Fishery Harbor Development: A Case Study of a Connecticut Coastal Community, Stonington, Connecticut

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MASTER OF ARTS THESIS
OF
JAMES L. WALLACE

Approved:

Thesis Committee:

Major Professor

Dean of Graduate School
ABSTRACT

This study was undertaken to investigate the problems and procedures encountered in the development of fishery harbors in Connecticut. Harbor facilities along the coast are in great disrepair or have been completely eliminated to allow for more profitable coastal uses. In addition, conflict between recreational and commercial fishermen for existing space has created a shortage of commercial harbor facilities. Because of this need, state and local officials have begun to investigate viable harbor development alternatives for Connecticut.

Due to the number of suitable locations for development along the Connecticut coast, one town was selected to serve as a case study example. Stonington, Connecticut, has been the home of a fishing fleet since the 1800s. It is a small port located in an area desired by real estate interests. In the past two decades the fishing fleet of Stonington has declined drastically. In order to make recommendations as to Stonington's redevelopment, the reasons for its decline were first identified. Methods employed in the study included a review of current literature pertaining to fishery harbor development, interviews with industry and government representatives and an analysis of the various steps which Stonington could take to improve its present facility. Ten major factors were identified as contributing to the decline of Stonington.
These factors included foreign competition, lack of available resources, distance from traditional fishing grounds, competition from other ports, lack of support facilities, lack of financing, inadequate marketing structures, resource and space conflicts, the unavailability of labor and regulatory impediments in construction.

Results indicated that due to space and political constraints, it was unlikely that Stonington would ever be able to compete with either Point Judith, Rhode Island, or New Bedford, Massachusetts, in terms of physical size or product volume. However, by making improvements in the existing port structure, Stonington could obtain its own market niche. The seafood industry consists of three sectors; harvesting, processing and marketing. Each sector is relatively dependent upon the other but at the same time, acts independently. Improvement or change in one sector usually is accompanied by a complimentary change in the others. Improvement in Stonington's harvesting structure could be achieved through the timed landings of high quality traditional species, the development of non-traditional pelagic species such as squid, mackerel and butterfish, as well as the harvesting of whiting, hakes and northern crab.

Improvement of the existing pier and offloading facilities and the introduction of processing were also found to be important. A combination of public and private funds would prove to be the most likely method of financing facility construction. The location of processing facilities away from
both the waterfront and residential areas could help to alleviate potential opposition. Contract packers located in Rhode Island and Massachusetts could be used in the event that local development is not possible. The formation of a marketing cooperative to consolidate product volume and negotiate production contracts would be beneficial. Movement away from traditional New York and Boston markets as well as utilization of joint ventures and farmer's markets could further enhance Stonington's market position. By implementing these improvements the port of Stonington and similar ports could survive increasing external pressures and remain competitive in a growing industry.
The renewed interest in the domestic commercial fishing industry, as a result of the passage of the Magnuson Fisheries Conservation and Management Act or "200 Mile Limit Law," has brought to light the need for improved fishery harbors. The complete utilization of domestic fishery resources is unlikely to occur without updated landing facilities.

The purpose of this study is to assist the Connecticut commercial fishing industry in the development of its fishery harbors. Due to the number of suitable locations along the Connecticut coastline, one town has been selected to serve as a representative model. Stonington, Connecticut, has been the home of a fishing fleet since the 1800s. Fleet size has varied due to available docking facilities and general economic conditions. State and local officials have shown continued interest in the revitalization of Connecticut's last offshore fishing fleet.

This study will attempt to:

a) Review present literature pertaining to the development of fishery harbors in and surrounding Connecticut.

b) Document the current programs and landings existing at the port of Stonington and relate these to the state as a whole.
c) Investigate the events which lead to the decline of the port of Stonington and make recommendations which could help in its revitalization.

d) Summarize the funding programs which have been used in the port and which could be used in the future to fund fishery harbor development.

e) Analyze the organizational and marketing alternatives available to the port of Stonington.

The development of a fishery harbor is a complex process requiring input from a variety of disciplines. This study will not address, in any depth, the specific design, engineering or planning of the proposed facility.

I would like to thank the following people for their assistance in the completion of this study:

- Staff members of the University of Connecticut Marine Advisory Service.
- Dennis W. Nixon, Assistant Professor of Marine Affairs, University of Rhode Island.
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CHAPTER I

INTRODUCTION

The passage of the Magnuson Fisheries Conservation and Management Act of 1976 (MFCMA) and the American Fisheries Promotion Act of 1980 (AFPA) has sparked a new age of fisheries development in the United States. Neither bill is the utopian answer which many fishermen hoped for, but they remain the framework for future development. By extending U.S. fisheries jurisdiction and limiting the amount of foreign vessels, the MFCMA has given domestic fishermen the opportunity to increase their landings to new highs. The American Fisheries Promotion Act amended six laws or programs related to fishermen. They included:

1. Fishing Vessel Obligation Guarantee Program.
2. Fishery Loan Fund.
5. Fisherman's Contingency Fund.
6. Saltonstall/Kennedy Program.

The Fishing Vessel Obligation Guarantee Program (FVOG) guarantees repayment of up to 87 1/2 percent of money borrowed by fishermen for constructing or reconditioning commercial fishing vessels. The guarantee assists fishermen in obtaining loans from commercial lending institutions so that they may finance a major capital investment for a longer than
usual period of time. The AFPA extends the program to shore-
side facilities and permits borrowers to obtain guaranteed
loans for land, buildings and equipment designed to unload and
receive fishery products from vessels. The program is admin-
istered by the National Marine Fisheries Service (NMFS). The
first guarantee of $10.5 million dollars was awarded in Au-
gust, 1983, to Trident Seafoods of Seattle, Washington, for
construction of an Alaskan processing plant.

The Fishery Loan Fund enables the Secretary of Commerce
to grant loans to finance or refinance the cost of purchasing
constructing, maintaining or operating new or used commercial
fishing vessels or gear. The Fishery Loan Fund currently has
approximately three million dollars on account for fiscal year
1984. The AFPA authorizes the Secretary of Commerce to award
loans to fishermen in order to avoid default on their mort-
gages.

The American Fisheries Promotion Act amends the MFCMA by
allowing Regional Fishery Management Councils to set an annual
foreign fishing level (TALFF) that is related to increases in
domestic harvest. After determining the surplus resources,
the amount of fish a particular country will be allowed to
catch is determined by:

1) tariff and other import barriers to United States
fishery products,

2) cooperation in trade,

3) domestic consumption needs,

4) contributions to the growth of the United States fish-
ing industry.
5) cooperation in fisheries research.
6) traditional fishing rights.

In addition, the AFPA increases the amount of money collected as fees from foreign vessels and increases the number of United States observers aboard these vessels.

The Fishermen's Protective Act deals with compensation for losses suffered by fishermen from other vessels. One of the major changes made by the AFPA was the inclusion of a provision permitting fishermen to apply for loss of income compensation resulting from damage to their vessel or gear caused by another vessel. There is approximately two million dollars available for fiscal year 1984.

The Fishermen's Contingency Fund Program compensates fishermen who suffer vessel or gear damage as a result of obstructions created by Outer Continental Shelf gas and oil operators. The AFPA increases the time a fisherman has to make a claim and also prevents claims against the United States Government in cases when the owners of the equipment which caused the damage admit responsibility. For fiscal year 1984, this program has been increased to three hundred thousand dollars. A description of the final program, the Saltonstall/Kennedy Program, will appear later in this report.

The commercial fishing industry benefited greatly from the passage of the AFPA. Unfortunately, lack of adequate supporting funds and the exclusion of a major provision from the AFPA has limited the effectiveness of the Act. The elimination of Capital Construction Funds, an attempt to extend
financial aid to shoreside processing facilities, was seen as a major setback to fisheries development. The Capital Construction Fund was established under the Merchant Marine Act of 1936 (46 U.S.C. 1177). If accepted, the Capital Construction Fund would have provided financial assistance of up to 50 percent to be used for facilities. Many industry representatives felt that the Capital Construction Fund provision was the most important aspect of the AFPA.

Rising fuel costs, low fish prices and increased regulations have contributed to the demise of many vessels, but they have also encouraged the industry to look for potential alternatives. The development of non-traditional species and increased utilization of established fisheries could help to make the industry stronger.

Many differences exist between the fishing industry and other industries. When a fisheries development project is considered, the factors which make the fishing industry unique must be taken into account. Fish harvesting is based on diverse, biological resources for which total catch is limited, variable and not controlled by individual firms. Because of these factors, there exists much uncertainty in the size and composition of catches. Since catches cannot be effectively predicted, the market structure is not stable and investment in this high risk system is limited. Fishing is similar to modern agriculture in many ways, but lacks the market and resource controls which attract investment.

Some segments of the fishing industry are large, but the
majority are small and privately owned. Fishermen are by
nature independent and somewhat reluctant to change with in-
creased control over these activities. The different compo-
nents of the fishing industry are unique in themselves. The
characteristics, and problems of fishermen, processors, mar-
keters and consumers vary from region to region and from fish
species to fish species. Harvesting can vary from the small
in-shore vessels operating on a daily basis, to large deep-
water vessels working on a weekly schedule. Processing opera-
tions may vary from small, local operations, to large multi-
national corporations.

The marketing of seafood is done in a variety of ways. Near coastal regions, the market is dominated by fresh fish. As one moves further inland, the market shifts toward a frozen product. This shift is due to preservation problems asso-
ciated with fresh fish. In order to maintain a quality pro-
duct, fish is processed into larger frozen blocks and breaded forms for transport inland. The manufacturers of fish sticks and fast-food burgers generally purchase their fish from for-
eign suppliers, leaving a substantial amount of domestic fish for the fresh and processed export markets.

According to National Marine Fisheries Service (NMFS) statistics, the fishing industry contributed seven billion dollars to the nation's gross national product, roughly 0.27 percent. The industry employs more than 277,000 individuals and provides an important source of protein.
In January 1979, NMFS established a task force on fisheries development. The task force's final report concluded that:

An opportunity exists for major expansion of many segments of the United States fishing industry that could have significant economic benefits. Task force studies indicated that developing six major new fisheries off Alaska, the West Coast, the Gulf of Mexico, New England and the Mid-Atlantic could produce 38,000 new jobs and contribute $1 billion to the United States economy by 1990, while reducing the current United States trade deficit of 2.9 billion dollars by at least $1.5 billion. Additional benefit would be created by developing other fisheries.17

Federal interest in fisheries is highlighted further by the availability of Saltonstall/Kennedy (S/K) funds administered by National Marine Fisheries Service (NMFS) to be used for fisheries development. A total of twenty-five million dollars in S/K funds has been made available for fisheries development for fiscal year 1981 through 1983.18

This renewed federal interest could possibly open the door to the development of the United States fishing industry. However, port facilities throughout the country are inadequate to support increased development. Coastal states are currently planning a variety of complex fishery harbors. Three of the most ambitious projects exist on the east coast. In North Carolina, the Wanchese Seafood Industrial Park could become one of the largest fishery harbors on the east coast. North Carolina has spent seven million dollars on this new facility. The money has currently provided a 15 acre harbor of refuge, a sewage treatment plant, a 38 ton ship lift, a portable water system and a variety of vessel support facilities.
In Port Royal, South Carolina, the South Carolina Marine Resources Committee and the Coastal Plains Regional Commission have joined forces to design a Seafood Park. And finally, the Port Authority of New York and New Jersey is proceeding with the development of a major fisheries complex at Erie Basin in Brooklyn, New York. This project involves the redevelopment of existing port facilities, as well as the solicitation of processors and vessels to locate there. The Port Authority currently has letters of intent from five small processors, but still lacks a vertically integrated company (termed "The Big Fish" by Port Authority personnel) which is needed to make the venture possible.

**Connecticut Fisheries Development**

Connecticut has been the home of a fishing fleet as far back as the early 1700s. Most of the approximately seven thousand Indians who lived along the coast during the 1600s were in some way, involved in fishing. The Pequots, Quinnipiacs, Hammonassets, Paugussets and others harvested a wide variety of fish and shellfish from Long Island Sound. With 583 miles of coastline (total shoreline frontage including embayments), Connecticut is still the home of diverse inshore and offshore fleets. The two fleets are distinguished from each other by the size of the vessels, the fishing methods used and the gear they employ. In 1979 there were 909 licensed fishermen in Connecticut (Figure 1). Of that number, 227 were considered full time. Since 1979 the total number has decreased to 619 of which only 87 are full time.
In 1982 the Connecticut fleet numbered 512 vessels, down from a high of 724 vessels in 1979 (Figure 2). The majority of the fleet consists of inshore vessels, that is, vessels of less than 40 feet and not exceeding five net tons. More than fifty percent of the total fleet is comprised of inshore lobster vessels, which fish the waters of Long Island and Block Island Sounds. The remaining inshore fleet consists of small trawlers and vessels operating within the fisheries of the Connecticut River systems (Figure 3). These vessels are docked in a variety of locations along the Connecticut coastline.

Note - At least half of these vessels are involved in inshore lobstering. The number of finfish, trawlers has increased by roughly 100% over the span of the years listed (from 33 to 67 vessels).
**Connecticut Commercial Fishing Vessels by Gear Type (1977-1982)**

<table>
<thead>
<tr>
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<td>6</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Trawler-Fish</td>
<td>19</td>
<td>33</td>
<td>35</td>
<td>40</td>
<td>59</td>
<td>67</td>
</tr>
<tr>
<td>Trawler-Lobster</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6</td>
</tr>
<tr>
<td>Fish Trap</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>5</td>
</tr>
<tr>
<td>Crab</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>Eel</td>
<td>18</td>
<td>19</td>
<td>15</td>
<td>19</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>Lobster-Inshore</td>
<td>398</td>
<td>378</td>
<td>494</td>
<td>482</td>
<td>427</td>
<td>368</td>
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<tr>
<td>Lobster-Offshore</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Conch</td>
<td>12</td>
<td>11</td>
<td>22</td>
<td>17</td>
<td>11</td>
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<tr>
<td>Gill Net</td>
<td>121</td>
<td>93</td>
<td>85</td>
<td>327</td>
<td>45</td>
<td>159</td>
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<tr>
<td>Hand Line</td>
<td>109</td>
<td>95</td>
<td>141</td>
<td>142</td>
<td>57</td>
<td>58</td>
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<td>Dip Nets</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
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<tr>
<td>Harpoon</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Clam</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Oyster</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>573</td>
<td>557</td>
<td>724</td>
<td>720</td>
<td>559</td>
<td>514</td>
</tr>
</tbody>
</table>

**Note:** Vessels totals do not add vertically due to multiple licenses existing for gear type. Totals listed do not include duplicate listings.

**Source:** Connecticut Department of Marine Fisheries
## Figure 4

Connecticut Fishermen, Vessels and Statewide Rate of Unemployment

<table>
<thead>
<tr>
<th></th>
<th>Number of Fishermen</th>
<th>Number of Vessels</th>
<th>Connecticut Annual Unemployment Rate</th>
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<tbody>
<tr>
<td>1977</td>
<td>789</td>
<td>573</td>
<td>7.0</td>
</tr>
<tr>
<td>1978</td>
<td>807</td>
<td>557</td>
<td>5.2</td>
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<tr>
<td>1979</td>
<td>909</td>
<td>724</td>
<td>5.1</td>
</tr>
<tr>
<td>1980</td>
<td>459</td>
<td>720</td>
<td>5.9</td>
</tr>
<tr>
<td>1981</td>
<td>707</td>
<td>559</td>
<td>6.2</td>
</tr>
<tr>
<td>1982</td>
<td>619</td>
<td>514</td>
<td>6.9</td>
</tr>
</tbody>
</table>

**Sources:** Connecticut Department of Marine Fisheries  
Bureau of Labor Statistics
Areas of concentration include Westbrook, Branford, New Haven and Milford. The current offshore fleet, that is, vessels greater than 70 feet and five net tons or more, numbered 16 vessels in 1982. These vessels are currently located entirely at the port of Stonington.

