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FILE

HARD CLAM CULTURE PROJECT

Preliminary Financial Evaluation

Prepared for Mr. Bruce Vogt

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Marine Resource Report No. 88 - 4

VOGT HARD CLAM CULTURE PROJECT

PRELIMINARY ANALYSIS

Introduction

In January, 1988 the Marine Business Specialist was asked to assist Mr. Bruce Vogt, of Mathews, Virginia to prepare a business plan for an extensive hard clam (*Mercinaria mercinaria*) culture project. After an initial meeting the Specialist determined that he could 1) present the business plan prepared by Mr. Vogt to the William and Mary Entrepreneurial Center for their evaluation and recommendations, and 2) assist Mr. Vogt in preparing a project cash flow analysis prior to preparing a business plan which could be used to solicit funds for the project.

Mr. Vogt's original plan was presented to a faculty member of the Entrepreneurial Center. Comments and recommendations are still pending.

In subsequent meetings, Mr. Vogt provided the data needed to construct a preliminary cash flow analysis. This is a report on the results of that analysis and includes recommendations which should be followed before further work is done on the business plan.

Project Objective

Mr. Vogt's stated objective is to begin planting 8 million clams and increase plantings at regular intervals until he is planting 60 million clams annually. Based on some limited planting he has done in 1987, he believes that his objective is attainable.

He would like to act as the entrepreneur who organizes the operation, supervises activities, and shares in the eventual profits. He would like to obtain a bank loan or attract venture capital to finance his project, with minimum financial input on his part.

Project Organization

The project is to be located on leased land adjacent and nearby to Mr. Vogt's residence in Mathews County. The Business Specialist visited the site with Mike Oesterling, commercial fisheries specialist, who determined that the site was physically appropriate for clam culture. Mr. Vogt reports in his business plan that the site has suitable temperatures, tidal flow and flushing, and salinity for clam culture.

Mr. Vogt's property will be used for the shore-based work required to plant the clams. This property already has some small storage facilities, a dock, and enough area for the work site.

The initial project proposal is to plant 8 million clams in years 1 and 2, 16 million clams in years 3 and 4, 32 million clams in years 5 and 6, and 60 million clams annually thereafter. The initial planting and harvesting cycle is shown in Table 1. Note that the figures in Table 1 are in thousands of trays. One thousand (1000) clams are planted per tray. The number of clams harvested depends on the survival until harvest, estimated to vary between 70% and 95%.

The trays are central to the success of the project. Mr. Vogt has chosen to plant clams in trays because 1) survival should be greatest and 2) planting and harvesting should be most efficient. The alternative to trays is to construct planting beds of pea gravel on the leased tidal lands, and seed the clams directly onto the beds.

The trays are to be filled with pea gravel, seeded, and placed on the tidal land in 40 (10 X 4) tray beds. A barge will be needed to transfer the filled trays from the land work site to the planting site. The same barge will be used for harvest. The beds will be protected from predators by covering them with a plastic mesh, held in place with sand bags.

The clams will need at least 24 months to reach the marketable "cherrystone" size. During the growing period the beds will have to be inspected each month. A portion of the beds will require maintenance consisting of replacing the protective mesh and drying and washing the used mesh for later reuse.

The organization part of the project is relatively straight forward, especially if it is thought of in terms of numbers of trays put into the water and numbers of trays pulled out of the water.

Financial Analysis

The following analyzes only the working capital requirements of the project. No construction or fixed costs are considered. This is because the fixed costs are still unknown, but it appears that over 90% of the costs of the project are variable, directly related to the number of trays planted.

The project is divided into three major activities, planting, maintenance, and harvesting. The materials and labor costs per 1000 trays for each part are shown in Table 2. The materials and labor details are in Appendix I.

The initial project was analyzed on an electronic spread sheet (Symphony), by showing the monthly cash flow for 11 years. The cash flow considers only the estimated operating expenses, but will eventually have to include capital investment costs, depreciations, working capital interest, debt repayment, management and supervision salaries, and some as yet to be determined operating expenses.

The cash flow shows the cash outlays and revenues for each month for 11 years. In addition it provides the sum of expenses for each major activity, the sum of revenues, a year-end net cash position, or profit, and an accumulated profit or loss. The cash flows for Years 1 through 11 are provided in Appendix II.

