CONSERVATION PRACTICE PHYSICAL EFFECTS WORKSHEET

STATE	Nebraska	FIELD OFFICE	Any	DATE	10/10/2008
PRACTICE: Irrigation System, Surface & Subsurface 443		Baseline Setting:			
		Appropriate Land Use(s): Crop, Hay, Headquarters, Mined, Pasture, Recreation, Urban, Wildlife			

RESOURCES, CONSIDERATIONS AND CONCERNS	**PHYSICAL EFFECTS**	**RATIONALE**
SOIL - EROSION		
Sheet and Rill	Not Applicable	Not applicable.
Wind	Slight Improvement	Wetting the surface reduces soil detachment by wind.
Ephemeral Gully	Not Applicable	Not applicable.
Classic Gully	Slight Worsening	Tailwater runoff may cause gully erosion.
Streambank	Slight Worsening	Over land return flows cause erosion on streambanks.
Shoreline	Slight Worsening	Over land return flows cause erosion on streambanks.
Irrigation Induced	Slight Worsening	Corrugates and Furrow irrigation may cause erosion.
Mass Movement	Not Applicable	Not applicable.
Road, Roadsides, and Construction Sites	Not Applicable	Not applicable.
SOIL – CONDITION		
Organic Matter Depletion	Not Applicable	Not applicable.
Rangeland Site Stability	Not Applicable	Not applicable.
Compaction	Slight Worsening	Increased soil moisture in the profile may result in increased compaction during field operations.
Subsidence	Not Applicable	Not applicable.
Contaminants:		
• Salts and other Chemicals	Neutral	The action should allow better management of salts, but the degree of impact depends on water management.
• 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	Slight to Moderate Improvement	System permits better management of pesticides in the root zone.
Damage from Sediment Deposition	Slight Worsening	Surface applied irrigation water may contain sediments.
WATER – QUANTITY		

Rangeland Hydrologic Cycle	Not Applicable	Not applicable.
Excessive Seepage	Slight Improvement	Because of more uniform infiltration.
Excessive Runoff, Flooding, or Ponding	Slight Improvement	More uniform applications reduces ponding and excessive tailwater runoff.
Excessive Subsurface Water	Slight Improvement	A more uniform and efficient irrigation prevents losses to deep percolation.
Drifted Snow	Not Applicable	Not applicable.
Inadequate Outlets	Slight Worsening	Tailwater runoff may adversely impact outlets.
Inefficient Water use on Irrigated Land	Slight to Substantial Improvement	Water is applied more efficiently and uniformly.
Inefficient Water use on Non-Irrigated Land	Not Applicable	Not applicable.
Reduced Capacity of Conveyances by Sediment Deposition	Slight Improvement	Water is applied in such away as to reduce erosion.
Reduced Storage of Water Bodies by Sediment Accumulation	Slight Improvement	Water is applied in such away as to reduce erosion.
Aquifer Overdraft	Slight Improvement	More efficient application of irrigation water reduces aquifer withdrawals.
Insufficient Flows in Water Courses	Slight Improvement	More efficient application of irrigation water requires smaller diversion from streams.
WATER – QUALITY		
In Groundwater:		
• Harmful Levels of Pesticides	Slight Improvement	Efficient and uniform irrigation reduces deep percolation.
• Excessive Nutrients and Organics	Slight Improvement	The action improves water use efficiency resulting in decreased deep percolation.
• Excessive Salinity	Slight Improvement	Efficient and uniform irrigation reduces transport to ground water.
• Harmful Levels of Heavy Metals	Slight Improvement	Efficient and uniform irrigation reduces transport to ground water.
• Harmful Levels of Pathogens	Slight Improvement	Efficient and uniform irrigation reduces transport to ground water.
• Harmful Levels of Petroleum	Slight Improvement	Efficient and uniform irrigation reduces transport to ground water.
In Surface Water:		
• Harmful Levels of Pesticides	Slight Improvement	Efficient and uniform irrigation reduces runoff and erosion.
• Excessive Nutrients and Organics	Slight Improvement	Efficient and uniform irrigation reduces transport of nutrients to surface water.
• Excessive Suspended Sediment and Turbidity	Not Applicable	Not applicable.
• Excessive Salinity	Slight Improvement	The action allows more efficient

