e-Dialogues

CHANGING THE CONVERSATION & NATURE CANADA PRESENT:

From the local to the global

Biodiversity Conversation Series:
How important are the common loon and polar bear to Canadians?

November 28th, 2017

The second e-dialogue from the Biodiversity Conversations: How important are the common loon and polar bears to Canadians? series will use the monarch butterfly to illuminate the local to global interdependencies of biodiversity conservation. We hope to reveal the dynamic interconnections and the need for global governance systems essential to protecting critical habitats and migratory paths. Biodiversity, like climate change, does not respect political borders and requires a broader systems approach for its conservation.

women for nature

Professor Ann Dale, Moderator, Co-Chair, Women for Nature, Principal Investigator, Meeting the Climate Change Challenge (MC3), Royal Roads University

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

Dr. Holly Clermont, Graduate, Royal Roads University

Michelle Corsi, Veterinary Science Assistant and H&S Lead, The Marine Mammal Center, San Francisco

Professor Leslie King, Women for Nature e-Panelist, Program Head, Master and Bachelor of Arts and Master and Bachelor of Science in Environmental Practice programs, Royal Roads University

Sharolyn Mathieu Vettese, Women For Nature e-Panelist, President, SMV Energy Solutions, President and Inventor Wind Simplicity Inc., environmentalist

Laren Stadelman, Woman For Nature e-Panelist, Management Consultant for not for profit and public sector clients, environmentalist

---

Ann Dale

Thank you for joining our second conversation in our Biodiversity series, at the end of which we will be finalizing an action agenda for Canadian decision-makers. Today, we will be discussing from the local to the global, that is, at what scale do we need to act? Are there any successful international strategies, plans, partnerships, and networks we could draw upon?

I would like to start by asking each of you to introduce yourself and why are you passionate about biodiversity conservation?

Leslie King

Hi all, I am Leslie King from the School of Environment and Sustainability at Royal Roads University. I teach a course in Global Process which focuses on Climate Change and Biodiversity. I am passionate about biodiversity and it is the environmental problem that keeps me awake at night. Many thanks Ann and all of you for this opportunity to discuss this thorny issue and together come up with some new solutions! And we need to act at all levels of societal organization—though the local is critical as well as linking the efforts of all levels and players!

Valerie Behan-Pelletier

Hi all—this is such a pleasure to be e-talking about Biodiversity Conservation. I'm Val Behan- Pelletier and my fascination is soil biodiversity, specifically mites. I've worked on aspects of soil biodiversity from the arctic to the tropics. Soil without biodiversity is just dirt, and it takes about 100 years to make 1cm of soil at our latitude. Yet, amazingly, we humans think nothing of disturbing it or destroying it.

Leslie King

Hi Val, soil biodiversity—wonderful! I work in Africa and the Arctic so I am very familiar with both the elephants and the polar bears to which Ann referred to but it troubles me more that there is a whole world of unseen biodiversity about which most people are blissfully unaware—and have no idea how much it is endangered!! Cheers, Leslie

Michelle Corsi

Hi everyone, I am so honored to be joining you all in this discussion. I am Michelle Corsi. I am a Canadian from Vancouver currently living in California and working at The Marine Mammal Center in Sausalito. I am passionate about biodiversity for many reasons; the interest in the vast possibilities or things to discover, the unknowable array of invisible interconnections that diversity upholds, and because I think things should just be allowed to exist, that their value comes from an inherent right to exist regardless of their anthropocentric value.

Leslie King

Many thanks for those eloquent words Michelle, and it is because of those marine mammals that I started my lifelong passion for the diversity of the earth!

Michelle Corsi

Hi Leslie, yes, it seems to me that while we all love the earth-bound creatures there are many who are inspired by the ocean bound ones to get the passions going for folks.

Ann Dale

Welcome Michelle, delighted to have you join us. So, you work with protecting or saving sea mammals, or both?

Michelle Corsi

We do both. We rescue and rehabilitate and release local marine mammals along the coast of California and sometimes assist other rescue centers by taking in their animals if they do not have the space or expertise. We also have vets from all over the world that come to the center to train and open their own rescue centers in places like Korea, Mexico, Italy, Netherlands, etc.

Our team also travels all over the world training others and working on conservation issues for different marine mammals (vaquita in Mexico, irrawaddy river dolphins in various parts of Asia, etc)

Valerie Behan-Pelletier

Ann, I'm jumping in here - in response to that link you sent me from the Washington Post, I think that Michele has captured the reason we all argue for biodiversity.

Laren Stadelman

Hi, I'm Laren Stadelman. I am a nature enthusiast and honoured to be invited to be a part of this conversation. I have a particular fondness for Monarch butterflies. I grew up with them as a kid. I've raised them from eggs to adulthood and I've visited where they overwinter in Mexico. I am particularly concerned about their declining numbers.