The cash flow for 11 years was evaluated using two financial analyses, the Present Value (PV), and the Internal Rate of Return (IRR), both calculated on the yearly profits and losses. The PV is the sum of the discounted value of each year's profit or loss. Discounting of the profits or loss after year one is necessary because of people's time preference; people perceive that a dollar received today is worth more than a dollar received two years from now. The difference in money received today over money received in the future is calculated using the interest rate. The interest rate can change, and so the PV was calculated for a range of rates from 5% to 10%. If the present value of the project is greater than or equal to the cost of the project, then the project is considered attractive from a purely business point of view.

The IRR is the rate of profit that an investment is expected to earn. The IRR is found by calculating the interest rate that results in a zero present value of the sum of the future stream of profits and losses. In other words, it is the interest rate which would have to prevail in society over the 11 years of the project for the future profits to be evaluated at zero in year one. Obviously the higher the IRR, the more attractive the project.

The PV and IRR depend on three important assumptions in the project, the interest rate, the survival of the clams to harvest, and the price at harvest. The effect of the interest rate is discussed above. The results of changing the survival and price are shown in Tables 3, 4, and 5.

Table 3 shows the PV's at different interest rates and the IRR for a price of 20¢ per clam and 80% survival. The PV varies from \$10,003,399 at 5% to \$6,136,112 at 10%. The IRR is 44.23%. The total amount required is \$1,392,492. These are acceptable returns but should be viewed cautiously because, 1) no risk analysis has been done, nor have the interest rates been adjusted for risk, and 2) the 20¢ per clam and 80% survival may be optimistic.

Table 4 shows the effect on PV and IRR if the price drops to 15¢ per clam and everything else the same. IRR drops to 22.5%, still respectable but probably not realistic given the reservations above. The PV varies from \$3,598,927 at 5% to \$1,812,073 at 10%, considerably less than the \$2,651,738 financing required to reach this stage in Year 11 of the project.

Table 5 shows what happens if the price is 15¢ per clam and only 70% survive. The required financing jumps to \$3,241,748, the IRR falls to 11.47% and the PV varies from \$1,183,751 at 5% to \$190,559 at 10%. Given the same reservations, this possibility makes the project look unacceptable.

In conclusion, the initial plan proposed by Mr. Vogt is overly ambitious and falls apart under the prospect of lower prices and survival. The cash flow analysis also shows that the proposed production schedule, starting with 8 million clams planted in the first year and doubling plantings every other year until 60 million are planted, puts an extreme strain on project finances because plantings do not generate revenues until 27 months later.

An Alternative Plan

Appendix I shows the details of the materials and labor costs for the three phases of the project. Phase I, planting, is the most expensive part, costing \$48,864 per thousand trays. Of that amount, \$30,000, or 62% is for clam seeds. This price buys an 8 mm clam seed, considered an ideal size for autumn planting, having the best prospects of survival until harvest. The clam seed cost could be cut in half if the project included an upwelling system, a technology to grow smaller seed clams to planting size.

Although Mr. Vogt knew about the upwelling systems, he did not plan to use them because he wanted his operation to be as simple as possible. However, it is safe to assume that the upwelling system would not cost half of what he could save just in first year costs if he could buy seed clams for \$15,000 per million (for 1000 trays). Operating costs would be mostly electricity to pump bay water through the system. Therefore the first suggestion made to Mr. Vogt is to investigate adding an upwelling system to his project to cut his seed clam purchase costs.

Secondly, based on what is known about production levels at the most advanced clam culture operation in Virginia, Mr. Vogt's project seems much too ambitious. He has not established a detailed plan of how he would manage the feat of planting 60 thousand trays per year, how to handle them on land or on the barge, how much time would actually be needed. It appears that just acquiring the 60 million clam seeds is not possible.

Therefore it is suggested that Mr. Vogt reduce considerably the number of clams he plans to plant each year to achieve the following: plant 4 thousand trays in years 1, 2 and 3, 6 thousand trays in years 4, 5, and 6, and 8 thousand trays in years 9, 10, and 11, and thereafter. Appendix III shows the cash flow for Years 1 through 11 for this plan. Table 6 shows the revised planting and harvesting cycle. Tables 7, 8, and 9 show the results of the financial analysis.

