



CHANGING THE CONVERSATION & NATURE CANADA PRESENT:

What is biodiversity and why is it important?

Biodiversity Conversation Series:

How important and the common loon and polar bear to Canadians?

SEPTEMBER 27th, 2017

As the first e-dialogue from the [Biodiversity Conversations: How important are the common loon and polar bears to Canadians?](#) series, panelists began with a broader discussion on the nature of biodiversity conservation, before moving into more specific issues. They explored the critical relationship between human well-being and biodiversity, focusing on diversity as a general theme, as well as the current state of biodiversity loss in Canada. They will discuss why it is imperative for Canada now, looking at the 2016 Living Planet Report, the state of North America's Birds 2016 and the connection between biodiversity conservation and regenerative sustainability.



Panelists

Professor Ann Dale, Moderator, Principal Investigator, **Meeting the Climate Change Challenge (MC3)**, Royal Roads University

Dr. Dawn Bazely, Professor in Biology at York University and former Director of York University's Institute for Research and Innovation in Sustainability

Dr. Valerie Behan-Pelletier, Honorary Research Associate in the Invertebrate Biodiversity Program at Agriculture and Agri-Food Canada

Holly Clermont, Doctoral Candidate, Royal Roads University

Chloe Dragon Smith, Climate Change Specialist, Co-Chair, Connecting a New Generation with Nature, Canadian Parks Council

Eleanor Fast, Former Executive Director, Nature Canada

Susan Gosling, Botanist, co-creator of Gosling Research Institute for Plant Preservation (GRIPP)

Anne Murray, Birdwatcher, naturalist, and author

Ann Dale

Welcome to the e-panel and e-audience for the first of our conversations in the biodiversity series. I believe the biodiversity imperative is the most critical imperative now facing humankind. There is no second chance from extinction, and you may wish to read [this article from the Guardian](#) talking about the threats to global food supplies.

Dawn Bazely

Dear fellow panelists and participants in this dialogue,

I'm delighted to be here from the very hot Keele Campus of York University in Toronto, and to be part of the conversation about Why Biodiversity Matters. The Keele Campus bio-blitz took place last Friday as part of the 2017 Science Literacy Week activities at YorkU. [This tweet](#) has a small video clip of the early morning birding in the woodlot that I see from my lab window.

Ann Dale

Welcome Dawn. Isn't the weather uncanny back east? I heard it was 33 degrees yesterday in Ottawa.

Dawn Bazely

Dear Ann, it is ridiculously hot — and this unseasonably hot Fall is in line with expected climate change effects.

As I walked back to the lab, I saw signs on the message screens that the chilled water system is malfunctioning, which means that a number of buildings are without air conditioning: these are mostly older buildings and they are full of students, staff and faculty.

I have been covering climate change models, and the greenhouse effect, as well as the United Nations Framework Convention on Climate Change in my undergraduate ecology courses, since 1991. I have also been doing research and teaching about the impacts of climate change on biodiversity. Much of what we projected and predicted nearly 30 years ago is happening.

Holly Clermont

Hello, everyone! I am delighted to be participating from Nanoose Bay, Vancouver Island. Since my bio is a bit outdated, I will introduce myself. I am a biologist completing a Doctorate of Social Sciences degree. My dissertation has focused on economy versus environment conflicts — more specifically, how values, sense of place, perceptions of science, networks of relationships, and media frames influenced decision-making for two proposed energy projects affecting sensitive ecosystems. My

master's degree was about financing conservation management. Most of my career has been spent protecting and rehabilitating sensitive ecosystems. For example, I worked as a local government and First Nations liaison for Garry Oak Ecosystems Recovery Team – hosting dialogue sessions, co-authoring a model bylaws document, and initiating research with hyperspectral imagery to develop an ecosystem connectivity model. Looking forward to the discussion today.

Valerie Behan-Pelletier

Heh all – just getting the hang of this in hot Ottawa.

I'm Val Behan-Pelletier. I'm interested in all biodiversity, and my expertise, and research is on biodiversity in soil. Most of my research over the last 40 years has been on soil mites, but I've also worked on other groups of soil animals, e.g., enchytraeids, collembola, earthworms etc. I've found, described and named hundreds of new species of mites primarily from Canada and the USA, but also from other parts of the world.

I'm considered a general expert on Soil Biology, and am one of the many authors on the Global Soil Biodiversity Atlas, [which you can access here](#).

Biodiversity is about me and you – Biodiversity is all life on earth – EVERYTHING living from viruses to elephants. It is usually defined as including genetic diversity, species diversity and ecosystem diversity.

We don't usually associate biodiversity with soils, but there is no soil without the bacteria, fungi roots and animals living in it. They make the rich organic humus in which plants grow and we can't forget that soils provide over 50% of our food.

Holly Clermont

Agreed, Valerie. I am often extolling the virtues of virgin soil in estuarine marsh platforms and ancient/old growth forests. One of the most important scientific discoveries, in my mind, was below ground — that individual plants in a community co-operate through mycorrhizal connections. The finding suggests we still have a lot to learn about ecology.

Chloe Dragon Smith

Hi everyone!! Joining from Yellowknife, NT. A chilly and beautiful fall day up here :)

Susan Gosling

Hi Susan Gosling here.

I have a plant background and am co-creator of the [Gosling Institute for Plant Preservation](#). When we lose a plant like the American elm all other species associated

with it are also affected. The biodiversity of where we live also defines who we are and gives us our International identity and recognition.

Eleanor Fast

Hi Susan, I really love your mention of "international identity and recognition", so true!

Anne Murray

Hi everybody, I am Anne Murray from Delta, British Columbia. I am a lifelong nature enthusiast with a particular interest in birds. I have a degree in physics and geology but worked mainly as a mathematics teacher at the high school level before switching to writing nature books and articles about 10 years ago. I do lots of volunteering with nature organizations and am passionate about trying to conserve habitat.

Ann Dale

Welcome, everyone, let's get started with our first question. Why do you think biodiversity conservation is so important?

