

Collecting Cones and Seed Processing of Whitebark Pine 2018



By Don Pigott

Yellow Point Propagation



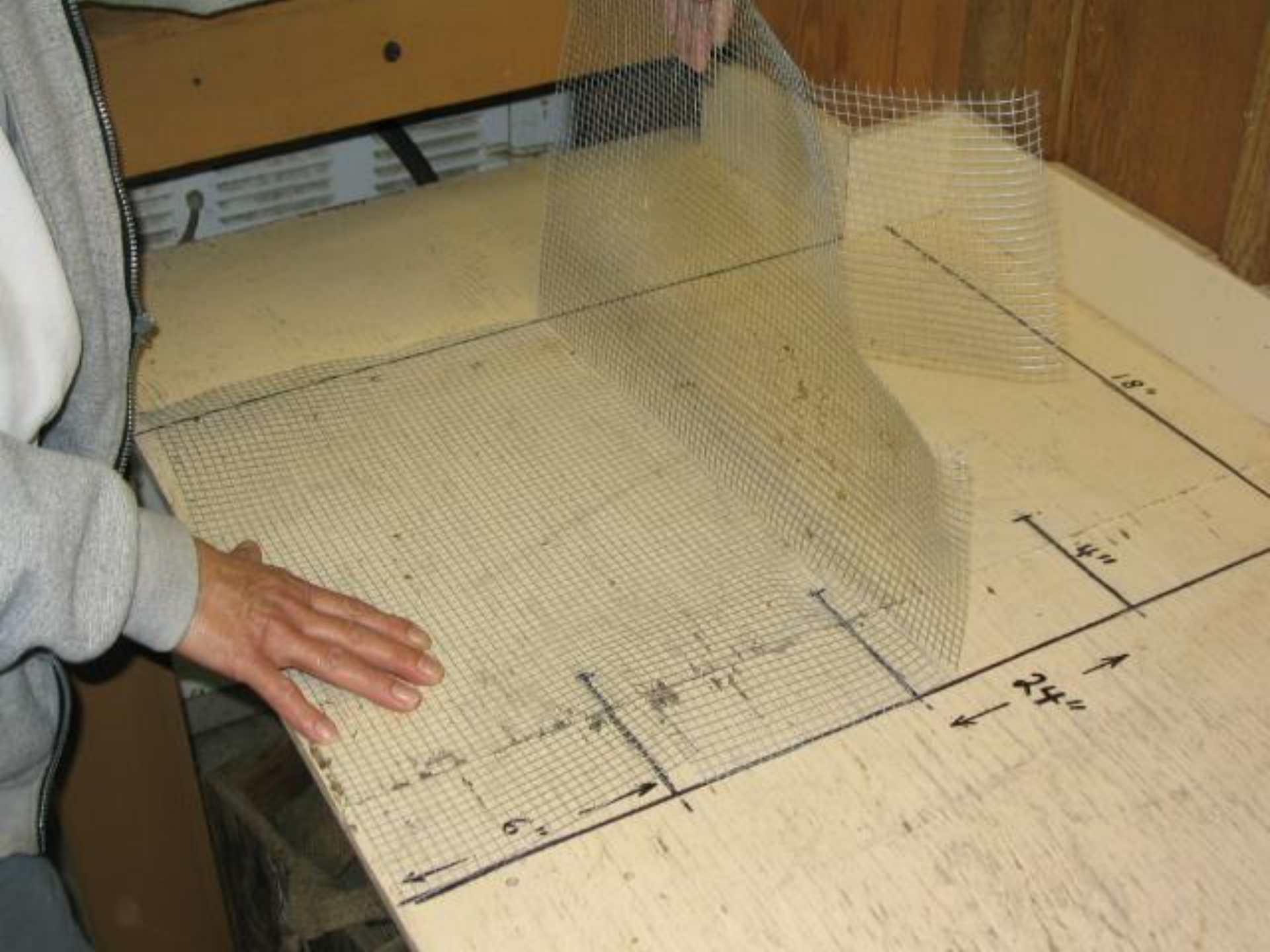
**Cone with scales broken
and seeds exposed.**