Valerie Behan-Pelletier

Laren—from eggs to adults. I have a big grin on my face.

Sharolyn Mathieu Vettese

Hello everybody! I'm thrilled to be joining this important discussion from Toronto which is having a mild winter like the ones I remember from sunny California more than 30 years ago. I don't think we'll be getting a white Christmas.

Ann Dale

Well, since I will be working from the East all winter, I won't mind a mild winter indeed. Sharolyn and Laren, can you tell us a little about butterflies, thanks? And any other examples of species dependent on both local and global ecosystems?

Michelle, your work?

Laren Stadelman

I think most of us are familiar with the Monarch lifecycle—from egg, to caterpillar, to chrysalis, to adult. It's an amazing lifecycle to watch firsthand, but it's a pretty common story in the butterfly world.

What is really special about Monarchs is their migration. In Canada, we are at the most northerly point they range. The first Monarchs typically arrive here in July and lay their eggs. The ones that are born here in August are a 'super generation' of Monarchs. They migrate south all the way to Mexico where they over winter in the oyamel fir trees of the central mountains. There they mass together in large numbers until spring when they begin to stir and head north again. They lay their eggs in the southern US in the spring and successive generations continue the journey. It takes four generations to complete the migratory cycle.

Here is an interesting graphic that shows the annual migratory cycle.

In Canada, we have two interesting connections to the Monarch migration:

- Professor Fred Urquhart of the University of Toronto is credited as discovering the over wintering location of the Monarchs in 1975. Here is a University of Toronto Magazine article on Fred and his wife, Norah Urquhart.
- Researchers Tyler Flockhart and Ryan Norris from the University of Guelph collaborated with others to determine where in North America the butterflies over wintering in Mexico come from. If you are curious, about 30% come to the provinces and states along the Canada-US border. Researchers at the University of Guelph identified Monarch Butterfly birthplaces to help Conserve the species.

Sharolyn Mathieu Vettese

Thank you for asking this question, Ann. The global to the local, or the local to the global doesn't matter because they are as intrinsically linked as the trees to the forest, or the forest to the trees. Without one, you don't have the other. My next door neighbour has a blue spruce, and three times I've found miniature blue spruce trees growing on my certified backyard habitat property among the shelter of the overgrown brush. Nobody planted them. They chose where they wanted to take up space. What is for sure is that they didn't start growing in a manicured lawn! Trees are considered in many ancient cultures the tree of life, but for them to provide a life and a home to the butterflies, birds, and the animals we love, we have to allow the lowly scrub plants to thrive naturally and organically without human interference, or manicure. I saw how

important this relationship is, and how that relationship has been broken when I visited the Monarch butterfly biosphere in Mexico.

Valerie Behan-Pelletier

Ann, your question about the importance of the global to the local is so relevant. We've really seen the impact of the Emerald Ash Borer on Ash trees around Ottawa in recent years. And that's a beetle that came to us from Asia (a global visitor) that is ravishing our local woods. It's just one example of the many plant pests that come to us mainly from Asia.

Ann Dale

So, there is global connectivity, both in terms of the movement of species and the negative, invasive species?

Leslie King

Hi Val, so right. I have been looking hard at all the ash trees in our area and starting the mourning process as I have for so many other species—elm, chestnut, who have been killed by those Asian pests! We are one world and need to be aware of the dangers that poses for biodiversity.

Valerie Behan-Pelletier

Leslie — thanks so much for those words. YES — the charismatic soil microfauna!

Both you and Jill (from the audience) may be interested in the Global Soil Biodiversity Atlas (it's linked on the Biodiversity Library Site). It's a UN-EC product that came out last year, with brilliant photos and ideas for students and teachers. It's freely downloadable here: https://globalsoilbiodiversity.org/?q=node/271

Michelle Corsi

Having lived in Asia it is interesting that we consider the impacts of our systems on their local flora and fauna. They have a number of introduced species from Europe etc. that are having similar effects on their wildlife and forests. So is that part of biodiversity conservation or to what degree do we manage/reduce introduced species despite the role they have played forever. Humans may be the biggest vector these days but things have been floating around and changing the landscape for as long as we know—just a tangent ;)

Ann Dale

We have been dancing around this first question, but let me ask it formally. Can you explain why the 'global' to the 'local' is so important for biodiversity conservation? And

pardon my ignorance, is there any species that is independent given how coupled ecological and human systems have become?

And while I am waiting for some answers to the first question, I thought I would reference this video from the Nature of Things, entitled What Trees Talk About.

There is so much we don't know, as they now think that trees are “smart and resilient, they share resources, fight animal predators and even change the weather. New research emerging from Canada’s boreal forest shows us that trees’ influence reaches well beyond their world — and into ours”.

