Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #1 - Oyster bag gear cycling with 20 percent redundant gear in year 1

Scenario Description:

This scenario describes the implementation of aquaculture gear and biofouling control for raising 50,000 bivalves, usually oysters, ON or NEAR the substrate of the ocean floor, for three or more years until they reach marketable size. The planned practice will meet the current 400 standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of redundant gear, increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle. NRCS AQUACULTURE PROGRAM Eligibility for Funding through the EQIP Chesapeake Bay Program is based upon concern for: 1) the land-based gear cycling activities that manage/clean grow-out bags and cages so the contaminants and replaced gear are properly disposed of; and 2) the tidal bottoms within areas of the bays and rivers of Virginia that are capable of supporting oysters which biofilter Bay waters. Because tidal waters are considered waters of the State, almost all bottom aquaculture operations require a state lease. The participant must have control of the submerged land in the form of a lease or other documentation showing they have sufficient control to implement and manage the contracted activities.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are potential negative impacts of in-water gear cleaning activities.

After Situation:

Producer uses environmentally sound methods to maintain adequate water flow to bivalves by monitoring, minimizing and removing biofouling organisms. Damaged or excessively fouled gear is removed from the water and transported on-shore for cleaning or proper disposal. Replace/cycle bags for the purpose of rotating cleaner bags to reduce biofouling inputs into the marine environment. Instead of flushing and washing the bags instream, i.e., within the open water, dirty bags will be removed and cycled out to dry. Each grower is expected to obtain and maintain 20% surplus gear to complete this scenario. Typical number of oysters per bag is 300 and bags per grower who uses them is 175; Note: a minimum of 50,000 oysters/grower are required to participate per Dr. Jim Wesson at the Virginia Marine Resource Commission, Newport News, Virginia;

Scenario Feature Measure: Oyster bags

Scenario Unit: Each

Scenario Typical Size: 35

Scenario Cost: $1,325.65 **Scenario Cost/Unit:** $37.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
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	$19.09	60	$1,145.40
Materials						
Shellfish growout bags	2004	Oyster mesh bags (i.e. Vexar, Intermas), 1/4", 1/2", and 1" mesh sizes, typically 50 x 100 cm. Includes materials and shipping only.	Each	$5.15	35	$180.25

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #2 - Clam net gear cycling with 100 percent redundant gear in year 1

Scenario Description:

This scenario describes the implementation of aquaculture gear and biofouling control for raising 50,000 bivalves, usually oysters, ON or NEAR the substrate of the ocean floor, for three or more years until they reach marketable size. The planned practice will meet the current 400 standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of redundant gear, increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle. NRCS AQUACULTURE PROGRAM Eligibility for Funding through the EQIP Chesapeake Bay Program is based upon concern for: 1) the land-based gear cycling activities that manage/clean grow-out bags and cages so the contaminants and replaced gear are properly disposed of; and 2) the tidal bottoms within areas of the bays and rivers of Virginia that are capable of supporting oysters which biofilter Bay waters. Because tidal waters are considered waters of the State, almost all bottom aquaculture operations require a state lease. The participant must have control of the submerged land in the form of a lease or other documentation showing they have sufficient control to implement and manage the contracted activities.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are potential negative impacts of in-water gear cleaning activities.

After Situation:

Producer uses environmentally sound methods to maintain adequate water flow to bivalves by monitoring, minimizing and removing biofouling organisms. Damaged or excessively fouled gear is removed from the water and transported on-shore for cleaning or proper disposal. Replace/cycle bags for the purpose of rotating cleaner bags to reduce biofouling inputs into the marine environment. Replace/cycle nets for the purpose of rotating cleaner nets to reduce biofouling inputs into the marine environment. Instead of flushing and washing the nets instream, i.e., within the open water, dirty nets will be removed and cycled out to dry. Each grower is expected to obtain and maintain 100% surplus gear to complete this scenario one time per year. Typical clam net/bed is 14ft. x 60ft. and the typical grower has 20 beds per Dr. jim Wesson of the Virginia Marine Resource Commission, Newport News, Virginia;

Scenario Feature Measure: Clam nets

Scenario Unit: Each

Scenario Typical Size: 20

Scenario Cost: $10,935.20 **Scenario Cost/Unit:** $546.76

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
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	$19.09	80	$1,527.20
Materials						
Shellfish Predation Netting, seed in-ground culture	1890	Preditor control netting for clams, soft mesh polyethylene, 1/4" - 1/2" mesh sizes; typical width is 14', lengths vary from 20' to 150'. Includes materials and shipping only.	Square Foot	$0.56	16800	$9,408.00

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #3 - Oyster cage,sm., gear cycling with 20 percent redundant gear in yr. 1

Scenario Description:

This scenario describes the implementation of aquaculture gear and biofouling control for raising bivalves, usually oysters, ON or NEAR the substrate of the ocean floor, for three or more years until they reach marketable size. The planned practice will meet the current 400 standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of redundant gear, increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle. Each small cage holds approximately 500 oysters. NRCS AQUACULTURE PROGRAM Eligibility for Funding through the EQIP Chesapeake Bay Program is based upon concern for: 1) the land-based gear cycling activities that manage/clean grow-out bags and cages so the contaminants and replaced gear are properly disposed of; and 2) the tidal bottoms within areas of the bays and rivers of Virginia that are capable of supporting oysters which biofilter Bay waters. Because tidal waters are considered waters of the State, almost all bottom aquaculture operations require a state lease. The participant must have control of the submerged land in the form of a lease or other documentation showing they have sufficient control to implement and manage the contracted activities.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are potential negative impacts of in-water gear cleaning activities.

