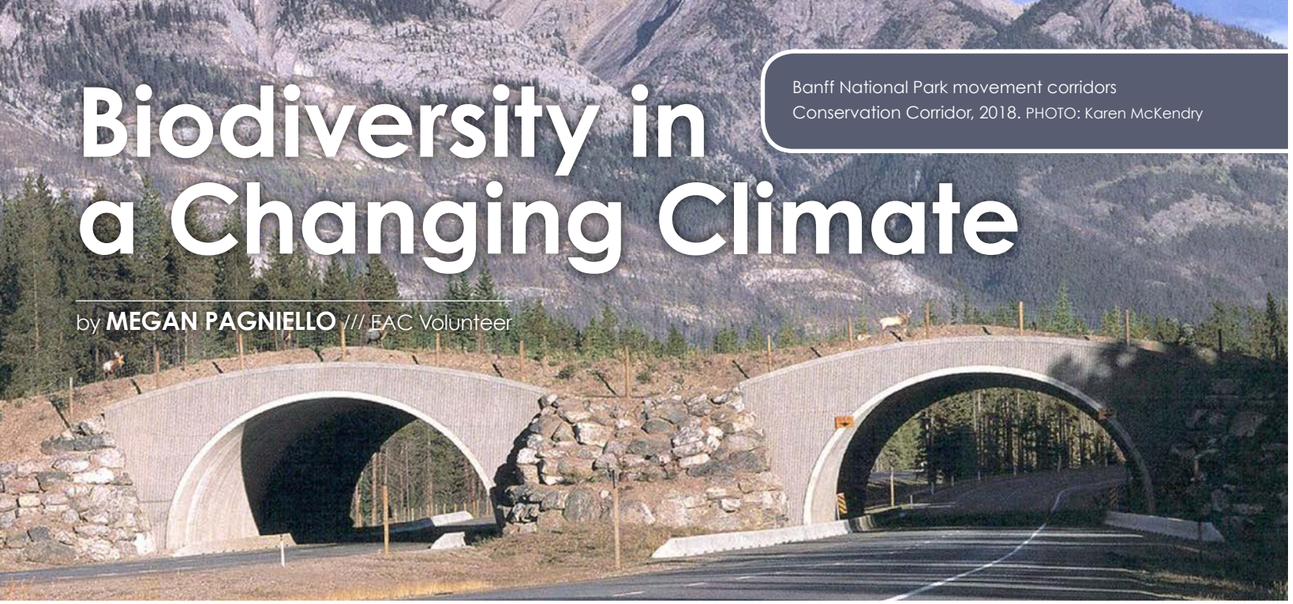


Banff National Park movement corridors Conservation Corridor, 2018. PHOTO: Karen McKendry

Biodiversity in a Changing Climate

by **MEGAN PAGNIELLO** /// EAC Volunteer

Climate change is occurring more rapidly than its has in the past.[1] But there is uncertainty as to how it will look in the future. We also don't yet know how climate change will continue to affect biodiversity.

If we want to try and avoid future extinctions and species loss on a global, national, and provincial scale, we need a better understanding of the effects climate change is having on biodiversity.

By understanding patterns and relationships that currently exist, we can better prepare and prevent biodiversity loss, and begin to address the overarching issue of climate change. We know that climate change is occurring more rapidly than it has in the past,[2] but there is uncertainty as to how it will look in the future, and uncertainty as to how climate change will affect biodiversity.

Here's what we do know; as climate change continues to worsen, species will be put under increasing stress to adapt to rising temperatures, move to more suitable habitat, or face extinction. Extinction – where a species no longer exists – and extirpation – where a species no longer exists in a certain region but exists elsewhere – are both occurring as climatically suitable habitat disappears or becomes geographically inaccessible. It is important to note that the extinction threshold, or the amount of habitat loss that results in extinction, varies from between species and regions.

There is inconsistency among predicted future global extinction rates, which range from zero to 54 per cent, depending on the methods, species, and regions being studied. However, the literature seems to be consistent in that extinction rates are projected to be highest in South America, Australia, and New Zealand. The latter two regions, specifically, have relatively little land mass for species to disperse to as a result of climate change pressures[3].