Holly Clermont

Biodiversity loss has tended to occur at local scales—habitat loss and fragmentation, resource extraction or exploitation, invasive species...gradually ‘scaling up’ to become a problem of global proportions. Now, global impacts are augmenting and even supplanting many of the local ones in their ability to destroy, degrade, and transform ecosystems—climate change, extensive transport of exotic species (through ballast water, import/export, etc.), product consumption and waste. The production and consumption of a single product that has manufacturing arms in different countries may cause damage to biodiversity in all of those places.

Laren Stadelman

I think the Monarch butterfly provides a great example. It's an iconic species that faces a number of significant threats. Four reasons come to mind:

- Monarchs are vulnerable to extreme weather when they are over wintering. This is particularly true of the eastern population that overwinters in highly concentrated numbers at a relatively small number of sites in Mexico. Extreme weather requires global solutions.
- Monarchs are threatened by loss of food, specifically loss of milkweed, which is largely a local issue.
- But it's more than that. Because Monarchs migrate they are dependent on having the right food available at the right time along the migratory pathway. So, in fact, it's a local issue that also needs to be considered from a broader perspective—multinational in the case of Monarchs.
- And finally, Monarchs are threatened by loss of overwintering habitat. Again, a local issue but one is hard to address in isolation from questions such as development and land use.
  What all of this means to me is that conservation is a very complex matter that requires coordinated action on a number of levels.

Ann Dale

Laren has introduced another critical factor, that of time. Many species are highly vulnerable to being in the right place, the right space at the right time as my beloved doctoral supervisor taught me so long ago. And if I am not mistaken, climate change, that is, warming also has a time variable. For example, the spring warming in the East is happening earlier, but the timing of the last hard frost before summer has not changed, therefore, making plants more vulnerable to frost than in previous times?

Holly Clermont

I am curious as to whether our panelists or audience have observed issues with photoperiod and temperature, as latitudinal range shifts occur?

Michelle Corsi

I think this is a powerful question Ann, in planning for biodiversity conservation we also must anticipate for these shifts. I know there is much research happening for Marine Protected Areas and their size an placement as the waters change.

The marine mammal world, much like avian and insects, is a vastly complicated world for biodiversity conservation with the ease at which these animals move around and cross borders. Of course, from a marine perspective, it is not just the mammals. All species do move at various stages to different locations (reproducing sponges float to their next location but the distance may not be so great), so conservation practices like marine protected areas are making a huge difference to the variety of species they conserve. I was involved in some landscape management planning way back in the day and as we know many of the parks we have protected in Canada are not well connected to allow animal passage so at least to a greater degree these marine protected areas are and so the local level can support the global level of diversity conservation.

Valerie Behan-Pelletier

Michelle, you have captured so well the global to the local of migratory species. I think so many forget that this is central to conservation of migratory species whether they be arctic terns, snow geese, salmon, whales, or monarch butterflies. We see them locally, either breeding or feeding, but they spend much of their lives in the global ‘elsewhere’.

You also raise the aspect that when we develop conservation approaches we do not keep organism movement in mind – as you say we leave out landscape corridors and connections.

Leslie King

In my course, I ask students to organize a field trip to identify local manifestations of global biodiversity loss, ways in which local biodiversity loss reflects global biodiversity loss, and the connections between local and global biodiversity loss as manifested in their local area. They rise to the challenge identifying global causes of local biodiversity loss and the way in which local actions impact global biodiversity—global forces that cause local biodiversity loss. We are much more effective at taking local action to reduce or slow the rate of biodiversity loss. Global actions such as the Convention on Biological Diversity have failed because they lack the connection to the local level and fail to address local causes and actions.

Global forces cause local and global biodiversity loss. Causes of biodiversity loss are the same globally and locally—habitat loss, climate change, pollution, inability to change or adapt ranges and habitats.

Actions to address local biodiversity loss can have benefits for global biodiversity.

Sharolyn Mathieu Vettese

Leslie, you bring up important points on the local level. Years ago, I was a community leader in North York before it amalgamated with the city of Toronto. One of the things we fought for, and got was parkland within the development area, but also adjacent to the redevelopment area where the land was cheaper, so we insisted on a continuous parkland so that wildlife would not be isolated. We were successful, and the City adopted this design in other parts of the city.

Holly Clermont

Hi Leslie! I do feel there has been some trickle down from the global agreements and initiatives. For example, IUCN designations were used to trigger provincial and federal zoning—parks, Wildlife Management Areas, Marine Protected Areas to protect estuarine and marine ecosystems at a local scale.

Leslie King

Thanks Dr. Clermont for your excellent contribution! Hope you are able to keep them coming! And yes, I knew I was being too sweeping in my criticism but protected areas have been around for a long time and have not really succeeded in slowing the loss of biodiversity—we need solutions that are far more holistic and don't depend on "out there" solutions but rather permeate our daily existence and locales.

Michelle Corsi

Hey Leslie, I think you have nailed it—and I am sure we can all agree on the fact that the link from local to global is essential.

