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# Standing Committee on Science and Research

EVIDENCE

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Chair: The Honourable Kirsty Duncan





## Standing Committee on Science and Research

Tuesday, February 7, 2023

• (1100)

[English]

**The Vice-Chair (Mr. Corey Tochor (Saskatoon—University, CPC)):** I call this meeting to order.

Welcome to meeting number 28 of the House of Commons Standing Committee on Science and Research. Today's meeting is taking place in a hybrid format, pursuant to the House Order of June 23, 2022. Members are attending in person in the room and remotely using the Zoom application.

Pursuant to Standing Order 108(3)(i) and the motion adopted by the committee on Monday, September 26, 2022, we are continuing our study on citizen scientists.

I'd like to make a few comments for the benefit of witnesses and members.

Please wait until I recognize you by name before speaking. For those taking part by video conference, click on the microphone icon to activate your mike, and please mute yourself when you are not speaking. For interpretation, those on Zoom have a choice, at the bottom-right of their screen, of “floor”, “English” or “French”. Those in the room can use the earpieces and select the desired channel.

I remind you that all comments should be addressed through the chair. To members in the room who wish to speak, please raise your hand. To members on Zoom, please use the “raise hand” function. The clerk and I will manage the speaking order as best we can, and we appreciate your patience and understanding in this regard.

In accordance with our routine motion, I am informing the committee that all witnesses have completed their required connection tests in advance of the meeting.

I would like to welcome our guests to committee. We will start with a five-minute opening statement from each witness.

When you have roughly 30 seconds left, as best you can.... If I catch your eye, I'll make a gesture to speed things up. We try to keep it on time, so we can get through all our witnesses and questioners.

With that, we will start with an opening statement from Mr. Wood.

You have five minutes.

**Mr. Christopher Wood (Director of eBird, Cornell Lab of Ornithology):** Good morning. On behalf of our team at the Cornell Lab of Ornithology, the hundreds of partner organizations around

the world—including Birds Canada and Québec Oiseaux, who manage eBird regionally—and the millions of people who participate in the project, I'd like to thank the committee for inviting me to discuss citizen science and eBird.

The world is at the cusp of a biodiversity crisis. It's a crisis that's entangled with climate change, human health and well-being, and our need for strong economies and long-term sustainability. To best address these challenges requires data—lots of data. Information needs to be precise and relevant at global, national, provincial and local scales. Our information needs will always outstrip the resources and funding we have available to hire professional scientists in data collection. Citizen science provides the best mechanism to gather these data.

Why birds? Birds are found all over the planet. Many species require specific habitats, resources and environmental conditions. They're excellent indicators of natural systems and ecosystems. People around the world love birds. This means they're eager to participate in data collection, particularly when the right incentives are there. They're also generally receptive to using these data in decision-making. There's now more information available on the distribution, abundance, status and trends of birds than any other taxonomic group.

It's the union of these two ideas, birds and citizen science, that gave rise to eBird. People know a lot about what's happening in their backyards. They know what's happening on their farms. They know what's happening in their forests. However, that information isn't always available to decision-makers. That gap between local knowledge and decision-makers leads to a lot of problems that you're all familiar with.

You can think of eBird as a solution for bridging that gap. Our challenge is to figure out how to reward the contribution of local knowledge to provide structure to these data so that they can be used to answer questions and have the most impact. Then it's to archive, freely share and power new data-driven approaches to science, conservation and education. Said another way, we meet local communities where they are and work with them to codevelop technology to drive global impact.

Now eBird has grown into one of the largest biodiversity-related science projects in the world, with more than 225 million bird sightings last year alone and more than 1.4 billion records. Last year alone, one in 40 people in Canada visited the eBird website. To date, eBird data have been downloaded nearly a quarter of a million times. They've been incorporated into more than 550 scientific peer-reviewed publications.

The power of these data is beyond anything that I think we would have imagined when we began this project. It's unprecedented and powerful.

The background material that I provided shows some examples of this. We're now able to see where birds are across the planet literally every week of the year. That allows us precision to target action that meets multiple needs.

These data products from eBird now power conservation around the world, from local land trusts to federal policy, from action plans aimed at individual species to corporate sustainable agriculture policies. These data also increase engagement in understanding birds, as eBird powers Merlin, a bird identification app that we also manage at the lab of ornithology. It has more than five million users, including over 100,000 every month last year in Canada.

It's important to emphasize that the foundation for all of this work began with federal funding, particularly in the U.S. with the National Science Foundation and NASA. Federal support has been incredibly important for the early stages development of both of these projects—eBird and Merlin—in research for how to develop new machine learning and statistical approaches to model and understand these data, and also the long-term support of our cyber-infrastructure.

Thank you very much. I look forward to answering any questions.

- (1105)

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much for keeping it within five minutes. It's much appreciated.

Now, we're going online with Mr. LeBaron.

**Mr. Geoffrey S. LeBaron (Director, Christmas Bird Count, National Audubon Society):** Thank you very much.

I want to thank the committee again, on my behalf and that of the National Audubon Society, for inviting me to talk to you about the Christmas bird count.

The Christmas bird count was started in 1900 by a gentleman named Frank Chapman at the American Museum of Natural History. There was a growing awareness of the need for the conservation of wildlife at the time, because wildlife supplies were dwindling rapidly due to both overhunting and also the millinery trade where feathers were used in ladies' fashion.

What Frank Chapman was able to do, because he had his own magazine called Bird-Lore, was call to do a Christmas bird count rather than a Christmas bird hunt during the holiday season. In 1900, the first Christmas bird count was done. There were 27 people involved in 25 locations across the continent. Two of those

counts were done in Canada, including in Toronto, and counts have been done every year throughout the continent and internationally.

After the 27 participants and 25 counts the first year, we have now grown to over 2,600 different counts across the hemisphere with major contributions from Colombia, Mexico and throughout Latin America and the Caribbean in addition to Canada. Each count is locally organized by a compiler. It's done within a 24-kilometre circle on one calendar day during the dates of December 14 to January 5 each season. All of any age, ability or experience are welcome to participate.

When I became in charge of the program in 1987, it was a 100% paper program. There was no database at that point. The end result was a 700-page printed issue that included all of the results of every Christmas bird count that had been submitted for that season. In 1998 and 2000, Audubon joined with the lab of ornithology and also got a major grant from the National Science Foundation to create what was then called BirdSource.

BirdSource has evolved into what is now, as Chris mentioned, eBird. We needed a core database to begin the structure of BirdSource, and creating the 100-year database for the Christmas bird count became the database that is now the core of the structure of eBird.

Around the same time, around the turn of the 21st century, we also joined with Birds Canada to manage the Christmas bird count in Canada. Since then, it's been very successful, and participation in Canada has grown 40% since Birds Canada joined on.

Until about the 1980s, scientists were reluctant to accept citizen science datasets as valuable for analysis. The combination of the Christmas bird count and the breeding birds survey as long-term datasets enabled ornithologists to realize that there was a lot of very important information about learning trend data about birds across the continent. That's what many scientists are doing now. There are over 300 peer-reviewed papers utilizing Christmas bird count datasets, and we get inquiries weekly from researchers to use the CBC.

One of the key things that helped the acceptance of citizen science data was that Audubon and Patuxent Wildlife Research Center developed a toolset to analyze citizen science datasets, not just ornithological datasets but citizen science datasets in general, so those techniques were adaptable to citizen science in all fields, some of which you'll hear more about today.

The combined trend data for CBC and the breeding birds survey has led to a lot of very important studies. COSEWIC in Canada and the United States government, for watch-lists on the red list, utilize both the Christmas bird count and the breeding birds survey to come up with the trend data on a continental basis.

The other thing about the Christmas bird count that's really interesting is that we have been able to track how birds respond to climate change as their ranges have been shifting over the last 75 years. Birds are excellent indicators of the quality of the environment and the health of the environment that we all share.

One of the key things that's kept the Christmas bird count relevant is that it becomes a holiday tradition for everybody involved. People travel great distances to do the Christmas bird counts. It's a major passion to see not only the birds in the areas where they're counting but also their long-time friends that they may only see during the CBC period. People get a sense of community and a sense of place, as well as a sense of the birds that are there.

Citizen science datasets and contributions of citizen scientists in all fields are a comprehensive and free resource for researchers in many fields, including studies by the federal governments of Canada and the United States.

• (1110)

With that, I think I will end.

Thank you very much.

**The Vice-Chair (Mr. Corey Tochor):** Thank you again.

We're two for two for under five minutes. Let's keep the trend running.

We're going to go to Mr. Ennis now for five minutes.

**Mr. Charles Ennis (President, Royal Astronomical Society of Canada):** Thank you.

On behalf of the Royal Astronomical Society of Canada, I would like to thank you for the opportunity to speak to you here today.

I am a retired police detective and military officer who, in the 10th year of his life, got a telescope. I now have 58 years of observing experience. I'm the national president of the Royal Astronomical Society of Canada, which has been around for 154 years, has 5,200 members across the continent and has 30 centres.

I am a citizen scientist. I work with the Galaxy Zoo project, which is part of the larger Zooniverse citizen science project, helping to classify galaxies identified in sky surveys.

I'm the founder and lead of the RASC's world asterisms project, which is an ethnoastronomical reconciliation project gathering the sky cultures of the people of the world. So far, we've examined 572 cultures and gathered over 11,000 asterisms. We're only 20 months old, so we're doing pretty well.

I'm a member of Astronomers Without Borders and work with ethnoastronomers and archeoastronomers around the world on projects.

