RAVINE XING

A LANDSCAPE CONNECTIVITY PLAN FOR TORONTO'S RAVINE SYSTEM

MAPPING BOOKLET

RAVINE XING:
A LANDSCAPE CONNECTIVITY PLAN FOR TORONTO'S RAVINE SYSTEM

PL8110: Advanced Planning Studio
School of Urban and Regional Planning
Ryerson University

Prepared for: City of Toronto

Prepared by: Christina Borowiec
Laura Brown
Teresa Liu
Grant Mason
Sean Nash
Ashley Varajão

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With special thanks to Jane Welsh, Jane Weninger and Garth Armour from the City of Toronto. We also appreciate the support of our mentors Mark Schollen of Schollen & Company; Arlen Leeming and Namrata Shretha from the Toronto and Regional Conservation Authority; Jennifer Kowalski, Kelly Snow and Matt Armstrong from the City of Toronto; Kelsey Blackwell of Studio Blackwell; and David Curruthers from PlanLab Ltd.

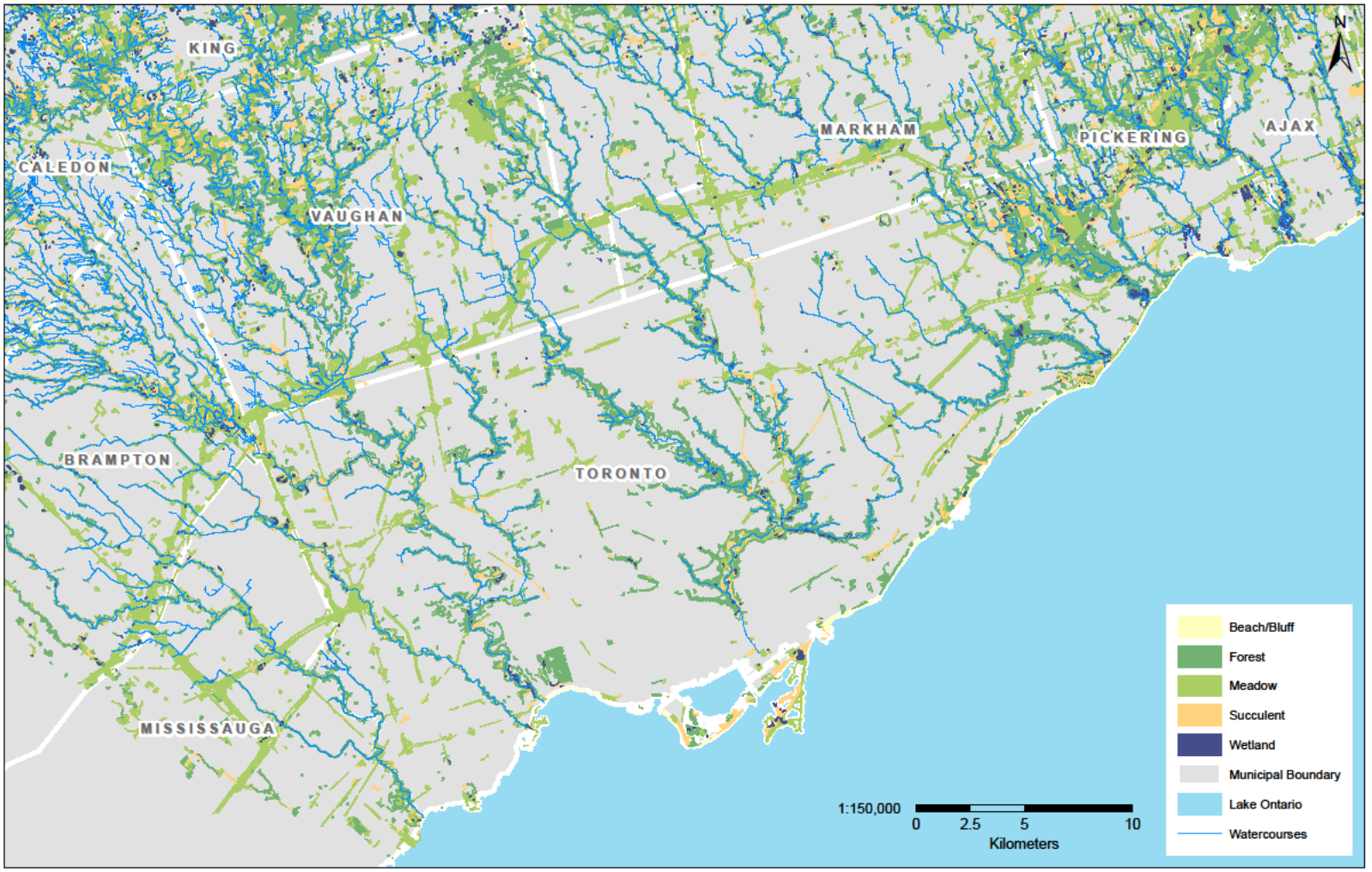
April 2017

REGIONAL MAPS

DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

REGIONAL WATERCOURSES

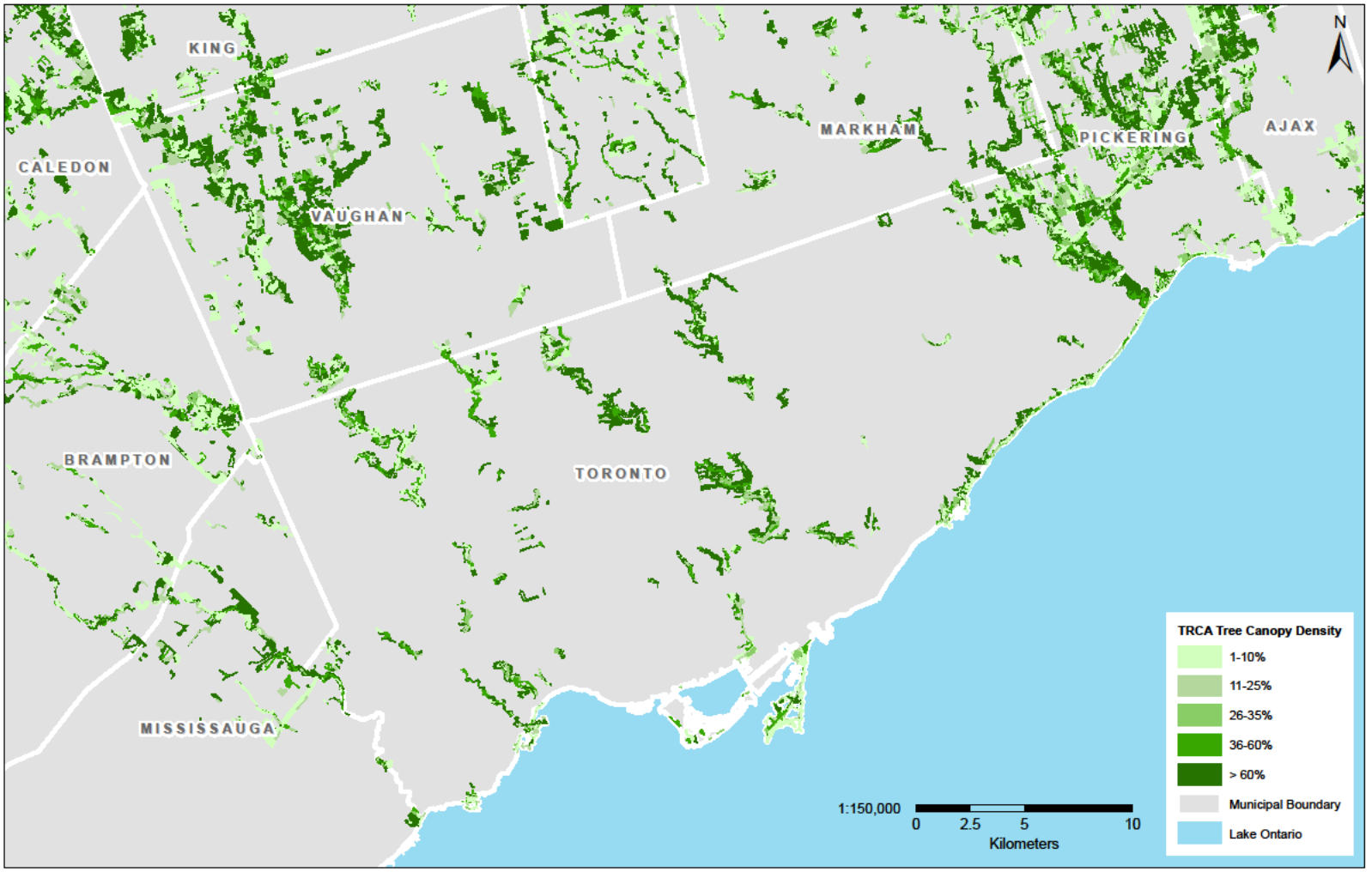
Flowing into Lake Ontario, a vast system of ravines, rivers, creeks, and streams have carved their way through the landscape over thousands of years. Although many of these watercourses have been buried and hidden beneath the rapid development of the urban grid in the Greater Toronto Area (GTA), they remain vital to the region's ecological and hydrological services.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

NATURAL COVER

Consisting of beaches and bluffs, forests, meadows, succulents, and wetlands, the region provides a diverse range of habitats for flora, fauna, and humans alike. With a variety of different soils, hydrological, and topographic conditions across the landscape, the particular requirements for individual species can be supported.

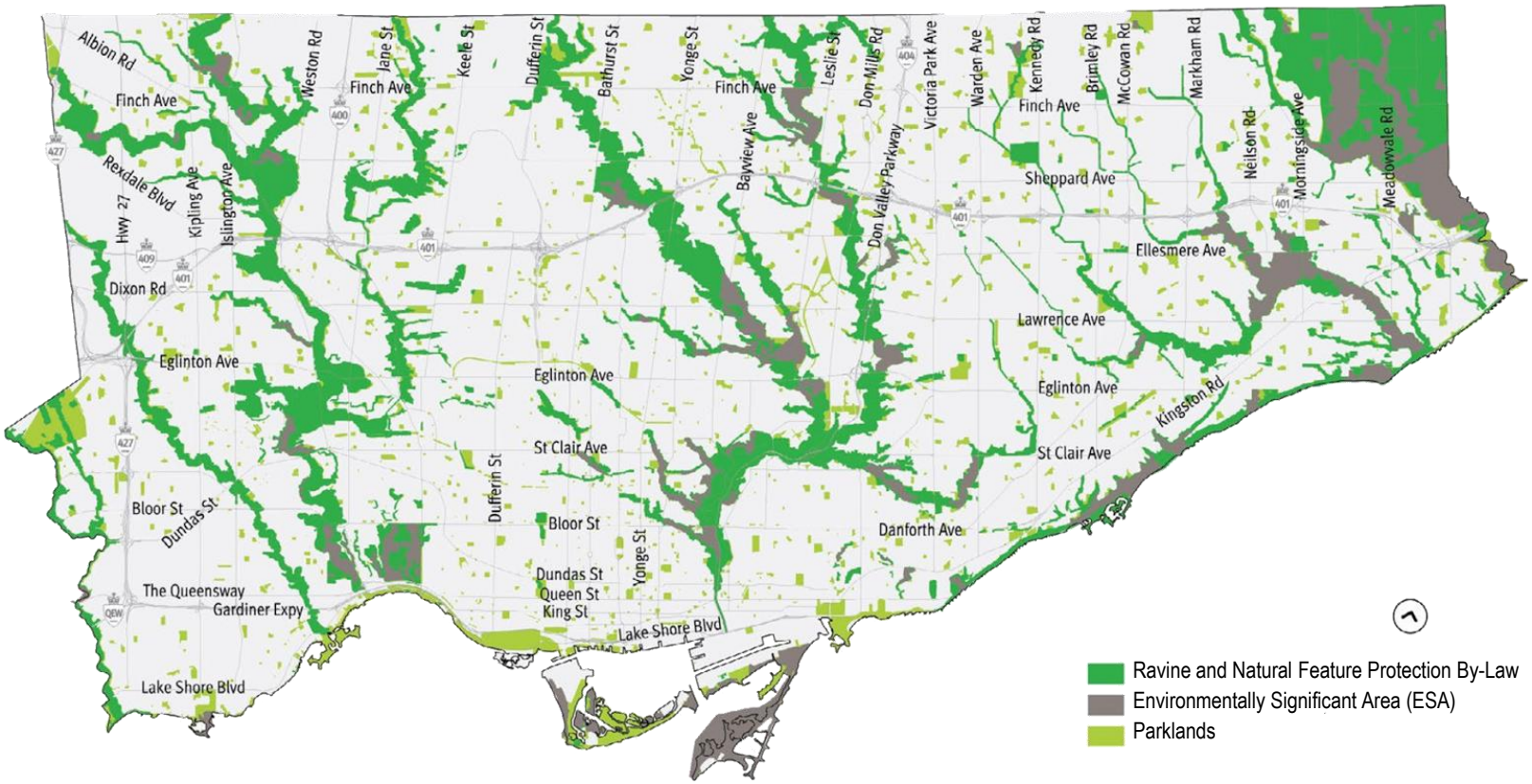


DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

TRCA TREE CANOPY DENSITY

Canopy density, a measure of how open or closed the tree crown is, affects the health and wellbeing of vegetation and wildlife communities. In addition to providing a habitat for several terrestrial and bird species, tree canopies improve air quality by producing oxygen and absorbing carbon dioxide and other airborne particulates, such as sulfur dioxide.

