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(1) STONINGTON LOBSTER AND FISHING INDUSTRIES:
INFRASTRUCTURE, CHALLENGES AND OPPORTUNITIES

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(2) SUPPLEMENTAL LOBSTER BAIT ANALYSIS
FOR STONINGTON, MAINE

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STONINGTON LOBSTER AND FISHING INDUSTRIES:
INFRASTRUCTURE, CHALLENGES AND OPPORTUNITIES

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Prepared by:

Caroline L. Noblet, M.S.
School of Economics
University of Maine

James Wilson, Ph.D.
School of Marine Sciences
University of Maine

Thomas Allen, M.S.
School of Economics
University of Maine

Prepared for:

Town of Stonington Community Development Block Grant (CDBG)
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STONINGTON LOBSTER AND FISHING INDUSTRIES:
INFRASTRUCTURE, CHALLENGES AND OPPORTUNITIES

EXECUTIVE SUMMARY

This report presents a profile of Stonington, Maine's lobster industry. The analysis is based on secondary data collected at the national, state and local level as well as primary data collected through surveys of members of Stonington's lobster industry conducted during the summer/fall of 2008. Key results of the study are summarized below:

- 23% of Stonington's workforce is employed in the Fishing Sector.
- Stonington is the 34th largest port in the U.S. based on dollar value of species landed
- 16.5% of statewide lobster licenses are held in Zone C; 40% of which are in Districts 2-5, the area Stonington harvesters operate in.
- Approximately 450 harvesters register Stonington as their primary port; 16% of these registered harvesters are from off-island.
- Stonington Lobster Landings are reported between 8 and 12 million pounds in 2007; valued at \$30 million dollars. These landings account for 40% of Hancock county total landings and 11% of Maine's total lobster landings.
- The Stonington economy receives \$2.5 million dollars in indirect and induced economic affects from the lobster industry.
- Stonington faces the simultaneous challenges of increasing input costs for the industry (including bait availability issues), declining value for landed lobster and threats to their working water infrastructure.
- Stonington may have the opportunity to address their challenges by engaging in trap experiments, pursuing value added/marketing endeavors, increased community involvement and pursuing changes in existing policy as a means of preserving working waterfront.

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1. INTRODUCTION

The Town of Stonington, Maine is located on the island of Deer Isle in Hancock, County Maine. The town faces many challenges in the current economic climate, particularly due to its reliance on a natural resource based industry. In an effort to be proactive regarding their future, the Town applied for and received a Community Development Block Grant (CDGB) in 2007. A portion of these funds was dedicated to an economic assessment of the towns fishing industry, with a particular focus on the lobster industry. The University of Maine and the CDBG advisory committee collaborated on the study. The economic assessment, the outcome of which is contained in this current report, was motivated by the desire to:

- (1) Assess the existing resources and infrastructure in the Stonington fishing industry;
- (2) Identify factors that would negatively impact or destabilize the flow of fishing product in the town and;
- (3) Identify actions that the town and/or local industry could take to mitigate potentially destabilizing forces, including opportunities to increase the local value added to fishing products landed in Stonington.

This report includes findings from work undertaken to address each of these motivating factors. This research is intended to help the Town of Stonington, and potentially other fishing-based towns, understand the current state of its fishing industry, and to provide a base for exploring opportunities to respond to market destabilization.

It is important to note that this study began in March of 2008. Destabilizing forces of a substantial nature, in and out of the fishing industry, have occurred since the commencement of this study. Many of these forces are beyond the control of any individual town or industry. This report strives to present options that may be within control of the local town and/or industry while remaining mindful of the current economic climate.

1.1 Background

.1 *Baseline data*

Currently the town of Stonington has an estimated population of 1,165 year-round residents, a decline of 7% since the 1990 Census (U.S. Census). The eclipse of the year-round community by seasonal residents remains a grave concern to the citizens of Stonington, a thread that will be evident throughout this report (Stonington Economic Development Meeting). Current data indicates that these concerns are not unfounded. Census data indicates that 37% of Stonington's housing units are considered seasonal or vacation homes. The average house costs \$96,300. These statistics are markedly higher than a similarly sized (pop. 1,185) Hancock county neighbor, the town of Sullivan where only 26% of houses are seasonal and the average house is \$83,200. The Stonington statistics more closely match the town of Friendship (pop. 1,204) in Knox County of Mid-coast Maine, an area well known for tourism and summer-residency. Currently 35% of Friendship's housing units are season, and the average home costs \$100,500. Citizens of Stonington are concerned that services upon which year-round residents rely

(ex: access to the waterfront, medical, food, etc.) will not continue to be available year-round should the number of year-round residents decline further.

Median household incomes in Stonington are substantially below the State and Hancock County medians. Additionally, Stonington has a very heavy reliance on one industry- fishing and in turn this industry is heavily reliant on a single species- lobster. Table 1 compares Stonington’s workforce and other economic characteristics to state of Maine and Hancock County averages.

Table 1. Stonington Economic Characteristics in Comparison to Maine Averages

	Stonington	Maine	Hancock County
Median Household Income (in 1999 dollars)	\$28894	\$37240	\$35811
Employment in Agriculture, forestry, fishing and hunting, and mining industry sector ^a	23% [104 of 454]	3% [16,087 of 624,011]	5.3% [1,315 out of 25,034]
Families below poverty level (percent of total families)	10%	8%	7%
Percent of housing units that are seasonal	37%	16%	31%
Receipt of public assistance (as a percent of total pop.)	7%	5%	4%

Source: 2000 Census.

^a Of the 1,165 citizens of Stonington reported in the 2000 Census, 454 are employed. 32 citizens are unemployed for a total workforce of 486.

2. PRINCIPLE FISHING INVENTORY AND INFRASTRUCTURE

To capture the existing resources and infrastructure devoted to the fishing industry in Stonington, data was culled from federal, state and local sources. Care has been taken to note the source of all data presented, as data from different sources is frequently inconsistent. When it was not apparent which data source was more reliable, these inconsistencies are noted in the report. Regrettably the local data contained in this report was limited by the low participation rate of some members of the industry in survey efforts. The international economic situation, and the season during which a majority of the work was conducted, likely contributed to this low participation rate. Future efforts, which investigate the inventory available in the town of Stonington, may benefit from increased participation. Additionally, town officials may best conduct future inventory assessments of the local area due to their access to local data.

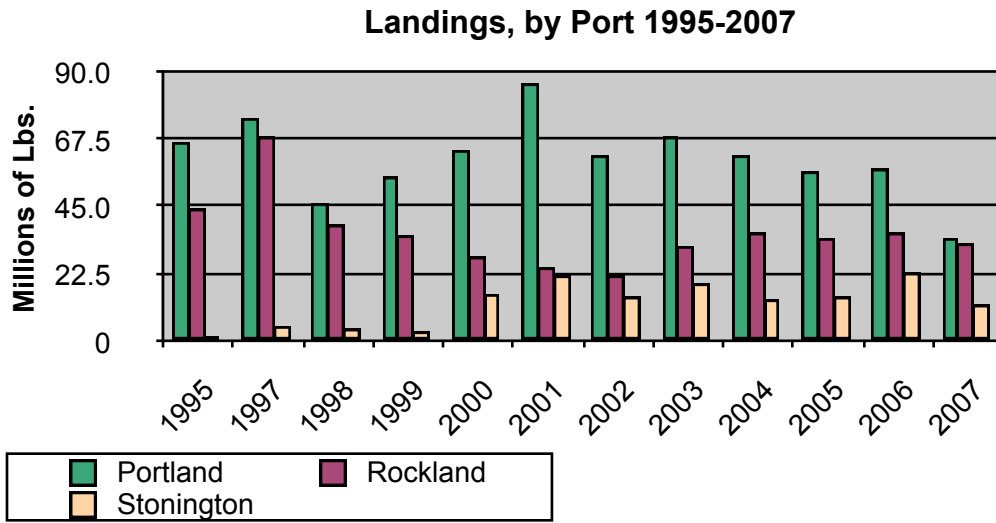
This inventory focused on place-based infrastructure such as the number of boats, harvesters in the area and lobster dealers. This report does not look at more mobile infrastructure issues such as transportation providers. We do not explore these mobile components of the infrastructure because typically these types of businesses are developed in response to an increase in demand for such a service. We would not expect these mobile infrastructure components to constrain business development as we anticipate such businesses would emerge as needed. Placed-based infrastructure on the other hand can limit economic growth and development, and thus is it important to understand what assets currently exist in Stonington that may be leveraged in the future.

2.1 Historic and Current Landings

According to the National Marine Fisheries Service (NMFS), for the year 2007 Stonington, Maine was ranked the 34th port in the United States based on dollar value of the landings for all species in the amount of \$23.5 million. In comparison, Portland, Maine ranked 33rd and Rockland, Maine ranked 61st. These are the only other Maine ports listed in the top 100 ports. NMFS data indicates that Stonington's ranking was 40th in 2000 and only 99th in 1995 (NMFS, 2008). Of interest, Stonington failed to make the top 100 prior to 1995¹. Figures 1 and 2 depict the landings and value data for Stonington in comparison to Rockland and Portland for the past ten years. In comparing Figure 1 and Figure 2, it can be seen that while Stonington, of the three ports shown, reports the lowest landings in pounds, the value reported is quite high. This high value per pound reflects the dominance of lobster in the Stonington fisheries industry.

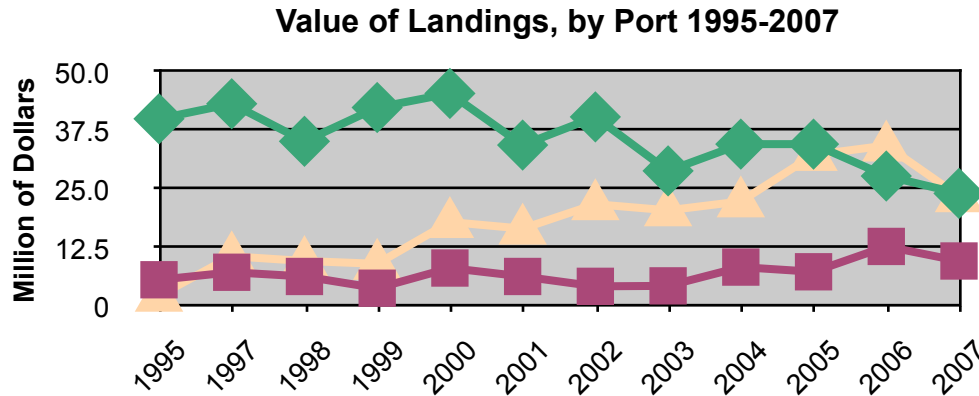
¹ This may be due to incomplete Federal collection of data prior to 1996.