Dr. Mona Nemer, when testifying the other day, mentioned that citizen scientists are not just helping hands but also great sources of

ideas for projects. I want to reinforce this. If you want to solve a problem or if you want to do an investigation, you need to get as many perspectives into the conversation and the investigation as you can. You need people from different educational, cultural and social backgrounds, because it's one of those unique perspectives that's going to give you the breakthrough that will speed things up. Citizen scientists are a great source for those perspectives.

There is a bottleneck in astronomy. Only about 10% to 20% of the astrophysicists who apply for time on the big telescopes get it. There are not enough telescopes. There are times when all of those observatories are socked in. We are the people who get the data when that happens.

Most astrophysicists don't go anywhere near an eyepiece. Technicians at the big observatories get the data they need. We spend our lives at the eyepiece. We are able to get the light curves to confirm exoplanets and exomoons transiting stars and to monitor variable stars to see if they are about to go supernova. We monitor the spectroscopy when they go supernova to figure out what kinds of elements are being created. We search off the plane of the galaxy, where there's no funding, to search for comets, for near-Earth objects that may be a hazard or for supernovas.

We get light quality readings to assist my two colleagues here, who are interested in how they affect the migration of birds. We track meteorites. We hunt them down and dig them up. In the Juno mission to Jupiter, most of those images you see are now processed by amateur astrophotographers. NASA made a decision to do that. I'm pretty sure they don't regret having done that.

We bring accurate information back to our communities and train the next generation of citizen scientists.

Dr. Rémi Quirion, when he was testifying the other day, mentioned his concerns regarding misinformation on social media. Notable science educator Neil deGrasse Tyson, in a recent radio interview, was saying there has been a failure in education because we're teaching people to memorize facts instead of teaching them how to think. The problem with that is, if the source of the facts is unreliable, you get problems.

We go out into the communities and we show them how to investigate their surroundings. I am still a detective, but now I investigate the universe.

I'd be happy to answer any questions you have for us today.

• (1115)

**The Vice-Chair (Mr. Corey Tochor):** Thank you, Mr. Ennis.

Now we will open up the six-minute round of questioning.

First, from the Conservatives, we'll have Mr. Lobb for six minutes.

**Mr. Ben Lobb (Huron—Bruce, CPC):** Thanks very much, Mr. Chair.

My first question is for Mr. Wood.

I checked out your information. For the benefit of the committee, can you help us on accuracy? What has your eBird institute done to ensure that if I go out, I don't screw up a robin with a blue jay?

Can you give us a description of that?

**Mr. Christopher Wood:** That's probably a 45-minute response—

**Voices:** Oh, oh!

**Mr. Christopher Wood:** —but I'll try to be brief.

Data quality is the core challenge of citizen science, and there are multiple steps that we employ to try to look at this.

The first step is that there are regional filters that are set by experts within a region that basically say, for this date and this location, what is the maximum number. If you exceed that, people are going to raise their eyebrows. In that case, because most sightings are coming in through mobile, you're presented at that time with something that says, "This is an unusual observation", and you're basically asked for photos or for sound documentation.

The next step, which we often think less about.... False positives are something that I think we immediately jump to, but the bigger challenge is that often there are things that are vocalizing that people miss. No matter what type of sensor networks you have, you're going to have error rates associated with failures to understand this, so what we're doing is basically calibrating a sensor network.

Ours is a sensor network of people. People have quite a bit of variation in their level of expertise. If you go out with Geoff LeBaron, he's going to detect and identify just about all the birds you find. If you go out with my mom, she may detect the chickadees and some of the common birds, but not the other ones.

There's a lot of work that we also do in looking at expertise and classifying how many species per unit time people find under a variety of circumstances. That then allows us to counterweight different sensors and basically build out a more standardized sensor network.

There are several other approaches that we use as well, but those are two of the high themes.

**Mr. Ben Lobb:** Okay.

Also, there are conservation decisions. Some of the data collected helps with conservation decisions and how everything works.

I'm wondering about two things.

One is conservation. Let's say, for example, on grasslands, that the decision may be to pasture cattle or some other animal on grasslands for the benefit of the bugs, the birds and everything else, or to just leave it as grass and trees, which does happen from time to time.

The other question I wanted to ask you is in relation to invasive species. Can birds help to predict invasive species such as, for example, in my area, the emerald ash borer or something like this?

• (1120)

**Mr. Christopher Wood:** Those are two very good questions. I'll answer the second one first.

Actually, I think that 4.7% of all of the records in eBird are actually non-native species. In Canada, that would be things like the European starling, house sparrows and pheasants.

One of the things we've done in just the last year is to classify across the entire world where things are exotic and established, and where they seem like they might be increasing and it's worth paying attention to as an early warning indicator system that non-native species may be expanding. This is something that the USDA has been particularly interested in. Also, then, it's about being able to understand it if there are unusual things, like somebody's parrot escaping. If somebody's parrot escapes in Florida, though, and there are multiple parrots that escape, all of a sudden you might have a situation that you hadn't thought could get out of control, so in the case of birds, yes.

I also know that within iNaturalist, there are a lot of efforts where people are actually photographing trees. In the case of the emerald ash borer, you're able to see the strips. Citizen science broadly is a very good way to deal with invasive species.

Could you remind me of the first part of your question?

**Mr. Ben Lobb:** It was on conservation decisions.

**Mr. Christopher Wood:** Yes, so in conservation decisions, one of the things that's important to understand is that we're not taking raw data and making decisions from raw data. There's a very rigorous modelling process, and I'd be happy to share with your analyst a few of the papers about how this works, but basically, the challenge that we have, when we're trying to deal with animal distributions, is that the things that animals are keying into differ across time and space.

For birds, it can be particularly challenging, and even if you just look at the breeding season for one species, that is going to be very different in the Okanagan Valley than it might be here in Ontario. When they migrate, they're using different habitats as well.

The modelling approach that we need to use needs to be robust enough that you can understand the difference in spatial and temporal patterns. What we're basically doing at a high level is running a series of independent models that allow us to understand those relationships. Think of it as a 100 by 100 kilometre grid. We overlay these on top of each other, and then do those for every week of the year. That allows us to understand how those spatial patterns could change across time and space.

One of the challenges you have is.... Traditionally, if you wanted to look at habitat management, you could do an intensive study in one particular place and focus on that question. Those results would probably work 50 miles away from there, maybe 100 kilometres away from there, but with distance and time, the impact would be different.

Citizen science allows us to understand that at an increasing spatial resolution, and that's some of the real power. Some of the things we've been doing right now have focused on sagebrush. Sagebrush in the inner mountain west is really being affected by non-native cheatgrass. It's sort of a merger of both of your questions.

Under various climate scenarios, the challenge that we have is where the best places are to target action on cheatgrass removal to achieve an optimal outcome. Using more traditional science, it's hard to address that, but in this case, we're able to look at that, because we have this information that's so spatially detailed. We can point to areas and say that these are the areas where you're going to see the highest number of increases in species of birds, because of the broad dataset and the fairly sophisticated analyses.

**The Vice-Chair (Mr. Corey Tochor):** Thank you, Mr. Wood.

Moving on to our next member of Parliament, Ms. Diab, you have six minutes.

**Ms. Lena Metlege Diab (Halifax West, Lib.):** Thank you very much, Mr. Chair, and welcome to all our witnesses.

Your testimony has been fabulous, particularly for some of us who are not as familiar with this study. The reason for our study is to understand the important contribution of citizen scientists. Your testimony is terrific. I actually wrote a couple of things down regarding working with local people and local economies to target action. I think those were your words, Mr. Woods. Also, I wrote "a sense of community and a sense of place". That was the same kind of idea, as well, from Mr. LeBaron.

Mr. Ennis, as a former detective, I very much appreciate that you are a detective, using your skills to investigate the universe.

I've been fortunate to organize guided nature walks in my community with Dr. Martin Willison, who's a retired biology and environmental studies professor at Dalhousie. I've also done a couple of nature hikes—it's only been two—with board members of Blue Mountain-Birch Cove Lakes, which is one of the most important natural spaces in my riding and, frankly, in Nova Scotia.

Your questions and what we're studying today have gotten me to think about how these kinds of leisure activities and walks in nature can also be data collection exercises, whether it's birdwatching or geocaching. Can you talk to us about how you envision regular Canadians and non-academics being able to contribute to our scientific inquiry through recreation or leisure pursuits?

I guess I could probably ask everyone that, but how about I start with Mr. LeBaron to give you, Mr. Wood, a moment to breathe.

• (1125)

**Mr. Geoffrey S. LeBaron:** Thank you. That's a wonderful question.

One of the really amazing things about ornithology is that a tremendous amount of the total knowledge of ornithological...or what's going on with all the birds everywhere comes from citizen science or non-professionals. There are an awful lot of ornithologists out there who do wonderful work and are also really good birdwatchers, but the great majority of the data that are collected—and certainly the vast majority of the data that come in through

eBird and from most of the people who participate in the Christmas bird count—are from non-professional citizen scientists.

Just being out there and noticing things and getting.... The more people go out, the more they have the ability to notice something new and different. First you need to learn the chickadees, the cardinals, the tufted titmice, the starlings and the house sparrows, but then, suddenly, you start to notice other things as well. The same is true, I'm sure, in astronomy, and it's also definitely true in terms of botany and other fields.

Just having people out there.... More and more through iNaturalist, eBird, the Christmas Bird Count and all these other citizen science programs, people are able to contribute to datasets that can actually then be utilized by researchers who want to look into what's happening in the environment. It's not only with regard to birds but basically all fields.

**Ms. Lena Metlege Diab:** Thank you very much.

Mr. Ennis, would you like to add on that for our study?

