

CHAPTER 10: WATER AND NATURAL HERITAGE SUMMARY

The following is a summary of the study process and recommendations for Water (groundwater and surface water) and Natural Heritage.

The full desktop study reports for Hydrogeology and Natural Heritage, and a High Park Surface Water Features Narrative prepared by City staff are included as appendices.

10.1. INTRODUCTION

Two desktop studies were conducted to supplement the overall Avenue Study, one each for natural heritage (Dougan, 2018) and hydrogeology (groundwater review, WSP, 2018a). The purpose of these studies was to understand the impact of development on sensitive natural resources adjacent to the Study Area, with an emphasis on High Park, and to address the PPS requirement to evaluate the ecological function of lands adjacent to provincially significant natural heritage features. The generalized scope of work for each included a review of existing available data and information, identifying and assessing potential impacts, identifying mitigation measures for

those impacts, and providing recommendations for new requirements, policies, procedures, or actions for further study. In addition, the effects of Intensification in the BWV Study Area on storm sewer, sanitary sewer/combined sewer capacity, and watermain capacity for potable water supply was assessed (WSP, 2018b). To further support these studies, Toronto Water (2018) reviewed existing reports, policies and available topographical and sewer infrastructure information to identify the links between High Park watercourses and water bodies, and the potential impacts of development.

The following is a summary of the study process and recommendations for Natural Heritage and

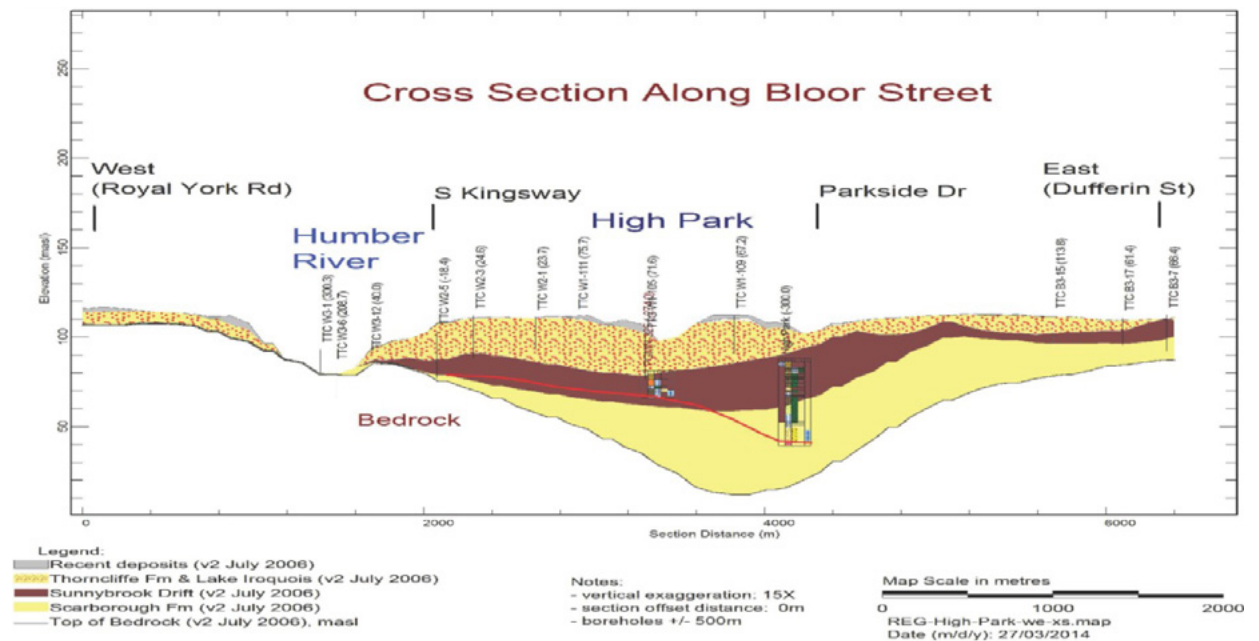


Figure 10.1 Hydrogeological Cross Section Along Bloor Street West

Water (groundwater and surface water). The full desktop study reports for Natural Heritage and Hydrogeology, the High Park Water Narrative and Servicing Study are included as appendices.

10.2. GROUNDWATER AND SURFACE WATER

Existing Characterization of High Park Water Features

Within the Study Area there are two key water sources that supply the High Park water features. Groundwater sources include shallow groundwater flow regimes, perched aquifers, and deep aquifers such as the buried Laurentian Channel—an ancient subterranean watercourse flowing from Georgian Bay to Lake Ontario (Fig 10.1). Surface water sources include stormwater runoff from upstream catchment areas flowing overland or captured, conveyed and discharged through the City of Toronto sewer infrastructure to the two key watercourses in High Park—Wendigo Creek and Spring Creek (Figure 10.2).

Wendigo Creek largely defines the western edge of High Park, and is considered the upstream portion of Grenadier Pond. It is fed by storm sewer outfall discharges from within a total catchment area of 120 hectares, of which 56% is impervious cover. Of the 120 hectares, only 8% of the total catchment area is within the Bloor West Village Avenue Study area.

