CONSERVATION PRACTICE PHYSICAL EFFECTS WORKSHEET

STATE	North Dakota	FIELD OFFICE		DATE	
PRACTICE: Field Border 386		Baseline Setting:			
		Appropriate Land Use(s): Crop, Recreation			
RESOURCES, CONSIDERATIONS AND CONCERNS		**PHYSICAL EFFECTS**	**RATIONALE**		
SOIL - EROSION					
Sheet and Rill		Moderate to Substantial Improvement	Permanent vegetation planted across the slope reduces erosive water energy.		
Wind		Slight Improvement	Stiff-stemmed, permanent vegetation traps saltating particles.		
Ephemeral Gully		Slight to Moderate Improvement	Vegetation across the slope reduces erosive energy of concentrated flows where they exit the field.		
Classic Gully		Neutral or Slight Improvement	Permanent vegetation reduces runoff and erosive energy of concentrated flows where they exit the field which helps to stabilize classic gullies.		
Streambank		Neutral or Slight Improvement	Increased vegetation can reduce concentrated runoff flowing over streambanks.		
Shoreline		Neutral or Slight Improvement	Increased vegetation can reduce concentrated runoff flowing over shorelines.		
Irrigation Induced		Neutral	Captures sediment in tailwater runoff but does not reduce erosion.		
Mass Movement		Neutral or Slight Improvement	Compared to annual crops, perennial vegetation has more root mass to bind soil and consumes more water that may otherwise contribute to sloughing. Rarely a concern.		
Road, Roadsides, and Construction Sites		Neutral or Slight Improvement	If field border also borders a road, permanent vegetation may reduce runoff.		
SOIL – CONDITION					
Organic Matter Depletion		Moderate to Substantial Improvement	Permanent cover and lack of soil disturbance reduces decomposition of soil organic materials such as roots and allows accumulation.		
Rangeland Site Stability		Not Applicable	Not applicable.		
Compaction		Slight to Substantial Improvement	Root penetration and organic matter helps restore soil structure.		
Subsidence		Not Applicable	Not Applicable		
Contaminants:					
• Salts and other Chemicals		Slight to Moderate Improvement	Perennial vegetation depletes soil moisture and reduces the potential for evaporative discharge/ soil salinization,		

• Animal Waste and other Organics - N	Not Applicable	Not Applicable
• Animal Waste and other Organics - P	Not Applicable	Not Applicable
• Animal Waste and other Organics - K	Not Applicable	Not Applicable
• Commercial Fertilizer - N	Not Applicable	Not Applicable
• Commercial Fertilizer – P	Not Applicable	Not Applicable
• Commercial Fertilizer – K	Not Applicable	Not Applicable
• Residual Pesticides	Neutral or Slight Improvement	Increased organic matter adsorbs pesticides and increased biological activity will break them down.
Damage from Sediment Deposition	Neutral or Slight Improvement	Permanent cover decreases erosion.
WATER – QUANTITY		
Rangeland Hydrologic Cycle	Not Applicable	Not applicable.
Excessive Seepage	Neutral or Slight Improvement	Perennial vegetation depletes soil water. Rarely a concern.
Excessive Runoff, Flooding, or Ponding	Slight Improvement	Permanent vegetation will reduce runoff and increase infiltration, but on small area.
Excessive Subsurface Water	Slight Improvement	Perennial vegetation depletes soil water.
Drifted Snow	Neutral to Moderate Improvement	Residual vegetation can be maintained tall enough to trap snow where desired.
Inadequate Outlets	Not Applicable	Not applicable.
Inefficient Water use on Irrigated Land	Not Applicable	Not applicable.
Inefficient Water use on Non-Irrigated Land	Slight Improvement	Perennial veg uses more water, than crop but on small part of field.
Reduced Capacity of Conveyances by Sediment Deposition	Slight to Moderate Improvement	Traps sediment at edge of the field.
Reduced Storage of Water Bodies by Sediment Accumulation	Slight Improvement	Traps sediment at edge of the field.
Aquifer Overdraft	Not Applicable	Not applicable.
Insufficient Flows in Water Courses	Slight Worsening	Permanent vegetation uses available water and reduces runoff.
WATER – QUALITY		
In Groundwater:		
• Harmful Levels of Pesticides	Neutral or Slight Improvement	Perennial vegetation typically reduces the need for pesticide applications.
• Excessive Nutrients and Organics	Neutral or Slight Improvement	Permanent vegetation will take up available nutrients and decrease area where fertilizer is applied..
• Excessive Salinity	Neutral	Perennial vegetation keeps salts lower in the soil profile, but has little effect on total amount of salt in the groundwater system.