After Situation:

Producer uses environmentally sound methods to maintain adequate water flow to bivalves by monitoring, minimizing and removing biofouling organisms. Damaged or excessively fouled gear is removed from the water and transported on-shore for cleaning or proper disposal. Note: a minimum of 50,000 oysters/grower are required to participate per VMRC in Virginia;

Scenario Feature Measure: Oyster cages, small

Scenario Unit: Each

Scenario Typical Size: 30

Scenario Cost: $4,878.90 **Scenario Cost/Unit:** $162.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
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	$19.09	90	$1,718.10
Materials						
Shellfish cages, bottom, rack or bag in cage systems	2006	Wire mesh shellfish growout cages 2'x3', 3'x3', 3'x4' wire cages, 6mm, 12mm, 18mm, 25mm mesh sizes. Deployed on bottom or racks, or bags and cage. Includes materials and shipping only.	Each	$105.36	30	$3,160.80

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #4 - Oyster cage, med., gear cycling with 20 percent redundant gear in year 1

Scenario Description:

This scenario describes the implementation of aquaculture gear and biofouling control for raising bivalves, usually oysters, ON or NEAR the substrate of the ocean floor, for three or more years until they reach marketable size. The planned practice will meet the current 400 standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of redundant gear, increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle. Each medium size cage holds approximately 1,000 oysters. NRCS AQUACULTURE PROGRAM Eligibility for Funding through the EQIP Chesapeake Bay Program is based upon concern for: 1) the land-based gear cycling activities that manage/clean grow-out bags and cages so the contaminants and replaced gear are properly disposed of; and 2) the tidal bottoms within areas of the bays and rivers of Virginia that are capable of supporting oysters which biofilter Bay waters. Because tidal waters are considered waters of the State, almost all bottom aquaculture operations require a state lease. The participant must have control of the submerged land in the form of a lease or other documentation showing they have sufficient control to implement and manage the contracted activities.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are potential negative impacts of in-water gear cleaning activities.

After Situation:

Producer uses environmentally sound methods to maintain adequate water flow to bivalves by monitoring, minimizing and removing biofouling organisms. Damaged or excessively fouled gear is removed from the water and transported on-shore for cleaning or proper disposal. Note: a minimum of 50,000 oysters/grower are required to participate per VMRC in Virginia;

Scenario Feature Measure: Oyster cages, medium

Scenario Unit: Each

Scenario Typical Size: 15

Scenario Cost: $3,266.70 **Scenario Cost/Unit:** $217.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
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	$19.09	90	$1,718.10
Materials						
Shellfish cages, double layer	2008	Oyster trays and cages 600-1800 double layer oyster cages. Includes materials and shipping only.	Each	$103.24	15	$1,548.60

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #5 - Oyster cage, lrg., gear cycling with 20 percent redundant gear in year 1

Scenario Description:

This scenario describes the implementation of aquaculture gear and biofouling control for raising bivalves, usually oysters, ON or NEAR the substrate of the ocean floor, for three or more years until they reach marketable size. The planned practice will meet the current 400 standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of redundant gear, increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle. Each large size cage holds approximately 2,000 oysters. NRCS AQUACULTURE PROGRAM Eligibility for Funding through the EQIP Chesapeake Bay Program is based upon concern for: 1) the land-based gear cycling activities that manage/clean grow-out bags and cages so the contaminants and replaced gear are properly disposed of; and 2) the tidal bottoms within areas of the bays and rivers of Virginia that are capable of supporting oysters which biofilter Bay waters. Because tidal waters are considered waters of the State, almost all bottom aquaculture operations require a state lease. The participant must have control of the submerged land in the form of a lease or other documentation showing they have sufficient control to implement and manage the contracted activities.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are potential negative impacts of in-water gear cleaning activities.

After Situation:

Producer uses environmentally sound methods to maintain adequate water flow to bivalves by monitoring, minimizing and removing biofouling organisms. Damaged or excessively fouled gear is removed from the water and transported on-shore for cleaning or proper disposal. Note: a minimum of 50,000 oysters/grower are required to participate per VMRC in Virginia;

Scenario Feature Measure: Oyster cages, large

Scenario Unit: Each

Scenario Typical Size: 100

Scenario Cost: $27,123.20 **Scenario Cost/Unit:** $271.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
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	$19.09	880	$16,799.20
Materials						
Shellfish cages, double layer	2008	Oyster trays and cages 600-1800 double layer oyster cages. Includes materials and shipping only.	Each	$103.24	100	$10,324.00