The Spring Creek system is part of what defines the eastern edge of High Park. It is fed by two outfalls from two catchments serviced by sanitary and combined sewers and storm sewers. The total

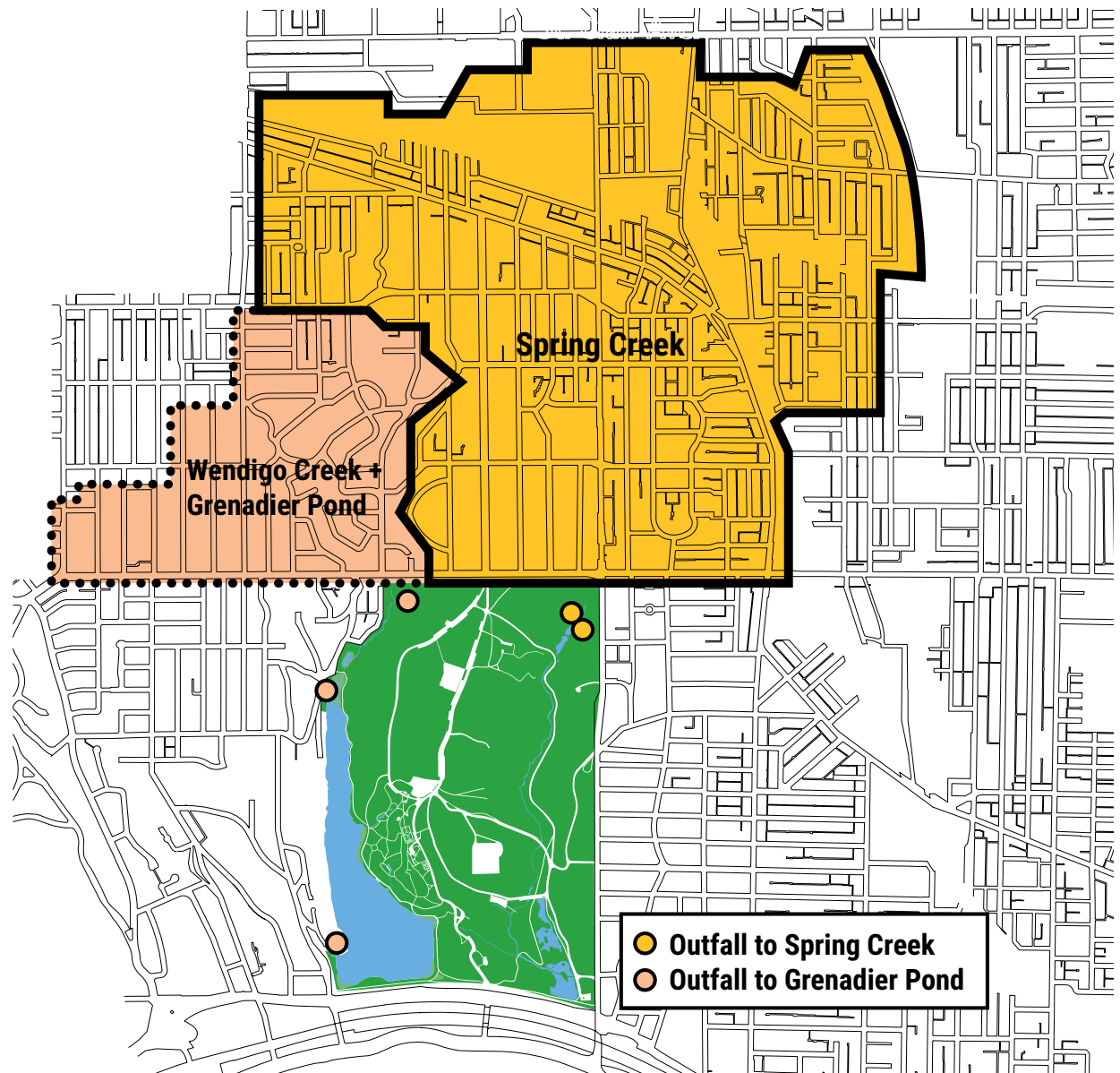


Figure 10.2 Stormwater Catchment Areas feeding High Park (c: City of Toronto)

contributing catchment is 305 hectares, of which 68% is impervious cover. Of the 305 hectares, only 5 hectares is within the Bloor West Village Avenue Study Area.

Sources for this section include the Hydrogeology Report, Servicing Report, and High Park Surface Water Narrative in the Appendices, as well as the 1995 Gartner Lee report prepared for the City of Toronto “Proposals for the Rehabilitation of Grenadier Pond, Wendigo Creek and Associated Wetlands”

General Overview of Development Impacts on Water Sources

Urbanization through development can add hard impervious surfaces (such as roofs, parking lots, and streets) over softer pervious surfaces that promote infiltration (such as parks, landscaping, and natural settings). An increase in impervious surfaces in a watershed may inhibit the recharge potential of groundwater sources through infiltration, and result in rapid and increased surface water discharge generated from stormwater runoff. Left unmitigated, this release of urban stormwater runoff could increase the risk of watercourse erosion, water quality & natural habitat degradation, as well as raise urban flooding concerns.

In addition to the impact of increased impervious surfaces, new development may also introduce sub-surface structures (e.g., parking garages) that can interfere with groundwater levels. This could result in the extraction and discharge of groundwater, potentially impacting groundwater