Table 7 shows financial results based on 20¢ per clam and 80% survival. Table 8 shows the results if price falls to 15¢ per clam and Table 9 shows what would happen if survival fell to 70%. The results in Tables 7 and 8 are encouraging, the lowest PV shown in Table 7 is \$1,731,774 for a financing requirement of \$399,276 and IRR of 54.14%. The lowest PV in Table 8 is \$766,360 for the same financing requirement, \$399,276, but with a lower IRR of 33.24%.

Table 9 shows discouraging results. The lowest PV is \$404,330 for a financing requirement of \$410,924. The IRR is 23.51%. However, this worst case prospect improves dramatically if the clam seed purchase price is cut by \$15,000 per 1 million clams which should be possible by using an upwelling system. The lowest PV becomes \$978,474, the financing requirement becomes \$279,276, and the IRR goes up to 47.48%. The financial results based on a reduced seed clam price are shown in Table 10.

Conclusion

Based on the cash flow, Present Value, and Internal Rate of Return Analyses, Mr. Vogt's initial plan to plant up to 6 million clams per year does not look like an attractive business plan. There are physical constraints he has not considered, and the financial analyses are not encouraging.

It is suggested that he 1) include an upwelling system in his project which will decrease the cost at which he buys seed clams, and 2) that he pursue a more modest production schedule. If he enjoys success under the alternative production schedule presented here, or another one, he can always benefit the experience gained, and develop a proposal for expanding his operations.

Finally, Mr. Vogt will need to decide on the final production schedule he intends to propose to prospective financial sources, and collect the information which is required to put together a complete business plan. At that point Advisory Services will be able to help prepare his final plan.

Table 1

Initial Planting and Harvesting Plan

<u>Year</u>	<u>Trays Planted (x1000)</u>	<u>Trays Harvested(x1000)</u>
1	8	0
2	8	0
3	16	2
4	16	8
5	32	10
6	32	16
7	60	20
8	60	32
9	60	39
10	60	60
11	60	60

Table 2

Operating Costs per 1000 Trays

	<u>Materials</u>	<u>Labor</u>	<u>Total</u>
I. Planting			
	42150	6714	48,864
II. Maintenance per Month			
	0	123	123
III. Harvesting			
	700	6000	6,700

Table 3

Financial Analysis, Vogt Clam Farm

Production = 60 kk clams planted in Year 7

Price = 20¢ per clam

Survival = .80

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(393987)	(393987)	
2	(405795)	(799782)	
3	(540744)	(1304525)	
4	402510	(902016)	
5	(87966)	(989982)	
6	807480	(182502)	
7	20754	(161748)	
8	1817550	1655802	
9	2850183	4505985	
10	6066900	10672885	
11	6066900	16639785	44.23%

Financing Required: \$1,392,492

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
10039399	9090566	8235252	7463464	6766361	6136112

Table 4

Financial Analysis, Vogt Clam Farm

Production = 60 kk clams planted in Year 7

Price = 15¢ per clam

Survival = .80

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(393987)	(393987)	
2	(405795)	(799782)	
3	(584744)	(1384726)	
4	82510	(1302016)	
5	(487966)	(1789982)	
6	167480	(1622502)	
7	(779246)	(2401748)	
8	537550	(1864198)	
9	1290183	(574015)	
10	3666900	3092885	
11	3666900	6795785	22.50%

Financing Required: \$2,651,738

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
3598927	3156916	2762200	2409498	2094158	1812073

Table 5

Financial Analysis, Vogt Clam Farm

Production = 60 kk clams planted in Year 7

Price = 15¢ per clam

Survival = .70

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(393987)	(393987)	
2	(405795)	(799782)	
3	(614744)	(1414526)	
4	(37490)	(1452016)	
5	(637966)	(2089982)	
6	(72520)	(2162502)	
7	(1079246)	(3241748)	
8	57550	(3184198)	
9	705183	(2479015)	
10	2766900	287885	
11	2766900	3054785	11.47%

Financing Required: \$3,241,748

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
1183571	931797	709805	514261	342082	190559

