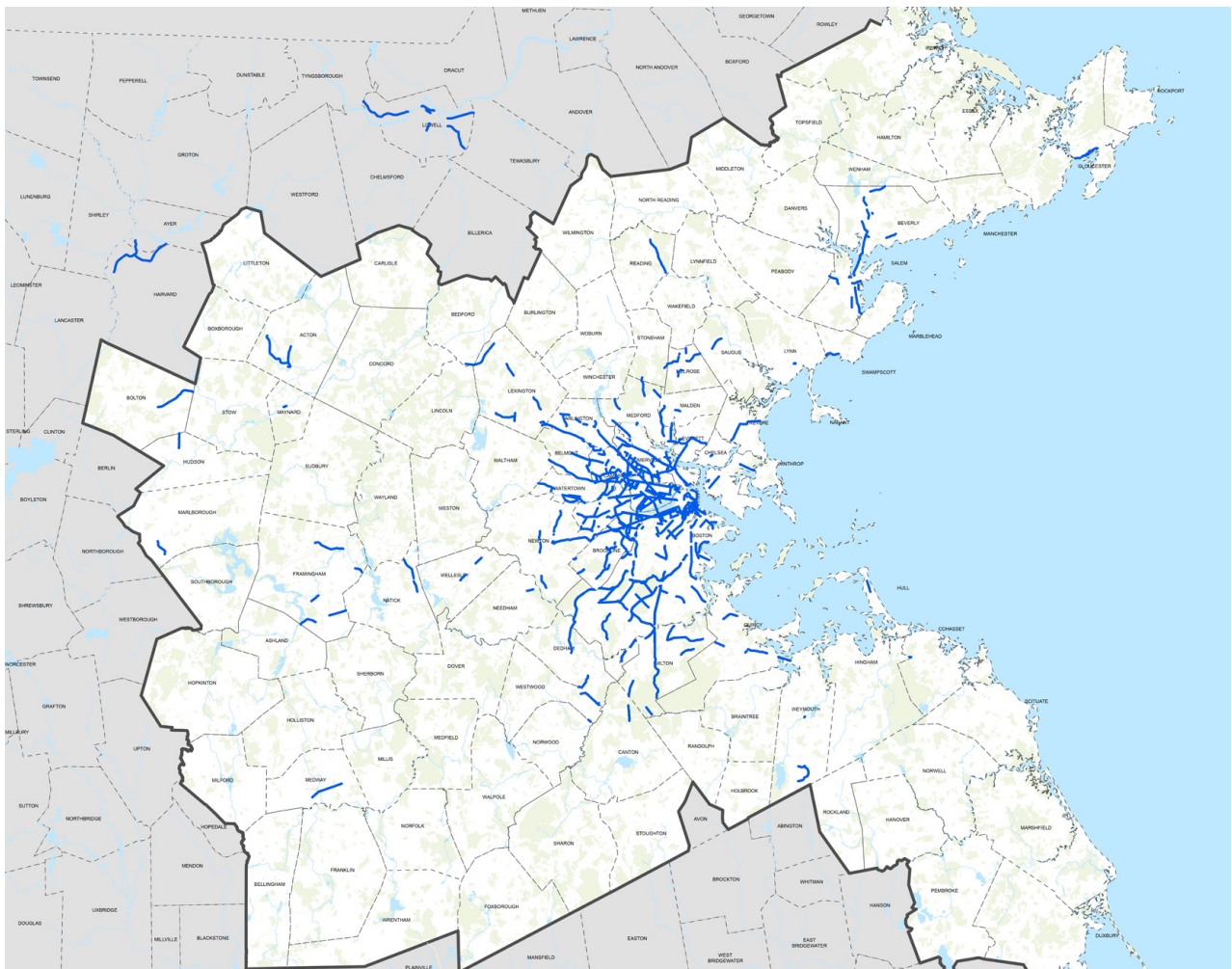
# Analysis

There are 43 MAPC communities with bike lanes and just 9 with protected bike lanes.

Cambridge leads, followed by Somerville. Both have over 70% of the arterial street miles covered by some type of bike lane. Both cities are actively working to convert many of the streets with conventional bike lanes to protected bike lanes. Narrow rights-of-way and parking conflicts on some streets may ultimately limit the number of protected bike lanes, but the momentum is significant.

The next highest wave of communities with bike lanes are generally inner core suburbs that are adjacent to Cambridge and Somerville, including Boston.

Quincy has by far the lowest percent of arterial roadways with bike lanes (less than 5%) of all communities that have MBTA rapid rail stations.