An interesting paper by Josep A. Garí, a Marie Curie Research Fellow at the University of Oxford, made this claim: field research in the Andes and Amazonia discloses that biodiversity is a crucial local process, rather than a global resource. Local ecological practices construct collective biodiversity flows that care for food security, health care, and ecosystem resilience alike. By constructing biodiversity as a global resource predetermined to both markets and intellectual property systems, the global developmentalism neglects and therefore undermines important local regimes of biodiversity.

I particularly like the reference to constructing biodiversity as a resource connected to markets neglecting and undermining local regimes.

In discussions around global biodiversity it must be brought back to how best to connect to local, and vise versa. Mind you, local level need to understand their linkage to the bigger picture.

Valerie Behan-Pelletier

Leslie, I was thinking about the Convention on Biological Diversity (CBD) this morning and why, given that Headquarters are in Montreal, it has been ineffective in bringing the changes in biodiversity and sustainability that it promised in 1992. why it has been ineffective at mobilizing government response to biodiversity conservation.
And the Criticisms about its rather limited vision of what constitutes biodiversity are well- founded.
It has a vast website and produces reams of reports, and engenders a wide range of research publications, but these don't capture the public's imagination the way the Montreal Protocol or the IPCC does.

But, as you say, it doesn't connect the global to the local.

Sharolyn Mathieu Vettese

Valerie, it's true that the Montreal Protocol was a success because it was a single issue with a single action. Copenhagen was not successful because it was broad and combined nature with the entire human spectrum. It failed because of power struggles.

Valerie Behan-Pelletier

Sharolyn, re: your pertinent comment on why the Montreal Protocol was successful, Ann and myself had briefly talked about the need for an Intergovernmental Panel for Biodiversity Assessment (IPBA) (modelled on the Intergovernmental Panel for climate Change (IPCC) first established in 1988, where changes could be followed. Your comments on the CBD are though-provoking.

Ann Dale

This is a critical recommendation, given the recent reports on the state of biodiversity loss in Canada and internationally that we discussed in our first conversation. Should it be led by the United Nations?

Valerie Behan-Pelletier

Interesting question Ann re: Leslie's comment that everything is connected.

A recent paper in Science was on Transoceanic Species Dispersal after the Tsunami caused by the Fukushima earthquake, which the authors called a “megarafting event”.

They reported over 300 species, not known from North America that had been rafted here on man-made objects. And we have no idea what the impact of these global visitors will have on local biodiversity. A colleague at Western, Dr. Zoe Lindo, is studying tsunami influence on mite diversity on Haida Gwaii.

AND, the global to the local also impacts humans. Many of our disease species — flus, SARS, Lyme disease, West Nile virus — are global species that have a local impact.

Leslie King

[In response to an audience comment: Hi there! SK Films (skfilms.ca) is joining! We produce giant screen and IMAX films with a focus on educational content. We have three exciting projects coming out next year, one of which is Backyard Wilderness. Backyard Wilderness will surprise and entertain viewers with the unexpected wonders of nature that are right under our noses – in our own backyards. One of the core themes of the educational programming, which will be produced by HHMI is the importance of biodiversity.]

SK Films, thank you—that is wonderful. I am starting a project on urban biodiversity in the Americas and when I talk about biodiversity everyone immediately assumes I am talking about wilderness, so I can't wait to see your backyard biodiversity film! Cheers, Leslie

Sharolyn Mathieu Vettese

Leslie, you bring up an important point of urban diversity. Here in Toronto people only think about raccoons and how they're a nuisance for being clever enough to get into the green bin. So, what does the City do? Design a smarter green bin to outsmart the clever raccoon. Now, we have fewer raccoons in my neighbourhood, and I have fewer wild mushrooms in my garden.

Ann Dale

Okay, you guys have made a very powerful case and convinced me. We need to conserve locally, regionally, provincially, nationally and internationally. Since biodiversity does not 'understand' political boundaries, how on earth can we conserve, for example, large species, such as polar bears and elephants, never mind migratory birds, butterflies, Canada geese. What are the critical factors?

Sharolyn Mathieu Vettese

Ann, your second question is a good one. It is understandable that biodiversity doesn't "understand" political boundaries because neither do humans! I was interested in how modern geopolitical conflicts arose and how they were caused by decisions made in the salons of European monarchs. Those decisions were made based upon the maps used by the early explorers and exploiters. I have a small collection of old African and Canadian maps from the 1600-1700s, and sure enough, the maps were made in order to return to the natural wealth of the region that the Europeans wanted—fish from the Grand Banks; and ivory and slaves from Africa, etc. The maps show what and where to find those items valued by the European powers. Although the European explorers knew about the local people, geopolitical boundaries were not made to keep the local people together, but to keep the desired natural resources together, and be easy to return to for exploitation. If the political boundaries were made without respecting the local people, why would we expect them to have respected the large or small wild migrating animals and insects who were not schooled in geopolitics?

