

Small-Scale Oyster Farming for Chesapeake Watermen

A Sustainable Business Marketing Plan

Prepared for the Campbell Foundation for the Environment,
Towson, MD

by

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EXECUTIVE SUMMARY

Goals

This program has two goals:

1. To help local watermen communities around Chesapeake Bay develop small-scale sustainable oyster farms that offer an additional economic option compatible with their lifestyles and traditions.
2. To help restore wild local oyster populations.

The watermen can increase their economic return by producing oysters almost year-round (rather than seasonally), and marketing the final product.

Achieving these goals requires:

1. High-quality oysters, consistently delivered at a reasonable price.
2. Creating and sustaining a long-term demand for these oysters by, among other things, educating the market about the heritage of Chesapeake Bay oysters and the watermen's desire to preserve their lifestyle.

Risks

Success requires understanding and controlling for certain risks:

- The volatility of the half-shell oyster market.
- Diseases that could damage the oysters as they grow to maturity.
- Competition from other suppliers outside the region.
- The slight risk of other diseases associated with raw oysters, which could have an adverse effect on a small percentage of consumers with weakened immune systems. Extensive federal and state regulatory programs monitor the production and marketing of raw shellfish to assure product safety, thereby minimizing this risk.

Competition

Supplies of half-shell oysters from the Chesapeake are unreliable and inconsistent at best, but the Washington-Baltimore market can obtain half-shell oysters from the Northeast, the Gulf and even the West Coast. However, demand for premium Chesapeake Bay Oysters remains high.

Ad hoc market research showed high quality Chesapeake Bay oysters to be an easy sell in the metropolitan market. A consistent quantity supplied might well increase demand.

Outcomes

The majority of Washington, DC-area restaurants and seafood wholesalers and retailers that tasted the Smith Island oysters have responded positively; several immediately placed orders. The team also introduced the Smith Island watermen to one of the largest seafood wholesalers in Jessup, Maryland. After tasting the oysters, the wholesaler offered to purchase, at a premium price, the entire amount of oysters currently being grown. A cost-effective distribution system was identified to transport the crop to Jessup. The watermen expect to make their first deliveries in fall 2001. They have also ordered more seed oysters and supplies to construct additional culture equipment so as to continue and expand their existing operation.

Recommendations

We recommend that, at least initially, the watermen continue to work with wholesalers to establish a market presence and create brand recognition for their oysters. This will decrease startup costs, streamline distribution logistics, and immediately establish a revenue stream. As the watermen refine their operation and improve their means of delivery, they may test the viability of direct sales to restaurants and seafood markets, or even sales to tourists on Smith Island.

Conclusions

The outcomes of the project, the market research and interviews conducted for the purpose of this study, and the financial model developed for the Smith Island watermen show that an oyster aquaculture operation that caters to the high-end half-shell market in the Washington-Baltimore area has the potential for becoming a sustainable and profitable business venture.

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1.0 INTRODUCTION

The 350-some inhabitants of Smith Island, MD are the direct descendants of British colonists who settled this Chesapeake Bay island in the early 1700s. To this day, the islanders still speak English with holdover accents and speech patterns from Elizabethan Cornwall. The island's economy has long depended on crab and oyster harvesting, the occupation of most adults to this day. But a diminishing resource base threatens their lifestyle.

Chesapeake Bay oyster (*Crassostrea virginica*) populations have declined significantly since the 1880s when the industry harvested about 15 million bushels (about 525,000 tons) annually. In 1998 only 148,000 bu. (5,180 t) were landed—less than one percent of historic levels. Overharvesting, habitat degradation and disease have contributed to this decline, and the wild harvest industry on Smith Island is no longer economically viable. Watermen do not want to give up their ability to harvest oysters from public grounds, but it has become increasingly difficult to support families and continue in the island's tradition. Many young islanders are seeking employment opportunities elsewhere.

1.1 Project Summary

The project was created through a two-part Chesapeake program that involved technical workshops and demonstration projects, followed by marketing assistance and extension support. The project team decided to start small, with one workshop, then expand the project depending on the watermen's interest. Team participants come from state and federal natural resource management agencies, academia, and non-profit and for-profit organizations involved in sustainable aquaculture and agriculture development, pollution prevention, and the food industry.

Oyster farming workshops were conducted on Smith Island and on nearby Tangier Island, VA in July 1998. Experts gave overviews of topics ranging from nursery and grow-out techniques to marketing and government regulations, followed by equipment demonstrations.

A pilot oyster culture project was begun in spring 1999 in the town of Ewing, MD, on Smith Island, in Levering Creek, a state-approved shellfish growing area off Tangier Sound. Smith Island watermen Bill Dize and Eddie Evans jointly own the project. Both men, former presidents of the Tangier Sound Watermen's Association, are prominent Smith Island residents. They have not yet signed any formal agreements for cooperatives or partnerships. The project will file for a for-profit status within state of Maryland within the immediate future.

Funding for the project has come from private foundations (Campbell Foundation for the Environment, Community Foundation of the Eastern Shore, Chesapeake Bay Trust), government (Office of Sustainable Development, USDOC), and in-kind providers such as TerrAqua, the University of Maryland and the Maryland Department of Natural Resources.

