

Project Summary

Title: *Improving models to predict phenological responses to global change*

Applicant: President and Fellows of Harvard College

Address: Holyoke Center 600, 1350 Massachusetts Avenue, Cambridge, MA 02138-2902

Principal Investigator: Andrew D. Richardson (tel. 617 496 1277; email arichardson@oeb.harvard.edu).

The term *phenology* describes both the seasonal rhythms of plants and animals, and the study of these rhythms. Plant phenological processes, including, for example, when leaves emerge in the spring and change color in the autumn, are highly responsive to variation in weather (e.g. a warm vs. cold spring) as well as longer-term changes in climate (e.g. warming trends and changes in the timing and amount of rainfall). We will conduct a study that addresses questions about the phenological response of northern peatland communities to global change. Field work will be conducted at the SPRUCE experiment in northern Minnesota. We will use digital camera imagery to track shifts in plant phenology driven by elevated carbon dioxide and elevated temperature, and then we will use these data to develop predictive phenological models. The models will be tested against ground data collected over the last three decades by a local collaborator. We will forecast responses of peatland phenology to future climate change over the next 50-100 years. Integrated with other measurements collected as part of the SPRUCE program, this study will provide insight into the degree to which phenology may mediate future shifts in carbon uptake and storage by peatland ecosystems.