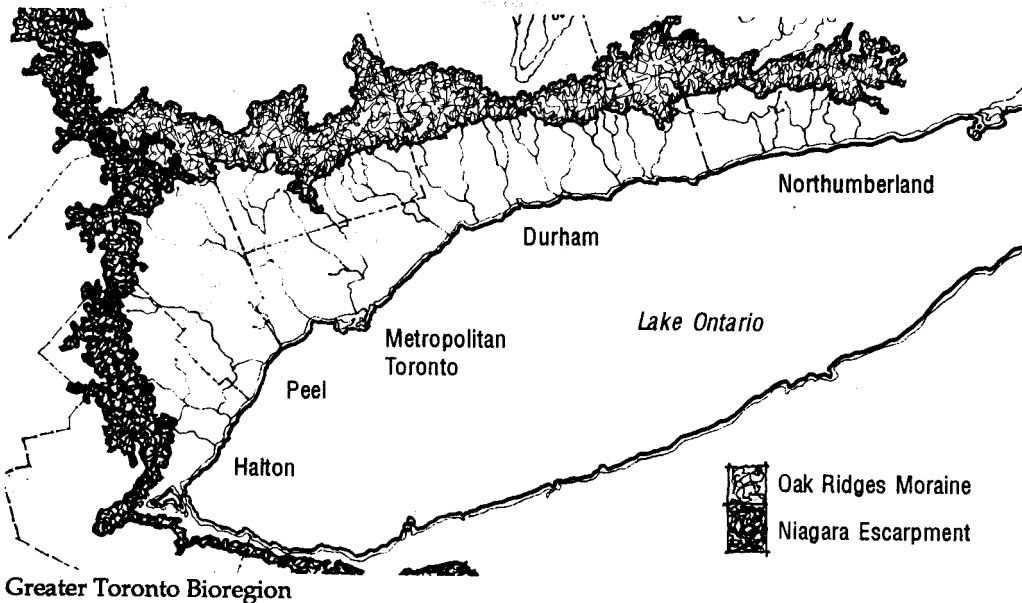


SECTION 1

INTRODUCTION

Along the Lake Ontario shoreline and in the Greater Toronto Bioregion, urban development and extensive engineering have fragmented the natural environments that once existed. Only a patchwork of woods, meadows, wetlands, and riparian habitats remain, many of them isolated and in need of protection, or in a seriously disturbed condition. This manual addresses those habitats most likely to be found along the Lake Ontario Waterfront Trail between Hamilton and Trenton and within the valleys, natural areas and urbanizing lands that link the lakeshore to the Greater Toronto Bioregion.

Ongoing planning work in the province is being undertaken to establish priority habitats for restoration, together with a wealth of research and practical programs that are being initiated by citizen groups, professionals, and municipalities. This manual brings together some of this knowledge and experience and provides a starting point for restoration initiatives in a field that is continually evolving.



1.1 THE PURPOSE OF THE MANUAL

This is a how-to manual. Designed to provide assistance in preparing restoration and management plans, it also outlines techniques for implementing them. It has been prepared for both professionals and non-professionals who may be required or want to do restoration work. Individuals and organizations likely to find this manual useful include:

- anyone planning and carrying out restoration projects, such as public and private landowners, government agencies, developers, community groups and environmental consultants;
- those reviewing restoration projects, such as municipal planners and local politicians;
- those looking for reference and educational material, such as students, consultants and the general public.

1.2 THE NATURE OF LANDSCAPE RESTORATION

Ecological restoration consists of re-establishing biological diversity and resilience to land and its life processes that have been seriously disturbed or destroyed, usually by human intervention. The need for restoration is one of the most important environmental issues of our day and is a consequence of many factors including a growing awareness of the role of natural processes in urbanization, its connections to sustainability and the quality of life, and community concerns and commitments to healing environmental ills of the past.

In its purest form, restoration means returning disturbed natural communities to their original state. In practice, however, such goals cannot be achieved in environments that have been infinitely complicated by human intervention. Farming, changes to physiography, soils and drainage, the introduction of domesticated animals and alien plants and urban activities have upset successional and interactive processes that once existed. In some situations, restoration may come close to achieving a semblance of endemic conditions. In others, it will not be possible to do so, although the diversity and natural quality achieved will be a marked improvement over what existed before.

