

CONSERVATION PRACTICE PHYSICAL EFFECTS WORKSHEET

STATE	Pennsylvania	FIELD OFFICE	Any	DATE	
PRACTICE: Nutrient Management 590	Baseline Setting:				
	Appropriate Land Use(s): Crop, Forest, Grazed Forest, Grazed Range, Hay, Headquarters, Mined, Native or Naturalized Pasture, Natural Area, Pasture, Recreation, Urban, Watershed Protection, Wildlife				
RESOURCES, CONSIDERATIONS AND CONCERNS	PHYSICAL EFFECTS		RATIONALE		
SOIL - EROSION					
Sheet and Rill	Neutral		Soil disturbance to incorporate fertilizer loosens the soil and buries surface residue which can increase erosion. Other application methods do not contribute to erosion.		
Wind	Neutral		Soil disturbance to incorporate fertilizer loosens the soil and buries surface residue which can increase erosion. Other application methods do not contribute to erosion.		
Ephemeral Gully	Neutral		Soil disturbance to incorporate fertilizer loosens the soil and buries surface residue which can increase erosion. Other application methods do not contribute to erosion.		
Classic Gully	Not Applicable		Not applicable.		
Streambank	Not Applicable		Not applicable.		
Shoreline	Not Applicable		Not applicable.		
Irrigation Induced	Slight Worsening		Soil disturbance to incorporate fertilizer loosens the soil and buries surface residue which can increase erosion.		
Mass Movement	Not Applicable		Not applicable.		
Road, Roadsides, and Construction Sites	Not Applicable		Not applicable.		
SOIL – CONDITION					
Organic Matter Depletion	Slight to Moderate Improvement		Applying sufficient nutrients will maintain or enhance biomass production.		
Rangeland Site Stability	Neutral		Soil disturbance to incorporate fertilizer loosens the soil and buries surface residue which can increase erosion. Other application methods do not contribute to erosion.		
Compaction	Slight to Moderate Worsening		Field operations on moist soils cause soil compaction.		
Subsidence	Not Applicable		Not applicable.		
Contaminants:					
• Salts and other Chemicals	Slight to Moderate Improvement		Decreased excess nutrients results in reduced salts and other		

		contaminants.
• Animal Waste and other Organics - N	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from N.
• Animal Waste and other Organics - P	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from P.
• Animal Waste and other Organics - K	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from K.
• Commercial Fertilizer - N	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from N.
• Commercial Fertilizer - P	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from P.
• Commercial Fertilizer - K	Slight to Moderate Improvement	Proper application results in reduced risks of contamination from K.
• Residual Pesticides	Not Applicable	Not applicable.
Damage from Sediment Deposition	Slight Improvement	Better vegetative growth results in less erosion.
WATER – QUANTITY		
Rangeland Hydrologic Cycle	Not Applicable	Not Applicable
Excessive Seepage	Not Applicable	Not applicable.
Excessive Runoff, Flooding, or Ponding	Not Applicable	Not applicable.
Excessive Subsurface Water	Not Applicable	Not applicable.
Drifted Snow	Not Applicable	Not applicable.
Inadequate Outlets	Not Applicable	Not applicable.
Inefficient Water use on Irrigated Land	Neutral	Excess nitrogen promotes shoot growth in relation to root growth.
Inefficient Water use on Non-Irrigated Land	Neutral	Excess nitrogen promotes shoot growth in relation to root growth.
Reduced Capacity of Conveyances by Sediment Deposition	Not Applicable	Not applicable.
Reduced Storage of Water Bodies by Sediment Accumulation	Not Applicable	Not applicable.
Aquifer Overdraft	Not Applicable	Not applicable.
Insufficient Flows in Water Courses	Not Applicable	Not applicable.
WATER – QUALITY		
In Groundwater:		
• Harmful Levels of Pesticides	Not Applicable	Not applicable.
• Excessive Nutrients and Organics	Substantial Improvement	The amount and timing of nutrient application are balanced with plant needs.
• Excessive Salinity	Slight Improvement	Proper nutrient application should reduce salinity if nutrient source contains salts.
• Harmful Levels of Heavy Metals	Slight to Moderate Improvement	The action limits the total amount of heavy metals that can be applied to a site ensuring that

