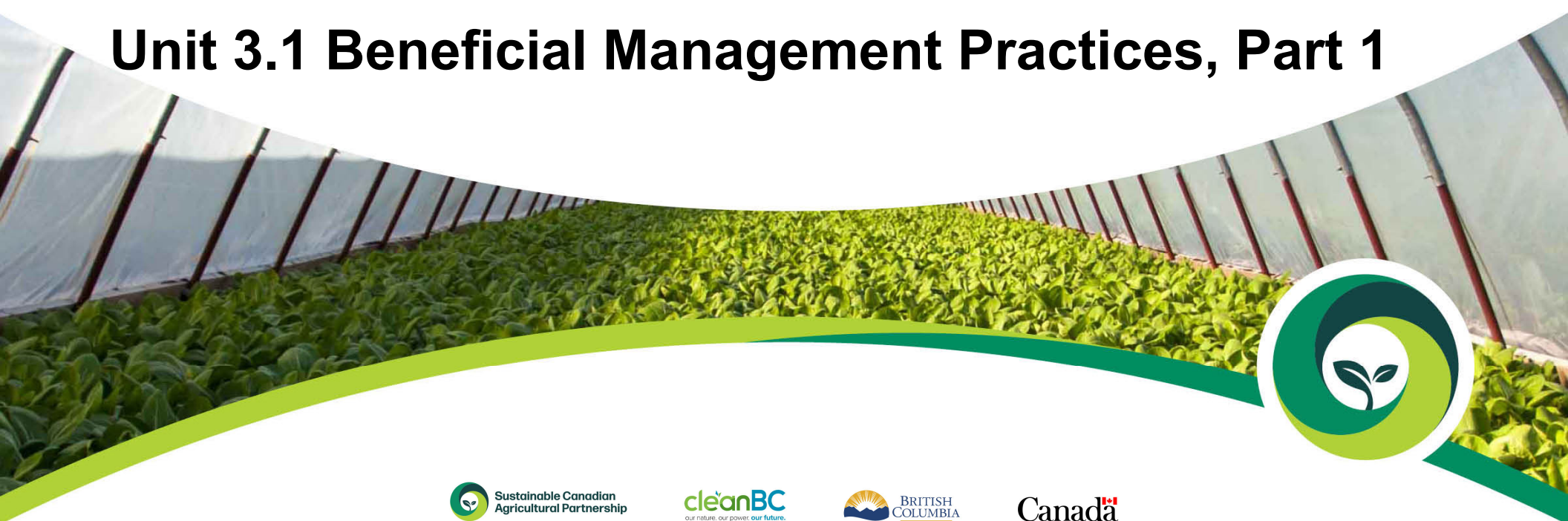


Sustainable Canadian Agricultural Partnership

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Silvopasture In British Columbia Information Series

Unit 3.1 Beneficial Management Practices, Part 1



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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 1

Goal

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

Suggested Prerequisites

Unit 2: Science behind silvopasture.

Introductory pasture and range management concepts.

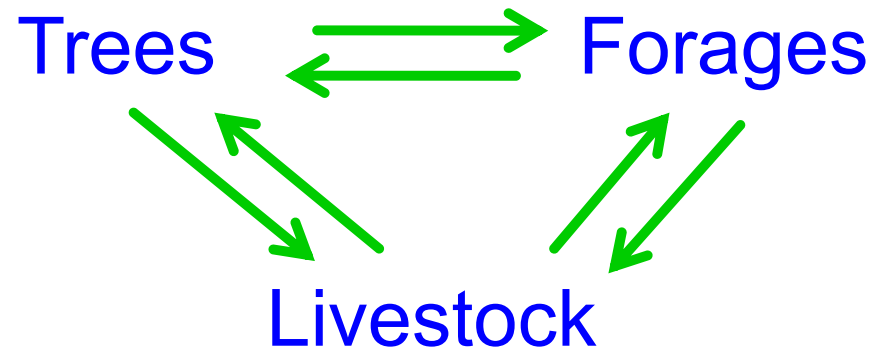
Content

1. Review: Resource Sharing, Interactions, Development Phases
2. Herbaceous Phase Focus: tree-forage and livestock-tree interactions



