

WAGNER NATURAL AREA NEWSLETTER

Volume 17 Number 2 November 2003

Newsletter of the Wagner Natural Area Society, Management Committee
and Volunteer Stewards of Wagner Natural Area, Parkland County, Alberta



Wagner Natural Area Society's

Annual Members' Night 2003

Thursday, **December 4th** in Room 327, Earth & Atmospheric Sciences Building
at the **University of Alberta**

Program:

6:30 p.m. Introduction, Reports of President, Treasurer, & Membership Secretary

7:00 p.m. Presentation by guest speaker, **Dr. Ben Rostron**, Ph.D, P.Eng., P. Geol., Associate Professor
in the Dept of Earth & Atmospheric Sciences, and Vice-President of Wagner Society, on
"**Groundwater In and Around Wagner Natural Area**"

8:30 p.m. Refreshments.

*Admission is free, and members and their guests are welcome! (Membership renewal available!)
Parking (\$3 per evening) is available in the BioSciences Parking Lot immediately to the north of the
building off Saskatchewan Drive.*

Keeping Track of Groundwater (The Story Continues...)

by Alice Hendry, President, Wagner Society

NOVO Development Corporation (also known as Edmonton West RV Park and Campground), Wagner Society's neighbour located immediately north of Highway 16, has applied to Alberta Environment for a water licence to allow operation of a stormwater management system on its property. For over two-and-a-half years Wagner Society has been expressing concern that NOVO's excavation of a pond (originally called a fish pond) could affect groundwater supplies in Wagner by withdrawing water from its aquifer. During July, 2003, Wagner Society directors worked with Department of Environment staff to ensure that any approval granted for the stormwater management system would prohibit the existing pond from being dug to a greater depth. The Society also requested a monitoring period of several years for the groundwater monitoring wells installed last winter by Omni-McCann Ltd.

continued next page

In This Issue

Keeping Track of Groundwater, pp.1-2
Wagner Grapevine, p. 2
Wagner Executive, p. 2
Peatland Creatures Great & Small,
Part I, pp. 3-6
Wagner Wildlife Watch, # 3:
Earthworms, pp. 7-8

**Christmas Gift Idea:
Wagner Orchid Posters
are still available at \$10 each plus
accompanying text**

**Pick yours up at the Members' Night or
call Pat, Alice or Patsy
(see executive list, p. 2, for phone nos.)**

Membership Subscription Renewals are now
due! Please complete and return the form
included in this newsletter!

Groundwater, continued from page 1

On August 14, NOVO Development was granted an Approval under the *Water Act* for the purpose of constructing a stormwater management pond. Attached to the Approval were 22 Conditions. Several of these conditions concerned construction of the stormwater management pond, while others related to monitoring, of both the pond and the groundwater monitoring wells. An additional condition allowed the Director (Alberta Environment) to order an alteration of the stormwater management pond if it is determined that an adverse impact has occurred to any underlying or adjacent aquifer.

On August 15, the Wagner Society's appeal (Statement of Concern) against NOVO Development's application for approval to convert the fish pond to a stormwater management pond was accepted by the District Approvals Manager, Alberta Environment. This allowed Wagner Society members to be recognized as official objectors to

the approval and the Society was given 14 days to submit a notice of appeal.

However, upon reviewing the conditions attached to the Approval Wagner executive chose not to file an appeal. Although the Society would prefer that the pond be filled in completely, we believe that the conditions attached to the Approval now provide sufficient protection for Wagner Natural Area. The depth of the pond will not be increased and portions will even be filled in, although the overall area will increase.

NOVO Development's Approval to construct a stormwater management pond expires on August 13, 2004. If the construction is not completed by then, the Approval will be extended for an additional year. Society members will be keeping a close watch on any construction that occurs; and, moreover, we will be requesting the opportunity to review the monitoring well records on a regular basis.



The Wagner Grapevine



High Insurance Rates – Affect Us All!

Wagner Society has just paid its annual public liability premium as official steward of Wagner Natural Area, reports past president **Irl Miller**. The only problem is that, whereas this premium, at an all-time high of \$582, once covered the whole year, it now only covers the period October 2003 through March 2004. After April, the Society will be uninsured unless it can find an affordable renewal rate in the interim. Part of the problem is that the provincial government can insure individuals under its volunteer programs, but not groups.

