Natural History Lecture Series of the Mississippi Valley Field Naturalists

2011-2012: *Trends in Fauna and Flora*

2012-2013: *Nature Beneath Our Feet*

Edited by:

Pauline A. Donaldson, Cathy J. Keddy, and Jim Bendell

Natural History Lecture Series of the Mississippi Valley Field Naturalists

Published by the Mississippi Valley Field Naturalists 2013

Printed and bound in Ontario, Canada

ISBN-13: 978-0-9918874-0-8

P. O. Box 1617

Almonte, Ontario

K0A 1A0

www.mvfn.ca

for Mike McPhail
MVFN President 2006-2009
in memory

TABLE OF CONTENTS

TABLE OF CONTENTS

2012-2013 *Nature Beneath our Feet* Series

PREFACE / ACKNOWLEDGEMENTS

This volume comprises reports of natural history talks presented at the Mississippi Valley Field Naturalists' (MVFN) monthly meetings in Almonte, Ontario, as part of two lecture series, *Trends in Fauna and Flora* and *Nature Beneath our Feet*, held between September 2011 and May 2013, and includes speaker biographies. The accounts provide interesting, up-to-date information relating to natural features of our local and global environments whose conservation is fundamental to our well-being.

MVFN, a federated member of Ontario Nature, is a charitable organization open to all interested in natural history. It is dedicated to increasing public understanding of the natural environment and the importance of natural heritage conservation. MVFN does this through lectures, field trips, youth education, the collection and dissemination of information on natural history, and other conservation activities. Information about ongoing and historic activities can be found on our web site (mvfn.ca).

In 2013, MVFN celebrated its 25th anniversary. As one of several quarter-century activities, we initiated the 'Spread the Word' project—the publication of lecture reports as bound volumes. The lecture speakers are experts in their fields, often at a world-class level. Thus the lectures are worthy of, and likely of interest to, a larger audience than those attending the meetings. Following each lecture, a report was written by a volunteer MVFN reporter, and most were published in the local media prior to inclusion in this volume. Now, with the publication of this volume for deposit in the public library system, the contents will be more widely available. We hope they will contribute to a broader understanding and greater appreciation of our natural environment, and wiser interaction with it. Perhaps in reading a report or biography a reader will be encouraged to follow in the footsteps of one of the expert speakers. Knowing and caring connect us with nature!

This project was possible thanks to the dedication of the following people who authored reports found in this volume: **Joel Byrne**, **Mary Robinson**, **Fred Schueler**, **Lynda Bennett**, **Jim Bendel**l, **Linda Mosquin**, **Pauline Donaldson**, **Mike Macpherson**, **Cliff Bennett**, **Eugene Fytche**, **Christine Hume**, and **Elizabeth Wiles.** All are active and passionate volunteers for nature, several having served on the board of MVFN, and all enthusiastically gave their time and effort to provide excellent details of the talks, as well as their own personal insights and impressions.

Reviewers and editors for the reports were Cathy Keddy (ecologist, B.Sc. and M.Sc. Dalhousie University), Pauline Donaldson (biologist, B.Sc. University of Waterloo, M. Sc. Carleton University), and Jim Bendell (retired Professor of Forestry and Zoology, B.Sc. University of Toronto, Ph.D. University of British Columbia). Cathy Keddy, MVFN's Program Chair since 2008, was the inspiration behind the lecture series and was responsible for pre-lecture planning, publicity, and coordination and logistics for the presentations. Along with Ms. Keddy, Pauline Donaldson and Jim Bendell saw the project to completion with the deposit of this volume in the public library in Almonte. Pauline Donaldson, Editor-in Chief, also submitted reports to the media and took many photos at the lectures, while Jim Bendell set up reporting guidelines and invited reporters to do the reports. MVFN thanks Peter Nelson, Head Librarian for the Town of Mississippi Mills Public Libraries for his advice and encouragement with this project.

A copy of this volume resides in the archives of the MVFN and another copy is a legal deposit at Library and Archives Canada. This document and accounts of other MVFN natural history lectures may also be found at mvfn.ca. We invite you to visit there to learn more about the natural world!

2011-2012

Trends in

Fauna and Flora

September 2011

"Citizen Science Networks: Linking Nature Observation with Conservation"
presented by **Marlene Doyle**, Environment Canada

Becoming a citizen scientist . . . or how to help monitor 'what's up world?'

Lecture report by Jim Bendell

When most of us stop and ask ourselves what we value most in life, we likely admit it is not a thing or things at all, but ourselves and other people. Next would be the natural environment, which, after all, we depend upon for at least food, water, clothing, and shelter. What can we do to understand more about our natural environment and how to protect and sustain it? Marlene Doyle of Environment Canada told us what we can do during her presentation: *"Citizen Science Networks: Linking Nature Observation with Conservation"*.

At her lecture to the Mississippi Valley Field Naturalists (MVFN) in Almonte, Ms. Doyle invited the audience to "Join the ranks of Darwin and the Compte de Buffon" . . . that is to become citizen scientists!!! Ms. Doyle has worked for many years in enlisting people of all ages to monitor plants and animals and their habitats as coordinator of our national Nature Watch program. Ms. Doyle holds a Master's degree from the University of Waterloo and is currently Canadian representative on the Circumpolar Biodiversity Monitoring Program's Terrestrial Export Monitoring Group, or, "What's Up? in the lands of the North?" Monitoring means observing and noting, something we do every day. Ms. Doyle gave us lots of ideas for what we can do to find out "what's up world?" by monitoring the health and diversity of our natural world as citizen scientists.

Everyone can take part and the requirements are simply interest, time, and wanting to help. Along the way you will learn new things, including how top professionals think and work. You will also see for yourself what people are or are not saying and writing about important issues. You will connect to nature and the community. You will certainly make new friends, have fun, and perhaps begin a successful career. The major reward is caring for Canada and the world by recognizing real environmental problems and doing something about them. The concerns are many and the need for help is unlimited. An important issue is climate change, which is real but what can be done about it? We are losing species of animals and habitats, making the world a poorer place, at never so fast a rate. Locally, and in a life time; tree swallows, nighthawks, whip-poor-wills, little brown bats and other birds and mammals have been significantly reduced. Might this signal greater losses for the future and eventually impact negatively on our own way of life? But why the losses and is there anything that can be done about them?

A start in solving these problems is to monitor aspects of the environment by sight, sound, odour, or feel. As a citizen scientist, you will work with an experienced leader and follow set procedures. The more who are working together to the same end the more powerful will be the result. While amateurs are the main workforce, professionals in organizations, schools, universities and government typically provide information, participate, and publish the results. Observations and actions by citizen scientists may be out-of-doors, or in a laboratory or library. Work as much as you wish, alone or in a group. The longer observations can be made the better. Some monitoring projects extend over many years. For example, you might go out and tag a clump of wildflowers on your property, and then follow PlantWatch monitoring directions for information which should be collected in the spring, file a report and repeat this again with the same plants each year. Or, you might join an MVFN Christmas bird count. You might participate in a marsh monitoring program or a Lakes Loon Survey next summer at your home or cottage. Always there is help at hand for advice and direction.

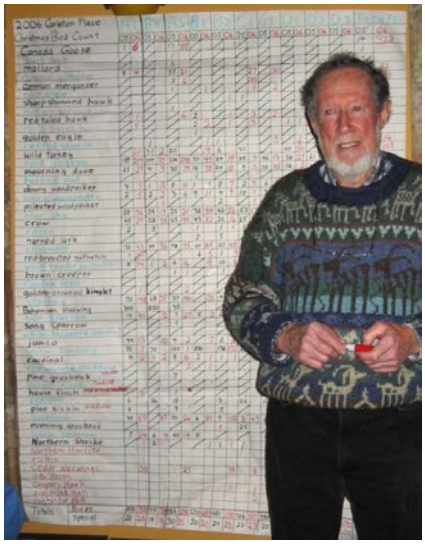
Often people hesitate to participate in an activity because they think it is of little value or beyond their abilities. In fact, thousands of people are actively caring for our environment simply by reporting observations. And their findings have been used by many professionals and others to write reports on research and management in authoritative journals and books. Numerous tests show inexperienced volunteers, with training, make accurate observations and determinations to provide trustworthy results. In fact, says Ms. Doyle, the quality of data is more likely affected by survey design or quality of communication than by the expertise of the person or group who collected the data. Not only is citizen science data reliable but it complements professional monitoring, it is relevant, local, timely, unique, and it is relatively low-cost to collect. Remember, you are not alone and can easily join many other interesting and committed people. Contact local and global leaders in the care of our environment. A main doorway in joining a quest of interest is through the speaker; Marlene Doyle at 613-949-7754 (and more on how to reach her later). She welcomes your call.

There are at least 283 projects powered by ordinary citizens across Canada. A classic example is the Christmas Bird Count, started more than 100 years ago, which now includes 50,000 observers reporting from 2000 locations throughout the United States, Canada, and beyond. The findings, which are solely based on citizen scientist reports, have helped elucidate the requirements of birds and clearly show changes in the abundance and distribution of species. For example, the counts tracked the spread of an introduced European Starling over the northern states and Canada and the disappearance of the similar Japanese Starling introduced to British Columbia. The Japanese form apparently cannot hatch its eggs under as cool conditions as the European bird and the abundance of both may be linked to climate change. Other projects range from counting Monarch Butterflies (an at risk species) to searching old logs and journals for information on past environments.

Data gathered by citizen scientists are credible, unique and useful for furthering our understanding of the natural world. In this photo, 'citizen scientists' join amateur naturalists and professional scientists taking a biological inventory of a Mississippi Mills property during MVFN's 2009 Bioblitz.
Photo Pauline Donaldson

Ms. Doyle, through Nature Watch Canada, coordinates the input of four large inventories. They are: Plant Watch, Frog Watch, Ice Watch, and Worm Watch. Observations on plants include invasive species and dates of flowering. The kinds and abundance of worms reveal the health of soil. Frogs and the formation of ice are sensitive indicators of many factors in aquatic ecosystems, including temperature.

Interested in more information? In Lanark Highlands, Carleton Place and Mississippi Mills talk to Cliff and Lynda Bennett at 613-256-5013, bennett@magma.ca ; or Cathy Keddy at 613-257-3089, keddy01@gmail.com. Then some relevant organizations, in no particular order, are: Environment Canada (NatureWatch, www.naturewatch.ca, Ms. Marlene Doyle, 613-949-7754, marlene.doyle@eg.gc.ca, see above); Natural Heritage Information Centre, Peterborough (705-755-2159, nhicrequests@ontario.ca); Toronto Zoo (361A Old Finch Ave., Scarborough, ON M1B 5K7, www.torontozoo.com); Ontario Nature (336 Adelaide Street West, Suite 201, Toronto, ON, M5V 1R9, www.ontarionature.org ; Royal Botanical Gardens (Ontario Plantwatch Coordinator, Natalie Iwanycki, niwanycki@rbg.ca); Bird Studies Canada (P.O. Box 160, Port Rowan, ON, N0E 1M0); Canadian Wildlife Service (Ontario Region, 49 Camelot Dr. Nepean, ON K1A 0H3); and Canadian Amphibian and Reptile Conservation Network (Chairperson, Christine Bishop, 4553-46B Street, Delta, B.C. V4K 2N2, apalone_thionyx@yahoo.com). Cornell University also keeps a directory of projects undertaken by volunteers at http://www.birds.cornell.edu/citscitoolkit/projects/find.



Another way to join the ranks of Darwin and become a citizen scientist is to participate in one of the many annual Audubon Christmas bird counts across North America. Two local counts include the Lanark Highlands and the Carleton Place Christmas Bird Counts (for further info visit mvfn.ca). Birder Cliff Bennett records data during the count-in held after local count-teams return from a 2006 MVFN CBC. Photo MVFN archive.

Citizen science in action in the Mississippi River watershed: from August 5-7, 2006, nearly one hundred citizen scientists (MVFN members and others), set out in canoes, row boats and motor boats to take the watersheds' temperature. The goal was to collect data and engage citizens in considering local implications of future climate change Shown is Howard Robinson, water-sampler in hand, ready to survey Palmerston Lake. Photo Mary Robinson

October 2011

"Avoiding Attack: Design and Deception in Nature" presented by
Tom Sherratt, Carleton University

Creatures evolved to survive in the natural world

Lecture report by Joel Byrne

The lights go down, the shuffling and conversations stop and I hear myself whispering: "This is going to be another great talk." And so it was as the Mississippi Valley Field Naturalists (MVFN) public lecture series continued October 20th with the presentation, "Avoiding Attack: Design and Deception in Nature."

The guest speaker, Dr. Tom Sherratt from Carleton University's Biology Department, would be comfortable being described as an 'evolutionary biologist', in that his "primary interest is in how natural selection has acted, and continues to act to produce organismal traits." His research interests, both theoretical and experimental, are in evolutionary ecology. He quickly outlined the solutions animals have evolved to avoid being attacked by predators in the natural world.

The first of these, and most obvious, is to avoid detection. Fortunately for potential prey animals there are a good number of ways to disguise themselves. Crypsis, or matching your background, sure challenges a predator. So does masquerading. The science behind this was explained using the Winnie the Pooh and the honey tree story (in which Pooh tries to fool the bees by pretending to be a little black rain cloud). Disruptive patterns break up your shape. Disruptive colouration can also do the trick. Dr. Sherratt's lab researchers went out looking for Yellow-Banded Underwing Moths and Carpet Moths on trees to see if the way they rested on the bark, vertically, horizontally, or somewhere in between reduced their rate of being attacked. They discovered that the best way to survive if you're an Underwing is to hang on vertically and head down and this is what they do. Orienting yourself with the bark worked better for Carpet Moths. Just remember—camouflage is good; without it, you'd better find another strategy.

Develop a defense and advertise it! That is use 'warning colours', develop spines, get a stinger, or develop a toxin. A classic example is the poison arrow frog with its toxicity and very bright warning colours, raising the big question, why do warning signals tend to be conspicuous? And, Dr. Sherratt asked, "Do invertebrate predators pay attention to warning signals?" To answer this the lab researchers tempted dragonflies with wasps, hover flies, bees and flies attached to sticks. The dragonflies attacked one and all, not paying attention to black and yellow markings or any other warning signs. Instead they seemed to be very size-selective about their potential prey, choosing the smaller flies and bees.

But what if you, the prey, have no defenses from predators? This brings up the third solution that Dr. Sherratt illustrated with more fascinating images: Look like something defended. In other words be a mimic. If you're an edible species, 'the mimic', evolve to resemble an inedible one, 'the model'. Thus the prey species gains a degree of protection from predators by resembling an unpalatable or otherwise defended species. This is Batesian mimicry, named after Bates a contemporary of Charles Darwin. Consider hover flies, of which there are many species. They so resemble bumble bees and wasps that they have played a key role in debate about 'perfection' in mimicry. Another kind of mimicry, Műllerian mimicry, named after Műller, also a contemporary of Darwin, occurs when 'an unpalatable or venomous species resembles another of the same.' Sound familiar? These two kinds of mimicry (Batesian and Műllerian) were brought to our attention to illustrate that distinctions between different kinds of mimicry might not be that clear cut. There can be overlap, grey areas, mistakes can be made, and myths can grow. A case in point is the Viceroy Butterfly's resemblance to the Monarch Butterfly. This was thought to be a great example of Batesian mimicry— the Viceroy a tasty (to birds) species resembling an unpalatable monarch and thus avoiding attack. But it has been discovered that the viceroy is toxic but still more edible than the monarch to some birds, Blue Jays and Red-winged Black birds, for example. Thus the viceroy butterfly is now generally classed as a Műllerian mimic of the monarch. Since both monarchs and viceroys get eaten it seems to be to their mutual benefit to stay toxic, resemble each other, and share the burden of teaching predators to not eat too much of either one. If this is too complicated a solution, a prey species can, like members of one fly family, adapt to look like wasps and pretend to actually sting would-be predators. Other kinds of mimicry were discussed including sexual mimicry accompanied by more illuminating images.

Dr. Sherratt wound up his talk with a quiz. He showed an image of wasp mimics, eighteen insects of various taxa all on one page, and asked which ones were wasps. Some of the look-a-likes were bees, some flies and so on, but picking out the wasps was tough. There were only four in the whole bunch. No one guessed correctly but one or two in the audience were close. Very humbling. After the talk, Dr. Sherratt fielded questions from the crowd. There were lots of good questions—a sure sign that the talk was well received. I found a great source of further insight into these questions and more, in a book entitled *Avoiding Attack-The Evolutionary Ecology of Crypsis, Warning Signals and Mimicry* co-authored by our speaker Thomas Sherratt, Graeme Ruxton and Michael Speed. Dr. Sherratt asked some of the Big Questions in evolution in his talk which only wetted our appetites for more big questions. Fortunately we can get some relief from this hunger in another of his books *Big Questions in Ecology and Evolution* co-authored with David Wilkinson.

E.T. Seton, in his book *Two Little Savages,* wrote a one-sentence preface as follows: "Because I have known the torment of thirst I would dig a well where others may drink." He was referring to his "torment of thirst" for knowledge of the natural world. Tom Sherratt gave us a hearty drink from his well. Go on-line for Dr. Sherratt's lab, website and email. One of Dr. Sherratt's doctoral

candidates, one Tom Hossie, has a caterpillar of the day blog about caterpillars & their eyespots. One actually appears to wink!

