

## CONSERVATION PRACTICE PHYSICAL EFFECTS WORKSHEET

STATE	Pennsylvania	FIELD OFFICE	Any	DATE	
<b>PRACTICE: Forest Stand Improvement 666</b>		Baseline Setting:			
		Appropriate Land Use(s): Forest, Grazed Forest, Mined, Native or Naturalized Pasture, Natural Area, Recreation, Urban, Watershed Protection, Wildlife			
<b>RESOURCES, CONSIDERATIONS AND CONCERNS</b>		<b>PHYSICAL EFFECTS</b>		<b>RATIONALE</b>	
<b>SOIL - EROSION</b>					
Sheet and Rill		Slight to Moderate Worsening		Removal of vegetation and ground disturbance can increase erosion.	
Wind		Neutral		Residual vegetation and debris maintain non-erosive conditions.	
Ephemeral Gully		Slight to Moderate Worsening		Removal of vegetation and ground disturbance can increase erosion.	
Classic Gully		Slight to Substantial Improvement		Removal of overstory canopy increases amounts and vigor of erosion-controlling ground cover.	
Streambank		Not Applicable		Not applicable.	
Shoreline		Not Applicable		Not applicable.	
Irrigation Induced		Not Applicable		Not applicable.	
Mass Movement		Slight to Moderate Worsening		Removal of some or all woody vegetation diminishes root systems which bind soil layers to resist gravity-induced movement.	
Road, Roadsides, and Construction Sites		Not Applicable		Not applicable.	
<b>SOIL – CONDITION</b>					
Organic Matter Depletion		Slight to Moderate Worsening		Removal of woody vegetation from a site removes organic material that could have become soil organic matter.	
Rangeland Site Stability		Not Applicable		Not applicable.	
Compaction		Slight to Moderate Worsening		Equipment used to harvest or remove forest products can compact forest soils.	
Subsidence		Not Applicable		Not applicable.	
Contaminants:					
<ul style="list-style-type: none"> <li>• Salts and other Chemicals</li> </ul>		Neutral		Forest products that have assimilated salts/chemicals are removed or harvested from the site.	
<ul style="list-style-type: none"> <li>• Animal Waste and other Organics - N</li> </ul>		Slight to Moderate Improvement		Forest products that have assimilated N from waste/organic materials are removed or harvested from the site, with higher uptake of N by remaining trees.	

• Animal Waste and other Organics - P	Slight to Moderate Improvement	Forest products that have assimilated P from waste/organic materials are removed or harvested from the site, with higher uptake of P by remaining trees.
• Animal Waste and other Organics - K	Slight to Moderate Improvement	Forest products that have assimilated K from waste/organic materials are removed or harvested from the site, with higher uptake of P by remaining trees.
• Commercial Fertilizer - N	Slight to Moderate Improvement	Forest products that have assimilated N from waste/organic materials are removed or harvested from the site, with higher uptake of N by remaining trees.
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• Commercial Fertilizer - K	Slight to Moderate Improvement	Forest products that have assimilated K from waste/organic materials are removed or harvested from the site, with higher uptake of P by remaining trees.
• Residual Pesticides	Not Applicable	Not applicable.
Damage from Sediment Deposition	Neutral	Removal of woody material in flood plains could increase scour and remove sediment deposits.
<b>WATER – QUANTITY</b>		
Rangeland Hydrologic Cycle	Not Applicable	Not applicable.
Excessive Seepage	Slight to Moderate Worsening	Fewer tall trees results in less water consumed.
Excessive Runoff, Flooding, or Ponding	Slight to Substantial Improvement	Removal of woody materials from flood or ponding-prone areas allows water to flow through or out of an area decreasing the duration of inundation.
Excessive Subsurface Water	Slight to Moderate Worsening	Removal of deep rooted vegetation can raise the water table.
Drifted Snow	Not Applicable	Not applicable.
Inadequate Outlets	Slight Worsening	Fewer trees results in less water consumed therefore increasing runoff rates, requiring larger outlets.
Inefficient Water use on Irrigated Land	Not Applicable	Not applicable.
Inefficient Water use on Non-Irrigated Land	Slight to Substantial Improvement	Undesired vegetation is removed which reallocates water to

