# Iris

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The Newsletter of the Alberta Native Plant Council


## Inside...



# Wetlands

## *Taking the mystery out of these mysterious ecosystems*

*Markus N. Thormann and David A. Locky*

It was not long ago that many people believed wetlands to be wastelands, harbours of disease, and places worthy only of draining for other land uses. Fortunately, during the last 10–20 years, public and even political opinion has turned in favour of wetlands, with an understanding of the importance of wetlands from both social and ecological perspectives. For example, wetlands play a role in transforming the landscape (removing pollution, slowing erosion), act as a source (of water, certain kinds of sediment, plants, animals, peat, and gases), and as sinks (for flood control/water augmentation, organic matter, and carbon) (Mitsch and Gosselink 2000). Many readers will know that wetlands are unique environments and often contain the greatest comparative diversity of organisms, including plants, animals, and fungi, many of which show fidelity to only wetlands and consequently are rare.

Wetlands are found throughout Canada, covering sixteen percent of the landscape (approximately 130 million hectares), more than in any other country (National Wetlands Working Group 1988). Eighteen percent of Alberta is covered with wetlands (Vitt *et al.* 1996), including all five wetland classes found in Canada: bog, fen, swamp, marsh, and shallow water wetland. How exactly does one define a wetland and differentiate among wetland

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Some of the members of the 2001–2002 ANPC Executive at our AGM in Lethbridge. Look for a summary of the 2001 AGM in the next issue of *Iris*. L–R: Jim Posey, Ed Karpuk, Dave Downing, Ken Sanderson, Elisabeth Beaubien, Jane Lancaster, Elaine Gordon, Mryka Hall-Beyer, Linda Kershaw , and Lorna Allen.


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# Conserving Nature in the Edmonton Region

## September 21–23, Grant MacEwan Community College

*Patsy Cotteril*

The Edmonton Natural History Club is sponsoring a conference that aims to explore some issues surrounding conservation of natural areas in urban settings in general, and in Edmonton in particular. The conference kicks off with a keynote presentation on Friday night, September 21, given by Randall Arendt, a conservation planner from Rhode Island, USA, who will speak on *Creative Development Design as a Tool for Protecting Conservation Lands*. On Saturday, Dr. Ross Wein of the University of Alberta will speak on the importance of green corridors in forming a network of conserved areas, Calgary's Bernard Amell will discuss *Natural Processes and Urban Form: Can a Modern City Support Healthy Ecological Functions?* and, to set the scene from the natural history point of view, Derek Johnson of the Canadian Forest Service will describe ecosystems in the Edmonton region.


To examine the more political/administrative aspects of conservation, there will be presentations by City of Edmonton Planning & Development and Community Services staff, followed by a workshop and a panel discussion to discuss issues and processes in greater depth. Other presentations will include examples of successfully conserved areas and management approaches, as well further initiatives to maintain nature in the city, such as naturalisation of schoolyards.

Naturalist/interpreter/photographer Chris Fisher will speak at the banquet supper on Saturday evening, during which a representative of the Federation of Alberta Naturalists will present the Loran L. Goulden Award. The conference will conclude on Sunday with a field trip by bus to selected natural areas in the city.

Prior to the conference posters on natural history and conservation themes will be on display at City Hall, as well as during the conference at the main venue, Grant MacEwan Community College downtown campus.

The cost of the conference is quite modest: $15 for the keynote presentation and $35 for Saturday events except the banquet supper which is $20. The field trip on Sunday is free. Registrants for the full package ($50) will receive a $15 discount if they register before September 1st. The registration package will include a "conservation handbook" that will indicate ways in which to participate in urban conservation initiatives. In addition, the ENHC plans to publish a proceedings of the conference by the end of the year.

To register, contact Dave Stepnisky at (780) 434-0374 or Tanya Hope at (780) 430-4218, or visit <www.enhc.com>. We look forward to seeing you there!

## **Wetlands**, *from page 1*

classes?

### Definition and wetland classification

According to the Canadian Wetland Classification System (National Wetlands Working Group 1988), a wetland is defined as: *land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment*. Wetlands can be divided into two general categories based on peat depth: (1) mineral wetlands, with no peat or less than 40 cm of peat, and (2) organic wetlands or peatlands, which have 40 cm or greater peat depth(Figure 1).

