

## Appendix C : NRCS T-Charts for Conservation Practices

### Conservation Practice Effects

Alley Cropping (Ac) 311	
<p><b>Definition:</b> Trees or shrubs planted in a set or series of single or multiple rows with agronomic, horticultural crops or forages produced in the alleys between the rows of woody plants.</p> <p><b>Major Resource Concerns Addressed:</b> Wind erosion, soil health, wildlife habitat.</p> <p><b>Benchmark Condition:</b> Small grain, hay crop rotation.</p> <p><b>Date:</b> October, 2016 <b>Developer/Location:</b> Hal Gordon, OR</p>	
Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced by vegetation, surface litter, tall vegetation and wind shadow.</li> <li>• Roots and vegetative matter from permanent vegetation increases organic matter.</li> <li>• Root penetration and organic matter helps restore soil structure and reduces compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding and ponding are reduced, less runoff with increased water infiltration.</li> <li>• Seasonal high water table and seeps are reduced with greater plant water uptake.</li> <li>• Drifted snow is captured by tree/shrub crowns and deposited between rows.</li> <li>• Tall vegetation reduces wind speeds and evapotranspiration allowing more efficient use of available water.</li> <li>• Trees and shrubs intercept pesticide drift and take up pesticide and nutrient</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be adversely effected during tree planting.</li> <li>• Increased complexity of land use, producing two or more crops.</li> <li>• Change to less intense land use, some land converted from crop to tree production.</li> <li>• No additional field equipment required.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Site preparation and tree planting costs.</li> <li>• Operation and maintenance costs maintaining vegetation and managing pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Reduced labor with less intensive agriculture.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase to manage additional farm enterprise.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Decrease in farm flexibility while</li> </ul>

<p>residues.</p> <ul style="list-style-type: none"> <li>• Nutrients and pesticides in surface and ground water will decrease as plant vigor improves soil conditions.</li> <li>• Pathogens and chemicals from manure in surface and groundwater will be reduced in sensitive areas.</li> <li>• Sediment in surface water will be reduced.</li> <li>• High water temperature will be reduced.</li> <li>• Petroleum, heavy metals and other pollutants in surface and groundwater will be reduced.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Trees provide windbreak and reduce saltating particles.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it as carbon in plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Crops are sheltered from airborne sediment and chemical drift.</li> <li>• Plant productivity will increase.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Fish, wildlife and livestock habitat, food, water, cover and shelter will improve for some species.</li> <li>• Wildlife habitat continuity (space) will improve, tall vegetation creates vertical habitat structure.</li> <li>• Trees can limit livestock heat stress.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Comparatively energy-efficient.</li> <li>• Potential biofuel production.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> </ul>	<p>following designed cropping pattern around perennial plantings.</p> <ul style="list-style-type: none"> <li>• Cash flow will decrease with less intense agricultural production.</li> <li>• Crops must be adapted and managed to account for use of available water by trees.</li> <li>• Foregone income from lost production or change in seasonal use.</li> </ul>
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- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.

**Net Effect: Alley Cropping improves soil productivity, reduces erosion at a moderate cost.**

**Commonly Associated Practices:** Conservation Crop Rotation, Contour Buffer Strips, Contour Farming, Cover Crop, Forest Stand Improvement, Integrated Pest Management, Multi-Story Cropping, Nutrient Management, Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal, Tree/Shrub Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Woody Residue Treatment

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Amending Soil Properties with Gypsum Products (Ac) 333

**Definition:** Using gypsum- (calcium sulfate dihydrate) derived products to change the physical and/or chemical properties of soil.

**Major Resource Concerns Addressed:** Soil health and plant productivity.

**Benchmark Condition:** Acidic cropland soil.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill and wind erosion is reduced by improved soil structure.</li> <li>• Organic matter is maintained or increased.</li> <li>• Aluminum toxicity is reduced.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding, or ponding is - Improved infiltration.</li> <li>• Use of irrigation water will - Improved infiltration.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Plant productivity and health will improve with better Ca:Mg ratio for improved nutrient use efficiency.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved Nutrient use efficiency for livestock feed and forage.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Human</b></p>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change to land use</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Slight increase in materials and annual operation and maintenance costs</li> <li>• No additional equipment required.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Minimal change in labor.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Minimal change in management.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• No additional risk.</li> </ul>

- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.

**Net Effect: Adding gypsum improves soil productivity at a minimal cost.**

**Commonly Associated Practices:** Agrichemical Handling Facility, Nutrient Management, Waste Utilization.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Conservation Cover (Ac) 327

**Definition:** Establishing and maintaining permanent vegetative cover

**Major Resource Concerns Addressed:** Soil Erosion and Water Quality.

**Benchmark Condition:** Annually tilled highly erodible low productivity cropland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Increased vegetation and cover will improve infiltration and decrease sheet and rill, wind, and gully erosion.</li> <li>• Streambank, shoreline, and channel erosion is reduced.</li> <li>• Organic matter will increase with residue and root establishment.</li> <li>• Compaction and subsidence is will decrease with fewer field operations.</li> <li>• Concentration of salts or other chemicals is reduced with permanent cover.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding, ponding, seeps or seasonal high water table may be reduced with increased water use.</li> <li>• Permanent vegetation can trap snow.</li> <li>• Soil moisture will increase.</li> <li>• Reduced nutrient and pesticide use, less transport to surface and ground water.</li> <li>• Less runoff and infiltration of salts, pathogens and chemicals from manure.</li> <li>• Less sediment in surface water.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Fewer emissions of particulate matter, permanent vegetation reduces wind erosion and generation of fugitive dust.</li> <li>• Emissions of ozone precursors and CO<sub>2</sub></li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Land use will be changed or land taken out of production if cropland is converted to permanent cover.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials, seedbed and planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and reduce pests.</li> <li>• Reduced farm income (forgone income).</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced whole farm flexibility and timing by taking land out of agricultural production.</li> <li>• Reduced or lost crop production.</li> <li>• Reduced cash flow.</li> <li>• Seeps may increase with deeper and more numerous roots and higher soil infiltration rates.</li> </ul>

<p>will be reduced with less machinery use.</p> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Plant community productivity and health will increase.</li> <li>• Permanent vegetation may slow the spread of noxious weeds.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Fish and wildlife habitat, food, cover and shelter will improve.</li> <li>• Fish and wildlife habitat continuity (space) will increase and may be used to connect other cover areas.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Less fuel and oil will be used with reduced machinery use.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be protected from erosion.</li> <li>• Labor, management and capital will decrease as land is taken out of production.</li> <li>• Reduced time cultivating previous crop.</li> <li>• Create sustainability of natural resources that support farm business.</li> <li>• Increase the property value (real estate).</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Net Effect:</b> Soil health will improve, erosion will be reduced and water quality improved at a significant cost. Profitability will decrease as land is taken out of production.</li> </ul>	

**Commonly Associated Practices:** Brush Management, Critical Area Planting, Fence, Tree/Shrub Establishment, Upland Wildlife Habitat Management

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.



## Conservation Practice Effects

### Conservation Crop Rotation (Ac) 328

**Definition:** Growing crops in a planned sequence on the same field.

**Major Resource Concerns Addressed:**

**Benchmark Condition:**

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind and gully erosion by maintaining sufficient canopy and residue cover that reduces soil detachment by water.</li> <li>• High residue crops can lead to increased root development and increased soil organic carbon.</li> <li>• Deep rooted crops in the rotation may reduce compaction.</li> <li>• Soil subsidence may be reduced if rotation addresses drainage.</li> <li>• Salt tolerant crops with high transpiration rates can increase salt uptake and reduce salt content in the root zone.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Improved plant uptake may reduce excessive seepage, runoff, flooding, ponding and seasonal high water table.</li> <li>• Crop rotation balances available water with crop needs and may reduce total irrigation requirements.</li> <li>• Reduced need for pesticide use by breaking pest lifecycles and improve surface and ground water quality.</li> <li>• Nitrogen demanding or deep rooted crops can remove excess nitrogen.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be harmed if new deep rooted crops are introduced.</li> <li>• Land may be utilized more intensely.</li> <li>• No change in land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Crop production costs.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional time cultivating crops.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase time managing crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Decrease in agricultural operation flexibility and timing with required crops in rotation.</li> <li>• Forgone income by going to less profitable crops.</li> </ul>

- Legumes in rotation will provide slow release nitrogen and reduce need for additional nitrogen and improve surface and ground water quality.
- Reduced erosion and runoff reduces transport of salts, and some crops may accumulate salts, improving water quality.
- Depending on crop rotation, less erosion and runoff reduces delivery of sediment and pathogens.

#### Air

- Crops in the rotation can reduce the generation of fugitive dust.
- Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.

#### Plants

- Increase in crop yield with improved soil quality, fertility and moisture holding capacity.
- Crop selection will be modified to include species better suited to soils and climate.
- Crop rotation creates diversity that may reduce weed pressures, break weed life cycles, and provide competition that would slow the spread of noxious plants.

#### Animals

- Suitable rotations may provide more food, cover and shelter for wildlife.
- Increased cover will increase space for wildlife and connect to other cover areas.
- Crop rotation may be designed to add forage crops and aftermath grazing for livestock.

#### Energy

- Legume crops supply nitrogen reducing fertilizer costs.

#### Human

- Increase yields/reduce costs as land becomes more productive.

- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Cover crop improves soil productivity, reduces erosion at a moderate cost.**

**Commonly Associated Practices:** Conservation Cover, Contour Buffer Strips, Cover Crop, Critical Area Planting, Cross Wind Trap Strips, Herbaceous Wind Barriers, Integrated Pest Management, Irrigation Water Management, Mulching, Nutrient Management, Residue and Tillage Management-Mulch Till, Residue and Tillage Management-No Till/Strip Till/Direct Seed, Residue and Tillage Management-Ridge Till, Residue Management-Seasonal, Terrace, Spoil Spreading, Stream Habitat Improvement and Management, Streambank and Shoreline Protection.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## **Conservation Practice Effects**

## Cover Crop (Ac) 340

**Definition:** Grasses, legumes, and forbs planted for seasonal vegetative cover.

**Major Resource Concerns Addressed:** Soil Erosion, Water Quality, Plant Productivity.

**Benchmark Condition:** Cropland, row crops, non-irrigated.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduce erosion from wind and water and transport of sediment.</li> <li>• Maintain or increase soil health and organic matter content.</li> <li>• Improve soil moisture use efficiency.</li> <li>• Minimize soil compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduce water quality degradation by utilizing excessive soil nutrients.</li> <li>• Reduce drainage, seepage and soil subsidence.</li> <li>• Increased organic matter will buffer salts.</li> <li>• Reduce runoff and increase infiltration.</li> <li>• Improves infiltration, soil structure, and soil water storage.</li> <li>• Increase soil biological activity.</li> <li>• Reduce runoff and transport of nutrients, pesticides, pathogens and soluble salts.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Ground cover helps reduce wind erosion and generation of fugitive dust.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Suppress excessive weed pressures and break pest cycles.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in landuse</li> <li>• Land utilized more intensely</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Materials &amp; planting costs.</li> <li>• Grass/Legume Seed.</li> <li>• Seeding Operation, No Till/Grass Drill.</li> <li>• Herbicide, ground application.</li> <li>• Mechanical or chemical crop kill.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor to plant, manage, eliminate crop.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase time managing crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Other farm activities delayed while implementing the practice.</li> <li>• In dry climates (&lt;20 inches/year) will compete for crop moisture.</li> <li>• May recruit unwanted wildlife.</li> <li>• May have to convert to shorter season crops in northern latitudes.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Improved plant health, productivity and crop yields.</b></li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Increased food and cover for wildlife.</b></li> <li>• <b>Increased space and connectivity for wildlife.</b></li> <li>• <b>Supplemental forage for livestock.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>Cover crops can reduce nitrogen inputs.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Increase yields/reduce costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Create open space and improve habitat for wildlife.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Cover crop improves soil productivity, reduces erosion at a moderate cost.</b></p>	