1.2 Project Overview and Status

The first seed oysters (45,000) were provided in July 1999. By September 1999 the oysters had grown almost ten-fold. The watermen were sufficiently impressed that they requested more seed oysters, and were provided with an additional 12,000 in October 1999. By November 1999 the largest oysters from the July seeding were about 3” long, and appeared robust. The watermen received an additional 20,000 seed oysters in August 2000. Oyster mortality has been negligible in the grow-out operation. Total start-up costs were approximately \$6,400 (See breakdown of costs in Table 1.3).

The watermen are receiving ongoing technical and marketing advice, and oyster disease monitoring. They are maintaining and expanding the growing operations. One husband and wife team plan to start a weekend bed and breakfast that will include a cultured oyster meal. It will become Smith Island’s second B&B.

One aspect of the overall project will be seeding cultured oysters around the island, to re-establish local wild oyster beds that can be harvested in the future. These temporary sanctuaries can allow disease-tolerant brood stock to proliferate, add habitat and improve water quality.

Project participants plan to continue and expand on the Smith Island project. Within Smith Island, they plan to help participating watermen expand their operations and to assist other interested watermen start their own operations. They also plan to export this approach to other interested local watermen communities—an interest that seems to be growing.

Table 1.3. Start-up costs

Items	Cost
Seed oysters	\$560
Culture floats (20)	1,920
Legal (LLC development)	1,000
Power washer	300
Shipping supplies: Staple machine [for fastening shipping boxes] (\$300) Waxed shipping boxes (\$440) Waterproof oyster tags (\$48) Ice chests (\$450) Thermometers (\$20) Box labels (\$100)	1,358
Liability insurance	750
Safe seafood handling (HAACP) certification	150
Permanent Water Column Aquaculture Permit (MD)	250
Miscellaneous	100
Total	\$6,388
Note: In-kind contributions for the Smith Island project are not included. If watermen in other regions want to initiate a similar project, it would cost approximately \$1,500 to bring in the consulting team for initial training, construction of sample floats, and overview of the business model.	

2.0 PRODUCTS

Products to be developed will be high-quality, single raw oysters for the half-shell market.

2.1 Product Description

To be sold as appetizers in oysters restaurants and seafood markets, the oysters must attain a size of 2-1/2” to 3-1/2” and larger. Oysters not reaching this size can sometimes be sold as “shooters” or “cocktail oysters” for a discounted price. The key to selling the oysters, according to the chefs, buyers and established growers with whom we spoke, rests on quality, consistency, and cleanliness. The product will need have an appealing salty flavor and be available almost year-round.

2.1.1 Risk to Product

The major diseases of wild oysters in Chesapeake Bay, Dermo (*Perkinsus marinus*) and MSX (*Haplosporidium nelsoni*), are likely to persist indefinitely. MSX, which tends to affect oysters in early life stages, does not yet appear to have affected the Smith Island oysters in culture. Dermo, which was detected in 2000 but not in 2001, affects older oysters. To minimize the likelihood of affecting oyster culture in Tangier Sound, the project is managing around and minimizing exposure to disease. The brood stock had survived earlier disease epizootics. The faster growth from suspended culture minimizes the growing time to market size—and may minimize the likelihood of this age-related disease. Watermen will minimize other causes of mortality by controlling fouling and predation. The oysters are regularly tested for Dermo. Dermo was detected in some of the oldest (over one-year-old) oysters, but no major mortalities have occurred.

2.2 Sourcing of Seed Oysters and Equipment

Seed oysters have been purchased from Middle Peninsula Aquaculture in North, VA. There are several other hatcheries in Virginia, and no high-quality commercial hatcheries in Maryland. The seed oysters are set on mini-cultch (finely ground shell) to create singles for the half-shell market. The broodstock, eight- to ten-year-old oysters collected from Tangier Sound, had survived earlier disease epizootics; the seed oysters were certified disease-free by VIMS. The 5-12-mm seed oysters are large enough to be placed directly into polyethylene mesh bags and suspended in floats (See Appendix A).

Modified Taylor floats are made from PVC pipe and elbows, and cable ties, which can be purchased in many large hardware stores. Plastic mesh bags, which are attached to the floats and contain the oysters, are manufactured by Fukui North America Corp. and purchased from ADPI Enterprises, Inc., Philadelphia, PA. Oyster seed costs \$5 to \$12 per thousand, depending on size. We conservatively estimated the total cost for one float, including mesh growout bags, at \$96 (See Appendix A).

2.3 Oyster Production

The goal is a one-season (May-November) grow-out to market size, and then, if the supply is sufficient, up to a 12-month market, selling oysters off as they reach a desirable size (or smaller size, if enough test positive for Dermo). However, there is some concern about being able to sell oysters during the summer, because reduced meat quality due to spawning, and high bacteria counts. To reassure customers, some growers do not sell oysters during the hottest months of the year.

Bob Rheault, of Moonstone Oyster Company in Wakefield, RI suggests that growers modulate their supply to ensure product availability year-round. This may allow growers to capitalize on the wild harvest closures and summer tourist booms by selling to these ready markets at a premium.

Glitches in production may be encountered during extremely cold weather, when it is difficult to work outside with oysters. Heavy winter icing can prevent access to oyster floats or regular boat shipments from Smith Island to the mainland (Crisfield, MD).

Restaurant chefs often expect year-round availability. They dislike surprises and don't like to put an item on the menu if they can't have the product all the time. On the other hand, many if not most high-end seafood restaurants and seafood markets in this area, especially those that change their menus daily depending on what's fresh and available, are accustomed to seasonal supplies.

