Practice: 309 - Agrichemical Handling Facility

Scenario # 1 **Agrichemical Handling Pad for mixing and loading**

Scenario Description: **Mississippi**

This practice scenario is an agrichemical handling facility for mixing and loading operations. This practice addresses water quality degradation and due to mis-handling, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

Before Practice Situation:

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

After Practice Situation:

This scenario is an agrichemical handling facility pad for mixing and loading operations. The average size of the agrichemical handling pad for mixing and loading is 16' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, containment of the pad is surrounded by sloped and ramped reinforced concrete. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

Scenario Feature Measure:

Total Containment Area

Scenario Typical Size: 640 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Sand, Graded, Washed	10	Cubic yard	$23.56	$235.60
Materials	Painting, concrete surface, impermeable	640	Square Foot	$0.96	$614.40
Equip./Install.	Concrete, CIP, slab on grade, reinforced	12	Cubic yard	$222.53	$2,670.36
Equip./Install.	Dozer, 80 HP	4	Hour	$54.19	$216.76
Labor	Equipment Operators, Light	4	Hour	$17.60	$70.40
Labor	General Labor	12	Hour	$17.95	$215.40
Mobilization	Mobilization, small equipment	2	Each	$93.22	$186.44
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$4,247.18

Practice: 313 - Waste Storage Facility

Scenario # 1 **Dry stack, earthen floor, wood wall**

Scenario Description: **Mississippi**

This scenario consists of a dry stack facility with compacted earthen floor with wooden walls, posts and a concrete curb. This scenario is intended for dryer material such as poultry litter. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground
water.

Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Practice Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwaters, in addition to the use of excessive amounts of fertilizers.

After Practice Situation:

The typical is 4,000 SqFt (40' x 100'). The earthen floor will be prepared by stripping the top 1' of soil and roller compacting it back into floor. Walls are 5' pressure treated wood (2" x 8" boards), 4' x 6" x 8' posts set 4' c-c with 6" concrete curbing. Walls allow for greater storage volume. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Scenario Feature Measure:

Square Foot Floor Area

Scenario Typical Size: 4000 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Dimension Lumber, Treated	1200	Board Foot	$0.72	$864.00
Materials	Lumber, planks, posts and timbers, treated	696	Board Foot	$1.15	$800.40
Equip./Install.	Concrete, CIP, formed reinforced	18	Cubic yard	$353.38	$6,360.84
Equip./Install.	Excavation, common earth, large equipment, 150 ft	148	Cubic Yard	$3.30	$488.40
Equip./Install.	Earthfill, Roller Compacted	148	Cubic yard	$3.43	$507.64
Labor	General Labor	90	Hour	$17.95	$1,615.50
Mobilization	Mobilization, large equipment	4	Each	$255.47	$1,021.88
				Total Cost:	$11,658.66

Practice: 314 - Brush Management

Scenario # 1 **Biological**

Scenario Description: **Mississippi**

Management of woody non-herbaceous plant species through the use of livestock that are closely herded to concentrate grazing on targeted shrubs. Dense stands of woody non-herbaceous species that exceed the desirable ecological site condition. This scenario is an alternative for organic producers.

Before Practice Situation:

Area consist of dense stands of woody non-herbaceous species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.

After Practice Situation:

Woody species are grazed to limit the regrowth of shrubs and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels.

Scenario Feature Measure:

Acres treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Animals used for biological weed control	40	Head per day	$1.00	$40.00
Equip./Install.	Trucking, moving livestock to new paddock	20	Mile	$2.27	$45.40
Equip./Install.	Truck, Pickup	8	Hour	$25.85	$206.80
Labor	General Labor	8	Hour	$17.95	$143.60
				Total Cost:	$435.80

Practice: 314 - Brush Management

Scenario # 2 **Mechanical**

Scenario Description: **Mississippi**

Removal of small woody vegetation. The practice entails the removal of brush by the use of mechanical cutter, chopper or other light equipment in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is a infestation. Typical unit is 40 acres.

Before Practice Situation:

Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

After Practice Situation:

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Scenario Feature Measure:

Acres planned

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mechanical cutter, chopper	12	Hour	$116.59	$1,399.08
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Labor	Equipment Operators, Light	12	Hour	$17.60	$211.20
Mobilization	Mobilization, small equipment	2	Each	$93.22	$186.44
				Total Cost:	$1,848.42

Practice: 314 - Brush Management

Scenario # 3 **Chemical - Ground Applied, Heavy**

Scenario Description: **Mississippi**

Apply brush management on 40 acres of pasture thru the use of broadcast application of material using high cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands. Heavy competition is defined as woody brush stocking more than 300 stems per acre or height greater than 48 inches.

Before Practice Situation:

Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on pasture which are adversely affected by brush.

After Practice Situation:

A 40 acre unit of pasture where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.

Scenario Feature Measure:

Acres planned

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Materials	Herbicide, 2,4-D	40	Acre	$6.00	$240.00
Materials	Herbicide, Imazapyr	40	Acre	$79.31	$3,172.40
Equip./Install.	Chemical, ground application	40	Acre	$4.33	$173.20
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$3,817.48

Practice: 315 - Herbaceous Weed Control

Scenario # 1 **Biological**

Scenario Description: **Mississippi**

Management of herbaceous plant species through the use of livestock that are closely herded to concentrate grazinging on undesired herbaceous species. Stands of herbaceous weed species that exceed the desirable ecological site condition. This scenario is an alternative for organic producers.

Before Practice Situation:

Area consist of tends of herbaceous weed species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.

After Practice Situation:

Woody species are grazed to limit the regrowth of herbaceous weed species and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels.

Scenario Feature Measure:

Acres teated

Scenario Typical Size: 10 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Animals used for biological weed control	10	Head per day	$1.00	$10.00
Equip./Install.	Trucking, moving livestock to new paddock	20	Mile	$2.27	$45.40
Equip./Install.	Truck, Pickup	4	Hour	$25.85	$103.40
Labor	General Labor	4	Hour	$17.95	$71.80
				Total Cost:	$230.60

Practice: 315 - Herbaceous Weed Control

Scenario # 2 **Mechanical**

Scenario Description: **Mississippi**

Removal of herbaceous weeds of light infestations. The practice entails the removal of herbaceous weeds by the use of mower, brush hog, disc or other light equipment in order to reduce fuel loading and improve ecological site condition. Weed has exceeded desired levels based on ecological site potential. Typical unit is 40 acres.

Before Practice Situation:

Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

After Practice Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Scenario Feature Measure:

Acres treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mower, Bush Hog	12	Hour	$42.07	$504.84
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Labor	Equipment Operators, Light	12	Hour	$17.60	$211.20
Mobilization	Mobilization, small equipment	2	Each	$93.22	$186.44
				Total Cost:	$954.18

Practice: 316 - Animal Mortality Facility

Scenario # 1 **Incineration, < 50 CF Chamber**

Scenario Description: **Mississippi**

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 lbs of average daily mortality for the species and size of the operation. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static compost pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

Before Practice Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

After Practice Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 150 lbs per day average mortality for a small poultry operation. Included is a concrete slab to set the incinerator on. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

Scenario Feature Measure:

Incinerator Chamber Volume

Scenario Typical Size: 44 Cubic Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Incinerator, 200 lb	1	Each	$6,025.00	$6,025.00
Equip./Install.	Excavation, Common Earth, side cast, small equipment	4	Cubic yard	$1.86	$7.44
Equip./Install.	Concrete, CIP, slab on grade, reinforced	4	Cubic yard	$222.53	$890.12
Equip./Install.	Hydraulic Excavator, 1 CY	1	Hour	$91.71	$91.71
Labor	Equipment Operators, Light	1	Hour	$17.60	$17.60
Labor	General Labor	1	Hour	$17.95	$17.95
Mobilization	Mobilization, medium equipment	4	Each	$136.58	$546.32
				Total Cost:	$7,596.14

Practice: 316 - Animal Mortality Facility

Scenario # 2 **Invessel Rotary Drum <700 CF**

Scenario Description: **Mississippi**

This scenario consists of installing a horizontal rotary drum to compost smaller poultry and swine facility mortality. It can handle between 250 and 600 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. This option is not typically least-cost. In most states a roofed static pile with concrete floor and multiple bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Practice Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

After Practice Situation:

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events.Installed a 5' diameter by 22' long rotary drum on two concrete pads that can process 325 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete apron for secondary composting. Area can be protected by adding Roofs and Covers (367) standard.

Scenario Feature Measure:

Volume of Drum

Scenario Typical Size: 432 Cubic Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Composter, drum, 12 CY	1	Each	$29,315.00	$29,315.00
Materials	Aggregate, Gravel, Graded	8	Cubic yard	$24.48	$195.84
Equip./Install.	Excavation, Common Earth, side cast, small equipment	4	Cubic yard	$1.86	$7.44
Equip./Install.	Concrete, CIP, formed reinforced	6	Cubic yard	$353.38	$2,120.28
Equip./Install.	Concrete, CIP, slab on grade, reinforced	11	Cubic yard	$222.53	$2,447.83
Equip./Install.	Concrete, CIP, formless, non reinforced	4	Cubic yard	$109.17	$436.68
Mobilization	Mobilization, very small equipment	6	Each	$37.82	$226.92
				Total Cost:	$34,749.99

Practice: 316 - Animal Mortality Facility

Scenario # 3 **Static pile, Wood Bin(s)**

Scenario Description: **Mississippi**

This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Potential Associated Practices: Roofs and Covers (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Practice Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

After Practice Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.Install facility on a 18' x 40' concrete pad with 4 bins (5' H x 10' W x 6' Length) along the front side and one 8'w by 40' long secondary bin. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Includes 10' gravel apron on three sides. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, installing wooden walls and doors, and gravel approach apron. Piles turned to go through a second heat cycle prior to final land application.

Scenario Feature Measure:

Total Bin Area

Scenario Typical Size: 720 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Lumber, planks, posts and timbers, treated	448	Board Foot	$1.15	$515.20
Materials	Dimension Lumber, Treated	880	Board Foot	$0.72	$633.60
Materials	Aggregate, Gravel, Graded	40	Cubic yard	$24.48	$979.20
Equip./Install.	Excavation, Common Earth, side cast, small equipment	100	Cubic yard	$1.86	$186.00
Equip./Install.	Concrete, CIP, formed reinforced	3	Cubic yard	$353.38	$1,060.14
Equip./Install.	Concrete, CIP, slab on grade, reinforced	14	Cubic yard	$222.53	$3,115.42
Labor	Skilled Labor	80	Hour	$23.57	$1,885.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Mobilization	Mobilization, very small equipment	5	Each	$37.82	$189.10
				Total Cost:	$8,837.42

Practice: 317 - Composting Facility

Scenario # 1 **Composter, with concrete under bins (wood or concrete) only**

Scenario Description: **Mississippi**

The composting facility, with concrete under bins only, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility.

Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Practice Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwaters, in addition to the use of excessive amounts of fertilizers.

After Practice Situation:

Manure, litter and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. The typical composter is designed to handle organic material from a 4 house poultry operation containing 20,000 4 lbs birds in each house. The typical composter is 40' x 56' with 5' high bins, 4-primary bins and 1 secondary bin with Storage Area. Strip top 1' of soil and roll compact same back into sub-floor. The bins are constructed on a 5" concrete slab used to store and stabilize manure, litter and other agricultural by-products from a four house complex on any farm.

Scenario Feature Measure:

Square Foot Floor Area

Scenario Typical Size: 2240 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Lumber, planks, posts and timbers, treated	936	Board Foot	$1.15	$1,076.40
Materials	Dimension Lumber, Treated	1720	Board Foot	$0.72	$1,238.40
Materials	Aggregate, Gravel, Graded	10	Cubic yard	$24.48	$244.80
Equip./Install.	Excavation, common earth, large equipment, 150 ft	83	Cubic Yard	$3.30	$273.90
Equip./Install.	Concrete, CIP, formed reinforced	10	Cubic yard	$353.38	$3,533.80
Equip./Install.	Concrete, CIP, slab on grade, reinforced	10	Cubic yard	$222.53	$2,225.30
Equip./Install.	Earthfill, Roller Compacted	83	Cubic yard	$3.43	$284.69
Labor	General Labor	90	Hour	$17.95	$1,615.50
Mobilization	Mobilization, large equipment	4	Each	$255.47	$1,021.88
				Total Cost:	$11,514.67

Practice: 328 - Conservation Crop Rotation

Scenario # 1 **Standard Rotation**

Scenario Description: **Mississippi**

In this region this practice may be part of a conservation management system to: 1) Reduce sheet and rill erosion 2) Reduce soil erosion from wind 3) Maintain or improve soil organic matter 4) Manage the balance of plant nutrient 5) Improve water use efficiency 6) Manage plant pests (weeds, insects, and diseases). 7) Provide food for domestic livestock and 8) Provide food and cover for wildlife. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 200 cropland farm. No foregone income. Cost represents typical situations for conventional (non-organic) producers.

Before Practice Situation:

The rotation consists primarily of low residue producing row crops. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.

After Practice Situation:

A rotation is establish that provides additional high residue and/or perennial crops that reduce erosion, improve soil quality, and break pest cycles.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 200 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Supervisor or Manager	10	Hour	$34.23	$342.30
				Total Cost:	$342.30

Practice: 328 - Conservation Crop Rotation

Scenario # 2 **Organic Rotation**

Scenario Description: **Mississippi**

In this region this practice may be part of a conservation management system to: 1) Reduce sheet and rill erosion 2) Reduce soil erosion from wind 3) Maintain or improve soil organic matter 4) Manage the balance of plant nutrients 5) Improve water use efficiency 6) Manage plant pests (weeds, insects, and diseases). 7) Provide food for domestic livestock and 8) Provide food and cover for wildlife. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 cropland farm. No foregone income. Cost represents typical situations for conventional (non-organic) producers.

Before Practice Situation:

The rotation consists primarily of low residue and conventionally produced row crops. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.

After Practice Situation:

The rotation established transitions the rotation from a conventional system to an organic system. The rotation is planned that compliments erosion control, nutrient cycling, soil organic matter, and pest management via crop rotation.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 100 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Supervisor or Manager	40	Hour	$34.23	$1,369.20
				Total Cost:	$1,369.20

Practice: 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Scenario # 1 **No-Till/Strip-Till**

Scenario Description: **Mississippi**

This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till (conservation tilled) system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes chemical weed control (rather than cultivation) and may also include a period of chemical fallow. System is applicable in both irrigated and non-irrigated fields.

Before Practice Situation:

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

After Practice Situation:

Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 100 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	200	Acre	$11.04	$2,208.00
Equip./Install.	Chemical, ground application	200	Acre	$4.33	$866.00
Equip./Install.	Seeding Operation, No Till/Strip Till Planter	100	Acre	$14.91	$1,491.00
				Total Cost:	$4,565.00

Practice: 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Scenario # 2 **Organic No-Till/Strip-Till**

Scenario Description: **Mississippi**

This practice typically involves conversion from a clean or mulch tilled (conventional tilled) system to no-till or strip-till (conservation tilled) system on 20 acres of organic cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The organic no-till/strip-till system relies on mulching/residue management, organic-approved chemical weed control, or alterative methods of weed control such as hand weeding, flaming, etc. (rather than traditional cultivation). System is applicable in both irrigated and non-irrigated fields.

Before Practice Situation:

Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested throughout the year. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and mulching. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Wind and/or water erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

After Practice Situation:

329 is applied per the practice plan and all the appropriate criteria are followed for the planned purpose(s). Crop residue is managed on the surface of an organic crop field (typical 20 acre) year around while limiting soil disturbing activities to those which condition residue, place nutrients, and plant crops. All crops are seeded/planted with a no-till drill, no-till/strip-till transplanter, or no-till/strip-till planter, which minimize soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect and provide wildlife food and cover. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 20 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mechanical weed control, Vegetation termination	20	Acre	$19.69	$393.80
Equip./Install.	Seeding Operation, No Till/Strip Till Planter	20	Acre	$14.91	$298.20
				Total Cost:	$692.00

Practice: 338 - Prescribed Burning

Scenario # 1 **Prescribed Burn - Forest Light**

Scenario Description: **Mississippi**

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications. Typically this will not be the first burn to occur on the site. This prescribed burn will consume small debris, herbaceous material and/or leaf litter. (Constructed firebreak or plow line cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

Before Practice Situation:

A primary burn has occurred within the last 5 years. Site has accumulation of small debris, herbaceous material and/or leaf litter. Typically this occurs in a open forest stand.

After Practice Situation:

Litter, small debris and slash are consumed, small seedlings may be killed. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced with increased herbaceous material rejuvenated for wildlife and erosion control.

Scenario Feature Measure:

Acres planned

Scenario Typical Size: 80 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Fuel, ignition fuel mixture	25	Gallon	$3.99	$99.75
Equip./Install.	Water tank, portable	8	Hour	$2.41	$19.28
Equip./Install.	Truck, Pickup	8	Hour	$25.85	$206.80
Equip./Install.	All terrain vehicles, ATV	8	Hour	$28.26	$226.08
Labor	Specialist Labor	8	Hour	$71.26	$570.08
Labor	Supervisor or Manager	12	Hour	$34.23	$410.76
Labor	Skilled Labor	32	Hour	$23.57	$754.24
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
Mobilization	Mobilization, Skilled labor	2	Hour	$22.56	$45.12
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
				Total Cost:	$2,511.25

Practice: 340 - Cover Crop

Scenario # 1 **Cover Crop-Chemical Kill**

Scenario Description: **Mississippi**

Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide a minimum of 3 weeks prior to planting the subsequent crop.

Before Practice Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Practice Situation:

Typically, within 30 days after harvest of row crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 40 acres. Typically, the cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Crimson Clover (Trifolium incarnatum)	520	Pound	$2.25	$1,170.00
Materials	Herbicide, Glyphosate	40	Acre	$11.04	$441.60
Materials	Rye, Cereal (Secale cereale L.)	2400	Pound	$0.30	$720.00
Equip./Install.	Chemical, ground application	40	Acre	$4.33	$173.20
Equip./Install.	Seeding Operation, No Till/Grass Drill	40	Acre	$14.20	$568.00
				Total Cost:	$3,072.80

Practice: 340 - Cover Crop

Scenario # 2 **Cover Crop-Mechanical Kill**

Scenario Description: **Mississippi**

Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechnical kill method (mowing, rolling, undercutting, etc.), a minimum of 3 weeks prior to planting the subsequent crop.

Before Practice Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Practice Situation:

Typically, within 30 days after harvest of row crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 40 acres. Typically, the cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Crimson Clover (Trifolium incarnatum)	520	Pound	$2.25	$1,170.00
Materials	Rye, Cereal (Secale cereale L.)	2400	Pound	$0.30	$720.00
Equip./Install.	Mechanical weed control, Vegetation termination	40	Acre	$19.69	$787.60
Equip./Install.	Seeding Operation, No Till/Grass Drill	40	Acre	$14.20	$568.00
				Total Cost:	$3,245.60

Practice: 340 - Cover Crop

Scenario # 3 **Organic Cover Crop**

Scenario Description: **Mississippi**

Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechnical kill method (mowing, rolling, undercutting, etc.), a minimum of 3 weeks prior to planting the subsequent crop. This scenario REQUIRES use of Certified Organic Seed.

Before Practice Situation:

Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Practice Situation:

Typically, within 30 days after harvest of row crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 40 acres. Typically, the cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Scenario Feature Measure:

Area planted

Scenario Typical Size: 25 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Certified Organic, Crimson Clover (Trifolium incarnatum)	325	Pound	$5.35	$1,738.75
Materials	Certified Organic, Rye, Cereal (Secale cereale L.)	1500	Pound	$0.58	$870.00
Equip./Install.	Mechanical weed control, Vegetation termination	25	Acre	$19.69	$492.25
Equip./Install.	Seeding Operation, No Till/Grass Drill	25	Acre	$14.20	$355.00
				Total Cost:	$3,456.00

Practice: 342 - Critical Area Planting

Scenario # 1 **Grass/legume mix-normal tillage**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac), and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Red Clover (Trifolium pratense)	8	Pound	$2.60	$20.80
Materials	Oats (Avena sativa)	48	Pound	$0.46	$22.08
Materials	Bermuda Grass (Cynodon dactylon)	5	Pound	$3.92	$19.60
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
				Total Cost:	$292.66

Practice: 342 - Critical Area Planting

Scenario # 2 **Organic Grass/legume mix-normal tillage**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Certified organic seed and fertilizer based upon NOP approved fertilizer inputs will be used where available.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. The plant nutrients will supplied by a blend of organic soil amendments. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre. Organic seed will be used where available. Manure may be used in lieu of a commercially blended product as long as the manure is tested and the correct quantity of manure is calculated such that the specified 30-60-60 N-P2O5-K2O requirement is met.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Certified Organic, Red Clover (Trifolium pratense)	8	Pound	$8.46	$67.68
Materials	Nitrogen, Organic	30	Pound	$2.48	$74.40
Materials	Bermuda Grass (Cynodon dactylon)	5	Pound	$3.92	$19.60
Materials	Phosphorus, Organic	50	Pound	$2.97	$148.50
Materials	Certified Organic, Oats (Avena sativa)	48	Pound	$0.62	$29.76
Materials	Potassium, Organic	50	Pound	$1.31	$65.50
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
				Total Cost:	$552.92

Practice: 342 - Critical Area Planting

Scenario # 3 **Native seeding - normal tillage**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, native grass seed, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Oats (Avena sativa)	32	Pound	$0.46	$14.72
Materials	Big Blue Stem (Andropogon gerardii)	14	Pound	$11.81	$165.34
Materials	Switchgrass, Blackwell (Panicum virgatum)	2	Pound	$9.62	$19.24
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
				Total Cost:	$411.78

Practice: 342 - Critical Area Planting

Scenario # 4 **Grass/legume mix-moderate grading**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Red Clover (Trifolium pratense)	8	Pound	$2.60	$20.80
Materials	Oats (Avena sativa)	48	Pound	$0.46	$22.08
Materials	Bermuda Grass (Cynodon dactylon)	5	Pound	$3.92	$19.60
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Dozer, 80 HP	4	Hour	$54.19	$216.76
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$621.51

Practice: 342 - Critical Area Planting

Scenario # 5 **Native seeding-moderate grading**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, native grass seed, companion crop, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Oats (Avena sativa)	32	Pound	$0.46	$14.72
Materials	Switchgrass, Blackwell (Panicum virgatum)	2	Pound	$9.62	$19.24
Materials	Big Blue Stem (Andropogon gerardii)	14	Pound	$11.81	$165.34
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Dozer, 80 HP	4	Hour	$54.19	$216.76
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$740.63

Practice: 342 - Critical Area Planting

Scenario # 6 **Grass/legume mix-heavy grading**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Red Clover (Trifolium pratense)	8	Pound	$2.60	$20.80
Materials	Oats (Avena sativa)	48	Pound	$0.46	$22.08
Materials	Bermuda Grass (Cynodon dactylon)	5	Pound	$3.92	$19.60
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Dozer, 80 HP	8	Hour	$54.19	$433.52
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$928.11

Practice: 342 - Critical Area Planting

Scenario # 7 **Native seeding-heavy grading**

Scenario Description: **Mississippi**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Practice Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Practice Situation:

This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

Scenario Feature Measure:

area seeded

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Oats (Avena sativa)	32	Pound	$0.46	$14.72
Materials	Switchgrass, Blackwell (Panicum virgatum)	2	Pound	$9.62	$19.24
Materials	Big Blue Stem (Andropogon gerardii)	14	Pound	$11.81	$165.34
Materials	Lime, ENM	2	Ton	$49.57	$99.14
Materials	Phosphorus, P2O5	50	Pound	$0.78	$39.00
Materials	Potassium, K2O	50	Pound	$0.52	$26.00
Equip./Install.	Cultipacking	1	Acre	$7.67	$7.67
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Dozer, 80 HP	8	Hour	$54.19	$433.52
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$1,047.23

Practice: 350 - Sediment Basin

Scenario # 1 **Embankment earthen basin with no pipe**

Scenario Description: **Mississippi**

An low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed with an earthen auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

Before Practice Situation:

Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

After Practice Situation:

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). No principal spillway will be used. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Scenario Feature Measure:

Embankment volume

Scenario Typical Size: 1500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Dozer, 140 HP	23	Hour	$100.14	$2,303.22
Labor	Equipment Operators, Heavy	23	Hour	$22.46	$516.58
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$2,978.63

Practice: 350 - Sediment Basin

Scenario # 2 **Embankment earthen basin with pipe**

Scenario Description: **Mississippi**

An low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed with a principal spillway conduit and earthen auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

Before Practice Situation:

Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

After Practice Situation:

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the Pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The principal spillway is created using an approved conduit material and filter diaphragm. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Scenario Feature Measure:

Embankment volume

Scenario Typical Size: 1500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Trash Guard, metal	118	Pound	$2.09	$246.62
Materials	Pipe, PVC, 10", SCH 80	98	Foot	$16.32	$1,599.36
Materials	Pipe, PVC, 12", SCH 80	8	Foot	$22.44	$179.52
Materials	Aggregate, Gravel, Graded	1.6	Cubic yard	$24.48	$39.17
Materials	Aggregate, Sand, Graded, Washed	19.6	Cubic yard	$23.56	$461.78
Equip./Install.	Concrete, CIP, formed reinforced	3	Cubic yard	$353.38	$1,060.14
Equip./Install.	Dozer, 140 HP	23	Hour	$100.14	$2,303.22
Labor	Equipment Operators, Heavy	23	Hour	$22.46	$516.58
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
				Total Cost:	$6,753.77

Practice: 351 - Water Well Decommissioning

Scenario # 1 **Shallow Well less than 20 feet deep**

Scenario Description: **Mississippi**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

Before Practice Situation:

Shallow well or hand dug well that is less than 20 feet deep. Assume 30" diameter casing. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

After Practice Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding

Scenario Feature Measure:

Length of well casing

Scenario Typical Size: 15 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Grout, cement	2.7	Cubic Yard	$70.11	$189.30
Materials	Chlorine	1	Gallon	$2.32	$2.32
Equip./Install.	Grout pump	1	Hour	$12.82	$12.82
Equip./Install.	Earthfill, Manually Compacted	2.7	Cubic yard	$4.59	$12.39
Equip./Install.	Backhoe, 80 HP	1	Hour	$44.57	$44.57
Labor	Skilled Labor	2	Hour	$23.57	$47.14
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$445.12

Practice: 351 - Water Well Decommissioning

Scenario # 2 **Shallow Well greater than 20 feet deep**

Scenario Description: **Mississippi**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Practice Situation:

Shallow or hand dug well that is greater than 30 feet deep. Assume 30" diameter casing.

