

# Sustainable Canadian Agricultural Partnership

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## Silvopasture In British Columbia Information Series

### Unit 3.s.1. Managing Tree and Shrub Damage





## **Acknowledgment**

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Insert local indigenous territorial acknowledgment.

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# Silvopasture in BC Information Series Content Guide



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This supplemental unit is part of the information series on silvopasture in BC.

It builds on information presented in core units 3.1 and 3.2, covering ‘Silvopasture Beneficial Management Practices’.

## Unit 3.s.1. Managing Tree and Shrub Damage

### Goal

Learn beneficial practices that may prevent or minimize damage to crop trees or shrubs in silvopastures.

### Prerequisites

Units 3.1 and 3.2: Silvopasture BMPs.

### Content

1. Review: Why tree and shrub damage occurs
2. Defer use / Monitor use
3. Individual tree protection
4. Fencing and other protection measures protecting larger areas; and,
5. Chemical and electronic devices.

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The goals of this unit is to provide a more in depth look at the beneficial management practices (BMPs) for managing tree and shrub damage in silvopastures.

Prior to commencing this advanced topic, you should have completed units 3.1 and 3.2, on silvopasture BMPs.

We will explore three groups of BMPs:

1. Individual tree protection;
2. Fencing and other protection measures for larger areas; and,
3. Chemical and electronic devices.

# Silvopasture - Managing Tree and Shrub Damage

## Trampling Damage

All trees and shrubs are susceptible to trampling until at least 50 to 60 cm tall.



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All trees and shrubs in the presence of grazing animals, unless completely protected by a physical barrier, are subject to trampling damage risk until they grow in sufficient size to a visual or physical barrier to animal movement.

As a rule of thumb, this is generally when they attain 50-60-cm in height (about 2 ft).

Livestock do not step on trees and shrubs on purpose. Rather, it is random effect relative to the animal density as they move about the site.

Anywhere livestock accumulate (e.g. trails or watering sites), trampling damage can be expected to increase proportionately with the increased animal density.

# Silvopasture - Managing Tree and Shrub Damage

## Browsing Damage

- Some browsing of non-preferred species is expected (<2% of stand) until the growing points are inaccessible.
- Severe damage can occur when no other feed is available.



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Browsing damage on tree and shrub species can be more complex to manage. It is a function of individual livestock feeding preferences. But preference is always relative to a host of factors, and thus, is constantly changing.

If the tree or shrub species is not a preferred food source and other preferred forage and browse species are available, then a small amount of incidental (accidental) browsing damage will occur until the crop tree/shrub has extended its growing points (the terminal buds) above where they can be accessed by the livestock.

If, however, the tree or shrub species is more palatable to the livestock, or no other feed is available, heavy to severe damage can occur. And the onset of browsing damage can occur quickly.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Defer Use

- Until after trees are > 50-cm tall
- Annually, until bud set, or later into the growing season.



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Most trampling and some browsing damage can be avoided simply by deferring pasturing animals in the silvopasture until the tree or shrub is less vulnerable. As with all management considerations, options should be evaluated within the context of your operation as a whole.

Options for consideration:

- To avoid trampling damage, minimize animal stocking until crop trees are at least 50-cm tall.
- To minimize browsing on non-palatable species do the same.

To reduce browsing, and the impacts of browsing, seasonally, defer grazing until the tree completes its annual spring growth flush and commences bud set. Tree and shrub foliage generally becomes less palatable and more resistant to browsing later in the growing season.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Monitor Use



- Livestock will turn to crop trees and shrubs once more preferred species are depleted.
- Monitor use and move animals after target species are grazed.
- The more intensive the livestock use, the more intensive the monitoring required.

Browsing damage on tree and shrub species can be complex to manage. It is a function of individual livestock feeding preferences. But preference is always relative to a host of factors, and thus constantly changing.

If the tree or shrub species is not a preferred food source and other preferred forage and browse species are available, browsing damage will be minimal until the more palatable species are depleted. And the onset of browsing damage can occur quickly.

Monitoring grazing use and moving animals from the unit after target species have been grazed will help manage potential damage. The more intensive the livestock use, the more intensive the monitoring required.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Livestock Barriers for Individual Trees



Tree guards: mesh or solid tubes; combinations of both.



### Tree Tubes

With individual tree protections, there can be considerable implementation costs, but it is generally very effective at eliminating trampling and browsing damage. Individual tree protection is usually employed for high-value tree and shrub plantings or where natural obstacles are absent.

Staking is usually necessary to support the tree protection, although in some cases this can become an attractant to animals to use as a scratching post.

There are many commercially available options or you can fashion your own from rolls of plastic or woven wire fencing. Some commonly used include:

1. Mesh tubes, creating a barrier that does not impede air flow
2. Solid, translucent tubes that also create a thermal pocket around the seedling in addition to protection from browsing and trampling; and,
3. Hybrid options, with both a solid tube core with additional wiring encapsulating the primary tube for added defense.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Obstacle Planting



Tree and shrub seedlings planted into the shelter of large rocks or coarse woody debris.