Michelle Corsi

I have always liked the idea of protection for the greater movers as it does allow for better coverage for those who maybe do not move as much. Identifying these species, what their key life needs are and what the barriers are to them achieving that is the best place to start. Breeding grounds, species fecundity, rearing habitat, overwintering are the first that come to mind. Then protection measures and ensuring pathways exist for these species.

Ann Dale

In response to the second question, I am going to share a paper entitled, Networking Networks for Global Bat Conservation.

Abstract. Conservation networks link diverse actors, either individuals or groups, across space and time. Such networks build social capital, enhance coordination, and lead to effective conservation action. Bat conservation can benefit from network approaches because the taxonomic and ecological diversity of bats, coupled with the complexity of the threats they face, necessitates a wide range of expert knowledge to effect conservation. Moreover, many species and issues transcend political boundaries, so conservation frequently requires or benefits from international cooperation. In response, several regional bat conservation networks have arisen in recent years, and

we suggest that, with the globalization of threats to bats, there is now a need for a global network to strengthen bat conservation and provide a unified voice for advocacy. To retain regional autonomy and identity, we advocate a global network of the regional networks and develop a roadmap toward such a meta-network using a social network framework. We first review the structure and function of existing networks and then suggest ways in which existing networks might be strengthened. We then discuss how regional gaps in global coverage might best be filled, before suggesting ways in which regional networks might be linked for global coverage.

Michelle Corsi

I was looking at an article about how NGOs make decisions surrounding conservation and I read these two interesting pieces:

"For a long time, the conservation community has leaned on intuition, personal experiences, ideology, or random trial and error to decide on a conservation strategy. Sometimes, conservation groups are simply opportunistic, banking on the strategy that attracts the most funding or political support. But over the last few decades, scientists have been pushing for more evidence-based conservation. They have been urging conservation NGOs to use the best available science to prescribe strategies."

Then the article goes into discussing similar ideas to what some have mentioned here, which are collaborative networks or research of the issues.

"Sutherland's Conservation Evidence Project at the University of Cambridge takes a slightly different approach. The group focuses on smaller-scale, more localized conservation strategies, and lists all available scientific studies that describe the effects of those strategies. Again, the team is looking for ways to disseminate their information in a more practitioner-friendly way, Sutherland told Mongabay.

People working to produce or synthesize evidence must engage directly with decision-makers, she added, recognizing that they are not one group but many. This is important to understand the types of evidence that are relevant to their decisions, and to pinpoint the critical knowledge gaps."

What I found interesting though was the idea of pulling the resources together to collectively examine all the scientific information out there into a useful bit. The dangers I see here are not surprising—the possibility of oversimplifying or tunnel vision of a theme, as well, one thing we come across a lot at work is that we just don't have the information. There is so much out there that no one has done the research on or has the money or time to do it. At TMMC we are one of the largest publishers of marine mammal research and there is still so much information we don't have. Sometimes calling on pure science just isn't timely.

Holly Clermont

Given the personal and illustrative comments here, this is likely to sound fairly antiseptic, but there are many factors to consider: ecological ones (size of habitats/

home ranges, distances/connectivity between patches/dispersal capabilities/ availability of vectors) and social ones—cross-border cooperation in evaluating and addressing ecological factors. There are many, many examples of cross-border cooperation in BC.

Here are a few:
The North Pacific Landscape Conservation Cooperative (NPLCC) is one of 22 American LCCs that bring agencies and organizations together to synthesize data and other information and build capacity and expertise for landscape-scale conservation. Unfortunately, these are reportedly crumbling because Trump has no interest in them.

Much of the work they do involves cross-boundary projects and collaborations. For example, Peter Arcese, UBC forestry prof, is the lead for 'Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems' – "synthesizing existing data into GIS tools to prioritize land acquisition and conservation investment" in BC, WA, and OR.

The Washington Wildlife Habitat Connectivity Working Group is an open, science-based partnership co-led by WA Department of Transportation and WA Department of Fish and Wildlife. Their website is rich with tools and publications. Subgroups take the lead on various projects. You can link to the Washington-BC Transboundary Climate-Connectivity Project applies existing climate and connectivity models to decision-making. There is a recent (2016) report on the work they have been doing at multiple scales: Climate impacts and adaptation actions for wildlife habitat connectivity in the transboundary region of Washington and British Columbia. BC Parks and Forests, Lands, and Natural Resource Operations (FLNRO), Pacific Climate Impacts Consortium (PCIC), Okanagan Nation Alliance, were all a part of this initiative.

Wild Links is an annual conference that 10 years old now and sponsored by Conservation Northwest focused on connectivity and adaptation science and policy. It's an excellent conference and was held in Manning Park this past October. By the way, Manning Park is an intimate, natural setting that organically facilitates collaboration.

