

SECTION 2

DEVELOPING A RESTORATION STRATEGY

The evaluation of a specific site and its regional and local context are key steps in the restoration process. The regional context considers adjacent lands and ecosystems and will indicate the limitations and opportunities for restoration. These physical conditions in combination with the planning or policy environment will set the overall direction for restoration. The site inventory and evaluation consists of a detailed description of the site and adjacent lands, assessment of habitat significance, and the need or potential for restoration. It lays the framework for setting objectives and developing the plan.

STEP 1 DETERMINE REGIONAL CONTEXT

No site can be understood in isolation. The purpose of this step is to focus attention on how the property fits into its larger regional and local context—the biophysical and cultural features, urban and rural land uses, service corridors, official plans and policies of the area.

Step 1 contributes to the following elements of the restoration plan:

	REPORT	ILLUSTRATIVE MATERIAL
	<i>Introduction</i>	
<i>STEP 1</i>	<i>Determine Regional Context</i> a) What do planning documents say about the site and surrounding areas? b) How does the site fit within regional ecological goals? c) How do the site's natural and cultural features link with the larger context? d) What are the policy requirements?	<i>Context maps</i> <ul style="list-style-type: none">◆ site location/regional context;◆ context plan with surrounding natural and man-made features;◆ ownership patterns/jurisdictions.
<i>STEP 2</i>	<i>Inventory and Evaluate Site Conditions</i>	<i>Site inventory maps</i> <i>Photos</i>
<i>STEP 3</i>	<i>Set Restoration Objectives</i>	
<i>STEP 4</i>	<i>Draw up Restoration Plan</i>	<i>Restoration drawings and documents</i>
<i>STEP 5</i>	<i>Implement, Manage and Monitor</i>	<i>Contract Documents</i> <i>Management plan</i>

a) What do planning documents say about the site and surrounding areas?

To understand the site within its regional context, examine existing studies and plans that might provide an overall context for restoration initiatives. These could include:

- watershed studies (conservation authorities);
- regional and municipal official plans;
- waterfront studies, such as the Lake Ontario Greenway Strategy (Waterfront Regeneration Trust) or municipal waterfront planning studies;
- regional planning studies, such as the Oak Ridges Moraine studies (Ministry of Natural Resources).

Reality Check

Such planning documents are often broad in scope, and might not include specific regional goals for restoration.

Ideally, regional (and bioregional) goals for protection and restoration should include a representation of all habitat types in each stage of succession. It is, therefore, advisable to ask agencies such as the Waterfront Regeneration Trust, Ministry of Natural Resources, or local conservation authority whether or not a bioregional habitat priorities study or similar document exists. Such a study would identify existing habitats and those that have disappeared from the landscape, and could help to focus restoration efforts to create the most value for the bioregion.

b) How does the site fit within regional ecological goals?

When evaluating a site, focus on the regional significance of its habitats and consider the following questions. Does it:

- satisfy regional priorities and targets for specific areas or habitat types? (these may be found in the documents listed above)
- link existing natural features and reduce fragmentation?
- complete or reinforce riparian habitat and other biological corridors?
- increase regional or local diversity of habitat?
- re-establish habitat(s) where none exists?

- ♦ provide buffers between significant natural features and existing or proposed land uses?
- ♦ provide educational initiatives for direct involvement by the public and existing communities?

c) How do the site's natural and cultural features link with the larger context?

A review of the site's natural attributes within its regional and local context may identify important opportunities to integrate it with surrounding natural and cultural areas. Consider the following possibilities.

- ♦ Are there water features, such as streams, rivers, ponds, lakes, wetlands, on the site or nearby?
- ♦ Are there other features of regional or local significance such as old-growth woodland, geological formations, groundwater reserves on site or in adjacent areas?
- ♦ Are there significant and/or designated cultural, historic, or archeological sites present?
- ♦ What is the zoning of the adjacent lands? Are existing natural features protected?

Air photos and topographic maps are useful tools for assessing regional and local character and gaining a general understanding of the relationship of the site to its surroundings. Official plans can shed light on zoning, the ultimate use of surrounding lands, and what natural features will be protected.

d) What are the policy requirements?

