



Profitable Silvopasture Systems: The Woodlands

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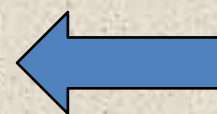
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United States Department of Agriculture
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Adding woods to
pasture (or...)



...Pasture to woods



A Forest (Woodland) Dominated Landscape



Credit: www.en.Wikipedia.com

Still a “foreign concept” in the Northeast...

Agroforest Syst
DOI 10.1007/s10457-012-9482-z

Comparing silvopastoral systems and prospects in eight regions of the world

Frederick Cubbage · Gustavo Balmelli · Adriana Bussoni · Elke Noellemeyer ·
Anibal N. Pachas · Hugo Fassola · Luis Colcombet · Belén Rossner ·
Gregory Frey · Francis Dube · Marcio Lopes de Silva · Hayley Stevenson ·
James Hamilton · William Hubbard

Received: 20 October 2011 / Accepted: 6 January 2012
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Abstract Silvopasture systems combine trees, forage, and livestock in a variety of different species and management regimes, depending on the biophysical, economic, cultural, and market factors in a region. We

Corrientes provinces, Argentina; La Pampa province, Argentina; northwestern Minas Gerais, Brazil; the Aysén region of Patagonia, Chile; the North Island of New Zealand; the Southeast United States; Paraguay;

... but a widely accepted agroforestry system in other forested regions of the world

Woodlands Have Value

- Silvopasture
- Timber
- Maple syrup
- Wildlife habitat
- Water filtering
- Recreation
- Firewood



