CONSERVATION PRACTICE PHYSICAL EFFECTS WORKSHEET

STATE	Nebraska	FIELD OFFICE	Any	DATE	12/27/2011
PRACTICE: Alley Cropping 311		Baseline Setting:			
		Appropriate Land Use(s): Crop, Hay			

RESOURCES, CONSIDERATIONS AND CONCERNS	**PHYSICAL EFFECTS**	**RATIONALE**
SOIL - EROSION		
Sheet and Rill	Substantial Improvement	Vegetation and surface litter reduce raindrop impact and slow runoff water increasing infiltration.
Wind	Substantial Improvement	Tall vegetation creates a wind shadow, reduces erosive wind velocities and provides a stable area which stops saltating particles.
Ephemeral Gully	Substantial Improvement	Vegetation reduces erosive energy of concentrated water flows reducing detachment of soil particles.
Classic Gully	Moderate Improvement	Reduce the flows contributing to gully erosion.
Streambank	Not Applicable	Not applicable.
Shoreline	Not Applicable	Not applicable.
Irrigation Induced	Not Applicable	Not applicable.
Mass Movement	Not Applicable	Not applicable..
Road, Roadsides, and Construction Sites	Not Applicable	Not applicable.
SOIL – CONDITION		
Organic Matter Depletion	Substantial Improvement	Roots and vegetative matter from permanent vegetation increases organic matter.
Rangeland Site Stability	Not Applicable	Not applicable.
Compaction	Slight to Moderate Improvement	Root penetration and organic matter helps restore soil structure.
Subsidence	Not Applicable	Not applicable.
Contaminants:		
• Salts and other Chemicals	Slight to Moderate Improvement	Plants may take up some salts, and increased root penetration improves infiltration that may lead to increased leaching.
• Animal Waste and other Organics - N	Moderate to Substantial Improvement	Woody plants and annual crops may take up excess N.
• Animal Waste and other Organics - P	Moderate to Substantial Improvement	Woody plants and annual crops may take up excess P.
• Animal Waste and other Organics - K	Moderate to Substantial Improvement	Woody plants and annual crops may take up excess K.
• Commercial Fertilizer - N	Moderate to Substantial Improvement	Woody plants and annual crops may take up excess N.
• Commercial Fertilizer – P	Moderate to Substantial Improvement	Woody plants and annual crops may take up excess P.
• Commercial Fertilizer – K	Moderate to Substantial	Woody plants and annual crops

	Improvement	may take up excess K.
• Residual Pesticides	Moderate Improvement	Plants take up pesticide residues and soil organic carbon binds pesticide residues.
Damage from Sediment Deposition	Slight to Substantial Improvement	Vegetation and surface litter traps sediment.
WATER – QUANTITY		
Rangeland Hydrologic Cycle	Not Applicable	Not applicable.
Excessive Seepage	Slight to Moderate Improvement	Plants uptake excess water.
Excessive Runoff, Flooding, or Ponding	Slight Worsening	Vegetation slows surface flow rates in areas subject to flooding or ponding.
Excessive Subsurface Water	Slight to Moderate Improvement	Plants uptake excess water.
Drifted Snow	Not Applicable	Not applicable.
Inadequate Outlets	Slight to Moderate Improvement	Vegetation slows and retains runoff; the need for larger outlets is reduced.
Inefficient Water use on Irrigated Land	Not Applicable	Not applicable.
Inefficient Water use on Non-Irrigated Land	Slight Improvement	Adapted and managed vegetative production allows more efficient use of available water.
Reduced Capacity of Conveyances by Sediment Deposition	Slight Improvement	Vegetation collects sediment preventing it from being deposited elsewhere.
Reduced Storage of Water Bodies by Sediment Accumulation	Moderate to Substantial Improvement	Vegetation collects sediment preventing it from being deposited elsewhere.
Aquifer Overdraft	Slight to Moderate Worsening	Deep rooted vegetation can draw water lowering the water table.
Insufficient Flows in Water Courses	Slight to Moderate Worsening	Crops including woody crops use available water and reduce runoff.
WATER – QUALITY		
In Groundwater:		
• Harmful Levels of Pesticides	Slight to Moderate Improvement	Trees and shrubs take up pesticide residues. Also, pesticide degradation may be improved by increased soil organic matter and biological activity.
• Excessive Nutrients and Organics	Slight Improvement	Plants and soil organisms uptake nutrients.
• Excessive Salinity	Slight Improvement	The action may promote increased salinity uptake due to vigorous plant growth..
• Harmful Levels of Heavy Metals	Slight Improvement	The action may promote increased uptake due to vigorous plant growth.
• Harmful Levels of Pathogens	Neutral	Improved vegetation encourages infiltration of surface water and associated pathogens, but increased plant vigor and microbial activity reduces pathogen numbers.
• Harmful Levels of Petroleum	Not Applicable	Not applicable.