After Practice Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding

Scenario Feature Measure:

Length of well casing

Scenario Typical Size: 30 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Grout, cement	5.5	Cubic Yard	$70.11	$385.61
Materials	Chlorine	1	Gallon	$2.32	$2.32
Equip./Install.	Grout pump	1	Hour	$12.82	$12.82
Equip./Install.	Earthfill, Manually Compacted	5.5	Cubic yard	$4.59	$25.25
Equip./Install.	Backhoe, 80 HP	2	Hour	$44.57	$89.14
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Labor	Skilled Labor	2	Hour	$23.57	$47.14
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$743.77

Practice: 351 - Water Well Decommissioning

Scenario # 3 **Drilled well less than 300 feet deep**

Scenario Description: **Mississippi**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Practice Situation:

Drilled well that is less than 300 feet deep. Assume 6" diameter casing.

After Practice Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding

Scenario Feature Measure:

Length of well casing

Scenario Typical Size: 200 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Grout, cement	1.5	Cubic Yard	$70.11	$105.17
Materials	Chlorine	1	Gallon	$2.32	$2.32
Equip./Install.	Grout pump	1	Hour	$12.82	$12.82
Equip./Install.	Backhoe, 80 HP	1	Hour	$44.57	$44.57
Labor	Equipment Operators, Heavy	1	Hour	$22.46	$22.46
Labor	Skilled Labor	2	Hour	$23.57	$47.14
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$371.06

Practice: 351 - Water Well Decommissioning

Scenario # 4 **Drilled well greater than 300 feet**

Scenario Description: **Mississippi**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Practice Situation:

Drilled well that is greater than 300 feet deep. Assume 6" diameter casing.

After Practice Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding

Scenario Feature Measure:

Length of well casing

Scenario Typical Size: 500 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Grout, cement	3.7	Cubic Yard	$70.11	$259.41
Materials	Chlorine	3	Gallon	$2.32	$6.96
Equip./Install.	Grout pump	1	Hour	$12.82	$12.82
Equip./Install.	Backhoe, 80 HP	1	Hour	$44.57	$44.57
Labor	Equipment Operators, Heavy	1	Hour	$22.46	$22.46
Labor	Skilled Labor	3	Hour	$23.57	$70.71
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$553.51

Practice: 356 - Dike

Scenario # 1 **Material haul < 1 mile**

Scenario Description: **Mississippi**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul < 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Practice Situation:

Site is subject to flooding or indundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

After Practice Situation:

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Scenario Feature Measure:

Volume of Earthfill (including volume of soil berm, as needed)

Scenario Typical Size: 4500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Earthfill, Roller Compacted	4500	Cubic yard	$3.43	$15,435.00
Mobilization	Mobilization, large equipment	3	Each	$255.47	$766.41
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$16,337.99

Practice: 359 - Waste Treatment Lagoon

Scenario # 1 **Waste Treatment Lagoon**

Scenario Description: **Mississippi**

A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. Earthen lagoon liners are addressed with another standard.Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632).

Before Practice Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Practice Situation:

A waste treatment lagoon constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan.Typical design size : Design Volume 439,440 ft3; 260' X 208' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13'; 1' freeboard (not included in design volume)

Scenario Feature Measure:

Design Storage Volume

Scenario Typical Size: 439440 Cubic Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Structural steel tubing, 2" diameter	8	Foot	$3.17	$25.36
Equip./Install.	Stripping and stockpiling, topsoil	1389	Cubic Yard	$0.78	$1,083.42
Equip./Install.	Earthfill, Dumped and Spread	1389	Cubic yard	$2.81	$3,903.09
Equip./Install.	Earthfill, Roller Compacted	9102	Cubic yard	$3.43	$31,219.86
Mobilization	Mobilization, large equipment	4	Each	$255.47	$1,021.88
				Total Cost:	$37,253.61

Practice: 362 - Diversion

Scenario # 1 Diversion

Scenario Description: **Mississippi**

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 500 feet long installed on a field slope of 5 percent and requires 1 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

Before Practice Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultral wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Practice Situation:

Diversion is installed using a dozer. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultral waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

Scenario Feature Measure:

Diversion Fill Volume

Scenario Typical Size: 500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Excavation, Common Earth, side cast, small equipment	500	Cubic yard	$1.86	$930.00
Labor	General Labor	2	Hour	$17.95	$35.90
Labor	Supervisor or Manager	2	Hour	$34.23	$68.46
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,170.94

Practice: 378 - Pond

Scenario # 1 **Embankment Pond without Pipe**

Scenario Description: **Mississippi**

A water impoundment structure on agricultural land to improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Practice Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.

After Practice Situation:

The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Scenario Feature Measure:

Embankment Volume

Scenario Typical Size: 1500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Earthfill, Roller Compacted	1500	Cubic yard	$3.43	$5,145.00
Labor	General Labor	8	Hour	$17.95	$143.60
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$5,425.18

Practice: 378 - Pond

Scenario # 2 **Embankment Pond with Pipe**

Scenario Description: **Mississippi**

A low-hazard water impoundment structure on agricultural land to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Practice Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.

After Practice Situation:

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 2000 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Scenario Feature Measure:

Embankment Volume

Scenario Typical Size: 2000 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Sand, Graded, Washed	19.6	Cubic yard	$23.56	$461.78
Materials	Trash Guard, metal	40	Pound	$2.09	$83.60
Materials	Pipe, PVC, dia. < 18", weight priced	628	Pound	$1.36	$854.08
Equip./Install.	Excavation, Common Earth, side cast, small equipment	1.6	Cubic yard	$1.86	$2.98
Equip./Install.	Earthfill, Roller Compacted	2000	Cubic yard	$3.43	$6,860.00
Equip./Install.	Concrete, CIP, formed reinforced	3	Cubic yard	$353.38	$1,060.14
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Labor	General Labor	40	Hour	$17.95	$718.00
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$10,365.71

Practice: 381 - Silvopasture

Scenario # 1 **Establish Trees**

Scenario Description: **Mississippi**

Establishment of trees into an existing pasture that contains adequate native or introduced forage.

Before Practice Situation:

Pasture with suitable forage for livestock. There is very little protection from the elements (sun, wind, etc.) available to the livestock. Additionally, there are no long-term wood products being produced. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Livestock Production Limitation - Inadequate Livestock Shelter.

After Practice Situation:

The site will be prepared using Tree/Shrub Site Preparation (490), if needed, and then 200 to 400 pine trees per acre will be planted, providing shade and wind protection to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are adressed.

Scenario Feature Measure:

Acres of silvopasture established

Scenario Typical Size: 10 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, conifer, seedling, bare root, 1-0	4000	Each	$0.06	$240.00
Equip./Install.	Tractor, agricultural, 60 HP	6	Hour	$19.28	$115.68
Equip./Install.	Mechanical tree planter	6	Hour	$4.38	$26.28
Labor	Equipment Operators, Light	12	Hour	$17.60	$211.20
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, Light Equipment Operator	4	Hour	$17.44	$69.76
				Total Cost:	$756.14

Practice: 382 - Fence

Scenario # 1 Barbed/Smooth Wire

Scenario Description: **Mississippi**

Multi-strand, Barbed or Smooth Wire - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate.

Before Practice Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Practice Situation:

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Scenario Feature Measure:

Length of Fence

Scenario Typical Size: 2640 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Post, Wood, CCA treated, 6" x 8'	12	Each	$20.58	$246.96
Materials	Gate, Pipe, 10'	2	Each	$159.27	$318.54
Materials	Post, Wood, CCA treated, 4" x 8'	6	Each	$10.69	$64.14
Materials	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	8	Each	$63.52	$508.16
Materials	Post, Steel T, 1.33 lbs, 6'	130	Each	$7.59	$986.70
Equip./Install.	Tractor, agricultural, 60 HP	40	Hour	$19.28	$771.20
Equip./Install.	Truck, Pickup	20	Hour	$25.85	$517.00
Equip./Install.	Auger, Post driver attachment	40	Hour	$7.30	$292.00
Labor	General Labor	96	Hour	$17.95	$1,723.20
Labor	Equipment Operators, Light	40	Hour	$17.60	$704.00
Mobilization	Mobilization, Light Equipment Operator	1	Hour	$17.44	$17.44
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, General labor	1	Hour	$17.84	$17.84
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$6,298.22

Practice: 382 - Fence

Scenario # 2 Woven Wire

Scenario Description: **Mississippi**

Woven - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc. Constructed using fencing materials rather than a pre-manufactured gate.

Before Practice Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, livestock access to water bodies is uncontrolled. Reduced vegetative cover increases opportunity for encroachment of noxious and invasive weeds.

After Practice Situation:

Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc... Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc.

Scenario Feature Measure:

Length of Fence

Scenario Typical Size: 2640 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Post, Wood, CCA treated, 6" x 8'	12	Each	$20.58	$246.96
Materials	Gate, Pipe, 10'	2	Each	$159.27	$318.54
Materials	Wire, Woven, Galvanized, 12.5 Gauge, 32"	8	Each	$166.41	$1,331.28
Materials	Post, Wood, CCA treated, 3-4" x 7'	6	Each	$9.04	$54.24
Materials	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	4	Each	$63.52	$254.08
Materials	Post, Steel T, 1.33 lbs, 6'	220	Each	$7.59	$1,669.80
Equip./Install.	Tractor, agricultural, 60 HP	40	Hour	$19.28	$771.20
Equip./Install.	Truck, Pickup	10	Hour	$25.85	$258.50
Equip./Install.	Auger, Post driver attachment	40	Hour	$7.30	$292.00
Labor	General Labor	96	Hour	$17.95	$1,723.20
Labor	Equipment Operators, Light	40	Hour	$17.60	$704.00
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, General labor	1	Hour	$17.84	$17.84
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$7,772.68

Practice: 382 - Fence

Scenario # 3 Electric

Scenario Description: **Mississippi**

Electric - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

Before Practice Situation:

On grazinglands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Practice Situation:

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Scenario Feature Measure:

Length of Fence

Scenario Typical Size: 1320 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Post, Fiberglass, ⅞" X 6'	27	Each	$9.24	$249.48
Materials	Post, Wood, CCA treated, 5" x 8'	4	Each	$15.72	$62.88
Materials	Wire, High Tensile, 12.5 Gauge, 4,000' roll	1	Each	$116.48	$116.48
Materials	Electric, Energizer, 3-4 joule	1	Each	$195.16	$195.16
Materials	Electric, Ground Rod Clamps	7	Each	$2.39	$16.73
Materials	Electric, Lightening Diverter	1	Each	$12.01	$12.01
Materials	Electric, Insulated cable	30	Each	$31.64	$949.20
Materials	Electric, Power Surge Protector	1	Each	$25.15	$25.15
Materials	Electric, Tester	1	Each	$34.60	$34.60
Materials	Electric, Ground Rods	7	Each	$12.84	$89.88
Equip./Install.	Tractor, agricultural, 60 HP	2	Hour	$19.28	$38.56
Equip./Install.	Auger, Post driver attachment	2	Hour	$7.30	$14.60
Labor	General Labor	8	Hour	$17.95	$143.60
				Total Cost:	$1,948.33

Practice: 386 - Field Border

Scenario # 1 **Field Border-Shrubs, Inc. Forgone**

Scenario Description: **Mississippi**

A strip of permanent vegetation and shrubs established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of herbaceous (Native warm season grasses (NWSG), legumes and forbs) and woody species. The area of the field border is taken out of production.

Before Practice Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Practice Situation:

This practice when applied around a field will support and connect other buffer practices within and between fields. Herbaceous plantings will be established to meet Field Border specifications and in addition shrubs will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Shrub species selected shall be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

Scenario Feature Measure:

Number of Acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Big Blue Stem (Andropogon gerardii)	2	Pound	$11.81	$23.62
Materials	Indian Grass, Tomahawk (Sorghastrum nutans)	2	Pound	$12.63	$25.26
Materials	Little Blue Stem (Schizachyrium scoparium)	4	Pound	$15.43	$61.72
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Tree, conifer, seedling, bare root, 1-0	1800	Each	$0.06	$108.00
Materials	Partidge Pea (Chamaecrista fasciculata)	4	Pound	$15.70	$62.80
Equip./Install.	Hand tools, tree planting	2	Hour	$9.44	$18.88
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Labor	General Labor	2	Hour	$17.95	$35.90
Forgone Income	FI, Rice	0.25	Acre	$401.74	$100.44
Forgone Income	FI, Soybeans Dryland	0.25	Acre	$168.41	$42.10
Forgone Income	FI, Cotton Dryland	0.25	Acre	$197.01	$49.25
Forgone Income	FI, Sorghum Dryland	0.25	Acre	$123.07	$30.77
				Total Cost:	$588.31

Practice: 386 - Field Border

Scenario # 2 **Field Border-Shrubs**

Scenario Description: **Mississippi**

A strip of permanent vegetation and shrubs established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of herbaceous (Native warm season grasses (NWSG), legumes and forbs) and woody species.

Before Practice Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Practice Situation:

This practice when applied around a field will support and connect other buffer practices within and between fields. Herbaceous plantings will be established to meet Field Border specifications and in addition shrubs will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Shrub species selected shall be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

Scenario Feature Measure:

Number of Acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Big Blue Stem (Andropogon gerardii)	2	Pound	$11.81	$23.62
Materials	Indian Grass, Tomahawk (Sorghastrum nutans)	2	Pound	$12.63	$25.26
Materials	Little Blue Stem (Schizachyrium scoparium)	4	Pound	$15.43	$61.72
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Tree, conifer, seedling, bare root, 1-0	1800	Each	$0.06	$108.00
Materials	Partidge Pea (Chamaecrista fasciculata)	4	Pound	$15.70	$62.80
Equip./Install.	Hand tools, tree planting	2	Hour	$9.44	$18.88
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Labor	General Labor	2	Hour	$17.95	$35.90
				Total Cost:	$365.75

Practice: 391 - Riparian Forest Buffer

Scenario # 1 **Bare-root, hardwood only**

Scenario Description: **Mississippi**

Establish a buffer of hardwood trees into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root deciduous trees. Generall, tree spacing is 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

Before Practice Situation:

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

After Practice Situation:

A buffer of trees will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 1500 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 6-18"	1500	Each	$0.25	$375.00
Equip./Install.	Hand tools, tree planting	10	Hour	$9.44	$94.40
Equip./Install.	All terrain vehicles, ATV	5	Hour	$28.26	$141.30
Equip./Install.	Trailer, enclosed, small	5	Hour	$3.42	$17.10
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
				Total Cost:	$942.98

Practice: 391 - Riparian Forest Buffer

Scenario # 2 **Bare-root, hardwood and pine**

Scenario Description: **Mississippi**

Establish a buffer of hardwood and pine trees into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root pine and deciduous trees. Generally, planting spacing is at 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

Before Practice Situation:

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

After Practice Situation:

A buffer of trees will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 2000 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 6-18"	1000	Each	$0.25	$250.00
Materials	Tree, conifer, seedling, bare root, 1-0	1000	Each	$0.06	$60.00
Equip./Install.	Hand tools, tree planting	10	Hour	$9.44	$94.40
Equip./Install.	All terrain vehicles, ATV	5	Hour	$28.26	$141.30
Equip./Install.	Trailer, enclosed, small	5	Hour	$3.42	$17.10
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
				Total Cost:	$877.98

Practice: 391 - Riparian Forest Buffer

Scenario # 3 **Bare-root, hardwood only with foregone income from crops**

Scenario Description: **Mississippi**

Establish a buffer of hardwood trees into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root deciduous trees. Generall, tree spacing is 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

Before Practice Situation:

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

After Practice Situation:

A buffer of trees will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

Scenario Feature Measure:

Area of planting

Scenario Typical Size: 5 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 6-18"	1500	Each	$0.25	$375.00
Equip./Install.	Hand tools, tree planting	10	Hour	$9.44	$94.40
Equip./Install.	All terrain vehicles, ATV	5	Hour	$28.26	$141.30
Equip./Install.	Trailer, enclosed, small	5	Hour	$3.42	$17.10
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
Forgone Income	FI, Cotton Dryland	5	Acre	$197.01	$985.05
				Total Cost:	$1,928.03

Practice: 391 - Riparian Forest Buffer

Scenario # 4 **Bare-root, hardwood and pine with foregone income from crops**

Scenario Description: **Mississippi**

Establish a buffer of hardwood and pine trees into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root pine and deciduous trees. Generally, planting spacing is at 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

Before Practice Situation:

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

After Practice Situation:

A buffer of trees will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

Scenario Feature Measure:

Area of planting

Scenario Typical Size: 5 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 6-18"	1000	Each	$0.25	$250.00
Materials	Tree, conifer, seedling, bare root, 1-0	1000	Each	$0.06	$60.00
Equip./Install.	Hand tools, tree planting	10	Hour	$9.44	$94.40
Equip./Install.	All terrain vehicles, ATV	5	Hour	$28.26	$141.30
Equip./Install.	Trailer, enclosed, small	5	Hour	$3.42	$17.10
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
Forgone Income	FI, Soybeans Dryland	5	Acre	$168.41	$842.05
				Total Cost:	$1,720.03

Practice: 393 - Filter Strip

Scenario # 1 **Filter Strip, Native species: Forgone Income**

Scenario Description: **Mississippi**

A strip or area of native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Scenario Feature Measure:

number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Partidge Pea (Chamaecrista fasciculata)	8	Pound	$15.70	$125.60
Materials	Wild Rye, Canada (Elymus canadensis)	20	Pound	$9.32	$186.40
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Forgone Income	FI, Sorghum Dryland	0.25	Acre	$123.07	$30.77
Forgone Income	FI, Rice	0.25	Acre	$401.74	$100.44
Forgone Income	FI, Cotton Dryland	0.25	Acre	$197.01	$49.25
Forgone Income	FI, Soybeans Dryland	0.25	Acre	$168.41	$42.10
				Total Cost:	$564.13

Practice: 393 - Filter Strip

Scenario # 2 **Filter Strip, Introduced species: Forgone Income**

Scenario Description: **Mississippi**

A strip or area of Introduced herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of introduced species. The area of the filter strip is taken out of production.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Fescue, Tall (Festuca arundinacea)	20	Pound	$1.80	$36.00
Materials	Phosphorus, P2O5	20	Pound	$0.78	$15.60
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Red Clover (Trifolium pratense)	10	Pound	$2.60	$26.00
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Forgone Income	FI, Sorghum Dryland	0.25	Acre	$123.07	$30.77
Forgone Income	FI, Rice	0.25	Acre	$401.74	$100.44
Forgone Income	FI, Cotton Dryland	0.25	Acre	$197.01	$49.25
Forgone Income	FI, Soybeans Dryland	0.25	Acre	$168.41	$42.10
				Total Cost:	$347.43

Practice: 393 - Filter Strip

Scenario # 3 **Filter Strip, Native Species w/ Land Shaping: Forgone Income**

Scenario Description: **Mississippi**

A strip or area of Native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Partidge Pea (Chamaecrista fasciculata)	8	Pound	$15.70	$125.60
Materials	Wild Rye, Canada (Elymus canadensis)	20	Pound	$9.32	$186.40
Equip./Install.	Dozer, 80 HP	2	Hour	$54.19	$108.38
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Forgone Income	FI, Sorghum Dryland	0.25	Acre	$123.07	$30.77
Forgone Income	FI, Rice	0.25	Acre	$401.74	$100.44
Forgone Income	FI, Cotton Dryland	0.25	Acre	$197.01	$49.25
Forgone Income	FI, Soybeans Dryland	0.25	Acre	$168.41	$42.10
				Total Cost:	$717.43

Practice: 393 - Filter Strip

Scenario # 4 **Filter Strip, Introduced Species w/ Land Shaping: Forgone Income**

Scenario Description: **Mississippi**

A strip or area of herbaceous vegetation, introduced species, situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep, land shaping and planting of approved species. The area of the filter strip is taken out of production.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Fescue, Tall (Festuca arundinacea)	20	Pound	$1.80	$36.00
Materials	Phosphorus, P2O5	20	Pound	$0.78	$15.60
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Red Clover (Trifolium pratense)	10	Pound	$2.60	$26.00
Equip./Install.	Dozer, 80 HP	2	Hour	$54.19	$108.38
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Forgone Income	FI, Sorghum Dryland	0.25	Acre	$123.07	$30.77
Forgone Income	FI, Rice	0.25	Acre	$401.74	$100.44
Forgone Income	FI, Cotton Dryland	0.25	Acre	$197.01	$49.25
Forgone Income	FI, Soybeans Dryland	0.25	Acre	$168.41	$42.10
				Total Cost:	$500.73

Practice: 393 - Filter Strip

Scenario # 5 **Filter Strip, Native species**

Scenario Description: **Mississippi**

A strip or area of native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Scenario Feature Measure:

number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Partidge Pea (Chamaecrista fasciculata)	8	Pound	$15.70	$125.60
Materials	Wild Rye, Canada (Elymus canadensis)	20	Pound	$9.32	$186.40
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
				Total Cost:	$341.57

Practice: 393 - Filter Strip

Scenario # 6 **Filter Strip, Introduced species**

Scenario Description: **Mississippi**

A strip or area of Introduced herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of introduced species.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Fescue, Tall (Festuca arundinacea)	20	Pound	$1.80	$36.00
Materials	Phosphorus, P2O5	20	Pound	$0.78	$15.60
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Red Clover (Trifolium pratense)	10	Pound	$2.60	$26.00
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
				Total Cost:	$124.87

Practice: 393 - Filter Strip

Scenario # 7 **Native Species Filter Strip w/ Land Shaping**

Scenario Description: **Mississippi**

A strip or area of Native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Partidge Pea (Chamaecrista fasciculata)	8	Pound	$15.70	$125.60
Materials	Wild Rye, Canada (Elymus canadensis)	20	Pound	$9.32	$186.40
Equip./Install.	Dozer, 80 HP	2	Hour	$54.19	$108.38
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
				Total Cost:	$494.87

Practice: 393 - Filter Strip

Scenario # 8 Introduced Species Filter Strip w/ Land Shaping

Scenario Description: **Mississippi**

A strip or area of herbaceous vegetation, introduced species, situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep, land shaping and planting of approved species.

Before Practice Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Practice Situation:

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Scenario Feature Measure:

Number of acres

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	1	Acre	$11.04	$11.04
Materials	Fescue, Tall (Festuca arundinacea)	20	Pound	$1.80	$36.00
Materials	Phosphorus, P2O5	20	Pound	$0.78	$15.60
Materials	Nitrogen (N), Urea	30	Pound	$0.59	$17.70
Materials	Red Clover (Trifolium pratense)	10	Pound	$2.60	$26.00
Equip./Install.	Dozer, 80 HP	2	Hour	$54.19	$108.38
Equip./Install.	Seeding Operation, No Till/Grass Drill	1	Acre	$14.20	$14.20
Equip./Install.	Chemical, ground application	1	Acre	$4.33	$4.33
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
				Total Cost:	$278.17

Practice: 394 - Firebreak

Scenario # 1 **Constructed - Medium equipment, flat-medium slopes**

Scenario Description: **Mississippi**

Use of medium equipment such as dozers to blade, disk, plow, etc. bare-soil firebreaks on slopes less than 15% along the boundary line or edge of the forest. All necessary water bars and/or wing ditches must be installed according to specifications to control erosion. Payment calculated for one erosion control structure every 80 ft. in. addition to cost of fire break. This practice implemented ONLY in the areas where the slope meet these requirements. Firebreak should average at least 15 feet wide (not to be less than 10' wide)Resource concerns include Wildfire hazards from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

Before Practice Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical.

After Practice Situation:

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is negligible.

Scenario Feature Measure:

Length of firebreak

Scenario Typical Size: 4000 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Water Bars	1500	Foot	$1.22	$1,830.00
Equip./Install.	All terrain vehicles, ATV	24	Hour	$28.26	$678.24
Equip./Install.	Truck, Pickup	6	Hour	$25.85	$155.10
Equip./Install.	Dozer, 140 HP	24	Hour	$100.14	$2,403.36
Labor	Equipment Operators, Heavy	24	Hour	$22.46	$539.04
Labor	General Labor	24	Hour	$17.95	$430.80
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	$22.25	$22.25
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$6,195.37

Practice: 394 - Firebreak

Scenario # 2 Vegetated permanent firebreak

Scenario Description: **Mississippi**

Establishing a 30 foot wide strip of permanent vegetation that will serve as a green firebreak. Scenario includes clearing the site, preparing the seedbed, seeding (typically cool season grasses and/or legumes), and applying needed soil amendments. Clearing will be achieved with the use of a bush hog or similar equipment. Seedbed preparation and vegetation establishment will be accomplished with farm equipment. Soil amendments will be applied according to local FOTG guidance. This scenario does not include follow-up maintenance operations such as weed control. mowing, etc. Resource concerns include Wildfire hazard from excessive biomass accumulation, Soil erosion, and Excessive sediment in surface waters.

Before Practice Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.

After Practice Situation:

The property is adequately protected from wildfire or can be safely prescribe burned. Wildlife habitat will also be enhanced and the potential for erosion from the firebreak is minimized.

Scenario Feature Measure:

Length of firebreak

Scenario Typical Size: 3000 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Phosphorus, P2O5	70	Pound	$0.78	$54.60
Materials	Potassium, K2O	70	Pound	$0.52	$36.40
Materials	Lime, ENM	1	Ton	$49.57	$49.57
Materials	Orchard Grass (Dactylis glomerata)	8	Pound	$2.04	$16.32
Materials	Crimson Clover (Trifolium incarnatum)	8	Pound	$2.25	$18.00
Materials	Perennial Ryegrass (Lolium perenne)	60	Pound	$1.94	$116.40
Equip./Install.	Seeding Operation, No Till/Grass Drill	2	Acre	$14.20	$28.40
Equip./Install.	Fertilizer, ground application, dry bulk	2	Acre	$6.97	$13.94
Equip./Install.	Tillage, Primary	4	Acre	$14.78	$59.12
Equip./Install.	Lime application	2	Acre	$10.43	$20.86
Equip./Install.	Truck, Pickup	8	Hour	$25.85	$206.80
Equip./Install.	Tillage, Light	2	Acre	$9.75	$19.50
Equip./Install.	Mower, Bush Hog	4	Hour	$42.07	$168.28
Labor	General Labor	8	Hour	$17.95	$143.60
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
Mobilization	Mobilization, General labor	1	Hour	$17.84	$17.84
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
				Total Cost:	$1,100.67

Practice: 410 - Grade Stabilization Structure

Scenario # 1 **Check Dams**

Scenario Description: **Mississippi**

Typical setting is on a 40-acre pasture/hayland field having a slope of 5 to 10 percent where ephemeral gullies have formed. Typical installation consists of stabilizing/regrading the gully and installing six check dams with a top width of 3', average height of 2.5', 19' length, and 2:1 side slopes, ; containing an average of 21 tons of rock for a total of 126 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

Before Practice Situation:

The operator presently has erosion gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed vegetation of disturbed areas use Critical Area Planting (342).