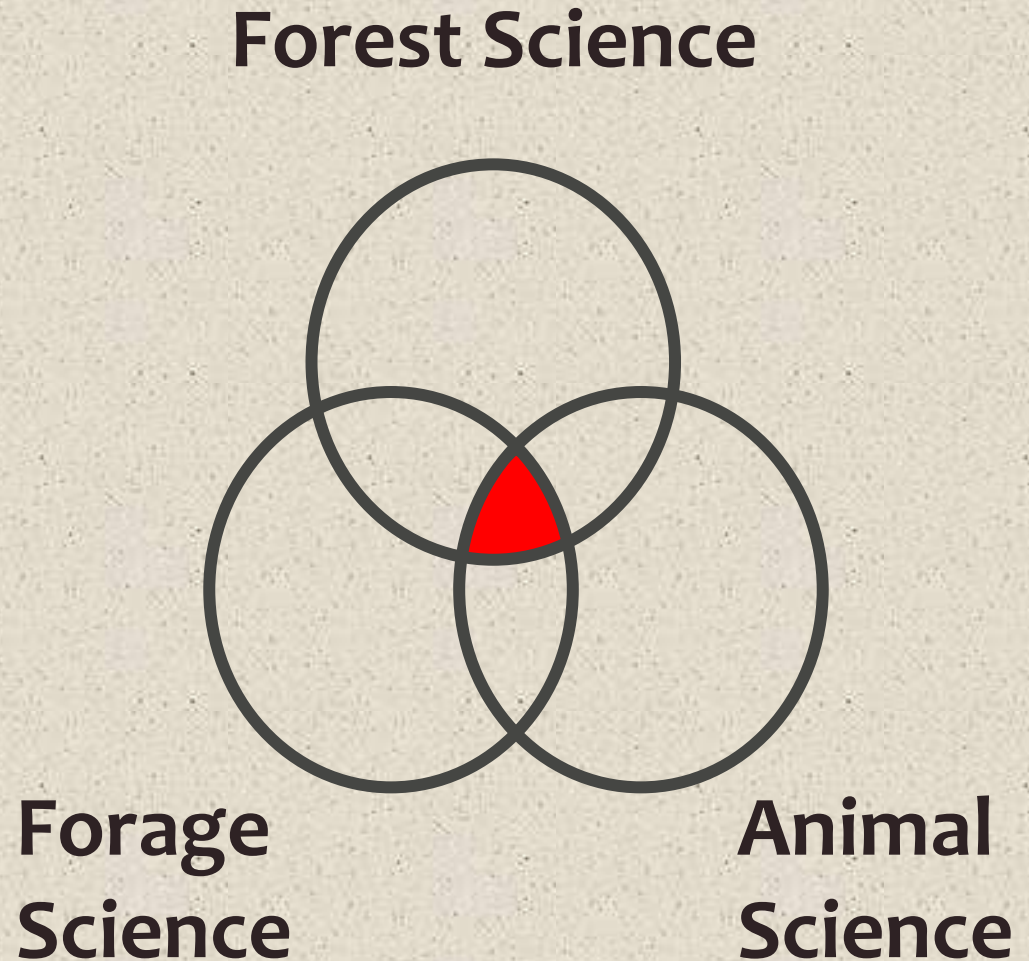
Woodland Have Their Own Worries



Silvopasture

Manage...

1. Tree density
2. Tree species
3. Forage species
4. Animal behavior



Scale of Operation

- Small train wreck
- Large train wreck



<http://marketplayground.com/wp-content/uploads/2011/11/train-wreck.jpg>

Outline



- Background and Context
- Site Assessment and Thinning
- Tree Selection
- Working with Foresters



Be able to Chew What You Bite Off

Balance pasture establishment with
pasture utilization


Credit: Jeff Jourdain

Silvopasture Forest Site Assessment

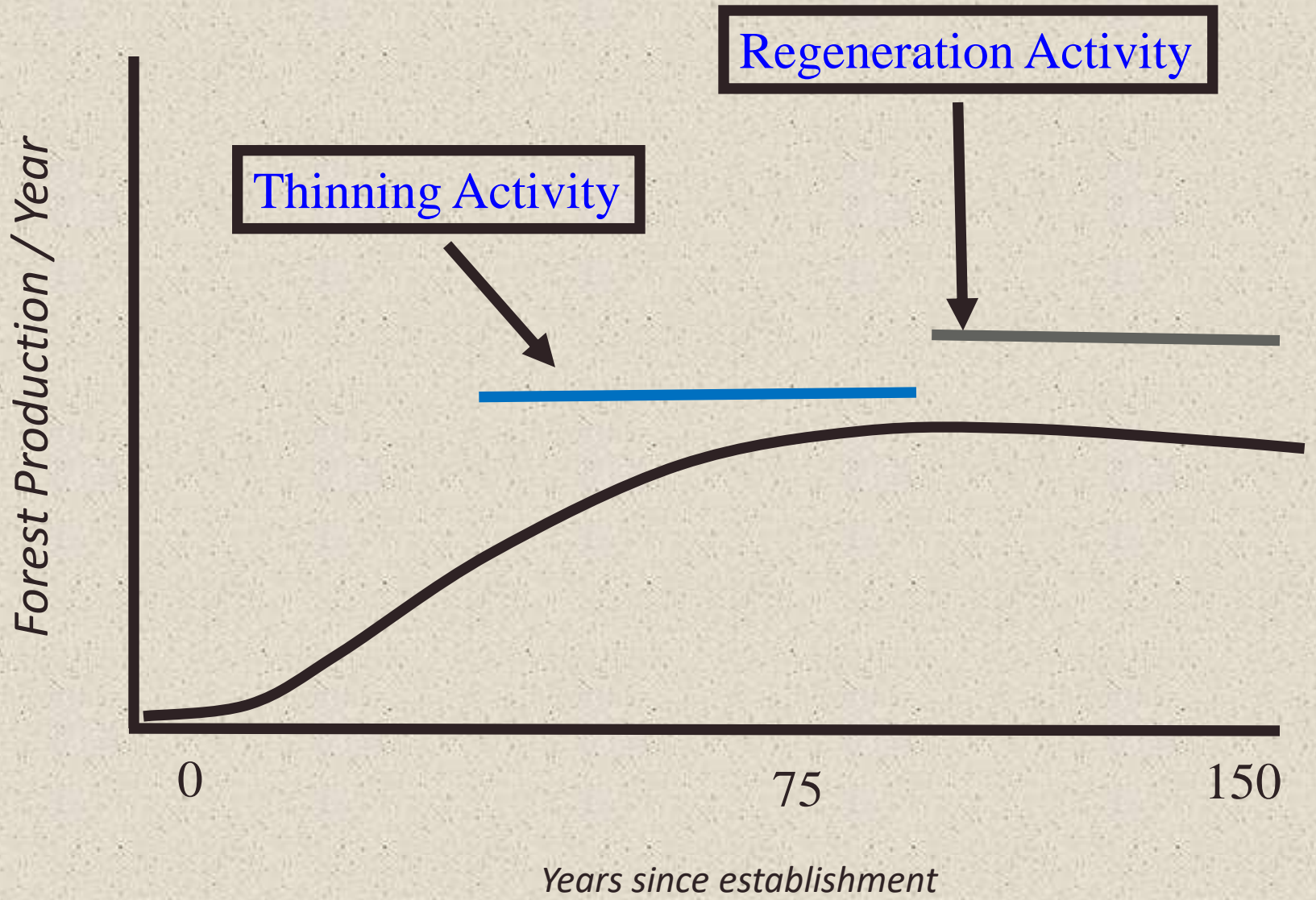
(www.ForestConnect.info)