Table 6

Revised Planting and Harvesting Plan

<u>Year</u>	<u>Trays Planted (x1000)</u>	<u>Trays Harvested(x1000)</u>
1	4	0
2	4	0
3	4	2
4	6	4
5	6	4
6	6	4
7	8	6
8	8	6
9	8	8
10	8	8
11	8	8

Table 7

Financial Analysis, Vogt Clam Farm

Production = 8 kk clams planted in Year 7

Price = 20¢ per clam

Survival = .80

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(196686)	(196686)	
2	(202590)	(399276)	
3	98352	(300924)	
4	305944	5070	
5	303042	308112	
6	300090	608202	
7	508101	1116303	
8	505149	1621452	
9	811257	2432709	
10	811257	3243966	
11	811257	4055223	54.14%

Financing Required: \$399,276

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
2625313	2412496	2218500	2041460	1897712	1731774

Table 8

Financial Analysis, Vogt Clam Farm

Production = 8 kk clams planted in Year 7

Price = 15¢ per clam

Survival = .80

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(196686)	(196686)	
2	(202590)	(399276)	
3	18352	(380924)	
4	145994	(234930)	
5	143042	(91888)	
6	140909	48202	
7	269101	316303	
8	265149	581452	
9	491257	1072709	
10	491257	1563966	
11	491257	2055223	33.24%

Financing Required: \$399,276

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
1256985	1139378	1032538	935382	846942	766360

Table 9

Financial Analysis, Vogt Clam Farm

Production = 8 kk clams planted in Year 7

Price = 15¢ per clam

Survival = .70

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(196686)	(196686)	
2	(202590)	(399276)	
3	(11648)	(410924)	
4	85994	(324930)	
5	83042	(241888)	
6	80090	(161798)	
7	178101	16303	
8	175149	191452	
9	371257	562709	
10	371257	933966	
11	371257	1305223	23.51%

Financing Required: \$410,924

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
743863	661958	587802	520602	459654	404330

Table 10

Financial Analysis, Vogt Clam Farm

Production = 8 kk clams planted in Year 7

Reduced Seed Clam Cost

Price = 15¢ per clam

Survival = .70

<u>Year</u>	<u>Profits</u>	<u>Accumulated Profits</u>	<u>IRR</u>
1	(136686)	(136686)	
2	(142590)	(279276)	
3	48352	(230924)	
4	175994	(54930)	
5	173042	118112	
6	170090	288202	
7	298101	586303	
8	295149	881452	
9	491257	1372709	
10	491257	1863966	
11	491267	2355223	47.48%

Financing Required: \$279,276

Interest Rate & Present Value:

5%	6%	7%	8%	9%	10%
1506664	1380673	1265918	1161279	1065760	978474

Appendix I

Details of Labor and Materials Costs

Appendix I

Operating Costs per 1000 Trays

Part I, Planting:

Materials

Item	Cost	per Unit	no. units	Cost
Clam Seed	\$30	1000	1000	\$30,000
Gravel	\$20	1	100	\$2,000
Trays	\$8.50	1	1000	\$8,500
Mesh	\$650	1000	1	\$650
Staples	\$1000	1	1	\$1,000
Sandbags				\$0
=====				
Total				\$42,150

Labor

1. Make , Fill, & Set Trays

1000 . . Trays
 4 . . Trays per hour
 250 . . hours
 4 . . men
 1000 . . man hours
 6 . . \$ per hour
 \$6000 . . Total

2. Fill Sand Bags

1000 . . Trays
 40 . . trays per bed
 25 . . beds
 112 ft. . . perimeter per bed
 2800 ft. . . = # sandbags
 30 . . sand bags per hour
 93 . . hours
 1 . . man
 93 . . man hours
 6 . . \$ per hour
 \$558 . . Total

3. Cover Trays

25 . . beds
2 . . beds per hour
13 . . hours
2 . . men
26 . . man hours
6 . . \$ per hour
\$156 . . Total

Planting Total Costs per 1000 Trays:

Labor = \$6714, Materials = 42150, TOTAL = 48864

Part II, Maintenance

Labor Only

1. Check Beds

8 . . hours per 25 beds per month
1 . . man
8 . . man hours
6 . . \$ per hour
\$48 . . Total for 1000 Trays per month