**Mr. Charles Ennis:** Certainly.

We're familiar with the sky. We know what we expect to see there, and that's one of the ways you discover things like supernovas. The youngest member of our society who discovered one, back in 2011, was 10 years old, and then her brother two years later repeated the feat. It's a matter of walking down the path and looking for something that you expect to see and then seeing something like a rock that doesn't belong there. Maybe it's a meteorite, so you go on a nature walk and you take a stick with a magnet on the end. It's getting as many eyes on the sky as you can.

One of the issues in our field is that funding covers the most likely areas where you can find stuff, but there are areas where it's less likely and that they don't want to spend money on, and that's where we spend our time. We search those areas for things. The last near-Earth asteroid that was in the news was discovered by an amateur astronomer. It's definitely the same sort of thing.

We work, as I said, in conjunction with our local naturalists to help them monitor the sky, because the misuse of artificial light at night interferes with migratory patterns and ends up causing a lot of birds to die every year, so we're very concerned about that and happy to help them.

**Ms. Lena Metlege Diab:** Thank you.

With the time remaining, I have a quick question for you, Mr. Wood.

We've heard from previous witnesses who suggest that increasing knowledge of scientific methods, being able to question the integrity of the data, helps combat misinformation, in fact. You were talking a little bit about that earlier. What are your thoughts on this, and do you have examples—and I think you were just sharing about the bird community—of how your own work with community engagement in science has helped against misinformation?

• (1130)

**Mr. Christopher Wood:** I think that's one of the excellent things about citizen science, and there's a continuum of types of citizen science. Overall, eBird is basically a framework that allows people to develop their own research questions. One of the things that can happen is that you can move into this space that's often called community-based science, where you pair a scientist with a community that has very specific questions. What we've seen is that this allows them to start questioning and asking things about their place. A good example of this is that there are various ejidos in Mexico that are interested in being able to certify their forests by the presence of the birds that are there. If there are certain birds there, then the forest can be certified by CONABIO, a regulatory group in Mexico.

The process of their actively understanding this and going out and seeing the bird connects the management action with the impact, and it allows them to see things that otherwise they wouldn't have seen.

**The Vice-Chair (Mr. Corey Tochor):** Thank you, Mr. Wood.

**Ms. Lena Metlege Diab:** Looking at the chair...

I was going to cede the remainder of my time to Mr. Cannings because I see how elated you are. You're very happy.

**The Vice-Chair (Mr. Corey Tochor):** You're a minute over already, so you'll take a minute off Mr. Cannings' time.

**Voices:** Oh, oh!

**The Vice-Chair (Mr. Corey Tochor):** With that, we'll move on to MP Blanchette-Joncas for six minutes, please.

[*Translation*]

**Mr. Maxime Blanchette-Joncas (Rimouski-Neigette—Témiscouata—Les Basques, BQ):** Thank you, Mr. Chair.

I would like to welcome the witnesses who are here today to help us with our study.

Mr. Wood, thank you for being here in person to talk about the eBird program. I was proud to learn that the eBird program was inspired by a Quebec initiative, the survey of bird populations of Quebec, which is a database set up in 1975 by Jacques Larivée, a visionary ornithologist. It fills me with pride to see how his efforts have borne fruit.

I have also learned that the eBird program was, at its inception, a small traditional citizen science project that has exploded and become a worldwide collaborative enterprise. I congratulate you. It is absolutely extraordinary, because we can see in concrete terms how citizen science can bring a lot of benefits to various communities.

How long has the eBird database been in existence?

[*English*]

**Mr. Christopher Wood:** In 2002 eBird began.

As you noted, there have been several different areas where the idea of using citizens to track birds emerged. Our partners in Quebec have been some of the most creative and exciting groups to work with, in large part because the way they're thinking about building community and leadership structures to manage data quality, and to engage new people in the collection of citizen science data, has really transformed how we think about gathering things.

One thing I'd like to highlight is that, by integrating large-scale projects, you're able to bring people in from Quebec, Chile or India, who are able to share their experiences. We have a Slack channel that involves regional leadership. My job is not to set any of the policies. Those are set and managed by local review teams. There's the same balance in citizen science that we have in government. When decisions are made at a local level, to what extent do they need to be coordinated at the federal level?

[*Translation*]

**Mr. Maxime Blanchette-Joncas:** Thank you very much, Mr. Wood.

You state that your program has been in existence since 2002. You mentioned in your opening statement that you receive federal funding. When did the funding start exactly and how much funding do you receive annually from the federal government?

[*English*]

**Mr. Christopher Wood:** I think we received a total of 14 different National Science Foundation grants, at least, to support various aspects. The very first funding we received for eBird was a National Science Foundation grant for informal science education. It began as an education-focused initiative.

It has transformed. Now, most of the funding we get is in the area of machine learning and statistics, and the interface of those two. Part of the reason for that is that the fundamental challenges in analyzing epidemiological data are very similar to the ones we're trying to work out in citizen science data. I spoke about this a bit before. You basically have a sensor network, where you may have doctors or birdwatchers who are reporting in slightly different rates. You're trying to understand the bias in both of those—both from your sensor and then what the truth is.

Machine learning has a lot of very good applications in terms of neural network models to not necessarily understand the drivers of those, where statistical frameworks are—

• (1135)

[*Translation*]

**Mr. Maxime Blanchette-Joncas:** We have to continue, Mr. Wood, but I thank you for your answer.

Does the federal government require that you use both of Canada's official languages, i.e., French and English, in all your communications as well as on your website?

[English]

**Mr. Christopher Wood:** The federal government did not. That's a best practice we adopted.

[Translation]

**Mr. Maxime Blanchette-Joncas:** If I understand correctly, you are eligible to receive federal funding, but there is no requirement attached to the funding to use both official languages in all your communications.

[English]

**Mr. Christopher Wood:** In the United States, from the National Science Foundation.... No, I'm not aware of that.

[Translation]

**Mr. Maxime Blanchette-Joncas:** I am talking about Canada, Mr. Wood. We are here in the Canadian Parliament and my question is about the federal government.

[English]

**Mr. Christopher Wood:** I'm sorry. When I was talking about the National Science Foundation, I meant the National Science Foundation in the United States.

[Translation]

**Mr. Maxime Blanchette-Joncas:** I will repeat the question. The federal government gives you grants. You said there were approximately 14 of them. Are those grants from the Canadian federal government?

[English]

**Mr. Christopher Wood:** No, I'm sorry. It's not the federal government in Canada but in the United States.

[Translation]

**Mr. Maxime Blanchette-Joncas:** Mr. Wood, I am speaking to you from Canada's House of Commons. I will therefore put my question to you in another fashion: do you receive funding from the Canadian federal government?

[English]

**Mr. Christopher Wood:** No.

[Translation]

**Mr. Maxime Blanchette-Joncas:** Alright.

There is a Quebec initiative, and some local organizations have taken it up in other regions in Canada, as you said. I'm trying to see how we can ensure that the scientific community pools its data.

I see that the eBird app is available in 27 languages. When I look at your communications, however, they are not always in both official languages, which is worrisome to me.

How do you think we can mobilize the francophone community when your communications are almost entirely in English or the French versions are incomplete?

[English]

**The Vice-Chair (Mr. Corey Tochor):** You have 30 seconds. Go ahead, please.

**Mr. Christopher Wood:** That's a very good question.

The way that we work, the small team we have at Cornell is not able to do this, so we work with Quebec Birds. As the partner, Quebec Birds—Québec Oiseaux—is really leading those efforts and is every bit as responsible as we are for any of the success we've had.

**The Vice-Chair (Mr. Corey Tochor):** Thank you, MP Blanchette-Joncas.

We now move to MP Cannings for six minutes.

**Mr. Richard Cannings (South Okanagan—West Kootenay, NDP):** Thank you. It's great to have these witnesses before us. For full disclosure, as I mentioned in the last meeting, I come from this background of citizen science. In fact, I worked for 13 years or so with Cornell on eBird. I was in charge of managing it in Canada. With Geoff in Audubon I was managing the Christmas bird count in Canada for a long time—I forget exactly how long. It's great to have you all here to talk about the importance of citizen science and its successes that we talked about.

I can assure Monsieur Blanchette-Joncas that everything Birds Canada and Québec Oiseaux do is in both official languages. Those groups, which are Cornell's partners, do get money from the federal Government of Canada. That's one of the requirements, and we're happy to do that. We have to do that when we're dealing with citizen science and have to communicate properly with citizens.

I just want to touch on one thing. We've heard a lot in this and in other studies this committee has undertaken about the concept of open data, and how many of the big projects of all sorts around the world in science are moving to an open-science, open-data concept.

Perhaps I can ask all three witnesses this question: What is your policy regarding the data you produce?

Maybe I'll start with Mr. Wood and then move on.

**Mr. Christopher Wood:** All eBird data are open and accessible, basically. There's a balance. It's not considered pure open-source, because we do ask for what your research affiliation is and what the purpose of the data is. That helps us, then, when we're able to come to meetings like this and others to understand the use of the data. Anybody is able to access the data once they answer those questions.

• (1140)

**Mr. Richard Cannings:** Mr. LeBaron.

**Mr. Geoffrey S. LeBaron:** Audubon manages the Christmas bird count in essentially the same way. We freely give data to, essentially, anyone who asks for it. For the same reasons we do ask for a form to be filled out so that we understand their thinking of what their project will be and how they intend on using it. We ask them to let us know if a paper comes out on the result of the data that they get from us and to give us a copy or a link to that final study. It's free and available.

A lot of the data they can pull right from the website themselves and we don't even know about it—or at least not easily. We don't track it on a day-to-day basis. For larger inquiries we supply the data to researchers who have their specific questions on anything from one particular species in Quebec to the entire database throughout the Americas.