Figures 1 and 2. Landings and Value, major Maine Ports 1995-2007

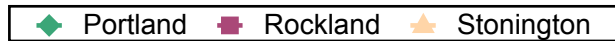


Source: NMFS, Port rankings by year

Figure 3 depicts the historical landings and inflation corrected value for American



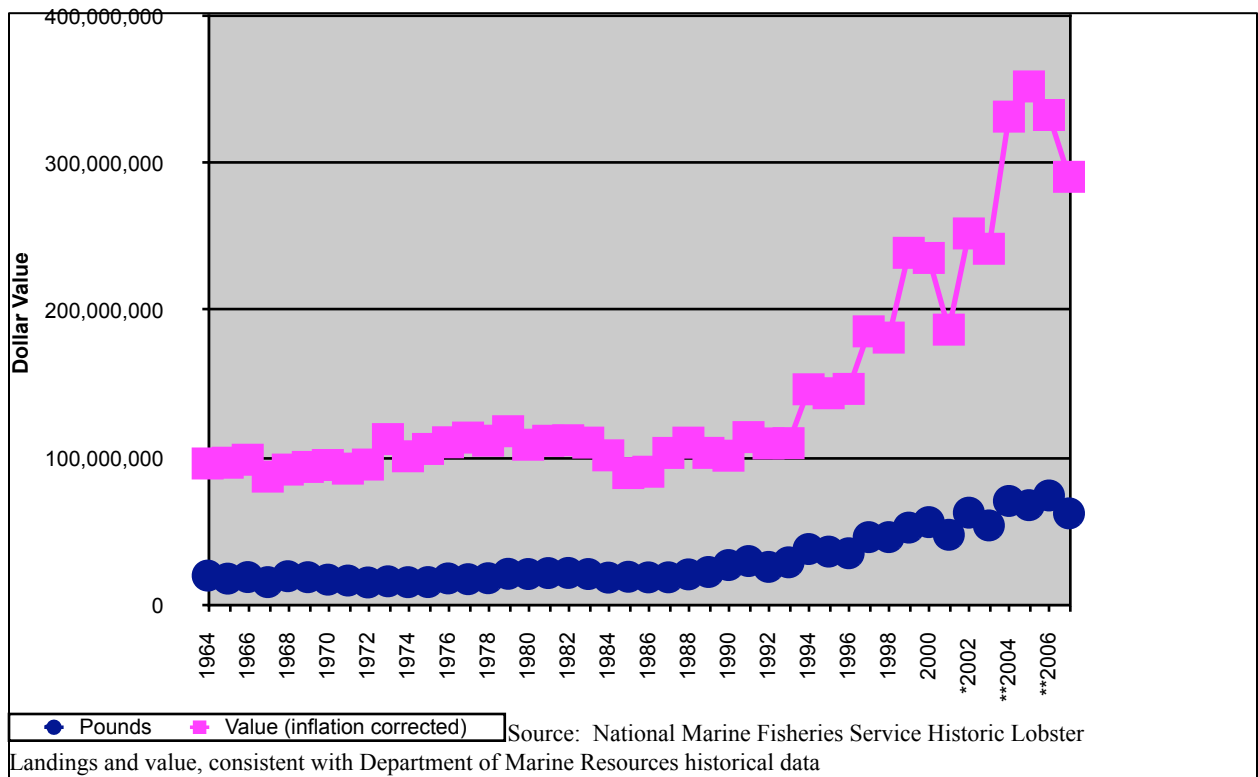
Lobster in Maine from 1964 to 2007. This figure shows the rapid increase in landings in



the 1990's, an increase that coincides with the decline in ground fishing. Figure 4 shows landings and the real price per pound of lobster (i.e., the price is corrected for inflation and stated in 2008 dollar equivalents so that good historical comparisons are possible). It is noteworthy that the real price per pound has declined since the 1970's (even when this year's dramatically lower prices are not taken into account); however, the really remarkable thing is that over the same period total sales and income have almost tripled.

According to industry sources this outcome appears to be due entirely to the growth of the processing sector of the industry. Live sales are thought to have increased only slightly over the last 15 years. For Stonington, until very recently, these price and landing trends have been very good and have encouraged a strong reliance on the industry. But, as is apparent from the current crisis, the downside of that reliance is less resilience in the face of external economic changes.

Figure 3. Historical Value corrected for inflation and Landings, 1964-2007^a

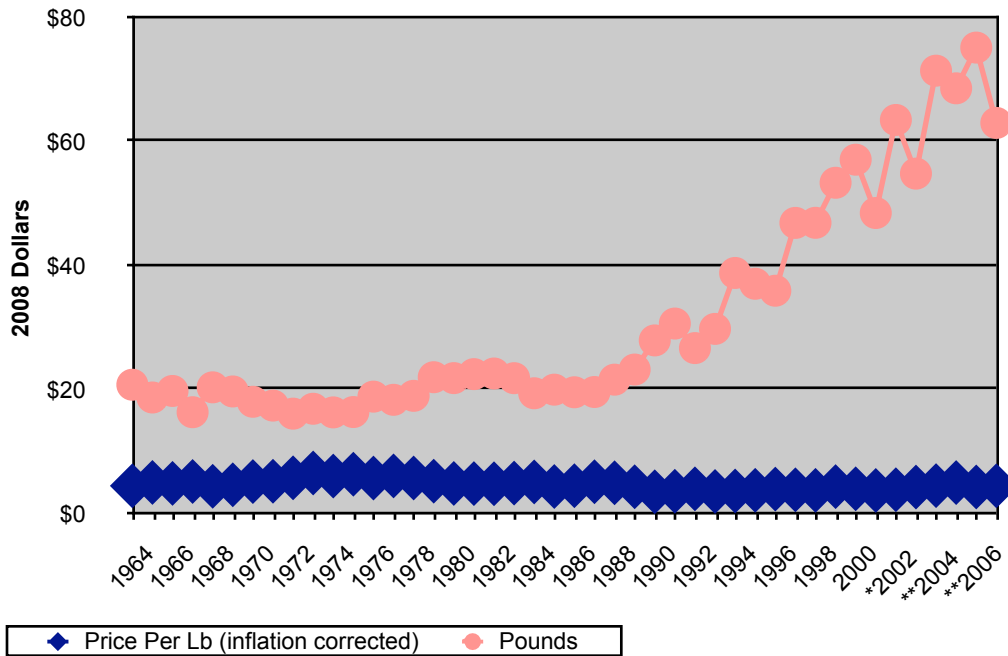


*The 2002 & 2003 landings may possibly reflect the increased effort by DMR to collect voluntary landings from some lobster dealers.

** Lobster reporting became mandatory in 2004 for all Maine dealers buying directly from harvesters, so caution is advised when comparing to previous years.

^a Data for 2008 is not available at this time.

Figure 4. Historic Landings and Price per Pound corrected for inflation , 1964-2007



Source: National Marine Fisheries Service Historic Lobster Landings and value, consistent with Department of Marine Resources historical data

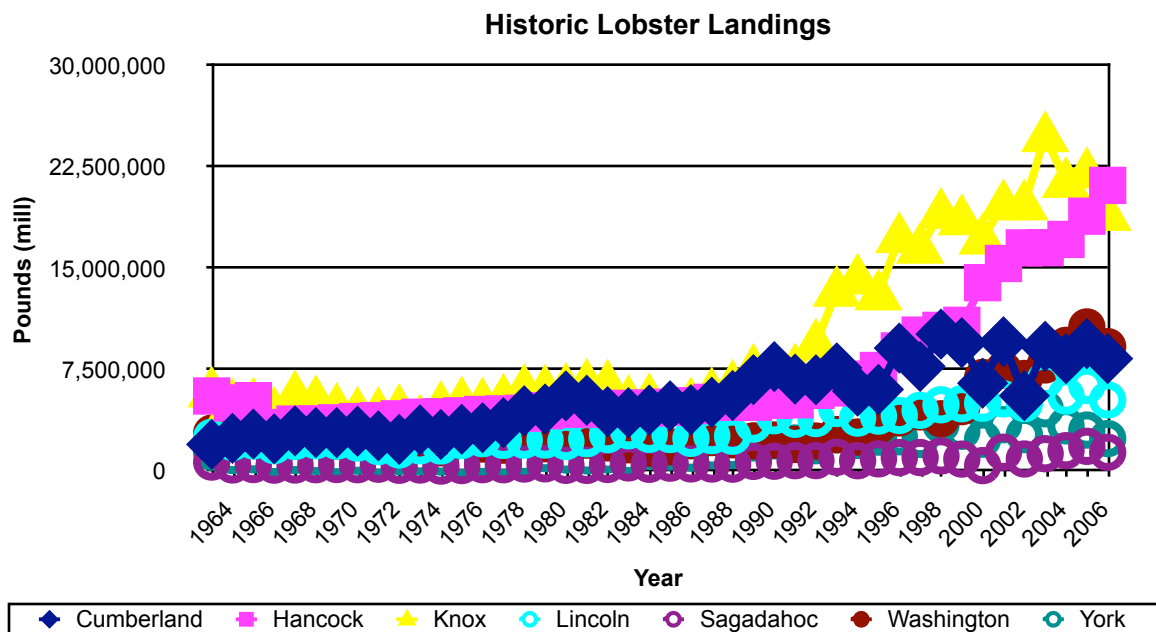
*The 2002 & 2003 landings may possibly reflect the increased effort by DMR to collect voluntary landings from some lobster dealers.

** Lobster reporting became mandatory in 2004 for all Maine dealers buying directly from harvesters, so caution is advised when comparing to previous years.

A less obvious recent trend in the industry is also worth noting. A slight eastward shift in the source of lobsters in Maine is evident from historical data (Figure 5). The counties of Hancock, Knox and Washington are clearly the principal providers of Maine lobsters, representing 27%, 30% and 15% of Maine lobster landings respectively. This represents a greater proportion of Maine’s lobster landings than historically provided by these counties. In particular the landings represented by the more Western coastal counties such as York, Cumberland and Sagadahoc have experienced a slight decrease in the proportion (and total volume) of Maine lobster landings. In is not clear whether these changes in trend are due to basic shifts in factors affecting lobster abundance or whether

they are simply the kind of short term ‘noise ‘ that might be expected in a complex resource. Put differently, the recent boom has had a much stronger impact in Knox and Hancock counties than elsewhere in the state. Consequently, if the boom ends the decline in landings in Knox and Hancock counties might be proportionality larger than elsewhere. There are no biological signs that the current high populations are likely to collapse, nevertheless, it is worthwhile keeping a wary eye on these trends.

Figure 5. Historic Maine Lobster Landings by County



Source: Department of Marine Resources Historic Lobster Landings and Value by County

2.2 Licenses

There are currently 6,787 commercial lobster licenses² held in the state of Maine. This is the lowest number of licenses held in the past ten years (DMR). Of these, 1,121 (16.5%) are held in Zone C, the zone to which Stonington area lobstermen belong. Zone C

² Apprentice licenses account for 1,105 of the total commercial licenses reported.

consists of nine districts (Figure 6). For the purposes of this report, we consider only the licenses held in districts 2 – 5 and 8, as these districts contain harvesters located on Deer Isle, including Little Deer Isle, Stonington and Isle au Haut. Harvesters from these communities typically use Stonington as their primary port, or, if not Stonington, an adjacent place of landing that is an integral part of the economy of the area.

Figure 6. Zone C Districts 2008-2009 and Map.