Fluctuations in fleet size have been attributed to a variety of factors. Increases in ex-vessel prices, product demand and unemployment all tend to increase the number of licensed fishermen and associated vessels. Studies in Rhode Island have shown a direct correlation between unemployment and the number of quahog licenses issued by the State. As the rate of unemployment increased so did the number of licensed quahog fishermen. Connecticut, however, has exhibited a net decrease in the number of vessels and licensed fishermen during a period of increasing unemployment (Figure 4).

The offshore fleet does not appear to be as susceptible to change. With the initial investment being higher, new vessel owners are required to have a firm economic base prior to entering a fishery. This tends to dissuade many people from entering a fishery without detailed planning. The number of offshore vessels has been affected, for the most part, by the MFCMA legislation and the strengthening market caused by it. In Rhode Island, Coast Guard documentation records have show a 7.4 percent increase in the total fleet since the MFCMA. In addition, vessels have increased their horsepower by factors of between two and three resulting in an increase in total fishing effort. Connecticut's trawler fleet (in
shore and offshore combined) has doubled from 33 to 67 vessels during the same period.26

The Connecticut fleet fishes the areas of Long Island and adjacent offshore areas. Like their Rhode Island counterparts, the fleet concentrates in the area bounded to the north by Nantucket Island and to the south by central Long Island and extending seaward to the edge of the continental shelf. These areas are contained in the NMFS statistical areas 611, 612, 613, 539, 537 and 526 (Figure 5). The offshore fleet, making trips up to 3-4 days, is capable of fishing all of these regions. The inshore fleet, however, would generally concentrate in areas 611 and 539, remaining at sea for between 12-36 hours.28

The Connecticut fleet harvests over thirty species of fish and shellfish from state and contiguous waters. Landings and dollar values of both fish and shellfish have steadily increased since 1979 (Figure 6). Finfish landings include approximately twenty-five species; the major ones being yellowtail flounder, blackback flounder, butterfish, cod, whiting and scup. According to a study conducted by the Electric Boat Division of General Dynamics, over 66 percent of Connecticut's finfish landings are attributed to the port of Stonington (Figure 7). It is interesting to note that during the year 1979-80 neither the State of Connecticut nor NMFS recorded landing data at Stonington; effectively eliminating over 50 percent of the state's recorded landings. For a number of
Figure 5  National Marine Fisheries Service Statistical Areas off Southern New England

Source: National Marine Fisheries Service
Figure 6

Connecticut Landings of Fish and Shellfish with Corresponding Dollar Values (1977-1982)

(Thousand Pounds)  (Thousand Dollars)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Finfish</td>
<td>Founds</td>
<td>3347</td>
<td>4128</td>
<td>3177</td>
<td>3103</td>
<td>5032</td>
</tr>
<tr>
<td></td>
<td>Dollars</td>
<td>738</td>
<td>1046</td>
<td>1725</td>
<td>1868</td>
<td>1981</td>
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<tr>
<td>Shellfish</td>
<td>Founds</td>
<td>1817</td>
<td>2329</td>
<td>1551</td>
<td>2127</td>
<td>2868</td>
</tr>
<tr>
<td></td>
<td>Dollars</td>
<td>3669</td>
<td>5856</td>
<td>3858</td>
<td>6003</td>
<td>7585</td>
</tr>
</tbody>
</table>

Total Pounds: 5164  6457  4728  5230  7900  7900
Total Dollars: 4407  6900  5583  6873  9567  11169

Source: Connecticut Department of Marine Fisheries
### Total Connecticut Landings of Selected Species 1977-1982 (Thousand Pounds)

<table>
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<tr>
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<tr>
<td>Anglerfish</td>
<td>68</td>
<td>91</td>
<td>51</td>
<td>76</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Butterfish</td>
<td>28</td>
<td>60</td>
<td>25</td>
<td>7</td>
<td>510</td>
<td>506</td>
</tr>
<tr>
<td>Yellowtail</td>
<td>384</td>
<td>307</td>
<td>346</td>
<td>867</td>
<td>1502</td>
<td>1501</td>
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<tr>
<td>Black Back</td>
<td>592</td>
<td>804</td>
<td>529</td>
<td>502</td>
<td>1153</td>
<td>1235</td>
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<tr>
<td>Fluke</td>
<td>63</td>
<td>110</td>
<td>30</td>
<td>48</td>
<td>81</td>
<td>65</td>
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<tr>
<td>Red &amp; White Hake</td>
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<td>31</td>
<td>13</td>
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<tr>
<td>Haddock</td>
<td>32</td>
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<td>12</td>
<td>39</td>
<td>87</td>
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<tr>
<td>Whitefish</td>
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<td>168</td>
<td>346</td>
<td>444</td>
<td>963</td>
<td>1200</td>
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<td>Squid</td>
<td>35</td>
<td>32</td>
<td>26</td>
<td>13</td>
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<tr>
<td>Lobster</td>
<td>638</td>
<td>799</td>
<td>808</td>
<td>830</td>
<td>1010</td>
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<tr>
<td>Oyster Meats</td>
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<td>1058</td>
<td>174</td>
<td>695</td>
<td>947</td>
<td>1095</td>
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<tr>
<td>Clam Meats</td>
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<td>180</td>
<td>300</td>
<td>325</td>
<td>360</td>
<td>419</td>
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</table>

### Total Landings of Selected Species for New London County 1977-1982 (Thousand Pounds)

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<td>91</td>
<td>51</td>
<td>76</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Butterfish</td>
<td>28</td>
<td>52</td>
<td>15</td>
<td>5</td>
<td>500</td>
<td>498</td>
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<tr>
<td>Yellowtail</td>
<td>384</td>
<td>307</td>
<td>346</td>
<td>867</td>
<td>1501</td>
<td>810</td>
</tr>
<tr>
<td>Black Back</td>
<td>576</td>
<td>653</td>
<td>491</td>
<td>444</td>
<td>963</td>
<td>1200</td>
</tr>
<tr>
<td>Fluke</td>
<td>60</td>
<td>43</td>
<td>21</td>
<td>44</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Hake</td>
<td>4</td>
<td>31</td>
<td>13</td>
<td>4</td>
<td>117</td>
<td>18</td>
</tr>
<tr>
<td>Haddock</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td>52</td>
<td>53</td>
</tr>
<tr>
<td>Whitefish</td>
<td>97</td>
<td>168</td>
<td>147</td>
<td>17</td>
<td>102</td>
<td>101</td>
</tr>
<tr>
<td>Squid</td>
<td>23</td>
<td>10</td>
<td>20</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Lobster</td>
<td>213</td>
<td>345</td>
<td>295</td>
<td>400</td>
<td>653</td>
<td>214</td>
</tr>
<tr>
<td>Oyster Meats</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Clam Meats</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Note:**
- 1 bushel Connecticut Oysters = 7.5 lbs. meat
- 1 bushel Connecticut clams = 12.0 lbs. meat

**Source:** Connecticut Department of Marine Fisheries
species, the port of Stonington would be responsible for between 75 and 100 percent of the State's landings (Figure 6).

On a regional basis, Connecticut is ranked fourth out of the five New England states. For 1982 the total landings (fish and shellfish) were:

<table>
<thead>
<tr>
<th>Pounds Landed</th>
<th>$ Thousand Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts 343,955</td>
<td>204,223</td>
</tr>
<tr>
<td>Maine         217,379</td>
<td>217,379</td>
</tr>
<tr>
<td>Rhode Island  112,898</td>
<td>55,401</td>
</tr>
<tr>
<td>Connecticut   7,900</td>
<td>9,618</td>
</tr>
<tr>
<td>New Hampshire 7,586</td>
<td>3,887</td>
</tr>
</tbody>
</table>

In addition to commercial finfish landings, Connecticut's recreational fishermen harvest a substantial volume of bluefish, flounder, scup and other species. In 1979 recreational fishermen landed 7.9 million pounds of fish. This compares to the 6.6 million pounds landed in Rhode Island for the same year.

Shellfish landings in Connecticut consist of lobster, scallops, oysters, conchs, crabs and clams. The most important shellfish by virtue of landings and dollar value is lobster. In 1981-82 landings of lobster exceeded one million pounds, an increase of 25 percent from previous years. This strengthening resource has resulted in the transformation of six vessels to trawlers in 1982. Considerable gear conflicts have arisen between trawl and traditional pot fishermen in the New Haven area, the home of the state's largest concentration of lobstermen. Through the combined efforts of the State and the Connecticut Commercial Fishermen's Association, the majority of these conflicts have been resolved. How-
ever, with increasing landings expected to continue it is likely that additional gear conflicts will occur. To resolve this problem, Governor William O'Neill directed both the Department of Marine Fisheries and the Sea Grant Marine Advisory Service to conduct a two year study on the impacts of trawling on the Long Island Sound lobster resource. Until that study is completed, an interim Lobster Management Plan has been implemented calling for a quota of 100 lobsters per day and a prohibition on lobster trawling west of the New Haven line.

The second most important segment of Connecticut shellfish industry is the harvesting of oysters and clams. In 1896 Connecticut's oyster production peaked at 100 million pounds of oyster meats. By the mid-1960s clam and oyster production had been reduced to 300 thousand pounds. This dramatic decline has been attributed to:

1. The encroachment of pollution, including silting due to dredging. As a result vast areas of rich oyster grounds were suffocated. This is the principal cause of the decline of the oyster.

2. The unavailability of a large supply of cheap labor due to other job opportunities and the curtailment of immigration.

3. A decrease in local demand

4. The unreliability of the set or annual crop of seed oysters (as well as an outbreak of starfish and drills, the natural enemies of oysters).

5. Out of date vessels and equipment.

Since that time, the State has actively pursued the culture and harvest of its oysters. In 1982 the State passed a bill allowing the depuration of polluted shellfish in Con-
necticut waters. Landings for that year subsequently exceeded 1.5 million pounds with a dollar value of 10 million dollars (Figure 6). The recorded landings and the actual production have been said to differ dramatically. State landings include only seed taken from town and state waters. Seed and market clams and oysters produced from private companies in Connecticut are not included. Conversations with three of the largest companies (Talmadge Bros., Little Stone House Oyster, Ram Island Shellfish) have indicated that the actual undocumented landings are in the order of 4.0 million pounds of market sized product. In addition, approximately 1.5 million pounds of seed are sold annually to Long Island Oyster Farms located in Greenpoint, New York. With resources on the rebound and the number of people applying for depuration areas increasing both industry and government officials feel that the Connecticut shellfish industry is on the threshold of major redevelopment.

The question of continuous resource availability arises in many projects involving fisheries development and expansion. During the 1970s, domestic fishermen took only 20 percent of the total catch from the New England waters (Figure 8). Passage of the MFCMA gave U.S. fishermen the opportunity to harvest additional quantities previously taken by foreign vessels. Furthermore, there exists mounting evidence that fisheries stocks are rebounding. A report issued by the Northeast Fisheries Center in Woods Hole states that:

The decline in the total biomass during the 1960s and
Dence of the extremely high overall fishing mortality generated by the foreign distant water fleets (and that while) a large share of the recent increase in fish stocks is due to squid, herring and mackerel, the overall biomass is now approaching the levels that existed prior to the arrival of foreign vessels. 41

**Figure 8**

**Foreign and Domestic Catches in NMFS Areas Adjacent to New England (Metric Tons)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod</td>
<td>35,299</td>
<td>36,293</td>
</tr>
<tr>
<td>Haddock</td>
<td>10,077</td>
<td>13,064</td>
</tr>
<tr>
<td>Yellowtail</td>
<td>32,210</td>
<td>14,022</td>
</tr>
<tr>
<td>Scup</td>
<td>6,097</td>
<td>8,961</td>
</tr>
<tr>
<td>Silver Hake</td>
<td>104,689</td>
<td>22,540</td>
</tr>
<tr>
<td>Mackerel</td>
<td>272,522</td>
<td>1,490</td>
</tr>
<tr>
<td>Sea Herring</td>
<td>189,496</td>
<td>50,584</td>
</tr>
<tr>
<td>Butterfish</td>
<td>11,739</td>
<td>2,555</td>
</tr>
<tr>
<td>Dogfish</td>
<td>13,940</td>
<td>1,061</td>
</tr>
<tr>
<td>Loligo Squid</td>
<td>25,796</td>
<td>1,282</td>
</tr>
</tbody>
</table>

715,772 153,436 21%

*Source: McBride and Brown, 1979.*

Fluctuations in fish stocks occur naturally. However, current NMFS surveys indicate that Connecticut and surrounding states should have ample fishery resources available to them throughout the next decade (Figure 9). It appears that Connecticut's limiting factors are the lack of vessels, facilities to support them and marketing channels rather than available resources. A Fishing Industry Feasibility Study prepared for the City of New London indicates that groundfish (cod, haddock, flounder and scallops), finfish (pollock, but-
Figure 9

Preliminary Stock Data 1984 (Metric Tons)

<table>
<thead>
<tr>
<th></th>
<th>Loligo</th>
<th>Illex</th>
<th>Mackerel</th>
<th>Butterfish</th>
<th>Whiting</th>
<th>Red Hake</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>44000</td>
<td>30000</td>
<td>87000</td>
<td>16000</td>
<td>Undetermined</td>
<td>Undetermined</td>
</tr>
<tr>
<td>OY</td>
<td>17500</td>
<td>12600</td>
<td>83500</td>
<td>16000</td>
<td>43000</td>
<td>22000</td>
</tr>
<tr>
<td>DAH</td>
<td>16000</td>
<td>11000</td>
<td>26500</td>
<td>11000</td>
<td>29600</td>
<td>13500</td>
</tr>
<tr>
<td>DAP</td>
<td>13000</td>
<td>8000</td>
<td>7300</td>
<td>11000</td>
<td>7600</td>
<td>13500</td>
</tr>
<tr>
<td>JVP</td>
<td>3000</td>
<td>3000</td>
<td>13400</td>
<td>4500</td>
<td>27000</td>
<td>3000</td>
</tr>
<tr>
<td>TALFF</td>
<td>1500</td>
<td>1600</td>
<td>57000</td>
<td>5000</td>
<td>13400</td>
<td>8500</td>
</tr>
<tr>
<td>Reserve</td>
<td>-0-</td>
<td>-0-</td>
<td>28500</td>
<td>-0-</td>
<td>-0-</td>
<td>3000</td>
</tr>
</tbody>
</table>

ABC = Allowable Biological Catch
OY = Optimum Yield
DAH = Domestic Annual Harvest
DAP = Domestic Annual Production
JVP = Joint Venture Production
TALFF = Total Allowable Level of Foreign Fishing

Source: NMFS, Woods Hole, Massachusetts
terfish, scup, ocean pout) and shellfish represent species of opportunity to Connecticut; that is, available for sporadic or incidental harvest depending on the season of the year, quota regulation and market strength. In addition, red hake, squid, mackerel and whiting represent enormous business growth potential and opportunity for year-round vessels operating in Connecticut.