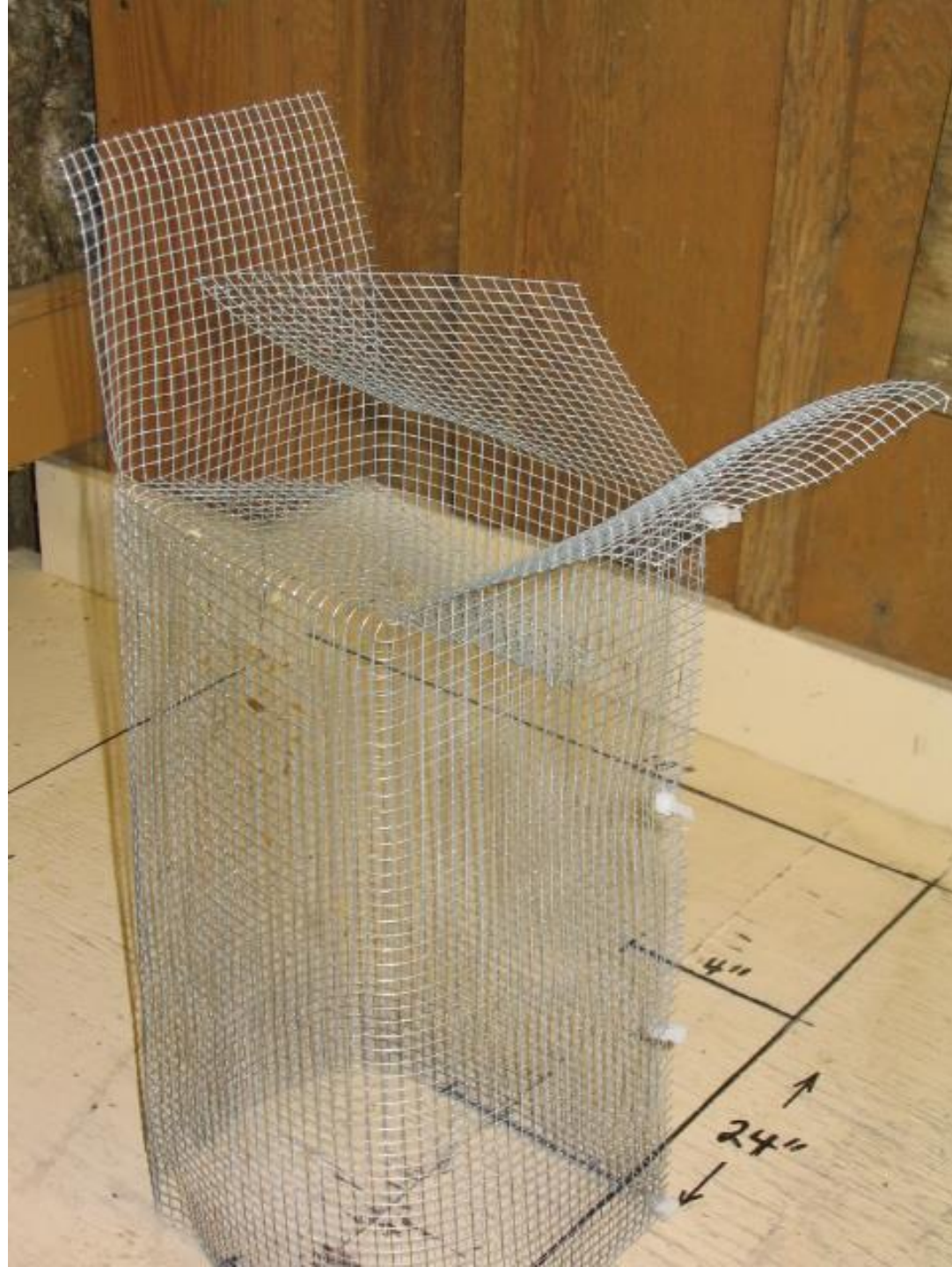
Cage construction



In the late 90's we inherited some envelope-style cages from the US. We gradually adopted our own "box-style" which worked well. We started with $\frac{1}{4}$ " mesh, but went to $\frac{1}{8}$ "





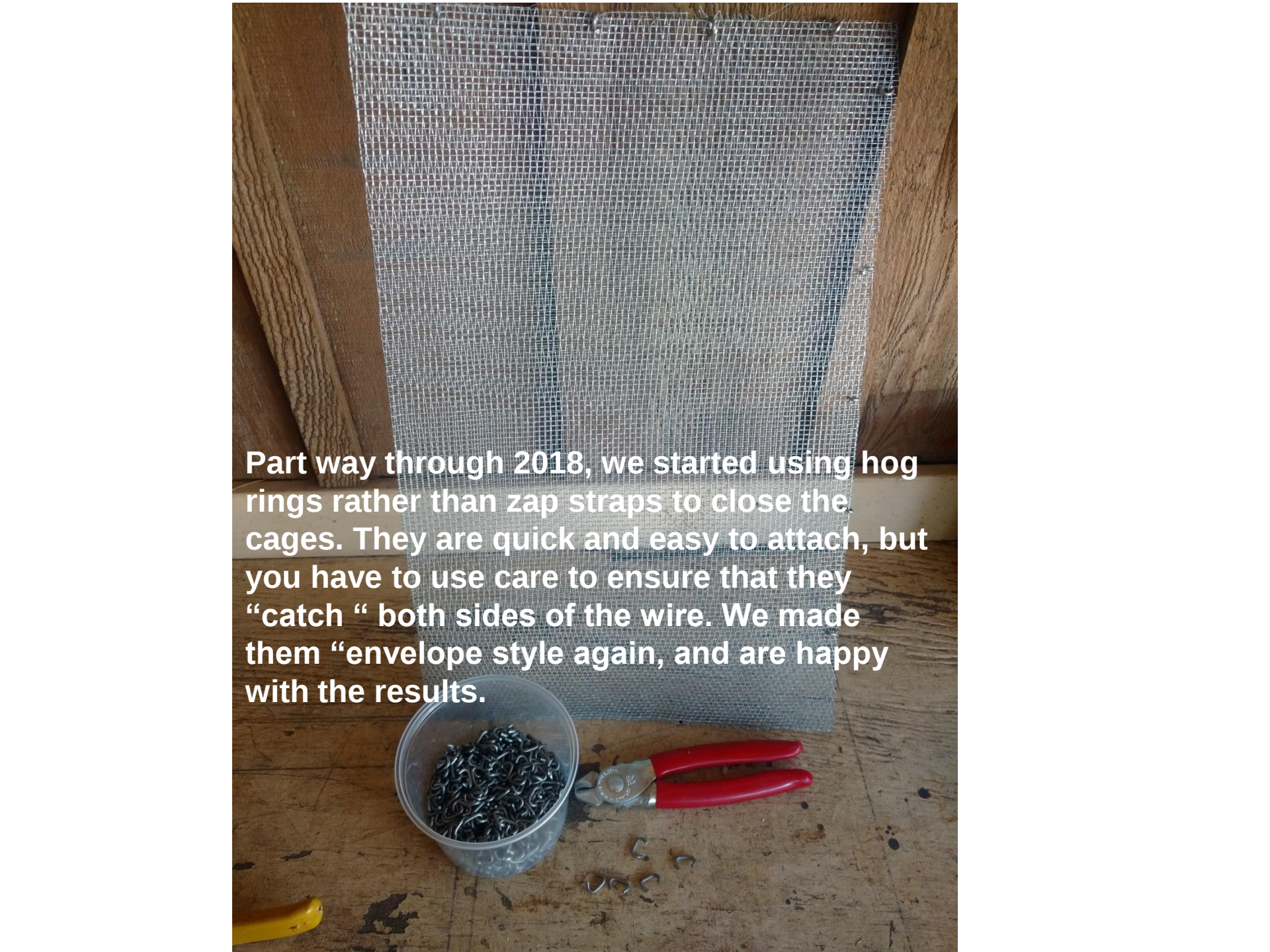


A hand is holding a piece of black plastic mesh material, which is being held up against a white background with horizontal slats. The mesh is a fine, woven plastic material. The hand is visible at the bottom left, holding the mesh by a blue cord. The mesh is draped and folded, showing its flexibility and texture. The background consists of white horizontal slats, possibly from a garage door or a fence.

In 2012 we thought we had found the answer, a plastic mesh material that was easy on the hands, light, and inexpensive. Our first year of use in a mast year was a success.

A photograph of a squirrel with brown and white fur peeking out from a black mesh trap. The trap is hanging from a pine branch, and the background is filled with green pine needles. The squirrel is looking directly at the camera with a neutral expression.

However, the following year
was a light crop, and almost
every cage we
installed was breached by
squirrels and Nutcrackers.



Part way through 2018, we started using hog rings rather than zap straps to close the cages. They are quick and easy to attach, but you have to use care to ensure that they “catch “ both sides of the wire. We made them “envelope style again, and are happy with the results.

A close-up photograph of a white pine trunk. The bark is dark, rough, and textured. There are several prominent, irregular, yellowish-white lesions on the trunk, which are characteristic of white pine blister rust. These lesions appear as if the bark has been peeled away, revealing a lighter, damaged tissue underneath. Some of the lesions are elongated and follow the vertical grain of the bark. To the right of the main trunk, there is a branch with several long, thin, brown pine needles. The background is blurred, showing green foliage and a hint of a blue sky.

White pine blister rust was introduced to
Western North America in 1910 at
Vancouver, BC.