Stewards of Alberta's Protected Areas Association (SAPAA)

SAPAA held its annual workshop and AGM on October 25 at the Kerry Wood Nature Centre in Red Deer. At the AGM **John Woienko** took over the helm from three-year president **Alison Dinwoodie**, with Alison promising to continue to play a leading role in the society. Guest speakers were **Glen Semenchuk**, Executive Director of the Federation of Alberta Naturalists, who gave a supportive and encouraging talk on the subject of

advocacy (it really isn't a dirty word!), and **Nigel Douglas**, Outreach Coordinator for the Alberta Wilderness Association, who spoke of the AWA's experiences as steward and advocate. Alison Dinwoodie later reviewed her extensive relationship with the Cardinal Divide Natural Area and Whitehorse Wildland Provincial Park. **Pat** and **Dick Clayton** and **Patsy Cotterill** represented Wagner Society at the meeting. Any provincial stewards wishing to join this (non-government) association, which exists to help stewards fulfill their role, should contact **Marilyn Shannon** at mshannon@oanet.com

Edmonton's Natural Areas Advisory Committee (NAAC)

Patsy Cotterill has been appointed as a citizen-at-large to this new committee with a mandate to provide public input on matters relating to the conservation of natural areas within Edmonton boundaries. Many thanks to **Alice Hendry**, who wrote a glowing letter of support for Patsy's application!

Wagner Natural Area Society, 26519 Highway 16, Spruce Grove, Alberta T7X 3L4

Visit our website at <http://www.wagner.fanweb.ca>

Executive 2003:	President	Alice Hendry (962-4836)	Directors:	Pat Clayton (456-9046)
	Past President	Irl Miller (455-3866)		Leota Cummins (447-4256)
	Vice-President	Ben Rostron (434-3839)		Beth Jenkins (458-1794)
	Treasurer	Tom Sherwood (435-6065)		Derek Johnson (436-8231)
	Secretary/Ed/Membership	Patsy Cotterill (481-1525)		Edgar Jones (436-5327)
				Mike Jenkins (481-8695)

Wetland Series (Part 5)

Peatlands and Creatures Great and Small: Part I - Vertebrates

by David A. Locky

Introduction

This article is Part I of a two-part series on peatland creatures. In this installment I'll provide background information on the five wetland classes in Canada and the associated creatures there, and then focus on peatlands and vertebrates, from mammals to fish. Part II will focus on peatlands and invertebrates, including insects and amoebae, then outline wetlands from the perspective of conservation and animals. A table including all of the creatures discussed in both installments will be provided with Part II.

Canadian wetlands are important to a great number of creatures, from the largest moose to the smallest protozoan. Of the five wetland classes in Canada, shallow water wetland, marsh, swamp, fen, and bog (NWWG 1997), wildlife use is best known in marshes and shallow-water wetlands. Found in coastal and inland areas, marshes and shallow water wetlands are the 'poster children' for wildlife, especially birds. These habitats provide feeding, breeding, nesting, and wintering habitat for tens of thousands of migratory birds, including waterfowl, cranes, coots and grebes, many shorebird species, some passerines, and birds of prey (Atlas of Canada 2003). Marshes and shallow water wetlands also provide critical habitat for many amphibians, some reptiles, and mammals like moose, beaver, and muskrat. Coastal estuaries are important habitats for harbour seals, sea lions, and sea otters, and are also critical for the spawning, feeding, cover, and provision of nursery areas for many species of shellfish, finfish, crustaceans, and other invertebrates. Non-marine fish and invertebrates are also dependent on freshwater wetlands (NWWG 1988; Atlas of Canada 2003).

Riparian areas surrounding wetlands and watercourses are often shrub-dominated swamps that provide vital habitat to passerines, amphibians, and ungulates that often feed there. In addition, many invertebrates, especially insects, breed or thrive in marshes, shallow-water wetlands, and swamps, providing large biomass of food for birds and other species higher up in the food chain, both within and adjacent to the wetlands (Atlas of Canada 2003).

Canadian marshes and shallow-water wetlands are not only important at the continental scale for conservation (NAWMP 2003), but also at the international scale (RAMSAR 2003). However, these wetlands are not the dominant types in Canada. In fact, the largest ecozone in Canada, the boreal region, has very little shallow-water

wetland and marsh. Peatlands, wetlands that accumulate greater than 40 cm of organic matter, are the dominant wetland type in the boreal region, and ironically, much less is known about the animals in peatlands.

Peatlands and animals

Approximately 16% of Canada is covered with wetlands, of which 12% are peatlands. Most of these are peatland complexes consisting of bogs in a matrix of various fen types and black spruce swamps (NWWG 1988). Bogs are isolated from ground and surface waters, receiving their water and nutrients entirely from precipitation, whereas fens and black spruce swamps are connected in varying degrees to ground and surface waters. These hydrological differences, which are often as great within sites as between them, promote great vegetational heterogeneity, which in turn supports a wider variety of wildlife than is generally known (Keiser and Hendry 1982; Damman and French 1987; Finnamore 1994; Calmé and Desrochers 2000). However, most of our knowledge of peatland animals is restricted to eastern North American peatlands.

