



Transitioning British Columbia To Climate Based Seed Transfer



CBST and Forest Health

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*The Ministry of Forests, Lands, Natural Resource Operations and Rural Development Forest Improvement and Research Management Branch is leading the development of a Climate Based Seed Transfer (CBST) system to support forest ecosystem resilience, health, and productivity in a changing climate. On **April 5, 2018** amendments to the Chief Forester's Standards for Seed Use were published to allow the option to use CBST on Crown land reforestation.¹ Implementation of CBST is phased (incremental) with a minimum of 2 to 3 years anticipated for full transition to CBST.*

Managing for Forest Health Objectives through the Use of Seed

The Chief Foresters Standards for Seed Use requires the selection of seed with the highest Genetic Worth (GW) for the desired trait (e.g. growth, wood density, disease and pest resistance) and management objectives set out in your Forest Stewardship Plan. This includes management objectives intended as a forest management (silviculture and seed use) response to **forest health** related issues and concerns.

CBST as a Strategy to mitigate Forest Health Impacts in a Changing Climate

Forest health related impacts in BC's forest and ecosystems are expected to increase in frequency, extent (distribution) and magnitude with climate change. CBST provides an opportunity to more effectively respond to natural disturbance events such as pest and disease epidemics by ensuring trees are more **resilient and climatically adapted** to the sites and climate conditions they are grown in, now and in the future. Use of assisted migration (range expansion and population migration within a species range), may also provide new adaptation tools to separate insect and disease pathogens from their primary and alternate hosts.

How is Forest Health Factored into CBST?

The Seed Planning and Registry (SPAR) system recently introduced new GW codes to support the identification of specific pest and disease pathogens. GW forest health codes are assigned to seed and vegetative lots upon registration, where applicable.

¹ On **April 9, 2019**, further amendments were published including minor changes for some species (expansion of CBST Areas of Use).

For more information on CBST go to:

Climate Based Seed Transfer:
www.gov.bc.ca/climatebasedseedtransfer

Chief Forester’s Standards for Seed Use:
<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use>

For more general information:

BC Government, Forest Improvement and Research Management Branch: Tree Seed
<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed>

FORHTIP.SEEDHELP@gov.bc.ca

AD	Deer browse	Cw
DFS	Dothistroma needle blight	Pli
DFU	Cedar leaf blight	Cw
DFW	Swiss needle cast	Fdc
DSB	White pine blister rust	Pw
DSC	Comandra blister rust	Pli
DSG	Western gall rust	Pli
GVO	Volume growth	Cw, Dr, Fdc, Fdi, Hw, Lw, Pli, Sx, Yc
IWS	White pine terminal weevil	Ss, Sx
WDU	Durability	Cw
WVE	Wood velocity measures	Fdc
WWD	Wood density	Fdc

Figure 1: Genetic Worth Codes for Forest Health Source: Seed Planning and Registry (SPAR)

Breeding for Pest and Disease Resistance

One of the key mechanisms that CBST addresses forest health concerns is through the breeding for **disease and pest resistance**. Province-wide provenance trials provide a number of opportunities for observing resistance in the field. Although, the Goat River Lodgepole pine provenance test (near McBride, B.C.) was almost completely killed by a Mountain Pine Beetle attack in 2004, some trees demonstrated a level of resistance (Figure 2).

Disease tolerant or resistant seed is currently available for Western gall rust, Comandra blister rust, and White Pine terminal weevil. Research is also currently underway to develop resistance to Dothistroma, Cedar leaf blight, Swiss needle cast and White Pine blister rust.



Figure 2: Interior Lodgepole Pine provenance trial attacked by Mountain Pine Beetle Source: BC Government, FLNRO

Building Resilience in BC’s Future Forests and Ecosystems

The CBST science foundation is designed to incorporate test results into transfer functions (measures of height, growth, and resistance across climatic gradients) as new information becomes available. More refined forest health information is expected over the next 5 to 10 years as the ministry’s **Forest Genetic program** is expanded to include forest health factors in tree breeding and genecology studies.