Susan Gosling

As I mentioned, biodiversity and International recognition tells the rest of the world who we are, so who are we when we lose important parts such as our maple trees. Do we change our flag?

Valerie Behan-Pelletier

Ann, thanks so much for the link to the Guardian article and embedded report. Agreed, we seem to be considering biodiversity as something 'separate' from everything that is going on in our lives, whereas it is integral.

Dawn Bazely

I read the excellent article in the Guardian.

When I teach Plant Biology, which includes Fungi, Seaweed, Bacteria, Viruses — basically everything except Animals — I begin the course by discussing People and Plants. Students learn that 80% of calories ingested globally by people and their animals comes from only 14 plant species.

This is from the excellent Raven's Plant Biology, now in its 8th edition.

If you are looking for a beautiful, readable text book about Biodiversity — everything from life cycles to ecology — I highly recommend it. I love it so much that [I wrote a blog post](#) about it.

Ann Dale

Dawn, doesn't that make us very vulnerable? I read somewhere that there use to be hundreds of potato species and now we are down to just a few. And I must acknowledge my colleague Val, for the Guardian article.

Dawn Bazely

Yes, we don't just rely on a few plant species for food, but we often rely on a few varieties that have been bred to be highly productive. There is a concern amongst agriculturalists and horticulturalists that we must preserve the genetic diversity of crop species as much as possible.

So, [the seed vault in Svalbard was created](#).

Eleanor Fast

Ann, Biodiversity isn't just important — it is essential to life on earth, and humans simply can't survive without it. So, biodiversity conservation is essential. I've been lucky enough to have an opportunity to think about this from a number of perspectives through the years. First as an undergraduate where I was fortunate to spend several months volunteering in northern Tanzania, conducting a biological inventory of a monsoon forest. Then as a graduate student where I studied the biodiversity of flies at Mont St. Hilaire, Quebec. I found several undescribed species, even in a relatively well visited area of Canada and it really open my eyes as to how little we really understand about what species there are in the world, let alone their natural history and how they interact with other species. Until recently I was Executive Director of Nature Canada, a position that allowed me to advocate for nature and biodiversity every day. I realized that there are so many other crises in the world that it is hard to get the message through to top decision-makers that urgent action is needed to understand biodiversity and sustain it. So, I am really looking forward to this e-conversation – thanks, Ann, for convening us!

Chloe Dragon Smith

Biodiversity conservation is important because it is what keeps our natural systems running, and that keeps us running too. To me, it is directly linked to social science and culture, and why it is important to talk about the two together. Human health, happiness and survival rely on biodiversity. Biodiversity right now, relies largely on human actions. We focus a lot on the two separately, but the intersection where they meet is where I believe our problem lies.

I have a degree in Earth Science, and my interest lies in the social/cultural benefits of the natural world, particularly where those values meet science and conservation.

Anne Murray

The question “Why is biodiversity conservation important” made me feel very shocked. We should not have to ask this. Biodiversity is the “assembly of life that took billions of years to evolve” as E.O. Wilson says. It is everything to this planet. Without the diversity of genes, species, ecosystems, our planet would be just another rock hurtling around in space.

Valerie Behan-Pelletier

Hi Anne Murray. You have got it in one sentence: “Biodiversity is the “assembly of life that took billions of years to evolve” as E.O. Wilson says”. I heard Stephen Gould speak in Ottawa and he pointed out that we are just highly evolved bacteria! A sobering thought.

Holly Clermont

For me, biodiversity’s provisioning role, and related to this— response diversity (or redundancy in providing a particular ecosystem service) — are fundamental to the future of every species, including our own. To quote Aldo Leopold, “to keep every cog and wheel is the first precaution of intelligent tinkering”. With climate change and other planetary boundaries already surpassed, super-bacteria and predicted pandemics, widespread losses of ‘mainstream’ pollinators and so on, it would seem prudent to keep all the cogs and wheels of biodiversity. It pains me to see that biodiversity is frequently framed as a victim (e.g., of climate change), when it should also be shown how biodiversity can help improve renewable resource management or mitigate and adapt to a changing climate (biodiversity as one of the best tools in the toolkit, or biodiversity as a solution).

Eleanor Fast

Hi Holly, great to e-meet you!

I feel your pain at biodiversity often being seen as a victim. And I agree with you that success in biodiversity conservation lies in changing the conversation (the excellent title of this web forum) and framing biodiversity as a crucial part of the solution.

Valerie Behan-Pelletier

Following up on what Eleanor said — thank you so much for convening us — its daunting to be with this panel I can tell you!

I think we need the conversation because of Canada's weak commitments to conservation. Yet we are the second largest country in the world. [A paper in Science in 2006](#) showed that Canada has “Crisis Ecoregions” for Biodiversity, “Frontier Forests” and “Last of the Wild” regions.

But we have focused on in Canada is what we are going to achieve by 2020! For

example: “[Target 1. By 2020](#), at least 17 percent of terrestrial areas and inland water, and 10 percent of coastal and marine areas, are conserved through networks of protected areas and other effective area-based conservation measures.”

I think these goals are shortchanging the possibilities of this country. Unfortunately, there is no timeline for getting this done, for achieving these goals and we are in the second half of 2017 already.

Yet we know that “Canada's natural spaces are a vital component of our culture, heritage, economy and our future, and they are of global importance. Canada's forests, wetlands, prairies, tundra and oceans provide essential ecosystem services. Approximately 30% of the world's boreal forest, 20% of the world's freshwater resources, the world's longest coastline and one of the world's largest marine territories are ours to enjoy, protect and share.”

Chloe Dragon Smith

Valerie, I agree — and it's also important to remember that there are actually [20 Aichi Targets from the Convention on Biological Diversity](#). We need to act on all simultaneously, not just target 11 (which is the protected area target for 2020).

Eleanor Fast

Yes! I agree. Target 11 is hugely important, but we must not forget the others. It would be nice to see task forces on the other targets, not just 11 (or Target 1 as the feds call it).