**Commonly Associated Practices:** Conservation Crop Rotation, Integrated Pest Management, Nutrient Management, Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying

a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Cross Wind Ridges (Ac) 588

**Definition:** Ridges formed by tillage, planting or other operations and aligned across the direction of erosive wind

**Major Resource Concerns Addressed:** Wind erosion.

**Benchmark Condition:** Level row-cropland in wind prone area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Wind Erosion is reduced by adding roughness to the soil.</li> <li>• Reduced wind erosion decreases organic matter loss.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced wind erosion transport of soil-adsorbed nutrients, pesticides and salts to surface water.</li> <li>• Reduced offsite sediment transport.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Emissions of Particulate Matter (and precursors) will - Surface roughness oriented perpendicular to the erosive wind direction will reduce wind erosion.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Decreased physical plant damage.</li> <li>• Improved crop yields.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Reduced time managing sediment.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be protected from erosion.</li> <li>• No change in land use.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; installation cost.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> <li>• Foregone Income.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in tillage operations.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased time managing crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Decreased agricultural operation flexibility and timing by taking land out of agricultural production.</li> <li>• Equipment weight during ridge establishment may increase soil compaction is under certain soil moisture conditions.</li> </ul>

- Improved agricultural operation flexibility and timing with protected agricultural land.
- Reduced labor repairing critical erosion areas and removing sediment.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Reduced wind erosion, improved plant productivity, at a low cost.**

**Commonly Associated Practices:** Cross Wind Trap Strips, Herbaceous Wind Barriers, Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal, Windbreak/Shelterbelt Establishment

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.



## Conservation Practice Effects

### Cross Wind Trap Strips (Ac) 589C

**Definition:** Herbaceous cover established in one or more strips typically perpendicular to the most erosive wind events.

**Major Resource Concerns Addressed:** Wind erosion.

**Benchmark Condition:** Level cropland in wind prone area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Wind erosion is reduced.</li> <li>• Increase in soil organic matter.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced wind erosion transport of soil-adsorbed nutrients, pesticides and salts to surface water.</li> <li>• Reduced offsite sediment transport.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Improved particulate matter air quality.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Decreased physical plant damage.</li> <li>• Improved crop yields.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Vegetation provides cover for wildlife.</li> <li>• Feed and forage for livestock.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Reduced time managing sediment.</li> <li>• Improved agricultural operation</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be protected from erosion.</li> <li>• No change in land use.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; installation cost.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> <li>• Foregone Income.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in tillage operations.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased time managing crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Decreased agricultural operation flexibility and timing by taking land out of agricultural production.</li> </ul>

<p>flexibility and timing with protected agricultural land.</p> <ul style="list-style-type: none"> <li>• Reduced labor repairing critical erosion areas and removing sediment.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Reduced wind erosion, improved plant productivity, at a low cost.</b></p>	

**Commonly Associated Practices:** Cross Wind Ridges, Herbaceous Wind Barriers, Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal, Upland Wildlife Habitat Management, Windbreak/Shelterbelt Establishment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Field Border (Ac) 386

**Definition:** A stripe of permanent vegetation established at the edge or around the perimeter or a field.

**Major Resource Concerns Addressed:** Water quality, wildlife habitat.

**Benchmark Condition:** Cropland field with annually tilled crop.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind and gully erosion if vegetation is planted across the slope.</li> <li>• Permanent cover and lack of soil disturbance reduces decomposition of soil organic materials.</li> <li>• Compaction is reduced as root penetration and increased organic matter restores soil structure.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Permanent vegetation will reduce runoff and increase infiltration.</li> <li>• Borders may attract beneficial insects or trap insect pests, reducing the need for pesticide applications.</li> <li>• Nutrients, pesticides, salts, pathogens, manure in surface and ground water will be reduced.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Permanent vegetation around the field edge reduces particulate emissions from vehicle traffic and tillage in the border area.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it as soil carbon.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Slight change in land use if cropland converted to border.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; planting costs.</li> <li>• Foregone income with land taken out of production.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Slight increase for weed control.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased management of crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced operation flexibility and timing with land taken out of production.</li> </ul>

**Plants**

- Plants are selected and managed to maintain optimal productivity and health.
- Vegetation is installed and managed to control undesired species.

**Animals**

- Increased quality and quantity of food, cover and shelter for wildlife.
- Permanent vegetation may provide added habitat and connectivity for selected wildlife species.
- Opportunity for feed and forage for livestock.

**Energy**

- None

**Human**

- Historic properties in agricultural context can be protected from erosion by permanent vegetative cover.
- Slight decrease in labor turning equipment at ends of fields.
- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Improves soil productivity and water quality at a low cost.**

**Commonly Associated Practices:** Conservation Crop Rotation, Dust Control on Unpaved Roads and Surfaces, Early Successional Habitat Development/Mgt., Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal, Upland Wildlife Habitat Management, Wetland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Field Operations Emissions Reduction (Ac) 376**

**Definition:** Adjusting field operations and technologies to reduce particulate matter (PM) emissions from field operations.

**Major Resource Concerns Addressed:** Air quality.

**Benchmark Condition:** Dryland fallow field in winter wheat crop rotation.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Techniques may reduce the potential for sheet, rill and wind erosion.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Reduced soil and residue particulates in the air with changes in tillage, harvest and other field operations.</li> <li>• Increase carbon sequestration and reduce greenhouse gas emissions.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Prolong life of above-ground cultural resources.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land use or land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Purchase new equipment.</li> <li>• Annual operation and maintenance costs to service and maintain equipment.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>

- **Promote good stewardship.**
- **May be eligible for cost share.**
- **Increased profitability in the long run.**

**Net Effect: Improved air quality at a moderate cost.**

**Commonly Associated Practices:** Conservation Cover, Contour Buffer Strips, Cover Crop, Critical Area Planting, Cross Wind Trap Strips, Herbaceous Wind Barriers, Integrated Pest Management, Irrigation Water Management, Mulching, Nutrient Management, Pumping Plant, Residue and Tillage Management-Mulch Till, Residue and Tillage Management-No Till/Strip Till/Direct Seed, Residue and Tillage Management-Ridge Till, Residue Management-Seasonal, Terrace, Spoil Spreading, Stream Habitat Improvement and Management, Streambank and Shoreline Protection.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Hedgerow Planting (Ac) 422

**Definition:** Establishment of dense vegetation in a linear design to achieve a natural resource conservation purpose.

**Major Resource Concerns Addressed:** Wildlife habitat, cover and shelter.

**Benchmark Condition:** Cropland without trees or shrubs.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced wind erosion with dense vegetation trapping saltating particles.</li> <li>• Permanent vegetation increases soil organic matter.</li> <li>• Root development will improve soil structure and porosity and reduce compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Tall vegetation will trap snow upwind of structures and animal concentration areas, and increase soil moisture.</li> <li>• Reduced pesticide drift and improve water quality.</li> <li>• Borders may attract beneficial insects or trap insect pests which reduce the need for pesticide applications.</li> <li>• Nutrients kept in place with reduced overland flow and wind erosion.</li> <li>• Borders along small streams increases shade and moderates stream temperatures.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Permanent rows of trees or shrubs can reduce wind erosion and intercept and trap airborne particles.</li> <li>• Vegetation removes CO<sub>2</sub> from the air</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be impacted during planting.</li> <li>• Change in land use as crop or grazed land is converted to shrub/tree and wildlife use.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Some brush management equipment may be required.</li> <li>• Materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional labor maintaining hedgerow, reduced time with some land out of crop production.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in crop production planning and scouting.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing with land taken out of production.</li> <li>• Forgone income as crop land is taken out</li> </ul>



<p>and stores it in the form of carbon in the plants and soil.</p> <ul style="list-style-type: none"> <li>• Reduced objectionable odors are intercepted.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Vegetation is installed and managed to control undesired species.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Selected plants improve food supply, cover, shelter and habitat for fish and wildlife.</li> <li>• Hedgerows can provide some shade and protection from wind for livestock.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	<p>of production.</p>
<p><b><u>Net Effect:</u> Improves soil productivity and wildlife habitat at a moderate cost.</b></p>	

**Commonly Associated Practices:** Stripcropping, Tree/Shrub Establishment, Upland Wildlife Habitat Management, Windbreak/Shelterbelt Establishment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Herbaceous Wind Barriers (Ac) 603

**Definition:** Herbaceous vegetation established in rows or narrow strips in the field across the prevailing wind direction.

**Major Resource Concerns Addressed:** Wind erosion.

**Benchmark Condition:** Cropland in wind erosion area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Wind Erosion is reduced by stiff stemmed herbaceous vegetation established across the prevailing wind erosion direction by trapping saltating soil particles and sheltering an area down wind.</li> <li>• Soil organic matter increased as wind erosion is reduced.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Trapped snow can provide additional plant available moisture.</li> <li>• Barriers may attract beneficial insects or trap insect pests which reduce the need for pesticide applications improving water quality.</li> <li>• Reduced wind erosion keeps soil-adsorbed nutrients and sediment in place improving water quality.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Barriers can reduce wind erosion and particulate emissions.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil and reduced soil loss/organic matter</li> </ul> <p><b>Plants</b></p>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Vegetative covers may protect near surface or subsurface historic properties.</li> <li>• Minor change in land use as crop is converted to grass/forb production.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional labor maintaining wind barriers.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in crop production planning and field scouting.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing with land taken out of production.</li> <li>• Forgone income with some land taken out of crop production.</li> </ul>

<ul style="list-style-type: none"> <li>• Increased crop yield with reduced wind erosion.</li> <li>• Vegetation is installed and managed to control undesired species.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Increased quality and quantity of vegetation provides more food, cover, shelter and habitat for wildlife.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity and reduced wind erosion at a moderate cost.</b></p>	

**Commonly Associated Practices:** Cover Crop, Residue and Tillage Management, Mulch Till, Residue and Tillage Management, No Till/Strip Till/Direct Seed, Residue and Tillage Management, Ridge Till, Residue Management, Seasonal, Upland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying

a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Mulching (Ft) 484

**Definition:** Applying plant residues or other suitable materials produced off site, to the land surface

**Major Resource Concerns Addressed:** Soil productivity.

**Benchmark Condition:** Depleted intensively farmed row crop land.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind, gully and streambank erosion.</li> <li>• Increased soil organic matter.</li> <li>• Reduced evaporation may reduce salt build-up and added organic matter will buffer salts.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased infiltration reduces runoff, flooding and ponding.</li> <li>• Increased infiltration and decreased evaporation results in more available water from irrigation and precipitation.</li> <li>• Reduced runoff of pesticides, nutrients, salts, sediment, manure, pathogens and other agricultural chemicals improve surface water quality.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Stabilized the soil surface, reducing the generation of particulate matter.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Improved crop production opportunities.</li> <li>• Improve growing conditions and increased plant health and vigor.</li> <li>• Thick and/or impenetrable mulch cover can prevent emergence of undesired weed</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Adverse effects on cultural resources possible during planting and/or removal.</li> <li>• No change in land use or land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Mulching equipment and materials.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in passes over the field.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No Change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Increase in pests may reduce crop yield.</li> <li>• Increase in seeps and seasonal high water table with increased infiltration.</li> <li>• Impervious mulches may increase runoff and surface water quality problems.</li> <li>• Increased infiltration negatively effects ground water.</li> </ul>

<p>species.</p> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Mulching enhances wildlife food, cover and shelter.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Increase yields/reduce costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity at a low cost.</b></p>	

**Commonly Associated Practices:** Contour Farming, Critical Area Planting, Integrated Pest Management, Irrigation Water Management, Nutrient Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics

Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.