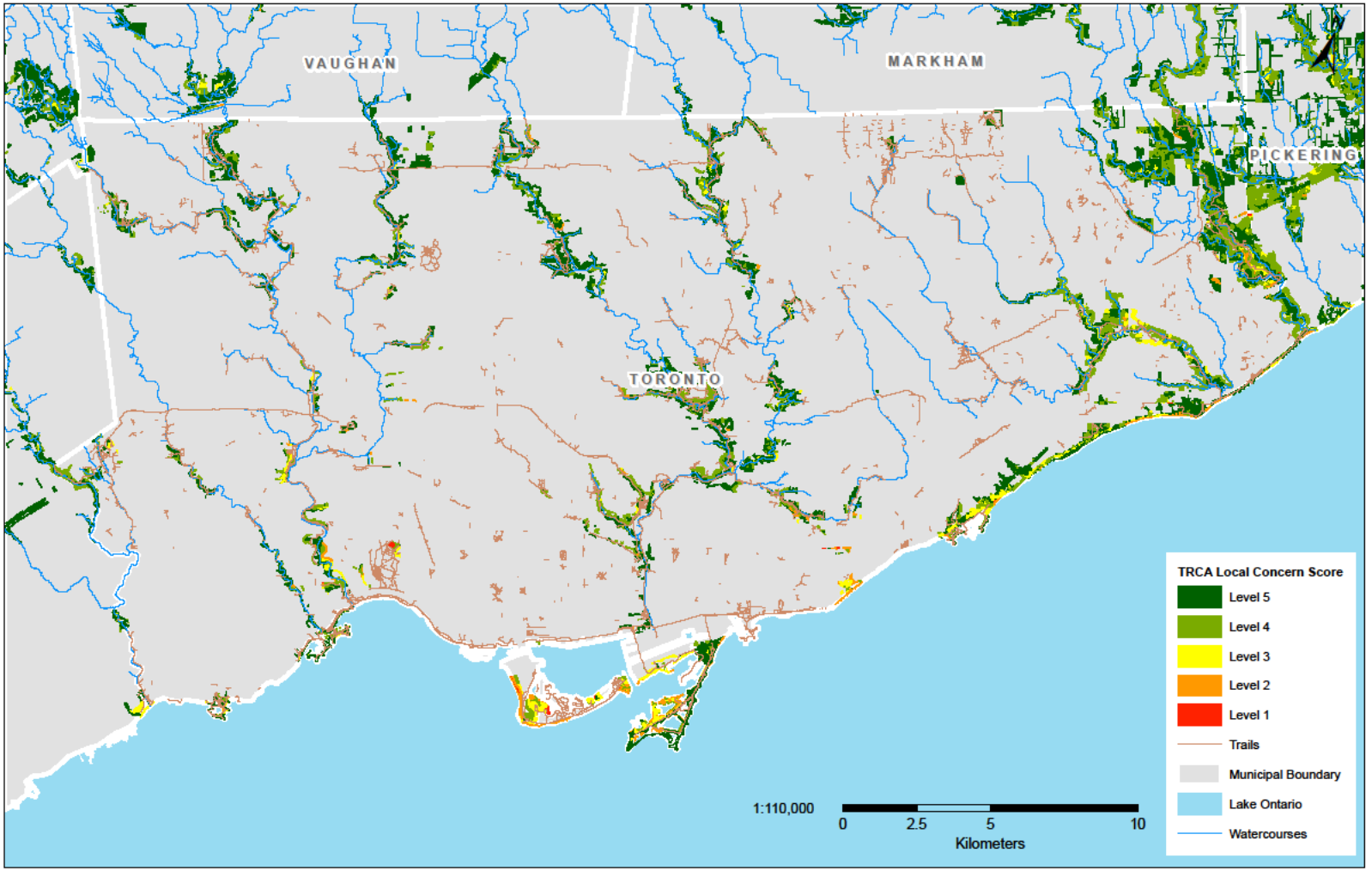
CITY OF TORONTO MAPS



DATA SOURCES: City of Toronto, 2017

RAVINES, ESAs, & GREENSPACE

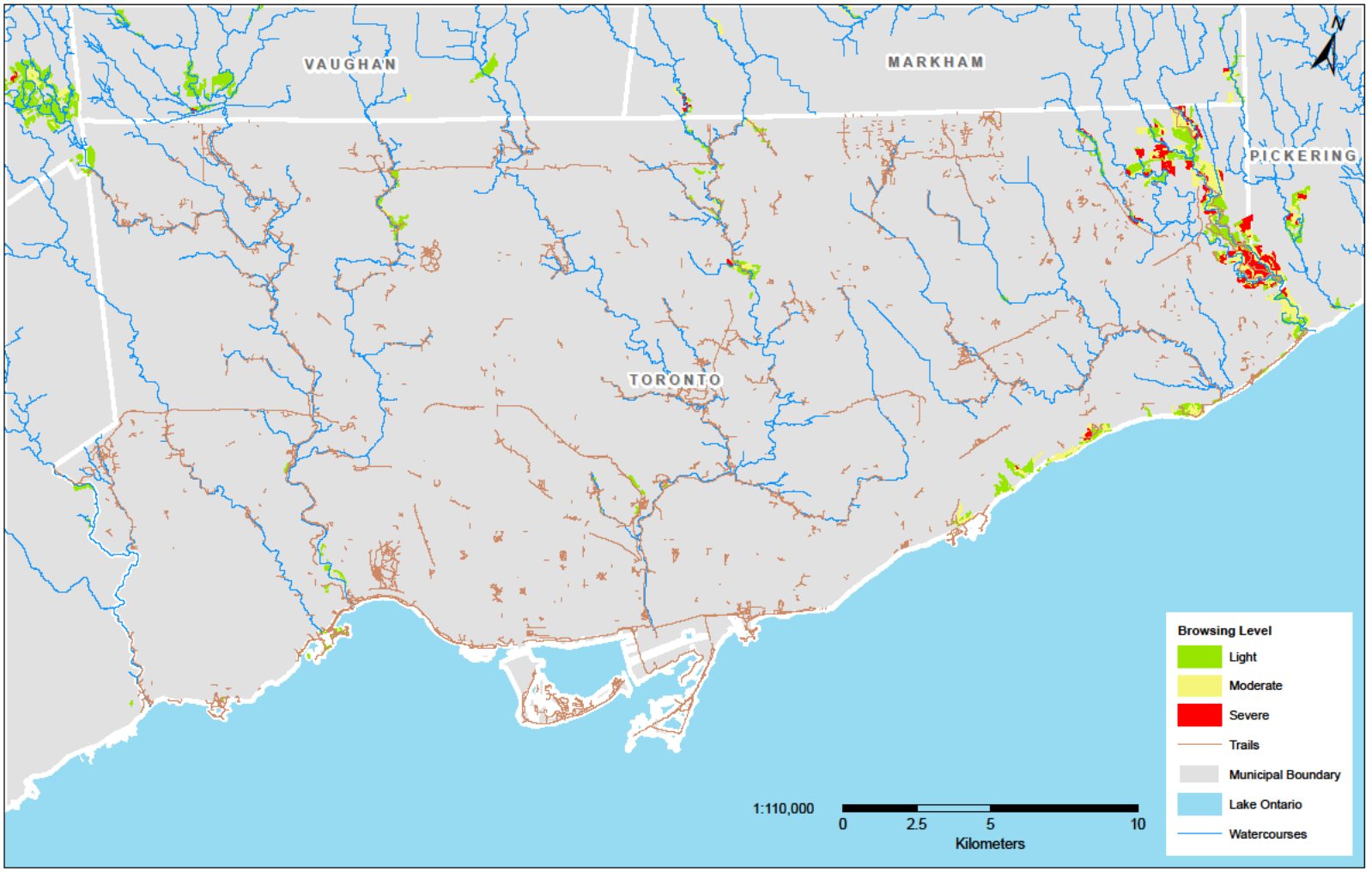
No other city in the world has a ravine network as extensive and integrated as Toronto's, which boasts over 10,500 hectares of green space and wilderness. The ravine system, which covers 17% of Toronto's total land area, is protected by the Ravine and Natural Feature Protection By-Law and includes nearly 87% of the city's ESAs within it.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

TRCA LOCAL CONCERN SCORE

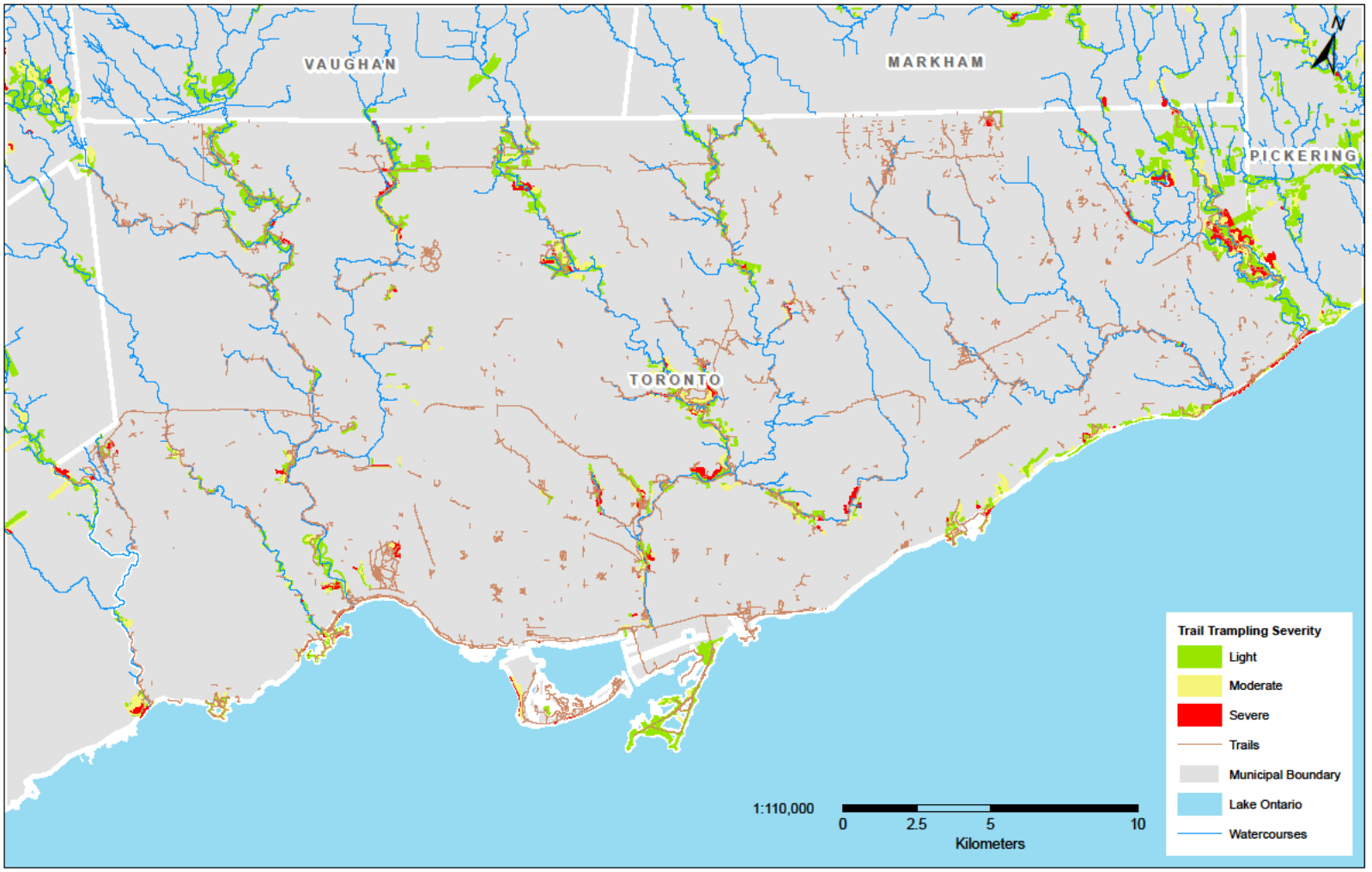
The score provides insight to species sensitivity to agricultural and urban developments and loss of habitat. A lower rank indicates a higher conservation priority, as species in the area are unable to withstand disturbances and are unsecure in the natural matrix. For example, Level 4s include flora and fauna which are generally secure in rural matrixes but not in urban developments. Level 1s are generally located in high-quality natural areas which are of regional concern due to the high dependency of wildlife on their habitat and need for special nest site requirements.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