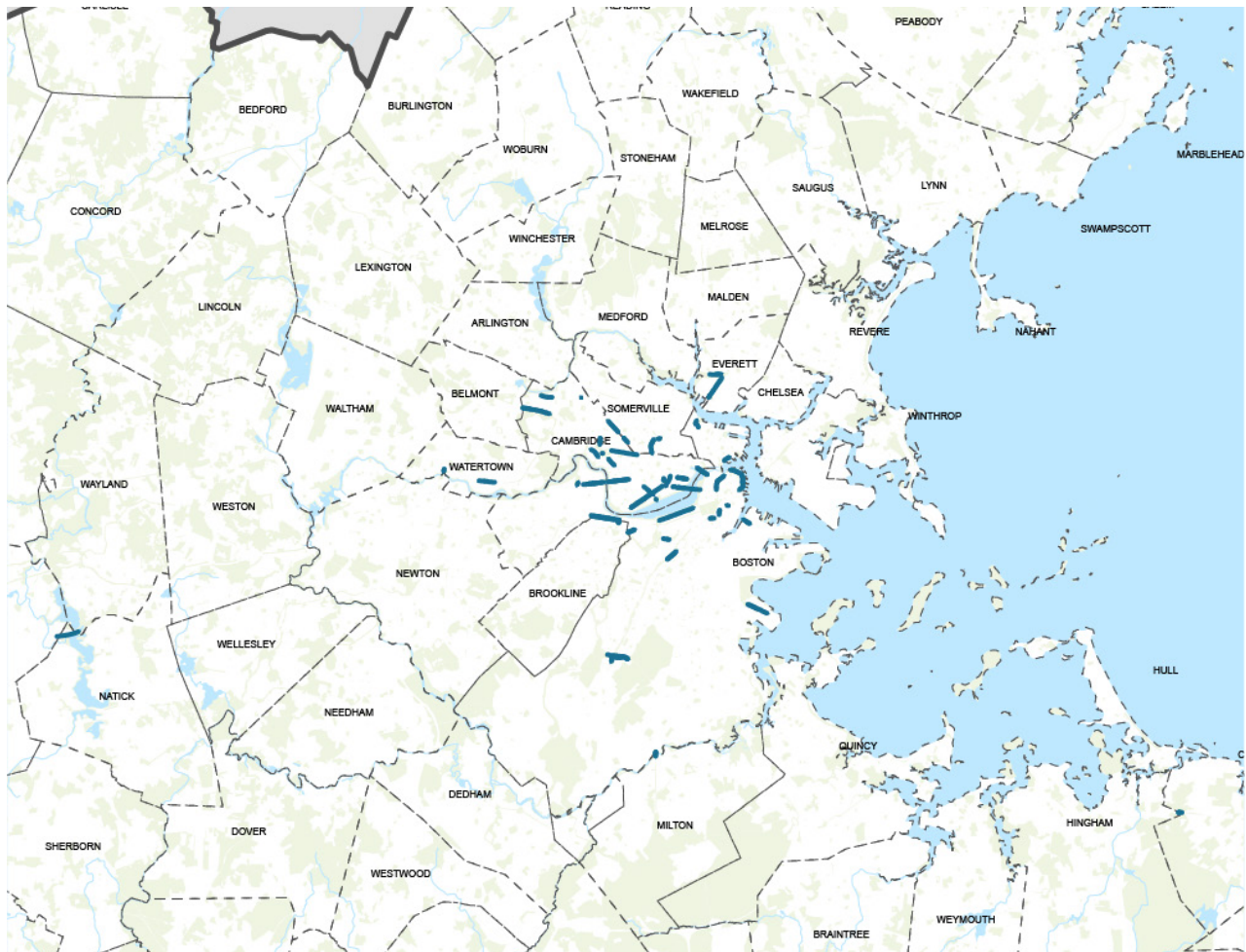
## BICYCLE LANES

# Protected Bike Lane Analysis

Currently, only 9 communities have installed protected bike lanes, most of which are in the inner core. These 9 cities are beginning to install more protected bike lanes when adequate space is available. We expect to see a sizable, continued increase in the use of protected bike lanes throughout the region.

Notably, the towns of Natick and Wayland partnered to install one of the first suburban protected bike lanes as part of MassDOT's Shared Streets program in 2020. Milton also installed a section of protected bike lanes.

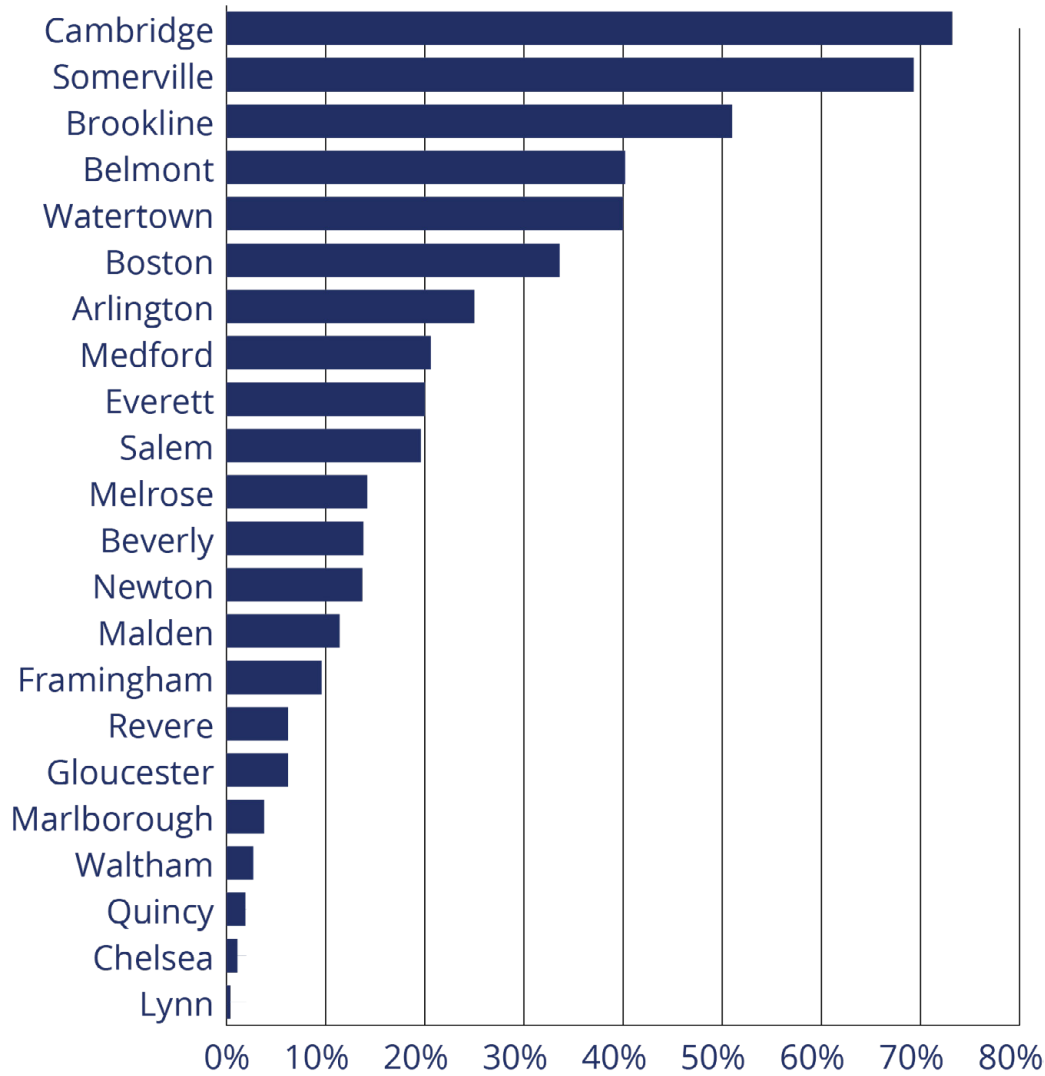
Protected bike lanes are becoming more common throughout the region as larger roadway projects have started to include protected bike lanes by default (per MassDOT guidelines). Alternatively, roadway sidepaths may be chosen over protected bike lanes, particularly in suburban areas. Both facility types serve the same purpose to protect vulnerable users.