Evolutionary Biologist Tom Sherratt (right) receives enthusiastic thanks from MVFN President Joyce Clinton at the conclusion of his MVFN talk on design and deception in nature. Photo by Pauline Donaldson

"Consider hoverflies . . ." said Dr. Sherratt during his natural history lecture. They so resemble bumble bees and wasps that they have played a key role in debate about 'perfection' in mimicry. This photo shows, not a wasp, but a hoverfly of the family Syrphidae. MVFN file photo courtesy Dr. Henri Goulet

November 2011

"Flying Squirrels—Nocturnal Aviators" presented by **Jeff Bowman**, Ontario Ministry of Natural Resources/Trent University

Two species of flying squirrels survive winter in our forests

Lecture report by Pauline Donaldson

As I arrived at the social hall of Almonte United church for the third lecture in the Mississippi Valley Field Naturalists (MVFN) natural history lecture series, I noticed the audience was larger than usual and there were several new faces. I was not surprised though, because the subject of the evening's lecture was to be the mysterious (seldom seen) nocturnal rodent— the flying squirrel.

From our expert guest speaker, Trent University adjunct Professor Dr. Jeff Bowman, a senior scientist with the Ontario Ministry of Natural Resources, we would learn that flying squirrels are beautiful and useful creatures and that without them our lives and forests would lose many values. As the lecture gets underway we learn there are more than 40 species of flying squirrels worldwide, including the cave-dwelling woolly flying squirrel of Pakistan which survives solely on a diet of pine needles. However, Dr. Bowman has come to talk to us about the only two species of flying squirrel found in North America. These flying squirrels are relatively rare and are adapted in many ways to our boreal and temperate forests.

A southern flying squirrel, foraging at night, is photographed by a remote, infra-red camera. Both the Northern and Southern Flying Squirrel are strictly nocturnal and therefore are seldom seen. Photo courtesy Jeff Bowman

In most places in North America one finds only one species of flying squirrel, either the Northern Flying Squirrel (*Glaucomys sabrinus*) or the Southern Flying Squirrel (*Glaucomys volans*). Since their ranges overlap in our area, we have both kinds here. These two flying squirrels do have distinct habitat and resource requirements though, and this is something Dr. Bowman and his research team study. Since flying squirrels are nocturnal, many people have never seen one, or have only caught glimpses of one in the town or country, scrambling at their bird feeder, or unfortunately sometimes in the jaws of their cat. Some do find their way into people's houses too. Outdoors, acorns with large holes bored into them can be evidence of their presence.

The Southern and Northern Flying Squirrels are similar, with brownish/ greyish backs, light white/cream bellies and large eyes characteristic of nocturnal animals. The Southern flying squirrel, at ~ 65 grams or about chipmunk-sized, is smaller than the Northern species, which is closer in size to the red squirrel. As far as flying goes, they really only glide: a large patagium or fold of skin, between their wrists and ankles acts like a parachute as they take off with their legs stretched wide apart. They glide, resembling little furry pancakes (albeit a little square), from one place to another using their tails to steer. Flying pancakes in our maple sugar bushes! The 'flying' mechanism of flying squirrels and of unrelated marsupial mammals such as the feather-tailed possums of Australia evolved in a similar way. As Dr. Bowman explains, this is an example of convergent evolution.

A short way into the presentation, we watched a video taken by Dr. Bowman: a small southern flying squirrel sits up, its large eyes staring. He/she appears to be chattering at us, but we hardly hear a sound. Dr. Bowman explains that his audio recorder captured sounds in a frequency barely audible to humans. Like humans and many animals they make many sounds at different frequencies and in different situations (e.g. chittering, chortling, chuck chucking, seeping etc.), some at ultrasonic frequencies which are inaudible to us and to barred owls, one of their predators (other predators are other owls, fishers and martens). Whatever they are saying we can't listen in, so for now we are happy to have Dr. Bowman speak on behalf of these creatures which he has studied for many years.

Flying squirrels do not hibernate and so have a particular challenge to survive the forest winter without putting on weight which would compromise their 'flying' ability. They have a number of strategies for this. One is brown fat which can give high energy and heat with little mass and another is to stockpile or cache foods (especially nuts in the case of the Southern species, or lichen for the Northern). Another key strategy is social nesting for thermoregulation; in winter they sleep in groups in nests made mainly in the cavities of trees. The requirement for group nesting may dictate other minimum habitat requirements for flying squirrels, so Dr. Bowman and his graduate students have made the study of social nesting behaviour a priority. How many nest together, how are they related and where do they nest, they wondered? They set about their

investigation aided by various instruments: very tiny injectable transponders with 'scannable' ID tags, tiny radio collars to locate some animals at a distance (these they take off a few weeks later), and datalogger stations to install temporarily at trees with active nests to track the comings and goings of the tagged individuals— with really fascinating results!

The flying squirrels need to co-nest with a critical number of 'friends' in order to survive winter and this could be only a few individuals, or at times up to 20 or more squirrels sharing a nest. But do the same individuals nest together each night? The answer is yes. However, they do not nesting with close relatives or kin. Rather, the nest-mates are unrelated individuals with summer foraging territories close to one another. Although they co-nest, they forage alone both winter and summer. Another thing the researchers discovered was that nest sites were abandoned surprisingly often. This may be to avoid parasite problems which can occur in the nest (despite their use of cedar in the nest lining materials). When nests were abandoned and the researchers finally located the newest nest site, to their surprise they always found the same gang of individuals huddled together in the nest.

Dr. Bowman's research work is contributing to a better understanding of the habitat requirements of flying squirrels, and their role in forest ecology. There are 1-2 flying squirrels per hectare, and it seems that a woodlot of at least 22 hectares is needed to support enough individuals for social nesting. Numbers of flying squirrels and other small mammals vary according to the nut density in the woodland, and all are affected by forest fragmentation. The Northern Flying Squirrel in particular is a good indicator species for old mature forests and they are particularly susceptible to forest fragmentation. A major component of the Northern Flying Squirrel's diet is a fungi found only on the roots of spruce trees. This symbiotic mycorhizzal fungus is essential for the health of the trees since it carries nitrogen-fixing bacteria. By eating the fungus the squirrel helps spread the fungal spores to other trees.

Dr. Jeff Bowman of OMNR and Trent University, guest speaker for our talk on flying squirrels
Photo Pauline Donaldson

Following the talk on Flying Squirrels participants examine exhibits provided by Dr. Bowman. Photos Pauline Donaldson

The research work is also giving insight into how a changing climate might affect flying squirrel populations. We are at the northern limit of the Southern species range. Dr. Bowman explained that as warmer temperatures shift north, the area of overlap between the Northern and Southern species is also expected to shift, although the impact of a parasite which affects the southern species is difficult to predict since it may or may not move north. In 2003, the northern limit of the southern species was 240 km further north than usual because of warm temperatures. The next year when temperatures dropped and food supply declined, the boundary moved sharply southward. The trend thought seems to be that the Southern Flying Squirrels are on the move; moving north into the range of the Northern Flying Squirrel with interesting effects. At the contact zone apparently 4% of flying squirrels are fertile hybrids, apparently an example of climate change induced hybridization. This new finding is important but little is yet known of the biology and behaviour of the hybrids and how well they may adapt to changing habitats or climate. Will this hybridization between species eventually lead to a decreased diversity or even species extinction for the flying squirrels?

January 2012

"Salamanders: Unseen, Unheard, but NOT Unimportant" presented by **Fred Schueler/Mike Oldham**, Bishops Mills Natural History Centre

Salamanders are keystone inhabitants of local streams and forests

Lecture report by Fred Schueler

The Mississippi Valley Field Naturalists (MVFN) 2011-12 natural history lecture series in Almonte continued recently with the 4th talk: Salamanders: Unseen, Unheard, but NOT Unimportant. Originally to have been given by Mike Oldham (MNR), stormy weather on lecture night forced Mike to turn back to Peterborough, and so Dr. Fred Schueler, scientist and local naturalist graciously stepped in and presented an excellent lecture. Dr. Schueler's lecture report which follows provides an overview of salamanders, and a focus on local salamander species. The full report by Dr. Schueler is posted at mvfn.ca.

Salamanders retain the long-tailed, four-limbed shape of primitive land-dwelling vertebrates, overlaid by a wide range of specialized adaptations. They diverged from the tailless frogs some time before the earliest known salamander fossils, from the Middle Jurassic, 164 million years ago. There are now about 550 species of salamanders in the world. Among provinces, Ontario has the greatest number of species, probably because it is closest to the southern Appalachian region, which is the world centre of salamander diversity. Our salamanders range from 35 mm to almost half a metre in length, and show remarkable variation in life histories and habits. Some spend their entire lives in the water, others live on the land but breed aquatically, and some have an entirely terrestrial existence. Salamanders may breathe via gills, lungs, and skin, or can be lungless and breathe only through their skin. Moisture is thus a very important factor regulating their distribution, and they tend to be active on the surface mostly on rainy nights, when potential observers tend to seek shelter.

Salamanders are elusive, and in addition to being rarely seen at the best of times, and on the formerly ploughed and trampled lands of eastern Ontario, they're often much rarer than they were before settlement, though because of their effectiveness as predators they are often regarded as 'keystone predators' in intact forest ecosystems of eastern North America.

Thirteen species of salamanders are known from Ontario, including six that are legally listed as 'at risk' either federally or provincially. Eastern Ontario is not a particularly diverse area for salamanders, but the seven the species found here have a variety of different life histories and are among our most poorly known vertebrates.

The **Mudpuppy** (*Necturus maculosus*) is Ontario's largest salamander, reaching a foot or more in total length. These salamanders are permanently aquatic and have feathery gills behind the head, and other features of larval morphology that other species lose when they mature.

Mudpuppies occur in larger rivers and lakes throughout southern Ontario, as far north as Thunder Bay and the upper Ottawa River, though their distribution is poorly known due to their permanently aquatic habits. They're known from the Rideau, Mississippi, and Madawaska rivers, on the basis of only a few records. The one place they can be easily seen in eastern Ontario is during the winter at **Mudpuppy Night in Oxford Mills –** http://pinicola.ca/mudpup1.htm **–** where many Mudpuppies from an abundant population are out in the open during their winter activity period.

The salamanders with the least surprising life history are the *Ambystoma* 'Mole Salamanders', so called because they spend much of their lives underground – like frogs these live on land and come to ponds to lay eggs in the spring, which hatch into larvae which, like tadpoles, transform to leave the water to live on land until they come back to breed in ponds as adults.

The Blue-spotted salamander (Ambystoma laterale) is the most frequently encountered species in our area, often wandering into basements or garages, or turned up under wood. Photo Amelia Argue

The **Blue-spotted Salamander** (*A. laterale*) is the most frequently encountered species in our area, often wandering into basements or garages, or turned up under wood that has been resting on the ground. Adults are about 13 cm in total length; they are black or dark brown with variable amounts of bluish spots or flecks. This species is closely related to the Jefferson Salamander, which does not occur in eastern Ontario, and the two species hybridized historically to produce unisexual polyploids which contain multiple sets of chromosomes from both the Jefferson and Blue-spotted Salamanders and are almost indistinguishable from the parental species except through genetic testing. These polyploid populations are almost entirely female and usually must mate with a male of one of the parental species to reproduce, though usually rejecting the chromosomes from his sperm.

At one time the polyploids occurring in eastern Ontario were called a separate species, **Tremblay's Salamander**, larger and less spotted than ordinary Blue-spots, with two sets of Blue-spotted genes and one of Jefferson genes; but since it doesn't reproduce sexually it is no longer considered a separate species. Our other Ambystoma is the **Yellow-spotted Salamander** (*A. maculatum*). This large, blackish Salamander has two rows of large yellow spots on its head and along its back and tail. It can grow to over 20 cm in length. It's fairly common on the Shield, including Lanark County, but is restricted to mature woods on sandy dunes in the limestone country of easternmost Ontario. The large, slow-hatching, jelly-swathed egg masses are conspicuous in woodland breeding ponds in the early spring.

The red colour of the terrestrial stage of the red-spotted newt serves as a warning to predators that it is poisonous. Efts such as this one photographed during MVFN's 2010 bioblitz near Almonte, are the only salamanders you'll see wandering around in daylight.
Photo by Karen Thompson

The Eastern or **Red-spotted Newt** (*Notopthalamus viridescens*) has a life-cycle that differs from any other Ontario salamander – the larvae transform into a terrestrial stage known as the 'red eft' and spend 2-4 years on land in the woods. They then return to the water to become mature aquatic adults. Adults have expanded tail fins, and are dark above, often a greenish-brown colour, with prominent black-ringed red spots on their sides; efts are orange-red, with the same red spots, but narrow tails. The red colour serves as a warning to predators that the eft is poisonous, and efts are the only Salamanders you'll see wandering around in daylight. In eastern Ontario the distribution of Newts is very scattered, and they may be declining.

The final and largest family of Salamanders is the lungless Plethodontidae. We have two specialized uncommon species, and one that is widespread and relatively abundant. The species with the most specialized habitat is the **Four-toed Salamander** (*Hemidactylium scutatum*). In May the females leave their woodland habitat and form cavities in moss, typically Sphagnum, overhanging water, where they lay their eggs. When the larvae hatch they wriggle down through the moss into the water where they live until they transform. Although the Four-toed Salamander has only four toes on its hind feet while similar Salamanders have five, the tiny toes are not a particularly useful identification character – better are the constriction at the base of the

tail and the underside which is bright white with bold black spots, quite unlike the greyish underside of the Red-backed Salamander, with which it could be confused. Undoubtedly the species is more common in eastern Ontario than very few old records indicate – you have to go to bogs or other moss-banked ponds or ditches during the breeding season to have the best chance of finding them.

Another small, slender Plethodontid Salamander is the **Two-lined Salamander**, *Eurycea bislineata*, almost always found in or very near running water or gravelly seepages. This species is generally gold-coloured with two dark longitudinal stripes down its back. Eggs are laid beneath flat rocks in streams and the larvae live in the stream until they metamorphose. The best way to find them is to flip over rocks just at the edge of a stream or lake. Two-lined Salamanders are not found in southwestern Ontario, but are locally common in a band from Georgian Bay, across Algonquin Park to Quebec, and south to the St. Lawrence River, though they are found east of the Shield in Ontario only in a very few sites where water flows into streams through seepages of clean gravel. Lanark County is part of this range where the species is fairly common; there used to be a population below the dams in Almonte, but the new hydro station has been built over the site where they occurred.

The **Eastern Redback Salamander**, *Plethodon cinereus*, is usually regarded as the most abundant vertebrate in the forests of northeastern North America. These Salamanders act as keystone predators to regulate the invertebrates of the forest floor community, and through them the character of leaf litter decomposition, soil, and nutrient cycling in the forest. Red-backed Salamanders are an exception to the rule that our amphibians lay their eggs in water, since they lay their eggs in moist spots inside or beneath rotten logs and the entire larval stage of the salamander occurs inside the egg, as they are attended by the mother. The Small Eastern

Colour morphs of Plethodon cinereus: Left, a redack morph (Photo Joe Crowley) and right, a leadback morph (Photo Bev Wigney), both on Earthworm castings.

Plethodon Salamanders, like several other common vertebrates in our forests (Ruffed Grouse, Screech Owls, and Redbelly Snakes), have distinct reddish and greyish colour forms. Rufous and

ashy are plausible colours for cryptic forest creatures, as the colours of freshly dead and decayed leaves . . . In Plethodon these morphs are 'leadback' - unpatterned and charcoal gray, and 'redback' with a reddish dorsal stripe. In New England leadbacks are more frequent in warmer localities, and it has been found that the morphs forage at different temperature . . . Across most of southern Ontario populations are mixed, with leadbacks rarely frequent, but in eastern Ontario south of Ottawa and east of the Frontenac Axis there are no redbacks. You can collaborate with Dr. Schueler's efforts to find out how abundance or colour morph ratios are changing by helping re-sample places where Plethodon have been collected in the past (http://pinicola.ca/thirty/pcin_2012.htm).

[One group of animals has been particularly detrimental to salamanders, i.e. Earthworms.] Pleistocene ice sheets wiped out any native Earthworms that had lived in Canada, leaving North American species . . . only where glaciation was incomplete, on Vancouver Island and the Richardson Mountains of the Yukon. [However, European earthworms were later introduced and where these invaded old growth forests all but the most recently fallen leaves have been pulled underground and consumed, leaving minimal leaf litter.] The missing leaf litter was home to complex communities of everything from snails to nematodes to springtails to centipedes to beetles to salamanders, and to the extent that their habitat is gone, the fauna must be gone from the forests with minimal leaf litter. The invasion of wooded areas by non-native earthworms can also lead to the decline in some native plants, such as rare woodland orchids that depend on a rich humus layer, as well as facilitating the invasion of wooded areas by non-native plants.

For further information or to contribute data, contact Fred Schueler, Bishops Mills Natural History Centre, RR#2 Bishops Mills, Ontario, K0G 1T0; 613-258-3107; bckcdb@istar.ca.

The most important thing those interested in contributing to salamander research and conservation can do is to archive sightings of salamanders and other species. This is perhaps even more important for common species not yet listed as 'at risk' because such species are not adequately monitored. Canadian agencies such as the Natural Heritage Information Centre [nhic.mnr.gov.on.ca] are only concerned with species at risk and rare habitat. Salamanders have what Schueler referred to as a 'boom and bust' economy. While many years in some habitats may offer great conditions for salamanders, often the habitat can't support any population at all and so suitable areas with a source of dispersing individuals are also vital for species survival. When you are out and discover these creatures, record where and when and what you see and share the information with the Ontario Herpetofaunal (Amphibian & Reptile) Summary Atlas (OHS) at http://www.ontarionature.org/protect/species/herpetofaunal_atlas.php

February 2012

"Green Aliens in Lanark County" presented by **Ken Allison**, Agriculture & Agri-Food Canada

Green alien plant invaders of natural habitats

Lecture report by Pauline Donaldson

The Mississippi Valley Field Naturalists (MVFN) recently held the 5th lecture of their 2011-12 natural history lecture series in Almonte. *'Green Aliens in Lanark County'* was presented by Mississippi Mills resident Ken Allison, an avid field naturalist and professional biologist who specializes in non-native invasive plant species. Allison has served on the Board of Directors for MVFN for more than a year and is currently President of MVFN.