- Site quality
- Access
- Erosion
- Hazards (to livestock or people)
- “Fencibility”
- Water
- Proximity and Logistics
- Alternative locations
- Timber value
- Forage value



- 
- A stylized, dark brown illustration of a plant with a central stem, several large, pointed leaves, and a cluster of small, round buds or fruits at the top. The plant is positioned on the left side of the slide, extending from the bottom to the top.
1. Looking at the forest
 2. Effects of thinning
 3. How to kill trees

THINNING METHODS TO PUT SUNLIGHT ON THE GROUND



What to Expect from Correct Thinning – the numbers*

Species	Index	% Increase	Author
BE, SM sapl	Diameter	33	Donoso
BC, SM, RM	Basal area	25	Smith, et al.
BC, SM, RO	Diameter growth / decade	100	Swaciak & Smallidge
Oak	Diameter	35 – 100	Hilt
Maple, cherry	Cords	75	Hough
N. Hdwds	Diameter & basal area	39	Marquis in Leak (2012)
N. Red oak	Diameter, precomm	85	Ward
Upland oak	Board ft.	33	Ward
B. oak, r. maple, b. birch	Diameter, precomm	50	Ward

* Most thinning removed approximately 33% of the basal area

Forest Management Is Predominately Light Management

- Woodlands can support layers of vegetation
- The upper canopy has two layers, the lower of which is of marginal value
- Judicious cutting can concentrate growth on best trees and create light for forage.