## INNER CORE AND REGIONAL URBAN CENTERS

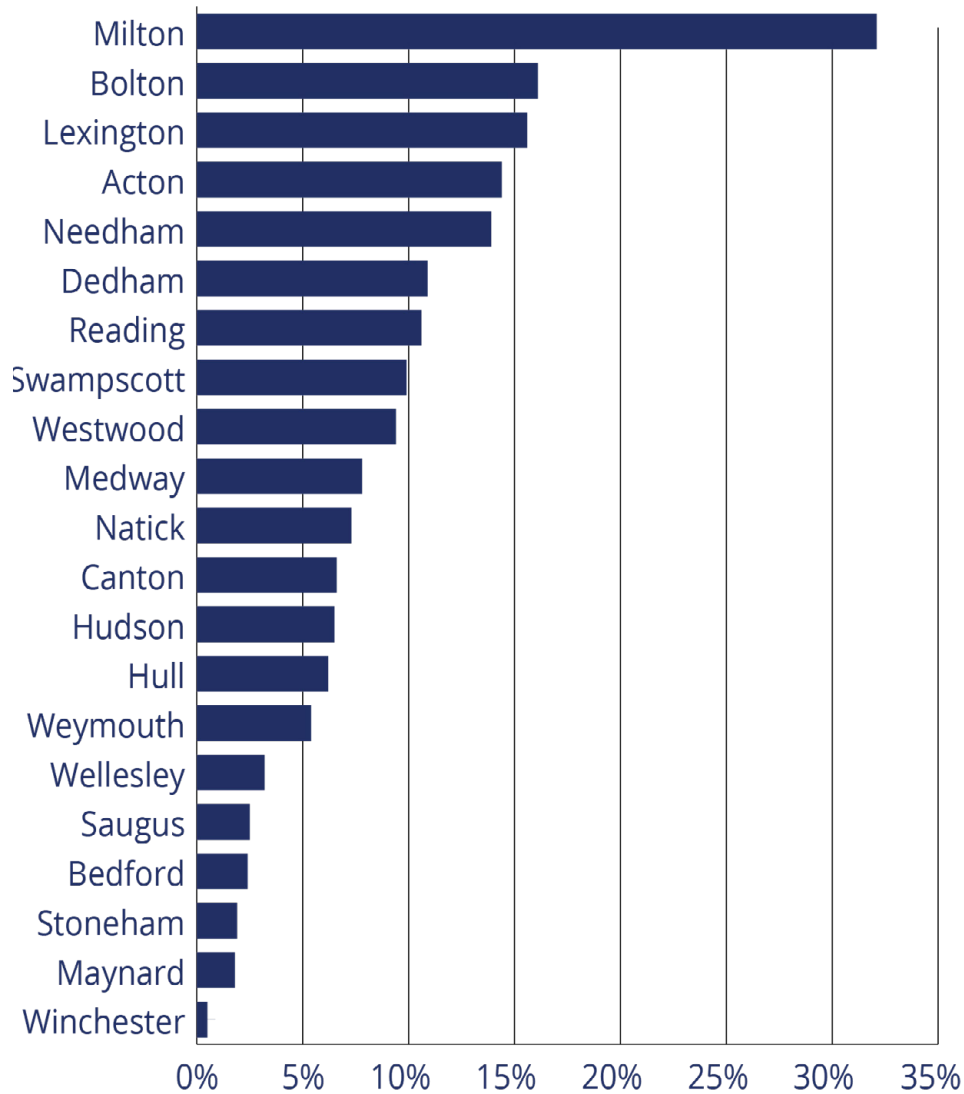
Existing Bike Lane Mileage/Arterial Street





## DEVELOPING AND EMERGING SUBURBS

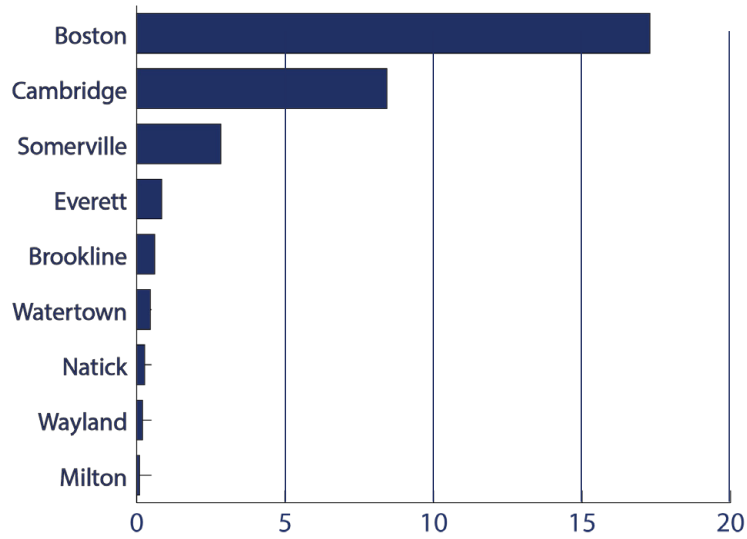
Existing Bike Lane Mileage/Arterial Street



