

**Practice: 612 - Tree & Shrub Establishment**

**Scenario: #1 - Individual Tree, hand planting**

**Scenario Description:**

Tree seedlings will be hand planted in the forested area where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.

**Before Situation:**

The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.

**After Situation:**

The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.

**Scenario Feature Measure: Area Planted**

**Scenario Unit:** Each

**Scenario Typical Size:** 6,000

**Scenario Cost:** \$5,872.68

**Scenario Cost/Unit:** \$0.98

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	8	\$298.40
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$11.22	100	\$1,122.00
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	120	\$2,278.80
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.74	2	\$73.48
<b>Materials</b>						
Tree, conifer, seedling, containerized, 8 cu. in.	1518	Containerized conifer stock, 8 cubic inches (e.g. 1.5" x 6"). Includes materials and shipping only.	Each	\$0.35	6000	\$2,100.00

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**Scenario: #2 - Individual Tree, hand planting with browse protection**

**Scenario Description:**

Tree seedlings will be hand planted in the forested area where few or no forest trees growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Seedlings are protected from wildlife browsing. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.

**Before Situation:**

The stocking level does not meet the minimum recommended number of trees per acre and does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor. Wildlife are known to browse tree seedlings in the area causing great damage.

**After Situation:**

The prescribed number of trees are hand planted, and the objectives of the landowner are met. Seedlings are protected from wildlife browsing by installing some type of protection devise. A forest will provide wildlife habitat, provide a long term ground and capture atmospheric carbon.

**Scenario Feature Measure:** Each Planted Seedling

**Scenario Unit:** Each

**Scenario Typical Size:** 6,000

**Scenario Cost:** \$31,481.30

**Scenario Cost/Unit:** \$5.25

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$11.22	100	\$1,122.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	16	\$596.80
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.74	20	\$734.80
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	230	\$4,367.70
<b>Materials</b>						
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	\$1.52	6000	\$9,120.00
Tree shelter, wire mesh	1557	5 feet tall, Woven Wire mesh, 6"x 6" opening or smaller, 10 gauge wire (minimum) , cage placed around seedling for animal protection. Materials only.	Each	\$2.24	6000	\$13,440.00
Tree, conifer, seedling, containerized, 8 cu. in.	1518	Containerized conifer stock, 8 cubic inches (e.g. 1.5" x 6"). Includes materials and shipping only.	Each	\$0.35	6000	\$2,100.00

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**Scenario: #3 - Trees, machine planted with tubes for animal protection**

**Scenario Description:**

This practice involves planting of tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a medium density planting rate. Typical scenario will consist of 1000 feet of trees with tubes for animal protection. The resource concerns addressed is degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Terrain is moderately sloping and will be planted with a mechanical tree planter. Smaller size seedlings (1-0) are planted.

**Before Situation:**

The land has a little or no tree cover, or is stocked with the wrong tree species. Competing vegetation is a before and after planting concern. Soil condition is degraded due to the loss of the native forest ecosystem (organic matter in top soil depleted). Native wildlife habitat is lacking. The main resource concern is degraded plant condition and inadequate structure and composition

**After Situation:**

Land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement. Planted trees have vexar tubes, or similar, installed to protect from animal damage.

**Scenario Feature Measure:** Number of Trees

**Scenario Unit:** Each

**Scenario Typical Size:** 100

**Scenario Cost:** \$945.36

**Scenario Cost/Unit:** \$9.45

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$23.53	1	\$23.53
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	\$6.37	1	\$6.37
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	2	\$74.60
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	4	\$75.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.65	2	\$45.30
<b>Materials</b>						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	40	\$3.60
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	\$1.52	100	\$152.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	\$0.05	100	\$5.00
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	\$0.64	100	\$64.00
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	\$4.95	100	\$495.00

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**Scenario: #4 - Trees, machine planted, no tubes**

**Scenario Description:**

This practice involves planting of tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a medium density planting rate. Typical scenario will consist of 1000 feet of trees. The resource concerns addressed is degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Terrain is moderately sloping and will be planted with a mechanical tree planter. Smaller size seedlings (1-0) are planted.

**Before Situation:**

The land has a little or no tree cover, or is stocked with the wrong tree species. Competing vegetation is a before and after planting concern. Soil condition is degraded due to the loss of the native forest ecosystem (organic matter in top soil depleted). Native wildlife habitat is lacking. The main resource concern is degraded plant condition and inadequate structure and composition

**After Situation:**

Land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement.

**Scenario Feature Measure: Number of Trees**

**Scenario Unit: Each**

**Scenario Typical Size: 100**

**Scenario Cost: \$293.36**

**Scenario Cost/Unit: \$2.93**

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	2	\$74.60
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	\$6.37	1	\$6.37
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$23.53	1	\$23.53
<b>Labor</b>						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.65	2	\$45.30
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	4	\$75.96
<b>Materials</b>						
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	\$0.64	100	\$64.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	40	\$3.60

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**Scenario: #5 - Hardwood Planting, 1 gallon pots**

**Scenario Description:**

Hardwood seedlings (potted) to be planted to reestablish an upland hardwood forest. Planting will be by hand. The resource setting is an area that historically was an upland hardwood forest. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife.

