SECTION

4

Cormorant Nesting Area, Tommy Thompson Park

4.10
BIODIVERSITY

The City's Official Plan defines biodiversity as the rich variety of life forms and recognizes the critical roles they play within varied ecosystems. The City's Official Plan also recognizes that ecological health is directly related to healthy biodiversity. The greater the biodiversity of an area, the greater the ecological health and resiliency of that area. Regeneration and renewal within a natural setting will be a critical aspect for the transformation of the Port Lands over the coming decades to ensure that the Port Lands' landscapes and habitats can continue to support a rich diversity of life as the area urbanizes.

For a city of nearly three million people, Toronto has an impressive natural heritage system and surprising diversity of plant and wildlife species. Toronto's natural system consists of a living, dynamic system that includes major landforms, watercourses and associated riparian zones, valleys and floodplains, forests, wetlands, meadows, beaches and bluffs, and other habitats (North-Shore Environmental Inc., 2012). These natural areas support a significant number of species and wide variety of ecological functions.

The landscapes and habitats within, and in close proximity to, the Port Lands are important aspects of the city's overall natural system, and include areas known for ecological succession, supporting rich biodiversity and being a concentration point for migratory wildlife. Naturalizing the mouth of the Don River and creating the Don Greenway north and south of the Ship Channel will have the broadest possible effect on Toronto's urban ecology by filling in a critical missing gap in the overall river and ravine system, linking to a spine of designated Environmentally Significant Areas south of Unwin Avenue and ultimately Lake Ontario.

While the river and Greenway will add great richness and complexity on multiple and mutually reinforcing levels and provide a renewed biophysical connection between the Don River and Lake Ontario, urban ecological systems extend beyond a city's traditional natural system. Urban areas are mosaics, consisting of a diverse range of ecologically important, connected patches and corridors of all shapes and sizes – all of which contribute to a city's ecological health. Wildlife is everywhere in Toronto. It lives and moves through our natural systems, including in our parks, big and small, in our street trees, on green roofs, and in community and backyard gardens.

Our streets and linear infrastructure, such as rail corridors and hydro corridors, play a pivotal role in connecting the various disparate areas. It is this variety of places and corridors, coupled with the provision of a diversity of native plants and vegetation suitable to local contexts, that equally contributes to Toronto's ecological health and the city's urban mosaic.

Much of the Port Lands landscape today is underutilized. This has provided opportunities for wildlife and vegetation to colonize vacant sites. The area's tapestry of corridors has also enabled movement through the area to the natural systems to the south. As the area urbanizes, a new, urban ecological balance and enrichment of the built landscape through natural solutions will be required to provide abundant biodiversity in the Port Lands.

A deeper exploration of biodiversity and the aspects required to support a rich diversity of life was undertaken with the assistance of a working group comprised of biologists, academics, nature enthusiasts and representatives from the Port Lands Stakeholder Advisory Committee and Land Owner and User Advisory Committee. Together, an approach was established for recognizing, supporting and enhancing biodiversity in the Port Lands. The approach endeavours to create an urban mosaic in the evolving landscape and the appropriate conditions to support native ecology in an urban context. Remarkably, the approach is largely consistent with earlier initiatives undertaken in the Port Lands, most notably Greening the Toronto Port Lands prepared by Michael Hough, Beth Benson and Jeff Evenson.

Toronto's greenspace system

4.10.1 Life and Nature in the Port Lands Today

The Ashbridges Bay Marsh was one of the most extensive freshwater coastal wetlands in eastern North America and was abundant with animals and diverse terrestrial, shoreline and aquatic habitats. Elizabeth Simcoe, in 1794, described Ashbridges Bay as a "low lands covered with rushes abounding with wild ducks and swamp black birds with red wings" (Innis 1965: 138).

While the rapid urbanization of Toronto and ultimate creation of the Port Lands itself led to the destruction of the marsh, the Port Lands has reemerged as an area rich in biodiversity that provides important natural habitat. The areas south of Unwin Avenue provide a diversity of terrestrial, shoreline and aquatic habitats within a number of designated Environmentally Significant Areas, including Cherry Beach, Base of the Spit and Tommy Thompson Park. More than 400 plants, 314 birds, 19 mammal and 12 reptile and amphibian species have been recorded in Tommy Thompson Park (TRCA 2011).

There are also a number of vacant and underutilized sites that have regenerated as meadows, wetlands or small woodlots. In some instances, these sites have limited ecological form and function on account of occasional maintenance that occurs. They nonetheless contribute to the overall natural system that exists in the Port Lands today. The Portlands Energy Centre (PEC) has been actively implementing reforestation and planting programs on their site, which has created habitat for native and migratory wildlife. The infrequently used rail corridors also provide important terrestrial connections for wildlife.

