

Practice: 340 - Cover Crop

Scenario: #1 - Soil Protection Cover

Scenario Description:

Typically a small grain, such as cereal rye, is planted as a cover crop immediately after harvest of a row crop, and is followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop is allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop is terminated using an approved herbicide prior to planting the subsequent crop.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Residue amounts after harvest degrade over the winter, resulting in bare soil being exposed to rainfall. As residue degrades, or is moved away by water, sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs. A surface crust may develop and some rill erosion may be visible by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and periods of bare soil.

After Situation:

Following harvest of the row crop, fields are planted with a small grain. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting, as late as possible to accumulate biomass without impairing production of the subsequent row crop. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface improve weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$3,120.00

Scenario Cost/Unit: \$78.00

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$5.72	40	\$228.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.90	40	\$796.00
Materials						
One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$36.55	40	\$1,462.00
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.83	40	\$633.20

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Scenario: #2 - Nitrogen Scavenging Cover

Scenario Description:

Typically a small grain and forb (such as radish) mix is planted as a cover crop immediately after harvest of a row crop, and is followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed is planted with a no-till drill. The cover crop is planted as early as possible and allowed to grow long enough to maximize nitrogen uptake, without delaying planting of the following crop. The cover crop is terminated using an approved herbicide prior to planting the subsequent crop.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Residue amounts after harvest degrade over the winter, resulting in bare soil being exposed to rainfall. As residue degrades, or is moved away by water, sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs. A surface crust may develop and some rill erosion may be visible by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and periods of bare soil.

After Situation:

Following harvest of the row crop, fields are planted with a small grain and radish mix. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting, as late as possible to accumulate biomass without impairing production of the subsequent row crop. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface improve weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$3,671.20

Scenario Cost/Unit: \$91.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$5.72	40	\$228.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.90	40	\$796.00
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.83	40	\$633.20
Two Species Mix, Cool Season Annual (1 grass and 1 legume)	2314	Cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$50.33	40	\$2,013.20

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Scenario: #3 - Nitrogen Fixing Cover

Scenario Description:

A cool season legume mixed with a small amount of small grain is planted as a cover crop immediately after harvest of a row crop, and is followed by a row crop that will utilize the fixed nitrogen and cover crop biomass as a mulch. This scenario assumes that seed is planted with a no-till drill. The legume seed is inoculated with a proper inoculant prior to planting. The cover crop is typically allowed to reach early to mid-bloom before it is terminated, using an approved herbicide mixture, in order to maximize nitrogen fixation. The legume promotes biological nitrogen fixation and reduces energy use by reducing the need for commercial nitrogen fertilizer in following crops.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Residue amounts after harvest degrade over the winter, resulting in bare soil being exposed to rainfall. As residue degrades, or is moved away by water, sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs. A surface crust may develop and some rill erosion may be visible by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and periods of bare soil.

After Situation:

Within 30 days after harvest fields are planted with a legume cover crop, typically a clover or vetch species. The average field size is 40 acres. The cover crop is seeded with a no-till drill. No fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect. By utilizing the nitrogen that is fixed by the legume cover crop, the amount of energy is reduced by reducing the amount of commercial fertilizer that will be needed for the following crop.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$3,946.00

Scenario Cost/Unit: \$98.65

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.90	40	\$796.00
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$5.72	40	\$228.80
Materials						
Two Species Mix, Cool Season Annual (1 grass and 1 legume)	2314	Cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$50.33	40	\$2,013.20
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.83	40	\$633.20
Herbicide, 2,4-D	330	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$6.87	40	\$274.80

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Scenario: #4 - Soil Health Cover

Scenario Description:

Typically a small grain-legume mix (forbs might be used instead of legumes on some sites such as radishes, turnips, buckwheat, etc.) is planted as a cover crop immediately after harvest of a row crop, and is followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed is planted with a no-till drill. The cover crop is allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop is terminated using a combination of mechanical roller/crimper operations and an approved herbicide prior to planting the subsequent crop.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Residue amounts after harvest degrade over the winter, resulting in bare soil being exposed to rainfall. As residue degrades, or is moved away by water, sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs. A surface crust may develop and some rill erosion may be visible by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and periods of bare soil.

After Situation:

Within 30 days after harvest of row crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with a combination of mechanical roller crimper and an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Both termination methods are needed to terminate the cover crop, due to different growth characteristics of the small grain and the legume. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$4,659.20

Scenario Cost/Unit: \$116.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$5.72	40	\$228.80
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$19.14	40	\$765.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.90	40	\$796.00
Materials						
Five Species Mix, Cool Season, Annual Grasses and Legumes	2320	Cool season, introduced grass and legume mix. Includes material and shipping only.	Acre	\$55.89	40	\$2,235.60
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.83	40	\$633.20

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Scenario: #5 - Organic weed control cover

Scenario Description:

A small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) is planted using organic seed, organically grown seed, or certified organic seed as a cover crop immediately after harvest of an organically grown crop. This cover crop is typically followed by an organic vegetable crop that utilizes the cover crop residue as a mulch. This scenario assumes that seed is planted using conventional tillage to prepare a seedbed, broadcasting seed and cultipacking the seed to ensure sufficient seed-soil contact. The cover crop is allowed to generate as much biomass as possible, without delaying planting of the following crop, then it is terminated using a mechanical kill method (mowing, rolling, undercutting, etc.), prior to planting the subsequent crop. This scenario requires use of organic seed, organically grown seed, or certified organic seed. Use of un-treated conventionally grown seed can be compatible with an organic system plan (OSP), but use of that non-organic seed is not compatible with use of this scenario. When conventionally grown, non-treated seed will be used another scenario should be selected.

Before Situation:

Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Situation:

Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically using organically grown, or certified organic rye and clover seed. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechanical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing residues. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$282.36

Scenario Cost/Unit: \$141.18

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.38	2	\$20.76
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$19.14	2	\$38.28
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	\$11.73	2	\$23.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$7.87	2	\$15.74
Materials						
Certified Organic, Two Species Mix, Cool Season, Annual Grasses and Legumes	2339	Certified organic cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$92.06	2	\$184.12

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Scenario: #6 - Orchard and Vineyard cover

Scenario Description:

A single species of cool season small grain or legume is no-till planted in the space between trees or vines in an orchard, vinyard, or Christmas tree field. The typical field size is 10-acres. However, only sixty-percent of the field is planted in the cover crop. The remaining 40% of field acreage is occupied by the crop trees or vines. The cover crop is either left to senesce after maturity, or it is destroyed by normal field operations. There is no termination operation associated with this scenario.

Before Situation:

Bare soil is exposed between vine/tree rows, so it suffers erosion by wind or water during intense rainfall in the fall, winter, and early spring. Over the winter sediment/nutrient runoff from orchards/vineyards increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of long periods of bare soil.

After Situation:

Bare soil areas between vine/tree rows are planted with a cool season small grain or legume. The cover crop is typically killed by normal farming operations, or left to senesce at the end of the cover crop's growing season. Cover crop residues are left on the surface and the root systems are left intact. Soil quality benefits are accrued by reducing soil erosion, re-establishing soil porosity, and adding organic matter to the soil. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 6

Scenario Cost: \$421.38

Scenario Cost/Unit: \$70.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.90	6	\$119.40
Materials						
Two Species Mix, Cool Season Annual (1 grass and 1 legume)	2314	Cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$50.33	6	\$301.98