Prominent on the second slide of Allison's MVFN presentation were the words "Lanark County has been invaded!" Invaded by plants that is. Gazing at the typical picturesque road-side scene filled with a pleasing, colourful array of familiar mid-summer wild flowers I am shocked as one by one they are named as alien species . . . Reed Canarygrass, wild carrot, bird's-foot trefoil. However, it is a relief to hear that, to Allison, this class of alien plant species is not a worry as they do no harm in natural areas. In fact some of these alien invaders of disturbed habitats are popular with insects. Spotted knapweed is covered in skipper butterflies in July. Others like coltsfoot are a beautiful sight in spring with yellow flowers and masses of green leaves.

Some aliens are most welcome and bring other world culture to Canada, for example coltsfoot which is much admired from ancient times as a heal all. Invasive plants that flourish near the roadside tend to be salt tolerant. More natives grow further from the road. Alien invasive plants which are common in lawns are white clover and common plantain. Some non-native plants only manage to be invasive in cultivated fields or gardens, for example common purslane or yellow wood-sorrel. There are other non-native species which sometimes tend to persist where they are planted e.g. the common lilac or orange day-lily, but they do not become invasive. So far so good, these alien inhabitants of disturbed habitats seem okay, but there are other classes of alien plant species which "we really need to worry about" says Allison.

The ones to worry about are certain non-native aggressive invaders of natural habitats, both terrestrial and aquatic. These 'bad' alien invasive plants tend to share a number of characteristics. Number 1, they have extra good seed dispersal mechanisms – think dandelion seeds, or buckthorn berries. Or they can grow up in a crack in the pavement. Also, they are able to take advantage of man-made disturbances and invade places where we have reduced or eliminated the competition. Often a non-native plant that becomes invasive was introduced as an ornamental. If the answer is yes to the following questions then the non-native plant probably has potential to

Bladder companion is an alien plant which is common in disturbed habitats such as roadsides, where it does no harm. Photo Ken Allison

be invasive: Does it kill or suppress surrounding plants? Is it a rapidly spreading groundcover? Is it low maintenance? Are its seeds spread by wind or water? Are the berries eaten by wildlife?

A 'good' example of a 'bad' alien plant invader of natural terrestrial habitats is European buckthorn (*Rhamnus cathartica*). Allison considers this "the worst of the worst locally". It is a shrub that is easy to find in October because it is the only one still with leaves. It is displacing native species because its' stands produce dense shade. There are other non-native plant invaders of natural terrestrial habitats which really do not do much harm, for example the pretty Herb Robert (*Geranium robertianum*). An example of an invasive orchid is the broadleaf helleboreine which invades on moist soil. It is also not having any apparent impact. Even some of these invasive species have benefited local insects. Henry's elfin butterflies have learned to lay their eggs on glossy buckthorn.

Aquatic environments are especially vulnerable to invasive plants. Animal non-native invaders such as zebra mussels, a small clam, are quite well known. However an invasive plant species that is causing problems is European frog's bit (*Hydrocharis morsus-ranae*). It is a free-floating aquatic plant with 3-petaled white flowers. This is a bad invader. It was brought in as an ornamental. Ducks and other waterfowl are probably partially responsible for its spread. It forms very dense floating mats which lead to a reduction of native plants and the dense growth out-competes other important plant and animal species for oxygen and nutrients in the water. Biological oxygen decrease is quite significant with frog's bit. Another plant which has been a concern in wetland areas in the past was purple loosestrife. However, with bio-control measures in the form of two European beetle species which were released, this invader is becoming more

civilized because the insects are keeping it down for now, but will this last? Common reed is another extremely aggressive non-native plant. Common reed loves ditches but it is unfortunately past worrying about. It is very invasive and out-competes all other native plants. It is still spreading in Eastern Ontario and the damage it does can be clearly seen nearby e.g. in the City of Montreal area. Another example of an invader of wetlands is Yellow flag (*Iris pseudocorus*).

European frog's bit (Hydrocharis morsus-ranae) is an invasive free-floating aquatic plant with 3-petaled white flowers. It was brought in as an ornamental. In natural habitats it forms very dense floating mats leading to a reduction of native plants and animals as it depletes oxygen and nutrients. Photo Ken Allison

What can individuals do to stop the spread of invasive plants? Some obvious things to do include: Do not plant known invasive plants. Keep your land free of invasive plants. If you see something new, try to identify it. Often by the time it is identified it is beyond hope of eradication. As Allison says "you can't put the genie back in the bottle."

Invasion by plants and animals is a natural process and helps explain their evolution and distribution. However, the speed and frequency of these invasions is now greatly increased because of the impact of man. An optimistic note is that most invaders prosper only in habitats greatly modified by man. The retention of large amounts of native vegetation and habitats for

native plants and animals is the best bet to keeping the most [natural and beneficial species] our land and waters provide."

Allison showed a simple but effective time-line illustrating the stages of invasion of aggressive non-native plants. Typically, when an invasive is first introduced it is not noticed. As time goes by it's numbers increase and it becomes more widespread. During this time it is noticed by the public and at some point after this there comes a time when it is beyond hope of eradication. If we can move identification by the public sooner, then the shape of the graph can be changed, and perhaps measures can be taken earlier to eradicate the plants, before it is too late to stop their spreading.

Allison named for us the 'Top 10 Terrestrial Invasive Plants' to watch for in the future: Japanese Knotweed, Japanese barberry, Garlic Mustard (is moving and may already be here in fill), Norway Maple (widely planted here. It escaped in New York state), Himalayan Balsam (an Impatiens-like jewel weed but it is purple), Russian Olive (an ornamental; not much in Lanark County but in Kanata areas are filling in with Russian Olive. It has the potential to be a bad invasive but it needs moisture and a disturbed area), Giant Hogweed (in southwestern Ontario now), Pale Swallowwort (is moving west; not yet in Lanark), Plumeless Thistle (most of Eastern Ontario seems to be an epicentre for this one), Spotted Knapweed (a prohibited noxious weed seed under the Canadian Seeds Act and Regulations; it is like steel wire and very difficult to pull).

The 'Top 5 Aquatic Invasive Plants' which Allison worries could become invaders of aquatic habitat in future i.e. the ones to watch out for include: Flowering Rush (a species which is doing well in Ottawa/Great Lakes), Water Soldier (in the same family as Frog's Bit; it is in the Trent system and is spreading. It came in from aquaria and OMNR is trying to stop it), Water Chestnuts (in the Ottawa system and bad in Quebec), Carolina Fanwort (is in the Trent system; it survives because it sinks to the bottom for the winter), Floating Heart (has a yellow, fringed petals).

So, do not plant non –native species, and if you see something new in your area, try to identify it. If it is a new or uncommon species you can contact speaker Ken Allison at ken.allison@inspection.gc.ca or Lanark County wild plant expert David White may be interested in hearing about it. Is it one of the top 10 terrestrial or top 5 aquatic plants that may be moving into our area? Allison recommends the following references for plant identification: *Plants of Lanark County*, 2011 edition by David White and the website www.lanarkflora.com . Also *Vascular Plants of the City of Ottawa, With the Identification of Significant Species* a document by Dan Brunton - see http://ottawa.ca/calendar/ottawa/citycouncil/occ/2005/06-08/pec/AppendixA%20-%20OTTAWA%20FLORA%20(APR%2005).htm

March 2012

"The Great River Project" presented by **Meredith Brown**, Ottawa Riverkeeper

Downstream of the Mississippi River, the Ottawa Riverkeeper Meredith Brown keeps watch

Lecture report by Michael Macpherson

It was at a Mississippi Valley Field Naturalists lecture several years ago (2007) that scientist Paul Hamilton of the Canadian Museum of Nature came to Almonte to talk about 'Water Quality' as part of our lecture series focusing on the Mississippi River Watershed. At that time Hamilton told us that the health of the Mississippi River, flowing through our towns on its way from Mazinaw Lake near Bon Echo to the Ottawa River, was similar to the health of rivers in relatively remote parts of Northern Europe. In other words, he considered the Mississippi River to be quite pristine. He also said, though, that it would take work to keep it that way.

The relatively good environmental health of the Mississippi River watershed was and still is good news for downstream areas such as the grand Ottawa River. Earlier, this year, as part of the Mississippi Valley Field Naturalists (MVFN) 2011-12 lecture series, Ottawa's Riverkeeper, Meredith Brown came to Almonte to present the lecture titled *The Great River Project* a lecture about the Ottawa River. Meredith Brown is an expert who brings to the task of 'riverkeeping', knowledge of river's biology and mechanics as engineer and biologist; she is also an avid paddler and communicator.

The Ottawa Riverkeeper organization is part of an international Waterkeeper Alliance founded in 1999 in the U.S.A, which has roots even earlier in a group formed to protect the Hudson River in New York state. The Waterkeeper Alliance now includes representative organizations on six continents, including 10 in Canada (e.g. the Fraser Riverkeeper in B.C. and the Peticodiac Riverkeeper in Nova Scotia etc.). "Naturally, we [here in Lanark County] have a connection to the vision and ambitions of the Ottawa Riverkeeper—the Mississippi River tributary contributes 3% of the Ottawa River's watershed and 2% of its flow. As stewards of the Mississippi watershed, we have a role to play in maintaining the natural greatness of the Ottawa River" says MVFN's Program Chair Cathy Keddy, the driving force behind MVFN's lecture series since 2007.

Focusing upon and drawing attention to the ecological health and future of the Ottawa River are the main tasks of the Ottawa Riverkeeper. Who [else] is paying attention to the health of the Ottawa River? , Brown asked at her MVFN lecture. A large river, 1271 km long, for a good part of its length the Ottawa forms the boundary between Ontario and Quebec, before emptying into

the St. Lawrence at Montreal. Over two million people obtain drinking water from the Ottawa, and it sustains a huge hinterland ecosystem, over 146,000 square km. The Ottawa River has been nominated by Parks Canada as a Canadian Heritage River, and was one of ten rivers studied and profiled by the World Wildlife Fund for environmental flows and in the report, "Canada's Rivers at Risk: Environmental Flows and Canada's Freshwater Future".

Brown stated that on balance, the water quality of the River is better than anticipated. She attributed this, somewhat surprisingly and in the simplest terms, to the fact that the Ottawa River is comparatively little used by the humans who live near it.

The height of pollution of the river was in the 1950's, and it came mainly from pulp mill effluent and sewage. Nowadays, higher than average winter flows and lower than average summer flows are indicators of change on the River. So too, are changes to the endocrine systems of fish in the river, and the decline of some species formerly common across the watershed, such as the American Eel. According to Brown, the major threats to the Ottawa include the impact on environmental flows, of over 50 major power dams, and urban and commercial human developments inimical to the health of the river.

For many years such scientific and technical data as were collected on the River were not shared or jointly analyzed by the jurisdictions accountable for the health of the river and the people and communities living along its length. The Ottawa Riverkeeper has started doing this and encourages others to broaden and strengthen efforts in this area. To this end, Brown showed photographs of five trips in canoes and kayaks made by the Riverkeeper and friends on the Ottawa to collect information and raise awareness.

While the provinces of Ontario and Quebec and the Federal Government, and their agencies are responsible for various aspects of protecting the River, from the Riverkeepers point of view there is too little leadership and cooperation in evidence. The primary areas of cooperation are found in the management of hydroelectric power resources to produce electricity and prevent floods. Power producers bid on the provision of power from hour to hour, so the river dances to the tune of the demand for power, which may not always be beneficial to the ecosystems of the River. Dam operators, for example, not in compliance with steps intended to protect the American Eel, a listed endangered species in Ontario, are now looking for exemptions to regulations. Brown suggested that it may be important to try to engage private companies and dam operators in more environmentally sensitive flows and uses of waters in the watershed.

Positive developments pointed to during the presentation included the Ottawa River Summit Day, which was an opportunity to share stories and solutions, identify what is falling between the cracks, and building a network of Riverwatchers along the River. A Riverkeeper Association has recently been started in Mississippi Mills for the Mississippi River, a tributary.

Meredith stated that a big part of her task as Riverkeeper is finding solutions to issues and problems identified, by building awareness, understanding, and genuine commitments to action.

***Left**: An extensive marsh along the shoreline of the Ottawa River near Ottawa (photo B. Shipley).*

***Below Left**: Mississippi River shoreline wet meadows and swamps below Carleton Place (photo Cathy Keddy)*

One of the ongoing problems cited was that the Federal Fisheries Act is not being enforced. Brown brought to our timely attention, perhaps like Cassandra warning the Trojans, that proposed changes to the Fisheries Act included in the omnibus budget bill being presented to Parliament will water down the Act, limit or exclude public input and comment, and give the Minister of the Environment much greater authority to make decisions on the environment. We should all be alarmed about this, Brown said, as it amounted to taking protection of environmental habitat out of the Act. The old Act protected fish habitat and all of the other plants and animals within these habitats, including fish, birds, reptiles, and amphibians. With the changes proposed, only fish populations deemed to be of "economic, cultural or ecological value" would be protected. As we now know, these changes have now been passed by Parliament.

Further information on the Ottawa Riverkeeper organization and Riverkeeper issues and events may be found at ottawariverkeeper.ca.

April 2012

"A Bird in Hand" presented by **Lesley-Anne Howes**, Canadian Wildlife Service

Looking into the unknown lives of birds using banding data

Lecture report by Cliff Bennett

The Mississippi Valley Field Naturalists (MVFN) 2011-12 natural history lecture series continued recently in Almonte. Guest speaker presenter for the seventh lecture "*A Bird in Hand"*, was Lesley Howes, biologist with the Canadian Wildlife Service in Ottawa.

Howes delivered an informed presentation to the public and MVFN members on the more than one hundred years of bird banding across North and South America. Bird banding research seems to have begun with the demise of the mourning dove, a game bird which was at one time in danger of being eliminated, like the passenger pigeon. Scientists and conservationists needed to know the patterns and life-style of the bird so they could try to protect it. The North American Bird Banding Protocol was established in 1923 following the 1916 signing of the Protection of Migratory Birds Act by Canada and the USA. These Acts demanded research into the numbers and species of birds travelling over national borders. Today, more than ever, we need to know where birds go, what they do and what conservation strategies can be used, in order to ensure they will be healthy into the future. Then and now most of the birds banded in Canada can be tracked at one time or another to the USA or further away.

Did you know that a red knot, a small shorebird the size of a robin, which breeds in the High Arctic, showed up in the Strait of Magellan at the tip of South America? How do we know that individual came so far? It was found with a band on its leg which showed it had been banded in the North-West Territories.

Bird banding is one of the most useful strategies used to track bird species. In fact it's one of the major activities leading to a better understanding not only of migration routes and distances, but behaviour, population dynamics, and habitat requirements of our migrating avian friends. Also as one MVFN member noted, perhaps even of physiology. Recently banding data showed that the Greenland wheatear, a type of flycatcher, breeds in the Canadian Arctic and flies across the Atlantic to winter in Russia! How can a bird that weighs only 20-25 grams fly the Atlantic non-stop? Perhaps there are yet to be discovered new aspects of muscle action?

Always active in field work all over the world, Lesley Howes has been involved in banding many of the more than 70,000,000 banded birds on record from all over the Americas since 1923. 300,000 of these birds were banded in Canada. Howes asked the audience which bird species they thought was the most often banded. No one guessed the correct answer, the mallard

duck. Howes went on to explain that, of all birds banded in Canada, 30% of those found with bands are found elsewhere in Canada, 68% are found in the USA and the rest are found internationally. More and more, with climate change, birds are moving globally. Canadian birds found in Europe and European birds found in Canada have a danger of carrying diseases to these areas. Knowing where a banded bird has been will allow authorities to act promptly to protect others in the species.

There are many bird banding stations throughout Canada and the world. Volunteers are always needed and are welcome. To be involved in bird banding, however, you need a permit. This requires you have a project in mind and qualified people to conduct it. Most bird banding stations are at permanent locations. Typically, birds are caught in flight in gentle, fine mist nets and animals are examined in hand followed by release after banding. The bird is weighed, measured, sexed and aged and all data is recorded. A small sample of blood which may be taken also yields vital data. The process takes about fifteen minutes before release.

Bird 'bands' may be simple metal tags, large wing patches, neck bands (used for geese), or other styles. They may be sophisticated and include a GPS to give instant information about location. ***Left****: an identification band being attached to the leg of a Yellow Warbler.* ***Right****: a Scarlet Tanager is examined during banding. Photos Lesley Howes*

Data is gathered when a bird is banded, and if and when banded birds are re-captured or found months or years later, more data can be gathered. Bands can range from a simple metal tag or coloured leg band, to a large patagial or wing marker, to a neck band i.e. such as may be used to band geese. Or a band may be as sophisticated as those with a GPS to give instant information as to the precise location at any given time of an animal.