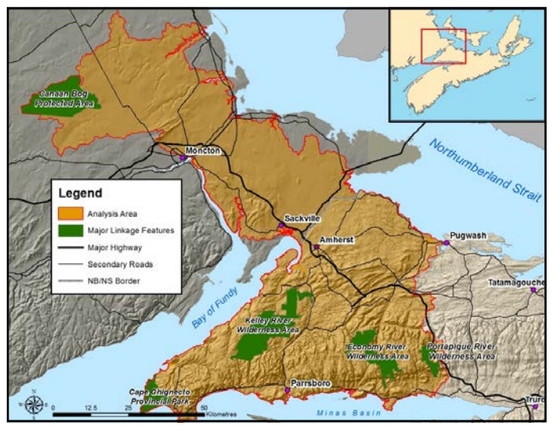
Human impact on habitat, coupled with climate change pressures, means that less habitat exists. It is estimated that less than one per cent of the world's rivers remain untouched by humans[4] and half of the global land coverage has been converted for agricultural purposes[5]. Within the United States, it is estimated that only 45 per cent of the land is natural, and of that land, only 41 per cent is connected enough to allow for species to move as the climate changes[6]. These pressures, combined with increasing temperatures, have resulted in less habitat and increased fragmentation. Habitat fragmentation – the human impacts and alterations that have broken up other species' habitat- has resulted in restricted movement for species, and in some cases, complete movement barriers. With this in mind, we need to understand how far species can potentially move, and if it is going to be enough movement for them survive temperature changes. Unfortunately, the general consensus is that the current landscape does not allow for species to disperse enough to find climatically suitable habitats.

Within Nova Scotia there are many examples of species that are gravely affected by habitat fragmentation. The mainland moose, which is a species at risk in Nova Scotia, has a population of less than 1,000 in the province. Nova Scotia's high road density has resulted in the isolation of populations and individuals, including the mainland moose, which means that the species are unable to disperse to more suitable habitat and to increase their populations[7].

One way we can try to address the issue of habitat loss, fragmentation and temperature increase is through climate connectivity. Climate connectivity refers to natural lands being in a spatial pattern that allows for species to move from unfavorable climatic regions to habitat that is better suited to the species or population[8]. For areas that are not well connected, often as a result of human impact, wildlife movement corridors can be used to connect patches of natural land and encourage species dispersal.

By connecting different areas through the use of corridors, species are able to disperse and find climatically suitable habitat. Increasing climate connectivity is cited by many as being one of the best ways to conserve biodiversity in the face of climate change[9]. These corridors take on many forms and exist across the globe, covering just a few hundred meters to thousands of kilometers. There are a handful of corridors that exist within Canada. In Banff National Park in Alberta, man-made corridors extend over the TransCanada Highway to allow animals, such as grizzly bears and elk, to disperse from one side of the highway to the other[10]. Yellowstone to Yukon (Y2Y) is a large-scale corridor that spans from Wyoming, United States, to the Yukon Territory in Canada, and covers 1.3 million square kilometers. Y2Y is intended to restore habitat and increase connectivity for species such as caribou, lynx, and grizzly bears[11]. In Eastern Canada, the Chignecto Isthmus region, which is the area around the border between Nova Scotia and New Brunswick, has been recognized as a critical corridor for wildlife movement[12]. It is the only land-based connection between Nova Scotia and the rest of North America, which also means it is a vital dispersal path for terrestrial species to find suitable habitat. This corridor would be used by several species, including the mainland moose, black bear, and red fox[13].

Climate connectivity planning is a lengthy process, and because of the human influences that obstruct dispersal routes, it can be extremely difficult to create routes that would be used. However, it is one of the best ways to address the impacts that climate change is having on biodiversity. Although it is not the only mechanism that can be used to address the issue at hand, climate connectivity planning is one viable option. In fact, successful corridors exist across the globe, and there has been extensive research performed here in Nova Scotia to see where corridors are most needed, and what needs to be done to create them. While the Chignecto Isthmus region is not currently a connectivity corridor, it is hopeful that the current research and planning being conducted will one day allow for species to disperse from Nova Scotia, if needed. Climate change is one of the biggest threats to biodiversity, and we need to take action now on behalf of our fellow species if we want to begin to conserve those that are left.



Chignecto Isthmus region as a connectivity corridor. Map by Nature Conservancy of Canada, 2018.

Y2Y Big Sky Conservation. Map by Institute GIS, 2008

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