• Harmful Levels of Heavy Metals	Not Applicable	Not Applicable
• Harmful Levels of Pathogens	Neutral	Not a problem originating from cropland.
• Harmful Levels of Petroleum	Not Applicable	Not applicable.
In Surface Water:		
• Harmful Levels of Pesticides	Neutral or Slight Improvement	Perennial vegetation typically reduces the need for pesticide applications.
• Excessive Nutrients and Organics	Neutral or Slight Improvement	Permanent vegetation will take up available nutrients and increase organic matter. Field borders typically are not fertilized.
• Excessive Suspended Sediment and Turbidity	Slight to Moderate Improvement	Vegetation protects soil surface and traps sediment.
• Excessive Salinity	Not Applicable	Not applicable.
• Harmful Levels of Heavy Metals	Not Applicable	Not Applicable
• Harmful Temperatures	Not Applicable	Not applicable.
• Harmful Levels of Pathogens	Neutral or Slight Improvement	Less erosion and runoff reduces delivery of pathogens.
• Harmful Levels of Petroleum	Neutral or Slight Improvement	Increased microbial activity in the planted area breaks down petroleum contaminants. Perennial vegetation residue might have more absorption capacity. Rarely a problem.
AIR – QUALITY		
Particulate Matter less than 10 Micrometers in Diameter (PM 10)	Slight Improvement	Permanent vegetation around the field edge reduces particulate emissions from farm equipment.
Particulate Matter less than 2.5 Micrometers in Diameter (PM 2.5)	Slight Improvement	Permanent vegetation around the field edge reduces particulate emissions from farm equipment.
Excessive Ozone	Neutral	There is a minimal reduction of ozone precursors through reduced surface temperatures offered by shade or ground cover, and minimal biofiltering of ozone concentrations due to interception by vegetation.
Excessive Greenhouse Gas:		
• CO_2 (Carbon Dioxide)	Slight Improvement	Vegetation removes CO2 from the air and stores it in the form of carbon in the plants and soil.
• N_20 (Nitrous Oxide)	Not Applicable	Not applicable.
• CH_4 (Methane)	Not Applicable	Not applicable.
Ammonia (NH_3)	Slight Improvement	Less area where NH_3 is applied.
Chemical Drift	Not Applicable	Not applicable.
Objectionable Odors	Not Applicable	Not applicable.
Reduced Visibility	Slight Improvement	Permanent vegetation around the field edge reduces particulate emissions from farm equipment.
Undesirable Air Movement	Neutral	Typical herbaceous vegetation has neglible effect.

Adverse Air Temperature	Not Applicable	Not Applicable
PLANTS – SUITABLIITY		
Plants not Adapted or Suited	Neutral to Substantial Improvement	Plants selected are adapted and suited.
PLANTS - CONDITION		
Productivity, Health, and Vigor	Neutral to Substantial Improvement	Plants are selected and managed to maintain optimal productivity and health.
Threatened or Endangered Plant Species:		
• Plant Species Listed or Proposed for Listing Under the Endangered Species Act	Not Applicable	Not applicable.
• Declining Species, Species of Concern	Not Applicable	Not applicable.
Noxious and Invasive Plants	Moderate Decline to Slight Improvement	The planted vegetation may be considered invasive, e.g., bromegrass, crested wheatgrass. Invasive/noxious weeds may decrease, or may increase if maintenance is not intense..
Forage Quality and Palatability	Not Applicable	Not applicable.
Wildfire Hazard	Moderate Decrease to Moderate Increase in hazard.	Management may create green firebreak effect. Residual vegetation can be a substantial fuel load in dry conditions.
ANIMALS - FISH AND WILDLIFE		
Inadequate Food	Slight to Moderate Improvement	Increased quality and quantity of vegetation provides more food for wildlife.
Inadequate Cover/Shelter	Slight Decline to Moderate Improvement	Field border may be good cover, but narrow width is vulnerable to predation. Field borders may entice nesting use before farm equipment travel/turning poses high risk later in season.
Inadequate Water	Not Applicable	Not applicable.
Inadequate Space	Not Applicable.	Space is constant; habitat quality/type is subject to change.
Habitat Fragmentation	Slight to Moderate Improvement	Vegetation will help support wildlife habitat structure, diversity, extent and connectivity.
Imbalance Among and Within Populations	Slight to Moderate Improvement	Habitat management is implemented to remove limiting factors.
Threatened and Endangered Fish and Wildlife Species:		
• Fish and Wildlife Species Listed or Proposed for Listing Under the Endangered Species Act	Not Applicable.	Not Applicable.