The nearest banding station in our area is at the Innis Point Bird Observatory just west of Ottawa and they have facilities for long-term volunteers. If you find a banded bird or when a banded bird is found elsewhere in the world, the band numbers should be recorded by the finder and reported

to the Canadian Wildlife Service at www.reportbirds.go.can.ca or to the US Audubon Society. These organizations can then combine information obtained when the individual was banded, with any new information obtained when the banded bird is re-caught or found, or when only a band is found.

Lesley-Anne Howes (left) is thanked by MVFN President Joyce Clinton.

After the bird banding talk there was time to examine dozens of specimens, bird bands and banding tools displayed by our guest speaker. Photos Pauline Donaldson

Back to the red knot, as a long distance traveller, it often has companions of other Arctic species including the Arctic tern, Eskimo curlew, ruddy turnstone and the white-rumped sandpiper. Howes concluded her lecture with slides of some other long-distance wanderers and answered questions from the audience. After enthusiastic applause from the over fifty members and guests present, Howes was thanked Joyce Clinton for showing us how 'a bird in hand with a band' is worth a wealth of data for bird conservation. After the lecture, there was time to view the dozens of banded bird specimens and the various bird bands and banding tools Howes had prepared for display.

May 2012

"World of Woodpeckers" presented by **Dan Schneider**, Senior Interpreter, Grand River Conservation Authority

Woodpeckers superbly adapted insect hunters and wood home builders

Lecture report by Eugene Fytche

The Mississippi Valley Field Naturalists (MVFN) 2011-12 natural history lecture series continued recently in Almonte. Members of the Mississippi Valley Field Naturalists (MVFN) and the public enjoyed a rare insight into the "World of Woodpeckers" during a presentation at MVFN's Annual Spring Gathering Banquet and AGM. The guest speaker was Dan Schneider, Senior Interpreter of the Grand River Conservation Authority. Although describing himself as a generalist, Schneider revealed a profound knowledge of woodpeckers, and kept his audience fascinated by his description of the variety of species of the woodpecker family (Picidae) and their remarkable adaptations. "Woodpeckers are best at exploiting the surface of trees. If you are an insect, you cannot hide from them!" said Schneider.

A map of the global distribution of the over 300 species of woodpeckers showed that there are species on all continents with the exception of Australia including New Zealand. By some quirk of nature, although they are found in Africa, there are none on the Island of Madagascar. The family is divided into four main groups: the *piculets*, found mainly in the tropical regions, the *wrynecks* found mainly in Africa (with the peculiar characteristic that they, like owls, can turn their head through nearly 180 degrees), and the *sapsuckers* in North America, along with *woodpeckers* as we know them. Nine species of woodpecker are found in Ontario. Most have a peculiar 'zygodactyl' arrangement of toes (with sharp, curved claws), two forward and two back (on each foot) so that they can grip the trunk of a tree while bracing themselves with specialized stiff tail feathers. Although Mr. Schneider digressed to tell us some interesting traits of the other groups, he sensed that his listeners were most interested in his insights into the North American birds, and produced many superb slides of both the better known species and species unfamiliar to the audience.

He explained that, of the largest woodpeckers ever found in North American, the Imperial Woodpecker and the Ivory Billed Woodpecker are now extinct (although there are extremely rare US sightings of the Ivory Billed). So a familiar local bird, the **Pileated Woodpecker**, now has the distinction of being the largest of our woodpeckers, and sightings and its distinctive loud repetitive calls are frequently enjoyed here.

The Pileated (or crested) Woodpecker might also be called the Condominium Developer of the Woods. It creates prodigious holes in both live and dead trees, and is a cavity nester, needing a cavity two feet deep (which can take up to a month to excavate), usually in dead tree stumps, to lay its eggs and raise its young. Its cavities throughout the forest become home to a wide range of plants and animals. The Wood Duck and the Flying Squirrels are frequent tenants. As food for humans, Audubon reported, that the Pileated Woodpecker tasted "bad"! First Nations people in America hunted the birds for food and used the crest feathers for decoration.

The most common local species of woodpeckers, the **Downy Woodpecker** and the **Hairy Woodpecker**, are hard to tell apart when seen separately; when together there is no problem since the Hairy Woodpecker is twice the size of the Downy which is about the size of a Chickadee. One thing to remember is that the smaller Downy has a small nail-sized bill. Other characteristics by which we can distinguish them: the Downy has black bars on its tail, and the male has a red spot on the back of its head. The Hairy has a much bigger beak, white outer tail feathers and the male has a red spot on his head. Both range from the Gulf of Mexico to Northern Canada. They feed on insects that they can hear in the tree trunks, but are partial to suet and sunflower seeds from feeders.

The impact of the straight bills of woodpeckers striking sound wood is of the order of 1200 g's, and the birds' well-being is dependent on hitting the wood straight on. Otherwise the physical defense against the impact, given by the peculiar arrangement of cushioning muscles, would not be effective. The brain in particular is well cushioned by muscles against the shocks. The 'tool' used by woodpeckers for extracting the ants, worms and insects that they hear in the trees is an extremely long tongue stored back over the skull and anchored behind the nostril. This amazing arrangement is unique to woodpeckers.

Northern Flickers on the other hand do not have straight bills, and tend to feed on ants on the ground. There are several morphs, all having long sticky tongues used to trap the ants. One flicker was found with over 5000 ants in its stomach. Schneider said they are so specialized that they really are filling the ecological niche of an anteater. They also catch insects in the air, eat fruit, and will visit feeders.

Another type of woodpecker, the Sapsucker, drills parallel lines of holes in trees to drink sap, but also catches insects in the air or on the ground. They are also cavity nesters. The drilling of trees, especially sugar maple, causes wells of sap in spring and provides a sugary food essential to hummingbirds and other animals when none else is available. **Yellow-Bellied Sapsuckers** found in Ontario are an important bird. Schneider considers them a 'double keystone species.' A keystone species is one whose existence makes it possible for other species to inhabit an area. The Yellow-Bellied Sapsucker can be considered a double keystone species because not only does it make cavities in trees creating habitat for other species, but the sap wells it makes provide essential food for hummingbirds and others.

Schneider described other species of woodpecker, including the ones with three toes instead of four, and obviously would have broadened our knowledge much further if time permitted. However, he had run out of time. He did mention that, interestingly, one of the three-toed woodpeckers, i.e. the **Black-Backed Woodpecker** is usually very unafraid of people. It favors burnt out areas of the forest. The **American Three-Toed Woodpecker** is the other three-toed woodpecker in Ontario. The well-named **Red-Headed Woodpecker** is rarer in the past 20 years during which a 60% decline has been noted. The last of the nine Ontario species mentioned, the poorly named **Red-Bellied Woodpecker**, Schneider noted, seems to be moving north, presumably as the climate warms.

Our speaker subsequently responded to a number of questions, among them "Why do woodpeckers peck on steel roofs." The answer: to make more noise, marking territory and attracting a mate. Schneider was given a rousing round of applause by the audience.

Following a short Annual General Meeting and fabulous buffet dinner prepared by Almonte Civitan Club volunteers, the audience sits back to enjoy Dan Schneider's World of Woodpeckers presentation. Photo Pauline Donaldson

Earlier in the evening, Al Potvin had been presented with an MVFN Champion for Nature Award for his role in the production of a large number of bluebird boxes for MVFN's habitat creation program. Speaker Dan Schneider referred to this during his woodpecker presentation, stating that Al, in making the boxes, occupied the ecological niche of a woodpecker! Photo Pauline Donaldson

Speaker Biographies 2011-2012

We thank all of the guest speakers in the 2011-2012 lecture series. The information included in these biographies is thought to be current as of 2011-12, but is not meant to be all inclusive. We apologize for any errors or significant omissions. Please contact the speakers for further information.

Marlene Doyle

Marlene Doyle is a Biologist with the Canadian Wildlife Service (Environment Canada) where she focuses on national environmental indicators. For more than 8 years she has coordinated and communicated ecological monitoring efforts of partners of Environment Canada, currently as Integrated Ecosystem Assessment Officer with, Wildlife Research and Landscape Science Directorate. Doyle holds a Bachelor of Science in Biology from McMaster University. After traveling to Indonesia for volunteer work, Doyle attended the University of Waterloo and completed her Master of Science thesis work in Environmental Studies titled: *"Developing Community-Based Indicators of Sustainability for Water Supply Systems: A Case Study of Makassar*".

Marlene Doyle has worked for many years with citizen science approaches to ecosystem monitoring, assessment and reporting. She is currently co-ordinator of the National Nature Watch Program and is the Canadian Representative on the Terrestrial Expert Monitoring Group of the Circumpolar Biodiversity Monitoring Program.

For more information contact marlene.doyle@ec.gc.ca.

Tom Sherratt

Tom Sherratt obtained a Ph.D. from the University of Dundee in Scotland and taught in that country for several years. Since 2002 he has been teaching and conducting research in Canada as Biology Professor at Carleton University in Ottawa. Sherratt teaches courses such as computational modeling in Ecology and Evolution and Ecological Relationships. He is an expert in the fields of crypsis (camouflage), warning signals and mimicry in nature. Sherratt has worked in this field of study with many species including birds, butterflies, fungi, and dragonflies and has published many scientific papers and books on this and other topics e.g. *Avoiding attack: the evolutionary ecology of crypsis, warning signals and mimicry* by Ruxton G.D., T.N. Sherratt & M.P. Speed (2004), and *Big questions in ecology and evolution* by Sherratt, T.N. & D.M. Wilkinson (2009).

Sherratt's research interests also include "the evolution of 'weird' behavioural and morphological traits such as cooperation among non-relatives and conspicuous warning signals,

how individual behaviour helps to shape the spatio-temporal dynamics of populations, and using artificial life systems to help test specific theories of the evolution of warning signals, and the development of neural network models to quantitatively assess the extent of similarity between models and mimics.

For further information contact Tom_Sherratt@carleton.ca

Jeff Bowman

Dr. Jeff Bowman is Senior Research Scientist with the Wildlife Research and Development Section of the Ontario Ministry of Natural Resources in Peterborough. He is also an Adjunct Professor in the Environmental & Life Sciences Graduate Program at Trent University and the Biology Department of Laurentian University. Bowman completed a B.Sc. degree at Queens University, a M.Sc. degree at Laurentian University and a Ph. D at the University of New Brunswick.

Jeff Bowman has been with OMNR since 2001 and during this time and prior to that as part of his thesis research he has been involved in research projects on many different species, including fishers, martens, lynx, wolverines, mink, wild turkeys, and flying squirrels. His research projects look at aspects such as ecology of both mammal and bird populations, natural resource management and spatial population ecology. He has studied flying squirrel ecology in Ontario for years, looking at genetics, habitats, boundary dynamics, population density, and landscape patchworks. More recently he has looked at the effects of climate change in terrestrial ecosystems, including effects on flying squirrels (see Garroway, C.J. et al., "The genetic signature of rapid range expansion by flying squirrels in response to contemporary climate warming" in Global Change Biology 17: 1760-1769).

For further information contact Jeff.bowman@ontario.ca

Mike Oldham

Michael J. Oldham is herpetologist and botanist at the Natural Heritage Information Centre (NHIC, Ontario Ministry of Natural Resources) in Peterborough. He has extensive knowledge of natural history in Ontario. Oldham has published over 50 peer reviewed papers and hundreds of other publications on natural history in Ontario, including extensive publications on amphibians and reptiles. He recently served on Committee on the Status of Species at Risk in Ontario (COSSARO). Oldham has been a naturalist at Arrowhead Provincial Park, was staff biologist at

the Essex Region Conservation Authority for 5 years and was involved in the creation of the Essex County Field Naturalist club and first editor of their newsletter.

In 1984 Oldham co-founded the Ontario Herpetofaunal Summary, the first modern atlas of reptiles and amphibians. Distribution maps were prepared for every species in the province based on 16 years of data collected from the field and the literature. Oldham has worked on recovery strategies for herpetofauna under the Recovery of Nationally Endangered Wildlife program (RENEW) and prepared status reports on the Spotted Turtle and the Cricket Frog for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). He has also written recovery plans for the Spiny Softshell Turtle and a paper on the decline of the Blanchard's Cricket Frog.

Also an expert botanist, Oldham has collected plants extensively in every province and territory of Canada and co-authored with S.R. Brinker, *Rare Vascular Plants of Ontario, Fourth Edition (2009)*, Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. Oldham is also currently a member of the Vascular Plant Specialist subcommittee for COSEWIC (Committee on the Status of Endangered Wildlife in Canada).

For further information contact michael.oldhamplus@ontario.ca.

Frederick W. Schueler

Fred says he was raised as a general naturalist on the volumes of the Peterson Field Guide series as they were first published. For his doctoral thesis at the University of Toronto, Fred studied geographically varying frogs. Then, as Fred explains, he and partner Aleta Karstad coalesced at the National Museum of Canada, in the early 1970's and then criss-crossed Canada exploring various aspects of biodiversity, before settling in the Eastern Ontario village of Bishops Mills. There they established the Bishop Mills Natural History Centre, where they survey and teach about organisms and issues that are often neglected and explore hypotheses about ecological change and stability. In the winter Schueler and Karstad also educate the public about the large salamander species, the mudpuppy, during 'Mudpuppy Nights' in Bishops Mills, Ontario.

For decades, Fred Schueler and artist Aleta Karstad have travelled extensively within Canada, researching biodiversity, recording changes, and painting and writing about natural history.

Schuler has published numerous articles and books on the biology and ecology of many species especially herpetofauna, crayfish, land snails and freshwater mussels. Since 1981 he has been a Research Associate at the Canadian Museum of Nature, Ottawa. His research and monitoring work has often dealt with rare and/or endangered species in Canada. Schueler prepared the COSEWIC status report on the Eastern Hog-nosed Snake, participated on the Freshwater Mussel

Recovery Team and was a founding member and served on the board of the Ontario Road Ecology Group. Currently Schueler and Karstad are “out on the road across in Eastern Canada “ 'Landscape Art & Science' mode - http://karstaddailypaintings.blogspot.com/ - surveying and painting sites where collections and observations of various species were made in the past

For further information contact Fred Schueler at bckcdb@istar.ca

Ken Allison

Ken Allison is a botanist, a self-proclaimed taxonomy ‘geek’, and an all-round naturalist and birder. Allison is in the process of relocating to the Wolfgrove Road area near Almonte fulfilling a long-delayed ambition to move into a wooded rural environment. He received his BSc in Wildlife Biology from the University of Guelph and has lived in the Ottawa area since 1981. In 2011 Allison joined the Board of Directors of the Mississippi Valley Field Naturalists as Publicity and Public Relations Chair, and in 2012 became MVFN’s President. Professionally, Allison is a botanist working with invasive plants for the federal government. As well as his involvement with MVFN, Allison also served as President of the Ottawa Field Naturalists' Club for several years. Ken enjoys photography and sketching wildlife and has participated in a number of bioblitzes and bird and butterfly counts in the Ottawa and Lanark County areas.

For further information contact Ken Allison at ken.allison@inspection.gc.ca

Meredith Brown- Ottawa RiverKeeper

Meredith Brown is the executive director of the *Ottawa RiverKeeper*, a not-for-profit group founded in 2001. The group is member of the international *Waterkeeper Alliance* (a worldwide network of ~ 200 waterkeepers who patrol and protect lakes, rivers and shorelines). As the Ottawa Riverkeeper since 2004, Brown has been acting as the rivers full-time guardian. Brown is from the North Bay Mattawa River area of Ontario and grew up with a love for the out-of-doors and all the activities it provides. She has a young family and additionally heads a staff of photographers, historians, naturalists and scientists who travel, study, and care for the Ottawa River. She holds degrees in Biology and Environmental Engineering from Queen’s University and the University of Guelph and earned a Masters in Resource and Environmental Management from Simon Fraser University. There and during subsequent work with a British Columbia not-for-profit consulting company with a mandate to restore fish habitat, she gained expertise in river engineering, stream restoration and watershed management.

As the Ottawa RiverKeeper, Brown is scientist, teacher, and law officer as she is regularly called on to provide solutions and recommendations to improve the health and future prospects of the Ottawa River. Meredith has significantly raised the profile of the Ottawa River and brought important issues such as sewage dumping and radioactive waste to the attention of the public and decision-makers. Brown sits on several advisory committees including an Environmental Stewardship Committee with Atomic Energy of Canada Limited, the Fisheries Management Advisory Committee for the Ottawa River with the Ontario Ministry of Natural Resources and the City of Ottawa's Stormwater Management Advisory Committee. Brown was recently named a Fellow of the Royal Canadian Geographical Society.

For contact information for Meredith Brown visit http://ottawariverkeeper.ca/about/contact_us/

Lesley-Anne Howes

Lesley-Anne Howes is a Biologist at Environment Canada and since 2003 has managed the Canadian Bird Banding Office at the National Wildlife Research Centre, Canadian Wildlife Service in Ottawa. She has been banding birds since 1990 and has experience banding passerines, raptors, shorebirds, seabirds, waterfowl and a few hummingbirds. Howes has volunteered on many conservation projects in Canada and around the world. As banding office representative, Howes is currently an Ex Officio member of the Ontario Bird Banding Association and contributes to their newsletter.

Howes completed a B.Sc. in Applied Zoology from McGill University and went on to complete a graduate diploma in endangered species management and conservation from the University of Kent in the U.K. and a graduate diploma in Captive Management and Breeding of Endangered Species in Conservation from Jersey Wildlife Preservation Trust, UK. Howes has conducted field research in many areas, including gull and tern interactions with the Newfoundland fishery, impacts of forestry practices on pine marten population in Western Newfoundland, elk reintroduction, and captive breeding and reintroduction of Pink Pigeons in Mauritius. Howes has volunteered on many conservation projects within Canada and around the world.