A wide range of animals is found in peatlands, but most do not complete their entire life cycles there; few vertebrates and invertebrates are obligate peatland species, i.e., 100% peatland-dependent (Damman and French 1987). Water availability distinguishes obligate aquatic animals from those that only tolerate wet or require not fully aquatic conditions. The only other conditions that influence animal taxa in peatlands are the presence of humic acids and water acidity, large temperature fluctuations, and low nutrient concentrations (Heathwaite *et al.* 1993). Fens are affected by these factors to a lesser extent than bogs. Organisms that require calcium and other minerals, like most molluscs and crustaceans, are not often found in acid peatlands like bogs (Charman 2002), although there are some exceptions.

In general, birds and mammals often encountered in peatlands are there due to a secondary dependence on invertebrates for food or habitat characteristics associated with specific life-cycle components. However, although the effects of water logging, poor nutrients, and high toxicity (e.g., due to reduced forms of iron, manganese, or sulfur) are not as significant to animals as they are to plants, many animal taxa respond in a fashion similar to plants and there are some specialist peatland fauna (Charman 2002).

continued next page

Mammals

'Charismatic' megafauna like moose, white-tailed deer, black bear (Damman and French 1987), and woodland caribou (Rettie and Messier 2000) probably spend more time in peatlands than most other large mammals. However, many large mammals move across peatlands, using them for escape cover, breeding, and for feeding. Aquatic habitats associated with peatland complexes are used extensively in the summer by moose foraging on aquatic plants (Damman and French 1987). In addition, caribou are very dependent on peatlands, especially wooded bogs, preferring them and some black spruce forests to other habitats for food (slow-growing arboreal and ground lichens) and protection from predators, including wolves (Rettie and Messier 2000). In many western Canadian wooded peatlands, it not uncommon to come across the remains of deer and moose killed by wolves. The kill sites are often associated with the extensive networks of trails made primarily by ungulates, but used by many mammals, large and small. While there is a paucity of research in this area, ungulate faeces deposited along these trails are often sources of important nutrients and provide microsites for a greater diversity of bryophyte and some vascular plant species (D.A. Locky, pers. obs.). Peatlands are also important to wood bison, with sedge meadows being a critical component of their winter forage habitats in the Northwest Territories peatland complexes (Matthews 1991).

Other megafauna found in peatlands include beaver, muskrat, mice, voles, water shrews, weasels, mink, raccoons, rabbits and hares (NWWG 1988). Not many small mammals are peatland specialists, but the northern bog lemming, southern bog lemming, and Arctic shrew prefer peatland over other habitats (Banfield 1977). Other species use bogs, but are often associated with edge habitats and disturbed areas (e.g., surface-mined peatlands). The rodents using these areas include meadow vole, red-backed vole, meadow jumping mouse, deer mouse, and red squirrel, and the insectivores include masked shrew, pygmy shrew, short-tailed shrew, American water shrew, smoky shrew, and star-nosed mole (Banfield 1977; Damman and French 1987; Mazerolle *et al.* 2001). American marten can also be found in wooded peatlands (D.A. Locky, pers. obs.) and where palatable trees and shrubs are present, porcupines can also be encountered (Kricher 1988). See Table 1 in the forthcoming installment of this series, Part II, for a list of North American mammals that frequent peatlands.

There are accounts of moose, elk, and woodland caribou found grazing in the 'bog' and meadowlands at Wagner Natural Area before Edmonton's settlement moved west (Keiser and Hendry 1982). While moose and potentially elk could still be found there, the black bear and wolf have disappeared and mule deer has been displaced by white-tailed deer. Lynx have been found at the Natural Area, but the carnivores one would likely see

in the peatland complex today are coyotes, red fox, mink, and ermine and least weasels. Rodents that make their home at the Wagner Natural Area peatlands include red and northern flying squirrels, meadow and red-backed voles, deer and meadow jumping mice, muskrat, and porcupine. Insectivorous mammals include water and masked shrews. Snowshoe hares can be found year round and little brown, big brown, and silver-haired bats frequent the Wagner Natural Area during the summer (Keiser and Hendry 1982; Wagner Natural Area Society 2001). For a full list of extirpated and extant mammals at Wagner Natural Area, see Wagner Natural Area Society (2001).

Birds

While there are few birds that would be found exclusively in peatlands, a number of species, especially passerines, obtain high densities there. Species common to black spruce bogs include spruce grouse, yellow-bellied flycatcher, palm warbler, Connecticut warbler, northern waterthrush, and Lincoln's sparrow (Breining 1992; Calmé and Desrochers 2000). Many other species are found in peatlands, especially wooded types, including a great variety of warblers such as Nashville warblers, black-and-white warblers, Cape May warblers, bay-breasted warblers, magnolia warblers, yellow-rumped warblers, and common yellowthroats. Sparrow species include chipping sparrows, white-throated sparrows, and swamp sparrows (Dansereau and Segadas-Vianna 1952; Dawson 1979; Damman and French 1987). In southern Quebec, of the 102 species detected on peatlands, 17 were found more significantly on peatlands than the surrounding landscapes. These species included American bittern, red-tailed hawk, ring-billed gull, great black-backed gull, common nighthawk, yellow-bellied flycatcher, golden-crowned kinglet, ruby-crowned kinglet, hermit thrush, Nashville warbler, magnolia warbler, palm warbler, common yellowthroat, northern cardinal, savannah sparrow, Lincoln's sparrow, and white-winged crossbill (Calmé *et al.* 2002).