Ecological restoration is a process that begins with nature, but recognizes the realities of human culture and intervention. It involves a continuum of interrelationships between natural processes, the human environment, cultural history, planning, design and management, and its practice and implementation is tied to a partnership of community groups, government agencies and the private sector.

1.3 PRINCIPLES OF LANDSCAPE RESTORATION

Guiding principles to be followed in ecological restoration are practical ones.

Respect regional identity

Landscape restoration should reflect the natural and cultural character of a region—those inherent qualities and conditions that make one place different from another. This is fundamental to the restoration process, which is based on reintroducing features indigenous to the local and regional landscape.



Recognize the unique ecological character of each site

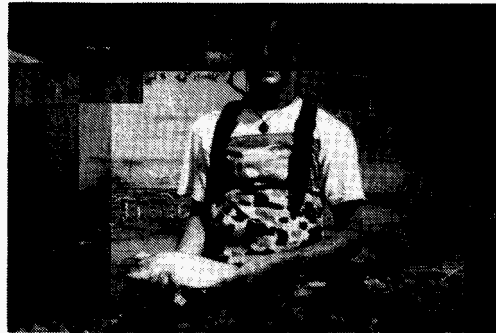
It is important to have a thorough understanding of a site's special nature, including not only plant communities, wildlife and heritage features, but also hydrology, soils and microclimate. The latter ultimately determine the diversity, quality and character of the former.





Protect significant natural features

Detailed examination of a site may reveal physical, biological or cultural features that are locally or regionally significant. Restoration efforts should, as a priority, focus on protecting them.



Establish priorities for restoration efforts

Focus restoration/enhancement where it will work and do the most good for the least cost.



Create low-maintenance, ecologically self-sustaining solutions

In an economic climate of dwindling budgets, restoration strategies need to focus on ecologically self-sustaining solutions that minimize human intervention. Approaches that mimic natural processes are, therefore, more

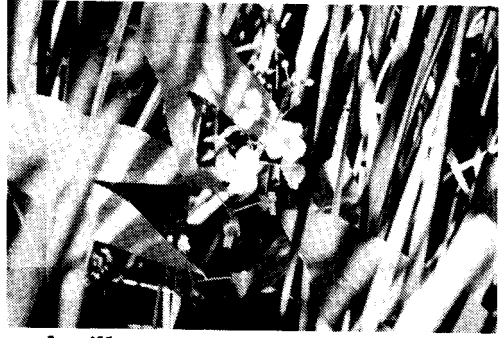
likely to succeed than those that involve high levels of human effort and financial resources.

The natural regeneration of complex biotic communities on disturbed sites provides important lessons for establishing natural areas. The evolution of the Leslie Street Spit from recent lake fill to a complex ecosystem of plants and animals is one example where natural-succession processes have created remarkably rich natural communities in a very short time.

Use native species

To maintain biodiversity, it is best to plant native species grown from local seed sources.

The usual focus of the landscaping industry on cultivated plants might limit the availability of some native species. Changes in demand, however, are creating shifts in the trade and will, over time, make native plants more available. The industry is also developing expertise in the installation, maintenance and management of restoration initiatives.



Accommodate human use

Restoration design must accommodate human uses where they are likely to occur. Trails, boardwalks, viewing stations and activity areas can control uses and limit them to appropriate locations. It is important to determine patterns of human activity early in the planning process to avoid interference with restoration efforts.



1.4 HOW TO USE THIS MANUAL

The manual outlines the steps needed to implement an ecological restoration program. It includes:

- how to evaluate diverse types of landscape habitat;
- how to identify restoration opportunities associated with various kinds of disturbance;
- what measures should be taken to protect and/or restore different habitats;
- specific implementation techniques and design criteria to be considered for protection, restoration, and ongoing management.

This guide offers a logical sequence of procedures and decision-making steps in the restoration process. The reader should note the use of icons to denote important problem areas, reality checks, and cautionary considerations. In reading the following chapters, please note the following icons.