District 1 (Surry, Blue Hill, Brooklin, Sedgwick, Sargentville, Brooksville)

District 2 (Little Deer Isle, Brooksville, Deer Isle, Cape Rosier, Eagle Isl.)

District 3 (East Penobscot Bay from Widows Island to Merchant Row, Little Deer Island, Deer Island, Stonington)

District 4 (Deer Isle, Stonington)

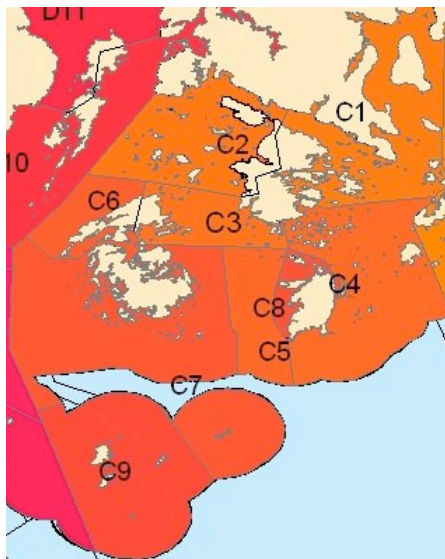
District 5 (Lower East Penobscot Bay from Merchant Row, Isle au Haut, Stonington, Deer Isle)

District 6 (North Haven)

District 7 (Vinalhaven)

District 8 (Isle au Haut)

District 9 (Matinicus)



Source: Department of Marine Resources

2.3 Fishing Fleet and Harvesters

Of the 1,121 licenses held in Zone C harvesters in districts 2-5 and 8 hold 454 of these licenses per Table 2³.

Table 2. Lobster Licenses held by Districts of interest in Zone C.

District/ License Type	Lobster/Crab Class 1	Lobster/Crab Class 2	Lobster/Crab Class 3	Lobster/Crab over age 70	Lobster/Crab under 18	Grand Total
2	18	24	3	1		46
3	34	47	15	5	2	103
4	31	78	29	9	3	150
5	35	57	30	2		124
8	7	18	5	1		31
Total	125	224	82	18	5	454

Source: Department of Marine Resources

The Stonington fleet has experienced a number of changes over the years with respect to number of vessels, and targeted catch, particularly after the severe decline in ground fishing in the early 1990's. In an effort to best understand the current fleet, data was gathered from a number of sources including National Marine Fisheries Service, the Maine Department of Marine Resources and to the extent possible town level data.

An important issue in the estimation of the number of vessels in Stonington Harbor, concerned boats whose owners and operators were not Stonington residents. These boats make important contributions to the area economy but are easy to miss because official records show registration in towns outside the immediate area. Part C of

³. 198 Lobster Apprentice or Student licenses were not assigned to a specific district within Zone C.

the Maine Lobster and Crab Harvesting License Application requires applicants to provide information on the vessel they will use to carry out their harvesting activities and, of particular relevance to this study, the town of primary anchorage. In previous efforts to capture the size of the fleet, these out-of-town harvesters may not have been counted as vessels that also use Stonington infrastructure. However, it is important to note that this data may not be entirely complete as DMR indicates⁴ that many license applications are returned without all parts of section C being completed. These license applications may still be processed and granted, despite the missing data. Therefore, it is possible that additional vessels utilize Stonington as their primary port, but are not captured in the data below.

In total, 714 applications report Stonington, Deer Isle (including Little Deer Isle) or Isle au Haut as the primary port. However, it is very important to note that many harvesters carry multiple licenses, and thus the total number of harvesters is more accurately 450 based on this data. Additionally, the data does not distinguish between full and part-time harvesters. Table 3 shows the results of this data. The data is consistent with information gathered by Coastal Enterprises Inc. 2002, which estimated the number of harvesters in Stonington at 359.

⁴. Keith Fougere, of the DMR, who kindly provided the raw data for Table 3, pointed out this limitation.

Table 3. Licenses Held by Town

Town	Licenses	Repeats	Estimated Harvesters
Deer Isle	174	52	122
Isle au Haut	35	13	22
Stonington	505	197	308
Totals	714	262	452

Source: *Department of Marine Resources*

Of particular interest, approximately 16% of vessels that list the Port of Stonington, Deer Isle or Isle au Haut as their primary port reported a mailing address off the islands⁵.

Owners from the towns of Sedgwick, Blue Hill, Brooklin, and Sargentville also frequently utilize the Stonington or Deer Isle infrastructure.

To assist in capturing the fleet data, we also utilized data from National Marine Fisheries Service, the U.S. Coast Guard Vessel Documentation Center and the towns of Stonington, Deer Isle and Isle au Haut. The U.S. Coast Guard Vessel Documentation Center tracks vessels of 5 net tons or greater, and reported 66 such vessels with a homeport of either Stonington, Deer Isle or Isle au Haut in 2007.

The town of Stonington reports 57-documented commercial fishing vessels and 14 recreational vessels that provide excise tax of \$29,293.43 to the town. Additionally, Stonington reports that they collect \$12,630 in excise tax on State registered vessels.

⁵. The following towns were considered ‘on-island towns’: Stonington, Deer Isle, Little Deer Isle, Isle au Haut and Sunset

2.4 Businesses that Market the catch

In addition to the fleet of harvesters that are so prominent in Stonington, the lobster dealers (or first buyers) are an essential part of industry infrastructure in the town. There is very little secondary (published) data available for this component of the industry. Maine County Business Patterns identifies establishments that are engaged in Seafood Product Preparation and Packing as well as Fish and Seafood Merchant Wholesalers. However, this data is only available at the County level and would therefore provide limited information on the capacity in Stonington. Consequently, in order to capture the value of economic activity in the dealer sector, University of Maine researchers undertook a survey of Stonington lobster dealers between June 2008 and October 2008.

With the assistance of the Community Development Block Grant (CDGB) Advisory Committee, a list of eight lobster dealers who operate in Stonington was developed. All dealers were called multiple times, mailed a survey and many received in-person visits from University of Maine researchers in order to obtain information. Some individuals and firms on the list declined to participate. However, aggregate information obtained from the dealers is presented here, as this information assisted in the creation of the economic assessment of the lobster industry.

State data indicates that the total value of landings for Deer Isle and Stonington in 2007 was approximately \$30,000,000. This is approximately 40% of the total value of landings reported for Hancock County. State of Maine data records Stonington landings of approximately 8 million pounds in 2007 (DMR), while NMFS records Stonington landings of approximately 12 million pounds in the same year (NMFS). The average of

these two conflicting data points is 10 million, which also corresponds with anecdotal evidence provided by dealers in Stonington. Participants of the dealer survey account for approximately 7 million pounds of the landings from Stonington. Table 4 summarizes the aggregate information obtained from the dealers.

Table 4. Stonington Dealer Survey Participant Aggregate Information

	<i>Average Dealer</i>	<i>Aggregate Total (Participating dealers)</i>
Full Time Employees	5.8	29
Part Time Employees	5	22
Annual Payroll	\$180000	\$1.1 million
Non-Payroll Expenditures	\$620000	\$3.1 million
Pounds Handled	1.4 million	7 million ^a
Annual Price for 2007	--	\$4.35
Total Revenue	6 million	\$29.9 million

^a 7 million pounds were handled by the participants of the survey. We extrapolate to 10 million pounds for the remainder of the analysis

In addition to the business data provided above, participants also shared insights on some issues and opportunities for the lobstering community of Stonington. These insights are relevant to some of the mitigation options, which are presented in later sections of this report.

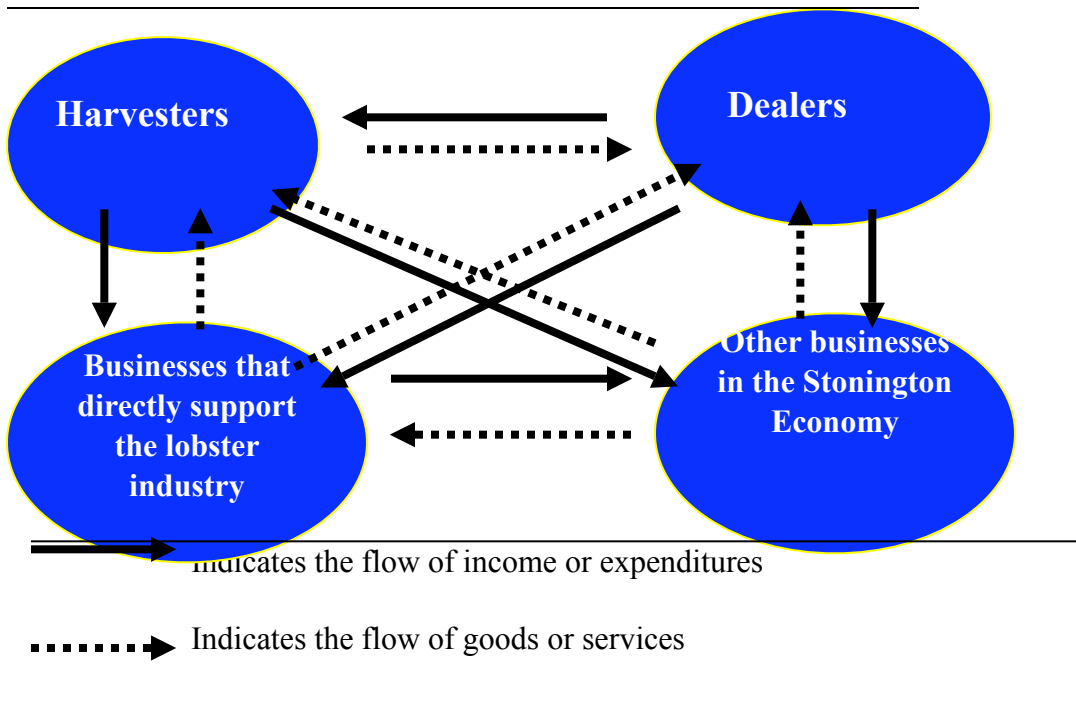
3.0 ECONOMIC ASSESSMENT

3.1. Methodology

The economic assessment of the lobster industry was modeled using the economic software Implan. Implan is a modeling system developed by the Minnesota Implan Group and is designed to track the economic connections between all industries in the economy. This model can be implemented at the national level or at a very local level such as Stonington. The model traces the effect of any one industry on all other industries and, through that, estimates the general level of economic activity. The interdependence of different pieces of the economy is a particularly important piece of the impact in a town level analysis such as Stonington's economy, especially if the suppliers to an industry are local establishments. The Implan economic model allows for estimation of the impact of changes in the lobster industry on the other businesses on the island that either directly (ex: maintenance, boat yards) or indirectly (ex: local restaurants that rely on local customers and their income) rely on this industry. As shown in Figure 7, these different pieces of the economy are tied together through transactions. For every flow of income or expenditures, there is a parallel and opposite flow of goods or services.

We used Implan to estimate the impact of the lobster industry on the Stonington area economy. The results will allow us to estimate what will happen to the greater Stonington economy with changes in the lobster industry, such as a decrease in landings, or decrease in the output of dealers.