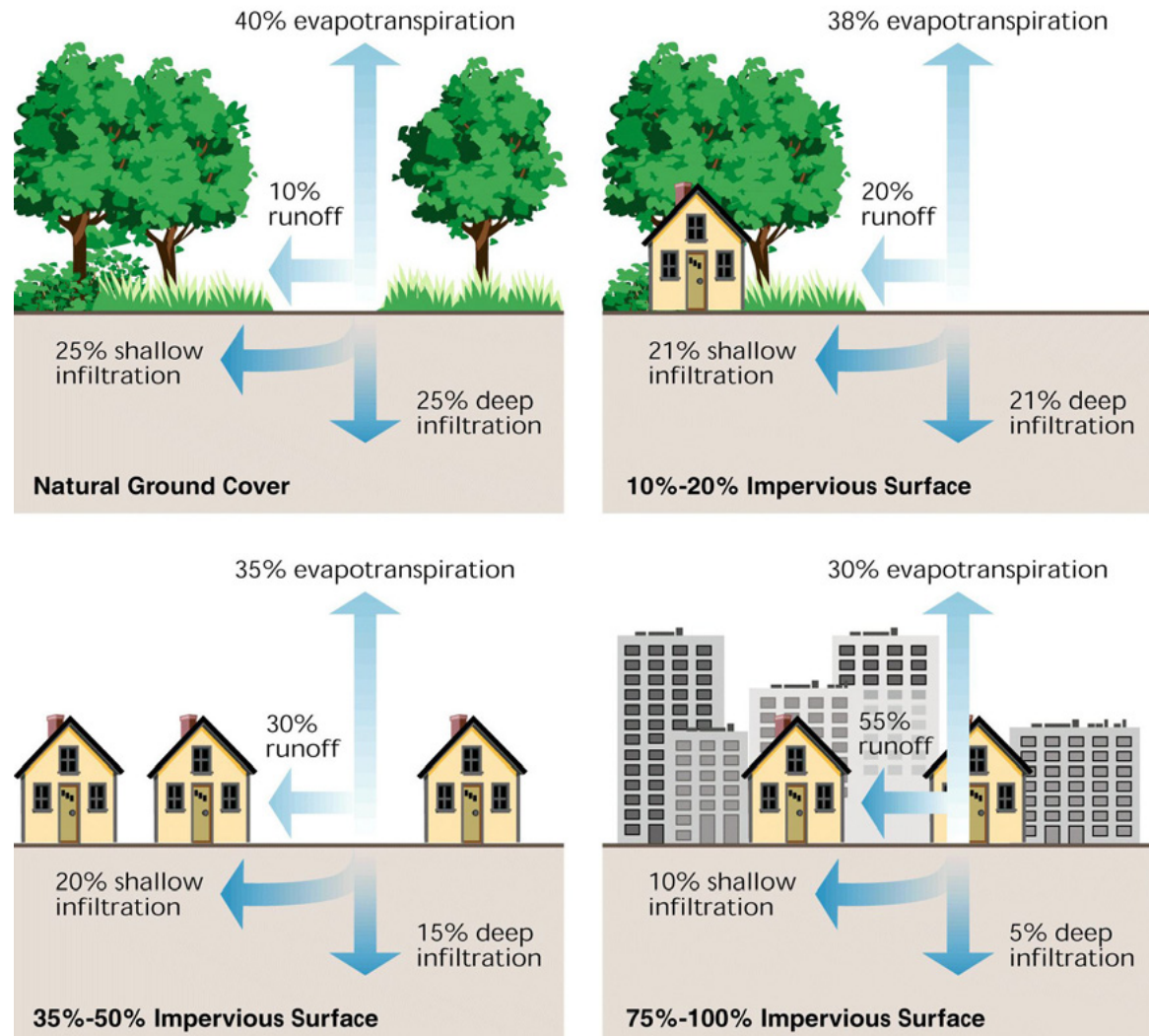


Figure 10.3 Impact of Development on Groundwater and Surface Water (c: US EPA)

sources. The reduction of sewer capacity may also be of concern in scenarios where extracted groundwater is permanently discharged to City sewers.

Based on available reports referred to in the WSP Hydrogeological Report in the Appendices, groundwater levels throughout the Study Area can range from a 12 to 20 meters below ground surface in the shallow overburden areas (e.g., fill material over bedrock or other deposit) while groundwater levels within the deeper overburden layers can exhibit flowing artesian groundwater conditions. Depending on site conditions, a sub-structure deeper than 20 meters such as a multi-level parking structure may breach the aquitard and the groundwater aquifers. An aquitard is a zone within the earth that restricts the flow of groundwater from one aquifer to another. In the case of High Park the aquitard is a layer of clay between an upper and much deeper aquifer—the buried Laurentian Channel (see Figure 10.1 and Hydrogeology Study Appendix for more detail).

Potential Impacts to High Park

The maximum effect of intensification within the BWV Study Area on hydrological pathways (surface water runoff, groundwater flow) flowing to the two High Park Natural Features (Grenadier Pond, Spring Creek) is of the order of 1 %, using the potential change in impervious cover as the measure of effect. This means that there is no measurable effect of intensification within the BWV Study Area on High Park Surface Water Features.

The small effect of intensification within the BWV Study Area is caused by the existing large level

Table 10.1
Development Impacts on Groundwater and Surface Water

	Groundwater	Surface Water
Key Water Sources	Groundwater sources include shallow groundwater flow regime and perched aquifers and deep acquifers (i.e., buried Laurentian Channel)	Surface Water sources stormwater runoff from upstream catchment areas flowing overland or captured, conveyed and discharged through City's sewer infrastructure.
Development Impact	<p>Increases in imperviousness may inhibit groundwater recharge.</p> <p>Sub-surface structures (e.g., parking garages) may require the extraction and discharge of groundwater to sewers impacting groundwater flow regimes, sewer capacity and potential for water quality degradation.</p> <p>Deep sub-surface structures may impede aquitards could cause release of pressurized aquifers.</p>	Increases in imperviousness may result in rapid and increased release of stormwater increasing the risk of water quality degradation and watercourse erosion, as well as raise urban flooding concerns.
Opportunities & City Requirements	<p>Improve groundwater recharge, through on-site prioritization of Green Infrastructure/Low Impact Development features as per City's WWFMG, Green Streets Technical Guidelines and upcoming MOECC direction.</p> <p>Provide site-specific hydrogeological investigation to understand impacts to groundwater and discharge, and meet City requirements for Groundwater Management (upcoming Policy) and By-Laws.</p>	Improve overall stormwater management from existing impervious & uncontrolled conditions using Green Infrastructure/Low Impact Development features to ensure adequate controls for water balance, quality and quantity as per City's WWFMG, Green Streets Technical Guidelines and upcoming MOECC direction.
Recommendations	<p>Investigate enhanced area-specific recharge requirements for sensitive areas.</p> <p>Limit the maximum depth of sub-surface structures in order to ensure no net impact to the groundwater regime.</p> <p>Confirm no impedance of aquifer or hydrogeological/geotechnical impact through monitoring well.</p>	Investigate enhanced area-specific SWM control requirements for sensitive areas.

