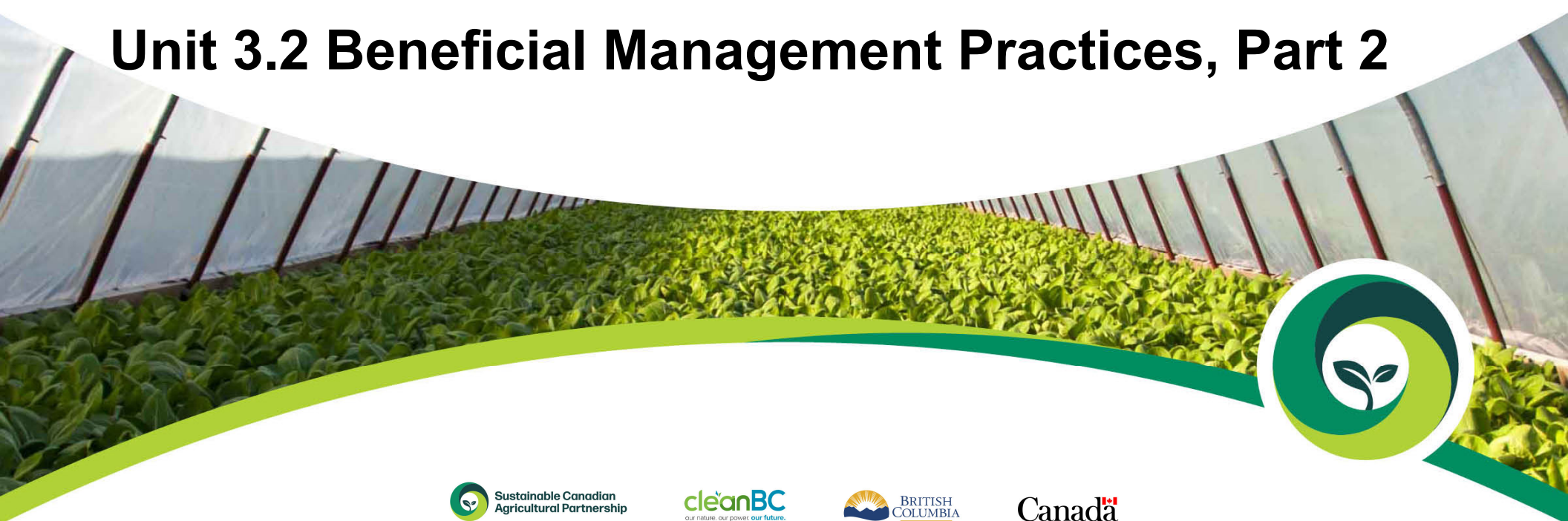


Sustainable Canadian Agricultural Partnership

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Silvopasture In British Columbia Information Series

Unit 3.2 Beneficial Management Practices, Part 2



Acknowledgment

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Silvopasture in BC Information Series Content Guide



Core Units

Case Studies

Supplemental Units

0. Series Overview

1. Introduction

2. Science Behind SP

3.1. SP BMPs - part 1

3.2. SP BMPs - part 2

4. SP Planning

2.c.1 Production Synergies:
Kootenay Tree Farms

2.c.2 Riparian Silvopasture:
Silver Hills Ranch

3.c.1 Small-lot SP: Just Another
Weed Patch Farm

3.c.2 Mature Forest to SP:
Indian Gardens Ranch

4.c.1 Planning on Crown Land:
SP Pilot Project

4.c.2 Adaptive Management at
Aveley Ranch

1.s. History of SP in BC

2.s.1. Light & Microclimate

2.s.2. Hydrology

3.s. Managing Damage

Unit 3.1 Beneficial Management Practices, Part 2

Goal

Learn beneficial practices that will maximize resource use separation and facilitation, or minimize negative interactions in silvopastures.

Suggested Prerequisites

3.1: Beneficial Management Practices, Part 1.

Introductory pasture and range management concepts.