The harvesting sector is only one segment of the seafood industry. Processors, wholesalers, retailers, restaurants, import/export companies and brokers all play a role in the distribution of seafood products (Figure 10). During the 1800s Connecticut was the home of between seven and ten menhaden rendering plants. Several were located in Mystic with others at Madison, Guilford, Niantic, Branford and Giants Neck. According to the "Coode Book" there were 631 men employed afloat and ashore in the Connecticut menhaden industry in 1880. The menhaden industry in Connecticut did not survive the depression of the 1930s when the price of fish fertilizer dropped to a point where profitable operation was impossible.

Fish filleting plants were also common in Connecticut until recent years. During the 1930s and 1940s, there were two plants in Groton and one in Stonington. Recently, a filleting plant has again begun operations in Stonington after a 20 year absence. The Stonington Fillet Company is buying fish from Stonington vessels and shipping it throughout the country. A recent attempt at expansion was greeted by strong
Figure 10

MAJOR FLOWS OF FRESH AND FROZEN FISH
IN UNITED STATES MARKETS

Source: Henry S. Marcus and James R. Towley
Using Cooperatives to Aid the New England Fishing Industry, MIT SeaGrant 75-7, 1974.
local opposition due to its residential location and has been tabled for future considerations.

Connecticut possesses an existing distribution system with varying degrees of expertise in the handling of both fresh and frozen seafood products. Recent surveys indicate that there are approximately:

1. 200 wholesale/retail outlets
2. 38 processors of various degrees
3. 36 chain supermarkets (more than 3 stores in chain)
4. 5 import/export companies

The Hartford-New Haven market region is ranked number two in the New England region; second only to Boston in total food store sales. It has been estimated that the Connecticut seafood market for direct consumption is in the order of 25-30 million dollars. For the most part, the existing distribution system has traditionally handled meat and poultry. However, a number of companies are familiar with seafood and have been purchasing products through traditional Boston and New York channels.

The state government of Connecticut has only recently begun to recognize the value of its living marine resources. Although the fishing and shellfish industries were strong in the past, the majority of the effort was exerted by individuals and local rather than state government. In an effort to promote development and regain this local participation, the State in 1982 passed the Aquaculture Act which called for the formation of town shellfish commissions to manage rebounding stocks. Advised by the State Aquaculture Commission, these
local shellfish commissions are responsible for the leasing of
town beds and licensing of fishermen. In a similar move,
legislation has been proposed which will prompt the formation
of harbor commissions to manage traffic, development and uses
within Connecticut harbors. Harbor commissions presently
exist in nine coastal towns, one of which being Stonington.

Direct legislative action and assistance has been slowly
coming to the Connecticut fishing industry. In 1979 and 1980,
the Connecticut Department of Economic Development demon-
strated its concern by granting the Town of Stonington a total
of 95,000 dollars to assist in dock repair and facility deve-
lopment. In addition to funding, the Department of Environ-
mental Protection's Division of Marine Fisheries, the State
has partially funded the University of Connecticut's Marine
Advisory Service to help service the fishing and marine sec-
tor. Beginning in 1982 and continuing with 1983, the Marine
Advisory Service has received 80 and 60 thousand dollars,
respectively, of direct appropriations.

It has been said that the biggest threat to the Connecti-
cut commercial fishing industry and the resource in general is
the growing conflict with recreational users. Competition
for existing stocks and numerous gear conflicts have arisen in
Long Island Sound. In addition, unchecked growth in the
number of recreational fishermen and the lack of accurate
landing data is suspected of putting severe strains on exis-
ting fish stocks.
CHAPTER II

The Port of Stonington

The port of Stonington is located adjacent to the town of Groton within the town of Stonington, which includes the villages of Mystic, Old Mystic, Pawcatuck and the Borough of Stonington. Stonington was incorporated as a town in Connecticut in 1662. It is located in the southeast corner of the state, bordered by the towns of North Stonington to the north and New London to the west. Its eastern border is the Pawcatuck River and Fishers Island Sound forms its southern boundary.

The Borough of Stonington, incorporated in 1801, is situated on a point of land roughly one-half mile long, extending southward into Fishers Island Sound. It is this point of land which forms Stonington Harbor and has been the home of several maritime fleets.

The original area was inhabited by the Pequot and Niantic Indians; its first settler, John Winthrop, started what was to become the town of Stonington in 1649. After several boundary disputes between Connecticut and Massachusetts, Southertown (Stonington) became part of Connecticut. In 1665 the name was changed from Southertown to Mystic in memory of victory over the Pequot Indians. It is suggested that the name Stonington was finally chosen due to the number of stones in the
soils and fields. During the 1700s, as a result of increasing maritime dependence, the population shifted to the point of land which has become Stonington Borough.

With the land surrounding Stonington being hilly and rocky, residents turned to the sea for transportation, food and income. Coastal shipping and boat building were Stonington's earliest non-agricultural pursuits with the exception of fishing. Stonington became prosperous enough to warrant numerous unsuccessful attacks by the British during the War of 1812. With the first boat being launched in 1680, Stonington continued boat building until after World War II. The majority of vessels currently fishing from Stonington were designed by Winthrop Warner and built at Stonington Boat Works between 1940-1945.

Prior to 1835 Stonington was primarily a seal and whale port with vessels ranging as far as Cape Horn and the Antarctic. Out of a fleet of 30 vessels fishing the Antarctic grounds during 1830, ten were from Stonington. Whaling was directly responsible for the introduction of the Portuguese into the local population. It was a common practice for whalers to leave port with a small crew and sign on a full complement in the Azores or Cape Verde Island. Some of these islanders returned to Stonington with the ships at the end of the voyage and settled there permanently.

By the turn of the century, whaling began to fade and steamboating began to grow. Two men, Cornelis and Jake Vanderbilt, were to pioneer and develop the Stonington steam ship
industry. The industry flourished when railroad linkages were made with Providence, Rhode Island, thus enabling passengers from New York to have both sea and land travel to points north. The Stonington steamship line was in operation until 1909.

The demise of the steamship industry left Stonington with only two major maritime industries, shipbuilding and fishing. Landings of cod, haddock, herring and flounder began to increase in the last half of the 19th century. In 1880 recorded landings for the Stonington region were (thousand pounds):

<table>
<thead>
<tr>
<th>Fish</th>
<th>Landings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halibut</td>
<td>490</td>
</tr>
<tr>
<td>Bluefish</td>
<td>467</td>
</tr>
<tr>
<td>Mackerel</td>
<td>4</td>
</tr>
<tr>
<td>Cod</td>
<td>1230</td>
</tr>
<tr>
<td>Lobster</td>
<td>17</td>
</tr>
<tr>
<td>Swordfish</td>
<td>74</td>
</tr>
<tr>
<td>Bass</td>
<td>159 9</td>
</tr>
</tbody>
</table>

The United States Fish Commission reported in 1893 that 261 men were employed on 47 vessels in the port of Stonington. Total landings for that year exceeded twenty million pounds. During this time period the vessels used were small single-masted sloops (smacks), usually not exceeding 30 feet in length. Fishermen concentrated their efforts on cod and haddock, using handlines in and around the waters of Block Island Sound.

The introduction of small horsepower engines rapidly changed fishing in Stonington. Trawling soon proved itself to be more efficient and profitable than handlines. Vessels began reaching the 60 foot range and landings of food and industrial fish increased dramatically. Boats were now exploiting the fishing grounds both east and west of Rhode
Island with trips of up to three days. This period of good fortune took a turn for the worse when the 1938 hurricane destroyed homes and sunk most of the boats in the harbor. Of the existing 52 vessels at the time, only one survived the storm; being in dry dock in Bridgeport.

The outbreak of the Second World War helped to encourage the rebuilding of the Stonington fleet. Meat consumption was down due to rationing and fish stepped in to fill the gap in the market. Favorable market conditions and government assistance proved to be a boon to Stonington fishermen. During and immediately following World War II, it was estimated that there were 60 boats fishing from Stonington with an additional 40 located throughout the New London and Mystic region. The Bindloss fillet plant opened in 1944 and supplied fish to the armed forces until ceasing operation in 1950.

The Stonington fleet went into a severe tailspin following World War II which did not stop until 1979 when the number of draggers reached an all time low of 12-14 vessels.

The Facility

The pier facilities of Stonington have changed very little in the past twenty years. The harbor is protected by two substantial breakwaters. The Stonington Outer Breakwater is about 1000 yards long and protects the harbor from the south and southeast. The Inner Breakwater is about 650 yards long and protects the harbor from storms coming from the south and southwest.

The pier facilities, originally constructed in the mid-
1800s, are located in the inner harbor at the former Vanderbilt railroad and steamship pier which was sold to the town in the mid 1960s. The facility consists of two piers of wood and concrete construction extending into Stonington harbor. (Figure 11). After purchasing the facility the town established a sewage treatment plant and paved the surrounding area. Berthing facilities are located on both sides of the piers giving approximately 2200 linear feet of available dock space. Dockside water depths range between ten and fifteen feet with a seven foot "ridge" rising in the eastern portion. Support facilities consist of an ice house, fuel storage and off-loading facility. There is presently no processing being done at the pier except for primary washing and boxing of product. Fishermen sell their catch to small retail stores or to one of two buyers, Connecticut Seafoods or Stonington Fillet Company. These two companies are both attempting to be the exclusive buyer in Stonington but neither has succeeded to this date.

The town of Stonington owns the pier facilities and leases them to the Southern New England Fishermen's Association (SNEFA) and the Connecticut Small Boat Association (CSBA). The Small Boat Association leases a small parcel located in the extreme southeast corner with the SNEFA leasing the remainder. The Fishermen's Association in turn sublets portions of the facility to prospective buyers. In addition, the Association charges non-resident buyers a per-box charge if they wish to purchase fish from individual vessels and supplies a dockmaster to oversee the facility. Development
Figure 11  Stonington Pier Facilities

Source: Town of Stonington Community Development Office
and repair of the facility is directed by the Town Waterfront Commission, whose membership consists of town officials and local fishermen.

The port of Stonington has attracted considerable interest on the state and local levels in recent years. Through the combined efforts of the SNEFA, Town of Stonington Waterfront Commission and the University of Connecticut Sea Grant Marine Advisory Service, both recognition and capital have begun to appear. An initial grant of 50,000 dollars from the Connecticut Department of Economic Development in 1979-80 to repair existing facilities sparked additional investments. To date, the town and port have received:

a. Connecticut Department of Economic Development - 95,000 Dollars
b. Housing and Urban Development/Community Development Block Grant - 250,000 Dollars
c. Farmers Home Administration - Grant - 215,000 Dollars
d. Farmers Home Administration - Loan - 45,000 Dollars

Total = 607,500 Dollars

Approximately half of these funds have or will be used for the renovation of existing facilities. The Waterfront Commission has indicated that after repair the next two priority projects will involve construction of a new building to house offloading and processing and dredging the harbor. Plans are presently being reviewed which will allow for the construction of a 50 x 120 foot steel offloading building on the Stonington pier.

Decline

In order to make recommendations for redevelopment of Stonington as a fishery harbor, the reasons for its decline
must first be discovered. Historically, the fleet has gone through a number of fluctuations. The demise of the whaling fleet began as a result of the development of natural petroleum products. The largest mass removal of whaling ships occurred during the Civil War when 41 ships from New England, loaded with stones, were scuttled in the mouths of southern harbors to prevent blockade running. The Arctic disasters of 1871 and 1876, in which vessels were frozen and crushed, served as the final blow to the whaling industry.

Plentiful fish stocks and a favorable market around the turn of the century, helped bolster Stonington into becoming a profitable finfish port. The 1938 hurricane destroyed the fleet (and most of New England) but a need for protein by the start of World War II helped to revive it once again. Following World War II the fleet began a decline that appeared fatal; within twenty-five years, the number of vessels was reduced from 60 to a mere 12 in 1979.

The events which caused this decline are complex and intertwined. Each factor appears to either cause or directly relate to another. This is typical of the fishing industry with the harvesting, processing and marketing sectors being linked very closely. The following is a description of the ten most important factors which led to the decline of the Stonington fleet:

1) Foreign Competition. Prior to the passage of MFCMA in 1976, foreign fishing in the waters adjacent to the United States was significant. The U.S. catch in the
waters off New England amounted to only 21 percent of total landings. In 1943 Connecticut landed 13 million pounds of fish but by 1976 this volume had dropped to 3 million pounds. In addition, imports of low cost foreign products began to take over U.S. markets. The U.S. imports seafood from about 100 nations. About half of these imports come from six countries: Canada, Mexico, Japan, Iceland, Denmark, and Norway. Until recently, large fast food chains (i.e. McDonalds, Arthur Treachers, etc.) would only purchase foreign product due to its low cost and superior quality. Only in recent years have these firms become more interested in U.S. products.

Despite having the largest fishery resource of any nation in the world in terms of value, the U.S. has been buying more than half of its fish from other countries. Over the period 1960-1981, while total U.S. supplies of fishery products grew about 94 percent, domestic landings increased by only 42 percent. In 1981, imports accounted for 57 percent of total supplies of edible fishery products, up from 41 percent in 1960 (Figure 12). Direct effects on Stonington can be attributed to the high percentages of cod (76), flounder (55), haddock (40), scallops (37) and lobsters (52) being imported in relation to the total U.S. market.
By the time American fishermen began to realize that their vessels, gear and processing procedures were obsolete, foreign competition had nearly taken over the U.S. Market. The vessels of Stonington are, for the most part, outdated wooden eastern rig draggers of between 30-60 feet, having the wheelhouse in the stern and hauling their nets over the side. The majority of these vessels were built at the Stonington Boat Works during World War II. These vessels are now approaching forty years of age indicating stagnation of construction in the fleet. Although adequate for fishing within the protected waters of Long Island Sound, these vessels could not compete with the 80-120 foot catcher/processors of the foreign distant water fleet. The 1965 report prepared by General Dynamics sums up the problem:

Not only are most of the fishing vessels out of date, but their equipment is obsolete and their operators often use antiquated techniques. The situation is exacerbated by the fact that some fishermen ignore repair and maintenance as the vessels grow older.30

2) Lack of Available Resources - Overfishing by foreign vessels combined with the cyclic nature of fish stocks helped to deplete the offshore resources available to Stonington fishermen. When these fishermen returned to their historic inshore grounds of Long Island and Block Island Sounds, they found pollution and an increasing number of vessels. Industrial pollution
and siltation had laid waste to the fisheries of Connecticut's rivers, as well as limiting the survival of larval finfish developing there.

Of the four major finfish species landed in Connecticut, cod, flounder, scup and whiting, Stonington is responsible for 68 percent of the total. These landings do not occur in large numbers, but are steadily landed as a "mixed bag" throughout the year. Stonington has been considered a specialty port by buyers; a source of a variety of species. The annual pattern of landings goes through a regular cycle with the volume and species of fish being landed changing with the seasons. The heaviest landings occur in the early spring and the lowest during the late summer and early fall. The most important species as related to the time of year are:

January-March : Yellowtail flounder, cod, butterfish
April-June : Blackbacks, flounder, squid
July-September: All flounders, fluke, whiting
October-December : Scup, flounder

The addition of butterfish and squid into the landings of Stonington has only occurred in the past 2-3 years. A strong Japanese market for butterfish and domestic demand for squid has encouraged the increased landings.