of impervious cover (64 %) in the catchments flowing to Grenadier Pond and Spring Creek, which includes the BWV Study Area. This level of impervious cover has largely been in place for ‘several decades’, as these areas have had a mature urban cover on these lands for that period of time.

Major changes within the urban catchments feeding High Park Natural Water Features over ‘these several decades’ have included (i) combined sewer separation with road sewers in the 1940s – 1970’s and (ii) retrofitting with end-of –pipe stormwater management facilities in the Catfish Pond and Wendigo Creek systems feeding Grenadier Pond, and Spring Creek Ponds and Lower Duck Pond within the Spring Creek system in the 2000’s, and (iii) implementation of the City’s mandatory roof downspout disconnection requirement since ca 2010. Additional protection to the water quality of Lake Ontario, particularly beach bathing water quality in the Western Beaches, has been afforded by construction of the Western Beaches Tunnel System which intercepts overflows from the combined sewer system adjacent to and largely east of High Park, intercepts flows from Spring Creek.

Further mitigation of the effects of intensification within the BWV Study Area on surface water and pathways flowing to High Park Natural Aquatic features is anticipated when re development occurs through implementation of Source Controls (Low impact development) measures. Further opportunities may be afforded through

the anticipated opportunity for developing Green Streets along Bloor Street West during its reconstruction, and an update of the High Park Management Plan.

Requirements and Opportunities

There are a number of additional opportunities to mitigate the potential impacts of development on surface water and groundwater sources feeding High Park water features. The Ontario Ministry of the Environment and Climate Change (MOECC) and City of Toronto have existing policies and guidelines outlining requirements to address groundwater and stormwater management (SWM).

In addition to the MOECC’s Stormwater Management Planning and Design Manual, through the City’s Wet Weather Flow Management Guidelines (WWFMG), and the Toronto Green Standard (TGS), improvements to overall surface water sources are expected through the implementation of on-site water balance (i.e., retention), quality and quantity controls as where new development takes place on existing sites within the Study Area where a high impervious coverage already exists with little to no SWM controls in place.

Additional opportunities to improve groundwater recharge exists through the use of Green Infrastructure and Low Impact Development (LID) features within the City’s right-of-way, as well as on development sites, as per the City’s Wet Weather Flow Master Plan (WWFMP), Green Street Technical Guidelines, and upcoming Ministry of Environment and Climate Change (MOECC) direction.

In addition to the submission of site-specific Stormwater Management reports, as part of the development approval process, development projects are also currently required to provide site-specific hydrogeological investigations to understand impacts to groundwater and discharge, and meet City requirements for the forthcoming Groundwater Management Policy and Sewer Use By-Law.

With an understanding of the above, the Study Team identified a number of recommendations to mitigate impacts on water and for future investigation following the completion of the Avenue Study process.

Recommendations

- The potential impact of intensification (i.e., new re-developments) on shallow groundwater regime is possible however the magnitude of the impacts are considered rather low especially if future development is limited to underground levels similar to currently existing structures and/or above the water table.
- Any development application proposed within the study area should be subject to a detailed hydrogeological review if the proposed underground elevation is below the water table, in order to confirm no impedance of aquifer or hydrogeological impacts through an appropriate assessment and monitoring program.
- Limit the maximum depth of sub-surface structures in order to ensure no net impact to the shallow groundwater regime.

- Further deep in-situ drilling programs are needed to evaluate the predicted bedrock valley depth, delineate the spatial extent, and quantify the head pressures from each distinct stratigraphic unit.
- Investigate enhanced area-specific recharge in order to ensure no net impact to the groundwater regime.

10.3. NATURAL HERITAGE

Characterization

The Study Area has significant existing natural heritage resources primarily located within the Humber River Valley and High Park (insert Map of Study Area showing significant natural features). Additional Environmentally Sensitive Areas (ESA)

and extensive mature urban forest also exist beyond these two main resources. There are recorded species of conservation concern that likely breed within the High Park and Humber River Valley natural habitats. Many other urban tolerant species breed in generalist habitat (i.e. parts of High Park, treed neighbourhoods, parks/parkettes, and backyards). The natural systems have been influenced by over a century of anthropogenic use and disturbance, which has led to high degree of landscape fragmentation and disturbance.

Characterization: High Park

As stated on the City of Toronto Parks, Forestry and Recreation website, High Park is recognized as one of the most significant natural areas in Toronto. Within High Park, there are rare habitats

(prairie/black oak savannah), rare plants and wildlife species interspersed with trails and other parkland uses. High Park provides habitat for Species-at-Risk (SAR), primarily in the prairie/savannah and wetland/aquatic habitats, and for urban-tolerant species. There are 64 species of breeding birds recorded in High Park (includes SAR). The Park is also a highly attractive stopover site for migratory birds. Urban tolerant mammals are also present; bats have been studied on a limited basis but SAR bats are not likely breeding in High Park. The diversity of amphibians and reptiles is low, and where they do exist are likely confined to wetlands, ponds, and the surrounding terrestrial interface.