Figure 7. Flow of transactions in the Stonington area economy



3.2. Industry Assessment

The value of lobster landings in 2007 for the municipalities of Deer Isle and Stonington were estimated to be \$30 to \$33 million dollars collectively, based on State of Maine Department of Marine Resource data. The primary question for the town is where, and to what extent, does this money circulate into the local economy?

Of the \$30 million dollars in landings, approximately \$25 million are spent on operating costs such as boat maintenance, purchase of equipment, etc. The remaining \$5 million is spent on labor and taxes, including proprietor's (i.e. fishermen's) incomes. Approximately \$2.5 million of the value stays directly in the local economy. Many of the manufactured goods that lobstermen purchase to maintain their operations are not

produced on-island. Thus lobster-landing dollars go to the service providers of these goods on-island but much of the money must go off island to purchase these products from the manufacturers.

Economic activity in Stonington is supported by the spending of businesses (indirect effects) and workers (induced effects) involved in the lobster industry. Table 5 reports the values of Stonington’s indirect and induced effects, which result from the lobster industry.

Table 5. Effects of Stonington’s Lobster Industry

<i>Source</i>	<i>Value</i>
Landings Value	Approx. \$30,000,000
Indirect Effects	\$2385285
Induced Effects	\$126943

An additional point of interest concerns where the spending from the indirect and induced effects is made. Table 6 shows approximate spending information for the \$2.5 million dollars of local activity generated by the lobster industry.

Table 6. Local Spending Activity

Sector	Proportion
Utilities/Construction	13%
Retail/Wholesale	58%
Finance/Insurance	1.3%
Real Estate	17%
Education/Health/Social Services	2%
Entertainment/Food	2%
Other Services	6%

The local lobster dealers also contribute directly to the local economy in the form of jobs and taxes, with their largest contribution to the local economy as the source of income for the local lobstermen when purchasing their landings. For each employee of a local lobster dealer 3.8 jobs occur in other places of the Stonington economy. Analyzing only the dealer contribution to the Stonington economy, for every one-dollar of activity generated by dealers (i.e. transactions), there is a six-cent impact elsewhere on the island, not including payments to lobstermen. This impact is due to payments to employees, who may spend some of their income locally, payments to the town in the form of taxes, and payments to service providers such as maintenance workers, who again may spend their income locally.

4.0 DESTABILIZATION OF MARKET FLOW

In commissioning the current project, the town was very cognizant of their heavy reliance on the lobster industry and thus was particularly interested in identifying factors that would negatively impact or destabilize the flow of fishing product in the town. The

sections below outline key challenges that the town faces in preserving a strong lobstering industry.

4.1 The cost of fuel, bait and other inputs

The costs of inputs are a significant cost to lobster harvesters. A report by the Gulf of Maine Research Institute (Holland 2008) indicates that fuel; bait and insurance (but not the cost of a sternman) consumed 25-30% of a harvester's gross during the 2005 season. Other costs, such as gear changes to meet new regulations, trap replacement; truck, boat, electronics and engine maintenance also consumed large portions of the harvester's gross. Given the current focus on the bait shortage, additional information on this factor is included.

4.1.1 Herring and Bait Shortage

For the past twenty years Gulf of Maine herring has been the principle bait used in the lobster industry. Prior to the establishment of the international boundary with Canada, the residuals from redfish processing (mostly Canadian caught fish) were the preferred bait. Figure 8 shows the historical landings from the Gulf of Maine, while Table 7 depicts the landings for 1996-2005 for the United States (with a New England breakout) and Canada. This data shows the large long and short-term fluctuations in herring abundance.

Figure 8. Gulf of Maine-Georges Bank Atlantic Herring Total Commercial Landings

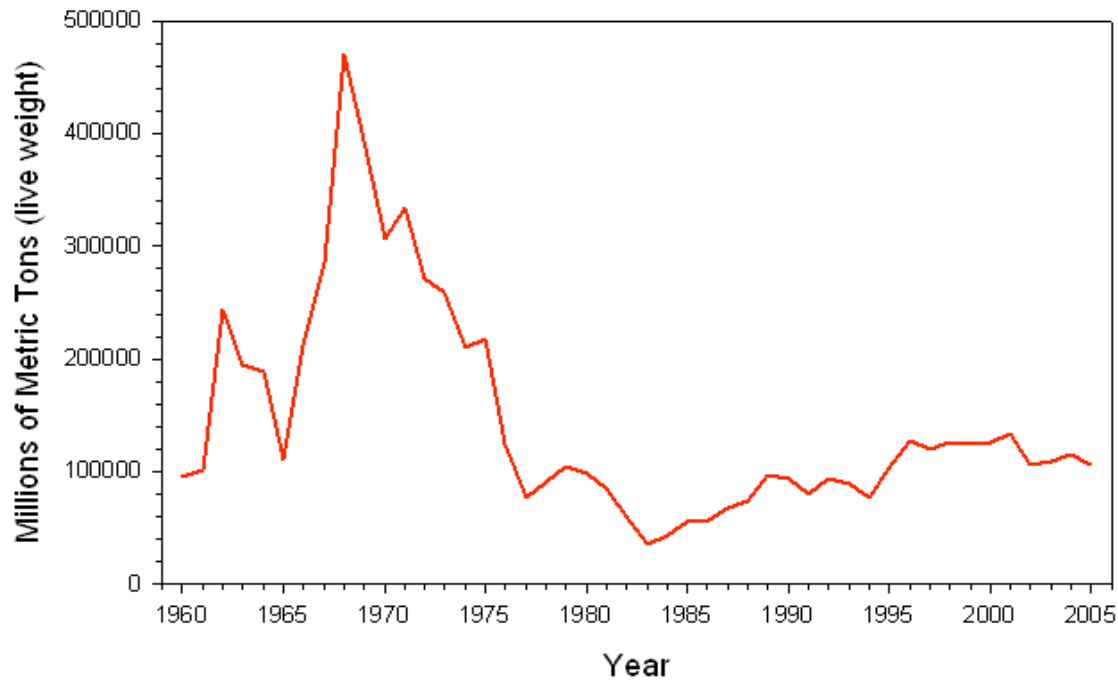


Figure reproduced from December 2006 Stock Assessment, TRAC 2006. Note that the very large landings in the 1960's and 1970's were mostly foreign fleet landings.

Table 7. Commercial Herring Landings, 1996-2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Canada	18	21	20	19	17	24	13	11	21	13
U.S.	109	99	106	106	109	108	93	101	94	92
New England	88	95	81	79	71	95	61	95	85	90
Total	127	120	126	125	126	133	107	110	115	105

Source: New England- NFMS, Canada and U.S. data- TRAC 2006

The variability of herring can also be seen from the stock assessment perspective.

Herring Biomass in the region hit a low of approximately 105,000 metric tons in 1982 but rebounded to approximately one million MT by 2005 (Figure 9).

Figure 9. Gulf of Maine-Georges Bank Atlantic Herring Trends in Recruitment and BioMass

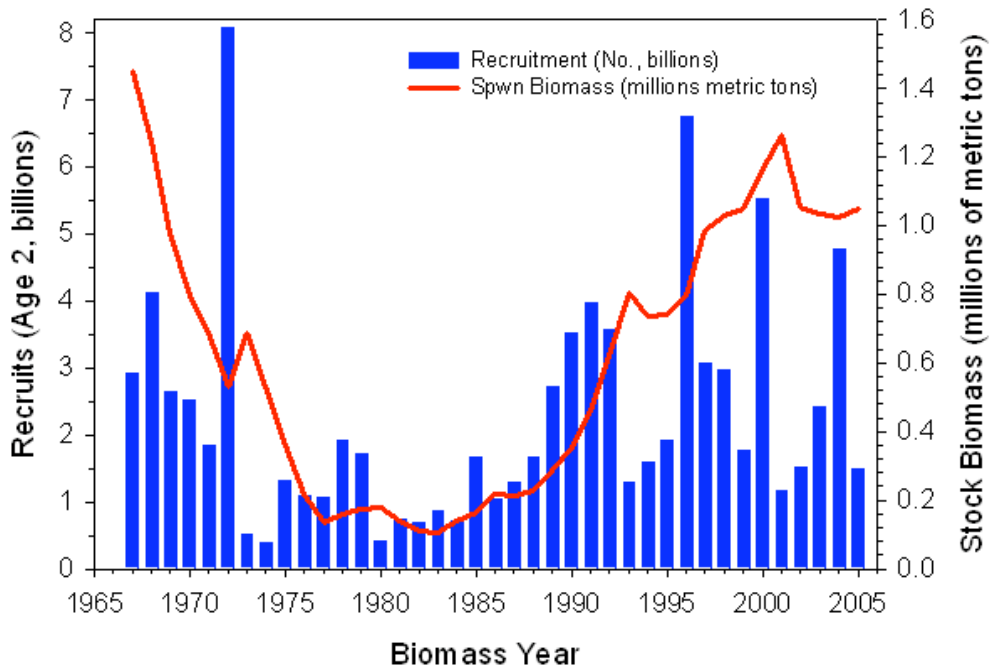


Figure reproduced from December 2006 Stock Assessment, TRAC 2006.

The recent shortage of bait can primarily be explained by changes in quota allocation. The Area 1A quota has been reduced by 32% over the last two years, from 60,000 metric ton (MT) in 2006 to 50,000MT in 2007 to 40,900 MT in 2008 (Maine Lobster Association, 2008). This quota change has drastically reduced the amount of fresh herring available to Maine lobster harvesters. Additionally, there are concerns that a lack of herring will mean stronger demand for other bait sources such as pogies, skins, cuttings and skate increasing the cost of these bait sources as well.

4.2 Decline in Value received for Product

Another threat identified is the fluctuating price received for the lobster catch. Per Figure 4, the real price (corrected for inflation) per pound for lobster declined continuously since

the 1970's. The price fell with the large increase in landings in the late 1980s but tended to stabilize with the growth of sales to processors. The current price per pound (approximately \$2.00+ per pound at the time of this report) is one of the lowest in decades. This price fluctuation has placed great strain on all members of the lobster industry.

4.3 Threats to Working Waterfront Infrastructure

Of Maine's 3,500 miles of coastline⁶ only 25 miles are currently working waterfront (Colgan, 2004). A 2002 study by Coastal Enterprises, Inc. (CEI) of 25 working waterfront communities found that Stonington has 79 miles of coastline and that 74% of current boat access in the town is used by commercial fisherman. In the 25 towns surveyed by the 2002 CEI study town managers and pier administrators were asked to discuss the greatest threats to commercial fishing access in their towns. The most prevalent answers were competition from tourism and residential boats, high property taxes and development pressures. Stonington was unique among these surveyed towns because the top reported threat was a possible decline in landings and the subsequent impact on the local economy. What this might mean for the survival of the local lobster dealers, and the maintenance of local business infrastructure was discussed at a May 17, 2008 fisherman's breakfast held in Stonington during an Economic Development Day. With decreased landings, local dealers may be unable to survive in the long-term and might be forced to sell their properties to the highest bidder, most likely an out-of-town

⁶ The actual length of Maine's coastline is a subject of ongoing debate. Agencies which measure the coastline may or may not trace all coastal inlets, bays, islands, etc. and therefore the number presented is but one measurement available for the size of Maine's coastline.

residential developer. There is compelling evidence from all along the coast that once a working waterfront transitions to residential use it does not revert back to fishing use.