2. Clean Mesh Covering Beds

25 . . beds
50% . . to be cleaned each month
0.5 . . hours per bed
6.25 . . hours cleaning per month
2 . . men
12.5 . . man hours
6 . . \$ per hour
\$75 . . per 1000 trays per month

Total Maintenance Costs per 1000 Trays per month: \$123

Part III, Harvesting

Materials

Item	Cost	per Unit	no. units	Cost
Harvest Bags	\$0.50	1	1400	\$700

Labor

Set labor costs equal to "make, fill, & set trays" cost: \$6,000.

Total Harvesting Costs per 1000 Trays: \$6,700.

Appendix II

Monthly Cash Flow for 11 Years

Production = 60 kk Clams Planted in Year 7

PRICE= 0.20 SURVIVAL = 0.80

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACC. NET
YEAR 1																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			
T.PLANTED	0	0	0	0	0	0	0	0	3	6	8	8				
T.HARVEST	0	0	0	0	0	0	0	0	0	0	0	0				
T'S.SET.	0	0	0	0	0	0	0	0	3	6	8	8				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	0	0	0	0	0	0	0	0	369	738	984	984	3075			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	0		0		
PROFITS	0	0	0	0	0	0	0	0	-146961	-147330	-98712	-984			-393987	-393987
YEAR 2																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			
TRAYS PLA	8	8	8	8	8	8	8	8	11	14	16	16				
TRAYS HAR	0	0	0	0	0	0	0	0	0	0	0	0				
TRAYS SET	8	8	8	8	8	8	8	8	11	14	16	16				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	984	984	984	984	984	984	984	984	1353	1722	1968	1968	14883			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	0		0		
PROFITS	-984	-984	-984	-984	-984	-984	-984	-984	-147945	-148314	-99696	-1968			-405795	-799782

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 3																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	6	6	4	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	293184	293184	195456	0	781824			
TRAYS PLA	16	16	16	16	16	16	16	16	22	28	32	32				
TRAYS HAR	0	0	0	0	0	0	0	0	0	0	0	2				
TRAYS SET	16	16	16	16	16	16	16	16	22	28	32	30				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	1968	1968	1968	1968	1968	1968	1968	1968	2706	3444	3936	3690	29520			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	0	0	0	0	0	0	0	0	0	0	0	13400	13400			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	320000	320000			
PROFITS	-1968	-1968	-1968	-1968	-1968	-1968	-1968	-1968	-295890	-296628	-199392	302910			-504744	-1304526

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 4																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	6	6	4	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	293184	293184	195456	0	781824			
TRAYS PLA	30	28	26	24	24	24	24	24	30	36	40	40				
TRAYS HAR	2	2	2	0	0	0	0	0	0	0	0	2				
TRAYS SET	28	26	24	24	24	24	24	24	30	36	40	38				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	3444	3198	2952	2952	2952	2952	2952	2952	3690	4428	4920	4674	42066			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	13400	13400	13400	0	0	0	0	0	0	0	0	13400	53600			
REVENUES	320000	320000	320000	0	0	0	0	0	0	0	0	320000	1280000			
PROFITS	303156	303402	303648	-2952	-2952	-2952	-2952	-2952	-296874	-297612	-200376	301926			402510	-902016

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 5																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	8	8	8	8				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	390912	390912	390912	390912	1563648			
TRAYS PLA	38	36	34	32	32	32	32	32	40	48	56	64				
TRAYS HAR	2	2	2	0	0	0	0	0	0	0	0	4				

TRAYS SET	36	34	32	32	32	32	32	32	40	48	56	60				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	4428	4182	3936	3936	3936	3936	3936	3936	4920	5904	6888	7380	57318			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	13400	0	0	0	0	0	0	0	0	26800	67000			
REVENUES	320000	320000	320000	0	0	0	0	0	0	0	0	640000	1600000			
PROFITS	302172	302418	302664	-3936	-3936	-3936	-3936	-3936	-395832	-396816	-397800	214908			-87966	-989982
YEAR 6																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	8	8	8	8				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	390912	390912	390912	390912	1563648			
TRAYS PLA	60	56	52	48	48	48	48	48	56	64	72	80				
TRAYS HAR	4	4	4	0	0	0	0	0	0	0	0	4				