If growers find they can't produce enough products to service clients year-round they should cut back on the number of clients, raise prices, or team up with several growers to meet demand. If growers can't make a scheduled shipment, they should give chefs advance warning so they can plan ahead.

Given the numbers of oysters likely to come out of Smith Island in the near future, it is more likely that the watermen will want to sell them in larger batches over a short period rather than selling them off fewer at a time over a longer period.

2.4 Oyster Growth Cycle

- April-May: Brood oysters spawn in hatchery
- Mid-late May: Seed oysters grow to 5-8 mm, large enough to put into culture apparatus
- November: Most oysters reach market size (rather than in Spring)

Starting with seed oysters late in one season may result in a greater percentage attaining market size by the end of the following season.

3.0 THE HALF-SHELL OYSTER MARKET

3.0.1 Supply

The National Marine Fisheries Service (NMFS) collects data on seafood harvests by obtaining output records from seafood processors. Since half-shell oysters do not go through processing plants, there are no accurate data explicating the volume of sales in the half-shell market.

National statistics on oyster production do show production trends for different regions. The East and Gulf coasts produce the majority of oysters grown for the U.S. half-shell market.

Table 3-1. Proportion of shell-stock to shucked and half-shell market, by region (1)

Region	Shucked	Half-Shell
Atlantic (Mid and South)	75%	25%
Gulf Coast	50%	50%
Northeast	10%	90%
West Coast	80%	20%

There are production statistics for individual states that imply a local supply shortage for the Washington-Baltimore area.

Table 3-2. Oyster Production for Virginia (2) and Maryland (3), July 1999 to June 2000. (It is unknown how many of these oysters were distributed for half-shell consumption.)

State	Bushels Produced	Bushels Imported
Virginia	21,855	471,275
Maryland	381,560	(data not collected)

A local seafood wholesaler estimates that 5 to 10 million half-shell oysters are sold in the Washington-Baltimore region every year. Ninety-nine percent of these oysters are imported from the Pacific Northwest, Northeast states, and the Gulf of Mexico. Only one percent of the raw oysters sold locally are from Chesapeake Bay. This shortage in supply creates an opportunity for Smith Island watermen and other Chesapeake growers to establish viable, profitable oyster farms to supply the half-shell market in the Washington-Baltimore region.

3.0.2 Demand

While most of the NMFS data show a general decline in oyster production and consumption in the U.S. because of low supply and health concerns associated with eating raw seafood,

these data are misleading for the high-end half-shell market. We conducted a brief restaurant survey and discussions with other growers, which identified a high demand and chronic shortage of high-quality half-shell oysters in the Washington-Baltimore area.

Metropolitan areas around the country have experienced a resurgence of raw bars and demand for gourmet oysters (1,4,5,6). New York City boasts over 150 raw bars, and high-end restaurant chains such as Clyde's in the metropolitan Washington, DC area sell over 1,000 oysters per week. Many gourmet restaurants feature oysters from specialty growers around the country. The demand for gourmet quality oysters outside of the Washington-Baltimore area is growing, and may provide additional market opportunities for Smith Island oyster growers.

As noted in Table 3-1, 90 percent of the oysters grown in the Northeast are sold to the half-shell market. According to several wholesalers, growers and chefs that were interviewed, half-shell oysters grown in the Northeast and Mid-Atlantic regions are superior in taste and quality and are more desirable than Gulf oysters. The preference is reflected in current market prices: premium Gulf Coast oysters are being purchased by wholesalers for \$.35 to \$.38 each, whereas Northeastern varieties are fetching anywhere from \$.45 to \$.65 each (if sold direct to restaurants and high-end markets). They retail for \$1 to \$2 each.

One should remember that high quality half-shell oysters are a luxury food item. Demand and pricing can be volatile, more so than for standard food items. From 1984 to 1990 prices per 100-count box of raw oysters at New York's Fulton Fish Market ranged from \$20 to \$61 (2), depending on quality and year. In late summer of 2001, for example, as the U.S. economy cooled, some Northeast growers experienced decreased demand for their products.

3.1 Competitive Comparison

Consumers (restaurant patrons) and restaurant and market buyers have historically been loyal to their region (e.g., the majority of East Coast consumers and buyers prefer East Coast oysters). This trend may be changing, however, given the recent popularity of West Coast oysters in the Washington, DC area and elsewhere on the East Coast.

One factor not in Chesapeake oysters' favor is their past reputation—plump but bland, a good cooking oyster but not the best for serving on the half-shell (7). High quality cultured Chesapeake oysters are a relatively new—and still relatively unknown—phenomenon.

High quality Chesapeake oyster growers include Circle C Oyster Ranch, the only full-time oyster farming operation on Chesapeake Bay, near Solomons, Maryland, and New Point Oyster Company in New Point, Virginia. In the early 1990s another suspended culture operation, on the Wye River, MD, supplied oysters to the Oyster Bar at Grand Central Station (9,10). The Northeastern growers and newly established operations in Virginia and Maryland are the most likely candidates to create future competition. Total production capacity of existing growers is estimated at 150,000 per year. It is clear that they cannot meet the existing quantity of oysters demanded in the Washington-Baltimore area, which is estimated to exceed 5 million oysters (for raw consumption) per year.

3.1.1 Foreign Competition

The majority of oyster products imported into the U.S. are from Korea and Canada. The Korean products are canned, smoked and shucked oysters, which pose no competition to U.S. half-shell producers.

