



## HFI's Pasture to Trees Project

Throughout Clark County, Washington and much of the Pacific Northwest, the old family farms have all but disappeared, giving way to smaller, rural residential lots and “hobby farms”. Much of these former farm lands had been laboriously cleared of trees and stumps have now been abandoned or neglected, resulting in brush fields, under-stocked forests, and poorly managed pasturelands. These lands can be a breeding ground for noxious and invasive weeds and produce little benefit for timber production, water quality, wildlife and carbon storage.

Today, many such landowners are still attempting to keep their lands classified as Farm and Agriculture under the Washington State Current Use Program. This Current Use Program requires that agricultural landowners prove income from farming activities to maintain their tax deferred status. Our experience tells us that most landowners have no desire, know-how or energy to farm the land and simply allow others to harvest hay or graze livestock to maintain the income requirements.

Recently, the Clark County Assessor's office has been reviewing lands identified as Farm and Agriculture Lands under the Current Use Program. Lands that are not actively being used for farming are being reclassified as Regular Tax parcels, or the landowners are required to apply under the Timberland or Open Space provisions to avoid paying back taxes and penalties.

In the last few years, HFI Consultants have been assisting such rural landowners in converting their farmlands to the Timberland classification to avoid the large bill that comes with losing their deferred tax status.



*Abandoned farm, Clark County, Washington*

In doing so, we have found that today's landowners often have a wide variety of thoughts and opinions about growing trees in pastures. Some think of a total pasture conversion to timber with intensive site preparation, high seedling densities and multiple applications of herbicides to control weed competition. Others are looking for a more subtle and less expensive approach with the thought of using their lands for both grazing livestock and growing trees. Some are for improving wildlife habitat and water quality. Some wish to plant multiple species with no site preparation and let them grow as they will. Others wish to plant trees and manage them intensively to grow high-end forest products. The abilities of the landowners also vary; some have access to labor and equipment to maintain the planted trees and are able to do so, and others have no interest in any of the work.

Because of this varied group, HFI is providing several techniques for pasture- to- trees conversion projects depending on the objectives and interests of the landowner. One such technique that is proving popular is called **Silvopasture**; a combination of growing trees and providing forage for either livestock or wildlife. Landowners like the idea of being able to graze a few head of livestock, yet grow enough trees to qualify for the Timberland designation under the Current Use program.

Although this practice is relatively unheard of in the Pacific Northwest, it is very common in the Southeast United States and has been used for centuries in other parts of the world. Silvopasture designs and techniques are very site specific with consideration given to the site conditions including soil type, rainfall, tree species, and vegetation and livestock management. A USDA Agroforestry Center report says "silvopastures can provide economic returns while creating a sustainable system with many environmental benefits. Well managed silvopastures offer a diversified marketing opportunity that can stimulate rural economic development." The same report states that "Silvopastures can increase wildlife diversity and improve water quality. The forage protects the soil from water and wind erosion while adding organic matter to improve soils properties...."



*Well managed silvopasture in Clark County, Washington*

HFI has completed several silvopasture projects in the Clark County area and desires to introduce this practice more broadly to rural landowners throughout Washington; especially those wishing to qualify under the Timberland designation of the Current Use program, or those who simply want to make better use of old pastures and abandoned hayfields.

Attached is a White Paper on Silvopasture that HFI has developed to provide information to those interested in converting pastures to trees. Please contact HFI Consultants at 360-723-5523 for more information.



Rural Lands, Farms and Forests

## White Paper

### Silvopasture: New Opportunities for an Old Technique

**Silvopasture** is the practice of combining forestry and animal grazing in an integrated and mutually beneficial way. Silvopasture is an old practice, dating back many centuries. It has been successfully utilized in many countries of the world. In the USA, silvopasture is most common in the southeast where under-utilized pasture land is converted to multiple use management. In silvopasture, trees are planted in single or multiple rows at a prescribed distance apart, often 20 to 30 feet or more. The space in between the tree rows are referred to as “forage alleys.” The tree rows and forage alleys are both managed by thinning, cropping, spacing and pest management to produce a plant community that meets the goals of both forage production and timber production. Some types of silvopastoral systems are common in the agriculture-forest interface zones of the Pacific Northwest, but are generally occur by happenstance, rather than a well- planned system of both silviculture and pasture management.

Silvopasture may or may not include livestock grazing, but is designed to provide enhanced forage production for either wildlife or domestic livestock, along with the production of a commercial timber stand. The proper integration, density and mix of tree species and forage species can greatly enhance wildlife habitat and biodiversity. Silvopasture can also improve water quality, minimize erosion potential, reduce stormwater runoff and increase carbon sequestration.

