Cocahoe Economics Fact Sheet

Undertaking a large project such as baitfish farming requires a good deal of advanced planning to ensure that prudent decisions are made. The purpose of this section is to provide cost estimates for potential producers. These estimates may assist interested parties in deciding which type of production, if any, is right for their individual situation. However, projected costs and returns vary considerably based on available resources and scale. These cost projections are meant to act as a guideline only for interested parties and potential producers to make cost estimates appropriate to their unique situations. Every individual situation will be unique and cannot be duplicated here.

In order to gain an accurate economic portrayal, interviews were conducted at four Louisiana bait shops across three parishes. These interviews served to provide information on interactions between wholesalers and retailers. Shop owners and managers were asked questions regarding holding capacity, types of holding systems, sale price, and survivability of cocahoe minnows. They also provided data on wholesale prices, reliability of wholesalers, and turnover on minnow batches. All of the shops interviewed sold cocahoe minnows as live bait. Of the four shops interviewed, three received their minnows from external harvesters. One of the shops interviewed caught their own bait. This shop also provided valuable information on the costs associated with catching minnows. The information collected in these interviews was used to determine our estimated standard price per minnow as well as the volume of minnows that could be sold per average unit of time. For the purpose of our estimates, both the average wholesale price and the average weekly turnover were used.

Five owner-operator production examples were developed, and costs associated with each were identified and quantified. An economic model was developed to create the projected costs and returns for each example. Projected costs for production scenarios were the result of a combination of information obtained from past minnow production publications, research and operations taking place at the LSU AgCenter Aquaculture Research Station, and the bait shop interviews. For these examples, it was assumed that the owner-operator was already in possession of the land needed with some type of existing structure for the production system. Prices of materials were based on average market value as of spring 2012. The costs and returns associated with these models are dependent on a number of factors. The type of production system employed and the size or scale of the operation have significant impacts on both the total investment needed and the estimated return as seen in

Owner-Operator Production Scenarios:

1) **Wild Harvest and Immediate Sale**
Minnows are trapped in the wild and sold immediately after harvest to bait shops or the public.

2) **Wild Harvest and Long Term Holding**
Minnows are trapped in the wild with the majority of the catch sold immediately after harvest to bait shops or the public. In this scenario extra traps are fished and a portion of the catch is held over to be sold in the off season when fish are not as abundant.

3) **Intensive Recirculated System**
Minnows are produced from eggs solely in tanks or pools in a closed recirculated system where all nutrition is provided via prepared feed.

4) **Pond Only Production System**
Minnows are produced from eggs solely in ponds where nutrition comes primarily from natural productivity and supplemented with prepared feed.

5) **Pool Spawning and Pond Growout Production System**
A hybrid system where minnows are produced from eggs. Broodfish are spawned intensively in pools. Larvae are hatched in outdoor ponds where nutrition comes primarily from natural productivity and supplemented with prepared feed.

Table 1. Wild Harvest and Immediate Sale

Start-Up Expenditures-Wild Harvest	Total
Harvesting Infrastructure	
16' Boat, 25hp motor, trailer	$9,267
Boat supplies and transport equipment	$866
Traps	$990
Bait Holding	
Submersible purging cages	$579
Holding tank(s)	$1,886
Pumps, plumbing, filters & other equip.	$8,410
Contingency (10%)	$2,200
Total Start-up costs	$24,197
Annual Operating Costs	
Bait, fuel, fishing lease	$8,664
Holding costs	$382
Labor	$3,600
Contingency (10%)	$905
Total Annual Operating Costs	$12,646
Annual Fixed Costs	
Principle and interest	$2,308
Depreciation (10%)	$2,419
Total Annual Fixed Costs	$4,728
Total Annual Costs	$17,347
Total Annual Revenue	$44,297
Net Revenue to Owner	$26,923