For further information contact Lesley-anne.howes@ec.gc.ca

Dan Schneider

Dan Schneider is Senior Interpreter with the Grand River Conservation Authority (GRCA). As an interpretive naturalist and environmental educator, Schneider has an extensive knowledge of the natural features of the Grand River and its surroundings. He is involved daily in the teaching of nature through his work as park naturalist, and teacher of children's environmental education classes and leader of nature walks and camps at the Guelph Lake Nature Centre. He has a global sense of natural heritage, having visited diverse places such as the Galapagos Islands, East

Africa, Thailand, Costa Rica, New Zealand, Belize, and Australia. Dan is also a past president of the Guelph Field Naturalists.

Schneider is also a well-known nature and travel writer. He has written many articles for publications such as Ontario Nature (on diverse topics such as salamanders, spiders, woodpeckers and others), Nature Canada, and Canadian Geographic. Schneider is founder of the Watershed Interpreters' Network (WIN) which was established at the GRCA to improve conservation authority education across the province. WIN is gaining momentum and in Schneider's words "Conservation authority education is also backed up by cutting edge resource management. GRCA staff is constantly gaining environmental information and passing it on to watershed residents. Our educators are called resource interpreters because they take this complicated knowledge and 'interpret' it, making it understandable and enjoyable to learn, even for young residents."

For further information contact bschneider@grandriver.ca

2012-2013

Nature Beneath Our Feet

September 2012

"Lanark County Soil FUNdamentals" presented by **David Kroetsch**, CanSIS, Agriculture and Agri-Food Canada

Soil fundamentals talk a natural start to MVFN's *Nature Beneath our Feet* lecture series

Lecture report by Pauline Donaldson

As students returned to school in September, the Mississippi Valley Field Naturalists (MVFN) natural history lectures resumed at the Almonte United Church social hall 'classroom.' You do not need to be an expert to enjoy these talks, just a curiosity and fascination for our natural world. And, in the case of the soil presentation which set the groundwork, so-to-speak, for the series "Nature Beneath our Feet", some soil vocabulary would also have been useful. Guest speaker for "*Lanark County Soil FUNdamentals"* was soil scientist David Kroetsch, a botanist and ecologist with the Canadian Soil Information Service. Kroetsch was involved in soil survey 'upgrade' work in Mississippi Mills in 2000 and participates in environmental education programs such as the Lanark County Stewardship Council's Envirothon for youth.

As Kroetsch began his MVFN presentation on soils, it was evident that many of us, with the possible exception of farmers and soil scientists in the audience, would be learning a new vocabulary– unfamiliar words such as 'gleysols' (soils that are greenish-blue-gray due to a predominance of a reduced vs. oxidized iron, caused by wet conditions) or 'catena' (from Latin for chain and referring to a group of related soil types with similar 'parent' material but different drainage). On the other hand, familiar words such as 'horizon' took on additional new meanings with reference to soil.

We were all familiar with the word soil, but what is soil really? Kroetsch explained that from early on soil was recognized appropriately as a natural living 'thing', understood to be different from bedrock, and formed by complex processes. "It is the unconsolidated material on the surface of earth, comprised of minerals, organics, water and air and which supports plants whose roots grow into it". In the 1930's answering the question, how does soil form? Hans Jenny, the 'father of soil genesis,' developed fundamental soil science principles and some terminology still used today. Soil is formed over time and five main factors determine the end product: the parent material, the living organisms present, the climate, the topography (surface shape of the land), and time itself.

Soils sharing the same parent material are related. The material might be unsorted glacial material or till, organic deposits from plants such as in swamps, lake deposited material as in

lacustrine soils, or other parent material. Secondly, living organisms of many types are present and play a critical role. These include bacteria such as nitrogen fixers critical for the nitrogen cycle. Fungi could include the mycorrhizae, a group of fungi that form essential symbiotic relationships with the roots of plants and trees. Microfauna are also there, i.e. tiny animals such as nematodes and the fascinating tardigrades, among others. A little larger, the mesofauna include mites, springtails etc., and finally, there are macrofauna such as slugs, snails, insects, earthworms, beetles and larvae which feed on other soil organisms and decaying matter. The third factor, climate, further 'molds' soil through cycles of freeze thaw, drying, and precipitation, and may alter soil pH (acid or base). The pH of soil in turn affects its overall chemistry, for example high acidity can cause calcium carbonate to be leached from clay soils making them more mobile. Fourthly, topography, or the shape of the land where the soil is, can affect the soil, i.e. whether or not it is on a slope or in a depression determines whether moisture will accumulate or drain away. Precipitation, moisture and drainage interact. Heavy precipitation and drainage can result in a lot of things being selectively removed from the soil, critically changing it, such as when 'Leda' clay suddenly starts to flow, compromising human built structures. A single soil type becomes a catena, depending on the slope of land and how well drained it is. For example the Almonte catena has subtype 'Almonte' on good drainage and 'Snedden' on imperfect drainage. The fifth factor is time.

Over time the 'horizonation' of the parent material occurs, things are added and changed over 10, 000 years. Soil horizons are all the distinct layers in soil, of different thickness, colour and texture which you see when you dig a large deep hole. A summary of the horizons present in the soil is a 'soil profile'. Most soils have at least 3 or 4 horizons: a surface 'O' layer which is the organic layer. This layer is very thick in forests, or at least it should be. Often there is an 'A', 'B' and finally a 'C' layer which may be the 'parent' rock material.

Looking at the big picture, Kroetsch explained that on a landscape level, forces of climate and the glaciers retreating created broad distinctive zones of soil and vegetation. For example, in much of Lanark County receding glaciers scraped surface material off ancient Precambrian bedrock leaving hard bare rocky ground. In other parts of the county productive lacustrine soils such as the Almonte soils were deposited from the Champlain Sea which filled part of Lanark County after the glaciers receded. To map distribution of soil types across the country, soil surveys are done by Agriculture and Agri-Food Canada using protocols described online at http://sis.agr.gc.ca/cansis/taxa/cssc3/intro.html; the first in Canada was done in1914 by A. J. Galbraith. The Canadian soil classification system is hierarchical, similar but not identical to one used in the U.S. Examples of Canadian soil types classified are chryosoils (frozen soils), podzolic soils (generally acid soils on the Canadian Shield), chernozyn (associated with grasslands) and gleysols (poorly drained but productive for agriculture when used with tile drainage, such as in the heavily farmed regions of Southern Ontario). Modern soil survey work, Kroetsch explained, involves site descriptions with GPS, and including elevation, slope, aspect and length of the slope, soil profiles and photographs. Vegetation, land use, stoniness, rockiness,

and seepage/water table depth are recorded. The information gathered and interpreted is used by farmers and by municipalities for land use decisions.

The last complete soil survey of Lanark County was done in 1961and the original report and soil maps from then are posted at http://sis.agr.gc.ca/cansis/publications/surveys/on/on40/index.html. One can review or download 2 large maps (each one is in two pieces, a north and south section), the 'Soil Map of Lanark County' which maps in detail the soil and soil composite types found across Lanark County, and the 'Soil Capability Map of Lanark county' which shows the corresponding 'soil capability'. This is the capability with respect to agronomic usefulness ranging from Class 1 to Class 7. For municipal purposes Class 1-3, which are good agricultural lands, are 'protected' in all official plans, Class 4 is marginal for cultivated field crops, Class 5 for permanent hay pastures, and Class 6 and 7 is classified as having no agricultural use. Keep in mind though that the groupings do not consider, for purposes of agronomic capability classification, that the land may be well-suited to production of trees, wild berries and other plants not requiring cultivation.

Those attending the Kroetsch lecture will hopefully have a firmer grasp of concepts to interpret soil survey maps. However, to better understand the soils and ecosystems of the area it helps to have a 'big picture image' of the underlying geology of Lanark County. Local ecologist Paul Keddy's book *Earth, Water, Fire: An Ecological Profile of Lanark County* is a very useful resource in this regard and helps put into perspective how the geology affects the soil type or lack of soil and the natural environment. Maps in the Keddy book show margins of geological formations such as old Precambrian rock or land over newer sandstone or limestone plains, and areas formerly covered by the ancient Champlain Sea, as well as locations of the many areas of natural and scientific interest in the county. For example, the Burnt Lands Alvar, a unique area of very shallow soil over limestone pavement, or Wolf Grove where the Canadian Shield juts up presenting an obstacle to road building and farming alike. Lands such as that, on the very old Precambrian rock, include much of Lanark County, particularly in north and west. Hard granite rock predominates and there you find extensive areas of rocky soil composites with shallow, acidic soil or bare rocky ground. These are seen on the 1961 soil maps as the extensive beige areas which are 'Monteagle sandy loam-Rock' (indicated as 237,700 acres worth in the report) and extensive dark brown areas of Tweed sandy loam-Rock complex (some 124,000 acres), both with Class 7 capability. Such land though has much value for wildlife habitat and leisure. Very mucky wet areas which do not drain may be too wet for agriculture but these swamps and bogs are very productive and are classed as significant wetlands. On the other hand areas south and west in Lanark County are on newer Paleozoic bedrock of limestone or sandstone with deeper more alkaline soil originating from lacustrine deposits, and there you find more productive agricultural soils such as Appleton, Lanark , Snedden or Grenville loam or silt loam on the map.

Having returned to survey some areas, of Mississippi Mills in 2000, Kroetsch noted that the nature of soils has remained relatively the same with some exceptions. Human activities cause changes in classification on a small spatial scale due to over-agriculture, drainage of wetlands,

addition of fertilizers, and atmospheric pollution. So they are considering adding a 12th soil type to be called anthroposoils. Generally, Kroetsch says, soil surveys have a half-life of only 25 years. Change will always occur, but at different rates. When forests were logged early last century soil became vulnerable to erosion. A more recent problem is earthworms. A typical forest will have a very thick 'O' horizon over a thin 'A' horizon. When non-native earthworms invade a forest they can very quickly consume the organic layer while at the same time depositing a thick 'A' horizon comprised of their castings. The absence of the 'O' layer is detrimental and the new 'A' horizon is too dense, leading to poor water infiltration and more erosion which is not good for the forest. We will hear more about earthworms at our November lecture as MVFN's *Nature Beneath our Feet* series continues.

Following the Lanark County Soil FUNdamentals talk there was an opportunity to socialize, enjoy refreshments or discuss soil profile samples and other items displayed by speaker, David Kroetsch of the Canadian Soil Information Service. Photo by Pauline Donaldson

October 2012

"Ground Beetles— My Favourite Group" presented by **Henri Goulet**, Agriculture and Agri-food Canada

'Ground beetles', a spectacular insect group, featured at MVFN natural history talk

Lecture report by Joel Byrne

About 350,000 species of beetles occupy this planet. They are found in nearly every terrestrial habitat and many watery ones, pole to pole. There are more named species of beetles than there are named species of any other group. When I saw the title of Dr. Henri Goulet's presentation to the Mississippi Valley Field Naturalists: *My Favourite Insect Group – Ground Beetles (Carabidae)*, I thought of a quote attributed to J.B.S. Haldane, a distinguished British biologist, who, when asked what he had learned about the 'creator' from looking at nature, replied that the creator ". . . has an inordinate fondness for beetles," referring to the enormous abundance of beetle species. Henri Goulet, MVFN's second speaker, in the lecture series *Nature Beneath Our Feet*, is a research scientist emeritus with Agriculture and Agri-Food Canada, and he also has a fondness for beetles—ground beetles. Why, out of 160 families of beetles would he choose to study ground beetles? The answer was found in his talk, as he shared some of his fond memories in a lifetime of adventures tracking down his favourite group of animals.

Henri (he is a friend) opened his talk by posing some basic questions: what is a beetle, what is a ground beetle? A series of photos outstanding for their clarity, detail, and colour followed, displaying anatomical features of beetles that distinguish them from other insect Orders. One could clearly see that the beetles have no tail-like structure and that their wing covers do not overlap. It is these wing covers or elytra which give rise to the name of the Order of insects to which beetles belong, i.e. Coleoptera, meaning 'sheath wings' in Greek. In this Order is a suborder, Adephaga, meaning 'voracious.' And in this voracious group is the ground beetle family, Carabidae, our speaker's favourite.

Carabid beetles number some 1700 species strong in North America; 250 species around Ottawa. The carabids have long antennae, large jaws, and long legs. Some are very fast, among the fastest animals in the world, for their size. Combine their murderous mandibles with their long speedy legs and you have a formidable predator. Even their larvae are usually big-jawed, active insect predators. All this is bad for their prey, often invertebrates, and good for us since a lot of invertebrates we consider farm and garden pests, aphids, slugs and caterpillars, are consumed. If any invertebrate wishes to avoid being devoured by a ground beetle in Canada, they should retire to a cave, since this is one of the few habitats ground beetles don't inhabit, we learned.

Then came the big question, posed by Henri—Why do I find ground beetles fascinating? Henri's fascination and fondness for ground beetles goes back to his childhood days in winters when he dug down in snow, then into and under the leaves where he found many of his pals stiff with cold, and warmed them up. But what got Henri interested initially in studying ground beetles was seeing species with dark metallic reflections.

There are many other reasons ground beetles became so fascinating to Henri. Unlike butterflies and dragonflies which quickly fly away, adult ground beetles are easy to pick up under debris or under the soil surface. The adults are quite easily seen, ranging in size from 1.5 mm to 30 mm, most being 5-10 mm in size. Adults live at least one season and of course, can be found even under snow. Adults come in a great variety of shapes. Many shiny black ground beetles have a 'typical' shape, athletic, but some are anything but typical. The 'snail eater' is a case in point having 'strikingly elongated mouth parts' the better to lunch on the inside of a snail's shell. There are round sand beetles that look like pills. Bombardier beetles are much wider aft than most, perhaps to house a sort of two-chambered gun at the end of their abdomen where they mix hot chemical 'bullets' and 'fire' them with an audible pop at anything that threatens them. Many in the Adephaga suborder are 'accomplished stinkers', thus avoiding predation.

Henri then showed us phenomenal photos of what, I believe, fascinated us all the most— their great variety of colours. The wing-cover slides alone, entitled Elytral Sculpture, were worth the price of admission. "Our perception is very much affected by what we are." We are humans and most of us are more interested in butterflies than a lot of black beetles because as humans we are attracted to colours. So when the first slide of elytral sculpture popped onto the screen there was a collective sigh. Mind-bogglingly beautiful metallic greens, bronzes, purples and blue blacks, more emerald greens. Also turquoise wing covers trimmed with copper called 'the best' in Canada, *Carabus vietinghoffi*, from the land of small willows. It was as if a sculptor and a jewelry designer had collaborated in crafting them.

As if an expert sculptor and jeweler had collaborated to craft it! A Carabus vietinghoffi, from the 'land of small willows,' with its turquoise wing covers trimmed with copper. This is the ground beetle Henri considered 'the best' in Canada.
Photo Henri Goulet.

There followed a series of photos of completely-assembled, i.e. entire specimens of ground beetles, starting with solely black species, then switching to beetles ranging from pale to dark single-coloured, to two-coloured species, and then three-coloured species. Then came the ones with dark metallic reflections, the ones that initially interested Henri, then ones with bright metallic reflections (my favourites), and then species with two and three hues of metallic reflections, and finally species with metallic hue and pigment colours. At which point Henri said, "So I hope I've exposed you to a lot of colours." We were mesmerized, colour-saturated!

This ground beetle, Elaphrus clairvillei, inhabits only marshy meadows and swampy places. Dr. Goulet is an excellent photographer and here, as in many photographs, he has captured the stunning beauty of the beetle.
Photo courtesy Henri Goulet.

The balance of the talk was devoted to many other special features of ground beetles which could have been a talk in itself. Most ground beetles hide in the day. Look for them under logs and rocks, and in stumps. Ground beetles are found on all land habitats except in water (one species stays under rocks submerged by tides). Most species are potentially excellent bio-indicators because their habitat requirement varies from quite narrow to extremely narrow. For example *Elaphrus clairvillei* inhabits marshy meadows and swampy places, but will not live in bogs as they are too acidic. Some adult ground beetles are very long-lived, 2-7 years. Most ground beetles are finicky about where they live but not fussy about what they eat. A good example, 'caterpillar hunters' (*Calasoma sycophanta)*, are forest ground beetles which emerge in the spring, look around for their prey and venture out and stay out if their prey is present, otherwise they return to the ground. Among ground beetles there are predators, scavengers, and herbivores (many are 'weed-seed' eaters), and even parasites (the very colourful leaf beetle parasites for example)—a very wide range of modes of life indeed.

A huge fan of the 'ground' beetles, Dr. Henri Goulet (centre), fields questions after his talk at the Almonte United Church, while others examine some of the many species specimens provided by the speaker for display. Photo Pauline Donaldson

The talk wound down with a lively question and answer period, while in the background the slide show continued. There was an initial burst of oohs! and ahs! as very colourful beetles seemed to dash across the screen: fabulous close-ups of live tiger beetles on the hunt. What a spectacular way to end the show!

A word about Henri Goulet's photographs— superb! His photos, taken with meticulous care, will long be remembered by those who set aside a few hours of a fall evening to learn and be entertained by the learning. What I came away with was the impression of incredible beauty in the colours and design of the host of ground beetles, each species with its own variation on the general plan.

I enjoyed the lecture so much I saw it twice!