*Silvopasture in a Southern Yellow Pine Plantation*

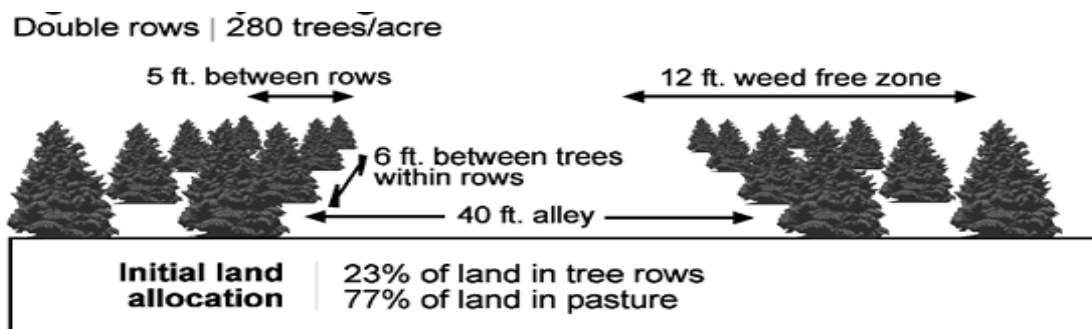


Advantages of properly managed silvopasture systems include the potential for increased income as well as significant ecological benefits due to the simultaneous production of trees and forage. In

addition, land owners may qualify for property tax deferral under the State Current Use Program and payment for ecological services e.g. stormwater mitigation and carbon sequestration.

Silvopastures systems require careful planning, design and implementation to ensure success and avoid unintended and undesirable consequences.

The first step in a silvopasture planning is to understand the goals and objectives of the landowner. Silvopasture is not a “plant and leave it” system. Short term and long term objectives should be well understood and incorporated into the silvopasture design. Plant communities, stand maintenance costs and income potential is largely influenced by the quality of the initial design and implementation methodology. Poor planning or implementation can increase the potential for soil erosion and/or the introduction of noxious weeds. The selection and spacing of tree species and the width of forage alleys must be carefully designed as it is very expensive to modify once established. Silvopastures can be designed in single or multiple rows with varying alley widths, straight or contoured rows and alleys, clusters of planted trees, or combinations of all the above.



The next step is to perform a site assessment. Web based resources are utilized to identify site attributes including acreage, elevation, slope, soil types, adjacent land use, and the presence of streams, floodplains, hydric soils and wetlands. A soil analysis is performed, including core sampling, to identify soil characteristics and the presence of hardpan layers or areas of highly compacted soils. Soil analysis is vitally important, not only to properly select the tree and forage species best suited to the site but also to determine the required site preparation. The site assessment will also analyze the existing vegetation on site including the identification of undesirable plants and or noxious weeds. Wildlife habitat and critical areas and opportunities to enhance habit will be studied. A good plan will consider the impacts to and from adjacent landowners and the shade or visual element the plantation will effect in time.



*Careful soil assessment is a must*

Armed with a complete site assessment and an understanding of the land owners goals and objectives, the development of a silvopasture plan can proceed effectively. The plan will identify the mix of tree and forage species best suited for the site. For instance, Douglas- fir maybe a candidate for well drained upland soils where Oregon Ash and Western Red Cedar may be the best choice for poorly-drained soils and wetland buffers. Tree spacing, row alignment, and the width of forage alleys will be determined based on the land owners' objectives. The plan must consider the impacts to forage production as the trees mature and crown closure increases, shading out the understory vegetation. The plan would address the opportunity to mitigate understory shading and improve timber quality by prescribe silvicultural operations such as thinning and pruning.

The silvopasture plan will identify site preparation techniques required to address specific site conditions. It may be necessary to control or remove noxious weeds and undesirable vegetation (e.g. blackberries) by mowing and or herbicide applications. Certain soil types are characterized by an impermeable hard pan layer that severely limits tree root growth. Similarly, pastures that have been grazed extensively often have highly compacted soils. These areas of hardpan or compacted soils often need to be mitigated prior to tree planting.

Minimal disturbance of the soil is generally preferred to reduce the potential for the invasion of noxious weeks and/ or the introduction of undesirable plant species. Extensive plowing or full field tillage is only recommended when a new forage crop is to be planted. The application of a pre emergent herbicide may be required to reduce competition, conserve soil moisture and minimize animal damage. Animal damage control measures, such as bud caps, seedling tubes or stem wraps, may be required to protect the tree seedlings from deer and rabbit browse or stem girdling from meadow voles.

*Whitfield scalping plow and ripper*



*ATV sprayer with GPS swath guidance system*

The next step is successful implementation of the silvopasture plan. Selected site preparation tools may include rotary brush hog field mowers or flail cutter to remove unwanted vegetation. Specifically designed sod scalping plows are often required to remove thick sod layers and create a suitable tree planting zone. A GPS guided tractor or ATV is utilized to establish uniform row spacings and alley configurations. GPS guidance also provides the means to create a detailed map of the project. A calibrated sprayer provides a metered dose of prescribed herbicides to just the tree planting rows. Additional herbicide application may be required in the forage alleys depending on the composition of the existing plant community and the goals and objectives of the plan.