Peatlands can be classified into ombrotrophic bogs, minerotrophic fens and swamps. Ombrotrophic ecosystems receive water and nutrients solely from precipitation and are separated from the underlying water table, while minerotrophic ecosystems receive nutrients from precipitation as well as ground and surface water flow. Fens can be subdivided into poor and rich fens, while rich fens can be further subdivided into moderate-rich and extreme-rich fens. Peatlands are distinguished from non-peat forming wetlands, such as marshes, minerogenous swamps, and shallow open waters, by the presence of a well-developed moss stratum and relatively stable water levels throughout the year in the former. In Alberta, the division between the boreal and prairie zones is generally considered to coincide with the more northern peatlands and southern mineral wetlands. The wetland classes can be described as follows (National Wetlands Working Group 1997):

**Bog**: A peatland receiving water exclusively from precipitation, no groundwater influence, and dominated by *Sphagnum* mosses. Although groundwater does not influence the vegetation, the water table is generally high due to the large water-holding capacity of *Sphagnum*. Bogs can be open, open with mostly ericaceous shrubs, or treed with black spruce (*Picea mariana*).

**Fen**: A peatland receiving water rich in dissolved minerals and varying dominant vegetation, *e.g.* treed, not treed, but generally including graminoid species and mosses. Fens are the most variable wetland class and can range from sedge (*Carex*) -dominated meadows that could be confused with graminoid marshes, to *Sphagnum*-dominated systems similar to bogs. The key concept is the influence of ground and surface waters, however minimal. Fens can traverse a number of gradients, including extreme-rich to poor, treed or not treed. Fens are often associated with bogs, especially in northern Alberta where peatland complexes dominate the landscape.

**Swamp**: Peatland or mineral wetland,

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but generally with flowing or standing mineral-rich waters for part of the year and dominated by woody and herbaceous plants. Mineral swamps in Alberta are often dominated by alder (*Alnus*) and willow (*Salix*) shrub species and are located in riparian zones, whereas peatland swamps are dominated by closely spaced *Picea mariana* and feather mosses.

**Marsh**: Peatland or mineral wetland that is periodically to persistently wet. The water is circumneutral to alkaline, and nutrient-rich. The dominant vegetation are graminoids, emergent plants and forbs, with some shrubs at the periphery. In Alberta, marshes are common on the prairie and they are often associated with sloughs (small bodies of water).

**Shallow Water Wetland**: Mineral wetlands with water up to 2 metres deep and present for most of the year. Less than 25% of the surface water area is covered by the dominant vegetation of submerged aquatic and emergent plants and some woody species. In Alberta, these wetlands are often associated with prairie marshes, but are also found in northern peatland complexes.

### Understanding peatlands

A more thorough understanding of peatlands can be obtained by examining the original defining criteria of these ecosystems. Originally, Tuomikoski (1942) and DuRietz (1949) classified peatlands according to the number of moss "indicator species". These are species that can be found consistently in the same type of peatland. They determined that bogs and poor fens have a low number, while rich fens have a larger number of characteristic bryophyte species. Bogs and poor fens are dominated by species of *Sphagnum* (peat mosses of the class Sphagnopsida), while rich fens are dominated by "brown mosses" (true mosses of the class Bryopsida), such as *Drepanocladus*, *Scorpidium*; and *Tomenthypnum*. Table 1 summarizes some of the more common vascular and non-vascular plant species of western continental wetlands, keeping in mind that there are many more plant species common to wetlands in this

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A subscription to *Iris* is included with membership in the ANPC. To join, contact the Secretary, or download a membership form from our web page, <www.anpc.ab.ca>

**Membership fees:**

| | |
|---|---|
| $15 | Individual |
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If you have an announcement, article or other items, you are invited to submit it to the editor for publication. Items concerning native plants will be given the highest priority.

The editors reserve the right to edit submissions, but will review changes with the authors whenever possible. Disputes will be resolved in favour of the audience.