The water features present immediately within the Port Lands provide little opportunity for aquatic habitat today. The Ship Channel, which will continue to be used for port activity, is characterized by a hardened shoreline of concrete and sheet pile walls with little to sparse instream vegetation. Most fish species that have been documented in the Ship Channel are transient, using the limited habitat available for foraging. Similarly, the Keating Channel lacks habitat diversity and complexity with limited in-stream cover (DMNP EA, 2015).

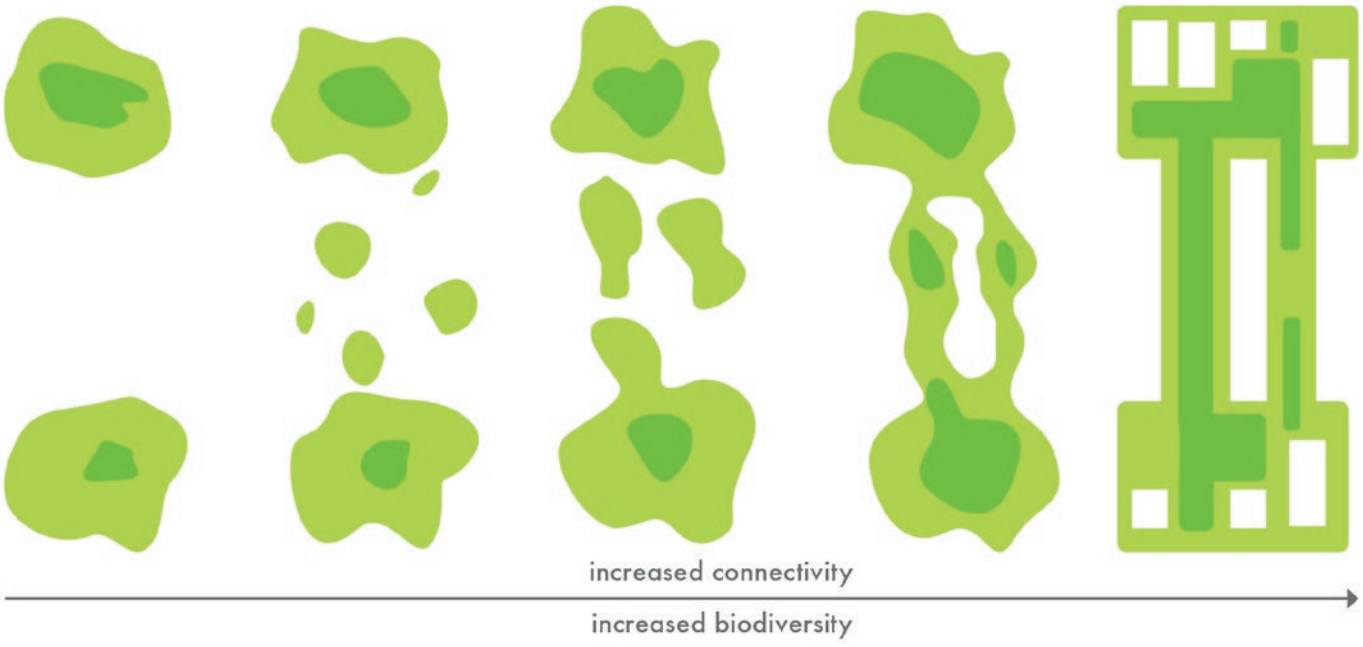
The opportunity for the Port Lands as regeneration and renewal unfolds over the coming the decades is to create new natural areas, expand existing natural areas and improve and create new aquatic habitats. The Port Lands may also recognize the importance of providing a variety of green and naturalized spaces throughout the geography to contribute to a healthy urban ecology.

4.10.2 Urban Mosaics and Biodiversity

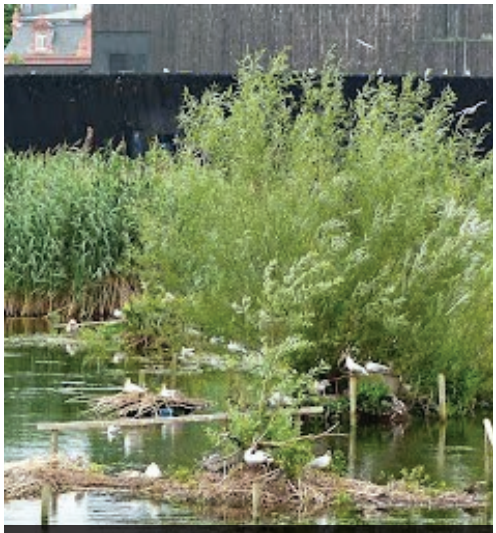
Urban areas are mosaics with a diverse range of connected, ecologically important patches and corridors of all shapes and sizes, all of which contribute to a city's ecological health. Where there is an increased number of habitats and microhabitats providing habitat heterogeneity, the more species an area can support (Forman, 2014).