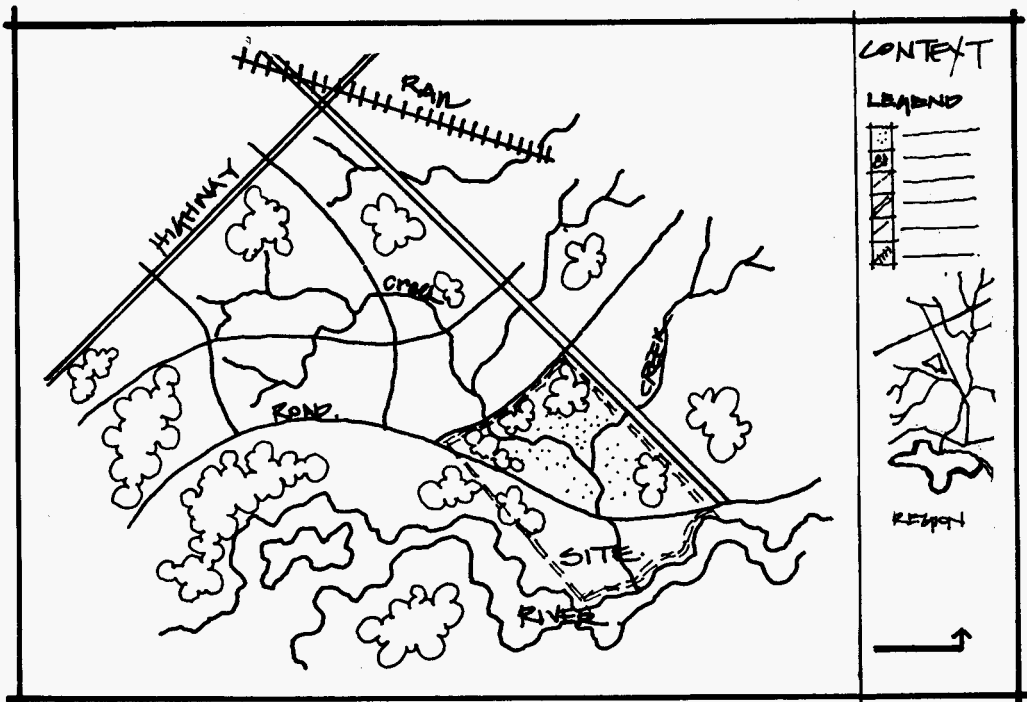
Policies and guidelines of the Planning Act are incorporated into regional and municipal official plans. These plans are important documents in guiding protection and restoration of natural habitats. Additional relevant information can be found in the policy statements. Natural Heritage, Environmental Protection and Hazard policies, and the Economic Community Development and Infrastructure policies contain important considerations for restoration.

Other applicable legislation includes the Fisheries Act. This statute protects fish habitat, which can be broadly defined as anything a fish species may require during its life cycle including water quality and quantity, substrate, aquatic and riparian vegetation, phytoplankton, zooplankton and macroinvertebrates. The goal of the associated policy is to achieve a net gain in fish habitat.

In addition to these acts and policy statements, conservation authorities may have specific regulations and guidelines on riparian habitats, and municipalities may have pertinent zoning by-laws and other caveats.

Step 1 Summary

The review of a site's larger context provides a key to understanding its significance from ecological, planning and policy points of view. Such a study reveals the constraints and opportunities that influence the site, provides direction for actions that should be taken, and reveals how the property can contribute to the health of the larger



Sample site context map

STEP 2 INVENTORY AND EVALUATE SITE CONDITIONS

Prior to embarking on a restoration project it is essential to understand how the ecological features of the site function, as well as the significance of different habitats, their relationship to present and proposed human uses, and how badly they have been disturbed. This step should be undertaken with the previous analysis of context in mind.

Step 2 contributes to the following elements of the restoration plan:

	REPORT	ILLUSTRATIVE MATERIAL
	<i>Introduction</i>	
<i>STEP 1</i>	<i>Determine Regional Context</i>	<i>Context maps</i>
<i>STEP 2</i>	<p><i>Inventory and Evaluate Site Conditions</i></p> <p>a) Reading the landscape and its function:</p> <ul style="list-style-type: none"> ◆ surrounding landscape types; ◆ immediately adjacent habitats; ◆ on-site physical conditions (topography, soil types, drainage characteristics); ◆ habitat types, characteristics, condition (woodland, wetland, meadow, riparian, river mouth, shoreline). <p>b) Assessing the significance of the landscape:</p> <ul style="list-style-type: none"> ◆ ecological age; ◆ native species; ◆ habitat size; ◆ continuity; ◆ rarity; ◆ diversity. 	<p><i>Site inventory plan</i></p> <ul style="list-style-type: none"> ◆ natural, human-made features; ◆ ecological conditions of habitats; ◆ evaluation notes. <p><i>Photos</i></p> <ul style="list-style-type: none"> ◆ accompanying photos of site (panoramic, specific habitats); ◆ aerial photographs.
<i>STEP 3</i>	<i>Set Restoration Objectives</i>	
<i>STEP 4</i>	<i>Draw up the Restoration Plan</i>	<i>Restoration drawings and documents</i>
<i>STEP 5</i>	<i>Implement, Manage and Monitor</i>	<i>Contract documents Management plan</i>

a) Reading the landscape and its function

The following checklist will help identify the characteristics, physical conditions, and types of habitat on the site and surrounding lands. These will influence the possibilities and nature of the proposed restoration.