In Surface Water:		
• Harmful Levels of Pesticides	Moderate Improvement	Trees and shrubs take up pesticide residues and may intercept pesticide drift. Also, the practice reduces runoff and erosion.
• Excessive Nutrients and Organics	Slight to Moderate Improvement	Plants and soil organisms uptake nutrients.
• Excessive Suspended Sediment and Turbidity	Slight to Moderate Improvement	Vegetation retards sediment-laden water to allow it to drop sediment load.
• Excessive Salinity	Slight Improvement	Vegetation encourages infiltration, which reduces the amount of surface runoff..
• Harmful Levels of Heavy Metals	Slight Improvement	Growing plants will take up metals.
• Harmful Temperatures	Neutral	Surface run-off is diminished if flow is intercepted by alley cropping.
• Harmful Levels of Pathogens	Slight to Moderate Improvement	Ground vegetation captures and delays pathogen movement and thereby increase their mortality.
• Harmful Levels of Petroleum	Slight Improvement	Increased microbial activity in the tree/shrub sets breaks down petroleum contaminants.
AIR – QUALITY		
Particulate Matter less than 10 Micrometers in Diameter (PM 10)	Slight to Moderate Improvement	Permanent vegetation can serve as a windbreak, reducing erosive wind velocities and providing a stable area which stops saltating particles.
Particulate Matter less than 2.5 Micrometers in Diameter (PM 2.5)	Slight to Moderate Improvement	Permanent vegetation can serve as a windbreak, reducing erosive wind velocities and providing a stable area which stops saltating particles.
Excessive Ozone	Neutral	There is a minimal reduction of ozone precursors through reduced surface temperatures offered by shade and minimal biofiltering of ozone concentrations due to interception by tree and shrub foliage.
Excessive Greenhouse Gas:		
• CO_2 (Carbon Dioxide)	Slight to Moderate Improvement	Vegetation removes CO2 from the air and stores it in the form of carbon in the plants and soil.
• N_20 (Nitrous Oxide)	Neutral	Not applicable.
• CH_4 (Methane)	Neutral	Not applicable.
Ammonia (NH_3)	Not Applicable	Not applicable.
Chemical Drift	Substantial Improvement	Tall vegetation slows surface air movement and intercepts and captures air borne materials.
Objectionable Odors	Not Applicable	Not applicable.

Reduced Visibility	Moderate to Substantial Improvement	Tall vegetation slows surface air movement and intercepts and captures air borne materials. Reduced wind erosion improves visibility.
Undesirable Air Movement	Moderate to Substantial Improvement	Tall vegetation creates turbulence and slows undesired, leeward winds.
Adverse Air Temperature	Moderate to Substantial Improvement	Tall vegetation provides shade and moderates temperatures.
PLANTS – SUITABLIITY		
Plants not Adapted or Suited	Substantial Improvement	Plants selected are adapted and suited.
PLANTS - CONDITION		
Productivity, Health, and Vigor	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 to Substantial Improvement	Vegetation is installed and managed to control undesired species.
Forage Quality and Palatability	Moderate to Substantial Improvement	Plants are managed to maintain optimal conditions.
Wildfire Hazard	Not Applicable	Not applicable.
ANIMALS - FISH AND WILDLIFE		
Inadequate Food	Slight to Substantial Improvement	If suitable plant species are chosen and managed to enhance food value for target species.
Inadequate Cover/Shelter	Slight to Substantial Improvement	Suitable plant species are selected and managed to enhance cover/shelter for wildlife.
Inadequate Water	Not Applicable	Not applicable.
Inadequate Space	Slight to Substantial Improvement	Tall vegetation creates vertical habitat structure.
Habitat Fragmentation	Slight to Substantial Improvement	Vegetation is installed and managed to connect habitats.
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	Neutral	Activities are designed, installed, and mitigated to an extent to maintain or enhance species of concern.
• Declining Species, Species of Concern	Neutral	Activities are designed, installed, and mitigated to an extent to

		maintain or enhance species of concern.
ANIMALS – DOMESTIC		
Inadequate Quantities and Quality of Feed and Forage	Slight to Substantial Improvement	The quality and quantity of feed and forage plants is enhanced by improving the microclimate.
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	Not applicable.	Not applicable.
Land – Land in Production	N/A or slight decrease	N/A, or slight decrease, corners and end rows taken out of production.
Capital – Change in Equipment	Negligible	
Capital - Total Investment Cost	Not applicable.	
Capital – Annual Cost	Negligible to slight increase.	
Capital – Credit and Farm Program Eligibility	Situational.	
Labor - Labor	Slight increase	Slight increase when moving between strips.
Labor – Change in Management Level	Slight to moderate increase	Slight to moderate increase to manage new mix of enterprises.
Risk - Yield	Slight Decrease	Slight decrease due to reduction of water erosion.
Risk - Flexibility	Slight to Moderate Increase	Slight to moderate increase due to following designed cropping pattern.
Risk - Timing	Negligible	
Risk – Cash Flow	Slight Increase	Slight increase due to fuel and labor requirements.
Profitability – Change in Profitability	Slight decrease.	
HUMAN - CULTURAL		
Cultural Resources and/or Historic Properties Present or Suspected to be PRESENT	Slight to Substantial Increase	Initial plantings; changes in setting can have adverse effects.
HUMAN – ENERGY		
Depletion of Fossil Fuel Resources	No Effect	Perennial crops (trees), after establishment, often require less energy. However some ally crops are high maintenance crops.
Underutilization of Non-Fossil Energy Resources	Slight Decrease	Perennial systems can sequester carbon, a renewable energy source. However, effect is negligible for energy utilization.

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.