These fluctuating landings characteristic of Stonington, have served to impede its growth and hasten its decline. By not being guaranteed of product,
buyers were reluctant to invest time and money at Stonington. In 1950, the Bindloss fillet plant employed between 30-40 people. The main reason given for the failure of the plant was the unreliability of the supplies of whole fish. The processor required fish to keep its production lines going and could not obtain the product. Since the fishermen had no equity in the plant, they were more concerned with higher priced species than supplying the processor. Therefore, when the higher priced scup arrived into the area, fishermen concentrated on them rather than flounders. Since scup is marketed whole, the plant had no raw material.

3) Distance from Fishing Grounds - The geographic location of Stonington has been mentioned as a contributing factor in its decline. Although not as important today, the fact that Stonington is the most westerly located port in New England has served to discourage vessels from homeporting there in the past. The majority of the vessels fishing from Stonington range from 30-60 feet. These vessels are limited to an area relatively close to port and are not well suited to deep water fishing or traveling long distances to Georges Bank. When inshore stocks become overfished, the vessels of Stonington were not capable of making the long offshore trips. Limited horsepower and vessel design made the trips not only unprofitable but
dangerous.

In the last three years, two vessels over 70 feet have joined the Stonington fleet. If market conditions are the same in all ports, these vessel owners see very little difference in steaming from Point Judith, Greenport or Stonington. Their larger size and increased horsepower gives them the flexibility to travel to a number of different fishing grounds. Large, modern vessels, therefore, are generally not as affected by Stonington's geographic location as are the smaller vessels. A feasibility study prepared for the city of London indicates that at certain times of the year southeastern Connecticut is actually at a geographic advantage. During the winter, finfish and migratory species concentrate in the waters adjacent to Connecticut allowing for easy access. It must be concluded, however, that the distance from fishing grounds and the closer location of other ports requires that the port of Stonington must have additional incentives to justify development.

4) Competition from Other Ports - The species harvested by vessels from Stonington are reached as easily by vessels from Point Judith, Greenport, New Bedford and Montauk. A number of vessels from Stonington periodically offload at these ports to take advantage of better prices. Some vessels have gone as far as to join the Point Judith Fishermen's Cooperative. All of
these ports have shoreside handling, marketing and service systems equal or superior to Stonington's. New Bedford is such a center for maintenance and equipment work that vessels travel there from all along the eastern seaboard. Point Judith is rapidly becoming one of the most profitable ports in New England. Numerous buyers (9 at last count), processing and offloading facilities make the port very attractive to new vessels. Despite limitations in terms of dock space and sewage treatment, Point Judith continues to enjoy both growth and state support.

5) **Lack of Facilities and Services** - Stonington possesses a good natural harbor but with some limitations. Although protected by an outer breakwater, the inner harbor is shallow in depth and difficult to negotiate. Vessels over 60 feet are restricted to the outside edge of the harbor to prevent running aground. This shoal condition combined with the poor conditions of the wharves, has prompted vessels to use facilities in Point Judith and to some extent New London. The town dock has become so crowded that vessels are required to raft out two-deep. Pilings and planks are old and decaying with the ice, fuel and offloading facilities being unable to support the present vessels. With only 2200 feet of dock space, the number of vessels which could be added is somewhat limited.

The dock facilities of Stonington have failed to
of the type suitable for use at Stonington would cost approximately $65.00 dollars per square foot to construct. With this type of investment it would be very difficult for a municipality to solely support a development project. With the lack of public funds combined with high interest rates, Stonington was unable to fund port development.

7) Inadequate Marketing Structure. The port of Stonington, like the majority of the fishing industry, suffers from inadequate marketing. Stonington remains a port devoted to boxing fish and shipping to either New York's Fulton Market or Boston. The basic distribution system at Stonington has changed very little in the past 30 years. Prior to the arrival of Stonington Fillet Company and Connecticut Seafoods, the Golden Eye Corporation (Stonington Fish Division) was the only major finfish buyer. By being limited to one outlet, Stonington fishermen were forced to chose between the price given or another port.

Prices at Stonington are determined by the New Bedford auction price the day after the fish are landed. The buyer generally deducts three cents per pound from that to cover the shipping of the product. Both Newport and Point Judith, however, determine their prices by the New Bedford price the day the fish are landed. At times, Stonington fishermen may sell to either of these locations if they feel the price
will drop the following day. Prior to Golden Eye Corporation, fishermen marketed their own catch, arranging the sale as well as distribution.

By remaining dependent upon a single buyer and traditional channels, Stonington could not take advantage of new markets opened by value-added processing. By varying cuts and packaging, value-added processing has opened markets in the food service and restaurant sectors. An example of this value added concept can be seen in Alaska. Seawest Industries, once a primary wholesaler, is now marketing salmon steaks, sides, portions and nuggets in vacuum sealed bags. Since Seawest began their program in 1980, all of the major Alaskan salmon producers have followed suit. Even if Stonington had a good supply of products and adequate facilities, the port would most likely not survive without proper marketing.

8) Resource and Space Conflicts. Stonington and the Connecticut commercial industry in general are under severe pressure from conflicting interests. In terms of resource availability, the recreational fishing sector is beginning to put strains on existing stocks and competing for available dockspace. These conflicts did not initiate the decline of Stonington, but have prevented its rebirth. As was cited earlier, it is suspected that unchecked growth in the number of recreational fishermen and the lack of accurate land-
ing data are putting severe strains on existing stocks. Although this statement is unsubstantiated at this point, it is interesting to note that the 1979 recorded recreational landings for Connecticut were more than double the commercial landings for the same year. A recent study, conducted for the Connecticut Marine Trades Association, estimates that marine trades in Connecticut are valued at 200 million dollars of gross sales. This same study values the commercial fishing industry at 11 million dollars.

The recreational boating industry is only one of the potential threats to the commercial industry. Competition for available waterfront land, as well as docks, slips, moorings and launching ramps has increased steadily. The port of Stonington is surrounded by land suitable for water dependent or water enhanced construction. Stonington's small New England seaside village character and the demand for coastal residences puts fishermen using private facilities in great jeopardy.

The site of the former Stonington Boat Works on the Stonington waterfront is now occupied by high priced condominiums. This project was initiated in the late 1970s and is considered to be the beginning of waterfront construction in Stonington. Although the Boat Works was no longer in operation, this development points toward an increase in the construction
of condominiums on available waterfront sites.

9) **Unavailability of Labor.** Due to the hours required and the type of work involved, fishing is an industry suited for a special breed of person. Because of these factors, fishing has never competed very well with shoreside industry. After World War II, shoreside industries in Connecticut were doing well. The introduction of Pfizer Chemical and the success of General Dynamics - Electric Boat Division encouraged many fishermen and plantworkers to seek employment on shore. Better pay, benefits, limited time away from home and steady hours continued to lure workers away from the Stonington fleet. This easy access to shoreside jobs and the curtailment of immigration limited the numbers and quality of workers which could be found.

10) **Regulatory and Organizational Factors.** The final reason cited for the decline of Stonington involves politics and regulatory constraints. Prior to 1968, a number of attempts were made to encourage development at Stonington. Overtures had been made by a large grocery chain, an animal food packer and a fishmeal processor. All of their attempts were unsuccessful in part due to hostility of the community and local zoning regulations. A further attempt by the State to buy land in the early 1960s through a self-liquidating bond failed when it was feared that the
bond could not be repayed in time.

The current administration in Stonington and the State are more aware of the fleet and the possibility for development does exist. The Town Planning Department is investigating ways to preserve and enhance water-dependent uses in Stonington. Under consideration is a new marine commercial zone that would allow water-dependent uses while severely restricting water-enhanced uses. This increased local and state awareness was accompanied by regulations and permits. To this date, however, the town has encountered marginal difficulty in this area. This could be due in part to the limited amount of construction which has been undertaken.

Future Recommendations

The future of the port of Stonington and its eventual survival depends upon changes occurring within the harvesting, processing and marketing sectors. Some of these changes could take place immediately, while others will require substantial time and capital investments. Changes in one sector will lead to adjustments and change in the others. The general political environment in Stonington and the state appear good for development, but different reactions may be encountered once development begins.
Harvesting Sector

The Stonington fishing fleet consists of twenty-seven vessels. Of this twenty-seven, sixteen are draggers involved in the harvesting of groundfish. The remaining eleven consist of various sized lobster boats involved in both full and part-time harvesting of the local lobster resources. The majority of the fleet works on a daily basis as opposed to a 3-5 day trip schedule. Three of the draggers are over 60 feet in length which enables them to work on a trip basis. The fleet is mostly of wood construction with the newer boats being made of fiberglass or steel. The average age of the wooden boats is 31 years.

The availability of product is the first item which needs to be assessed. As has been shown earlier, foreign competition, the cyclic nature of fish stocks and the distance from the fishing grounds all contribute to the availability of product in Stonington. For the most part, passage of the MFCMA eliminated foreign competition within the harvesting sector of New England. Foreign vessels are no longer allowed to harvest traditional groundfish products and are restricted to non-traditional species such as squid, mackerel, hake and herring. In addition, these vessels are allowed to fish only in certain areas called "windows" located off the coasts of New England and the Mid-Atlantic.

The vessels homeported in Stonington have a diverse number of species available to them. The first step which should be taken is the improved utilization of traditional species
such as cod and flounder. These species have shown an increase in abundance over the past few years. One of the most important species to Stonington is the yellowtail flounder. Yellowtail became a desirable food fish during the mid-1930s when abundance of blackback flounder (or winter flounder) declined so severely that the industry sought a substitute. The 1982 landings of yellowtail in New England exceeded those of 1981 by 60 percent. Preliminary 1983 figures indicate that landings may exceed 75 million pounds; 36 percent above the 1982 landings of 55 million pounds. With a landed value of over 30 million dollars, yellowtail is ranked as the most important flatfish in New England. The recent increase in landings has been attributed both to increased abundance and to the removal of catch quotas. With ex-vessel prices averaging around $.55/pound (at times prices may reach $1.25 per pound) yellowtail has become the consistent money-fish in Stonington.

As can be seen from Figure 13, of the five traditional species harvested in Stonington, yellowtail had the second highest ex-vessel price. Fluke, the highest priced species, accounts for only a small portion of Stonington's total landings.
Figure 13

U.S. Landings of Selected Species 1982

<table>
<thead>
<tr>
<th>Species</th>
<th>Thousand Pounds</th>
<th>Thousand Dollars</th>
<th>Average Ex-vessel Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowtail</td>
<td>5,500</td>
<td>3,025</td>
<td>$ .55</td>
</tr>
<tr>
<td>Blackback</td>
<td>32,392</td>
<td>15,274</td>
<td>.47</td>
</tr>
<tr>
<td>Cod</td>
<td>104,438</td>
<td>37,385</td>
<td>.35</td>
</tr>
<tr>
<td>Fluke</td>
<td>26,535</td>
<td>19,434</td>
<td>.73</td>
</tr>
<tr>
<td>Scup</td>
<td>22,263</td>
<td>10,104</td>
<td>.45</td>
</tr>
</tbody>
</table>

Source: Fisheries of the United States 1982

It is unlikely that Stonington will be able to compete with ports such as Point Judith, New Bedford or Gloucester in terms of harvesting substantial volumes of traditional species. Stonington must take the approach of harvesting a better quality product which has been brought to port in one day rather than 3-5 days. The New England Fisheries Development Foundation has demonstrated that a quality product will result in an increased landed weight and better ex-vessel price. In addition, by landing this product on particular days, vessels at Stonington can take advantage of market conditions.

Landings of traditional finfish products are usually greatest prior to heavy weather or on Wednesday or Thursday. By playing the New York, Boston and New Bedford markets, fishermen as well as purveyors hope to catch a day when their product is the only one on the market. For example, a recent
spell of bad weather in New England resulted in an ex-vessel 56 yellowtail price of over $2.00 per pound. Because Stonington vessels fish in protected waters, they could have taken advantage of these higher prices. Increased awareness of market conditions and better communications with buyers could help to increase the value of the product landed at Stonington.

The second avenue for improved harvesting at Stonington is the development of non-traditional pelagic species. Harvesting of species such as squid, mackerel and butterfish gives Stonington the opportunity to add vessels and possibly expand facilities. Formerly called underutilized, these non-traditional species have yet to be accepted by the U.S. consumer. These species, however, have been harvested, consumed and traded on the international market for years.

Two species of squid are available to Stonington vessels, the longfin squid (Loligo pealei) and the shortfin squid (Illex illecebrasus). Recent NMFS statistics estimate that there are over 160 million pounds of these squid available for harvest.

Historically, production from the United States has been dominated by landings in southern California of the common market squid (Loligo opalescens). These squid were either canned or frozen for export to Greece, Italy, Spain and Japan. Normally packed whole, recent technological improvements have allowed for the production of a cleaned tube and tentacle pack. East coast fishermen have had squid available to them
since the passage of the MFCMA, however, not until the recent
decline of the west coast fishery did intensive harvesting
begin in the east. During 1982, ex-vessel prices for east
coast *Loligo* ranged from .20 - .60 per pound.

With a minimum of investment, Stonington vessels can take
better advantage of the squid resource. When foreign vessels
were denied access to the productive squid areas of Nantucket
and Long Island, many of them turned to partnerships with
American processors. These partnerships, or joint ventures,
usually involve the over-the-side sale of product to a foreign
vessel, as well as an agreement to purchase a certain amount
of domestically processed product. A considerable amount of
controversy has arisen between joint venture concerns and
domestic processors. As long as joint ventures are being
conducted, domestic processors cannot obtain the volume of
product they require. Joint ventures not only limit the
supply of raw material, they also supply the finished product
to the same foreign market. Although joint ventures supply
needed processing technology, as well as an outlet for Ameri-
can fishermen, they are at the same time hurting some domestic
processors.

Stonington is surrounded by a number of joint ventures
for squid. The ISTC Corporation of New Jersey is buying
products in Montauk, New York; Joint Trawlers Corporation has
located in Greenport, New York; and Stonington Seafoods of
Rhode Island is operating in Point Judith. All of these
companies have expressed an interest in working with the
Due to the areas in which each joint venture operates an over-the-side joint venture involving either the ISTC or Joint Trawlers Corporations would be the most accessible. Both of these companies obtain product from the waters adjacent to Connecticut while Stonington Seafoods is planning operations off the coast of Cape Cod. Stonington vessels could sell product over the side to a floating processor or land the product at shoreside plants in Montauk and Greenport. Participation in joint ventures should be viewed as an interim measure to developing additional offloading and processing capabilities at the port of Stonington.

The same principles which have been used in the development of squid can be applied to other pelagics such as butterfish (*Peprilus triacanthus*) and mackerel (*Scombrus scombrus*). In the harvesting of pelagics large volumes of product are necessary to compete in the international export market. Small volumes of product can be sold domestically at higher prices but this outlet becomes flooded very quickly. A number of Stonington vessels are currently harvesting butterfish. This product is offloaded in Stonington and trucked to Point Judith, New Hampshire or Maine for packing. Ex-vessel prices range from $.05 to .45 per pound on the average. Butterfish are hand-packed and sold to Japan where they are split, dried and sold in retail outlets. The final price of the product depends not only on size, but overall attractiveness of the pack and fat content. NMFS statistics indicate that there is approximately 35 million pounds of butterfish available for
harvest in 1984. It is expected that U.S. fishermen can readily harvest this amount with very little foreign participation.