Content

1. Intermediate Phase Focus: livestock-tree interactions
2. Arboreal Phase Focus: tree-forage interactions



Silvopasture Development Phases

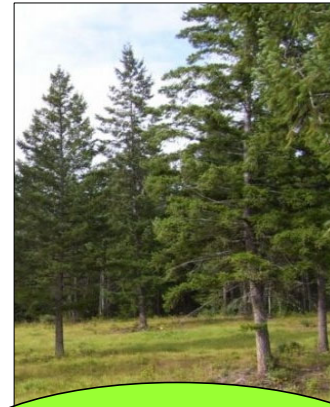
1. Herbaceous
2. Intermediate
3. Arboreal



Herbaceous



Intermediate



Arboreal

Silvopasture BMPs

Successful silvopastoral management revolves around managing three critical interactions

	Tree-Forage	Tree-Livestock	Forage-Livestock
Herbaceous	Critical	Critical	Important
Intermediate	Normal	Important	Normal
Arboreal	Critical	Normal	Normal

Intermediate Phase BMPs

2. **Intermediate Phase:** Interactions are limited to soil resources; most livestock impacts on trees and shrubs are diminished.



Intermediate

Silvopasture BMPs - Intermediate Phase

Managing Livestock-Tree Interactions

- Rubbing
- Biting or gnawing
- Soil compaction



Silvopasture BMPs - Intermediate Phase

Managing Livestock-Tree Interactions

Rubbing Damage

- Some unavoidable - driven by livestock instincts.
- Providing access to a scratching post or oiler can reduce tree or shrub use.



DIY scratching post

Silvopasture BMPs - Intermediate Phase

Managing Livestock-Tree Interactions

Biting or Gnawing

- More prevalent with horses and camelids.
- A sign of boredom – rotate livestock between environments.
- May indicate mineral deficiency - provide supplements.

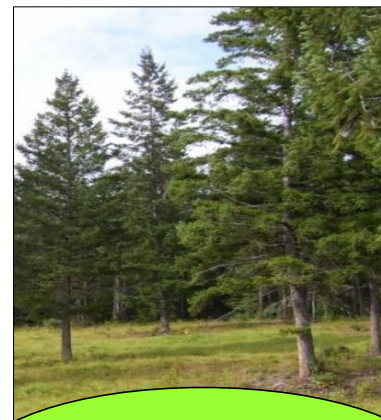
Soil Compaction

- Follow BMPs provided for Herbaceous Phase.



Arboreal Phase BMPs

3. **Arboreal Phase:** Mature trees/shrubs control availability of most resources and understory microclimate; livestock have limited impact on trees.



Arboreal

Silvopasture BMPs - Arboreal Phase

Managing Tree-Forage Interactions

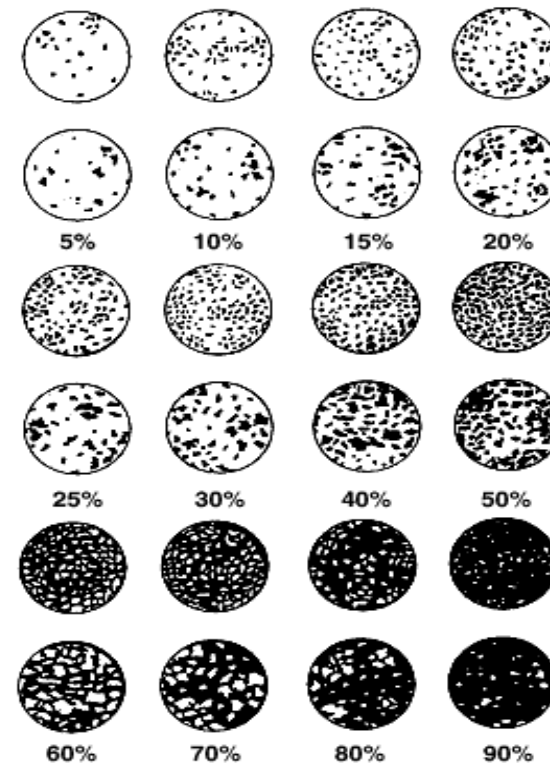
- Mature trees and shrubs dominate resource availability.
- Understory production decreases when canopy closure greater than 30-40%.
- Manage resource use by controlling woody species:
 1. Density; and/or
 2. Distribution (spatial arrangement)
- Silvopasture design can be implemented:
 1. At planting; or through
 2. Selective harvest or thinning



Silvopasture BMPs - Arboreal Phase

Managing Tree-Forage Interactions

- Canopy closure: not estimated by stem density, but by how much of the sky is blocked.
- Measure with specialized sensors or visual estimates.
- Factor in seasonality for deciduous species.