***Resources**: reference books on ground beetles are Common Ground Beetles (1987) by Trevor G. Forsyth and An Illustrated Identification Guide to Adults and Larvae of Northeastern North America Ground Beetles (2010) by Yves Bousquet.*

November 2012

"Earthworms: Whose Friends are They? presented by **Paul Gray**, Ontario Ministry of Natural Resources

Opening a can of worms

Lecture report by Linda Mosquin

As a gardener I have dug up many earthworms in our flower and vegetable gardens and have long considered the earthworm to be a friend, always marveling at its ability to break up, aerate and improve the soil. Or, as our Mississippi Valley Field Naturalist's speaker Dr. Paul Gray of the Ontario Ministry of Natural Resources(OMNR) more largely described them, as ". . . ecological engineers famous for their ability to ingest and integrate soils through different layers, for their contribution to agricultural productivity, for their role as food for wildlife and for use by anglers as fish bait." Many animals eat earthworms…. think crows, gulls, skunks, flickers, robins and others. In Ontario the business of exporting worms to the United States is valued at 110 million dollars a year and involves a migrant work force picking worms at night. And with agricultural fields and pastures in Ontario using more than 5 million hectares of soil, the earthworm would appear to be a seemingly benevolent creature.

Indeed, the earthworm helps the economy, but as our speaker pointed out, with warmer climate change due to humans burning fossil fuels, the evolving earthworm story in Canada/North America is more complex and darker. Native Ontario earthworms, where they existed, are believed to have been eradicated with the Wisconsin glaciers 10,000 years ago and southern native species did not manage to re-colonize this area. Thus our forests developed in the absence of earthworms until they arrived with soils (for ballast) and plants brought here by European settlers. So at present 17 European non-natives and two North American (non-native to Ontario) earthworm species thrive in the province. Some of these earthworms are invasive and with our warming climate it is becoming more apparent that there is a potential for range expansion of these worms in Ontario's forested ecosystems. Already much damage has been done to the forest habitat around the Great Lakes.

Gray presented a number of detailed charts depicting the warming trend for climate change in Ontario. The International Panel on Climate Change models show the warmest trends of between 9-10 degrees, in the northern latitudes, and 4-5 degrees in our area by the end of the century. Earthworms can be killed by freezing but they have developed systems to avoid this happening. As climate warms they will continue to move forward into our northern forests.

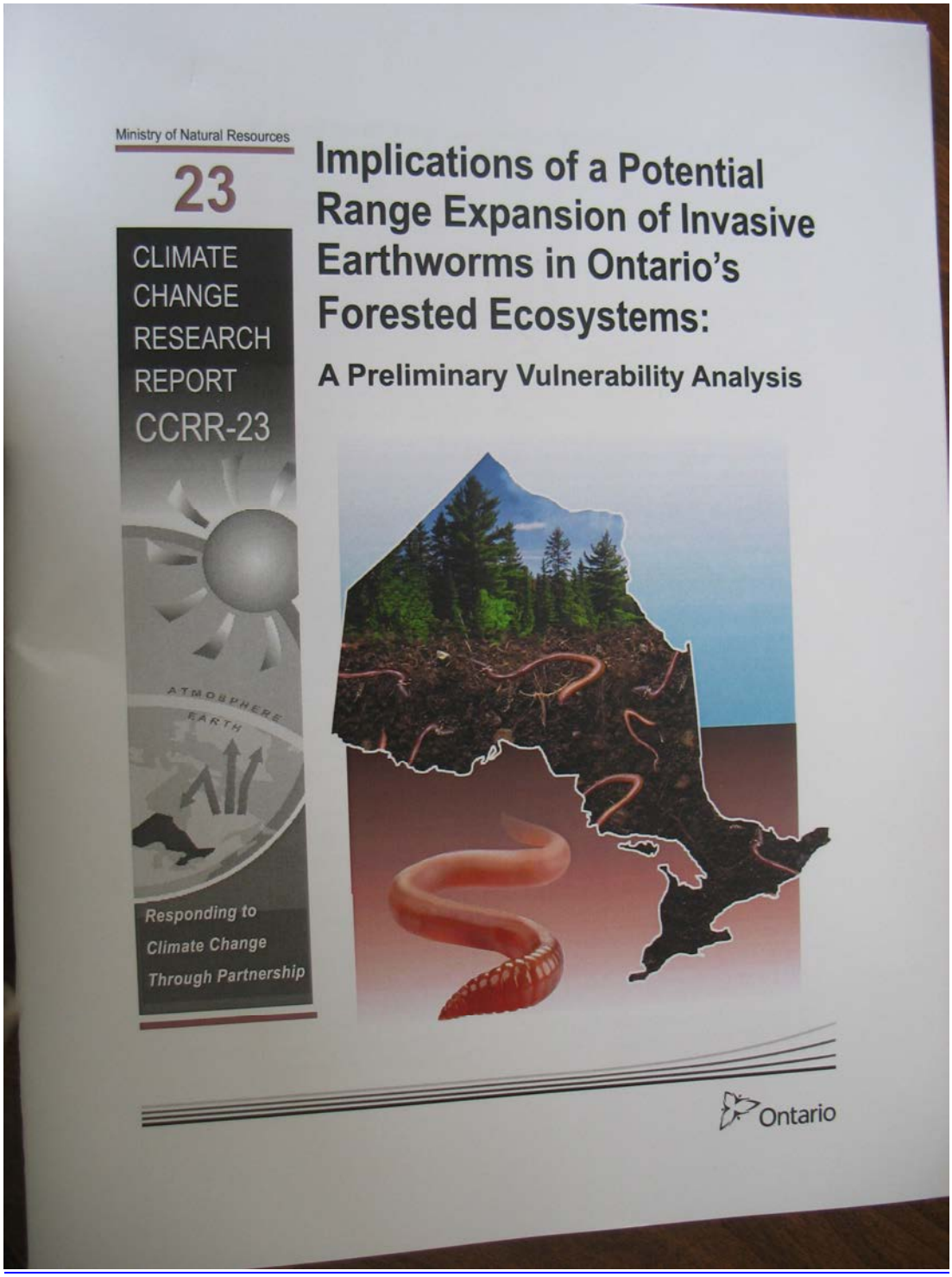
Earthworms are classified into three ecological groups, namely: endogeic, these are rich soil feeders, topsoil dwellers, have no pigmentation, make horizontal burrows, and are small

(approx.7.5-12.5 cm). Epigeic earthworms are top-litter feeders and dwellers; they are pigmented, make no burrows and are the smallest (at 7.5cm). Anecic earthworms are larger (12.5-20 cm) earthworms which are litter and soil feeders and dwellers, dorsally pigmented, and make extensive permanent vertical burrows.

Given the different strata of the soil the different earthworms groups reside in and their burrowing habits, it is no surprise that the impact on forests from earthworms is greatest when all three kinds of earthworms are present. As they move into a forest one can see the edge of the healthy, rich, thick horizon zone meeting the edge of the 'denuded' soil caused by earthworms eating up much of the available organic material. Organic layers are lost, protozoa are eaten, micro-arthropod eggs are damaged and micro-fauna are preyed upon. Plant communities are weakened and often destroyed. Invasive earthworms do most damage to hardwood forests, such as those consisting of maple, basswood, red oak, poplar, or birch species. So a forest that once had a lush understory ends with a single species of native herb and essentially no tree seedlings. Over time (spreading 5 to ten meters a year) earthworms change the forest soils from a fungal to a bacterial dominated system which hastens the conversion of leaf litter to mineral compounds, starving the plants of organic nutrients. This change in soil eliminates seedlings, ferns, and wildflowers. There is evidence emerging that changes caused by alien earthworms can even eventually affect small mammal, bird and amphibian populations and increase the impacts of herbivores like white-tailed deer. Invasive plants such as buckthorn and mustard garlic can establish a roothold in a diminished ecosystem. These species reduce and destroy habitat for native species and are a serious threat to biodiversity and the health of our forests. Once established, earthworms are virtually impossible to eradicate.

Much of Paul Gray's presentation on earthworms is based on American information since most of the research has been done there, although one of the best known books on earthworms, "*The Earthworms (Lumbricidae and Sparganophilidae) of Ontario*" (1977) was written by a Canadian, John W. Reynolds.

Gray described the findings from a multi-species invasion of earthworms at a site in Timmons he worked on in 2011. Nineteen species were identified at this site. Along with other researchers, he has developed a ranking system for the risk posed by these species as a preliminary 'Invasion Index' for earthworms in Ontario. Categories included in the ranking system are abundance, distribution, reproduction, transportability as bait, most northerly isotherm (temperature) and pH tolerance. Earthworms like a neutral pH but can exist in a wide range of acidic soil. As the soil becomes less acidic they will find it easier to establish themselves. The species were ranked low, medium or high for invasion potential. The full details of their findings are contained in the OMNR report released in 2012: "Implications of a Potential Range Expansion of Invasive Earthworms in Ontario's Forested Ecosystems: A Preliminary Vulnerability Analysis" which Gray co-authored with others and which was released in 2012. The speaker had copies of this excellent report at the lecture and it is also available online at the OMNR website http://www.mnr.gov.on.ca/en/Business/ClimateChange/Publication/STDPROD_092882.html.



Indeed, the lowly earthworm helps the economy, but as Ontario Ministry of Natural Resources (OMNR) Paul Gray recently told an MVFN audience, the evolving earthworm story in North America is much more complex. He is co-author of the 2012 report: Implications of a Potential Range Expansion of Invasive Earthworms in Ontario's Forested Ecosystems.

How do earthworms travel into forested areas in Ontario? With human help of course! Fishermen dumping bait near forested areas, gardeners moving compost, road building, or ATV tire-treads or truck tire-treads which have adult worms and cocoons (egg cases), could all start an earthworm invasion into forested areas. There are some simple things you can do to prevent their further spread. For example, people should take unused fishing bait home and freeze the container for at least a week before discarding the contents, avoid dumping compost anywhere except in your own garden, and wash ATV or other soil-holding vehicle tires before transporting the vehicle. In Minnesota, where extensive research on earthworms has been done it is illegal to dump worm bait.

More research in Ontario on managing invasive earthworms, especially with our warming climate, would be useful. Regulation and education could help prevent alien earthworms from invading Ontario forests. Another route to scientific research that is very much supported by Gray is citizen science. He would be happy to help organize training and seek support for citizen groups that would like to become involved in collecting data about invasive earthworms. If you are interested in starting or joining such a group consider contacting Dr. Gray at paul.gray@ontario.ca. To help citizens become informed on earthworms there are various sites on the internet which offer additional information such as http://www.naturewatch.ca/english/wormwatch/ and http://www.nrri.umn.edu/worms/default.htm

Paul Gray (right) of the Applied Research and Development Branch, OMNR, in lively discussion with MVFN President Ken Allison (left) and member Neil Carleton after his presentation on earthworms. Photo Pauline Donaldson

January 2013

"Coarse Meaty Debris: The significance of Large Dead Animals in our Forests presented by **Paul Keddy**

Which forest is healthier?

Lecture report by Christine Hume

Which forest [of the two shown on the next page] is healthier? If you selected the one in image A – you are on the right track. At the recent Mississippi Valley Field Naturalists (MVFN) talk "*Coarse Meaty Debris: The Significance of Large Dead Animals in our Forests*" given by Dr. Paul Keddy, we learned that a forest that has a healthy mixture of living trees, fallen decomposing trees, and dead standing trees is a healthy forest ecosystem. The talk focused on the deciduous forests of eastern North America.

Many of the forests in this area were cut by the end of the last century, so most of the ancient old growth forests are long gone. Slowly our deciduous forests have come back; some of the key indicators to help judge the health of these forests were discussed. The presence of diagnostic species such as spring ephemerals (e.g. Trillium), Wood Warblers and Salamanders are good signs. Additional indicators include: more big trees, canopy composition, a diverse herbaceous layer, wildlife trees, woodpecker nesting trees, and coarse woody debris. The woody debris is a major source of biological diversity, allowing ferns, mosses and fungi to thrive.

It is important for landowners with forested property to understand the benefits of maintaining and managing biological diversity. We learned that it is beneficial to a wide range of plants, animals and insects to let a tree that falls in the woods—just lie there. A general rule of thumb is to leave 8 fallen trees per acre—the bigger the tree the better!

Dr. Keddy then noted that as he was preparing the talk and thinking about the benefits of "woody debris" – the phrase "meaty debris" came to mind. The talk next focused on the importance of "coarse meaty debris" (animal carcasses) and the contribution it makes to a healthy forest. Of particular interest to me, was the description of the simple study conducted by Dr. Keddy and his wife Cathy on their property. On a beaver pond they set up a man-made carcass—a pile of trim (meat and bone scraps) from their local butcher. Then they recorded detailed field notes and observations over a period of 3 – 10 days noting which birds and mammals came to feed on the "carcass". We were very surprised to learn that the first bird that came to feed on the meaty debris was a tiny little chickadee. It was feeding on the fat of the carcass.

Two different Lanark County forests. ***A: Top****: This forest has coarse woody debris.* ***B: Bottom****: This forest has little or no coarse woody debris; has been cleaned up. Photos Paul Keddy*

Next in the carcass line-up was a couple of crows, then turkey vultures, then a large gathering of crows and ravens; several coyotes and so on. It was a powerful demonstration of the number of species that will feed on carcasses and may depend on the availability of 'meaty debris' for survival.

The first bird to visit and feed on the 'artificial' carcass was a tiny chickadee.
Photo Cathy Keddy

Another study that was conducted in Algonquin Park was presented— the 'meaty debris' in this instance included deer and moose carcasses. Species that eventually found the carcasses included: ravens, turkey vultures, fox, black bear, otter, and wolf. Black bears are known to be carrion feeders. There is a huge array of species that feed on carcasses. They are a centre of biodiversity. The bodies are cleaned up—animals may tear, grind, pick, gnaw and disperse pieces of the carcass. Anything remaining goes back into the soil. After a few weeks there is nothing left. Quite fascinating really!

It was also interesting to learn about the 68 species of burying beetles. The beetles bury small carcasses; lay their eggs in the carcass and their young then feed off of it. And then Dr. Keddy

presented some examples of how humans can interfere with the circle of life – and keep it from running smoothly.

Given a total deer population for Ontario of 400,000, (estimated by the Ontario Ministry of Natural Resources), the range of deer i.e. covering about 40% of the area of the province, and a natural annual mortality rate of 10%, the natural deer carcass density would be approximately 1 carcass/10 km^2. The annual removal of potential carcasses through hunting (60,000 – 70,000, estimated by OMNR) is high relative to the 40,000 animals that naturally become "meaty debris." The removal of deer by hunting results in a steady drain of carcasses, nitrogen, phosphorus, and calcium from our forests. This probably has a significant negative impact on all the species that feed on carcasses.

And going back 10,000 years Dr. Keddy briefly discussed "megafauna" and the big carcasses of that era, now missing, including: woolly mammoth; sabre-toothed cat; giant ground sloth and more. The cause of the demise of these giant creatures at the end of the last ice age is widely debated. We saw photos of hand-chiseled spearheads that were found along with the remains of some of these gigantic mammals. It is suspected that our human ancestors became a bit too skilled at hunting and likely were largely responsible for exterminating the megafauna.

This talk really made me think of the circle or web of life – and how interconnected and interdependent the trees, plants, mammals, insects are on each other.

How can we contribute to keeping our forests healthy?
Find out what is being done with road kill that is collected? Instead of it being incinerated or disposed of, can some be distributed in managed forests to support a healthier ecosystem? Can some be put where naturalists can observe and learn the effects of meaty debris?

Increase public awareness that dead trees and carcasses in the woods are an essential part of nature— a "good thing," not something to be offended by— they will be cleaned up by nature itself.

Resources*: To learn more about our forests and the Managed Forest Program, check the Ontario Ministry of Natural Resources website at http://www.mnr.gov.on.ca/en/. If you are interested in volunteering and helping with forest management projects, refer to information provided by OMNR, the Ontario Forestry Association (http://www.oforest.ca/) and the Eastern Ontario Model Forest http://www.eomf.on.ca/ . If you found the report about this talk interesting, consider coming to a Mississippi Valley Field Naturalists talk or event. The value you get from a membership in this organization is priceless! For more information, visit http://mvfn.ca/. And for more information about the research work of ecologist Dr. Paul Keddy, please visit his website at http://www.drpaulkeddy.com/*

February 2013

"Survivor: Winter Wildlife—Outwit, Outlast, Outplay" presented by **Patty Summers**, Wild Bird Care Centre

Survivor: winter wildlife edition

Lecture report by Elizabeth Wiles & Pauline Donaldson

A delightful, clearly delivered talk to the Mississippi Valley Field Naturalists by Patty Summers from the Wild Bird Centre described the varied and intriguing ways wildlife will prepare to survive winter. How will they do it? Summers divides wildlife winter-survivor strategies into three categories – outwit, outlast and outplay, with outwit being by far the most widely employed strategy.

Outwitting winter, Summers explained, involves turning the tables, knowing the science of cold and of snow and cold water to find the secret, hidden warmth. Fresh snow can be up to 90-95% air and is a good insulator. In the 'subnivean' space 15 cm under the snow, small mammals such as mice and voles inhabit a relatively cozy 0° C space between snow and ground. They are not alone there; in fact an entire foodchain inhabits the subnivean space: bacteria, fungus, springtails, spiders, shrews, weasels etc. Likewise aquatic 'outwitters' seek out the relative warmth of deep water zones way below the ice. Cooler water sinks and stabilizes at 4° C with no circulation and there it has a higher concentration of dissolved oxygen than surrounding layers. Fish here eat less, move less or, like carp, bury themselves in mud. Some aquatic plants have turions which survive in the 4° C water at the bottom of ponds. These turions, or overwintering 'buds', sink, but will outwit winter to rise again in spring, and grow new plants. Dragon flies stay in the water in the nymph stage. Another outwit strategy is 'Build a four season home'. Bees do this. They consume honey for energy and form tight shivering clusters which are 32 ° C in the middle. Individual bees regularly rotate position, with bees near the centre trading places with bees on the periphery so there is a better chance for survival. Waste is excreted outside the cluster.