		application of irrigation water, which reduces the potential for runoff from the field.
• Harmful Levels of Heavy Metals	Slight Improvement	Efficient and uniform irrigation reduces transport to surface water.
• Harmful Temperatures	Neutral	Conservation irrigation systems minimize affects to surface water quality.
• Harmful Levels of Pathogens	Slight Improvement	Efficient and uniform irrigation reduces transport tosurface water
• Harmful Levels of Petroleum	Slight Improvement	Efficient and uniform irrigation reduces transport tosurface water
AIR – QUALITY		
Particulate Matter less than 10 Micrometers in Diameter (PM 10)	Slight to Moderate Improvement	An irrigation application moistens the soil surface and reduces the erodibility of the soil. Increased production from irrigation lowers the soil wind erodibility group by one class.
Particulate Matter less than 2.5 Micrometers in Diameter (PM 2.5)	Slight to Moderate Improvement	An irrigation application moistens the soil surface and reduces the erodibility of the soil. Increased production from irrigation lowers the soil wind erodibility group by one class.
Excessive Ozone	Not Applicable	Not applicable.
Excessive Greenhouse Gas:		
• CO_2 (Carbon Dioxide)	Not Applicable	Not applicable.
• N_20 (Nitrous Oxide)	Not Applicable	Not applicable.
• CH_4 (Methane)	Not Applicable	Not applicable.
Ammonia (NH_3)	Not Applicable	Not applicable.
Chemical Drift	Not Applicable	Not applicable.
Objectionable Odors	Slight Worsening	Agricultural wastes and byproducts in open systems can increase VOCs and particulates.
Reduced Visibility	Slight Worsening	fine particulates created
Undesirable Air Movement	Not Applicable	Not applicable.
Adverse Air Temperature	Not Applicable	Not applicable.
PLANTS – SUITABLIITY		
Plants not Adapted or Suited	Not Applicable	Not applicable.
PLANTS - CONDITION		
Productivity, Health, and Vigor	Slight to Substantial Improvement	Increased water availability and managed application enhances plant growth, health and vigor.
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	Slight Improvement	Improved irrigation efficiency

		improves crop health and vigor which decreases weed competition.
Forage Quality and Palatability	Not Applicable	Not applicable.
Wildfire Hazard	Not Applicable	Not applicable.
ANIMALS - FISH AND WILDLIFE		
Inadequate Food	Not Applicable	Not applicable.
Inadequate Cover/Shelter	Not Applicable	Not applicable.
Inadequate Water	Slight Improvement	Water is temporarily provided during the irrigation season.
Inadequate Space	Not Applicable	Not applicable.
Habitat Fragmentation	Not Applicable	Not applicable.
Imbalance Among and Within Populations	Not Applicable	Not applicable.
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	Moderate to Substantial Improvement	Production will be improved with uniform and consistent application of water.
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 to Substantial	N/A if no change in crops irrigated, substantial if water use changes.
Land – Land in Production	Slight decrease	Slight short-term decrease in cropland as pipeline is installed
Capital – Change in Equipment	Moderate increase.	
Capital - Total Investment Cost	Moderate.	
Capital – Annual Cost	Slight to moderate increase.	
Capital – Credit and Farm Program Eligibility	Situational.	
Labor - Labor	Moderate increase	Moderate increase to maintain channels and monitor water flow.
Labor – Change in Management Level	Moderate increase	Moderate increase, timing and maintenance require above average management skills.
Risk - Yield	Slight to Moderate Decrease	Slight to moderate decrease due to increased irrigation efficiency.
Risk - Flexibility	Moderate Decrease	Moderate decrease due to more flexible irrigation requirements.
Risk - Timing	Not applicable.	Not applicable.

Risk – Cash Flow	Substantial Increase	Substantial increase due to investment cost.
Profitability – Change in Profitability	Situational	Moderate decrease or increase.
HUMAN - CULTURAL		
Cultural Resources and/or Historic Properties Present or Suspected to be PRESENT	Slight to Substantial Increase	Construction impacts (mechanical).
HUMAN – ENERGY		
Depletion of Fossil Fuel Resources	Slight to Substantial Decrease	Gravity fed irrigation is energy efficient but water inefficient. Lining reduces water losses and associated pumping requirements. Energy use would be high for establishing furrows, which are not permanent structures
Underutilization of Non-Fossil Energy Resources	Not Applicable	Not applicable.

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.