BROWSING LEVEL

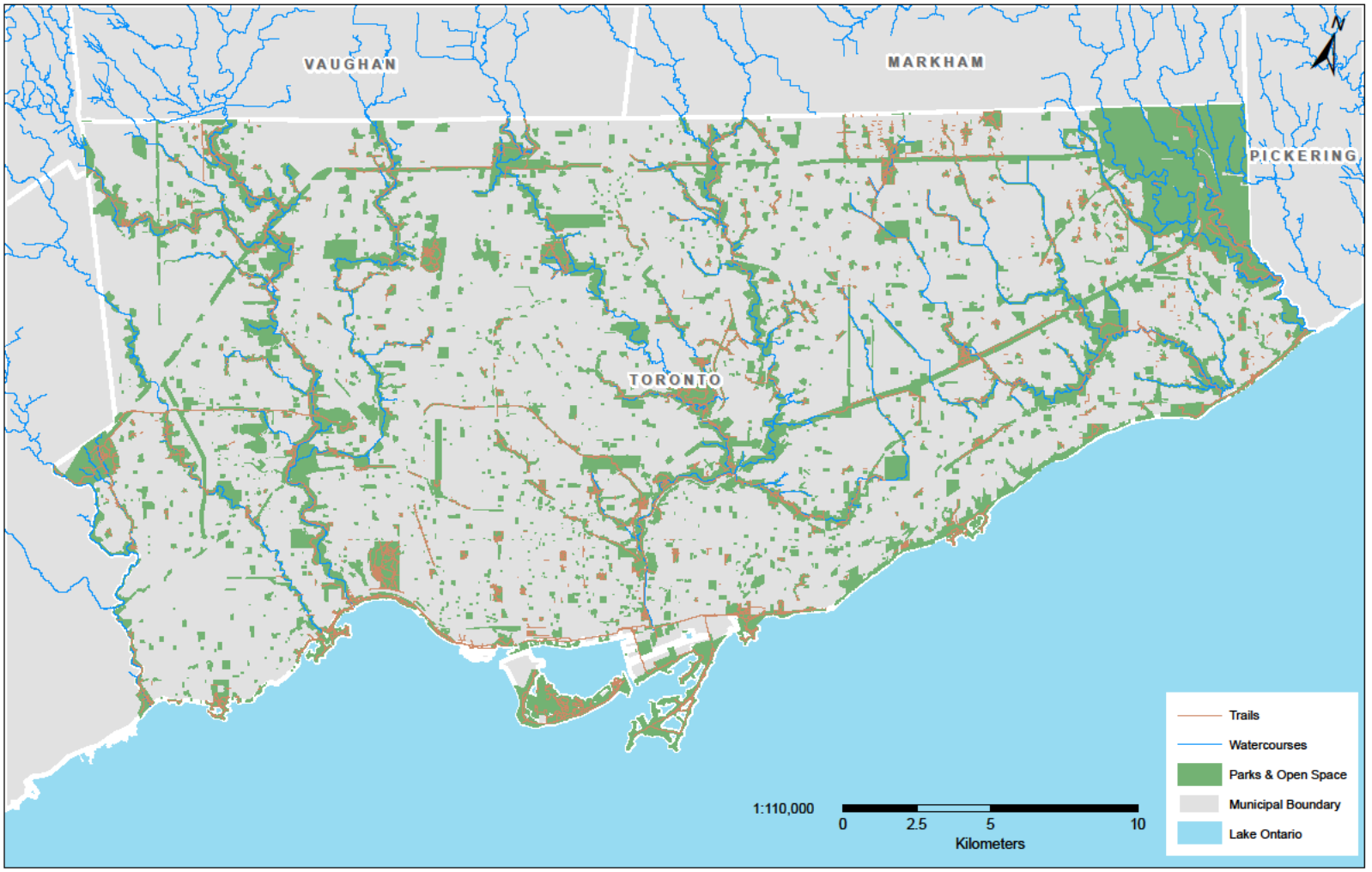
The browsing level indicates the presence of herbivory from non-domesticated fauna such as deer and geese. Browsing is different from grazing (which indicates the presence of herbivory from cattle and other livestock) in that it reveals natural areas which need to be preserved as a significant migratory destination and food source for wildlife.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

TRAIL TRAMPLING SEVERITY

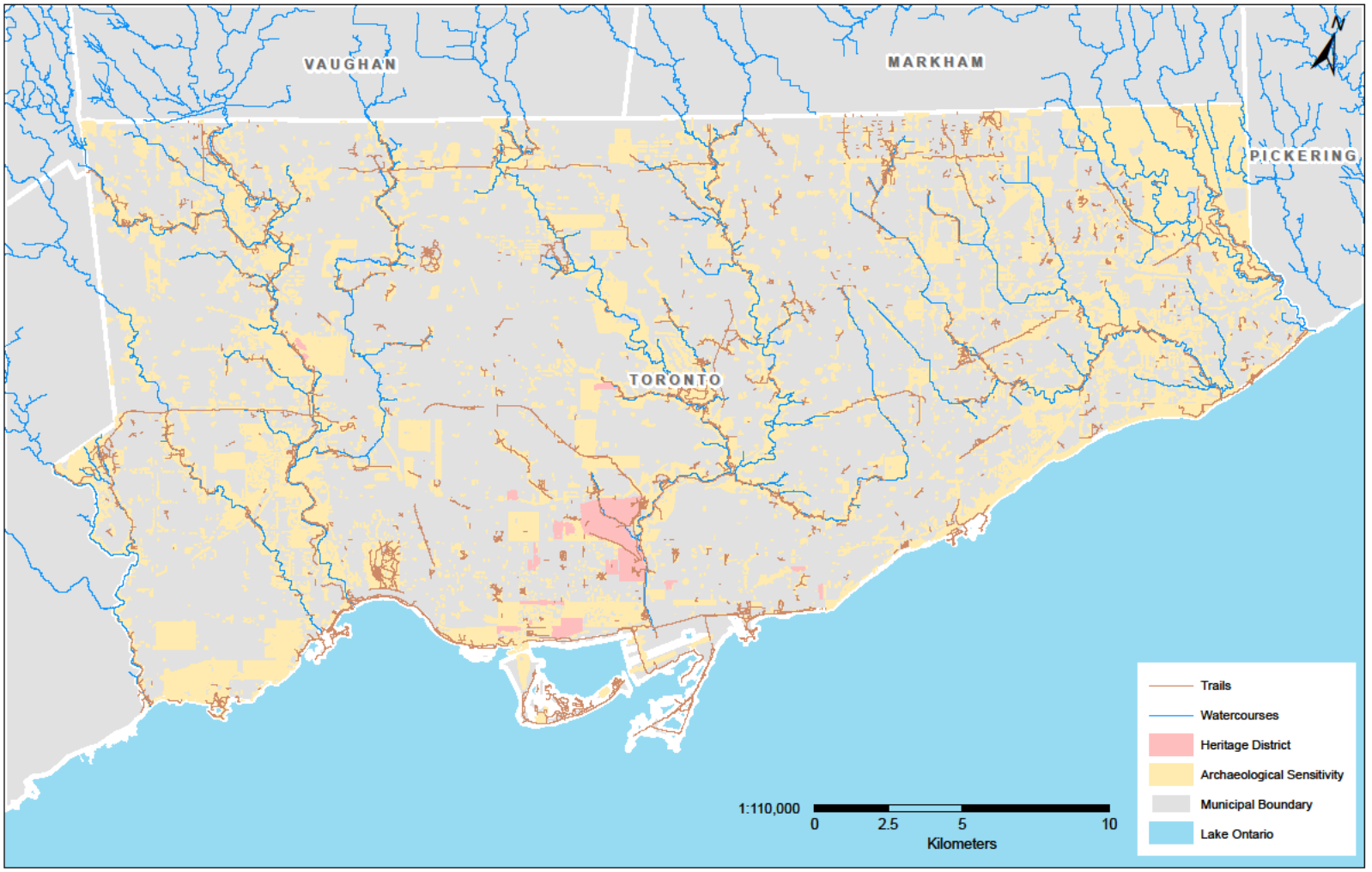
Trail trampling leads to soil compaction and the removal of leaf litter and ground flora. Sensitive species cannot tolerate exposure to compaction due to delicate root systems, wherein one set of leaves is often produced per growing season. Trails of severe trampling should be rerouted or closed periodically throughout the year to protect and improve the health of sensitive species.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

TRAILS, PARKS, AND OPEN SPACE

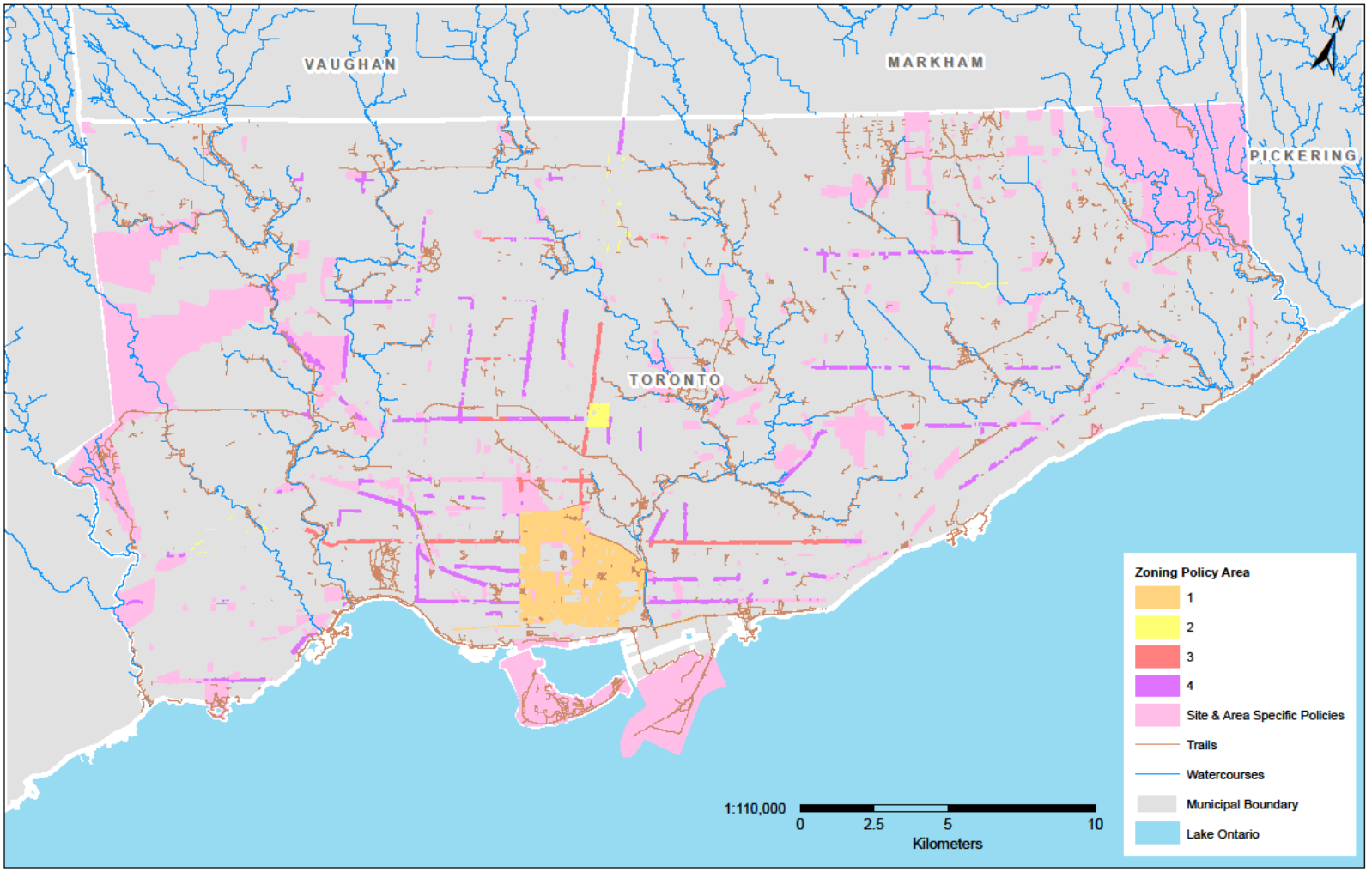
The City of Toronto consists of over 1,500 parks and open spaces, with nearly 600 km of trails. As the city continues to grow and intensify, greenspace is secured through development agreements and new trails are added to the system. In total, the parks system covers 8,000 hectares, equivalent to about 13% of the city's land area.



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

ARCHAEOLOGICAL POTENTIAL & HERITAGE

The City of Toronto has a rich cultural heritage that is protected and maintained with pride by residents. Areas of potential archaeological interest are located throughout the city, many of which mirror the trajectory of the ravines, and heritage conservation districts are concentrated in the downtown, where the foundations of the city were built. The districts reflect the cultural heritage values if the city and serve to ensure historically significant areas are protected.

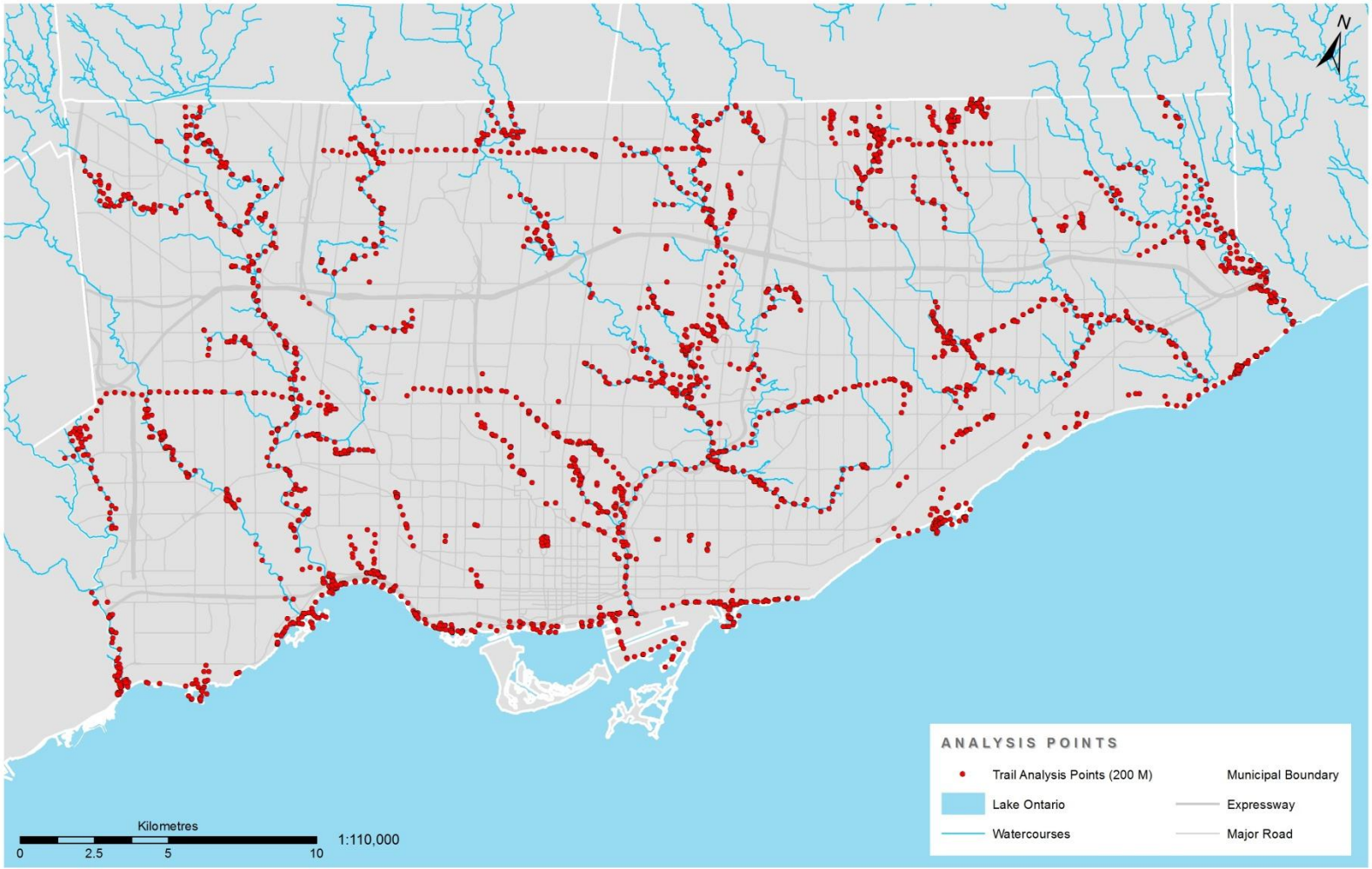


DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

POLICIES

A review of zoning policy areas and site and area specific policies in the City of Toronto reveal a desire to protect and conserve environmentally significant areas. Previous maps revealed areas of local concern and where species are most sensitive to habitat loss as they are unable to withstand the impacts of urban development. Many of these areas are protected through policy.