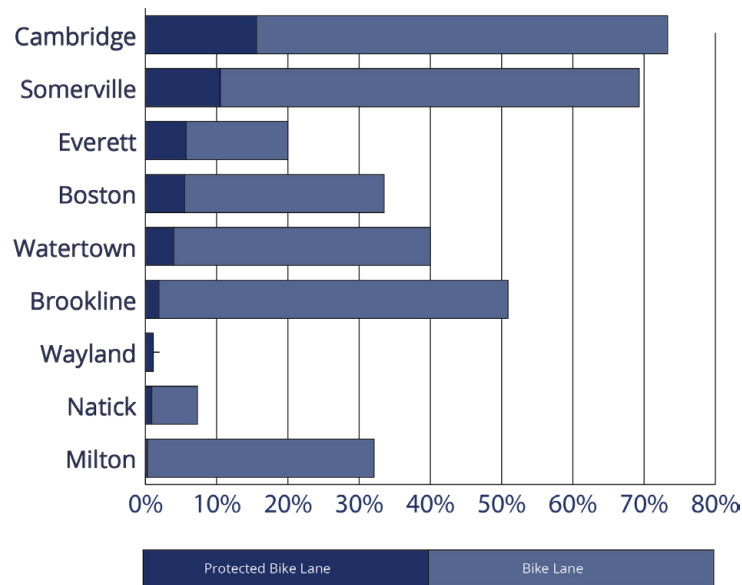


# BICYCLE LANES

## PROTECTED BIKE LANE MILEAGE



## BIKE LANES AND PROTECTED BIKE LANES PER ARTERIAL STREET MILE



# TRAIL INVENTORY

TRAILS, BIKEWAYS, & GREENWAYS



## FOOT TRAILS



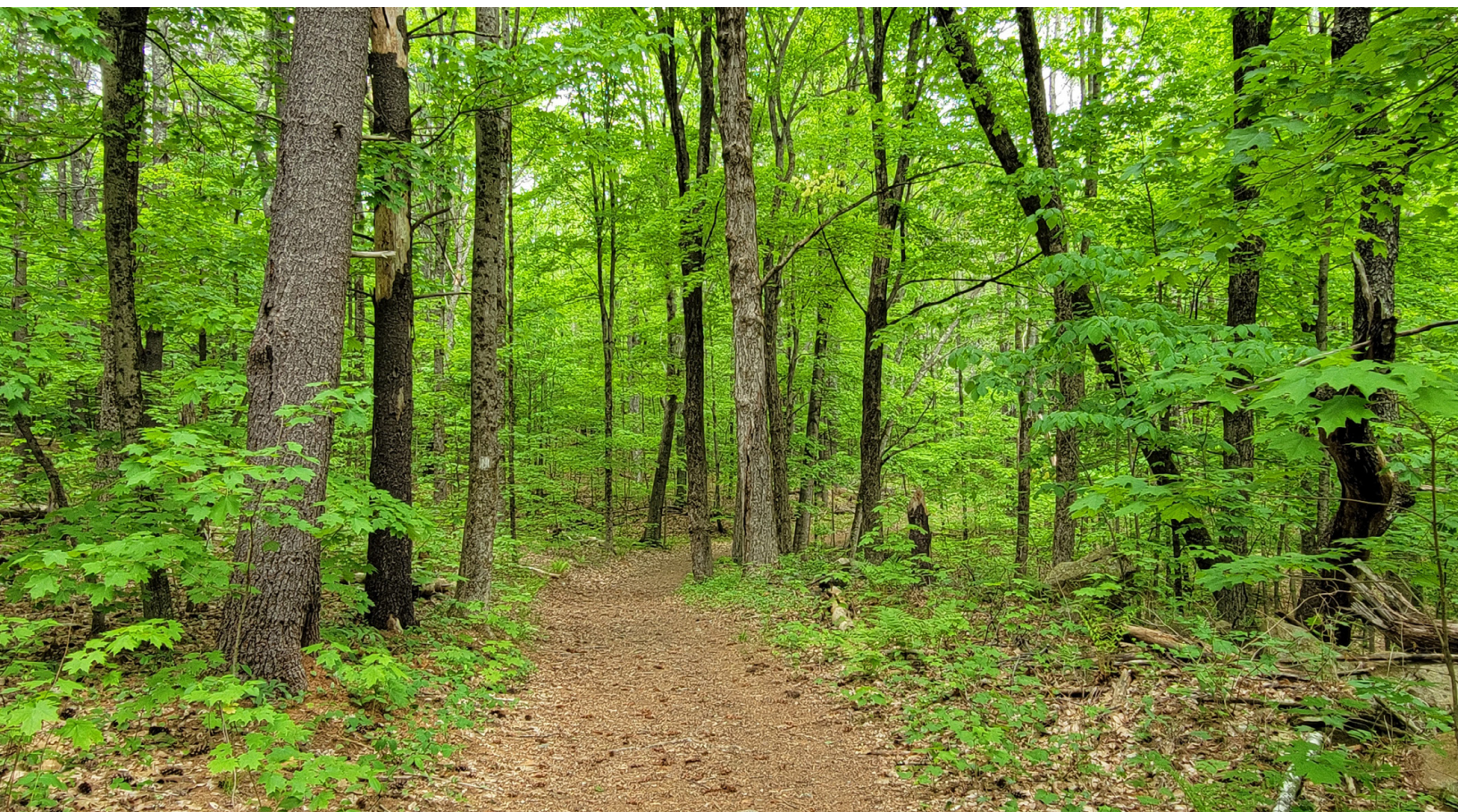
## FOOT TRAILS

The MAPC trail database includes a comprehensive collection of foot trails. Foot trails are developed primarily for walking and some segments may allow or attract users on bicycles, with strollers, or using wheelchairs where conditions permit.

The trails in this database are, for the most part, not within the road right-of-way. MassDOT maintains a sidewalk inventory within the roads database as part of its GIS program. MassDOT's data is not included in this report.

The foot trail database is organized as follows.