Of course one the primary selection criterior when caging cones is to select trees that apper to be resistant to the rust, or have been less severely attacked than the majority of the trees in the stand.



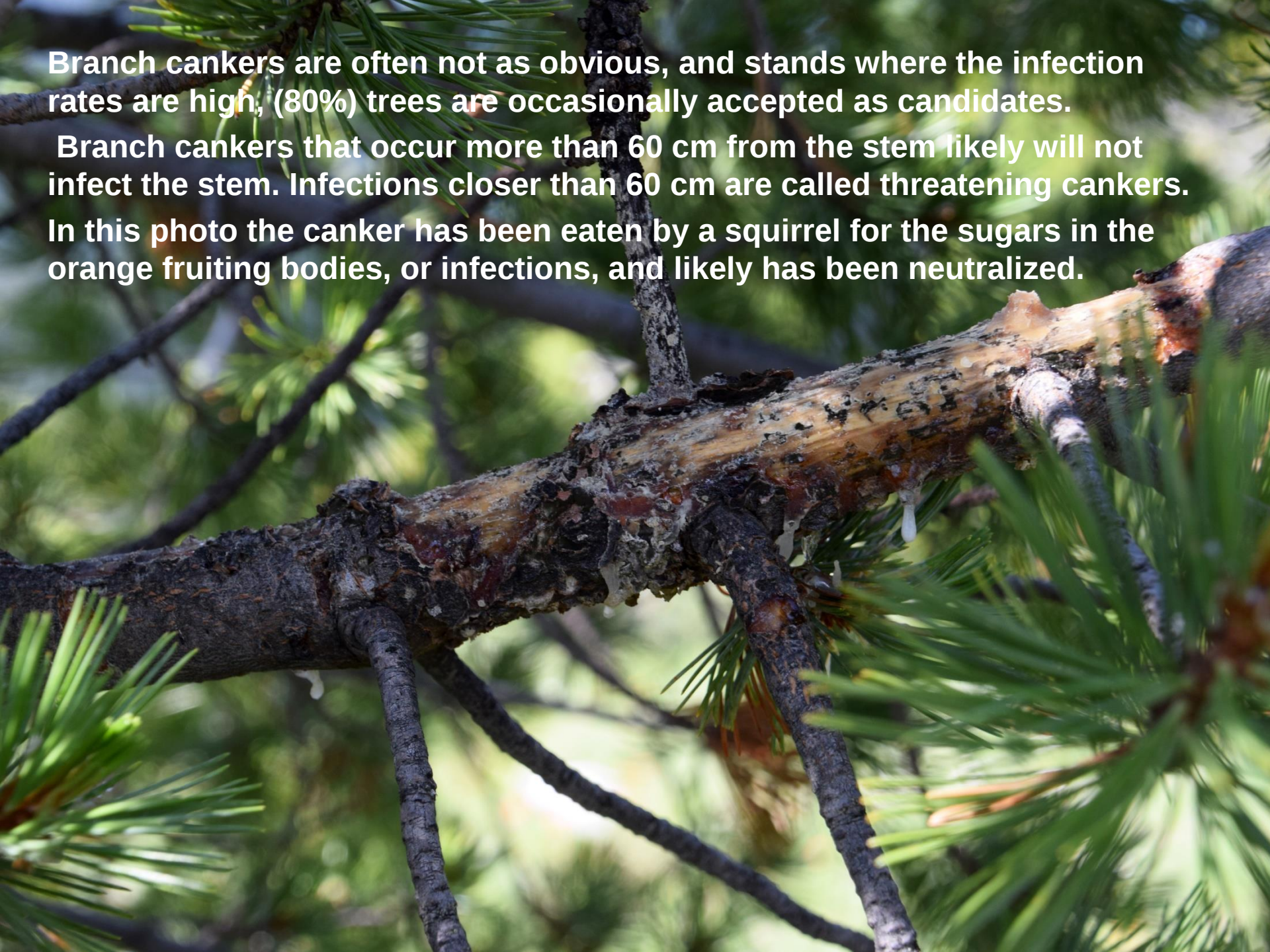
Stem cankers are quite obvious and normally immediately excluded a tree from being selected.

White pine blister rust

Branch cankers are often not as obvious, and stands where the infection rates are high, (80%) trees are occasionally accepted as candidates.

Branch cankers that occur more than 60 cm from the stem likely will not infect the stem. Infections closer than 60 cm are called threatening cankers.

In this photo the canker has been eaten by a squirrel for the sugars in the orange fruiting bodies, or infections, and likely has been neutralized.





Aerial survey of Whitebark pine for potential cone crop are possible, and a heavy crop can often be identified easily from the air. Aerial surveys require an experienced pilot used to sampling from the air.



In light to moderate crops, ground survey can be conducted, even in mid- winter. The conlets are much smaller, but still easily seen, albeit much larger and more visible in the spring and summer.

- Mast crops can occur every 5-10 years, and it is important to take advantage of these crops when possible.



Caging the cones

Cone caging can start as soon as the sites are accessible in June, July and August.