		remaining desired vegetation or provides additional water yield from the site.
Reduced Capacity of Conveyances by Sediment Deposition	Slight Improvement	Removal of overstory canopy increases amounts and vigor of erosion-controlling ground cover.
Reduced Storage of Water Bodies by Sediment Accumulation	Slight Improvement	Removal of overstory canopy increases amounts and vigor of erosion-controlling ground cover.
Aquifer Overdraft	Slight Improvement	Removal of some or all deep-rooted vegetation consumes less water.
Insufficient Flows in Water Courses	Slight to Substantial Improvement	Undesired vegetation is removed which provides additional water yield from the site.
<b>WATER – QUALITY</b>		
In Groundwater:		
• Harmful Levels of Pesticides	Slight to Moderate Improvement	Managing for desirable plant health and vigor reduces the need for pesticide applications.
• Excessive Nutrients and Organics	Slight to Substantial Improvement	Forest products that have assimilated nutrients/organics are removed or harvested from the site.
• Excessive Salinity	Neutral	Forest products that are storing salts in their biomass may be removed or harvested from the site. Reduced stand density can increase infiltration and leaching of salts.
• Harmful Levels of Heavy Metals	Slight Improvement	Removal of overstory canopy increases vigor of ground cover that can increase heavy metal uptake and reduce the potential for leaching.
• Harmful Levels of Pathogens	Slight Improvement	Removal of canopy/woody vegetation exposes the site and increases mortality of pathogens that would have otherwise entered ground water.
• Harmful Levels of Petroleum	Not Applicable	Not applicable.
In Surface Water:		
• Harmful Levels of Pesticides	Slight to Moderate Improvement	Managing for desirable plant health and vigor reduces the need for pesticide applications.
• Excessive Nutrients and Organics	Slight to Substantial Improvement	Removal of overstory canopy increases amounts and vigor of ground cover that slows surface runoff and allows infiltration. Nutrients and organics are used by vegetation and soil biota.
• Excessive Suspended Sediment and Turbidity	Neutral	Proper stocking rates of desired vegetation will provide minimal

		effect.
• Excessive Salinity	Slight Improvement	Removal of overstory canopy can increase the amount and vigor of ground cover, slowing runoff and increasing infiltration.
• Harmful Levels of Heavy Metals	Slight Improvement	Removal of overstory canopy increases vigor of ground cover that can increase heavy metal uptake and reduces runoff.
• Harmful Temperatures	Slight Worsening	Removal of overstory canopy removes shade that moderates stream temperature.
• Harmful Levels of Pathogens	Slight to Substantial Improvement	Removal of canopy/woody vegetation exposes the site and increases mortality of pathogens that would have otherwise entered surface water.
• Harmful Levels of Petroleum	Slight Improvement	Removal of canopy/woody vegetation exposes the site and increases evaporation of petroleum that would have otherwise entered surface water.
<b>AIR – QUALITY</b>		
Particulate Matter less than 10 Micrometers in Diameter (PM 10)	Not Applicable	Not applicable.
Particulate Matter less than 2.5 Micrometers in Diameter (PM 2.5)	Not Applicable	Not applicable.
Excessive Ozone	Neutral	There is a short-term increase in vehicle emissions and ozone precursors from site preparation equipment.
Excessive Greenhouse Gas:		
• CO <sub>2</sub> (Carbon Dioxide)	Moderate to Substantial Improvement	Health and vigor of remaining plants have increased utilization of CO <sub>2</sub> , thus sequestering carbon. Carbon may be stored indefinitely in wood products removed from the site.
• N <sub>2</sub> O (Nitrous Oxide)	Not Applicable	Not applicable.
• CH <sub>4</sub> (Methane)	Not Applicable	Not applicable.
Ammonia (NH <sub>3</sub> )	Not Applicable	Not applicable.
Chemical Drift	Slight Worsening	Reduction in canopy allows less opportunity for drift particle adsorption and increases wind speeds that transport particles.
Objectionable Odors	Not Applicable	Not applicable.
Reduced Visibility	Slight Worsening	Reduction in canopy allows less opportunity for particle adsorption and increases wind speeds that transport particles.
Undesirable Air Movement	Slight Worsening	Reduction in canopy increases wind speeds.
Adverse Air Temperature	Slight to Moderate Worsening	Removal of tall vegetation