## Conservation Practice Effects

### **Multi-Story Cropping (Ft) 379**

**Definition:** Existing or planted stands of trees or shrubs that are managed as an overstory with an understory of woody and/or non-woody plants that are grown for a variety of products.

**Major Resource Concerns Addressed:** Soil productivity.

**Benchmark Condition:** Annual cropland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, gully and streambank erosion is reduced by vegetation and surface litter reducing raindrop impact, slowing runoff water and increasing infiltration.</li> <li>• Wind erosion is reduced by trees or shrubs creating turbulence, reduced wind velocities and stable areas which stops saltating particles.</li> <li>• Biological activity, root depth/density and organic matter cycling increases.</li> <li>• Compaction is reduced and soil structure improved.</li> <li>• Canopy cover and organic matter provide soil buffer during extended tropical droughts to reduce organic matter oxidation and loss.</li> <li>• Plants may take up some salts, and increased root penetration improves infiltration that may lead to increased leaching.</li> <li>• <b>Water</b></li> <li>• Runoff, flooding, ponding, high water table and seeps are reduced with increased infiltration, evapotranspiration utilizes water, and increased soil organic matter holds water.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be damaged during tree planting.</li> <li>• Increased intensity of land use, producing two or more crops.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Additional field equipment required to produce two crops.</li> <li>• Materials, installation and management costs.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Labor for additional field operations.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in management to take soil test, calibrate equipment and keep records.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing with less annual crop and more perennial vegetation.</li> <li>• Crops must be adapted and managed to account for use of available water by trees.</li> <li>• Changes in stand structure and composition may interrupt continuity of habitat for certain wildlife species.</li> </ul>

- Management of mixed multistoried crops reduces need for chemicals to manage pests. Pesticide degradation may be improved by interception of drift by varied canopy layers. Surface and ground water are improved.
- Permanent vegetation and soil organisms' uptake nutrients and surface and ground water are improved.
- Varied canopy layers and surface cover and organic matter increases infiltration and reduces need for irrigation or chemical inputs and reduces harmful pathogens.
- Reduced sediment-laden runoff from reaching surface water conveyances.
- Air
- Permanent vegetation traps air and slows movement of air, reducing wind velocities and wind stress on crops while providing a stable area to intercept air particles.
- Emissions of greenhouse gases are reduced and stored as carbon.
- Plants
- Increase in crop yield with more effective use of nutrients and plant protection.
- Plants are selected and managed to maintain optimal productivity, health and to control plant pests and undesired species.
- Management of multiple layers and surface organic matter reduce ladder fuel load buildup.
- Animals
- Fish and wildlife habitat, cover and shelter will improve.
- Changes in stand structure and composition may create habitat diversity and edge conditions favored by some wildlife.
- Energy
- No change.
- Human

<ul style="list-style-type: none"> <li>• <b>Opportunity to produce two or more sources of income.</b></li> <li>• <b>Decrease in labor with land taken out of annual crop production.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Create open space and improve habitat for wildlife.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improves soil productivity at a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control , , Brush Management, Firebreak, Forage and Biomass Planting, Forest Stand Improvement, Forest Trails and Landings, Herbaceous Weed Control, Integrated Pest Management, Nutrient Management, Tree/Shrub Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Woody Residue Treatment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics

Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Residue and Tillage Management, Reduced Till (Ac) 345**

**Definition:** Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting.

**Major Resource Concerns Addressed:** Soil erosion, water quality, plant productivity.

**Benchmark Condition:** Corn and soybean crop rotation.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR **Date:** October, 2016  
**Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully erosion is reduced by increasing residue and reducing soil disturbance.</li> <li>• Improvement in soil health and water holding capacity.</li> <li>• Decreased erosion and less oxidation from lack of soil disturbance will increase or maintain organic matter.</li> <li>• Fewer field operations and less tillage reduce the potential for soil compaction.</li> <li>• Low disturbance and high residue increase organic matter which buffers salts.</li> <li>• Increase in soil carbon.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased infiltration results in more water moving through the profile, reducing runoff, ponding and seasonal high water table.</li> <li>• Increased infiltration and decreased evaporation results in more available water.</li> <li>• Decreased runoff and erosion reduces nutrients, pesticides, salt, pathogens and</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land in production.</li> <li>• More intensive land use.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Additional field equipment required including no-till drill and spray rig.</li> <li>• Increase in pest management costs.</li> <li>• Annual operation, maintenance and replacement costs of new field equipment.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase management costs in developing crop, nutrient, pest plans and record keeping.</li> <li>• Steep learning curve first few years.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced flexibility when tillage is not available as a management option.</li> <li>• Increase in pesticide use (substitute tillage with chemical pest control).</li> <li>• Increased infiltration reduces the efficiency of flood and furrow irrigation.</li> </ul>

<p>sediment to surface waters.</p> <ul style="list-style-type: none"> <li>• High soil organic carbon may cause microbes to immobilize nutrients to leaching.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Fewer field operations reduce the generation of particulate matter, ozone precursors and CO<sub>2</sub>.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Possible increase in crop yields.</li> <li>• Conserving moisture and improving soil conditions improve plant productivity and health.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Crop residue provides food, cover, shelter and habitat for wildlife.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Fewer passes over the field reduces fuel and oil use.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Reduction in field labor, fewer passes over the field.</li> <li>• Reduced equipment repairs with fewer passes over the field.</li> <li>• Improved drainage allows working the field earlier and later in field season.</li> <li>• Salvage value of obsolete field equipment.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased infiltration may increase nutrient, salt and agricultural chemicals leaching to ground water.</li> <li>• High residue on cold and wet soils may delay crop emergence and early growth.</li> </ul>
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- **Make land more attractive and promote good stewardship.**
- **May be eligible for cost share.**
- **Increased profitability in the long run.**

**Net Effect: Improved soil productivity and improved water quality at a profit.**

**Commonly Associated Practices:** Conservation Crop Rotation, Contour Farming, Integrated Pest Management, Irrigation Water Management, Nutrient Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Residue and Tillage Management, No Till (Ac) 329**

**Definition:** Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round, limiting soil-disturbing activities to those necessary to place nutrients, condition residue and plant crops.

**Major Resource Concerns Addressed:** Soil erosion, water quality, plant productivity.

**Benchmark Condition:** Small grain and fallow crop rotation.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully erosion is reduced by increasing residue and reducing soil disturbance.</li> <li>• Improvement in soil health and water holding capacity.</li> <li>• Decreased erosion and less oxidation from lack of soil disturbance will increase or maintain organic matter.</li> <li>• Fewer field operations and less tillage reduce the potential for soil compaction.</li> <li>• Low disturbance and high residue increase organic matter which buffers salts.</li> <li>• Increase in soil carbon.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased infiltration results in more water moving through the profile, reducing runoff, ponding and seasonal high water table.</li> <li>• Increased infiltration and decreased evaporation results in more available water.</li> <li>• Decreased runoff and erosion reduces nutrients, pesticides, salt, pathogens and sediment to surface waters.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land in production.</li> <li>• More intensive land use.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Additional field equipment required including no-till drill and spray rig.</li> <li>• Increase in pest management costs.</li> <li>• Annual operation, maintenance and replacement costs of new field equipment.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase management costs in developing crop, nutrient, pest plans and record keeping.</li> <li>• Steep learning curve first few years.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced flexibility when tillage is not available as a management option.</li> <li>• Increase in pesticide use (substitute tillage with chemical pest control).</li> <li>• Increased infiltration reduces the efficiency of flood and furrow irrigation.</li> <li>• Increased infiltration may increase nutrient, salt and agricultural chemicals</li> </ul>



<ul style="list-style-type: none"> <li>• High soil organic carbon may cause microbes to immobilize nutrients to leaching.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Fewer field operations reduce the generation of particulate matter, ozone precursors and CO<sub>2</sub>.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Possible increase in crop yields.</li> <li>• Conserving moisture and improving soil conditions improve plant productivity and health.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Crop residue provides food, cover, shelter and habitat for wildlife.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Fewer passes over the field reduces fuel and oil use.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Reduction in field labor, fewer passes over the field.</li> <li>• Reduced equipment repairs with fewer passes over the field.</li> <li>• Improved drainage allows working the field earlier and later in field season.</li> <li>• Salvage value of obsolete field equipment.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> </ul>	<ul style="list-style-type: none"> <li>• leaching to ground water.</li> <li>• High residue on cold and wet soils may delay crop emergence and early growth.</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity and water quality at a profit.</b></p>	

**Commonly Associated Practices:** Conservation Crop Rotation, Contour Farming, Integrated Pest Management, Irrigation Water Management, Nutrient Management

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Stripcropping (Ac) 586

**Definition:** Growing planned rotations of row crops, forages, small grains, or fallow in a systematic arrangement of equal width strips across a field.

**Major Resource Concerns Addressed:** Wind erosion.

**Benchmark Condition:** Level cropland in wind prone area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced when applied on or near the contour.</li> <li>• Perennial crops in the alternating strips can add organic matter to the soil.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased water infiltration and seeps, particularly during fallow periods.</li> <li>• Increased water infiltration which may slightly reduce the potential for flooding or ponding.</li> <li>• Protected strips will capture additional snow, increase infiltration and create excess soil moisture and subsurface water.</li> <li>• Reduced runoff and erosion and soil-attached pesticides, nutrients, salts, manure and pathogens delivered to surface water.</li> <li>• Increased water infiltration could move salts, pesticides, nutrients and other agricultural chemicals to groundwater.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Vegetated strips provide ground cover and reduces wind erosion.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be protected from erosion.</li> <li>• No change in land use.</li> <li>• Change to less intensive crop production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor with more turns at end of rows.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in developing crop management plan and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing when required to follow designed row pattern.</li> </ul>

<p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• <b>Reduced erosion will improve site potential and enhance plant productivity and health.</b></li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Improved fish and wildlife habitat, food, cover and shelter.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Reduced time managing sediment.</b></li> <li>• <b>Improved agricultural operation flexibility and timing with protected agricultural land.</b></li> <li>• <b>Reduced labor repairing critical erosion areas and removing sediment.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Reduced wind erosion, improved plant productivity, at a low cost.</b></p>	

**Commonly Associated Practices:** Conservation Crop Rotation, Contour Farming, Diversion, Grassed Waterway, Integrated Pest Management, Nutrient Management, Underground Outlet.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying

a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Surface Roughening (Ac) 609

**Definition:** Performing tillage operations that create random roughness of the soil surface.

**Major Resource Concerns Addressed:** Wind erosion.

**Benchmark Condition:** Level fallow cropland in wind prone area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Wind erosion is reduced.</li> <li>• Maintained soil organic matter.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced wind erosion transport of soil-adsorbed nutrients, pesticides and salts to surface water.</li> <li>• Reduced offsite sediment transport.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Improved particulate matter air quality.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Reduced time managing sediment.</li> <li>• Improved agricultural operation flexibility and timing with protected agricultural land.</li> <li>• Reduced labor repairing critical erosion</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be protected from erosion.</li> <li>• No change in land use or land taken out of production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Additional tillage passes over the field.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in tillage operations.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased time managing crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>

<p>areas and removing sediment.</p> <ul style="list-style-type: none"> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Reduced wind erosion at a low cost.</b></p>	

**Commonly Associated Practices:** Conservation Crop Rotation, Cross Wind Ridges, Cross Wind Trap Strips, Herbaceous Wind Barriers, Integrated Pest Management, Nutrient Management, Residue and Tillage Management-Mulch Till, Residue and Tillage Management-No Till/Strip Till/Direct Seed, Residue and Tillage Management-Ridge Till, Residue Management, Seasonal, Windbreak/Shelterbelt Establishment, Windbreak/Shelterbelt Renovation.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Vegetative Barrier (Ac) 601**

**Definition:** Permanent strips of stiff, dense vegetation established along the general contour of slopes or across concentrated flow areas.

