

Practice: 655 - Forest Trails and Landings

Scenario: #1 - Trail Layout

Scenario Description:

The use of professional assistance in trail design or redesign, location and layout. Installation costs are not included. Resource concerns include Concentrated flow erosion, and Excessive sediment in surface waters.

Before Situation:

Access to a forested tract is not available for the occasional travel by the landowner or manager for the purposes of monitoring or for the removal of forest products. Improperly designed and installed trails will cause soil erosion and water quality (sedimentation) problems. The trail will be installed as part a management operation such as timber harvesting and will not include extensive water control measures more common to access roads such as gravelling or ditching.

After Situation:

A trail system is designed and laid out that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Scenario Feature Measure: Length of trail designed

Scenario Unit: Feet

Scenario Typical Size: 5,280

Scenario Cost: \$843.28

Scenario Cost/Unit: \$0.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Labor</i>						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$105.41	8	\$843.28

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Scenario: #2 - Trail and Landing Installation

Scenario Description:

Construction of forest trails and landings for the purpose of providing access to a gently sloping forested tract. Access will allow the application of other conservation practices, monitoring and the removal of forest products. It is not, however, to be used if the installation is done as part of a commercial operation such as timber harvesting. In such a case, the Scenario 1 should be used. Installation will include removal of trees and brush as needed, a minimum amount of blading and soil disturbance, and the installing of water control measures such as water bars, broad-based dips, wing ditches, etc. It will not include measures more common to access roads such as graveling or ditching. Installation will be supervised by a consultant forester, land manager, or other resource professional. Resource concerns include Excessive sediment in surface waters, Sheet & rill erosion, and Concentrated flow erosion

Before Situation:

Access to the tract is not available for occasional travel by the landowner or manager for the purposes of monitoring, installing conservation practices and/or the removal of forest products. Improperly installed trails and landings will cause soil erosion and water quality problems.

After Situation:

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Scenario Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 2,000

Scenario Cost: \$4,874.58

Scenario Cost/Unit: \$2.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.81	16	\$588.96
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Foot	\$3.14	225	\$706.50
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.23	8	\$49.84
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.73	24	\$1,025.52
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$66.54	10	\$665.40
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.86	34	\$845.24
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	\$24.74	16	\$395.84
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	\$42.58	4	\$170.32
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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	\$171.69	1	\$171.69

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Scenario: #3 - Trail Erosion Control w/o Vegetation, Slopes < 35%

Scenario Description:

Rehabilitation of existing forest access trail segments on a 20% slope and a 4% grade by addressing legacy resource issues for long-term use. Typically the trail is a single lane (18-foot wide, including cut and fill), seasonal prism requiring sustained erosion control measures installed by using heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages. This scenario includes designing and installing measures such as cross drains, rock drains, relief drains, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. Some hand work (chainsaw) will be needed to allow the use of the equipment. Installation will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario. Treatments are for long-term reduction of sediment, restoration of fish habitat, creation of fire access, and the removal of routes off unstable slopes. Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Sheet and rill erosion, and Degradation of wildlife species.

Before Situation:

Trails are delivering sediment to waterways, impacting riparian areas and wetlands and possibly affecting T&E species. The system's usefulness for access is also being compromised by inadequate erosion and drainage control systems. However rehabilitation over abandonment is an acceptable course of action.

After Situation:

Trails and landings provide access and do not adversely affect the resources concerns.

Scenario Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 2,000

Scenario Cost: \$7,724.07

Scenario Cost/Unit: \$3.86

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.23	9	\$56.07
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.81	18	\$662.58
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Foot	\$3.14	250	\$785.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$66.54	18	\$1,197.72
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$112.94	18	\$2,032.92
Labor						
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	\$24.74	18	\$445.32
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$34.14	36	\$1,229.04
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	\$42.58	8	\$340.64
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	2	\$974.78

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Scenario: #4 - Trail Erosion Control w/o Vegetation, Slopes >35%

Scenario Description:

Rehabilitation of existing forest trails and landings by addressing legacy resource issues such as gully erosion and sedimentation, for infrequent use. Typically the trail is a single lane, existing 10-12 foot wide skid trail on a steep (45%) slope on forestland requiring sustained erosion control measures applied by using heavy equipment such as dozers, backhoes, or excavators. The purpose is to hydrologically disconnect existing trail/landing system from the streams and natural drainages and reduce soil erosion. This includes the design and installation of drains, out sloping (or changing road surface drainage), water bars and ditch outs as needed. This scenario applies to only those segments of the trail system that have resource concerns requiring rehabilitation. A typical water bar or rolling dip installed in this scenario is on a 30 foot spacing with a depth of about 2-3 foot (closeout style). Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, Lined Waterway or Outlet and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario. Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Classic Gully erosion, and Degradation of wildlife species.

Before Situation:

Trails are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

After Situation:

Trails and landings provide access and do not adversely affect the resources concerns.

