THE FEDERAL POLICY ON WETLAND CONSERVATION

IMPLEMENTATION GUIDE FOR FEDERAL LAND MANAGERS

Wildlife Conservation Branch
Canadian Wildlife Service
Environment Canada

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1996

Wildlife Conservation Branch
Canadian Wildlife Service
Environment Canada

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FOREWORD

The *Federal Policy on Wetland Conservation* was released in March 1992, under Canada's *Green Plan*. Federal departments have now had several years to consider the goals, guiding principles, and strategies articulated by the *Policy*, and how these might best be integrated with their program delivery.

Environment Canada, specifically the headquarters office of the Canadian Wildlife Service and regional Environmental Conservation Branch offices, is responsible for coordinating the implementation of the *Policy*. As a result, these offices have been consulted on the application of the *Policy* to many different federal decisions, mostly involving federal land management. This experience not only reaffirmed the range of opportunities afforded the federal government to practise wetland conservation, but also identified a need for guidance for federal land managers on how to effectively apply the *Policy*.

It was clear that a general guide was required to field front-line questions such as: When and how should the *Policy* be brought to bear on federal land management decisions? What does the *Policy* mean to real property transactions, federal land planning programs, or environmental assessments? How does the federal wetland policy relate to provincial wetland policies? Where can federal land managers obtain further advice, assistance, or information required to make decisions that involve wetlands?

The Government of Canada is pleased to present this *Guide* and to confirm the continued support of the Canadian Wildlife Service and the Environmental Conservation Branch of Environment Canada in each region in helping federal land managers to understand and apply the *Federal Policy on Wetland Conservation*.

David Brackett
Director General
Canadian Wildlife Service

I. INTRODUCTION

The *Federal Policy on Wetland Conservation* (the *Policy*) promotes wetland conservation through the full range of federal decisions and responsibilities. Although the *Policy* is not a regulatory document, the federal Cabinet directed that it should be applied to all policies, plans, programs, projects, and activities carried out by the federal government.

This document, *The Federal Policy on Wetland Conservation: Implementation Guide for Federal Land Managers* (the *Guide*), is intended to help federal land managers uphold their environmental commitments as described in the *Policy*. The *Guide* is designed to assist federal land managers when making decisions that may affect wetlands, whether these involve granting permits, constructing facilities, buying, selling or leasing land, or preparing a master land use plan. The *Guide* can also assist departmental policy makers in developing "customized" departmental plans and directives for implementing the *Policy*.

The *Guide* provides:

- a reference on **policy interpretation**, explaining the wording and intent of *Policy* statements;
- practical information on the **roles and responsibilities** of federal land managers and the Canadian Wildlife Service, as well as on the **processes and tools** for implementing those responsibilities; and,
- **references and resources** available to assist land managers in carrying out their wetland conservation responsibilities.

The *Guide* is organized into three major sections:

- **Understanding the *Policy*** – answers such questions as "Why does the government have a policy on wetlands?", "Who is responsible?" and "What does the *Policy* mean?"
- **Implementing the *Policy*** – encourages federal land managers to take a proactive approach to implementing the *Policy* by conducting wetland inventories and evaluations, developing wetland conservation guidelines, establishing networks of contacts to assist in making timely and informed decisions, and gaining an understanding of conservation partnerships.
- **Integrating the *Policy* into existing decision-making processes** – identifies the ways and means of implementing the *Policy* through processes such as environmental assessment, real property transactions, and using federal legislation for environmental protection.

The *Guide* will also assist personnel, in the headquarters office of the Canadian Wildlife Service and Environmental Conservation Branch offices across Canada, to respond in an efficient and consistent manner to the growing number of inquiries concerning the implications of the *Policy* to federal land management decisions.

Guidelines for implementation of the *Policy* through policies, programs, and projects not related to federal land management, are not included in this document but may be prepared in the future.

II. UNDERSTANDING THE WETLAND POLICY

II.1 Why does the federal government have a policy on wetlands?

Wetlands are worth conserving. They are among the most highly productive natural systems on earth, and provide habitat for a great diversity of vegetation and wildlife in Canada. Wetlands play a role in cleansing and supplying water, preventing floods, and protecting shorelines. Canadians depend on wetlands for recreation, open space, food, and timber. But despite growing recognition of the substantial contribution of wetlands to the lives of all Canadians, wetland losses continue at an alarming rate. These losses affect the health, safety, and quality of life of all Canadians.

In view of their significant, but undervalued, importance, wetland conservation is now a matter of public policy. And although wetland conservation is a shared responsibility among many levels of jurisdiction in Canada, the federal government can be a major part of the solution. The federal government, as a major landowner in its own right, has direct management responsibility for large tracts of wetlands across the country. About 29% of all Canada's wetlands are located on federal lands or waters, mainly in our northern territories. Wetlands are found in national parks, federal ports and harbour lands, wildlife areas, community pastures, and a wide range of other Crown land holdings. Wetlands cover 18% of the combined area of Canada's National Parks, National Wildlife Areas, and Migratory Bird Sanctuaries.

Wetlands are critical to federal responsibilities for maintaining the quality of the environment, migratory bird populations, inland and ocean fisheries, and international or transboundary resources such as water and wildlife. The federal government is also responsible for managing the impacts of over 900 of its policies and programs in Canada. Many of these directly or indirectly affect wetlands.

The *Federal Policy on Wetland Conservation*:

- States the federal commitment to wetland conservation, and provides a catalyst for mutually supporting actions across the country;
- Calls attention to wetland benefits – both socio-economic and environmental – ensuring that wetlands receive greater consideration in decision-making processes;
- Provides direction and support to individual decision-makers to ensure that opportunities for the sustained wise use of wetlands are realized, and to avoid or resolve wetland-related conflicts;
- Clarifies specific responsibilities for wetlands, and links complementary legislation, policies and programs which support wetland conservation; and,
- Encourages a consistent, coordinated federal approach to wetland conservation, ensuring progress toward specific objectives and goals.

What is a wetland?

A *wetland* is land where the water table is at, near, or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands", and mineral wetlands or mineral soil areas which are influenced by excess water but produce little or no peat.

Wetlands are described in *The Canadian Wetland Classification System* according to class, form, and type. The five wetland classes are bog, fen, marsh, swamp, and shallow open water. Wetland forms are described according to their surface form, surface pattern, water type and underlying mineral soil. Examples of wetland forms include flat bog, shore marsh, and floodplain swamp. Wetland types are classified according to the physical appearance of the vegetation, such as hardwood treed, tall rush, or floating aquatic types.

A more detailed description of *The Canadian Wetland Classification System* may be found in Appendix 1.

II.2 Who is responsible for wetland conservation in the federal government?

Wetland conservation in areas of federal jurisdiction, as defined and described by the *Policy*, is the responsibility of all departments, agencies, and corporations of the Government of Canada. These agents of the Crown are referred to as "federal authorities" in this *Guide*, consistent with the terminology of the *Canadian Environmental Assessment Act (CEAA)*.

All federal land managers should consider the *Policy*'s objectives and strategies in their daily decisions, whether that involves granting a permit for work access or an easement for a service corridor, leasing Crown land to a third party for timber harvesting, or developing a maintenance plan for a riverside greenbelt.

To the federal land manager, the Canadian Wildlife Service (CWS) headquarters office and the Environmental Conservation Branch (ECB) regional offices of Environment Canada are the primary windows or entry points to the full range of federal government skills, expertise, and services regarding wetland conservation (see sidebar).

The CWS and ECB offices are responsible for coordinating the implementation of the *Policy*. These offices promote the conservation, maintenance, enhancement and management of wetlands on federal lands for their full range of functions. These include wildlife habitat, water supply and purification (e.g. groundwater recharge, flood control, maintenance of flow regimes, and shoreline erosion buffering), and soil and water conservation, as well as tourism, heritage, recreational, educational, scientific, and aesthetic opportunities.

