

Climate change = a much greater diversity of species + a need to rethink conservation paradigms

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Researchers suggest that preserving a range of habitats and landscapes may prove the best way of ensuring biodiversity over the long-term. Credit: Jacques Larivée

A team of researchers believe that, paradoxically, climate change may result in Quebec's national and provincial parks becoming biodiversity refuges of continental importance as the variety of species present there

increases. They used ecological niche modeling to calculate potential changes in the presence of 529 species in about 1/3 of the protected areas in southern Quebec almost all of which were under 50 km² in size. Their results suggest that fifty—eighty years from now (between 2071-2100) close to half of the protected regions of southern Quebec may see a species turnover of greater than 80 %.

The research team, from l'Université du Québec à Rimouski, le Ministère des Forêts, de la Faune et des Parcs, and McGill University believe that, depending on the region, the gain in the number of [species](#) of birds, amphibians, trees, and vascular flowering plants could range from 12 and 530 %. It is the first study to examine in such details the potential effects of [climate change](#) on the biodiversity of a large network of northern protected areas.



Researchers calculate that more than 80 % of the species currently found in provincial and national parks in Quebec may have been replaced by others within 50-80 years as the climate changes. Credit: Jacques Larivée

A need to rethink conservation paradigms?

The researchers believe that the scale and rapidity of the species turnover will also result in a necessary reexamination of current [conservation](#) paradigms, since it will be impossible to preserve a snapshot of today's biodiversity in the National Parks. More specifically, the researchers believe that:

1. Rather than trying to preserve current biodiversity in the National Parks, a more effective conservation strategy to ensure future [biodiversity](#) may be to preserve site resilience and a diversity of physical features and conditions.
2. There will potentially be complicated choices ahead for managers of protected areas as increasing numbers of new immigrant species colonize protected sites. If historical communities are deeply modified, the managers may need self-sustaining populations of non-native species in some protected areas. But newly arriving species may also have negative impacts on ecosystem structure and function.
3. Assigning conservation status to rare and recently naturalized species may prove a thorny issue, given that a significant portion of northern species are already at risk. But the conservation value of rare new species should be considered in a long-term continental perspective rather than short-term national perspective.
4. It will be important to preserve and restore connectivity of protected areas to allow potential corridors for migration. In this way, species will avoid being trapped for decades or centuries between rapid retreat from the territory's southern edge and only a slow advance on the northern edge.

The researchers caution, however, that potential species gains should not draw attention away from the potential extinction of local species that may no longer find suitable conditions in future in the protected areas

where they are at the moment. The geographical pattern of potential relative species loss suggests that several species could disappear in both the southernmost [protected areas](#) of Quebec, and in the higher latitudes, where the extinction of only a few local species can have drastic effects on whole ecological communities.



The researchers point to the importance of creating corridors for migration so that species avoid being trapped for decades or centuries as the landscape changes. Credit: Jacques Larivée

More information: Dominique Berteaux et al, Northern protected areas will become important refuges for biodiversity tracking suitable

climates, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-23050-w](https://doi.org/10.1038/s41598-018-23050-w)

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