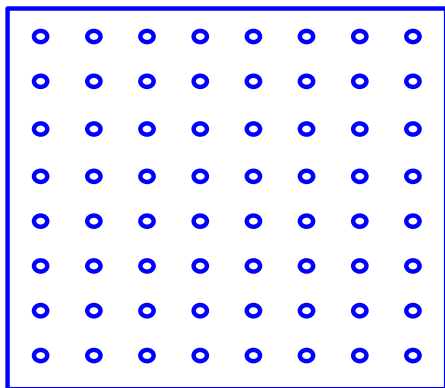
BC Ministry of Forests, 1997

Silvopasture BMPs - Arboreal Phase

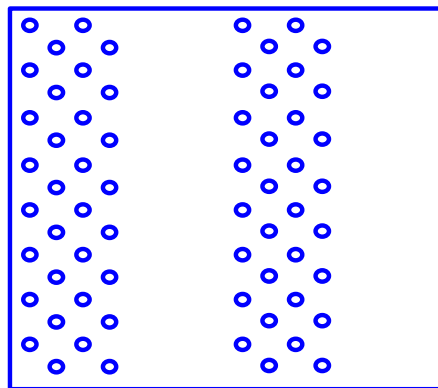


Managing Tree-Forage Interactions

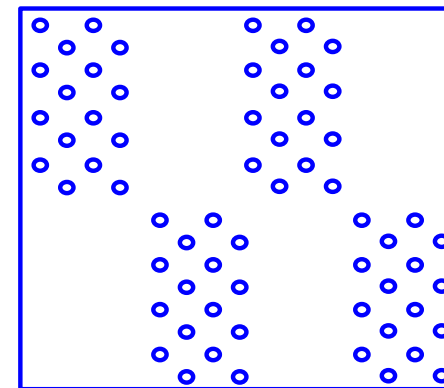
- Spatial arrangement (planting or retention patterns) will have strong effects on understory at the arboreal phase.
- Three basic arrangements with many variations possible.



Grid



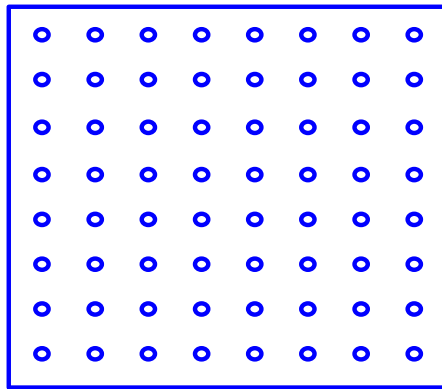
Multi Rows



Clusters

Silvopasture BMPs - Arboreal Phase

Managing Tree-Forage Interactions



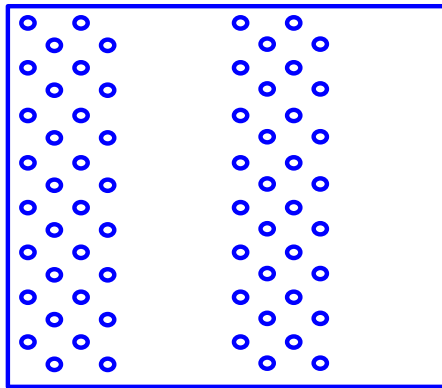
Grid



Silvopasture BMPs - Arboreal Phase



Managing Tree-Forage Interactions

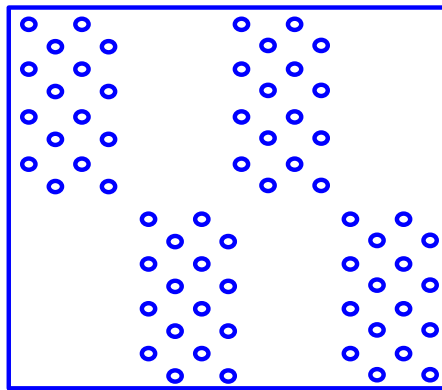


Multi Rows



Silvopasture BMPs - Arboreal Phase

Managing Tree-Forage Interactions



Clusters



Silvopasture BMPs - **Arboreal Phase**

Managing Tree-Forage Interactions

Spatial Considerations - Livestock Distribution

- Grid patterns maximize the interface between livestock and trees/shrubs.
- Multi-row and cluster patterns may have adverse impacts on livestock access over the full area.
- Multi-row and cluster designs also allow for livestock sheltering from extreme weather.