*GPS Map detailing row spacing and alignment.*

Multiple silvopasture designs may be required on a single site due to the presence of hydric soils, critical habitat and the desired tree or forage species. Acquisition of high quality tree seedlings for the site and the timing of tree planting is also a crucial element of a successful system. The benefit of good plan and successful site preparation may be lost if a poor quality planting stock or forage seed is planted, or good quality stock is improperly planted. If animal damage is anticipated, protection measure should be applied soon after planting.



*Foil wrapping to prevent girdling by meadow voles*

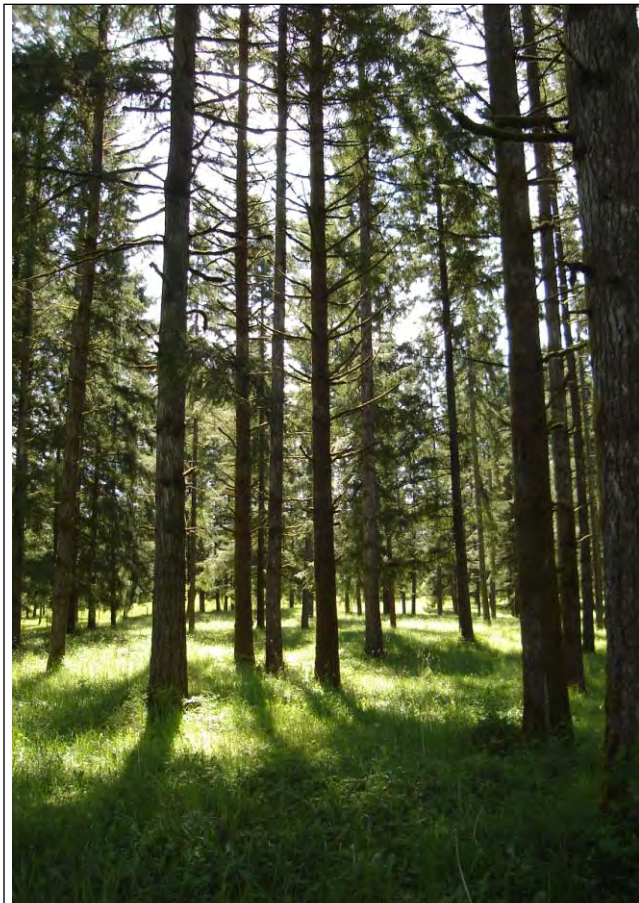
A follow up site assessment is usually performed following the first and second years after planting. The success of the planting and growth herbicide applications and animal protection measures are assessed with a follow-up treatment if needed. Following successful establishment, the forage alleys may be grazed or cropped as prescribed in the plan. Generally, grazing should be avoided until the stand is well established, unless protection techniques are used to minimize damage. Trees are thinned and pruned to provide continual sunlight to the forage alleys.

As mentioned before, the design of the silvopasture can be varied depending on the goals of the landowner. A more natural looking setting can be achieved by a combination of cluster planting and row planting using contoured rows and alleys rather than planting in straight rows with trees planted an equal distance apart. Multiple species can be used alternately or aggregated in clumps. The design possibilities are endless.

Silvopasture conversion costs can range from as little as \$350 per acre, to as much as \$1,500 per acre depending on the level of site preparation required and species planted. Maintenance costs can add \$50 per acre per year or more for the first five years depending on the site conditions.



*Converted pasture with clusters and rows. Approx 12 years of age*



*Mature Douglas-fir stand managed as Silvopasture in Clark County, Washington.*

HFI Consultants sees a growing interest in some level of pastures-to-trees conversion, particularly silvopasture. As the people in this area moved further away from an agrarian lifestyle, much of the lands that had been cleared in the past century for farming and livestock pasturing has been abandoned or neglected resulting in an expanse of brushfields, under stocked forests, or underutilized or mismanaged pasturelands. These lands are often breeding grounds for noxious and invasive weeds and produce little benefit for timber production, water quality, wildlife and carbon storage. We would do well to encourage planting of such lands to commercial tree species for the mutual benefit of the economy and the environment.

**For more information, visit our website at [www. hficonsultants.com](http://www.hficonsultants.com) or contact us at 360-723-5523**



*Initial site preparation and planting. Soil is cultivated and grasses are treated, prior to planting.*



*15 year old stand of Douglas-fir Silvopasture. Stand is thinned and trees are pruned to increase sunlight to the forest floor.*



*15 year old stand of cottonwood managed as silvopasture, Ridgefield,*



**Total Conversion Method**

*Pasture conversion near Amboy, WA. Total site preparation with plowing and disking. Planted with Douglas-fir in a uniform grid 8 feet apart followed by several herbicide applications.*