**Mr. Richard Cannings:** Thank you.

**Mr. Charles Ennis:** The Royal Astronomical Society has all of its data online freely available for the world to see. If somebody wants to be a partner in the project, we have a drive on which we share information with each another. It's definitely available to anyone who wants it, for free.

**Mr. Richard Cannings:** Thank you.

Mr. LeBaron, I just want to get a sense of.... The real power of citizen science is the fact that we have these long-term datasets, going back, in your case, more than a century over broad geography throughout the Americas or on eBird throughout the world, and the ability to do all this with very few paid employees.

Bang for the buck in citizen science, I think, is “astronomical”, if I can use that term, Mr. Ennis.

Mr. LeBaron, can you tell me how many people run the Christmas bird count, how many paid employees run that whole project, where they get that funding and what is done with that by governments across North America?

**Mr. Geoffrey S. LeBaron:** Sure. Thank you for that question.

Actually, you're looking at the full-time staff for the Christmas bird count. I am the only person, actually, who is full-time staff for Audubon in terms of the Christmas bird count. My boss helps with some aspects of the IT parts of the program in terms of management of the database, especially when something goes wrong. She's able to interface with our IT division. We have the ability to ask other divisions for their help. When the map of active circles goes down or isn't updating regularly, then I can contact the GIS folks.

Basically in terms of paid employees, it's just me and then one other person part time. It's—

**Mr. Richard Cannings:** Just to interrupt, then, that's compared with—let's say for Canada alone, from my own experience—how there might be 20,000 people producing that data for you.

**The Vice-Chair (Mr. Corey Tochor):** Please give us a very quick answer.

**Mr. Geoffrey S. LeBaron:** There are probably 40,000 to 50,000 people in the U.S. who are.... It varies from year to year how many people are actually participating in the Christmas bird count, but there are roughly 2,500 or 3,000 compilers—the ones in charge of the counts—plus 70,000 to 80,000 observers. We also have a team

of regional editors, getting to the accuracy point, who review all the data from every count submitted before it is actually finalized for a given season. That's all volunteer work.

**The Vice-Chair (Mr. Corey Tochor):** Thank you kindly.

Moving on to the five-minute round, we'll be hearing from MP Mazier for five minutes.

**Mr. Dan Mazier (Dauphin—Swan River—Neepawa, CPC):** Thank you, Chair.

Thank you to the witnesses for coming out to see us.

Being a farmer all of my life, I've had an opportunity to learn a lot from nature and a lot about science, and to understand what's going on in terms of the landscape. Unfortunately, being a farmer, I've had the opportunity, as well, to learn what happens when governments don't listen. I'll give you a brief example.

There was a small dams initiative started by government departments, and it was led by the Department of Fisheries and Oceans. At the time, they said, “Here—the dam should go here”, and the locals said, “No, the dam should go over here.” At the end of the day, DFO won and they put this dam up in the wrong place, according to the locals, in the watercourse. As a result of this dam, the water backed up. It contaminated a bunch of wells. The streams started running backwards. It destroyed a whole bunch of ecosystems. All that had to happen was for the government to take into account the locals' knowledge.

I guess this is my lead-up question for you, Mr. Wood. How important is it for government to listen to citizens and consider that knowledge that's on the landscape when they're developing projects like this?

• (1145)

**Mr. Christopher Wood:** My sense is that citizen science provides a very good framework for listening. One of the things it does is to help structure things in such a way that they can be communicated so that both parties understand. Sometimes the local community may speak differently. They may speak a different language. They may have different ways of expressing something so that it isn't heard by the receiver. Putting it into a scientific context, I think, can be very helpful, so that both groups can understand each other a bit more.

**Mr. Dan Mazier:** In your opening remarks, you mentioned that there was a gap between Canadians and decision-makers. What did you mean by that?

**Mr. Christopher Wood:** My remarks weren't specific to Canada. I think in general there's often a gap between local knowledge and where decisions are coming from. One of the things that citizen science can really help with is that, when it goes through the scientific process, it's a way of.... Basically, if you're able to report things in a standardized way, it enables the world, then, to have access to this information in a consistent way, so we understand that we're talking about the same thing in the same framework.

When I think of this as bridging the gap, it's a way of connecting people with data so that there's a shared understanding across both parties.

**Mr. Dan Mazier:** How significant is this gap? How much would it take to start bridging that gap? What needs to happen?

**Mr. Christopher Wood:** I would probably ask Birds Canada or some of the partners who are more familiar with the situation in Canada. I'm not an expert in that.

I'll say from my perspective in the U.S., every bit helps. Every time that you start to understand another group and meet with them.... One of the things is that we're developing citizen science initiatives, particularly ones that can be more focused on specific questions. When we go and understand that community's goals, aspirations and what they're trying to address, it allows us to then structure things to be able to answer those questions, which is ultimately what we're trying to do.

**Mr. Dan Mazier:** Okay.

Earlier this week, Canada's chief science adviser stated that, if the government fails to engage with citizens when developing policies that impact them, "there is a loss of trust, and the loss of trust in institutions and in government can be quite costly and can erase a lot of the benefits that otherwise can accrue from all the efforts that both the government and many parts of the public actually work towards."

Do you agree with this statement, and can you expand on the negative impact of governments failing to engage with citizens?

**Mr. Christopher Wood:** It's very important to be able to have feedback mechanisms in anything that we do. To me, again, that's the power of citizen science. It's people who live there every day, who are providing their observations and making them available. The opportunity is to build a structure, and citizen science is a mechanism to do that, that can allow people to connect in this way.

When you don't do that, my perspective is that it can lead to distrust. It can lead to people not understanding why policies are being enacted, and maybe even at the very best, if you don't take into account the data different people have, you might have suboptimal results.

**Mr. Dan Mazier:** Thank you.

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much.

Now, moving on to the five-minute round for the Liberals, we have MP Sousa.

• (1150)

**Mr. Charles Sousa (Mississauga—Lakeshore, Lib.):** Thank you very much.

Thank you for the presentation.

I would argue that government and levels of government have actually been working well to try to promote citizen science, engagement with the science community and engagement with citizens particularly. I say that only because, contrary to my colleague, Mr. Dan Mazier, I feel actually very privileged and comforted by the fact that there is an engagement. That's why we're even having this committee. That was provided by our former colleague and chair.

My point to this is that in my community there's a conservation area called the Rattray Marsh. We have a huge number of people

who are engaged in bird watching, engaged with local authorities to try to protect and revitalize our waterfront and to protect those airsheds and watersheds. Their engagement to repopulate some of the species within an area that for years was an industrial area on that waterfront, to revitalize and rehabilitate the area, and to bring the creek back up to its natural state, is very rewarding. It's very rewarding for the community as well.

I compliment you on putting forward some of the initiatives that you've had to enable them to have a portal by which to share information, be it information about peregrine falcons that some of the industry groups are promoting, or even the citizens who are looking at the migration of a number of other species.

My question is very simple. How do you become a citizen scientist? What is that? We're talking about it, but how does one actually say, I'm a citizen scientist? What do you do?

**Mr. Christopher Wood:** That's to me, I assume.

**Mr. Charles Sousa:** Yes.

We do have a citizen scientist as a witness. I'd be interested to hear from him as well.

**Mr. Christopher Wood:** From my perspective, it's just starting. Just engaging with somebody who's already out in the field looking at things, you start to learn.

There's a whole continuum of citizen science projects. There are some projects like iNaturalist that are more on the educational aspect, which is just a matter of going out, seeing something for the first time and seeing the wonder in the world. The magic that happens starts a series of questions: Why is this here? Why isn't it somewhere else? What's happening with it?

Whether it's looking at the stars at night, looking at birds in your backyard or trying to understand the insects in your river, you just start by looking at things and that process fosters questions. That process of asking questions is ultimately what science is all about.

**Mr. Charles Ennis:** This is about getting people to look at what they're surrounded with and reintroducing them to the wonder that surrounds them. It is about citizen scientists going out there and teaching people how to do this. The young people we work with are the next generation of citizen scientists, so there's a continuum there.

We make all kinds of outreach events available at our observatories. People are introduced to the wonders of the sky. It's a completely different thing to look at a picture of Saturn than to see it in real time. Then you can see people who are passionate about it. That's really all it takes. Once you have the passion, you can get them interested in contributing to the project.

**Mr. Charles Sousa:** I appreciate that.

I also appreciate this notion of integrity. The web and the information out there.... We've spoken a lot about the misinformation that also exists. Enabling that integrity to be kept in check is critical. I see stuff on YouTube about these new birds that don't exist. That's just an example.

We need to be sensitive. That measure of accountability, your portal and a few other things that you're promoting and discussing today are welcome.

I don't know how you maintain it with respect to those that still proscribe and divulge information. People buy into it. Kudos to you for fighting back and enabling that integrity to exist. All of us have a sense of responsibility to also make sure that it is protected.

I don't know if I have anything more to add other than.... Give me your thoughts or an example of misinformation that is being promoted by someone who is or is not a citizen scientist or maybe proclaims to be, who is putting forward information like the world is flat, for example. It's out there; people believe it. People of some great degree of stature in the community are convinced that this is all bogus.

How do you deal with that misinformation that's out on the web? How do you protect us with regard to it?

• (1155)

**The Vice-Chair (Mr. Corey Tochor):** We are out of time, but I would invite the witnesses to submit a written answer. We're 18 seconds over.

Going on to our two and a half minute round, we have MP Blanchette-Joncas.

[Translation]

**Mr. Maxime Blanchette-Joncas:** Thank you, Mr. Chair.

Mr. Ennis, thank you for being here with us today. I also congratulate you on your commitment.

I notice that you are a big fan of astronomy. The Royal Astronomical Society of Canada was founded in 1868, over 150 years ago. How extraordinary, despite the adjective "Royal," which gives me hives. But that is another topic for another day.