• Declining Species, Species of Concern	Slight Improvement	Activities are designed, installed, and mitigated to an extent to maintain or enhance species of concern. Grassland nesting birds might benefit from additional perennial vegetation.
ANIMALS – DOMESTIC		
Inadequate Quantities and Quality of Feed and Forage	Slight to Moderate Improvement	There may be some use of the planting for feed and forage by livestock.
Inadequate Shelter	Not Applicable	Not applicable.
Inadequate Stock Water	Not Applicable	Not applicable.
Stress and Mortality	Not Applicable	Not applicable.
HUMAN – ECONOMICS		
Land - Change in Land Use	Slight	Slight, cropland converted to border.
Land – Land in Production	Moderate decrease	Moderate decrease, lost cropland.
Capital – Change in Equipment	Negligible	
Capital - Total Investment Cost	Slight to Moderate.	
Capital – Annual Cost	Slight increase.	
Capital – Credit and Farm Program Eligibility	Situational.	
Labor - Labor	Slight decrease	Slight decrease due to efficient equipment turns at ends of fields.
Labor – Change in Management Level	Negligible	
Risk - Yield	Neutral or Slight Decrease	Negligible to slight decrease due to reduction of erosion.
Risk - Flexibility	Negligible	
Risk - Timing	Slight Increase	Slight increase in short-term, since- practice needs to be established during growing season.
Risk – Cash Flow	Slight Increase	Slight increase due to establishment costs.
Profitability – Change in Profitability	Slight decrease.	
HUMAN - CULTURAL		
Cultural Resources and/or Historic Properties Present or Suspected to be PRESENT	Slight to Substantial Decrease	Historic properties in agricultural context can be protected from erosion by permanent vegetative cover.
HUMAN – ENERGY		
Depletion of Fossil Fuel Resources	Not Applicable	Not applicable.
Underutilization of Non-Fossil Energy Resources	Neutral or Slight Improvement in Utilization	Field border could produce biofuel if technology is improved.

Human Considerations Explanation

Considerations	Physical effects indicate:
Land - Change in Land Use	The degree to which implementing the conservation practice is expected to cause a change from one land use to another.
Land - Land in Production	The degree to which implementing the conservation practice is expected to cause an increase or decrease in the amount of land in production.
Capital - Change in Equipment	The degree to which implementing the conservation practice is expected to cause an increase or decrease in the amount of capital equipment required for farm or ranch operations.
Capital - Total Investment Cost	A qualitative measure of the increase in total investment dollars required in order to implement the conservation practice.
Capital - Annual Cost	A qualitative measure of the expected change in annual capital costs required in order to operate and maintain the conservation practice.
Capital - Credit & Farm Program Eligibility	Included to make conservation planners aware of the potential availability of funding for implementing conservation practices.
Labor – Labor	The degree to which implementing the conservation practice is likely to cause an increase or decrease in the total amount of overall farm or ranch labor required for operations.
Labor - Change in Management Level	The degree to which implementing the conservation practice is likely to cause an increase or decrease in the total amount of required active management on a farm or ranch.
Risk – Yield	The degree to which risk, as related to crop or livestock yields, is expected to increase or decrease as a result of implementing the conservation practice.
Risk – Flexibility	The degree to which risk, as related to the flexibility of farm or ranch operations, is expected to increase or decrease as a result of implementing the conservation practice. For example, converting from flood irrigation to a sprinkler system gives a farmer an increase in flexibility of irrigation, which results in a decrease in the level of risk associated with inflexibility of operations.
Risk – Timing	The degree to which risk, as related to the timing of farm or ranch operations, is expected to increase or decrease as a result of implementing the conservation practice.
Risk - Cash Flow	The degree to which risk, as related to cash flow in farm or ranch operations, is expected to increase or decrease as a result of implementing the conservation practice.
Profitability - Change in Profitability	The degree to which farm or ranch profitability is expected to increase or decrease as a result of implementing the conservation practice.
Cultural Resources and/or Historic Properties Present or Suspected to be Present	The degree to which implementation of the conservation practice is expected to increase or decrease the risk of cultural resource disturbance, degradation, or loss.
Depletion of Fossil Fuel Resources	Inefficient use of fossil-originated energy sources (diesel, gasoline, propane, natural gas, coal), lubricants, and other materials.
Underutilization of Non-Fossil Energy Sources	Available and cost-effective alternative energy sources (solar, wind, biofuel, hydroelectric, geothermal) are not being used or are being used inefficiently.