DOE Contacts for Advice on the Federal Policy on Wetland Conservation

Habitat Conservation Division Canadian Wildlife Service
Place Vincent Massey
351 St. Joseph Blvd.
HULL, Quebec
K1A 0H3
Tel. 819- 953-0485
Fax 819- 994-4445

Regional Director Pacific and Yukon Region
Environmental Conservation Branch
5421 Robertson Road, R.R. #1
DELTA, British Columbia
V4K 3N2
Tel. 604-946-8546
Fax 604-946-7022

Regional Director Prairie and Northern Region
Environmental Conservation Branch
Room 200, 4999-98 Avenue
EDMONTON, Alberta
T6B 2X3
Tel. 403-951-8853
Fax 403-495-2615

Regional Director Atlantic Region
Environmental Conservation Branch
P.O. Box 1590 - 63 East Main Street
SACKVILLE, New Brunswick
E0A 3C0
Tel. 506-364-5011
Fax 506-364-5062

Regional Director Ontario Region
Environmental Conservation Branch
4905 Dufferin Street,
DOWNSVIEW, Ontario
M3H 5T4
Tel. 416-739-5839
Fax 416-739-4408

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Service canadien de la faune
1141, route de l'Église - 9e étage
C.P. 10,100
SAINTE-FOY, Québec
G1V 4H5
Tel. 418-648-2543
Fax 418-649-6475

CWS/ECB Advisory Roles

To supplement the information contained in this *Guide*, federal land managers are encouraged to contact the CWS/ECB offices listed here for information and advice on:

- techniques/methodologies for, and existing data bases on the identification, inventory, evaluation and monitoring of wetlands;
- the ecological role of wetlands, such as their hydrologic and habitat functions;
- methods/techniques for wetland management and enhancement, and for the assessment and mitigation of land use effects on wetland functions;
- the achievement of "no net loss" of wetland functions;
- enforcement of existing federal legislation for wetland protection;
- cooperative agreements/ stewardship arrangements for wetland conservation, maintenance and/or enhancement;
- agreements to transfer administration or the management of, important habitat on federal landholdings to DOE, or to enter into co-management agreements;
- environmental assessment of impacts to wetlands under the *Canadian Environmental Assessment Act*; and,
- the application of provincial/territorial policies to federal land management.

The CWS headquarters office provides information on the general interpretation of the *Policy*. ECB regional offices should be consulted for advice on projects involving wetlands or specific wetland sites.

Accordingly, for those wetland functions not falling within the expertise of the CWS and ECB, other expert departments within the federal government will be consulted as appropriate. For example, the conservation of wetlands integral to fish habitat and management is guided by the *Policy for the Management of Fish Habitat*, requiring the expertise of Fisheries and Oceans Canada.

The CWS headquarters office can provide information on the general interpretation of the *Policy*, while ECB regional offices should be consulted for advice on projects involving wetlands or information on specific wetland sites. Both offices can also be contacted for referrals to private sector agencies and provincial/territorial ministries that could support a federal authority's conservation efforts.

Under the *CEAA*, expert departments, including Environment Canada, must provide specialist information and expertise when requested by the federal authority responsible for an environmental assessment. If wetlands are a factor in a self-directed assessment, the ECB regional office should be contacted to provide specialist information or expertise, and to comment on environmental assessment reports.

Another source of national level expert advice and information is the Secretariat of the North American Wetlands Conservation Council (NAWCC) (Canada), established in 1990 by the Minister of the Environment. The Council promotes wetland programs in Canada through the coordination and support of management, science and policy initiatives. The NAWCC (Canada) Secretariat publishes the *Sustaining Wetlands Issues Paper Series*, and various other public reports, to increase awareness of the importance of wetland ecosystems and to give practical guidance to land managers. This Secretariat also supports the implementation of the North American Waterfowl Management Plan.

II.3 What does the Policy say about wetlands and federal land management?

Two of the seven strategies presented in the *Policy* pertain directly to federal lands. Those strategies, and associated action items relevant to federal land managers, are reproduced here. (Key phrases that require explanation are presented in bold type, and are defined and explained in the sidebar). The full text of the *Policy* should also be reviewed.

Strategy 2: "Develop **exemplary practices** in support of wetland conservation and sustainable wetland use to be incorporated in ... the management of federal lands and waters."

- Encourage actions to **enhance wetland functions** on federal lands and waters ... especially in those **areas of Canada where** the continuing loss or degradation of wetlands has reached critical levels, or where wetlands are important ecologically or socio-economically to a region.

- Commit all federal departments to the goal of **no net loss of wetland functions** on federal lands and waters, in areas affected by the implementation of federal programs where the continuing loss or degradation of wetlands has reached critical levels, and where federal activities affect wetlands designated as ecologically or socio-economically important to a region. Due to local circumstances where wetland losses have been severe, in some areas **no further loss of any remaining wetland area** may be deemed essential.

- Promote a cooperative approach to wetland conservation initiatives for lands and waters held by the federal government for native peoples (such as Indian Reserves and lands and waters transferred to native peoples under comprehensive land claim settlements) in consultation and cooperation with native institutions and peoples.

Strategy 3: "The federal government will continue to manage the use of National Parks, National Wildlife Areas, Migratory Bird Sanctuaries, National Capital Commission lands and other federal areas established for ecosystem conservation purposes so as to sustain their **wetland functions** and natural processes."

- Require the creation of management plans which adequately reflect the special role of the wetland resource on federal lands secured for ecosystem conservation purposes, and the periodic review and update of these plans. Management of such wetlands should only support those activities that are compatible with sustaining **wetland functions**.

- Commit federal land managers to the goal of **no net loss of wetland functions** in all federal areas secured for conservation purposes.

- Protect these wetlands from impacts resulting from land or water use and environmental quality changes, both internal and external to the federal area boundaries, by applying the Federal Environmental Assessment and Review Process, by enforcing compliance with federal regulations, by working cooperatively with other levels of government, non-government organizations and the private sector and, if required, by intervening in legal or decision-making processes. It should be noted that the Federal Environmental Assessment and Review Process has been superceded since the writing of the *Policy* by the *Canadian Environmental Assessment Act*, passed June 1992.

- Encourage recreational, scientific, and educational uses of wetlands as long as these uses are not detrimental to **wetland functions** and do not conflict with the purposes of the area.

... and what does it mean?

"Exemplary practices" refers to wetland conservation actions or procedures that serve as examples of the ways and means of maintaining or enhancing wetland functions, and that demonstrate the high standards that are attainable.

"Wetland functions"* means the natural processes and derivation of benefits and values associated with wetland ecosystems, including economic production (e.g. peat, agricultural crops, wild rice, peatland forest products), fish and wildlife habitat, organic carbon storage, water supply and purification (groundwater recharge, flood control, maintenance of flow regimes, shoreline erosion buffering), and soil and water conservation, as well as tourism, heritage, recreational, educational, scientific, and aesthetic opportunities.

The *Policy* focuses on wetland functions as the target for conservation efforts. Wetland functions provide the best rationale for applying the policy to decisions involving wetlands, and the best basis for identifying and implementing the mitigation of wetland impacts. It is not the fact that there is a wetland on or near the project site that determines what can and cannot be done. Rather, it is the ecological functioning of the wetland, that is, the role of the wetland in the surrounding environment, that should determine the fate of the site.

"Enhance wetland functions"* means to increase the capacity of a wetland for natural processes or to provide benefits. For example, improving water supply to the wetland, or changing water levels across the wetland basin, could increase plant diversity and attract more wildlife species to the area. The phrase can also refer to the gain in wetland functions in a geographic area through rehabilitation, enhancement or creation.

"Areas of Canada where ... " describes geographic areas where wetland losses or functional values require that special measures, such as wetland enhancement, be applied. A map which approximates these geographic areas is in Appendix 2.

"No net loss of wetland functions" recognizes that further degradation of the wetland resource is not acceptable. However, all wetland loss cannot be avoided: some loss occurs naturally, some results from past activities, and some losses may result from beneficial human activities. The goal ventures to balance the unavoidable loss of wetland functions, through rehabilitation of former degraded wetland or enhancement of healthy, functioning wetland. As a last resort, compensation for lost functions could be sought through non-wetland replacement of functions, or creation of wetland where there was none before. In short, "no net loss of wetland functions" means that unavoidable losses of wetland functions must be compensated.

In practice, the "no net loss" goal provides a structured approach to land management decisions involving wetlands. No net loss requires project proponents to work through a strict sequence of mitigation alternatives – avoidance, minimization, and compensation – with clear criteria and defined outcomes. Mitigation alternatives and associated criteria should recognize the limitations in our understanding of wetland functions (and ways and means to assess such functions), as well as our capacity to rehabilitate or create new wetlands.

In some areas of Canada **"no further loss of any remaining wetland area"** is prescribed. Impacts and intrusions on wetlands in these regions must be avoided: "minimization" and "compensation" cannot be considered as mitigation options in this region.