I read your annual report. I see that you don't have any members in Quebec. There were 20 or so a few years ago, but since 2018, you no longer have any members from Quebec. I would like to know what caused the loss of those members. Did they leave to join another organization? Is there another explanation?

[English]

**Mr. Charles Ennis:** I think the principle problem was that until 2018 we didn't pay any attention to inclusivity and diversity. We talked a lot about translating things and didn't put a lot of effort into it.

I was a co-founder of the inclusivity and diversity committee that we created in 2018. We are now working on getting those members back—and members from all kinds of other cultural organizations as well. We had more members joining during the pandemic than leaving, and I think that was an indication that it is beginning to work.

We are definitely concerned about that and we are definitely working on that.

[Translation]

**Mr. Maxime Blanchette-Joncas:** Thank you, Mr. Ennis.

I notice that you have a diversity and inclusiveness committee. You mentioned that you are a member of the committee. Does this committee have any criteria on linguistic diversity?

[English]

**Mr. Charles Ennis:** We have committed to translating all our observing programs into French. In fact, we just started doing that. One of our members of the Montreal centre couldn't start earlier, because she was working on her master's degree. We didn't want to interfere with that. We also have connections with Astronomers Without Borders and offers to translate into other languages. We recently had an offer to translate it all into Mandarin, for example.

Yes, we want to make it extremely accessible, and that's the way we intend to go about it.

[Translation]

**Mr. Maxime Blanchette-Joncas:** Thank you, Mr. Ennis.

I would be curious to learn how you finance your activities: do you operate solely on donations, or do you receive funding from the federal government?

[English]

**Mr. Charles Ennis:** We receive funding for summer students. We got a CEBA grant during the pandemic. We have applied for grants like the New Horizons program, for example, to include more senior mentor activity. For the last six years we have had a fundraiser working on grants from other programs, such as the Trottier foundation, to help enhance programs and tackle problems like light abatement and diversity.

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much for that.

For the final two and a half minutes, we will go to MP Cannings.

**Mr. Richard Cannings:** Thank you.

I'm going to direct this question to Mr. LeBaron.

You mentioned in your statement at the start how some of this data is used by the Canadian government through groups like COSEWIC, the Committee on the Status of Endangered Wildlife in Canada, which makes decisions as to whether species are threatened or endangered or other categories. Those decisions are, of course, based on data.

For full disclosure, I used to sit on that committee. We had far more data on birds than we had on anything else, whether it was fish or plants or mammals. We had that data because of these citizen science projects that spanned many decades and covered the country.

I'm just wondering if you could comment on that, on why it's so important to have these programs. Not only does it save the government money; this is also the only way we can do this. It's producing data that's very useful in conservation issues, as I think Mr. Lobb was alluding to.

**Mr. Geoffrey S. LeBaron:** Citizen science datasets are just incredibly powerful and long term. For the Christmas bird count and other ones, and eventually eBird as more data gets entered into the past, we're able to actually track longer and longer periods back through time to understand what's happening in the present and what's likely to be happening in the future. Having these datasets available for analysis by ornithologists but also for the use of legislators helps us understand what's happening to not only the birds but other stuff as well. We actually look at a lot of things habitat-wise, and birds, as I said, are wonderful indicators of the quality of the environment for everything. They're indicator species.

Having these amazingly powerful datasets helps us understand what's going on in the natural groups, but it also really helps in getting the citizen scientists themselves engaged with science, understanding what's going on and caring about the environment and conservation. It's a two-pronged thing, really. Yes, the data are very valuable for analysis, but it's also about developing another community of people who are willing to step up and help promote legislation to their own governments. That's around the hemisphere now.

• (1200)

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much to all our witnesses. We are out of time, unfortunately.

We will now suspend briefly before we move on to our next panel.

• (1200) \_\_\_\_\_ (Pause) \_\_\_\_\_

• (1205)

**The Vice-Chair (Mr. Corey Tochor):** Welcome back, everybody.

I would like to make a few comments before we get started with our new witnesses.

Please wait until I recognize you by name before speaking. For those taking part via video conference, click on the microphone icon to activate your mike and please mute yourself when you're not speaking. Interpretation on Zoom is found in the bottom corner.

I remind everyone that all comments should be addressed through the chair. You can direct them to whatever witness you would like to hear from.

I would now like to start with the opening statements by our witnesses.

We'll start first online with Mr. Lawrie.

**Mr. David Lawrie (Program Director, Citizen Scientists):** Thank you for the chance to address the committee.

I'm going to talk about our group a little bit and our experience with the role of citizen science. We're definitely on a different scale than the last group you talked to. We're a small NGO in the east end of Toronto. We operate in what's now the Rouge Urban National Park. We've been operating there for 21 years. We have a lot of experience, but in terms of scale and scope, our experiences are different from those of the other groups you've talked to.

The value we in Citizen Scientists perceive is that we can really fill a lot of gaps that other agencies and organizations don't currently fill. We have become a niche organization that helps to fill those gaps. We're a lot more flexible and adaptable than a much larger group, such as a conservation authority or ministry, can be. If we want to go and monitor something else next week, we can do that. We don't need the approval of a board. We don't need approved budget line items. We can use our own equipment and our own labour to go do that. We're quite flexible and adaptable in that way.

The other thing that's really of benefit from a science perspective is that we are on the ground a lot. We often have members who are activists or scientists. They are from the local areas. They really know the landscape more than any other agencies or biologists from the ministry, for example, do. They're there all the time, every month of the year, for years upon years. We can see changes that occur. We try to systematically document those changes.

When you have a ministry or there is a larger program that does the work, they come through once every decade and they do a day of surveying. Our understanding of the local systems is different from what that of a biologist from another agency might be.

The role we play in the landscape and the world around us is largely dictated by those who are in charge of the land. We're in southern Ontario. We're not a major landowner. We're on land that's owned by someone else—the government, private organizations, conservation authorities or something like that. We are there trying to observe the world, but we often need permission and an invitation to participate in those discussions about how the land is managed or operated. The role is defined for us in large part.

When you talk about citizen science, there's often confusion between what science is and what activism, involvement or engagement is. We try to do actual science. We do a lot more detailed work than some of the other groups might do. They are more activist-focused. Their primary role is trying to raise awareness.

If you're looking to encourage citizen science over time, we need to consider that there are two ends of the spectrum. There's the organization that wants the data or the government that wants the information, and there's the application of the individuals collecting the data.

There are also the guys who do that work on a volunteer basis. They have wants and needs as well. Some of them want to have some increased training to build their skill set, but often they want to see changes in the world. That's why they are out doing the work. They want to see something that concerns them get changed, rectified or managed better.

That's one thing you have to think about. The encouragement and involvement by the citizen science community in doing something meaningful and actual is really a role that needs to be encouraged, to help expand their roles.

- (1210)

I guess you guys saw, in the first presentation, that there are two scales of monitoring or research they encourage with citizen science. The first role or the first stream originated years ago. There were primarily expert naturalists and retired professionals who had a lot of background in that field. They wanted to continue their role in the world and help other agencies and scientists fill gaps. There was a lot more on-the-ground monitoring and measuring of the real world around them, so that requires primitive field equipment and that sort of thing.

The more recent adaptation has been—

**The Vice-Chair (Mr. Corey Tochor):** We're going to have to explore some of your comments more in the answers to questions, because we are over time already.

We are moving on to Madam Hull, please.

**Ms. Juliet Hull (National Volunteer Coordinator, Community Collaborative Rain, Hail and Snow Network):** Hello. Thank you for allowing me to speak in front of you today. It is an honour.

Today I'm representing Community Collaborative Rain, Hail and Snow Network Canada, from here on in referred to as CoCoRaHS Canada. This is an international precipitation reporting network that has thousands of volunteers in the U.S., Canada and the Bahamas.

The network started in 1998 out of Colorado State University and expanded into Canada in 2011 following a massive flood in Manitoba. In the first year, the network gained 80 active volunteer observers. As of January 31, 2023, there are 843 active volunteer observers in Canada.

Not only has the network grown to 10 times its size from the first year, but over the years there has been a steady increase in the number of reports each volunteer makes per year. All of this is to say that CoCoRaHS Canada has been able not only to keep a network of enthusiastic and consistent volunteers but to also steadily increase it.

There are several key ideas that we attribute to the continued success. These include strong partnerships, reliable local coordinators, enthusiastic volunteers, an accessible website, detailed training, simple low-cost equipment and an easy reporting system.

Identifying partners who are interested not only in the subject matter of the program but also in the data collected, with the ability to adapt it locally, is key. Being able to identify groups that would not only willingly work with you but that want to work with you is an important first step in building a citizen science volunteer network. Examples of groups that CoCoRaHS has partnered with include agriculture groups, emergencies managers, universities and local schools, conservation areas, meteorologists, climatologists, ECCC and local municipality water management.

Having reliable local coordinators among the group of partners is a wonderful way to build up a network. These coordinators have

valuable insight into people who may want to join the network, such as community members, local groups and leadership in the area. Local coordinators will better be able to connect with enthusiastic volunteers and nurture their enthusiasm to be long-lasting. Having enthusiastic volunteers means that they are intrinsically motivated to continue with reporting for longer than someone who is seeking external validation would be.

While having enthusiastic volunteers and good connections is vital, if the method in which they are reporting their findings is difficult or confusing, or the equipment that's necessary is expensive or complicated, then they are not likely to continue with the program. Finding a method of reporting that is simple, easy to learn and quick is key to keeping an established volunteer network. Even with the most valiant cause and the most enthusiastic volunteers, if the work is difficult or time-consuming, volunteers are likely to get discouraged. I believe it is vital to remember that citizen scientists are still volunteers and that as a citizen science organization we need to show that we value their time and energy.