Canadian oyster growers are producing an excellent half-shell product. They cater mostly to New England cities, although Canadian oysters are now showing up in markets and restaurants in the Washington-Baltimore area. As raw bars and restaurants continue to build their diverse offerings for oyster connoisseurs, the demand for Canadian oysters will likely continue but not create a market barrier to Chesapeake Bay growers because of limited supply and market growth potential.

4.0 MARKET NICHE AND COMPETITIVE ADVANTAGE

The exceptional quality of the Smith Island oysters is a result of good husbandry, good water quality, good water circulation, abundant food organisms and relatively high salinity (20-21 ppt). These attributes impart an appealing flavor that sets them apart from some of the other oysters grown by competitors in Maryland and Virginia. The chefs, wholesalers and seafood buyers that sampled the Smith Island oysters were impressed with the texture, consistency and taste. Many requested orders prior to availability.

The quality of Smith Island oysters and consumer affinity for local products are enough to capture a local market niche. By including the story behind the oysters and the attempt to create new economic opportunities for Chesapeake Bay watermen and restore natural oyster beds, the Smith Island growers can create an image and brand recognition that will give them an additional advantage over their competitors.

4.0.1 Marketing

Marketing costs will vary depending on sales strategy. During the first two years of operations marketing costs should be minimal due to high demand, but growers should expect to invest time to establish accounts with restaurants and wholesalers. Along with oyster samples, we recommend brochures that can be left with chefs, supermarket buyers and wholesalers describing the oyster operation.

4.0.2 Partnerships

Partnerships or “strategic alliances” with non-profit organizations, businesses, and industry associations with shared goals or interests can leverage existing assets and provide mutually beneficial returns. This may be in the form of low-cost opportunities for marketing, branding and development of new accounts. Once the watermen have refined their production abilities and are ready to increase their business, they may wish to contact environmental nonprofits such as the Oyster Recovery Partnership, the Chesapeake Bay Foundation and the media in an effort to obtain local and national exposure. A story on public radio, network news or articles in nonprofits’ newsletters and websites can create significant public awareness, demand for the product and possibly bring in new clients. By

working with a specialty market like Whole Foods, the watermen could create mutual PR and marketing benefits. For example, Whole Foods could capture community support if they advertised they were working to preserve the Chesapeake Bay and traditional lifestyles of watermen by selling Smith Island oysters.

4.1 Sales

Every aspect of growing and selling—as opposed to harvesting wild—oysters has been new to the watermen, and they face logistical challenges with distribution and sales due to their remote location and limited distribution options and experience. To date, because of time and logistical constraints, neither participating waterman has been able to make a sales call. It is critical that each waterman candidly assess his interests, skills, financial goals, and time limitations so he can choose an appropriate sales strategy.

Three sales channels have been identified for the Smith Island watermen:

1. Direct sales to restaurants and markets
2. Wholesalers
3. Internet seafood sites

4.2 Direct Sales

4.2.1 Pricing

Direct sales are potentially the most profitable option for the watermen. They can expect to receive \$.45 to \$.55 or more for medium and large oysters when selling direct to white tablecloth restaurants and high-end seafood markets. As awareness of the quality and availability of Chesapeake oysters grows, the price of Smith Island oysters could rise as high as \$.65 or more, based on other growers' experience in the Northeast. The price of smaller shooter or cocktail oysters should remain constant at approximately \$.30.

If selling direct, growers should be strategic in the accounts they pursue. Chefs and market buyers that make purchasing decisions based on quality, not price, are the preferred client. These buyers will stay loyal to the grower; help build the brand name and prestige of the Smith Island oysters. In addition, they are less likely to change suppliers to save a few cents.

Bob Rheault, of Moonstone Oysters, suggests that the growers raise their prices for half shell oysters by 5% every year to compensate for cost of living/production increases. If the growers decide to implement such a strategy, the clients should be notified up front to maintain good customer relations and to avoid surprises.

4.2.2 Requirements and Realities

Direct sales require a significant investment of time up front for going door-to-door to restaurants and markets. Personal contacts with chefs and buyers are important in creating a lasting relationship between watermen and their markets, and will improve the chances of getting and keeping restaurant and client orders. These long-term relationships are the

foundation for steady revenue streams and eventually profitability. Some mid-sized Washington-Baltimore area seafood restaurants and markets typically sell 200-400 raw oysters a week. Larger restaurants sell even more.

It is important to note that direct sales come with additional costs and time demands associated with distribution and customer service. Restaurants generally call for deliveries once or twice a week. The watermen will need to have a person or answering service available at all times to take orders and schedule prompt deliveries (within one or two days), and to oversee billing.

4.2.3 Distribution

Two different delivery options have been identified. The watermen can purchase a vehicle to make deliveries themselves or they can contract an individual delivery service that may cost approximately \$.10 per oyster. Special deliveries to Washington, DC by commercial carrier from Crisfield, Maryland are a minimum of \$100. The remote location of Smith Island creates a small but not insurmountable challenge for distribution. The route identified has at least four legs:

Table 4-1. Steps in shipping oysters from Smith Island to Washington, DC-area restaurants and markets, if watermen sell direct but do not deliver oysters themselves.

Leg	Cost
1. Smith Island to Crisfield, by ferry	\$15
2. Crisfield to Jessup, by refrigerated truck	\$2 per 100-count box of oysters
3. Jessup to Washington, DC by refrigerated truck	\$10
4. DC to area restaurants and markets	\$.10 per oyster (\$10 per box)

To date, it has proven difficult to find an adequate holding facility in Jessup. As a result, it is unclear how realistic this option is for now.