Critical to maintaining and enhancing biodiversity in urban areas is ensuring a network of connected natural areas and open spaces anchored by major natural systems. Green spaces, of all different sizes, that work to create a connected system while providing natural habitat, can maintain viable populations of species that would otherwise disappear from urban environments (Haq, 2011; Byrne and Sipe 2010).

There are numerous opportunities for enhancing biodiversity in the Port Lands, from within the major new natural areas and aquatic habitats, to the creation of small, interconnected patches of upland habitat, and through ensuring well-designed urban spaces and buildings that include natural features and elements.



Patch, Corridors Mosaic
Source: Waterfront Seattle Framework Plan, 2012



In stream habitat

Urban bird box

Corktown Common

Honeycomb Bee Hotel

Rouge Park understorey

Stork nest on a transmission tower

Wetted fringe

Stormwater feature in La Confluence, Lyon

Tommy Thompson Park

Natural Areas and Aquatic Habitats

The naturalization of the mouth of the Don River will deliver five hectares of terrestrial habitat within the constructed river valley system, as well as create and enhance 14 to 15 hectares of aquatic habitat. A series of levies will be introduced that will create 13 hectares of wetlands. These wetlands would provide habitat for fish, birds and turtles among others. An objective of the project is to also establish habitat to support game fish, including walleye, northern pike and other native species.

In the Keating Channel, the placement of stone armouring (revetments) will act to stabilize existing dockwalls and simultaneously provide structure for fish habitat. There could be similar opportunities along the Ship Channel's northern dockwall that should be explored in future, more detailed, planning. A portion of the Ship Channel's dockwall will also be removed at the Don Greenway allowing lake water from the Ship Channel to enter into a constructed coastal wetland. The lakefill associated with the creation of Promontory Park and relocation of Cherry Street will result in the creation of two shallow aquatic habitat coves with coastal forest and successional habitat features (Figure 75).

The Don Greenway south of the Ship Channel, coupled with the realignment of Unwin Avenue, will create additional, large contiguous natural areas capable of sustaining robust habitat and wildlife. The Greenway has been expanded from the area originally contemplated in the Central Waterfront Secondary Plan. This expanded area will provide enhanced naturalization opportunities, complete the Don River sequence and improve public access south of the Ship Channel.

The realignment of Unwin Avenue also has the potential to create anywhere from three to six additional hectares of natural area contiguous to the Cherry Beach Extension Environmentally Significant Area (ESA) depending on the final alignment of the street. This net environmental gain would enable greater ecological diversity, habitat functionality, terrestrial connectivity, and reduce wildlife interactions on Unwin Avenue.

