

Practice: 397 - Aquaculture Ponds

Scenario: #1 - Aquaculture Pond

Scenario Description: Typical practice is 1 acre (surface area) pond, 3:1 side slopes, average 5' depth. The construction of an aquaculture pond to facilitate the containment of the cultured organisms, the efficient use of water, and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of an earthen pond, an earthen pond is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in earthen ponds. This scenario does not include a liner of any kind. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond outlet shall be Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species.

After Situation: Aquaculture pond is typically 1 acre in surface area, 5 feet deep with 3:1 side slopes. The resource concerns identified on site are addressed. The practice is installed using a dozer. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Acre of Aquaculture Pond

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$26,900.21

Scenario Cost/Unit: \$26,900.21

Cost Details

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

Labor

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	2	\$87.22
-----------------------	-----	--	------	---------	---	---------

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	1	\$487.39
-------------------------------	------	--	------	----------	---	----------

Equipment Installation

Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.77	6990	\$26,325.60
---	------	--	------------	--------	------	-------------

Practice: 397 - Aquaculture Ponds

Scenario: #2 - With Rock Bottom

Scenario Description: Typical practice is 1 acre (surface area) pond , 3:1 side slopes, average 5' depth with a 6" gravel placed in pond bottom as required for certain species of fish. The construction of a aquaculture pond to facilitate the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of a gravel-lined pond, an earthen pond with gravel lining is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in earthen ponds. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond and furnish and place gravel. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system that one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species.

After Situation: Aquaculture pond is typically 1 acre in surface area, 5 feet deep with 3:1 side slopes with 6" of gravel on the bottom. The identified resource concerns on site are addressed. The practice is installed using a dozer. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Acre of Aquaculture Pond

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$66,650.20

Scenario Cost/Unit: \$66,650.20

Cost Details

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

Equipment Installation

Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.77	7581	\$28,551.41
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.58	4840	\$12,469.78

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$36.06	690	\$24,882.71
---------------------------	----	--	------------	---------	-----	-------------

Labor

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	2	\$87.22
-----------------------	-----	--	------	---------	---	---------

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	1	\$487.39
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	1	\$171.69

Practice: 397 - Aquaculture Ponds

Scenario: #3 - With Waste Sump

Scenario Description: Typical practice is a 90' by 45' pond, 3:1 side slopes, average 4' depth (25,300 cubic feet) with a waste sump constructed of 10 CY of concrete to collect and remove waste. The construction of an aquaculture pond to facilitate the efficient collection and transfer of waste, the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of an earthen pond, an earthen pond is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in earthen ponds. This scenario is used where the frequent removal of waste from the culture unit are required, to meet water quality objectives. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be a Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond and construct reinforced concrete waste sump. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species. The desired water quality objectives are not met, wastes are accumulating within the pond, the health and condition of the cultures species are in decline, and/or wastes are being discharged to downstream waters.

After Situation: Aquaculture pond is typically 7,866 square feet in surface area (90' by 45' bottom dimension), 4 feet deep with 3:1 side slopes and a waste sump. The identified resource concerns on site are addressed. The practice is installed using a dozer. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Cubic Yard of Aquaculture Pond

Scenario Unit: Cubic Yard

Scenario Typical Size: 940

Total Scenario Cost: \$12,385.35

Scenario Cost/Unit: \$13.18

Cost Details

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

Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$511.29	7	\$3,579.03
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$4.31	937	\$4,038.43

Labor

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	4	\$174.45
-----------------------	-----	--	------	---------	---	----------

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	1	\$487.39
-------------------------------	------	--	------	----------	---	----------

Materials

Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	\$2,053.03	2	\$4,106.06
-------------------------------------	------	--	------	------------	---	------------

Practice: 397 - Aquaculture Ponds

Scenario: #4 - Rock Bottom and Waste Sump

Scenario Description: Typical practice is a 90' by 45' pond, 3:1 side slopes, average 4' depth (25,300 cubic feet) with a waste sump constructed of 10 CY of concrete to collect and remove waste, and 6" of gravel placed in pond bottom as required for certain species of fish. The construction of an aquaculture pond to facilitate the efficient collection and transfer of waste, the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of a gravel-lined pond, an earthen pond with gravel lining is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in earthen ponds. This scenario is used where the frequent removal of wasted from the culture unit are required, to meet water quality objectives. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be a Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond, furnish and place gravel, and construct reinforced concrete waste sump. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species. The desired water quality objectives are not met, wastes are accumulating within the pond, the health and condition of the cultures species are in decline, and/or wastes are being discharged to downstream waters.

