

There are many types of wetlands and they all have different management issues. Nevertheless, most of the issues involve a conflict between meeting human needs and the continued existence of wetlands. For example, wetlands provide staging and breeding grounds, nesting sites, and food and shelter for waterfowl. However, in some parts of Alberta, some waterfowl may damage crops. At the same time, there are demands for recreational opportunities such as viewing and hunting activities associated with large numbers and species of waterfowl. Wetlands (muskeg) are crossed to access trees for harvesting, and for seismic lines. Impacts are numerous.

Individuals are being encouraged to co-exist with wetlands. Every wetland should be ringed by a vegetative buffer zone (also called a healthy riparian zone), which can extend a wetland's life by controlling erosion and acting as a natural filter. The riparian zone also provides wildlife habitat, protects fields from the spread of salinity and contributes to a healthier watershed, overall.

Stewardship programs promote education and/or incentives so that farmers and developers understand why activities such as filling in wetlands, or plowing or mowing up to the water's edge are no longer acceptable. Farmers are encouraged to control or restrict livestock access to wetlands where they tend to trample vegetation, stir up sediments and pollute the water. One farmer, who was contaminating a stream with runoff from an animal stockyard, decided to become a better environmental steward by building several dams along a ditch to create a series of mini-wetlands and settling basins. The basins were planted with native wetland species. The emergent plants absorbed the nutrients and purified the water before it entered the stream. The water in the wetland added valuable moisture to the soil. Of course, since the farmer was working in a waterbody, these conservation actions had to be approved first by the Government of Alberta!

Cattails, reeds, and rushes are also being used in some communities where human made marshes are created to extract toxic chemicals and metals from highly polluted water. Calla lilies are planted to clean up discharge from septic tanks. When peatlands must be disturbed to access trees for harvest, these forest activities usually occur in winter when the ground is frozen in order to minimize disturbances and impacts.

Not only are our wetlands in danger of disappearing, but also so are some of the plants and animals that live there. As people are becoming more aware of the extraordinary place wetlands hold in the ecosystem, they are more concerned about the dangers that threaten wetlands and their inhabitants. This awareness can lead to understanding that can, in turn, lead to personal action.

In Alberta there are a number of wetland management issues. Here are some examples.

Activity	Issue	What is Being Done
<b>Timber Harvesting</b>	<p>Soil may be compacted by vehicles and heavy equipment.</p> <p>Removal of vegetation or road construction may cause erosion and alter surface water drainage patterns.</p> <p>The forest industry contributes to Alberta's economy.</p>	<p>Alberta Sustainable Resource Development (SRD) approves preliminary, detailed and operational plans for harvesting, and sets ground rules.</p> <p>The government places conditions on harvesting and plant site permits such as winter harvesting only or allowance for buffer zones around streams and lakes.</p> <p>Universities, conservation organizations, and forestry companies are currently conducting research to determine the impacts on boreal wetlands and watersheds to help guide conservation strategies for the future.</p>
<b>Horticulture Peat Mining</b>	<p>This practice lowers the water table because of drainage.</p> <p>Horticultural peat and peat moss are used by millions of residents in North America for gardening and in greenhouses.</p> <p>Other applications for peat being researched and applied on a small scale include oil spill absorption and treatment of sanitary and urban wastewaters.</p> <p>This industry provides employment opportunities and contributes to the economy.</p> <p>Natural vegetation is temporarily removed and "stockpiled", and habitat is destroyed during mining.</p> <p>The bog takes many years to return to its naturally functioning state because hydrology and water chemistry have been altered. The accumulation of new plant material is slow (See Wetland Wisdom on poster back).</p>	<p>Provincial government charges a royalty on peat extracted from public lands as well as rental fees.</p> <p>Alberta has wetland conservation and management policies in place.</p> <p>Conditions are placed on sites requiring reclamation.</p> <p>Research in Alberta (and other prairie provinces) is currently being conducted to determine if peatlands serve as significant carbon sinks (storage areas), helping to reduce the effects of greenhouse gases.</p>
<b>Agriculture</b>	<p>Wetlands have been drained or cultivated to provide more arable land.</p> <p>Habitat provided to hundreds of species of plants and animals is lost or significantly altered.</p> <p>The water table changes.</p> <p>There can be contamination from livestock wastes, pesticides and fertilizers.</p> <p>Drinking water quality can be affected, both nearby and further away.</p> <p>A loss of buffer zones.</p> <p>A loss of waterfowl breeding habitat.</p> <p>Erosion occurs from cultivating too close to the wetland riparian area.</p> <p>The agriculture industry contributes to Alberta's economy.</p>	<p>SRD is responsible for day-to-day management of public land.</p> <p>SRD works with Albertans across the province to ensure a balance between the economic, environmental and social values of our province.</p> <p>The Alberta Government strives to conserve wetlands in their natural state, mitigate degradation or loss of wetlands and enhance, restore or create wetlands in areas where they have been depleted or degraded.</p> <p>Individual landholders determine activities on private land; government approvals are required to disturb a wetland on public and on private property.</p> <p>Incentive and education programs encourage farmers to retain wetlands. These programs are delivered through various government and non-profit organizations concerned with wetland protection, from federal to local levels.</p> <p>Ranchers fence off wetlands and streams to</p>