In Alberta and northern Canada, some waterbirds will breed and nest in areas associated with peatlands, especially ring-necked ducks and rednecked phalaropes. Also found on open peatlands and sedge meadows are sandhill and whooping cranes, greater yellowlegs, solitary sandpipers and short-billed dowitchers (Semenchuk 1992).

Much of the variation in bird assemblages is associated with the peatland vegetation structure (Stockwell 1994; Calmé and Desrochers 1999; Calmé and Desrochers 2000; Calmé *et al.* 2002), and this may be unique on the landscape if the landscape is fragmented. Peatlands in southern Quebec could be considered islands of boreal vegetation in an Appalachian-Saint Lawrence Lowlands

continued next page

region, as the boreal species there are considered rare (Calmé *et al.* 2002). The size of peatland is also an important determinant in avian diversity. Upland sandpipers and palm warblers have been found to be negatively correlated with isolated or small peatland patches (Calmé and Desrochers 2000) and savannah sparrows have been positively associated with larger peatlands (Calmé and Desrochers 1999). This is important, as some species, including the palm warbler, are peatland specialists during the breeding season and most of the world's population breeds in Canada's peatlands (Wilson 1996). Peatland type is also a consideration. Swamp sparrows are more likely to be found in mineral-rich fens than ombrotrophic peatlands (Calmé and Desrochers 1999; Calmé and Desrochers 2000). Large peatlands with poor fen habitat in eastern Canada are likely to provide habitat for upland sandpiper and common snipe (Calmé and Haddad 1996) and peatlands dominated by tamarack (rich fens) often have birds associated with shrubby habitat, including the great gray owl. In eastern Canada, white cedar-dominated swamps often have high densities of breeding northern parula and black-throated green warblers (Dawson 1979). In Germany, peatland bird species richness dramatically increased along the bog-fen gradient (Boelscher 1988). Perhaps even more interesting is that Finnish fens with flarks (patterned fens), which are more common in the north than the south, exhibit a reverse latitudinal gradient of species diversity; there are actually more bird species to the north than the south in these systems (Jaervinen *et al.* 1987)! See Table 1 in the next installment of this series, Part II, for a list of North American birds that have been found to frequent peatlands.



Solitary Sandpiper
in Wagner Natural
Area

Photo: Terry Thormin

A large number of the species discussed above (within their ranges) and others such as LeConte's sparrow and some waterfowl can still be found at the Wagner Natural Area, despite declines in the number of birds due to the construction of Hwy 16 and encroaching residential and industrial developments (Thormin 1982). Wagner is somewhat of an island of boreal vegetation that acts as a refuge for many species generally found a little further north. For a full list of birds at Wagner Natural Area, see Wagner Natural Area Society (2001).

Amphibians and Reptiles

Although many amphibians and reptiles are found in peatlands, very few would be considered obligate peatland species. In ombrotrophic peatlands (bogs), low pH makes unsuitable habitat for some species, especially amphibians that have very absorbent skins.

Amphibians commonly found in eastern Canadian bogs include American toads, green frogs, northern leopard frogs, mink frogs, wood frogs, mole salamanders (Mazerolle 2003), and in eastern North American peatlands, blue-spotted salamanders (Damman and French 1987), and four-toed salamanders (Reschke 1990). In western Canadian fens, one would most likely find boreal chorus frogs (both green and copper-coloured), often in good populations, wood frogs, and perhaps a wayward leopard frog (D.A. Locky, pers. obs.).

Low pH and temperatures in peatlands means generally a low diversity of reptiles, without any endemic species. However, especially in southeastern Canadian peatlands, a number of species can be found, including bog and spotted turtles, and eastern garter snakes (Damman and French 1987). In Canada, there is one snake that is often found in non-forested fens and transitional peatlands. The eastern massasauga rattlesnake commonly occurs in open weakly minerotrophic fens with shrubs in eastern North America (Johnson and Leopold 1998). In southern Ontario, much of this habitat can be found along the Bruce Peninsula, which separates Lake Huron from Georgian Bay. These snakes overwinter in spaces beneath shrub hummocks and tussock vegetation and require open-canopy areas for thermoregulation of gestation and digestion (Johnson 1995). Currently the eastern massasauga rattlesnake is a threatened species in Canada (Atlas of Canada 2003). Refer to Table 1 in the next installment of this series, Part II, for a list of North American amphibians and reptiles that may be found in peatlands.