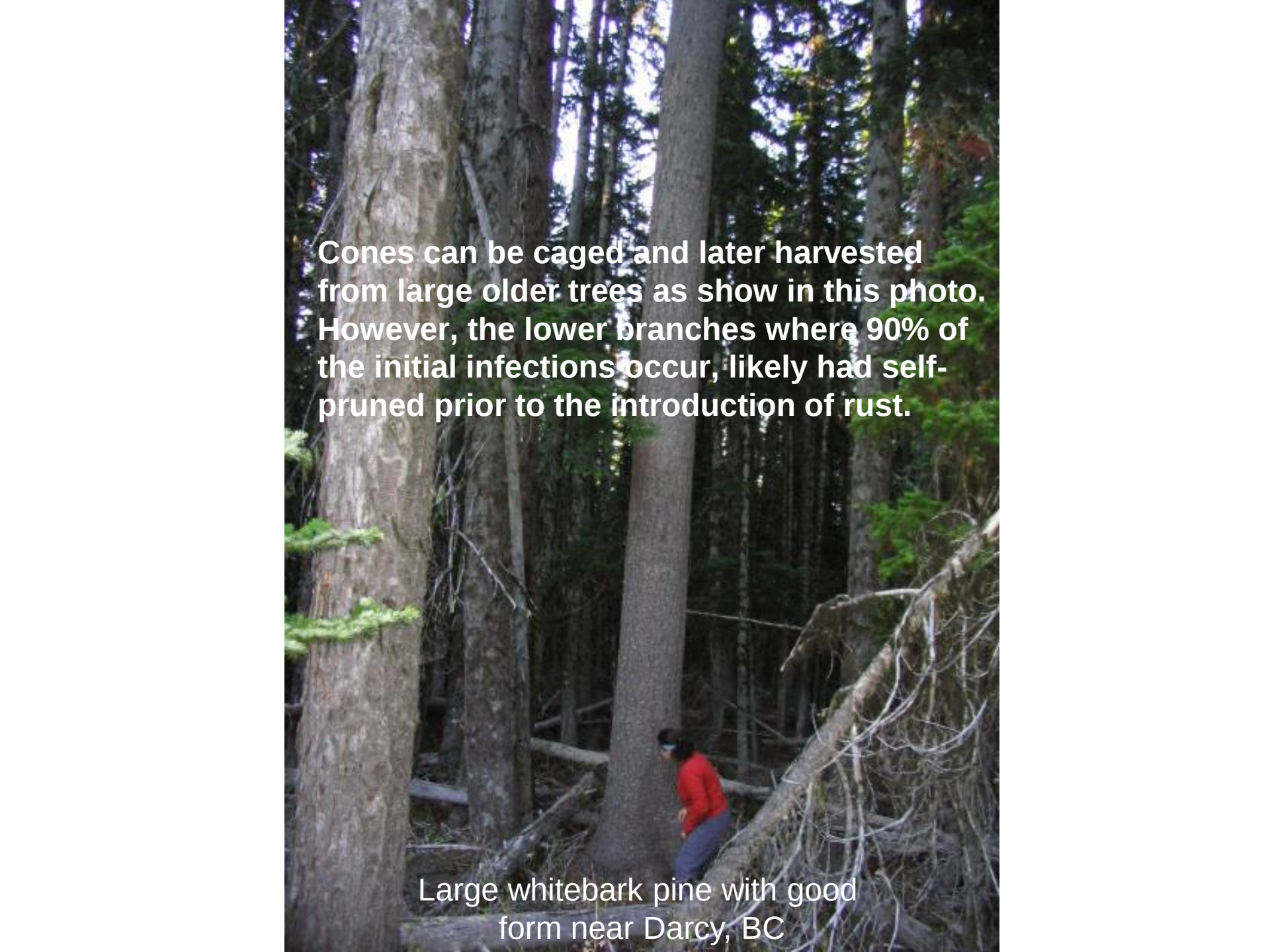




Caging cones is best done by experienced, agile climbers who are not afraid of heights.

It can be risky leaving the caging too late (into August). Predators such as squirrels, Clark's nutcracker's, and even bears may start feeding on the cones.





Cones can be caged and later harvested from large older trees as show in this photo. However, the lower branches where 90% of the initial infections occur, likely had self-pruned prior to the introduction of rust.

Large whitebark pine with good form near Darcy, BC

- **Smaller, younger trees with live, or intact lower branches are easier to assess for the presence or absence of blister rust, and are easier to climb. In Western white pine 90% of the infections occur within 2 metres of the ground.**



SPECIES: P. albicaulis **STAND NAME & NO:** Jesmond **Name:** Don Pigott, Stan Wheat, Martin and Alice Foltanek

Date: July 25, 26, 2018

Biogeoclimatic Zone & Subzone: ESSFxc3

Ecosystem Association:

Species Composition: Pa₃(Plc. Se)

Age & Distribution of Ages: 40-100 **Stand History:** old burn. **Landform & Terrain:** slope

Site/Stand Comments: Moderate rust, patchy some old mortality.

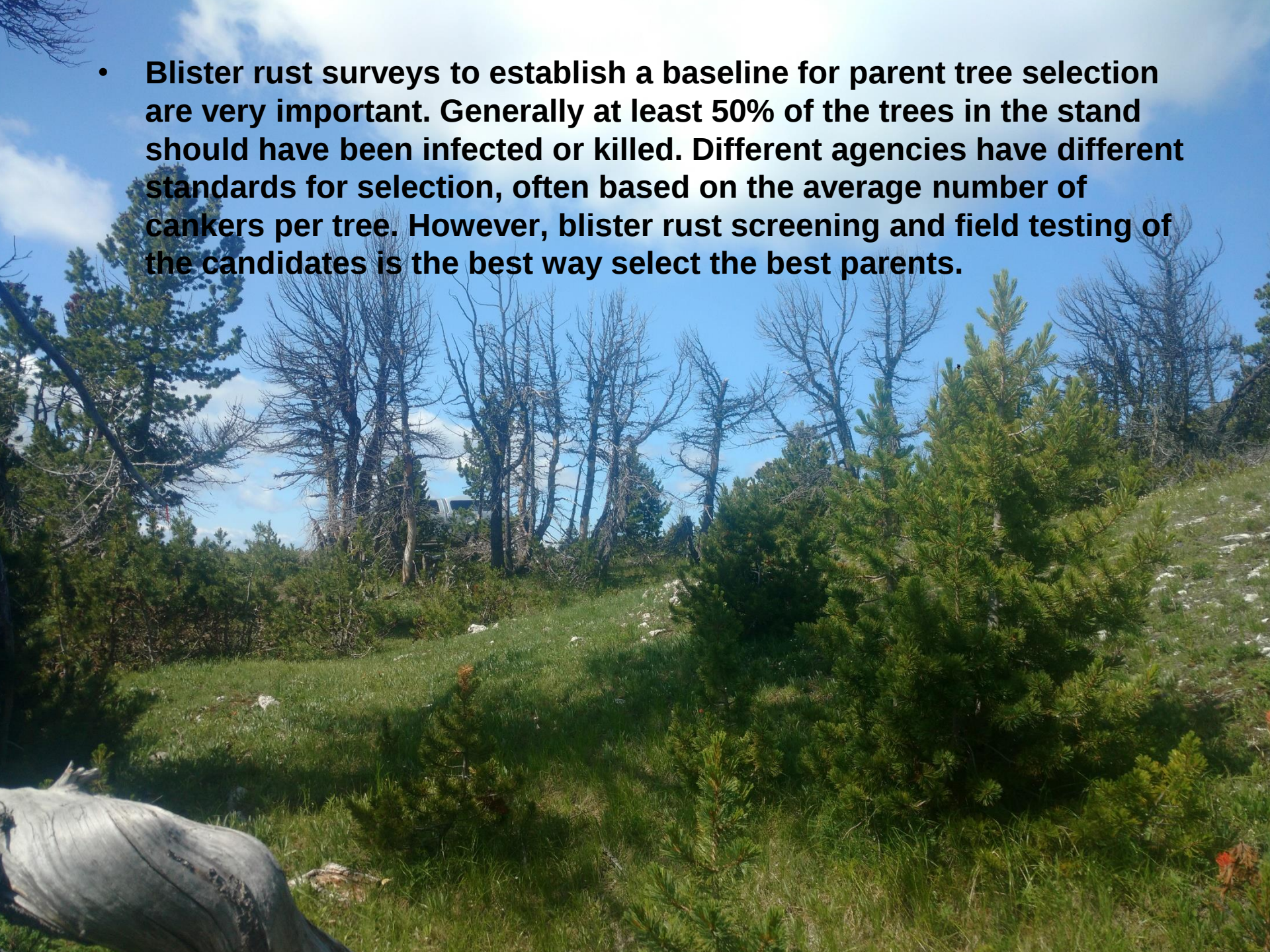
Marked by: Blue ribbon, blue paint and metal tag.