Scenario Feature Measure:

Tons of rock installed

Scenario Typical Size: 126 Ton

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Rock Riprap, Placed with geotextile	84	Cubic yard	$58.09	$4,879.56
Equip./Install.	Excavation, common earth, large equipment, 50 ft	160	Cubic Yard	$1.39	$222.40
Labor	General Labor	8	Hour	$17.95	$143.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$5,518.72

Practice: 410 - Grade Stabilization Structure

Scenario # 2 **Embankment, Pipe <= 6"**

Scenario Description: **Mississippi**

An earthen embankment dam with a principal spillway pipe of 6 inches or less. Assessment shows anti-seep collars or sand diaphragms are not required. To stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,000 cubic yards, and 80 feet of pipe 6" PVC pipe with a canopy inlet. A small, non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size: 2000 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, 6", SCH 40	80	Foot	$5.45	$436.00
Equip./Install.	Hydraulic Excavator, 1 CY	5	Hour	$91.71	$458.55
Equip./Install.	Earthfill, Roller Compacted	2000	Cubic yard	$3.43	$6,860.00
Equip./Install.	Earthfill, Manually Compacted	20	Cubic yard	$4.59	$91.80
Labor	Equipment Operators, Heavy	5	Hour	$22.46	$112.30
Labor	Skilled Labor	20	Hour	$23.57	$471.40
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$8,882.71

Practice: 410 - Grade Stabilization Structure

Scenario # 3 **Embankment, Pipe 8"-12"**

Scenario Description: **Mississippi**

An earthen embankment dam with a principle spillway pipe between 8 and 12 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" pace, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size: 2500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, 10", SCH 80	90	Foot	$16.32	$1,468.80
Materials	Pipe, PVC, 2", SCH 40	60	Foot	$1.06	$63.60
Materials	Aggregate, Sand, Graded, Washed	3	Cubic yard	$23.56	$70.68
Equip./Install.	Hydraulic Excavator, 1 CY	10	Hour	$91.71	$917.10
Equip./Install.	Earthfill, Roller Compacted	2500	Cubic yard	$3.43	$8,575.00
Equip./Install.	Earthfill, Manually Compacted	29	Cubic yard	$4.59	$133.11
Labor	Equipment Operators, Heavy	10	Hour	$22.46	$224.60
Labor	Skilled Labor	30	Hour	$23.57	$707.10
Labor	General Labor	30	Hour	$17.95	$538.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$13,009.47

Practice: 410 - Grade Stabilization Structure

Scenario # 4 **Embankment, Pipe >12"**

Scenario Description: **Mississippi**

An earthen embankment dam with a principle spillway pipe greater than 12 inches. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, smooth steel drop inlet principle spillway with a 7 ft riser and 90 ft barrel, and 82 Square feet of anti-seep collars. A rock lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size: 2500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 12", Std Wt, USED	90	Foot	$22.41	$2,016.90
Materials	Pipe, Steel, 16", Std Wt, USED	7	Foot	$30.59	$214.13
Materials	Dimension Lumber, Treated	30	Board Foot	$0.72	$21.60
Materials	Steel, Plate, ⅛"	82	Square Foot	$4.23	$346.86
Materials	Rock Riprap, Placed with geotextile	14	Cubic yard	$58.09	$813.26
Equip./Install.	Hydraulic Excavator, 1 CY	13	Hour	$91.71	$1,192.23
Equip./Install.	Earthfill, Roller Compacted	2500	Cubic yard	$3.43	$8,575.00
Equip./Install.	Concrete, CIP, formed reinforced	2	Cubic yard	$353.38	$706.76
Equip./Install.	Earthfill, Manually Compacted	129	Cubic yard	$4.59	$592.11
Equip./Install.	Concrete, CIP, formless, non reinforced	1	Cubic yard	$109.17	$109.17
Labor	Equipment Operators, Heavy	13	Hour	$22.46	$291.98
Labor	Skilled Labor	38	Hour	$23.57	$895.66
Labor	General Labor	42	Hour	$17.95	$753.90
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$16,840.54

Practice: 410 - Grade Stabilization Structure

Scenario # 5 **Embankment,Soil Treatment**

Scenario Description: **Mississippi**

An earthen embankment dam with a principal spillway pipe where on site soils are not acceptable and require extra processing or hauling from off farm, distances greater than one mile. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" pace, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size: 2500 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, 10", SCH 80	90	Foot	$16.32	$1,468.80
Materials	Pipe, PVC, 2", SCH 40	60	Foot	$1.06	$63.60
Materials	Aggregate, Sand, Graded, Washed	3	Cubic yard	$23.56	$70.68
Equip./Install.	Hydraulic Excavator, 1 CY	10	Hour	$91.71	$917.10
Equip./Install.	Earthfill, Roller Compacted	2500	Cubic yard	$3.43	$8,575.00
Equip./Install.	Hauling, bulk, highway truck	25000	Cubic Yard Mile	$0.27	$6,750.00
Equip./Install.	Earthfill, Manually Compacted	29	Cubic yard	$4.59	$133.11
Labor	Equipment Operators, Heavy	10	Hour	$22.46	$224.60
Labor	Skilled Labor	30	Hour	$23.57	$707.10
Labor	General Labor	30	Hour	$17.95	$538.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$19,759.47

Practice: 410 - Grade Stabilization Structure

Scenario # 6 **Pipe Drop, Plastic**

Scenario Description: **Mississippi**

A full flow pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon 6 ft high 18" (1.5') PVC riser with a 40 ft long barrel (1.5' x 3.14 x 40' = 188 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Riser Weir Length x Barrel Length

Scenario Typical Size: 188 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, 18", SCH 40	40	Foot	$27.34	$1,093.60
Materials	Pipe, PVC, 24", ASTM-2241, SDR 26	6	Foot	$33.95	$203.70
Materials	Coupling, PVC, Tee, 24x18, SCH 40	1	Each	$2,243.54	$2,243.54
Equip./Install.	Concrete, CIP, formed reinforced	1	Cubic yard	$353.38	$353.38
Equip./Install.	Earthfill, Manually Compacted	20	Cubic yard	$4.59	$91.80
Equip./Install.	Earthfill, Roller Compacted	100	Cubic yard	$3.43	$343.00
Equip./Install.	Hydraulic Excavator, 1 CY	2	Hour	$91.71	$183.42
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Labor	General Labor	8	Hour	$17.95	$143.60
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$4,875.36

Practice: 410 - Grade Stabilization Structure

Scenario # 7 **Pipe Drop, Steel**

Scenario Description: **Mississippi**

A full flow pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a smooth steel pipe drop structure with a 36", 12' tall riser and a 100' long 30" barrel (Riser Weir length x Barrel Length = 3ft x 3.14 x 30ft = 940). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Riser Weir Length x Barrel Length

Scenario Typical Size: 940 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 30", Std Wt, USED	100	Foot	$85.56	$8,556.00
Materials	Pipe, Steel, 36", Std Wt, USED	12	Foot	$100.14	$1,201.68
Materials	Steel, Plate, 3/8"	9	Square Foot	$12.84	$115.56
Materials	Steel, Plate, ⅛"	30	Square Foot	$4.23	$126.90
Equip./Install.	Hydraulic Excavator, 1 CY	4	Hour	$91.71	$366.84
Equip./Install.	Earthfill, Roller Compacted	600	Cubic yard	$3.43	$2,058.00
Equip./Install.	Earthfill, Manually Compacted	100	Cubic yard	$4.59	$459.00
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Labor	Skilled Labor	11	Hour	$23.57	$259.27
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$13,723.57

Practice: 410 - Grade Stabilization Structure

Scenario # 8 **Weir Drop Structures**

Scenario Description: **Mississippi**

A Straight, semicircular, or Box Drop structure composed of metal or reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Feet of Weir length times Drop Height

Scenario Typical Size: 90 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Corrugated Steel, 12 Gauge, galvanized	212	Square Foot	$9.27	$1,965.24
Materials	Pipe, CMP, 12", 14 Gauge	2	Foot	$8.58	$17.16
Materials	Rock Riprap, graded, angular, material and shipping	11	Ton	$26.50	$291.50
Materials	Aggregate, Gravel, Graded	3	Cubic yard	$24.48	$73.44
Equip./Install.	Hydraulic Excavator, 1 CY	5	Hour	$91.71	$458.55
Equip./Install.	Earthfill, Roller Compacted	75	Cubic yard	$3.43	$257.25
Equip./Install.	Concrete, CIP, formed reinforced	9	Cubic yard	$353.38	$3,180.42
Equip./Install.	Geotextile, woven	9	Square Yard	$2.15	$19.35
Equip./Install.	Excavation, Common Earth, side cast, small equipment	40	Cubic yard	$1.86	$74.40
Labor	Equipment Operators, Heavy	5	Hour	$22.46	$112.30
Labor	Skilled Labor	10	Hour	$23.57	$235.70
Labor	General Labor	30	Hour	$17.95	$538.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$7,496.97

Practice: 410 - Grade Stabilization Structure

Scenario # 9 **Rock Drop Structures**

Scenario Description: **Mississippi**

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Feet of Weir length times Drop Height

Scenario Typical Size: 48 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Gabion basket or mat	7	Cubic Yard	$144.90	$1,014.30
Equip./Install.	Earthfill, Roller Compacted	40	Cubic yard	$3.43	$137.20
Equip./Install.	Hydraulic Excavator, 1 CY	5	Hour	$91.71	$458.55
Equip./Install.	Excavation, Common Earth, side cast, small equipment	7	Cubic yard	$1.86	$13.02
Equip./Install.	Geotextile, woven	23	Square Yard	$2.15	$49.45
Equip./Install.	Tractor, agricultural, 210 HP	3	Hour	$94.20	$282.60
Labor	Supervisor or Manager	10	Hour	$34.23	$342.30
Labor	General Labor	10	Hour	$17.95	$179.50
Labor	Equipment Operators, Heavy	5	Hour	$22.46	$112.30
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$2,862.38

Practice: 412 - Grassed Waterway

Scenario # 1 **Base Waterway**

Scenario Description: **Mississippi**

Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Practice Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Practice Situation:

Installed grassed waterway is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. The practice is installed using a dozer. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure:

Acre of Waterway

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Excavation, common earth, large equipment, 50 ft	800	Cubic Yard	$1.39	$1,112.00
Labor	Supervisor or Manager	1	Hour	$34.23	$34.23
Labor	General Labor	4	Hour	$17.95	$71.80
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,354.61

Practice: 412 - Grassed Waterway

Scenario # 2 **Grass Waterway with Checks**

Scenario Description: **Mississippi**

Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Fabric or stone checks are installed every 100 feet along the length of the waterway perpendicular to waterflow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. Fabric Checks are installed 18" deep with 12" laid over on the surface. (Alternatively, rock checks could be installed). This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Practice Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Practice Situation:

Installed grassed waterway is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. Fabric checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Fabric or stone checks are installed with small backhoe and labor. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure:

Acre of Waterway

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Geotextile, non-woven, light weight	132	Square Yard	$1.87	$246.84
Equip./Install.	Excavation, common earth, large equipment, 50 ft	800	Cubic Yard	$1.39	$1,112.00
Equip./Install.	Excavation, Common Earth, side cast, small equipment	33	Cubic yard	$1.86	$61.38
Equip./Install.	Earthfill, Manually Compacted	33	Cubic yard	$4.59	$151.47
Labor	Supervisor or Manager	2	Hour	$34.23	$68.46
Labor	General Labor	12	Hour	$17.95	$215.40
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$2,123.17

Practice: 422 - Hedgerow Planting

Scenario # 1 **Wildlife, Trees - Shrubs only**

Scenario Description: **Mississippi**

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: corridors for habitat conectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants.Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight - ten foot intervals (this will vary with species selection and density goals). The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Practice Situation:

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

After Practice Situation:

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by corridors of dense hedgerow vegetation. Food resources in crop fields are made availble by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

Scenario Feature Measure:

Length and width of Hedgerow

Scenario Typical Size: 660 Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 16-36"	66	Each	$0.26	$17.16
Materials	Shrub, seedling or transplant, bare root, 18"-36"	166	Each	$0.69	$114.54
Materials	Tree shelter, solid tube type, 3-1/4" x 36"	166	Each	$2.56	$424.96
Equip./Install.	Tractor, agricultural, 120 HP	1	Hour	$47.06	$47.06
Equip./Install.	Tillage, Primary	1	Acre	$14.78	$14.78
Equip./Install.	Hand tools, tree planting	2	Hour	$9.44	$18.88
Labor	General Labor	2	Hour	$17.95	$35.90
Labor	Equipment Operators, Light	1	Hour	$17.60	$17.60
				Total Cost:	$690.88

Practice: 422 - Hedgerow Planting

Scenario # 2 **Wildlife - Trees-Shrubs-NWSG**

Scenario Description: **Mississippi**

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: corridors for habitat conectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants.Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight - ten foot intervals (this will vary with species selection and density goals). A mix of at least 3 native warm season grasses (NWSG) and forbs adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Practice Situation:

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

After Practice Situation:

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by corridors of dense hedgerow vegetation. Food resources in crop fields are made availble by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

Scenario Feature Measure:

Length and width of Hedgerow

Scenario Typical Size: 660 Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 16-36"	66	Each	$0.26	$17.16
Materials	Shrub, seedling or transplant, bare root, 18"-36"	166	Each	$0.69	$114.54
Materials	Little Blue Stem (Schizachyrium scoparium)	0.75	Pound	$15.43	$11.57
Materials	Stiff Goldenrod (Solidago rigida)	0.25	Pound	$143.45	$35.86
Materials	Big Blue Stem (Andropogon gerardii)	0.25	Pound	$11.81	$2.95
Materials	Indian Grass, Tomahawk (Sorghastrum nutans)	0.25	Pound	$12.63	$3.16
Materials	Tree shelter, solid tube type, 3-1/4" x 36"	166	Each	$2.56	$424.96
Equip./Install.	Tractor, agricultural, 120 HP	2	Hour	$47.06	$94.12
Equip./Install.	Tillage, Primary	0.25	Acre	$14.78	$3.70
Equip./Install.	Seeding Operation, No Till/Grass Drill	0.25	Acre	$14.20	$3.55
Equip./Install.	Hand tools, tree planting	2	Hour	$9.44	$18.88
Labor	General Labor	2	Hour	$17.95	$35.90
Labor	Equipment Operators, Light	2	Hour	$17.60	$35.20
				Total Cost:	$801.55

Practice: 430 - Irrigation Pipeline

Scenario # 1 **PVC (Iron Pipe Size) <2" Micro (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 1 ½-inch. Construct 260' of 1-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. 260' of 1 ½ inch, Class 125 (SDR-32.5) PVC pipe weighs 0.227 lb/ft, or a total of 59.02 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 260 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	64.9	Pound	$1.36	$88.26
Equip./Install.	Trenching, Pipeline Plowing	260	Foot	$1.00	$260.00
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$729.12

Practice: 430 - Irrigation Pipeline

Scenario # 2 **PVC (Iron Pipe Size) 2" - <4" Micro (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 3-inch. Construct 260 feet of 3-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 3-inch, Class 125 (SDR-32.5) PVC pipe weighs .730 lb/ft, or a total of 189.8 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 260 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	208.78	Pound	$1.36	$283.94
Equip./Install.	Trenching, Pipeline Plowing	260	Foot	$1.00	$260.00
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$924.80

Practice: 430 - Irrigation Pipeline

Scenario # 3 **PVC (Iron Pipe Size) 4" - 6" Micro (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 5-inch. Construct 260 feet of 5-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 5-inch, Class 125 (SDR-32.5) PVC pipe weighs 1.810 lb/ft, or a total of 470.6 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 260 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	517.66	Pound	$1.36	$704.02
Equip./Install.	Trenching, Pipeline Plowing	260	Foot	$1.00	$260.00
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$1,344.88

Practice: 430 - Irrigation Pipeline

Scenario # 4 **PVC (Iron Pipe Size) 8" Micro (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 8-inch. Construct 260 feet of 8-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 8-inch, Class 125 (SDR-32.5) PVC pipe weighs 4.348 lb/ft, or a total of 1130.5 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 260 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	1243.5	Pound	$1.36	$1,691.16
Equip./Install.	Trenching, Pipeline Plowing	260	Foot	$1.00	$260.00
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$2,332.02

Practice: 430 - Irrigation Pipeline

Scenario # 5 **PVC (Plastic Irrigation Pipe) ≤ 10" ft**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 8-inch. Construct 1/4 mile (1,320 feet) of 8-inch, Class 50 (SDR-81.0), PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 8-inch, Class 50 (SDR-81.0) PVC PIP weighs 2.515 lb/ft, or a total of 3319.8 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of pipe

Scenario Typical Size: 1320 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	3651.8	Pound	$1.36	$4,966.45
Equip./Install.	Trenching, Earth, 12" x 48"	1320	Foot	$1.09	$1,438.80
Labor	General Labor	48	Hour	$17.95	$861.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$7,540.01

Practice: 430 - Irrigation Pipeline

Scenario # 6 **PVC (Plastic Irrigation Pipe) 12" ft**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 12-inch. Construct 1/4 mile (1,320 feet) of 12-inch, Class 80 (SDR-51.0) , PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 12-inch, Class 80 (SDR-51.0) PVC PIP weighs 5.654 lb/ft, or a total of 7,463 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of pipe

Scenario Typical Size: 1320 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	8209	Pound	$1.36	$11,164.24
Equip./Install.	Trenching, Earth, loam, 24" x 48"	1320	Foot	$2.49	$3,286.80
Labor	General Labor	48	Hour	$17.95	$861.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$15,585.80

Practice: 430 - Irrigation Pipeline

Scenario # 7 **PVC (Plastic Irrigation Pipe) 15" (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 15-inch. Construct 1/4 mile (1,320 feet) of 15-inch, Class 80 (SDR-51.0) , PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 15-inch, Class 80 (SDR-51.0) PVC PIP weighs 8.874 lb/ft, or a total of 11,713.7 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of pipe

Scenario Typical Size: 1320 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	12885	Pound	$1.36	$17,523.60
Equip./Install.	Trenching, Earth, loam, 24" x 48"	1320	Foot	$2.49	$3,286.80
Labor	General Labor	48	Hour	$17.95	$861.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$21,945.16

Practice: 430 - Irrigation Pipeline

Scenario # 8 **PVC (Plastic Irrigation Pipe) ≥18" (ft)**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 21-inch. Construct 1/4 mile (1,320 feet) of 21-inch, Class 80 (SDR-51.0), PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 21-inch, Class 80 (SDR-51.0) PVC PIP weighs 18.41 lb/ft, or a total of 24,301 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of pipe

Scenario Typical Size: 1320 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, steel, smooth wall, galvanized, weight priced	26731	Pound	$1.49	$39,829.19
Equip./Install.	Trenching, Earth, loam, 24" x 48"	1320	Foot	$2.49	$3,286.80
Labor	General Labor	48	Hour	$17.95	$861.60
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$44,250.75

Practice: 430 - Irrigation Pipeline

Scenario # 9 **Steel (IPS) StreamXSleeve**

Scenario Description: **Mississippi**

Description: Steel (Iron Pipe Size) sleeve for PVC underground pipeline. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 18-inch; and typical scenario size is 18-inch. Construct 60 ft of 18-inch, Schedule 10, Galvanized Steel Pipe across a stream as a sleeve for a PVC underground pipeline. The unit is the weight of pipe material in pounds. 60 feet of 18-inch, Schedule 10, Galvanized Steel Pipe weighs 47.39 lb/ft, for total of 2843.4 pounds. Typical installation applies to soils with no special bedding requirements.Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use.

Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 60 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, smooth steel, weight priced	2843.4	Pound	$1.10	$3,127.74
Equip./Install.	Backhoe, 80 HP	4	Hour	$44.57	$178.28
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Equip./Install.	Portable Welder	4	Hour	$16.39	$65.56
Labor	Skilled Labor	4	Hour	$23.57	$94.28
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$3,743.98

Practice: 430 - Irrigation Pipeline

Scenario # 10 **Stand Pipe, Steel (IPS)**

Scenario Description: **Mississippi**

Description: New or replacement of Steel (Iron Pipe Size) stand or manifold. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 16-inch to 36-inch; and typical scenario size is 30-inch. Fabricate and install 8 ft of 30-inch, Schedule 10, Galvanized Steel Pipe stand/manifold at a well, relift pump or within a pipeline . The unit is the weight of pipe material in pounds. 8 feet of 30-inch, Schedule 10, Galvanized Steel Pipe weighs 98.93 lb/ft, for total of 791.4 pounds. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

An old undersizes stand pipe/manifold in need of replacing or no stand pipe/manifold currently in place.

After Practice Situation:

Stand pipe/Manifold installed either at a well, relift or at a junction of several underground pipelines.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 8 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, smooth steel, weight priced	870.6	Pound	$1.10	$957.66
Materials	Steel, Plate, ⅛"	4.91	Square Foot	$4.23	$20.77
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Labor	Equipment Operators, Heavy	6	Hour	$22.46	$134.76
Equip./Install.	Portable Welder	6	Hour	$16.39	$98.34
Labor	Skilled Labor	6	Hour	$23.57	$141.42
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,808.65

Practice: 430 - Irrigation Pipeline

Scenario # 11 Dog Leg, Steel (IPS)

Scenario Description: **Mississippi**

Description: New or replacement of Steel (Iron Pipe Size) stand or manifold. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 10-inch to 18-inch; and typical scenario size is 12-inch. Fabricate and install 12 ft of 12-inch, Schedule 10, Galvanized Steel Pipe dogleg/z pipe at a well or relift pump. The unit is the weight of pipe material in pounds. 12 feet of 12-inch, Schedule 10, Galvanized Steel Pipe weighs 24.16 lb/ft, for total of 289.9 pounds. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Practice Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Practice Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 12 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, smooth steel, weight priced	319.9	Pound	$1.10	$351.89
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Labor	Equipment Operators, Heavy	6	Hour	$22.46	$134.76
Equip./Install.	Portable Welder	6	Hour	$16.39	$98.34
Labor	Skilled Labor	6	Hour	$23.57	$141.42
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,182.11

Practice: 436 - Irrigation Reservoir

Scenario # 1 **Embankment Dam with On-Site Borrow**

Scenario Description: **Mississippi**

The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway outlet through the embankment, is controlled by a canal-style gate. Outlet can also serve as overflow protection with a 12" diameter standpipe and tee to the 18" pipe. Any watershed runoff will be diverted around reservoir. It will be built with approximately 4,500 cubic yards of on-site material. It will be about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 acre-feet). The top of berm will be 10 feet wide and the embankment side slopes will be 2.5 H to 1 V up and down stream. Resource concern: Insufficient Water - Inefficient use of irrigation water.Associated practices include: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 378 - Pond; 447 - Irrigation System, Tailwater Recovery; 484 - Mulching; and 342 - Critical Area Planting.

Before Practice Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.Divert water around - no spillway

After Practice Situation:

This is an embankment, installed across a natural off-stream intermittent watercourse, used to store water for subsequent irrigation. It will be used to accumulate and store water for timely and efficient application of water through an irrigation system The water source could be a well, irrigation district pipeline, and/or a pump from a stream. It is designed to deliver water by gravity to an open ditch or non-pressurized pipeline, generally in excess of 5 cfs. All earthen materials will be from on-site sources.

Scenario Feature Measure:

Volume of Compacted Eartfill

Scenario Typical Size: 4500 Cubic Yards

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Screw gate, cast iron, 18" diameter, 10/0 head	1	Each	$958.00	$958.00
Materials	Pipe, HDPE, CPT, Double Wall, Soil Tight, 12"	36	Foot	$8.41	$302.76
Materials	Pipe, HDPE, CPT, Double Wall, Soil Tight, 18"	120	Foot	$10.86	$1,303.20
Materials	Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12"	1	Each	$378.76	$378.76
Equip./Install.	Excavation, common earth, large equipment, 1500 ft	4500	Cubic Yard	$3.59	$16,155.00
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Labor	General Labor	16	Hour	$17.95	$287.20
Mobilization	Mobilization, large equipment	2	Each	$255.47	$510.94
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Forgone Income	Foregone income, place holder	1	Acre	$0.00	$0.00
				Total Cost:	$20,442.86

Practice: 436 - Irrigation Reservoir

Scenario # 2 **Reservoir Machine Compacted**

Scenario Description: **Mississippi**

Due to the nature of the alluvial soils in the area, especially the high clay content soils, extra compaction is required to work the material into a proper density and to avoid macropores. This is an on-farm storage reservoir constructed from on-site borrow to construct levees above the natural grade. Water is pumped from on-farm drainage (storm runoff, irrigation return flows) into the structure. Typically, the runoff is temporarily stored in a adjacent tailwater channel. The levees are constructed with a 12 foot top and a 4 foot berm at full pool conditions to prevent wave action erosion. The levees are typically built 8 feet above ground with a two to three foot cut in the reservoir bottom. Typical size is 50,000 to 60,000 cuyds of earthfuill. An auxiliary spillway is set at the berm elevation to prevent water level rises above the berm. Critical Area Planting and Mulching is required.Resource Concern: Aquifer Overdraft, Excess nutrients in surface water.Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Practice Situation:

Current irrigation system relies on pumped groundwater from an aquifer that is being mined (aquifer overdraft). Farm runoff containing nutients and sediments is not captured.

After Practice Situation:

The on-farm storage reservoir will accumulate and store on-farm runoff during the winter and early spring for use as irrigation water during the growing season as irrigation water, reducing groundwater demand by 75%, reducing storm runoff from the farm by 50% and reducing nutrient delivery similarly.