Figure 75:
North Habitat Cove Enlargement

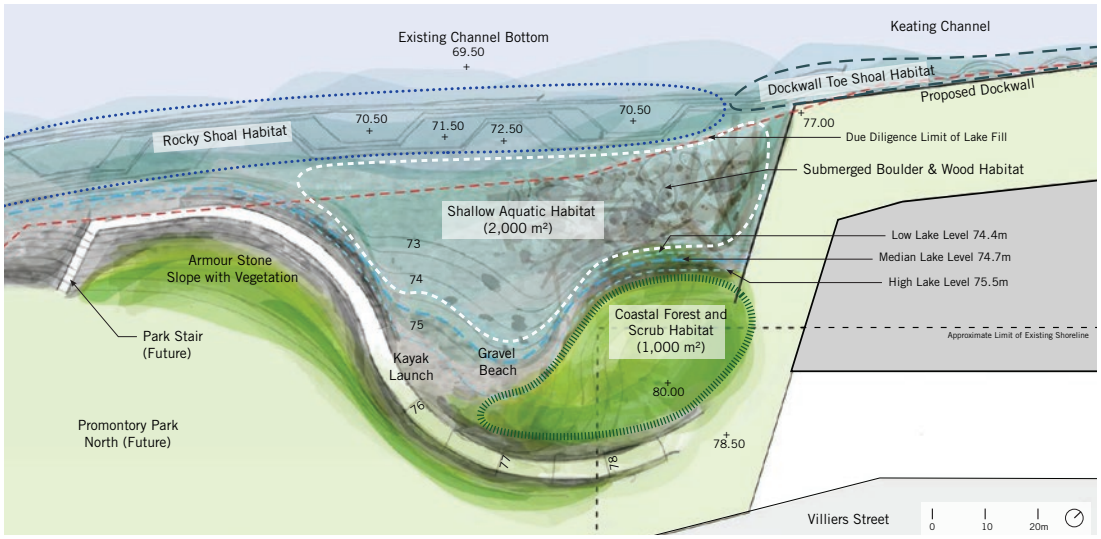
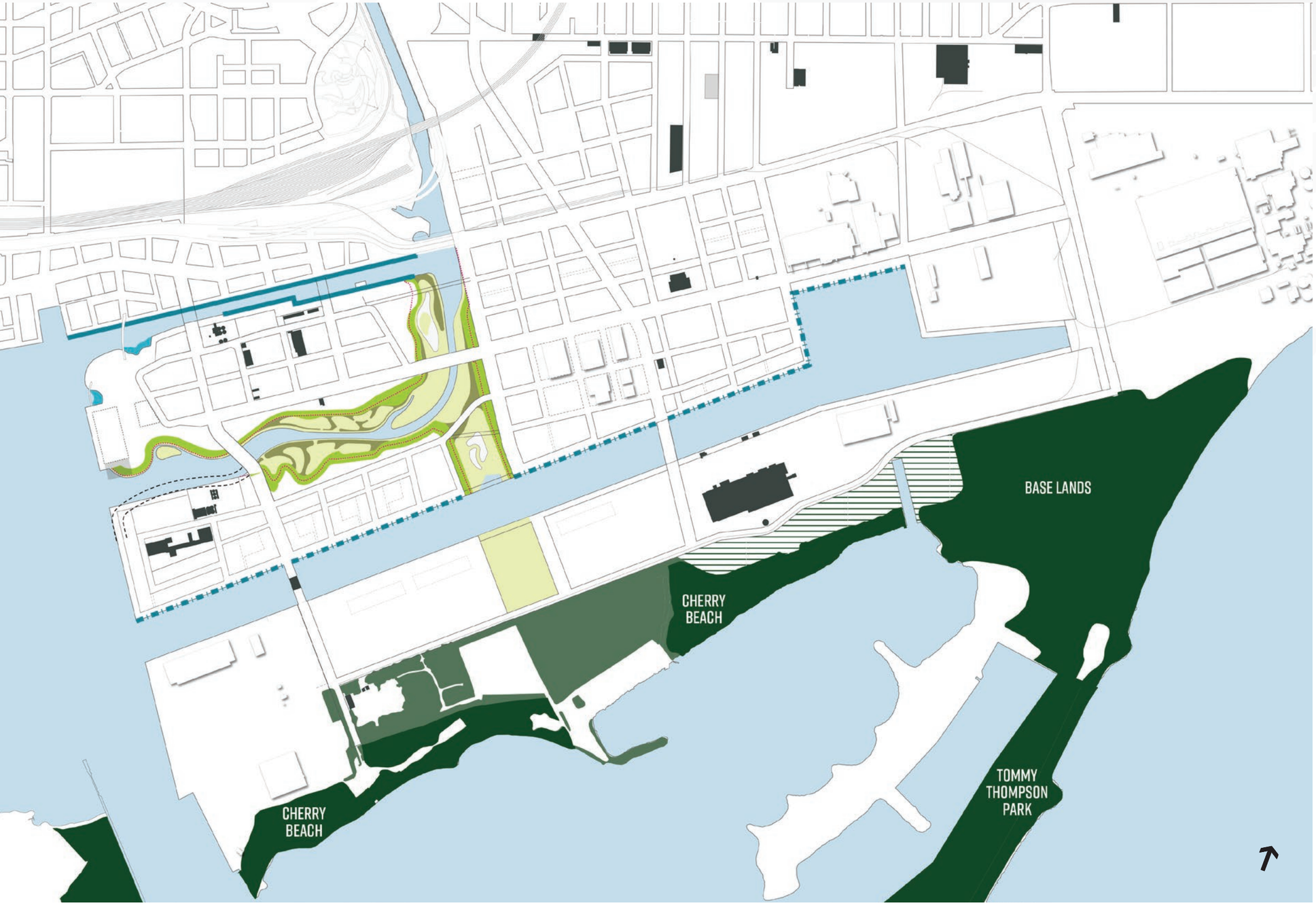