*This scenario will produce 295,313 fish per year

Table 2. Wild Harvest and Long Term Holding

Start-Up Expenditures-Harvest and Holding	Total
Harvesting Infrastructure	
16' Boat, 25hp motor, trailer	$9,267
Boat supplies and transport equipment	$866
Traps	$1,320
Bait Holding	
800 gallon poly holding tanks	$1,886
Submersible purging cages	$579
Holding tank(s)	$1,886
Pumps, plumbing filters & other equip.	$11,886
Contingency (10%)	$2,769
Total Start-up costs	$30,458
Annual Operating Costs	
Bait, fuel, fishing lease	$11,379
Holding costs	$435
Labor	$3,600
Contingency (10%)	$1,181
Total Annual Operating Costs	$15,413
Annual Fixed Costs	
Principle and interest	$2,906
Depreciation (10%)	$3,045
Total Annual Fixed Costs	$5,951
Total Annual Costs	$21,365
Total Annual Revenue	$59,063
Net Revenue to Owner	$37,697

*This scenario will produce 393,750 fish per year

our examples. The location of the operation may also influence costs. These numbers are based on hypothetical examples, and actual costs and returns will vary based on individual situations. All scenarios are assuming a price of $0.15 per minnow and startup costs financed over five years.

Wild Caught Harvest and Immediate Sale

The first example is for a wild caught harvester scenario with short-term holding (Table 1). This scenario is the current practice in the cocahoe minnow bait industry. In this scenario it is assumed that the owner-operator is fishing 30 traps on a 1000-acre lease for 150 days out of the year and catching an average of 75 minnows per trap. It is assumed there is some paid part-time help, and 100 percent of the surviving catch is sold. The projected number of minnows produced for sale per year in this scenario is 295,300 fish. This is enough cocahoes to support an estimated one or two shops if the supply is consistent year round. The number of minnows that would need to be sold to break even in this scenario is 115,827 fish per year (Table 1).

Wild Caught Harvest and Long Term Holding

The next example expands on the first wild caught scenario with the addition of long-term holding (Table 2). This scenario is not as common but may be beneficial in supplying minnows when they are difficult to catch. In this scenario it is assumed that the owner-operator is fishing 40 traps on a 1000-acre lease for 150 days out of the year and catching an average of 75 minnows per trap. The number of traps fished in this scenario was increased to account for the additional minnows that would need to be held long-term to make this scenario feasible. This scenario also assumes there is some paid part-time help, and 100 percent of the surviving catch is sold. The projected number of minnows produced for sale per year in this scenario is 393,700 fish. This is enough to support

Table 3. Intensive Recirculated System

Start-Up Expenditures-Intensive Recirculated	Total
Holding Infrastructure	
Fiberglass tanks	$13,735
Growout tanks	$90,437
Salinity and DO meter	$1,270
Pumps, plumbing, filters & other equip.	$28,654
Fish hauling tank	$1,422
Holding tank(s)	$1,886
Salt	$4,919
Contingency (10%)	$15,683
Total Start-up costs	$158,002
Annual Operating Costs	
Spawning supplies	$377
Feed	$53,957
Electricity	$7,561
Labor	$36,000
Contingency (10%)	$6,189
Total Annual Operating Costs	$97,895
Annual Fixed Costs	
Principle and interest	$15,075
Depreciation (10%)	$15,800
Total Annual Fixed Costs	$30,875
Total Annual Costs	$128,770
Total Annual Revenue	$40,230
Net Revenue to Owner	-$88,540

*This scenario will produce 268,202 fish per year

an estimated one to three shops year round. The number of minnows that would need to be sold to break even in this scenario is 142,436 fish per year (Table 2).

Closed Recirculated System

The costs and returns associated with minnow production in a closed recirculated system are outlined in Table 3. In this scenario the broodstock are spawned outdoors in six 2,641-gallon fiberglass pools in April and May and again in September through mid-October. They are stocked at a density of approximately 250 fish per tank with a 2:1 female to male ratio. Each female is assumed to produce approximately seven eggs per day. Of the total eggs produced, 75 percent are estimated to be viable. In this scenario the fish were air incubated and separated into two-week batches. They are then grown out in 500-gallon polyethylene tanks at a density of 19 fish per gallon at the fry and larvae stage and 11 fish per gallon at the juvenile stage. They will reach market size, approximately 0.18 oz. in eight months. Thus in the first year the returns will be lower as only one round of eggs will be ready for market that year. In this scenario, one full time employee will be required in addition to the owner operator due to the intensive nature of the system. It is also assumed that 100 percent of the surviving fish will be sold. The projected number of fish produced the first startup year is 155,500 individuals. After the initial year the number of minnows produced is estimated to be 268,200 fish. This is enough to supply one to two bait shops year round; however, it would take about 858,467 fish per year sold at $0.15 to break even in this system.