With CoCoRaHS, there are three ways to submit reports: on our website, on our smart phone app or over the phone. With every method, it takes only about one to five minutes of day-to-day active participation. We also have training and slide shows on every single part of the reporting process available on our website at any time. The volunteers use basic practical methods to conduct their observations, which makes the program accessible to all communities.

The final thing I would like to mention is the importance of providing meaning behind participation. Ensuring that volunteers know what their hard work is being used for and who it is benefiting is one of the most vital steps to establishing a successful citizen science network. This gives the volunteers' work purpose and makes them feel as if they are making a difference. Even though their work is extremely important, if this isn't made clear, then they're likely to lose enthusiasm for the project, especially if it's meant to be long-lasting.

In CoCoRaHS, every single report that any observer across the three countries that it's run in is plotted on an interactive map that is available for the public to see, and every year all observers are given an analysis of their reports across the water year. Their different research reports, such as snow coverage reports and rainy day reports, are available on the website at any time. Observers are also made aware of the ECCC reports that their data is being used in throughout the year.

If an organization can truly make volunteers feel as if they would be making a difference and bettering the world, then that is the most important thing to successfully enhancing Canada's citizen science network.

Thank you.

• (1215)

**The Vice-Chair (Mr. Corey Tochor):** Thank you so kindly for delivering your opening remarks within five minutes. It's much appreciated.

Now we'll go to our witness in person, Madam Reinsborough.

**Ms. Laura Reinsborough (Riverkeeper and Chief Executive Officer, Ottawa Riverkeeper):** Thank you, Mr. Chair, for having me today.

Thank you, all, for looking at this topic of citizen scientists. I think you have an opportunity here, not only to validate the work but also to provide opportunities to strengthen it. I'm eager to tell you why Ottawa Riverkeeper has been engaging citizen scientists in our work as an integral part of what we've been doing for the last decade.

Ottawa Riverkeeper is a trusted, independent voice for the protection of fresh water. A charitable organization founded in 2001, we're a champion for swimmable, drinkable, fishable waters throughout the Ottawa River watershed.

[Translation]

Ottawa Riverkeeper's goal is to better understand and protect the ecological health of the Ottawa River watershed. We are a bilingual organization guided by a science-based approach.

[English]

When you are in Ottawa, you are very likely drinking water from the Ottawa River—cheers. We quite literally depend on this source of life. This is a vast watershed. The Ottawa River watershed is more than twice the size of New Brunswick. It is nested in the world's largest freshwater ecosystem. The Ottawa River itself is the largest tributary to the St. Lawrence at over 1,200 kilometres long, yet we know very little about this waterway.

There are multiple overlapping jurisdictions and a sense of taking it for granted, so we're left with significant data gaps. This leaves us vulnerable and unable to make informed decisions in the best interests of both our human health and ecosystem health.

The work that Ottawa Riverkeeper does, including our watershed health assessment and monitoring initiative, which is a comprehensive suite of scientific monitoring for 14 different indicators of river health, aims to fill these gaps and inform decision-makers like yourselves.

This year we're celebrating our 10th anniversary of engaging citizen scientists. We have involved them in many different scientific studies on many different issues, and I have a few key messages to share with you today based on our experience.

Citizen scientists extend both the reach and the rewards of science. Particularly, NGOs play a critical role in ensuring that this work is done successfully. Here are a few examples of how Ottawa Riverkeeper has done this work.

In 2013, we launched our riverwatcher network. There are over 100 volunteers now who monitor monthly in their stretch of the river for water quality data, pH, temperature, dissolved oxygen and ice cover. We get a really local view regularly along the river stretch to

see what is happening, like local impacts of climate change, for example.

In 2015, we worked with the Canadian Museum of Nature to have citizen scientists monitor zebra mussel infestations. That same year, we launched in the city of Gatineau, the island of Hull, looking at *E. coli* contamination from combined sewer overflows and whether beaches were really healthy to swim at.

Then in 2015, we collaborated with Dr. Jesse Vermaire from Carleton University to look at microplastics in fresh water, and it was the largest group of citizen scientists collecting data on microplastics in a freshwater ecosystem worldwide. We recently co-authored a paper with Dr. Jesse Vermaire.

Last year we had 157 different citizen scientists monitoring across various programs: algae blooms, conductivity testing for road salt chloride levels, total phosphorus, and chlorophyll a.

We are testing and trying to engage citizen scientists across many of our programs because they extend our reach. The geographic reach in such a huge watershed is so much more than what our small team can achieve. It really is exponential in allowing us to monitor across the whole watershed. It also expands our capacity for monitoring the frequency with which we could monitor and, very importantly, they bring local knowledge, which enriches the data and also informs better decision-making based on that data.

They extend the rewards. We believe that people protect what they love, and they love what they know and understand, what they're familiar with. Citizen scientists have this direct hands-on engagement by knowing the river, and this translates to more and more people actively engaged in protecting those waterways.

• (1220)

Critical to all this success are ENGOS, like Ottawa Riverkeeper. We're trusted. We have connection with community, which lends credibility and brings in people to be involved in this work.

This is where we can offer long-term support, if we have funding and the capacity to make sure that we can be a strong third sector supporting citizen scientists and decision-makers.

Thank you.

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much for that.

We now move onto the six-minute round.

From the Conservatives, we have MP Mazier.

**Mr. Dan Mazier:** Thank you, Chair.

Ms. Hull, thank you for being here today.

You just reminded me in your opening remarks about why I got involved with CoCoRaHS. I was a volunteer for about a decade. It was a 2011 flood that actually got me involved, realizing that there was a lack of data in our area and on our farm.

As a result, the 2014 flood showed the missing data. Again, our farm got hammered, with over 180% of normal precipitation that year. The data does speak for itself and the volunteer efforts.... I recognize that right off the hop.

I did also realize that CoCoRaHS seems to be reliant on a small number of staff and coordinators across this nation to keep it going. I was wondering what happens when a key member of the organizations leaves.

Where is that data kept? How does ECCC help you out with maintaining your organization and input with that data?

**Ms. Juliet Hull:** You are currently looking at the entire staff of CoCoRaHS Canada. It's just me working for the organization.

I also have my ECCC contact, Rick Fleetwood, who has been with the organization since it started in Canada. He has been indispensable. Sadly, he retired around October of last year. He has come back twice now on casual contracts, but he is definitely done for good in March. While there is a succession plan, losing someone who has been with the program for so long and has so much knowledge built up from years of experience working with it is really difficult.

When CoCoRaHS first started expanding around 2013, we received a big contract from ECCC, as well as AAFC. That was a five-year contract. That was when there were, I believe, three or four other coordinators across the country who were able to focus in on just Manitoba, just B.C., just the Maritimes and just Ontario. That contract ended in 2018.

In 2020, another contract was signed with ECCC, but for substantially less. We haven't been able to build that infrastructure back up, which definitely has had an impact on our ability to expand in certain regions.

Rick has been great because he's been able to connect me with different branches of the government that are interested in applying the program. For example, we're currently in talks with the Nunavut government on expanding the program there. We currently only have one observer there and with this program, we're looking to get anywhere from 12 to 24 observers, which is wonderful. I don't think I would have been able to do that without Rick's connections because Nunavut is such a different culture. There are language barriers sometimes.

In order to truly expand and strengthen the network, we need to have people across the country on the inside helping us out.

• (1225)

**Mr. Dan Mazier:** It definitely speaks to the strength of having those volunteers in place. It's almost a shame to see them all kind of disintegrate. Then there's government trying to consolidate instead of enhancing and making that network grow.

Thank you for bringing that point forward today. Hopefully, we can act on that moving forward.

You're part of the United States, as well. I guess that's where the main part of this process or initiative started. Are there parts of the United States that outperforming Canada? Do you know any reason why the United States seems to be almost thriving?

Is there something different we can do here in Canada as far as government, versus the United States?

**Ms. Juliet Hull:** As far as the government is concerned, I can't really speak on that, but I know that in the States, they have somewhere between five and 15 local coordinators per state. For example, Massachusetts is a relatively small state, but there are six local coordinators just for that state.

As well, I've been told by my colleagues in Colorado that the American population is very weather obsessed. The general population already has a different viewpoint on weather and reporting on weather, which can create some differences in the number of people willing to sign up and report.

However, I truly think it's the lack of coordinators across the country that has limited our expansion.

**Mr. Dan Mazier:** What are the future plans for CoCoRaHS?

**Ms. Juliet Hull:** Mainly, right now, we're focusing on expanding into the territories, because we have one observer in Nunavut, two in the Northwest Territories and one in Yukon. The north is a very important place to get weather data, especially when looking into things like climate change, so we're focusing on and really pushing into the north.

We've been working with the Nunavut government and the Northwest Territories government. We're trying to plant the seed at the head of the government, and then they're able to trickle down to different organizations within the territory. I know that in Nunavut, they're reaching out to the hunters associations and the fisheries, which would be very interested in the data.

• (1230)

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much for that. We are out of time for that round.

We're moving on to MP Bradford for six minutes.

**Ms. Valerie Bradford (Kitchener South—Hespeler, Lib.):** Thank you, Mr. Chair.

Welcome to all three of our witnesses today.

This is the inaugural parliamentary committee dedicated to science and research. We had the opportunity to look at big science in earlier studies and moon shots most recently. Now it's so important that we have a chance to speak to you about citizen science, which is a very cost-effective means of on-the-ground observation and data collection. It's a very important piece of the puzzle.