Chloe Dragon Smith

Absolutely, and to go even further — a task force that brings together representation from all Canadians and thinks about all the targets in tandem. How can we change our systems and thinking to allow for success for biodiversity?

Holly Clermont

After a few years concentrating on academia, I found my awareness of what was happening in government had deteriorated. When reconnecting with my contacts this week, we all agreed that we are way too siloed. There needs to be much more cross-pollination among governments and academics. A task force could begin to bridge the gap.

Valerie Behan-Pelletier

Holly, thanks for that. This siloing is so evident this summer with the right whale debacle in the Gulf of St. Lawrence. Lack of foresight in responding to major biodiversity issues (e.g., surge in right whale deaths). These giants of the ocean have been studied for years. Their habitat is moving north (climate change??). They are

being researched by Canadian and US Universities, DFO, and yet 10 died in the last 2.5 months in the Gulf of St. Lawrence (see [Nature Canada blog](#) & [ScienceMag](#)).

The Nature Canada blog suggests that the cause of death is the same as other years (fishing nets/ collisions). But this was exacerbated in 2017. There are more cruise boats each year in the St. Lawrence. Added to which there is a lack of synchronicity between government departments (e.g., tourism & DFO & the general public regarding why control of the presence/speed of cruise boats & fishing is helping this whale species).

And yesterday in [the Globe and Mail reported](#) a confirmation in decline of right whales.

The message is not simple or single, there is no concerted effort to give a MESSAGE, Yet, right whales are among the largest animals in the world, definitely charismatic megafauna and they have been in Canadian waters for a long time. This summer's event should not be a surprise.

Eleanor Fast

I'll jump in by saying I think the driving force has to be those in a position to take action — i.e. governments and landowners. But in terms of who should be at the table, I think it is essential that we move beyond the usual suspects. We need people who have never thought about biodiversity before, we need people from all walks of life — computer engineers, school teachers, and novelists, as well as biodiversity scientists and policy experts. And we need the room to look like Canada's diversity. I think that only by listening to people who haven't thought about the issue before will we figure out what the compelling messages are.

Dawn Bazely

Hear, hear. Diversifying the voices at the table is essential.

Ann Dale

Chloe, could you elaborate on your idea of a task force, maybe a round table on the issue. Who should be at the table? Who would lead it? Others jump in as well.

Chloe Dragon Smith

I would like to see many Indigenous people at this table, as those who have successfully managed biodiversity in Canada for 10s of thousands of years. I would also like to see young people, conservation experts, and representation from the resource sector. All our interests need to come together around the importance of Nature for survival. How can we all work together towards a world that is sustainable, where we still interact with the land, but in all we do, put what Nature needs to function first?? How does that mean changing systems that are not working now? I think we need some new thinking – I'm not sure we can accomplish what we want in the frame we are in right now.

Valerie Behan-Pelletier

I agree completely that we need to be focused on all the Targets for 2020. My apprehension is that without clear timelines we Canadians will not reach many targets, and we will not meet Target 1. And I think the Biodiversity target is central from a global perspective. We are in a unique position of being a relatively wealthy, well-educated population, living in the second largest country in the world. We have the resources, but have fell behind other G7 countries, much less Costa Rica, in our commitment and follow-through on Conservation of Biodiversity.

The CPAWS report highlights this and other aspects: [Canadian Parks and Wilderness society's 2015 report: PROTECTING CANADA'S NATIONAL PARKS A CALL FOR RENEWED COMMITMENT TO NATURE CONSERVATION](#)

“For almost a decade CPAWS has observed a significant shift in Parks Canada’s approach to managing our national parks, away from their legislative first priority of protecting nature, towards a more tourism and marketing focused agenda which is putting wildlife and wilderness in our national parks at risk.”

Chloe Dragon Smith

That last quote is exactly where I struggle. I think that tourism in parks, if managed correctly, is important for biodiversity too. This is an important way to get people out experiencing Nature, understanding the value for human health and happiness, and witnessing biodiversity in action. It has to be a balance, and to me, simply protecting the land is not enough either. I do agree that we need to find a sustainable middle ground.

Holly Clermont

Hmm, I struggle with this too. Seeing protected areas as protecting biodiversity is misleading. When protected areas are not on alpine outcrops or in remote wilderness, they are often postage stamps (i.e., too small to conserve biodiversity on their own) and are targets for visitors and tourism that degrade them. BC land managers are getting better at recognizing representative ecosystems in protected areas (in accordance with our biogeoclimatic classification system), and most local governments are using sensitive ecosystem mapping in land use planning, but we still have a long way to go to protect and rehabilitate areas with species at risk.

Dawn Bazely

I am a biologist and ecologist. I study arctic and temperate forests and see how biodiversity has been directly affected by human activities in both biomes (habitats).

The first thing that I teach students about biodiversity is that 99% of all species that ever existed have gone extinct.

There have also been previous episodes of mass extinction — dinosaurs, 65 million years ago and many ice age megafauna like saber-toothed tigers.

But, unlike before, at this moment, the extinctions are happening more rapidly than at any time, and we are losing species before we even give them a Latin name.

Some of the biodiversity that we are losing is essential for ecosystem functioning, and a habitat's ability to recover from a disturbance like a hurricane or flood. For example, mangroves and wetlands which have been lost at an alarming rate, protect low lying areas from the worst impacts of flooding. The countries and coastlines being hit by flooding in September and late August no longer have those protective, diverse habitats.

Valerie Behan-Pelletier

Hi Dawn,

And vs "Some of the biodiversity that we are losing is essential for ecosystem functioning, and a habitat's ability to recover from a disturbance like a hurricane or flood." that we know so little about functioning that we need to apply the precautionary principal.

Anne Murray

Dawn: your comment is very relevant as we often hear the history of the planet brought up in discussions about climate change by people saying, "well it has changed before" and "it is all natural" without discussing the speed of the change occurring currently. As you say there have been at least 5 massive extinction events in the past, so it is something that can and has happened on earth, with disastrous consequences for life at those times. But this latest extinction event is happening all over the world, very rapidly — within one or two human lifetimes. We need much more of a sense of global urgency to tackle the declines that are controllable, while we work on the ones that are more intractable. Unfortunately, the political and economic will is lacking...