- **Natural surface trails.** Typically located in parks and other open spaces, as well as trail easements, and used by the general public.
- **Paved surface trails.** Trails with an applied hard surface, typically asphalt, concrete, or an accessible stone dust or similar material. These trails are generally designed to be accessible, though may have steep slopes. Paved trails that are 8 to 10 feet or wider are generally considered to be shared use paths (designed for cycling as well), and therefore included in the shared use path portion of this report. Paved surface trails are often located in urban parks and on school campuses.

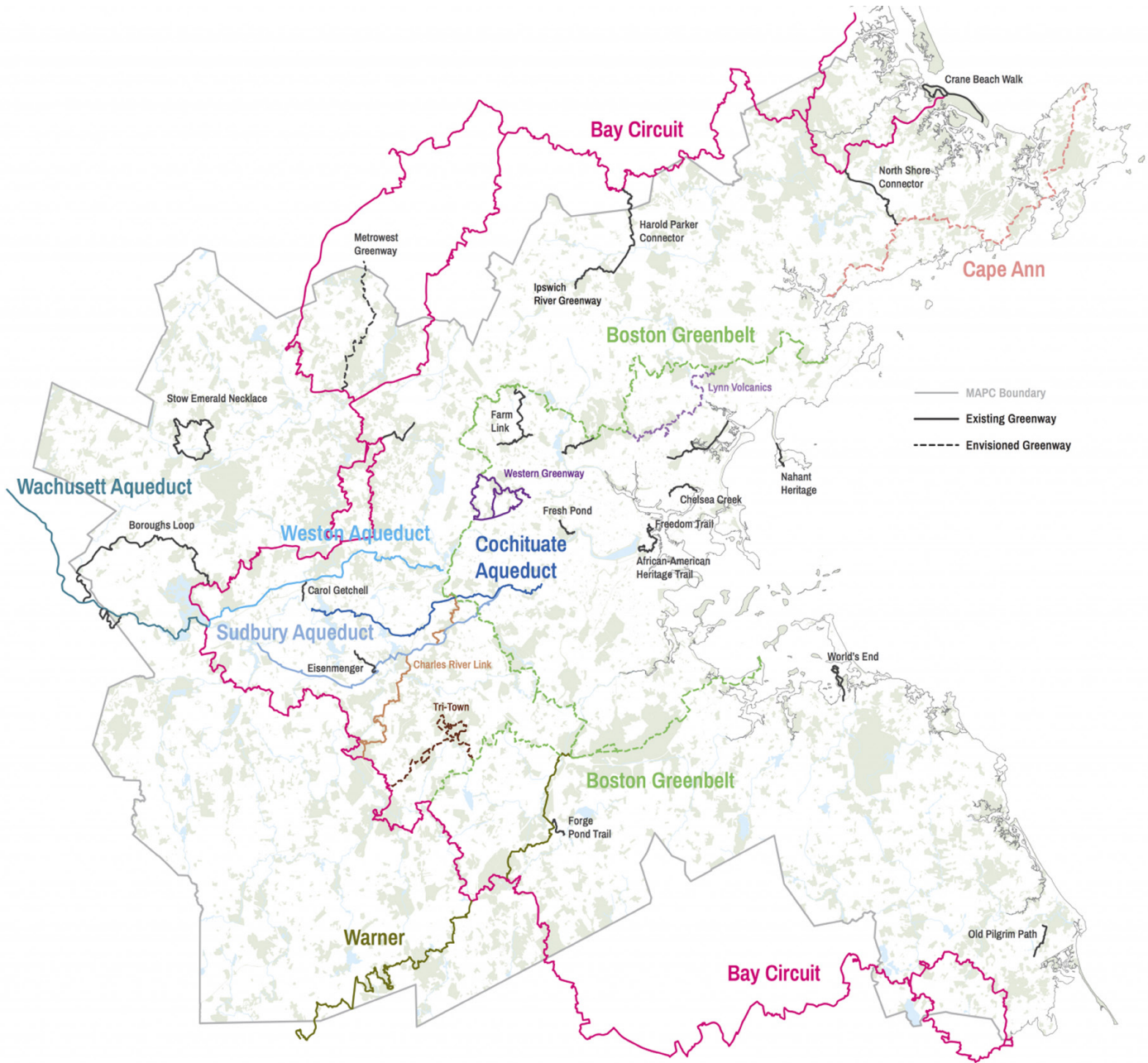


## FOOT TRAILS

# Analysis

For this analysis, we are aggregating the foot trails together and not distinguishing by surface type.

As part of the LandLine Vision Plan, MAPC developed a regional foot trail map as shown below. The plan includes well-established trails such as the 230+ mile Bay Circuit Trail, Warner Trail, and recently completed Boroughs Trail.