At Wagner Natural Area, one could expect to find tiger salamanders, western (boreal) toads, boreal chorus frogs, wood frogs, and red-sided and wandering garter snakes (Wagner Natural Area Society 2001).

Fish

Many peatland complexes contain shallow-water wetlands and ponds. Most freshwater fish spawn in only shallow water, and this includes shallow-water wetlands (particularly for warmer-water fish) (Reppert *et al.* 1979). Smaller fishes, including minnows and sticklebacks, are often found in ponds and shallow-water bodies in Alberta, (including peatland complexes), but may not survive winters due to low oxygen levels and a thickening ceiling of ice. This is referred to as winterkill and occurs during cyclic low-water conditions (Danylchuck and Tonn 2003).

The marl pools in the Wagner Natural area have

continued next page

populations of fathead minnows. These minnows sometimes make their way into the networks of channels and water-filled hollows in the wooded peatland surrounding the marl ponds during high-water levels. Remarkably, they survive in large groups in pools no bigger than large bowls, probably feeding on the rich assemblage of insects in the area well into the fall (D.A. Locky, pers. obs.). Presumably they will succumb to winterkill with the onset of ice and a lowered water table in winter. Other fish that may be found at the Wagner Natural Area include northern pike and brook stickleback (Wagner Natural Area Society 2001).

The final installment of this two-part series on peatland creatures will cover peatlands and invertebrates and will arrive in the next issue with a table listing the creatures referred to in both parts.