I think the first couple of questions will go directly to Mr. Lawrie and Ms. Reinsborough, because it strikes me that you're both doing very similar sorts of research, but in different watersheds. Mr. Lawrie is with the Rouge River in the Toronto area and you, of course, are here with the Ottawa River.

Maybe David can start first, because he was first up. What aspects of research, such as study design, data collection, data analysis, evaluation, monitoring and knowledge dissemination does citizen science contribute in your organization?

**Mr. David Lawrie:** For our group, we follow standard protocols. We use OSAP as a base to collect standardized fisheries, channel data and thermal data from the stream. For forests, we'll do EMAN or salamander plots to look at the biodiversity of the forest and salamander population. We'll then do other formalized standard protocols for other tentative ecological research.

We don't produce a lot of technical reports, because we don't have the capacity. We are entirely volunteer-run and -operated, so we have enough trouble just trying to get people out to collect data.

We make the data available to other researchers and the local governments if they want it, and we try to encourage them to take it and use it when we have the ability to do that. We've provided our data to U of T, and worked with academics and Ph.Ds to produce scientific papers on the data we've helped to collect.

That's where we're trying to do the dissemination. It's through other organizations that have that capacity to get the information out there through academics and local schools, primarily like Centennial and U of T.

**Ms. Laura Reinsborough:** We have created a number of different ways in which citizen scientists are involved. Sometimes it means we are collaborating with, for example, the Museum of Nature or Carleton University researchers. We are a conduit to engage the volunteers, provide the training materials and set them up for success in the work they would be doing.

With our road salt monitoring, it involved training citizen scientists to learn how to use the conductivity meters and how to submit the data points. Sometimes it is about the doing, but there is also opportunity for co-creation, especially when we are collaborating with indigenous communities and Algonquin communities.

The watershed is almost exactly the unceded land of the Algonquin Anishinabe. Working with the indigenous guardians program at Kitigan Zibi First Nation, for example, we have an opportunity to be co-creating, but also to be careful about the data sharing. In most cases, we are very transparent about sharing data, but we want to ensure we are doing this with full respect for the indigenous communities in order to make sure they have control over the data and how it is shared. There are a number of different ways of involvement, depending on what we're monitoring. There is also a role for

the Ottawa Riverkeeper. We are confident that citizen scientists can be involved in all of those steps you outlined.

• (1235)

**Ms. Valerie Bradford:** Continuing with that, how can the results of citizen science be better integrated into government decision-making?

**Ms. Laura Reinsborough:** I would point to a report that came out of the Gordon Foundation a few years ago. This is within the context of water quality monitoring with community-based monitoring or citizen scientists. It came up with five different areas where the federal government could take action. It's all outlined in the report.

The Gordon Foundation, Living Lakes Canada and WWF Canada pulled together this forum to look at what is needed to support this work for water monitoring across the country. It includes capacity building, data management, regional and national collaboration, and ensuring data has a clear pathway to informed decision-making. The steps are all broken down. It's a great report, and we've included it in our brief as a reference for the committee.

**Ms. Valerie Bradford:** Thank you.

Turning to you, Ms. Hull, in your opinion, what role can the federal government play in promoting and supporting citizen science and citizen-driven scientific goals?

**Ms. Juliet Hull:** The federal government has many channels to get awareness out there. The first problem is that people don't know these things exist. I am sure there are plenty of people across the country who would be interested in joining any sort of citizen science program, no matter if it's bird identification, helping with the watershed or doing precipitation reporting.

**The Vice-Chair (Mr. Corey Tochor):** Thank you so much for that. We're out of time. There will be other questions, hopefully, where you can unpack that thought a bit more.

With that, we'll move on to MP Blanchette-Joncas for six minutes.

[*Translation*]

**Mr. Maxime Blanchette-Joncas:** Thank you, Mr. Chair.

I would like to welcome the witnesses who are here with us for the second half of our meeting today.

Ms. Reinsborough, I congratulate your nonprofit organization's contribution and engagement, which is playing a vital role in protecting watersheds. I also work closely with organizations seeking to protect watersheds. It is important to protect our ecosystems, especially the aquatic ones. I salute your work and I encourage you to continue. It is crucial work.

I liked the reminder you made that the water we are drinking today comes from the Ottawa River. I would like to expand on that statement. We should remember that 60% of the human body is water: water is important.

I would like to understand in concrete terms how the federal government could better help organizations in getting people involved in citizen science.

**Ms. Laura Reinsborough:** Our organization, Ottawa Riverkeeper, believes that the federal government has an important role to play in supporting our work and helping nonprofit organizations. We are indeed very important partners when it comes to linking the federal government with what is happening at the community level. The federal government should trust us, because we have a relationship with the communities.

When I spoke of support, it isn't just supporting us in our work, but also supporting us financially. The important initiative that I spoke of was funded by the federal government, actually by Environment and Climate Change Canada, but only for three years. This funding was hugely beneficial when we launched the program, but we don't know where to get funding now. We need more long-term support. Those three years were a good start, but it doesn't help us over the long term.

**Mr. Maxime Blanchette-Joncas:** Thank you, Ms. Reinsborough.

If I understand you correctly, you need stable funding from the government to allow you to better plan your activities. If you are unable to plan, you have to negotiate every year and you are constantly in a state of flux, and we know that it will be hard for you to retain talented people. I think the message has been heard. We are certainly able to include it in our report.

Do you believe that citizens, economic stakeholders and elected officials are listening when your organization takes a stand on issues that concern the Ottawa River?

• (1240)

**Ms. Laura Reinsborough:** Yes, people trust us. We are the river's voice. I think the fact that we are science-based and speak about facts and what the river needs helps us to engage in factual and honest discussions and to work collaboratively to meet the river's needs. Those needs are linked to human needs. Right now, we need cooperation and collaboration. That benefits everyone.

**Mr. Maxime Blanchette-Joncas:** Ms. Reinsborough, I see that your organization also acts as an ombudsman and public defender for the Ottawa River. You receive financing from the government...

**Ms. Laura Reinsborough:** That is not our official title. Our role is to be the river's voice.

**Mr. Maxime Blanchette-Joncas:** Do you understand my question? Do you hesitate to intervene or to act in certain cases, know-

ing that you could lose the federal government's support, which is one of your main sources of funds? I took a look at your budget: you have \$1.5 million in annual revenue, which is a pretty good budget. A quarter of your funds come from the government.

**Ms. Laura Reinsborough:** It is really important for us to uphold our reputation in the community. I personally believe that we are an independent voice. Yes, it is important to receive funding from various sources, including the government, but when the day comes that funding will have an impact on our activities, the buck stops there.

**Mr. Maxime Blanchette-Joncas:** We understand perfectly, Ms. Reinsborough: It is important to maintain one's independence.

You work in the region of the Ottawa River, which means you also work in Ontario. The region is bilingual, and by bilingual I mean French and English. You receive federal funding. I would like to know if you produce your communications and reports and carry out your information and public awareness activities in both official languages and, if that is the case, if this is a requirement attached to the federal funding.

**Ms. Laura Reinsborough:** Yes, we do everything in both official languages. Two thirds of the watershed are located in Quebec. It is therefore very important that our organization be bilingual.

**Mr. Maxime Blanchette-Joncas:** Ms. Reinsborough, I know that you are from New Brunswick and that you have a greater awareness of the importance of offering services in French in certain francophone communities in Canada, such as the Acadian ones.

What do you think is the importance of mobilizing citizens in francophone communities who do not have access to certain scientific publications because they are only published in English? How can we mobilize those francophone communities, both in and outside of Quebec, if the people do not have access to scientific publications in the official language that they use?

[English]

**The Vice-Chair (Mr. Corey Tochor):** I'm sorry to interrupt. We were 26 seconds over on the delivery, not even in the answer. If I could get a written response to MP Blanchette's question, that would be great.

Now we move on to MP Cannings for six minutes.

**Mr. Richard Cannings:** Thank you. I think I will start with Ms. Hull.

You have quite a few volunteer reporters across the country, and I know from my own experience how important showing people that the data they are putting in is being used is in attracting and maintaining that network.

My first question is if you could maybe remind me and expand on how that data is shown in output, how people can, say, go online and see how that data has been put together and whether they can see a dot on the map where they put in their data. That seems to be a really important part of keeping citizen scientists going—that is, showing that their efforts made a difference.

**Ms. Juliet Hull:** On the CoCoRaHS website, there is an interactive map where every single report from every station is a colour-coded dot depending on how much precipitation was reported that day, from zero to however high the precipitation is. You can zoom out and see a complete map of North America and see all of the reports that were done for that day, or you can zoom in to where you are and you can click on every single dot on the map and it tells you exactly what was reported, and if there were any comments.

There are different things you can report. Every observer has a manual rain gauge, which is a graduated cylinder with a funnel on top and an extra outer cylinder to catch overflow. Reporting what is in the rain gauge is necessary in order to submit a report, but there are other things like snow depth, 24-hour snow accumulation and snow water equivalent reports. There are also different types of reports there.

If you want to get involved, you can do something as simple as just go outside, check your rain gauge, see that you got one centimetre of rain yesterday, enter it and, boom, you're done, or if you are more interested, you can do condition monitoring reports, all different sorts of snow measurements or make big comments about the temperature, the timing, the wind speed. All of that is visible just on the map by clicking on a dot, so if you were curious about what happened in Nova Scotia yesterday...

When Hurricane Fiona was happening, we had wonderful reports from observers who had really detailed comments about what was happening.

● (1245)

**Mr. Richard Cannings:** You mentioned that you had a Mr. Rick Fleetwood from ECCC helping you. Hopefully that help will continue in some way. How does ECCC use this data from your organization?