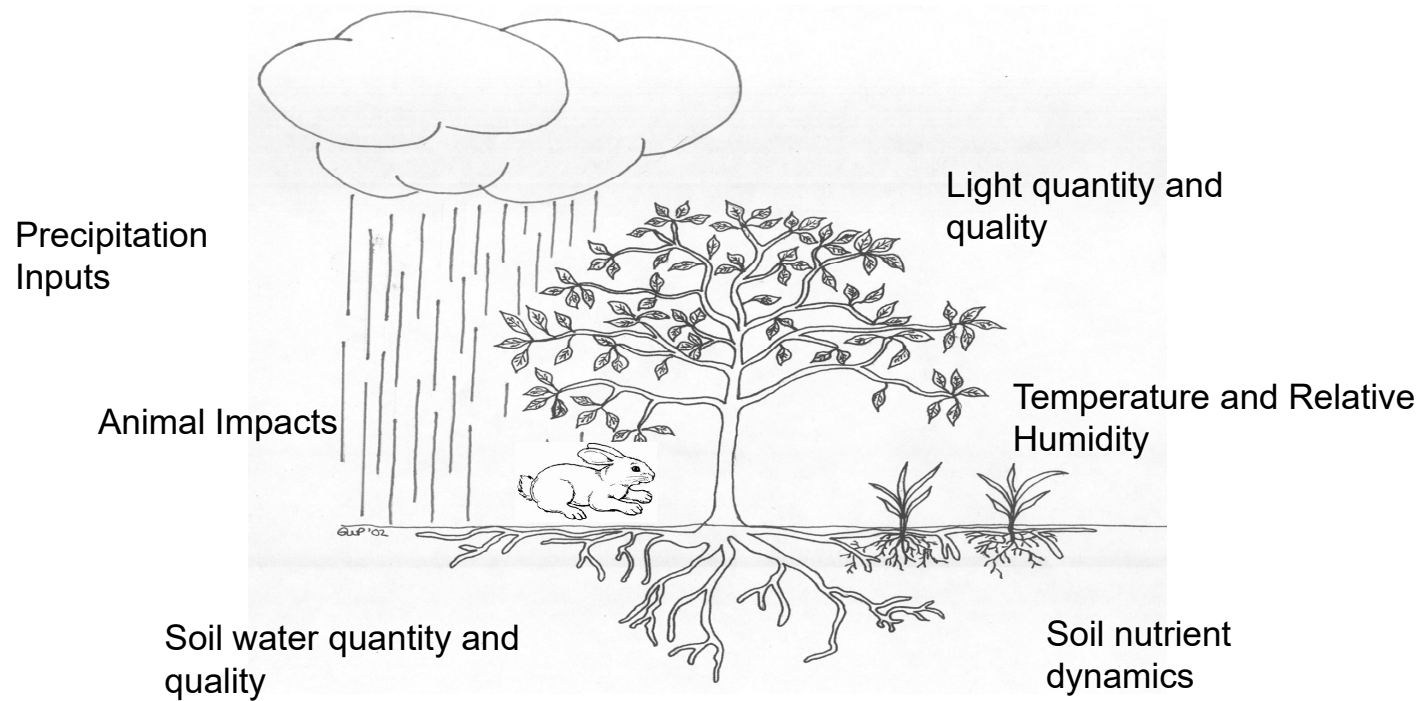
Silvopasture is a Type of Applied Ecology

- Understanding basic principles will help design and manage your silvopasture.
- Focus: manage resource sharing and interactions among three components.



Silvopasture Resource Sharing and Interactions

Above- and Below-ground, Competition and Facilitation



Silvopasture Development Phases

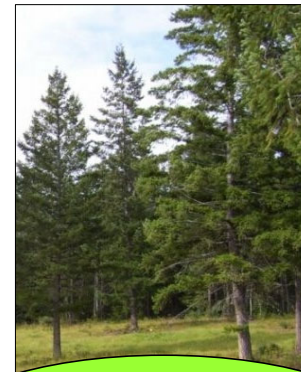
1. **Herbaceous Phase:** Trees, shrubs and forages interact symmetrically, and all are susceptible to direct livestock impacts.
2. **Intermediate Phase:** Interactions are limited to soil resources; most livestock impacts on trees and shrubs are diminished.
3. **Arboreal Phase:** Mature trees/shrubs control availability of most resources and microclimate; livestock have limited impact on trees.



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

Herbaceous Phase BMPs

1. **Herbaceous Phase:** Trees, shrubs and forages interact symmetrically (proportionate to their size), and all are susceptible to direct livestock impacts.