References

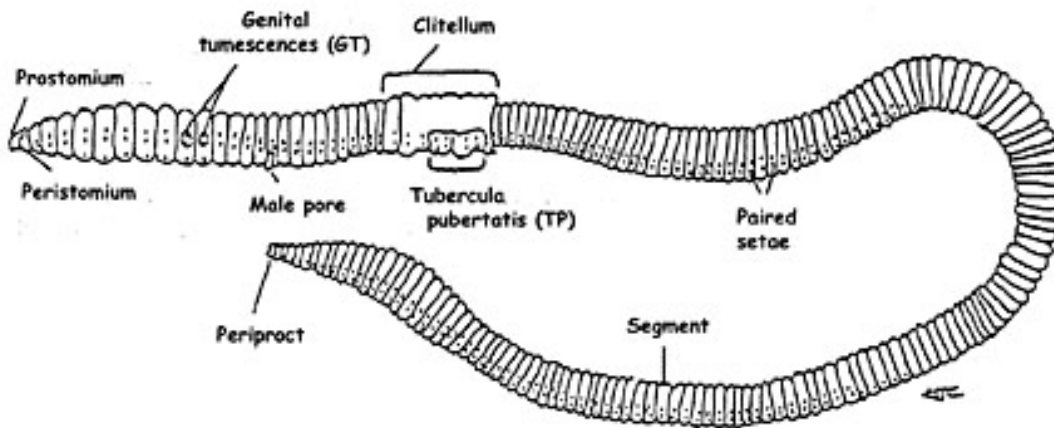
- Atlas of Canada. 2003. URL: http://atlas.gc.ca/site/english/learning_resources/wetlands/wetlands_e_cosos.html
- Banfield, A.W.F. 1977. The mammals of Canada. The National Museum of Natural Sciences, National Museums of Canada. University of Toronto Press, Toronto, ON, Canada.
- Boelscher, B. 1988. On habitat selection of bird species in northwest German raised bogs - A contribution to landscape evaluation. Braunschweiger Naturkundliche Schriften 3: 29-119.
- Breining, G. 1992. Rising from the bogs. Nature Conservancy 42: 25-29.
- Calmé, S. and A. Desrochers. 1999. Nested bird and micro-habitat assemblages in a peatland archipelago. Oecologia 118: 361-370.
- Calmé, S. and A. Desrochers. 2000. Biogeographic aspects of the distribution of bird species breeding in Quebec's peatlands. Journal of Biogeography 27: 725-732.
- Calmé, S. and S. Haddad. 1996. Peatlands: a new habitat for the upland sandpiper, *Bartramia longicauda*, in eastern Canada. Canadian Field-Naturalist 110: 326-330.
- Calmé, S., A. Desrochers, and J.P.-L. Savard. 2002. Regional significance of peatlands for avifaunal diversity in southern Quebec. Biological Conservation 107: 273-281.
- Charman, D. 2002. Peatlands and Environmental Change. John Wiley & Sons, Rexdale, ON, Canada.
- Damman, A.W.H. and T.W. French. 1987. The ecology of peat bogs of the glaciated northeastern United States: a community profile. US Fish and Wildlife Service Biological Report 85 (7.16).
- Dansereau, P. and F. Segadas-Vianna. 1952. Ecological study of the peat bogs of eastern North America. Canadian Journal of Botany 30: 490-520.
- Danylchuk A.J. and W.M. Tonn. 2003. Natural disturbances and fish: Local and regional influences on winterkill of fathead minnows in boreal lakes. The American Fisheries Society 132: 289-298.
- Dawson, D.K. 1979. Bird communities associated with succession and management of lowland conifer forests. In DeGraaf, R.M. and K.E. Evans, compilers. Management of Northcentral and Northeastern Forests for Nongame Birds: Proceedings of the workshop; 1979 January 23-25; Minneapolis, MN, U.S.A. Gen. Tech. Rep. NC-51. St. Paul, MN, US Department of Agriculture, Forest Service, North Central Forest Experiment Station: 120-131.
- Finnamore, A.T. 1994. Hymenoptera of the Wagner Natural Area, a boreal spring fen in central Alberta. Memoirs of the Entomological Society of Canada 169: 181-220.
- Heathwaite, A.L., K.H. Göttlich, E.-G. Murmeister, G. Kaule, and T. Grospietsch. 1993. Mires: definitions and form. In Heathwaite, A.L. and K. Göttlich (eds.), Mires: Process, Exploitation, and Conservation. John Wiley & Sons, Chichester, NY, U.S.A. pp. 1-75.
- Jaervinen, O., J. Kouki, and U. Haeyrdinen. 1987. Reversed latitudinal gradients in total density and species richness of birds breeding on Finnish mires. Ornis Fenn 64: 67-73.
- Johnson, G. 1995. Spatial ecology, habitat preferences, and habitat management of the eastern massasauga, *Sistrurus c. catenus*, in a New York transitional peatland. Dissertation, State University of New York, College of Environmental Science and Forestry, Syracuse, NY, U.S.A.
- Johnson, G. and D.J. Leopold. 1998. Habitat management for the eastern massasauga in a central New York peatland. Journal of Wildlife Management 62: 84-97.
- Keiser, J. and A. Hendry. 1982. Mammals of Wagner Bog. In The Edmonton Naturalist, Special Issue: The Wagner Bog 10: 33-36.
- Matthews, S.B. 1991. An assessment of bison habitat in the Mills Mink Lakes area, Northwest-territories, using Landsat thematic mapper data. Arctic 44: 75-80.
- Mazerolle, M.J., B. Drolet, and A. Desrochers. 2001. Small-mammal responses to peat mining of southeastern Canadian bogs. Canadian Journal of Zoology 79: 296-302.
- Mazerolle, M.J. 2003. Detrimental effects of peat mining on amphibian abundance and species richness in bogs. Biological Conservation 113: 215-223.
- NAWMP (North American Waterfowl Management Plan). 2003. URL: <http://www.nawmp.ca/>
- NWWG (National Wetlands Working Group). 1988. Wetlands of Canada. Ecological Land Classification Series, No. 24. Sustainable Development Branch, Environment Canada, Ottawa, ON, and PolyScience Publications, Inc., Montreal, PQ, Canada.
- NWWG (National Wetlands Working Group). 1997. The Canadian Wetland Classification System. Warner, B.G. and C.D.A. Rubec (eds.). Wetlands Research Centre, Waterloo, ON, Canada.
- RAMSAR. 2003. Map of RAMSAR wetlands sites of international importance in Canada URL: http://www.wetlands.org/RDB/north_america/Canada.html. Text on RAMSAR wetlands in Canada URL: http://www.wetlands.org/RDB/Ramsar_Dir/Canada.htm.
- Reppert, R.T., W. Sigles, E. Strakhiv, L. Messman, and C. Meyers. 1979. Wetland values: concepts and methods for wetlands evaluation. United States Army Corps of Engineers. Institute for Water Resources, Fort Belvoir, VA, U.S.A.
- Reschke, C. 1990. Ecological Communities of New York State. New York State Department of Environmental Conservation, New York Natural Heritage Program, Latham, NY, U.S.A. 96 p.
- Rettie, W.J. and F. Messier. 2000. Hierarchical habitat selection by woodland caribou: its relationship to limiting factors. Ecography 23: 466-478.
- Semenchuk, G. (ed.). 1992. Atlas of the Breeding Birds in Alberta. Federation of Alberta Naturalists, Edmonton, AB, Canada.
- Stockwell, S.S. 1994. Habitat selection and community organization of birds in eight peatlands in Maine. Ph.D. thesis, University of Maine, Orono, ME, U.S.A.
- Thormin, T. 1982. Birds of the Wagner Bog. In The Edmonton Naturalist, Special Issue: The Wagner Bog 10: 42-45.
- Wagner Natural Area Society. 2001. Fish, Amphibians, Reptiles and Mammals of the Wagner Natural Area. URL: <http://wagner.fanweb.ca/vert.htm>
- Wilson, W.H., Jr. 1996. Palm warbler (*Dendroica palmarum*). In Poole, A. and F. Gill (eds.), The Birds of North America. The Academy of Natural Sciences, The AOU, Philadelphia, PA and Washington, D.C., U.S.A. No. 23.