*Definitions from the *Federal Policy on Wetland Conservation*

III. IMPLEMENTING THE WETLAND POLICY (PREPARATION AND PLANNING)

Federal land managers are urged to take a proactive approach to implementing the *Policy* by conducting wetland inventories and evaluations; developing wetland conservation guidelines customized to their operations; establishing networks of contacts to assist in making timely and informed decisions; and gaining an understanding of conservation partnerships.

III.1 Inventory and evaluation

A wetland inventory of a federal authority's properties provides basic, factual information about the resource and is an important first step to making land management decisions with respect to wetland conservation. A wetland inventory could contain information such as the location and size of wetlands; wetland type, condition, flora and fauna; and a list of existing information sources. More detailed inventories of sites of particular interest to the land manager for development or protection purposes might describe the soils, hydrology and peat development of the wetland, including the physical and chemical properties of the soil and water.

Wetland evaluations are analyses of the above resources. For example, evaluations could characterize wetlands by measuring the level of risk to the wetland, determine wetland functions, or rank wetlands based on their relative value or importance. The sidebar shows how the North Fraser Harbour Commission analyzed their shoreline habitat as a basis for development planning.

Please refer to Appendices 3 and 4 for other wetland policies and a listing of major wetland inventory and evaluation programs.

Case Study: North Fraser Harbour Commission

The North Fraser Harbour Commission (NFHC) in British Columbia initiated work in 1985 to establish an environmental management program for the North Fraser Harbour to be jointly administered by the NFHC and Fisheries and Oceans Canada. A key program element is a shoreline classification which colour codes all habitats according to habitat value and suitability for development:

1. Red:
   -highly productive habitat
   -prevention as a guide
   -no development allowed unless suitable mitigation applied to proposal to ensure that existing habitat would not be alienated

2. Yellow:
   -habitat of moderate value due to the type of habitat involved or due to past alienation by industry
   -development allowed subject to mitigation/ compensation (Like for like and close proximity rules applied if compensation considered)

3. Green:
   -habitat of lower values
   -development allowed subject only to mitigation (i.e. environmentally sound design and timing restrictions)

The classification is a guide for selecting appropriate, (i.e. least sensitive) areas for industrial or commercial development, and indicates the level of mitigation/compensation required by proponents.

Wetland inventory and evaluations enable land managers to avoid wetland conflicts or issues by:

- Directing development to the most appropriate geographic areas. Mitigation options (such as avoid, mimimize or compensate) could be prescribed for individual or "categories" of wetlands;

- Identifying those geographic areas requiring land use controls. Conservation designations or zoning could be assigned to wetlands, and associated upland habitats, buffer zones, and inflowing waterways;

- Identifying areas for conservation opportunities. Enhancement projects could be considered for wetlands in passive use areas, or where current use could accommodate enhanced wetland functions. Adjacent non-

federal lands which are ecologically/hydrologically linked to federal wetlands could be identified as priorities for acquisition programs, or promoted as candidates for conservation partnership or stewardship programs (see section III.4);

- Providing a context to consider development applications (for permits, licences, plan approvals). Wetland inventories and evaluations allow land managers to make informed decisions, by providing information to answer such questions as: What is the size and type of the wetland that will be affected? How much more wetland is in the immediate area, watershed, or region? What is the relative health of these wetlands/what are the risks to their health? How important is this wetland? To what ecological processes/functions is the wetland contributing (clean water, flood control, habitat for fish, moose or geese)? Which of these functions will likely be affected by the project?

- Establishing a baseline for monitoring environmental quality, the effectiveness of wetland conservation programs, and assessing progress in implementing policies affecting wetlands.

Wetland inventories and evaluations can be expensive and time consuming in the short term, but provide considerable long term environmental and economic benefits:

- Improved environmental quality through planned, comprehensive protection of functioning wetlands;

- Savings of time and money in project planning and environmental assessment phases, by guiding development away from areas of potential concern. The screening of wetland mitigation plans under the *CEAA* reduces the workload for individual project assessments later on;

- A more efficient, streamlined process of development approvals, with increased predictability and consistency in development decision making; and,

- A context for assessing the cumulative effects of loss or degradation of individual wetlands within a watershed or region, which is a requirement under the *CEAA*.

Wetland inventory and evaluation may seem daunting, but federal land managers should be aware that:

- Wetland inventory and evaluation data bases are already available for much of Canada. Environment Canada and numerous other government and non-government agencies have surveyed many of the wetlands in Canada. Appendix 4 identifies the scope and range of existing wetland inventories.

- Federal land managers can obtain expert advice from regional Environmental Conservation Branch offices (see section II.2). Professional ecologists, biologists, and hydrologists can be consulted by federal land managers on strategies for advance planning, existing data, and available resource materials.

III.2 Conservation guidelines

It is the responsibility of each federal authority to develop plans and directives for wetland conservation specific to their operations. Various government agencies have developed wetland conservation and evaluation guidelines. These could assist the federal land managers in a proactive approach to wetland conservation through already existing land management activities (see sidebar). For example, a federal authority may want to develop, or adapt existing:

- Standard conditions for operating in and around wetland areas, to be attached to permit approvals which may affect wetlands;

- Mitigation guidelines or codes of practice for particular types of activities, such as forest harvesting, shoreline stabilization projects, or routine maintenance, in and around wetlands;

- Environmental assessment guidelines for wetlands, such as checklists of functions or effects; or guides to evaluating wetland values, in the face of competing values and to determine the most appropriate use;

- Environmental quality guidelines, that establish acceptable standards for various wetland components, such as water quality; or

- Marketing and communication strategies to increase public awareness of wetland values.

For further information on developing federal land management guidelines respecting wetlands...

Bond, W.K., K.W. Cox, T. Heberlein, E.W. Manning, D.R. Witty, and D.A. Young. 1992. *Wetland Evaluation Guide: Final Report of the Wetlands Are Not Wastelands Project*. Sustaining Wetlands Issues Paper, No. 1992-1. North American Wetlands Conservation Council (Canada). Ottawa, Ontario.

• *A three-stage evaluation approach to identify the benefits of a wetland, to establish their value to society, and to compare their value to the value of proposed alternatives.*

Department of Fisheries and Oceans Canada. 1994. *Habitat Conservation and Protection Guidelines*. First Edition. Ottawa, Ontario.

• *Describes an approach to implementing the DFO no net loss principle, and includes a hierarchy of preferred options for habitat conservation and protection and a sequence of decision steps.*

Environment Canada. 1993. *Report on Codes, Guidelines and Objectives in Conservation and Protection*. Regulatory and Economic Affairs Division, Environmental Protection Directorate. Hull, Quebec.

Lynch-Stewart, P. 1992. *No Net Loss: Implementing "No Net Loss" Goals to Conserve Wetlands In Canada*. Sustaining Wetlands Issues Paper, No. 1992-2. North American Wetlands Conservation Council (Canada). Ottawa, Ontario.

• *Contains a review of current implementation procedures, and a recommended approach to implementing "no net loss" in Canada.*

Norman, A. and K. Coleman. 1993. *Interim Checklist for Scoped Environmental Impact Studies*. Ontario Ministry of Natural Resources, Southern Region Science and Technology Transfer Unit Technical Note TN-002. Aurora, Ontario.

• *A checklist for use in the field, as a means of rapidly reviewing small-scale development proposals adjacent to wetlands.*

Ontario Ministry of Natural Resources. 1994. *Guidelines for Wetland Environmental Impact Studies*. Ontario Ministry of Natural Resources, Southern Region Science and Technology Transfer Unit Technical Report. Aurora, Ontario.

• *Technical guidelines for environmental impact studies as required by the Ontario Wetlands Policy Statement. Includes definition of what is meant by "no net loss of function".*

Ontario Ministries of Natural Resources and Municipal Affairs. 1992. *Manual of Implementation Guidelines for the Wetlands Policy Statement*. Toronto, Ontario.

• *Presents options and approaches for incorporating wetland protection and management into the land use planning process in Ontario, and further explanation of the Ontario Wetlands Policy Statement.*

Sheehy, G. 1993. *Conserving Wetlands in Managed Forests*. Sustaining Wetlands Issues Paper, No. 1993-2. North American Wetlands Conservation Council (Canada). Ottawa, Ontario.

• *Describes potential impacts of forestry practices on wetland ecosystems and suggests practical measures to prevent or reduce these impacts.*

Guidelines for achieving "no net loss" of wetland function

Development of "no net loss" (NNL) directives should be guided by *No Net Loss: Implementing "No Net Loss" Goals to Conserve Wetlands in Canada* and should contain the following elements:

- A sequence of mitigation alternatives (e.g. "avoidance" of impacts, "minimization" of unavoidable impacts, and "compensation" for unavoidable impacts), with criteria associated with each option;

- Compensation requirements (i.e. related to function or area basis, type of wetland, geographic context, time frame), including definition of priorities and criteria;

- Compensation alternatives to restoration or creation of wetlands (direction on the acceptability of mitigation banking or non-wetland creation activities in working toward NNL goals); and,

- Monitoring and maintenance requirements.