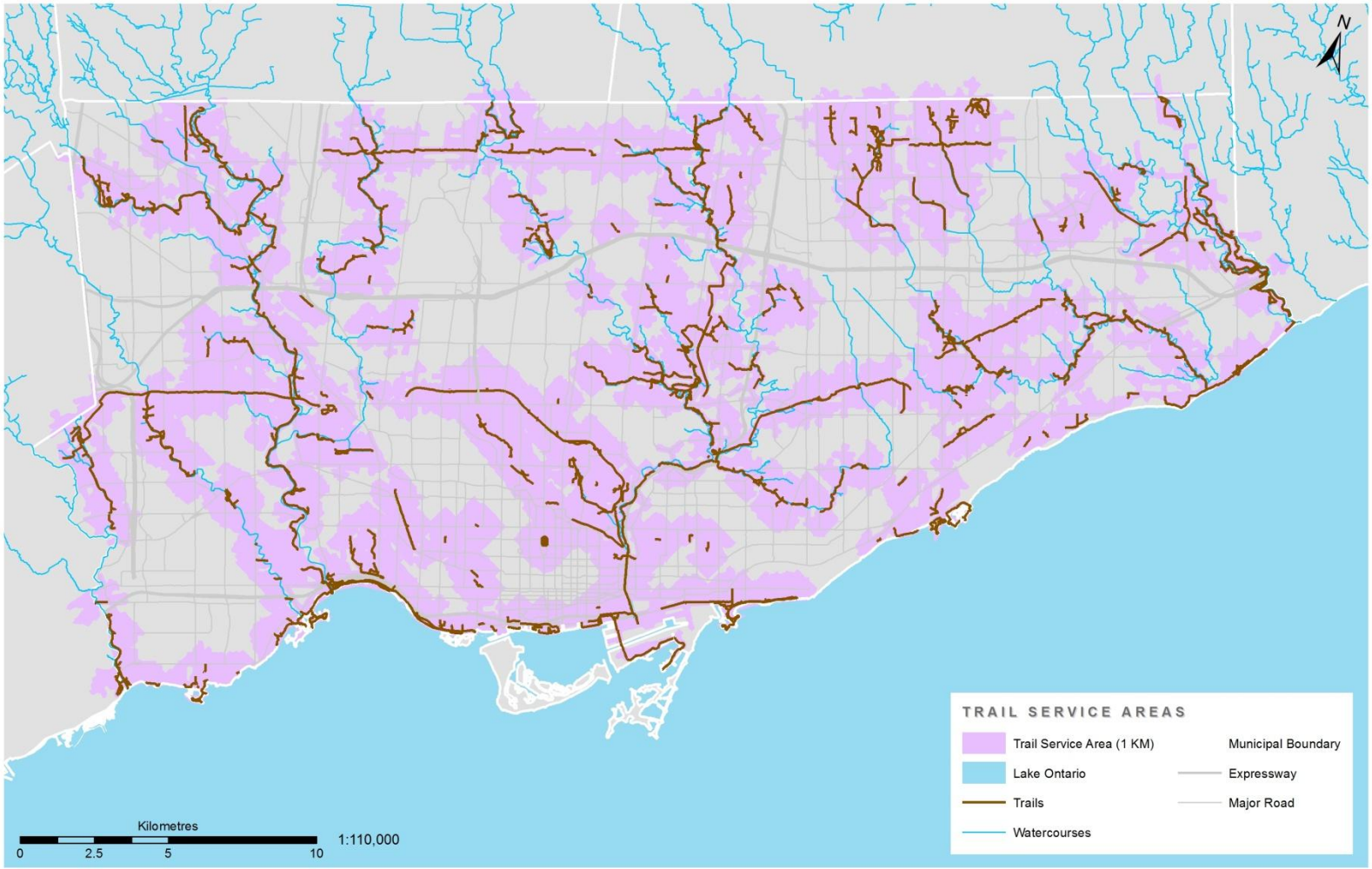
SYSTEM-WIDE MAPPING ANALYSIS



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

ANALYSIS POINTS

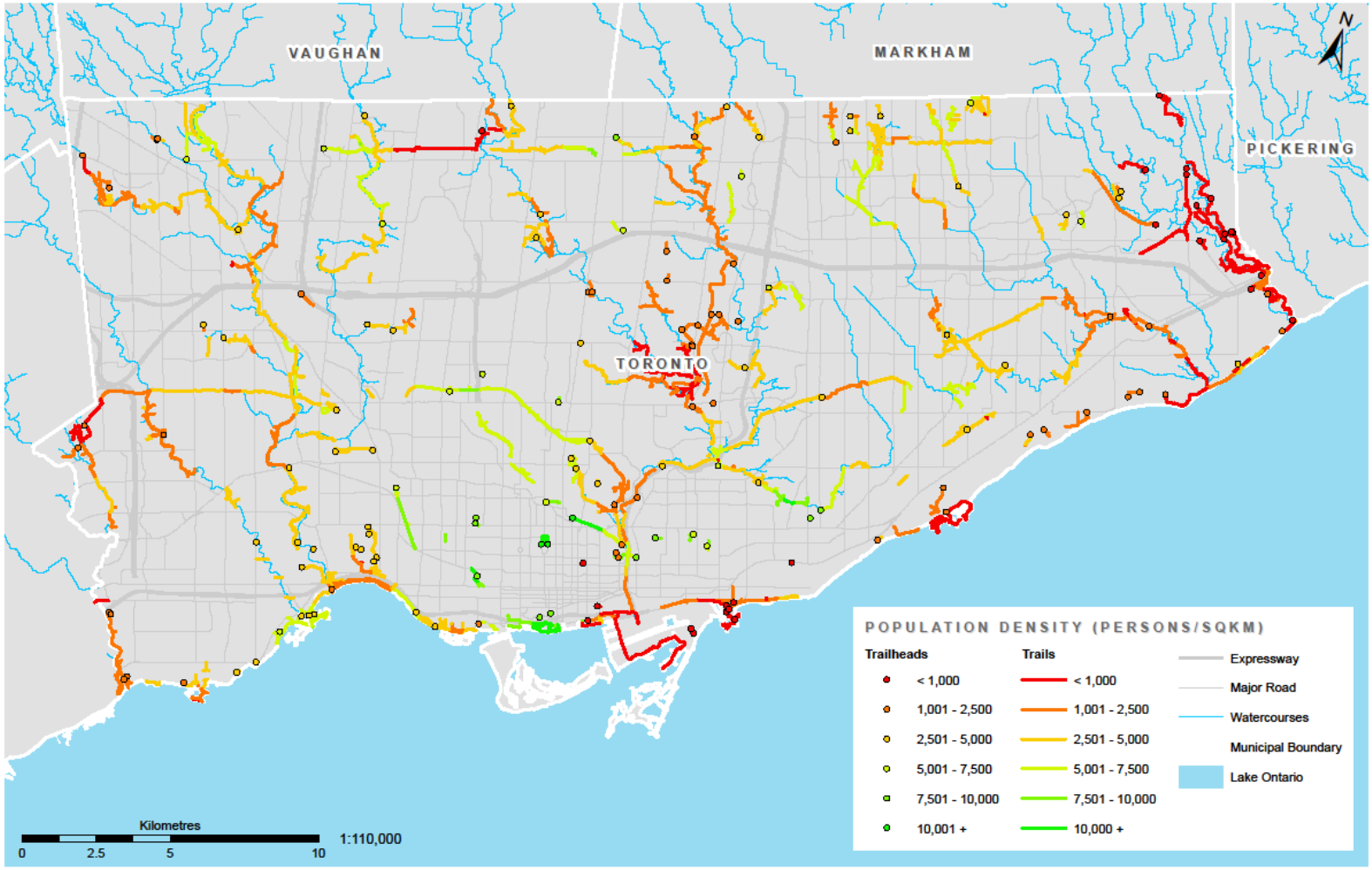
The Ravine Xing studio conducted a system-wide mapping analysis of the City of Toronto to identify areas in need of investment to improve human and ecological connections. Using the methods of studies conducted in the United States as a guide, latent trail demand was estimated. The first step in this analysis was the creation of analysis points along the existing trail network. The points were created at 200 m intervals (network distance).



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

TRAIL SERVICE AREAS

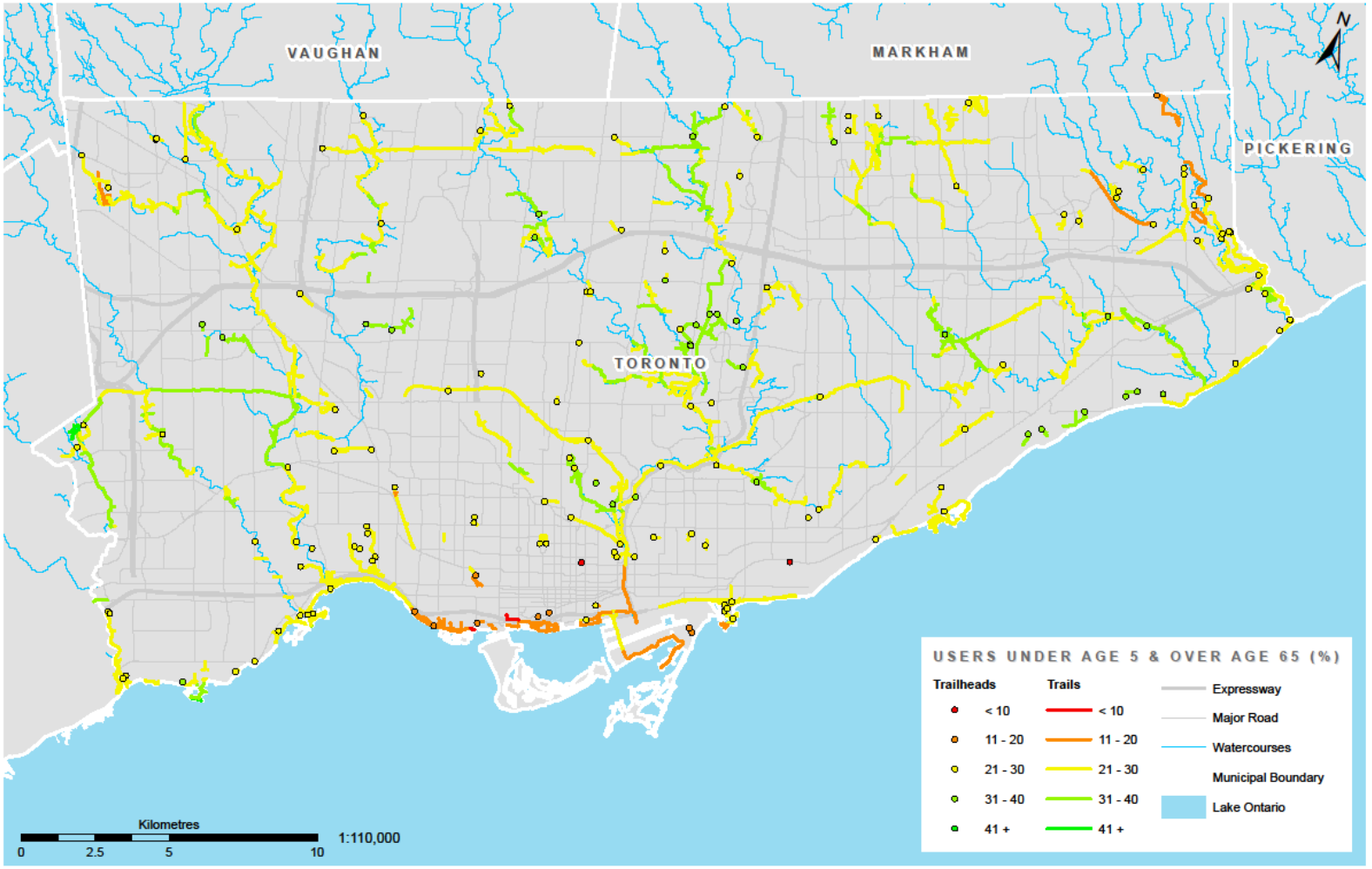
Following the creation of analysis points, trail service areas were determined. The service areas were created for each analysis point at a 1 kilometre network distance, wherein trails, regional roads, and local streets served as the base for the network dataset. In doing so, the dissemination areas (DA) within a walkable distance of each trail segment were identified.