The Cascadia Climate Adaptation Strategy is linked to the NPLCC and the Great Northern LCC, a network of natural resource practitioners coordinating across the WA/ BC border.

University of Washington's Climate Impacts Group is conducting applied research and developing decision support tools for biodiversity conservation (e.g., SAGR, MAMU research, tree genetic adaptation, wetland adaptation, etc.). Meade Krosby's cross-scale transboundary project was part of this.

Baha to Bering is a marine conservation initiative among North American countries.

Crown of the Continent is a landscape ecosystems initiative includes the Rocky Mountain region of Montana, BC, and Alberta.

Coast to Cascades Grizzly Bear Initiatives does conservation work in Southwest British Columbia.

Pacific Rocky Intertidal Network do monitoring, including sea star wasting syndrome.

Valerie Behan-Pelletier

Well given that political boundaries are a human construct, I guess sorting out political boundaries to optimize conservation of species is totally up to us humans. We seem very effective at ignoring political boundaries when it is to our economic, health and/or pleasure advantage, e.g., agriculture between Northern Ireland & Republic of Ireland; European Union with their Grande Routes for hiking the length and breadth of Europe; the Great Lakes Water Quality Agreement between US and Canada, and the Arctic Science Agreement.

Laren Stadelman

In response to the second question:

What strikes me is that we need to collaborate —we can't do this alone. I will go back to the Monarch butterfly again for some examples:

There is collaboration at the international level: in 1995, Canada, the United states and Mexico signed an agreement to cooperate on environment and conservation issues. And in 2008, UNESCO recognized the area where the butterflies overwinter as a World Heritage Biosphere Reserve.

For more information see: Commission for Environmental Cooperation (CEC): http://www.cec.org/
UNESCO: http://whc.unesco.org/en/list/1290

There are examples of multi-sector collaboration: The Monarch Joint Venture, in the US is a partnership of governmental, NGO and educational organizations that work together on Monarch conservation. There is also an initiative looking at developing transportation and utility rights of way as habitat for pollinators (including Monarchs).

For more information see:
Monarch Joint Venture: https://monarchjointventure.org/
Rights of Way as Habitat working group http://www.erc.uic.edu/biofuels-bioener ... as-habitat

And there are numerous examples of organizations that work to support and coordinate the work of individuals. The Journey North supports citizen science and encourages individuals to report monarch sightings, the Monarch Teachers Network provides resources for teachers, and various groups provide advice and seeds for individuals wishing to plant a butterfly garden.

For more information see:
The Journey North: https://www.learner.org/jnorth/monarchs
Monarch Teachers Network: http://www.monarchteacher.ca/

Ann Dale

Here is a question from our e-audience, if anyone can answer it: "I am interested in things we can do in our community bylaws to protect natural habitat and connectivity in the Qu'Appelle Valley." I would suggest that at a minimum if your community has an Official Community Plan, biodiversity conservation should be front and centre.

Leslie King

Take a look at the Surrey, BC plan which puts their Biodiversity Plan as the overall framework of their OCP. Cheers, Leslie

Sharolyn Mathieu Vettese

Hi Ann—I can answer that audience question since I do have experience as a community leader who has gone to the Ontario Municipal Board where the ultimate ruler is in the Official Plan. To ensure the green space remains as a habitat it is best protected in the official plan that is also combined with a map. Today I would add that the City would be limited to how much they can build on that space by putting up a community centre, playground, etc. that ends up developing the habitat.

Holly Clermont

To address connectivity at a community level first requires connectivity 'hotspot' mapping—in another post I have outlined some great resources for this. It is likely that there are mapping initiatives at the provincial level—I was amazed at how much had been accomplished over the last couple of years in our region. The province has been holding workshops for local governments and First Nations on how to use it—both in planning and to create policy around it. There is also a great tool called Google Earth Engine—it takes photos so you can time lapse how a city is growing, how a river is meandering, etc. It can be set up to send you an alert, when it finds a house in a connectivity corridor for example.

There is also a U.S. initiative that might be a good resource: The Wildlife Corridors Conservation Act To Protect Biodiversity was introduced in late 2016 to reverse habitat loss and fragmentation for U.S. species, and has been referred to 8 different committees.

Ann Dale

From Dr. Francois Jost: "two key points regarding the second question might be the national/international agreements to avoid habitat fragmentation and to promote wildlife (or habitat) corridors". Going back to Holly's comment about hot spot mapping, it is also my understanding from a federal court case (will provide details in our final conversation) that asked how can we protect a species when we haven't even mapped what their critical habitat is?

Ann Dale

So, our last question and I will also include a related question from the e-audience.

Okay, given how important the global to the local is, what are your recommendations for how to move forward?