It is predicted that mackerel will be the next species of opportunity for east coast fishermen. With close to 200 million pounds of mackerel available for harvest in 1984 the potential for development is very great. Although east coast fishermen can harvest squid and butterfish quite readily, they have not been as successful with mackerel. For the most part, mackerel are harvested by trap nets along the coast and by purse seine fleets in Maine and Canada. Ex-vessel prices on the average range between $.05 - $.25 per pound, but at times the fresh market in New York can bring up to $.90 per pound.

Stonington vessels have the opportunity to harvest mackerel in quantity during their spring and fall migrations along the east coast. Additional harvesting technology would have to be developed if the vessels wished to trawl for mackerel; however, both gill and trap nets could be used in the interim. In addition to harvesting technology, a market other than New York's Fulton Market would have to be identified. Substantial volumes of mackerel are presently being imported from Canada and Norway for use in U.S. bait and zoo food markets.

The third step which Stonington could take to improve its available resources is the development of three additional species; whiting, northern crab and hake. The whiting or silver hake (Merliccius bilinearis) has been harvested consis-
tently at Stonington. Landings for 1982 reached 100 thousand pounds. The majority of this product has been harvested by 2-3 trawlers operating in inshore waters. The potential harvest of whiting has been estimated at 100 millions pounds. Whiting is considered the second most under-harvested species outside of mackerel. Interviews with Stonington fishermen have indicated that with the introduction of a small mesh whiting net (cost approximately $2,000) a substantial volume of whiting could be obtained.

Low ex-vessel price and rapid spoilage of the product have prevented expansion of the whiting fishery. Fishermen have indicated that a price of $.20 - $.25 per pound would make it attractive for them to fish for whiting. During the month of January, 1984, whiting prices dropped to $.05 per pound. Boxing of whiting on board has helped to produce a better quality product but ex-vessel prices have failed to rise to desired levels. In addition, strong competition from whiting harvested in Argentina, Uruguay and the state of Washington has kept the northeast resource from developing to its full potential.

The northern crab is another species of potential for Stonington. Two species of crab are included under the name northern crab; the Jonah crab *(Cancer borealis)* and the Rock crab *(Cancer irroratus)*. During the early 1970s Stonington vessels were involved in a directed fishery for northern crab in Block Island and Long Island Sounds. These vessels landed their catch at the Sweet Crab Company located in Montauk, New
York. When this company went out of business, the vessels at Stonington stopped harvesting the crab. This fishery has flourished in Maine for many years and since 1980, four New England companies have begun to market northern crab.

Northern crab can be harvested both from inshore and offshore grounds. Stock sizes for the northern crab have never been fully assessed, but the NMFS has estimated that in New England the stock could reach up to 50 million pounds. The entire east coast resource has been estimated at 500 million pounds. At the time of its termination, the Sweet Crab Company had six Stonington vessels harvesting crab.

There are two possible ways that vessels could begin to utilize the northern crab resources. The first is for fishermen presently fishing for lobster to fish for crab in their off seasons (April-June; September-January). These vessels are presently equipped to use pot-gear so it would involve only an investment for the purchase of crab pots. Due to their small size the majority of these vessels would be limited to the inshore crab resources, harvesting crabs of approximately 12 ounces. These boats would work on a daily schedule, supplying a constant amount to a processor. During his five years of operation, one fisherman increased his harvest from 1,000 pounds per week to 10,000 pounds per day using 220 crab pots. Each pot on the average, was capable of harvesting 40-60 pounds per day. The crabs were put in boxes and covered with wet burlap. They were cooked immediately upon delivery. Due to increasing demand this fisherman
contracted other vessels in order to increase the supply of crab. The potential resource is illustrated by the fact that this one fisherman harvested 3/4 million pounds of crab from an area of two square miles within Block Island Sound.

The second way in which vessels could utilize the crab resource is by the conversion of small draggers to pot-fishing. These vessels would be used to fish the offshore resource, harvesting crabs between 16-20 ounces. This is a good opportunity for fishermen with older vessels who prefer different harvest strategies rather than increasing their vessel size and overhead to compete in the traditional ground fishery. One Stonington vessel was converted to a crabber on a temporary basis. It took approximately one month to convert the vessel at a cost of $4,000, not including deck hardware. New additions to the vessel included a hydraulic pot hauler, a wooden rail for tending pots and the specially designed pots. The vessel began fishing for crabs about three miles offshore of Montauk Point. The Sweet Crab company agreed to buy 20-40 thousand pounds of crab per week. New pot gear must "soak" for a while before it begins to produce. Just as the new gear was beginning to produce, internal problems at the processor began to occur. Since the market for the crab no longer existed the vessel resumed operation as a dragger.

The potential for development of the northern crab resource still exists. Discussions with the owners of the former Sweet Crab Company indicate that they are interested in beginning operations again. Finding a suitable location for
the crab processing plant appears to be the limiting factor. In the interim, Stonington fishermen have a market for live crab which brings $.20 - $.25 per pound.

The final species which show promise for harvest in Connecticut are the red hake (*Urophycis chuss*) and white hake (*Urophycis tenuis*). These species are not new to the vessels in Stonington and have been harvested in the past. Landings of these hake in Stonington for 1982 were near 20 thousand pounds. Estimated stock figures indicate that there is over 80 million pounds available on the east coast. Hake is a popular fresh fish with substantial volumes being shipped to Baltimore during the summer months. Frozen hake fillets are also used as a substitute for cod and pollock to a limited extent. Frozen hake, however, cannot be kept longer than three months in storage - the flesh becoming tough and rubbery. This toughness is caused by an enzyme which causes the tissue to bind together. The same enzyme which makes frozen hake unpalatable after three months also makes it highly desirable for the production of "surimi" or minced fish.

Surimi is the Americanized name of a Japanese product called Kamaboko or fish paste. Traditionally made with Alaskan pollock, surimi is becoming the fastest selling seafood product on the market. Surimi is made by washing and straining minced fish. Sugar, salt and sorbitol are added to yield a concentrated fish paste. The fish is then pressed into various shapes using the inherent binding properties found in the fish's tissue. Flavorings and color are added to produce
a variety of imitation crab legs, shrimp, lobster or scallops. Product on the market can range from 100 percent fish to a 50:50 crab/fish combination. Imports of surimi product into the U.S. were 2 million pounds in 1979. This has soared to 29 75 million pounds in 1983.

Because of the growing popularity of surimi products, U.S. industry has begun to search for ways to produce their own. Both the National Fisheries Institute and the National Food Processors Association held meetings in early 1984 to discuss surimi production. In addition, the NMFS has allocated $1.5 million dollars worth of S-K money to be used for surimi development in 1984. The New England Fisheries Development Foundation (NEFDF) and North Carolina State University have determined that the red hake produces an excellent surimi product with no modification to the process applied to Alaskan pollock. Red hake has some competition when trying to become the next raw material for surimi; freshwater catfish, menhaden and gulf croacker have all been identified as having surimi potential.

With current ex-vessel prices of between $.04 - .10 per pound, substantial volumes of red hake must be harvested in order to make the venture profitable for Stonington fishermen. Small scale surimi production is presently being conducted by Champlin's Seafood of Narragansett, Rhode Island. A step ahead of Stonington, Champlin's is utilizing red hake for raw product and adding Northern crab or lobster bits for flavorings. The product is still at the formative stages and in no
way competes with Japanese production.

If resource availability were the only criteria used in the development of fishery harbors, then Stonington would have little trouble adding a number of vessels into its fleet. Prices for new vessels range from $300,000 dollars for a 60 foot trawler to over $600,000 dollars for a vessel 75 feet in length excluding gear. Funding for vessels can be obtained but high interest rates and the uncertain nature of fishing tend to increase the risks. A 1979 fishing industry feasibility study prepared for the City of New London indicated that under "favorable market conditions" large offshore vessels operating from Connecticut could make a profit. Vessels of between 60-75 feet are not adversely affected by the distance from Connecticut to traditional fishing grounds. Many of the areas where squid, mackerel, butterfish and hake are harvested are within easy reach of Connecticut and Stonington. However, to date this fleet has failed to materialize despite its proposed profitability. It must therefore be assumed that factors other than those of resource availability and vessel economics have prevented the development of Stonington.

Facilities and Processing

Fishery harbors have a number of general functions which are common to all harbors whether cargo or fishery. These functions include:

1) A safe and easily identified approach from the open sea adequate depths.

2) A well defined entrance and approach of adequate depth.
3) A sufficiently large, deep and protected basin to cater for the operations required.

4) All necessary navigational aids, visual and electronic, to assist vessels in the safe use of the port.

5) Where necessary, protective breakwaters to reduce wave and storm effects.

6) Adequate docking to service the numbers and types of vessels using the facility or likely to use in the near future.

7) Utility services such as fuel, water, electricity, water drainage, sewerage systems and fire fighting equipment.

8) Buildings to support smooth and efficient operation.

9) Adequate space for expansion.

10) Access to main road connections or railways.

11) Parking and adequate space for loading and unloading vehicles without upsetting the free flow of traffic.

12) Repair facilities in the vicinity of the port.

The characteristics which make fishery harbors different from other shipping harbors are the perishable nature of the product handled and the need for early distribution or immediate processing. This requires rapid unloading and handling and frequently, for the location of processing facilities within the harbor. In many fishery harbors the vessels are relatively small, calling for a higher degree of protection from the elements. Also, due to the uncertainty of catch and grounds fished, it is not possible for vessels to determine their actual arrival and departure time. Therefore, the harbor facilities should be able to deal with an irregular and unpredictable flow of traffic.

As has been stated previously, the present facilities at
Stonington have been used for fishing for many years. The outer and inner breakwater provide adequate protection from storms arising from seaward. As you approach the inner harbor, water depths exceed 25 feet. Once inside the harbor, water depth approaches ten feet in some areas, shoaling to seven feet next to the pier (Figure 14). In its present condition, Stonington harbor could accommodate large vessels of 70 feet in length only on the north and west sides of the pier. At low tide, these large vessels would hit bottom within the inner pier area. Maintenance dredging of the harbor area would be desirable, however, the cost of such a project and disposal of the dredged material have prevented it to date. The Town of Stonington believes that rehabilitation of the pier and construction of support facilities should take precedence over dredging. Dredging will prove inevitable if major development is to occur.

Renovation of the existing 2200 feet of dock has already begun. New planking has been installed along the south side of the North Pier with the north side being next in line. A grant from the Farmer's Home Administration, for the sum of $215,000 dollars, is being used for the construction of a 50 x 120 foot steel offloading building on the south side of the North Pier. At this time only offloading and packing will be allowed in the new building. Some processing (i.e. filleting) could be done in the building but the appropriate tenant has not yet been identified. Other projects which have been identified but as yet unfunded include:
Figure 14 Stonington Harbour Overview

Source: Department of the Army, Corps of Engineers
1) Replacement of 218 feet of dock on the inboard north side of the South Pier.

2) Extension of 162 foot section on the inboard end of the south side of the North Pier.

3) Construction of a 60 x 4 foot dock at the east end of the basin.

4) Extension of the South Pier 75 feet of the west to add dock space and serve as an additional breakwater protecting the new offloading building.

5) Construction of a 70 x 4 foot dock across the west face of the South Pier.

6) Construction of finger piers on the north side of the North Pier.

7) Upgrading the present 616 square feet of ice storage and increasing fuel tank capacity from 14 to 100,000 gallons.

The lack of sufficient docking facilities and support services has definitely prevented new vessels from homeporting in Stonington. While Stonington slept, Point Judith, New Bedford, Greenport and Shinnecock all proceeded with major restorations and construction of their facilities. Point Judith has over 10,000 linear feet of dock as opposed to Stonington's 2,200 feet. New vessels were attracted to these modern facilities and some Stonington vessels joined them. The location of processing plants at these facilities has also served to attract vessels by creating an outlet for product. Point Judith has nine processors of varying degree within a short distance from the port and Shinnecock and Greenport each have two. The port of Stonington could benefit from the creation of processing facilities at or near the port. The scale of these operations can range from additional
offloading to large scale packaging and freezing operations. In any of these situations it would be beneficial to give fishermen the opportunity to acquire equity in the project. One of the reasons cited for the demise of the Bindloss fillet plant in the late 1950s was the fishermen's desire to harvest scup rather than the lower priced flatfish used in filleting. By having equity in a processing operation, fishermen would have a vested interest in supplying it with product. The Penobscot Bay Fish and Cold Storage facility located in Maine is a cooperatively owned and operated processing plant. Fishermen have equity in the facility and therefore will supply product to it even if a competitor is paying a higher ex-vessel price. The fishermen hope to make up the difference in the profit made by the final sale of the product. A cooperative approach in processing would give Stonington an advantage even over an established cooperative like the Point Judith Cooperative which up until now has not become involved in processing.

The processing of pelagic species is a fairly simple procedure but one which has not yet been mastered fully by Americans. Squid, mackerel and butterfish have all traditionally been hand packed and frozen at sea by foreign distant water fleets. The shore frozen product produced in the U.S. is not an acceptable product in most buyers' eyes - but it is sometimes the only product on the market. Stonington could conceivably pack their own product. By landing a high quality product the fishermen could either pack on site
and ship to a public cold storage facility or contract out the packing to an established processor. Depending upon the volume, packing charges can range from $0.10 - $0.25/lb. There are five facilities located in Rhode Island which will pack product on order. By packaging product in this way, Stonington has a price advantage and does not need to invest in facilities. The SEAMARK Corporation of Boston presently has three facilities packing butterfish on contract. SEAMARK has only to purchase the raw product and pay for packaging and storage.

The processing of whiting, red and white hake and northern crab is more detailed than that of pelagics. Without a structured processing facility complete with filleting lines, waste disposal, adequate water and freezer capacity, it is unlikely that a quality product will be produced.

Both whiting and the two species of hake spoil rapidly after harvesting. Proper on board handling of these species is imperative to produce a product at shoreside which is not only fresh but which will produce a good yield when filleted. Whiting is processed in a variety of market forms, headed and dressed or gutted (H&G) as butterfly fillets; and the larger fish (King whiting) are sold both whole for smoking or in regular fillet form. Any one of these species is readily filletable by hand or machine. The processing of red and white hake for surimi is a project beyond the capacity of Stonington. Fishermen should take the posture of supplying raw material to companies such as Yamaga Enterprises in Los
Angeles or other emerging surimi producers. Former producers of fish meal from menhaden are also investigating the feasibility of producing surimi in their now idle plants.

The processing of Northern crab could be accomplished through existing facilities based in Montauk or by the construction of a Connecticut-based facility. The live crab market is very promising but storage problems tend to indicate that processing the crabs into specialty products would be more profitable. Some of the products that have been obtained are:

1. Whole cooked crabs on ice.
2. Cooked claws—"crab fingers" and "cocktail claws."
3. Picked meat (canned and frozen with fish flake extenders).
4. Extruded paste combined with breading and packed in crab carapaces as stuffed crab.