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

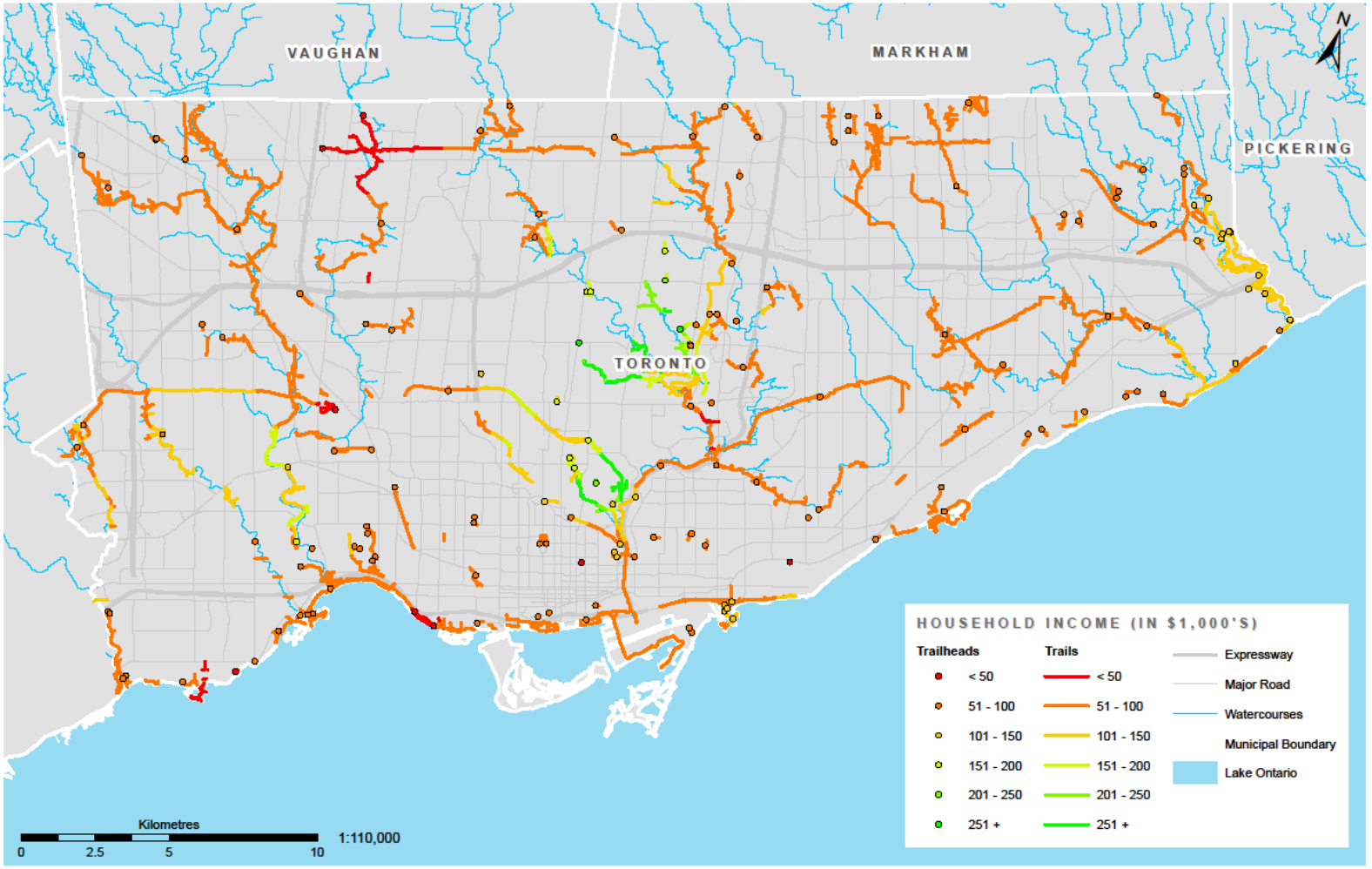
POPULATION DENSITY (PERSONS/SQKM)

Once the study area was established, the regression equation of Wang et. al (2014) was adopted for the City of Toronto and used to estimate latent trail demand. The equation involved several demographic inputs, including: population density, the number of children under age 5 and seniors, household income, and education levels.



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

USERS UNDER AGE 5 & OVER AGE 65 (%)



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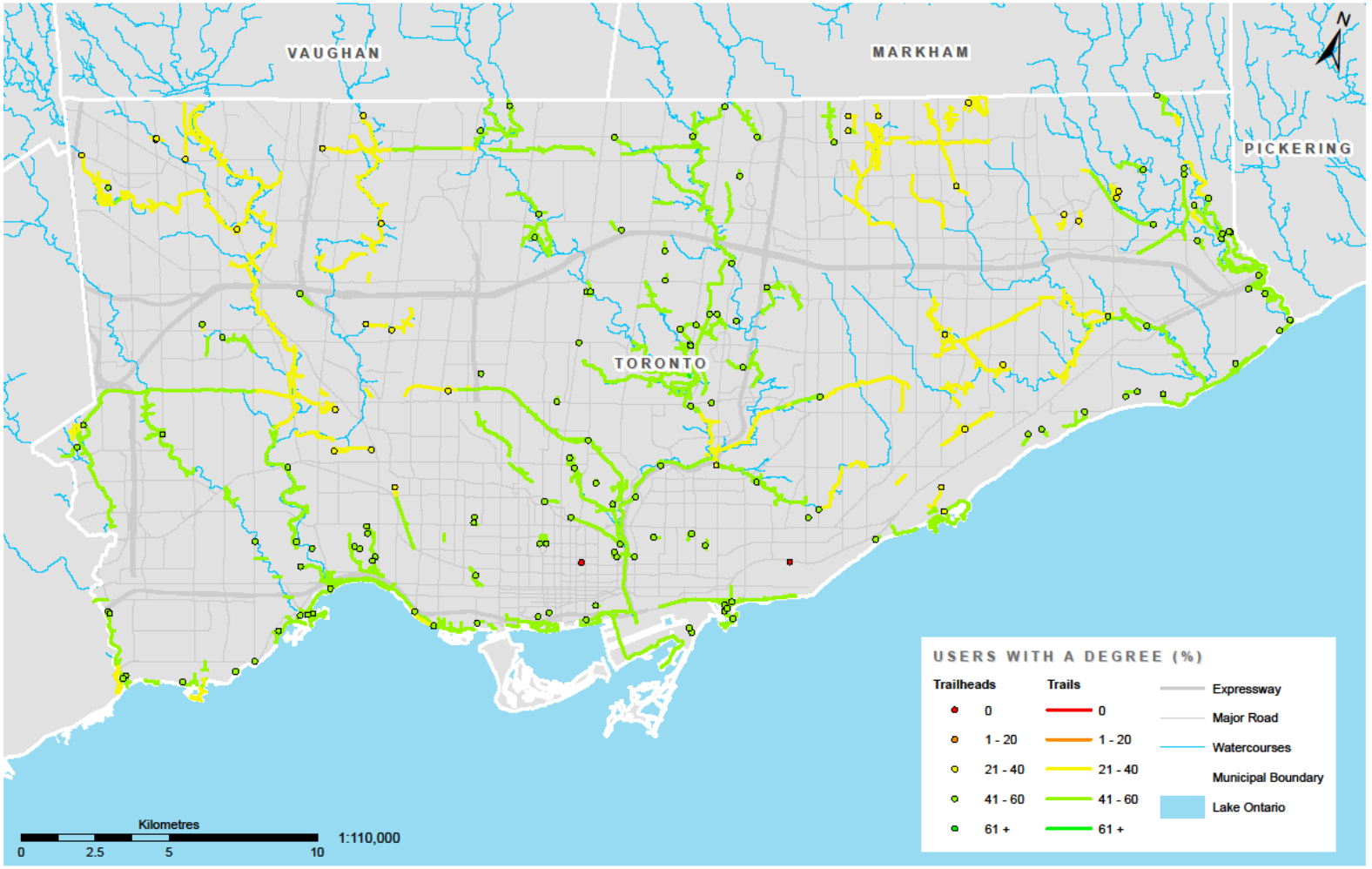
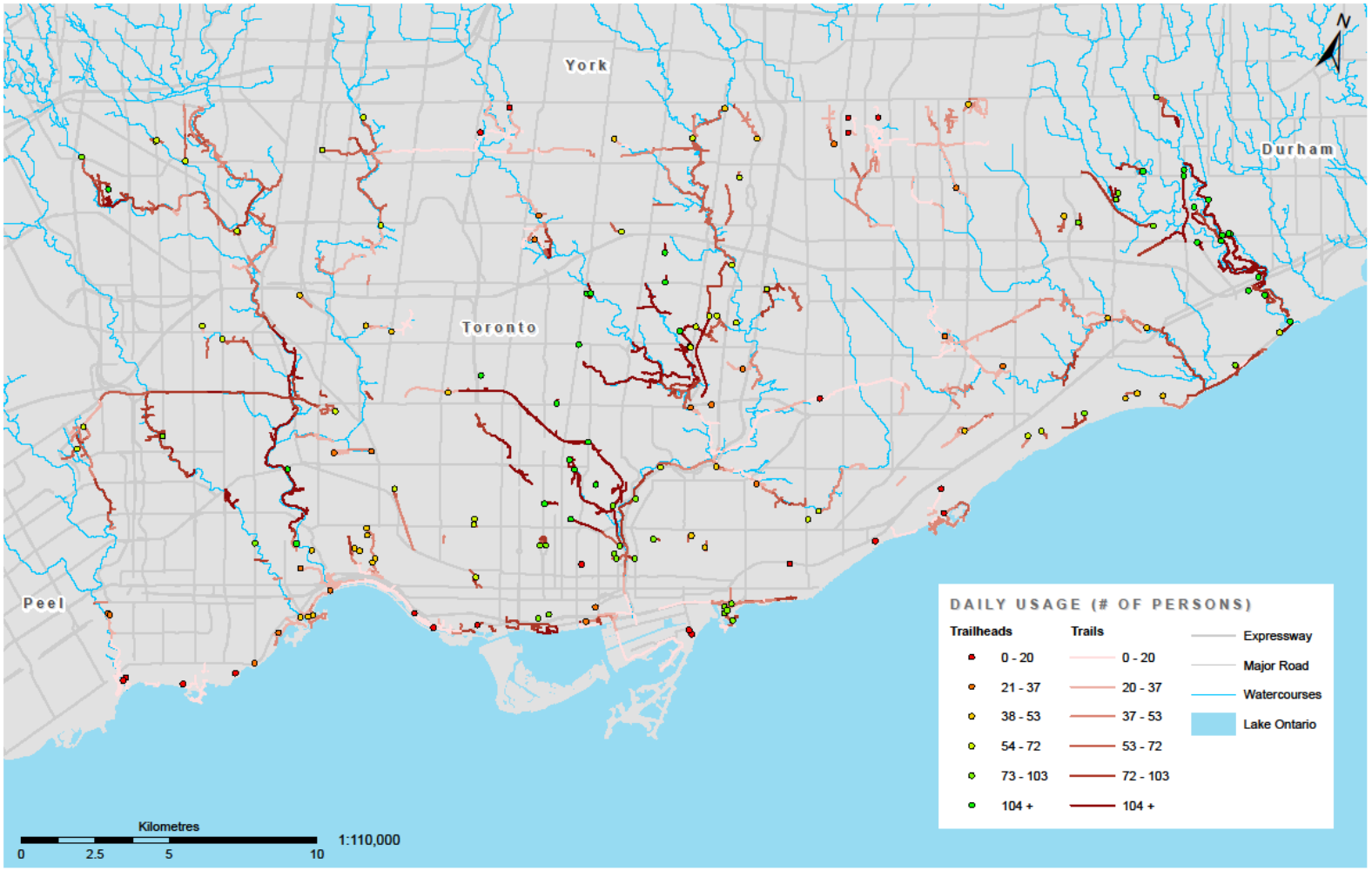
HOUSEHOLD INCOME (IN $1,000'S)