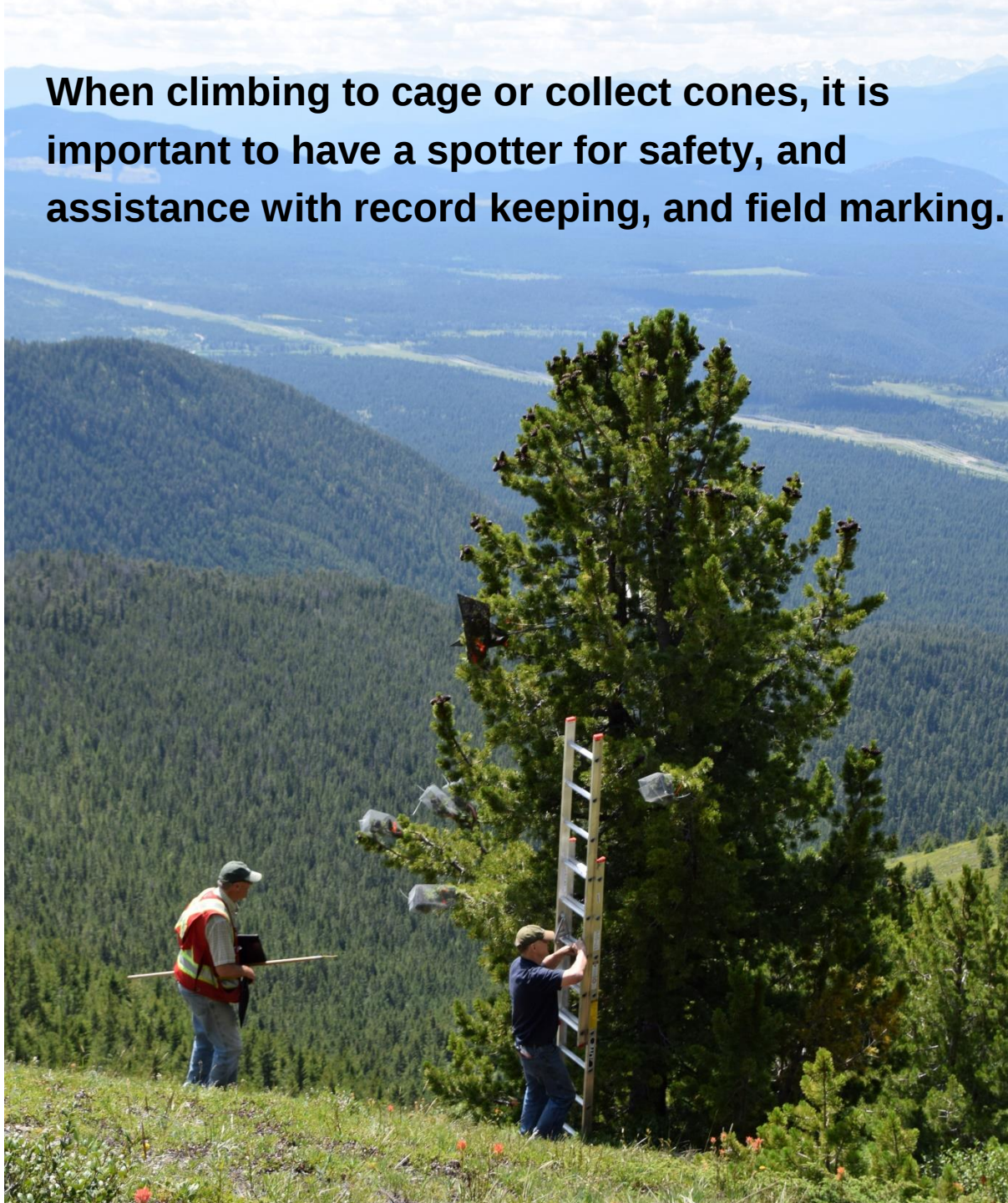
TREE NO.	LATITUDE	LONGITUDE ±3m	ELEV [m]	DBH [cm]	HT. [m]	Active Branch cankers	In-active Branch cankers	Active Stem Canker	Inactive Stem cankers	Cages	Cones	Comments/vigor.0-10
901	51.30799	121.91603	1924	15	4.5	-	1	-		7	54	10. beside road,
902	51.30814	121.91601	1926	13	4-	-	-	-	-	6	40	8. Mechanical damage.
903	51.30796	121.91662	1921	12	4	-	--	-	-	4	23	10.
904	51.30762	121.91566	1921	13	3.5	-	-	-	-	8	51	10. beside road.
905	51.30750	121.91533	1916	14	4	-	-	-	-	9	59	10.
906	51.30787	121.91553	1921	22	6	-	-	-	-	7	58	10. Needle shedder
907	51.30807	121.91530	1921	20	5.5	-	-	-	-	7	65	10.
908	51.30774	121.91628	1905	18	4.5	-	-	-	-	7	50	10
909	51.30746	121.91656	1892	22	5	-	-	-	-	8	53	10
910	51.30736	121.91666	1887	26	7	-	-	-	-	7	50	10. fork@ 3 m.
911	51.30737	121.91471	1905	28	50	-	-	-	-	9	86	9. Crook @ 2m sampled before. Down old spur.
912	51.30753	121.91485	1905	22	4.5	-	-	-	-	8	35	10..
913	51.30772	121.91412	1901	22	5.5	-	-	-	-	6	49	10.
914	51.30823	121.91430	1909	18	4.5	-	-	-	-	3	20	6. Back side of Kettle
915	51.30716	121.91473	1905	21	4.5	-	-	-	-	6	42	10. Start of old spur rd.
916	51.30692	121.91464	1906	18	4.5	-	-	-	-	7	60	10.
917	51.30702	121.91453	1906	18	5.0	-	-	-	-	5	33	10.

Good record keeping, and field identification of parent trees in the field are essential.