In order to process Northern crab machinery for cooking, washing and meat extraction must be used. Cooking and washing machines are standard equipment and readily available. Meat extraction machinery is still being perfected by the industry. There are five types of machines which are presently being used to extract crabmeat. They are the vibratory shaker, the roller meat extractor, the meat/bone separator, the hammermill and the centrifuge. A recent development by BEAD Engineering Co. Limited of England could help to make machine-picked crabmeat production from northern crab an economic reality. Until the creation of Bead's crabmeat separator, the majority of northern crabmeat produced had shell fragments in it.
By employing the various types of processing equipment, a very versatile operation can be constructed. After washing and cleaning, the crabs can be fully cooked, sold whole or put in a meat/bone separator. Particles of meat can be reformed by using the natural protein binding abilities already present in the crab. This binding ability could combine nicely with the similar properties of red hake. Another processing alternative is to separate the legs and claws after an initial cooking. The body of the crab is used in the meat/bone separator or shaker and the legs and claws are treated separately. Legmeat is usually hand-picked and added to the separated meat. The claws may be frozen and marketed as whole claws, the meat hand-picked or they may be cut into cocktail claws. A cocktail claw is prepared by making a circular cut around the tip of the claw so that the shell remains attached to only the pincers, the remaining shell is easily pulled away. All of the processed products may be either canned or frozen. Both Abbotts of New England and Connecticut Seafoods have shown interest in working with Northern crab. Due to previous experiences, however, fishermen are reluctant to harvest large quantities of Northern Crab without a contractual buying situation.

Up until this point recommendations pertaining to the expansion of Stonington have been made ignoring the potential problem areas. Improved facilities through rehabilitation or construction and the location of processing facilities would all help the fleet. These projects are, however, constrained
by conflicting uses, construction limitations and the overall lack of capital. The town of Stonington is becoming a highly prized area for vacations and real estate investment. The demand for coastal residences has made the real estate business in Stonington an attractive venture. The site of the former Stonington Boat Works, adjacent to the fishing port, is now occupied by high priced condominiums. Floating concrete piers have been extended into the harbor to serve as docking facilities for recreational boats. This area had once been considered by Stonington Seafoods of Narragansett as a prime location for the offloading of fish and lobster. A fishing port often adds a New England-like character to small towns which is attractive to real estate developers. The attitude in Stonington appears to be that fishing is fine as long as the wind doesn’t blow in my direction.

Facility expansion at Stonington will have to occur to the north and west. Directly to the south lies both the Connecticut Small Boat Association and the newly constructed condominiums. To the east is the downtown section of Stonington complete with private homes, restaurants and stores. Increased traffic flow to and from the port could cause problems in the summer season. The movement of trucks at night could help to speed traffic flow. Unlike the western end of the state, Stonington is not competing with recreational fishermen for docking facilities. Since the pier facilities were bought by the town with the intention of preserving the fishing fleet, it is unlikely that space conflicts at the pier will
Stonington fishermen harvesting within Long Island Sound do face intense conflicts with recreational users. Competition for finfish and lobster has become very heated in recent years. The future of Stonington, however, does not lie within the waters of Long Island Sound but in the offshore areas. An improved facility at Stonington could become the future home of western vessels being pushed out of existing dock facilities. In response to these conflicts, the town of Stonington is investigating zoning methods that can maintain existing water dependent users. Under consideration is a new marine commercial zone that will allow water dependent uses while severely restricting others.

The second impediment to Stonington's growth stems from construction limitations. Physical space available will not allow Stonington to resemble Point Judith of even Shinnecock. The only avenues open are rehabilitation and extension westward. At the present time, Stonington vessels dock bow to stern along the face of the pier. At the most, 30 vessels can be accommodated. The addition of a 75 foot T-extension on the south pier would add an additional 250 linear feet of available dock. This T-extension would also help to protect the North Pier from southerly storms. Extension of the section further than 75 feet would block the channel and pose a hazard to navigation. The addition of finger piers along the north side of the north pier has also been proposed. Vessels could then dock stern first on the pier allowing space for additional vessels. Construction of the fingers would be re-
stricted to the west end. Sewage lines and a restricted safety area exist on the eastern end adjacent to the sewage treatment plant. With the construction of a T-extension and finger piers, Stonington could accommodate an additional ten vessels depending upon size.

Dockside processing facilities in Stonington would help the port substantially. Electricity, water, sewage and waste disposal are all of sufficient capacity to allow for the construction of a processing facility. However, due to a negative attitude by the local public, strong opposition would occur. Offensive odors, strain on existing services and destruction of the scenic character of the port are just some of the objections raised against processing. A recent hearing concerning the expansion of the Stonington Fillet Company at a site removed from the port, caused enough upheaval that the idea was withdrawn from the hearing. Small scale processing and contract packing appear to be steps which can be taken immediately. In addition, the location of a processing plant away from the port area is a workable alternative. If product is handled properly on board the vessel, the extra time required to reach a processing plant would not affect the quality significantly. However, this would put Stonington at a slight disadvantage in some markets that would not occur with dockside processing. Japanese buyers prefer product processed immediately upon landing. Product processed otherwise is considered inferior and at times unsellable.

The town of Stonington looks favorably on the rehabilita-
Local zoning regulations do not restrict growth in the port area. Development outside of the port area would depend upon the site selected and zoning regulations for that area. The majority of the construction that would take place at Stonington would be on existing facilities. Because of this, regulatory requirements could prove to be purely procedural. However, in the event of new construction or dredging considerable time delays could be encountered. The initial plans for construction of the offloading building began in late 1981 and this project is only now beginning the construction phase. Since the pier is owned by the town, regulatory compliance would be coordinated by the Stonington Town Planning Department, Community Development Office and Waterfront Commission. This tri-department approach has helped to eliminate problems caused by regulatory compliance. Permitting does not appear to be a factor which would inhibit the growth of the port of Stonington. However, regulatory requirements for the construction of new piers and dredging of the harbor could prove to be not only costly but time consuming.

The third factor limiting the port of Stonington and fishery harbor development in general is the lack of available capital for harbor development. Fishing ports have remained small and scattered, with increased development becoming of interest only after the passage of the MFCMA. Present government programs are not adequate or timed appropriately to foster growth in port and harbor facilities suitable for
fisheries development. Port development is a costly endeavor. Engineering, planning and a growing number of federal laws and regulations embracing port security, environmental preservation and waterfront safety require agencies to expend substantial sums. Other costs arise from lengthy delays created by numerous federal, state and local agencies, each requiring different certificates, licenses, permits and approvals for port navigation and water resources projects.

Despite the inadequacies and concentration upon cargo ports, many of the funding programs available may be employed to develop fishery harbors. Funds are generally obtained from long-term borrowing such as the issuance of general obligation or revenue bonds or some form of subsidy at the federal, state or local level. Port authorities can issue general obligation bonds, which are usually tax supported. The state, county or municipality, when acting as the legislative parent of the port authority, is required to provide collateral security by pledging its full faith and credit. Issuance of such bonds may be preceded by a referendum to determine the consensus of the community. This type of land financing places a burden upon the local taxpayer. The acceptance or rejection of the referendum is based on the will of the community concerning the overall economic benefits of the new facility to be financed. One recent example of a referendum - supported bond program for the development of fishery harbor exists in Maine. In 1979 voters approved a bond totaling nine million dollars to be used for the improvement of the state's
fishery harbors. Rhode Island approved a similar bond issue for 600,000 dollars in 1983 to finance port improvements in that state. Most successful fishery development activities in the nation have been established through local efforts. Federal port financing programs have been directed toward channel improvements, maintenance and navigational aids.

The Town of Stonington has been fairly successful in securing funds for their port development project. In total, the town has obtained over 600,000 dollars for facility improvement. Obtaining funds is a constant struggle due to the high cost of pier construction. For Stonington to continue its program, some creative financing utilizing both public and private sources must be employed (see Appendix for public funding sources). Stonington has already utilized some of the more traditional funding sources such as the Connecticut Department of Economic Development, the Community Development Program of the Department of Housing and Urban Development and the Farmers Home Administration. It is unlikely that additional monies will be obtained from these programs. The Economic Development Administration (E.D.A) was once the primary source of funds for port and harbor development. Both Shinnecock Harbor and Portland, Maine, have received funds from the E.D.A. However, the E.D.A. stopped considering proposals for harbor development in 1982 at the request of the Reagan Administration. Stonington, therefore, is forced to look for areas of funding other than traditional sources.

Despite cutbacks, the federal government has recognized
fishery harbor development as an important facet of fisheries development. The extension of the Fishing Vessel Obligation Guarantee Program (FVOG) to cover shoreside facilities was a major commitment. The FVOG program does not make grants but guarantees repayment of up to \(87 \frac{1}{2}\) percent of the money borrowed for constructing or reconditioning commercial fishing vessels. It is likely that the FVOG program will tend to help established companies rather than new facilities. Since the program is a guarantee, the risk would be reduced by dealing with an established company. Trident Seafoods of Alaska, the most recent recipient of an FVOG guarantee, has been a leader in the Alaska industry for many years. With the proper backing, Stonington has the potential to utilize the FVOG program.

The Saltonstall/Kennedy (S/K) program of the Department of Commerce is a program designated for fisheries development which has not yet been applied to shoreside facilities. Their funds originate from 30 percent of the gross receipts collected by the U.S. Customs on Fisheries products imported into the United States. The fund is designated for the promotion of domestically produced fisheries products by conducting an educational service, as well as biological research programs. The fund was originally used for the programs of the NMFS and, more recently, have been utilized by Regional Fisheries Development foundations organized by industry. Two recent pieces of legislation call for the use of S/K monies in their programs. The United States Fisheries Development Cor-
poration Act proposes to take over the industry grant program of S/K and distribute the monies at the direction of the Corporation. The National Fisheries Marketing Council Act requires that a portion of S/K money be used to start the program. After that, the program would be funded by a 1/5th of a cent assessment on landings and imports. Only the Corporation bill specifically mentions shoreside facility construction as a priority product.

The S/K program has become somewhat of a political football with NMFS, the development foundations and now Congress fighting over possession. Stonington needs to keep abreast of recent developments and have fishery harbor development included into any program which rises from the huddle. The S/K program has not been used for shoreside facilities as of yet. In 1979, Stonington along with a variety of other ports applied for monies to be used for facility repair and construction. In an effort to fund regional programs, all port development proposals were turned down. The 1984 guidelines for S/K proposals as designated by the NMFS specifically state that "funding will not be provided for port and harbor development. Unless these guidelines are revised, it is unlikely that Stonington could receive funds through S/K for harbor improvements. If S/K is reorganized by some of the proposed legislation, then perhaps shoreside facility improvements will be funded.

A final government program which could prove useful for fishery harbor development in Stonington is the Capital Con-
struction Fund. The CCF program began in 1972 with the purpose of assisting fishermen by exempting from taxes certain income to be used for vessel acquisition or reconstruction.

At the present time the program can be used to:

1) Construct a new fishing vessel.
2) Reconstruct an existing vessel.
3) Pay the principal part of existing debt on a vessel.

The purpose of the CCF program is to improve the fishing fleet by allowing fishermen to accelerate their accumulation of funds with which to replace or improve their fishing vessels or improve their operations. The extension of the CCF program to shoreside facilities was originally included in the AFPA of 1980. However, prior to passage, the CCF extension was eliminated. Since that time, fishing industry supporters in Washington have attempted to obtain passage of a CCF extension to shoreside facilities, but up until now they have failed to do so. Although not applicable at the present time the CCF program could be useful to Stonington in later years (See Appendix for additional information on CCF program).

Stonington cannot rest its future on the availability of public development funds. The introduction of a bond program could help to provide some development monies. Lending institutions (savings banks, trust companies, commercial and national banks) in both Connecticut and Rhode Island are capable of providing funds for fishery development. Conversations with local banking institutions have indicated that funds are available. The Liberty Bank for Savings of Mystic, Connec-
ticut, has previously financed vessels in Stonington. Funding for direct pier construction is not encouraged but industrial revenue bonds could be made available for shoreside facilities. The Connecticut Department of Economic Development has made revenue bonds available to private companies such as Abbotts of New England, in New London, Noank Marine, in Noank, and Wilcox Marine, in Stonington. A public bond referendum, however, would have to be supported by the state government and local community. The uncertain and sometimes hostile nature of the Stonington community towards fishing operations could severely hamper passage of a bond referendum. A State bond to purchase the pier facilities prior to town ownership was defeated before it went to local hearing stages. A bond referendum including recreational piers or the "historic preservation" of local waterfront structures could have a better chance of passage.

In conclusion, it would appear that the current trend in port financing is toward the private sector. Unfortunately, the private sector is either unable or unwilling to finance basic pier construction projects. It is willing to finance shoreside facilities but not the piers themselves. The future of federal programs related to port financing is still uncertain. Federal funds still appear necessary for construction projects with private funds being employed for support facilities. If federal funds are not available, the future of port development lies in either the use of revenue bonds or the involvement of a large corporation. Most corporations have
stayed away from investing in the fishing industry because of its uncertain nature. Large agricultural companies, however, have begun to invest in fishing operations. The Con-Agra Corporation owns large trout and catfish farms in the midwest and has recently acquired the Singleton Shrimp Company. International Multifoods has begun to diversify its grain exports to include squid and butterfish and has also begun to market products domestically. Technological improvements and increased consumer awareness are making the fishing industry more attractive to large corporations by decreasing their investment risks. The introduction of an established corporation could help Stonington develop its facilities at a faster rate. The home offices of both Motts Markets and First National Supermarkets are located in Connecticut. Organizations such as these, which have their own warehouse processing, could be interested in investing or purchasing product at Stonington.

Marketing Sector

Assuming that the fishermen of Stonington are able to harvest, offload and process their catch, they still must be able to market the final product. The per capita consumption of seafood in the United States is presently 12.3 pounds per person; relatively low in comparison to 66.8 and 67.4 pounds per person for Iceland and Japan respectively. Despite this relatively low capital consumption figure, the United States ranks fourth as a leading consumer behind Japan, The Soviet Union, and China; utilizing 7.5 percent of the total
world catch of fish and shellfish. In 1982, about 8.0 billion pounds (round weight) of edible fishery products were consumed in the United States. The majority of seafood products are consumed away from the home. In 1980, 61 percent of consumer spending on seafood occurred in public eating places, 34 percent in retail stores, and 5 percent in institutions such as hospitals, schools, jails, and the military.

U.S. consumers eat a multitude of different species, but heavy consumption has traditionally concentrated on shrimp and canned tuna, which account for more than one-third of the total. In 1980, 62 percent of the U.S. seafood consumption was in the form of fresh and frozen, about 36 percent canned and 2 percent cured. The largest increase in per capita consumption by product form occurred in fresh and frozen products, having increased by 40 percent in the last twenty years.

The health and fitness fad combined with increased promotion by the seafood industry has helped to stimulate seafood consumption. Attributes such as low fat, high protein and possible disease prevention characteristics have all helped to promote seafood consumption. The American Heart Association of Washington has produced a publication called "Seafood is Heart Food" and the consumption of mackerel has been said to prevent internal blood clotting which could lead to strokes. The seafood industry invested about seven million dollars in generic promotions of product in 1983. This is a substantial start for the industry but relatively low when
compared to the 25 million dollars invested by the United Dairy Industry and 3.5 million invested by the American Egg Board to promote the "Incredible Edible Egg."

Demand for seafood in the U.S. is affected by several factors including price, consumer income, the price of substitutes and consumer tastes and preferences. In 1979, Ball estimated that a ten percent increase in price will reduce consumption by four percent for all types of seafood. Smallwood and Blaylock found consumer income to be an important factor as well. It was estimated that a ten percent increase in income would result in a three percent increase in consumption. However, substitutes and the preferences of the consumer appear to be the commanding factors controlling the demand for seafood.