Crown Class

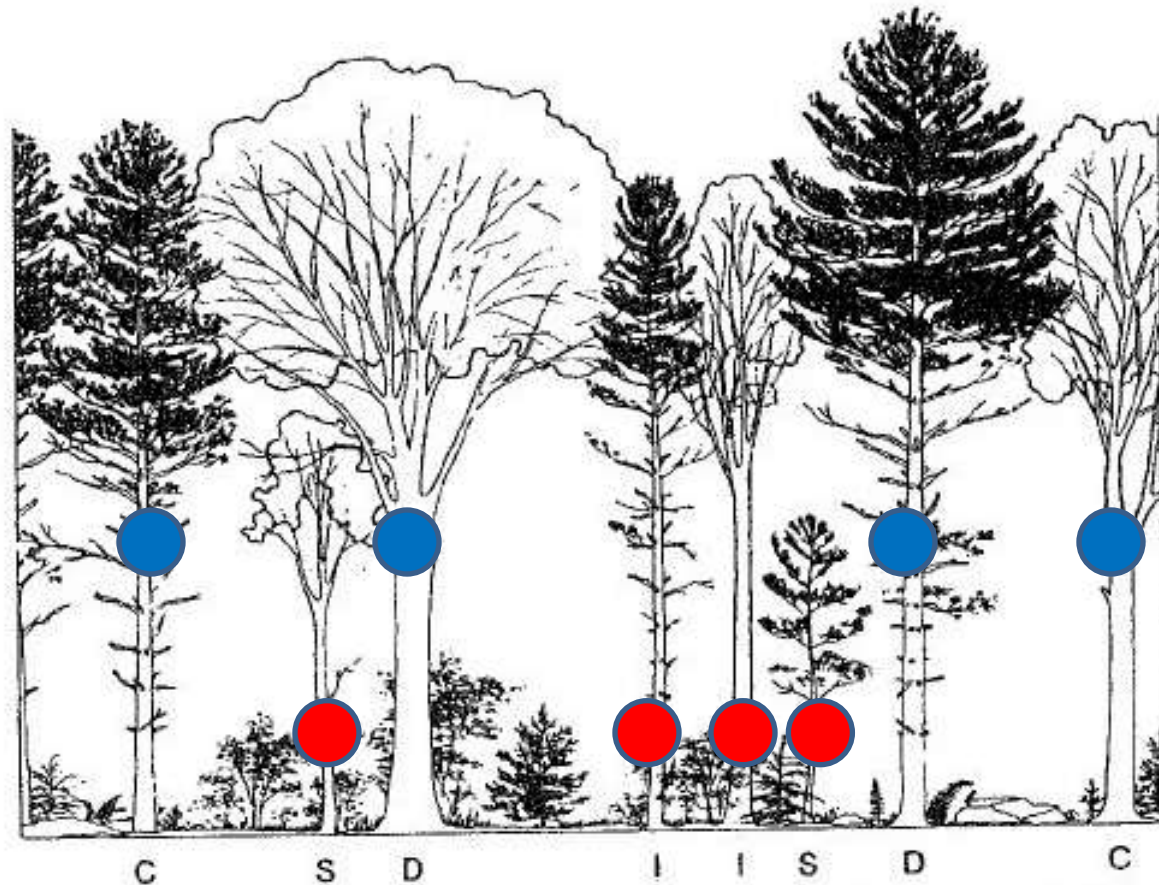
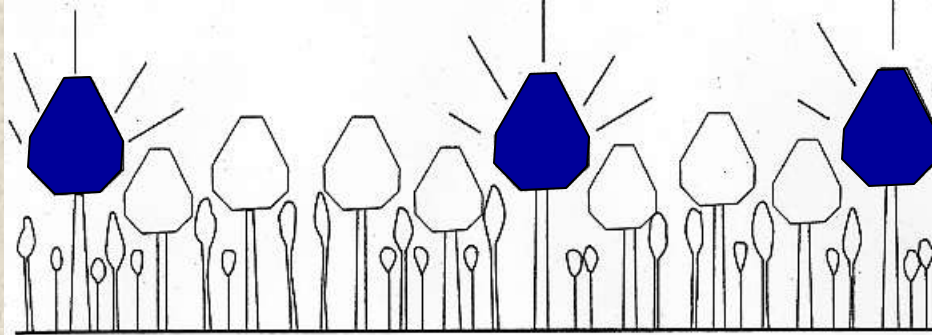


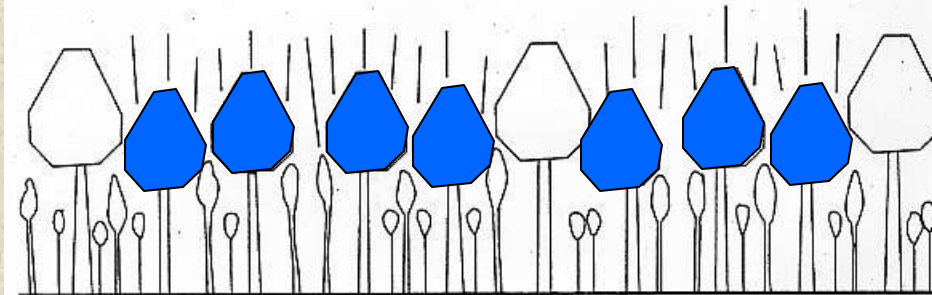
Fig. 38. Crown classes. Trees marked "D" are dominants, "C" codominants, "I" intermediates, and "S" suppressed, even though all of the trees are in the same age class. The vegetation below the suppressed trees forms the understory.

