Establishing a Baseline:
Using Geographic Information Systems to Understand Active Transportation and Health

nova scotia health authority

What is GIS?

Geographic Information Systems (GIS), is designed to capture, store, analyze, manage, and present spatial or geographic data, usually in the form of a map or data table. Spatial and location data can be used to show a variety of demographic, health, evaluation, and infrastructure information and trends. Examples are:

- Customizable maps
- Population density
- Income and age dispersion
- Health data trends
- Physical activity monitoring
- Connectivity
- Wayfinding systems
- Gaps in infrastructure and data
- Geospatial analyses
- Mapping and inventory
- Spatial change over time
- Investment areas
- Equity mapping and analyses
- Transportation mode share
- New, local data

Why use GIS?

GIS can communicate complex concepts by synthesizing information into a recognizable visual form. Spatial analysis can define priorities, identify network gaps, and create new local data. It supports informed decision making, measuring progress, justifying investment, and planning effectively using timely, local evidence.

When to use GIS?

GIS is a data analysis tool with a spatial component. It can produce maps, complete spatial analyses, and generate data tables. While often considered a “mapping tool” its strength is in its analytical and synthesizing capabilities. Many programs also include tools for organizing and managing data.

Who can use GIS?

While popular amongst policy makers and researchers in fields related to demographics, geography, planning, and engineering, GIS analysis is suited to a much broader audience, including the health sector. Anyone can gain the skills to work with GIS; online and commercial versions of GIS software provide meaningful, user-friendly, easily accessible teaching tutorials that cover everything from the basics to advanced spatial analyses. Alternate platforms such as Youtube also provide user guides and tips. As well, ask around your office network; many workplaces, particularly municipalities employ either GIS technicians or people with some GIS skills.

Where to get GIS software?

Companies have developed unique spatial data softwares, such as ESRI’s ArcGIS. These softwares can be purchased and allow users to easily manipulate, organize and maintain spatial data. However, multifaceted GIS programs are often very expensive. There are more cost-effective versions of GIS software available online, such as ArcOnline or QGIS, including some free options. While the free or lower cost options do not have the full range of tools and functions, they are a great place to start developing skills and exploring the potential of GIS.

How to use GIS for Active Transportation and Health Projects

GIS’ capability to inform decision making, justify investment, and identify infrastructure gaps makes it an invaluable tool to understand and improve health and physical activity within communities. Features such as sidewalks, multi-use pathways, roadways, trails, and bike networks, as well as their level of accessibility, connectivity, and quality can all be captured and stored in a GIS. This data can then be manipulated into maps, data tables, and info-graphics. As an AT network grows, GIS can be used to optimize infrastructure placement, capture new local data, plan for the equitable dispersion of resources, and monitor trends.

Case Study:
Halifax's Regional Centre AAA Bike Network

Halifax is currently implementing its Integrated Mobility Plan's All Ages & Abilities (AAA) Bike Network in the Regional Centre. This network will increase the accessibility, length, and connectivity of the existing bike system. To illustrate the potential of GIS, Public Health, Central Zone conducted example analyses to assess how the proposed network improvements will impact people's ability to access healthy infrastructure.

Process & Analyses Examples

The difference in area located within 400m of the existing (Figure 1) and proposed AAA (Figure 2) bike networks in the Regional Centre is illustrated below. These figures were created by linking the existing and proposed bike network infrastructure data with the GIS buffer analysis tool to create a new '400m coverage' data layer. This initial analysis, i.e. network coverage, was then linked with other data, such as population, to conduct further analyses and visually identify network gaps. Other communities can conduct similar analyses to assess their AT networks and inform future planning and investment decisions.

Population

The Regional Centre has a population of approximately 98,800. With the proposed network changes, 27% more residents will live within 400m of the AAA Bike Network than the Existing Bike Network (85% vs. 58%).

Connectivity

Figure 1 contains isolated network segments under 250m which are not conducive to a safe and connected bike network. These are addressed in the AAA network. Further analyses could consider network connectivity to community amenities and services.

Future Investment

Figure 2 shows network gaps in three residential areas. These gaps were then linked to housing data (residential units) to help identify future investment priorities.

1. West End Halifax (916)
2. Crichton Park (1,830
3. Southdale (2,793)

Figure 1: Existing Bike Network Coverage

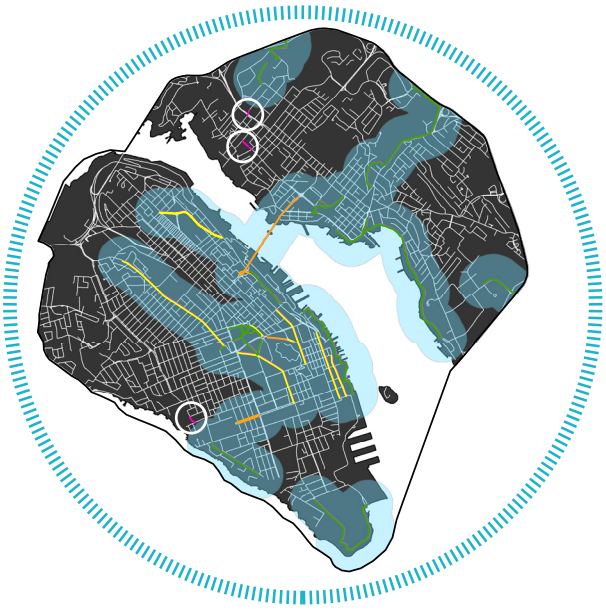
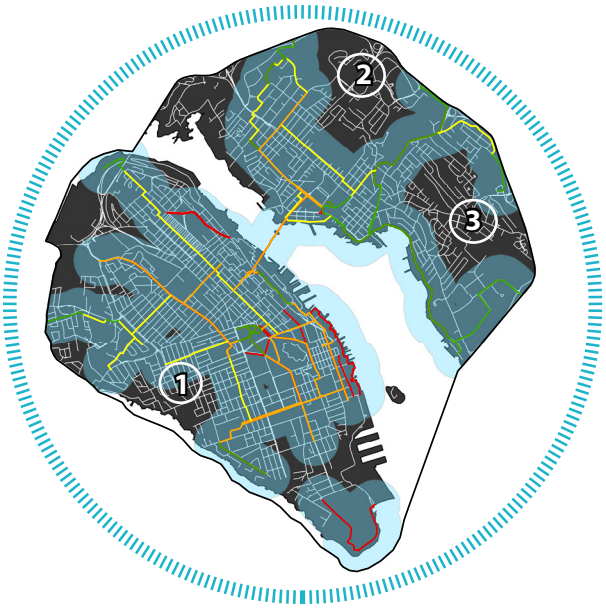


Figure 2: AAA Bike Network Coverage



Multi-use Pathway
Local Street Bikeway
Protected Bikeway
400m (5 Minute Walk)
Regional Centre Boundary
Segments of Existing Network under 250m
Non-AAA Bikeways

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