Not surprisingly there are challenges faced by the 'outwitters', and some will not survive. Life in the subnivean space is risky. The insulating capability of snow depends on its density. Freeze-thaw cycles compact snow, reducing its insulating ability and allowing dangerous levels of carbon dioxide to accumulate. There is also the threat of hunters of the subnivean space. Foxes can hear prey under the snow and can leap and pounce through. Grey owls can locate prey 2 feet under the snow and plunge through a snow crust that can hold 175 pounds!

While outwit involves taking advantage of subnivean and deep water spaces, or building a four-season home during freezing weather, outlast involves becoming dormant and conserving energy. Or, as Summers described it, "dig deep and stay there". This is the way of the frog, toad, ant and worm. Earthworms survive 6 feet underground in a slimy membrane. Ants burrow into the soil or under tree bark. Others such as groundhogs, chipmunks, and woodland jumping mice hibernate below the frost. Frogs and salamanders, who can absorb oxygen (O_2) and emit carbon dioxide (CO_2) through their skin, go deep underwater, as do turtles, who can survive but must dig very deep. Another slogan of the outlast survivors is "It's better with friends". Snakes can't dig but they gather by the hundreds in tree stumps, holes, or in cracks or caves among rocks and share their warmth. Ladybugs do the same under bark and rocks or the south side of a house.

Dormancy or hibernation is another key 'outlaster' strategy. In an extreme example, some frogs cryopreserve themselves. As 'frogcsicles' their heart is stopped but their organs stay 'alive' with no oxygen or nutrients. They survive fatal freezing damage by eliminating water from inside their cells; no ice is formed inside their cells because, instead of water, cells are high in glucose which does not freeze easily. Box turtles and many insects use a freeze-tolerant mechanism; the arctic woolly bear caterpillar may freeze and thaw seven times before finding conditions right for it to pupate, often a matter of years. Some animals have a unique super cooling ability; using high sugars or sugar alcohols and excreting waste, they can lower their body temperature below freezing without becoming a solid. Mourning cloaks, slugs, snails, gall wasp larvae do this but it is risky if they touch ice or if it gets too cold. Perennial plants outlast winter as well, storing nutrients in roots below the frost line. Trees reabsorb valuable nutrients from leaves before the leaves are shed and form buds before winter. Conifers form protects them from snow load and as their roots go past the frost line for water, valves can shut off if ice is present.

Just as there are risks to outwitting winter, there are also risks when attempting to outlast winter. Turtles hibernating under the mud with their hearts beating only once every few minutes are totally vulnerable if they did not dig deep enough. They will be eaten if found because they will not wake up.

A third winter survivor strategy is 'outplaying' winter. Dress for winter, remain active and 'play' all winter despite the harsh conditions. Birds increase feathers and down layers, lose bright colours, eat more and spend nights in torpor, with lowered metabolic rates and body temperature. They keep their feet warm with extra feathers, and a heat-exchange blood circulation system. Some birds will tuck alternate legs up inside their feathers to keep them from freezing. "Who needs boots?" says Summers. One well-dressed 'outplayer' among the winter survivors is the ptarmigan with feathers around its toes and ankles and projections off its feet that look like mittens. Mammals will increase fur, change color to a dull white fur which has more air pockets for better insulation. They will fatten up with brown fat. Some small mammals like chipmunks and flying squirrels are active in their burrows and often emerge on sunny days.

Squirrels are active all winter, as are deer, that ‘yard’ in an area of good browsing and shallow snow. They keep the snow beaten down with their trampling for ease of movement.

Another game of the outplayers says Summers is “Cache and Seek”. Birds, mammals, squirrels will hide (cache) extra food to use in winter. Many birds cache food in the fall and find it later by smell and in some cases by their amazing memory. ‘Bird brains?’ Beavers live in their houses with food stored nearby and muskrats make and live in mounds of vegetation called ‘push-ups’. They also establish food caches and bundle together for warmth. Others, such as weasels continue to hunt. Some owls have lopsided ears which allow them to locate prey through triangulation of sound. As mentioned, a grey owl can locate prey under deep snow and plunge through to catch prey. Another strategy is ‘form an alliance’. Crows roost together. Flying squirrels must nest in groups together. Large ungulates will follow group paths through the deep snow. In cities birds flock to roost near warm buildings or chimneys.

Wildlife expert Patty Summers poses with a highly specialized winter survivor, a Great Grey Owl, following her MVFN talk in Almonte. Photo Pauline Donaldson

Which of these strategies is best? If there was an award for the best winter survivor amongst wildlife, which animal would it go to? At the conclusion of her presentation, Patty Summers, told us that for her, the star of ‘winter survivor wildlife’ is a bird, the golden crowned kinglet. This tiny bird does not enter torpor. It maintains a normal body temperature which is 3°C higher than other birds. This ultimate outplayer of winter also manages to find three times its weight in food daily, and may raise two broods per year – a marvel of activity!

March 2013

"The Changing Face of Predation on Arctic Nesting Birds" presented by **Ken Abraham**, Ministry of Natural Resources

Cool summer in the Arctic is 'nice' for the many ground-nesting birds that make the trip

Lecture report by Lynda Bennett

Dr. Ken Abraham, wetland and waterfowl scientist with the Wildlife Research Team of the Ministry of Natural Resources recently spoke at a Mississippi Valley Field Naturalists (MVFN) meeting in Almonte. His talk *"The Changing face of Predation on Arctic Nesting birds"* focused on climate change and several remarkable ground-nesting birds of the Arctic, including Red Knots, Semipalmated Plovers, Snow Geese, Eiders and Whimbrels. Some of these birds make spectacular migrations to get to the Arctic only to nest and raise young in a relatively harsh landscape. The Red Knot, a small shorebird, is a good example. In a few days it flies from the Southern tip of South America to the northern tip of Canada. Tracking by satellite shows migration is on a very fixed route and feeding stops are essential. In Delaware Bay, on the Atlantic coast, they have a feeding frenzy on the eggs of Horseshoe Crabs amassing onshore, potentially doubling their weight in a few days! This resource is absolutely critical for migration. Another long-distance migrant, the Whimbrel, deals with hurricanes on its way from Brazil!

Why do these birds make the long journey to the Arctic? Relief from predation is part of the answer. In a simple demonstration experiment Abrahams and colleagues placed nests along a line north from James Bay to the Arctic Ocean. The nests were subject to less predation (primarily from foxes) the farther north they were; it was 3.6% less per degree of latitude northward. In this case predation appears to act as a 'top down control' of the nesting population. Factors shaping populations can be approached from a 'top-down' or 'bottom up' view. 'Top down' factors include predation, weather and disease as major factors in nest success. 'Bottom-up' factors include resources such as food abundance, nest sites and water availability.

Although it is clear ground nesting birds do get some relief from predators in the Arctic, they are still preyed upon by many species including Arctic Foxes, other birds such as gulls, eagles and Parasitic Jaegers, and, as it turns out, to an increasing degree by Polar bears. There are complex predator-prey relationships at work in the Arctic. A common theme of the interplay of these arctic ground nesting birds and the animals who prey on them is the effects of the relative abundance (and its cyclical or geographical variation) of the preferred prey of the predators. For example Dr. Abrahams explained that although the Arctic Fox is a major predator of many arctic ground-nesting birds, Lemmings are actually its 'preferred' prey, and Snow Geese are only the

‘alternate’ prey in low Lemming years. Still other Arctic birds may only be ‘incidental’ prey for the Arctic Fox, when neither Lemmings nor Snow Geese are present in the area.

Our speaker used interesting examples and illustrations to show how Arctic ground nesting birds use the Arctic habitat to their advantage and have evolved several strategies to ensure their nests are as successful as possible. Semipalmated Plovers, for example are: i) masters of camouflage, using the sparse landscape to hide their beige/grey spotted eggs ‘in plain sight’ on open pebbly ground, ii) masters of distraction displays, faking an ‘injured wing’ to lure prey away from vulnerable eggs or chicks, and iii) use nest associations to conceal themselves, i.e. evidence shows they benefit from nesting in close proximity to Arctic Terns whose aggressive defensive behavior discourages predators.

Ken Abrahams (standing left) is thanked by MVFN Vice President Stephen Collie. Abrahams spoke about Arctic breeding birds to a large audience. Ground-nesting birds do get some relief from predators in the Arctic, but they are still preyed upon by species such as Arctic Fox, birds including gulls, eagles and Parasitic Jaegers, and, as it turns out, to an increasing degree, Polar Bears! Photo Pauline Donaldson

Species such as Whimbrels nest on the ground near dwarf shrubs, or hummocks using lichen and other things. to disguise their nests. Early nesting, short incubation and precocious chicks are other strategies to avoid predators, e.g. Red Knot hatching is synchronized and hatchlings begin foraging with parents within a day.

Another strategy involving safety in numbers is the colonial nesting of the common Eider. There are more nesting Eiders in the high Arctic than in the lower and as Abrahams explained they are adapted to nesting in tight, large crèches with multiple hatchings on islands with usually few or no predators. They are tame and not used to predators, so have little defense against increasing predation by, for example, Grizzly Bears moving northwards with climate change. Even Bald Eagles, having made a come-back since the banning of DDT, can do quite a lot of damage to nesting Eiders.

Abrahams concluded with further insights into how climate change is changing the 'face' of predation in the north. Polar Bears were seen eating numerous Snow Geese eggs; they are coming to land earlier and earlier each year due to ice melting. On land they cannot access their preferred traditional prey, seals. New camera technology is helping Abrahams and other researchers get a better idea of what is going on. A camera set up opposite a Snow Goose nest revealed that even Black Bears are finding their way up to the low Arctic now and were seen destroying large numbers of Snow Geese eggs; and Barren Ground Caribou trample on a good number of nests

April 2013

"Native Freshwater Mussels of the Ottawa Valley" presented by **Jacqueline Madill**, Canadian Museum of Nature

The speaker shows her mussels at natural history talk

Lecture report by Jim Bendell

At a recent natural history lecture in Almonte, the Mississippi Valley Field Naturalists (MVFN) welcomed 'malacologist' Jacqueline Madill, Senior Research Assistant, Zoology, Research and Collections, Canadian Museum of Nature as guest speaker for the MVFN 2012-13 '*Nature Beneath our Feet'* lectures. Madill's subject was the important but little-understood or appreciated, 'Native Fresh-water Mussels of the Ottawa Valley' and she brought many several favourite specimens to the talk. About one-third of the worlds' mussel species live in North America, with 55 species in Canada, of which 41 are found in Ontario. Madill reminded us first thing that we should not pick up mussels from the river bottom; each species inhabits only a specific water zone and they have limited locomotion. Not only that but freshwater mussels are considered one of the most endangered group of species in North America, with 67% at risk!

Mussels and Clams belong to the family Mollusca (derived from Latin: soft), a very large group of soft-bodied animals that also includes the Chitons, Tooth Shells, Snails and Slugs, Oysters, and the Nautili, Squids and Octopuses! Look them up and be amazed! In abundance and diversity, they are second only to the Arthropods (which includes Insects), and were among the first creatures on earth. Mussels and clams range in size from barely visible to approximately 20 cm in length. Both are bivalves living in a box of two shells. Think of the Blue Mussels or clam chowder you last ate at the fish restaurant, said Madill. Two limey (mainly calcium carbonate) shells enclose their 'bivalve' body in a box that may be opened or closed for passage of water, and protection. This structure reflects the life of a sedentary animal (or couch potato), no head or limbs but a muscular foot that provides anchorage and infrequent locomotion. About the body is a mantle that produces the shell and aids in growth and reproduction. Within the body there are various organs that work as in our own. Most important are the gut and gills that act in feeding, as part of a giant filter.

Madill and others assess Mussel biodiversity and numbers in local lakes and rivers as part of their work. Hinge structure and other features are used for identification and often identification can be made just by the feel of the shell underwater. Mussel species may vary in numbers from zero, to a few, to such an amazing density one cannot walk without treading on a shell. Here they earn the names 'Heelsplitter' and 'Ouch'! Other more 'happy as a Clam' individuals are

Rainbow, Warty Back and Maple Leaf. Eastern Elliptis is a very common species locally, and others such as a Cylindrical Papershell found in Quebec, had not been seen since the 1830's.

Why mess with mussels? Well, we must agree that water is fundamental to life. Here in the Ottawa Valley we are well supplied with five major rivers and many smaller streams, and so should have abundant clean water and excellent aquatic life. But if we are to sustain and improve our standard of living we must care for our waters. And the study and care for Mussels and Clams are part of that concern because these little-known animals give many ecological benefits. Perhaps the most significant is their filtering; an individual may ingest and clean 3 liters of water per hour, removing toxic chemicals, excess nutrients, harmful bacteria and viruses, and importantly light blocking matter. They also provide benefit by mixing sediments as they slowly move. They provide food for fish, muskrats, shorebirds and others. Also since some mussels are quite long lived, many living decades, they carry within their tissues a useful record of biological and chemical changes in the environment. As they age annual rings form in the shell as in a tree. According to Madill, some Eastern Pondshells can live 200 years!

But why are Mussels so endangered? At one time, commercial harvest and disruption from log drives reduced their numbers, but these are not ongoing. Now the sermon; sadly, and to our peril, the current plight of bivalves reflects the damage we have done and are doing to water and its inhabitants. Mussels need clean, clear running water relatively high in oxygen and water bodies connected to maintain stable levels and flow, provide nutrients, and permit dispersal of the young. In turn, the density and persistence of these creatures are good indicators of healthy waters. Main disrupters are dams and locks that restrict flow and cause extreme fluctuation in temperature and levels of water. According to Madill, it can take 50-100 years for an area of mussels to be reestablished once it has been disrupted. Mussels are also particularly sensitive to pollutants of many kinds which include fertilizers from lawns and cropland. Many large water bodies and waterways have been made uninhabitable by channeling, loss of near shore habitat, and choking with litter and debris. Another significant threat has been the invasive Zebra Mussel, perhaps the most damaging to our native bivalves, as well as to human infrastructure such as intake pipes. It appeared in the Great Lakes in 1988 on ships from Middle Europe. Of incredible reproductive capacity, one female can produce 30,000 to 1,000,000 larvae annually. Madill noted that Mussels of the Rideau River have suffered a 'double whammy' from Zebra Mussels and the rapid and alternating water levels due to the canal locks. In 10 years Zebra Mussels have spread throughout the Great lakes smothering large beds of native bivalves.

Another issue raised by Madill's was the intriguing connection between the decline of particular Mussel species and the decline of biodiversity in local fish. The explanation is as follows. Mussels and clams live partially buried in sediment with little traveling about, which potentially restricts their distribution. The problem is solved by some Mussel species which produce specialized larvae, called glochidia (from the Greek: pointed or hooked), that are shed in clouds, manage to attach to the gills of a particular species of host fish, and so are transported. They then drop off in new habitat suitable to both fish and Mussel. For example, the female Pocket-Book

Mussel extends its mantle, the tip of which is shaped, marked and moves like a small fish. This attracts a desired larger fish for a lift. When the fish 'takes the bait' the Mussel ejects a puff of glochidia that attach to the gills, thus obtaining a convenient taxi for its young! Other species mimic a worm to attract a 'ride'. Check out Youtube.com for videos of some of these creative mussel displays, says Madill.

What can we do to improve the health of our waters and native fresh-water Molluscs? How can we make a Mussel as "happy as Clam?" If you would like further information, please contact our speaker, she welcomes inquiries and can be contacted at the Canadian Nature Museum Research Building in Gatineau or via email jmadill@mus-nature.ca. An excellent reference guide to local Mussels is by J. Metcalfe-Smith, A. MacKenzie, I. Carmichael and D. McGoldrick, *Photo Field Guide to the Freshwater Mussels of Ontario*, 2005, published by the St. Thomas Field Naturalist Club. Other useful references for general information on the zoology and ecology of Mussels and Clams include on-line information on Mussels of Eastern Ontario at pinicola.ca and books by Clarke, A. H. 1981, *The Fresh Water Molluscs of Canada*. National Museum of Natural Sciences, National Museum of Canada, and T.I. Storer and R. L. Usinger, 1957, *General Zoology,* McGraw-Hill, Toronto.

Jacqueline Madill (left) spoke about the important but little-understood or appreciated, 'Native Freshwater Mussels of the Ottawa Valley' and brought many of her favourite Mollusca specimens to the talk, such as the Eastern Elliptio, a very common freshwater Mussel.
Photo Pauline Donaldson

May 2013

"Looking Back and Looking Ahead: Nurturing our National Nature"
presented by by **Éric Hébert-Daly**, Canadian Parks and Wilderness Society

Nurturing our national nature in Canada's National Parks

Lecture report by Mary Robinson

At the Mississippi Valley Field Naturalists (MVFN) 25th anniversary **S**pring Gathering an inspirational presentation "Looking Back and Looking Ahead: Nurturing Our National Nature" was presented by Éric Hébert-Daly, National Executive Director of the Canadian Parks and Wilderness Society (CPAWS). This year CPAWS celebrates 50 years of its collaborative approach to conservation. By keeping in touch with 13 chapters active locally across Canada they see national tendencies. They have helped protect over half a million square kilometres of wilderness by helping government, industry and First Nations. Approximately 90% of Canada's lands and waters are public, but only 10% is protected; CPAWS' long-term goal is to increase this to 50%.