From e-audience, "Human disturbances in one place (local) also affect the remaining natural landscape, which can have a multiplier effect, altering the natural ow and movement of organisms (affecting biodiversity) in a more regional / international scale. How should affected neighboring countries proceed, as international conventions (eg. CBD) cannot be directly enforced?"

Laren Stadelman

I find this a daunting question because the challenges are so complex. For me personally, the answer lies at the local level. I try to do what I can about the issues that are important to me and I encourage others to do the same. I believe that once we start to understand how we are connected to the environment, then we start to change our behaviour. And in the longer run, that's what will make the difference.

Valerie Behan-Pelletier

We need human buy-in, as we talked about in the first Biodiversity Conversations. We buy-in for Pleasure with National and Provincial Parks, the idea of Corridors for Biodiversity Conservation, e.g., the Great Lakes—Great Rivers Corridors, just as we have corridors for human infrastructure. We buy-in for Economics and Health when we start factoring in the cost of the Ecosystem Services that Biodiversity provides. For example, a Canada-wide carbon tax, and no subsidies for carbon producers would encourage all to protect carbon sinks such as soil, forests, peatlands and their associated biodiversity.

Leslie King

I think another scary dimension is time—what we do today will affect cascading biodiversity impacts into the future. This interesting article is one small slice of that problem:

Culbert, P. D., Dorresteijn, I., Loos, J., Clayton, M. K., Fischer, J., & Kuemmerle, T. (2017). Legacy effects of past land use on current biodiversity in a low-intensity farming landscape in Transylvania (Romania). Landscape Ecology, 32(2), 429-444.

Ecological impacts of past land use can persist for centuries. While present-day land use is relatively easy to quantify, characterizing historical land uses and their legacies on biodiversity remains challenging. Southern Transylvania in Romania is a biodiversity-rich area which has undergone major political and socio-economic changes, from the Austro-Hungarian Empire to two World Wars, communist

dictatorship, capitalist democracy, and EU accession—all leading to widespread land-use changes.

Objectives: We investigated whether present-day community composition of birds, plants, and butterflies was associated with historical land use.

Holly Clermont

Considering all of this, it is difficult to stay positive. There was a hopeful little article yesterday, that suggests biodiversity is still up to the task in tackling some of our greatest ecological challenges.

Sharolyn Mathieu Vettese

Holly, I, too am scared about what is happening in terms of climate. This summer we drove up to Inuvik and then continued on to Tuktoyaktuk. That was real scary because there are multiple causes of climate change happening at once. If we don't know what to do, what about the animals? They're allowed one mistake and they're dead. They had no doctors, GPS, shelter, grocery stores, or other conveniences that we humans have. What we humans don't realize is that without Nature, we are dead.

We need Nature more than she needs us. I remain hopeful that Nature will be forgiving because I see the radical shift in our business and political leaders to address climate change because they've come to the conclusion it is too costly to do nothing. Business leaders like Elon Musk are putting old established business leaders to shame by showing that technology is there if we want to support it, and adopt it. The positive steps that are being taken now won't be knocked off because it is obvious this is what we have to do now, or never. So, I'm excited to be part of this shift.

Ann Dale

From our e-audience: “Have you seen Flight of the Butterflies? Check out the website, there are so many different ways we can all be citizen scientists and help with the conservation of monarchs!”

Leslie King

We need ways of connecting the global and local—ensuring interplay in conservation initiatives—also among civil society and governance institutions, and of course we need to raise awareness and focus on education—education of both decision-makers, local to global and citizens everywhere—a tall order! And especially, as you suggest, Tory (from the e-audience), young people!

Sharolyn Mathieu Vettese

To move forward, a common interest has to be identified, and acknowledged. Maybe even personalized. In some African cultures, the locals believe the trees have spirits that protect them, so the locals protect the trees because it is to their benefit to keep the trees alive. Here, we think of trees as lumber, unless they have plants or benefits that cannot be replicated in a lab. But another way to protect biodiversity is to engage women through gender equality. The two times I've been to Mexico to see the Monarch butterflies, I was impressed by the sanctuary's washrooms that were maintained by the women. They charged a small fee for toilet paper, but the washroom was spotless, and beautifully painted with Monarch butterflies on the walls. I saw schoolchildren walking to school impeccably dressed in their school uniforms, most likely paid for by the earnings the women got from the tourists. If the Monarch butterflies no longer migrate there, then the local and foreign tourists will not come, and there won't be any jobs. I think engaging the women is key to preserving the forest for future generations because they understand the generational link. Seven generations.

Thank you Lara (from the e-audience) for bring up climate change—a huge factor that is affecting the planet, and it is happening exponentially. It is not only created by the increase in GHG emissions caused by mostly more cars, industries, and houses, but the loss of forests that are being cut down to make room for more people. The forests are also unable to cope with the numerous indignities they're subjected to, and are dying.