Pond Only

The pond spawning and grow out scenario is outlined in Table 4. For this scenario, cost and yields were projected for the same operation at two different scales: 10-acre and 2-acre. In both cases the use of the three-phase pond system was assumed. Brood ponds were stocked at 10,000 fish per acre with a 2:1 female to male ratio. Eggs were separated into two-week batches with an assumed 65 percent viability. Fry ponds were stocked at a density of 1,000,000 per acre and grow out ponds were stocked at a density of 100,000 fish per acre. It was assumed that the ponds were fertilized weekly and supplemented with feed. Of the viable eggs, it was assumed that only 60 percent would survive to market size, 39 percent survivability from the total eggs harvested. Market size would be attained in about six months, and 100 percent of fish reaching market size would be sold. For the 10-acre scenario, it was assumed that one full time employee and one part time employee would be required in addition to the owner-operator. For the 2-acre scenario, it was assumed that only one fulltime employee was needed in addition to the owner-operator. The 10-acre scenario accounts for three 0.25 acre brood ponds, four 0.2 acre larval ponds and fourteen 0.55 acre grow out ponds. At this scale approximately 475,000 fish would be produced the first year and 819,000 fish in subsequent years. This is enough to supply at least six to seven bait shops year round. To break even at this scale a minimum of 731,047 fish would need to be produced and sold, approximately 35 percent survivability of the total eggs produced.

The smaller scale 2-acre operation entails one 0.15 acre brood pond, four 0.04 acre larval ponds and seven 0.2 acre grow out ponds. At this scale approximately 95,000 fish will be produced the first year and 163,800 fish in the

Table 4. Pond Only Production System

Start-Up Expenditures-Ponds	Total: 10 Acre	Total: 2 Acre
Holding Infrastructure		
Pond construction	$46,159	$9,656
Salinity and DO meter	$1,270	$1,270
Paddlewheel aerator	$4,036	$847
Aerator	$3,683	$1,841
Fish hauling tank	$1,422	$1,422
Holding tank(s)	$1,886	$1,886
Harvesting & testing supplies	$1,767	$1,546
Contingency (10%)	$6,022	$1,847
Total Start-up costs	$66,245	$20,317
Annual Operating Costs		
Spawning Supplies	$987	$67
Feed	$50,175	$10,035
Fertilizer	$6,316	$1,283
Electricity	$2,274	$764
Labor	$27,000	$18,000
Gas for distribution	$1,284	$1,284
Contingency (10%)	$8,675	$3,015
Total Annual Operating Costs	$96,712	$34,450
Annual Fixed Costs		
Principle and interest	$6,321	$1,938
Depreciation (10%)	$6,624	$2,032
Total Annual Fixed Costs	$12,945	$3,970
Total Annual Costs	$109,657	$38,420
Total Annual Revenue	$122,850	$24,570
Net Revenue to Owner	$13,193	-$13,850

*These scenarios will produce 819,000 and 163,800 fish per year respectively.

Table 5. Pool Spawning and Pond Growout Production System

Start-Up Expenditures-Pool & Pond	Total 10 Acre	Total 2 Acre
Holding Infrastructure		
Fiberglass tanks	$68,673	$13,735
Pond construction	$47,752	$9,550
Salinity and DO meter	$1,270	$1,270
Paddlewheel aerator	$8,579	$1,716
Aerator	$3,683	$3,683
Blower and air lines	$2,289	$458
Fish hauling tank	$1,422	$1,422
Holding tank(s)	$1,886	$1,886
Salt	$4,707	$941
Harvesting & testing supplies	$2,083	$1,583
Contingency (10%)	$14,234	$3,624
Total Start-up costs	$156,575	$39,867
Annual Operating Costs		
Spawning supplies	$1,884	$377
Fertilizer	$6,079	$1,283
Feed	$50,612	$10,122
Electricity	$4,710	$1,733
Labor	$27,000	$18,000
Supplemental salt	$470	$470
Gas for distribution	$1,285	$1,285
Contingency (10%)	$9,204	$3,807
Total Annual Operating Costs	$90,285	$36,598
Annual Fixed Costs		
Principle and Interest	$14,939	$3,804
Depreciation (10%)	$15,658	$3,986
Total Annual Fixed Costs	$30,597	$7,790
Total Annual Costs	$120,882	$44,389
Total Annual Revenue	$186,543	$46,636
Net Revenue to Owner	$65,661	$2,247

*These scenarios will produce 1,554,525 and 310,905 fish per year respectively.

years after that. This is enough to supply one to two bait shops; however to breakeven at this scale, 256,134 fish would need to be produced and sold, 61 percent of the eggs produced.

