New paper lays out agenda for the next generation of biodiversity research

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Weather and climate disasters in the United States have cost more than $100 billion this year, according to reports from the National Oceanic and Atmospheric Association. The devastating year of heatwaves,

flooding and wildfires is making it clear that humanity is interconnected to natural systems—and that the impacts of human activities on nature are in turn driving negative consequences for humans in a vicious feedback loop. But are research, investment and science-policy interactions keeping pace? New work from University of British Columbia biodiversity expert Dr. Mary O'Connor and colleagues calls for more explicitly incorporating feedbacks into biodiversity research and policy making.

Your paper focuses on the need to explicitly consider feedbacks in biodiversity research and policy making. In this context, what are feedbacks?

A feedback is anytime a system affects itself. This happens all the time in social systems: I say something that you react to, and then I react to your reaction. And it happens in nature. In an agricultural system there's an interrelated feedback loop between pollinator diversity, plant seed production and human activities—we know conservation measures to protect pollinator diversity may benefit humans by enhancing crop yields. If we don't integrate these types of feedbacks into our knowledge frameworks and policy, our plans for the future could miss some important affects of feedbacks. We might not realize the full benefits of actions we could take to enhance sustainability.

You argue the biodiversity community needs to do a better job of collaborating and connecting.

Yes. We face such an immense challenge we must join together to meet it. We need to build collaborations that reflect the ways people know and interact with biodiversity, all sectors and contexts. If we do, we'll include a broader range of knowledge systems and perceptions of human–biodiversity interactions. People serve as observers, knowledge

keepers and knowledge users—humans benefiting from ecosystem services and decision makers play critical roles in feedback cycles.

We also need to do a better job around diversity. Scientific and science–policy collaborations in biodiversity should strive for cultural, geographical, political and ethnic diversity among researchers and within research projects.

A key recommendation is building national and global biodiversity observatories that monitor both ecosystems and human activities. What would that look like?

This is something we can act on in Canada right now. It would look like a networked community of people—not only scientists—observing local biodiversity regularly and sharing those observations. Regional and national teams would process, analyze and visualize data to identify feedbacks and big changes, and guide decisions. We have nothing like this right now, but we are close to building it. The Global Earth Observatory Biodiversity Observation Network is underway and leading in this area, and now is the time to roll up our sleeves in BC and Canada. In this way, we build a Canada-wide community that works to live our lives with biodiversity thriving around us.

Are you hopeful the biodiversity research community and policy makers can make some these investments and changes in time?

Absolutely. With growing momentum for observation networks in Canada, we face an unprecedented opportunity to join together across sectors and cultures on the subject of biodiversity assessments that

include ecosystem functioning and human activities. This is about observing our world and participating mindfully in change. It's also a way to come together as people who live in Canada and care about our natural heritage. As climate change accelerates and our past actions catch up to us, we have a unique opportunity to change course. Committing to a program that emphasizes biodiversity, ecosystems and humans is the right way to go.

The paper was published in *Proceedings of the Royal Society B: Biological Sciences*.

More information: Mary I. O'Connor et al, Grand challenges in biodiversity–ecosystem functioning research in the era of science–policy platforms require explicit consideration of feedbacks, *Proceedings of the Royal Society B: Biological Sciences* (2021). DOI: 10.1098/rspb.2021.0783

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