		harmful levels are not leached to groundwater.
• Harmful Levels of Pathogens	Slight Improvement	The action limits the amount of manure that can be applied thus preventing harmful levels of pathogens.
• Harmful Levels of Petroleum	Not Applicable	Not applicable.
In Surface Water:		
• Harmful Levels of Pesticides	Not Applicable	Not applicable.
• Excessive Nutrients and Organics	Substantial Improvement	Source, amount, timing, and method of application are managed to maximize nutrient use efficiency by the crop and to minimize the potential for nutrient losses in leaching and runoff.
• Excessive Suspended Sediment and Turbidity	Neutral	Proper nutrient application will minimize losses due to runoff.
• Excessive Salinity	Slight Improvement	Proper nutrient application should reduce salinity if nutrient source contains salts.
• Harmful Levels of Heavy Metals	Slight to Substantial Improvement	Changing pH will alter the solubility of metals. The action will reduce the application rate of heavy metals if required.
• Harmful Temperatures	Not Applicable	Not applicable.
• Harmful Levels of Pathogens	Slight Improvement	Decrease application of pathogens if nutrient source contains pathogens.
• Harmful Levels of Petroleum	Not Applicable	Not applicable.
AIR – QUALITY		
Particulate Matter less than 10 Micrometers in Diameter (PM 10)	Slight to Moderate Improvement	The proper application of nutrients can reduce the production of particulates.
Particulate Matter less than 2.5 Micrometers in Diameter (PM 2.5)	Slight to Substantial Improvement	The proper application of nutrients can reduce the production of particulates and minimize volatilization losses during and immediately after application.
Excessive Ozone	Slight to Substantial Improvement	There is a decrease in potential ozone precursor emissions.
Excessive Greenhouse Gas:		
• CO ₂ (Carbon Dioxide)	Slight Improvement	Management of nutrients optimizes the storage of soil carbon.
• N ₂ O (Nitrous Oxide)	Slight Improvement	Reduction in N in waste results in less N volatilization
• CH ₄ (Methane)	Slight to Moderate Improvement	Proper nutrient management reduces methane production.
Ammonia (NH ₃)	Slight to Moderate Improvement	Proper nutrient management reduces NH ₃ production.
Chemical Drift	Not Applicable	Not applicable.
Objectionable Odors	Moderate to Substantial	Proper management and

	Improvement	application/incorporation reduces volatilization, VOCs, and particle transport.
Reduced Visibility	Slight to Moderate Improvement	Reduction in fine particulate matter and ozone precursors
Undesirable Air Movement	Not Applicable	Not applicable.
Adverse Air Temperature	Not Applicable	Not applicable.
PLANTS – SUITABILITY		
Plants not Adapted or Suited	Slight to Substantial Improvement	Nutrients and soil amendments are optimized to enhance suited and desired species.
PLANTS - CONDITION		
Productivity, Health, and Vigor	Slight to Substantial Improvement	Nutrients and soil amendments are optimized to enhance health and vigor of desired species.
Threatened or Endangered Plant Species:		
<ul style="list-style-type: none"> Plant Species Listed or Proposed for Listing Under the Endangered Species Act 	Not Applicable	Not applicable.
<ul style="list-style-type: none"> Declining Species, Species of Concern 	Not Applicable	Not applicable.
Noxious and Invasive Plants	Not Applicable	Not applicable.
Forage Quality and Palatability	Moderate to Substantial Improvement	Proper management will increase quality and palatability of forage.
Wildfire Hazard	Not Applicable	Not applicable.
ANIMALS - FISH AND WILDLIFE		
Inadequate Food	Slight Improvement	Management enhances production of any food species planted.
Inadequate Cover/Shelter	Slight Improvement	Management enhances cover/shelter conditions.
Inadequate Water	Not Applicable	Not applicable.
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:		
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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	Nutrients are managed to ensure optimal production and nutritive value of the forage used by livestock.

Inadequate Shelter	Not Applicable	Not applicable.
Inadequate Stock Water	Slight to Moderate Improvement	Management improves livestock water quality.
Stress and Mortality	Slight to Substantial Improvement	Management results in nutritive forage improving livestock health.
HUMAN – ECONOMICS		
Land - Change in Land Use	Not applicable.	Not applicable.
Land – Land in Production	Not applicable.	Not applicable.
Capital – Change in Equipment	Slight Increase.	
Capital - Total Investment Cost	Not applicable.	
Capital – Annual Cost	Slight increase.	
Capital – Credit and Farm Program Eligibility	Situational.	
Labor - Labor	Negligible	
Labor – Change in Management Level	Slight increase	Slight increase to take soil test, calibrate equipment, apply accurate rates, keep records.
Risk - Yield	Slight Decrease	Slight decrease due to more effective use of nutrients.
Risk - Flexibility	Slight Increase	Slight increase due to closer management of nutrient use.
Risk - Timing	Substantial Increase	Substantial increase - practice must be applied in an effective manner.
Risk – Cash Flow	Slight Decrease	Slight decrease due to higher yields and reduced costs.
Profitability – Change in Profitability	Situational	Slight decrease or increase.
HUMAN - CULTURAL		
Cultural Resources and/or Historic Properties Present or Suspected to be PRESENT	Not applicable.	Not applicable.
HUMAN – ENERGY		
Depletion of Fossil Fuel Resources	No Effect	The energy associated with nitrogen fertilizers may be increased or decreased depending on the farm nutrient balance/budget.
Underutilization of Non-Fossil Energy Resources	Slight to Substantial Decrease	When nitrogen needs of the crop can be supplied by organic sources, accounting for these sources in the farm nutrient budget will save embodied energy.

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.