

Forest Management Directives and Procedures

06 Forest Health and Silviculture
02 SeedFOR 06 02 01
Directive**SEED ZONES OF ONTARIO****Approval date:** July 30, 2010**Review date:** 2013**Contact:** Forest Health and Silviculture Section Forests Branch Policy Division**INTRODUCTION**

The conservation of genetic diversity is widely recognized as a key component of forest sustainability. One of the primary attributes of genetic diversity in native trees is the presence of adaptive variation among populations. *Adaptive variation* refers to genetic differences among populations as a result of localized evolutionary changes, which enhance the ability of species to survive and reproduce in their local environment including climatic conditions.

When seed/stock are moved some distance from their geographic origin, it is probable that they will be poorly adapted to the local climatic conditions and will be at some increased risk of damage and death due to cold, drought, insects and disease. Since poorly adapted stands can harbour larger populations of insects and disease, they can also act as sources of infection to the surrounding forests. Thus, the cornerstone of managing genetic diversity and ensuring an effective planting and direct seeding regeneration program is the control of tree seed and stock transfer to ensure the use of well adapted plant material.

BACKGROUND

Many jurisdictions have developed a system of seed zones for guiding seed movement to promote the use of adapted tree seed and stock. Since 1997, Ontario has used a system of seed zones (see map on page 3) based on the Ontario Climate Model to manage seed and stock movement. The Ontario Climate Model, developed in the early 1990s, provides information about the climatic gradients within the province.

RATIONALE

Gene conservation is addressed Ministry of Natural Resources (MNR) strategic documents.

- Our Sustainable Future (MNR 2005) states that “The ministry is committed to the conservation of biodiversity and the use of natural resources in a sustainable manner. Maintaining the diversity of life on Earth is a foundational premise for sustainable development. Biodiversity conservation is a commitment to ensure healthy ecosystems, protect our native species and sustain genetic diversity.”
- The [Policy Framework for Sustainable Forests \(MNR 1994\)](#) states that: “Maintaining ecological processes is essential for the functioning of the biosphere, and biological diversity must be conserved in the use of forest ecosystems”.

In addition to these broad directions, the following principles provide specific direction when addressing the movement of tree seed or stock:

- The tree seed source with the best general adaptation (vigour and reproduction) to a site is from the immediate vicinity of the area to be reforested. Without species-specific studies, there is no way to predict the exact distance of seed movement associated with a significant loss of general adaptation to a planting site.
- In the absence of biological information, a system of climatically-based generic seed zones provide an effective means for preventing the use of poorly adapted tree seed and stock. Since they are generic, the climatically-based seed zones are conservative.
- Seed movement across zones is acceptable only if the origin of the seed lot is well documented and the environment of the seed origin is similar to that of the planting site.
- The Seed Zones of Ontario map can be improved only if good records of seed sources and subsequent performance are kept.
- As biological information becomes available, species specific seed transfer guidelines may be developed and used.

DIRECTION

Use climatically-based seed zones to ensure that tree seed and stock used in planting and direct seeding regeneration activities are adapted to local climatic conditions.

The Seed Zones of Ontario map is an operational interpretation of these climatically-based seed zones. This map will be updated and re-issued whenever the seed zone boundaries are refined.

APPLICATION AND SCOPE

This policy directive applies to all tree seed and stock used to renew Ontario's Crown forests. This program direction will also apply to private lands where the Ontario Government supports reforestation.