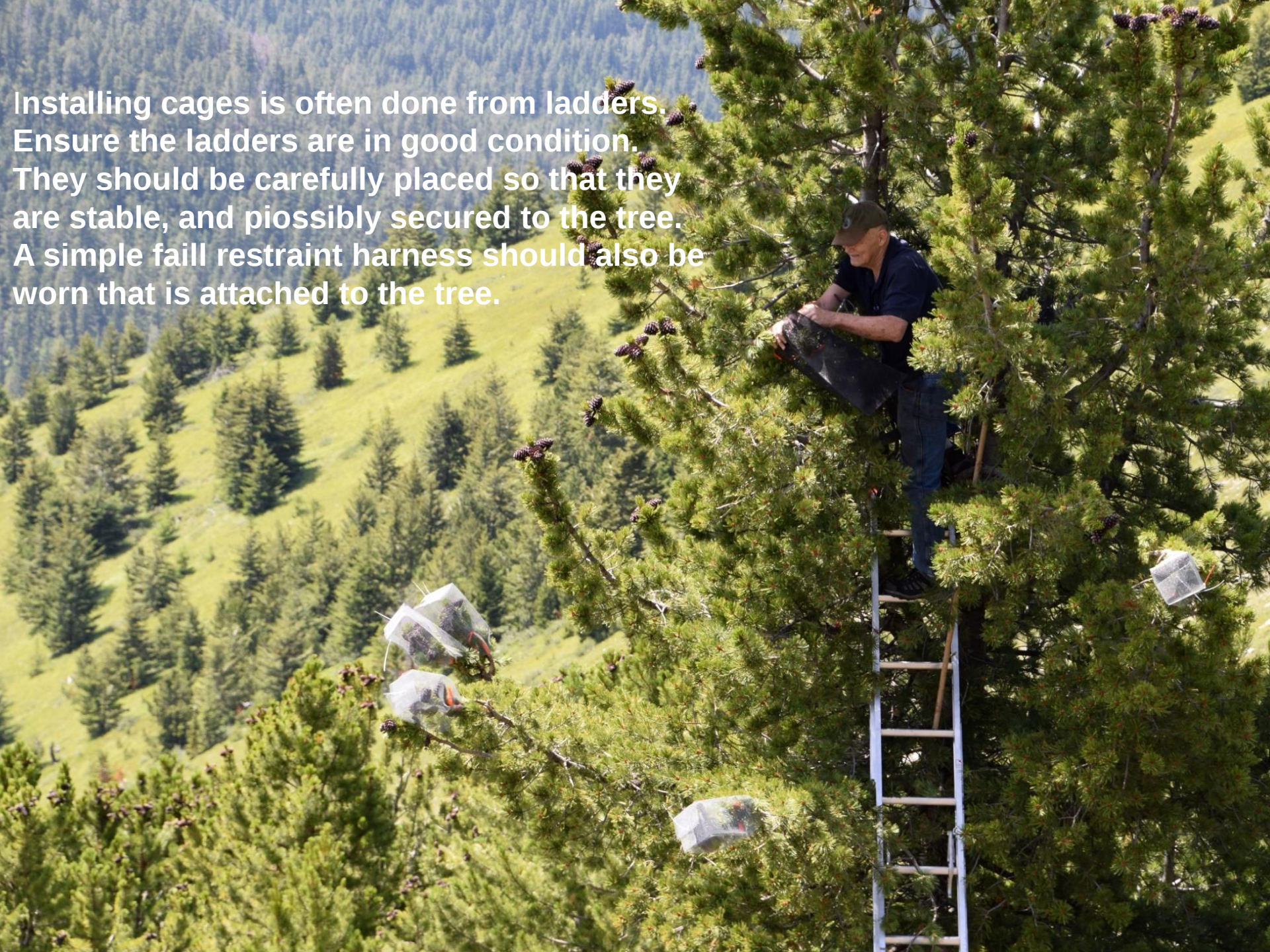
- **Blister rust surveys to establish a baseline for parent tree selection are very important. Generally at least 50% of the trees in the stand should have been infected or killed. Different agencies have different standards for selection, often based on the average number of cankers per tree. However, blister rust screening and field testing of the candidates is the best way select the best parents.**



When climbing to cage or collect cones, it is important to have a spotter for safety, and assistance with record keeping, and field marking.



Installing cages is often done from ladders. Ensure the ladders are in good condition. They should be carefully placed so that they are stable, and possibly secured to the tree. A simple fall restraint harness should also be worn that is attached to the tree.



**Proper safety equipment is advisable,
and training in safe work procedures.
Some organizations require certified
arborist or professional climbers.**



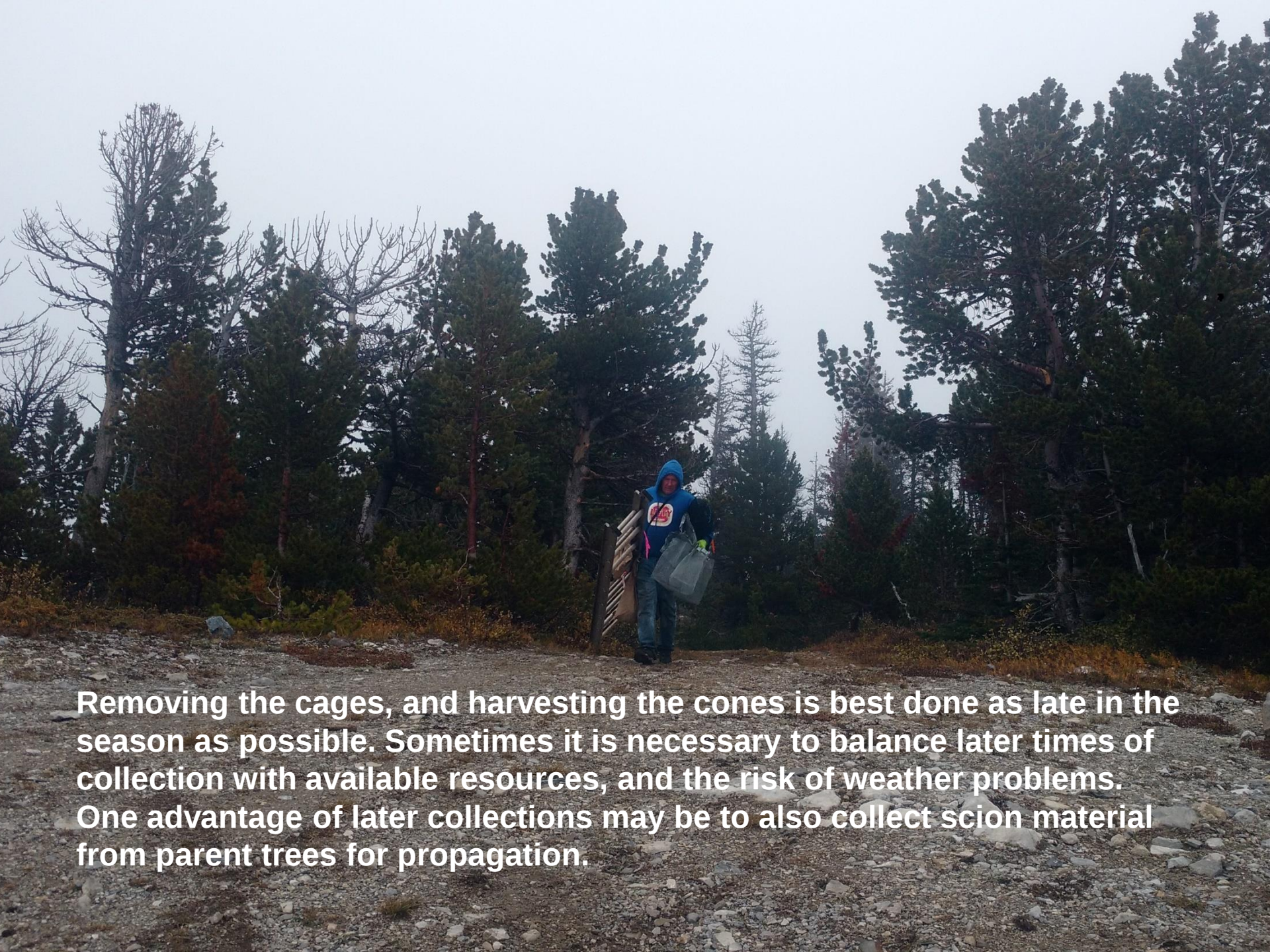
- It is possible to cage one year old conelets the year before maturity. However there is a risk of the conelets being damaged or knocked off by wind or snow.