Scenario Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$4,912.07

Scenario Cost/Unit: \$9.82

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.81	8	\$294.48
Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$188.78	16	\$3,020.48
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.23	4	\$24.92
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$34.14	16	\$546.24
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	\$42.58	8	\$340.64
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	\$24.74	8	\$197.92
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	1	\$487.39

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Scenario: #5 - Grading and Shaping with Vegetative Establishment

Scenario Description:

Rehabilitation of existing forest access trails and landings on a medium slope by addressing rutting, erosion, and sedimentation. Typically the trail is a single, existing 18-foot wide (including cut and fill) seasonal road prism on gently sloping terrain requiring sustained erosion control measures applied with heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages and to establish a vegetative cover. This scenario includes designing and installation measures such as cross drains, rock drains, relief drainage, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. It also includes seedbed preparation, seeding and soil amendments determined to be needed. Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting. Access Road and Structure for Water Control can be adjacent/apurtenant but not part of the practice scenario. Treatments are for long-term reduction of sediment, restore fish habitat, create fire access and to move routes off unstable slopes. Resource concerns include: Excessive sediment in surface waters, Concentrated and Sheet & rill flow erosion, Soil compaction, and Habitat degradation.

Before Situation:

Trail/landings are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

After Situation:

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Scenario Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 2,000

Scenario Cost: \$7,733.94

Scenario Cost/Unit: \$3.87

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Motor Grader, 200 HP	1782	Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-240. Equipment cost, does not include labor.	Hour	\$156.30	10	\$1,563.00
Truck, water	1448	Water tanker truck. Equipment only. Labor not included.	Hour	\$164.52	6	\$987.12
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.73	16	\$683.68
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.36	1	\$6.36
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Foot	\$3.14	300	\$942.00
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$55.45	16	\$887.20
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.52	1	\$9.52
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$11.79	1	\$11.79
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$30.40	10	\$304.00
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.44	1	\$10.44
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.23	8	\$49.84
<i>Labor</i>						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.86	40	\$994.40

Labor

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	\$24.74	16	\$395.84
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	\$42.58	4	\$170.32

Materials

Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.79	70	\$55.30
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.39	55	\$21.45
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.28	40	\$11.20
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$119.94	1	\$119.94

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	2	\$510.54
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Scenario: #6 - Temporary Stream Crossing

Scenario Description:

The design and installation of a temporary stream crossing that will meet the immediate forest management/conservation needs. Afterwards the crossing will be restored and stabilized. Improperly designed and/or installed stream crossings will, in the long term, adversely affect water quality and aquatic life. Approaches will also be stabilized for the use of the crossing and stabilized afterwards as necessary. Installation will be supervised. Permanent and/or high-traffic crossings will be designed and installed according to the Stream Crossing (578) Standard. Resource concerns include: Excessive sediment in surface waters and Habitat degradation.

Before Situation:

Access to a forested tract is not available for the installation of conservation practices or removal of forest products due to the lack of a suitable stream crossing(s).

After Situation:

Access was available to address other resource concerns/management needs and the stream is restored to its previous or better condition.

Scenario Feature Measure: Number of crossings

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$1,019.03

Scenario Cost/Unit: \$1,019.03

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$112.94	2	\$225.88
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.73	2	\$85.46
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.81	1	\$36.81
Labor						
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	\$42.58	1	\$42.58
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$34.14	2	\$68.28
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	\$24.74	2	\$49.48
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	2	\$510.54

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Scenario: #1 - Re-Route Sections

Scenario Description:

Problem sections of existing forest trails will be re-routed to avoid sensitive areas or to avoid continued use of problem steep sections with erosion. This scenario may also address fixing existing road sections that are severely eroding but that don't require the extensive work and gravel existing in other scenarios. This will primarily consist of earthwork. The resource concerns include but are not limited to soil erosion, water quality - sedimentation, and in some cases insufficient cover/shelter (when sensitive areas are avoided).

Before Situation:

Existing skid trails sections are located at low topographic areas running through wetlands, riparian areas or vernal pools damaging habitat for species of concern. Or, trail sections are located such that slopes are excessive and erosion is difficult to address with minor earthwork.

After Situation:

Problem sections of existing forest trails will be relocated to minimize negative impacts and to reduce or eliminate soil erosion and sedimentation. New sections will avoid problem areas and tie in with existing skid trails through the forest. In some cases extra earthwork and equipment time will address erosion problems and not require re-routing the skid trail section. Typical length of application is 300 feet.

Scenario Feature Measure: Foot

Scenario Unit: Foot

Scenario Typical Size: 300

Scenario Cost: \$4,088.36

Scenario Cost/Unit: \$13.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$112.94	10	\$1,129.40
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.23	4	\$24.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.81	2	\$73.62
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Foot	\$3.14	300	\$942.00
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$40.66	4	\$162.64
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	\$24.74	4	\$98.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$34.14	10	\$341.40
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	\$42.58	8	\$340.64
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	2	\$974.78