The lack of urgency and action is a huge problem. There does not seem to be enough public awareness of the overall problem although everyone can quote issues related to their own local areas.

Ann Dale

Anne, I agree, but I believe biodiversity conservation is a sleeper in Canadian society—the general Canadian public is unaware of its importance and how critical the state of biodiversity loss is, especially given the recent [WWF Living Planet Report Canada](#). And even if people are aware, they don't seem to link its loss to their day-to-day activities. We can't have our cake and eat it too. The more space we take, the less there is for the critters. This leads nicely into our second question.

Do you have any compelling definitions that would communicate its importance to Canadians? Please include any art, videos, compelling pictures.

Holly Clermont

I don't have a compelling definition, but I do have a model in art to share. [See Tone Bjordam's sustainability model in art](#), hanging at the Resilience 2017 conference in Stockholm. Here, economy hangs in strings from society, and society from nature.

Eleanor Fast

Hi Ann, it's not art or anything, but the documents you provided as resources jogged my memory of a beautiful passage.

You included the Council of Canadian Academies' report on Taxonomy. I was on the staff team supporting the Expert Panel in that assessment and everyone on the panel spent a long long time considering the definitions and there is a useful but boring glossary in the back. Not content with the boring definitions, we decided to add something more moving as a frontispiece – a quote from Darwin's Origin of Species. Here it is:

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. [...] There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

Darwin, Charles R. (1859). On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life. (First ed.). London: John Murray

One can almost imagine Darwin sitting there by a river, just thinking, and enjoying nature. Something I know I should try to do more of!!!

Holly Clermont

I could read this over and over, all day long. Much of the discussion at Resilience 2017 revolved around having underestimated the power of art and literature in changing the conversation.

Susan Gosling

All the definitions I looked at were rather lengthy: "Biodiversity refers to the variety of species, ecosystems and the ecological processes of which they are a part" biodivcanada.ca or "It is the link between all organisms of life, binding each into an

interdependent ecosystem in which all species have their role". wwf.panda.org – and other more recent definitions which correctly include genetic diversity as part of overall biodiversity too.

More simply: Biodiversity is the great variety of life found on Planet Earth from tiny microbes to plants and animals. It includes species, genetic varieties and ecosystems. Biodiversity in BC.

Chloe Dragon Smith

For the second question, I think it is really important to get people interacting with Nature. We can't go straight to talking about biodiversity, no matter how accessible we think we are making it, if the people we are talking to don't have the hands-on, visceral experiences of the importance and beauty of Nature. I think we need to focus energy on helping people to connect with the land, which will move perspectives to a place more open to understanding the importance of biodiversity. That said, I always love documentaries like Planet Earth for showing biodiversity in an exciting way!

And, for art:

There is a [Human/Nature art exhibit by Suzanne Paleczny at the the Yukon Arts Centre in Whitehorse](#) right now, showcasing the human interaction with Nature and how we are distant right now from our relationship with the land.

Susan Gosling

I quite agree. I think each of us needs to develop an emotional attachment with nature.

Holly Clermont

Patrick Herzog, a retired college professor of mine, recently published what I think may be a very important book, [From the Mist](#), about how he recovered from cancer by reconnecting with nature. Having said that, I also believe that environmental education (and nature immersion) has to happen early (childhood to young adulthood) if it's going to encourage people to prioritize concern for nature (a 'self-transcendence' value) over achievement and other 'self-enhancement' values. Value priorities and sense of place, both constructed over time and stable — at least in older adults, and in my doctoral research, these influenced whether people supported environmental protection over development.

Anne Murray

There has to be better education of children, as that is where much of the nature ethic and understanding is founded, but it is getting more and more difficult. I had the disconcerting experience of showing some Vancouver schoolchildren some sea shells and being asked "are they real?" Many children spend no time in nature now. Many adults do not know different species. So, explaining biodiversity is a huge challenge. Yet everyone whom I have ever pointed out an "interesting" bird or plant or animal to,

has been interested. I have never had an adverse reaction from many, many encounters. I guess life is too busy for most people to take time to learn on their own and few now live surrounded by nature.

Susan Gosling

Yes, children can learn even without knowing it. A mosquito bite—discuss why they were bit and why mosquitoes are there in the first place

Chloe Dragon Smith

Totally agree. And add the importance of unstructured, child directed play in sparking that curiosity. I know that is the reason I love Nature today!!!

Ann Dale

The social scientist in me just raised her head. How many of you played outside as children? And how do you think our social media tools are changing this?

Susan Gosling

I grew up outside and felt it was punishment to have to come in to eat. I wanted to be outside. Having said that I watched very little TV. This generation lives on their iPhones and social media. Different world. I think it is a sad world.

I also think that many children would find it a 'punishment' to have to go outside and would not know what to do once there.

Of interest: I still spend as much time as I can outside. No matter how I feel when I go for a walk, I always feel better when I return. Outside and being with nature is part of my soul.

Chloe Dragon Smith

I think we are living in a time where we need to embrace, and work with technology and social media, to encourage people to go outside. Especially the younger generations where technology has always been an inextricable part of daily life! Technology is a tool, it can neither create nor destroy. It all depends on how we use it. The world is changing, but that doesn't have to be sad if we can adapt and find balance.

Eleanor Fast

I agree Chloe, I think the issue of technology is separate to how much time kids spend outside. I think that is more related to risk tolerance among parents. For example, one of my sons just loves climbing trees. He loves climbing up and just sitting there watching the world go by. He's a competent climber and I think it is a lovely thing for him to do. But so many many many adults who see him climbing tell either him or me

that it is too dangerous and he shouldn't do it. Imagine their kids never having the fun of sitting in a tree! But that risk avoidance isn't just about nature. My other son has been getting the city bus on his own since age 10. Many many parents have criticized me for that too (including two who threatened to call social services). The two issues are related. People don't allow kids to play outside because they're scared — not just of what might happen to their kids, but of what other people will think of their parenting. :((

Chloe Dragon Smith

Totally! I love thinking about risk in the way that inaction is a choice, and also presents risk. What risks are we taking by letting our kids stay inside, and not take risks?? Arguably they are much bigger than riding a city bus or climbing a tree.