The directives should also recognize that this federal no net loss goal came into effect in 1992, and that compensation requirements are not retroactive to losses incurred prior to announcement of the *Policy*.

III.3 A network of contacts

An established network of contacts can be an invaluable aid to conserving wetlands. Federal land managers should establish contacts in agencies such as those listed below, to keep them informed of plans, policies or land use changes that might affect federal land holdings, or to whom they can go for advice on wetland management. Wetland contacts may include representatives of:

- CWS Headquarters and ECB offices in the regions (see *CWS/ECB Advisory Roles*, section II.2).

- Provincial/territorial and municipal governments can be a source of baseline environmental information, technical expertise in the evaluation of wetlands, and assessment of mitigation of adverse effects. They potentially could advise you on the importance of wetlands on your property to the local environment, local strategies for wetland conservation in the region or watershed, and proposed changes in adjacent land use which may affect wetlands on your landholdings.

- Non-government organizations, such as:

  Wildlife Habitat Canada, which provides a focus for cooperation and partnership in conservation programs across Canada, facilitating cooperation among government and non-government groups for a variety of habitat projects with particular emphasis on wetlands (see next section on *Conservation partnerships*).

  Ducks Unlimited Canada, a major national conservation organization, actively involved in partnership projects with provincial, federal and non-government agencies and private landowners, in wetland and related habitat securement and enhancement projects across Canada (see section III.4 on *Conservation partnerships*).

- Adjacent landowners may be interested in cooperating to ensure conservation of mutually beneficial wetland functions, such as maintaining water flows and quality in a stream (see section III.4 on *Conservation partnerships*).

CWS/ECB offices should be contacted for referrals to private sector agencies and provincial/ territorial ministries that could support a federal authority's conservation efforts.

III.4 Conservation partnerships

Advance planning should also include becoming familiar with conservation partnerships. Such partnerships benefit agencies, the private sector, the community, and most importantly, wetlands. They provide a range of opportunities to supplement and support federal efforts often enabling a federal land manager to carry out conservation activities that would be difficult or impossible to achieve alone. Potential conservation partners include non-government organizations, provincial governments, private landowners and non-profit associations.

Conservation partnerships also give local communities and individuals the opportunity to learn more about the intrinsic value of these resources and play an active role in protecting them into the future.

A partnership may be an annual, verbal commitment or handshake agreement with adjacent landowners regarding the use and management of a wetland site. It may be an easement or a 20-year legal agreement with a non-government organization to implement management objectives or it may take the form of a legal covenant on private property to protect the wetland function in perpetuity without the responsibilities of ownership.

Partnerships can include fundraising efforts by non-profit organizations for land acquisition or the donation of land. They can include management agreements between federal and provincial agencies identifying management roles and responsibilities. Partnerships can embrace whatever the situation requires.

Wetlands have been the focus of numerous examples of conservation partnerships in Canada. This section identifies five types of partnerships that have been struck for wetland protection. These were developed to meet the shared desire to protect, restore, and educate the wider community on the value of wetlands and the need to protect these environments.

Agreements with non-government organizations

Federal managers are able to leverage time, expertise and dollars with non-government organizations (NGOs) that have an interest in the conservation and management of wetlands that fall under federal ownership. For example, agreements between numerous federal and provincial government agencies and Ducks Unlimited Canada have been designed across Canada to undertake various forms of wetland management.

Agreements are based on mutually supported plans that identify the wetland objectives to be met; the nature, type, and location of structures to restore and maintain wetland sites; the proposed management strategies and responsibilities; and the period of the agreement. Some agreements have granted access to Crown lands for construction and maintenance of structures and for co-management of sites.

Ducks Unlimited Canada, for example, entered into a 21-year agreement with Natural Resources Canada for a wetland site at the Petawawa National Forestry Institute, Ontario. This is a beaver pond management project designed to optimize the habitat quality and waterfowl productivity of 52 wetland and upland sites. The agreement provides an easement to Ducks Unlimited Canada to access the property to construct and maintain a structure. The agreement allows for renegotiation at the end of the 21 years.

Multi-jurisdictional agreements

Wetland conservation in an area can fall under the jurisdiction of several agencies. An example of a multi-jurisdictional agreement is a Rideau Canal wetland agreement which is being drafted between Parks Canada, the local offices of the Ontario Ministry of Natural Resources, and two regional conservation authorities.

The Rideau Canal, an historic waterway managed by Parks Canada, stretches 212 kilometres from Ottawa to Kingston, Ontario and is home to numerous provincially and regionally significant wetlands. The waters and

riverbed of the canal are federally owned whereas the shorelines fall under the jurisdiction of the Ontario Ministry of Natural Resources. Both governments have prepared policies on wetland management with parallel philosophies but varying applications. The Canal also falls under the auspices of two regional conservation authorities that are responsible for flood control and 26 municipal governments with responsibilities for local planning. The majority of canal frontage is privately owned.

A Rideau Canal wetland agreement is to ensure a consistent application of policy and procedures to meet the intent of both government wetland management policies, and to alleviate the present confusion among municipal governments, landowners, and land managers. The draft agreement identifies agency roles and responsibilities and suggests protocol to follow in issues of environmental impact and assessment, fill and construction regulations, management, and protection of wetlands.

Fundraising partnerships

Acquisition funds are often limited or difficult to access when significant properties come on the market. The Nature Conservancy of Canada (NCC) is a private, non-profit organization which seeks donations from individuals, foundations and corporations to acquire significant properties for conservation. It also accepts donations of property.

The NCC works with partners, including federal land managers to purchase significant properties. It seldom retains title but passes the property on to a third party. In cases where the Conservancy holds title, it arranges with others by means of a lease or agreement to manage the property. The Nature Conservancy of Canada has secured more than 46 500 hectares across the country including over 14 000 hectares of wetland.

Private land stewardship

A proactive approach to private wetland conservation has been initiated in Ontario and supported under the Eastern Habitat Joint Venture of the North American Waterfowl Management Plan (NAWMP). A partnership between Wildlife Habitat Canada, Ducks Unlimited Canada and the Ontario Ministry of Natural Resources provided the resources to initiate a four-year landowner contact program for selected provincially significant wetlands in southern Ontario. It is one of the many such provincially-based stewardship initiatives implemented through the NAWMP across southern Canada.

A first step in conservation, private land stewardship gives federal land managers an opportunity to speak directly with landowners to increase the knowledge of the importance of wetlands and influence land management change. It also provides a way for federal agencies to recognize individual conservation initiatives.

This non-regulatory approach to influencing the use and management of wetland areas is successful in Ontario. During a four-year period, the private land stewardship program resulted in influencing 1 203 landowners to protect 17 326 hectares of wetland in 114 wetland areas.

Land trusts

Land trusts are generally non-government agencies that work with landowners and public agencies through private sector initiatives to protect land. They can be either community or regionally based. Land trusts dedicate themselves to a range of interests and goals and choose to operate in a number of ways. To the land manager, land trusts offer an avenue into the community, a local advocate for conservation and often a partner in fundraising, monitoring, and public education.

The Island Nature Trust is a non-government, non-profit conservation organization "... devoted to the protection and management of natural areas" on Prince Edward Island. It aims to acquire lands to be held in trust for future generations and to manage these lands as an example of appropriate and sustained use." For

example, the Island Nature Trust owns a portion of DeRoche Point which is directly adjacent to Prince Edward Island National Park. The Trust is involved with monitoring and working with other private landowners to protect the natural values of this and many other sites in the province.

For further information on Conservation partnerships...

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III.5 Applying the Federal Policy on Wetland Conservation in the North

The distinct land management regime of Canada's Northwest and Yukon Territories, and the implications for implementing the *Policy*, must be recognized. Not only is the jurisdiction of the Department of Indian and Northern Affairs more like that of a province's, but vast areas of the Territories are subject to comprehensive land claims by aboriginal peoples. Accordingly, the principles, objectives, and strategies of the *Policy* will be carried out as much as possible, through Environment Canada representation/ participation in:

- co-management structures in land claim settlement areas, such as land and water boards, impact review boards, and planning commissions;
- advisory councils/boards in comprehensive land claim areas;
- land selection negotiations, to address wildlife and habitat issues and to establish cooperative management systems;
- the Regional Environmental Review Committee, for the approval of land use permits and dispositions; and,
- environmental assessments of all proposed development.