The U.S. consumer changes consumption patterns to reflect price, nutrition and safety, food preparation and developing food products. The low cost, easy to use surimi products from Japan have taken a strong hold in the U.S. market exhibiting the consumer's flexibility. Between 1970-1980 consumption of fishery products rose 10 percent, poultry products rose 25 percent, pork increased 12.6 percent and the consumption of red meats declined 0.3 percent. Poultry and pork are the two biggest competitors of seafood products. Unlike seafood, these industries can control their production and ultimately their price. As a result, both poultry and pork have steadily increased their per capita consumption. Seafood prices, on the other hand, have increased steadily and, as a result,
consumption has remained relatively flat. Consistency in price and product quality are the two major factors which have made poultry and pork more successful than seafood. As can be seen from Figure 15, the Bureau of Labor Statistics consumer price indexes for the last ten years have been consistently higher than those of competing products.

It has been said that there are no new markets for seafood — they just belong to someone else. This is true not only in how seafood industry relates to poultry, beef and port, but within the seafood industry itself. The number of trade shows exhibiting seafood has risen dramatically in the U.S. as has their attendance. In addition, the Norwegian, Canadian, and French governments have begun to export fresh fish and seafood products into the United States. A growing market and a strong U.S. dollar have made even the risky export of fresh fish attractive.

The future of Stonington lies not only in improved harvesting and processing, but through the use of innovative marketing strategies. Without a defined market, there would be little incentive to increase harvesting of traditional or developing products. Stonington's decline was hastened by inadequate marketing and its revival depends on improvement. The first step Stonington should take to improve its market posture is the creation of a fishery cooperative for the purpose of consolidating product volume. The Southern New England fisherman's Association (SNEFA) presently purchases fuel and equipment on a cooperative basis but is not involved
Figure 15

CONSUMER PRICE INDEXES FOR FISH AND COMPETING PRODUCTS, 1970-80

Source: USGS Fisheries of the United States 1981
in marketing. A marketing cooperative would be capable of consolidating and selling available product as well as negotiating with potential buyers on contracts. A direct representative of some type would be essential to the success of a joint venture or contract export sale. By having one person or company responsible for the final sale, the fisherman would be protected from buyers attempting to negotiate separate agreements. This sales entity would operate on a commission basis thereby having a vested interest in the final sale.

Fishermen own a cooperative by purchasing shares of stock or paying a membership fee. Each member usually has only one vote despite the number of shares they may own. In most cases, a board of directors is elected who determine co-op policy and hire appropriate staff. Modern business does not operate on a cost basis but successful cooperatives do. A cooperative buys and sells for its members, with all proceeds after operating costs being returned to the members. The failure rate of cooperatives is relatively high and the fishermen of Stonington are noted for their independent nature. However, two similar ventures, the Point Judith Cooperative, in Rhode Island, and the Penobscot Bay Cooperative, in Maine, have proven successful. The present organizational structure developed by the SNEFA could be used as a foundation toward the formation of a marketing cooperative.

Whether or not a marketing cooperative becomes a reality, Stonington is still capable of improving its present structure. At this time, all of the product harvested at Stoning-
ton is shipped fresh through traditional channels. These channels involve either trucking product to New York's Fulton Market, the Boston Fish Pier, or to cutting houses in New Bedford. In any of these cases, the buyer will deduct from the ex-vessel price, as determined by the New Bedford auction price the day after landing, any boxing and shipping costs incurred. Until recently the port had only one fish buyer which imposed on the fishermen a take it or leave it situation. The introduction of additional buyers could be a second step towards improving Stonington's marketing. Stonington Fillet Company has begun purchasing product to be filleted for restaurant use. It is reported that Stonington Fillet at times will pay $.05 - $.10 more per pound than any other buyer in order to prevent other buyers from purchasing the product. The introduction of additional buyers as production increases could help to raise the ex-vessel price given to the fishermen even more. This increased competition will also help to prevent monopolization of the port by one buyer.

Movement away from boxing and shipping fish through traditional channels can also help to increase returns. The Connecticut Department of Agriculture in cooperation with the University of Connecticut Sea Grant Marine Advisory Service has begun a program to promote the intra-state sale of seafood harvested in Connecticut. The most recent census estimates the population of Connecticut has just exceeded three million people. With approximately 7.6 pounds per person of fresh and frozen seafood consumed in the U.S. this would indicate
that the Connecticut market is capable of consuming 22.8 million pounds of seafood. To utilize this potential, Stonington fishermen can begin selling product at existing farmers markets sponsored by the Department of Agriculture. In 1983, there were 31 farmers markets held weekly from July through October. The timing of these markets corresponds with the times when fish landings are high but ex-vessel prices are low. Most fishermen own a small truck or have access to one. With the additional investment in ice, boxes, signs and tarps, a fisherman could increase his ex-vessel returns. Farmers in Connecticut have found this direct marketing approach to be very successful but it is of yet untested by fishermen.

The introduction of a processing and/or freezing operation in the vicinity of Stonington would greatly enhance the port's marketability. If the fresh market became flooded with product it could then be channeled toward frozen. In addition, specific products, due to their perishable nature, are best marketed in frozen form. The export market for pelagic species is done entirely on a frozen basis. The sale of squid, mackerel and butterfish would be virtually impossible without access to packaging and cold storage. The political climate of Stonington would indicate that the most realistic approach would be for fishermen to sell directly to a joint venture or pack on contract at another facility. Connecticut Seafoods is currently buying butterfish for processing at its Providence, Rhode Island facility and Stonington Fillet is selling butterfish to a concern in New Hampshire. Market
prices returned to U.S. processors by Japanese buyers range between $.50 - $.75 per pound.

In terms of ex-vessel price, squid is the second most important pelagic species for Stonington fishermen. Prior to the passage of the MFCMA, squid production in the U.S. was dominated by west coast landings. The decline of the west coast fishery coupled with strong stocks in the Atlantic, enabled processors in New England to pack large quantities of squid. In the spring of 1983 over fifteen processors were packing squid for export and domestic markets. Thirty-one million pounds of squid was landed on the east coast in 1983. As of March, 1984, approximately 4.0 million pounds of this product was still in cold storage.

The market for fresh squid in the United States is growing. Wholesale prices can range from $.65 - $1.00 depending upon season. Due to squid's perishability, a large portion must be marketed frozen. A low moisture content makes squid very stable and it can remain frozen for up to a full year. Squid for export is traditionally hand-packed in ten kilogram boxes and sold to Spain, Italy, Germany, and at times, Japan. A strong domestic market prompted packers to produce a three and five pound retail supermarket pack. Despite large production in New England, the majority of frozen retail packs found in this region were packed by Fass Brothers of Virginia under their "Virginia Cape" label. The domestic and export market for squid is in no way dominated by U.S. resources. Squid is produced in Argentina, Taiwan, India and Thailand. Argentina
has been producing a vessel frozen "illex" squid which has been very popular in European markets. When the Argentine fishery was closed, Polish factory vessels moved off to the Falkland Islands and continued to flood markets with high quality, low-priced product. This foreign competition has forced U.S. processors to sell their product domestically or overseas at cost or less. The export market for squid is still attractive, but if strong foreign competition continues, processors will be forced to pay low ex-vessel prices to make a profit. Figure 15 gives an indication of the wholesale prices of squid from different origins. Squid not suitable for food consumption is packed in bulk and sold as bait in a variety of fisheries. At times the margin on bait products can be as high or higher than food quality.

The harvesting of mackerel at Stonington is as yet untried. Mackerel is occasionally harvested as a by-catch when harvesting squid and butterfish. As with all pelagic species, volume is the key with mackerel. East coast production of Atlantic mackerel is dominated by Canadian producers with some production coming from Lunds of New Jersey. Due to the low volumes harvested presently, Stonington could easily take advantage of the fresh market. Market prices for mackerel in New York are extremely volatile and can range from $.30 - $.90 per pound in the same week (Figure 16). Mackerel has also become popular with smokers, although this market too is limited.
# Figure 16

## CURRENT MARKET SURVEY FOR SELECTED SPECIES

### Wholesale Price/Lb.

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<tbody>
<tr>
<td>Squid</td>
<td>Whole Fresh Loligo</td>
<td>1 x 100 CT, RI</td>
<td>.35 - .50</td>
<td>.65 - 1.00</td>
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<td></td>
<td>Whole Frozen Loligo</td>
<td>1 x 22 CT, RI</td>
<td>.20 - .40</td>
<td>.45 - .50</td>
<td>.65 - .95 Europe</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Thailand</td>
<td>-</td>
<td>.54 - 1.10 Italy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spain</td>
<td>-</td>
<td>1.00 - 1.30 Spain</td>
</tr>
<tr>
<td></td>
<td>Whole Frozen Illex</td>
<td></td>
<td>Argentina</td>
<td>-</td>
<td>.50 - .75 Italy</td>
</tr>
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<td></td>
<td>Cleaned Squid Tubes</td>
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<td></td>
<td></td>
<td></td>
<td>Taiwan</td>
<td>-</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>India</td>
<td>-</td>
<td>.65 - 1.15</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Argentina</td>
<td>-</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
<td>Thailand</td>
<td>-</td>
<td>.90 - 1.50</td>
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<td>Nephrops</td>
<td>Whole Fresh</td>
<td>1 x 100 RI, NJ, CT</td>
<td>.05 - .25</td>
<td>.30 - .90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whole Frozen</td>
<td>1 x 25 RI, NJ, CT</td>
<td>-</td>
<td>.20 - .45</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Norway</td>
<td>-</td>
<td>.15 - .30</td>
</tr>
<tr>
<td>Euphausia</td>
<td>Whole Fresh</td>
<td>1 x 100 USA</td>
<td>.10 - .45</td>
<td>.20 - .60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whole Frozen</td>
<td>1 x 22 USA</td>
<td>.10 - .45</td>
<td>-</td>
<td>.60 - .85 Japan</td>
</tr>
<tr>
<td>Red &amp; White Halibut</td>
<td>Whole Fresh</td>
<td>1 x 100 RI, ME</td>
<td>-</td>
<td>.30 - .70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen Fillets</td>
<td>10 x 5 ME</td>
<td>-</td>
<td>.60 - .60</td>
<td></td>
</tr>
<tr>
<td>Silver Hake (Whitones)</td>
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<td>.05 - .60</td>
<td>.20 - 1.25</td>
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<tr>
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<td>Breamed Frozen</td>
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<td>.05 - .60</td>
<td>.20 - 1.25</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Puget Sound</td>
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<td>.35 - .40</td>
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<td></td>
<td></td>
<td></td>
<td>Argentina</td>
<td>-</td>
<td>.50 - .50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>South Africa</td>
<td>-</td>
<td>.90 - .90</td>
</tr>
<tr>
<td>Blochs</td>
<td>4, 15, 5 Argentina</td>
<td>-</td>
<td>.57 - .59</td>
<td></td>
<td></td>
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<tr>
<td>Northern Crab</td>
<td>Whole Fresh</td>
<td>1 x 100 CT, RI, ME</td>
<td>.10 - .25</td>
<td>.50 - .40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whole Frozen</td>
<td>1 x 12</td>
<td>-</td>
<td>.80 - 1.00</td>
<td></td>
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<tr>
<td></td>
<td>Spiny Lobster Claws</td>
<td>1 x 24</td>
<td>-</td>
<td>1.50 - 2.00</td>
<td>1.00 - 2.00 England</td>
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<tr>
<td></td>
<td>Claw-SP Claws</td>
<td>10 x 1</td>
<td>-</td>
<td>3.00 - 4.00</td>
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<tr>
<td></td>
<td>Claw-SP Claws 10 x 5</td>
<td>-</td>
<td>6.00</td>
<td></td>
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<td></td>
<td>Extruded Claws</td>
<td>10 x 5</td>
<td>-</td>
<td>1.00 - 1.50</td>
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</tr>
</tbody>
</table>

**Sources:**
- MHS Nisbet House Office (Green and Blue Sheets)
- Price Quotes from the following companies: Pruiside Foods (Newport, RI); Pilgrim Fish (Newport, RI); Foss Bros. (Kempston, VA); R.M. Bierin (Brooklyn, NY); Kayen International (New York, NY).
High quality frozen mackerel of between 3/4 - 1 pound per piece is always in demand for zoo and bait markets. Competing directly with Pacific mackerel and imports, price rather than origin is usually the deciding factor. Both the New England and Mystic Aquariums utilize approximately 20 thousand pounds per month of Atlantic mackerel. Bait mackerel is used widely in the swordfish, groundfish and snapper longline fisheries along the east coast. One company reports that during the summer season approximately 100 thousand pounds of bait mackerel is imported per month into Gloucester. Wholesale prices of bait mackerel range from $.15 - $.45 per pound depending upon supply. Zoo food mackerel is considered food grade and commands a slightly higher price.

Unless the domestic market becomes more stable, the future of the mackerel fishery lies overseas. Both the European and African markets are familiar with Atlantic mackerel. European markets are presently supplied by their own fleets and African countries have problems with foreign exchange. NMFS personnel predict that the North Sea mackerel resource will take a turn for the worse during the mid-1980s. If this prediction comes true, the U.S. industry could become a major supplier of mackerel to Europe. Research is presently being conducted by the NMFS in cooperations with Spanish and Polish vessels to obtain additional stock and harvesting information. Harvesting will most likely take the form of joint ventures until U.S. producers obtain sufficient technology. Due to the fact that mackerel travel up and down the
east coast during their spring/fall migration, Stonington would be able to participate in any number of ventures.

The market for domestic whiting as well as red and white hake is still developing. Processors have attempted to market domestic whiting but have been unsuccessful due to quality problems and intense foreign competition. South African whiting (*Merluccius capensis*) is considered the best due to a firm texture and pleasing taste. Argentine (*M. hussbi*) and Chilean (*M. gayi*) whiting are considered about equal in quality while Atlantic whiting (*M. bilinearis*) and Pacific hake (*Mentricirrhus productus*) are considered the least desirable. Preference is determined by firmness, oil content and general pack appearance. Depending upon the packer, many of these species, with the exception of South African product, can be interchanged readily. South African whiting is used largely for smoking and produces a superior product. The whiting market is "played" using both supply and price. When the Falklands Island war shut down the Argentine fishery, buyers moved toward Chile and Peru for product. Severe water temperature fluctuations in the Pacific during 1983 (El Nino) disrupted the Chilean, Peruvian and Puget Sound (Pacific) fisheries and directed buyers back to Argentine and to some extent Atlantic whiting.

Whiting is a white-fleshed fish often substituted for cod. Its major domestic market area is in the south and midwest where large volumes of H & G whiting are sold in supermarkets packed in five pound printed retail boxes. In
addition to dressed product, whiting is also sold as fillets (skin on and off) and in block form. Wholesale prices for H & G whiting can range from $.20 - $1.25 per pound with fillets ranging from $.70 - $2.00 depending upon size and origin (Figure 15). Blocks are usually sold to processors who produce portions and sticks for fast food markets. Block prices are relatively stable and hover between $.57 - $.59 per pound.

The most immediate market for whiting would be in the fresh form. Wholesale prices from New York range between $.20 - $1.00 per pound depending upon season. The fresh market becomes saturated readily and a frozen alternative would be desired. Due to whiting's rapid spoilage, near port processing would be the most preferable. Recent statistics for Stonington indicate that whiting landings have been around 100 thousand pounds per year with a limited directed fishery.