TRAYS SET	56	52	48	48	48	48	48	48	56	64	72	76				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	6888	6396	5904	5904	5904	5904	5904	5904	6888	7872	8856	9348	81672			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	26800	26800	26800	0	0	0	0	0	0	0	0	26800	107200			
REVENUES	640000	640000	640000	0	0	0	0	0	0	0	0	640000	2560000			
PROFITS	606312	606804	607296	-5904	-5904	-5904	-5904	-5904	-397800	-398784	-399768	212940			807480	-182502

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 7																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	15	15	15	15				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	732960	732960	732960	732960	2931840			

TRAYS PLA	76	72	68	64	64	64	64	64	79	94	109	124				
TRAYS HAR	4	4	4	0	0	0	0	0	0	0	0	8				

TRAYS SET	72	68	64	64	64	64	64	64	79	94	109	116				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	8856	8364	7872	7872	7872	7872	7872	7872	9717	11562	13407	14268	113406			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	26800	26800	26800	0	0	0	0	0	0	0	0	53600	134000			

REVENUES	640000	640000	640000	0	0	0	0	0	0	0	0	1280000	3200000			

PROFITS	604344	604836	605328	-7872	-7872	-7872	-7872	-7872	-742677	-744522	-746367	479172			20754	-161748

YEAR 8																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	15	15	15	15				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	732960	732960	732960	732960	2931840			

TRAYS PLA	116	108	100	92	92	92	92	92	107	122	137	152				
TRAYS HAR	8	8	8	0	0	0	0	0	0	0	0	8				

TRAYS SET	108	100	92	92	92	92	92	92	107	122	137	144				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	13284	12300	11316	11316	11316	11316	11316	11316	13161	15006	16851	17712	156210			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	53600	53600	53600	0	0	0	0	0	0	0	0	53600	214400			

REVENUES	1280000	1280000	1280000	0	0	0	0	0	0	0	0	1280000	5120000			

PROFITS	1213116	1214100	1215084	-11316	-11316	-11316	-11316	-11316	-746121	-747966	-749811	475728			1817550	1655802

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 9																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	15	15	15	15				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	732960	732960	732960	732960	2931840			
TRAYS PLA	144	136	128	120	120	120	120	120	135	150	165	180				
TRAYS HAR	8	8	8	0	0	0	0	0	0	0	0	15				

TRAYS SET	136	128	120	120	120	120	120	120	135	150	165	165				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	16728	15744	14760	14760	14760	14760	14760	14760	16605	18450	20295	20295	196677			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	53600	53600	53600	0	0	0	0	0	0	0	0	0	100500	261300		
REVENUES	1280000	1280000	1280000	0	0	0	0	0	0	0	0	0	2400000	6240000		
PROFITS	1209672	1210656	1211640	-14760	-14760	-14760	-14760	-14760	-749565	-751410	-753255	1546245			2850183	4505985

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 10																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	15	15	15	15				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	732960	732960	732960	732960	2931840			
TRAYS PLA	165	150	135	120	120	120	120	120	135	150	165	180				
TRAYS HAR	15	15	15	0	0	0	0	0	0	0	0	15				

TRAYS SET	150	135	120	120	120	120	120	120	135	150	165	165				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	18450	16605	14760	14760	14760	14760	14760	14760	16605	18450	20295	20295	199260			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	100500	100500	100500	0	0	0	0	0	0	0	0	0	100500	402000		
REVENUES	2400000	2400000	2400000	0	0	0	0	0	0	0	0	0	2400000	9600000		
PROFITS	2281050	2282895	2284740	-14760	-14760	-14760	-14760	-14760	-749565	-751410	-753255	1546245			6066900	10572885