An additional threat to the local infrastructure is the presence of out-of-town dealers buying fresh catch off the pier thereby removing these landings from the Stonington economic cycle. The current Commercial Fish Pier Ordinance for Stonington levies a one-time annual fee of \$2,000 for use of the Pier to collect landings. In levying this fee, the Town of Stonington must attempt to balance the potential benefits of new competition for landings from outside dealers with the potential harm of using public monies to essentially subsidize this competition. The use of the commercial pier by non-resident buyers for purchases of lobster and other fish poses a difficult policy problem for the town. Purchases by non-resident buyers tend to put clear price pressures on local buyers and for that reason are viewed, especially by fishermen, as healthy competition that benefits their economic well-being. At the same time, purchases by non-resident buyers result in very little, if any, additional local economic activity, especially when compared with purchases by local dealers who operate private wharfs and other facilities. Additionally, depending on the fees for use of the pier, the town runs the danger of subsidizing non-resident buyers at the expense of local buyers and local economic activity. In the long term, persistent subsidies in the form of very low pier fees could result in the permanent loss of working waterfront infrastructure. A reasonable town policy (i.e., one that balances the competition enhancing aspects of purchases on the pier against the risk of losing local infrastructure through unfair subsidization) should be informed by two numbers: (1) A good estimate of the implicit subsidy to non-resident

dealers (i.e., what infrastructure expenditures does a non-resident buyer avoid?) and (2) the potential loss to the local economy that results from sales over the pier rather than through local buyers. We cannot give an answer to the first, which is probably the most important question, but we can provide an estimate of the loss to the local economy. Information on pier-use fees levied by other municipally owned commercial piers is contained in section 5.3.

As part of the economic assessment we considered the role of the dealers in the greater Stonington economy, and how changes to the proportion of landings sold to local dealers would impact the overall economy. Our findings indicate that with the current situation, where 90% of lobsters are sold to the local dealers, a 10 million dollar increase in output would yield a \$16 million dollar total increase for the greater Stonington economy. If we change the circumstances, and assume that only 50% of the lobsters are sold to local dealers, a \$10 million dollar increase in output would lead to a \$13.5 million impact on the rest of the greater Stonington economy. This information may be valuable as the town evaluates future ordinance regarding pier fees for off-island dealers.

5.0 MITIGATION ACTIONS AND OPPORTUNITIES TO INCREASE LOCAL RETURN ON PRODUCTS

Even before the current international economic crisis the town was concerned about its heavy reliance on the lobster fishery. If the factors outlined above came to pass, i.e. decline in abundance and availability of herring used for bait, decline in consumer demand for lobster, decline in the population of lobster in the water, higher price of fuel,

diminished availability of financing and possibly other factors, the economic base of the town would be adversely affected; not just the lobster industry but other business that depend in on way or another on the lobster industry. Many of the most important factors that could adversely affect the industry are beyond the control of the local industry. An important question is whether there are steps that the town or the local industry can take that might soften the effects of the uncontrollable variation in the economic climate.

In the course of this project a number of ideas have surfaced regarding possible strategies that might mitigate (1) the current economic situation of the industry and town and/or (2) make the both more resilient over the long haul. However, it is important to note that mitigation actions can typically come in two forms: (1) actions taken by private individuals and (2) collective actions by the town and/or groups of individuals and businesses. This study cannot address actions that may be taken by private individuals, and therefore we address only collective actions that may be appropriate for the town of Stonington and/or industry to undertake.

5.1 The cost of fuel, bait and other inputs

5.1.1 Changes in fishing methods:

One of the original intentions behind the lobster zone council system was to give local industry groups the ability to act in a way that they might find beneficial without, at the same time, harming neighboring zones or fishermen within the same zone. Other Maine lobster communities (Tenants Harbor, Swans Island and Monhegan) are considering or have adopted trap reductions in order to mitigate the costs of fuel and the availability and

price of bait. Fishermen on Monhegan, in collaboration with the Maine Department of Marine Resources, recently participated in experiments designed to better understand the economic and biological effects of differences in trap densities. Briefly described, the experiment took place in September of 2006 at a time when the exclusive fishing zone around Monhegan was closed to commercial fishing. During the experiment, different areas were fished with different trap densities. The difference in catch rates between the areas with low trap rates and the areas with triple the number of traps was approximately 15%. The decreased number of traps, and fewer days spent on the water led to lower fuel and bait costs. The cost savings in comparison to the reduction in catch suggest, but don't conclusively prove, the possibility of large cost savings and conservation benefits if a way can be found to equitably reduce trap numbers.

The questions raised by these experiments are: (1) If traps numbers were cut by about 60% (from 800 to 300 as on Monhegan) and if catch falls by only 15%, would there be potential savings in trap costs, bait, fuel and/or time on the water that more than offset the decline in catch, in other words would costs decline by more than 15%? How might fishing methods adapt to a change in trap numbers, i.e. would there be less 'camping out' and fewer set-over days? (2) Are the results from Monhegan comparable with what might be expected in Stonington? And, (3) if the answer to this question is yes, is there a way to design the reduction in traps so that the burden is shared equally? And (4) if the answer to the comparability question is no, is there a way to design an experiment that might determine whether or under what conditions trap reductions might lead to economic benefits for Stonington lobstermen?

Discussions with members of Stonington’s lobster community raise concerns about the relevance of the Monhegan experiments to the Stonington area. First, members of the lobster community indicated that Stonington’s lobster industry is very different from Monhegan, in size, infrastructure and external forces (for example, harvesters coming from off-island). Second, the behavior of lobsters in the offshore environment of Monhegan is likely very different from the behavior of lobsters in the Stonington area simply because of the local geography. For example, it is possible that lobsters ‘move through’ the Monhegan area whereas lobsters in the bays around Stonington might be more sedentary. If that were the case (and this report does not purport to know if it is) then Monhegan fishermen would not notice a fall-off in catch as they fished a local area, but fishermen in Stonington might. These differences between Stonington and Monhegan must be addressed before pursuing this option further. A well-designed experiment that is appropriate to the Stonington area is probably the only way to determine whether Monhegan-like results would occur in Stonington.

Finally, with the current very low price per pound harvesters may feel more effort, rather than reduced costs, is what is needed to make income similar to previous years. In this economic climate, trap experiments may be seen as ‘trap limits’ preventing harvesters from expending the additional effort they believe is needed.

5.1.2 Community Involvement

Stonington may have the opportunity to assist harvesters with input costs at the community level. A community loan fund may be established to assist lobstermen during

times of transition (for example: gear change), or to subsidize inputs such as fuel or bait. The increase in seasonal residents may provide an opportunity for a town-level real estate transfer tax to be implemented, with proceeds earmarked for the community loan fund. An example of such a tax would be for any real estate transaction over the amount of \$200,000 a 1% transfer tax would be assessed. Seasonal residents may be willing to support this fund via the transfer tax as a means of preserving the traditional Stonington community that attracted them to the area. The town may also choose to work with the Maine Department of Marine Resources to connect fishermen with State agencies and private banks that might be able to renegotiate loans, or offer other financial options.

5.2 Decline in Value received for Product

5.2.1 Pounding

Increased use of pounds has been suggested as a possible response to the current economic situation, however pounds may be a limited option at this time for the Stonington area. Pounds are utilized as a means of meeting off-season demand, and to take advantage of seasonal changes in prices. Herb Hodgkins, former President of the recently disbanded Maine Lobster Pound Association kindly provided data on the extent of pound use in Maine as well as some of the challenges faced by his former members. Additional information regarding pounding was obtained from area pound operators. It is estimated that approximately 65 to 70 lobster pounds, owned by 55 businesses operated in Maine in the late 1990's. These pounds held between 4 and 4.5 million pounds of

lobster annually. In the seventies and eighties upwards of 8 million pounds may have been held (including many Maine caught lobsters that were pounded in Canada). In comparison currently it is estimated that only 15-20 pounds are in operation, storing only 1 to 1.75 million pounds annually. Mr. Hodgkins and pound owners point to the recent increase in disease outbreaks and recent limited price differential between seasons as primary reasons why pound owners are choosing to leave the industry. Members of Stonington's lobster community indicated that shrink of 15-18% in the pounds were not uncommon. With respect to price, the cost per pound of storing a lobster is approximately \$1.10. While pound keepers may be able to sell a few of their lobsters at prices of \$8.00, they begin to accept prices of \$5.50 as a means of trying to match their investment in input costs. Pounds find themselves in a position of selling at cost in an effort to break even.

5.2.2 Increase Return on Product/ Value Added

As the town investigates options that may mitigate some of the challenges facing the industry, discussion also centered on the possibilities available to receive a larger return on the harvesting and dealer investment, in the form of a higher price, for the sea products landed and processed/packaged in Stonington. Two main ideas emerged from these discussions: 1) A collaboration of dealers to sell lobsters to a single source (ex: Canadian producers) in order to benefit from collective bargaining and economies of scale and 2) Branding or marketing of the Stonington name as a source of highest quality American Lobsters.

1) Collaboration

The idea of a collaboration of harvesters and dealers, gathered under a single umbrella to create leverage in selling Stonington lobster as a collective unit, is not a new idea to the Town of Stonington. However, throughout this project opportunities have presented themselves to further identify the steps needed to consider this option. First, the U.S. – Canadian exchange rate is a potential issue given the high volume of sales between Stonington and Canada. Through colleagues at the Lobster Institute, this research team has made contact with a Canadian processor, who currently purchases Stonington lobster, interested in discussing a potential partnership. The processor would be interested in purchasing Stonington’s entire product in a partnership arrangement, where Stonington would be invited to make investments in this Canadian facility. The facility is situated in an area with a large labor pool. Additionally, dealers would have access to supplies of live Canadian lobsters during the off-season to satisfy consumers when the Stonington harvesting season ended. Further discussion of this potential is likely best left directly to the town and the processor in question, however the University of Maine research team is available to assist in making the appropriate contact.

In presenting the above collaboration option to members of the Stonington Lobster community, community members shared valuable insights that would need to be considered should the town choose to move forward on this option. First, the various Stonington based dealers have existing relationships with different processors, which may inhibit the development of a new collaborative. Second, some dealers have limited interest in such a collaborative because a low percent of their product goes to Canadian

dealers currently. Third, as mentioned above there have been previous efforts at collaboration among Stonington dealers, in one case to jointly supply bait: this previous effort was unsuccessful. In order to move forward on collaboration, explicit contracts with penalties and provisions would need to be drawn to prevent individual dealers from joining the collaborative, but then removing their product from the collective pool. These trust and transparency issues must be addressed should the town or the industry choose to move forward on this opportunity.