Figure 76: Natural Areas and Aquatic Habitats



- Aquatic Habitat/Waterways
- Lake Connected Wetlands
- Wetland Levee System
- Valley Habitat
- Top of Bank
- Aquatic Habitat Cove
- Stone Revetments
- Aquatic Habitat Enhancement Opportunity
- Existing Natural Cover
- Environmentally Significant Areas
- Net Environmental Gain Zone
- Future Naturalization

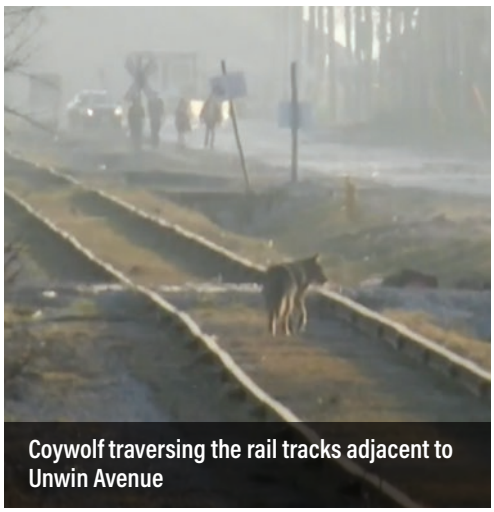
Small, Interconnected Patches of Upland Habitat

An important aspect of the city's urban mosaic is ensuring small-interconnected patches of habitat. The variety of existing natural cover and vegetated areas dispersed across the Port Lands have contributed to the city's urban mosaic. As the area transforms, smaller nodes and patches of naturalized plantings will be needed that would interconnect to the broader natural system. Equally important, is ensuring native planting in all areas are suitable to a waterfront context.

Well-Designed Urban Spaces and Buildings

In Toronto, many initiatives have been put in place, or are being advanced, that are globally recognized and contribute to the urban mosaic and collectively lessen the impact of the built environment on the natural environment. Toronto's **Bird-Friendly Development Guidelines** provide design guidance for building design and lighting to reduce bird strikes. The **Green Roof Bylaw** and **Guidelines for Biodiverse Green Roofs** assist in creating green spaces on rooftops that support insects and some birds. The **Toronto Green Standard** includes development performance measures that help preserve the urban forest and ensure native species are planted.

The City is currently exploring the introduction of a green streets program and a City-wide biodiversity strategy. These initiatives, however, need to be supplemented by enhanced direction to ensure well-designed urban spaces and buildings that are contextually specific to the Port Lands. This includes providing generous landscaped setbacks in key areas, using naturalized, low-impact design for on-site stormwater management, integrating wooded copses or hedgerows in new development and parks and open space design where possible, and designing streets to enable wildlife movement in and through the area.



Coywolf traversing the rail tracks adjacent to Unwin Avenue

Natural cover in the Port Lands

Cherry Beach ESA

4.10.3 Biodiversity in the Port Lands

The commingling of active creative, industrial and port areas with post-industrial neighbourhoods offers new opportunities to think creatively and sustainably in terms of the integration of ecology and enhancements to aquatic and terrestrial habitat in the Port Lands. Development and initiatives that consider the needs of all life forms can contribute to the identity for the Port Lands and complement the public realm experience.

The approach generated by the working group to ensure a biodiverse future for the Port Lands built on the many ideas generated at the two-day Port Lands Charrette, such as providing a diverse and multi-functional public realm and allowing for new ecologies and uses throughout the geography.

The approach consists of three guiding principles and five structural layers to create the Port Lands urban mosaic and a series of strategies to ensure successful implementation and appreciation of the special environment that will be created in the Port Lands. The principles, structural layers and strategies will ensure that ecology is a key consideration in the transformation of the Port Lands.

Principles

1. Enhance Ecosystem Structure and Function

The recognition and enhancement of the network of natural areas and Environmentally Significant Areas will have the greatest contribution to the creation of a biodiverse Port Lands and city. It will create the conditions where an appropriate Lake Ontario waterfront native ecology can (re) populate and flourish.

The integration of semi-natural areas and improving the diversity of native vegetation within a waterfront context will likewise provide important contributions towards biodiversity and enhancements to ecosystem structure and function. This requires ensuring both a mature and robust tree canopy, but also enhancing the canopy with understorey plantings and native grasses throughout the Port Lands geography.

Lastly, enhancing the health of soil and water will also influence the type and amount of biodiversity present in the Port Lands in the future. Today, at least 75 per cent of species in the Port Lands are invertebrate species which are equally important to biodiversity and thrive in diverse types of soil. Further riparian habitats, which are located next to water, are highly dynamic and contribute to high levels of biodiversity.