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUES	YEARLY NET	ACCUMULA NET
YEAR 11																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	15	15	15	15				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	732960	732960	732960	732960	2931840			
TRAYS PLA	165	150	135	120	120	120	120	120	135	150	165	180				
TRAYS HAR	15	15	15	0	0	0	0	0	0	0	0	15				
TRAYS SET	150	135	120	120	120	120	120	120	135	150	165	165				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	18450	16605	14760	14760	14760	14760	14760	14760	16605	18450	20295	20295	199260			
HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	100500	100500	100500	0	0	0	0	0	0	0	0	100500	402000			
REVENUES	2400000	2400000	2400000	0	0	0	0	0	0	0	0	2400000	9600000			
PROFITS	2281050	2282895	2284740	-14760	-14760	-14760	-14760	-14760	-749565	-751410	-753255	1546245	6066900	16639785		

Appendix III

Monthly Cash Flow for 11 Years

Production = 8 kk Clams Planted in Year 7

PRICE 0.2 SURVIVAL 0.8

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACC. NET
YEAR 1 PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	0	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	0	97728	97728	0	195456			
T. PLANTED	0	0	0	0	0	0	0	0	0	2	4	4				
T. HARVEST.	0	0	0	0	0	0	0	0	0	0	0	0				
T'S. SET.	0	0	0	0	0	0	0	0	0	2	4	4				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	0	0	0	0	0	0	0	0	0	246	492	492	1230			
HARVEST HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	0		0		
PROFITS	0	0	0	0	0	0	0	0	0	-97974	-98220	-492			-196686	-196686

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 2 PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	0	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				
TOTAL	0	0	0	0	0	0	0	0	0	97728	97728	0	195456			
TRAYS PLAN	4	4	4	4	4	4	4	4	4	6	8	8				
TRAYS HARV	0	0	0	0	0	0	0	0	0	0	0	0				
TRAYS SETT	4	4	4	4	4	4	4	4	4	6	8	8				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				
TOTAL	492	492	492	492	492	492	492	492	492	738	984	984	7134			
HARVEST HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	0		0		
PROFITS	-492	-492	-492	-492	-492	-492	-492	-492	-492	-98466	-98712	-984			-202590	-399276

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 3																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	0	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	0	97728	97728	0	195456			
TRAYS PLAN	8	8	8	8	8	8	8	8	8	10	12	12				
TRAYS HARV	0	0	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	8	8	8	8	8	8	8	8	8	10	12	10				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	984	984	984	984	984	984	984	984	984	1230	1476	1230	12792			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	0	0	0	0	0	0	0	0	0	0	0	13400	13400			
REVENUES	0	0	0	0	0	0	0	0	0	0	0	320000	320000			
PROFITS	-984	-984	-984	-984	-984	-984	-984	-984	-984	-98958	-99204	305370			98352	-300924

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 4																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	2	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	97728	97728	97728	0	293184			
TRAYS PLAN	10	10	8	8	8	8	8	8	10	12	14	14				
TRAYS HARV	0	2	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	10	8	8	8	8	8	8	8	10	12	14	12				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	1230	984	984	984	984	984	984	984	1230	1476	1722	1476	14022			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	0	13400	0	0	0	0	0	0	0	0	0	13400	26800			
REVENUES	0	320000	0	0	0	0	0	0	0	0	0	320000	640000			
PROFITS	-1230	305616	-984	-984	-984	-984	-984	-984	-98958	-99204	-99450	305124			305994	5070

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 5																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	2	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	97728	97728	97728	0	293184			

TRAYS PLAN	12	12	10	10	10	10	10	10	12	14	16	16				
TRAYS HARV	0	2	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	12	10	10	10	10	10	10	10	12	14	16	14				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	1476	1230	1230	1230	1230	1230	1230	1230	1476	1722	1968	1722	16974			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	0	13400	0	0	0	0	0	0	0	0	0	13400	26800			

REVENUES	0	320000	0	0	0	0	0	0	0	0	0	320000	640000			

PROFITS	-1476	305370	-1230	-1230	-1230	-1230	-1230	-1230	-99204	-99450	-99696	304878			303042	308112

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 6																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	2	2	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	97728	97728	97728	0	293184			

TRAYS PLAN	14	14	12	12	12	12	12	12	14	16	18	18				
TRAYS HARV	0	2	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	14	12	12	12	12	12	12	12	14	16	18	16				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	1722	1476	1476	1476	1476	1476	1476	1476	1722	1968	2214	1968	19926			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	0	13400	0	0	0	0	0	0	0	0	0	13400	26800			