It is also recognized that wetland characteristics and impacts are also substantially different in the North. The *Policy* is still relevant in this environment, due to its focus on sustaining wetland functions (see section II.3), and to the structured approach to mitigation (see section IV.2) which considers the relative importance of the wetland within the context of environmental assessment.

IV. INTEGRATING THE WETLAND POLICY INTO EXISTING DECISION-MAKING PROCESSES

The *Policy* emphasizes the importance of incorporating wetland conservation considerations into existing decision-making processes. The ways and means of implementing the *Policy* through the *Canadian Environmental Assessment Act (CEAA)* and other decision-making processes are described in this section.

IV.1 Implementing the Policy under the Canadian Environmental Assessment Act

The *CEAA* provides a legislated framework within which the *Policy* can be used to guide the actions and decisions of a responsible authority when preparing an environmenal assessment (EA) for a project affecting wetlands. A responsible authority is defined by the *CEAA* as the federal authority that has either proposed the project or has been asked to provide support in the form of funding, land, permit, licence or other approval specified by the regulation. Federal land managers should refer to the *Canadian Environmental Assessment Act* and *The Responsible Authority's Guide to the Canadian Environmental Assessment Act* (Canadian Environmental Assessment Agency 1994) for detailed information regarding compliance to the *Act*.

The majority of federal projects under the *CEAA*, require a self-directed environmental assessment. Self-directed assessments, through either a screening or comprehensive study, provide a systematic approach for identifying the environmental effects of a proposed project. Should wetlands be affected by a project, the *Policy* and this *Guide* can be valuable tools for incorporating wetland considerations into an EA report. Previous sections of this *Guide* have identified contacts and resources available to the responsible authority for undertaking a wetland inventory and evaluation.

Three Examples of Wetland Situations Requiring an EA under the CEAA:

1) A federal department proposes the transfer (by sale) of a property which contains a wetland. The property will be used for the extension of a road; the proposed route bisects the wetland. The wetlands on federal lands are potentially affected as a result of this real property transaction.

2) Federal conservation officers monitoring a wetland on federal land, designated a "conservation area" on master plans, identify a marked decline in water quality and vegetation over several seasons. The wetland is wholly situated on federal land, but is fed by surface and subsurface flows from adjacent non-federal lands. The federal authority is concerned that the water quality could deteriorate further as a result of construction activities being undertaken on adjacent land where the proponent is being funded by a federal agency.

3) A manufacturing company on the shores of one of the Great Lakes is the proponent of a proposed dock extension. The company requires an approval under the *Navigable Waters Protection Act* for the dock. The fill for the dock is proposed to be dredged from a nearby shoreline wetland. The wetlands on non-federal land are potentially indirectly affected by these activities that result from the regulatory approval on federal land.

It is a requirement of a self-directed assessment that the responsible authority identify mitigation measures which will eliminate, reduce, or control a project's adverse environmental effects. The mitigation of adverse environmental effects on wetlands should be guided by the *Policy* goal of achieving "no net loss" of wetland function (see section II.3). As previously identified in this *Guide*, "no net loss" can be achieved by using a hierarchical sequence of mitigation alternatives: avoidance, minimization, and compensation.

IV.2 Integration of the mitigation sequence and the environmental assessment process

The Responsible Authority's Guide to the Canadian Environmental Assessment Act (Canadian Environmental Assessment Agency 1994) identifies eight steps to be taken by the responsible authority to complete the environmental assessment process. Table 2 shows how the mitigation alternatives, described in Table 1, fit into this step-by-step process. A number of points should be emphasized concerning the assessment and mitigation of adverse effects on wetlands:

- Mitigation of adverse effects on wetlands should be initially considered in Step 2 "Assess the environmental effects". At this step, all feasible alternatives to carrying out the project are assessed. Efforts should be made here to avoid adverse effects through project siting or design.

- Compensation cannot be used to reduce the assessment of "significance" of adverse effects, and therefore only avoidance and minimization of environmental effects is considered in Step 3 "Mitigate the environmental effects".

- In Step 7, the responsible authority is able to implement one of two courses of action with respect to the mitigation alternatives:

    1) *The responsible authority may take action that enables the project to proceed, if the project is not likely to cause significant adverse environmental effects.*

        In this case, the responsible authority must ensure implementation of appropriate avoidance and minimization measures, and compensate for any residual effects on wetland functions.

    2) *The responsible authority must not take any action that enables the project to proceed, if the project is likely to cause significant adverse environmental effects that cannot be justified.*

        In this case, the project may be abandoned, modified and reassessed, or referred to a public review. Public review would clarify whether the project is likely to cause significant adverse environmental effects, and/or to decide whether these significant adverse effects are justified. If the significant adverse effects on wetland functions are declared justifiable by the public review, then compensation as described in Table 1 for lost wetland functions, is required under the *Policy*.

Table 1 defines the wetland mitigation alternatives and describes the situation within which each option should be applied, based on factors such as relative importance of wetland functions, wetland losses in the region or watershed, the nature of the project and available alternatives. Rather than creating yet another set of standards for assessing environmental effects on wetlands, the sequence encourages the use of existing wetland evaluations. By working through the sequence of mitigation alternatives, federal land managers can determine the acceptable course of action when wetlands may be affected by their project.

Table 1: The sequence of wetland mitigation alternatives

1. **Avoidance** refers to the elimination of adverse effects on wetland functions, by siting or design of a project. Avoidance is recommended in all wetland conflict situations, but is particularly prescribed:

   (a) On or near wetlands designated as ecologically or socio-economically important to a region.

   A number of jurisdictions have developed and applied evaluation systems that designate those wetlands that require a high level of protection by classification (for example, *Ontario Wetland Evaluation System*, Fisheries and Oceans Canada's *Habitat Conservation and Protection Guidelines*, *Key Migratory Sites in the Northwest Territories*), zoning, or legislated protection status, etc. Avoidance should also be practised on or near wetlands that discharge into important aquatic and habitat systems.

   (b) In areas where wetland losses have been severe.

   Wetlands on federal lands and waters in "areas of Canada where the continuing loss or degradation of wetlands has reached critical levels" or "due to local circumstances where wetland losses have been severe" (see section II.3 and Appendix 2).

   (c) For projects with feasible alternatives.

   That is, those projects not requiring access to a wetland, and where technically and economically feasible alternatives to the project or siting exist, that will result in no, or insignificant, adverse effects on wetland functions.

   (d) When significant adverse effects on wetland functions cannot be mitigated or justified.

   That is, projects assessed as having significant adverse effects (as defined by *CEAA*) on wetlands, that cannot be mitigated (including consideration of the capacity for regeneration of wetland functions).

2. **Minimization** refers to the reduction or control of adverse effects to wetland functions through project modification or implementation under special conditions. Minimization should be practised when and only when adverse effects have been avoided as per (1) above.

3. **Compensation** refers to the replacement of unavoidably lost wetland functions, through enhancement or rehabilitation of existing wetlands, or, as a last resort, creation of new wetlands. Compensatory mitigation should be practised when and only when:

   (a) all possible avoidance and minimization measures have been applied;

   (b) the project justifies adverse effects or diminished functions and all possible mitigation has been applied; and,

   (c) the proponent provides evidence that functions can be effectively replaced when, where, and to what or to whom they are important.

   Compensation cannot be achieved through the protection of another wetland, but rather involves the addition or improvement of wetland functions elsewhere.

Table 2: Integration of the wetland mitigation alternatives and the EA process

Key Steps of the Self-Directed EA (Canadian Environmental Assessment Agency 1994)	**Wetland Mitigation Alter-natives to be Considered**
Step 1: Scoping	N/A
Step 2: Assess the environmental effects	Avoidance
Step 3: Mitigate the environmental effects	Avoidance Minimization
Step 4: Determine significant adverse environmental effects	N/A
Step 5: Preparing the environmental assessment report	N/A
Step 6: Review of environmental assessment report	N/A
Step 7: Decision by responsible authority and the Minister	N/A
Step 8: Post-decision activity	Avoidance Minimization Compensation
Step 9: Mediation and/or Panel Review	Avoidance Minimization Compensation

Consideration of the wetland mitigation alternatives is the key to achieving the *Policy* objectives within the environmental assessment process. It must be noted that mitigation measures are not restricted to the environmental assessment phase of a project: mitigation of environmental effects should be a major factor driving the planning and detailed development phases of the project, particularly in the consideration of project design and siting options.