Large portions of High Park are designated as provincially significant Area of Natural and Scientific



High Park Existing Conditions



Considerable modifications have occurred over the years. This image is of the sewer system being constructed along Bloor Street West in the early 20th century.



Humber River Valley Existing Conditions



Interest (ANSI) and Environmentally Significant Area (ESA). These areas and SAR are protected by existing policies at the Provincial and Municipal levels. Further, the City has been implementing restoration measures as defined in the High Park Woodland & Savannah Management Plan (2002) to improve the resilience of the natural heritage features and functions.

Characterization: Humber River Valley

The Humber River Valley is characterized by steep forested valley slopes with a Provincially Significant Wetland complex and ESA in the bottomlands. The wetland communities provide important habitat for flora and fauna. There are 56 species breeding within the Humber River Valley (includes SAR). The forested and open water habitats of the Humber are highly attractive stopover sites for migratory birds. Based on available data, mammal, amphibian, and reptile diversity in the Humber River Valley is similar to High Park, but a higher likelihood exists for some species to be present due to overall connectivity (i.e. White-tailed deer) and wetland extent (i.e. amphibians). There is ecological connectivity to the Lake Ontario waterfront through the City from the Oak Ridges Moraine, although the connections are fragmented in places by roads/bridges. There are additional prairie/savannah habitats adjacent to the Humber corridor (for example Lambton Shores, Sassafras Woods).

For the significant wetlands, rare habitats and SAR, there is existing policy protection at the Provincial and Municipal levels.