Activity	Issue	What is Being Done
		<p>prevent cattle from walking in wet areas, trampling soils and leaving waste behind. Ranchers pump water into troughs, making it cleaner for the cattle, and for the water, too.</p> <p>Farmers are encouraged to develop environmental farm plans for their operations.</p>
<b>Oil and Gas Exploration</b>	<p>The dominant pressure in Alberta’s boreal forest region is from oil, oilsands, mining and gas exploration. All of Alberta is affected by the oil and gas industry.</p> <p>Oil and gas contributes to Alberta’s economy.</p> <p>Roads, seismic activities and the drilling of oil wells require the removal of forest and often results in the disruption of water flow, affecting wetlands.</p> <p>There is currently a lack of information concerning the impact industry is having on the wetlands and watersheds of the boreal forest.</p>	<p>Petroleum companies practice wetland mitigation techniques. They must avoid disturbance and minimize their impact.</p> <p>Research is being conducted in the boreal forest regions of Alberta to determine the effect of energy exploration on wetlands and aquatic ecosystems.</p> <p>New techniques for seismic exploration can greatly minimize impacts.</p>
<b>Urbanization</b>	<p>In urban areas such as Calgary, up to 90 per cent of prairie wetlands have been destroyed due to urban expansion.</p> <p>Urban expansion in towns and cities across Alberta threatens wetlands.</p>	<p>Alberta Water Resource Commission developed a wetland management policy in 1993.</p> <p>The policy goal is to conserve wetlands, keep damage or loss of wetlands to a minimum and make up for the wetland areas that have been lost!</p> <p>An updated Wetland Policy for Alberta is currently being developed.</p> <p>In 2004, a Wetland Conservation Plan was approved for the city of Calgary. This makes Calgary the first municipality in Canada to support a wetland protection policy.</p> <p>Other cities and towns are making efforts to ensure that the conservation of wetlands and other natural areas is balanced with the desire for development.</p>
<b>Stormwater and Effluent Drain Damage</b>	<p>As wetlands are used more and more for their water purification properties, there is a danger that they will become dumping grounds for dirty water disposal or stormwater management.</p> <p>Wetlands have different properties and functions than stormwater treatment ponds, yet some people falsely believe them to be the same.</p>	<p>Ducks Unlimited Canada is establishing guidelines for the treatment of stormwater and effluent (waste water from industry or sewage) using wetlands.</p> <p>For example, only constructed wetlands (specifically designed to treat wastewater) should be used for treating effluent or stormwater drainage. Natural wetlands should not be used!</p> <p>If natural wetlands are used for treatment the water must be treated (cleaned) first and meet provincial water quality standards.</p>

## **Wetland Management in Alberta**

Albertans place different values on the functions of wetlands and derive different benefits from them. Because of their importance we all have a responsibility for becoming knowledgeable about them and for taking some part in their conservation. In Alberta, the *Wetland Management in the Settled Area of Alberta - An Interim Policy* guides wetland management decisions. This policy calls for -1- the conservation of slough/marsh wetlands in a natural state, -2- the mitigation of harmful effects of development or loss of slough/marsh wetland benefits as near to the site of disturbance as possible and -3- enhance, restore or create slough/marsh wetlands in areas where wetlands have been depleted or degraded.

The provincial wetland policy, which was drafted in 1993 and is currently being revised and updated, is based on five principles:

1. Wetlands are an integral and important part of our environment and provide many environmental, economic, and social benefits;
2. Wetlands are dynamic ecosystems that vary in type, size, distribution, function, and significance;
3. The responsibility for wetland management does not rest entirely with the government: it is a shared responsibility;
4. Decision-making is based on the best available information which is shared with the public; and,
5. Responsible management considers the needs of future generations when options are evaluated.