Silvopasture BMPs - Arboreal Phase

Managing Livestock-Forage Interactions

Secondary Livestock Distribution Effects

- Low-density cluster designs may be a strong attractant for livestock seeking shade or improved forage palatability.
- Can result in increased trailing with greater risk of soil compaction.
- Can result in uneven distribution of manure and urine deposition.



Silvopasture BMPs - **Arboreal Phase**

Managing Tree-Forage Interactions

Spatial Considerations - Tree Growth

- Low-density tree grids may adversely affect tree growth form.
- If you thin a grid silvopasture, pruning may be needed.
- Multi-row and cluster designs benefit from self-pruning.



Silvopasture BMPs - Arboreal Phase



Managing Tree-Forage Interactions

Establishment Costs from Mature Stands

- Can be lowered because pasture zones are only prepared on a portion of the silvopasture.
- Rocks, stumps and logging slash can be retained in treed zone.



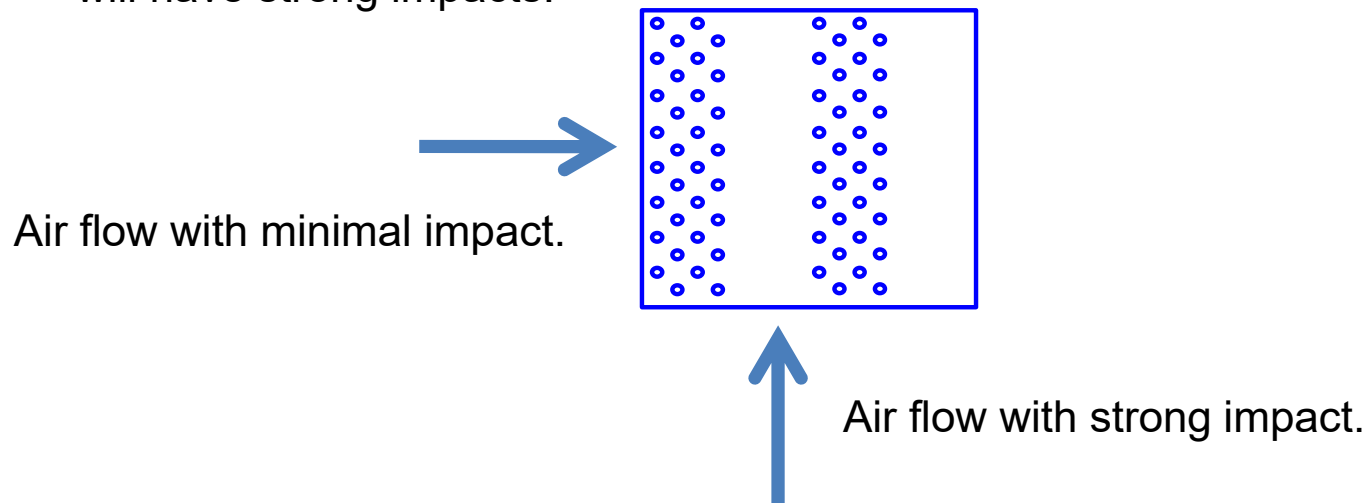
Silvopasture BMPs - Arboreal Phase



Managing Tree-Forage Interactions

Capturing Microclimate Benefits

- Temperature and humidity effects are generally independent of canopy cover within grid or cluster arrangements.
- Within multi-rows, the orientation of the openings to the prevalent wind flow will have strong impacts.



Silvopasture BMPs - **Arboreal Phase**



Managing Tree-Forage Interactions

Reducing Competition for Light

- Light availability is strongly affected by location (latitude) and topography (aspect and slope).
- Shade is more evenly distributed in a grid design.
- Solar input is maximized on sites with a south to south-west aspect on gentle slopes.
- Light modeling can factor in all the site conditions and the height and density of the tree/shrub crop.

Silvopasture BMPs - **Arboreal Phase**

Managing Tree-Livestock Interactions

Spatial Considerations - Animal Welfare

- Low tree density in very hot / cold conditions can have poor animal distribution
- Grid and cluster designs restrict line-of-sight (may cause livestock stress), and provide cover for predators.



Silvopasture BMPs - **Arboreal Phase**

Managing Livestock-Tree Interactions

Browsing in Orchards

Browsing of foliage and fruit can occur on accessible branches.

- Prune lower branches; or
- Delay turn-out past fruiting.



Questions and Discussion

