

**Practice:** 659 - Wetland Enhancement

**Scenario:** #1 - Tidal Channel Restoration/Establishment

**Scenario Description:** In coastal and estuarine wetland areas existing tidal channels are restored or new tidal channels are installed to improve tidal flow and increase salinity levels in these wetlands. The facilitated drainage increases in salinity and improves the overall health of the coastal wetland system. The increased salinity is capable of reducing or eliminating the invasive plant Phragmites. Coastal wetland range in size from 1 acre to 500 acres. The channels are installed using low pressure excavation equipment. Coastal permitting agencies usually require the excavated materials to be removed from the wetland. Many projects require installation of new culverts to allow flow through dikes and roads. Resource concerns include: Inadequate Habitat for Fish and Wildlife, Degraded plant condition. Facilitating practices include: 587 Structure for Watercontrol, 657 Wetland Restoration, 390 Riparian Herbaceous Cover.

**Before Situation:** Coastal and estuarine wetlands are degraded due to inadequate flow of salt water. The marsh vegetation is dying off and being replaced by invasive plants such as Phragmites. Areas of the marsh are devoid of vegetation.

**After Situation:** Tidal flow is restored and salinity is increased by restoring existing channels or installing new channels. The increased salinity allows native coastal plants such as *Spartina alterniflora*, *Spartina patens*, and *Iva frutescens* and *Distichlis spicata* to flourish and repopulate the marsh. The increased salinity

**Scenario Feature Measure:** <Unknown>

**Scenario Unit:** Acre

**Scenario Typical Size:** 0.25

**Total Scenario Cost:** \$24,055.92

**Scenario Cost/Unit:** \$96,223.68

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
----------------	----	-------------	------	------	-----	-------

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$25.96	220	\$5,710.73
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.61	110	\$4,797.29

**Equipment Installation**

Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$62.61	110	\$6,886.64
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$57.44	110	\$6,317.87

**Mobilization**

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$171.69	2	\$343.39
-------------------------------	------	--	------	----------	---	----------

**Practice:** 659 - Wetland Enhancement

**Scenario:** #2 - Tidal Marsh Excavation

**Scenario Description:** In coastal and estuarine wetland areas where tidal flow has been restored and invasive plants such as Phragmites has been eliminated there is a need to remove accumulated invasive plant rhizomes to facilitate natural restoration of native plant communities such as *Spartina alterniflora*, *Spartina patens*, *Iva frutescens* and *Distichlis spicata*. Normally excavating 0.5 to 1.0 fof of the material will remove the accumulated rhizomes and associated organing material. The resulting mud flats are then able to be naturally revegetated. There may be situations when planting is required. Coastal wetland range in size from 1 acre to 500 acra. The marsh surface is excavated using low pressure excavation equipment. Coastal permitting agencies require the excavated materials to be removed from the wetland. Many projects require installation of new culverts to allow flow through dikes and roads. Resouce concerns include: Inadequate Habitat for Fish and Wildlife, Degrade palnt condition. Facilitating practices include: 587 Structure for Watercontrol, 657 Wetland Restoration, 390 Riparian Herbaceous Cover, 396 Aquatic Organism Passage..

**Before Situation:** Coastal and estuarine wetlands are degraded due to growth of invasive plants such as Phragmites. The Phragmites has been eliminated using a variety of techniques including restoration of tidal flow, invasive plant removal, and tidal channel restoration. Large areas of dead rhizomes, usually 0.5 to 1.0 feet in thickness prevent native vegetation from re-establishing.

**After Situation:** The ares with dense mats of rhizomes are removes. Mud flats can be colonizes by native plancts such as: *Spartina alternaflora*, *Spartina patens*, and *Iva frutescens* and *Distichilis spicata*. The restored area provides habitat for coastal wildlife.