## FOOT TRAILS

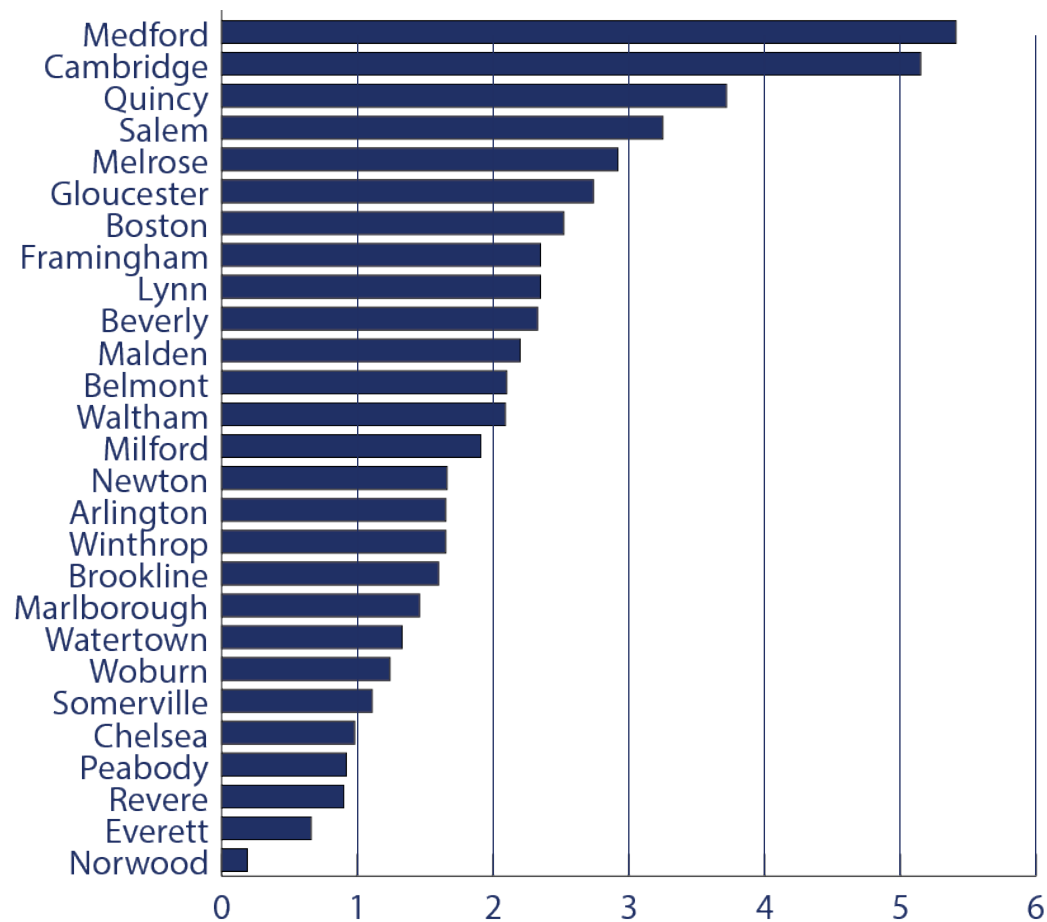
It also includes concepts for new trails, such as the Boston Greenbelt Trail, Cape Ann Trail, and a few others. Please contact MAPC to get involved in these efforts.

As with previous sections of this report, we tabulate foot trails by municipality. This is to show a relative ranking of trails by municipality. The output reflects the density of trails in a given municipality: the trail mileage divided by the municipality's square mileage.

The two graphs below show all communities in the MAPC region, separated roughly by the urban communities in one graph and the suburban communities in the other.

### INNER CORE AND REGIONAL URBAN CENTERS

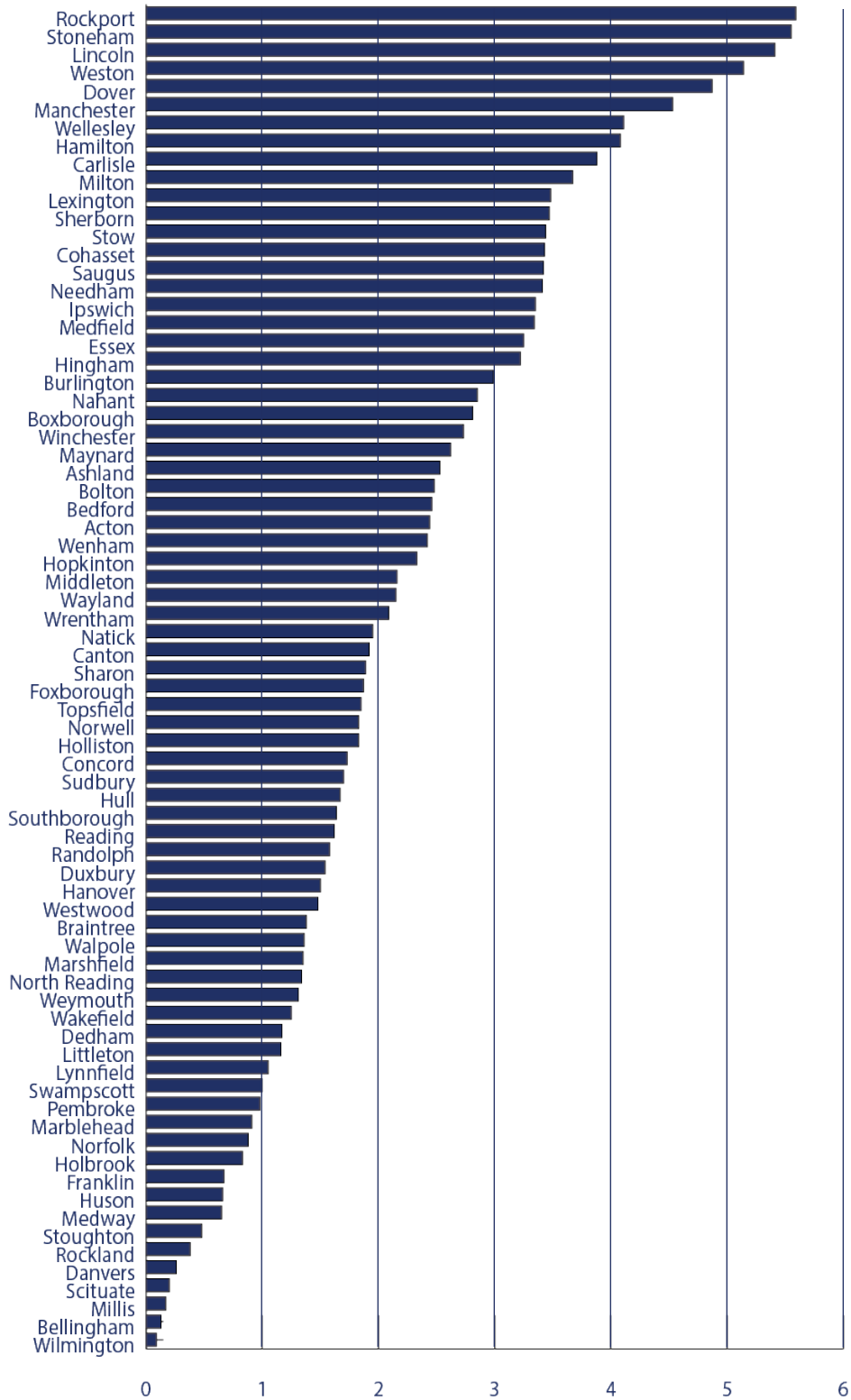
Foot Trail Mileage/Square Mile



# FOOT TRAILS

## MATURING SUBURBS AND DEVELOPING SUBURBS

Foot Trail Mileage/Square Mile



## FOOT TRAILS

Roughly 10% of all MAPC communities have greater than 4 miles of trails per square mile. Most of these communities have large regional parks in their communities:

- The large Middlesex Fells Reservation located in both Medford and Stoneham
- Blue Hills Reservation helps the rankings in Milton, Quincy, and Canton
- Cambridge scores particularly high due primarily to the large number of paved walkways through Harvard and MIT campuses.
- Lincoln, Weston, and Dover all have extensive town trail networks, as well as national or regional parklands. The low density and relative wealth of these communities have allowed for extensive open space protection.

More than 50% of all MAPC communities have between 2 and 4 miles of trails per square mile. Approximately 40% of all MAPC communities have less than 2 miles of trails per square mile.

- The cities of Chelsea, Revere, and Everett are fully built out urban communities with very limited opportunities for new trails. Access to open spaces and foot trails in these communities is best provided by developing and completing regional greenway (shared use path) corridors that connect to nearby open spaces.
  - Revere and Everett are home to the North Strand Trail (shared use path) which provides opportunities for connecting to regional open spaces. Connecting Chelsea to the regional trail network should be a priority for improved trail access.
  - Revere has over 3 miles of beachfront, offering extensive open space access. Opportunities for beach front walking are not factored into these results, but the city's boardwalk factors into the shared use path section of this report. We support a future effort to catalog all public beaches and categorize those as "beach trails."

Several communities at the bottom of the lists, including Bellingham, Wilmington, and Norwood, are suburban communities that are partially developed. These communities have not prioritized open space protection or trail development.

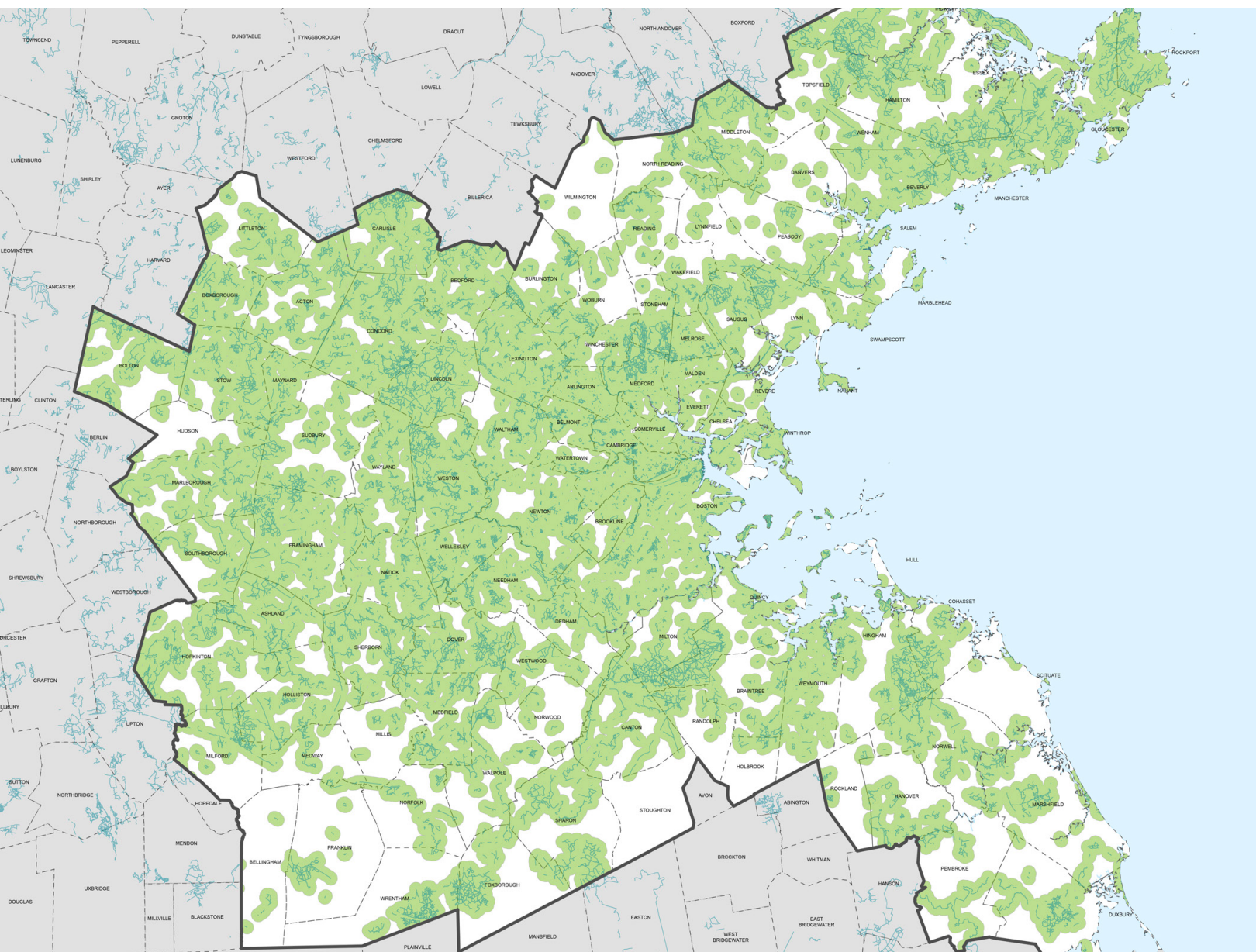
MAPC is in the process of developing the trail database and it should be noted that there may be some missing trails data for these communities.