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

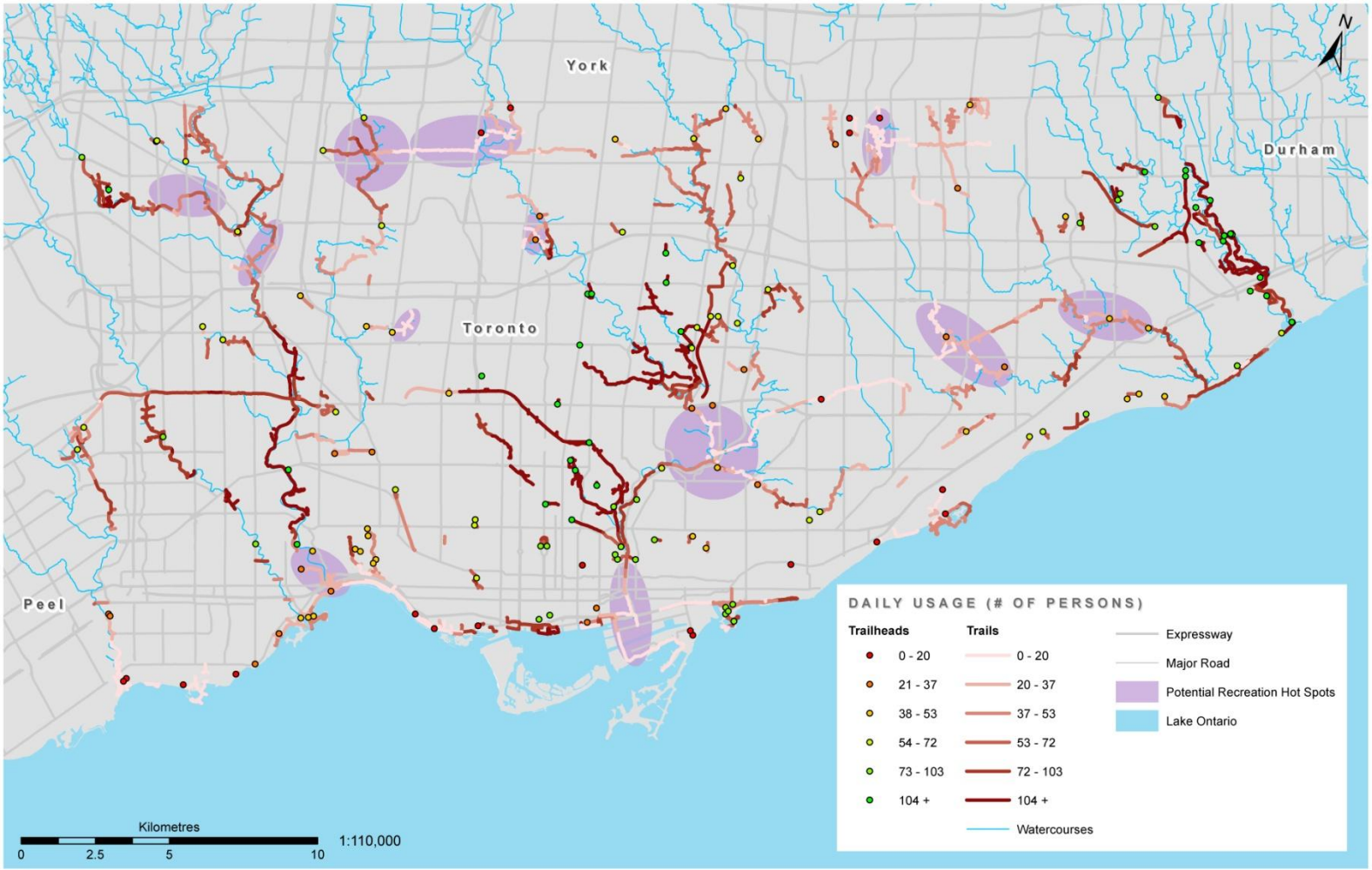
USERS WITH A DEGREE (%)



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

DAILY USAGE (# OF PERSONS)

Once latent trail demand estimates were calculated (equivalent to daily usage counts for trails and trailheads), priority areas for investment could be identified. Two separate analyses were conduced for connection recommendations: human and ecology.



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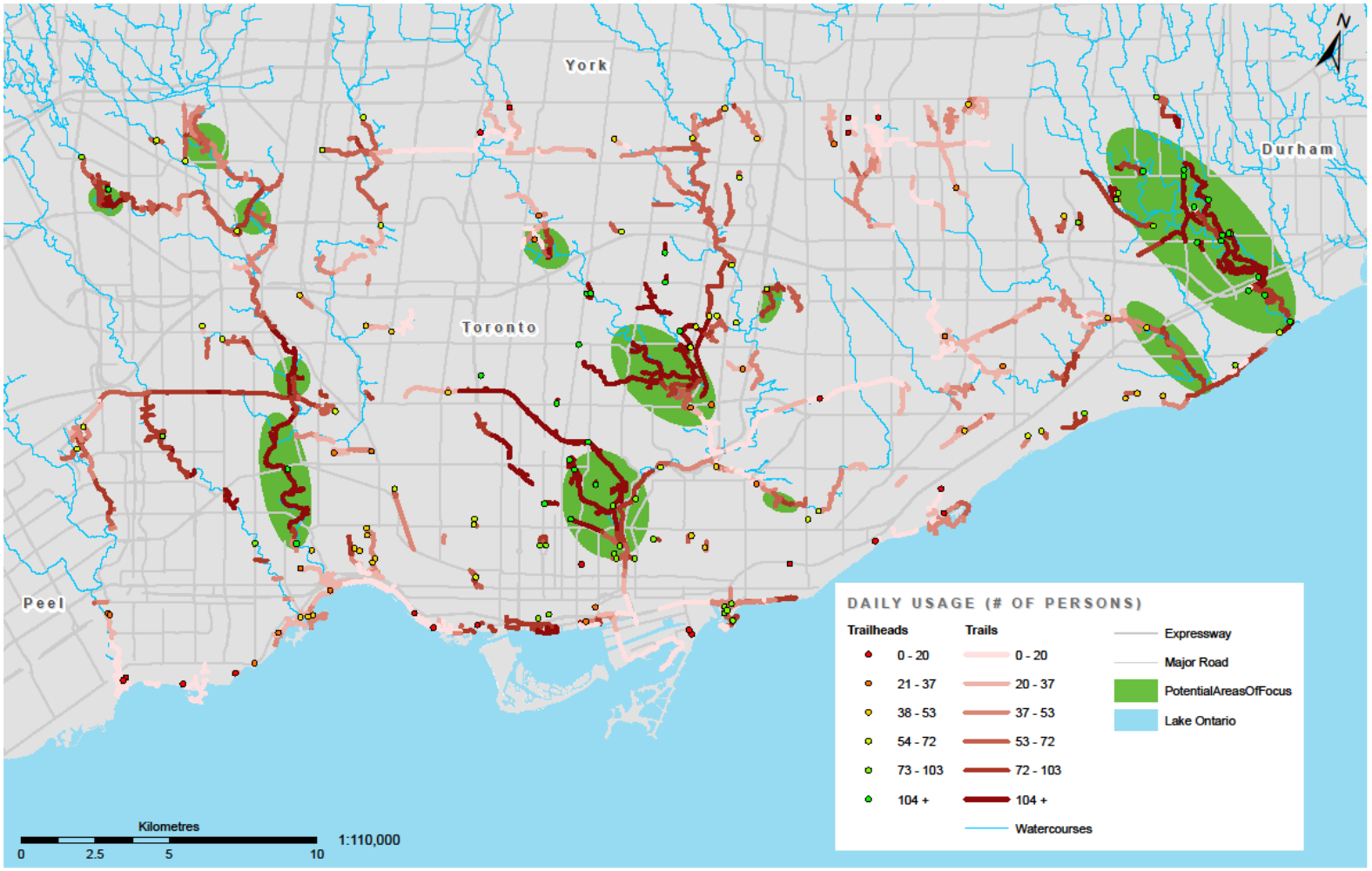
HUMAN - PRIORITY INVESTMENT AREAS

Areas with high population density but low trail usage were identified as potential priority areas for investment. The potential improved connection areas for human connections are fairly evenly dispersed across the entire City, with a slightly higher than average concentration in the north-west. With more investment in hubs, pathways, and gateways in these areas, better recreational connections can be created and usage of trails can be improved.



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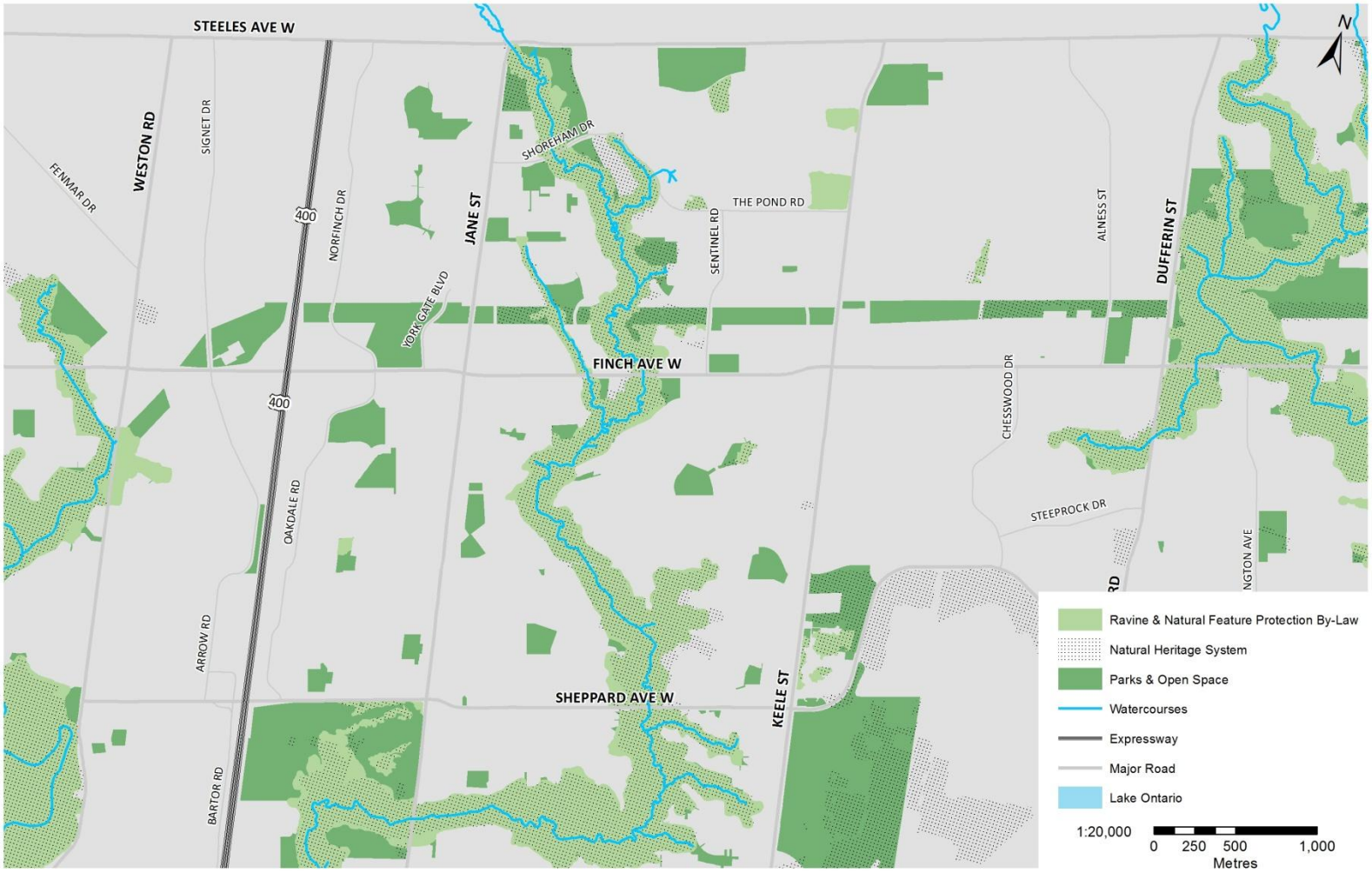
ECOLOGY - PRIORITY INVESTMENT AREAS

Areas of high trail usage located within or n ear to an environmentally significant area were identified as potential wildlife tension areas. These areas include some of the most sensitive habitats in the City, and need to be protected as they are critical to species survival. With more data on wildlife migratory routes, health, and populations, stronger and more focused ecological connection recommendations can be made. Nonetheless, it is up to the City to decide if they prefer to deter or encourage usage of trails in these areas.

KEELE & FINCH / BLACK CREEK MAPS



DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

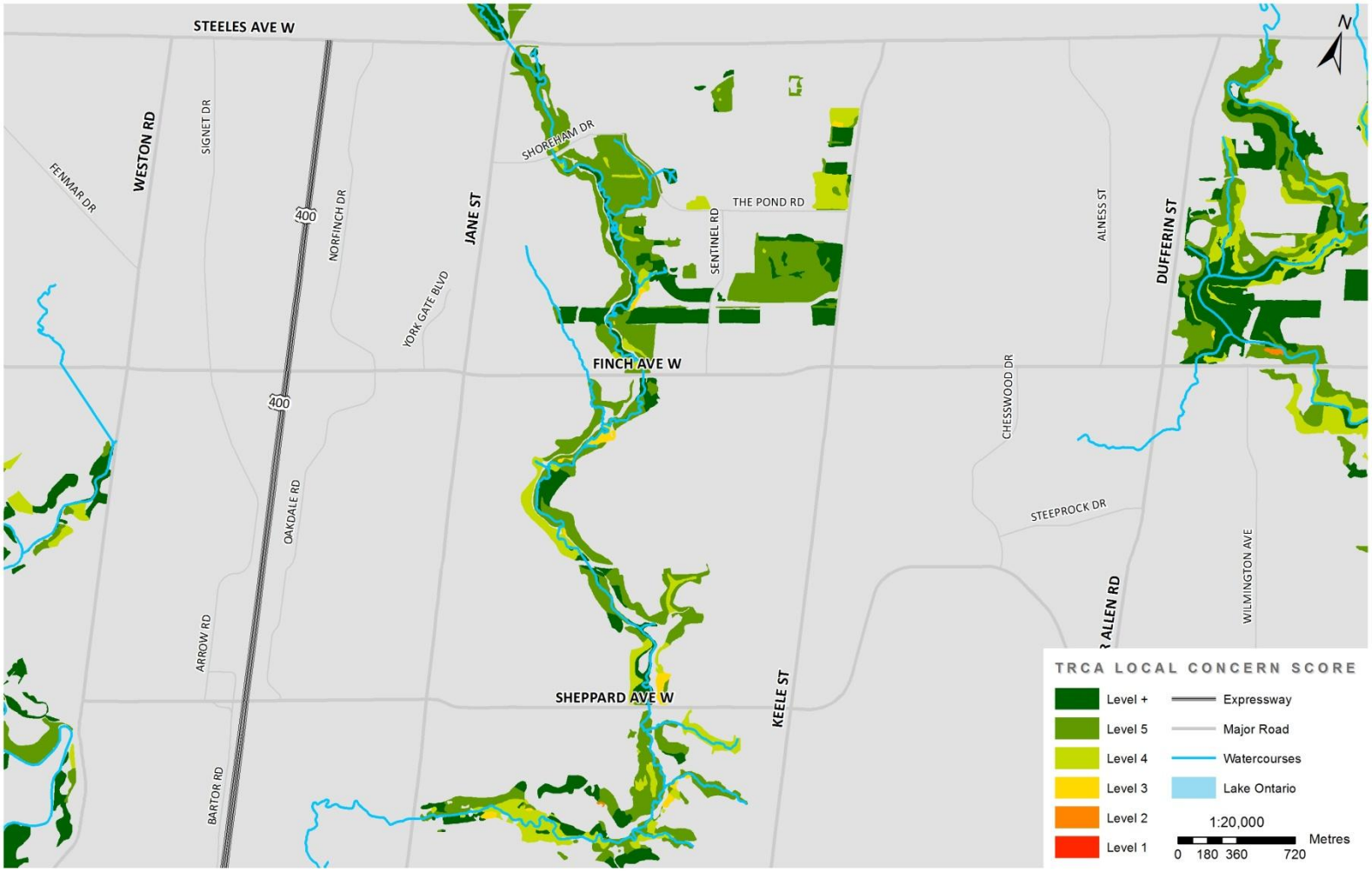
RAVINES & GREENSPACE

The system-wide analysis of the ravine system identified the Black Creek area from Steeles Ave. W to Sheppard Ave. W as a potential priority investment area for human and ecological connections. In exploring this area as a case study, there is potential to create synergies with the community planning process underway as part of the Keele Finch Plus project.

DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

PARKS & OPEN SPACE

Parks and open space occupy a large proportion of the study area, much of which is located adjacent to the ravines. In reviewing this map it is clear that Black Creek is a prominent north-south wildlife corridor, and that the hydro corridor serves as a vital east-west connection between natural areas.



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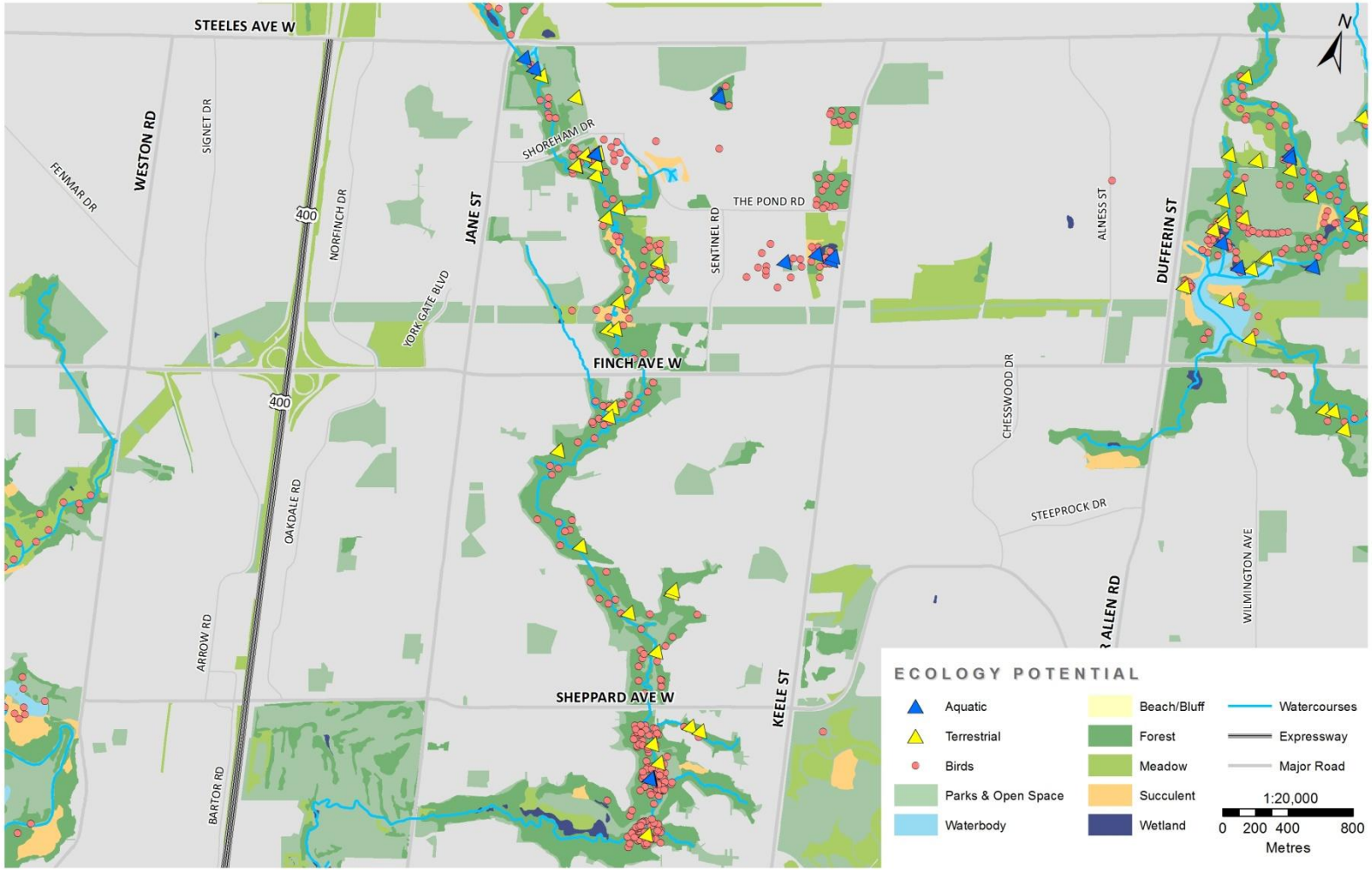
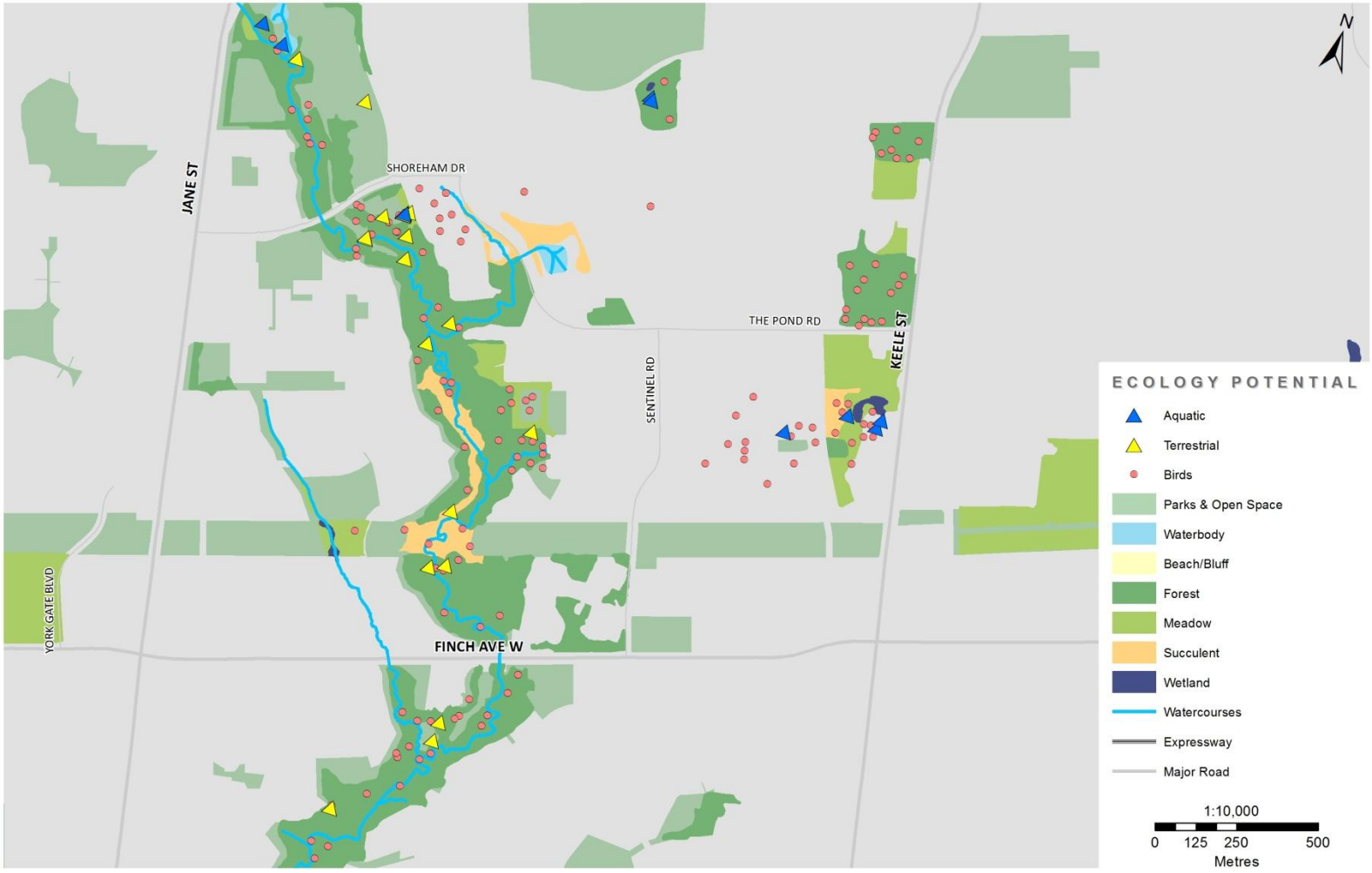


DATA SOURCES: City of Toronto, 2017 & TRCA, 2017

ECOLOGY POTENTIAL

In mapping observations of aquatic, terrestrial, and bird wildlife collected by the TRCA between 1987 to 2016, areas with significant ecological potential can be identified. Wildlife appear to be concentrated within and adjacent to the ravine system, particularly at the intersection of Black Creek and the hydro corridor and south of Sheppard Ave. W. However, data is limited. It is unknown if TRCA prohibited access to some records or if no species were truly observed in particular areas.