In his presentation, Hebert-Daly talked in depth about three key shifts in the approach to conservation in Canada's National Parks in the last 25 years. These three key shifts are: a shift in focus to ecological integrity instead of visitor experience, a shift from unilateralism to multilateralism in planning and decision making, and a shift from islands to networks with respect to interconnection and geography of protected areas.

Challenges to keeping a focus on ecological integrity

In discussing the first shift, Mr. Hébert-Daly spoke about Canada's first national park, Banff National Park, created 127 years ago. When the railway was being built into the west, workers discovered the wonderful hot springs at Banff. When the government heard about this natural wonder they realized it could be a great attraction for visitors to Canada, especially Europeans interested in the 'wild' nature of Canada. At that time, wilderness with its untouched natural beauty represented the countries 'soul' and could be used to show-case Canada. This was the primary reason the National Park program began.

In time, more parks were created and activities such as camping, hiking and canoeing became synonymous with Canada's parks. People loved them and came from all over the world. Infrastructures to support the cars, campers, food and waste had to be created. Eventually we began to lose sight of the ecological values of our parks and the environment and wildlife people were coming to see started to disappear.

CPAWS came into existence in 1963, to monitor and save the nature within the parks and preserve it for future generations. In the 1980s and 1990s CPAWS and local partners in Banff pushed hard to prevent Park encroachment by developers of the Banff town site.

This led to a National Panel on the Ecological Integrity of our National Parks. Scientists and conservationists came together in a consensus report recommending that ecological integrity become the first priority in park management; the National Parks Act was changed accordingly. Scientists were hired by Parks Canada, and ecological monitoring and measurement became a reality. This model was the first in the world and was adopted by other countries such as Korea, the U.S. and Australia.

Looking forward, however, this priority is being challenged. Parks Canada has suffered massive cut-backs and scientists have been "shown the door". As a result, the monitoring and evaluation in Canadian Parks is not taking place. Moreover, developmental pressures in our National Parks are being felt again. The private sector is getting involved in ways that are not always successful. To illustrate, Mr. Hébert-Daly showed a slide of the Jasper Discovery Walk - a massive glass-bottom platform, overhanging a cliff in Jasper National Park. The intent is to offer visitors an unobstructed view of wildlife. However, animals such as mountain goats, who are natural climbers, will not migrate into an area with an artificial overhang such as that. This example shows we still need increased vigilance regarding development and infrastructures within our parks. Another problem is that boundaries of the parks are not recognized by wildlife. At this point, Eric showed a slide of a baby caribou, possibly within a National Park. Not only do we need to protect what is inside the Parks, we also need to consider the impact of development outside the Parks. Our speaker showed a slide of Gros Morne National Park, a UNESCO World Heritage site. There is a proposal for oil fracking oil off the coast, just 100 metres outside the Park. Clearly, we need buffer zones around the Parks, including coastal and marine buffer zones, so the entire ecosystem remains healthy and survives.

Unilateralism to Multilateralism in Consultation and Planning

The second big shift around conservation efforts was the shift from a unilateral approach to planning and decision making to one that is multilateral and includes all 'stakeholders'. In the early 1900's park creation was done on a very ad-hoc basis without much logic or thought, sometimes with a reckless "wild west" mentality. Later, in the 1970's more thought was put into the big picture and a decision was made to create a network of National Parks representing each of the distinct eco-regions in Canada. Presently there are 42 National Parks, and 26 of the 39 distinct ecoregions are represented. It was revolutionary to develop such a concept that would drive park creation nationally.

In the past, indigenous First Nations communities were ignored in the creation of Parks. Hebert-Daly related a story from the 1970s, about a small Lutsel K'e Dene First Nation community on the East Arm of Great Slave Lake accessible only by boat or plane. People from Ottawa made an

unannounced visit and informed the community leader of their plans to develop a National Park there. He listened and then escorted them back to their plane and asked them to leave. From then on Hebert-Daly says, "to those First Nations people, the word 'Park' became a 'four-letter' word" as they feared for their right to their land and the conversion of their home lands into a public campground. The approach to conservation in those years was clearly unilateral and many 'bridges were burned'. In recent years, the process is much more multilateral. Time is taken to consult those impacted and the decision to create a national park is lengthy. However, when there is an upwelling of community support for it, things can happen quickly, and remain inclusive.

For example, the same community on the East Arm of Great Slave Lake is now in negotiations with Parks Canada to create a co-managed National Park where they will be the interpreters and lead the eco-tourism initiatives. A new 30,000 square kilometre park to be named Thaidene Nene (Land of the Ancestors) is to be announced soon. This will be a fully co-managed National Park and an economic model for future generations. Hébert-Daly showed a slide of the beautiful Ts'akui Theda (Lady of the Falls) waterfalls within the proposed Thaidene Nene. It is a traditional pilgrimage and spiritual site for healing and prayer. A traditional story, explains that centuries ago First Nations people out hunting for a giant beaver that was destroying their homeland, left behind a beautiful woman. She had asked for some of the beaver blood but was not given any, so she stayed behind at the falls to heal and console people. Large ancestors of modern day beavers lived thousands of years ago in the area and skulls of these massive animals have been found.

A waterfall in beautiful Thaidene Nene, a 30,000 square kilometre proposed National Park near the East Arm of Great Slave Lake. It will be a fully co-managed National Park and an economic model for future generations. Photo David Murray

A shift from islands to networks (but including some urban islands)

The third shift in conservation approach is from islands to networks. In the past efforts were made to protect a particular ecologically, culturally or spiritually significant area on its own. However, there needs to be interconnectivity, between individual areas or islands in order to create networks which will maintain ecological integrity, for example for adequate migration and mixing of individuals within a population. Remember the baby caribou? Creating a Caribou Recovery Strategy is only the first step in caring for this species. We need to take care of entire eco-systems to ensure survival of herds.

We need to look at the bigger picture. Land-use planning, considered by many a boring topic, will be critical for examining the landscape as a whole. All relevant players should be at the table deciding on the best possible use of the land. Where are the resources of interest and the conservation values? How can viable economic development, roads and infrastructure, and ecological integrity co-exist.

We need to examine what we value in our culture. We tend not to attribute an economic value to two of our most important resources: clean water and air – the very things that keep us alive and healthy. CPAWS is supporting David Suzuki and his 30 x 30 Nature Challenge for Canadians to get outside in nature for 30 minutes for 30 days in May. This is increasingly important when approximately 80% of Canada's population lives in the cities and our population is becoming increasingly diverse with immigrants arriving from places which did not offer experiences of wilderness or familiarity with the benefits for wildlife and people.

Canada is fortunately taking interesting approaches to ensuring that everyone can get 'back to nature'. This includes creating some island parks which are not connected to others, but will nevertheless serve a vital purpose. Rouge National Urban Park, in the middle of Toronto, is a new National Park which will be Canada's first National Urban Park. While it will not be able to, nor will it be required to, maintain the same ecological standards as other national parks, it will have a huge benefit by virtue of a huge population at its doorstep.

Canada protects less than 10% of its public lands and only 1% of its oceans. Only four years ago, Australia was like Canada with minimal protection of its oceans but now Australia protects 35% of its oceans. So things can change if the will is there.

In conclusion, we have established some amazing protected areas in Canada over the last 127 years, and we have learned a lot along the way. However, we need constant vigilance to establish and maintain the ecological integrity of our park lands and waters. We cannot act unilaterally to protect places without risking creating barriers to future success. We are all inter-connected with our natural environments and our public natural areas need to be planned and managed at a broader scale than we have done so far.

Éric Hébert-Daly (right) National Executive Director of the Canadian Parks and Wilderness Society inspired us with his "Nurturing our National Nature" talk on historical shifts in approach to conservation in Canada's National Parks. He is shown here with Iain Wilkes, MVFN Board member and MC for the evening, Photo Pauline Donaldson

The following is a summary of key questions posed to Hébert-Daly following the presentation:

Where does CPAWS get its funding? The funding is from individuals and foundations. CPAWS does not rely on the government; therefore they can be critical of the governments, when required, and complimentary when merited.

What is the status of the Canadian Boreal Forest Agreement? The Canadian Boreal Forest Agreement includes 9 environmental organizations signed with 21 forest companies who are members of the Forest Products Association of Canada (FPAC). Under the Agreement, FPAC members commit to the highest environmental standards of forest management and conservation, while environmental organizations commit to global recognition and support for FPAC members efforts (reference http://www.canadianborealforestagreement.com/). Unfortunately, it is very hard to implement. The third anniversary of the Agreement is this Saturday. Depending on what happens in the next short while, there may be an announcement that CPAWS is very frustrated with certain aspects of the situation.

We have to ask what we are going to do with this landscape at the broad level. There is a lot of information out there but is has never been put together. We need to take the information and overlay it. For example, take Alberta and its Boreal Forest. When they overlaid where the caribou travel and where the forest, oil and gas areas are, it was discovered that all could take place in Alberta at the same time.

Who would be responsible for doing this overlay of existing information? That should be done by the Federal Government as it has responsibility for anything that crosses the provincial boundaries. Almost all resources belong to the provinces and implementation of conservation efforts has to happen at the provincial level.

What about the Budget cuts to the National Parks? That is a question of philosophy. There is an undermining of the scientific capacity at the federal level – almost as if they are thinking if we don't know certain things – we can ignore it.

What are possible future areas for Parks?

- Mealy Mountains in Labrador –to protest a large portion of boreal forest, tundra and shoreline on the Labrador Sea.

- Parc national Tursujuq - to become the biggest national park in Quebec and the biggest in eastern North America
- Lancaster Sound – a national marine area in the Arctic
- Southern Strait of Georgia in BC – a national marine conservation area
- Thaidene Nene National Park Reserve – at the east end of Great Slave Lake
- Other possible areas include the South Okanagan in BC, and areas in Manitoba and Nova Scotia

What can a small organization like MVFN do? In answering this question posed after his talk, Hebert Daly said "Never underestimate the power of the written word." A group like MVFN and its individual members could take the time to write letters or emails on specific environmental issues. Such actions can be very powerful. When many people are sending the same message to government and other officials they tend to pay attention. Be on the email list for CPAWS or other similar organizations and respond when requested.

Speaker Biographies 2012-13

We thank all of the guest speakers in our lecture series for 2012-13. The information included in these biographies is thought to be current as of 2013, but is not meant to be all inclusive. We apologize for any errors or significant omissions. Please contact the speakers for further information.

David Kroetsch

Dr. David Kroetsch is a Senior Soil Resource Specialist with the Canadian Soil Information Services (Can SIS) of Agriculture and Agri-Food Canada. He is also an adjunct Professor in the School of Environmental Studies at the University of Guelph.

David completed his B.Sc. in Plant Ecology at the University of Guelph and his M.Sc. in Soil Geography at Carleton University. Early in his working career, David served as Ontario Soil specialist with Agriculture and Agri-Food Canada for 14 years. In his present role with CanSIS, David specializes in soil survey upgrades and research on soil re-survey techniques using digital information and the spatial and temporal change in soil and landscape attribute information. He is also involved with the interpretation of regional and national soil data for soil applications from national Soil Landscape mapping, North America – European (OECD) Pesticide dissipation studies, and Climate Change projects.

For the past 10 years, David has also contributed his time to educating youth for an environmental training program for high school students for the Lanark Envirothon. He is a certified Wine Judge of Canada, sings 2nd bass with the Nepean Choir, and is a kayak and canoe tripper on the rivers and lakes of near-north Ontario.

For further information contact david.kroetsch@agr.gc.ca

Henri Goulet

Though most people would list their degrees and universities attended, Henri prefers to start with the real inspiration behind his interest in nature, insects and especially ground beetles. The story starts at Rigaud, west of Montreal. During the 1950s and 1960s this was a great place for a budding naturalist, as nearby nature was abundant and diverse: a mountain, a sedimentary plain, the Ottawa and Rigaud rivers, forest swamps and meadows. In 1961 his science club had a new rule: 50% of their time should be devoted to something other than birds. Some turned to plants, others to fish, mammals, and reptiles, and one, Henri, to beetles. Henri felt that insects would be fantastic, as he knew very little about them and they had extraordinary metallic reflections.

Henri spent 7 years learning about beetles and ground beetles at Rigaud. He later completed a B.Sc. at MacDonald College. He then completed a Master of Science degree at the University of Alberta with thesis work that compared the ecology of closely related forest ground beetles at all life stages. He decided to remain in Alberta for his Ph. D work, a world review of fascinating ground beetles of the genus *Elaphrus*.

Henri was employed by Agriculture and Agri-Food Canada, where he remained for his entire career. He was responsible for sawflies and Braconid wasps, but he used various opportunities to continue research on ground beetles. His interests enlarged over the years and he became familiar with numerous insect groups. Thus Henri developed a great interest in photography of all life forms and especially those of insects and spiders.

For further information contact henri.goulet@agr.gc.ca

Paul Gray

Dr. Paul Gray is career wildlife expert currently with the Climate Change Program of the Ontario Ministry of Natural Resources in Peterborough. As Dr. Gray tells it he attended University "when dinosaurs roamed the earth." He holds a Bachelor of Environmental Studies from the University of Waterloo and a Ph.D. in Biology from York University. Dr. Gray's career has spanned many continents and topics. He has worked on a variety of natural asset management projects in Ontario, Alberta, Northwest Territories, and Zimbabwe.

A Certified Wildlife Biologist, in the 1970's Gray wrote articles on bears, birds and wildlife generally for the Canadian Field Naturalist.

Since 1999 Paul has been involved in climate change issues from various points of view including implications for invasive species.

For further information contact paul.gray@ontario.ca

Paul Keddy

Dr. Keddy is a biologist and writer now living in the forests of Lanark County. A professor of ecology for 30 years (teaching at the University of Guelph, University of Ottawa and as Schlieder Endowed Chair for Environmental Studies at Southeastern Louisiana University), he has published over 100 scholarly papers. Paul began his studies at York University and later completed a Ph.D. at Dalhousie University.

Dr. Keddy has achieved international designation as a Highly Cited Researcher, has received awards from the Canadian Botanical Association, the New York Botanical Garden, the Society

of Wetland Scientists and the Environmental Law Institute. He has published several books used in university courses, including *Wetland Ecology: Principles and Conservation* and *Plants and Vegetation: Origins, Processes, Consequences*. His recent lectures have included Washington, Toronto, Madrid, Lyon, and Hildesheim. Locally Paul is an MVFN-designated *Champion for Nature* and author of *Earth, Water, Fire: An Ecological Profile of Lanark County*.

For further information contact drpaulkeddy@gmail.com or www.drpaulkeddy.com.

Patty Summers

Summers is a biologist with the Wild Bird Care Centre(WBCC) in Nepean. Also, as part of MVFN's Environmental Education Program, Patty creates and delivers our highly successful program for Young Naturalists.

Patty began volunteering at Wild Bird Care Centre at the age of sixteen and continued working there during the summer months while earning a B. Sc. in Zoology at Laurentian University. With a particular interest in birds, Patty focused her Master's research at Carleton University on the effects of roads and traffic noise on bird abundance in the Ottawa area. She has participated in local bird counts and has been a volunteer bander at both Innis Point and Long Point Banding Stations. Patty returned to the WBCC to implement an educational outreach program and care for sick, injured and orphaned wild birds.

For further information contact patricia.summers@glel.carleton.ca

Ken Abraham

Dr. Abraham is a Wetlands and Waterfowl specialist with the Wildlife Research Team at the Ontario Ministry of Natural Resources. Ken is also an adjunct professor at Trent University in the Environmental and Life Sciences graduate program. At OMNR he leads the Hudson Bay Lowland Wetland and Waterbird Research and Monitoring Program examining relationships between geese and wetlands in the Hudson Bay and James Bay area. His work takes him to other parts of the arctic, including Southampton Island in Nunavut and also includes shorebird studies. Dr. Abraham's love for the North began during his Master's degree while conducting research on the north slope of Alaska in the 1970s.

Ken completed a B.Sc. in Biology from Luther College, and then went on to complete a M.Sc. degree in Wildlife Biology at Iowa State University, and a Ph.D. in Ecology and Evolution at Queens University in Kingston.

For further information contact ken.abraham@ontario.ca

Jacqueline Madill

Madill is a senior research assistant with the Canadian Museum of Nature specializing in mollusks, particularly Canadian freshwater mussels. Madill also is an expert hirudinologist, having a love for leeches.

Jacqueline Madill completed a B.Sc. in Zoology from McGill University in Montreal and a B.A. in Music from the University of Ottawa.

For further information contact jmadill@mus-nature.ca

Éric Hébert-Daly

Hébert-Daly has been the National Executive Director of the Canadian Parks and Wilderness Society since April 2009. He has "led and championed social, political and environmental causes most of his life. For 6 years Eric was Executive Director and Chief Financial Officer for one of Canada's major political parties. Éric is fluently bilingual, a graduate of Concordia University's School of Community and Public Affairs, and a Certified Lay Worship Leader for the United Church.

Hébert-Daly has worked with municipal, regional and national groups across Canada and has focused his attention on social justice, ecological and human rights issues throughout his career. Éric is an avid cyclist and hiker and has travelled extensively throughout Canada, with a particular interest in remote and northern regions from Labrador to Inuvik.

For further information contact eric@cpaws.org