Pool Spawning and Pond Grow Out

The final scenario, in Table 5, is a hybrid system incorporating pool spawning with pond grow out. The costs and yields for this scenario were also projected on a larger 10-acre and smaller 2-acre scale. For both size operations, the fish were spawned in 2,641-gallon fiberglass pools at a density of 250 fish per pool at a 2:1 female to male ratio. Eggs were again separated into two-week batches. They would then be hatched in the larval ponds and transferred to grow out ponds after 3-4 weeks. They are stocked at the same densities by life stage as the ponds only scenario and fertilized and fed in the same manner. It is assumed that this scenario will yield a higher percentage of viable eggs (75 percent) because they are produced in a more controlled environment. However the pond survivability is assumed the same, yielding an overall survivability of 45 percent of the total eggs produced. Market size is reached in about six months. For the large-scale scenario it was assumed that one full time employee and one part-time employee would be needed in addition to the owner-operator. The large-scale scenario assumes 30 fiberglass pools for spawning, four 0.35 acre larval ponds and 14, 0.6 acre, grow out ponds. This would produce 901,600 fish the first year and 1,554,500 in subsequent years. At this level of production at least 12-15 bait shops would need to be supplied to sell 100 percent of the fish produced. As a more conservative estimate, the figures in Table 5 adopt

an 80 percent sale of fish produced, which would still supply 8-12 bait shops. In order to break even at this scale 805,880 fish would need to be sold.

In the smaller scale 2-acre operation it was assumed that one fulltime employee would be needed in addition to the owner operator (Table 5). This scenario at this scale utilizes six fiberglass pools, four 0.07 acre larval ponds, and eight 0.2 acre grow out ponds. At this scale, this scenario would produce 180,300 fish the first year and 310,900 in years after. At 100 percent sale of fish produced this would supply two to three bait shops year round. To break even at this scale 287,428 fish would need to be sold.

Conclusion

When choosing the scenario that best suits your needs scale is a very important factor. The wild harvest scenario, while it turns a modest profit, requires the sale of the least minnows to break even. Conversely, the large scale 10 acre pool spawning and pond grow out scenario, which yielded the highest profit, requires an extremely high percentage of the minnows produced to be sold in order to break even. If this scenario were to be implemented it would be best to establish a guaranteed market with a set sale price prior to implementation. This would ensure enough of the product could be sold at a sustainable price for the owner operator to maintain a profit. The smaller scale 2 acre pool spawning and pond grow out may also be an avenue to be explored along with wild harvest and long term holding as they both require relatively low volume of minnow sale to break even. Also in both cases, an adequate profit can be earned if the system is utilized to its maximum production potential. While the large-scale pond only scenario does produce a positive profit, the volume of minnows that would need to be sold to break even is high, and again, it would be wise to establish guaranteed buyers with a set sale price before this scenario was implemented. In addition scale is very important. While there was a small profit at the full 10 acre scale, 2-acre pond only scenario resulted in a loss. The recirculated system scenario produced the largest net loss to owner. In order to break even this system would require a threefold increase in market price as it is not able to produce the volume of minnows required to break even. This system is strongly unadvisable for anyone looking to enter cocahoe minnow production unless proper infrastructure is already in place.

All of the numbers and figures in this section were generated through generic conceptual economic models with no less than 39 specific assumptions that affect the costs and yields of these scenarios. Anyone seriously interested in investing in cocahoe minnow production is strongly encouraged to contact Dr. Julie Anderson at JAnderson@Agcenter.lsu.edu or (225) 578-7718 or Dr. Christopher Green at CGreen@Agcenter.lsu.edu or (225) 765-2848 for a situational economic analysis.

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