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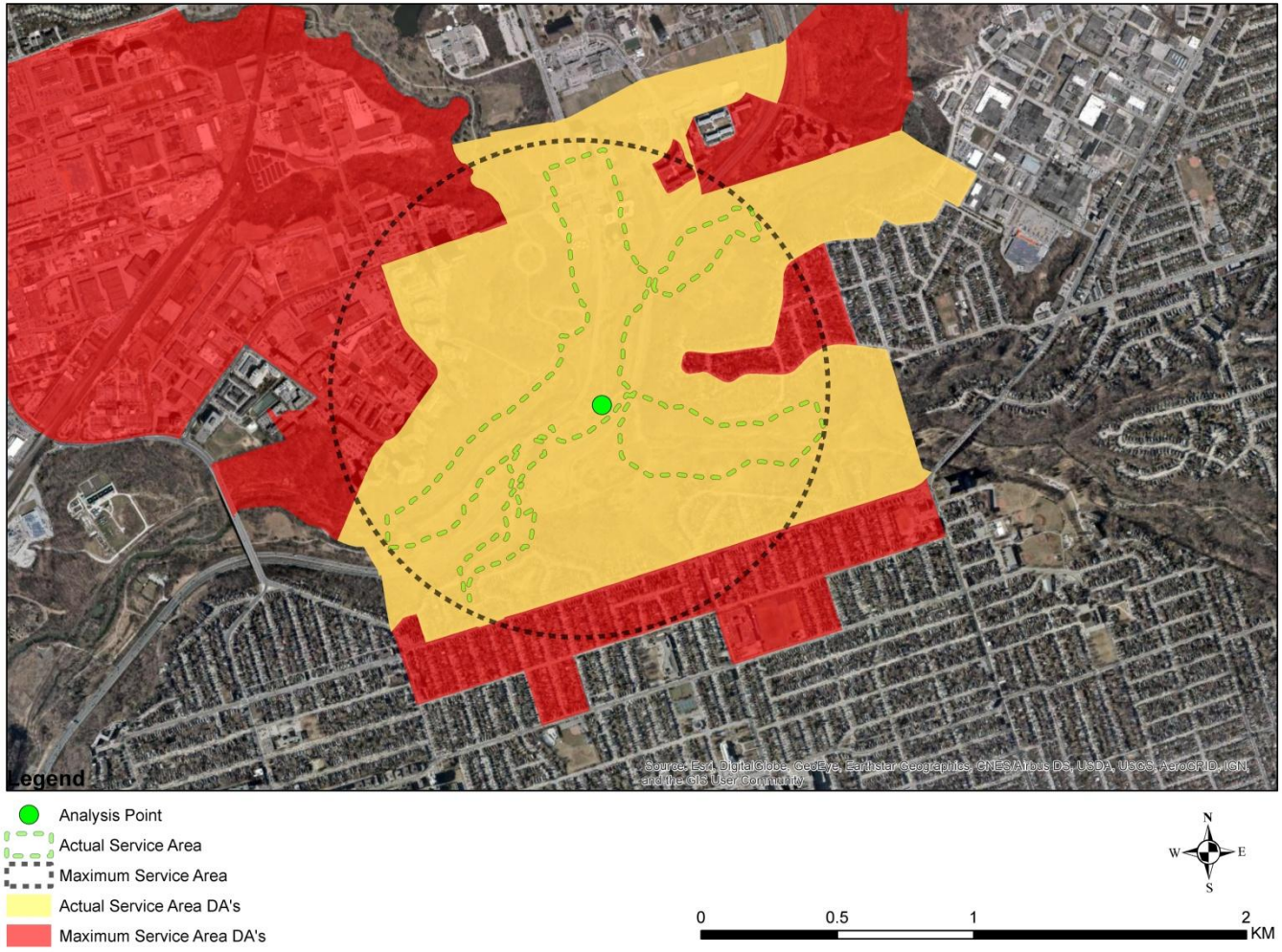
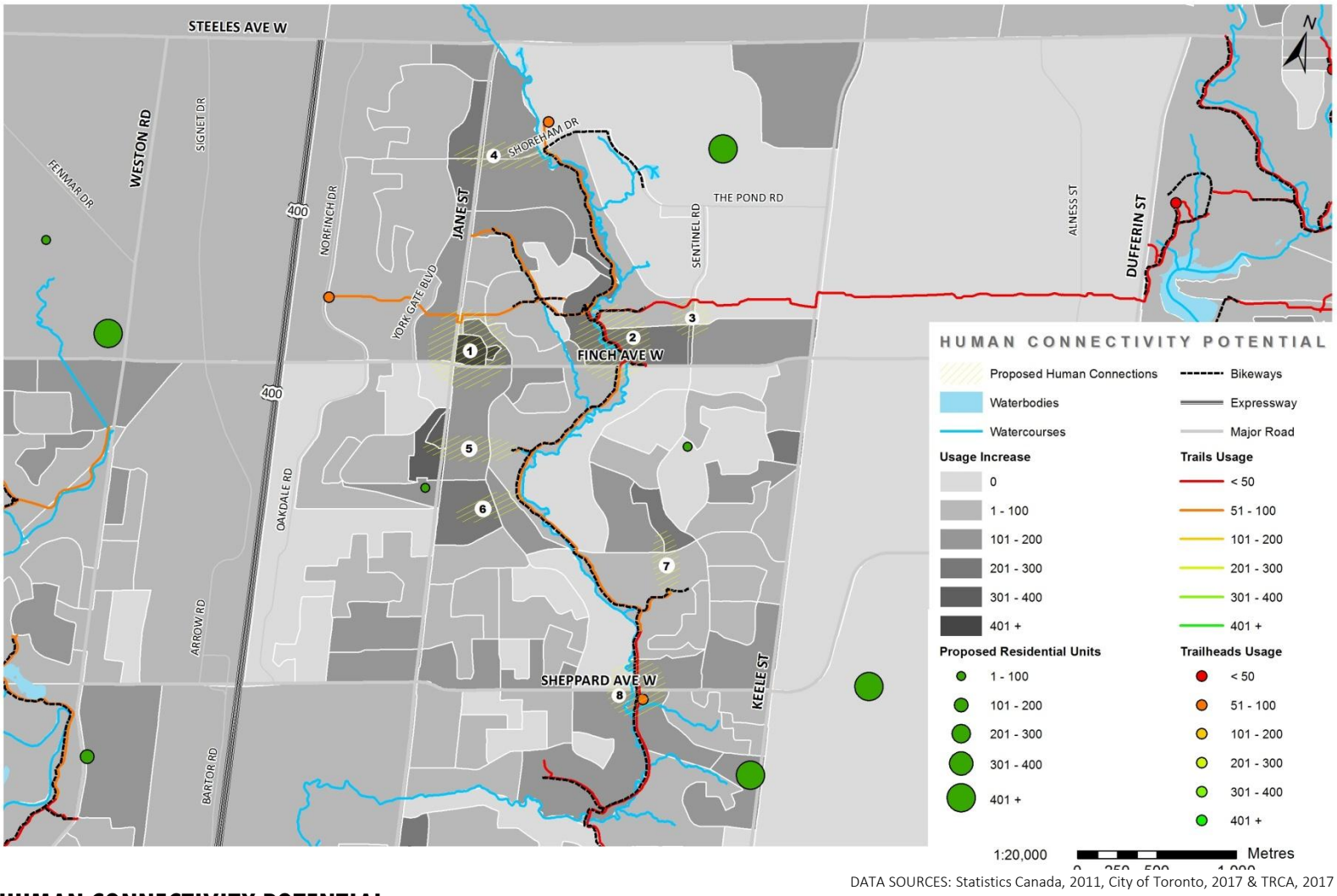
CASE STUDY
MAPPING ANALYSIS



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

CASE STUDY ANALYSIS

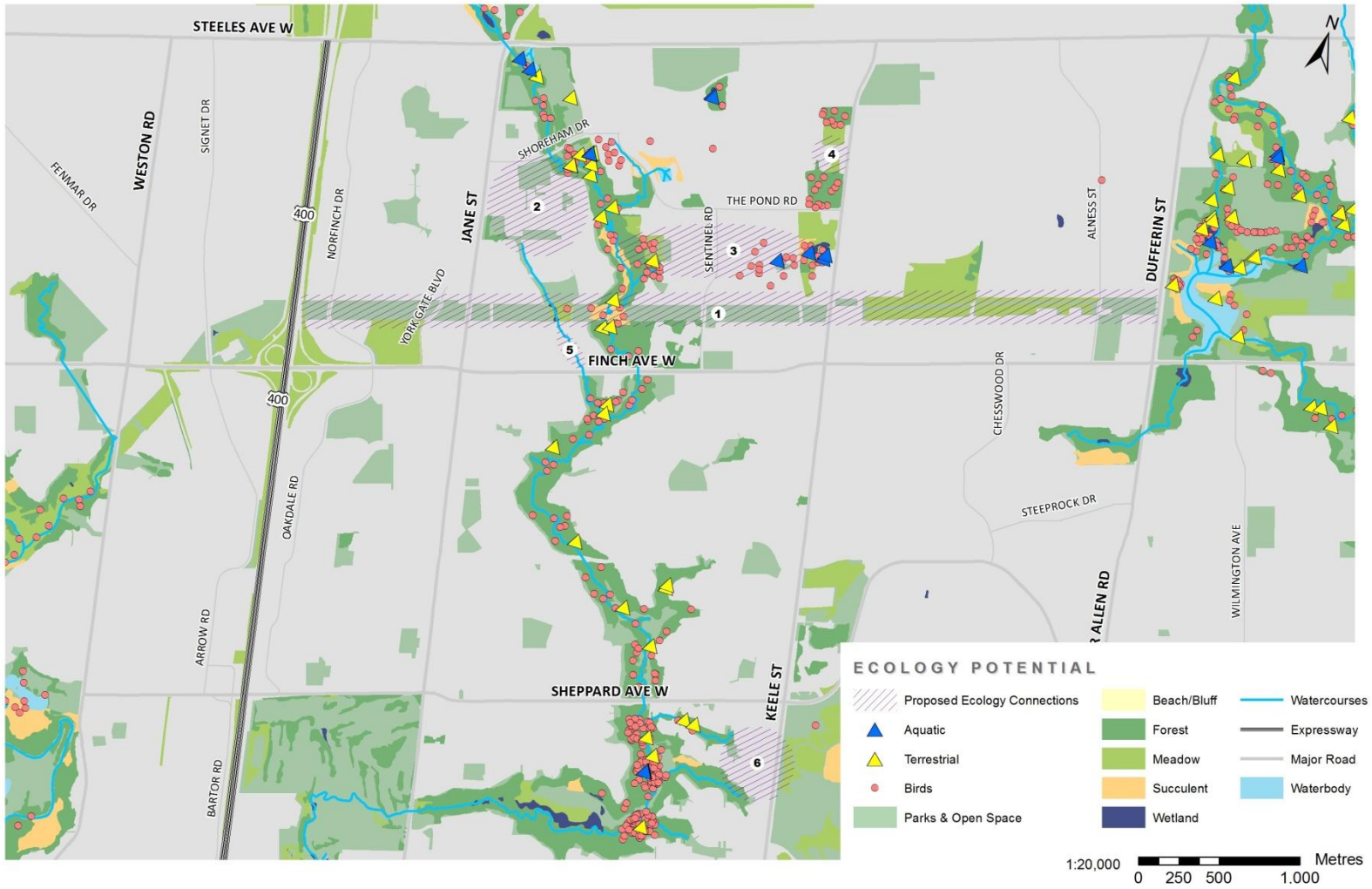
To estimate which trail segments have the greatest potential for connectivity, the results of our original service areas were compared to those of an ideally connected system. To achieve this, a second set of service areas (ideal service areas) were determined utilizing the minimum bounding geometry of existing service areas. Minimum bounding geometry analysis produces a circular area that perfectly encapsulates the existing service area, and unlike the original service areas, is not bound by the street network. As such, the ideal service areas will reach additional DAs that may not have been accessible to the original service area. These DAs represent areas which are reached if connectivity was perfect. The estimated trail usage of these additional DAs was then calculated to determine trail segment connectivity improvement potential.



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

HUMAN CONNECTIVITY POTENTIAL

The higher the number of added users, the greater the overall potential for connectivity a neighbourhood presents. The contribution of trail users for each DA was calculated to determine the degree with which each area was contributing to trail usage. These results provide information regarding the direction of focus for interventions, and thus represent priority areas for investment in human connections, should the goal be to increase maximum overall trail usage.



DATA SOURCES: Statistics Canada, 2011, City of Toronto, 2017 & TRCA, 2017

ECOLOGY CONNECTIVITY POTENTIAL

Priority areas for investment in ecological connections were determined through a visual analysis due to data limitations. Recorded observation data for species in the study area was provided by the TRCA. In total, there were 21 aquatic species observations, 61 terrestrial species observations, and 478 bird species observations collected between 1982 and 2015. Through considering species observation data, TRCA local concern scores, natural heritage areas and cover, and parks and open spaces, recommendations to improve ecological connections were made.

PROPOSED CONNECTIONS

PROPOSED CONNECTIONS

In total nine connections are proposed to the City of Toronto on behalf of the Ryerson University Ravine Xing Studio Group. The connections aim to reveal the ravines and improve human and ecological accessibility and connectivity in the Keele St. and Finch Ave. W neighbourhood (identified by the black box on the adjacent map). The connections are informed by: the results of the mapping analysis; attendance at the Keele Finch Plus public meeting on March 7, 2017; consultations with urban planners working on the project and the TRCA; and several site visits.

1. Highway 401 Wildlife Crossing

2. Humber Blvd. Improvements

3. Hydro Corridor Improvements

4. Jane St. and Shoreham Dr. Wildlife Corridor

5. Shoreham Dr. (York University) Trailhead

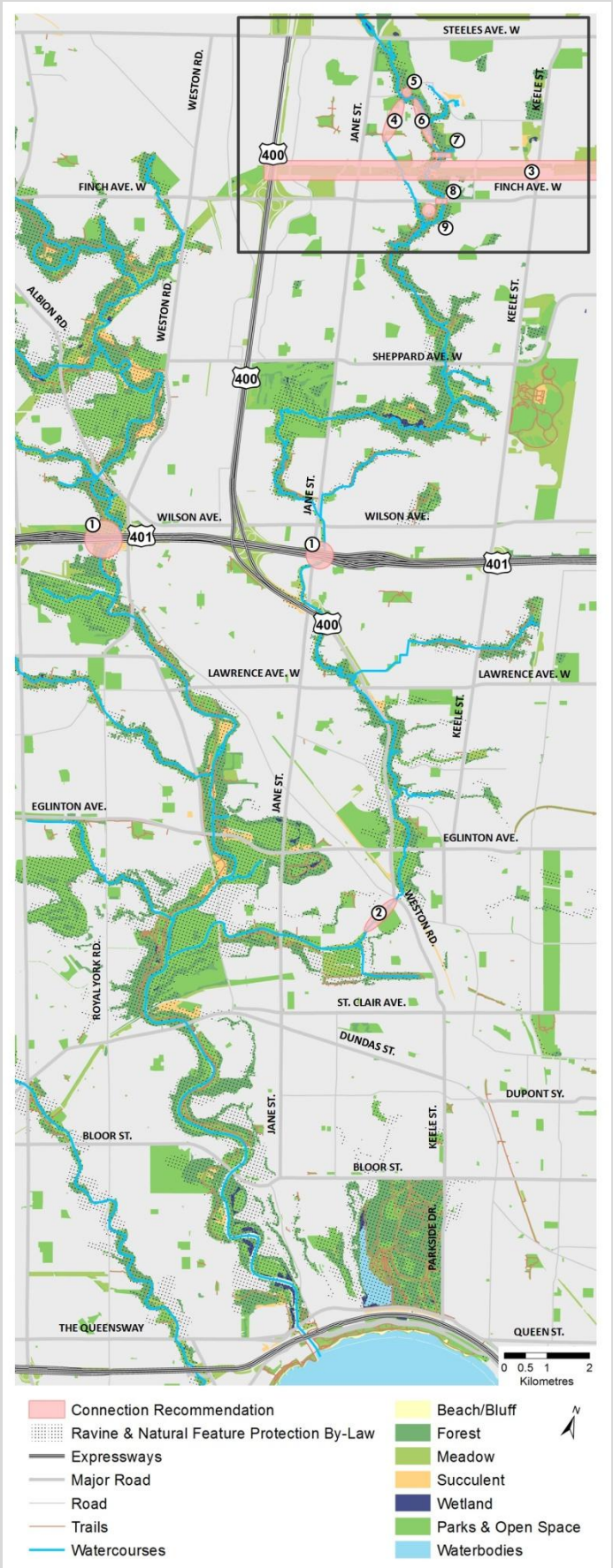
6. Community Connections

7. Bridge between Murray Ross Pkwy. & Niska Rd.

8. Finch Ave. Crossing

9. York Woods Pubic Library Access

**For additional information on each proposed connection, please see the accompanying project report.*



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