A potential collaboration that the town requested additional information on was investment in a Stonington based processing plant. One feasibility issue that arises with this potential is the depth of the labor pool. Deer Isle/Stonington has a limited labor pool from which to draw should a new processing plant be built. Additionally, due to the lack of affordable housing on the island it may be difficult to attract workers from other regions to a Stonington based plant. A second step in identifying the feasibility of a Stonington based processing plant is a suitable location, given that large land tracts are a precious commodity in Stonington, particularly if located near the working waterfront. One potential site is the large tin building located in Webbers Cove off Ocean Drive. The land is currently owned by an out of town entity, and is valued at approximately \$176,500 with a shore frontage of 300 feet. The large building also located on the site is valued at approximately \$140,400 for a total of \$316,900. Clearly the town or private entity would need to identify a group of suitable investors and address the labor pool issue prior to pursuing this opportunity.

2) Branding and Consumer Education

The idea of branding or marketing the name ‘Stonington’ revolves around the potential for customers to distinguish between similar products, and reveal a willingness to pay a price premium for a product that is considered of higher quality. In order for this value enhancing idea to begin working for Stonington, the traditional habit of harvesters identifying themselves by what dealer they sell too, would need to diminish. In order to pursue the ‘Stonington’ brand, the community would have to provide a united front across all harvesters and dealers. To provide information to the citizens of Stonington on this potential, information on current and proposed brands in the fisheries industry was collected and included below.

- Fresh Catch Initiative

Other Maine communities have already undertaken initiative to utilize branding in an effort to increase their return on harvesting investment. One example of this is the ‘Port Clyde Fresh Catch Initiative’ implemented during the Spring/Summer of 2008. Port Clyde Fresh Catch is an initiative of the MidCoast Fisherman’s Association designed as a Community Supported Fishery to consistently supply whole fish to local restaurants.

They tout two primary attributes of the product in their marketing: freshness and support of local, sustainable traditional fisheries. The Fresh Catch Initiative team was kind enough to provide information for this current report on their initial findings on the success and challenges of using a collaborative and branding in marketing catch.

The Fresh Catch Initiative team indicates that a key component of their success is the ability to deliver high quality, consistent product at the same time each week – exactly

in keeping with their advertising. This consistency allows their restaurant consumers to plan menus and purchases from other vendors based on the delivery from Fresh Catch. Their ability to deliver is in turn a function of a second key component of their success: a delivery and distribution coordinator. The Fresh Catch team indicated that the manpower required to set up delivery routes and develop a customer base could be truly daunting. While the addition of new customers and routes is exciting for the team, the benefits of an addition must always be weighed against the cost of further work for the team and whether the current delivery infrastructure can handle the additional stress.

As the Fresh Catch Initiative was a new endeavor this summer, the costs of starting and maintaining the project have not yet been quantified. Additionally, the team indicated that no ‘feasibility’ studies were conducted prior to the implementation of this project and therefore they were unable to share this information with this current effort. Penobscot East, which works closely with Port Clyde, began a pilot program with shrimp this winter that might possibly be expanded to other species. It may be in the best of interest of Stonington to maintain contact with the Fresh Catch Initiative to learn of additional successes and challenges in using branding as a marketing technique.

- Ready Seafood

Ready Seafood out of Portland has initiated a program called “Catch a Piece of Maine” where consumers from across the nation ‘buy’ their own lobster trap, where the purchaser will be shipped every lobster caught in their trap. *“Each FedExed shipment of four or more lobsters comes with a pound each of steamer clams and mussels, lobster bibs,*

cooking instructions and a primer on Maine's sustainable lobstering practices" (Chu, 2008). Ready Seafood currently offers a 40-cent premium to harvesters who participate in the program.

Stonington may wish to pursue the avenue of branding and consumer education to enhance the value of landings for Stonington lobster. Stonington resident Ingrid Bengis notably uses the 'quality of Stonington' in describing her brands. Additionally, many restaurants, which utilize Ms. Bengis' products, include either her name or 'Stonington' on the menu. Thus the quality of Stonington sea products has already begun to be established and may be an avenue for Stonington to receive greater value for their landings. Another idea that was vocalized during data collection for this project was the idea of investing in marketing of the 'Stonington' brand collectively across all seafood products harvested and processed in Stonington. Once again members of the Stonington Lobster community provided insights into some considerations that must be included in discussions of this opportunity. First, a need was identified for a baseline goal of committing a certain number of pounds (ex: 200,000) to this joint effort in the first two years. Transparency was also identified as a key component, where those responsible for the Stonington brand would need to be able to show the change in price received for branded products in relation to the amount spent on advertising. A sense emerged from the lobster community that the Town government's role should likely be limited to facilitation of the initial discussions necessary to set up such an entity.

Concerns about quality incentives were also voiced. Given that the basic idea behind 'branding Stonington' would be to permanently associate Stonington products

with quality, there would need to be a mechanism that would ensure consistent high quality (i.e. inspection, certification, etc.). Without assurances of a reliable method for enforcing quality standards the threat of a free rider devaluing the brand would discourage most potential participants. A lesson from historical branding efforts is worth recalling: In the 1980's U.S. dealers began selling lobster in Europe, branding them 'Maine' lobsters. These dealers failed to maintain the quality of their product. As a result anyone selling Maine lobster in Europe faces a potential disadvantage in the market. In short, the cost of failure in a branding effort can be very long term. Finally, one of the selling points for such a product may be assuring the consumer that the purchase of Stonington quality product also preserved a sustainably harvested traditional industry. An opportunity may exist to include many of Stonington's other wonderful characteristics (i.e. history, scenery, year-round community) as a method of enhancing consumer enjoyment of Stonington seafood products, much like the Fresh Catch Initiative and Ready Seafood currently do.

With respect to this idea, Stonington may also wish to contemplate a relationship with Maine's 'Lobster College' and consider how to invest in infrastructure such that the Lobster College and other culinary events may be held in the town.

5.3 Threats to Working Waterfront Infrastructure

As noted above, concern exists that the survival of the working waterfront infrastructure is closely tied to the fate of the local dealers. One threat to the dealer infrastructure was the out-of-town dealer doing business from the commercial pier for a fee of \$2,000.

Given the concerns surrounding this issue, the town may wish to consider revising the pier fee structure to ensure that any out-of-town dealer contributes to the town in a manner similar to the existing dealers, so that the town does not inadvertently subsidize business in a way that diminishes the value of economic activity in the town itself. To assist the town in this endeavor, information was gathered from other Maine towns that are heavily reliant on their commercial fish piers to provide access for their fishing fleet. The City of Rockland, Maine also maintains a publicly owned commercial fish pier. The city currently charges an annual fee of \$9,000 or \$16,000 plus any electrical expenses, to any entity using a lobster buying station. The price is dependant upon the size of the operation, where \$9,000 is for one permit area only and \$16,000 for two permit areas. The town notifies the public of the opportunity to purchase permits during the fall, for permits that will cover from January 1 to December 31 of the year. The permit notification must be in the local paper for 45 days. The town currently offers four such buyer stations, but at this time one-entity purchases 3 of the 4 spots. The town of Vinalhaven also has a fee schedule for seafood dealers who operate off of their publicly owned commercial fish pier. The town has established a one-cent per pound fee for any entity purchasing product off the pier, where this fee includes the use of a hydrolic lift. The town briefly had one entity intending to purchase landings in this manner, but the business subsequently purchased permanent infrastructure. Of course, off-island buyers find it much less convenient to buy on Vinalhaven than they do in Stonington.

The city of Eastport, in contrast, does not currently charge for use of the commercial pier to purchase local product. The Eastport fish pier is a municipally owned facility,

with a 25-year lease to the Port Authority for management of the facility. Currently, during scallop season, one or two entities purchase product directly from local harvesters right off the pier. However, the pier management considers this a service to the local harvesters, because there is no local infrastructure to purchase these scallops, and therefore does not charge a fee. Additionally, there are no ‘services’ associated with this on-pier buying (i.e. no electricity utilized, no lifts), just trucks on the pier. With respect to lobster landings, a majority of the landings are sold directly to local restaurants and there is currently no on-pier buyer for this product (and no associated fee).

Another large municipally owned pier facility is the Portland Fish Pier. The city of Portland owns the Pier, however the pier is currently a financially independent entity which rents the pier buildings (primarily for marine uses and services) to cover costs, and receives no subsidy from the city. The other source of revenue is paid parking permits. Currently all product landed in the port of Portland must be sold on the fish exchange, and therefore there is no ‘pier fee’ for buyers. Any entity can participate in the fish exchange purchase process provided they pay the appropriate buyer fees charged by the auction. Given the information above, the town of Stonington may wish to carefully consider their fee schedule for the commercial fish pier.

As noted earlier the potential also exists for Stonington to develop a community loan or preservation fund to assist member of the lobster community. This type of entity may also be able to assist with community preservation issues, such as purchasing waterfront land for the public in lieu of seeing the land sold to a private entity that may restrict access.

6.0 SUMMARY

The information included within this report serves as a benchmark for this industry, upon which future analysis can be used for comparison. This project was initiated as a means to not only understand the current state of the lobster industry in greater Stonington, but also to identify potential actions that the community could take to mitigate potentially destabilizing forces in the industry, including opportunities to increase the return on fishing products landed in Stonington. This report identified three primary threats to the health of the Stonington lobster industry, and provides potential mitigation options. Table 8 is a brief summary of the threats identified and potential mitigation options, which the town may wish to pursue.

Table 8. Summary of Identified Threats and Potential Mitigation Options

<u>Threat Identified</u>	<u>Potential Mitigation Option</u>
<ul style="list-style-type: none"> Increased costs of harvesting, including bait shortages 	<ul style="list-style-type: none"> Changes in Fishing methods, including trap experiments Community Loan fund, potentially funded by real estate transfer tax
<ul style="list-style-type: none"> Decline in Value of Landings 	<ul style="list-style-type: none"> Use of pounds (limited) Collaboration of dealers, to take advantage of economies of scale and collaborative bargaining Branding and Marketing of Stonington as source of high quality sea products (examples: Fresh Catch of Port Clyde, Ready Seafood of Portland)
<ul style="list-style-type: none"> Threats to working waterfront, including depletion of waterfront infrastructure with loss of local dealers 	<ul style="list-style-type: none"> Reconsider pier fee schedule for on-pier purchasing Community Loan fund for purchase of working waterfront lands

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Maine Department of Marine Resources

- 1) Historic Lobster Landing and Value by County 1964-present
- 2) Lobster licenses by Zone: data received February 11, 2008.
- 3) 2007 Licenses: data received from Carl Wilson, August 5, 2008.

4) Maine Lobster Zone Council Districts 2007-2008

→ District data available at: <http://www.maine.gov/dmr/council/lobsterzonecouncils/LZCVotingDistrictList2007-2008.pdf>

→ District Map available at:

<http://www.maine.gov/dmr/rm/rov/zonecbig.jpg>

5) Vessel Anchorage: data received from Keith Fourgere. Phone conversation regarding data requested, and potential limitations on August 7, 2008. Data received August 12, 2008.

Maine Lobster Association

- 1) Email dated September 19, 2008 from the MLA to its membership entitled 'Herring Update'.

Maine Pounding Association. Herbert Hodgkins, Former President. Phone conversation August 1, 2008. Use of information contained in these conversations is used with the generous permission of Mr. Hodgkins.