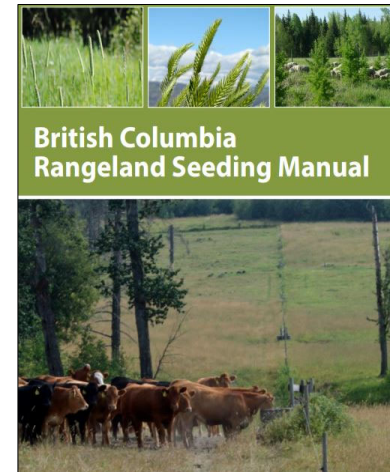
Herbaceous

Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Forage Interactions

Minimize Tree-Forage Competition with Species Selections

- Species mixtures must balance the short-term risks against longer-term production potential.
- Tree stock: large, vigorous, establishes and grows rapidly.
- Forages: slow to establish, short-stature, shallow-rooted, or grows at a different time of year than the tree.



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Forage Interactions

Goal: Minimize Tree-Forage Competition with Vegetation Management

- Create a 1- to 2-m minimal vegetation zone for 2 to 3 years.
- Counter-act short-term forage competition window.

Options

- Herbicides
- Mats and Mulches
- Manual or Mechanical Weeding
- Grazing



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Forage Interactions

Vegetation Management: Herbicides

- Widely used in BC
- Regulatory compliance: transport, storage, application, disposal
- Herbicide choice restricted by mixed species
- Livestock access restricted after treatment
- Application restricted to prevent drift, set-backs from water



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Forage Interactions

Vegetation Management: Mats & Mulches

- Cost and labour considerations
- Organic mulch adds OM as it breaks down.
- Inorganic mulch has better vegetation control, but extra labour for removal.
- Some mulches create rodent habitat.

Vegetation Management: Manual or Mechanical

- Most labour-intensive option
- Mechanical control can be restricted by topography



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Forage Interactions

Vegetation Management - Livestock

- Primary benefit of silvopasture.
- Livestock preferences must be understood.
- Defer grazing or use other BMPs when strong preference for browsing.
- Effectiveness increased by combining grazing with other treatments.



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Livestock Interactions

Minimize Woody Species Damage

- Trampling
- Browsing
- Root-zone compaction



Silvopasture BMPs - **Herbaceous Phase**

Managing Tree-Livestock Interactions: Trampling

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

- Exclude or minimize use until tree or shrub is taller than threshold; or,
- Use physical protections around woody seedlings.
- Action guided by relative costs.



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Trampling

Livestock Barriers for Individual Trees



Obstacle planting



Tree guards



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Trampling

Livestock Barriers for Tree Clusters or Rows



Debris fencing, or
Temporary electric fencing



Random elevated debris

A more detailed description of protection strategies is provided in supplemental unit 3.s.1.

Silvopasture BMPs - **Herbaceous Phase**



Managing Livestock-Tree Interactions - Browsing

- Some browsing is expected (<2%) until the growing points are inaccessible.
- Severe damage can occur when no other feed is available.
- Severe damage can occur when the tree is a preferred species.
- Seedlings are most susceptible from early spring to early summer.



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Browsing

Relative palatability is a complex subject: 'eating at the buffet':

- Individual species and breed preferences (biological);
- Individual animal and herd preferences (learned);
- Palatability changes with time of year, weather (chemical/physical).



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions – General Browse Palatability

	Cattle	Sheep	Goats
Aspen	High	High	High
Birch	Low	Low	Moderate
Cottonwood	High	High	High
Maple	Moderate	Low	High
Pine	Low	Moderate	Moderate
Spruce	Low	High	Moderate
Willow	Moderate	High	High



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Browsing

Management strategies

- Ensure good livestock distribution: use mineral supplements, water sources.
- Monitor utilization closely: preference an expression of what is available.
- The more intensive the grazing, the more intensive the monitoring required.
- Train your animals to graze on target species.
- Multi-species grazing.



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Browsing

- Use obstacle planting or physical barriers
- Use chemical deterrents



A more detailed description of protection strategies is provided in supplemental unit 3.s.1.

Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Tree Interactions - Soil Compaction

- Generally not an issue with moderate stocking rates and rotational use.
- Seasonal freeze-thaw cycle naturally de-compacts soils.



Silvopasture BMPs - **All Phases**

Managing Livestock-Tree Interactions - Soil Compaction

- Heavier livestock with shallow tree/shrub roots on clay soils, increases the risks of negative impacts.
- Decompaction may not be possible on clay soils without additional management inputs.
- Special consideration needed to prevent compaction when soils are saturated.



Silvopasture BMPs - **Herbaceous Phase**

Managing Livestock-Forage Interactions

- Follow BMPs you would use for any new pasture or range seeding.
- If seeding will be part of establishment, silvopastures will typically require scarification to ensure a good seed bed.
- Adjust animal stocking to account for exclusion zones around tree/shrub seedlings .



Questions and Discussion