Crown Class

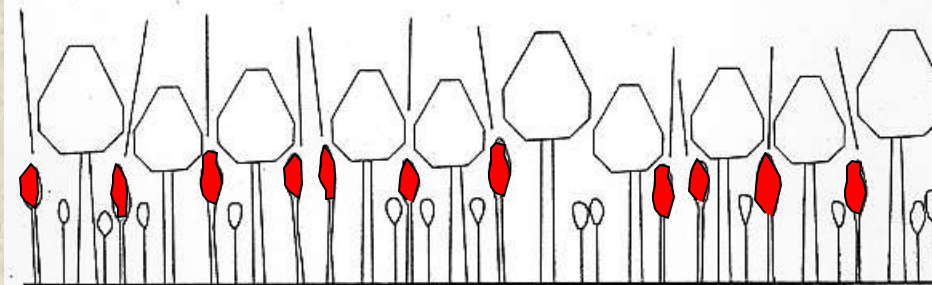


Dominants

Responsive

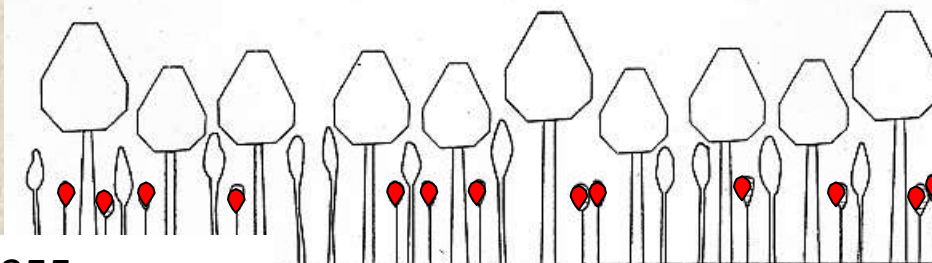


Codominants



Intermediates

Non-responsive



Overtopped

Growth
response of
lower canopy
is $1/3$ to $1/8$ as
much as in
upper canopy.
(Nyland, 2009)