**Ms. Juliet Hull:** ECCC has a network of weather stations across the country. All of them are more technologically advanced, whether it's a tipping bucket by weight—and those are established across the country—but ECCC actually uses the CoCoRaHS network to do QA/QC and to bulk out the precipitation data that they get. Depending on the area, for example, in the Northwest Territories, the CoCoRaHS observer reports are oftentimes more accurate or trustworthy and have a lot of weight behind them, and they're put in the different precipitation outlook reports that ECCC puts out.

**Mr. Richard Cannings:** Thank you.

I'll turn to Ms. Reinsborough now.

It sounded like your organization is doing a whole lot of quite different things. It's a very diverse suite of programs you have. Can you just remind me which of these, if any, have a long-term aspect to them? As I was mentioning in the previous list of witnesses, one of the real values of citizen science is that we can get these long-

term datasets. I'm just wondering which of your programs have that in mind.

**Ms. Laura Reinsborough:** They don't all have a long-term role.

What we found with our E. coli water quality testing in Gatineau was that then the City of Gatineau began doing regular water testing. There was no more need for us to continue that. We continued to upload those values to the Swim Guide, but we found that was the measure of success.

However, with our watershed health assessment and monitoring initiative, the goal is to gain long-term datasets that we can combine with other datasets. Having the more local citizen scientist datasets allows us to see the really nuanced long-term effects. With our riverwatchers, we already have 10 years of data for the water quality they've been monitoring. Ten years is still just a small blip. The more we collect the data, the more we will be learning from it.

We're also finding shorter loops for some of the data. Unfortunately, we are seeing that some of it tells us a story about very quick, local impacts of climate change. The long-term data is important, but there's already so much to learn in analyzing the short-term data as well.

● (1250)

**Mr. Richard Cannings:** Thank you.

Also, if I have some more time....

**The Vice-Chair (Mr. Corey Tochor):** You're 20 seconds over already, Mr. Cannings, unfortunately.

We're moving on to the five-minute round with MP Soroka.

**Mr. Gerald Soroka (Yellowhead, CPC):** Thank you, Mr. Chair.

I'll start off with Ms. Hull.

I think the work you're doing is quite interesting. I'm just curious, though, about the accuracy of your data. You speak about regional weather stations and those are much more scientific than what you're doing with the citizen scientists. I'm just curious. I'm not saying it does happen, but if you did have somebody trying to prove that the climate crisis was really hitting them hard so it was very dry and very hot, then what would you do with that type of information? Would you accept that or would you consider it invalid and just not use that person's information anymore?

**Ms. Juliet Hull:** That's actually a great question.

CoCoRaHS in general has a very robust QA/QC process. Every single report is put through that process to make sure it is accurate. We have had to close some stations because people were using it to push a narrative. We don't do that immediately. We try to discuss what they should be doing and how to report properly. We definitely do sometimes get people using it to push an agenda.

Most of the time when there are errors in reporting, they're either typos or people have forgotten to make a multi-day report and they put a week's worth of precipitation into a single day. That all does go through a rigorous QA/QC process.

**Mr. Gerald Soroka:** Thank you, for that, Ms. Hull.

That's one of my big questions. Citizen scientists are great. They help out a lot, but as you said, if they have their own agenda.... I'm glad there are safeguards put in place so the information is accurate in the end. That's what we actually need—accurate information. That's great work on that.

I'll go to Ms. Reinsborough.

I love the fact that you're looking at salt. I just cannot believe how much salt they use here in Ottawa. Is your data proving that it's having an impact? If so, are you having any success in trying to get the cities to use less salt or not?

**Ms. Laura Reinsborough:** This is now our fourth winter doing road salt testing in local creeks in urban areas of both Ottawa and Gatineau. What we are finding is that 80% of the tests we have done are showing that they are beyond the threshold limits of what an aquatic ecosystem can endure. The data will tell us where the most urgently affected areas are that have the highest concentration. They sometimes have close to ocean levels of salt.

That allows us to look at the land use around those creeks and to do education on awareness. In fact, last week was our road salt reduction week. We do awareness campaigns about lessening salt use but also some training. One intervention we did last year was to bring in some key operators who would be applying road salt for private companies and have them do "Smart About Salt" training, which was developed in Ontario. That's one intervention.

We know where those high urgency creeks are only by doing the regular testing.

You were just asking about the validity of the data, and there's an opportunity there. We can test for the conductivity in a creek. That's a proxy for understanding how high the chloride levels are. If we're seeing very high levels, then we will do a test for chloride directly. We'll take that same water sample to a lab and test it for chloride, not just for conductivity. That will allow us to compare and see that we can confirm the results.

Overall, yes, it is the municipalities that apply road salt, but it is individuals and it is businesses. We really need that broader education effort to ensure we all know what the appropriate use of salt is.

• (1255)

**Mr. Gerald Soroka:** Actually, that's a very good point, but I just didn't know how you'd be determining municipal road salt versus public road salt. The reason I bring this up is that when summer-

time comes and people start applying fertilizers, a farmer would put on, maybe, 150 to 200 pounds an acre of nitrogen and so forth, where for someone in the city here it's probably around 1,000 to 1,500 pounds an acre, the same equivalence. They are just superseding the nutritional requirements of grass and don't even realize it. They think, that whole bag lasted me the whole summer and it only was \$34, so big deal. Do they know how many thousands of pounds an acre they're actually applying?

That's where I think it is, that really, people don't realize in their own personal use how excessive they're becoming. That's why I was wondering. I didn't think you could determine between the two. Could you?

**The Vice-Chair (Mr. Corey Tochor):** MP Soroka, you're over time. You are worth your weight in salt. I'm very appreciative of the question because I, too, have concerns about how much salt Ottawa is putting in our environment, but I digress.

The last five-minute round will go to MP Collins.

**Mr. Chad Collins (Hamilton East—Stoney Creek, Lib.):** Thanks, Mr. Chairman. Thanks to our witnesses for appearing today.

My questions are going to centre around the pandemic and its impact on, maybe, your volunteer base. As a long-time city councillor and as a 20-year member of our conservation authority, as an example, I know that when the pandemic arrived so many people had no opportunity to travel at home or, really, abroad. Thus, so many people "rebound" the outdoors, so to speak. Our campsites filled up immediately. There were so many people using our trails. In numbers, for our waterfront trails and our local parks, the usage was off the charts in terms of what we were accustomed to experiencing over the years. From a conservation perspective, it was a welcome change in terms of the numbers.

I know that if I switch gears, then, to the food bank I started and opened with my constituents, the volunteer numbers there fell during the pandemic. It was tough to get people to come out. There was a lot of hesitancy about being indoors, obviously, and close to people with all that went on in the first couple of years.

I've watched recently and I've read recently some reports that talk about volunteerism affecting the non-profit sector. Numbers are down in the range of between 55% and 65% in some areas, in terms of trying to encourage people to volunteer or donate their time to certain causes.

I'd like to understand, from all the witnesses here today, how the pandemic might have impacted your operation, with volunteers or otherwise, and what role the government might play to assist in maybe kick-starting and providing support with either infrastructure, outreach or other operational issues that you may still find to be a challenge.

Ms. Reinsborough, with that, I'll ask you to answer it first.

**Ms. Laura Reinsborough:** Thank you. Yes, it's a great question.

When the pandemic first started I was working with a food security organization at the time. The impacts on volunteerism were absolutely hard.

The type of volunteering that Ottawa Riverkeeper does with citizen scientists is quite different. Often an individual will gather data on their own in a single point and then mail or transfer the results back. In this actually, though we as an organization needed to pivot in how we supported volunteers—more virtual training, preparing packages, ensuring that contents were safe for all parties involved—we could still ensure that it was done safely.

There were some volunteers who decided not to continue and we paused on some programs, but most were able to continue. That access to blue spaces and the more qualitative impacts of being able to volunteer—a sense of belonging, a sense of purpose, being part of something bigger than yourself—all of this continued and was even more needed, I would say, during the pandemic.

Our volunteering has been able to continue. In fact, we've had very high demand. Last year we had over 225 people respond to a single request for volunteers. We're now trying to make sure that we have opportunities for all of them to be supported. It does take staff capacity. I would say that's where the long-term stable funding for the third sector, the community sector, can really make a difference.

**Mr. Chad Collins:** Thank you very much for that answer.

Mr. Lawrie, can I ask you the same question?

**Mr. David Lawrie:** Yes. We're similar in that a lot of our work can be done individually. We have had a lot training programs in the past to help train volunteers, but we had to shut that down for the last two and a half years. We're just getting started up again this year with some of our work. We were pretty much shut down for the last two or three years, except for a couple of volunteers who were willing to work on their own doing acoustic bat surveys and salamander monitoring. Other than that, we are just getting back up to speed now.

Similarly, having access to some kind of stable funding would help tremendously, because we have none for our operational work. We do a lot of project-based work, and that's all grant-based. That's money in the door and out the door. We don't have any operational funding to do long-term training or operational activities. It's all project-based.

● (1300)

**Mr. Chad Collins:** Thank you.

Mr. Chair, I think I'm out of time. I don't know whether Ms. Hull can provide some written correspondence as it relates to what her answer might be.

**The Vice-Chair (Mr. Corey Tochor):** Thanks so much for all the questions and answers today from our witnesses. We are done for that portion of the meeting.

We do have a quick matter to discuss and to approve. The clerk shared a draft budget in the amount of \$17,950 for our study on citizen scientists. Is there a motion to adopt that budget?

(Motion agreed to)

**The Vice-Chair:** Our next meeting is scheduled for Thursday, February 9. The chair will have the clerk publish the notice soon.

Colleagues, with that, is there agreement to adjourn that meeting?

Seeing that there is, we are adjourned until Thursday.





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