4.3 Wholesalers

4.3.1 Pricing

According to Kurt Friesland, a seafood buyer for J.J. McDonnell, a seafood wholesaler in Jessup, Maryland, Smith Island watermen can expect to receive \$.42 to \$.44 cents for medium and large oysters from wholesale distributors. Because of the high-quality product and unique story that accompanies the Smith Island operation, they may be able to negotiate a few cents more for their oysters.

4.3.2 Requirements and Realities

Selling to wholesalers requires less time servicing accounts but brings a slightly lower price per oyster when compared to direct sales. One wholesaler made a verbal offer of \$.44 per oyster and can take up to 30 to 40 (100-count) boxes per week. They generally ask for two deliveries per week. The wholesaler offered to introduce the Smith Island growers to other local distributors if the growers' supply exceeds the wholesaler's capacity.

Using wholesalers decreases the amount of bookkeeping and account management, and allows growers to focus more time on production and quality control. However, when prices reach a premium during holidays and times of shortage, they will need to monitor the market to ensure they are receiving the best price possible from wholesalers.

4.3.3 Distribution

The wholesalers contacted for this study are located in Jessup, Maryland. They have the capacity to move all of the Smith Island oysters for at least two years. As Table 4-3 illustrates, the route to the wholesalers only has two legs. If harvesting takes longer than two hours the oysters will have to be kept in cold storage or ice chests on Smith Island. The oysters need to be packed in ice chests for the ferry ride to Crisfield where they are picked up by refrigerated trucks and delivered to Jessup.

Table 4-3. Steps in shipping oysters from Smith Island to Washington, DC-area restaurants and markets, if watermen sell through a wholesaler in Jessup, MD.

Leg	Cost
Smith Island to Crisfield via ferry	\$15
Crisfield to Jessup by truck	\$2 per 100-count box of oysters

4.4 Internet Retail and Wholesale Sites

Recent developments on the Internet have created new sales venues for seafood producers around the world. Gofish.com appears to be the online market leader for wholesale market news and sales. Gofish.com requires an annual subscription fee of \$3,995 to sell via their auctions and daily seafood exchanges. There is additional cost to the seller of half a point of the sale or three-quarters of a point if the seller also wants the transaction insured.

Farm-2-market.com (www.farm2market.com) provides growers an opportunity to sell direct to consumers. Classified ads on Farm-2-market.com cost approximately \$5 per month. Selling direct to consumers may require additional costs and infrastructure for shipping and accepting credit cards. West Coast oysters are currently being sold on the site for approximately \$.80 each plus shipping. Marshall Schnider, Farm-2-Market's CEO, is receptive to featuring Chesapeake oysters, and requested a sample.

The owners of the Crab Place, an Internet-based seafood marketing company in Crisfield, MD (www.crabplace.com), recently contacted the Smith Island watermen for a sample. The

owners were impressed, and have expressed an interest in selling the Smith Island oysters. Although their primary product is crabs, they sell wild-harvested local oysters country-wide for \$1 apiece plus shipping. The watermen, in turn, like the simplicity of dealing with a local company.

Selling via the Internet is still in its infancy, and is not a recommended sales venue at present. As the growers expand their operation and the Internet matures they may want to explore the surviving online seafood exchanges to see if they will produce new buyers.

4.5 Recommendations

The Smith Island watermen would like to grow this pilot project into a full-time business that will provide long-term, sustainable income. Because of constraints discussed above, it is unlikely that they will conduct direct sales during the first two years of operations. Until they grow a crop large enough to support their families, part-time oyster culture will supplement their regular activities (e.g., fishing, crabbing, piloting).

Doug Outten, a waterman who works on oyster culture projects for the Maryland Department of Natural Resources, says part-time growers have a tendency to fall behind with husbandry (mostly cleaning and grading) because of lack of time or labor. If this happens, oyster mortality can increase, growth rate can diminish and the operation can degrade to a point of no return. He recommends that the watermen take an additional season to streamline their entire operation, from husbandry to harvesting to distribution, so they can consistently deliver their product to the accounts they establish in 2001. Therefore, it is prudent to implement a full-time business plan/strategy for the watermen to ensure that this can, should they choose, become a viable, year-round activity.

4.5.1 Distribution and Sales

The costs of transporting oysters from Smith Island to the Washington-Baltimore restaurants and markets have been estimated at \$.10 per oyster (\$10 per 100 count box), \$2 per box from Crisfield to Jessup, plus gas and the ferry. If the watermen are able to capture \$.45-\$.55 an oyster, this brings them a net per oyster after delivery of approximately \$.35- \$.45. This is the same price they can capture by using a wholesaler.

We recommend that, at least initially, Bill Dize and Eddie Evans work with the Jessup, MD wholesalers to establish a market presence and create brand recognition for their oysters. This will decrease startup costs, streamline distribution logistics, and immediately establish a revenue stream.

Initial sales calls to Whole Foods and several DC-area restaurants and markets generated considerable interest in the product. After the growers streamline their packaging and distribution system, they may want to approach these and additional seafood restaurants and markets and establish direct sales accounts. By working with a limited number of sophisticated consumers, they can test the market and see if they like selling direct, gauge if it is more profitable than working with wholesalers, and build brand recognition of their product. Selling directly to restaurants and through wholesalers simultaneously may be difficult, however, because wholesalers may perceive the activity (rightly so) as competition.