After Situation: Aquaculture pond is typically 7866 square feet in surface area (90' by 45' bottom dimension), 4 feet deep with 3:1 side slopes, a waste sump, and 6" of gravel placed on pond bottom. The identified resource concerns on site are addressed. The practice is installed using a dozer. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Cubic Yard of Aquaculture Pond

Scenario Unit: Cubic Yard

Scenario Typical Size: 940

Total Scenario Cost: \$20,467.92

Scenario Cost/Unit: \$21.77

Cost Details

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

Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$511.29	7	\$3,579.03
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$4.31	1085	\$4,676.31
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.58	874	\$2,251.77

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$36.06	144	\$5,192.91
Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	\$2,053.03	2	\$4,106.06

Labor

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	4	\$174.45
-----------------------	-----	--	------	---------	---	----------

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	1	\$487.39
-------------------------------	------	--	------	----------	---	----------

Practice: 397 - Aquaculture Ponds

Scenario: #5 - Concrete Pond

Scenario Description: Typical practice is a 90' by 45' pond, average 4' depth (16,200 cubic feet) with a waste sump constructed of 10 CY of concrete to collect and remove waste. The construction of an aquaculture pond to facilitate the efficient collection and transfer of waste, the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are not conducive to the creation of an earthen pond, an earthen pond is not suitable for the planned aquaculture system, or the respective state agencies will not allow for the culture of the targeted species in earthen ponds. This scenario could also be used when a producer has an existing earthen pond(s), and a flow-through aquaculture system, and is going to convert to a recirculating aquaculture system (RAS) to conserve surface or groundwater withdrawals. This scenario is used where the frequent removal of wasted from the culture unit are required, to meet water quality objectives. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be a Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond and construct reinforced concrete waste sump. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species. The desired water quality objectives are not met, wastes are accumulating within the pond, the health and condition of the cultures species are in decline, and/or wastes are being discharged to downstream waters. The diversion of surface water into the existing aquaculture system (flow-through) is having detrimental effects on the source (stream, lake, pond), and the conversion from a flow-through system to a RAS will minimize water withdrawals from the source water.

After Situation: Aquaculture pond is typically 4,050 square feet in surface area (90' by 45'), 4 feet deep, with floor slab and walls constructed of reinforced concrete, and a waste sump. The identified resource concerns are addressed. The practice is installed using a dozer and concrete equipment. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Cubic Yard of Aquaculture Pond

Scenario Unit: Cubic Yard

Scenario Typical Size: 600

Total Scenario Cost: \$137,629.76

Scenario Cost/Unit: \$229.38

Cost Details

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

Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$511.29	227	\$116,062.83
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$4.31	1750	\$7,542.43
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.58	450	\$1,159.38

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$36.06	181	\$6,527.20
Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	\$2,053.03	2	\$4,106.06

Labor

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
-----------------------	-----	--	------	---------	----	------------

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	1	\$487.39
-------------------------------	------	--	------	----------	---	----------

Practice: 397 - Aquaculture Ponds

Scenario: #6 - Precast Walls with Rock Bottom

Scenario Description: Typical practice is a 90' by 45' pond, average 4' depth (16,200 cubic feet) with a waste sump constructed of 10 CY of concrete to collect and remove waste, and 6" of gravel placed in pond bottom as required for certain species of fish. The construction of an aquaculture pond to facilitate the efficient collection and transfer of waste, the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of a gravel-bottom pond, a gravel-bottom pond is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in gravel-bottom ponds. This scenario could also be used when a producer has an existing earthen pond(s), and a flow-through aquaculture system, and is going to convert to a recirculating aquaculture system (RAS), or a partial RAS to conserve surface or groundwater withdrawals, and the use of a full concrete pond is not warranted. However, soil and/or site conditions are not conducive to use a pond with typical earthen side slopes. This scenario is used when frequent removal of waste from the culture unit are required, to meet water quality objectives. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be a Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond, furnish and place gravel, and construct reinforced concrete waste sump. Water Control Structure and Seeding not included.

Before Situation: In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species. The desired water quality objectives are not met, wastes are accumulating within the pond, the health and condition of the cultured species are in decline, and/or wastes are being discharged to downstream waters. The diversion of surface water into the existing aquaculture system (flow-through) is having detrimental effects on the source (stream, lake, pond), and the conversion from a flow-through system to a RAS will minimize water withdrawals from the source water. Based on site conditions, a full concrete pond is not warranted.

After Situation: Aquaculture pond is typically 4,050 square feet in surface area (90' by 45'), 4 feet deep with a rock bottom, walls constructed of precast concrete, and a waste sump. The identified resource concerns are addressed. The practice is installed using a dozer and large excavator. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Scenario Feature Measure: Cubic Yard of Aquaculture Pond

Scenario Unit: Cubic Yard

Scenario Typical Size: 600

Total Scenario Cost: \$43,002.88

Scenario Cost/Unit: \$71.67

Cost Details

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

Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$511.29	7	\$3,579.03
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$4.31	2336	\$10,068.07
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.58	630	\$1,623.13

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$36.06	135	\$4,868.36
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yard	\$105.03	164	\$17,224.17
Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	\$2,053.03	2	\$4,106.06

Labor

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	24	\$1,046.68
-----------------------	-----	--	------	---------	----	------------

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	1	\$487.39
-------------------------------	------	--	------	----------	---	----------