For many thousands of years wetlands did not have a very good reputation. As a result, protection was not a priority and wetlands were lost as they were dredged, filled in, built upon and used as dumping grounds. Now the diversity of attitudes towards wetlands are as great as the functions and values they provide. This activity highlights the changes in attitudes toward wetlands over time.

**Note:** See *Bogged Down* and *Time Machine* from the poster back for more historical information. Visit [www.worldwatch.org/pubs/timeline](http://www.worldwatch.org/pubs/timeline) to purchase a timeline of world environmental events or have students interact with the online version.



## Wetland information Cards

Print the 19 information cards below. ✂ Cut apart and distribute to students; some students may pair up and share a card.

You may choose to have students pin their information card to a four-meter string clothesline using clothespins or have students organize themselves into the timeline line without talking. When they think they have got it right, from the earliest to modern time, have them say aloud the dates to double check the timeline's accuracy. When you are satisfied, have each student read their card's date again and information. Have students listen to how wetlands developed and how human attitudes towards wetlands changed through history. Review together and have each student write a paragraph to summarize the learning.

### 360 million years ago

The earth's crust is cool enough to hold torrents of rain. Soon, oceans and rivers fill the hollows in the crust. The force of water and weather is breaking down some of the rocks into soil. First plants are sprouting in this soil.



### 300 million years ago

Plants are growing thickly in shallow areas of the oceans creating saltwater marshes. Huge wetland plants such as ferns also grow in the warm, squishy mud. They are taller than a three-story house.

**Over millions of years:**

As trees and plants die in the swamps, they sink to the bottom, layer upon layer, eventually forming peat. Over time, the peat is covered by mud and sand. As the pressure becomes greater, heat is produced and eventually the peat turns into coal. People of the future will burn coal and peat for fuel.



**170 million years ago**

Climate is warmer and more humid. Swamps cover much of North America. The dinosaurs dominate the wetlands.



**66 million years ago**

An asteroid (16-32 km diameter) impacts the earth. There is a massive extinction of the dinosaurs and other land animals heavier than 25 kg.



**9,000 years ago**

The last Ice Age ends. Glaciers inch down the mountains, gouge into the ground and melt to form depressions for marshes, bogs and fens.



**3,000 years ago**

Scientists of the future believe people who live in Northern Europe make human sacrifices to help their crops grow. Over 700 human bodies from this time period will be found preserved in bogs.



**2,000 years ago**

The Tollund Man is murdered and buried in a Danish bog in fourth century BC. He will be found in 1950 almost perfectly preserved.

(The oldest peat bog bodies date back to 10,000 years ago (Koelbjerg Woman), some bodies suggest human sacrifice rituals associated with Celtic cultures.)



**20th century**

People think that wetlands are dark places of mystery and superstition.

**Industrial Revolution (1750-1830)**

Wetlands are being drained to make way for urban development and farmland.



**1938**

Ducks Unlimited Canada is formed to preserve wetland habitat and restore waterfowl populations.



**1980s and 1990s**

There is a growing concern about preserving wetlands for the environmental benefits they offer, including habitat for wildlife and especially for endangered species.



**1986**

An important conservation agreement is signed between Canada, the U.S.A and Mexico. It is known as the *North American Waterfowl Management Plan* (NAWMP). The goal is to conserve North America's wetlands and their surrounding uplands to provide habitat for many species, while working for soil and water conservation for agriculture.



**1992**

Cows and Fish program in southern Alberta is raising awareness among the agricultural community about the importance of conserving riparian areas. As a result, many landowners are changing their land management practices.



**1993**

In response to the loss of wetlands in Alberta, temporary guidelines (known as an *Interim Policy*) for *Wetland Management in the Settled Area of Alberta* are produced by the Government of Alberta.



**Late 1990's/ 21st Century:**

People want more natural areas; wetlands are incorporated into the design of new subdivisions and developments.

**2004**

Calgary has lost up to 90 per cent of their wetlands due to development. City Council approved the Calgary Wetland Conservation Plan to put a priority on protection of remaining wetlands.

**2009**

A wetland policy is being developed by the Government of Alberta to ensure that wetlands are protected. We understand that wetlands play a critical role in providing essential ecosystem goods and services – such as clean air and water.

**Today**

What have you noticed about wetlands? Do you see any wetlands in your neighbourhood? In your community? Do you visit wetlands with your family?