**Deadlines for upcoming issues:**

| | |
|---|---|
| **Fall** | **Oct 15** |
| Winter | Jan 15, 2002 |
| Spring | May 15, 2002 |

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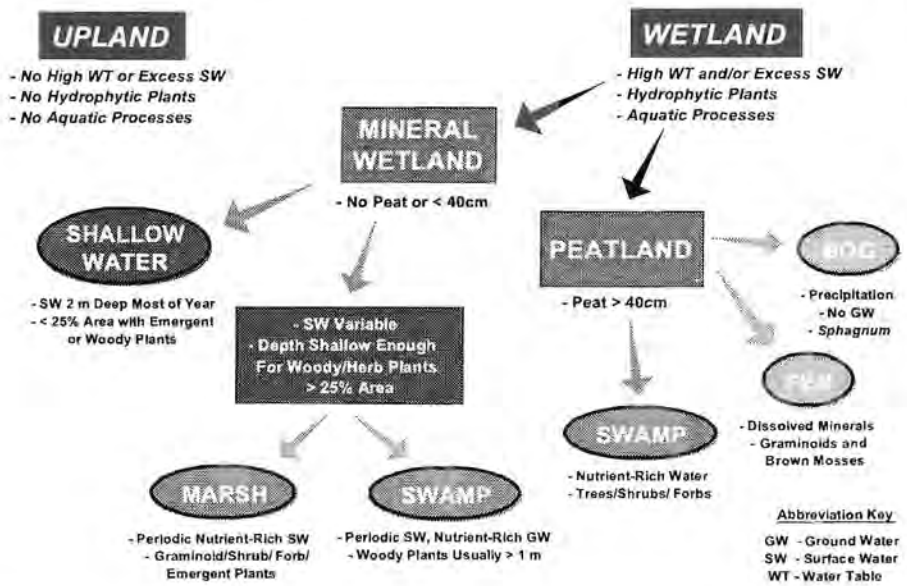


Figure 1. Generalized Canadian classification key to the five wetland classes. Based on hydrology, peat occurrence and depth, and vegetation. Swamp and marsh wetland class can be mineral wetland or peatland. Adapted from National Wetlands Working Group (1997).

region and that wetlands in other regions, *e.g.* in eastern Canada or Europe, have substantially different plant communities.

Sjörs (1950, 1952) overlaid a chemical gradient onto the vegetation gradient, focussing on pH and conductivity of the surface water. Therefore, along this vegetation-chemical gradient, bogs are highly acidic and are dominated by oligotrophic species of *Sphagnum*, poor fens are less acidic and are dominated by mesotrophic species of *Sphagnum*, and rich fens are slightly acidic to alkaline and are dominated largely by brown mosses (Table 1). Over the years, this increasing gradient of pH and conductivity along the bog- poor fen- rich fen gradient has been erroneously applied to include other surface water nutrients, such as nitrate, ammonium, and phosphorus, when indeed all peatlands have similar concentrations of these nutrients in their surface water (Vitt 1994).

In contrast, non-peat forming wetlands are eutrophic, that is, they have higher surface water concentrations of nitrate, ammonium, and phosphorus than oligotrophic and mesotrophic bogs and fens. Furthermore, their water levels fluctuate significantly throughout the year, hindering the establishment of a well-defined bryophyte stratum and favouring the establishment of emergent plants, such as species of sedge (*Carex*), cat-tail (*Typha*), rush (*Scirpus*), and canary grass (*Phragmites*) (Table 1). Although generally considered non-peat forming wetlands (National Wetlands Working Group 1997), some marshes do form peat; however, their peat consists of vascular plant remains, in contrast to bryophyte-derived peat in bogs and most fens, and is not evenly distributed throughout the wetland. For example, the Florida Everglades is a large expanse of swamps and marshes often with significant peat deposits. Similarly, many marshes in central Alberta contain significant peat deposits and should be considered peatlands (Thormann and Bayley 1997). However, further research is required to determine the extent of peat in marshes elsewhere.

Wetland classification is by no means a clearly defined process and indeed still a contentious issue (see Bridgham et al. 1996). While technical by necessity, this classification system has provided a common language for our wetlands that is usable by all. For example, Wagner Bog (now Wagner Natural Area, west of Edmonton) is not really a bog but a peatland complex consisting of small extreme-rich fens (characterized by marl ponds) and bogs. There are countless other examples of this mislabelling or uncertainty regarding differentiation among wetlands, for example, the term "muskeg" appears on many labels of plant

## Wetlands to See in Alberta

Edmonton's unique location in the transition zone between the northern prairie and southern boreal regions makes it an ideal centre from which to visit examples of all five wetland classes in Alberta. The shallow water wetlands and marshes of the prairies give way to the peatlands of the boreal region, although you can certainly find mineral wetlands north and isolated peatlands in the south. Some sites to explore:

**Bleak Lake peatland complex**, approximately 17 kilometres southwest of Athabasca. This is a good place to see bogs, moderate-rich fens and rich fens. Take the first eastbound road north of Perryvale (approximaltely 100 kilometres north of Edmonton on Highway 2). The wetlands are found 5–15 kilometres north and south along Perryvale Road.