Dave Locky is a PhD student at the University of Alberta, studying peatlands in Manitoba and Alberta. See his website at <http://www.ualberta.ca/~dlocky>. This is the fifth in a series on wetlands written specially for the newsletter by Dave and Markus N. Thormann.

Wagner Wildlife Watch # 3

Earthworms

by Cliff Adams



Earthworm External Features(from <http://www.cnf.ca/wormwatch/id.html>)⁽²⁾

To many, watching wildlife evokes the image of herds of wildebeeste, antelope and large cats waiting in the tall grass for a meal. To others, wildlife watching is a little more mundane as we enjoy the chirp of a warbler, the gulping sound of a bittern or the cry of a sparrowhawk and, if we are fortunate, we see these beautiful creatures. And to a few, the enjoyment of wildlife becomes the observation of a spider web glistening with dew in the morning sunlight, the centipede scurrying through the leaf litter, the merest rustle of dead leaves to mark the passage of a mouse or shrew, and perhaps the small pile of "worm mould" (as Charles Darwin might have put it) at the edge of a field.

I had thought to write a little about earthworms for this issue because we see them all the time on the surface after a rainstorm and when we dig in the ground. In Wagner Natural Area this summer, I expected to see the usual wormy kinds of things: the castings at the surface, the drowned creatures apparently trapped in puddles after a storm... but then I realized how much I didn't know about these beautiful creatures. I could watch worms slither (or is it slime?) their way through the vegetation at the surface and I knew, in general, that earthworms use their bristles or setae as anchors while they move in their burrows or along the surface. I knew too that birds have a rather harder time pulling worms from the ground because of these setal anchors. But I didn't really know as much as I thought! It seemed it was time to learn more...so here goes....

While researching for this article, I learned there are about 25 Canadian species of earthworm. I had assumed that most of the worms I saw were of the good old Biology 101 *Lumbricus terrestris* variety. Now I'm

definitely not sure! (And yes, I did mean to say that.) In fact, Wagner Natural Area may be home to some unique species and I propose to find out what we might have in the way of earthworms – next summer, that is (it's too cold to contemplate a field trip to observe worms right now).

According to Dr. Alan Tomlin, a researcher who has written about earthworms for Agriculture Canada, there are no native Canadian earthworms – the last ice age wiped them out – and furthermore, earthworms do not come to the surface during or after a rainstorm to avoid drowning.⁽¹⁾ Needless to say I now have many questions I'd love to ask. Why do earthworms come to the surface during rainstorms and why do they seem to get into so much trouble in puddles? I still rescue these undulating creatures from puddles on my walks after rainstorms. I also wonder how earthworms, with their relatively limited mobility, have come to populate many of the soils of Alberta so quickly after the retreat of the ice sheets.

We may think we are familiar with earthworms, but are we really? The standard biology textbook drawings of earthworms seem to stress their internal parts and pay less attention to their external bits. One diagram I found gives us a general idea of the external features but until we look at variations between species, the typical worm will be a creature 2 – 20 cm long, segmented, and with a saddle (the clitellum) about a third of the way back.

continued next page

purplish bodies. Six of the nine common species of reddish worms are found in Alberta including the dew worm (*Lumbricus terrestris*), but by far the most diverse genus of earthworms is *Aporrectodea*, which is represented by six species in Alberta including one species observed in an unglaciated area of the Porcupine Hills that is said to be a native Canadian species! Four additional species representing various genera are also known from Alberta.

Earthworms aerate the soil and bring materials from deep within the lower soil horizons to the surface in a constant turn-over of soil components. Their burrows allow moisture to penetrate deep into the ground and the almost constant foraging for organic detritus, dead leaves, scraps of plant material and bacteria by earthworms returns organically rich castings to the surface and leaves a stable crumbly soil texture. Clearly, earthworms are an important animal component of soils.

Some worm species dig vertical burrows, others burrow horizontally and a few species merely forage within the

leaf litter without making many burrows at all. It is said that earthworms are the chief agent by which soils are mixed from top to bottom and are the major soil aerators — a claim that might be challenged only by the ants... but that's another story.

And what of Wagner Natural Area? What species ought we to expect to find on our patch of ground and what is the role of our native earthworms? I intend to find out next summer!