**Major Resource Concerns Addressed:** Waste runoff, water quality.

**Benchmark Condition:** Livestock winter feeding and loafing area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced by stiff-stemmed vegetation planted along the contour or across areas of concentrated flow increasing infiltration.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced runoff and erosion and traps adsorbed pesticides, nutrients and agricultural chemicals.</li> <li>• Soluble organics infiltrate into the soil and may be taken up by plants and soil organisms.</li> <li>• Vegetative barriers capture sediment-bound pathogens and retard pathogen movement, allowing more time for mortality to occur before pathogens can reach water bodies.</li> <li>• Vegetation slows runoff, filters water, and increases infiltration.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Reduced erosion and improved water</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Historic properties may be protected by erosion reduction.</li> <li>• Minimal land taken out of agricultural production, some land may be brought into production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Installation equipment costs.</li> <li>• Materials and planting costs.</li> <li>• Annual operation and maintenance costs to maintain control barrier.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor to remove sediment and maintain vegetation.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No Change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Over time salts are collected or redistributed within a field due to seepage, if present.</li> </ul>



<p>management creates site conditions favorable to plant health and productivity.</p> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Wildlife habitat/food species can be included in the barrier.</li> <li>• The barrier provides cover, space and habitat for some species.</li> <li>• Fish and wildlife habitat/water will be improved by the filtering functions of the barriers.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Stabilizing steep land and bringing land into production.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Improved water quality and reduced erosion at a moderate cost.</b></p>	

**Commonly Associated Practices:** Conservation Crop Rotation, Contour Farming, Integrated Pest Management, Nutrient Management, Residue and Tillage Management-Mulch Till, Residue and Tillage Management-No Till/Strip Till/Direct Seed, Residue and Tillage Management-Ridge Till, Residue Management-Seasonal.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Windbreak/Shelterbelt Establishment (Ac) 380

**Definition:** Windbreaks or shelterbelts are single or multiple rows of trees or shrubs in linear configurations.

**Major Resource Concerns Addressed:** Wind erosion, energy savings.

**Benchmark Condition:** Exposed cropland and headquarters.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill and gully erosion is reduced by vegetation across the slope and surface litter reduces erosive water energy.</li> <li>• Wind Erosion is reduced by tall vegetation that creates a wind shadow, reduces erosive wind velocities and provides a stable area which stops saltating particles.</li> <li>• Roots and vegetative matter and its breakdown increases organic matter.</li> <li>• Root penetration and organic matter helps restore soil structure and reduces compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduction in seeps as trees/plants uptake excess water.</li> <li>• Runoff, flooding, or ponding is reduced as trees or shrubs increase infiltration and retard flood water movement.</li> <li>• Water table and soil moisture is restored as plants uptake excess water.</li> <li>• Snow is captured within and downwind of tree/shrub rows increasing soil moisture.</li> <li>• Tall vegetation reduces wind speeds and evapotranspiration allowing more</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Change in land use and land in production.</li> <li>• Historic landscapes may change.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Materials, planting &amp; installation costs.</li> <li>• No additional field equipment required.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> <li>• Forgone income.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor during planting.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Management change from previous crop.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>

efficient use of available water.

- Sheltered crops intercept pesticide drift.
- Plants and soil organisms' uptake nutrients and improve surface and ground water quality.
- Vegetation traps sediment preventing it from being deposited elsewhere.

#### Air

- Reduced particulate emissions associated with wind erosion and filtering particulate matter, CO<sub>2</sub> and ammonia from the air.
- Vegetation will reduce wind movement and intercept fine particulates, dust and reduce odor.

#### Plants

- Crops are sheltered from airborne sediment and chemical drift.
- Reduced crop damage.
- Vegetation is installed and managed to control undesired species.

#### Animals

- Improved plant diversity and quality and quantity of vegetation provides food, cover and space for wildlife.
- Livestock feed and forage in is enhanced by improving the microclimate.
- Tall vegetation provides shelter for wildlife and livestock.

#### Energy

- Reduced heating and cooling around farmsteads.
- Potential biomass as fuel source.

#### Human

- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.

- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.

**Net Effect: Reduced wind erosion, improved soil productivity at a moderate cost.**

**Commonly Associated Practices:** Access Control , Brush Management, Conservation Crop Rotation, Cover Crop, Cross Wind Trap Strips, Dust Control from Animal Activity on Open Lot Surfaces, Fence, Field Border, Firebreak, Herbaceous Weed Control, Herbaceous Wind Barriers, Integrated Pest Management, Mulching, Residue and Tillage Management-Mulch Till, Residue and Tillage Management-No Till/Strip Till/Direct Seed, Residue and Tillage Management-Ridge Till, Residue Management-Seasonal, Tree/Shrub Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Upland Wildlife Habitat Management, Watering Facility, Windbreak/Shelterbelt Renovation.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Access Control (Ac) 472

**Definition:** The temporary or permanent exclusion of animals, people, vehicles, and/or equipment from an area.

**Major Resource Concerns Addressed:** Soil erosion, streambank protection, wildlife habitat.

**Benchmark Condition:** Riparian area.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully, streambank erosion is reduced by less disturbance of the soil and vegetation.</li> <li>• Organic matter increases.</li> <li>• Soil compaction is reduced.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding, ponding, seasonal high water table and seeps may be reduced as plant vigor increase water uptake and soil structure improves.</li> <li>• Soil moisture will increase with improved vegetation and soil structure.</li> <li>• Nutrients and pesticides in surface and ground water will decrease as plant vigor improves soil conditions.</li> <li>• Pathogens and chemicals from manure in surface and groundwater will be reduced in sensitive areas.</li> <li>• Sediment in surface water will be reduced.</li> <li>• High water temperature will be reduced.</li> <li>• Petroleum, heavy metals and other pollutants in surface and groundwater will be reduced.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Emissions of particulate matter, ozone</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Land will be taken out of production with a change to less intense land use.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Reduced use of field equipment.</li> <li>• Forgone income from previous land use.</li> <li>• Annual operation and maintenance costs to maintain control barrier.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Agricultural operation flexibility and timing will be limited due to deferred land use, reduced grazing or cropping.</li> <li>• Cash flow will decline, annual costs may be greater than annual benefits.</li> <li>• Profitability will decrease if land is taken out of production.</li> <li>• Wildfire hazard from excessive biomass accumulation may increase.</li> <li>• The threat of noxious and invasive plants may increase.</li> </ul>

precursors and greenhouse gases will be reduced.

#### **Plants**

- **Plant community productivity and health will increase by excluding animals, people, and vehicles and encouraging natural revegetation.**
- **The threat of noxious and invasive plants may decrease.**

#### **Animals**

- **Fish and wildlife habitat, food, water, cover, and shelter will improve for certain wildlife species.**
- **Fish and wildlife habitat continuity (space) will improve.**
- **Livestock feed, forage and shelter will improve (if utilized in the future).**

#### **Energy**

- **Less energy will be expended with reduced land use.**

#### **Human**

- **Reduced labor and management.**
- **Cultural resources will be protected.**
- **Create sustainability of natural resources that support your business.**
- **Increase the property value (real estate) of your property.**
- **Create open space and improve habitat for wildlife.**
- **Conserve soil and water for periods of drought and future use.**
- **Prevent off-site negative impacts.**
- **Comply with environmental regulations.**
- **Promote family health and safety.**
- **Make land more attractive and promote good stewardship.**
- **May be eligible for cost share.**

**Net Effect: Access Control improves soil productivity, reduces erosion and protects wildlife in the long term at a moderate cost.**

**Commonly Associated Practices:** Aquaculture Ponds, Critical Area Planting, Fence, Forage and Biomass Planting, Forest Stand Improvement, Fuel Break, Karst Sinkhole Treatment , Land Reclamation, Abandoned Mined Land, Land Reclamation, Currently Mined Land, Land Reclamation, Landslide Treatment, Multi-Story Cropping, Pond, Prescribed Grazing, Range Planting, Riparian Forest Buffer, Road/Trail/Landing Closure and Treatment, Silvopasture Establishment, Tree/Shrub Establishment, Vegetated Treatment Area , Waste Storage Facility, Waste Treatment Lagoon, Water Well, Water Well Decommissioning, Watering Facility, Wetland Restoration, Windbreak/Shelterbelt Establishment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.



## Conservation Practice Effects

### **Anionic Polyacrylamide (PAM) Erosion Control (Ac) 450**

**Definition:** Application of water-soluble Anionic Polyacrylamide (PAM) to meet a resource concern.

**Major Resource Concerns Addressed:** Furrow irrigation erosion.

**Benchmark Condition:** Furrow irrigated row crops.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced as soil particles coagulate making them less susceptible to detachment from flowing water and wind.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Minimize furrow erosion allowing higher water flow in the furrow that provides more efficient application.</li> <li>• Reduced erosion and delivery of sediment-attached nutrients and pesticides to be carried off-site to surface water and infiltrated to ground water.</li> <li>• Reduces sediment load to waterways.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Reduce the susceptibility of soil to wind erosion.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Improved crop yields.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Water quality improvement to fish and wildlife.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Reduces seepage losses resulting in</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land in production or land use.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Materials and some mixing and field application equipment required.</li> <li>• No operation and maintenance costs.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Materials application labor.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in record keeping and developing irrigation schedules.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• No increase in risk.</li> </ul>

<p>reduced energy use for pumping.</p> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Less time managing sediment in waterways.</li> <li>• Increase furrow irrigation management options.</li> <li>• Increased crop yields and reduced erosion and sediment management costs.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> PAM improves soil productivity, reduces erosion at a low cost.</b></p>	

**Commonly Associated Practices:** Irrigation Canal or Lateral, Irrigation Field Ditch, Irrigation System, Sprinkler, Irrigation System, Surface & Subsurface.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics

Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Brush Management (Ac) 314

**Definition:** The management or removal of woody (non-herbaceous or succulent) plants including those that are invasive and noxious.