## FOOT TRAILS

# Spatial Distribution of Foot Trails

The analysis above largely focuses on the density of foot trails in each community. Using spatial distribution, we also sought to identify how much of the population is within walking distance of a foot trail. Using GIS analysis, we formulated a map that shows 1/3 mile buffers from all foot trails.

As noted previously, foot trails include both hiking trails in larger conservation areas and paved paths through small city parks.





## FOOT TRAILS

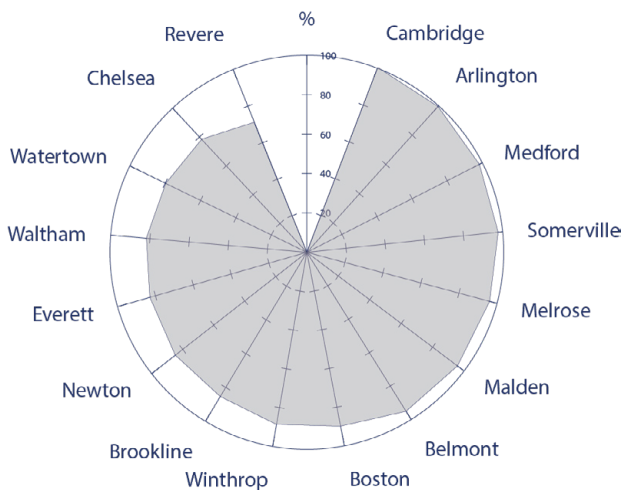
The visualizations below display the percent of the population that lives within a 1/3 mile distance of the nearest foot trail, sorted by community type.

We find that the inner core communities have by far the largest proportion of any community type within walking distance to a trail. These communities are also more likely to have a network with streets with sidewalks that access these trails.

The remaining communities have varied rates of accessibility to trails, within a 1/3 mile radius.

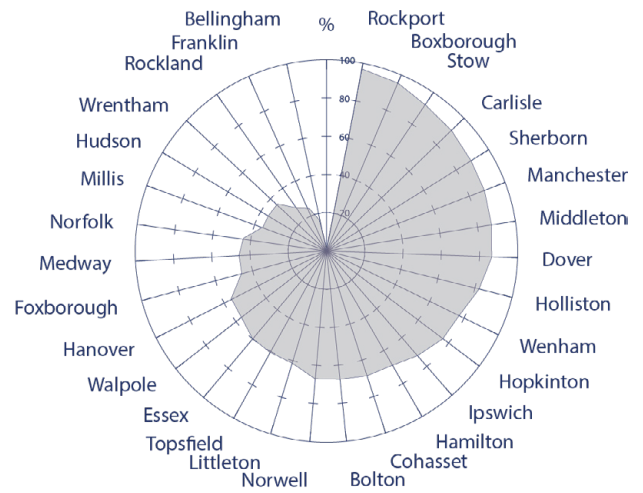
### INNER CORE

% of Area within 1/3 mile of Foot Trail



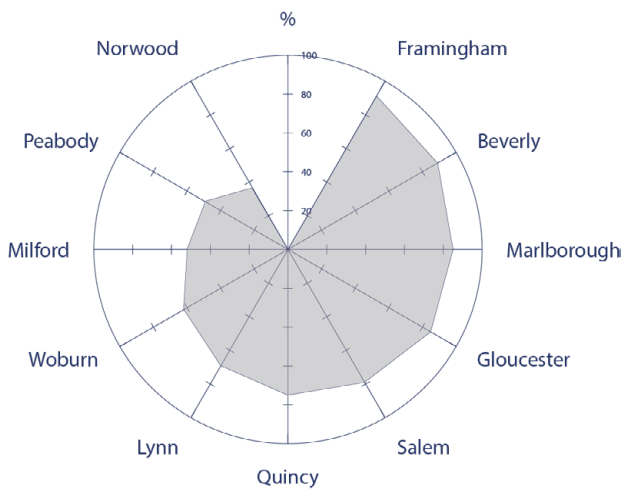
### DEVELOPING SUBURBS

% of Area within 1/3 mile of Foot Trail



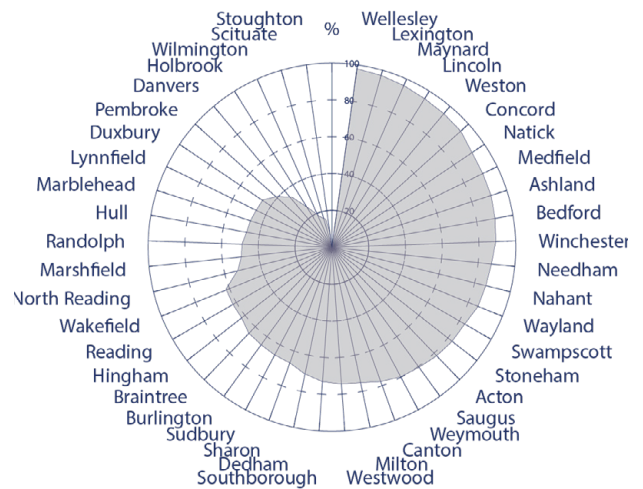
### REGIONAL URBAN CENTERS

% of Area within 1/3 mile of Foot Trail



### MATURING SUBURBS

% of Area within 1/3 mile of Foot Trail



# Conclusions

Our agency's goal is for our roadway network to be safe and accessible for all vulnerable users. The roadway network should be connected by a robust trail and greenway network through parks, river corridors, and rail corridors. We recommend bike lanes and sidewalks on every street with significant traffic and shared streets that are calmed for the safety and enjoyment of all users.

This report provides a picture of pedestrian and bicycle conditions in the year 2020. We aim to highlight how extensive and complete our infrastructure is. In the coming years, we plan to track the progress and concurrently encourage communities to prioritize creating safer streets for all.

Admittedly, the MAPC dataset is not perfect. Therefore, we encourage the communities and residents to reach out to us to provide additions, corrections, and feedback. Contributions from our region's municipalities will strengthen MAPC's Trailmap Database and help us work together to improve conditions across the Greater Boston region.