5.0 MANAGEMENT AND ORGANIZATIONAL STRUCTURE

We suggest creating an advisory board to assist the waterman as they expand their operations. Presently, there has not been any formal structure created for the oyster project. We recommend they form a Limited Liability Corporation (LLC). An LLC can provide added liability protection, while simplifying the bookkeeping because they can be taxed like a sole proprietorship.

5.1 Personnel Plan

Estimates for the number of watermen needed on a part-time basis for the project run about 60,000 oysters per waterman per season (considerably more if full-time). Work is done in batches and takes approximately five days to grade, clean and maintain the operation every month during the growing season. Because of their hectic schedules, the watermen are contemplating hiring temporary part-time help for harvesting and maintenance.

6.0 FINANCIAL PLAN SUMMARY

Revenues

The revenue model projects production and sales of oysters doubling every year for the first five years of operations. Depending on the watermen's availability and operation's efficiency, total build-out of the business may take more than five years.

A Jessup, MD wholesaler offered the watermen \$.42 to \$.44 for oysters 2.5 inches or more. We have developed cost vs revenue projections for four revenues (\$.35, \$.40, \$.45, and \$.50 per oyster), each with 25% and 50% of the oysters "lost" to consumption by the growers, free samples, handling and mortality.

The projected revenues, even at worst-case scenario, illustrate that a viable business opportunity exists and may provide enough income for the watermen to sustain their lifestyles and families. (See Table 6.1.)

Table 6.1. Financial Summary Years 1 – 5

25% Mortality	2001	2002	2003	2004	2005
Oysters to market	60,000	120,000	240,000	480,000	960,000
Net Revenues @ \$.35	\$3,038	\$13,721	\$30,217	\$64,279	\$133,913
Net Revenues @ \$.40	\$6,038	\$19,721	\$42,217	\$88,279	\$181,913
Net Revenues @ \$.45	\$9,038	\$25,721	\$54,217	\$112,279	\$229,913
Net Revenues @ \$.50	\$12,038	\$31,721	\$66,217	\$136,279	\$277,913
50% Mortality	2001	2002	2003	2004	2005
Oysters to market	40,000	80,000	160,000	320,000	640,000
Net Revenues @ \$.35	(\$3,318)	\$1,009	\$4,793	\$13,431	\$32,217
Net Revenues @ \$.40	(\$1,318)	\$5,009	\$12,793	\$29,431	\$64,217
Net Revenues @ \$.45	\$682	\$9,009	\$20,793	\$45,431	\$96,217
Net Revenues @ \$.50	\$2,682	\$13,009	\$28,793	\$61,431	\$128,217

*Complete financial models are in Appendix B

Seed expense

Small seed oysters cost \$5-\$8 per 1,000. We estimated \$7/1,000.

Float equipment expense

Float expense was determined by dividing total oyster seeds by 1,500 (the number of market-size oysters each float can hold) multiplying by the cost of each float (\$96). (This figure includes cost of PVC tubing, plastic ties, and plastic mesh grow-out bags. It is a very conservative estimate; many growers put many more seed and small oysters into fewer smaller-mesh bags than we have estimated, which can save up to \$25 per float. See Appendix A for float design and costs.)

Labor expense

The number of watermen needed for the project has been estimated at one per 60,000 oysters per season. The number of hours needed for husbandry (cleaning, grading and packaging) during the seven-month growth cycle is estimated at 350 (approximately 50 hours per month). The labor cost per hour is estimated to be \$15 (vs. \$10/hr used in a 1992 cost

analysis of Chesapeake oyster culture [6]). Labor costs may be less than projected depending on the amount and time the watermen participate in startup activities.

Transportation expense

Costs were derived with the assumption that there will be 36 weeks (nine months) of delivery per year. We expect three months off due to hot and inclement weather. According to our discussion with wholesalers, the watermen will have to make two deliveries per week. They can use the ferry or their own boats; either way the cost is approximately \$15.

Distribution expense

Distribution expenses will vary depending on the sales channel(s) the watermen choose.

Direct sales

A cost-effective infrastructure for delivering direct to restaurants and markets is not available. It can be done, but involves a fragmented distribution route with associated costs and challenges delineated in section 4.2.

The watermen have the option of purchasing, renting or borrowing a vehicle and making deliveries themselves. Due to the cost of purchasing a vehicle and limited availability of watermen to make deliveries, this is not recommended at present, but may become a viable option in the future.

Wholesale

Distribution via wholesalers is our recommendation for startup. The closest group of wholesalers is in Jessup, Maryland. Trucking oysters by commercial refrigerated carrier from Crisfield to Jessup costs \$2 for each 100-count box.

Shipping supplies expense

<u>Waxed boxes:</u>	\$1.10 each delivered; each box holds 100 oysters.
<u>Oyster tags:</u>	\$.12 each; one per 100-count box.
<u>Ice chests:</u>	\$45 each.
<u>Box labels:</u>	\$50 per 1000.
<u>Thermometers:</u>	\$2, one per ice chest.

Marketing expense

Initial marketing expenses for logo development and brochures will be minimal (under \$1,000), but may increase as the need may develop for educating the consumer on the name and traditions of the Chesapeake watermen. An investment in waterproof cards and custom-printed boxes is recommended to build brand recognition among buyers.

Sales

Grant funding will initially absorb this expense. However, as sales increase, there may be a need for a part-time sales representative.