**Major Resource Concerns Addressed:** Invasive plants, wildlife habitat, soil erosion.

**Benchmark Condition:** Juniper infested rangeland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully erosion is reduced with reduced brush canopy and increase in herbaceous ground cover resulting in increased infiltration, reduced overland flow and reduced soil detachment.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding and ponding is reduced with increased ground cover.</li> <li>• Increase in soil moisture and plant use efficiency with a decrease in undesirable species.</li> <li>• Reduced sediment in surface water with improved plant cover and less overland flow and runoff.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Positive long-term carbon sequestration effect from brush management.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Brush removal increases desirable plant community health, vigor and biodiversity.</li> <li>• Reduced wildfire hazard and fuel loadings.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved composition, structure,</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be damaged with mechanical treatment.</li> <li>• Land may be utilized more intensely.</li> <li>• Land in production may increase.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Treatment costs (chemical, mechanical, grazing or fire).</li> <li>• Annual operation and maintenance costs may include spot treatment for reinvading brush.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Short term foregone income or change in seasonal use if deferred from grazing.</li> <li>• Temporary increase in soil erosion following mechanical treatment.</li> <li>• Pesticides in surface water if used to control brush.</li> <li>• Removal of vegetation by mechanical means or burning can increase short-term particulate matter emissions, CO<sub>2</sub>,</li> </ul>

<p>amount and availability of plants for food.</p> <ul style="list-style-type: none"> <li>• Improved fish and wildlife cover/shelter and habitat continuity depending on the amount of brush removed and the enhancement of stand composition and structure.</li> <li>• Increased production of forage that meets nutritional and productive needs for livestock.</li> </ul> <p>Energy</p> <ul style="list-style-type: none"> <li>• None</li> </ul> <p>Human</p> <ul style="list-style-type: none"> <li>• Reduced time managing unwanted brush and livestock.</li> <li>• Increase yields/reduced costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	<p>VOC and/or NOx emissions.</p> <ul style="list-style-type: none"> <li>• Loss of habitat for some wildlife species.</li> </ul>
<p><b><u>Net Effect:</u> Improved soil productivity, forage yield, wildlife habitat at a moderate cost.</b></p>	

**Commonly Associated Practices:** Early Successional Habitat Development/Mgt., Herbaceous Weed Control, Integrated Pest Management, Nutrient Management, Prescribed Burning, Prescribed Grazing, Riparian Forest Buffer, Upland Wildlife Habitat Management, Woody Residue Treatment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Critical Area Planting (Ac) 342

**Definition:** Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

**Major Resource Concerns Addressed:** Soil erosion and sedimentation.

**Benchmark Condition:** Steep cropland slope above perennial stream.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully and streambank erosion reduced with increased vegetation, cover and stabilization of erosive conditions.</li> <li>• Increase in soil organic matter.</li> <li>• Decrease in soil compaction with increased root growth.</li> <li>• Increased vegetation will increase salt uptake and increased organic matter may tie up salts and other chemicals.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Growing plants will take up excess water and may reduce seeps, ponding, flooding and high water table with large treatment area.</li> <li>• Reduced soil erosion and sediment-attached nutrients delivered to surface and ground water.</li> <li>• Permanent vegetation will uptake excess nutrients.</li> <li>• Less runoff reduces transport of soluble salts to surface and ground water.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Permanent cover helps reduce wind erosion and generation of fugitive dust.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Historic properties and cultural resources may be protected from erosion.</li> <li>• Change in land use if large areas are planted.</li> <li>• Some land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> <li>• Forgone income.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing by taking land out of production.</li> <li>• Reduced profitability with land taken out of production.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</b></li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• <b>Establishment of permanent vegetation may provide competition that would slow the spread of noxious plants.</b></li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Increased quality and quantity of wildlife food, cover, shelter and habitat.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Reduced labor repairing critical erosion areas and removing sediment.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Create open space and improve habitat for wildlife.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> </ul>	
<p><b><u>Net Effect:</u> Reduced erosion and improved soil quality a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units



and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Dust Control on Unpaved Roads and Surfaces (SqFt) 373

**Definition:** Controlling direct particulate matter emissions produced by vehicle and machinery traffic or wind action from unpaved roads and other surfaces by applying a palliative on the surface.

**Major Resource Concerns Addressed:** Air Quality

**Benchmark Condition:** Dusty roads at farm headquarters.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Treatment of unpaved surfaces can help to bind particles, resulting in reduced erosion.</li> <li>• Wind erosion is reduced by treatment of open lots.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced manure, nutrient, salt, pathogen and other chemical runoff from the open lot surface.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Reduce particulate matter emissions from vehicle traffic and wind erosion on unpaved roads and surfaces.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• No effect</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved working conditions and animal health.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• No effect</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Improved working conditions.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land use or land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Some application equipment required and purchase materials.</li> <li>• No O&amp;M costs after implementation.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional labor required to operate dust control equipment.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased management of equipment and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• If road oils are used, nearby surface water may be impacted.</li> </ul>

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| <ul style="list-style-type: none"> <li>• Increase the property value (real estate) of your property.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> </ul> |  |
| <p><b><u>Net Effect:</u> Improved air quality at a low cost.</b></p>  |  |

**Commonly Associated Practices:** Critical Area Planting, Dust Control Animals, Heavy Use Area Protection, Irrigation Pipeline, Irrigation Reservoir, Irrigation System, Sprinkler, Livestock Pipeline, Mulching, Pumping Plant, Windbreak/Shelterbelt Establishment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Forage and Biomass Planting (Ac) 512

**Definition:** Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production.

**Major Resource Concerns Addressed:** Plant productivity.

**Benchmark Condition:** Low yield hayland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind, gully erosion with an increase in vegetative cover.</li> <li>• Improved soil organic matter with enhanced biomass production, root development, litter accumulation, increased biological activity, and reduced tillage (if associated with change in land use).</li> <li>• Reduced soil compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced runoff, flooding and ponding with an increase in cover and infiltration.</li> <li>• Reduced pesticides, nutrients, pathogens and other agricultural chemicals in surface and ground water.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Permanent vegetation reduces the potential for generation of particulates by wind erosion.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Increased crop yield with better plant species mix and plant density.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land use if currently hayed/grazed.</li> <li>• Increase in land in production if land is brought into production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials and planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No Change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased management of crop production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility, timing and income if converting from annual to perennial crop.</li> <li>• During the establishment period, there may be an increase in soil erosion, depending on seedbed preparation, seeding method, and species planted.</li> </ul>

- Improved plant community structure and composition with adapted and suited plants.

**Animals**

- Planted species may provide food, cover and shelter for certain wildlife species.
- Plant species will be selected that accommodate seasonal livestock production and nutritional needs.

**Energy**

- Use of biomass as an alternative energy source can greatly reduce the use of fossil fuels.

**Human**

- Improved agricultural operation flexibility and timing with higher quality crop.
- Decrease in labor from annual cropping.
- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Improves soil productivity and air quality at a low cost.**

**Commonly Associated Practices:** Access Control, Conservation Crop Rotation, Forage Harvest Management, Herbaceous Weed Control, Integrated Pest Management, Nutrient Management, Prescribed Grazing, Upland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Grazing Land Mechanical Treatment (Ac) 548

**Definition:** Modifying physical soil and or plant conditions with mechanical tools by treatment such as; pitting, contour furrowing, and ripping or sub-soiling.

**Major Resource Concerns Addressed:** Plant productivity.

**Benchmark Condition:** Rangeland with declining forage production.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill and wind erosion with increased surface roughness and improved vegetation cover that increases infiltration and reduced runoff and soil movement.</li> <li>• Improved plant vigor and productivity increases organic matter.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased infiltration and decreased runoff, ponding and flooding.</li> <li>• Increased water infiltration and improved plant soil moisture.</li> <li>• Reduced nutrients, pathogens and sediment in surface water.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Emissions of greenhouse gases will - Intensive disturbance of soil can release stored soil carbon as carbon dioxide.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Plant productivity, health and vigor will increase.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved forage and livestock yield with improved soil permeability, infiltration and plant vigor.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• No change in land use or land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials and planting costs.</li> <li>• No additional operation and maintenance costs.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• May have forgone income if land is deferred for one or more years.</li> <li>• Intensive disturbance of soil can release particulate matter into air.</li> <li>• Undesired plants can colonize newly treated disturbed areas.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Improved plant production and species diversity.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>No change.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Improved agricultural operation flexibility and timing with an increase in forage productivity and grazing opportunities.</b></li> <li>• <b>Increase yields/reduce costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity and forage quality and yield at a moderate cost.</b></p>	

**Commonly Associated Practices:** Forage and Biomass Planting, Integrated Pest Management, Nutrient Management, Prescribed Grazing, Range Planting.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation



practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Heavy Use Area Protection (Ac) 561

**Definition:** The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetation cover, by surfacing with suitable materials, and/or by installing needed structures.

**Major Resource Concerns Addressed:** Soil health and livestock productivity.

**Benchmark Condition:** Muddy sacrifice area near water facility on rangeland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind, gully and streambank erosion with vegetative cover, hard-surfacing, or installing structures to protect the soil.</li> <li>• If vegetation is used to protect the site, organic matter may be increased, if another material is used to protect the site, organic matter will be decreased or unchanged.</li> <li>• The area will be used preferentially and the area adjacent to the site will have less soil compaction.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced nutrient, pathogen, manure and sediment runoff into surface water as they are collected and disposed.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Stabilizing high-traffic areas can reduce particulate matter and dust.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Use of the protected area will result in less traffic on adjacent areas, resulting in improved plant health.</li> </ul> <p><b>Animals</b></p>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Vegetative cover may protect surface or subsurface cultural resources; heavy surface treatment or structures may damage cultural resources.</li> <li>• No change in land use.</li> <li>• Minor amount of land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Construction costs and materials.</li> <li>• Annual operation and maintenance costs to keep pad clear and surfaced.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Reduced time removing debris and managing livestock.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increased management of site.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Impermeable surfaces will cause increased runoff.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Improved livestock health and management.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Less livestock labor required.</b></li> <li>• <b>Improved opportunities for land use and water management.</b></li> <li>• <b>Increase yields/reduced costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improves soil health and livestock productivity at a low cost.</b></p>	

**Commonly Associated Practices:** Access Road , Critical Area Planting, Dry Hydrant, Dust Control from Animal Activity on Open Lot Surfaces, Fence, Filter Strip, Nutrient Management, Prescribed Grazing, Roof Runoff Structure, Subsurface Drain, Trails and Walkways, Vegetated Treatment Area , Waste Storage Facility, Waste Transfer, Waste Treatment, Waste Utilization.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to

combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Herbaceous Weed Control (Ac) 315

**Definition:** The removal or control of herbaceous weeds including invasive, noxious and prohibited plants.

**Major Resource Concerns Addressed:** Plant productivity, wildlife habitat.

**Benchmark Condition:** Russian knapweed and jointed goatgrass infested pasture.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully erosion is reduced with increased health, vigor and cover of desirable plant species.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Reduced nutrients and sediment in surface water with improved ground cover reducing overland flow.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Positive long-term carbon sequestration effect from weed management.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Weed removal increases desirable plant community health, vigor and biodiversity.</li> <li>• Increase in forage productivity and grazing opportunities.</li> <li>• Reduced wildfire hazard and fuel loadings.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved composition, structure, amount and availability of plants for food.</li> <li>• Improved fish and wildlife cover/shelter and habitat continuity depending on the type and amount of weeds removed.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be damaged with mechanical treatment.</li> <li>• Land may be utilized more intensely.</li> <li>• Land in production may increase.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Treatment costs (chemical, mechanical, grazing).</li> <li>• Annual operation and maintenance costs may include spot treatment for reinvading weeds.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional time controlling weeds.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in crop production planning and field scouting.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Pesticides may be used to control vegetation.</li> <li>• Removal of vegetation by mechanical means or burning can increase short-term particulate matter emissions, CO<sub>2</sub>, VOC and/or NO<sub>x</sub> emissions.</li> <li>• Loss of habitat for some wildlife species.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Increased production of forage that meets nutritional and productive needs for livestock.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Increase in crop and livestock yields due to reduced weed competition.</b></li> <li>• <b>Reduced time managing unwanted brush and livestock.</b></li> <li>• <b>Increase yields/reduced costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improved plant productivity and farm enterprise opportunities at a low cost.</b></p>	

**Commonly Associated Practices:** Critical Area Planting, Early Successional Habitat Development/Mgt., Forage Harvest Management, Forest Stand Improvement, Integrated Pest Management, Land Clearing, Nutrient Management, Prescribed Burning, Prescribed Grazing, Range Planting, Upland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to

combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Land Reclamation, Landslide Treatment (Ft) 453

**Definition:** Managing in-place natural materials, mine spoil (excavated over-burden), mine waste or overburden to reduce down-slope movement.