Scenario Feature Measure:

Volume of Compacted Earthfill

Scenario Typical Size: 55000 Cubic Yards

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 18", Std Wt	100	Foot	$80.00	$8,000.00
Equip./Install.	Earthfill, Roller Compacted	55000	Cubic yard	$3.43	$188,650.00
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, large equipment	3	Each	$255.47	$766.41
Forgone Income	FI, Rice	25	Acre	$401.74	$10,043.50
				Total Cost:	$208,431.37

Practice: 436 - Irrigation Reservoir

Scenario # 3 **Delta Tailwater Pit**

Scenario Description: **Mississippi**

This is an excavated pit with a control structure. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. It will have a bottom width of 20 ft and length of 1,250 feet. The side slopes will be no steeper than 1.5 H to 1 V inside and out. It will be built with approximately 20,000 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 1 feet of freeboard. Volume is approximately 12 ac-ft (3,950,303 gallons). Resource concern: Insufficient Water - Inefficient use of irrigation water.Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Practice Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Practice Situation:

An excavated regulating reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal.

Scenario Feature Measure:

Volume of Earth Excavated

Scenario Typical Size: 19600 Cubic Yards

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Tractor, agricultural, 360 HP	130	Hour	$138.20	$17,966.00
Equip./Install.	Scraper, pull, 15 CY	260	Hour	$21.13	$5,493.80
Labor	Supervisor or Manager	1	Hour	$34.23	$34.23
Labor	General Labor	2.87	Hour	$17.95	$51.52
Mobilization	Mobilization, Heavy Equipment Operator	2	Hour	$22.25	$44.50
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Forgone Income	FI, Rice	2.87	Acre	$401.74	$1,152.99
Equip./Install.	Dozer, 80 HP	40	Hour	$54.19	$2,167.60
Labor	Equipment Operators, Heavy	40	Hour	$22.46	$898.40
				Total Cost:	$28,082.20

Practice: 441 - Irrigation System, Microirrigation

Scenario # 1 **SDI (Subsurface Drip Irrigation)**

Scenario Description: **Mississippi**

A subsurface drip irrigation system (SDI) with a lateral spacing between 37-59 inches. This buried drip irrigation system utilizes a thinwall dripperline or tape with inline emitters at a uniform spacing for the system laterals. The dripperline or tape is normally installed by being plowed in approx 10-14 inches deep with a chisel shank type plow equipped with tape reels. This type of drip irrigation system utilizes a buried supply manifold with automated zone control valves and a buried flush manifold with manual flush valves. This permanent micro-irrigation system includes an automated filter station, flow meter, backflow prevention device, automated control box or timer, the thinwall dipperline or tape for laterals, both a supply and a flushing manifold and numerous types of water control valves. This is an all-inclusive system starting with the filter station including all required system components out to the flush valves. The water supply line from the water source to the filter station is an irrigation pipeline (430) and is not included as part of this systemResource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measrement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Practice Situation:

Typical before irrigation situation would normally be an existing inefficient surface or sprinkler irrigation system on a cropland or hayland field. The existing irrigation system would experience poor, non-uniform irrigation applications and significant water losses affecting both water quantity and water quality

After Practice Situation:

A typical practice would be the installation of a subsurface drip irrigation system (SDI) on a 60 acre cropland or hayland field. The system lateral (thinwall dripperline or tape) spacing would 40 inches. This highly efficient SDI (buried) irrigation system provides irrigation water directly to the plant root zone eliminating application losses resulting in a very high water application efficiency and properly designed these SDI systems are capable of very uniform water applications.Typical field size is 60 acres.

Scenario Feature Measure:

Acres in System

Scenario Typical Size: 60 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Micro Irrigation, control valves and timers	1	Each	$2,537.00	$2,537.00
Materials	Micro Irrigation, media filter	3	Each	$5,289.33	$15,867.99
Materials	Micro Irrigation, buried drip tubing	824108	Foot	$0.07	$57,687.56
Materials	Micro Irrigation, screen filter, ≥ 100 gpm	1	Each	$722.00	$722.00
Materials	Pipe, PVC, dia. < 18", weight priced	4800	Pound	$1.36	$6,528.00
Materials	Flow Meter, with Electronic Index	1	Each	$1,387.50	$1,387.50
Equip./Install.	Micro Irrigation, chemical injection equipment	1	Each	$1,750.00	$1,750.00
				Total Cost:	$86,480.05

Practice: 441 - Irrigation System, Microirrigation

Scenario # 2 **Surface PE with emitters**

Scenario Description: **Mississippi**

A micro-irrigation system, utilizing surface PE tubing (can be placed on trelis or above ground) with emitters to provide irrigation for an orchard, vinyard, or other specialty crop grown in a grid pattern. The typical system is a permanent system, installed on a 60 acre vineyard on the ground surface or trellis. The vineyard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart.This system utilizes emitters at each tree or plant as the water application device. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir).

Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measrement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Practice Situation:

A vineyard has an inefficient surface flood irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Practice Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an vineyard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Scenario Feature Measure:

Acres in System

Scenario Typical Size: 60 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Micro Irrigation, control valves and timers	1	Each	$2,537.00	$2,537.00
Materials	Micro Irrigation, media filter	3	Each	$5,289.33	$15,867.99
Materials	Micro Irrigation, screen filter, ≥ 100 gpm	1	Each	$722.00	$722.00
Materials	Pipe, PVC, dia. < 18", weight priced	4800	Pound	$1.36	$6,528.00
Materials	Micro Irrigation, surface drip tubing or tape	319440	Foot	$0.26	$83,054.40
Materials	Flow Meter, with Electronic Index	1	Each	$1,387.50	$1,387.50
Equip./Install.	Micro Irrigation, chemical injection equipment	1	Each	$1,750.00	$1,750.00
				Total Cost:	$111,846.89

Practice: 441 - Irrigation System, Microirrigation

Scenario # 3 **Microjet**

Scenario Description: **Mississippi**

A micro-irrigation system, utilizing micro-jets to provide irrigation and\or frost protection for an orchard or other specialty crops grown in a grid pattern. The system is installed with all fittings, control valves, pressure reducing/regulating valves, air/vacuum release, sand media/screen/disc filters, pressure gauges, submains, lateral lines, and micro-jet sprayers to deliver water to the trees. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). The typical installation is a permanent, microjet -irrigation system installed on a 60 acre orchard. Typical tree spacing is 20' x 20 feet. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measrement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Practice Situation:

An orchard has an inefficient irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Practice Situation:

A micro-spray microirrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Scenario Feature Measure:

Acres in System

Scenario Typical Size: 60 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Micro Irrigation, control valves and timers	1	Each	$2,537.00	$2,537.00
Materials	Micro Irrigation, emitters or sprays and tubing	143748	Foot	$0.14	$20,124.72
Materials	Micro Irrigation, media filter	3	Each	$5,289.33	$15,867.99
Materials	Micro Irrigation, screen filter, ≥ 100 gpm	1	Each	$722.00	$722.00
Materials	Pipe, PVC, dia. < 18", weight priced	4800	Pound	$1.36	$6,528.00
Materials	Flow Meter, with Electronic Index	1	Each	$1,387.50	$1,387.50
Equip./Install.	Micro Irrigation, chemical injection equipment	1	Each	$1,750.00	$1,750.00
				Total Cost:	$48,917.21

Practice: 441 - Irrigation System, Microirrigation

Scenario # 4 **Hoop House System**

Scenario Description: **Mississippi**

A micro-irrigation system, utilizing surface PE tubing (can be placed on trelis or above ground) with emitters to provide irrigation for specialty crop grown in hoop houses. The typical system is a permanent system, installed in a 30' x 50' house. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measrement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Practice Situation:

Irrigation of hoop house crops is done using manual irrigation methods such as a garden hose or water pail. Requires a great amount of time and many times plants are over watered in areas and underwaterd in others. Inefficient use of irrigation water is a concern.

After Practice Situation:

A micro irrigation system is in place that provides uniform water distribution throughout the house so that all crops will receive adaquete and timely irrigation water.

Scenario Feature Measure:

Area of house

Scenario Typical Size: 1500 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Micro Irrigation, screen filter, < 100 gpm	1	Each	$39.85	$39.85
Materials	Micro Irrigation, surface drip tubing or tape	600	Foot	$0.26	$156.00
				Total Cost:	$195.85

Practice: 442 - Irrigation System, Sprinkler

Scenario # 1 **Center Pivot System**

Scenario Description: **Mississippi**

Installation of a low pressure center pivot system. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications).Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Practice Situation:

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

After Practice Situation:

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers on drops.

The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.

Scenario Feature Measure:

Length of Center Pivot Lateral

Scenario Typical Size: 1300 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Center pivot system with appurtenances, fixed cost portion	1	Each	$1,117.65	$1,117.65
Materials	Irrigation, Center pivot system with appurtenances, variable cost portion	1300	Foot	$61.74	$80,262.00
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$81,728.45

Practice: 442 - Irrigation System, Sprinkler

Scenario # 2 **Solid Set System**

Scenario Description: **Mississippi**

A solid set irrigation system.Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Practice Situation:

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

After Practice Situation:

The system is installed on 10 acres or less. The installed solid set system has 3-4 inch pipe sizes and sprinklers set 30 – 50 ft apart. Improved distribution uniformity and irrigation efficiency will result.

Scenario Feature Measure:

Area of Irrigation System

Scenario Typical Size: 10 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Solid Set, w/Appurtenances	10	Acre	$2,140.10	$21,401.00
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$21,476.64

Practice: 442 - Irrigation System, Sprinkler

Scenario # 3 **Traveling Gun System, < 2" Hose**

Scenario Description: **Mississippi**

A portable small gun system used to apply irrigation water on small fields.A small traveling gun irrigation system is installed to apply water uniformly and at an acceptable application rate operated under pressure to effectively irrigate less than 3 acres. The irrigation system is installed with all necessary appurtenances.Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

Before Practice Situation:

An existing traveling gun on a 5 acre field is inefficient and is not applying water uniformly or not at an acceptable application rate. Excess applied water causes irrigation induced erosion, runoff and deep percolation. The runoff and deep percolation degrade the receiving waters.

After Practice Situation:

A small traveling gun irrigation system is installed to irrigate 5 acres based on the determined spacing needs.

Irrigation is applied efficiently and uniformly to maintain adequate soil water for plant growth without causing excessive water loss, erosion, or water quality degradation The irrigation system is installed with all necessary appurtenances.

Scenario Feature Measure:

Number of Traveling Gun Systems

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Traveling Gun System with ≤ 2" Nominal size hose, and appurtenances light duty	1	Inch Diameter	$5,063.50	$5,063.50
				Total Cost:	$5,063.50

Practice: 442 - Irrigation System, Sprinkler

Scenario # 4 **Traveling Gun System, 2" to 3" Hose**

Scenario Description: **Mississippi**

A portable big gun system used to apply waste water from animal feeding operations.This traveling big gun unit includes a sprinkler, towable cart, 1000' or more of PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed towpath width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

Before Practice Situation:

A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

After Practice Situation:

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens.The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1" to 1½" orifice mounted onto a movable cart. 1000' or more flexible 3" PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

Scenario Feature Measure:

Number of Traveling Gun Systems

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Traveling Gun System, > 2" to 3 " Nominal size hose	1	Inch Diameter	$6,852.10	$6,852.10
				Total Cost:	$6,852.10

Practice: 442 - Irrigation System, Sprinkler

Scenario # 5 **Traveling Gun System, > 3" Hose**

Scenario Description: **Mississippi**

A portable big gun system used to apply waste water from animal feeding operations.This traveling big gun unit includes a sprinkler, towable cart, 1200' or more of PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed towpath width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

Before Practice Situation:

A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

After Practice Situation:

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens.The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1" to 1½" orifice mounted onto a movable cart. 1200' or more flexible 4" PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

Scenario Feature Measure:

Number of Traveling Gun Systems

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Traveling Gun System, > 3" Nominal size hose	1	Inch Diameter	$9,721.60	$9,721.60
				Total Cost:	$9,721.60

Practice: 442 - Irrigation System, Sprinkler

Scenario # 6 **Renovation of Existing Sprinkler System**

Scenario Description: **Mississippi**

Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water conservation. A typical scenario assumes a 1300 LF span, including end booms renozzled with low-pressure nozzles.Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Practice Situation:

A center pivot or lateral move system has high pressure sprinklers. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.

After Practice Situation:

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

Scenario Feature Measure:

Length of Lateral Retrofitted

Scenario Typical Size: 1300 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators	1300	Foot	$5.10	$6,630.00
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$6,705.64

Practice: 443 - Irrigation System, Surface and Subsurface

Scenario # 1 **Surge Valve & Controller**

Scenario Description: **Mississippi**

This scenario would typically include installation and utilization of a 10-inch surge valve with automated controller (including all appurtenances) and installation labor needed to convert from a conventional surface irrigated system to a surge irrigation system. Typical field size is 80 acres. The surge valve will be used with PVC Gated Pipe or PE Gated Tubing to convey and distribute irrigation water to alternating irrigation sets in a timed surge cycle that results in reduced a surging irrigation application. The surging action increases rate of advance along set length, reduces deep percolation at upper end of field, increases uniformity of application along row length, and on lower intake soils can significantly reduce runoff losses. The result is improved irrigation efficiency, reduced leaching and erosion losses, and conserved energy. This scenario does not include gated pipe or associated practices.Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Practice Situation:

Unacceptable irrigation application uniformity along existing surface irrigation system furrow or border length caused by excessive run length or soil infiltration rate when operated with continuous inflow on existing system. System is over irrigated in attempt to adequately irrigate low end of field.

After Practice Situation:

A surge surface irrigation system is in place. After implementation, distribution uniformity and irrigation efficiency is improved, by reducing irrigation application volume and deep percolation losses. Runoff reductions, reduced energy use, and air quality improvements can also result.

Scenario Feature Measure:

Number of Surge Valves

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Surge Valve And Controller	1	Each	$1,672.50	$1,672.50
Labor	General Labor	2	Hour	$17.95	$35.90
				Total Cost:	$1,708.40

Practice: 449 - Irrigation Water Management

Scenario # 1 **Basic IWM ≤ 30 acres**

Scenario Description: **Mississippi**

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Supervisor or Manager	24	Hour	$34.23	$821.52
				Total Cost:	$821.52

Practice: 449 - Irrigation Water Management

Scenario # 2 **Basic IWM > 30 acres**

Scenario Description: **Mississippi**

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 125 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	General Labor	8	Hour	$17.95	$143.60
Labor	Supervisor or Manager	32	Hour	$34.23	$1,095.36
				Total Cost:	$1,238.96

Practice: 449 - Irrigation Water Management

Scenario # 3 **Intermediate IWM ≤ 30 acres**

Scenario Description: **Mississippi**

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. For a typical scenario, soil moisture is determined by in-field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Supervisor or Manager	32	Hour	$34.23	$1,095.36
				Total Cost:	$1,095.36

Practice: 449 - Irrigation Water Management

Scenario # 4 **Intermediate IWM > 30 acres**

Scenario Description: **Mississippi**

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. For a typical scenario, soil moisture is determined by in field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 125 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	General Labor	12	Hour	$17.95	$215.40
Labor	Supervisor or Manager	40	Hour	$34.23	$1,369.20
				Total Cost:	$1,584.60

Practice: 449 - Irrigation Water Management

Scenario # 5 **Advanced IWM ≤ 30 acres**

Scenario Description: **Mississippi**

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equiped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually.Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Supervisor or Manager	40	Hour	$34.23	$1,369.20
				Total Cost:	$1,369.20

Practice: 449 - Irrigation Water Management

Scenario # 6 **Advanced IWM > 30 acres**

Scenario Description: **Mississippi**

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equiped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually.Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

Before Practice Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with sprinkler irrigation.

After Practice Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Scenario Feature Measure:

Irrigated Area Managed

Scenario Typical Size: 125 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	48	Hour	$34.23	$1,643.04
				Total Cost:	$1,930.24

Practice: 449 - Irrigation Water Management

Scenario # 7 **Soil Moisture Sensors_YR1**

Scenario Description: **Mississippi**

This practice includes the installation of soil moisture sensors such as tensiometers, gyp blocks, capacitance sensors etc, that are installed and read to determine point in time soil moisture by depth. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and read sensors or meter. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Meters used to read sensors may be portable. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Practice Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation.

After Practice Situation:

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer uses periodic soil moisture measurements to schedule irrigation resulting in improved irrigation water managment and reduced energy use.

Scenario Feature Measure:

Number of Measuring Sites

Scenario Typical Size: 2 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Soil Moisture Meter	1	Each	$333.50	$333.50
Materials	Soil Moisture Sensor	8	Each	$44.80	$358.40
Labor	General Labor	8	Hour	$17.95	$143.60
Labor	Supervisor or Manager	32	Hour	$34.23	$1,095.36
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$2,006.50

Practice: 449 - Irrigation Water Management

Scenario # 8 **Soil Moisture Sensors with Data Recorder_YR1**

Scenario Description: **Mississippi**

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Practice Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

After Practice Situation:

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water managment and reduced energy use.

Scenario Feature Measure:

Number of Measuring Sites

Scenario Typical Size: 2 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Data Logger	2	Each	$567.25	$1,134.50
Materials	Soil Moisture Sensor	8	Each	$44.80	$358.40
Labor	General Labor	12	Hour	$17.95	$215.40
Labor	Supervisor or Manager	40	Hour	$34.23	$1,369.20
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$3,153.14

Practice: 449 - Irrigation Water Management

Scenario # 9 **Soil Moisture Sensors w. Telemetry_YR1**

Scenario Description: **Mississippi**

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Practice Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

After Practice Situation:

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water managment and reduced energy use.

Scenario Feature Measure:

Number of Sensors in field

Scenario Typical Size: 2 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Data Logger with Telemetry System	1	Each	$1,119.75	$1,119.75
Materials	Soil Moisture Sensor	8	Each	$44.80	$358.40
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	48	Hour	$34.23	$1,643.04
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$3,484.03

Practice: 464 - Irrigation Land Leveling

Scenario # 1 **Irrigation Land Leveling (CY)**

Scenario Description: **Mississippi**

This is scenario will level a typical 40 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 100 to 500 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

Before Practice Situation:

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

After Practice Situation:

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.

Scenario Feature Measure:

Volume of Earth Moved

Scenario Typical Size: 14000 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Scraper, pull, 15 CY	176	Hour	$21.13	$3,718.88
Equip./Install.	Stripping and stockpiling, topsoil	2800	Cubic Yard	$0.78	$2,184.00
Equip./Install.	Tractor, agricultural, 260 HP	88	Hour	$107.76	$9,482.88
Labor	Equipment Operators, Heavy	88	Hour	$22.46	$1,976.48
Mobilization	Mobilization, large equipment	2	Each	$255.47	$510.94
Mobilization	Mobilization, Heavy Equipment Operator	2	Hour	$22.25	$44.50
				Total Cost:	$17,917.68

Practice: 468 - Lined Waterway or Outlet

Scenario # 1 **Rock Lined - 24"**

Scenario Description: **Mississippi**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with riprap (D100 = 18", Velocity ~ 11 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 18" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.

Before Practice Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

After Practice Situation:

Rock lined waterway is 300 ' long by 15' wide by 1.5' deep. Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Scenario Feature Measure:

Square Foot of Waterway

Scenario Typical Size: 4500 Square Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Rock Riprap, Placed with geotextile	465	Cubic yard	$58.09	$27,011.85
Equip./Install.	Excavation, Common Earth, side cast, small equipment	555	Cubic yard	$1.86	$1,032.30
Labor	Supervisor or Manager	2	Hour	$34.23	$68.46
Labor	General Labor	2	Hour	$17.95	$35.90
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Forgone Income	FI, Soybeans Irrigated	0.1	Acre	$207.87	$20.79
				Total Cost:	$28,305.88

Practice: 484 - Mulching

Scenario # 1 **Natural Material - Full Coverage**

Scenario Description: **Mississippi**

Application of straw mulch or other other state approved natural material to reduce erosion and facilitate the establishment of vegetative cover. Mulch provides full coverage and is typically used with critical area planting. Assumes 125 bales/acre (3 bales/1000 sq ft)

Before Practice Situation:

Typical scenario ranges from a 0.1 to 1.0 acre disturbed site around a newly constructed structural practice. The potential for soil erosion is high and mulch is needed to stabilize the soil and facilitate the establishment of vegetative cover.

After Practice Situation:

Straw mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established.

Scenario Feature Measure:

Area Covered by Mulch

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Straw	2.5	Ton	$120.00	$300.00
Equip./Install.	Truck, Pickup	0.5	Hour	$25.85	$12.93
Labor	General Labor	10	Hour	$17.95	$179.50
				Total Cost:	$492.43

Practice: 484 - Mulching

Scenario # 2 **Erosion Control Blanket**

Scenario Description: **Mississippi**

Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions. Blanket is typically made of coconut coir, wood fiber, straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

Before Practice Situation:

There are areas of concentrated flow and a grassed waterway is being installed. Soil erosion is a concern and there is little to no vegetation.

After Practice Situation:

The erosion control blanket is placed on concentrated flow areas and secured with ground stables. Soil erosion is minimized and vegetative cover is established.

Scenario Feature Measure:

Area Covered by Mulch

Scenario Typical Size: 45000 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Erosion Control Blanket, biodegradable	5000	Square Yard	$1.46	$7,300.00
Labor	General Labor	8	Hour	$17.95	$143.60
				Total Cost:	$7,443.60

Practice: 484 - Mulching

Scenario # 3 **Synthetic Material**

Scenario Description: **Mississippi**

Installation of geotextile, biodegradable plastic, polyethylene plastic, or other state approved synthetic mulch to conserve soil moisture, moderate soil temperature, suppress weed growth and provide erosion control. Payment based on actual area covered by mulching material.

Before Practice Situation:

Site conditions very. Typically scenarios include new tree and shrub plantings, irrigated orchards or vineyards, or annual and perennial specialty crops. Water quantity and soil moisture is a concern.

After Practice Situation:

Synthetic mulch is applied in rows with a mulch layer or by other mechanized means. Soil moisture is conserved, energy use associated with irrigation is decreased, and weed growth is suppressed.

Scenario Feature Measure:

Area Covered by Mulch

Scenario Typical Size: 1 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Geotextile, woven	4840	Square Yard	$2.15	$10,406.00
				Total Cost:	$10,406.00

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 1 **Mechanical - Heavy, shearing and windrowing**

Scenario Description: **Mississippi**

This practice involves the use of heavy machinery (usually bull dozers & not typical farming equipment) to treat an area in order to improve site conditions for establishing trees and/or shrubs. Usually vegetation and/or debries is sheared and raked or pushed to form piles or windrows. Typical sites include trees and brush cover that is not appropriate to the site or does not provide the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition and soil quality degredation - soil erosion - sheet and rill. Treatment must be done before planting.

Before Practice Situation:

The site is dominated by undesirable vegetation including herbaceous plants and significant amounts of woody vegetation (trees and brush) occupying the site. There is also a significant component of woody debris on site. Noxious and invasive species may also be present on the site. Adequate planter access is impossible with existing conditions. If left untreated, seedlings can not be planted properly at the proper density. Existing competition will cause poor survival or reduced growth of trees/shrubs to be established on the site.

After Practice Situation:

Undesirable vegetation has been removed using mechanical methods reducing competition for target trees and/or shrubs. Woody debris has been removed to facilitate tree/shrub planting operations. Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Heavy mechanical site prep, raking	40	Acre	$140.00	$5,600.00
Equip./Install.	Heavy mechanical site prep, shearing, V-blade, K-G blading	40	Acre	$140.00	$5,600.00
Labor	Supervisor or Manager	6	Hour	$34.23	$205.38
Mobilization	Mobilization, large equipment	2	Each	$255.47	$510.94
Mobilization	Mobilization, Heavy Equipment Operator	12	Hour	$22.25	$267.00
Mobilization	Mobilization, Supervisor or Manager	6	Hour	$33.91	$203.46
				Total Cost:	$12,386.78

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 2 Mechanical - Light, Mowing

Scenario Description: **Mississippi**

This practice involves the use of light/moderate machinery(typcially tractors used in normal farming operations) to clear above ground vegetation (disk or bush hog) in order to improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. This following resource concerns: soil quality degredation - compaction, soil erosion - sheet and rill, and degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

Before Practice Situation:

Undesirable vegetation is present on the site including herbaceous plants and sparse woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Practice Situation:

Undesirable vegetation has been removed using a bush hog and/or disk to cut and/or knock down existing vegetation, thus enhancing the conditions for planting and survival of trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mower, Bush Hog	16	Hour	$42.07	$673.12
Labor	Equipment Operators, Light	16	Hour	$17.60	$281.60
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Light Equipment Operator	2	Hour	$17.44	$34.88
				Total Cost:	$1,126.18

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 3 **Chemical - Ground Application on Open Field**

Scenario Description: **Mississippi**

This practice involves the use of various herbicides applied using ground-based machinery (farming equipment) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

Before Practice Situation:

Undesirable vegetation is present on the site including herbaceous plants and woody vegetation. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Practice Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	40	Acre	$11.04	$441.60
Materials	Herbicide, Triclopyor	40	Acre	$61.01	$2,440.40
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Equip./Install.	Chemical, ground application	40	Acre	$4.33	$173.20
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$3,440.12

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 4 **Chemical - Ground Band Spray**

Scenario Description: **Mississippi**

This practice involves the use of various herbicides applied using ground-based machinery (farming equipment & ATV's) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs by spraying strips and not the whole tract. (Whole field is counted, but approximately one third of the fiield is treated). Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

Before Practice Situation:

Undesirable vegetation is present on the site including herbaceous plants and woody vegetation. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Practice Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs in strips (usually 2 ft on each side of planted row). Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Sulfometuron & metsulfuron	13	Acre	$22.78	$296.14
Materials	Herbicide, Imazapyr	13	Acre	$79.31	$1,031.03
Equip./Install.	Chemical, precision application	40	Acre	$8.90	$356.00
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$2,024.49

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 5 **Chemical - Aerial Application**

Scenario Description: **Mississippi**

This practice involves the use of herbicides applied by helicoptor in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. This typical scenraio includes open land such as abandoned fields, pastures or forestlands that were recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

Before Practice Situation:

Undesirable vegetation is present on the site including herbaceous plants and woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Practice Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Imazapyr	40	Acre	$79.31	$3,172.40
Materials	Herbicide, Glyphosate	40	Acre	$11.04	$441.60
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Equip./Install.	Chemical, aerial application, helicopter	40	Acre	$29.58	$1,183.20
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Labor	General Labor	8	Hour	$17.95	$143.60
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$5,361.74

Practice: 490 - Tree & Shrub Site Preparation

Scenario # 6 **Mechanical-Ripping/chopping**

Scenario Description: **Mississippi**

This practice involves the use of heavy machinery (usually bull dozers & not typical farming equipment) to rip/cut/lift underground root systems to improve site conditions for establishing trees and/or shrubs. Typical sites include trees and brush cover that is not appropriate to the site or does not provide the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition and soil quality degredation - soil erosion - sheet and rill. Treatment must be done before planting.

