Whitebark and Limber Pine Fact Sheet 4
Seed Collection

In Alberta, you need a **permit or authorization lette**r to collect and transport cones and seeds. Provincial Standards require 10% of un-tested seed collected from Crown land to be provided to Alberta.

Alberta stores seeds in **the Alberta Tree Improvement and Seed Centre in Smoky Lake**, properly archived and stored under optimal conditions.

Proper collection and handling methods have huge effects on seedling vigour, yields, and longevity in storage. This *Seed Matters* report has best practices. Exceptionally high fat and protein cause these seeds to start losing viability after 7 to 10 years, but can keep longer if treated right. They are very costly to collect so make sure you get the most from every cone.

To **collect seeds**, protect cones from predation before cones start getting pecked by Clark's nutcrackers (limber pine start May, whitebark pine start June or early July) by installing **wire mesh cages**, secured around branches with zip ties. Whitebark pin, cones do not open so mesh can be 1/4", but limber pine cones open and seeds will fall out if mesh is larger than 1/8". Caging requires climbing to tree tops. Without caging, no seeds may remain to collect. Avoid injuring branches, damaging next year's developing cones, or cramming too many cones in the cage. Collect no earlier than mid-September, **as late as possible** so seeds mature properly – another climb. Remove each cage without damaging the branch, insert the cones, fold the cage closed. Do not leave cages over winter: snow may break branches, and seeds become rancid in sunlight (e.g., late spring before cages are accessible).

Avoid caging cones damaged by birds, infections or pests, and broken branches. Avoid caging trees that are not plus trees as their seedlings will be unlikely to reproduce., Blister rust is ubiquitous so your restoration will be ineffective. A tarp on the ground reduces potential contact with pathogens on the forest floor if dropping cages to the ground crew during collection. Clean cages after use.

Methods and equipment must follow provincial health and **safety** regulations and standards. ArborCanada and Parks Canada have developed whitebark pine-specific safe climbing and access methods to resolve unique challenges of working with these species, including how to manage sap accumulation without injuring the tree. Contact ArborCanada for a specialized training session.

Keep cones separate by tree to grow seedlings, track field performance, and add to provincial archives.

Keep cones in **well-aerated burlap sacks**, separate sacks for each tree. No pillowcases. Leave plenty of air space below the tie-off: heat from respiring seeds can kill seed embryos and promote fungal and bacterial growth. Each sack needs a matching **tag inside AND outside** with Tree ID, date, GPS location and number of cones. K keep sacks in a single layer on mesh racks with fans in shade. **Protect from mice and squirrels** – rodents love these seeds above all else.

Cones must be air-dried and processed manually to extract seeds; a tumbler can extract some limber pine seed, but need to be manually pried out of the cone scales. Whitebark pine cones must be crumbled apart into pieces and the seeds separated from the cone bits. Seed processing facilities can process your cones, or do it yourself, but the seed will only be accepted for registration and storage if it has meets provincial standards for quality. ATISC will only accept extracted seed, not cones. ***Seed Matters*** has advice on seed handling.

This link has good resources on whitebark pine **seed biology**. Embryo immaturity is common in these species. If properly handled and stored, seeds can still germinate even if the embryo only fills 30% of the cavity, and if the megagametophyte is translucent. So keep all seed except those with air-separated or x-rayed empty seed coats with no embryos.