2. Connect Natural and Semi-Natural Areas

Connecting natural and semi-natural areas through a network of green corridors and passageways will enable wildlife movement throughout the area. Numerous opportunities exist within the Port Lands to create ecosystem connectivity by establishing a connected system of green streets, natural areas, parks and open spaces of all sizes and maintaining existing rail corridors in a relative natural state. In addition, these physical connections, can provide social connections for people to nature, which can encourage a sense of stewardship over the ecology of the Port Lands.

3. Design the Built Environment with Nature in Mind

Designing the built environment with nature in mind will further support native ecology and ecosystem services. The incorporation of green roofs, walls and infrastructure, as well as native landscaping at the site level will not only enhance the performance and efficiency of buildings, but also contribute to improving biodiversity and assist in replicating the system of nodes and patches currently found throughout the Port Lands geography.

The Port Lands Urban Mosaic

The Port Lands urban mosaic will be achieved through a series of structural layers. The layers are mutually reinforcing, address the principles and are the collective prerequisites for a healthy and natural environment to support biodiversity. Figure 77 provides a composite of the structural layers.

Major Natural Systems

The existing and planned major natural areas and aquatic habitats are the foundation for the Port Lands mosaic. The natural areas will be included as part of City's Natural Heritage System. They consist of large contiguous landscapes capable of providing a diversity of habitats and functions. The naturalized mouth of the river, Don Greenway north and south of the Ship Channel, coupled with wild, natural areas south of the realigned Unwin Avenue comprise the major natural systems.

Other Major Parks and Open Spaces

The other major parks and open spaces in the Port Lands will offer a range of additional opportunities for integrating naturalized plantings and ecological function at a larger scale. These parks and open spaces are distributed across the Port Lands geography and naturalized plantings can be accommodated alongside park programming. These opportunities could include the provision of small woodlots or copses with understory plantings, hedgerows and naturalized stormwater demonstration projects.

Nodes and Patches

Nodes and patches are smaller green spaces that play an important role in increasing the structural complexity and functional connectivity of a city's urban mosaic by providing stepping stones, as well as local habitat that supports pollinators, insects, birds and other small animals. The nodes and patches will be connected to the broader system through a series of wildlife linkages.

As the Port Lands develops, these nodes and patches will become increasingly important from a biodiversity perspective. As part of the larger system, they provide additional habitat heterogeneity on a smaller scale. The nodes and patches include smaller parks and open spaces, and also wide landscaped setbacks and open space features within larger sites, particularly in areas adjacent to the wild, natural areas south of Unwin Avenue.

Wildlife Linkages

Wildlife linkages unite the system of major and smaller natural areas, and support the movement of plants and animals. Wildlife linkages also increase resilience, as organisms are able to move to areas with more favourable conditions.

The wildlife linkages include continuous linear open spaces along Lake Shore Boulevard and adjacent to the Don Roadway, bioswales and landscaped open channels within new and improved streets and rail corridors. These linkages are continuous across different geographies connecting the major natural systems, parks and open spaces, and nodes and patches.

Naturalized Development

Naturalized development will fill in the remaining gaps in the overall system, enrich the built landscape through natural solutions, and ensure the Port Lands fully develops as a thriving urban ecosystem over the coming decades. All developments will need to demonstrate enhanced naturalization and biodiversity features that go beyond what is currently required by the Toronto Green Standard. This could include constructed habitats, such as bee, bat or bird boxes, on-site, at-grade native greening, integrated stormwater features, pollinator landscapes, hedgerows and treed areas incorporated within the site and on the building envelope. All mixed use, commercial, industrial and institutional development should contribute to the Port Lands ecological network through the incorporation of biodiversity-supporting features and installations.

Figure 77: Port Lands Urban Mosaic

Major Natural Systems

Other Major Parks and Open Spaces

Nodes and Patches

Wildlife Linkages

Linear Open Spaces

Bioswales

Rail Corridors

A green wall

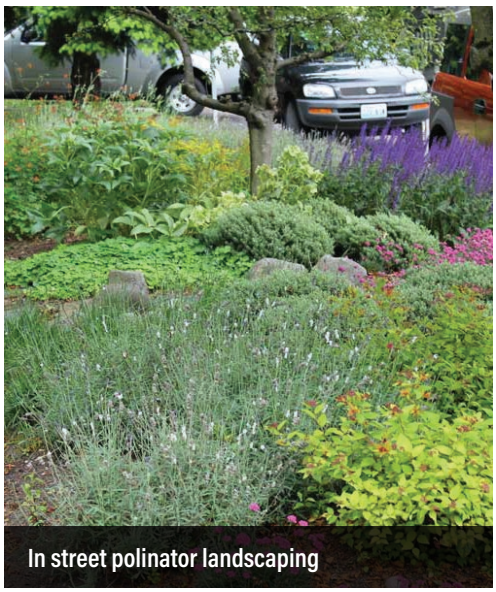
Leslie Barns Green Roof

Rainwater collection pond

A green wall

Urban bioswale

The Highline



In street polinator landscaping

Allotment Gardens

Planter boxes on seating

Ensuring Success

The working group also identified that in order for successful integration of ecological considerations in the Port Lands' transformation, a legal framework, partnerships, education and monitoring were equally as important as the principles and structural layers.