**Scenario Feature Measure:** <Unknown>

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$23,707.56

**Scenario Cost/Unit:** \$23,707.56

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
----------------	----	-------------	------	------	-----	-------

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$25.96	280	\$7,268.20
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.61	40	\$1,744.47

**Equipment Installation**

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	80	\$5,279.08
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$44.50	200	\$8,900.73

**Mobilization**

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$171.69	3	\$515.08
-------------------------------	------	--	------	----------	---	----------

**Practice:** 659 - Wetland Enhancement

**Scenario:** #3 - Tidal Barrier Removal

**Scenario Description:** Removal of a barrier to tidal flow in a coastal wetland complex. Typically undersized culverts that had been previously installed do not provide adequate flow into a coastal marsh system. The limited tidal flow has significant impacts on the salinity levels, native vegetation, and native species. The typical scenario included removal of a 24 inch culvert that is approximately 20 feet long. Material will be hauled away from the site and disposed of outside of the wetland/marsh area. This scenario only includes removal of the culvert and fill material that has been placed in the channel. Facilitating practices include: 342 Critical Area Planting, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 315 Herbaceous Weed Control, 657 Wetland Restoration, 644 Wetland Wildlife Habitat Management.

**Before Situation:** The practice will be completed typically in a coastal marsh that has been impacted by reduced tidal flow. Culverts have been installed across walking paths or small roads. The installed culverts have caused a reduction in the normal tidal flow. The decrease tidal flow has impacted the marsh and decrease native wildlife habitat, increased the presence of Phragmites and decreases the presence of native plants such as *Spartina alterniflora* and *Spartina patens*. The dense Phragmites vegetation has limited the use of the marsh by native wildlife. Water quality has been impacted by the decreased tidal flow.

**After Situation:** The culvert has been removed and the natural tidal flow has been restored. The invasive plant Phragmites is eventually eradicated. Native coastal marsh plants become re-established. Native wildlife using the marsh become more abundant. Wildlife food and cover is increased. Water quality has improved because of improved tidal flow.

**Scenario Feature Measure:** <Unknown>

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$6,976.61

**Scenario Cost/Unit:** \$6,976.61

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
----------------	----	-------------	------	------	-----	-------

**Labor**

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$36.00	32	\$1,151.94
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$26.15	16	\$418.43
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.61	6	\$261.67

**Equipment Installation**

Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$164.10	16	\$2,625.56
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$96.51	16	\$1,544.23

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	2	\$974.78
-------------------------------	------	--	------	----------	---	----------

**Practice:** 659 - Wetland Enhancement

**Scenario:** #4 - Macro-Micro Topography Creation-On Site Disposal

**Scenario Description:** The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishment of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will used or disposed of onsite. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

**Before Situation:** A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usually monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existent.

**After Situation:** The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Island nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communites have been restored. Water is available for native and migratory wildlife.

**Scenario Feature Measure:** <Unknown>

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$10,237.84

**Scenario Cost/Unit:** \$10,237.84

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
----------------	----	-------------	------	------	-----	-------

**Labor**

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$36.00	41	\$1,475.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$25.96	4	\$103.83
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$26.15	32	\$836.86
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.61	10	\$436.12

**Equipment Installation**

Dozer, 105 HP	1320	Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included.	Hour	\$84.20	8	\$673.62
Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$164.10	32	\$5,251.13
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$57.58	4	\$230.31

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	2	\$974.78
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27

**Practice:** 659 - Wetland Enhancement

**Scenario:** #5 - Creation of Micro/Macrotopography Haul Away Spoils

**Scenario Description:** The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishment of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will be hauled off site. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

**Before Situation:** A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usually monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existent.

**After Situation:** The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communites have been restored. Water is available for native and migratory wildlife.

**Scenario Feature Measure:** <Unknown>

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$21,828.75

**Scenario Cost/Unit:** \$21,828.75

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
----------------	----	-------------	------	------	-----	-------

**Labor**

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$36.00	120	\$4,319.76
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$26.15	60	\$1,569.12
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.61	20	\$872.24

**Equipment Installation**

Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$113.50	60	\$6,809.94
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	\$121.38	60	\$7,282.92

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$487.39	2	\$974.78
-------------------------------	------	--	------	----------	---	----------