IV.3 Other decision processes

Policy objectives should also be considered in carrying out the following responsibilities that do not require environmental assessment under the *CEAA*.

IV.4 Policies, plans and programs

In addition to the *CEAA* which focuses on projects, a separate non-legislated process for the environmental assessment of policy and program proposals was approved as part of the Environmental Assessment and Review Process (EARP) Reform in June 1990 and issued as a Cabinet Directive. The Cabinet Directive requires that an environmental assessment process be applied to policy and program proposals submitted to Cabinet for consideration and approval. It requires that environmental factors be considered in the development of the proposal, and that the appropriate documentation, public statements and public consultations concerning the environmental implications of the proposal be undertaken.

IV.5 Real property transactions

The disposal, acquisition, or lease of properties undertaken when the essential details of a project are not known, do not require an EA under the *CEAA*. If the property involved in the transaction contains wetlands, the federal authority should consider:

- Restrictive covenants, legal easements (where provincial legislation is in place, see Silver *et al*. 1995 as listed in section III.4), or conditions or caveats in legal agreements, to ensure wetland conservation; and,

- In the acquisition of property that contains wetlands, federal authorities have an obligation to conserve wetland functions, and that functional protection is facilitated by ownership of the entire wetland and an adequate buffer. It is particularly important to ensure that the hydrological reach is protected. Responsible authorities should also be aware of the wetland mitigation alternatives that must be applied to any projects planned for the newly acquired property.

IV.6 Environmental quality monitoring and enforcement

Wetland conservation should not be confined to considering the ecosystem in the context of possible development. The ongoing health of wetlands on federal lands should be monitored. If signs of deterioration are evident, such as change in vegetation or water quality, two avenues are open to the federal authority:

- if the adverse effects on the wetland are the result of a project that was subject to a legal permit or environmental assessment, the project proponent should be required to audit the effectiveness of the mitigation measures to determine the success in preventing impacts. If the measures are unsuccessful, the proponent must work with the appropriate agency to ensure (other) effective mitigation measures are identified and implemented; or,

- a variety of legal tools can be used to enforce protection of wetlands, such as the:
  - *Canada Wildlife Act*
  - *Canadian Environmental Protection Act*
  - *Fisheries Act* and the *Policy for the Management of Fish Habitat*
  - *Historic Canals Regulations*
  - *Migratory Birds Convention Act*
  - *National Parks Act*
  - *Navigable Waters Protection Act*

IV.7 Regulatory actions that may affect off-site, non-federal wetlands

In light of the Supreme Court of Canada's decision on *Friends of the Oldman River Society v. Canada* (1992), environmental assessments cannot be used to invade or unduly intrude in matters of provincial jurisdiction.

The scope of an EA essentially depends on the federal trigger that created the initial need for an assessment. If the EA is "triggered" because a federal authority is a proponent or provides money or an interest in land to the project, then the federal EA may consider all potential environmental effects, not only those that fall within federal jurisdiction. If the EA is "triggered" by federal regulatory involvement in a project – that is, whenever a project requires a federal license, permit or other authorization for it to proceed – the EA must be restricted to areas of federal jurisdiction (i.e. those covered by federal legislation, including: migratory birds, navigable waters, fish and fish habitat, federal protected areas such as National Parks and National Wildlife Areas, historic canals, Indian Reserves, and transboundary issues) as well as those areas of provincial jurisdiction that directly impact on an area of federal jurisdiction or that are within the scope of the legislation that require the issuance of a license, permit or other authorization.

Therefore, if federal authorization is required, on either federal or non-federal land, potential environmental effects on wetlands which would result from that authorization to proceed, can only be considered if: i) the affected wetland is on federal land; or, ii) the potential effects are within an area of federal jurisdiction. Otherwise, federal authorities can promote the conservation of wetlands through cooperative, voluntary means such as those outlined in the section "Conservation partnerships" (see section III.4 and also Appendix 3).

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APPENDICES

1. *The Canadian Wetland Classification System*
2. Special Geographic Areas referred to in the Policy
3. Other Wetland Policies and Regulations across Canada
4. Major Wetland Inventories

APPENDIX 1. THE CANADIAN WETLAND CLASSIFICATION SYSTEM

The Canadian Wetland Classification System (National Wetlands Working Group 1987, 1997) contains three hierarchical levels: (1) class; (2) form; and (3) type. Five wetland classes are recognized on the basis of the overall genetic origin of wetland ecosystems. Wetland forms are differentiated on the basis of surface morphology, surface pattern, water type, and morphology of underlying mineral soil. Wetland types are classified according to vegetation physiognomy.

Wetland Class: Wetland classes are recognized on the basis of properties of the wetland that reflect the overall genetic origin of the wetland ecosystem and the nature of the wetland environment.

Wetland Form: Wetland forms are subdivisions of each wetland class based on surface morphology, surface pattern, water type and morphological characteristics of underlying mineral soil. Many of the wetland forms apply to more than one wetland class. *Subforms* of various wetland forms are also recognized and some of these are described in the book *Wetlands of Canada* (National Wetlands Working Group 1988).

Wetland Type: Wetland types are subdivisions of the wetland forms and are classified according to vegetation physiognomy. Some wetland types occur in several wetland classes whereas others are unique to specific classes and forms.

The Bog Wetland Class

A *bog* is a peatland, generally with the water table at or near the surface. The bog surface, which may be raised or level with the surrounding terrain, is virtually unaffected by the nutrient-rich groundwaters from the surrounding mineral soils and is thus generally acidic and low in nutrients. The dominant materials are weakly to moderately decomposed *Sphagnum* and woody peat, underlain at times by sedge peat. The soils are mainly Fibrisols, Mesisols, and Organic Cryosols (permafrost soils). Bogs may be treed or treeless, and they are usually covered with *Sphagnum* spp. and ericaceous shrubs.

The Fen Wetland Class

A *fen* is a peatland with the water table usually at or a few centimetres above or below the surface. The waters reaching the fens have passed through mineral soil and therefore have enhanced mineral content (minerotrophic). The water table is not stagnant, but moves through the peat by seepage or, in some cases, in open channels. The dominant materials are moderately decomposed sedge and/or brown moss peat of variable thickness. The soils are mainly Mesisols, Humisols, and Organic Cryosols.

The Marsh Wetland Class

A *marsh* is a wetland which periodically retains shallow surface water, whose levels usually fluctuate daily, seasonally or annually due to tides, flooding, evapotranspiration, or seepage losses, often exposing intermittent drawdowns or mudflats. Water sources of a marsh include surface water catchment, stream inflow, precipitation, storm surges, groundwater discharge and tidal action. A marsh, which is dependent upon variations in surface runoff and subject to a gravitational water table, usually retains less permanent water than one supplied by groundwater. The water table usually remains at or below the soil surface, but soil water remains within the rooting zone for most of the growing season, except in years of extreme drought.

The Swamp Wetland Class

A *swamp* can be defined as forested or thicketed (tall shrub-covered) wetland that is influenced by minerotrophic groundwater, occurring either on mineral or organic soils. The water table is below the major portion of the ground surface, and the dominant ground surface is at the level of hummock, that is, 20 cm or more above the average summer groundwater level. It is the usually aerated (or partly aerated) zone of substrate above the water

which is available for growth of roots by trees and/or tall woody shrubs. A swamp is distinguished by having a relatively closed canopy of forest trees or tall shrubs, with at least 25% cover. A swamp occurs on mineral soils as well as peat. The associated mineral soils are various textures, ranging from clay to sand, and usually are Gleysols. On sands, iron-rich ortstein or fragipans are often present, acting as dense layers which impede water drainage. A swamp on mineral soils tends to accumulate peat by the paludification process. If peat is present, it usually has abundant wood (ligno) peat, intermixed with material derived from leaf litter, mosses, herbs and graminoids, shrubs, and other forest plants. Organic soils are Mesisols or Humisols.