The Monarch butterflies are feeling that effect as the remaining patch of forest cannot keep the climate steady for the butterflies, and they are more exposed to the elements as the forest cover has more gaps.

Holly Clermont

"Personalized" is important, and a huge challenge. So, consumers can understand what their impact is, the disconnect between people and places needs to be overcome. This may include more complete reporting by companies, labelling each product with an index of sustainability that includes sources of all parts or ingredients, and measures of transport. People doing well by doing good, with voluntary certification systems that reward initiative and compliance, similar to LEEDs, Greenshores, Sustainable Forestry Initiative, etc. From the 'Journal of Cleaner Production', there are resource conservative manufacturing, remanufacturing, closed-loop manufacturing.

Valerie Behan-Pelletier

Dr. Jost noted that agreements such as the Montreal Protocol, the CBD and for that matter - the Paris Climate Accord, and the Antarctic Accord - are not enforceable. Yet, countries try to adhere. I'm hoping it is because they recognize that these are good for their human population. Global agreements positively affect our air, water and soil quality, habitat and thus biodiversity locally. But we need a "measuring stick" much like the IPCC, and hence the suggestion for the Intergov. Panel for Biodiversity Assessment.

Ann Dale

What do you think is the best way to engage and educate young people on the importance of biodiversity?

Holly Clermont

Start early, getting kids out into nature even before they can walk. Teach them the names of things—I believe it was Ian McTaggart-Cowan who said that if the public didn't know what was out there, they couldn't be expected to miss it when it was gone. Show them different ecosystems—where biodiversity has been preserved and where species compositions are becoming more alike, the postage stamp protected areas that are inundated with visitors, and get them to think critically about what all of this this means. Teach them island biogeography theory, meta population/community/ ecosystem/landscape theories, and unpack the importance of biodiversity in meeting the challenges of a changing climate.

Michelle Corsi

Get them outside! But apart from that, I think it is important for us to engage young people on their terms. Creatively engaging with them through different media. Yes taking kids outside and building outdoor programs into school systems are great for those who can afford it. New technologies exist that can enhance their learning. Video games that many folks put down, I believe are an untapped resource. Kids want to participate in virtual reality. We can make games for that, that maybe gets them interested in conservation. There have been some made for displays on whales and ocean trash that had a huge role to play at a museum I was just at. Online communities of gamers are solving these types of problems already in the games, why are we not tapping into the people who are doing this for fun 8-10 hours a day from all different walks of life? It is just an avenue I see since my husband is in the video game industry and there is nothing there yet that could be used to collaborate, educate with.

Holly Clermont

Interesting post, Michelle

Here is a little food for thought: Ahn, S. J. (Grace), Bostick, J., Ogle, E., Nowak, K. L., McGillicuddy, K. T., & Bailenson, J. N. (2016). Experiencing Nature: Embodying Animals in Immersive Virtual Environments Increases Inclusion of Nature in Self and Involvement With Nature. Journal of Computer-Mediated Communication, 21(6), 399-419. https://doi.org/10.1111/jcc4.12173

Sharolyn Mathieu Vettese

Michelle, I agree children need to get outside. Technology is part of our operating lives (I think about power outages because I know how vulnerable our electrification

infrastructure is) but children and parents should schedule time to turn off their electronics. Did anybody see the movie "Captain Fantastic" with Vigor Mortensen? Very entertaining and informative movie about an alternative way of parenting—more like what Margaret Atwood got, but not exactly.

Yes, a nature game would be worthwhile to educate children, and having Nature Canada involved would be a novel project. Hopefully it would inspire children to go out and see there is another world out there that is worth exploring.

Ann Dale

Brilliant, over to you, Jodi Joy, a project for Nature Canada, let's get the funding, a game that uses the beauty and wonder of nature to engage millions. Thank you for your time and commitment, any last comments before we close.

Holly Clermont

'The Matrix' - where the landscape between patches of natural habitat would play a superhero role in helping support viable populations of species, allowing wildlife to travel between habitat patches, and supporting ecological processes at a landscape scale :)

Leslie King

Thank you so much everyone. If there is a note of optimism here—and there must be one—it is the intensity of the engagement and commitment of all you wonderful people. I'm going to sign off now as my concussion cannot take the bouncing of the text—but it has been a great experience and I think Sharolyn's comments and Val's are a fitting summary. Thanks Ann and all!

Valerie Behan-Pelletier

It’s been brilliant talking to you all. Thank you, Ann, for getting us together.

Michelle Corsi

Thanks, everyone! I have taken lots of notes away from this and I look forward to reading more. Hopefully our paths will cross again! If you are ever in San Francisco, come to the Center!
Best, Michelle

Sharolyn Mathieu Vettese

I have to say good-bye to everyone. Ann, thank you so much for inviting me to participate in this forum. I hope we inspire others to make a difference, no matter how small or large because it still is something that will add up to a movement.