Reality Check

Caution

Community Involvement

The manual provides details on the four most common types of habitat likely to be found in the Greater Toronto Bioregion:

- wetlands (lakeshore, river mouth, inland types);
- meadows and grasslands;
- woodlands/forest;
- riparian (streams, river edge and shoreline habitats).

It does not deal with more specialized habitats such as bogs, fens, alvars, prairies and dunes, although some of these are discussed briefly. The user should look to other relevant sources for guidance in restoring these habitats. Some references are provided in the Appendix.

Five easy steps to a restoration plan

The manual is arranged in a series of sections outlining the best approach to restoration and detailing five steps required to produce documents, obtain approvals, and implement and manage the project. Section 2 explains these steps.

- Step 1 Determine regional contexts
(natural, human influences, heritage, jurisdictional, political, watershed, planning)
- Step 2 Inventory and evaluate site conditions
(protection/restoration opportunities, ecosystem functions)
- Step 3 Set restoration objectives
(protection, restoration, management, community involvement)

Step 4 Draw up the restoration plan

Step 5 Implement, manage and monitor

Sections 3 through 6 contain specific detailed approaches and technical information for restoring the four most common habitat types.

- Section 3 - wetlands
- Section 4 - meadows and prairies
- Section 5 - woodlands
- Section 6 - riparian habitat

Pits and quarries (Section 7) are used as an example of how a severely affected site can be restored to a self-sustaining natural area with a variety of habitats.

Stormwater ponds (Section 8), which are often incorporated into urban developments, provide an opportunity to protect waterways and, if carefully designed, provide wildlife habitat.

Resulting products

The key steps and products in preparing a restoration strategy are summarized in the accompanying table. The left column provides an example of a brief report outline and the right column lists illustrative material that may accompany a restoration report. By following the five-step process, you will end up with the information needed to prepare a restoration report, drawings, and plans.

Sample Restoration Report Outline

	REPORT	ILLUSTRATIVE MATERIAL
	<i>Introduction</i> <ul style="list-style-type: none">• the purpose of the document;• site location and general site description.	
<i>STEP 1</i>	<i>Determine Regional Context</i> <ol style="list-style-type: none">What do planning documents say about the site and surrounding areas?How does the site fit within regional ecological goals?How do the site's natural and cultural features link with the larger natural context?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.

<p>STEP 2</p>	<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); ◆ access, man-made features and human use. <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 maps</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.
<p>STEP 3</p>	<p><i>Set Restoration Objectives</i></p> <p>a) General considerations.</p> <p>b) Implications of current conditions.</p> <p>c) Establishing restoration opportunities and benefits.</p> <p>d) Ensuring restoration objectives are realistic.</p>	
<p>STEP 4</p>	<p><i>Draw up the Restoration Plan</i></p> <p>a) Physical layout of restoration areas.</p> <p>b) Protecting significant habitat.</p> <p>c) Identify what habitats to enhance and where to create new habitats.</p> <p>d) Human access and impacts.</p> <p>e) Restoring degraded habitats.</p> <p>f) Prepare the detailed restoration plan.</p>	<p><i>Restoration drawings and documents</i></p> <ul style="list-style-type: none"> ◆ overall protection/restoration concept; ◆ detailed design showing existing natural features, areas of natural succession, planting zones and public access and trails; ◆ sketches for educational/interpretive features.
<p>STEP 5</p>	<p><i>Implement, Manage and Monitor</i></p> <p>a) Implement the restoration plan:</p> <ul style="list-style-type: none"> ◆ installation. <p>b) Prepare management plan:</p> <ul style="list-style-type: none"> ◆ short-term management (maintenance practices during establishment phase); ◆ long-term management (periodic intervention required to manage and/or maintain habitats). <p>c) Monitoring.</p>	<p><i>Contract documents</i></p> <ul style="list-style-type: none"> ◆ detailed working drawings; ◆ technical specifications. <p><i>Management plan</i></p> <ul style="list-style-type: none"> ◆ detailed plan showing specific management treatments for different site areas.