Based on this conversation, the risks go as far and as deep as a loss of biodiversity, and the survival of humanity! Okay – now it's getting existential..... ;)

Valerie Behan-Pelletier

I had the disconcerting experience of showing some Vancouver schoolchildren some sea shells and being asked "are they real?". Yikes Chloe!

But thinking about Social Media and developing Apps for identification of those shells —there are Apps for identifying birds and bird-calls and I think for some plants. Why not seashells?

Dawn Bazely

I was born in India, but my parents emigrated to the UK when I was under 2, and I grew up in very urban, gritty London of the 1960s and early 70s, before my family emigrated, again, to live in a subdivision in Mississauga. This essentially meant that my experience of what most Canadians think of as wilder areas was entirely driven by my own interests. In London, I learned to identify the city fauna and flora. So, I can honestly say that, while I played outside, it was in London UK gardens and parks.

I have taught generations of YorkU undergrads, many of whom hadn't previously been to a national or provincial park, and get them interested in ecology and conservation. The interest is definitely there, but we need to find ways of allowing urbanites to get outside — and we must recognize that there are large cultural differences in how the outdoors is viewed.

Ann Dale

Dawn, that reminds me of a paper we wrote, [Celebrating the Mundane: Nature and the Built Environment](#).

Dawn Bazely

Thanks, Ann — it's on my "to-read" list.

Anne Murray

I also grew up in London UK and played outside extensively. I also learned to recognize many aspects of nature as a child — I still recognize bird songs, plant species etc. from England very readily. The nature ethic in England was very strong. I don't know if it still is but it has a long history in writing, poetry, music, art, the land and pursuits of the upper classes, love of pets, especially dogs, etc., etc. Moving to Canada with all its glorious scenery and wildlife was very exciting for me in my late twenties. But I soon saw that for many people there was a disconnect with the details of the countryside.

Ann Dale

A moderator is not supposed to participate but I really would like to offer my definition: "biodiversity is the living library of Earth, and diversity is so essential for all of life, and we humans aren't very good at recognizing how important it is for our creativity, our innovation, and for becoming more human."

I enclose [an article I wrote](#) about why human beings are so bad at difference.

Valerie Behan-Pelletier

Ann, have you moved to the second question? I'll upload a poster on the Global Soil Biodiversity Atlas. Also, a photo of a mites described from eastern Canada — it's beautiful and is found from Gatineau Park to the Maritimes and is less than a third of a millimeter in size. These animals are among the charismatic microfauna!

To me, a compelling statement for Canadians is the [May 2017 press release](#) from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that over 60 wildlife species at risk in Canada's changing North. These include the Eastern Migratory Caribou and the Atlantic Walrus. As the Chair of COSEWIC said "Canada's biodiversity is at risk from coast to coast to coast, and timely action on many fronts is required, from dealing with habitat disturbance and overharvesting to concerted efforts to combat the effects of climate change".

This is our Canadian heritage!

Ann Dale

Yes, dear colleague, I have moved on to the second question.

Chloe Dragon Smith

There is a line in a song that I love called [the Stable Song by Gregory Alan Isakov](#). It goes like this: “I threw stones at the stars but the whole sky fell”. The song is not explicitly about biodiversity or even Nature, but I see the way we think and act around biodiversity in this metaphor — it gets at how everything is connected. Acting in only one area is not likely to work, and we have to consider the bigger picture if we are to find long-term success. We can’t simply protect land and expect it to last without engagement and a fundamental change in how we view our relationships with Nature.

Dawn Bazely

Biodiversity is a very vague concept for most people.

I remember sitting in a large ballroom in a Toronto airport hotel, in the early 2000s, with over a hundred other biologists, to brainstorm around what a Biodiversity Strategy for Ontario would look like.

First, the meeting wasted a good hour debating how to define biodiversity. I put my hand up and said “hey, the CBD already defined it, so let’s stop re-inventing their wheel and get to grips with the tough stuff — like figuring out how to get people to care about biodiversity.”

This is very difficult. In around 2004, students in my ecology course surveyed YorkU students on their understanding of DNA vs. biodiversity. Students “got” DNA but were vague about biodiversity and why it matters.

Step one is to help people being able to “look” at nature and breaking it down to its component species. This can be done through Citizen Science activities, like this June’s bio-blitz in Toronto. I led guided bio-blitzes and taught people — I mean, really taught, coached and tutored them — to use field guides for trees and flowers. Some people only identified 2 species in 1.5 hours, but they learned to use the field guide. One young person on the tree bio-blitz hike said: “wow, I thought there were only 2 kinds of trees: evergreens and deciduous (not his terms). But, now I know there are, like 3 kinds of maple trees here, wow!! This is blowing my mind.” To me, that was a huge success because people were learning to observe.

You can’t care about biodiversity if you can’t see it for yourself, and it is everywhere—including in our homes.

Here is the [definition of biodiversity from the Convention on Biological Diversity](#):

For the purposes of this Convention:

“Biological diversity” means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

Valerie Behan-Pelletier

Dawn, a formidable statement: "You can't care about biodiversity if you can't see it for yourself, and it is everywhere – including in our homes".

We humans forget that we are the sum of our own biodiversity, we wouldn't function at all without our microbiome (all those bacteria etc. in our extensive guts) and the layer of bacteria on us. And I'm grinning cause I have checked the biodiversity in my home – but not my gut as of yet!

Anne Murray

Dawn: I agree completely.

