

SILVOPASTURE SCENARIOS FOR CALIFORNIA: Planting Trees on Rangeland



A Longhorn cow passes safely by a Blue Oak silvopasture planting at Bobcat Ranch in Winters, California.

SILVOPASTURE APPROACHES

- Planting trees for restoration on an actively grazed rangeland
- Adding trees to rangeland for shade and supplemental forage for cattle

CONSIDERATIONS

Livestock type: What types of animals are currently grazing or have historically grazed your rangeland? While beef cattle are common grazers of California's rangelands, sheep and goats are also options. Additionally, some producers graze multiple species, depending on the forage present and the management goals.

Tree establishment:

- Consider using local tree genetics and nursery stock for locally adapted varieties. Finding reliable sources for such plant material for both initial planting and replanting of

seedlings can be challenging. You may wish to propagate your own trees from local seed sources, or contract with a nursery to produce plants from locally collected seed.

- Selecting a suitable site for tree planting is vital to tree establishment. Some factors to consider in selecting a planting site include:
 - The remote nature of planting sites and large areas typical of rangeland, and what this might mean for irrigation needs and ongoing monitoring of trees.
 - The risk of wildfires regionally and fire prone areas of a given property.
 - The risk and impact of persistent drought, especially when establishing trees without irrigation.
 - How and where livestock graze currently, including where they tend to congregate versus low-utilization areas.
- Depending on the local and micro-climates, watering seedlings at planting will likely be necessary. Consider your water infrastructure needs for both the initial watering in at planting and ongoing irrigation.
- Planting in rangeland can be challenging due to compacted soil. Pre-augering holes may help survival rates by breaking up hardpan.
- The addition of soil amendments at planting can support establishment and early plant growth.
- Direct seeding in selected locations may be the most cost-effective strategy. Placing multiple (3-5) seeds in each planting hole is recommended to help ensure establishment of at least one seedling. Surplus seedlings can be removed if competition becomes an issue, leaving the most vigorous individual and removing others.

Tree protection: Seedlings and young trees will need to be protected from livestock, and potentially from rodents or other pests as well. The type of tree protection necessary will depend on the type of livestock that is grazing the rangeland, pest pressure, tree species, and site microclimate.

- The most common tree protection method is a combination of T-posts, wire caging, and tree tubes/sleeves.
- Consider how your tree protection method will fare over time. Slow growing tree species (such as oaks) will likely need protection for many years and thus may necessitate more durable tree protection methods and/or more regular monitoring and maintenance.
- Some types of damage to consider when selecting your tree protection method:
 - Damage from livestock, deer, elk, or pigs. Presence of larger animals will necessitate more robust tree protection.
 - Damage from gophers and other pest damage.
 - Damage from wind and frost.
 - Weed pressure. Additionally, consider whether your tree protection method will impede hand weeding or weed whacking.

Buy-in: If you are already partnering with a contract grazer or lessee, it is important to consult with them before planting and identify any necessary changes to how grazing is managed. Consider the financial and personal impact of any additional labor demands of moving animals more frequently, supervising animals more closely, and tending to trees during and after establishment.



Kuni Kuni pigs graze under a row of Monterey Cypress planted as a windbreak and for timber at Gaviota Givings.

POTENTIAL BENEFITS

- Trees provide shade and shelter for livestock.
- For fire prone areas, additional shade may help maintain soil and forage moisture, helping to reduce fine fuel flammability.
- Trees on rangeland – and even the T-posts and cages that protect young trees – can provide habitat for native birds and other wildlife.
- Integrating livestock and tree crops can provide more diverse revenue sources, including carbon credits or fruits and nuts from edible tree species.
- Adding trees to pasture systems can enhance system nutrient cycling, productivity and resilience to climate change.
- When properly managed, incorporating trees on grazed rangeland has the potential to increase overall ecosystem carbon storage.

Relevant California silvopasture producer case studies:

Mazaroli, D.N., and Carlisle, L. California Silvopasture Producer Case Study: Bobcat Ranch. Strategy Research Science. (2023).
<https://www.strategyresearchscience.com/bobcat-ranch>

Mazaroli, D.N., and Carlisle, L. California Silvopasture Producer Case Study: Gaviota Givings. Strategy Research Science. (2023).
<https://www.strategyresearchscience.com/gaviota-givings>

Mazaroli, D.N., and Carlisle, L. California Silvopasture Producer Case Study: PT Ranch. Strategy Research Science. (2023). <https://www.strategyresearchscience.com/pt-ranch>

Mazaroli, D.N., and Carlisle, L. California Silvopasture Producer Case Study: Restoration Oaks Ranch. Strategy Research Science. (2023).
<https://www.strategyresearchscience.com/restoration-oaks-ranch>

Mazaroli, D.N., and Carlisle, L. California Silvopasture Producer Case Study: True Grass Farms. Strategy Research Science. (2023). <https://www.strategyresearchscience.com/true-grass-farms>

ADDITIONAL RESOURCES

Barry et al. A Guide to Livestock Leases for Annual Rangelands. UC ANR. (2020).
<https://anrcatalog.ucanr.edu/pdf/8679.pdf>

Field Guide for Common California Rangeland and Pasture Plants. UC ANR
<https://ucanr.edu/sites/BayAreaRangeland/files/260542.pdf>

Hardegree et al. Assessment of Range Planting as a Conservation Practice [Chapter 4]. USDA USFS. (2011). https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1045799.pdf

Johnson, T. and Rinehart, L. Grazing Contracts for Livestock. ATTRA Sustainable Agriculture Program. (2016). <https://attra.ncat.org/product/grazing-contracts-for-livestock/>

Livestock Management on Rangelands. UC ANR. (2022).
<https://oaks.cnr.berkeley.edu/livestock-management-on-rangelands/>

McCreary, D. Regenerating Rangeland Oaks in California. UC ANR. (2009).
<https://anrcatalog.ucanr.edu/pdf/21601e.pdf>

NRCS Conservation Practice Standard 381: Silvopasture. USDA NRCS. (2018).
https://efotg.sc.egov.usda.gov/api/CPSFile/26002/381_KS_CPS_Silvopasture_2018

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