Bloor Street West Corridor



Dacre Crescent



Rennie Park

Figure 10.5 Areas of Influence: ESAs (in green) within the broader Study Area

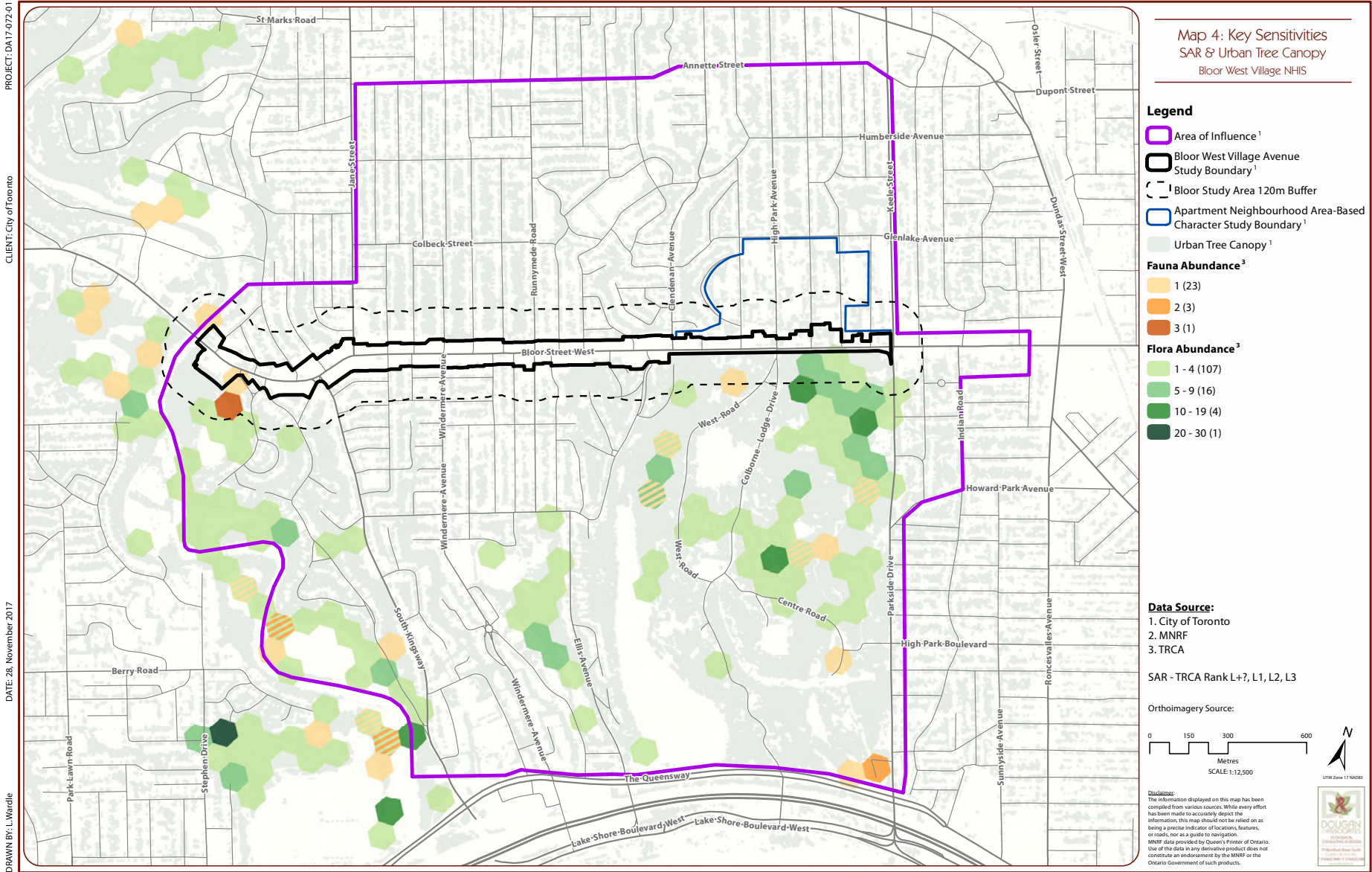


Figure 10.6 Species at Risk

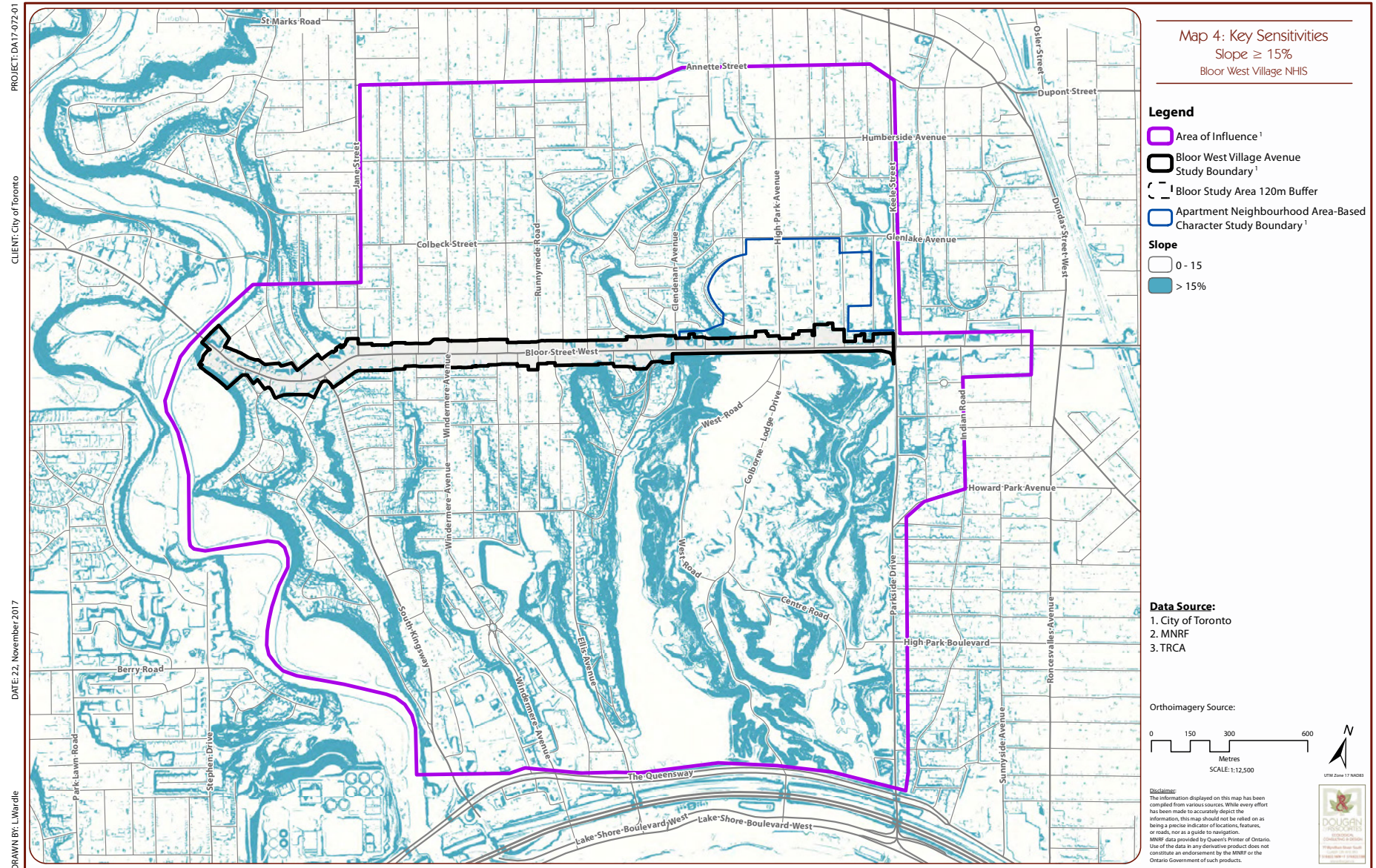


Figure 10.7 Slope

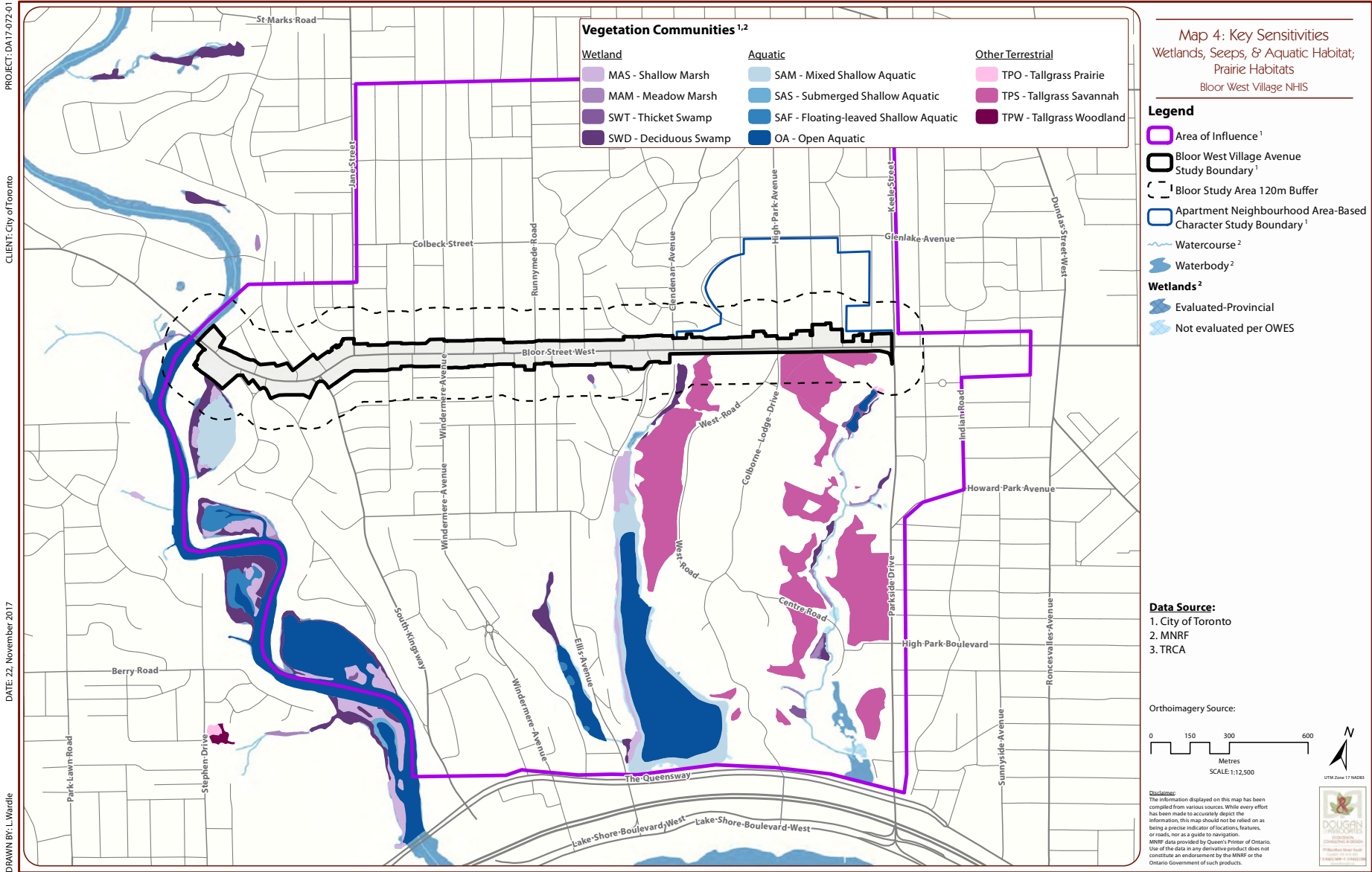


Figure 10.8 Wetland Prairie

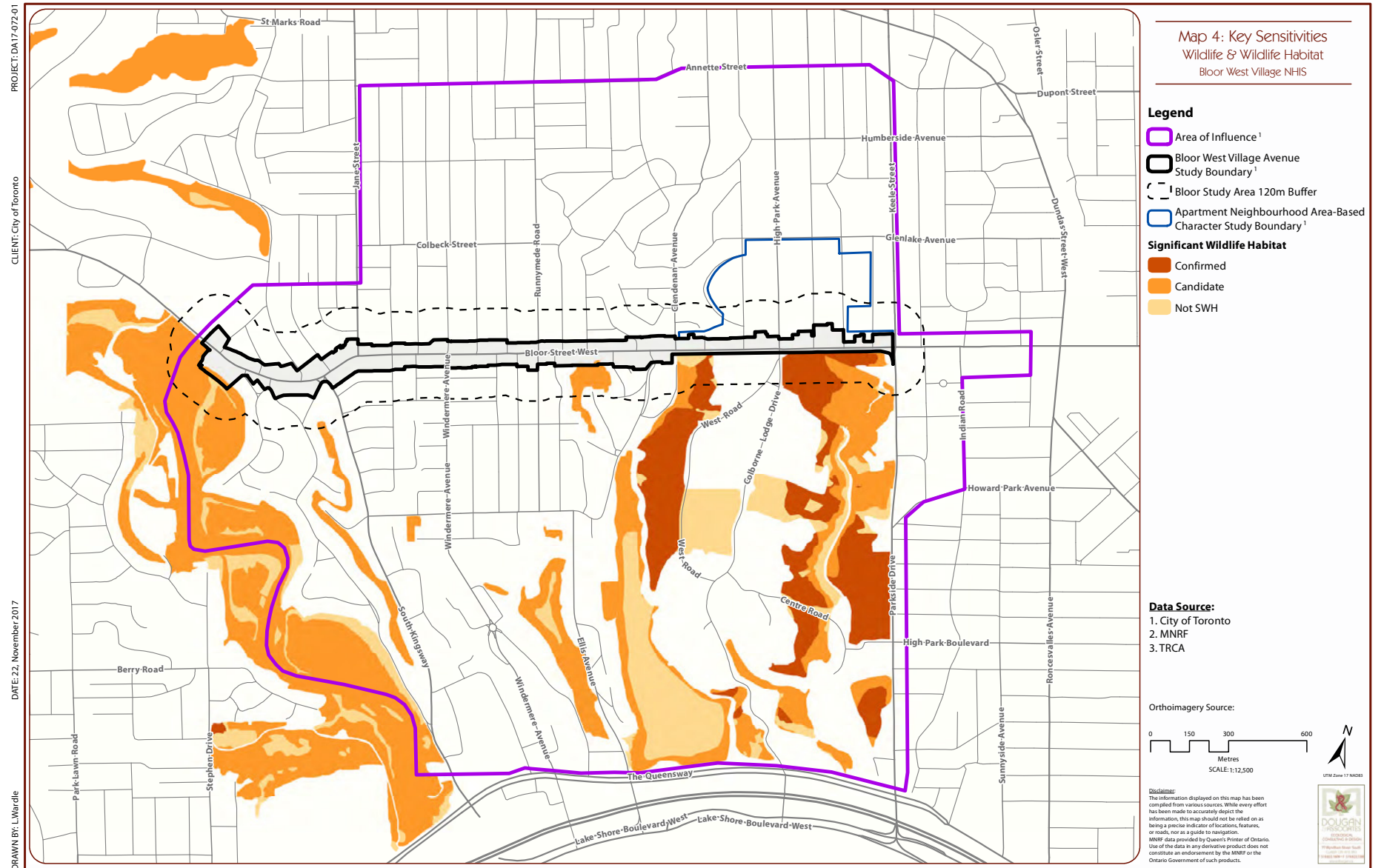


Figure 10.9 Wildlife

Characterization: Areas of Influence

Within the broader area of influence beyond High Park and Humber River Valley, there are existing established neighbourhoods with mature urban forest canopy that correspond to a complex topography. Several ESAs are present in this broader area as well (on the South Kingsway West Flank, South Kingsway East Flank, and Rennie Park). There are also several ravine fragments throughout (steep slopes north and south of Bloor Street West; and deciduous swamp, and seepage from the No Frills Parking Lot down to the end of Dacre Crescent) as well as wetlands that provide breeding and migratory habitat for diverse bird species. For the ESAs and ravine features there is existing Municipal policy protection in force.

Potential Impacts

Impacts related to new built form are limited within the Bloor West Village Avenue Study Area. The potential impacts depend on location and nature of development, and could include: tree canopy loss, slope impacts, increased hazard of buildings to migratory & breeding birds, removal of habitat for Species at Risk (e.g., chimney swifts, bats), construction impacts to wildlife (i.e. nest removal, mortality), changes in downstream water quality and quantity, and increased impacts on High Park (due to increased use).

Impact Mitigation

The potential mitigation measures to address the potential impacts include the following: require arborist studies for development sites with trees, minimize tree loss and injury, replant removals with native, site-appropriate trees; require geotechnical study to determine long-term stable top of slope location for sites including or adjacent to steep slopes; require buildings facing High Park to have bird friendly design for entire façade; require scoped studies for SAR that use urban structures (i.e. Chimney Swift, Bats) where buildings proposed for removal to determine presence/absence, and create habitat opportunities through biodiverse green roofs and green streets.