REVENUES	0	320000	0	0	0	0	0	0	0	0	0	320000	640000			

PROFITS	-1722	305124	-1476	-1476	-1476	-1476	-1476	-1476	-99450	-99696	-99942	304632			300090	608202

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 7																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			

TRAYS PLAN	16	14	12	12	12	12	12	12	15	18	20	20				
TRAYS HARV	2	2	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	14	12	12	12	12	12	12	12	15	18	20	18				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	1722	1476	1476	1476	1476	1476	1476	1476	1845	2214	2460	2214	20787			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	0	0	0	0	0	0	0	0	0	13400	40200			

REVENUES	320000	320000	0	0	0	0	0	0	0	0	0	320000	960000			

PROFITS	304878	305124	-1476	-1476	-1476	-1476	-1476	-1476	-148437	-148806	-100188	304386			508101	1116303

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 8																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			

TRAYS PLAN	18	16	14	14	14	14	14	14	17	20	22	22				
TRAYS HARV	2	2	0	0	0	0	0	0	0	0	0	2				

TRAYS SETT	16	14	14	14	14	14	14	14	17	20	22	20				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	1968	1722	1722	1722	1722	1722	1722	1722	2091	2460	2706	2460	23739			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	0	0	0	0	0	0	0	0	0	13400	40200			

REVENUES	320000	320000	0	0	0	0	0	0	0	0	0	320000	960000			

PROFITS	304632	304878	-1722	-1722	-1722	-1722	-1722	-1722	-148683	-149052	-100434	304140			505149	1621452

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 9																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			

TRAYS PLAN	20	18	16	14	14	14	14	14	17	20	22	22				
TRAYS HARV	2	2	2	0	0	0	0	0	0	0	0	2				

TRAYS SETT	18	16	14	14	14	14	14	14	17	20	22	20				

MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	2214	1968	1722	1722	1722	1722	1722	1722	2091	2460	2706	2460	24231			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	13400	0	0	0	0	0	0	0	0	13400	53600			

REVENUES	320000	320000	320000	0	0	0	0	0	0	0	0	320000		1E+06		

PROFITS	304386	304632	304878	-1722	-1722	-1722	-1722	-1722	-148683	-149052	-100434	304140			811257	2432709

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 10																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			

TRAYS PLAN	20	18	16	14	14	14	14	14	17	20	22	22				
TRAYS HARV	2	2	2	0	0	0	0	0	0	0	0	2				

TRAYS SETT	18	16	14	14	14	14	14	14	17	20	22	20				

MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	2214	1968	1722	1722	1722	1722	1722	1722	2091	2460	2706	2460	24231			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	13400	0	0	0	0	0	0	0	0	13400	53600			

REVENUES	320000	320000	320000	0	0	0	0	0	0	0	0	320000		1E+06		

PROFITS	304386	304632	304878	-1722	-1722	-1722	-1722	-1722	-148683	-149052	-100434	304140			811257	3243966

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY COSTS	YEARLY REVENUE	YEARLY NET	ACCUMULA NET
YEAR 11																
PLANTING																
#TRAYS	0	0	0	0	0	0	0	0	3	3	2	0				
PTCOSTS	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864	48864				

TOTAL	0	0	0	0	0	0	0	0	146592	146592	97728	0	390912			

TRAYS PLAN	20	18	16	14	14	14	14	14	17	20	22	22				
TRAYS HARV	2	2	2	0	0	0	0	0	0	0	0	2				

TRAYS SETT	18	16	14	14	14	14	14	14	17	20	22	20				
MTCOSTS	123	123	123	123	123	123	123	123	123	123	123	123				

TOTAL	2214	1968	1722	1722	1722	1722	1722	1722	2091	2460	2706	2460	24231			

HARVEST																
HTCOSTS	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700	6700				

TOTAL	13400	13400	13400	0	0	0	0	0	0	0	0	13400	53600			

REVENUES	320000	320000	320000	0	0	0	0	0	0	0	0	320000		1E+06		

PROFITS	304386	304632	304878	-1722	-1722	-1722	-1722	-1722	-148683	-149052	-100434	304140			811257	4055223