- In some cases, where access is an issue, helicopters can be useful and cost-effective for caging and cone collections. Cones have been caged and collected at up to to six sites in one day.



Sapeye Mountain in the Chilcotin



Removing the cages, and harvesting the cones is best done as late in the season as possible. Sometimes it is necessary to balance later times of collection with available resources, and the risk of weather problems. One advantage of later collections may be to also collect scion material from parent trees for propagation.

Transportation of the cones after harvest is an important part of the process. Care must be taken to ensure the cones are well-aerated and dry, and are taken to interim storage as soon as possible.



At the storage location, the same rules apply. Well-aerated, and dry. Precautions may also be required to protect the cones from predators.



Good cone storage.



If predators are a problem, it may be necessary to construct covers at the storage site to protect the cones.

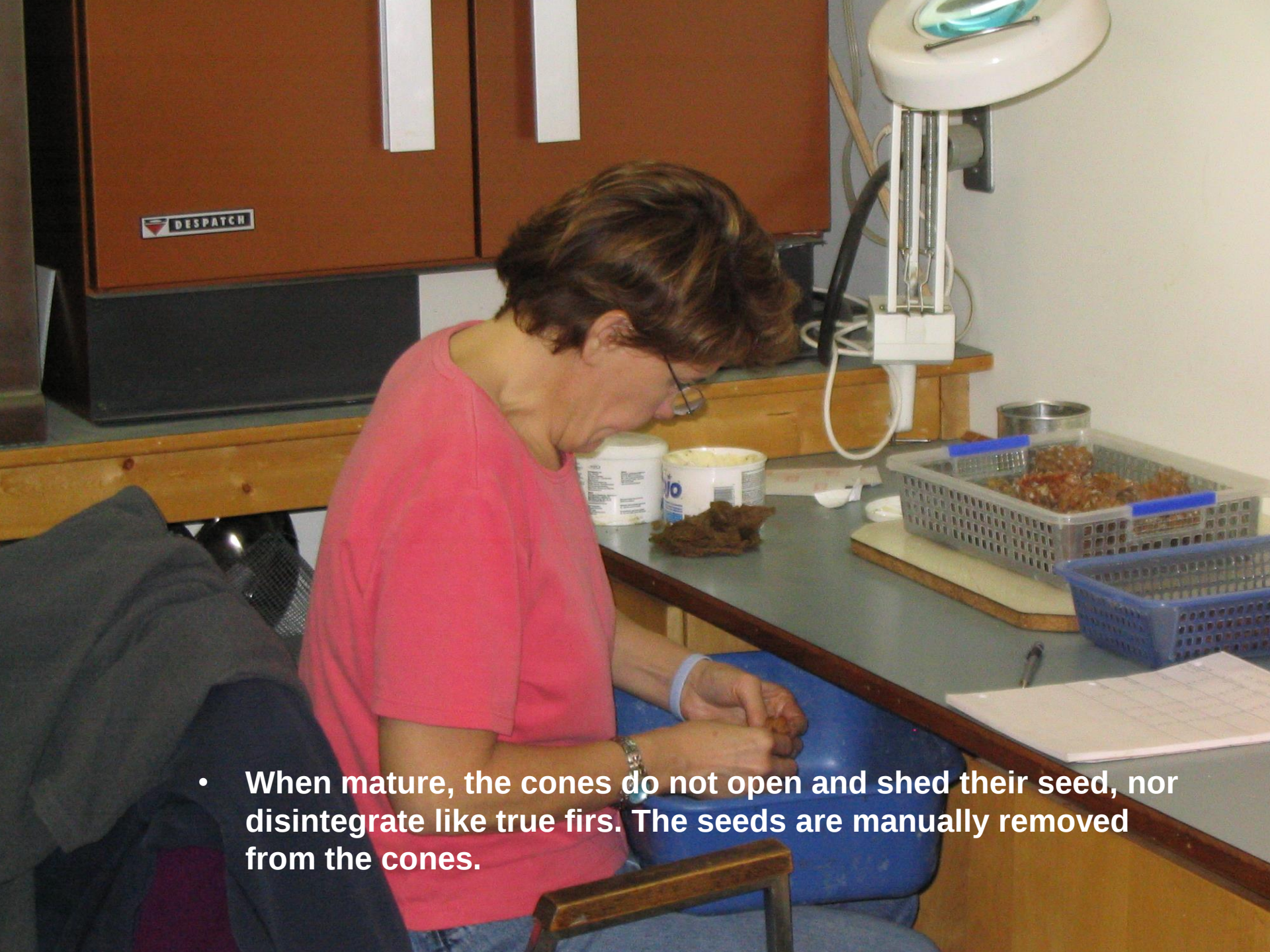
Good ventilation is required as well.

Dehumidifiers may also be useful to help the cones and seeds to dry.





A poor quality cone with no filled seeds



- When mature, the cones do not open and shed their seed, nor disintegrate like true firs. The seeds are manually removed from the cones.



- The seed extraction team.



Simple hand screens are useful for the removal of coarse and fine debris.

Good, filled seeds can then be separated from empty, or damaged seeds using simple air separation equipment.



Once the seeds have been extracted and air separated they will require drying to meet storage requirements. The best measure of moisture content is water activity (AW) and it is non-destructive. The target in BC is 0.35. It may take several weeks at room temperature to reach that point.



SEEDLOT NO. MT 2000
COMMON NAME PEANUT
SPECIES PEANUT A
PLACE OF COLLECTION INDONESIA
CROP YEAR 2000
PROCESSOR REV 21/03



The seeds must again be protected from predators such as mice, rats, and squirrels.