**Wagner Natural Area**, west of Edmonton, 1 kilometre south of Calahoo. This is a good place to see extreme-rich fens

**Swamps**: common in riparian areas throughout Alberta.

**Marshes and shallow water wetlands**: Found around sloughs in southern Alberta and in association with other wetland classes in northern Alberta.

specimens in many herbaria, because the collector was unable to classify the type of wetland from which a particular plant was collected.

From a botanist's perspective, learning more about wetland identification can be very beneficial. For example, peatlands, particularly fens, are probably the best areas to look for orchids in Alberta.

*Markus Thormann recently completed his Ph. D. in Ecology and Environmental Sciences at the University of Alberta. His field of research is wetland plant ecology with emphasis on decomposition dynamics, nutrient cycling, and microfungal communities.*

*David Locky is a Ph. D. candidate in Ecology and Environmental Sciences at the University of Alberta. His field of research is wetland ecology with emphasis on wetland delineation, effects of disturbance, and plant and avian communities.*

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Table 1. Some typical bryophyte indicator species and vascular plants of western continental wetlands in Alberta

| Wetland class | Mosses | Vascular plants |
|---|---|---|
| **Bogs** | *Sphagnum angustifolium*<br>*S. cuspidatum*<br>*S. magellanicum*<br>*S. nemoreum*<br>*S. fuscum* | *Andromeda polifolia*<br>*Chamaedaphne calyculata*<br>*Picea mariana*<br>*Rhododendron groenlandicum*<br>*Vaccinium vitis-idaea* |
| **Poor fens** | *Aulacomnium palustre*<br>*S. exannulatus*<br>*S. jensenii*<br>*S. papillosum*<br>*S. riparium* | *Andromeda polifolia*<br>*Betula pumila*<br>*Carex* spp.<br>*Menyanthes trifoliata*<br>*Salix* spp. |
| **Moderate-rich fens** | *Brachythecium mildeanum*<br>*Calliergonella cuspidata*<br>*Drepanocladus aduncus*<br>*D. vernicosus*<br>*Tomenthypnum nitens* | *Betula pumila*<br>*Carex* spp.<br>*Larix laricina*<br>*Menyanthes trifoliata*<br>*Salix* spp. |
| **Extreme-rich fens** | *Scorpidium scorpioides*<br>*D. revolvens*<br>*T. nitens*<br>*Campylium stellatum*<br>*Sphagnum warnstorfii* | *Betula* spp.<br>*Carex* spp.<br>*Muhlenbergia glomerata*<br>*Salix* spp.<br>*Triglochin* spp. |
| **Mineral swamps** | *Climacium dendroides*<br>*Plagiomnium cuspidatum*<br>*P. ellipticum* | *Alnus* spp.<br>*Betula* spp.<br>*Calamagrostis* spp.<br>*Carex* spp.<br>*Salix* spp. |
| **Peatland swamps** | *Hylocomnium splendens*<br>*Pleurozium schreberi*<br>*Ptilium crista-castrensis*<br>*S. warnstorfii* | *Alnus* spp.<br>*Betula* spp.<br>*Calamagrostis* spp.<br>*Carex* spp.<br>*Salix* spp. |
| **Marshes** | absent | *Carex* spp.<br>*Lemna* spp.<br>*Phragmites* spp.<br>*Scirpus* spp.<br>*Typha latifolia* |
| **Shallow open water** | absent | *Ceratophyllum* spp.<br>*Myriophyllum* spp.<br>*Nuphar* spp.<br>*Polygonum* spp.<br>*Potamogeton* spp. |

# AGM 2002

Plans are already afoot for next year's Annual General Meeting and Workshop. Next year's workshop will be held in Red Deer and co-sponsored by the Red Deer River Naturalists.

The organising committee is looking for suggestions for a theme as well as presentation topics and speakers. If you have any ideas or would like to contribute in any way, please drop a note to Ed Karpuk <ed.karpuk@gov.ab.ca>, or call him at (403) 347-5723.