Existing policy and guidelines provide protection and assist with mitigation. The City of Toronto currently has a private tree by-law, City tree by-law, and a Ravine and Natural Features Protection By-law to regulate and minimize tree canopy loss. Slope impacts are managed through the application of a 10 m setback from long-term stable top of slope. The Toronto Green Standard, Endangered Species Act, Migratory Birds Convention Act, Erosion and Sediment Control Bylaw and the Wet Weather Flow Master Plan Guidelines manage impacts from new development. The High Park Woodland & Savannah Management Plan helps to protect, preserve and enhance habitat, water quality, mitigate impacts of increased use and impacts on natural heritage features through restoration and park management.

Overall, direct impacts on natural heritage features and functions due to future intensification within the Bloor Street West Avenue Study area are minimal and can be mitigated, and natural heritage can be enhanced through the implementation of the recommendations in this report. Mitigation of indirect and cumulative impacts and enhancement activities is complex and requires coordinated management, policy enforcement and cooperation affecting many parties.

Mitigation and Enhancement Opportunities Outside of the Bloor West Village Avenue Study Area

A number of mitigation and enhancement opportunities exist beyond the Bloor West Village Avenue Study Area. All new projects should be bird friendly, incorporate at-source measures to improve water quality and reduce peak storm flows, not allow any discharge of groundwater, ensure greater protection for high value trees, provide biodiverse green roofs and use local and pollinator friendly plant species in landscape projects.

