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Silvopasture - Growing Trees in Your Pasture or Vice-Versa

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Forestry and livestock production are mainstays of the natural resource based economies of North Central Idaho. There is also a strong tradition of livestock grazing in other

forests across the West. Silvopasture, the combination of forest management and improved forage species, is a more intensive, controlled application of this traditional use of livestock grazing and growing trees. Silvopasture is the deliberate introduction of timber into a forage production system, or vice-versa. With silvopasture, timber and pasture are managed as a single integrated system. It is not utilized as much in the West as it is in the Southeast, but is most often implemented to increase profitability, reduce risk, and augment environmental benefits from land management. Silvopasture systems are designed to produce high-value timber while providing short term cash flow from livestock.

The ability of recently forested land to grow trees can be predicted by the performance of the previous stand. However, the ability of pasture or rangeland to support commercial timber production is harder to predict. Many forage plants are more shallowly rooted than trees are, and a productive forage pasture may have soils that are too shallow to support commercial tree production. Since soils can change significantly over a short distance, the presence of trees near a pro-

posed silvopasture is no guarantee of successful tree establishment and growth. Local University of Idaho Extension and Natural Resource Conservation Service offices are good sources of information about soil suitability for specific pasture and tree species.

Most folks would prefer planting trees into an existing or recently seeded pasture due to ease of operation. However, vegetation control is critical, especially when planting trees into an established pasture where grass roots form a fibrous mat throughout the upper soil layer. This can allow grasses to out-compete tree seedlings for moisture. In dry summer climates, conifer seedlings grow best when competing vegetation is removed for the first three years. This can be accomplished through various means of site preparation. Apply an herbicide or plow a two to four foot wide strip for each row of trees to be planted. In some areas, a prescribed burn or pesticide application may be needed to control rodents prior to and after tree planting. Follow-up with a selective herbicide may be needed for the next two to three years until trees are well established.

The desired pasture mix will vary with site characteristics and the desires of the land manager. Orchardgrass, tall fescue, and perennial ryegrass along with a clover species are commonly used silvopasture forages. Nitrogen fixing clovers are often seeded to provide high quality feed for livestock and to serve as a biological source of nitrogen for trees and associated grasses. Legumes

often have more exacting nutrient requirements than do grasses, making a soil test and possible subsequent fertilization an important part of the management plan. The forage composition will change over time as trees grow and modify the environment. Trees generally have little impact on forage production until shading becomes dense enough to limit sunlight to the understory. Forage production of warm season species can be reduced somewhat. Orchardgrass seems to tolerate the environment under trees better than perennial ryegrass or Kentucky bluegrass. Although tall fescue does well under trees, it has the lowest forage value and highest degree of competition of the forages.

Douglas-fir and ponderosa pine are the two predominant timber species that grow best in our area. Larch, as well as western white pine can also be grown, but western white pine is subject to white pine blister rust. Regardless of what species is used, it is generally recommended that seedlings are purchased locally or from a locally adapted seed source. Such seedlings are both quicker to establish, grow faster, and can be more tolerant of browse and other damage.

Silvopastures are generally planted at about 200-300 trees per acre, and can be planted in grids or in single rows, multiple rows, or even clusters. This planting style provides for wide open alleys for forage production and easy access for livestock grazing, hay harvesting, fertilizer spreading, spraying, and other agricultural practices. Alley width should be determined by width of farm equipment. For example, a 20 foot alley provides easy access for cutting hay with a 16 foot swather. This same spacing allows for mechanized harvesting later when trees mature. There is plenty of room for creativity when it comes to planting trees in combinations, however, rows of three or more are generally not recommended as the inner rows of trees may be out-competed by the outer rows.

Trees may be damaged by livestock or wild animals which can eat, rub, or step on them.

Multiple damage events may kill trees, but single events generally only slow growth. Conifers are especially sensitive to the removal of the topmost leader (terminal bud). This is the most palatable, nutrient packed portion of the seedling. Leader loss results in dramatic loss of height and diameter growth and stimulates production of multiple leaders or forked tops. Most tree damage is likely to occur in the first two to three years when they are small and do not have their resinous chemical defense well established. The best way to reduce the risk of damage during this period is by haying rather than grazing. This approach does not resolve the problem of damage by native wildlife herbivores like deer and elk. Young trees may be protected with chemical repellants, mesh tubes, or some type of appropriate fencing. Sheep, goats, and deer are more likely to eat needles than are cattle or elk. Established conifers are not as attractive to large herbivores when other forage is present. If heavy browsing is observed there may be a deficiency in the livestock diet.

Trees that provide shade or wind protection can have a climate stabilizing effect by reducing heat stress and wind chill of the livestock. Protection from trees can reduce the direct cold effect by 50% or more and reduce wind velocity by as much as 70%. Livestock require less feed energy, so their performance is improved and mortality is reduced. In contrast to concentrated livestock operations, silvopastoral systems are less likely to raise environmental concerns related to water quality, odors, dust, noise, disease problems, and animal treatment.

For more information on silvopasture, contact your local University of Idaho Extension Office or Natural Resources Conservation Services Offices.

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