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The implementation of assisted migration in Canadian forests

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ABSTRACT

We outline the major steps involved in implementing assisted migration (AM) and assess, in a general way, the capacity to carry out each step in Canadian forests. Our findings highlight the fact that capacity to implement AM differs between forest species; in particular, the existence of established provenance trials, seed transfer guidelines, seed procurement systems, and plantation establishment protocols makes AM considerably more feasible for most commercial tree species than for most species of conservation concern. We report on several AM efforts involving commercial tree species that are already underway in Canada and identify a number of initiatives that could be undertaken to help build AM capacity. This paper is not intended as an endorsement of the AM approach; however, we feel there is considerable value in discussing implementation issues at this point in the AM debate.

Key words: assisted migration, implementation, provenance data, seed procurement, Canada, forest, seed transfer, climate change

RÉSUMÉ

Les auteurs donnent un aperçu des principales étapes de la mise en œuvre de la migration assistée (MA) et évaluent, de manière générale, la capacité d'exécuter chacune des étapes dans le contexte des forêts canadiennes. Les conclusions indiquent que la capacité de mise en œuvre de la MA varie selon l'essence forestière; plus particulièrement que l'existence des tests de provenance, les lignes directrices concernant le transfert des semences, les systèmes d'acquisition de semences et les protocoles d'établissement de plantations facilitent considérablement plus la MA des essences commerciales, comparativement aux essences préoccupantes sur le plan de la conservation. Les auteurs décrivent plusieurs exemples de MA d'essences commerciales au Canada et présentent certaines initiatives qui permettraient d'accroître la capacité en matière de MA. Ce document ne vise pas à prôner la MA, cependant les auteurs sont de l'avis qu'il y a avantage à discuter des questions de mise en œuvre à cette étape du débat sur la MA.

Mots clés : migration assistée, mise en œuvre, données de tests de provenance, acquisition des semences, Canada, forêt, transfert des semences, changements climatiques

Introduction

The term “implementation” denotes a move from the conceptual to the practical—a shift from theory to action. Reporting on assisted migration (AM) implementation may seem premature given the substantial uncertainty around spatiotemporal patterns of climate change, the well-documented risks associated with AM (Schwartz 2005, McLachlan *et al.* 2007, Ricciardi and Simberloff 2009), and the relative infancy of the science and public debate on the topic; however, some Canadian agencies have already modified seed zone policy and practice in response to climate change. In addressing this topic, our intent is not to advocate a “full steam ahead” approach to AM, but to report on the state of the resources (i.e., knowledge, tools, data, and practices) needed to carry

out sound, science-based AM initiatives—if and when such initiatives are deemed appropriate. Despite our focus on the practicalities of AM, we acknowledge that complex decisions pervade any implementation of AM and present profound challenges to existing conservation and management frameworks.

Contemporary forest management is organized according to a variety of objectives ranging from intensive cultivation of timber to the protection of endangered species. Different types of AM can be discerned along this spectrum (Ste-Marie *et al.* 2011). For example, AM involving commercial tree species would often make use of existing seed transfer data, seed procurement networks, and established practices around plantation establishment and management in order to estab-

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