Before Practice Situation:

Undesirable vegetation is present on the site including herbaceous plants and sparse woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of harvesting heavy equipment activities or other land uses.

After Practice Situation:

Undesirable vegetation has been knocked down with heavy tillage equipment used to breakup and lift root systems, breakup compaction (<18" deep), thus enhancing the conditions for planting and survival of trees and/or shrubs. Soil compaction has been alleviated, allowing penetration of moisture and allowing roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs.

Scenario Feature Measure:

Area of Treatment

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Heavy mechanical site prep, drum chopping	40	Acre	$140.00	$5,600.00
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, large equipment	1	Each	$255.47	$255.47
				Total Cost:	$6,129.31

Practice: 511 - Forage Harvest Management

Scenario # 1 **Perennial Crops - Delayed Mowing**

Scenario Description: **Mississippi**

In perennial forage crops, the delaying the harvest of the first cutting to promote the reproduction of ground nesting birds. Delaying the harvest of the first cutting will benefit ground nesting birds; research at the University of Vermont showed that breeding success for declining grassland songbirds (e.g. Bobolink) went from 0 on a regularly harvested hay field to 2.8 fledglings per female per year when the the first harvest on a hayfield was delayed until August 1st. Bobolinks, Eastern Meadowlarks, and Savannah Sparrows require a nesting period to fledge young that lasts through the end of July in most parts of the eastern US. The delayed harvest results in a decrease in overall forage quality. Farmers could see as much as a 50% reduction in market value due to declines in protein (~50%) and digestibility (~20%), making the forage crop less palatable and lower in relative feed value. The selected fields should be large enough to promote ground nesting birds. After young have fledged the field will be harvested for dry forages.

Before Practice Situation:

Perennial forage crops are produced and harvested; ground nesting birds are disturbed and/or fledgling birds are killed in the process.

After Practice Situation:

Annual crops are harvested with a delayed mowing; forage quality is compromised, however, the survival of ground nesting birds is promoted.

Scenario Feature Measure:

Increased grassland bird populations.

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Test, Plant Tissue Test	1	Each	$24.61	$24.61
Labor	Skilled Labor	1	Hour	$23.57	$23.57
Acq. Tech.	Transportation	100	Mile	$0.56	$56.00
Acq. Tech.	Training, Registration Costs	1	Each	$176.25	$176.25
Acq. Tech.	Training, Workshops	1	Each	$116.67	$116.67
Forgone Income	FI, Grazing AUMs	30	AUM	$15.29	$458.70
				Total Cost:	$855.80

Practice: 512 - Forage and Biomass Planting

Scenario # 1 **Seeding - Native Perennial Grass (1 species)**

Scenario Description: **Mississippi**

Establish or reseed adapted perennial native grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of native grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Poorly managed/degraded pasture land or cropland being converted to pasture and/or hay.

After Practice Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Switchgrass, Blackwell (Panicum virgatum)	180	Pound	$9.62	$1,731.60
Materials	Herbicide, Glyphosate	30	Acre	$11.04	$331.20
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Lime application	30	Acre	$10.43	$312.90
Equip./Install.	Cultipacking	30	Acre	$7.67	$230.10
Equip./Install.	Tillage, Light	30	Acre	$9.75	$292.50
Equip./Install.	Tillage, Primary	30	Acre	$14.78	$443.40
Equip./Install.	Chemical, ground application	30	Acre	$4.33	$129.90
Equip./Install.	Fertilizer, ground application, dry bulk	30	Acre	$6.97	$209.10
Equip./Install.	Seeding Operation, No Till/Grass Drill	30	Acre	$14.20	$426.00
				Total Cost:	$9,030.90

Practice: 512 - Forage and Biomass Planting

Scenario # 2 **Seeding-Native Perennial Grasses (4 species)**

Scenario Description: **Mississippi**

Establish or reseed adapted perennial native warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial native warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Practice Situation:

Suitable NWSG species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture and/or biomass production.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Switchgrass, Blackwell (Panicum virgatum)	60	Pound	$9.62	$577.20
Materials	Herbicide, Glyphosate	30	Acre	$11.04	$331.20
Materials	Indian Grass, Tomahawk (Sorghastrum nutans)	78	Pound	$12.63	$985.14
Materials	Big Blue Stem (Andropogon gerardii)	78	Pound	$11.81	$921.18
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Little Blue Stem (Schizachyrium scoparium)	120	Pound	$15.43	$1,851.60
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Lime application	30	Acre	$10.43	$312.90
Equip./Install.	Cultipacking	30	Acre	$7.67	$230.10
Equip./Install.	Tillage, Light	30	Acre	$9.75	$292.50
Equip./Install.	Tillage, Primary	30	Acre	$14.78	$443.40
Equip./Install.	Chemical, ground application	30	Acre	$4.33	$129.90
Equip./Install.	Seeding Operation, Broadcast, Ground	30	Acre	$20.01	$600.30
				Total Cost:	$11,599.62

Practice: 512 - Forage and Biomass Planting

Scenario # 3 **Seeding- Introduced Perennial Cool Season Grasses**

Scenario Description: **Mississippi**

Establish or reseed adapted perennial introduced cool season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Poor or nonexistent stand of grass species. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Practice Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	30	Acre	$11.04	$331.20
Materials	Fescue, Tall (Festuca arundinacea)	450	Pound	$1.80	$810.00
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Nitrogen (N), Ammonium Nitrate	1200	Pound	$0.78	$936.00
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Cultipacking	30	Acre	$7.67	$230.10
Equip./Install.	Tillage, Light	30	Acre	$9.75	$292.50
Equip./Install.	Tillage, Primary	30	Acre	$14.78	$443.40
Equip./Install.	Chemical, ground application	30	Acre	$4.33	$129.90
Equip./Install.	Fertilizer, ground application, dry bulk	30	Acre	$6.97	$209.10
Equip./Install.	Seeding Operation, Broadcast, Ground	30	Acre	$20.01	$600.30
				Total Cost:	$8,906.70

Practice: 512 - Forage and Biomass Planting

Scenario # 4 **Seeding-Introduced Perennial Warm Season Grasses.**

Scenario Description: **Mississippi**

Establish or reseed adapted introduced warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Practice Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosionon cropland ,hayland, pasture, and/or biomass production.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Bermuda Grass (Cynodon dactylon)	120	Pound	$3.92	$470.40
Materials	Herbicide, Glyphosate	30	Acre	$11.04	$331.20
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Nitrogen (N), Ammonium Nitrate	1200	Pound	$0.78	$936.00
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Cultipacking	30	Acre	$7.67	$230.10
Equip./Install.	Tillage, Light	30	Acre	$9.75	$292.50
Equip./Install.	Tillage, Primary	30	Acre	$14.78	$443.40
Equip./Install.	Chemical, ground application	30	Acre	$4.33	$129.90
Equip./Install.	Fertilizer, ground application, dry bulk	30	Acre	$6.97	$209.10
Equip./Install.	Seeding Operation, Broadcast, Ground	30	Acre	$20.01	$600.30
				Total Cost:	$8,567.10

Practice: 512 - Forage and Biomass Planting

Scenario # 5 **Overseeding Legumes**

Scenario Description: **Mississippi**

Establishment of legumes for the purpose of increasing plant diversity, soil quality and fertility, and plant health and enhancing the quality of forage. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Existing stand of perennial grasses or monoculture with no legumes present.

After Practice Situation:

Legumes will be maintained through proper grazing management and improve plant diversity and soil quality.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Ladino Clover (Trifolium repens)	90	Pound	$3.74	$336.60
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Fertilizer, ground application, dry bulk	30	Acre	$6.97	$209.10
Equip./Install.	Seeding Operation, No Till/Grass Drill	30	Acre	$14.20	$426.00
				Total Cost:	$5,895.90

Practice: 512 - Forage and Biomass Planting

Scenario # 6 **Seeding - Native Perennial Grasses and Forbs**

Scenario Description: **Mississippi**

Establish or reseed adapted perennial native warm season grasses and forbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial native warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Practice Situation:

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Practice Situation:

Suitable NWSG and forb species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture and/or biomass production.

Scenario Feature Measure:

Acres of Forgage and Biomass Planting

Scenario Typical Size: 30 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Glyphosate	30	Acre	$11.04	$331.20
Materials	Illinois Bundleflower (Desmanthus illinoensis)	90	Pound	$27.94	$2,514.60
Materials	Partidge Pea (Chamaecrista fasciculata)	30	Pound	$15.70	$471.00
Materials	Indian Grass, Tomahawk (Sorghastrum nutans)	90	Pound	$12.63	$1,136.70
Materials	Big Blue Stem (Andropogon gerardii)	90	Pound	$11.81	$1,062.90
Materials	Lime, ENM	60	Ton	$49.57	$2,974.20
Materials	Potassium, K2O	1500	Pound	$0.52	$780.00
Materials	Little Blue Stem (Schizachyrium scoparium)	53	Pound	$15.43	$817.79
Materials	Phosphorus, P2O5	1500	Pound	$0.78	$1,170.00
Equip./Install.	Lime application	30	Acre	$10.43	$312.90
Equip./Install.	Cultipacking	30	Acre	$7.67	$230.10
Equip./Install.	Tillage, Light	30	Acre	$9.75	$292.50
Equip./Install.	Tillage, Primary	30	Acre	$14.78	$443.40
Equip./Install.	Chemical, ground application	30	Acre	$4.33	$129.90
Equip./Install.	Seeding Operation, Broadcast, Ground	30	Acre	$20.01	$600.30
				Total Cost:	$13,267.49

Practice: 516 - Pipeline

Scenario # 1 **PVC (Iron Pipe Sizes <1.5")**

Scenario Description: **Mississippi**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1-inch. Construct 1,320 feet of 1-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is weight of pipe material in pounds. 1,320 feet of 1-inch, Schedule 40, PVC pipe weighs 0.240 lb/ft, or a total of 317 pounds. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

Before Practice Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Practice Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Scenario Feature Measure:

Length of Pipe

Scenario Typical Size: 1320 Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, dia. < 18", weight priced	348	Pound	$1.36	$473.28
Equip./Install.	Trenching, Earth, 12" x 48"	1320	Foot	$1.09	$1,438.80
Labor	General Labor	12	Hour	$17.95	$215.40
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$2,400.64

Practice: 528 - Prescribed Grazing

Scenario # 1 **Moderate Mgmt (Year 1)**

Scenario Description: **Mississippi**

A baseline pasture condition assessment will be completed by the participant with the assistance of a conservationist using the pasture condition score card. A grazing mgmt plan will be implemented. Participant will monitor the health of the pastures by conducting at least quarterly pasture condition assessment (transects). Participant will record the number of days grazed and rested, stubble heights of forage before and after grazing, number & size of grazing animals, nutrients/herbicides applied. Participant has 3 years to bring score from 26-35 to 36-45. Year 1

Before Practice Situation:

Pasture is not deferred/rested from grazing. Spot grazing is 10-30%. Desirable species 40-60% of the stand. 25-50% of the stand meets the minimum residual grazing height of the desirable species. Yields may be below site potential. Moderate compaction evident throughout. Some service ponding. Pasture contains two to four species, two functional groups and one legume.

After Practice Situation:

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animals is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological condition of the plants.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Rangeland/grassland field monitoring kit	1	Each	$44.24	$44.24
Labor	Skilled Labor	28	Hour	$23.57	$659.96
Labor	General Labor	64	Hour	$17.95	$1,148.80
				Total Cost:	$1,853.00

Practice: 528 - Prescribed Grazing

Scenario # 2 Moderate Mgmt (Yr 2&3)

Scenario Description: **Mississippi**

2nd and 3rd year of monitoring. Participant will turn in record keeping book which also includes weather data and pictures of livestock and forage.

Before Practice Situation:

Pasture is not deferred/rested from grazing. Spot grazing 10-30%. Desirable species 40-60% of the stand. 25-50% of the stand meets the minimum residual grazing height fo the desirable species. Yields may be below site potential. Moderate compaction evident throughout. Some service ponding. Pasture contains two to four species, two functional groups and one legume

After Practice Situation:

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animal is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological conditon of the plants

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Labor	General Labor	24	Hour	$17.95	$430.80
				Total Cost:	$619.36

Practice: 533 - Pumping Plant

Scenario # 1 **Electric-Powered Pump ≤ 3 Hp**

Scenario Description: **Mississippi**

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system; or for transferring liquid waste in a waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water.Waste Transfer: Contaminated water needs to be moved to a containment facility.

After Practice Situation:

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage. Waste Transfer: Liquid wastes that have been collected through a waste transfer system are now efficiently transferred to an appropriate treatment or storage facility.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 1 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$222.53	$55.63
Labor	General Labor	6	Hour	$17.95	$107.70
Labor	Supervisor or Manager	6	Hour	$34.23	$205.38
				Total Cost:	$825.74

Practice: 533 - Pumping Plant

Scenario # 2 **Electric-Powered Pump ≤ 3 HP with Pressure Tank**

Scenario Description: **Mississippi**

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline.

Before Practice Situation:

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water.

After Practice Situation:

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 1 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pressure Tank, 40 gallon	1	Each	$264.00	$264.00
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$222.53	$55.63
Labor	General Labor	6	Hour	$17.95	$107.70
Labor	Supervisor or Manager	6	Hour	$34.23	$205.38
				Total Cost:	$1,089.74

Practice: 533 - Pumping Plant

Scenario # 3 **Electric-Powered Pump >3 to 10 HP**

Scenario Description: **Mississippi**

This is a close-coupled 7.5 Hp electric-powered centrifugal pump, mounted on a platform. It is for a large, high-pressure (200 psi) livestock pipeline, used for watering livestock as part of a prescribed grazing system; or for pressurizing a medium-sized (200 gpm and 40 psi) irrigation system; or a medium-sized (400 gpm and 20 psi) waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Practice Situation:

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 7.5 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	7.5	Horsepower	$105.45	$790.88
Equip./Install.	Truck, Pickup	24	Hour	$25.85	$620.40
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.5	Cubic yard	$222.53	$111.27
Labor	General Labor	24	Hour	$17.95	$430.80
Labor	Supervisor or Manager	24	Hour	$34.23	$821.52
				Total Cost:	$5,022.26

Practice: 533 - Pumping Plant

Scenario # 4 Electric-Powered Pump >10 to 40 HP

Scenario Description: **Mississippi**

This is a close-coupled, 3-phase, 25 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler or large microirrigation (850 gpm and 35 psi) system or a large-sized surface irrigaiton system (1,200 gpm) or a large-sized (1,200 gpm and 25 psi) waste transfer system.

Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 25 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	25	Horsepower	$105.45	$2,636.25
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	56	Hour	$25.85	$1,447.60
Equip./Install.	Backhoe, 80 HP	8	Hour	$44.57	$356.56
Labor	Supervisor or Manager	56	Hour	$34.23	$1,916.88
Labor	General Labor	56	Hour	$17.95	$1,005.20
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Materials	Pipe, Steel, 16", Std Wt, USED	40	Foot	$30.59	$1,223.60
Materials	Pipe, Steel, 18", Std Wt, USED	14	Foot	$37.79	$529.06
Equip./Install.	Portable Welder	8	Hour	$16.39	$131.12
				Total Cost:	$12,580.13

Practice: 533 - Pumping Plant

Scenario # 5 Electric-Powered Pump >40 HP

Scenario Description: **Mississippi**

This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized (1,200 gpm and 50 psi) sprinkler or very large microirrigation (1,700 gpm and 35 psi) system or a very large-sized surface irrigation system (6,000 gpm) or a very large-sized (2,400 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

After Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 50 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	50	Horsepower	$105.45	$5,272.50
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	56	Hour	$25.85	$1,447.60
Equip./Install.	Backhoe, 80 HP	8	Hour	$44.57	$356.56
Labor	Supervisor or Manager	56	Hour	$34.23	$1,916.88
Labor	General Labor	56	Hour	$17.95	$1,005.20
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Materials	Pipe, Steel, 20", Std Wt, USED	40	Foot	$40.57	$1,622.80
Materials	Pipe, Steel, 24", Std Wt, USED	14	Foot	$51.45	$720.30
Equip./Install.	Portable Welder	8	Hour	$16.39	$131.12
				Total Cost:	$15,806.82

Practice: 533 - Pumping Plant

Scenario # 6 **Internal Combustion-Powered Pump ≤ 7½ HP**

Scenario Description: **Mississippi**

The typical scenario supports replacement of a pump in an existing irrigation system on cropland with a 5 HP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a 5 HP pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley.Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 5 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, < 50 HP, Pump & ICE power unit	5	Horsepower	$205.00	$1,025.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$222.53	$55.63
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Labor	General Labor	4	Hour	$17.95	$71.80
				Total Cost:	$1,341.05

Practice: 533 - Pumping Plant

Scenario # 7 **Internal Combustion-Powered Pump > 7½ to 75 HP**

Scenario Description: **Mississippi**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 40 BHP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 40 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 30", Std Wt, USED	14	Foot	$85.56	$1,197.84
Materials	Pipe, Steel, 24", Std Wt, USED	40	Foot	$51.45	$2,058.00
Materials	Swing Check Valve, metal, 14"	1	Each	$4,892.56	$4,892.56
Materials	Pump, < 50 HP, Pump & ICE power unit	40	Horsepower	$205.00	$8,200.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	1	Cubic yard	$222.53	$222.53
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$153.45	$1,227.60
Equip./Install.	Truck, Pickup	4	Hour	$25.85	$103.40
Equip./Install.	Portable Welder	8	Hour	$16.39	$131.12
Labor	General Labor	32	Hour	$17.95	$574.40
Labor	Skilled Labor	16	Hour	$23.57	$377.12
Labor	Equipment Operators, Heavy	16	Hour	$22.46	$359.36
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$20,164.77

Practice: 533 - Pumping Plant

Scenario # 8 **Internal Combustion-Powered Pump > 75 HP**

Scenario Description: **Mississippi**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is 75 break HP pump or larger. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters.

Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 80 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 70 HP, Pump & ICE power unit	80	Horsepower	$142.00	$11,360.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	6	Hour	$25.85	$155.10
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$153.45	$1,227.60
Labor	Supervisor or Manager	24	Hour	$34.23	$821.52
Labor	General Labor	48	Hour	$17.95	$861.60
Labor	Skilled Labor	8	Hour	$23.57	$188.56
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Materials	Pipe, Steel, 30", Std Wt, USED	40	Foot	$85.56	$3,422.40
Materials	Pipe, Steel, 36", Std Wt, USED	14	Foot	$100.14	$1,401.96
Equip./Install.	Portable Welder	8	Hour	$16.39	$131.12
Materials	Pipe, Steel, 18", Std Wt, USED	20	Foot	$37.79	$755.80
Materials	Swing Check Valve, metal, 16"	1	Each	$6,837.20	$6,837.20
				Total Cost:	$28,060.76

Practice: 533 - Pumping Plant

Scenario # 9 **Tractor Power Take Off (PTO) Pump**

Scenario Description: **Mississippi**

This scenario involves a PTO driven pump to either transfer water for an irrigation system from a Pond - 378 (includes backflow prevention as appropriate) to cropland or; to transfer semi-solid/ liquid manure (as part of a waste transfer system) at the farm headquarters from a Waste Storage Facility - 313, to an irrigation system or waste treatment facility. In both cases, a PTO driven pump is selected because the landowner has equipment available to supply power to the pump. Electricity is not readily available and/or a stationary engine is not a practical alternative.Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 430 - Irrigation Pipeline; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 590 - Nutrient Management; 378 - Pond; 313 - Waste Storage Facility; and 634 - Waste Transfer.

Before Practice Situation:

Irrigation Setting: An existing surface irrigation system employs an inefficient, improperly sized pump that leads to inefficient water delivery resulting in high energy costs; Waste Transfer Setting: various types of semi-solid or liquid waste at the headquarters are uncollected causing surface and ground water issues. A transfer method for waste is needed. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Practice Situation:

Irrigation Setting: A properly designed PTO-driven pump is installed, to transfer water to an Irrigation Pipeline (430) or Irrigation Canal or Lateral (320). Waste Transfer Setting: Wastes that have been collected through a waste transfer system are now efficiently transferred from a Waste Storage Facility (313) to an appropriate treatment facility or to an irrigation system. The pump typically will move 2,000 gallons per minute and is portable so that it can be used at several locations.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 60 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, Ag Water PTO, 1,000 GPM	1	Each	$6,182.70	$6,182.70
Equip./Install.	Truck, Pickup	16	Hour	$25.85	$413.60
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
				Total Cost:	$7,876.24

Practice: 533 - Pumping Plant

Scenario # 10 Photovoltaic-Powered Pump <= 250 ft total head

Scenario Description: **Mississippi**

The installation of a photovoltaic-powered pumping plant with a design operating total head on pump less than or equal to 250 feet. The typical scenario assumes the installation of a submersible solar-powered pump in a well, pond, or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater.Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Practice Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Practice Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1/2 Hp (0.5 Hp) solar-powered submersible pump in a 100 foot deep well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1/2 Hp solar-powered submersible pump to deliver about 5 gpm and develop a pressure at the pump outlet of about 60 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Scenario Feature Measure:

Each Pumping Plant

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Solar Panels, fixed cost portion	1	Each	$2,155.70	$2,155.70
Materials	Solar Panels, variable cost portion	0.372	Kilowatt	$3,337.70	$1,241.62
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	0.5	Horsepower	$229.73	$114.87
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	16	Hour	$25.85	$413.60
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
				Total Cost:	$4,936.27

Practice: 533 - Pumping Plant

Scenario # 11 Photovoltaic-Powered Pump 251-400 ft total head

Scenario Description: **Mississippi**

The installation of a photovoltaic-powered pumping plant with a design operating total head on pump between 251 feet to 400 feet. The typical scenario assumes installation of a submersible solar-powered pump in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency.Resource Concerns: Insufficient stockwater.Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Practice Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Practice Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a 250 foot well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 7 gpm and develop a pressure at the pump outlet of about 60 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Scenario Feature Measure:

Each Pumping Plant

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Solar Panels, fixed cost portion	1	Each	$2,155.70	$2,155.70
Materials	Solar Panels, variable cost portion	0.746	Kilowatt	$3,337.70	$2,489.92
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	16	Hour	$25.85	$413.60
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
				Total Cost:	$6,299.43

Practice: 533 - Pumping Plant

Scenario # 12 **Photovoltaic-Powered Pump >400 ft total head**

Scenario Description: **Mississippi**

The installation of a photovoltaic-powered pumping plant with a design operating total head on pump greater than 400 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency.Resource Concerns: Insufficient stockwater.Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Practice Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Practice Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1-1/2 Hp (1.5 Hp) solar-powered submersible pump in a 300 foot well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1-1/2 Hp solar-powered submersible pump to deliver about 10 gpm and develop a pressure at the pump outlet of about 60 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Scenario Feature Measure:

Each Pumping Plant

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Solar Panels, fixed cost portion	1	Each	$2,155.70	$2,155.70
Materials	Solar Panels, variable cost portion	1.12	Kilowatt	$3,337.70	$3,738.22
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1.5	Horsepower	$229.73	$344.60
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	16	Hour	$25.85	$413.60
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
				Total Cost:	$7,662.60

Practice: 533 - Pumping Plant

Scenario # 13 Water Ram Pump

Scenario Description: **Mississippi**

A water ram is used to transfer water from a live stream to a Watering Facility (614) or small Irrigation Reservoir (436) utilizing the energy of moving water to transfer a portion of that water to a higher elevation. It is anchored to a small concrete pad. Bypass water (which could easily be 90% of the water diverted from the stream) is returned to the stream or transferred in a pipe, to a lower elevation tank (614 or 436), without erosion or impairment to water quality. In the livestock scenario, the objective is to provide water to the cattle outside of a live stream or other natural water source thereby eliminating a significant erosion situation while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. The water ram may need to be fenced for protection from curious bovines. While it is generally not considered practical for irrigation, in the irrigation scenario, water can be retrieved from a stream and stored in a small 436 to provide water for a very small (0.1 acre) irrigation system.Resource Concerns: Insufficient stockwater.Associated Practices: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Practice Situation:

Water in a nearby stream is not available at the desired location, pressure and/or flow rate.

After Practice Situation:

A 2" diameter inlet pipe is installed and connected to a water ram pump with all appurtenances and anchored to a concrete pad (9 ft x 4 ft x 5 in) or other appropriate secure base. Depending upon the application, either a 1-inch diameter Livestock Pipeline (516) or an Irrigation Pipeline (430) is installed from the water ram to a 5,000 gallon storage facility. Improved water quantity or quality, grazing management, plant diversity, animal health, and/or irrigation purposes as outlined in the appropriate NRCS irrigation system standard. A 2" water ram, with 10 gpm of inlet flow and 10 feet of drop, can supply about 1.0 gpm to a location about 50 feet higher than the water ram.

Scenario Feature Measure:

Nominal Diameter of Inlet Pipe

Scenario Typical Size: 2 Inches

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, Ram	1	Each	$515.00	$515.00
Equip./Install.	Truck, Pickup	16	Hour	$25.85	$413.60
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.5	Cubic yard	$222.53	$111.27
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
				Total Cost:	$1,874.75

Practice: 533 - Pumping Plant

Scenario # 14 **Electric-Powered Pump >10 to 40 HP without L-Pipe**

Scenario Description: **Mississippi**

This is a close-coupled, 3-phase, 25 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler or large microirrigation (850 gpm and 35 psi) system or a large-sized surface irrigaiton system (1,200 gpm) or a large-sized (1,200 gpm and 25 psi) waste transfer system.

Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 25 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	25	Horsepower	$105.45	$2,636.25
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	56	Hour	$25.85	$1,447.60
Equip./Install.	Backhoe, 80 HP	8	Hour	$44.57	$356.56
Labor	Supervisor or Manager	56	Hour	$34.23	$1,916.88
Labor	General Labor	56	Hour	$17.95	$1,005.20
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$10,507.79

Practice: 533 - Pumping Plant

Scenario # 15 **Electric-Powered Pump >40 HP without L-Pipe**

Scenario Description: **Mississippi**

This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized (1,200 gpm and 50 psi) sprinkler or very large microirrigation (1,700 gpm and 35 psi) system or a very large-sized surface irrigation system (6,000 gpm) or a very large-sized (2,400 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

After Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 50 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	50	Horsepower	$105.45	$5,272.50
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	56	Hour	$25.85	$1,447.60
Equip./Install.	Backhoe, 80 HP	8	Hour	$44.57	$356.56
Labor	Supervisor or Manager	56	Hour	$34.23	$1,916.88
Labor	General Labor	56	Hour	$17.95	$1,005.20
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$13,144.04

Practice: 533 - Pumping Plant

Scenario # 16 **Internal Combustion-Powered Pump > 7½ to 75 HP without L-Pipe**

Scenario Description: **Mississippi**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 50 BHP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 40 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Swing Check Valve, metal, 14"	1	Each	$4,892.56	$4,892.56
Materials	Pump, < 50 HP, Pump & ICE power unit	40	Horsepower	$205.00	$8,200.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	1	Cubic yard	$222.53	$222.53
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$153.45	$1,227.60
Equip./Install.	Truck, Pickup	4	Hour	$25.85	$103.40
Labor	General Labor	32	Hour	$17.95	$574.40
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Labor	Supervisor or Manager	16	Hour	$34.23	$547.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$16,221.01

Practice: 533 - Pumping Plant

Scenario # 17 Internal Combustion-Powered Pump > 75 HP without L-Pipe

Scenario Description: **Mississippi**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is 75 break HP pump or larger. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters.

Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 80 Horse Power

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 70 HP, Pump & ICE power unit	80	Horsepower	$142.00	$11,360.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$222.53	$445.06
Equip./Install.	Truck, Pickup	6	Hour	$25.85	$155.10
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$153.45	$1,227.60
Labor	Supervisor or Manager	24	Hour	$34.23	$821.52
Labor	General Labor	48	Hour	$17.95	$861.60
Labor	Equipment Operators, Heavy	8	Hour	$22.46	$179.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Materials	Swing Check Valve, metal, 16"	1	Each	$6,837.20	$6,837.20
				Total Cost:	$22,160.92

Practice: 533 - Pumping Plant

Scenario # 18 L-pipe > 20 ft lift

Scenario Description: **Mississippi**

The typical scenario for when the location of the surface water from a river, stream or lake requires a lift greater than the common 20 ft. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Length of Lift

Scenario Typical Size: 30 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 30", Std Wt, USED	30	Foot	$85.56	$2,566.80
Materials	Pipe, Steel, 24", Std Wt, USED	20	Foot	$51.45	$1,029.00
Equip./Install.	Backhoe, 80 HP	16	Hour	$44.57	$713.12
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Labor	Equipment Operators, Heavy	16	Hour	$22.46	$359.36
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Skilled Labor	16	Hour	$23.57	$377.12
Equip./Install.	Portable Welder	16	Hour	$16.39	$262.24
				Total Cost:	$5,646.54

Practice: 533 - Pumping Plant

Scenario # 19 **Dual Intake on L-Pipe**

Scenario Description: **Mississippi**

An intake from the reservoir is required to allow for gravity feed pipelines and direct pumping from the reservoir. Typical pipe of 24" intake pipe in conjuction with 2800 gpm relift pump that is installed through the reservoir levee that is typically 100 feet from toe to toe. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water.Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Scenario Feature Measure:

Length of Intake

Scenario Typical Size: 100 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 24", Std Wt, USED	100	Foot	$51.45	$5,145.00
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Equip./Install.	Truck, Pickup	1	Hour	$25.85	$25.85
Equip./Install.	Dozer, 80 HP	6	Hour	$54.19	$325.14
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Labor	General Labor	4	Hour	$17.95	$71.80
Labor	Skilled Labor	4	Hour	$23.57	$94.28
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
Equip./Install.	Portable Welder	4	Hour	$16.39	$65.56
				Total Cost:	$6,358.05

Practice: 533 - Pumping Plant

Scenario # 20 Pump Conversion to Low Pressure

Scenario Description: **Mississippi**

This scenario involves converting an existing pump which is set up to operate any high pressure system to a pump set up to operate a low pressure system, when the existing high pressure system is being converted to low pressure system. Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality Degragation; Energy ConservationAssociated Practices: 449 - Irrigation Water Management, 442 - Irrigation System, Sprinkler

Before Practice Situation:

An existing irrigation pump is operating a high pressure center pivot system and needs to be converted to a low pressure pump to efficiently operate a center pivot system converted to low pressure.

After Practice Situation:

The existing high pressure pump is pulled and stages are removed in order to reduce the pressure which the pump will produce, this will cause a more energy efficient system and a system which is more efficiently distributing water.

Scenario Feature Measure:

conversion of pump

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Crane, truck mounted, hydraulic, 12 ton	6	Hour	$82.47	$494.82
Materials	Pump, Bowl replacement, 30 to 100 HP	50	Horsepower	$61.96	$3,098.00
Labor	General Labor	6	Hour	$17.95	$107.70
Labor	Supervisor or Manager	2	Hour	$34.23	$68.46
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$4,042.14

Practice: 533 - Pumping Plant

Scenario # 21 Pump Automation

Scenario Description: **Mississippi**

Typical: a diesel or electrical pump is set up with telemetry capabilities to operate the pump while recording important data such as the fuel levels, the temperature, oil levels, water levels in the reservoir or tailwater pit or both, and rainfall at the site. This data is collected and obtainable by the producers from any location.

Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality

Before Practice Situation:

Pumps are manually started. Oil, fuel, and water level in reservoir/tailwater pit are manually read. Requires a person to physically be on site to maniputate the pump and to take readings. Excess irrigation water is allowed to run off the crops and farmland when situations occur where farm labor is unable to operate the pump when irrigation is needed or needs have been met.

After Practice Situation:

Pump has an automatic pump start/stop remotely controlled from any location based on the information relayed from water availability or unavailibility. This prevents the landowner from being physically at the site when sufficient water is available or not for irrigation. Crops are supplied the required water needs and excess is not allowed to leave the farm, thus preventing damage to the pumping system, increased labor of the overall farm operation and increasing effiency, preventing sediment loss, reducing turbidity, over saturation of the plants, water quality turbity or excess water use in critical ground water areas.

Scenario Feature Measure:

automation of a pump

Scenario Typical Size: 1 each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Switches and Controls, programmable controller	1	Each	$149.00	$149.00
Materials	Switches and Controls, Wi-Fi system and software	1	Each	$750.00	$750.00
Materials	Switches and Controls, radio system	1	Each	$770.00	$770.00
Materials	Data Logger with Telemetry System	1	Each	$1,119.75	$1,119.75
Materials	Weather Station	1	Each	$153.29	$153.29
Labor	General Labor	8	Hour	$17.95	$143.60
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
				Total Cost:	$3,137.34

Practice: 554 - Drainage Water Management

Scenario # 1 **Drainage Water Management (DWM)**

Scenario Description: **Mississippi**

This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 75 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 5 water control structures; 3 structures control field water levels and 2 structures control a single denitrifying bioreactor.Resource Concern: Water Quality - Excess Nutrients in surface and ground waters.Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .

Before Practice Situation:

Existing drainage systems are in place and water flows uncontrolled.

After Practice Situation:

Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading by denitrification.

Scenario Feature Measure:

Number of Control Structures

Scenario Typical Size: 5 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	Skilled Labor	15	Hour	$23.57	$353.55
Acq. Tech.	Lodging	0.66	Each	$77.00	$50.82
Acq. Tech.	Training, Workshops	0.33	Each	$116.67	$38.50
Acq. Tech.	Transportation	66	Mile	$0.56	$36.96
				Total Cost:	$479.83

Practice: 560 - Access Road

Scenario # 1 **New 6" gravel road in wet, level terrain**

Scenario Description: **Mississippi**

Newly Constructed gravel road with min. 6 inch thick compacted gravel surface in relatively level ground in wet areas. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

Before Practice Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Practice Situation:

The road will be 14 feet wide with 6 inch gravel surfacing at the top. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

Scenario Feature Measure:

Length of Roadway

Scenario Typical Size: 1000 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Gravel, Ungraded, Quarry Run	275	Cubic yard	$17.62	$4,845.50
Equip./Install.	Earthfill, Dumped and Spread	1330	Cubic yard	$2.81	$3,737.30
Equip./Install.	Earthfill, Roller Compacted	1330	Cubic yard	$3.43	$4,561.90
Equip./Install.	Geotextile, woven	2000	Square Yard	$2.15	$4,300.00
Labor	Skilled Labor	10	Hour	$23.57	$235.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$17,816.98

Practice: 561 - Heavy Use Area Protection

Scenario # 1 **Reinforced Concrete with sand or gravel foundation**

Scenario Description: **Mississippi**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Practice Situation:

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Practice Situation:

The stabilized area is surfaced with approximately 630 square feet of approximately 8 cubic yards of welded wire mesh reinforced concrete with 8 cubic yards of sand or gravel foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Scenario Feature Measure:

Area

Scenario Typical Size: 630 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Sand, Graded, Washed	8	Cubic yard	$23.56	$188.48
Equip./Install.	Excavation, Common Earth, side cast, small equipment	4	Cubic yard	$1.86	$7.44
Equip./Install.	Concrete, CIP, slab on grade, reinforced	8	Cubic yard	$222.53	$1,780.24
Mobilization	Mobilization, General labor	0.5	Hour	$17.84	$8.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$2,121.66

Practice: 561 - Heavy Use Area Protection

Scenario # 2 **Rock/Gravel on Geotextile, 6" thick**

Scenario Description: **Mississippi**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

Before Practice Situation:

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Practice Situation:

The stabilized area is surfaced with approximately 630 square feet of rock, (6" deep) and or gravel on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Scenario Feature Measure:

Area of Rock and or Gravel

Scenario Typical Size: 630 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Gravel, Graded	12	Cubic yard	$24.48	$293.76
Equip./Install.	Geotextile, woven	70	Square Yard	$2.15	$150.50
Equip./Install.	Excavation, Common Earth, side cast, small equipment	4	Cubic yard	$1.86	$7.44
Mobilization	Mobilization, General labor	0.5	Hour	$17.84	$8.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$597.20

Practice: 578 - Stream Crossing

Scenario # 1 Hard armored low water crossing

Scenario Description: **Mississippi**

Stabilize the bottom and slope of a stream channel using rock riprap or cast in place concrete. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap or cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks or concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Practice Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Practice Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Scenario Feature Measure:

Crossing dimensions

Scenario Typical Size: 420 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Silt Fence	50	Foot	$0.67	$33.50
Materials	Rock Riprap, Placed with geotextile	18	Cubic yard	$58.09	$1,045.62
Equip./Install.	Truck, dump, 12 CY	2	Hour	$71.62	$143.24
Equip./Install.	Excavation, common earth, side cast, large equipment	18	Cubic Yard	$1.65	$29.70
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,433.56

Practice: 578 - Stream Crossing

Scenario # 2 **Low water crossing using prefabricated products**

Scenario Description: **Mississippi**

To install a stable crossing medium on channel bottom and approatches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Practice Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Practice Situation:

Access road and waterflow are able to cross each other in a stable manner.Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Scenario Feature Measure:

low water crossing

Scenario Typical Size: 420 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Silt Fence	50	Foot	$0.67	$33.50
Materials	Aggregate, Sand, Graded, Washed	6	Cubic yard	$23.56	$141.36
Materials	Aggregate, Gravel, Graded	18	Cubic yard	$24.48	$440.64
Equip./Install.	GeoCell, 4"	50	Square Yard	$12.70	$635.00
Equip./Install.	Truck, dump, 12 CY	2	Hour	$71.62	$143.24
Equip./Install.	Excavation, common earth, side cast, large equipment	18	Cubic Yard	$1.65	$29.70
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Labor	General Labor	40	Hour	$17.95	$718.00
Mobilization	Mobilization, General labor	1	Hour	$17.84	$17.84
				Total Cost:	$2,204.20

Practice: 578 - Stream Crossing

Scenario # 3 **Steam Crossing, Concrete Bottom**

Scenario Description: **Mississippi**

Stabilize the bottom and slope of a stream channel using cast in place concrete with gravel approaches. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with gravel and cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks above normal highwater mark and concrete below the normal highwater mark. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 linear feet of concrete (bottom width and approaches) with 10 foot gravel approaches on either side above the normal highwater mark. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Practice Situation:

An unimproved stream crossing has rill and gully erosion causing excessive sediments and excess nutrient potential. Erosion is made worse by vehicle traffic through the stream or rutting has progressed to the point that access to the field on the other side is no longer possible. Stream flow/velocity during storm events is such that culverts or a less ridgid ford type crossing is not anticipated to last its design life. Access is difficult to the field across the stream and water quality is negatively impacted.

After Practice Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Scenario Feature Measure:

Crossing dimensions

Scenario Typical Size: 420 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Sand, Graded, Washed	5	Cubic yard	$23.56	$117.80
Materials	Geotextile, non-woven, heavy weight	32	Square Yard	$4.04	$129.28
Equip./Install.	Truck, dump, 12 CY	2	Hour	$71.62	$143.24
Equip./Install.	Excavation, common earth, wet, side cast, large equipment	50	Cubic Yard	$3.98	$199.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	18	Cubic yard	$222.53	$4,005.54
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Labor	General Labor	16	Hour	$17.95	$287.20
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$5,063.56

Practice: 580 - Streambank and Shoreline Protection

Scenario # 1 **Structural**

Scenario Description: **Mississippi**

Protection of streambanks using structural measures such as riprap, concrete block, gabions, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, geotextile, and rock rip rap; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. The rock toe will be 3' thick and 5' high. The bank above the riprap will be graded to a stable slope and revegetated.Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility

Before Practice Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Practice Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure:

Linear Feet of Streambank/Shoreline Protected

Scenario Typical Size: 1000 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Ryegrass, Annual (Lolium multiflorum)	25	Pound	$1.25	$31.25
Materials	Erosion Control Blanket, biodegradable	556	Square Yard	$1.46	$811.76
Materials	Rock Riprap, Placed with geotextile	1667	Cubic yard	$58.09	$96,836.03
Materials	Fescue, Tall (Festuca arundinacea)	25	Pound	$1.80	$45.00
Equip./Install.	Earthfill, Roller Compacted	2500	Cubic yard	$3.43	$8,575.00
Equip./Install.	Excavation, common earth, wet, side cast, large equipment	2500	Cubic Yard	$3.98	$9,950.00
Equip./Install.	Dozer, 80 HP	16	Hour	$54.19	$867.04
Equip./Install.	Seeding Operation, Broadcast, Ground	0.12	Acre	$20.01	$2.40
Labor	Supervisor or Manager	80	Hour	$34.23	$2,738.40
Labor	General Labor	320	Hour	$17.95	$5,744.00
Labor	Equipment Operators, Light	16	Hour	$17.60	$281.60
Mobilization	Mobilization, Supervisor or Manager	10	Hour	$33.91	$339.10

Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, large equipment	1	Each	$255.47	$255.47
Mobilization	Mobilization, General labor	40	Hour	$17.84	$713.60
				Total Cost:	$127,420.45

Practice: 580 - Streambank and Shoreline Protection

Scenario # 2 **Vegetative with Willow Staking**

Scenario Description: **Mississippi**

Protection of streambanks consisting of conventional plantings of vegetation to stabilize and protect against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, staking of willow cuttings, critical area vegetation, and erosion control fabric; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) where the lowere 3-feet is staked with willows is used for estimation purposes.Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility

Before Practice Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has marginally degraded streambanks that are unstable with little hydraulic roughness near the toe and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Practice Situation:

The streambank is stablized against further erosion by the roots of planted willows and encourages natural sediment transport and deposition. The stream bank's toe is further stabilized by the addition of hydraulic roughness, via growing brushy vegatation, at the toe of the slope. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure:

Linear Feet of Streambank/Shoreline Protected

Scenario Typical Size: 1000 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Fescue, Tall (Festuca arundinacea)	100	Pound	$1.80	$180.00
Materials	Ryegrass, Annual (Lolium multiflorum)	100	Pound	$1.25	$125.00
Materials	Cuttings, woody, medium size	1000	Each	$0.44	$440.00
Materials	Erosion Control Blanket, biodegradable	2222	Square Yard	$1.46	$3,244.12
Equip./Install.	Excavation, common earth, wet, side cast, large equipment	2500	Cubic Yard	$3.98	$9,950.00
Equip./Install.	Dozer, 80 HP	16	Hour	$54.19	$867.04
Equip./Install.	Seeding Operation, Broadcast, Ground	0.46	Acre	$20.01	$9.20
Labor	Equipment Operators, Light	16	Hour	$17.60	$281.60
Labor	General Labor	234	Hour	$17.95	$4,200.30
Labor	Supervisor or Manager	56	Hour	$34.23	$1,916.88
Mobilization	Mobilization, Supervisor or Manager	7	Hour	$33.91	$237.37
Mobilization	Mobilization, General labor	28	Hour	$17.84	$499.52
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16

Total Cost:	$22,317.41

Practice: 580 - Streambank and Shoreline Protection

Scenario # 3 **Longitudinal Peak Stone Toe**

Scenario Description: **Mississippi**

Protection of streambanks using Longitudinal Peak Stone Toe protection (LPST). Use "Structural" where additional structural measures such as tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions are used. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. The typical scenario involves the stabilization of 1,000 linear feet of a stream bank having 12 foot high near verticle banks. Estimated cost is based on the insallation of LPST, as described in NEH 654, TS14K-13, having a height of 4 ft, topwidth of 2ft, 3:1 front slope and 2:1 back slope. The area between the sloped bank and LPST is a 19 foot wide bench planted with shrub type vegetation (willow stakes). Material used to make the bench are taken from excavated material taken to acheive the 3(H):1(V) slope. The bank above the riprap will be graded to a stable slope and revegetated in accordance with Critical Area Planting (382).Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility

Before Practice Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Practice Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure:

Linear Feet of Streambank/Shoreline Protected

Scenario Typical Size: 1000 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Ryegrass, Annual (Lolium multiflorum)	129	Pound	$1.25	$161.25
Materials	Rock Riprap, graded, angular, material and shipping	1893	Ton	$26.50	$50,164.50
Materials	Fescue, Tall (Festuca arundinacea)	129	Pound	$1.80	$232.20
Equip./Install.	Earthfill, Roller Compacted	2100	Cubic yard	$3.43	$7,203.00
Equip./Install.	Hydraulic Excavator, 1 CY	241	Hour	$91.71	$22,102.11
Equip./Install.	Seeding Operation, Broadcast, Ground	0.06	Acre	$20.01	$1.20
Labor	Supervisor or Manager	44	Hour	$34.23	$1,506.12
Labor	General Labor	320	Hour	$17.95	$5,744.00
Mobilization	Mobilization, large equipment	2	Each	$255.47	$510.94
Equip./Install.	Hauling, bulk, highway truck	72800	Cubic Yard Mile	$0.27	$19,656.00

Materials	Cuttings, woody, medium size	2000	Each	$0.44	$880.00
				Total Cost:	$108,161.32

Practice: 587 - Structure for Water Control

Scenario # 1 **Inlet Flashboard Riser, Metal**

Scenario Description: **Mississippi**

A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the inlet (Half-Rounds). They are often fabricated from half pipes (i.e. half-rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment.

Before Practice Situation:

The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.

After Practice Situation:

The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Flashboard Weir Length (in) x barrel Length (ft)

Scenario Typical Size: 1800 Inch-Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Lumber, planks, posts and timbers, treated	32	Board Foot	$1.15	$36.80
Materials	Pipe, Steel, 30", Std Wt, USED	50	Foot	$85.56	$4,278.00
Materials	Pipe, Steel, 36", Std Wt, USED	6	Foot	$100.14	$600.84
Materials	Steel, Angle, 3" x 3" x 1/4"	24	Foot	$3.05	$73.20
Materials	Steel, Plate, 3/8"	4	Square Foot	$12.84	$51.36
Equip./Install.	Hydraulic Excavator, .5 CY	2	Hour	$45.50	$91.00
Equip./Install.	Earthfill, Manually Compacted	10	Cubic yard	$4.59	$45.90
Equip./Install.	Earthfill, Roller Compacted	190	Cubic yard	$3.43	$651.70
Labor	Equipment Operators, Heavy	2	Hour	$22.46	$44.92
Labor	Skilled Labor	5	Hour	$23.57	$117.85
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$6,273.67

Practice: 587 - Structure for Water Control

Scenario # 2 **Inline Flashboard Riser, Metal**

Scenario Description: **Mississippi**

A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the embankment. They are often fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment.

Before Practice Situation:

The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.

After Practice Situation:

The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Flashboard Weir Length (in) x Barrel Length (ft)

Scenario Typical Size: 1800 Inch-Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Lumber, planks, posts and timbers, treated	4	Board Foot	$1.15	$4.60
Materials	Pipe, Steel, 30", Std Wt, USED	50	Foot	$85.56	$4,278.00
Materials	Pipe, Steel, 36", Std Wt, USED	6	Foot	$100.14	$600.84
Materials	Steel, Angle, 3" x 3" x 1/4"	24	Foot	$3.05	$73.20
Materials	Steel, Plate, 3/8"	10	Square Foot	$12.84	$128.40
Equip./Install.	Hydraulic Excavator, .5 CY	4	Hour	$45.50	$182.00
Equip./Install.	Earthfill, Manually Compacted	15	Cubic yard	$4.59	$68.85
Equip./Install.	Earthfill, Roller Compacted	190	Cubic yard	$3.43	$651.70
Labor	Equipment Operators, Heavy	4	Hour	$22.46	$89.84
Labor	Skilled Labor	7	Hour	$23.57	$164.99
Labor	General Labor	10	Hour	$17.95	$179.50
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
				Total Cost:	$6,596.32

Practice: 587 - Structure for Water Control

Scenario # 3 **Slide Gate**

Scenario Description: **Mississippi**

This scenario is the installation of a permanent slide gate structure to control the conveyance of water. The typical size is a 4' diameter opening. The slide gate may be installed on an open channel or pipeline. The slide gate is made of steel and has a hand operated mechanical lifting system, i.e. screw. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are: 533-Pumping Plant.

Before Practice Situation:

A channel or pipeline is in need of a head gate to control the flow of water.

After Practice Situation:

A 4' slide gate is installed and operated by hand is installed.

Scenario Feature Measure:

diameter

Scenario Typical Size: 4 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Screw gate, cast iron, 4' diameter, 10/0 head	1	Each	$5,516.33	$5,516.33
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Labor	Skilled Labor	12	Hour	$23.57	$282.84
Labor	General Labor	12	Hour	$17.95	$215.40
Labor	Equipment Operators, Heavy	6	Hour	$22.46	$134.76
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$6,553.33

Practice: 587 - Structure for Water Control

Scenario # 4 **Flap Gate**

Scenario Description: **Mississippi**

This scenario is the installation of a permanent flap (tide) gate structure to control the direction of flow resulting from tides or high water or back-flow from flooding. The typical size is a 4' diameter opening. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are:

Before Practice Situation:

A wetland or other area is in need of a flap gate to control the direction of the water.

After Practice Situation:

A flap gate 4' wide is installed.

Scenario Feature Measure:

Feet Diameter (of Gate)

Scenario Typical Size: 4 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Flap Gate, cast iron, 4' diameter	1	Each	$5,070.33	$5,070.33
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Labor	Skilled Labor	12	Hour	$23.57	$282.84
Labor	Equipment Operators, Heavy	6	Hour	$22.46	$134.76
Labor	General Labor	12	Hour	$17.95	$215.40
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$6,107.33

Practice: 587 - Structure for Water Control

Scenario # 5 **Fabricated Metal Water Control Structure**

Scenario Description: **Mississippi**

A Water Control Structure fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. This scenario is applicable to large fabricated structures used locally or not covered by other scenarios for the control of water surface elevation. The Cost estimate is based on a structure fabricated from a used Tank Car, having a diameter of 9 ft and lenght of 60 ft (9ft x 60ft = 540 Square Feet). The top half of the tank car is cut away 7 ft from one end, and a steel endplate is welded onto the cut end to form a three sided weir (7ft deep x 9ft wide). A 24 inch steel pipe having a screw valve, accessible topside, is welded through the plate allowing drawdown or further water surface elevation control. The structure passes through an embankment and regulates flow between the two sides. Payment rate is based upon the steel structure's plan view deminsions (Length x Width) in Square Feet (SF).

Before Practice Situation:

Fields are irrigate but excess irrigation water runs off into ditches and streams due to inefficiencies in irrigation. The excess water is carrying sediment and nutrients with it which are flowing into to the basins and causing water quality issues throughout the watershed.