References:

- (1) http://www.ibiblio.org/pub/academic/agriculture/sustainable_agriculture/faqs/earthworm-faq.html FAQ last revised in 1996.
- (2) <http://www.cnf.ca/wormwatch/id.html> This is a wonderful site for earthworm aficionados and contains much useful taxonomic information.

Cliff is a science teacher with Edmonton Public Schools.

Editor's Addendum

"It may be doubted whether there are many other creatures which have played so important a part in the history of the world." Charles Darwin, 1881

<http://www.nysite.com/nature/fauna/earthworm.htm>
Many of us share some of Cliff's curiosity, even though I cannot pretend to have noticed many earthworms in Wagner Natural Area! I have, however, noticed how many earthworms die of desiccation on suburban sidewalks after a rainstorm has subsided, presumably because they get flushed irreversibly out onto the concrete where their setae are not designed to grip! I found out the hard way (or at least my poor victims did) that earth-worms cannot stand the sun. Once, as a kid, I decided to help out the local blackbird population (this was the UK) by digging up some worms and putting them in a dish in the middle of the garden on a sunny day. When I came by a little later to check if they had been eaten I was aghast to find a bunch of frazzled, flat, crispy ribbons. No doubt the birds, if they were about, had been unable to recognize the worms in such strange surroundings! I was guilt-stricken at my ignorance, and vowed never to meddle with nature again.

Speaking of worms coming to the surface during rains, which apparently they do because they can move around more easily on wet ground – also, their skin must remain wet for them to breathe – I had an interesting experience one July a few years ago when I camped in Bow Valley Provincial Park. I set up my tent in the evening during a terrific thunderstorm. The following morning when I took the tent down I was amazed to see literally dozens of worms curled up on the ground where my soggy nylon floor had been, although there were no worms to be seen on the rest of the gravel pad! I can't remember now whether the worms were dead; they didn't rush away when I exposed them, but they were also incredibly fresh-

looking, and they weren't squashed! I can only assume that worms had emerged all around me during the night, as well as under me, but the ones that were outside the tent went underground again when daylight came, whereas the ones under my tent were fooled into thinking it was still night! Does anyone have any alternative explanations?

Most of us are familiar with the connection between worms and American robins. I'll swear that the latter have learnt to associate garden sprinklers with earthworms. Within a couple of minutes of a person turning on a sprinkler in the appropriate season a robin will be there doing its familiar, cock head, pause, jab, pull, gobble and swallow routine, never mind how heavy the artificial downpour or how close the human is, watching in amusement! Do robins distinguish between natural rain and sprinklers? Maybe they don't need to, the results are often the same.

I notice that Cliff says little about the sexual habits of worms (well, this is a family newsletter!). They are hermaphrodite, with both male and female sexual organs, and must mate in order to exchange sperm and produce fertilized eggs. I can think of a good Wagner field trip for next year, led by Cliff, of course, to watch an orgy of mating earthworms amidst the leaf litter on a warm, wet summer evening. That would be an interesting wildlife watching experience for sure! After all, if earthworms were good enough for Charles Darwin to study, the rest of us should show a little appreciation!

Patsy Cotterill

Membership in Wagner Natural Area Society

The membership year runs from January 1 to December 31. Please consider renewing promptly if you haven't already done so to support the Society and Wagner Natural Area. Fill out this form and mail it with a cheque payable to Wagner Natural Area Society. As a member you will receive two newsletters per year and an invitation to the Annual Members' Night in October/November. Field trips and other activities are organized from time to time for the benefit of members. Donations are tax-deductible. For more information, contact the Membership Secretary at 481-1525.

Please include me as a member of the Wagner Natural Area Society!

- Family/Organization \$12 Individual \$10
 Student/Senior \$8

In addition to my membership fee, I enclose a gift to support the activities of Wagner Natural Area Society for _____.

Name: _____

Address: _____

Telephone: _____ Date _____

Mail to: c/o Membership Secretary, Wagner Natural Area Society,
 26519 Highway 16, Spruce Grove, Alberta T7X 3L4

Membership in Wagner Natural Area Society

The membership year runs from January 1 to December 31. Please consider renewing promptly if you haven't already done so to support the Society and Wagner Natural Area. Fill out this form and mail it with a cheque payable to Wagner Natural Area Society. As a member you will receive two newsletters per year and an invitation to the Annual Members' Night in October/November. Field trips and other activities are organized from time to time for the benefit of members. Donations are tax-deductible. For more information, contact the Membership Secretary at 481-1525.

Please include me as a member of the Wagner Natural Area Society!

- Family/Organization \$12 Individual \$10
 Student/Senior \$8

In addition to my membership fee, I enclose a gift to support the activities of Wagner Natural Area Society for _____.

Name: _____

Address: _____

Telephone: _____ Date _____

Mail to: c/o Membership Secretary, Wagner Natural Area Society,,
 26519 Highway 16, Spruce Grove, Alberta T7X 3L4