National Marine Fisheries Service

- 1) Port rankings by year, based on dollar value of landings

http://www.st.nmfs.noaa.gov/st1/commercial/landings/lport_year.html

- 2) Historic Lobster Landing and Value 1950-present: [http://](http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html)

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Appendix A: Economic Assessment Technical Notes

To develop the economic assessment described in this report our research team needed to customize a model appropriate for the Stonington area economy. Implan modeling is available at the very local level, corresponding with zip codes, however recognizing that the economic impact of the Stonington lobster industry is felt island wide, we elected to use a modified Hancock County level of detail. We took the following steps in customizing this model.

1. Employment

Using Implan we studied the ratios of output to employment in industry sectors and reapportioned these ratios so that they were appropriate to the Stonington island economy. To obtain the output and employment ratios, both secondary (i.e. from state or county sources) and primary data (from the dealer survey) were utilized. For information on total employment in Stonington the Maine Department of Labor indicates that 494 citizens are employed in Stonington, which is consistent with Census data reported earlier. However, when combined with County Business Patterns, the establishments located in Stonington are estimated to only employ 300 people. We must therefore assume, that 100 of Stonington's workers do not work for businesses located in Stonington itself. Additionally, County Business Patterns indicate that there are 270 people employed in the town of Deer Isle, but this does not include people who are self-employed. This employment data helped us to determine the number of local workers in each sector of the greater Stonington economy. We were then able to utilize the output

per worker ratios to determine the output per worker in each sector of the economy at a ratio appropriate for Stonington. We also utilized Stonington level data regarding the lobster landings, the number of harvesters in the lobster fleet as well as the number of employees and output associated with the lobster dealers.

2. Regional Purchase Coefficients

In order to achieve the proper model adjustments, we also had to reappportion the Regional Purchase Coefficient (RPC) assumptions inherent in the base Implan model. The RPC indicates what percent of a business' purchases are local. Stonington area dealers indicated in survey results that approximately 90% of the lobsters they handle come from local harvesters that use Stonington as their primary port. The dealers also tend to utilize local service providers for maintenance of their infrastructure and for other management services. Thus the RPC's for these sectors were adjusted to reflect the almost exclusive use of local establishments.

To begin the analysis we focused on the industry sector associated with the dealers, Seafood Product Preparation and Packaging. This choice was made as the landings from Stonington flow almost exclusively through local dealers. This allowed us to track the economic contributions of the entire industry, as well as the dealers as a separate component. Based on the fact that local landings are valued at approximately \$30 million dollars, we assumed that \$28 million in lobster was purchased locally by the dealers, to allow for small leakage (i.e. 5%) of local lobsters away from the dealers. This assumption only reflects the 5% of lobsters not sold to local dealers because they are sold

or gifted to family/friends or directly to other local establishments (i.e. restaurants). It does not account for the sale of an unknown quantity of Stonington landed lobsters to off-island dealers as may have occurred in summer of 2008. This situation, and its impact on the island economy will be discussed in section 4.3 of the report.

We assumed that dealers purchased \$30.5 million in lobsters, to allow for some purchase from non-local harvesters during the off-season. These inputs then resulted in \$42.8 million in output based on aggregating the survey results to the remaining dealers that chose not to participate in the survey⁷. Additional information provided by dealers also assisted assumptions made during the modeling process, for example dealers indicated that approximately 40% of lobsters handled by Stonington dealers go out of the country (i.e. Canadian or European markets).

⁷. Survey participants accounted for only 7 million pounds of landings, of the expected 10 million typically landed in Stonington. Given that survey participants reported \$29.9 million in output, we aggregated to \$42.8 million to account for the missing 3 million pounds of lobster.

SUPPLEMENTAL LOBSTER BAIT ANALYSIS
FOR STONINGTON, MAINE

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Prepared by:

Benjamin H. Urquhart.
School of Economics
University of Maine

Roshan Ranshinge.
School of Economics
University of Maine

George Criner, Ph.D.
School of Economics
University of Maine

Advised by:

James Wilson, Ph.D.
School of Marine Sciences
University of Maine

| **Introduction**

This study is a follow-up study of the report “Stonington Lobster and Fishing Industries: Infrastructure, Challenges and Opportunities” (Noblet, Wilson & Allen-2009). There are two parts to the study: (1) an analysis of the costs of storing bait either by leasing or by building one’s own facility. The analysis includes spreadsheets that allow Stonington fishermen and dealers to analyze costs given their sense of future bait prices and availability, and (2) a description of the costs and principal considerations associated with the building option.

Part I: Bait Storage Options

The recent herring stock assessment figures and expectations for 2010 and later indicate a high probability of persistent bait shortages. Next year supplies from the Gulf of Maine and from the whole of New England are expected to be approximately half of what they have been this year. There appear to be three ways the industry can adapt to these circumstances: (1) Bait can be imported or alternatives to herring can be found, e.g., menhaden, fish racks or mackerel; (2) individuals or companies can try to corral and store bait early in the year, and (3) fishermen can find ways to reduce their dependence on bait through changes in fishing methods.

It is reasonable to assume that a large part of the lobster industry in New England will respond to the recent assessment by purchasing bait early and freezing it. Consequently, unless reasonably priced imported bait can be found, demand for New

England caught herring will shift to earlier in the year (as people race to fill their storage), closures will occur earlier or more frequently, supplies will fall and prices will rise (augmented by the costs of storage). In effect, a potential “race for bait” could result in extremely unfavorable economic results for the industry as a whole.

Stonington industry will not be able to insulate itself from these trends, but it should consider how it might best participate in that race (as individuals and/or as an industry coalition) and the steps it might take to minimize the bad effects of the race locally and for the whole industry. (1) Storing New England caught or imported bait is probably a necessity (especially if everyone else in the industry is storing); (2) individually or through the zone C council it may be possible for fishermen to change fishing operations in a way that minimizes bait dependence, and (3) it may be possible through the Federal management processes to alter the harvest rules in the herring industry in a way that minimizes the need for storage of bait by matching herring supplies with lobster industry demand.

Herring storage costs — spreadsheet analysis

There are a number of questions that are important when considering the storage of bait:

- What are the costs of storage?
- How much needs to be stored?
- When should bait be purchased for storage?
- What happens if bait is stored and there is no closure?

- What will prices (weekly, monthly, annual) look like given the new assessment figures?
- How much will prices ramp up as it becomes clear that a closure is imminent?
- Should storage space be leased or built?
- What is the availability of existing storage?
- What will be the volume, price and impact of imported bait?

Answering these questions with any degree of precision is difficult because of the uncertainties created by rapidly changing circumstances in the bait market. In this kind of situation, probably the most reasonable way to get a clear view of whether it is wise to store bait (or not) is to develop a ‘what if’ analysis that can be refined or up-dated as relevant information becomes more certain. For this purpose we developed two spreadsheets, one intended for leased or rented storage and one for a special built storage facility. (Considerations specific to each ‘option’ are discussed in limited detail in Part II: Bait Storage Cost and Considerations). Each spreadsheet is intended, as a decision making tool that will help estimate the costs and benefits of bait storage. The spreadsheets are written in Excel; a printed version of the ‘lease option’ appears below; a digital copy can be obtained from the town manager’s office.

Table 1. Lease Option Assumptions	
Pounds per Tray	120
Pounds per exactic	2000
Exactics/delivery	20
Storage Rate (\$/100 lbs)	\$0.65
Storage Handling Rate (\$/100 lbs)	\$0.67

The spreadsheets can be used in two ways: (1) as better information becomes available that information can be plugged in at the appropriate places in the worksheet in order to refine estimates of the costs and benefits of storage. Or (2) in the absence of solid data, it is possible to ‘play around’ with various assumptions about prices, closures and a variety of other things in order to explore possible scenarios. For example, say it becomes apparent that large numbers of dealers/fishermen intend to store bait in the spring and early summer of 2010. This can be expected to drive prices upward with possibly serious implications for Stonington (or for a particular dealer or fisherman). The spreadsheet can help the user get a better idea of these implications and how to respond. The user simply plugs in his best estimates of likely prices and then ‘plays around’ with different storage strategies. The spreadsheet will calculate the bottom-line costs of storage; but it will not provide an interpretation of what those numbers mean. A dealer who has cultivated clients who depend on steady supplies of fresh lobsters will interpret

Table 2. Lease Option: Closure expected

Month	Expected Price	Stock		Storage Inventory (lbs)	Storage Costs	Storage Handling Costs	Total Storage Costs	Bait Purchase (-) / sale (+)	Net Costs (-) / Income (+)
		In / Out (cks / month)	In / Out (lbs / month)						
Jan	0.15	0	0	0	\$0		\$0	\$0	\$0
Feb	0.15	0	0	0	\$0	\$0	\$0	\$0	\$0
Mar	0.15	0	0	0	\$0	\$0	\$0	\$0	\$0
Apr	0.18	4	160000	160000	\$0	\$0	\$0	-\$28800	-\$28800
May	0.18	4	160000	320000	-\$1040	\$197	-\$843	-\$28800	-\$29643
Jun	0.22	10	400000	720000	-\$2080	\$197	-\$1883	-\$88000	-\$89883
Jul	0.22	1	40000	760000	-\$4680	\$601	-\$4079	-\$8800	-\$12879
Aug	0.26	0	0	760000	-\$4940	\$60	-\$4880	\$0	-\$4880
Sep	0.26	-19	-760000	0	-\$4940	\$0	-\$4940	\$197600	\$192660
Oct	0.26	0	0	0	\$0	\$0	\$0	\$0	\$0
Nov	0.26	0	0	0	\$0	\$0	\$0	\$0	\$0
Dec	0.22	0	0	0	\$0	\$0	\$0	\$0	\$0
		0	0		\$17680	\$1055	\$16625	\$43200	\$26575

those numbers in a way that is very different from a dealer supplying an impersonal wholesale market.

The critical assumptions for these calculations are contained in the light yellow shaded cells. We have filled in our best guesses about prices, storage rates and the other assumptions simply to provide an example. Storage and handling rates will vary by facility and, as the full impact of the assessment and management policy becomes clear, prices will change. The row labeled “[Expected Prices](#) is particularly important. “Expected prices” summarize the user’s intuition about all the important events that affect the bait market, e.g., an early closure of the herring fishery, the amount of bait competitors are storing, the volume of bait imports and a variety of other factors. The column labeled “[Stock In/Out \(trucks/months\)](#)” (i.e., the amount of bait put into and taken out of storage on a monthly basis in terms of the number of deliveries from the storage facility predicated on the number of Exactics shipped and their capacity in pounds) is important because this allows the user to enter data representing his response to anticipated changes in prices or the time of a closure. In other words, the only way the user can respond to the market is to change the amount or timing of bait put into and taken out of storage with special regard to having it available for use (i.e.- ‘delivered’); this column allows a ‘best’ storage strategy to be explored (see below).

We filled in the spreadsheet to reflect deliveries in truckloads of 20 exactics. If another amount is appropriate the ‘Exactics/delivery’ should be changed appropriately.