Ann Dale

Dawn, these bio-blitzes are critical for increasing literacy and I know that Nature Canada does some as well, as well as the David Suzuki Foundation. A long time ago, one of my colleagues, Heather Hamilton, tried to organize the Great Canadian Bio-blitz. I think we should have a national one every year at the same time and that the citizen science goes up on a website—a sort of citizen monitoring on-the-ground, which is updated every year?

Dawn Bazely

Hello, Ann. Bio-blitzes are booming — led by the Royal Ontario Museum's Dave Ireland, to support making them national: <http://bioblitzcanada.ca/>

Also, do check out [National Geographic's amazing Photo Ark project](#). The photographer behind this project gave a [TEDx talk](#).

Valerie Behan-Pelletier

Ann, a National bio-blitz captured on video and uploaded annually would contribute to a permanent monitoring system, just like the Annual Bird Count does for birds, and the butterfly count does for those in the UK. Wonderful, wonderful idea!

Holly Clermont

Building on this — on the first day of the conference Resilience 2017, I took part in a PhD student workshop on resilience. There was a dozen or so participants, nearly everyone in the group was from a different country, and about half were ecologists. Near the end, a woman from South Africa commented that ecosystems can take care of themselves, not all species are important, and planning and management for sustainability and resiliency should be focused on providing services to people, not other species. There was another comment about nice but rather unimportant research on rhinos or other iconic species. Not one person aside from me questioned these statements, and they were quick to move on. Aside from the fact that this contradicted

my own research findings (Only one of 62 survey respondents prioritized the statement, 'Ecosystems can take care of themselves'), it suggested to me that biodiversity for these students was perceived as somewhat of a luxury, rather than pivotal to survival. I wonder whether the 'social' in 'social-ecological systems' research, or the notion of people as part of the environment, are narrowing the scope of concern to an extent where biodiversity is losing ground.

Dawn Bazely

I totally agree with Holly — the perception that biodiversity is a luxury needs to be challenged. We need to find a way to communicate with these ultra-utilitarian perspectives. That, I think is the issue — biodiversity needs many different ways of being communicated.

Valerie Behan-Pelletier

Holly, your experience at the Resilience conference (re. the SA participant is depressing) and it does indicate the danger of focusing on the charismatic macrofauna only. The polar bear and loon are beautiful symbols of biodiversity, BUT most Canadians will never see a polar bear outside a Zoo.

Rather than have 2 symbols, I would advocate for the Canadian biodiversity 100 or the Canadian Biodiversity 350? That way we could more effectively cover our unique biota, or those shared with outer countries, e.g., the monarch butterfly, snowy owls, those on Cosewic's list etc.

We also need examples of Canadian biodiversity that we might see in an urban/suburban area which would lead into Ann's suggestion of a National Bioblitz.

Holly Clermont

Here, I will post a link to my [4-minute speed talk from Resilience 2017](#) that suggests bio-blitzes, while very important and valuable in so many ways, mostly preach to the choir. I contend that biodiversity can benefit from people who don't have a nature-centric sense of place or much concern for nature, as long as we stop seeing one another as adversaries in environment versus economy conflicts, and start to view 'the other' as having another, different lens on a complex problem.

Anne Murray

As symbols of biodiversity, we need a multiplicity of life forms not just mega mammals. Without biodiversity, we would not have many of our medical drugs. Think of the Madagascar rosy periwinkle. That plant gives us Vincristine, one of the key cancer fighting drugs in use today. It may very well have just saved my granddaughter's life. 20–25% of drugs used in modern medicine derive from plant chemicals. Over 12,000 active compounds are known to science deriving from medicinal plants.

Holly Clermont

Actually, the students I was speaking of were not concerned about megafauna either. They were mostly concerned about nature as ecosystem services for humans. In my view, we need to work with this and shift the conversation. A re-framing is necessary: biodiversity conservation and connectivity as paths to sustainability and resilience, and the survival of other species as integral to our own.

Anne Murray

I was meaning to respond to the polar bear and loon concept rather than your discussion of the Resilience conference.

Ann Dale

Thank you everyone, for the wonderful quotes, art, and now a song. It makes me wonder how we can tell compelling stories that communicate both the science, but also reach people's hearts. But that is a difficult question for another day, perhaps. Have you ever wondered how car advertisements often feature an SUV with a backdrop of nature? They use its beauty to sell their products. We need to turn the cake upside down.

Dear colleagues, I am going to insert a question from the e-audience, which I would like you to address, if possible.

"I find that governments spend on species at risk programs and protected area (parks) programs. Should governments be focusing more on preserving species that are still common? Isn't it already too late for the species that are already at risk? Although creating parks is nice in the long term, I often find that parks are created in already undisturbed areas that aren't at risk of development. Should we be focusing on remediation?"

Dawn Bazely

Hmm, interesting question, given the passenger pigeon, which went from 136 million in one site, [to extinction a few decades later](#).

Conservation approaches must happen at more than one scale and this can be tough. As well, the ecosystem approach to management and conservation of single, rare

species is generally considered to be more beneficial to more species, but OTOH, we may need to focus on just a single species.

This apparent lack of clarity about the best approach doesn't actually represent confusion — rather there are many different scenarios and pathways and options. It would be lovely to do all of them, but when dollars are scarce, we do make choices.

All of this to say, that a scenarios planning approach to conservation is probably more

accessible and easier to follow for many people — in other words — tell the plan as a story.

Anne Murray

I would like to see more focus on all species and habitats, i.e., biodiversity as the subject of protection rather than just species at risk — which the government programs have completely failed at anyway — SAR are in more danger than ever. And the idea of habitat compensation schemes for development has to be re-examined because habitat is not something that can easily be created when existing habitat is destroyed.

Eleanor Fast

This is a great question. I don't have the ultimate answer but here's a couple of thoughts.