I. Identify the predominant type of surrounding landscape (arranged from most to least disturbed):

- residential/commercial;
- industrial/utility;
- rural village;
- agricultural area;
- natural area;
- other.

Although there may be similar habitats in several landscapes, they may function differently. In urban areas, the habitat will be subjected to stresses by humans, pets, and introduced plant species, and will likely support only very common plants and animals. This does not lessen the importance of these habitats, however. They can be extremely valuable locally, but have less priority than more regionally important sites. At the other end of the scale, there is potential to provide or enhance habitat for forest-interior and area-sensitive species in forested landscapes.

II. Identify the immediately adjacent habitat:

- urban;
- row crops;
- manicured park or cemetery;
- hay or pasture;
- pits with cooperative rehabilitation plans;
- herbaceous meadow;
- shrub meadow;
- forest;
- wetland;
- other.

This will indicate whether or not there are opportunities to enlarge an existing natural area or if the site is constrained by adjacent land uses.

If the habitat is isolated by adjacent land uses, determine the distance to the nearest natural area that is 4 ha in area or larger:

- > 2 km
- 1.5 to 2 km
- 1 to 1.5 km
- 0.5 to 1 km
- < 0.5 km

The farther the site is from adjacent natural patches, the more it will have to function on its own, with limited plant and wildlife recruitment from external sources. Areas within 500 m of an adjacent patch will support a greater diversity of species than an isolated area of the same size.

Is the area:

- isolated from adjacent natural areas?
- connected by:
 - a narrow grassy fencerow;
 - a shrubby or treed fencerow 5 m wide or less;
 - a vegetated corridor 5 to 30 m wide;
 - a vegetated corridor 30 to 100 m wide;
 - a vegetated corridor wider than 100 m;
 - a first- or second-order stream;
 - a third- or greater-order stream?

Chapter 3 of *Ecological Restoration Opportunities for the Lake Ontario Greenway* provides a discussion on corridors and wildlife species likely to use them.

Corridors:

- provide habitat for certain species, some of which may not occur in adjacent habitats;
- facilitate movement of plants and animals through the landscape;
- act as a filter or barrier to species movement;
- may be a boundary to home ranges, and may increase wildlife diversity by creating visual boundaries between territorial birds.

Corridors also result in more soil moisture, more organic matter in the soil, and changes in wind and solar radiation.

Urban corridors are beneficial because they provide habitat for species that might otherwise be absent. Common wildlife species such as White-Footed Mouse and Eastern Chipmunk will use them to move between habitat patches.

In rural areas, narrow corridors have the potential to guide predators into connected natural areas, potentially reducing the reproductive success of more sensitive species. It has been suggested that rural corridors should be at least 100 m wide. Streams and stream corridors frequently have a dual function, acting as travelways for wildlife and providing a hydrological connection and flow of nutrients through the site.

By characterizing a site using the above checklists and consulting the *Ecological Restoration Opportunities for the Lake Ontario Greenway* report, you should be able to predict how your site will interact with the broader landscape, and what opportunities and constraints exist.