**Major Resource Concerns Addressed:** Soil and water quality.

**Benchmark Condition:** Landslide on steep mined slope resulting from road water run-off.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Reduced sheet, rill, wind and gully erosion with the establishment of vegetative cover.</li> <li>• Increase in soil organic matter.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Removal of water to stabilize slopes reduces seepage and seasonal high water table.</li> <li>• Reduced run-off of pathogens, agricultural chemicals, manure and sediment into surface water.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Increase vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Vegetative cover species will be selected and maintained at optimal conditions for the intended purpose.</li> <li>• Vegetation is installed and managed to control undesired species.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Increased quality and quantity of vegetation provides food, cover and shelter for wildlife.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be impacted during construction.</li> <li>• Land may be brought into production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials and installation costs.</li> <li>• No annual operation and maintenance costs.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Labor to dispose of spoil material.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in plan development and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>



<p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Increase in public safety.</li> <li>• Increase in crop and livestock production from restoration of previously unproductive areas.</li> <li>• Create sustainability of natural resources that support farm business.</li> <li>• Increase the property value (real estate).</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity and water quality at a significant cost.</b></p>	

**Commonly Associated Practices:** Critical Area Planting, Integrated Pest Management, Land Reclamation, Currently Mined Land, Land Reclamation, Toxic Discharge Control, Nutrient Management, Obstruction Removal, Subsurface Drain, Terrace, Underground Outlet.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Prescribed Burning (Ac) 338

**Definition:** Controlled fire applied to a predetermined area

**Major Resource Concerns Addressed:** Noxious weeds, plant and livestock productivity.

**Benchmark Condition:** Brush and noxious weed infested grazing land.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced with improved plant production and vegetative cover.</li> <li>• Improved plant production increases soil carbon.</li> <li>• Organic soils are susceptible to subsistence.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding, or ponding is reduced with improved vegetative cover.</li> <li>• Increased plant vigor improves the uptake of nutrients and improves surface and ground water quality.</li> <li>• Improved vegetative cover reduces runoff and sediment into waterways.</li> <li>• Maintain or lower surface water temperatures.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Increased plant vigor reduces the potential for generation of particulates by wind erosion.</li> <li>• Minimal reduction of ozone precursors through reduced incidence of wildfire.</li> <li>• Short-term increase in ozone precursors (NO<sub>x</sub> and VOC emissions) during the burn.</li> <li>• Emissions of greenhouse gases and CO<sub>2</sub></li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be affected by burning and mechanical treatment.</li> <li>• Increase in land use, brush/tree areas brought into production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required, some installation equipment required.</li> <li>• Consultants, permits, safety considerations and implementation.</li> <li>• No operation and maintenance costs, only one-time implementation costs.</li> <li>• Foregone income from lost production or change in seasonal use.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No Change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Develop fire management plan.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Fire hazard to people, structures, crops and livestock.</li> <li>• Burning mineralizes organic materials, may increase salts.</li> <li>• Increase in particulate emissions from the fire.</li> </ul>

<p>emissions are decreased with the decreased incidence of wildfire.</p> <ul style="list-style-type: none"> <li>• Increased plant vigor increases carbon sequestration.</li> <li>• Fire increases smoke, particulates and other objectionable associated odors.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Growing conditions are altered to enhance health and productivity of more desirable plants.</li> <li>• Improved management of undesirable vegetation.</li> <li>• Reduced fuel loading and wildfire hazard.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Improved livestock distribution, increased forage availability, improved livestock health, extended grazing period, and improved forage production.</li> <li>• A more diverse plant community with adequate food and cover for wildlife.</li> <li>• Restored desired habitat, space and wildlife habitat continuity.</li> <li>• Improved production and quality of desirable forage species.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Reduced energy requirements for firefighting and pest control.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• More land management options.</li> <li>• Labor savings managing brush and improved livestock herding.</li> <li>• Increase in wildlife recreational opportunities.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Some shrubs and trees which provide livestock and wildlife shelter are removed from area.</li> </ul>
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<p><b>for wildlife.</b></p> <ul style="list-style-type: none"> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> improves soil productivity, reduces erosion at a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control , Brush Management, Critical Area Planting, Dust Control on Unpaved Roads and Surfaces, Early Successional Habitat Development/Mgt., Forage and Biomass Planting, Forest Stand Improvement, Forest Trails and Landings, Fuel Break, Herbaceous Weed Control, Integrated Pest Management, Range Planting, Sediment Basin, Silvopasture Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Woody Residue Treatment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Prescribed Grazing (Ac) 528

**Definition:** Managing the harvest of vegetation with grazing and/or browsing animals.

**Major Resource Concerns Addressed:** Low plant/animal productivity and health.

**Benchmark Condition:** Native rangeland, poor livestock distribution, low forage yields.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion reduced by improving the health/vigor of plant communities with increased vegetative cover and water infiltration.</li> <li>• Streambanks protected with an increase in riparian vegetation.</li> <li>• Increase in vegetative cover, deeper root systems, increased soil organic material and biological activity, and improved nutrient cycling.</li> <li>• Reduced soil compaction.</li> <li>• Increased cover reduces evaporative salt accumulation.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Spring and seep flows improved.</li> <li>• Runoff, flooding, or ponding is reduced and infiltration increased with improved vegetative cover.</li> <li>• Soil moisture improved, less irrigation.</li> <li>• Reduced pesticides and fertilizer use with better plant health and vigor, improved surface and ground water.</li> <li>• Reduced risk of movement of pathogens in surface waters with increase in soil microbial activity.</li> <li>• Reduced sediment delivery to surface water.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Slight increase in land in production with better livestock distribution.</li> <li>• Protect buried cultural resources.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Slight increase in equipment costs, some monitoring equipment may be required (camera, stakes, hoops, clippers, etc.)</li> <li>• Minor increase in annual operation and maintenance costs for herding and forage monitoring.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Additional labor herding livestock between pastures.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in field scouting to determine when to move livestock and manage forage, minerals and water.</li> <li>• Increase record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Possible foregone income from forage deferment during implementation.</li> </ul>

- **Reduced surface water temperatures.**

**Air**

- **Improved vegetative cover reduces the generation of particulates and removes CO2 from the air and stores it as carbon in plants and soil.**
- **Objectionable manure odor reduced.**

**Plants**

- **Improved plant and animal management enhances growing conditions of the desired plant community and reduces noxious and invasive plants.**
- **Improved forage yields and access.**
- **Reduced fuel loads and wildfire hazard.**

**Animals**

- **Improved fish and wildlife habitat, cover, shelter, water, habitat continuity and space.**
- **Livestock numbers are in balance with feed and forage that meets livestock nutritional and productive needs.**
- **Grazing management considers animal shelter throughout the year.**

**Energy**

- **Opportunity to reduce herding requirements and fuel use.**

**Human**

- **Improved livestock distribution and management options.**
- **Increase yields/reduce costs as land becomes more productive.**
- **Create sustainability of natural resources that support your business.**
- **Increase the property value (real estate) of your property.**
- **Create open space and improve habitat for wildlife.**
- **Conserve soil and water for periods of drought and future use.**
- **Prevent off-site negative impacts.**
- **Comply with environmental regulations.**
- **Promote family health and safety.**

<ul style="list-style-type: none"> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> improved forage productivity &amp; water quality, reduce erosion at a minor cost.</b></p>	

**Commonly Associated Practices:** Access Control , Animal Trails and Walkways, Dust Control from Animal Activity on Open Lot Surfaces, Feed Management, Fence, Forage and Biomass Planting, Heavy Use Area Protection, Integrated Pest Management, Livestock Pipeline, Nutrient Management, Pond, Spring Development, Stream Crossing, Water Well, Watering Facility.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Range Planting (Ac) 550

**Definition:** Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees.

**Major Resource Concerns Addressed:** Soil productivity.

**Benchmark Condition:** Low productive range land.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, shoreline and gully erosion is reduced with increased vegetative cover.</li> <li>• Increase in organic matter and reduced soil compaction with enhanced root development, litter accumulation, and increased biological activity.</li> <li>• Site may be planted to adapted species that reduce saline seeps.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Runoff, flooding, ponding, high water table and seeps are reduced with an increase in cover, infiltration and reduced runoff and overland flow.</li> <li>• Reduced drifting snow.</li> <li>• Reduced runoff, erosion and the delivery of organics and nutrients to surface water.</li> <li>• Permanent vegetation will uptake excess nutrients protecting surface and ground water.</li> <li>• Planting in recharge areas may reduce movement of salts to seep areas and surface and ground waters.</li> <li>• Increased soil microbiological activity will reduce movement of pathogens.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be affected by mechanical treatment.</li> <li>• No change in land use if currently grazed, substantial if change from other land use.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• During the establishment period, there may be a slight to moderate risk of erosion, depending on seedbed preparation, seeding method, and species planted.</li> <li>• There may be an increase in seeps because of increased infiltration.</li> <li>• Potential for leaching of salt into ground water because of increased infiltration.</li> <li>• Short term foregone income from lost production or change in seasonal use.</li> </ul>



- Reduced runoff and sedimentation.
- Reduced high water temperature through thermal regulation of gravitational water moving laterally to open water.

#### Air

- Permanent vegetation reduces the potential for generation of particulates by wind erosion.
- Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.

#### Plants

- Plants are selected and managed to maintain optimal productivity, health and ecological function.
- Undesired species are controlled.

#### Animals

- Increase in livestock and wildlife yield from better plant species mix and plant density.
- Fish and wildlife cover, shelter and habitat are improved.

#### Energy

- No change.

#### Human

- Improved livestock distribution, increased forage availability and management options.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote

<p>good stewardship.</p> <ul style="list-style-type: none"> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b><u>Net Effect:</u> Improves soil productivity at a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control, Brush Management, Grazing Land Mechanical Treatment, Prescribed Burning, Prescribed Grazing, Upland Wildlife Habitat Management, Watering Facility.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Restoration and Management of Rare or Declining Habitats (Ac) 543

**Definition:** Restoring, conserving, and managing unique or diminishing native terrestrial and aquatic ecosystems.

**Major Resource Concerns Addressed:** Wildlife habitat.

**Benchmark Condition:** Vernal pool habitat for aquatic invertebrates and waterfowl.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully and streambank erosion is reduced by establishing or improving native vegetative cover.</li> <li>• Improved vegetative cover may increase soil organic matter. However, if prescribed burning is used, removal of vegetation and litter from a site temporarily removes organic material that could have become soil organic matter.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Improved vegetative cover will reduce runoff and sedimentation.</li> <li>• Restoration of habitat adjacent to streams or water bodies will moderate surface water temperatures.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Additional vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Plants are selected and managed to maintain optimal productivity, health and the desired plant community.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be harmed during restoration.</li> <li>• Some land may be taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No change in field equipment.</li> <li>• Materials &amp; construction costs.</li> <li>• Annual operation and maintenance costs to clean-out debris, repair and replace structures, maintain vegetation and manage pests.</li> <li>• Foregone income from lost production or change in seasonal use.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor depends on natural or artificial habitat.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Develop habitat management plan, field scouting and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced agricultural operation flexibility and timing with more restricted land use.</li> </ul>

<ul style="list-style-type: none"> <li>• <b>Vegetation is managed to control undesired species.</b></li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Improved plant diversity and quality and quantity of vegetation provides food, cover, shelter and habitat for wildlife.</b></li> <li>• <b>Declining habitats and space are restored.</b></li> <li>• <b>Additional feed and forage for livestock.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>None</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>Labor, management and capital will decrease as land is taken out of production.</b></li> <li>• <b>Reduced time cultivating previous crop.</b></li> <li>• <b>Create sustainability of natural resources that support farm business.</b></li> <li>• <b>Increase the property value (real estate).</b></li> <li>• <b>Create open space and improve habitat for wildlife.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improved soil productivity and wildlife habitat at a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control , Animal Trails and Walkways, Brush Management, Conservation Cover, Early Successional Habitat Development/Mgt., Fence, Forage and Biomass Planting, Range Planting, Tree/Shrub Establishment, Upland Wildlife Habitat Management, Wetland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Riparian Forest Buffer (Ac) 391**

**Definition:** An area predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

**Major Resource Concerns Addressed:** Wildlife habitat and streambank erosion.

**Benchmark Condition:** Degraded riparian area adjacent to cropland.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced by vegetation and surface litter.</li> <li>• Streambank, shoreline and conveyance channels erosion is reduced.</li> <li>• Root penetration and organic matter will reduce compaction and restore soil structure.</li> <li>• Increased vegetation and organic matter will increase salt uptake tie up salts and other chemicals.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Trees or shrubs may retard flood water movement from the site.</li> <li>• Seasonal high water table may be reduced as plants take up excess water.</li> <li>• Trees, shrubs and other vegetation may reduce runoff, trap adsorbed pesticides, take up pesticide residues and may intercept pesticide drift.</li> <li>• Plants and soil organisms will utilize nutrients, and the buffer will filter out suspended particles to which nutrients are attached.</li> <li>• Pathogens, agricultural chemicals and manure will be captured and delayed or removed from waterways.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Historic properties may be protected from erosion by permanent cover.</li> <li>• Some land may be taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No change in field equipment.</li> <li>• Materials, planting and construction costs.</li> <li>• Annual operation and maintenance costs to clean-out debris, repair and replace structures, maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in developing a habitat management plan, field scouting and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced farm flexibility when land is taken out of production.</li> </ul>

- Sediment, pathogens, chemicals, manure, bio-solids or compost will be captured and delayed from entering waterways.
- Riparian forest canopy shades streams and rivers, cooling water temperatures.