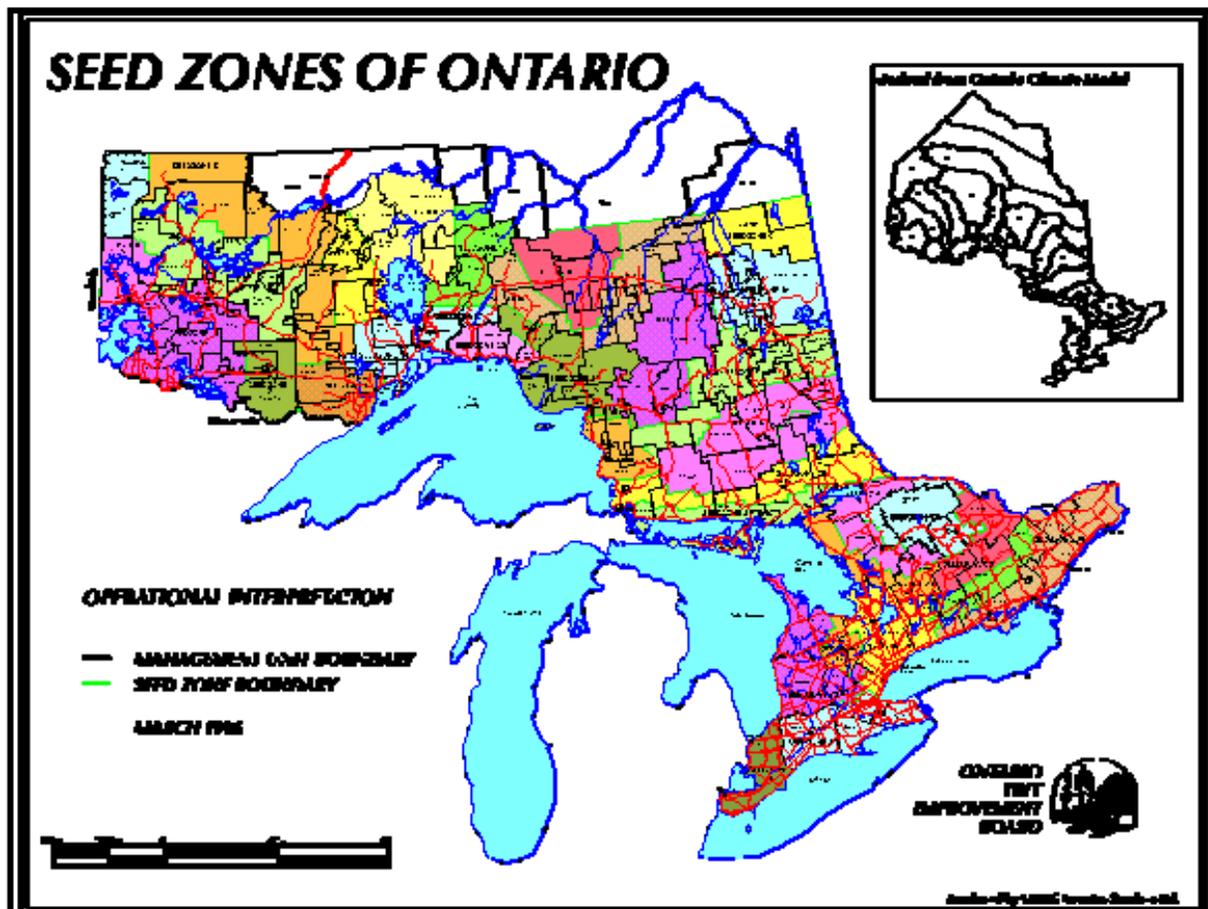
TECHNICAL REQUIREMENTS

A system of 38 discrete seed zones has been developed for use in the province. The map outlines the seed zones based on the Ontario Climate Model; used to ensure that tree seed and stock used in planting and direct seeding regeneration is climatically adapted. The seed zone boundaries have been operationalized to facilitate seed collection.

Technical requirements include:

Seed Collection

Source-identified tree seed may be either from a general collection when only the seed zone origin is known, or stand collection when the latitude and longitude (or Universal Transverse Mercator co-ordinates) of the parental stand is known.



For more information see [Seed Zones](#).

Seed and stock Deployment

- Movement of tree seed and stock within seed zones is unrestricted.
- Movement of general collection tree seed and stock across seed zone boundaries is prohibited.
- Movement of stand collection tree seed and stock across seed zone boundaries requires the approval of the appropriate regional tree improvement specialist and provincial forest geneticist.
- When biological information is available, the generic climatically-based seed zones may be replaced with species-specific seed zones or seed transfer guidelines.
- Deployment of genetically improved tree seed and stock will be based on breeding zones.

RESPONSIBILITIES

The MNR Forest Health and Silviculture Section in Forests Branch is responsible for interpreting, maintaining and reviewing this policy directive.

Seed zones are planned for and reported on as part of the renewal support activity in forest management planning. The renewal support activity is described in the [Forest Management Planning Manual for Ontario's Crown Forests](#). Information requirements monitoring, evaluation and reporting on the renewal support activity are described in the [Forest Information Manual](#).

For auditing purposes, forest managers must keep records that allow for the tracking of the chain of custody for tree seed and stock.