Policy and Legislative Tools

All the policy and legislative tools at the City's disposal need to be utilized to ingrain the principles and structural layers, but also to ensure these are actionable and enforceable. Precinct planning and context planning will be utilized to flesh out the principles and layers in more detail, including establishing native plant species to be utilized in the various open spaces and within wildlife linkages. This will be a critical stage in the process and buy-in from City Divisions and Agencies will be needed due to the potential for alternative maintenance and operational requirements. Demonstration projects that are designed to not only provide biodiversity benefits, but also reduce long-term maintenance requirements and costs should be advanced and explored. Zoning by-laws will need to include enhanced performance standards for setbacks and landscaping on site. Site Plan Control will likewise be a critical process where site specific details will be detailed and secured in agreements registered on title.

Partnerships

Many biodiversity projects in Toronto are completed by stewardship groups, researchers, students, and dedicated volunteers, including monitoring migratory bird populations by the Tommy Thompson Park Bird Research Station, Portlands Energy Centre habitat restoration by University of Guelph students, the Lower Don trail development by Evergreen and species inventories by BioBlitz Ontario.

Partnerships with a range of stakeholders, such as education and academic institutions, stewardship organizations, volounteers and future residents, will be needed. First Nations will be important partners in stewarding and advancing a biodiverse Port Lands.

The creation of biodiverse landscapes will take years or decades. Early actions will sow the seeds for a beautiful and ecologically functional Port Lands landscape. Early actions could include tree planting events, creating pollinator gardens, planning invasive species pick parties and undertaking habitat stewardship projects in the many existing and planned natural areas and park spaces.

Education

The biodiversity working group felt that educating future inhabitants, workers and recreationists was critical to the success of biodiversity initiatives. A healthy ecosystem that provides functional habitats to support food webs, and is reliant on healthy natural conditions with some areas remaining pristine and untouched by the influences of people, is desired. Educational projects, initiatives and events will be needed to create understanding and awareness of the fragile natural systems throughout the Port Lands. In particular:

- Opportunities must be created for residents and visitors to have positive and educational experiences with urban nature;

- Urban nature should be integrated into daily life by incorporating information, signage and educational displays in public spaces and private developments; and

- Building awareness of the Don River and other natural features to ensure a healthy coexistence between people and nature.

Monitoring

Monitoring and ensuring continuous and ongoing inventorying of natural areas as the area urbanizes will be needed. Monitoring will enable the City and partner Divisions and Agencies to gauge the success of efforts, but also proactively problem solve and adjust approaches and initiatives as needed.

Monitoring could include developing and strengthening tools for managing biodiversity information. These tools could include biodiversity indicators, mapping, information requirements and reporting. A monitoring program will need to be developed that would include (among others):

- Determining and measuring the ongoing health of the habitat in an area;

- Determining whether the practices implemented are effective;

- Including an adaptive management approach and determining if modifications are required; and

- Assessing the long-term maintenance costs and performance associated with green infrastructure and comparing to traditional infrastructure.

Much of the current success of ecological conservation, restoration and enhancement in Toronto has been the result of the combined efforts of passionate individuals and organizations in the private, public, academic and not-for-profit sectors. Volunteers, or citizen scientists, could assist in the collection of ecological data, such as is done with the Don River Watershed BioBlitz. Citizen science can also be used to improve local knowledge and instill a passion for the Port Lands natural areas and public realm features that will do triple duty.

Evergreen tree planting event

2015 Don River Watershed BioBlitz

4.10.4 Recommendations

The Port Lands urban mosaic provides a framework to view the Port Lands' future landscape through an ecological lens. The creation of the Port Lands mosaic will be realized through a series of recommended policies and actions that integrate and align with the City's, Waterfront Toronto's, and the TRCA's approach to sustainability and the environment. These recommendations are designed to complement and build upon existing policies, processes and plans, while providing leadership in city-building with consideration of biodiversity in all facets of the Port Lands transformation.