III. Determine the on-site physical conditions that present opportunities and constraints for landscape restoration.

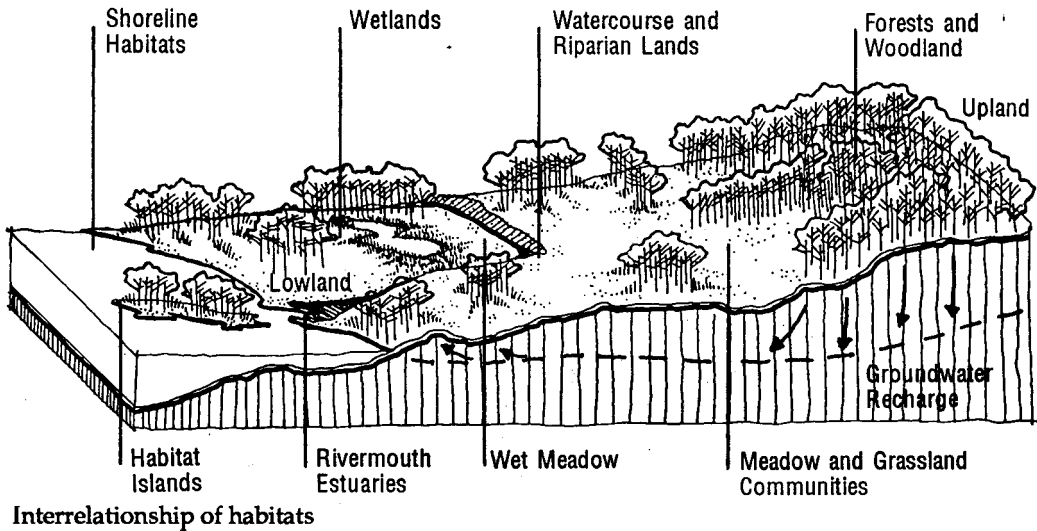
Certain physical (abiotic) features are critical in determining what plant and wildlife communities an area can support. These factors are listed in the following table.

FACTOR	CONDITION	IMPLICATION
SOIL DRAINAGE	<ul style="list-style-type: none"> • well drained (gravel, coarse sand, silt, loam till) • imperfectly drained (alluvium, silt loam, clay loam) • poorly drained (clay, fine sand over clay) 	<ul style="list-style-type: none"> • upland • possibly a combination of upland and wetland • wetland
SOIL DEPTH	<ul style="list-style-type: none"> • deep • shallow to bedrock 	<ul style="list-style-type: none"> • will support a wide variety of plant species • favourable for grasslands and prairies
SOIL FERTILITY	<ul style="list-style-type: none"> • fertile • infertile 	<ul style="list-style-type: none"> • will support a wide variety of plant species • favourable for grasslands and prairies
TOPOGRAPHY	<ul style="list-style-type: none"> • steep • rolling • flat 	<ul style="list-style-type: none"> • potential erosion problems, opportunities for habitat diversity • opportunity for wide variety of habitats and species • less diversity in soils, drainage, and micro-habitat

<i>SLOPE</i>	<ul style="list-style-type: none"> ◆ south facing ◆ east ◆ north ◆ west 	<ul style="list-style-type: none"> ◆ warm microclimate ◆ cold microclimate ◆ cold microclimate ◆ warm microclimate, but may be affected by dominant winds
<i>WATER</i>	<ul style="list-style-type: none"> ◆ absent ◆ standing for 3 to 4 months or more ◆ running ◆ seeping 	<ul style="list-style-type: none"> ◆ upland, but potential for isolated marsh if soils are poorly drained ◆ potential wetland ◆ potential for riparian and/or marsh habitat ◆ potential for wide variety of wetland and riparian species

Information on streams and other aquatic habitats is often available from the Ministry of Natural Resources. Ministry staff may also assist in interpreting the effects that abiotic features can have on biological resources. Groundwater movement can frequently be determined from visual clues such as springs, cold streams, or upswelling areas in watercourses. Alternatively, the groundwater regime can be determined by examining maps of aquifers and existing data on boreholes and wells.

Groundwater at or near the surface provides unique opportunities for habitat restoration and enhancement. It results in a cool microhabitat that has the potential to support specialist plant, fish, wildlife and aquatic invertebrate species.



Saturated soils sustain wetland communities, depending on the type of soil, the length of time soils are flooded, and the amount and type of water reaching them.

IV. Identify the habitats present on the site and evaluate their quality.

The resulting information, coupled with your knowledge of relevant abiotic factors will help you focus on potential opportunities for habitat rehabilitation and creation.

The most common habitats likely to be encountered in the Greater Toronto Bioregion include:

- ♦ woodlands and forests;
- ♦ wetlands;
- ♦ meadow and grassland communities;
- ♦ watercourses and adjacent riparian lands;
- ♦ river mouths and estuaries;
- ♦ natural shoreline habitats.



Woodlands and forests

Continuous forest was the major habitat type in the Greater Toronto Bioregion prior to settlement. Fragmentation has since resulted in the creation of patches, affecting the size and age of stands and overall ecological functioning. Where there once were forests, only isolated woodlands remain. The main factors

influencing woodland character are soil texture, hydrology (which influences soil moisture levels), age and size of the stand. Major woodlands consist of deciduous, mixed deciduous/evergreen, and evergreen stands in either upland or lowland conditions.

Woodland structure can indicate the relative health and renewal capabilities of the stand. To assess structure, investigate the presence or absence of the following.

- ♦ Closed or semi-closed canopy of large mature deciduous and occasional coniferous trees. A closed canopy creates shade, which