#### Air

- Vegetation reduces erosive wind velocities and provides a stable area which stops saltating particles.
- Vegetation removes CO2 from the air and stores it in the form of carbon in the plants and soil.

#### Plants

- Buffer establishment and management creates the desired plant community.
- Vegetation is installed and managed to control undesired species.

#### Animals

- Improved fish and wildlife habitat, food, continuity, space, cover and shelter for wildlife.

#### Energy

- None.

#### Human

- Decrease in labor with land taken out of production.
- Reduced labor managing sediment and sloughing shoreline.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for fish and wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.

<ul style="list-style-type: none"> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> <li>•</li> </ul>	
<p><b><u>Net Effect:</u> Improve wildlife habitat and water quality at a moderate cost.</b></p>	

**Commonly Associated Practices:** Access Control , Brush Management, Early Successional Habitat Development/Mgt., Field Border, Filter Strip, Firebreak, Fish Passage, Forest Stand Improvement, Grassed Waterway, Herbaceous Weed Control, Integrated Pest Management, Multi-Story Cropping, Nutrient Management, Prescribed Grazing, Recreation Area Improvement, Riparian Herbaceous Cover, Shallow Water Development and Management, Stream Crossing, Stream Habitat Improvement and Management, Streambank and Shoreline Protection, Structure for Water Control, Subsurface Drain, Tree/Shrub Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Underground Outlet, Upland Wildlife Habitat Management, Wetland Creation, Wetland Enhancement, Wetland Restoration, Wetland Wildlife Habitat Management, Woody Residue Treatment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.



## Conservation Practice Effects

### Riparian Herbaceous Cover (Ac) 390

**Definition:** Grasses, sedges, rushes, ferns, legumes, and forbs tolerant of intermittent flooding or saturated soils, established or managed as the dominant vegetation in the transitional zone between upland and aquatic habitats.

**Major Resource Concerns Addressed:** Wildlife habitat and streambank erosion.

**Benchmark Condition:** Degraded riparian area adjacent to pasture land.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced by vegetation and surface litter.</li> <li>• Streambank, shoreline and conveyance channels erosion is reduced.</li> <li>• Root penetration and organic matter will reduce compaction and restore soil structure.</li> <li>• Increased vegetation and organic matter will increase salt uptake tie up salts and other chemicals.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Shrubs may retard flood water movement from the site.</li> <li>• Seasonal high water table may be reduced as plants take up excess water.</li> <li>• Shrubs and other vegetation may reduce runoff, trap adsorbed pesticides, take up pesticide residues and may intercept pesticide drift.</li> <li>• Plants and soil organisms will utilize nutrients, and the buffer will filter out suspended particles to which nutrients are attached.</li> <li>• Pathogens, agricultural chemicals and manure will be captured and delayed or</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Historic properties may be protected from erosion by permanent cover.</li> <li>• Some land may be taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No change in field equipment.</li> <li>• Materials, planting and construction costs.</li> <li>• Annual operation and maintenance costs to clean-out debris, repair and replace structures, maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase in developing a habitat management plan, field scouting and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced farm flexibility when land is taken out of production.</li> </ul>

removed from waterways.

- Sediment, pathogens, chemicals, manure, bio-solids or compost will be captured and delayed from entering waterways.
- Herbaceous cover and shrubs may shade waterways, cooling water temperatures.

#### Air

- Vegetation reduces erosive wind velocities and provides a stable area which stops saltating particles.
- Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.

#### Plants

- Buffer establishment and management creates the desired plant community.
- Vegetation is installed and managed to control undesired species.

#### Animals

- Improved fish and wildlife habitat, food, continuity, space, cover and shelter for wildlife.

#### Energy

- None.

#### Human

- Decrease in labor with land taken out of production.
- Reduced labor managing sediment and sloughing shoreline.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for fish and wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.

<ul style="list-style-type: none"> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> <li>• <b>Increased profitability in the long run.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improve wildlife habitat and water quality at a low cost.</b></p>	

**Commonly Associated Practices:** Access Control , Conservation Cover, Fence, Forage and Biomass Planting, Forest Stand Improvement, Herbaceous Weed Control, Integrated Pest Management, Prescribed Grazing, Riparian Forest Buffer, Stream Habitat Improvement and Management, Streambank and Shoreline Protection, Structure for Water Control, Tree/Shrub Establishment, Tree/Shrub Site Preparation, Upland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Road/Trail/Landing Closure and Treatment (Ac) 654

**Definition:** The closure, decommissioning, or abandonment of roads, trails, and/or landings and associated treatment to achieve conservation objectives.

**Major Resource Concerns Addressed:** Soil compaction and plant productivity.

**Benchmark Condition:** High road density on grazing woodlots.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Increased vegetation and cover and stabilization of erosive conditions will improve infiltration, decrease soil detachment by water and reduce erosion, gully formation and streambank erosion.</li> <li>• Increased soil organic matter.</li> <li>• Decrease in soil compaction.</li> <li>• Increased organic matter may tie up salts and other chemicals.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Hydrologic processes are restored through vegetative and other treatments.</li> <li>• Reduced nutrient, salt, pathogens, agricultural chemicals, manure and sediment delivery to surface and ground water.</li> <li>• Reestablishment of natural hydrology can reduce surface water temperatures.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Permanent cover and other treatments help reduce wind erosion and wind and traffic generation of fugitive dust.</li> <li>• Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Negative if trail is historic and needs maintenance.</li> <li>• Change in land use from roadway to other land use.</li> <li>• Reduced access may reduce land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No change in field equipment.</li> <li>• Materials &amp; construction costs.</li> <li>• Operate and maintain water bars, barriers and structures.</li> <li>• Foregone income from lost production or change in seasonal use.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Decrease in labor with land taken out of production.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Decrease in agricultural operation flexibility and timing due to restricting access, reduced grazing or agricultural production options.</li> <li>• Increase in travel costs.</li> </ul>

**Plants**

- Proper plant selection, nutrient modification and management improves plant growth and vigor.
- Establishment of permanent vegetation provide competition that slows the spread of noxious plants, removes noxious plants and improves plant community

**Animals**

- Increased quality and quantity of vegetation provides more food, cover, shelter and habitat for wildlife.
- Established vegetation may add forage for domestic animals.

**Energy**

- No change.

**Human**

- Decrease in labor with land taken out of production.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Improves soil and plant productivity at a moderate cost.**

**Commonly Associated Practices:** Access Control , Critical Area Planting, Forest Stand Improvement, Sediment Basin, Structure for Water Control, Upland Wildlife Habitat Management, Woody Residue Treatment.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Silvopasture Establishment (Ac) 381**

**Definition:** An application establishing a combination of trees or shrubs and compatible forages on the same acreage.

**Major Resource Concerns Addressed:** Soil productivity and livestock habitat.

**Benchmark Condition:** Sparse woodlot adjacent to pasture land.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully and streambank erosion is reduced by establishing a combination of trees, shrubs and forages which reduce erosion by water.</li> <li>• Permanent vegetation, roots, vegetative matter and livestock waste may increase soil organic matter.</li> <li>• Tree root penetration and organic matter counteracts soil compaction from livestock.</li> <li>• Contaminants taken up by forage plants will be returned to the soil as manure.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Decrease in runoff, flooding, ponding, seeps and seasonal high water table with increased utilization of soil moisture and evapotranspiration from changes in vegetative structure and composition.</li> <li>• Increase in drifted snow that is captured by tree/shrub crowns and deposited within the forage area.</li> <li>• Trees and shrubs will take up additional pesticide residues and intercept pesticide drift.</li> <li>• Increased nutrients and salt uptake by plants, reducing their movement to</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Cultural resources may be harmed during earth moving or tree planting.</li> <li>• Change in land use and land in production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Additional field equipment may be required (crop, hay or livestock).</li> <li>• Installation, materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor managing tree and crop production.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Increase time managing crop and tree production.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Slight increase in seeps or high water table with increased infiltration, especially during dormant season.</li> <li>• Grazing animals may cause difficulty in scheduling forage irrigations.</li> <li>• Establishment of permanent silvopasture vegetation may negatively impact the native understory plant community.</li> </ul>

<p>surface and ground water.</p> <ul style="list-style-type: none"> <li>• Captured and delayed pathogen movement and increased pathogen mortality.</li> <li>• Reduced sedimentation.</li> <li>• Tall vegetation established near surface waters provides shade and reduces water temperatures.</li> <li>• Vegetation may take up heavy metals.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Reduced wind velocities, filtering particulates from the air, stopping saltating particles and reduced odor.</li> <li>• Increase in storing soil carbon.</li> <li>• Tall vegetation slows surface air movement and intercepts and captures airborne particulates.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Vegetation is installed and managed to control undesired weed species.</li> <li>• Overstory trees are spaced and managed to reduce wildfire hazard.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Changes in structure and composition will have positive effects on food, cover and habitat for certain wildlife species and wildlife.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Reduced energy use associated with fighting wildfire.</li> <li>• Potential biofuel production.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Improved agricultural operation flexibility and timing with diversification of land uses.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in structure and composition will have negative effects on food, cover and habitat for certain wildlife species.</li> </ul>
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- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Improved soil productivity, livestock and wildlife habitat at a moderate cost.**

**Commonly Associated Practices:** Access Control , Brush Management, Dust Control from Animal Activity on Open Lot Surfaces, Firebreak, Forage and Biomass Planting, Forest Stand Improvement, Herbaceous Wind Barriers, Livestock Pipeline, Prescribed Burning, Prescribed Grazing, Tree/Shrub Establishment, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Upland Wildlife Habitat Management, Watering Facility, Wetland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Trails and Walkways (Ac) 568

**Definition:** A pathway for pedestrian, equestrian, bicycle, other off-road modes of recreation travel, farm-workers, construction/maintenance access and small walk behind equipment.