- 1) No, I don't think it is too late for many species at risk, and I think it is right that we devote resources to protecting and restoring their populations.
 - 2) Yes, I think we need to protect both undisturbed areas AND also protect biodiversity in disturbed and particularly in urban areas. Even though urban nature isn't pristine, it is often people's main exposure to the wonders of nature and biodiversity.
-

Holly Clermont

For me, this raises another problem: what I would describe as 'apparent inconsistency' among biodiversity publications. If the various publications were reconciled, we would have a much stronger case. For example, the WWF Canada report says half of monitored species are in decline. At the same time, BC CDC shows 14% of native plants, animals and ecological communities are on the red or blue list in BC — which might suggest one or both numbers are off. CDC provides information on more than 13,872 plants and animals and 637 ecological communities, and tracks 1,973 of them (342 red and blue ecological communities and 1,631 red and blue native plants and animals). It has listed 2858 species as SU (unrankable) due to lack of information. These have been looked at and "reviewed" but determined to be lacking in information. It has 1740 species as SNR meaning "not yet ranked". CDC has 80 ecological communities as SNR meaning "not yet ranked". 1567 species that are SNA (not going to be ranked, e.g. exotics). When calculating percentages, these latter numbers are often unreported, but they are important. The WWF and CDC numbers could be compatible, or not. We just don't know.

Anne Murray

Good point about the inconsistency. The IUCN has been accused of mis-categorising species by putting them too low on the endangered scale too. I think the problem is we just don't know enough and endangerment is happening faster than we can keep track.

Also, sudden viruses sweep through populations — look what happened to previously very common starfish along the west coast of North America this last two years. Populations were wiped out in many places. That changes the balance of ecosystems dramatically. Starfish are beginning to return in some areas where the conditions allowed for remnant populations to survive but are slow to recover elsewhere. Some species were affected more than others.

It is all very complex and institutions/government take ages to respond so they cannot keep up. Where the species in question is a human resource (e.g., herring, salmon, anchovy), it creates enormous problems.

Valerie Behan-Pelletier

Ann, re: question from the audience, "I find that governments spend on species at risk programs and protected area (parks) programs. Should governments be focusing more on preserving species that are still common? Isn't it already too late for the species that are already at risk? Although creating parks is nice in the long term, I often find that parks are created in already undisturbed areas that aren't at risk of development. Should we be focusing on remediation?"

Most of our focus in Canada is on our vertebrate species (e.g., polar bears, muskox, fish). We only know about 25–50% of our arthropod (insects etc.) animals. We really don't know many of the species that may be at risk and so that is why it is important to conserve habitats, e.g., the Serengeti of the arctic (see upload from Science). I agree that funding for remediation is critical also. And some/all of this funding should be from those that cause the problem, e.g., tar sands, coastal erosion. But it is not an either/or.

We have not committed enough land to biodiversity conservation in parks AND we need to have programs for remediation. AND, as the CPAWS report mentions, parks are under threat of development, e.g., Banff NP.

Chloe Dragon Smith

Species at risk are important, and working to stabilize them will also, in most cases, help with common species. I think in many cases, efforts to help species at risk have been successful and that gives people hope!

To address your point "parks are created in already undisturbed areas that aren't at risk of development", this is something I think about a lot. I believe we need to start looking at the land more fluidly, as a functioning landscape. That means protection and development would work together, from a large, thriving base of Nature. When looking through that lens, we will probably find that many areas that are already disturbed will need to be remediated or development will need to slow down, especially in the south where we are very crowded

Ann Dale

I find this concept a powerful way to communicate the project, **Nature Needs Half**. If

we think about leaving half of the world for nature, then many of our current challenges would be solved—climate change and biodiversity conservation to name only two. (Re)connecting spaces worldwide, biosphere reserves with parks, wildlife corridors and new strategic partnerships are a powerful and immediate way of leaping forward. For example, the Haida Nation has recently achieved protection of nearly half their homeland through a combination of court challenges and negotiations with the province of British Columbia to create new conservancies. [Click here to learn more about Nature Needs Half.](#)

Holly Clermont

Re: corridors. I was delighted to see a [Wildlife Corridors Conservation Act](#) has been introduced in the U.S.

Chloe Dragon Smith

Ann, I love Nature Needs Half. It is easy to grasp, bold, and exciting. It does make me think though — if we are talking about leaving half the world for Nature, we are taking ourselves out of the equation and stating that we are not part of Nature. It is my belief that this is a manifestation of the world view that has gotten us here in the first place.... and will eventually keep eroding our relationship with Nature, no matter how much we protect now. I wonder how we could re-frame Nature Needs Half to include humans as part of the natural world, seeing ourselves as part of an integrated and thriving landscape??

Valerie Behan-Pelletier

I think E.O. Wilson came up with the [Nature Needs Half](#). It's definitely a vision to go for. Especially corridors and reconnecting spaces.

Ann Dale

What do you think are the top three barriers to acting on this critical issue, and do you have any suggestions for breaking them down?

Eleanor Fast

I think the barriers mainly come down to the will to act. At all scales from our individual homes and gardens, to our workplaces and schools, to our governments at all levels.

We have the means to act — but we need the will. I think that everyone knows it is important but how do we get people to move? An MP once said to me: “Eleanor, I know this is important, but unfortunately in politics the urgent always gets in the way of the important”. And he was right. We collectively — and me personally — simply haven't inspired the majority of people that worrying about biodiversity is the most urgent thing they have to do. We have to move away from our existing approach of knowing we're right and thinking that if people aren't listening then it is because we're not shouting loud enough, and so we just shout the same thing louder. No, we need to change the message. But unfortunately I don't know what that right message is...

Valerie Behan-Pelletier

Eleanor's response from the MP is an easy cop-out I think (for the MP).

In Canada, we pride ourselves on our human diversity, our openness to others of the human species from around the world. But we fail to equally celebrate our non-human Biodiversity – all those other species. So rather than focus on Conservation, focus on Biodiversity Enhancement, and proactive conservation. We are at the bottom of the G7 table, re. CBD obligations: “Annual study looking at the UN Convention on Biodiversity obligations shows Canada has done far less than other nations in preserving areas from development.” Yet we are the second largest country in the world.

A [paper in Science in 2006](#) showed that Canada has “Crisis Ecoregions” for Biodiversity, “Frontier Forests” and “Last of the Wild” regions. We should be celebrating this amazing biodiversity.