After Practice Situation:

Excess irrigation water is captured and able to be stored at a consistant level to allow for adequate pumping in order to relift the excess water back into the system either directly to the field or to a surface storage reservoir. The water control structure allows the excess water to be stored so that it is not running down the basin and so excess nutrients or sediments have a chance to settle out of the water. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Structure Length (ft) x Stucture Width (ft)

Scenario Typical Size: 540 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Steel Tank Car	1	Each	$8,366.67	$8,366.67
Materials	Slide gate, steel, 2' diameter, low head	1	Each	$375.00	$375.00
Materials	Welded Bar Grate, metal	45	Square Foot	$13.07	$588.15
Materials	Pipe, Steel, 24", Std Wt, USED	20	Foot	$51.45	$1,029.00
Materials	Steel, Angle, 3" x 3" x 1/4"	8	Foot	$3.05	$24.40
Equip./Install.	Hydraulic Excavator, 1 CY	16	Hour	$91.71	$1,467.36
Equip./Install.	Concrete, CIP, formed reinforced	4	Cubic yard	$353.38	$1,413.52
Equip./Install.	Earthfill, Manually Compacted	15	Cubic yard	$4.59	$68.85
Equip./Install.	Earthfill, Roller Compacted	304	Cubic yard	$3.43	$1,042.72
Labor	Skilled Labor	20	Hour	$23.57	$471.40
Labor	General Labor	40	Hour	$17.95	$718.00
Labor	Equipment Operators, Heavy	16	Hour	$22.46	$359.36
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Materials	Steel, Plate, 3/8"	40.5	Square Foot	$12.84	$520.02
				Total Cost:	$16,581.03

Practice: 587 - Structure for Water Control

Scenario # 6 **Flow Meter with Mechanical Index**

Scenario Description: **Mississippi**

Permanently installed water flow meter with mechanical, cumulative volume and rate index. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

Before Practice Situation:

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After Practice Situation:

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

Scenario Feature Measure:

Nominal Diameter of Meter

Scenario Typical Size: 10 inch

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Flow Meter, with mechanical Index	1	Each	$1,141.12	$1,141.12
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$1,216.76

Practice: 587 - Structure for Water Control

Scenario # 7 **Flow Meter with Electronic Index**

Scenario Description: **Mississippi**

Permanently installed water flow meter with an electronic index . Meters can be any flow measurement device that meets CPS 433, (i.e., meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes or data logging capability. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch turbine flow meter, with electronic index output. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waster Transfer, and 590-Nutrient Management.

Before Practice Situation:

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After Practice Situation:

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

Scenario Feature Measure:

Nominal Diameter of Meter

Scenario Typical Size: 10 Inches

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Flow Meter, with Electronic Index	1	Each	$1,387.50	$1,387.50
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$1,463.14

Practice: 587 - Structure for Water Control

Scenario # 8 **Flow Meter with Electronic Index & Telemetry**

Scenario Description: **Mississippi**

Permanently installed water flow meter with an electronic flow rate and volume index and data telemetry transmission system. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch magnetic flow meter, with electronic index output and telemetry data transfer system for monitoring irrigation system flow rate.Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

Before Practice Situation:

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After Practice Situation:

Producer is able to access instantaneous rate and cumulative flow volume data from a personal computer or cell phone at any time. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

Scenario Feature Measure:

Nominal Diameter of Meter

Scenario Typical Size: 10 Inches

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Flow Meter, with electronic Index and telemetry	1	Each	$2,667.80	$2,667.80
Mobilization	Mobilization, very small equipment	2	Each	$37.82	$75.64
				Total Cost:	$2,743.44

Practice: 590 - Nutrient Management

Scenario # 1 **Basic NM System**

Scenario Description: **Mississippi**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Records demonstrating implementation of the 4 R's of the NM criteria will be required.

Before Practice Situation:

In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff or soil erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients.

After Practice Situation:

A nutrient management system will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. The use post-harvest of soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Test, Soil Test, Standard	1	Each	$9.53	$9.53
Equip./Install.	Truck, Pickup	1	Hour	$25.85	$25.85
Labor	Specialist Labor	2	Hour	$71.26	$142.52
Labor	General Labor	2	Hour	$17.95	$35.90
				Total Cost:	$213.80

Practice: 590 - Nutrient Management

Scenario # 2 **Basic Organic NM System**

Scenario Description: **Mississippi**

The planned NM system for organic production will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, training attendance, consultant services that provide nutrient recommendations. Records demonstrating implementation of the 4 R's of NM standard will be required. This Scenario is designed to encourage organic producers to effectively utilize organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil and manure analyses.

Before Practice Situation:

In this geographic area, an organic fertility program does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of organic fertilizers and amendments are not based on a nutrient budget. Nutrients are transported to surface waters through runoff or erosion and to ground waters through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

After Practice Situation:

A nutrient management system will be developed to meet the NRCS 590 standard and NOP regulations. A nutrient management budget will be developed annually for each field(s) based on soil test analysis and crop needs. Soil testing is completed according to LGU instructions. Application of nutrients will be completed at the proper rate, timing, and methods, and sources. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. Application of nutrients via manures, cover crops or approved commercial forms are applied in a manner that minimizes nutrient runoff and leaching. Specialized training is required by attending annual workshops and/or conferences. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Test, Soil Test, Standard	1	Each	$9.53	$9.53
Materials	Test, Manure Analysis	1	Each	$43.06	$43.06
Materials	Test, Compost Analysis	1	Each	$39.52	$39.52
Equip./Install.	Truck, Pickup	1	Hour	$25.85	$25.85
Labor	Specialist Labor	2	Hour	$71.26	$142.52
Labor	General Labor	1	Hour	$17.95	$17.95
				Total Cost:	$278.43

Practice: 590 - Nutrient Management

Scenario # 3 **Basic NM system with manure**

Scenario Description: **Mississippi**

This scenario describes the implementation of a basic nutrient management system on planning units 40 ac or larger of cropland or hayland where there is manure or compost application in addition to commercial fertilizer applications. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients while minimizing off-site degradation or the excessive built up of N and P. Payment for implementation is to defray the costs of soil testing, manure testing, analysis, proper implementation, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Risk assessments including PI (phosphorus index) and NI (nitrogen index) will be completed with applications of manure completed based on risk results. Records demonstrating implementation of the 4 R's of the NM plan will be required along with copies of risk assessments.

Before Practice Situation:

In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing and manure testing is not completed on a regular basis and applications of nutrients are not based on land grant university recommendations or a nutrient budget. Nutrients and manure solids are transported to surface waters through runoff or erosion or to groundwater through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection often times resulting in wind, sheet, rill, and ephemeral erosion.

After Practice Situation:

A nutrient management system that includes manure as a source will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil tests and manure test analysis along with land grant university recommendations or crop removal rates. On a planning unit soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. Applications of manure are based on risk assessments (PI - phosphorus index). The use of post-harvest soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, The use of Pre side-dress soil nitrogen test (PSNT) or a Pre Top Dress Tissue test (PTDTT) prior to the rapid biomass growth of the plant will assist the producer in evaluating the mineralization of Nitrogen from manures / cover crops in providing adequate nitrogen to meet the crop requirements, thus reducing the potential for off-site impacts. Records will be provided annually documenting current soil tests, manure tests, analyses, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. The producer will attend one extension crop school or nutrient management workshop or similar activity annually to stay current on crop-specific nutrient management.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Test, Soil Test, Standard	1	Each	$9.53	$9.53
Materials	Test, Manure Analysis	1	Each	$43.06	$43.06
Equip./Install.	Truck, Pickup	1	Hour	$25.85	$25.85
Labor	Specialist Labor	2	Hour	$71.26	$142.52
Labor	General Labor	2	Hour	$17.95	$35.90
				Total Cost:	$256.86

Practice: 590 - Nutrient Management

Scenario # 4 **Precision NM System**

Scenario Description: **Mississippi**

This scenario describes the implementation of a basic precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level. Records demonstrating implementation of the 4 R's of at the NM plan will be required. This scenario goes beyond the basic NM system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing precision techniques and tools. Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.

Before Practice Situation:

In this geographic area, a fertility program is already in place, however, applied nutrients are applied across large acreages based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by reducing energy inputs. Because whole fields are fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Due to the mono-application rate, excess nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.

After Practice Situation:

Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each field or management zone. Soil sampling consists of methods that allow for various zones to be established. Zone maps are created and a nutrient budget developed for each zone. An application rate (prescription) is developed for each zone based on representative soil analysis and zone nutrient budget. Nutrient applications are based on LGU recommendations. Soil testing is completed at least once every three years for P-K. A nutrient budget is developed for each field annually. Application of nutrients is completed so that non-point source pollution is minimized. Nutrients are applied based on realistic yield expectations. Records are maintained for all nutrient applications and soil testing. Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Nitrogen-Urease inhibitor	40	Acre	$10.17	$406.80
Materials	Test, Soil Test, Precision, Grid or Zone	15	Each	$12.45	$186.75
Equip./Install.	Truck, Pickup	1	Hour	$25.85	$25.85
Equip./Install.	Fertilizer, precision application	40	Acre	$11.65	$466.00
Equip./Install.	All terrain vehicles, ATV	2	Hour	$28.26	$56.52
Labor	Specialist Labor	3	Hour	$71.26	$213.78
Labor	General Labor	2	Hour	$17.95	$35.90
				Total Cost:	$1,391.60

Practice: 590 - Nutrient Management

Scenario # 5 **Advanced NM Precision System**

Scenario Description: **Mississippi**

This scenario describes the implementation of an advanced precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services, skilled labor and specialized nutrient application that provide nutrient proper recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level that includes split applications, NDVI sensing, and aerial imaging. Records demonstrating implementation of the 4 R's of the NM plan will be required. This scenario goes beyond the basic precision system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing specialized precision techniques and tools (variable rate applicators, NDVI, aerial photography, yield monitoring). Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.

Before Practice Situation:

In this geographic area, a fertility program is already in place, however, application of nutrients across large acreages is based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by reducing energy inputs and utilizing precise mapping and diagnostic equipment. Because whole fields are often fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Excess nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.

After Practice Situation:

Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each field or planning unit including zone directed sampling, real time NDVI (normalized differenced vegetative index) sensing, EC Index type sampling, or via high definition aerial photography that allows for the identification of numerous variations (zones) in a planning unit. Zone maps are created and a nutrient budget developed for each zone. An application rate (prescription) is developed for each zone based on representative soil analysis and a zone nutrient budget. Soil testing is completed annually for N and at least once every three years for P-K. A nutrient budget is developed for each field annually. Application of nutrients is completed so that non-point source pollution is minimized. Nutrients are applied based on realistic yield expectations. The average field size is >=40acres. Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator. Applications of nutrients will be completed in split applications where a majority of the N needs are applied based on the needs of the crop based on growing season requirements. Advanced training may be needed to effectively implement the practice. Producer will attend training courses and use specialized labor where needed in the annual maintenance of the NM plan. Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications. Yield monitoring maps will be collected and utilized (where technology allows) to develop the following year nutrient applications.

Scenario Feature Measure:

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Nitrogen-Urease inhibitor	40	Acre	$10.17	$406.80
Materials	Test, Soil Test, Precision, Grid or Zone	15	Each	$12.45	$186.75
Materials	Test, Soil Nitrogen Testing	1	Each	$14.59	$14.59
Equip./Install.	Truck, Pickup	3	Hour	$25.85	$77.55
Equip./Install.	Electrical Conductivity (EC), field mapping	40	Acre	$7.80	$312.00
Equip./Install.	Satellite imagery, aerial photography, infrared	40	Acre	$0.12	$4.80
Equip./Install.	Fertilizer, precision application	40	Acre	$11.65	$466.00

Equip./Install.	All terrain vehicles, ATV	4	Hour	$28.26	$113.04
Labor	Skilled Labor	2	Hour	$23.57	$47.14
Labor	Specialist Labor	4	Hour	$71.26	$285.04
Labor	General Labor	3	Hour	$17.95	$53.85
				Total Cost:	$1,967.56

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario # 1 **Litter Amendments for Water Quality With Partially Treated Brood Chamber**

Scenario Description: **Mississippi**

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions and water-soluble phosphorous in the poultry litter. An entire poultry house is treated year round for air and water quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air and water quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens and air quality impacts due to particulate matter and associated precursors, and objectionable odors.Associated practices: Nutrient Management (590).

Before Practice Situation:

No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address resource concerns from existing nutrient levels which may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and cause adverse air quality impacts such as objectionable odors and ammonia emissions.. The operation raises 4 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 18.7% of the needed litter amendments are being applied and only during the winter months.

After Practice Situation:

An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical broiler operation with 4 flocks in a 42’ x 500’ house (21,000 square feet) is treated to reduce the impacts on air and water quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 4 times annually. The total amendment applied is adjusted by 81.3% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to reduce ammonia emissions and soluble phosphorus in the litter. The selected amendment is applied in conformance with the manufacturer’s recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation from nutrients in surface and ground water and air quality impacts due to objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units:(Square Feet of house) / 1000 SF X (Number of houses) X (Number of applications/year) = Number of 1000SF/year. 21,000 SF / 1000 SF X 1 house X 4 app/yr = 84 units of 1000SF

Scenario Feature Measure:

Number of 1000SF applications per year

Scenario Typical Size: 84 1000 Square Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Ag Waste Amendment, aluminum sulfate, alum	3.4	Ton	$650.00	$2,210.00
Equip./Install.	Application of ag waste amendment for poultry litter	3.4	Ton	$52.21	$177.51
				Total Cost:	$2,387.51

Practice: 600 - Terrace

Scenario # 1 Broadbased

Scenario Description: **Mississippi**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a broadbased terrace having 5:1 upstream and 5:1 downstream slopes measuring 2,500 feet in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. Channel and berm are farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

Before Practice Situation:

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

After Practice Situation:

A system of broadbased terraces measuring 2,500 feet in length, 2.5 height, and 5:1 front and back slopes is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The installed terrace is typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

Scenario Feature Measure:

Length of Terrace

Scenario Typical Size: 2500 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Dozer, 140 HP	34	Hour	$100.14	$3,404.76
Labor	Supervisor or Manager	6	Hour	$34.23	$205.38
Labor	Equipment Operators, Heavy	34	Hour	$22.46	$763.64
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$4,510.36

Practice: 600 - Terrace

Scenario # 2 **Narrow Base < 8%**

Scenario Description: **Mississippi**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 2,500' length, and 2.5' height in a field with slopes from 3% to 8% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

Before Practice Situation:

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

After Practice Situation:

A system of narrow base terraces with approximately 2:1 front and back slopes measuring 2,500 feet in length and 2.5 feet height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

Scenario Feature Measure:

Length of Terrace

Scenario Typical Size: 2500 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Dozer, 140 HP	24	Hour	$100.14	$2,403.36
Labor	Supervisor or Manager	3	Hour	$34.23	$102.69
Labor	Equipment Operators, Heavy	24	Hour	$22.46	$539.04
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$3,181.67

Practice: 601 - Vegetative Barriers

Scenario # 1 **Vegetative Barrier: Cuttings on slopes**

Scenario Description: **Mississippi**

Permanent strips of stiff, dense vegetation established along the general contour of slopes.

Before Practice Situation:

Significant erosion is occurring resulting in substantial transport of sediment across the slope or concentrated flow areas. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

After Practice Situation:

A strip or strips of stiff, dense vegetation such as Vetivier Grass is/are established along the general contour of the slope that effectively settles a significant amount or sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

Scenario Feature Measure:

Linear feet of practice installed

Scenario Typical Size: 100 Linear Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Vetiver Grass, plug	400	Each	$3.82	$1,528.00
Materials	Herbicide, Glyphosate	0.0092	Acre	$11.04	$0.10
Materials	Nitrogen (N), Ammonium Sulfate	0.4591	Pound	$0.99	$0.45
Equip./Install.	Ground sprigging	0.0092	Acre	$88.80	$0.82
Equip./Install.	Fertilizer, ground application, dry bulk	0.0092	Acre	$6.97	$0.06
Equip./Install.	Chemical, ground application	0.0092	Acre	$4.33	$0.04
Forgone Income	FI, Rice	0.0023	Acre	$401.74	$0.92
Forgone Income	FI, Sorghum Dryland	0.0023	Acre	$123.07	$0.28
Forgone Income	FI, Soybeans Dryland	0.0023	Acre	$168.41	$0.39
Forgone Income	FI, Cotton Dryland	0.0023	Acre	$197.01	$0.45
				Total Cost:	$1,531.52

Practice: 607 - Surface Drainage, Field Ditch

Scenario # 1 **Field Drainage Ditch**

Scenario Description: **Mississippi**

This scenario is the construction of a surface drain, field ditch. Typical construction dimensions are 4' bottom x 2.5' deep x 1320' length with a side slope of 3:1. Excess water is either reused in an Irrigation System, Tailwater Recovery (447) system, or conveyed to a receiving water body. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water and Water Quality Degradation - Excessive Sediment in Surface Waters.

Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management

Before Practice Situation:

Excess water has no outlet and backs up into the fields causing damage or loss of the crop.

After Practice Situation:

An earthen ditch that follows the natural slope of the land at the low end of the field will be constructed to carry excess water to an outlet.

Scenario Feature Measure:

Volume of Earth Excavated

Scenario Typical Size: 1406 Cubic Yard

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Excavation, Common Earth, side cast, small equipment	1406	Cubic yard	$1.86	$2,615.16
Mobilization	Mobilization, small equipment	2	Each	$93.22	$186.44
				Total Cost:	$2,801.60

Practice: 612 - Tree & Shrub Establishment

Scenario # 1 **Plant Pine, Bareroot**

Scenario Description: **Mississippi**

Tree seedlings will be hand planted in the forested area where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.

Before Practice Situation:

The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.

After Practice Situation:

The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 10000 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, conifer, seedling, bare root, 1-0	10000	Each	$0.06	$600.00
Equip./Install.	Hand tools, tree planting	40	Hour	$9.44	$377.60
Labor	General Labor	40	Hour	$17.95	$718.00
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$2,172.94

Practice: 612 - Tree & Shrub Establishment

Scenario # 2 **Plant hardwood, bareroot**

Scenario Description: **Mississippi**

Establishing a hardwood forest setting by hand planting hardwood tree seedlings. Resource concerns are degraded plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

Before Practice Situation:

In an existing upland forest the present trees are poor quality, at low stocking levels, or are undesirable species. Existing conditions do not meet landonwer objectives of growing high quality trees. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

After Practice Situation:

The area of treatment is 20 acres. Bare root hardwood seedlings are planted by hand in the best locations for seedling survival. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 6000 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, hardwood, seedling or transplant, bare root, 6-18"	6000	Each	$0.25	$1,500.00
Equip./Install.	Hand tools, tree planting	24	Hour	$9.44	$226.56
Labor	General Labor	24	Hour	$17.95	$430.80
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$2,634.70

Practice: 612 - Tree & Shrub Establishment

Scenario # 3 **Shrub Planting**

Scenario Description: **Mississippi**

Shrubs are planted to provide a more diverse habitat. Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for widlife. Resource concern is inadequate habitat for fish and wildife - habitat fragmentation.

Before Practice Situation:

No shrubbery vegetation, or very little, is present under the forest overstory. Wildlife species that need shrub cover are not present. An adequate stand of overstory trees is present, but it is a single level, not multi-level.

After Practice Situation:

A 10 acre area is planted with shrubs. Shrubs are not planted over the entire 10 acres. They are planted in groups or motts. The motts, more or less circular in shape, are 50 feet in diameter, with 50 shrubs planted within each mott. 4 motts are planted per acre for a total of 200 shrubs per acre. Motts are randomly established to take advantage of site conditions and shrub species being planted.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 2000 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree shelter, solid tube type, 3-1/4" x 36"	2000	Each	$2.56	$5,120.00
Materials	Shrub, seedling or transplant, bare root, 18"-36"	2000	Each	$0.69	$1,380.00
Materials	Stake, bamboo, 3/8" x 36"	2000	Each	$0.08	$160.00
Equip./Install.	Hand tools, tree planting	16	Hour	$9.44	$151.04
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
				Total Cost:	$7,575.58

Practice: 612 - Tree & Shrub Establishment

Scenario # 4 **Plant pine-containerized**

Scenario Description: **Mississippi**

Tree seedlings will be hand planted in the forested area where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.

Before Practice Situation:

The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.

After Practice Situation:

The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.

Scenario Feature Measure:

Number planted

Scenario Typical Size: 10000 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tree, conifer, seedling, containerized, 4 cu. in.	10000	Each	$0.34	$3,400.00
Equip./Install.	Hand tools, tree planting	40	Hour	$9.44	$377.60
Labor	General Labor	40	Hour	$17.95	$718.00
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, Material, distance > 50 miles	100	Dollar	$1.00	$100.00
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$4,972.94

Practice: 614 - Watering Facility

Scenario # 1 **Permanent Drinking/Storage <500 Gallons**

Scenario Description: **Mississippi**

A permanent watering facility for livestock and or wildlife constructed of approved materials with less than 500 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and
health.

Before Practice Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be
improved.

After Practice Situation:

A permanent watering facility with a capacity of less than 500 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure:

Capacity in Gallons

Scenario Typical Size: 250 Gallon

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Tank, Galvanized Steel Livestock, >75 - 300 gallon	250	Gallon	$0.90	$225.00
Materials	Aggregate, Gravel, Ungraded, Quarry Run	0.5	Cubic yard	$17.62	$8.81
Materials	Wildlife Escape Ramp	1	Each	$36.74	$36.74
Equip./Install.	Backhoe, 80 HP	2	Hour	$44.57	$89.14
Equip./Install.	Excavation, Common Earth, side cast, small equipment	0.5	Cubic yard	$1.86	$0.93
Equip./Install.	Truck, Pickup	2	Hour	$25.85	$51.70
Labor	General Labor	2	Hour	$17.95	$35.90
Labor	Equipment Operators, Light	2	Hour	$17.60	$35.20
Mobilization	Mobilization, Light Equipment Operator	0.25	Hour	$17.44	$4.36
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, General labor	0.25	Hour	$17.84	$4.46
				Total Cost:	$628.82

Practice: 614 - Watering Facility

Scenario # 2 **Permanent Drinking/Storage 500-1000 Gallons**

Scenario Description: **Mississippi**

A permanent watering facility for livestock and or wildlife constructed of approved materials with 500 to 1,000 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and
health.

Before Practice Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be
improved.

After Practice Situation:

A permanent watering facility with a capacity of 500 to 1,000 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habit. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure:

Capacity in Gallons

Scenario Typical Size: 750 Gallon

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Gravel, Ungraded, Quarry Run	2	Cubic yard	$17.62	$35.24
Materials	Tank, Galvanized Steel Livestock, > 300 - 1,000 gallon	750	Gallon	$0.59	$442.50
Materials	Wildlife Escape Ramp	1	Each	$36.74	$36.74
Equip./Install.	Backhoe, 80 HP	6	Hour	$44.57	$267.42
Equip./Install.	Excavation, Common Earth, side cast, small equipment	2	Cubic yard	$1.86	$3.72
Equip./Install.	Truck, Pickup	6	Hour	$25.85	$155.10
Labor	Equipment Operators, Light	6	Hour	$17.60	$105.60
Labor	General Labor	6	Hour	$17.95	$107.70
Labor	Skilled Labor	6	Hour	$23.57	$141.42
Mobilization	Mobilization, General labor	0.25	Hour	$17.84	$4.46
Mobilization	Mobilization, Light Equipment Operator	0.25	Hour	$17.44	$4.36
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Skilled labor	0.25	Hour	$22.56	$5.64
				Total Cost:	$1,446.48

Practice: 614 - Watering Facility

Scenario # 3 **Permanent Drinking/Storage >5000 Gallons**

Scenario Description: **Mississippi**

A permanent watering facility for livestock and or wildlife constructed of approved materials with more than 5,000 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

Before Practice Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be
improved.

After Practice Situation:

A permanent watering facility with a capacity of more than 5,000 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns must be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure:

Capacity in Gallons

Scenario Typical Size: 10000 Gallon

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Aggregate, Sand, Graded, Washed	13	Cubic yard	$23.56	$306.28
Materials	Tank, Galvanized Steel Bottomless Livestock, > 6,000 gallon	10000	Gallon	$0.18	$1,800.00
Materials	Wildlife Escape Ramp	1	Each	$36.74	$36.74
Equip./Install.	Backhoe, 80 HP	12	Hour	$44.57	$534.84
Equip./Install.	Concrete, CIP, slab on grade, reinforced	7	Cubic yard	$222.53	$1,557.71
Equip./Install.	Excavation, Common Earth, side cast, small equipment	13	Cubic yard	$1.86	$24.18
Equip./Install.	Truck, Pickup	12	Hour	$25.85	$310.20
Labor	Equipment Operators, Light	12	Hour	$17.60	$211.20
Labor	General Labor	12	Hour	$17.95	$215.40
Labor	Skilled Labor	12	Hour	$23.57	$282.84
Labor	Supervisor or Manager	12	Hour	$34.23	$410.76
Mobilization	Mobilization, General labor	0.5	Hour	$17.84	$8.92
Mobilization	Mobilization, Light Equipment Operator	0.5	Hour	$17.44	$8.72
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Skilled labor	0.5	Hour	$22.56	$11.28
Mobilization	Mobilization, Supervisor or Manager	0.5	Hour	$33.91	$16.96
				Total Cost:	$5,872.61

Practice: 614 - Watering Facility

Scenario # 4 **Fountain**

Scenario Description: **Mississippi**

This scenario is for the installation of a livestock watering fountain in a pasture; typically near headquarters. The fountain is a manufactured valve type fountain with a capacity of less than 200 gallons. The cost includes all field preparation, excavation, concrete or gravel pad, and plumbing as needed to install the fountain. It does not include the pipeline to deliver the drinking water to the fountain or the heavy use are around the fountain. The unit cost will be based on each (ea) structure installed. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and
health.

Before Practice Situation:

The typical location of this practice is near headquarters or other winter grazing area which has limited or no access to water. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be
improved.

After Practice Situation:

A permanent watering facility, typically a single livestock watering fountain with two ball tupe access ports, with a capacity of less than 200 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as
appropriate.