Table 3. Lease Option: No closure expected

Month	Expected Price	Stock		Storage Inventory (lbs)	Storage Costs	Storage Handling Costs	Total Storage Costs	Bait Purchase (-)/sale (+)	Net Costs (-) / Income (+)
		In / Out trucks / month	In / Out (lbs / month)						
Jan	0.15	0	0	0	\$0		\$0	\$0	\$0
Feb	0.15	0	0	0	\$0	\$0	\$0	\$0	\$0
Mar	0.15	0	0	0	\$0	\$0	\$0	\$0	\$0
Apr	0.18	4	160000	160000	\$0	\$0	\$0	-\$28800	-\$28800
May	0.18	4	160000	320000	-\$1040	\$197	-\$843	-\$28800	-\$29643
Jun	0.22	10	400000	720000	-\$2080	\$197	-\$1883	-\$88000	-\$89883
Jul	0.22	1	40000	760000	-\$4680	\$601	-\$4079	-\$8800	-\$12879
Aug	0.22	-5	-200000	560000	-\$4940	\$60	-\$4880	\$44000	\$39120
Sep	0.22	-5	-200000	360000	-\$3640	\$0	-\$3640	\$44000	\$40360
Oct	0.22	-5	-200000	160000	-\$2340	\$0	-\$2340	\$44000	\$41660
Nov	0.22	-4	-160000	0	-\$1040	\$0	-\$1040	\$35200	\$34160
Dec	0.22	0	0	0	\$0	\$0	\$0	\$0	\$0
		0	0		\$19760	\$1055	\$18705	\$12800	-\$5905

Using the Spreadsheet

The spreadsheet is designed to help explore different possible scenarios under a “Leasing” or “Building” option. For example, the spreadsheet example in figures 2 and 3 is set up to answer the question: “what if 380 tons (19 truck loads) of bait is stored in anticipation of a closure and (1) the closure happens or (2) the closure doesn’t happen?” Or put differently, “when is the best time to start storing bait in preparation for a closure and what is it going to cost if it turns out there is no closure?” Using the spreadsheet, it is possible to generate an idea of cost given either possibility under specific assumptions. Starting with knowledge of the industry’s structure and history, a user can determine a reasonable ‘guess’ or ‘estimate’ about current market conditions and likely future developments. These estimates can be adjusted to produce various scenarios including those that anticipate the most extreme or unlikely circumstances for worst case analysis.

To compare likely outcomes with and without a closure:

1. Start with the assumption there will be a closure [Table 2 printed above. Or on digital version of the spreadsheet, go to the “Lease Option” tab (bottom left) in the Excel spreadsheet and chose the ‘closure expected’ table.].

2. Fill-in the assumptions about poundage, storage rates, etc. as in Figure 1 above.

3. Use the most current knowledge of the market to determine a likely set of monthly prices with a closure:

- Put those prices in the column labeled ‘expected prices’. [In figure 2 above we filled-in 15, 15, ... , 26, 22]

- In the next column, fill in a storage strategy, i.e., “Stock In/Out (trucks/months)” for each month. [We filled in 0,0,0,4,4, ...]

- The spreadsheet then calculates the costs of storage and handling, the cost to purchase bait, the revenue from bait sales, and a bottom-line estimate of the total costs of the strategy.

- Different possibilities can be explored simply by filling in different sets of monthly prices and storage strategies. ‘Exploring’ the data this way will provide the user with a fairly good idea of what kind of storage strategy to pursue.

4. The same kind of exploration can be done in the second table - “no closure expected”. Fill in and explore expected prices and storage strategies based on the assumption that there will be no closure. Comparing the two tables gives the user a better perspective on what the market is likely to do and his best responses.

5. Any number of possibilities can be explored. For example, what would be a likely outcome if everyone anticipated a closure and it didn’t happen? What would be the costs of incorrectly anticipating the closure? By filling in an appropriate set of prices and a storage strategy (i.e., “in/out, trucks/month”) the spreadsheet will give a rough estimate of the likely outcome.

A similar procedure using the “Building Option” tab of the spreadsheet will generate cost analyses under various scenarios for a “Bricks and Mortar” approach to storing bait locally. A systematic and documented approach is recommended for all analyses.

Part II: Bait Storage Considerations

For this study, two different sized refrigerated units were considered to estimate storage costs: one small (108,000 lbs) and one large (438,000 lbs). Each size would have a storage area ceiling height of 12 ft. that would allow for the vertical stacking of three (3) totes, with each tote having an individual volume and capacity of 27ft³ (3Lx3Wx3H), and up to 2000 lbs (one short ton).

Additional considerations in storage layout design included:

- Minimal product handling (2x in most cases: in/out);
- Maximum "tote" surface exposure for adequate cooling purposes;
- A single door for storage retrieval and replenishment;
- Material Handling Equipment storage (reach or forklift truck).

The small storage format requires an interior working area of 7800ft³ (25Lx26Wx12H) with a working footprint of 27 totes per tier, vertically stacked in two (2) tiers (2x27). Fifty-four (54) storage totes are accommodated as follows:

- A center aisle of 10ft allows for handling of the product along two (2) building length rows (one set 2x5 and the other 2x6, stacked 2 high) against each opposite wall of the structure (length-wise, from the rear, forward). Once wall space is covered, the 10ft aisle wide is available for one (1) building length row of five (5) product totes, stacked 2 high from the rear of the structure forward.

The larger storage format requires an interior working area of 18360ft³ (45Lx34Wx12H) with a working footprint of 73 totes per tier, vertically stacked in three (3) tiers (3x73). Two-hundred nineteen (219) storage totes are accommodated as follows:

- A center aisle of 10ft allows for handling of the product along three (3) building length rows (one set 3x10 and the other 3x11, stacked 3 high) against each opposite wall of the structure (length-wise, from the rear, forward). Once wall space is covered, the 10ft aisle wide is available for one (1) building length row of ten (10) product totes, stacked 3 high from the rear of the structure forward.

Building New Storage Capacity

For the purpose of the study, various cooling and refrigeration unit manufacturers were contacted. Discussions with the manufacturers enabled us to gather information regarding the costs involved in building a storage unit. Primarily, for the construction of building the storage unit, the costs are incurred for the following⁸ :

- a) Pre-fabricated refrigeration unit: This usually includes Urethane insulated panels; forklift door and air cooled condensing unit or a pre-engineered “Bally box”. It may include coils, expansion valves and thermostat for the unit.
- b) Installation/ Assembly costs: For the purpose of this study, it includes unloading panels on delivery; assembly of cooler box, fitting coils with drainage; mounting of evaporator coils, temperature control and thermal expansion valves; brazing and insulation of piping and installation of the doors.
- c) Foundation costs: Outdoor units require assembly/construction on an insulated steel reinforced concrete slab on grade. These costs reflect construction and labor charges.

⁸ There may be additional costs involved and the town may best conduct an assessment from civil contractor and engineer for more accurate estimates.

d) Electric costs: The refrigeration unit has to be hooked to electricity. These costs would include the labor and cost of electric hookup. See Tables 6 and 7.

The dimensions for the two size formats, temperature and product details were provided to the manufacturers/contractors. Numerous firms were contacted for price quotations to supply, install, and commission prefabricated or custom manufacture refrigerated storage units. A tabular summary (tables 4 and 5) detailing those cost estimates by four (4) firms is found below:

I) Quotes for the unit with dimensions (25L x 26W x 12H)

Table 4. Storage Quote	Indoor		Outdoor		
Pre-fabricated Refrigerated unit (Small)	<i>Barr</i>	<i>Bush</i>	<i>Bush</i>	<i>U n i t e d (Bally Box)</i>	<i>C M R C (Bally Box)</i>
a) Unit/Structure (\$)	22727	24300	33800	53144	120000
b) Installation/Assembly (\$)	53352	53352	53352	53352	(included)
c) Reinforced Concrete Slab (\$)			4971		
Totals	\$76079	\$77652	\$92123	\$111467	\$124971

II) Quotes for the unit with dimensions (45L x 34W x 12H)

Table 5. Storage Quote	Indoor		Outdoor		
Pre-fabricated Refrigerated unit (Large)	<i>Barr</i>	<i>Bush</i>	<i>Bush</i>	<i>U n i t e d (Bally Box)</i>	<i>C M R C (B a l l y Box)</i>
a) Unit/Structure (\$)	37042	41900	63900	85884	155000
b) Installation/Assembly (\$)	53352	53352	53352	53352	(included)
c) Reinforced Concrete Slab (\$)			10340		
Totals	\$90394	\$95252	\$127592	\$149576	\$165340

All quotes used in this study are “budgetary” in nature and are provided by each individual manufacturer/contractor with the understanding that precise “actual” cost

estimates can only be made on the basis of prior submission of architectural drawings and specifications. Quotes are attached in the appendix for reference.

Additionally, all quotes were submitted without estimates of electric installation/hook-up charges since those costs are greatly influenced by local coding and requirements for specific applications that this study does not supply. The cost of each size format would increase to the extent of these additional costs.

For this study, the energy costs are estimated for refrigeration units with three capacities namely 5HP, 7.5HP and 10HP having 85% efficiency. A refrigeration unit typically runs between 16 to 18 hours a day. We have estimated costs with run time of 16 hours per day. We collaborated with Bangor Hydro Electric Company to estimate the energy costs.

Table 6. Electrical Cost Assumptions				
Unit	Motor HP	Motor Efficiency	Hours/Day	kWh/Month
1	5	0.85	16	2735
2	7.5	0.85	16	4102
3	10	0.85	16	5469

Table 7: Electrical Cost Estimates					
Unit	B a n g o r H y d r o Delivery		Supply		Total
1	\$193.70	+	\$246.03	=	\$439.73
2	\$283.98	+	\$368.99	=	\$652.97
3	\$374.25	+	\$491.96	=	\$866.21

The energy costs would vary with the motor capacity of the condensing unit (i.e., the higher the motor capacity of the unit, the higher the energy costs would be).

Leasing Commercial Storage for Bait

Leasing remote long term refrigerated storage of herring in commercial storage facilities is not possible given the effect that the rapid deterioration of this product has on other food products stored in close proximity. Freezing becomes the only option for commercial storage and this analysis is predicated on only one (1) quotation⁹.

Commercial cold storage enterprises handle a number of different products and follow a specific storing protocol to capture their costs and profits across those diverse products. Most of these operations act as part of a larger logistics network focused primarily on short to intermediate term storage and handling ('turnover') of stock. Quotations for leased storage were based on the larger bait requirement (450,000lbs) and reflect these two cost components associated with sub-10° F storage. Also assumed is the ability to isolate herring from other food products through wrapping and/or placement in an independent room or building.

| Summary

- An analytical tool was developed for the exploration of alternative bait storage scenarios (bait price and deliver pounds) under various market assumptions and regulatory events.
- This study estimated storage units with the capacity of 108,000 lbs and 438,000 lbs. We assessed the dimensions as 25L x 26W x 12H and 45L x 34W x 12H for the units.

⁹Wilmington Cold Storage, Wilmington, MA

· For the smaller unit, the costs incurred on manufacturing and installation ranged from \$70,000 to \$120,000 and for the larger unit the costs ranged from \$90,000 to \$155,000.

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