The Shallow Open Water Wetland Class

Shallow open water wetlands are distinct wetlands transitional between those wetlands normally saturated or seasonally wet (bog, fen, marsh or swamp), and aquatic ecosystems (lakes) which are permanent, deep water bodies usually with a developed profundal zone. Shallow waters are subject to aquatic processes typical of upper limnetic or infralittoral lake zones, such as nutrient and gaseous exchange, oxidation, and decomposition. Ionic composition of waters varies widely since dissolved solids, acid-base balances, and nutrient levels are influenced by hydrological origins, underlying geological materials, nutrient fluxes, and autogenic succession. Usually limnic deposits of sedimentary peat, organic-mineral mixtures and marl accumulate in stable water regimes, but little accumulation occurs in shallow waters influenced by high energy systems such as tidal regimes, rivers or large lakes. In semi-arid regions, shallow waters dry intermittently, often leaving evaporite deposits of alkaline salts. Except in highly saline or acid waters, these deposits provide a substrate for rooted submerged and floating hydrophytic vegetation, as well as for algae and aquatic mosses.

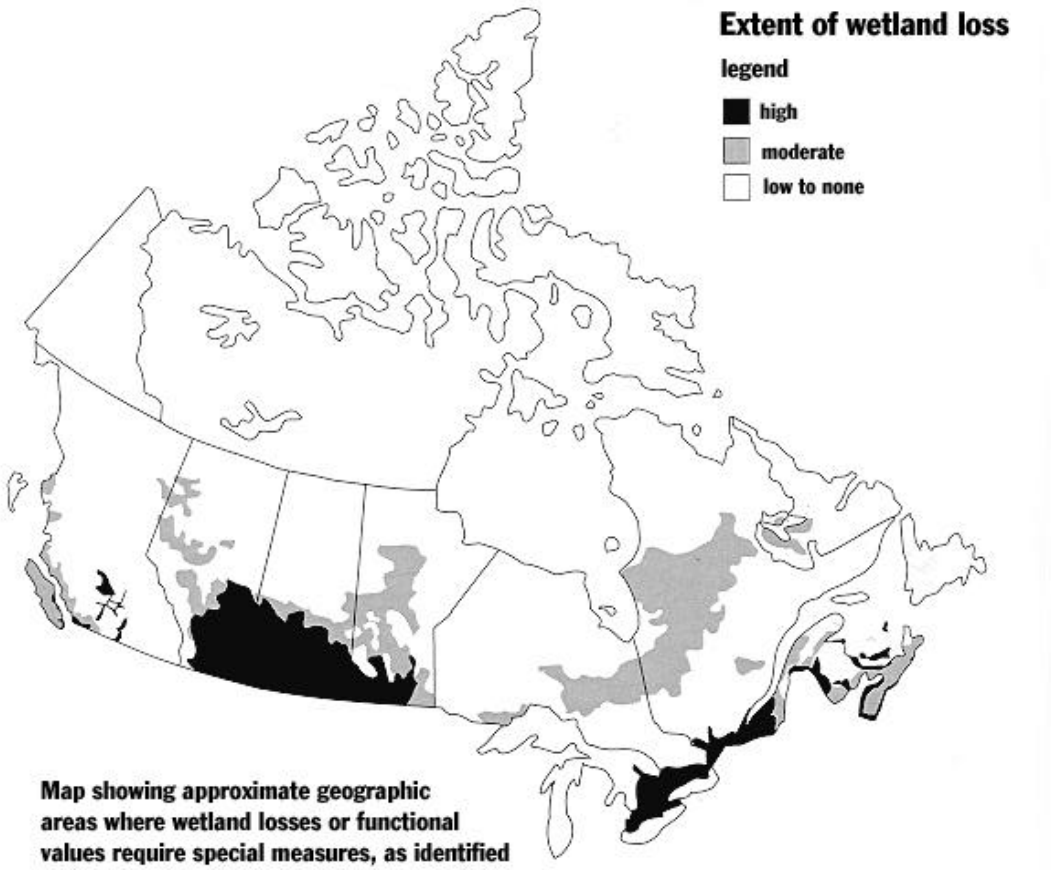
The Canadian Wetland Classification System in a first provisional edition was published by the National Wetlands Working Group in 1987 as Report No. 21 of the Ecological Land Classification Series, Canadian Wildlife Service, Environment Canada, Ottawa. A second revised edition of the *Classification System* will be published in cooperation with the Canadian Wildlife Service of Environment Canada, the Wetlands Research Centre of the University of Waterloo, and the Secretariat of the North American Wetlands Conservation Council (Canada). It is hoped that this revised edition will be completed by the National Wetlands Working Group during 1997.

APPENDIX 2. SPECIAL GEOGRAPHIC AREAS REFERRED TO IN THE POLICY

Strategy 2 of the *Federal Policy on Wetland Conservation* makes reference to "those areas of Canada where the continuing loss or degradation of wetlands has reached critical levels, or where wetlands are important ecologically or socio-economically to a region." The map on the next page approximates the geographic areas where wetland losses or functional values require that special measures, such as wetland enhancement, be applied. The map provides a general guide for federal land managers. Regional officers of the Environmental Conservation Branch (ECB) of Environment Canada can make a more detailed determination of the federal properties that fall within these specially designated areas.

Strategy 2 also states "Due to local circumstances where wetland losses have been severe, in some areas no further loss of any remaining wetland area may be deemed essential." The ECB Regional Office is also in the best position to identify these areas within their region.

The black areas in the accompanying map indicate zones that have experienced wetland loss of 50-90% of the original wetland base due to a combination of pressures for agricultural, urban, ports or other land use developments. The stippled areas indicate areas where current or potential development for hydro-electric, forestry and agriculture may significantly impact wetlands in Canada. White areas on this map are zones characterized by isolated, minor, or no land use impacts on wetlands at the current time.



Map showing approximate geographic areas where wetland losses or functional values require special measures, as identified in the Federal Policy on Wetland Conservation

APPENDIX 3. OTHER WETLAND POLICIES AND REGULATIONS ACROSS CANADA

Generally, provincial enactments cannot bind the federal Crown. In particular, where a provincial law interferes with land use, the law will be inoperative in relation to federal lands (Laux 1993). However, the *Federal Policy on Wetland Conservation* emphasizes a coordinated, cooperative approach to wetland conservation, involving all levels of government and the public. Strategy 2 concerning federal lands and waters makes specific reference to the conservation of wetlands designated as "ecologically or socio-economically important to a region." Strategy 4, Enhancing Cooperation, states "The federal government will continue to be a partner in cooperative activities and agreements with the provinces and territories and non-government agencies to advance wetland conservation." Action items of note include "encourage and support provincial and territorial policies that promote wetland conservation" and "enhance and, where necessary, develop new mechanisms for the resolution of interjurisdictional wetland problems."

Current provincial wetland policies for several provinces (see Lynch-Stewart *et al.* 1993) complement the federal strategies. Federal departments are encouraged to work with the provinces (and agencies which promulgate provincial laws such as municipalities), to realize the objectives and intent of provincial laws and policies with respect to wetlands. In some areas, it may be useful to develop agreements among agencies with jurisdiction over wetland areas, describing an approach that will be taken for regulating land use on wetlands, satisfactory to all parties, such as that proposed for interagency management and conservation of Rideau Canal wetlands (Penney 1993).

Provincial wetland policies are under development or being implemented in Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, and Nova Scotia. Several provinces have addressed wetland protection through legislative mechanisms – Prince Edward Island, Quebec, and Ontario. Environmental assessment regulations are used in all provinces to promote conservation of wetland functions. References for the provincial documents now available are included in the "Selected Bibliography" of this report (see Section V).

APPENDIX 4. MAJOR WETLAND INVENTORIES

Major wetland inventory and evaluation programs that provide information on Canadian wetlands are listed below. There are many other local mapping studies.

PACIFIC REGION

1. **Coastal Estuaries Program:** Surveys of wetland location, ecological characteristics and an evaluation scheme. Ties to Pacific Estuaries Enhancement Program. Not digitized.

Agencies: Environment Canada
Province of British Columbia
Fisheries and Oceans Canada

2. **Coastal Resources Management Program:** A late 1970s folio of maps of integrated coastal management program includes sensitive wetland areas.

Agencies: Environment Canada
Province of British Columbia
Fisheries and Oceans Canada

3. **Wetlands Inventory of the Lower Fraser Delta:** Complete 1994 inventory of wetlands at 1:50 000 scale. GIS data sets.

Agency: Canadian Wildlife Service

PRAIRIES

4. **Alberta Peatlands:** A map based on federal and provincial soil survey information that presents all peatlands of Alberta. Agriculture Canada. Ottawa. Scale 1:1 000 000. 1992.

Agencies: Forestry Canada
Government of Alberta
University of Alberta

5. **Prairie pothole and aspen parkland wetlands:** Focuses on southern Alberta and Saskatchewan. This area was a Ducks Unlimited Inc. remote sensing wetland inventory program from 1985 to 1991. Inventory scale is 1:50 000 in Canada. GIS compatible.