Legal expense

The legal expense will go towards the initial creation of the LLC and subsequent needs as they arise.

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APPENDIX A. OYSTER CULTURE FACT SHEETS

Parts for constructing a 10' X 26" modified Taylor float

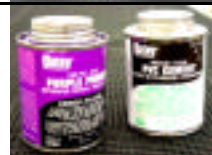
Three 10' sections of 4" thin-wall PVC pipe (Source: hardware stores, ~\$7 ea)



Four 4" PVC pipe elbows (Source: hardware stores, ~\$2 ea)



PVC primer and cement (Source: hardware stores, ~\$10, can use on many floats)



Cut two 33" sections from the third 4" PVC pipe, to form the end pieces. Prime, cement and connect the four sections (two 10' and two 33" pipes) with PVC elbows.

Polyethylene culture bags. Two fine-mesh (5-mm) spat bags, three small-mesh (1/8") bags, five medium mesh (3/16") bags, and six large-mesh (3/4") growout bags per float (@ \$3.70 ea. Local source: Eastfield Farms, POB 275, Matthews, VA. 23109; 804-725-3948)



24 21" nylon cable ties (four per culture bag, to attach to float). (Source: hardware stores, ~\$7)



Cable ties or coated wire to close each end of the bags

Floats can be tied to a dock or tethered at both ends to 3" x 3" or 4" x 4" stakes driven into the sediment.

How many oysters will each float support?

Each growout bag holds ~250 fully grown oysters. Each float holds six growout bags, or 1,500 oysters. Seed oysters (5-8 mm) go into spat bags, 500 to 1,000 per bag. In this area, oysters grow about 1/2" a month during the growing season. Example: to grow 15,000 oysters, start by putting 750 seed oysters into each of 20 fine-mesh spat bags, which can fit on four floats. Grade oysters and put into increasingly larger-mesh bags as they grow. Once sufficiently large (about 1" long) the oysters can go into 3/4" growout bags—eventually 60 bags on 10 floats.



Obtaining seed oysters; growing them to market size

The best source of seed oysters in this region is Middle Peninsula Aquaculture, PO Box 769, North, VA 23128. 804-725-0159.

Cost depends on size. We have paid between \$5 per thousand (smallest) and \$25 per thousand (large), plus shipping (\$48 for overnight shipping). Ideally, purchase one large batch of small oysters (\$5 to \$8 per thousand) early in the season. The cost includes disease-free certification from a Virginia Institute of Marine Science lab.

How long does it take seed oysters to attain market size?

In this region, if one starts early, most oysters can reach market size in one season (May-November). Disease susceptibility may be lower, and a greater proportion of oysters will attain market size, when seed oysters are introduced late rather than early in the growing season, and harvested the following year.

How much labor is required for growing oysters?

A lot less with these modified floats than with older Taylor floats. The major labor, once the floats are built and the oysters are growing, is periodic agitation at the beginning (about once a week, to prevent seed oysters from fusing to one another) and removing algae and other fouling organisms, which can restrict the flow of water and food organisms into the floats and compromise growth and survival. These floats, tethered at both ends, can be easily flipped, exposing the mesh bags (and fouling organisms) to the sun and air. After 24 or 48 hours, the floats should be righted. The fouling falls away within a few hours.

If selling the oysters, they should be cleaned with a power washer or wire brush.



5-8 mm seed oysters



Oysters about 1" long, ready to go into grow-out culture bags

APPENDIX B. FINANCIAL MODELS

Sales via wholesaler @ \$.35 per
oyster with 25% mortality

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	60,000	120,000	240,000	480,000	960,000
# Half-shell oysters to market	60,000	120,000	240,000	480,000	960,000
Price per oyster	\$0.35	\$0.35	\$0.35	\$0.35	\$0.35
Total Revenues	\$21,000	\$42,000	\$84,000	\$168,000	\$336,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$1,200	\$2,400	\$4,800	\$9,600	\$19,200
Shipping supplies					
Waxed boxes	\$660	\$1,320	\$2,640	\$5,280	\$10,560
Oyster tags	\$72	\$144	\$288	\$576	\$1,152
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,962	\$28,279	\$53,783	\$103,721	\$202,087
Net Income	\$3,038	\$13,721	\$30,217	\$64,279	\$133,913

**Sales via Wholesaler @ \$.40
per oyster with 25% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	60,000	120,000	240,000	480,000	960,000
# Half-shell oysters to market	60,000	120,000	240,000	480,000	960,000
Price per oyster	\$0.40	\$0.40	\$0.40	\$0.40	\$0.40
Total Revenues	\$24,000	\$48,000	\$96,000	\$192,000	\$384,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$1,200	\$2,400	\$4,800	\$9,600	\$19,200
Shipping supplies					
Waxed boxes	\$660	\$1,320	\$2,640	\$5,280	\$10,560
Oyster tags	\$72	\$144	\$288	\$576	\$1,152
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,962	\$28,279	\$53,783	\$103,721	\$202,087
Net Income	\$6,038	\$19,721	\$42,217	\$88,279	\$181,913