**Before Situation:**

The native forest that has been removed and the land is either row cropped, grazed or hayed or brushy forest. If any upland trees exist they are poor quality tree or undesirable species. Terrain is gently to moderately sloping with soil erosion-sheet and rill occurring.

**After Situation:**

The area of treatment is 10 acres. Potted/containerized hardwood seedlings are planted by hand. Post vegetation control should be evaluated and conducted it necessary.

**Scenario Feature Measure:** Area of Treatment

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Scenario Cost:** \$7,862.36

**Scenario Cost/Unit:** \$786.24

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$11.22	15	\$168.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	8	\$298.40
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	34	\$645.66
<b>Materials</b>						
Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal.	1531	Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only.	Each	\$4.50	1500	\$6,750.00

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**Scenario: #6 - Hardwood Establishment, direct seeding**

**Scenario Description:**

Native seed (acorns, nuts, etc) from native tree species are directly planted in the soil. The direct seeding is done with a broadcast seeder so the seeding rates have been increased. Site preparation is completed (discing to eliminate competing vegetation). The native seed are collected/purchased locally so as to get trees known to be adapted to local conditions. Resource concerns are degraded plant condition, inadequate habitat for fish and wildlife.

**Before Situation:**

The hardwood forest is degrading. High value species, lumber and wildlife habitat, are not regenerating due to changes in the natural disturbance regime or past harvesting. Unwanted shade tolerant tree species have regenerated and are in the overstory competing with desirable species as well as in the mid and understory where they will eventually out-compete with desirable species.

**After Situation:**

Seed from native species are collected or purchased and planted at prescribed rates. Site preparation is done prior to direct seeding. Degraded plant condition is on an upward trend and habitat for wildlife will improve.

**Scenario Feature Measure:** Area of Treatment

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Scenario Cost:** \$1,215.20

**Scenario Cost/Unit:** \$121.52

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Mechanical nut planter	1601	Mechanical nut planter for direct seeding of trees and shrubs. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	\$1.98	4	\$7.92
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$23.53	4	\$94.12
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.58	4	\$42.32
<b>Labor</b>						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.65	6	\$135.90
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	8	\$151.92
<b>Materials</b>						
Trees and shrubs, seed	1871	Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only.	Pound	\$4.35	100	\$435.00
<b>Mobilization</b>						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$174.01	2	\$348.02

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**Scenario: #7 - Shrub Planting**

**Scenario Description:**

Shrubs are planted to provide a more diverse habitat. Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for wildlife. Resource concern is inadequate habitat for fish and wildlife - habitat fragmentation.

**Before Situation:**

No shrubby vegetation, or very little, is present under the forest overstory. Wildlife species that need shrub cover are not present. An adequate stand of overstory trees is present, but it is a single level, not multi-level.

**After Situation:**

A 10 acre area is planted with shrubs. Shrubs are not planted over the entire 10 acres. They are planted in groups or motts. The motts, more or less circular in shape, are 50 feet in diameter, with 50 shrubs planted within each mott. 4 motts are planted per acre for a total of 200 shrubs per acre. Motts are randomly established to take advantage of site conditions and shrub species being planted.

**Scenario Feature Measure:** Per plant

**Scenario Unit:** Each

**Scenario Typical Size:** 2,000

**Scenario Cost:** \$1,775.78

**Scenario Cost/Unit:** \$0.89

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	6	\$223.80
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$11.22	10	\$112.20
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	14	\$265.86
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.74	8	\$293.92
<b>Materials</b>						
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	\$0.44	2000	\$880.00

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**Scenario: #8 - Shrub Thicket**

**Scenario Description:**

Shrubs are planted to provide a more diverse habitat. Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for wildlife. Resource concern is inadequate habitat for fish and wildlife - habitat fragmentation.

**Before Situation:**

No shrubby vegetation, or very little, is present under the forest overstory. Wildlife species that need shrub cover are not present. An adequate stand of overstory trees is present, but it is a single level, not multi-level.

**After Situation:**

A 30x50 foot area is planted with 150 shrubs forming a dense thickets. The thicket is established to take advantage of site conditions and shrub species being planted.

**Scenario Feature Measure:** Per shrub

**Scenario Unit:** Each

**Scenario Typical Size:** 150

**Scenario Cost:** \$297.95

**Scenario Cost/Unit:** \$1.99

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$37.30	2	\$74.60
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.58	0.5	\$5.29
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$23.53	1	\$23.53
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	\$6.37	1	\$6.37
<b>Labor</b>						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.65	2	\$45.30
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.99	4	\$75.96
<b>Materials</b>						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	10	\$0.90
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	\$0.44	150	\$66.00