The City and Toronto and Region Conservation Authority can further advance efforts to mitigate impacts and enhance the quality of natural heritage. Further study of flora and fauna resources will assist with the inventory and protection of rare and sensitive species. Greater information and education about the value of High Park will also heighten the appreciation of this special and unique place. Implementing Green Streets technology will benefit water quality and quantity.

Recommendations

- Trees to be removed outside migratory and breeding bird seasonal windows; construction sites to be contained with silt fence to minimize accidental mortality
- Require buildings to have bird-friendly façades, design lighting to be bird-friendly, and have bird-friendly building management operations, with recommendation of increased standards within High Park Character Area
- Require native landscaped areas; restrict use of non-native species along streets abutting natural areas
- Require arborist studies for all development sites, minimize tree loss and injury, replant removals with native, site-appropriate trees
- Protect species at risk that use urban structures (e.g., Chimney Swifts and Bats), replace habitat if appropriate
- Require scoped, site specific studies to determine long-term stable top of slope location for sites including or adjunct to steep slopes
- Design buildings to minimize changes in existing conditions (light, soil conditions, water availability) to mature trees that will be retained on site
- Improve water quality and reduce “flashiness” of flows through at-source measures within BWV Study Area
- City to protect and improve habitat and increase resilience of High Park, in collaboration with TRCA, including continuation of High Park Oak Savannah burn and restoration work
- Require buildings adjacent to High Park to be designed to have capacity to prevent smoke intake from annual High Park burn
- Use Green Infrastructure and landscaping in the boulevard and on development sites to create habitat, especially in the section between Kennedy Avenue and Parkside Drive. Incorporate habitat structures into the built environment
- Require on-site dog courtesy areas and stewardship packages for all dog owners to be provided for all condo sites