**Sales via Wholesaler @ \$.45 per
oyster with 25% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	60,000	120,000	240,000	480,000	960,000
# Half-shell oysters to market	60,000	120,000	240,000	480,000	960,000
Price per oyster	\$0.45	\$0.45	\$0.45	\$0.45	\$0.45
Total Revenues	\$27,000	\$54,000	\$108,000	\$216,000	\$432,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$1,200	\$2,400	\$4,800	\$9,600	\$19,200
Shipping supplies					
Waxed boxes	\$660	\$1,320	\$2,640	\$5,280	\$10,560
Oyster tags	\$72	\$144	\$288	\$576	\$1,152
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,962	\$28,279	\$53,783	\$103,721	\$202,087
Net Income	\$9,038	\$25,721	\$54,217	\$112,279	\$229,913

**Sales via Wholesaler @ \$.50 per
oyster with 25% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	60,000	120,000	240,000	480,000	960,000
# Half-shell oysters to market	60,000	120,000	240,000	480,000	960,000
Price per oyster	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50
Total Revenues	\$30,000	\$60,000	\$120,000	\$240,000	\$480,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$1,200	\$2,400	\$4,800	\$9,600	\$19,200
Shipping supplies					
Waxed boxes	\$660	\$1,320	\$2,640	\$5,280	\$10,560
Oyster tags	\$72	\$144	\$288	\$576	\$1,152
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,962	\$28,279	\$53,783	\$103,721	\$202,087
Net Income	\$12,038	\$31,721	\$66,217	\$136,279	\$277,913

**Sales via Wholesaler @ \$.35 per
oyster with 50% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	40,000	80,000	160,000	320,000	640,000
# Half-shell oysters to market	40,000	80,000	160,000	320,000	640,000
Price per oyster	\$0.35	\$0.35	\$0.35	\$0.35	\$0.35
Total Revenues	\$14,000	\$28,000	\$56,000	\$112,000	\$224,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$800	\$1,600	\$3,200	\$6,400	\$12,800
Shipping supplies					
Waxed boxes	\$440	\$880	\$1,760	\$3,520	\$7,040
Oyster tags	\$48	\$96	\$192	\$384	\$768
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,318	\$26,991	\$51,207	\$98,569	\$191,783
Net Income	(\$3,318)	\$1,009	\$4,793	\$13,431	\$32,217

**Sales via Wholesaler @ \$.40 per
oyster with 50% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	40,000	80,000	160,000	320,000	640,000
# Half-shell oysters to market	40,000	80,000	160,000	320,000	640,000
Price per oyster	\$0.40	\$0.40	\$0.40	\$0.40	\$0.40
Total Revenues	\$16,000	\$32,000	\$64,000	\$128,000	\$256,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$800	\$1,600	\$3,200	\$6,400	\$12,800
Shipping supplies					
Waxed boxes	\$440	\$880	\$1,760	\$3,520	\$7,040
Oyster tags	\$48	\$96	\$192	\$384	\$768
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,318	\$26,991	\$51,207	\$98,569	\$191,783
Net Income	(\$1,318)	\$5,009	\$12,793	\$29,431	\$64,217

**Sales via Wholesaler @ \$.45 per
oyster with 50% mortality**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	40,000	80,000	160,000	320,000	640,000
# Half-shell oysters to market	40,000	80,000	160,000	320,000	640,000
Price per oyster	\$0.45	\$0.45	\$0.45	\$0.45	\$0.45
Total Revenues	\$18,000	\$36,000	\$72,000	\$144,000	\$288,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$800	\$1,600	\$3,200	\$6,400	\$12,800
Shipping supplies					
Waxed boxes	\$440	\$880	\$1,760	\$3,520	\$7,040
Oyster tags	\$48	\$96	\$192	\$384	\$768
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,318	\$26,991	\$51,207	\$98,569	\$191,783
Net Income	\$682	\$9,009	\$20,793	\$45,431	\$96,217

**Sales via Wholesaler @ \$.50 per
oyster with a 50% mortality rate**

	2001	2002	2003	2004	2005
Revenues					
# of seed oysters	80,000	160,000	320,000	640,000	1,280,000
Inventory after mortality	40,000	80,000	160,000	320,000	640,000
# Half-shell oysters to market	40,000	80,000	160,000	320,000	640,000
Price per oyster	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50
Total Revenues	\$20,000	\$40,000	\$80,000	\$160,000	\$320,000
Expenses					
Liability Insurance	\$750	\$750	\$750	\$750	\$750
Seed Oysters	\$560	\$1,120	\$2,240	\$4,480	\$8,960
Float Equipment	\$5,120	\$5,120	\$10,240	\$20,480	\$40,960
Labor	\$7,000	\$14,000	\$28,000	\$56,000	\$112,000
Transportation	\$1,080	\$1,080	\$1,080	\$2,160	\$2,160
Distribution	\$800	\$1,600	\$3,200	\$6,400	\$12,800
Shipping supplies					
Waxed boxes	\$440	\$880	\$1,760	\$3,520	\$7,040
Oyster tags	\$48	\$96	\$192	\$384	\$768
Ice chests	\$450	\$225	\$225	\$225	\$225
Thermometers	\$20	\$20	\$20	\$20	\$20
Labels	\$100	\$200	\$400	\$800	\$1,600
Marketing	\$200	\$1,000	\$1,000	\$1,000	\$1,500
Legal	\$500	\$500	\$1,000	\$1,000	\$1,000
Sales	-	-	\$500	\$500	\$1,000
Other	\$250	\$400	\$600	\$850	\$1,000
Total Expenses	\$17,318	\$26,991	\$51,207	\$98,569	\$191,783
Net Income	\$2,682	\$13,009	\$28,793	\$61,431	\$128,217