Effects of Thinning

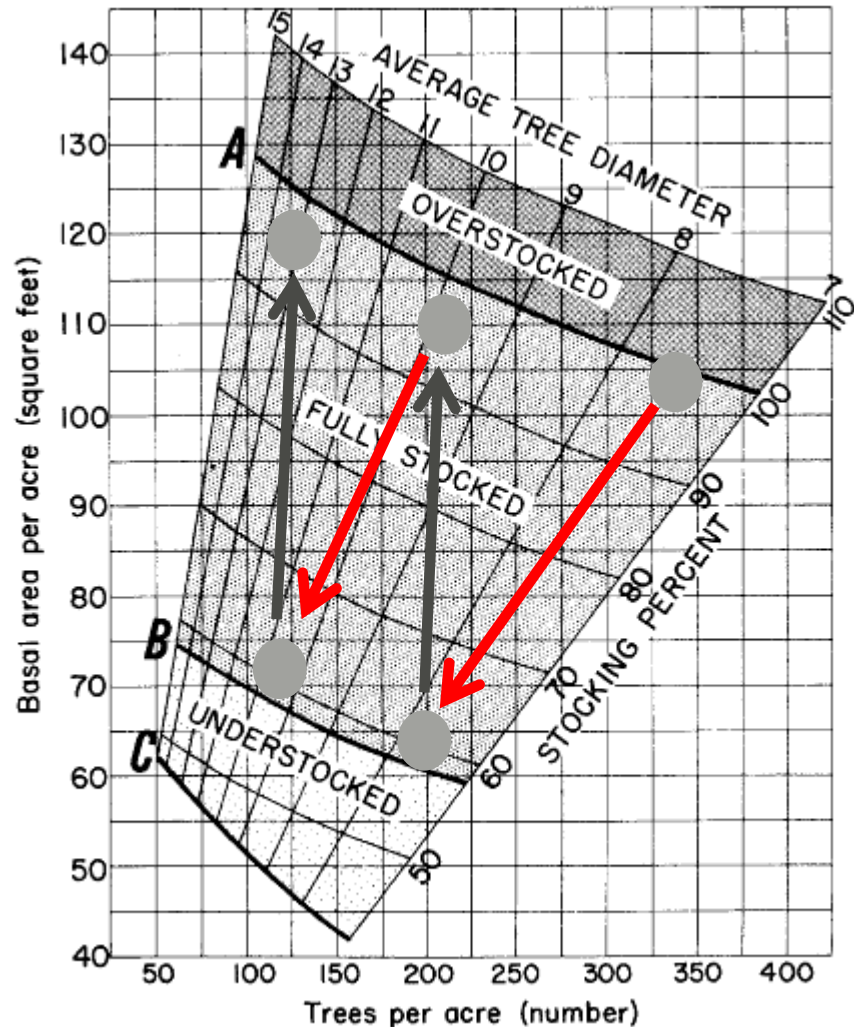
Desirable
Understory
Development



Basal Area Thinning Chart: Upland Hardwoods

- Stand's basal area and trees per acre are plotted on the appropriate stocking chart.
- Selection guidelines and cutting prescription are developed (covered in silviculture class).
- Stand is thinned (red line).
- Stand regrows (green line).

Illustration of Stand Thinning by Stocking Chart



Effects of Thinning

Undesirable
Understory
Development



Board Foot / Acre on High Quality Northern Hardwood Site



Silvopasture Establishment has Deliberate Harvesting Targets

- Controlled increase of sunlight at ground level
- Plan for future cuts
- Retain high value trees
- Spacing is important
- Retain border trees for fencing
- Debris management



Effects of Thinning

Debris
management



Non-Utilization Methods

- Non-commercial
- Pre-commercial



Utilization Methods



A stylized, dark brown illustration of a plant with a central stem, several large, pointed leaves, and a cluster of small, round buds or fruits at the top. The plant is positioned on the left side of the slide, extending from the bottom to the top.

Which, and How Much, to Kill or
Cut or Plant

TREE SELECTION

Retain Those Species...

- Adapted to the site
- Have acceptable future value
- Compatible with pasture management
- ~ 50-65% crown closure



How Much Should You Kill or Cut?

- Enough to increase sunlight
- (?) Enough to attract a contractor
- Retain sufficient future value & volume (?)
- Rule of Thumb:
1/3 of wood volume



Crop Tree Management



CTM influences but does not control residual volume and light

Area-Wide Thinning

- More complicated than CTM
- Is not tree-centric
- Numeric targets to shift growth to best trees
- Better for controlling structure and growing forage



Find A Good Forester & Ask Questions

- Future minimum cut ?
 - Acres & Volume
 - Quality matters
- Species best suited to?
 - Soils
 - Local markets
- Local contractors and equipment?



Trees Into Pasture

- Artificial regeneration is expensive but possible
- Match species to soils
- Select species for future use and revenue potential
- Match protection to livestock behavior
- Do it right or don't do it





WORKING WITH FORESTERS

Potential for (Historical) Bias



Criteria to Select a Forester

- Willingness to work on silvopasture
- Competent to work on silvopasture
- Check references
- Access to necessary markets
- Someone you connect with



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Key Points

- Plan for a small train wreck
- Seek and use good counsel
- Write down your plan
- Know that you are managing the amount and location of sunlight

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