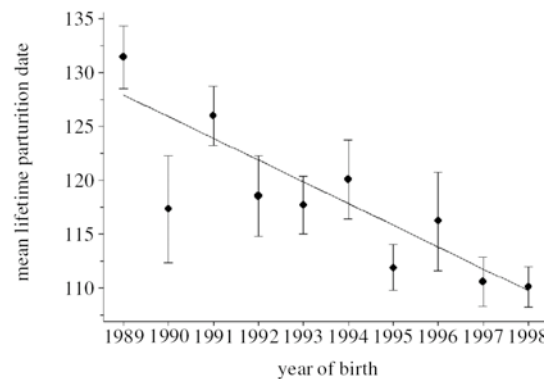
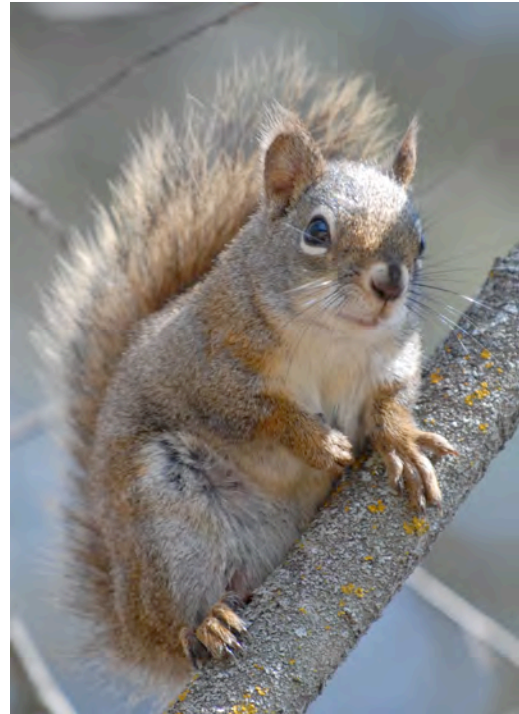


## Adaptation to climate change

Canada is a focal point for climate change, with shifts over the past few decades and the coming years exceeding those in most other places in the world. Research conducted with NSERC Discovery Grant funding has generated fundamental insights into how organisms might respond to these changes and thereby influence biodiversity and ecosystem services in Canada's future. Examples include changes in the seasonal timing of northern animals and the ability of phytoplankton to uptake carbon dioxide. Changes in seasonal timing are studied by many Canadian scientists, with one example coming from the work of Dr. Denis Réale (Univ. du Québec à Montréal), Dr. Stan Boutin (Univ. of Alberta), Dr Andrew McAdam (University of Guelph), and Dr. Dominique Berteaux (Univ. du Québec à Rimouski). By tracking a population of red squirrels in the Yukon for many years, something only possible given the consistency of Discovery Grant funding, the researchers showed that red squirrels have advanced the timing of their reproduction to match levels of food supply (spruce cones) that is linked to climate. Some of this response was purely behavioral but some of it was also evolutionary. The phytoplankton work was conducted in the laboratory of Dr. Graham Bell (McGill Univ.). With his student Sinéad Collins, Dr. Bell determined how these small uni-cellular aquatic algae would respond to the increasing levels of carbon dioxide that accompany climate change. This work showed that phytoplankton did not evolve a greater ability to uptake carbon. This result is critical in showing that evolution in aquatic primary producers, such as phytoplankton, will probably not greatly increase the rate of carbon sequestration in the ocean – which had been suggested as a potential counterbalance to the increased human-mediated atmospheric carbon. These two studies highlight need for additional basic research on which organisms will and will not evolve in response to particular environmental conditions. Discovery Grant funding is the backbone of this work.



A Canadian red squirrel (photo: Andrew Hendry) and changes reproductive timing in response to climate warming (from Réale et al. 2003 – Proceedings of the Royal Society of London B 270: 591–596).