		eliminates shade and increases temperatures.
<b>PLANTS – SUITABILITY</b>		
Plants not Adapted or Suited	Moderate to Substantial Improvement	Plants selected for retention are more adapted and suited.
<b>PLANTS - CONDITION</b>		
Productivity, Health, and Vigor	Substantial Improvement	Most productive, healthy and vigorous plants are retained.
Threatened or Endangered Plant Species:		
<ul style="list-style-type: none"> <li>Plant Species Listed or Proposed for Listing Under the Endangered Species Act</li> </ul>	Neutral	When threatened or endangered plants are present, protection and recovery are addressed in the planning process.
<ul style="list-style-type: none"> <li>Declining Species, Species of Concern</li> </ul>	Neutral	When threatened or endangered plants are present, protection and recovery are addressed in the planning process.
Noxious and Invasive Plants	Moderate to Substantial Improvement	Noxious and invasive plants are removed.
Forage Quality and Palatability	Moderate to Substantial Improvement	Canopy is modified to favor forage quality and palatability.
Wildfire Hazard	Substantial Improvement	Canopy and understory removal reduces fuel loadings, breaks up fuel continuity, removes "ladder" fuels.
<b>ANIMALS - FISH AND WILDLIFE</b>		
Inadequate Food	Slight to Substantial Improvement	Canopies and understories are managed to enhance wood production and value and will provide food for wildlife and improved watershed conditions.
Inadequate Cover/Shelter	Slight to Substantial Improvement	Trees are managed to enhance wood production and value and will provide cover/shelter for wildlife and improved water quantity and quality in watersheds for aquatic habitats.
Inadequate Water	Not Applicable	Not applicable.
Inadequate Space	Slight to Moderate Improvement	Canopies and understories are managed to enhance space requirements.
Habitat Fragmentation	Slight to Moderate Improvement	Canopies and understories are managed to retain plant community connectivity.
Imbalance Among and Within Populations	Slight to Substantial Improvement	Canopies and understories are managed to meet species requirements.
Threatened and Endangered Fish and Wildlife Species:		
<ul style="list-style-type: none"> <li>Fish and Wildlife Species Listed or Proposed for Listing Under the Endangered Species Act</li> </ul>	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.
<b>ANIMALS – DOMESTIC</b>		
Inadequate Quantities and Quality of Feed and Forage	Moderate to Substantial Improvement	Canopy is modified to improve understory forage quantity and quality.
Inadequate Shelter	Neutral	Remaining canopy and understory continue to provide shelter.
Inadequate Stock Water	Not Applicable	Not applicable.
Stress and Mortality	Slight to Substantial Improvement	Improved forage quality and quantity reduces animals illness or death from disease, parasites, insects, poisonous plants, or other factors.
<b>HUMAN – ECONOMICS</b>		
Land - Change in Land Use	Not applicable.	Not applicable.
Land – Land in Production	Not applicable.	Not applicable.
Capital – Change in Equipment	Moderate increase.	
Capital - Total Investment Cost	Moderate.	
Capital – Annual Cost	Slight increase.	
Capital – Credit and Farm Program Eligibility	Situational.	
Labor - Labor	Moderate to substantial increase.	
Labor – Change in Management Level	Slight increase.	
Risk - Yield	Slight to Moderate Decrease	Slight to moderate decrease due to reduction of competitive vegetation.
Risk - Flexibility	Slight to Moderate Decrease	Slight to moderate decrease due to reduction of competitive vegetation.
Risk - Timing	Not applicable.	Not applicable.
Risk – Cash Flow	Moderate to Substantial Increase	Moderate to substantial increase due to implementation costs.
Profitability – Change in Profitability	Situational	Slight decrease to moderate increase.
<b>HUMAN - CULTURAL</b>		
Cultural Resources and/or Historic Properties Present or Suspected to be PRESENT	Slight to Substantial Increase	Construction impacts (mechanical).
<b>HUMAN – ENERGY</b>		
Depletion of Fossil Fuel Resources	No Effect	This practice uses energy, however the energy used depends on the intensity of implementation. The long term effect is an increase in biomass energy production.
Underutilization of Non-Fossil Energy Resources	Slight to Substantial Decrease	This practice facilitates the production of biomass that could be used for energy production.



## Human Considerations Explanation

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