Eleanor Fast

Hi Valerie. Yes, I agree it's a cop-out, but it is also the reality in which people are trying to advocate for biodiversity conservation. Unfortunately.

Susan Gosling

Instead of barriers let's look for examples that build hope, success stories out there to build on, no matter how small they are.

Eleanor Fast

Hi Susan, yes, I agree!!!

Ann Dale

And Susan, this introduces co-benefits. Walking contributes to better health outcomes. The video “[23 and 1/2 hour](#)” by Dr. Mike Evans, an animation, shows all the medical benefits of walking only 1/2 hour a day.

Anne Murray

Knowledge and understanding about all the elements of biodiversity — best taught at school from an early age and with experience of nature — outdoors, up close, more social equality, more control on the major resource industries worldwide that destroy habitats, wildlife, and people's lives.

Holly Clermont

Whenever I want to focus on barriers, I tend to turn to [this document](#) for an overview. The most important in my view is a Fear of Losing Control/Power. Agencies guard power and resources to ensure their own perpetuation. This suggests we need to work

at the power centres to shift priorities to an extent where it becomes unacceptable to destroy and degrade sensitive ecosystems and SAR when developments etc. are proposed. That involves working with these entities, not against them.

Anne Murray

I agree with your comment Holly.

Dawn Bazely

Hear, hear.

Anne Murray

Barriers to action:

- Not reaching the wider public with the scientific knowledge and nature awareness associated with biodiversity loss.
- Being stuck in silos, and not reaching across Canada and worldwide.
- Standing up to corporate greed

Ann Dale

Illuminating the co-benefits of integrated planning, what works, why it works and wherever possible is critically important for accelerating further innovation. We have published a co-benefits map, showing the relationships between acting on climate change and what are the unanticipated and often unplanned consequences. Changing the rules of the game is also important. When the mayor of New York regulated that all new communities could be no farther than 5 kilometers from a transit station, guess what, more compact, dense community planning occurred.

Chloe Dragon Smith

As I've mentioned indirectly a few times, I think the biggest, systemic barrier is our current societal world view and how in general, we see conservation, biodiversity, and Nature itself as something separate from us. This has become a deeply entrenched frame through which we live our lives, and small actions and attitudes every day add up to the problem. Using the land is not bad. In fact, it is essential to understanding our relationship with the Earth, and then from that base, acting appropriately. We can look to an Indigenous worldview as a model of holistic connection and interaction to see how this can result in harmony with Nature in the long term.

I want to see us transition from our current model of disconnectedness and parceling the land, to one of large landscape, flexible planning, to maybe one day, one where we put the relationship between ourselves and Nature first in everything we do, growing and breathing with the land in true harmony – trusting it, and trusting ourselves.

As I see it, the solution for all Canadians can be as simple as connecting with Nature. Each of us ourselves, but also consciously helping others to connect too – maybe those

who don't often get the opportunity. The only way to recognize we are part of the land, is to be out there in Nature.

Holly Clermont

This disconnect includes understanding where our products come from, and how they affect people locally. One of the most powerful texts I can recall was learning how a can of Coca Cola was made (from the book, Natural Capital, perhaps?). If we knew that every time we use our cell phone, we are impacting x people in y countries, with z ecosystem degradation...

Chloe Dragon Smith

Absolutely. This is a symptom of our disconnect I think. We've largely lost touch with how the world really works.

Valerie Behan-Pelletier

Chloe, I agree. Our world view—it permeates Canadian society so that we don't celebrate the accomplishments in Biodiversity Conservation with bells and whistles. A good example is [the Serengeti of the Arctic](#), which is formidable.

Other countries, including the US, would be doing press releases on this for weeks (remember the large marine reserve that Obama named).

Dawn Bazely

Top 3 barriers:

People!!! Seriously — Joe Linklater, former Chief of Vuntut Gwitchin once said this. But, I think we need to be trained to deal with both co-operation and conflict, and navigating through the latter.

Education — 30 years ago, I thought: "gosh, I'm gonna do a great job educating people and then it will all be ok". What I have learned, is that the task of education is endless.

To hearken back to some earlier comments — Siloes: breaking them down, to connect with people in a respectful, inclusive way, is key.

Sorry, those are quite overlapping but somewhat different.

Ann Dale

What a fast-paced conversation, dear colleagues. I wonder if there are lessons we can bring forward from successful campaigns, for example, the ozone layer, the landmines campaign and climate change? There are a number of elements in common, but first

and foremost, is scientific consensus, nationally and internationally. If we don't have agreement among scientists about the focus — be it the species level, or the habitat level, we will not move forward?

We have just opened up a post-survey questionnaire for the e-audience after your participation on your views about this conversation. [It may be found here](#), and we would greatly appreciate your contribution to our research.

To my colleagues, any concluding remarks? I cannot thank you enough for your invaluable contribution and commitment to one of the most critical imperatives now facing Canadians. :)

Dawn Bazely

Only to push, again, for you to look at [the National Geographic Ark project](#).

When the National Geographic photographers, Michael and Jennifer, played the 10-minute film about the filmmaker behind the project to a room of 100 passengers in the arctic, you could have heard a pin drop.

Holly Clermont

A wonderful program is [Students On Ice](#). An Arctic expedition that is life-changing for those who participate.

Chloe Dragon Smith

Thanks everyone!!! I'm honoured to have been a part of this conversation. Great perspectives all around. :)

Valerie Behan-Pelletier

Ann, THANK YOU for the conversation and the chance to be with Chloe, Holly, Dawn, Susan, Anne and yourself.

Eleanor Fast

Thanks so much for convening us, Ann. It was very exciting to be part of such a great group of Women for Nature, and discussing such a crucial issue.

Valerie Behan-Pelletier

Yes, THANK YOU very much Ann and team.

Holly Clermont

Yes, thanks! It was great to e-meet everyone!!

Dawn Bazely

Thank you, Ann and team for this!! Very interesting and now I have homework reading!

Best, Dawn