Biodiversity refers to the rich variety of life and the critical roles they play within varied ecosystems. This includes diversity within species, between species and of ecosystems. A biodiverse Port Lands will be achieved by:

- **Enhancing ecosystem structure and function;**
- **Connecting natural and semi-natural areas; and**
- **Designing the built environment with nature in mind.**

The following will be required for all development and/or public works, as applicable, to ensure a biodiverse Port Lands:

- **protecting, restoring and enhancing natural heritage features and functions, including Environmentally Significant Areas;**
- **creating new, connected natural areas and greenways and net environmental gains associated with Environmentally Significant Areas;**
- **integrating large areas of naturalized plantings and/or habitat as a component of the design for larger parks and open spaces;**
- **supporting wildlife movement through the Port Lands by creating habitat linkages, built landscapes and by retaining decommissioned rail corridors into the Port Lands as landscape features;**
- **providing habitat at the site level, including retention or replacement of existing natural cover, enhanced landscaped setbacks, naturalized planting, hedgerows, and/or integrated stormwater management;**
- **ensuring buildings contribute to biodiversity through measures such as, but not limited to, biodiverse green roofs designed to meet the City's Guidelines for Biodiverse Green Roofs, green walls and enhanced bird collision deterrence measures;**
- **providing dedicated spaces within new communities for dog off-leash areas that are physically separated from natural areas;**

Official Plan Policy Direction | Future Follow-on Work | Continued Consultation

- siting trails/public spaces to maximize functional core habitat within large natural areas to avoid bisecting and fragmenting habitat; and
- using exterior site lighting, street lighting or lighting for any recreational uses within or adjacent to natural areas that is fully cut-off and designed to minimize excess light, skyglow, glare and light spillage.

At precinct planning or prior to rezoning land in a precinct, or at Site Plan Control where a rezoning is not required, a Naturalization Plan will be prepared.

Infrastructure and capital projects, such as new streets, street reconstruction, bikeways, and multi-use pathways, will provide habitat and wildlife corridors, and will include, but not be limited to eco-passages, wildlife crossings and naturalized landscaping including understorey plantings and enhancements to the tree canopy. Interpretative signage will also be incorporated to educate the public on any biodiversity features.

Naturalization Plans will include, but not be limited to, the following:

- Identification and evaluation of any natural features, natural cover and habitat (terrestrial, aquatic and wetland) within or adjacent to the precinct/site and wildlife species (migratory and colonizers);
- Identification of enhancement strategies to improve existing natural features and habitat as part of development;
- Identification of parks and open spaces, nodes and patches and opportunities and approaches for integrating habitat opportunities alongside other programmatic elements in these areas;
- Identification of the location and depth of landscaped setbacks and amount of landscaped open space at grade on development sites;
- Identification of any opportunities for integrating existing natural cover or hedgerows;
- Identification of the wildlife linkages within the precinct or site, and approaches for landscaping and accommodating wildlife movement, including concept designs for linkages with plant lists for achieving species diversity within a waterfront context;
- Identification of the specific strategies to be employed in the precinct or site for naturalizing development and to achieve a net environmental gain.

The City will update Map 9: Natural Heritage to reflect the natural areas identified in this Framework.

Official Plan Policy Direction | Future Follow-on Work | Continued Consultation

The City, Waterfront Toronto and the TRCA, in consultation with Ports Toronto, will explore opportunities to improve aquatic habitat in the Ship Channel as part of precinct planning and/or during the design of water's edge promenades.

The City, Waterfront Toronto and the TRCA will advance a biodiversity monitoring program in partnership with academic institutions, First Nations, stewardship groups and stakeholders to monitor the state of biodiversity in the Port Lands as the area transforms. The monitoring program should address:

- the identification of biodiversity indicators for species, habitats, and environmental health;
- the establishment of a baseline for periodically measuring the state of biodiversity within the Port Lands;
- the identification of gaps in biodiversity knowledge in the Port Lands; and
- the approach for ongoing evaluation of the impacts of existing, planned and proposed development on biodiversity in the Port Lands.

Opportunities for educational opportunities and programs on biodiversity in the Port Lands will be explored, including interpretative signage in the detailed design and implementation of infrastructure and parks and open spaces.

Waterfront Toronto, as part of their Innovation and Resiliency initiative, will include biodiversity elements as key considerations.

All purchase and sale agreements from publicly owned lands will include clauses relating to natural areas and wildlife. The provision of instructional material and orientation tours will also be provided for new residents and workers on the natural features and habitats in the area.

The City, Waterfront Toronto and TRCA will explore opportunities for establishing an interpretative centre in the Port Lands.