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### Obstacle Planting

In obstacle planting, tree or shrub seedlings are planted adjacent to a large natural object (e.g. rock or stump) such that the obstacle becomes the physical or visual barrier to animal movement.

This planting technique is well-documented for successfully reducing trampling damage, and to lesser extent browsing damage. It can, however, increase planting labour costs, because it may reduce the number of trees that can be planted per unit time, as the planter must spend extra time seeking suitable planting locations.

It is also not a practical option for silvopastures established in a green field (e.g. old hayfield) setting where the rocks and large coarse woody debris have been removed from the site.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Install Fencing for Tree Clusters or Rows

- Variety of options at various cost points.
- Temporary electric fences are low cost and highly reconfigurable.



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For silvopastures planted with trees in multi-row or cluster designs, fencing can be used to protect groups of tree and shrub seedlings.

Fencing of any type can be suitable, including low-cost options such as log fences created from woody material left on site after harvest.

Permanent fencing is more durable, but has higher installation and maintenance costs. Wire selection for permanent fencing needs to be appropriate to the intended livestock species (e.g. Paige-wire for sheep and goats).

Permanent fencing cannot be reconfigured easily, and can also entangle wildlife and may require undesirable levels of soil and vegetation disturbance to clear the fence line on sensitive areas of the landscape.

Temporary electric fencing is a relatively low-cost option, is easily reconfigurable and generally provides good animal control under most conditions once animals have been trained to the electric fence. Electric fencing however, requires a reliable power source and provides little deterrence to livestock determined to pass through. An online search will provide a number of resources with information, tips and tricks on the topic. Electric fencing in silvopastures may also require some additional ongoing removal or pruning of woody vegetation to keep vegetation clear of the live wires.

# Silvopasture - Managing Tree and Shrub Damage

## Considerations: Other Livestock Barriers for Tree Clusters or Rows



Debris fencing

Debris fencing, which is created from piling coarse woody material left behind at harvest, is another option for sheltering clusters and rows of trees.

Debris placement can be a cost-effective method of livestock control, particularly when they are created at the same time as timber harvest, and thus utilizing machinery that is already on site.

Debris fences need to be a suitable height and density relative to the livestock species on site, being cognizant of gaps that can be exploited by livestock, as with any other fencing option. In some instances, designed permeability of the debris fences may be desirable to 'direct traffic flow' and allow for easier wildlife movement. Other considerations include settling of the woody debris after installation, especially if installed on top of snow cover, and assessing woody species making up the debris barriers for implications with respect to damaging insects (e.g. Douglas-fir beetle).

## Silvopasture - Managing Tree and Shrub Damage

### Considerations: Other Livestock Barriers for Tree Clusters or Rows



Random elevated debris

Single or multi-row silvopasture designs can also utilize wood debris arranged in a random elevated pattern amid large stumps or rocks to inhibit, but not completely eliminate, livestock access.

A detailed debris placement plan should be created for the silvopasture unit before timber harvest, and the logging crews briefed on the general plan. For efficiency and cost-effectiveness, if possible, elevated debris structures should be installed during timber harvest activities to take advantage of equipment being on-site.

# Silvopasture - Managing Tree and Shrub Damage



## Considerations: Virtual Fencing

- Livestock fitted with GPS collars that communicate with towers to create a virtual zone.
- When the livestock reach the edge, an alarm is sounded.
- Livestock passing through the boundary receive a mild electric shock.
- Livestock generally modify their behaviour through learned experience.



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Virtual fencing is a relatively recent technology that controls livestock distribution without physical fences. The technology is rapidly evolving with multiple companies entering the marketplace. Livestock are fitted with global positioning system (GPS) collars that communicate with reception towers to form a zone defined by the land manager.

When the livestock reach the edge of the virtual zone, an auditory alarm is emitted from the collar. And if livestock pass through the zone boundary, they receive a mild electric shock.

Livestock generally modify their behaviour through learned experience and will start to respond to the audio warning before advancing far enough to obtain a shock. Livestock must be trained for the virtual fence, though, just like an electric fence.

The livestock collars and towers used in virtual fencing are relatively expensive, but can be used to create any desired zone configuration.

In silvopastures, mature tree cover may interrupt with the GPS signals required to maintain the invisible boundary.

## Silvopasture - Managing Tree and Shrub Damage

### Considerations: Chemical Deterrents

- Odour that repels livestock or wild ungulates.
- Can be effective but they must be reapplied periodically.
- May also deter grazing in the immediate vicinity of the tree or shrub seedling.



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Chemical deterrents have been developed that, when sprayed onto the foliage of crop trees or shrubs, has an odour that may repel browsing by livestock or wild ungulates.

Chemical solutions can be effective but they need to be reapplied annually or after periods of prolonged, episodic heavy precipitation.

Because they work by odour, they may also deter grazing in the immediate vicinity of the tree or shrub seedling. Thus the full benefits of grazing to release tree-forage competition may not be realized because forages may be left ungrazed in the critical 1- to 2-m zone around the base of a tree or shrub.

# Questions and Discussion



*Question and answer break.*