SEEDLOT NO.: 1316

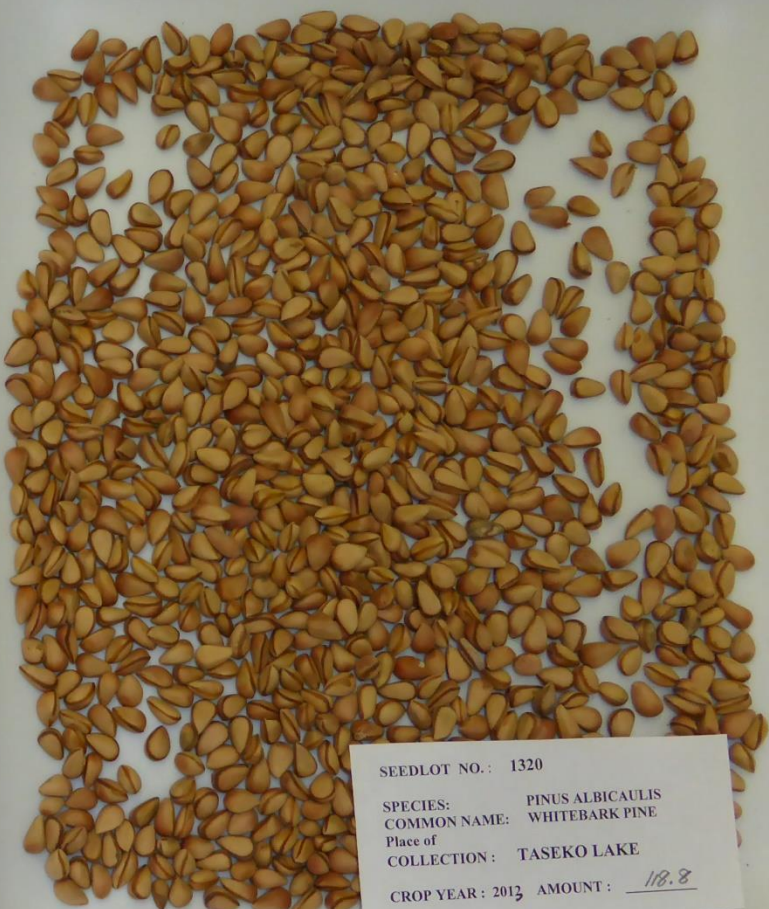
SPECIES: PINUS ALBICAULIS

COMMON NAME: WHITEBARK PINE

Place of

COLLECTION: TASEKO LAKE

CROP YEAR: 2012 AMOUNT: 182.6



SEEDLOT NO.: 1320

SPECIES: PINUS ALBICAULIS

COMMON NAME: WHITEBARK PINE

Place of

COLLECTION: TASEKO LAKE

CROP YEAR: 2012 AMOUNT: 118.8

Seeds from the same location may vary from tree to tree in size, color, and viability.



Seeds should be well-aerated when drying as well.

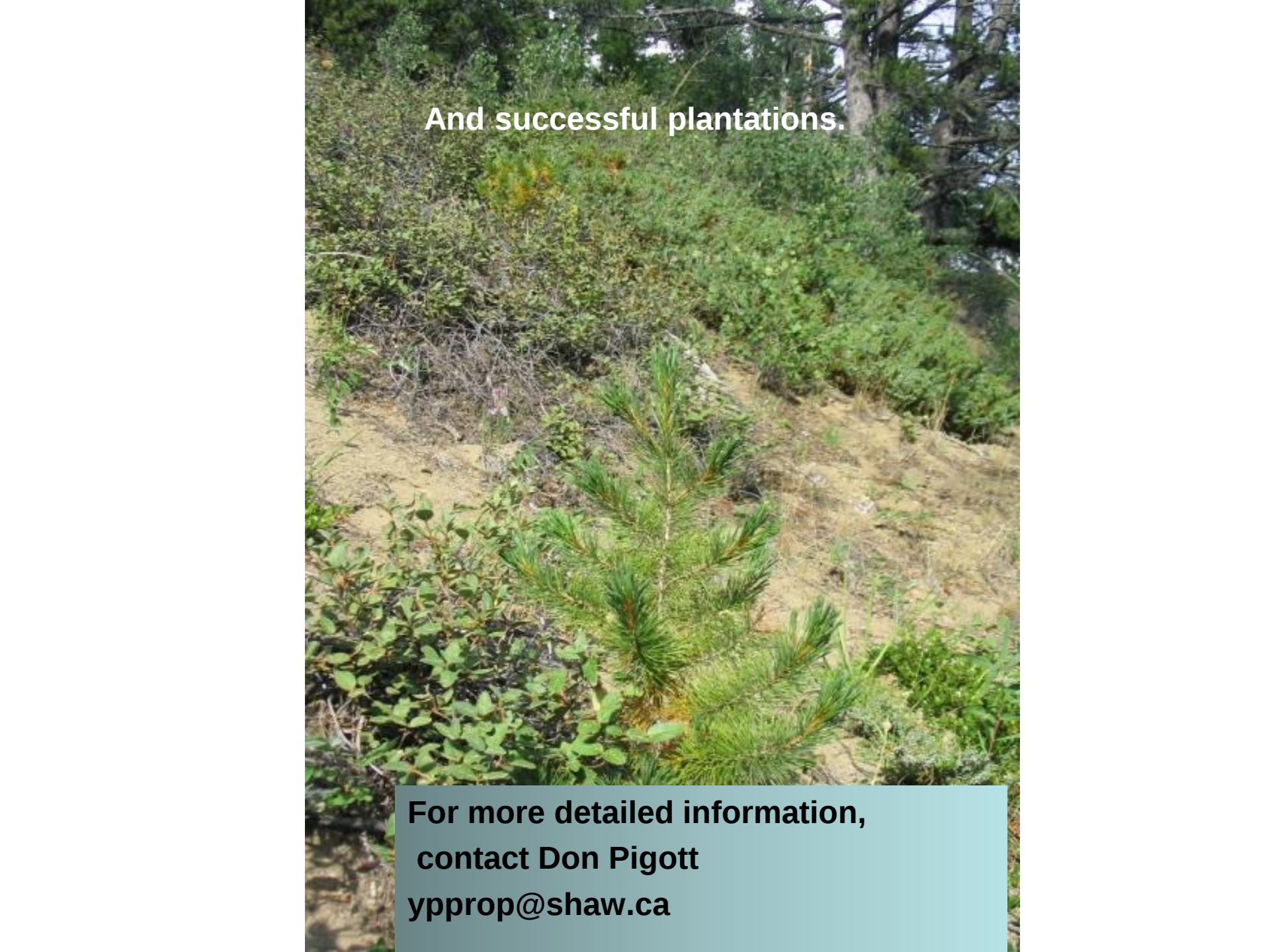


Simple drying racks can be constructed from readily available building supplies for a couple of hundred dollars.

Good quality seed will yield good quality seedlings.



4 year old seedling



And successful plantations.

**For more detailed information,
contact Don Pigott
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