Agencies: Ducks Unlimited Canada
Ducks Unlimited Inc.

6. **Prairie pothole waterfowl production transects:** Inventory and population counts in Prairie region of Canada. Over 40 years of transect data. GIS of land use change and effects of NAWMP exist for some transects e.g. southwest Manitoba.

Agencies: U.S. Fish and Wildlife Service
Canadian Wildlife Service

7. **Northern Resources Inventory Program Manitoba (NRIP):** A series of about 25 NRIP 1:250 000 maps prepared in 1976-1979 to provide detailed soil and vegetation description and mapping of all wetlands and other landscape features for much of the area of north central Manitoba and a corridor to Churchill. Not digitized.

Agency: Manitoba Department of Natural Resources

ONTARIO

8. **Southern Ontario Wetland Inventory:** Wetland mapping and loss evaluation led by Environment Canada in 1980-1985. A total of 125 1:50 000 maps were produced. These maps are now sold by the Federation of Ontario Naturalists under an agreement with Environment Canada. Not digitized.

Agencies: Environment Canada
Federation of Ontario Naturalists

9. **Southern Ontario Wetland Evaluation Program:** Over 2 400 sites have been evaluated in a Class 1-7 system, maps produced to guide Ontario Department of Revenue for Land Tax Reduction Program for wetland landowners. Summarized on 1:250 000 maps. Not digitized.

Agencies: Environment Canada
Ontario Ministry of Natural Resources

10. **Ontario Peatland Inventory:** During the 1980-1990 period, the Ontario Ministry of Natural Resources had a program to identify and characterize peatland and other surficial deposits, mainly in northern and central Ontario. Consists of site records mainly.

Agency: Ontario Ministry of Natural Resources

11. **Northern Ontario Wetland Inventory:** Ontario Ministry of Natural Resources had a program from 1980-1984 led by the Ontario Centre for Remote Sensing. Numerous prototype and operational inventory peatland maps were produced. Generally 1:250 000 scale. Digital records in original form.

Agency: Ontario Ministry of Natural Resources

12. **Northern Ontario Wetland Evaluation:** Initiated in 1992 to develop an evaluation scheme for wetlands north of Canadian Shield limit. Maps at 1:250 000 scale identify evaluated sited. Not digitized.

Agency: Ontario Ministry of Natural Resources

13. **Hudson/James Bay Integrated Management Program:** Numerous linear coastal and coastal zone maps of wetlands and other features from the late 1970s at 1:50 000 scale were produced based on interpretation of remote sensing data. Some of this data are digitized.

Agencies: Environment Canada
Ontario Ministry of Natural Resources
University of Guelph

14. **Northwestern Ontario Wetland Inventory Project:** 1993-1994 Field evaluation of thematic mapper data centred on portion of Kenora area. GIS data set.

Agencies: Ontario Ministry of Natural Resources
Geomatics International Inc.

QUEBEC

15. **St. Lawrence Wetlands Inventory:** From 1980-1981, the Canadian Wildlife Service contracted a series of 1:20 000 scale linear maps for all shoreline areas of the Ottawa, Richelieu and St. Lawrence Rivers from the Ontario border through Matane, Quebec including the Gaspé and Magdalen Islands. Inventory in all areas; temporal change analysis up to the Quebec City region for the 1965-1980 period.

Agencies: Canadian Wildlife Service
Le Groupe Dryade Ltée.

16. **Peatland Inventory Quebec:** Quebec Ministry of Natural Resources, Mines Sector has published an atlas of about 110 1:250 000 scale maps of peatlands in Quebec south of 49° 50' N to 50° 00' N latitude identifying fen and bog sites, areas of peat harvesting operations and data on peat characteristics for energy interests.

Agency: Quebec Ministry of Natural Resources

17. **Peat Soil Areas, Southwest Quebec:** A folio of three 1:250 000 map sheets in the Montreal-Sherbrooke region identify sites with peat soils suitable for market gardening development. Published in 1989.

Agency: Agriculture Canada

18. **James Bay Ecological Land Survey:** During the 1977-1982 period, over 45 1:250 000 scale maps that include landscape mapping incorporating peatland and coastal wetland complexes were produced by Environment Canada. GIS data sets were developed.

Agencies: Environment Canada
Quebec Ministry of Natural Resources
James Bay Development Corporation

ATLANTIC CANADA

19. **Maritime Wetland Protection Mapping Program:** From 1980-1986, maps of all the area of Prince Edward Island, Nova Scotia, and New Brunswick were produced by the Canadian Wildlife Service. These data are stored in a computerized format. Maps and ranking system by Golet System for non-forested wetlands of value to wildlife. Mapping scale is 1:50 000. In Nova Scotia and New Brunswick, integration projects with the peatland/mining sector are now underway to create integrated provincial wetland data bases and to update the inventory information.

Agencies: Canadian Wildlife Service
Government of New Brunswick
Government of Nova Scotia
Government of Prince Edward Island

20. Peatland Inventory Programs: New Brunswick and Nova Scotia: From 1980-1985, provincial mapping covered all of New Brunswick and Nova Scotia. Maps at 1:50 000 scale are tied to computer files on site descriptions and peat for energy characteristics including rare metal surveys data. These data are GIS compatible. These data are forming part of provincial integrated natural resources data bases now being developed.

Agencies: New Brunswick Department of Natural Resources and Energy
Nova Scotia Department of Natural Resources

21. Newfoundland Peatland Inventory: From 1980-1984, the province produced maps in hard copy or fiche for all peatland sites on the Island of Newfoundland at 1:50 000 scale. Data are not in computerized format. The province has also initiated a southern Labrador peatland survey in association with Environment Canada.

Agencies: Government of Newfoundland/Labrador
Canadian Wildlife Service

22. Newfoundland Coastal Wetland Inventory: Environment Canada in the 1984-1986 period led the creation of maps for oil spill impact assessment including detailed inventory of coastal wetland sites for most of insular Newfoundland. Scale 1:50 000.

Agency: Environment Canada

23. Prince Edward Island Wetland Inventory: All wetlands have been remapped effective to 1993-1994 and data are in geocoded format.

Agency: Prince Edward Island Department of Environmental Resources

NORTHERN CANADA

24. Northern Wetland Project, Northwest Passage/Beaufort: Environment Canada and Northern Oil and Gas Program (NOGAP) in the 1984-1985 period created wetland maps for a shipping impact assessment. The study includes 19 maps at 1:500 000 scale, covering all of the total map sheet areas adjacent to the Beaufort Sea and Northwest Passage regions including Lancaster Sound, mapping location of wetland complexes and providing data sheets for each complex on ecological and wildlife characteristics.

Agency: Environment Canada

25. Northern Land Use Information Map Series: From 1978-1985 Environment Canada and Indian and Northern Affairs Canada produced over 180 map sheets published at 1:250 000. These integrated land use planning maps include ecological landscape characterization of northern portions of the District of Keewatin and most of Arctic Islands south of 71° 00' N. latitude. These include wetland complexes as specific map units.

Agencies: Environment Canada
Indian and Northern Affairs Canada

CANADA

26. Wetlands of Canada: Wetland Regions and Wetland Distribution, two maps at 1:7 500 000 scale were published by the National Atlas of Canada in 1986, authored by the National Wetlands Working Group. It is a joint publication of Environment Canada and Energy, Mines and Resources Canada. Ottawa. Exists as Statistics Canada GIS data base.

Agencies: Environment Canada
National Wetlands Working Group

27. Peatland Inventory of Canada: In 1995, an updated map of peatland distribution was published as an open file data base of the Geological Survey of Canada. The map scale is 1: 6 000 000.

Agencies: Geological Survey of Canada
Agriculture and Agri-food Canada

28. National Land Cover Project, Environment Canada: The State of Environment Reporting Branch houses a national Land Cover GIS Data Base summarizing land cover for each of 5 400 ecodistricts. One class of land cover is "total wetland area" by ecodistrict. The data were synthesized from many sources in 1985. Ottawa.

Agency: Environment Canada

29. Ducks Unlimited Canada, Provincial Wetland Inventories: Wetland maps for many sectors of southern Canada that are used to identify key wetland areas for waterfowl are prepared and housed by provincial offices of the company. Many of these inventories are not in computerized format. Hard copy maps exist in addition to the Prairie wetland mapping noted above (item 5).

Agency: Ducks Unlimited Canada

Source: C.D.A. Rubec, Canadian Wildlife Service, personal files.