Scenario Feature Measure:

Each Fountain

Scenario Typical Size: 1 Each

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Wildlife Escape Ramp	1	Each	$36.74	$36.74
Materials	Tank, Freeze Proof, 2 hole	1	Each	$533.60	$533.60
Equip./Install.	Backhoe, 80 HP	2	Hour	$44.57	$89.14
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.5	Cubic yard	$222.53	$111.27
Labor	General Labor	2	Hour	$17.95	$35.90
Labor	Equipment Operators, Light	2	Hour	$17.60	$35.20
Mobilization	Mobilization, small equipment	1	Each	$93.22	$93.22
				Total Cost:	$935.07

Practice: 620 - Underground Outlet

Scenario # 1 **UO<=6" w Riser**

Scenario Description: **Mississippi**

Install 500 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"" deep and 15" wide by trencher. Costs include 6" HDPE corrugated single wall plastic tubing, 8" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Practice Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Practice Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure:

Length of Conduit

Scenario Typical Size: 500 Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, HDPE, 6", CPT, Single Wall	500	Foot	$1.13	$565.00
Materials	Rock Riprap, Placed with geotextile	1	Cubic yard	$58.09	$58.09
Materials	Inlet, riser, 8"	2	Each	$123.42	$246.84
Equip./Install.	Excavation, common earth, small equipment, 50 ft	105	Cubic Yard	$2.24	$235.20
Equip./Install.	Compaction, earthfill, vibratory plate	2	Cubic Yard	$1.96	$3.92
Equip./Install.	Trencher, wheel type	5	Hour	$244.74	$1,223.70
Labor	Equipment Operators, Light	5	Hour	$17.60	$88.00
Labor	Supervisor or Manager	2	Hour	$34.23	$68.46
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$2,762.37

Practice: 620 - Underground Outlet

Scenario # 2 **6"<UO<=12" w Riser**

Scenario Description: **Mississippi**

Install 500 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, 12" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Practice Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Practice Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure:

Length of Conduit

Scenario Typical Size: 500 Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, HDPE, CPT, Double Wall, Soil Tight, 10"	500	Foot	$5.52	$2,760.00
Materials	Inlet, riser, 10"	2	Each	$170.56	$341.12
Materials	Rock Riprap, Placed with geotextile	1	Cubic yard	$58.09	$58.09
Equip./Install.	Excavation, common earth, small equipment, 50 ft	210	Cubic Yard	$2.24	$470.40
Equip./Install.	Compaction, earthfill, vibratory plate	2	Cubic Yard	$1.96	$3.92
Equip./Install.	Trencher, wheel type	5	Hour	$244.74	$1,223.70
Labor	Equipment Operators, Light	5	Hour	$17.60	$88.00
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16
				Total Cost:	$5,355.31

Practice: 629 - Waste Treatment

Scenario # 1 **Litter Windrow Pasteurization**

Scenario Description: **Mississippi**

This practice scenario includes the in house windrowing of poultry litter to promote pasteurization between flocks. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient and pathogens) and air quality impacts (PM & PM precursors, and objectionable odors).Associated practices: Amendments for Treatment of Agricultural Waste (591), Waste Storage Facility (313), & Nutrient Management (590)

Before Practice Situation:

A poultry operation typically removes part of the litter and bedding between flocks, called a cakeout. A full cleanout of litter and bedding is typically done once every 1-3 years depending on the operation. Over time, the accumulation of poultry waste in the litter contributes to an increase in odors and high ammonia emissions in the house contribute to impacts on bird health.

After Practice Situation:

This scenario assumes 4 flocks per year in an operation with 2 - 42 x 500 square foot houses. Three (3) in-house pasteurization events will be performed annually. There will be a full cleanout after the 4th flock. Formula to calculate the total number of pasteurization events per year on a 1000 SF basis:(Square Feet of house) / 1000 SF X (Number of houses) X (Number of pasteurization events) = Number of 1000SF. 21,000 SF / 1000 SF X 2 houses X 3 events = 126 units of 1000SFIn house pasteurization of poultry litter is achieved by windrowing the litter in the house. The process takes approximately one week. This process successfully addresses the air quality impacts (ammonia emissions, PM and PM precursors) and bird health resource concerns. This process also improves the quality of poultry litter that must be spread on farmland. Bird health is improved and bird mortality is reduced.

Scenario Feature Measure:

Surface Area of housing floor windrowed per year in 1000 SF

Scenario Typical Size: 126 1000 Square Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Tractor, agricultural, 120 HP	18	Hour	$47.06	$847.08
Labor	Equipment Operators, Light	18	Hour	$17.60	$316.80
				Total Cost:	$1,163.88

Practice: 634 - Waste Transfer

Scenario # 1 **Waste hauling**

Scenario Description: **Mississippi**

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can be used for any distances greater than 10 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Practice Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Practice Situation:

Trucks are loaded with 80 tons of manure solids and hauled 60 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhorphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Scenario Feature Measure:

Ton of waste and miles hauled

Scenario Typical Size: 4800 Ton-mile

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Manure Hauling, solid manure, transportation	4800	Ton-Mile	$0.12	$576.00
Mobilization	Mobilization, large equipment	1	Each	$255.47	$255.47
				Total Cost:	$831.47

Practice: 642 - Water Well

Scenario # 1 **Deep Well**

Scenario Description: **Mississippi**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. Well casings are 4-6" in diameter. Cost estimate based on a well 800 feet deep, with steel casing installed to a depth of 775 feet.

Before Practice Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Practice Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure:

Linear Foot of well depth

Scenario Typical Size: 800 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Well Casing, Metal, 6"	775	Foot	$47.52	$36,828.00
Materials	Chlorine	1	Gallon	$2.32	$2.32
Materials	Well Cap, 6"	1	Each	$32.35	$32.35
Materials	Grout, cement	2	Cubic Yard	$70.11	$140.22
Materials	Test, Standard Water Test, Well Water	1	Each	$52.20	$52.20
Materials	Well Screen, stainless steel, 6"	25	Foot	$209.12	$5,228.00
Equip./Install.	Rotary Drill Rig with Operator	35	Hour	$154.42	$5,404.70
Mobilization	Mobilization, Heavy Equipment Operator	0.5	Hour	$22.25	$11.13
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$47,835.50

Practice: 642 - Water Well

Scenario # 2 **High Volume Shallow Well**

Scenario Description: **Mississippi**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for overhead irrigation. An average well depth is 75 feet. Well casings are ≥ 6" in diameter. Steel casing is installed to a depth of 65 feet.

Before Practice Situation:

There is insufficient water for use in irrigation.

After Practice Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure:

Linear Foot of well depth

Scenario Typical Size: 75 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Chlorine	1	Gallon	$2.32	$2.32
Materials	Well Cap, 10"	1	Each	$61.65	$61.65
Materials	Grout, cement	2	Cubic Yard	$70.11	$140.22
Materials	Test, Standard Water Test, Well Water	1	Each	$52.20	$52.20
Materials	Well Screen, stainless steel, 10"	10	Foot	$347.04	$3,470.40
Equip./Install.	Rotary Drill Rig with Operator	3	Hour	$154.42	$463.26
Mobilization	Mobilization, Heavy Equipment Operator	0.5	Hour	$22.25	$11.13
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Materials	Well Casing, Metal, 10"	65	Foot	$60.38	$3,924.70
				Total Cost:	$8,262.46

Practice: 642 - Water Well

Scenario # 3 **High Volume Typical Well**

Scenario Description: **Mississippi**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are ≥ 6" in diameter. Steel casing is installed to a depth of 375 feet.

Before Practice Situation:

There is insufficient water for use in irrigation.

After Practice Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure:

Linear Foot of well depth

Scenario Typical Size: 400 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Chlorine	1	Gallon	$2.32	$2.32
Materials	Well Cap, 10"	1	Each	$61.65	$61.65
Materials	Grout, cement	2	Cubic Yard	$70.11	$140.22
Materials	Test, Standard Water Test, Well Water	1	Each	$52.20	$52.20
Materials	Well Screen, stainless steel, 10"	25	Foot	$347.04	$8,676.00
Equip./Install.	Rotary Drill Rig with Operator	18	Hour	$154.42	$2,779.56
Mobilization	Mobilization, Heavy Equipment Operator	0.5	Hour	$22.25	$11.13
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Materials	Well Casing, Metal, 10"	375	Foot	$60.38	$22,642.50
				Total Cost:	$34,502.16

Practice: 642 - Water Well

Scenario # 4 **Small Farm Well, 4" Plastic**

Scenario Description: **Mississippi**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 300 feet of the ground surface. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems, such as, micro-irrigation. Cost estimate is based on a well depth of 100 feet, with well casing 4" in diameter, PVC casing installed to a depth of 50 feet, and yield of <= 250 gpm. In general, the crush strength of plastic well casing is not sufficient for wells > 300 ft.

Before Practice Situation:

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

After Practice Situation:

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure:

Linear Foot of well depth

Scenario Typical Size: 100 Linear Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Well Casing, Plastic, 2"	0	Foot	$4.07	$0.00
Materials	Well Casing, Plastic, 4"	50	Foot	$9.72	$486.00
Materials	Test, Standard Water Test, Well Water	1	Each	$52.20	$52.20
Materials	Well Screen, plastic, 4"	50	Foot	$6.45	$322.50
Materials	Well Cap, 4"	1	Each	$23.64	$23.64
Materials	Well Screen, plastic, 2"	0	Foot	$3.80	$0.00
Materials	Grout, cement	2	Cubic Yard	$70.11	$140.22
Materials	Chlorine	1	Gallon	$2.32	$2.32
Equip./Install.	Rotary Drill Rig with Operator	3	Hour	$154.42	$463.26
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$1,626.72

Practice: 644 - Wetland Wildlife Management

Scenario # 1 **Topoggraphic Feature Creation, High**

Scenario Description: **Mississippi**

Corrective measures will require the use of equipment 150 HP in size or larger due to current site conditions and implementation techniques. The setting is all landuses, but typically is on lands used for the production of agricultural products, where the slope gradient is less than two percent and soils that are not excessivly drained, that are being converted back to wetland habitats for fish and wildlife. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient variability in microtopograpic releif in the area. The construction of low intensity and low complexity topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife. The contruction of micro and macro topographic featuires will require the use of equipment 150 HP in size or larger due to current site conditions and implementation techniques. Appropriate equipment (i.e. – Dozer, Excavator, etc) will be used to construct planned topographic features essential for identified species.

Before Practice Situation:

The site lacks sufficient micro- and macrotopographic features needed for optimal wetland wildlife habitat for target species. Typically the site has been previously manipulated and utilized for agricultural production. With the loss of ridges and swales and other topographic features scattered throughout the site, both plant and animal species that are dependent on the microenvironments created by these features are no longer present or are in decline within the planning unit.

After Practice Situation:

Appropriate equipment (i.e. – Dozer, Excavator, etc) was used to construct planned topographic features essential for identified species. As a result of the installation, adequate habitat structure such as micro and macro topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife.

Scenario Feature Measure:

number and size of constructed features

Scenario Typical Size: 100 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Satellite imagery, aerial photography, infrared	100	Acre	$0.12	$12.00
Equip./Install.	Dozer, 200 HP	1000	Hour	$152.27	$152,270.00
Equip./Install.	Hydraulic Excavator, 2 CY	1000	Hour	$153.45	$153,450.00
Labor	Supervisor or Manager	248	Hour	$34.23	$8,489.04
Labor	Equipment Operators, Heavy	2000	Hour	$22.46	$44,920.00
Mobilization	Mobilization, Supervisor or Manager	62	Hour	$33.91	$2,102.42
Mobilization	Mobilization, Heavy Equipment Operator	248	Hour	$22.25	$5,518.00
Mobilization	Mobilization, large equipment	4	Each	$255.47	$1,021.88
Acq. Tech.	Training, Workshops	1	Each	$116.67	$116.67
				Total Cost:	$367,900.01

Practice: 644 - Wetland Wildlife Management

Scenario # 2 **Close Risers by Nov.1-Feb.15**

Scenario Description: **Mississippi**

This scenario addresses inadequate habitat for fish and wildlife on cropland and/or moist soil areas. The resource concern is addressed by providing shallow water habitat for wildlife such as shorebirds, waterfowl, wading birds, mammals, fish, reptiles, amphibians, and other species that require shallow water for at least part of their life cycle. Sites are flooded up to a depth of 18" with an average depth of 9". Water is provided by placing boards in risers of water control structures by November 1 to catch precipitation. Removal of boards after February 15 allows area to drain. Associated practices are P.C. 587, Structure for Water Control and P.C. 356, Dikes.

Before Practice Situation:

There is inadequate habitat to provide optimum resting, nesting, and feeding habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

After Practice Situation:

A single or series of shallow water areas that are managed per standard and specification. Water levels are regulated to maintain temporary wildlife habitat. Water control structures are closed by November 1 and held through February 15 to catch rainfall. Depths are based on actual rainfall for that year; based on climatic data, assume enough rainfall to average 6-8 inches. The producer manages the timing and duration of water required for different species of waterfowl/shorebirds. This management will benefit wildlife while minimizing nutrient export and aquifer depletion. Flooded sites vary from mudflats to water depths of 18" with an average depth of 9". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.). If needed and dikes or water control structures are not currently present on the fields planned to be flooded, these practices may be planned for the same fields and cost shared under Structure for Water Control (587) and Dike (356). Depending on local conditions, other Conservation Practices may also be required.

Scenario Feature Measure:

Scenario Typical Size: 15 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Labor	General Labor	6	Hour	$17.95	$107.70
Mobilization	Mobilization, General labor	3	Hour	$17.84	$53.52
				Total Cost:	$161.22

Practice: 647 - Early Successional Habitat Development and Management

Scenario # 1 **Disking**

Scenario Description: **Mississippi**

This practice addresses inadequate wildlife habitat for species requiring early successional habitat at varying stages. This scenario provides early successional habitat by setting back succession and manipulating species composition by disking vegetation and creating bare ground, forbs for feeding habitat, and NWSGS for nesting habitat all within the homerange for grassland birds, such as quail. No more than 1/3 to 1/2 of the area should be disked within 1 year. The typical setting for this scenario is at the edge of crop fields, in pastures, odd areas such as pivot corners, and thinned forest understory. This scenario is applicable nationwide. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. Where chemical control of weeds, including invasives, is required to reduce competition for the desired plant community conservation practice 315 herbaceous weed control should be used. Where the seedbank is inadequate for natural regeneration and seeding is required, use conservation practice 550 range seeding or 327 Conservation Cover.

Before Practice Situation:

The site is static or trending to higher successional plant species. The disturbance regeme to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are often dense and inhibit the movements of younger wildlife species suchh as game bird chicks.

After Practice Situation:

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openess of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

Scenario Feature Measure:

width and length of treated area

Scenario Typical Size: 40 Acres

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Tillage, Light	40	Acre	$9.75	$390.00
Labor	Supervisor or Manager	20	Hour	$34.23	$684.60
				Total Cost:	$1,074.60

Practice: 655 - Forest Trails and Landings

Scenario # 1 **Grading and Shaping with Vegetative Establishment**

Scenario Description: **Mississippi**

Rehabilitation of existing forest access trails and landings on a medium slope by addressing rutting, erosion, and sedimentation. Typically the trail is a single, existing 18-foot wide (including cut and fill) seasonal road prism on gently sloping terrain requiring sustained erosion control measures applied with heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages and to establish a vegetative cover. This scenario includes designing and installation measures such as cross drains, rock drains, relief drainage, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. It also includes seedbed preparation, seeding and soil amendments determined to be needed. Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting. Access Road and Structure for Water Control can be adjacent/appurtenant but not part of the practice scenario. Treatments are for long-term reduction of sediment, restore fish habitat, create fire access and to move routes off unstable slopes. Resource concerns include: Excessive sediment in surface waters, Concentrated and Sheet & rill flow erosion, Soil compaction, and Habitat degradation.

Before Practice Situation:

Trail/landings are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

After Practice Situation:

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Scenario Feature Measure:

Length of trail treated

Scenario Typical Size: 2000 Feet

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Nitrogen (N), Ammonium Nitrate	70	Pound	$0.78	$54.60
Materials	Phosphorus, P2O5	55	Pound	$0.78	$42.90
Materials	Lime, ENM	1	Ton	$49.57	$49.57
Materials	Bahia grass (Paspalum notatum)	20	Pound	$4.07	$81.40
Materials	Potassium, K2O	40	Pound	$0.52	$20.80
Materials	Silt Fence	100	Foot	$0.67	$67.00
Equip./Install.	Backhoe, 80 HP	16	Hour	$44.57	$713.12
Equip./Install.	Skidsteer, 80 HP	16	Hour	$34.45	$551.20
Equip./Install.	Chainsaw	8	Hour	$5.34	$42.72
Equip./Install.	Motor Grader, 200 HP	10	Hour	$136.23	$1,362.30
Equip./Install.	Tillage, Light	1	Acre	$9.75	$9.75
Equip./Install.	Truck, water	6	Hour	$149.16	$894.96
Equip./Install.	Water Bars	300	Foot	$1.22	$366.00
Equip./Install.	Fertilizer, ground application, dry bulk	1	Acre	$6.97	$6.97
Equip./Install.	Lime application	1	Acre	$10.43	$10.43
Equip./Install.	Seeding Operation, Broadcast, Ground	1	Acre	$20.01	$20.01
Equip./Install.	All terrain vehicles, ATV	10	Hour	$28.26	$282.60
Labor	Equipment Operators, Light	40	Hour	$17.60	$704.00
Labor	General Labor	16	Hour	$17.95	$287.20
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, medium equipment	2	Each	$136.58	$273.16

Mobilization	Mobilization, Supervisor or Manager	4	Hour	$33.91	$135.64
				Total Cost:	$6,148.93

Practice: 666 - Forest Stand Improvement

Scenario # 1 **Forest Stand Improvement - Single stem-Hand tools**

Scenario Description: **Mississippi**

Adjust species composition and/or density of a stand of trees to meet objectives. The operation is carried out using hand tools such as chainsaws, weed eaters with saw blades, or machetes. Species that do NOT sprout are targeted (i.e. cedar and pine). This scenerio is NOT appropriate to target species that sprout. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

The density and/or species composition of a stand of trees is inconsistent with desired objectives. The stand could have poor health and vigor because of overstocking or undesirable species to be compatible with objectives for timber, wildlife, or aesthetics.

After Practice Situation:

Density and/or species composition of the stand is consistent with desired objectives. Stand will have good health and vigor with desirable species.

Scenario Feature Measure:

Area treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Chainsaw	160	Hour	$5.34	$854.40
Labor	Specialist Labor	40	Hour	$71.26	$2,850.40
Labor	General Labor	160	Hour	$17.95	$2,872.00
Mobilization	Mobilization, Specialist Labor	10	Hour	$73.38	$733.80
Mobilization	Mobilization, General labor	20	Hour	$17.84	$356.80
				Total Cost:	$7,667.40

Practice: 666 - Forest Stand Improvement

Scenario # 2 **Forest Stand Improvement - Chemical-Ground-Heavy Equipment**

Scenario Description: **Mississippi**

Using ground applied herbicides to release young desirable trees from competing and/or overtopping vegetation using ground-based machinery (dozers or skidders and NOT typical farm equipment). Typical sites include forestland with terrain too rough and uneven or vegetation too big or thick to be sprayed with normal farm equipment. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

An adequately stocked stand of desirable species is not meeting objective due to undesirable vegetation. If left uncontrolled, undesirable vegetation will inhibit desired species. Noxious and invasive species may also be present on the site. Application of herbicides will be by ground equipment as an over-the-top spray.

After Practice Situation:

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure:

Acres treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Materials	Herbicide, Imazapyr	40	Acre	$79.31	$3,172.40
Equip./Install.	Log skidder	32	Hour	$116.59	$3,730.88
Labor	Equipment Operators, Heavy	32	Hour	$22.46	$718.72
Labor	General Labor	32	Hour	$17.95	$574.40
Mobilization	Mobilization, large equipment	1	Each	$255.47	$255.47
Mobilization	Mobilization, Heavy Equipment Operator	6	Hour	$22.25	$133.50
				Total Cost:	$8,628.97

Practice: 666 - Forest Stand Improvement

Scenario # 3 **Forest Stand Improvement - Chemical, Aerial**

Scenario Description: **Mississippi**

Using aerially applied chemicals to release desirable trees from competing and/or overtopping vegetation. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

An adequately stocked stand of desirable species and trees is not growing to its potential for the site due to severe competition from undesirable trees and brush. Releasing the desirable trees from the competition will be achieved through the application of appropriate herbicides according to label directions. Application will be by helicopter as an over-the-top spray. The work will be professionally planned and supervised.

After Practice Situation:

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure:

Area treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Materials	Herbicide, Imazapyr	40	Acre	$79.31	$3,172.40
Equip./Install.	Chemical, aerial application, helicopter	40	Acre	$29.58	$1,183.20
Labor	General Labor	8	Hour	$17.95	$143.60
Labor	Supervisor or Manager	8	Hour	$34.23	$273.84
Mobilization	Mobilization, General labor	2	Hour	$17.84	$35.68
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$4,920.14

Practice: 666 - Forest Stand Improvement

Scenario # 4 **Forest Stand Improvement- Mechanical, Light Equipment**

Scenario Description: **Mississippi**

Using light equipment (typcially tractors used in normal farming operations) to control undesirable vegetation (disk or bush hog) competing with desirable species. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

A stand of young, desirable trees is adversely affected by competition either from undesirable species or because the stand is overstocked. The vegetation to be controlled is small enough that it can be mowed or shredded. The work can be done by mowing or shredding strips through the stand, mowing between planted rows, etc.

After Practice Situation:

After adjusting the stocking to an acceptable level and/or controlling the competing vegetation, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

Scenario Feature Measure:

Area Treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mower, Bush Hog	32	Hour	$42.07	$1,346.24
Labor	Equipment Operators, Light	32	Hour	$17.60	$563.20
Mobilization	Mobilization, Light Equipment Operator	6	Hour	$17.44	$104.64
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$2,150.66

Practice: 666 - Forest Stand Improvement

Scenario # 5 **Forest Stand Improvement- Mechanical, Medium Equipment**

Scenario Description: **Mississippi**

Using medium equipment (usually hydroax & not typical farming equipment) to control undesirable competing vegetation that is competing with desirable species or to reduce the stocking level of a stand of desirable trees too big to be mowed with a bush hog. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed.

After Practice Situation:

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure:

Area treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Brush Chipper, 6" capacity	80	Hour	$17.40	$1,392.00
Labor	Specialist Labor	10	Hour	$71.26	$712.60
Labor	Equipment Operators, Heavy	80	Hour	$22.46	$1,796.80
Mobilization	Mobilization, Specialist Labor	10	Hour	$73.38	$733.80
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Heavy Equipment Operator	10	Hour	$22.25	$222.50
				Total Cost:	$4,994.28

Practice: 666 - Forest Stand Improvement

Scenario # 6 **Forest Stand Improvement - Mechanical, Heavy Equipment**

Scenario Description: **Mississippi**

Using heavy equipment (usually bull dozers, masticator, or mulcher & not typical farming equipment) to control undesirable competing vegetation that is competing with desirable species or to reduce the stocking level of a stand of desirable trees too big to be mowed. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods such as using masticators or mulchers is necessary.

After Practice Situation:

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure:

Area treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Mechanical cutter, chopper	110	Hour	$116.59	$12,824.90
Labor	Specialist Labor	15	Hour	$71.26	$1,068.90
Labor	Equipment Operators, Light	110	Hour	$17.60	$1,936.00
Mobilization	Mobilization, Specialist Labor	2	Hour	$73.38	$146.76
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
				Total Cost:	$16,113.14

Practice: 666 - Forest Stand Improvement

Scenario # 7 **Forest Stand Improvement - Chemical-Ground-Light Equipment**

Scenario Description: **Mississippi**

Using ground applied herbicides to release young desirable trees from competing and/or overtopping vegetation using ground-based machinery (typical farm equipment). Typical sites include abandoned fields, pastures, or agricultural fields. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

Before Practice Situation:

An adequately stocked stand of desirable species is not meeting objective due to undesirable vegetation. If left uncontrolled, undesirable vegetation will inhibit desired species. Noxious and invasive species may also be present on the site. Application of herbicides will be by ground equipment as an over-the-top spray.

After Practice Situation:

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure:

Acres treated

Scenario Typical Size: 40 Acre

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Herbicide, Surfactant	40	Acre	$1.09	$43.60
Materials	Herbicide, Imazapyr	40	Acre	$79.31	$3,172.40
Equip./Install.	Chemical, ground application	40	Acre	$4.33	$173.20
Labor	Supervisor or Manager	4	Hour	$34.23	$136.92
Mobilization	Mobilization, medium equipment	1	Each	$136.58	$136.58
Mobilization	Mobilization, Supervisor or Manager	2	Hour	$33.91	$67.82
				Total Cost:	$3,730.52

Practice: 717 - Livestock Shade Structure

Scenario # 1 **Portable Shade Structure**

Scenario Description: **Mississippi**

A flexible membrane or fabric-like roof placed on a steel or wood portable frame used to promote animal health where prescribed grazing practices have limited livestock access to shade. Cost estimate is based upon a 25 ft x 40 ft portable structure.Associated practices include Fence (382), Prescribed Grazing (528), and Watering Facility (614).

Before Practice Situation:

Livestock are being managed using a prescribed grazing plan resulting in a lack of shade during the summer months. The livestock are stressed and eat less frequently.

After Practice Situation:

Livestock shade structures are rotated and sized according to NRCS plans and specifications. Livestock access to water, shade, and forage are dispersed to decrease animal stress and promote a better grazing and nutrient spreading.

Scenario Feature Measure:

Area of Roof Frame

Scenario Typical Size: 1000 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	"Pipe, Steel, 1 ¼"", SCH 40"	94	Foot	$2.05	$192.70
Materials	"Pipe, Steel, 2"", SCH 40"	185	Foot	$4.11	$760.35
Materials	Synthetic Liner, 60 mil	1000	Square Foot	$1.25	$1,250.00
Labor	Skilled Labor	16	Hour	$23.57	$377.12
Labor	General Labor	8	Hour	$17.95	$143.60
Materials	"Steel, Plate, 3/16"""	2	Square Foot	$6.34	$12.68
Materials	"Pipe, PVC, 2"", SCH 40"	25	Foot	$1.06	$26.50
Mobilization	Mobilization, very small equipment	1	Each	$37.82	$37.82
Equip./Install.	Portable Welder	16	Hour	$16.39	$262.24
				Total Cost:	$3,063.01

Practice: 798 - Seasonal High Tunnel for Crops

Scenario # 1 **Contiguous US**

Scenario Description: **Mississippi**

Used for contiguous US states in areas with low or no snowfall. A quonset-style (round) manufactured frame of tubular steel (30 x 72 ft.) covered with 4-year 6mil plastic. Costs are based on purchase of manufactured kit and landowner installing the structure. Structure must be installed to manufacturer's specifications.

Before Practice Situation:

Cropland where extension of the growing season is needed. Additional resource concerns that may need to be addressed include; soil erosion, soil condition, water quality, water quantity, plant condition, and energy use.

After Practice Situation:

A seasonal high tunnel has been installed and the growing season has been extended for 1-4 months on average. Plant health and vigor is improved and there is decreased energy use by producing food locally.

Scenario Feature Measure:

Area of Tunnel Installed

Scenario Typical Size: 2160 Square Foot

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Hoop House, quonset style, base package	2160	Square Foot	$2.60	$5,616.00
Labor	General Labor	71	Hour	$17.95	$1,274.45
				Total Cost:	$6,890.45