**Major Resource Concerns Addressed:** Sensitive riparian areas, water quality.

**Benchmark Condition:** Wet meadow along riparian area near dairy milking parlor.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind, gully and streambank and shoreline erosion is reduced by directing travel away from erosion prone areas.</li> <li>• Controlled traffic confines compaction is to a more limited area.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Managed foot traffic increases vegetative cover and reduces compaction, runoff, flooding, or ponding.</li> <li>• Trails and Walkways can move traffic away from sensitive riparian areas.</li> <li>• Suspended sediment and turbidity in surface water will decrease due to controlled traffic and reduced erosion.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>• Reduced time and travel of motorized vehicles.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Trails provide firebreaks and access to sites for fuel reduction activities.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• By confining animals to a trail they will stay out of the stream and away from wildlife food, cover and shelter sources.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Historic properties and cultural resources may be affected by route preparation, construction and by certain operation and maintenance actions.</li> <li>• Minimal land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Installation equipment and materials.</li> <li>• Annual operation and maintenance costs to maintain pathway, control vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>

- Improved distribution of animals makes forage more readily available to livestock.
- Provides access to previously inaccessible feeding and watering areas.

**Energy**

- Reduced time and travel of motorized vehicles.

**Human**

- Increase in farm flexibility with improved accessibility.
- Improved livestock management and health.
- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for wildlife.
- Prevent off-site negative impacts.
- Comply with environmental regulations.
- Save time, money and labor.
- Promote family health and safety.
- Make land more attractive and promote good stewardship.
- May be eligible for cost share.
- Increased profitability in the long run.

**Net Effect: Improved livestock management, protect sensitive areas, at a moderate cost.**

**Commonly Associated Practices:** Access Control , Access Road , , Critical Area Planting, Dam, Dam, Diversion, Dike, Diversion, Dust Control on Unpaved Roads and Surfaces, Filter Strip, Heavy Use Area Protection, Mulching, Recreation Area Improvement, Recreation Land Grading and Shaping, Riparian Forest Buffer, Riparian Herbaceous Cover, Upland Wildlife Habitat Management, Water and Sediment Control Basin, Wetland Wildlife Habitat Management.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying

a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### **Tree/Shrub Establishment (Ac) 612**

**Definition:** Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

**Major Resource Concerns Addressed:** Plant productivity, unproductive woodlot.

**Benchmark Condition:** Douglas fir riparian area after wildfire.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Sheet, rill, wind and gully erosion is reduced by vegetation and surface litter.</li> <li>• Establishment of permanent woody vegetation increases root and shoot development and increases soil organic matter.</li> <li>• Root penetration and organic matter helps restore soil structure and reduces compaction.</li> <li>• Woody vegetation takes up limited quantities of salts and other chemicals.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Deep rooted plants uptake excess water and reduce seeps, ponding, flooding and high water table.</li> <li>• Snow is captured and deposited down wind of planted trees and shrubs.</li> <li>• Adapted and managed vegetative production allows more efficient use of available water.</li> <li>• Trees and shrubs take up pesticide, nutrient and agricultural chemical residues.</li> <li>• Reduces runoff of pesticides, nutrients and agricultural chemicals into surface and groundwater.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Change in land use if converting to woodland.</li> <li>• Land taken out of agricultural production.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• No additional field equipment required.</li> <li>• Materials &amp; planting costs.</li> <li>• Annual operation and maintenance costs to maintain vegetation and manage pests.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor during planting.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Reduced farm flexibility by changing to permanent vegetation.</li> <li>• Trees or shrubs may retard flood water movement away from the site.</li> </ul>

- Woody vegetation captures and delays pathogen movement.
- Near streams and other water bodies, trees and shrubs provide shade to moderate water temperature.

#### Air

- Permanent vegetative cover reduces wind erosion and fugitive dust generation.
- Vegetation removes CO<sub>2</sub> from the air and stores it in the form of carbon in the plants and soil.
- Vegetation will reduce wind movement and can intercept odors.

#### Plants

- Plants are selected and managed to maintain optimal productivity and health.

#### Animals

- Plants are chosen and managed to enhance food, cover and shelter for target species.
- May be used as feed and forage by livestock if the desired trees and shrubs are not harmed.
- Tall vegetation provides livestock shelter.

#### Energy

- Plantings may reduce need for heating and cooling around farmsteads.
- Potential biomass fuel production.

#### Human

- Increase yields/reduce costs as land becomes more productive.
- Create sustainability of natural resources that support your business.
- Increase the property value (real estate) of your property.
- Create open space and improve habitat for wildlife.
- Conserve soil and water for periods of drought and future use.
- Prevent off-site negative impacts.
- Comply with environmental regulations.

<ul style="list-style-type: none"> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> <li>• Increased profitability in the long run.</li> </ul>	
<p><b>Net Effect:</b> Improved woodland at a moderate cost.</p>	

**Commonly Associated Practices:** Conservation Cover, Critical Area Planting, Early Successional Habitat Development/Mgt., Forest Stand Improvement, Forest Trails and Landings, Hedgerow Planting, Integrated Pest Management, Nutrient Management, Riparian Forest Buffer, Sediment Basin, Tree/Shrub Pruning, Tree/Shrub Site Preparation, Upland Wildlife Habitat Management, Windbreak/Shelterbelt Establishment, Windbreak/Shelterbelt Renovation

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Watering Facility (No) 614

**Definition:** A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and or wildlife.

**Major Resource Concerns Addressed:** Livestock distribution, water quality and plant productivity.

**Benchmark Condition:** Uncontrolled in-stream access to watering livestock.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>• Increased vegetated cover due to better livestock distribution reduces soil and gully erosion.</li> <li>• Streambank, shoreline and water conveyance channel erosion are reduced with reduced animal traffic.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Increased infiltration due to better vegetative cover, and an increase in seep flow and reduced ponding, flooding and high water table.</li> <li>• When used in place of an in-stream water source, decreased manure deposition in stream.</li> <li>• Better distribution of animals results in less concentration of contaminants entering waterways.</li> <li>• Getting animals out of the stream will keep them cleaner and reduce contact with manure-borne pathogens.</li> <li>• A water development will decrease livestock trampling in wet areas and nearby streams, reducing sediment, turbidity and high stream temperatures.</li> </ul> <p><b>Air</b></p>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>• Possible damage to cultural resources during installation.</li> <li>• Increase in land use intensity if livestock can access additional land.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>• Installation, operation and maintenance equipment required.</li> <li>• Annual operation and maintenance costs include clean-out debris, repair and replace structures and equipment.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>• Increase in labor to maintain structures.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Develop water management plan.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Livestock traffic may increase soil compaction around the practice, but the practice will help reduce excess moisture where traffic occurs.</li> </ul>



<ul style="list-style-type: none"> <li>• <b>No change.</b></li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• <b>Improved livestock distribution improves growth and vigor of plants.</b></li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• <b>Supplying water to off-stream locations protects the stream, riparian areas and fish and wildlife habitat.</b></li> <li>• <b>Improved distribution of animals makes forage more readily available to livestock.</b></li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• <b>No Change.</b></li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• <b>More dependable water supply.</b></li> <li>• <b>Improved access to livestock water.</b></li> <li>• <b>Reduce livestock water costs and develop more intensive grazing system.</b></li> <li>• <b>Increase yields/reduce costs as land becomes more productive.</b></li> <li>• <b>Create sustainability of natural resources that support your business.</b></li> <li>• <b>Increase the property value (real estate) of your property.</b></li> <li>• <b>Create open space and improve habitat for wildlife.</b></li> <li>• <b>Conserve soil and water for periods of drought and future use.</b></li> <li>• <b>Prevent off-site negative impacts.</b></li> <li>• <b>Comply with environmental regulations.</b></li> <li>• <b>Save time, money and labor.</b></li> <li>• <b>Promote family health and safety.</b></li> <li>• <b>Make land more attractive and promote good stewardship.</b></li> <li>• <b>May be eligible for cost share.</b></li> </ul>	
<p><b><u>Net Effect:</u> Improves soil and water quality, increases plant productivity, at a low cost.</b></p>	

**Commonly Associated Practices:** Critical Area Planting, Dust Control from Animal Activity on Open Lot Surfaces, Dust Control on Unpaved Roads and Surfaces, Fence, Heavy Use Area Protection, Livestock Pipeline, Prescribed Grazing, Spring Development, Upland Wildlife Habitat Management, Water Well.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.

## Conservation Practice Effects

### Water Well (Ac) 642

**Definition:** A hole drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply.

**Major Resource Concerns Addressed:** Inadequate livestock water.

**Benchmark Condition:** Rangeland with poor livestock distribution.

**Date:** October, 2016 **Developer/Location:** Hal Gordon, OR

Positive Effects	Negative Effects
<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>Increased vegetative cover due to better distribution of water reduces soil erosion.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>Well will provide a dependable supply of water allowing better management.</li> <li>Where well flows are used for irrigation, contaminants can be leached below the root zone.</li> <li>Reduce high water table as water is removed from subsurface water source.</li> </ul> <p><b>Air</b></p> <ul style="list-style-type: none"> <li>No Change.</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>Plant productivity and health will improve with increased availability and managed application of irrigation water.</li> </ul> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>Provides dependable water supply to livestock and wildlife in areas where surface water is scant.</li> <li>Improved distribution of animals makes forage more readily available to livestock.</li> <li>Wells facilitate the availability and distribution of water.</li> </ul>	<p><b>Land</b></p> <ul style="list-style-type: none"> <li>Facilitating practice, may convert to irrigated land or more intensive grazed land.</li> <li>Significant increase in land in production with irrigation.</li> </ul> <p><b>Capital</b></p> <ul style="list-style-type: none"> <li>Install well and associated water management and distribution equipment.</li> <li>Annual operation and maintenance costs to repair and replace structures and equipment.</li> </ul> <p><b>Labor</b></p> <ul style="list-style-type: none"> <li>Increase in labor if bringing more land into production.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>Increase in management and record keeping.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>In coastal areas pumping fresh groundwater may allow the intrusion of saltwater.</li> <li>Use of wells to irrigate previously non irrigated land will increase the likelihood of soluble and sediment-attached</li> </ul>

<p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• No change.</li> </ul> <p><b>Human</b></p> <ul style="list-style-type: none"> <li>• Improved options for agricultural production.</li> <li>• Reduce irrigation or culinary water costs, develop more intensive agriculture.</li> <li>• Increase yields/reduce costs as land becomes more productive.</li> <li>• Create sustainability of natural resources that support your business.</li> <li>• Increase the property value (real estate) of your property.</li> <li>• Create open space and improve habitat for wildlife.</li> <li>• Conserve soil and water for periods of drought and future use.</li> <li>• Prevent off-site negative impacts.</li> <li>• Comply with environmental regulations.</li> <li>• Save time, money and labor.</li> <li>• Promote family health and safety.</li> <li>• Make land more attractive and promote good stewardship.</li> <li>• May be eligible for cost share.</li> </ul>	<p>contaminants moving of-site, probable less contaminants on grazing lands.</p> <ul style="list-style-type: none"> <li>• Where well flows are used for irrigation, contaminants can be leached below the root zone.</li> <li>• Increase in energy use.</li> </ul>
<p><b><u>Net Effect:</u> Improved water management and plant productivity, at a moderate cost.</b></p>	

**Commonly Associated Practices:** Irrigation Water Management, Livestock Pipeline, Pumping Plant, Watering Facility.

**Note:** This worksheet contains general talking points for the conservation planner to discuss with the land user. It is the first step towards an economic or financial analysis. The second step would include identifying a specific site for analysis at the farm or field level, editing the template for local conditions, adding units and quantities of farm inputs and outputs. The third step in the economic analysis is to place a dollar value on as many variables as possible, put all units in the same time frame, using amortization (\$/Acres/Year) or net present value (\$/Acre), so benefits and costs can be compared. The fourth and final step would be to combine several conservation practices into a conservation system, which is how most conservation practices are applied at the field level. Data for the worksheet comes from the land user, conservation planner, technical specialist and local agricultural supply vendors and contractors. See Economics

Technical Note: TN 200-ECN-1, Basic Economic Analysis Using T-Charts (August 2013) for more information.