A possible market for this whiting exists in local supermarkets. Connecticut based supermarkets have begun to substantially expand their fresh and frozen seafood displays. These supermarkets currently handle fresh H & G whiting and have shown interest in product from Stonington. A Connecticut based processing plant could be successful in the marketing of whiting. The majority of the whiting harvested at Stonington is landed on the same day which it is caught. This high quality product would be an advantage in the fresh and frozen markets. However, strong foreign competition and the general lack of label-loyalty characteristic of the whiting market, would indicate that a processor should not rely
totally on the sale of whiting.

The marketing of red and white hake may prove to be the most difficult for Stonington. A seasonal (June thru August) fresh market exists in Baltimore for white hake. Frozen hake is not readily sold due to its poor holding capacity. The future of the hake resource could be in the production of seafood analogs and surimi. Five species of fish have been identified as having the proper components for the fabrication of surimi: croaker, Alaskan pollock, red hake, freshwater catfish and menhaden. Croaker is the traditional species used for surimi, but was depleted by overfishing leaving pollock as the next desirable. Of the remaining three, red hake and freshwater catfish produce surimi similar to that of pollock. Menhaden produces surimi of suitable quality, but is less stable than others due to menhaden's high oil content. Of these five species only pollock has been used commercially for the production of surimi. Japanese producers are resistant to use new raw material when they have ample pollock resources. Furthermore, American industry has yet to perfect the technology required to produce surimi on a commercial scale.

Space conflicts in Stonington will most likely prevent the location of a surimi plant in this area. Surimi plant location is expected to take place in the West or South to take advantage of lower operating costs. Stonington, as well as other New England ports, could ship hake to these emerging plants to be used as raw material. With an ex-vessel price on the average of $.04 per pound, red hake is at least competi-
tive with other products. The majority of surimi products on the market use varying percentages of shellfish (crab, scallop or lobster) to add flavor. A perfect compliment to red hake could possibly be northern crab. Extracted or minced meat could be used as flavoring at a price well below other crab products.

There is significant demand for all crab products in the U.S. The demise of the king crab fishery has left a gap in the market which is being filled by surimi as well as other crab products such as red, snow and blue crabs. Again, some type of processing outlet would be required for Stonington to be successful in the marketing of northern crab. With the price of king crab meat approaching $19.00 per pound and snow crab meat near $7.00 per pound, a less expensive product is required. Current northern crab meat prices range from $1.00 per pound for extruded meat to $6.00 per pound for all leg meat (Figure 15).

Northern crab is a diverse product which can be marketed in a number of ways. Fresh live crabs can be sold through traditional outlets and wholesale for $.30 - $.40 per pound. Fresh-cooked and iced crabs could also prove attractive allowing for a longer shelf life than live crab. The northern crab tends to fit well in any market which is accustomed to Dungeness crab. The northern crab is generally more difficult to pick and has a darker meat but marketing efforts have proved relatively successful. The success of the whole northern crab is due to its low price. Whole frozen northern
crab are priced around $1.00 per pound while the same form of Dungeness approaches $3.00 dollars per pound.

The second market form available to northern crab is the cocktail claw. Capitalizing on the popularity of Florida stone crab claws, the most successful form has been these cocktail claws. Wholesale prices range from $1.50 - $2.00 per pound, about half of the price of the now difficult to find stone crab claws. One New England company has even begun to market northern crab as "New England Stone Crab". Foreign competition has taken notice of the successful crab claw market. Crab claws of similar appearance are now being imported from England and Chile and range in price from $2.00 - $2.50 per pound. Cocktail claws are usually sold whole but some processors have begun to sell cracked and cap-off claws for between $3.00 - $4.00 per pound (Figure 16). Considering the ex-vessel cost of the crab, processors are capable of returning a substantial profit just on the claws.

The remaining body of the crab is either picked by hand or put in a meat/bone separator to yield a crabmeat product. Pick-meat is usually sold fresh but a frozen pack is becoming popular. Prices on this meat range from $5.50 to $6.00 per pound on the wholesale level. The extruded meat, resembling a grey-white paste, is used as an extender and filler wholesaling for $1.00 - $1.50 per pound (Figure 16).

Recent studies in Maryland have indicated that the northern crab can be sold as soft shell crabs similar to blue crab. If this is found viable, it could add an additional
product form to the now diverse market structure of northern crab. Stonington should begin to pursue the shipment of live northern crab by air to different parts of the country. Dungeness continues to rise in price leaving buyers with little room to make a profit. Florida and Colorado are two states which consume substantial quantities of Dungeness crab. In addition, Stonington should investigate the possibility of selling northern crab to existing processors. The rising price of competitive products could only open new market channels for northern crab.

For Stonington to succeed in a new market venture, consistent quality and market identity are required. Consumer confidence and recognition cannot be obtained without these qualities. Obtaining processing facilities at Stonington will be difficult. But with processing comes value-added production and label identity. Instead of remaining a fish shipper, Stonington could become a seafood producer. The rewards may include not only increased recognition and investment in the port but returns on initial investments as well. Both Perdue and Holly Farms have become successful by developing consumer loyalty by providing consistent, high quality products. Stonington will never be able to supply half the U.S. but it can obtain its own local and regional market niche.
CHAPTER III

Summary and Conclusions

Connecticut's 583 miles of coastline has been the home of a variety of inshore and offshore fishing fleets since the early 1700s. The state has historically produced substantial volumes of oysters and finfish from Long Island Sound as well as whales and seals from the distant Antarctic. Present landings consist of over thirty species of fish and shellfish harvested from Long Island Sound and adjacent offshore waters. Estimated total landings of fish and shellfish in 1983 reached 8.0 million pounds with a landed value in excess of 11 million dollars.

The total worth of the Connecticut commercial fishing industry including processors, wholesalers and retailers has been assessed at 36 million dollars. The recreational fishery in Connecticut contributes approximately 8.0 million pounds of additional fish and shellfish annually to the state's seafood landings.

The port of Stonington is the home of Connecticut's last offshore fishing fleet. Twenty-seven vessels currently home-port at this port. Of this twenty-seven, sixteen are draggers of between 40-60 feet in length. The remaining eleven consist of various sized lobster boats involved in both full- and part-time harvesting of the local lobster resources. The
fleet is mostly of wood construction, averaging 31 years of age, with the newer vessels being made of fiberglass or steel. Present landings at Stonington exceeded 3.0 million pounds of fish and shellfish or approximately 38 percent of the state total. However, in terms of finfish Stonington was responsible for over 66 percent of the state total. Predominant species at Stonington include blackback and yellowtail flounders, whiting, scup, butterfish and squid.

Stonington flourished as a fishing port until the end of World War II. The number of vessels fishing in Stonington declined from sixty in 1945 to an all time low of twelve to fourteen in 1979. In order to make recommendations toward the revitalization of Stonington the factors which led to its decline were first identified. Ten factors which contributed to the decline of Stonington include:

1) Foreign Competition in Fishing and Imports.
2) Lack of Available Resources.
3) Distance from the Fishing Grounds.
4) Competition from Other Ports.
5) Lack of Facilities and Services.
6) Lack of Financing for Development.
7) Inadequate Marketing Structures.
8) Resource and Space Conflicts.
9) Unavailability of Labor.
10) Regulatory and Organizational Factors.

It has been determined that Stonington's revitalization and eventual survival depend upon changes being made in the
existing structure. The seafood industry consists of three sectors: harvesting, processing and marketing. Each sector is relatively dependent upon the other but at the same time, acts independently. The marketing sector has the greatest flexibility, being able to purchase product from a variety of producers and origins. Unlike the poultry, pork and beef industries, no one organization generally has investments in all three sectors. This lack of vertical integration prevents the seafood industry from obtaining security in production, price stability, consistent quality and ultimately consumer confidence. Complete vertical integration in the seafood industry is not likely but the end results of integration are possible through other means.

The improved utilization of traditional species landed at Stonington is the first step which should be undertaken to improve the port's harvesting sector. This improvement involves landing a better quality product through on-board boxing and bleeding as well as timed landings when possible. Industry studies have indicated that on-board quality enhancement procedures produce a product which results in a better yield in processing and an increased ex-vessel price. In addition, through increased communications with shoreside buyers or representatives, landings of product can be timed to arrive when product supply is low resulting in a higher ex-vessel price. Although difficult to predict and even harder to implement, timed landings have been an effective tool used by "highliners" (successful captains) for some time. This
increased communication can involve a telephone call prior to departure or at sea radio communications concerning market conditions.

The second avenue for improved harvesting at Stonington is the development of non-traditional pelagic species. Harvesting species such as squid, mackerel and butterfish provides a new resource which could lead to the addition of vessels. The availability of joint ventures within Connecticut's surrounding area would provide an interim market for these species until Stonington is capable of processing their own product. The present vessels at Stonington have sufficient gear to harvest most of these species; however, the harvesting of mackerel would require some technological improvements to make the venture more profitable.

Whiting, red and white hake and northern crab have also been identified as species of opportunity for Stonington. Both whiting and the hakes are sometimes classified as traditional species but their present market value does not warrant large production. Better quality whiting could be harvested and sold fresh to local schools and present users of cod and haddock products. Both red and white hake have been identified as having potential for use in developing surimi products. Further investigations need to be made to identify developing surimi producers. At the present time surimi is produced almost exclusively in Japan. U.S. processors have not developed suitable technology for commercial surimi production. The northern crab has also shown development poten-
tial. Available resources, established harvesting techniques and a growing market have combined to make the northern crab an attractive species for development. Stonington fishermen harvest all three of these species currently, but have not increased production due to lack of facilities and low ex-vessel prices.

The lack of pier, offloading and processing facilities not only contributed to the decline of Stonington, but for a large part has prevented its revitalization. The Town of Stonington recognized this problem and has acquired 600,000 dollars in state and federal monies to be used for pier and facility renovation. The high cost of pier construction, however, has limited the amount of work which has been done to date. Additional monies need to be obtained to continue with the town's redevelopment program. If possible, Stonington should continue to pursue public funds for pier development. Government cutbacks and Stonington's utilization of the more popular sources of public funding will make this task increasingly difficult. Additional funding could be obtained from:

a) Loans from private lending institutions.
b) A referendum supported bond program.
c) Industrial revenue bonds.
d) Investment by a large corporation.

Local banking institutions have indicated that they have monies available to assist in fishery development projects. These loans would be available for shoreside support and processing facilities but not pier renovation or construction.
The unwillingness of local banking institutions to finance pier construction would require the use of alternative funding sources. A referendum supported bond issue is one alternative method. This bond issue could be either on a local or statewide scale to support pier construction along Connecticut's coast. Unlike Rhode Island and Maine which have passed similar issues, Connecticut's fishing industry may lack sufficient political muscle to obtain passage of such an issue. The bond may have to include recreational and private objectives in order to insure passage.

The use of industrial revenue bonds financed by either private lending institutions or the Connecticut Department of Economic Development would seem to be the next best alternative method of funding. These industrial bonds have already been employed by private companies in the Stonington and New London areas. Industrial bonds are not as a rule granted to public entities but since Stonington is the only offshore port in Connecticut, exceptions may be made. In the event that public entities cannot use revenue bonds, then a joint effort between the town of Stonington and a private company may be possible. Investment by a large corporation in the port of Stonington may prove to be advantageous. This corporation could provide funds for pier development as well as vessels. A private company may be reluctant to invest, however, due to development constraints which exist at Stonington.

The port of Stonington is in great need of pier and processing facilities. Expansion of these facilities are
constrained not only by finances but by physical space, conflicting uses and public opinion as well. The addition of a T-pier to the west and finger extension to the north could add an additional 700 linear feet of dock space allowing for the addition of ten or more vessels depending upon size. By docking vessels bow or stern to the pier additional dock space could be obtained. Further expansion to the west is limited by the existing approach channel and expansion to the Northeast is limited by the presence of the town sewage treatment facility. Renovation should not encounter regulatory impediments, but new construction will require lengthy permitting with associated financial costs and time delays.

The location of processing facilities in Stonington is desirable, but will be difficult to obtain. Small scale filleting or packing could be done either at dockside or at an off-pier facility. Zoning regulations permit small scale processing in most commercial areas. The introduction of large scale processing including filleting equipment, waste and gurry disposal increased water usage and visual pollution is not looked at favorably by the local community. Although the town government wishes to develop the fleet, public hearings have indicated that strong opposition would be voiced. The problem appears to be a matter of location rather than general opposition to fish processing. Most fish processing is not water dependent. The location of a processing facility away from existing residential areas could help to alleviate much of the public opposition. In addition, contract packing
at facilities located in Rhode Island can serve as an interim measure. In any of these processing alternatives, an equity program involving local fishermen would help to guarantee a steady supply of raw material to the processor.

Improvement in the harvesting and processing sectors is useless without complimentary improvement in marketing as well. Stonington fishermen should expand their present organization (SNEFA) to include marketing capabilities. Through the consolidation of product volume the fishermen can obtain a better overall ex-vessel price. It is possible that Stonington could obtain a higher price than that of New Bedford by selling on contract to an established chain store. Most large buyers follow the auction price but purchase second and third hand thereby paying a higher price. This method of cooperative marketing ties in directly with the timed landing of traditional species. If a cooperative is not possible than additional buyers should be solicited to foster competitive buying in the port. Without this competitive climate fishermen could be forced into accepting marginal ex-vessel prices.

The traditional method of fish movement at Stonington has been the boxing and trucking of fish to New York, Boston or New Bedford. By promoting the intra-state sale of local seafood (i.e. Connecticut Fresh; Catch Connecticut), Stonington fishermen could earn higher prices. This direct marketing would involve the utilization of the farmer's market system already in place. By using federal consumption figures, the market for fresh and frozen seafood has been esti-
mated at over 22 million pounds. Even if Connecticut's per capita consumption were in fact one pound per person, Stonington would just be able to meet the demand. By utilizing a pickup truck, boxes, ice and tarps, Stonington fishermen could reach an additional market. This direct marketing method would be most applicable to small or part-time vessels since initial volume sold may be relatively small.

The successful marketing of squid, butterfish and mackerel can be achieved by taking advantage of the limited fresh market and developing export markets. Direct sales to joint venture concerns and existing processors would be the most immediate outlet. Development of local packing capabilities or a cooperative effort to contract pack on order would be the most profitable. Overpack and product not of suitable quality could be sold in a variety of bait markets. Northern crab, whiting, red and white hake could also be developed, with northern crab being the most versatile. Whiting could be promoted as a fresh product with the two hake species being used in the fabrication of surimi. The successful marketing of northern crab, whiting and the hakes would require some type of processing facility. This processing capacity opens the door to value added products as well as label identification.

The fishery harbor serves as the focal point for most of the activities associated with the fishing industry. It is the home which provides safety from gales and equipment for repairs. Fishery harbor development has traditionally occur-
red in response to a need for shelter and unloading facilities for vessels in existing fisheries. The perishable nature of the products handled and the need for early distribution or immediate processing sets fishery harbors apart from other shipping harbors. These demands call for rapid unloading and handling operations and frequently for the location of processing facilities within the harbor area.

The port of Stonington has reached a crossroad which will determine its survival. The seafood industry is growing rapidly and the demand for high quality products is strong. Stonington can no longer survive as a packer and shipper of whole product. It must diversify to supply processed product for a more consumer-oriented market. Stonington will never be able to match the size of Point Judith or New Bedford but a well planned harbor area can be an effective market unit. Changes in the present structure could help Stonington survive increasing external pressures and develop a competitive market position.
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Public Act 82-334, State of Connecticut General Laws, 1982. Depuration is defined as the movement of polluted shellfish into clean water for a determined period of time to be cleansed for resale. In Connecticut the time period is a minimum of 14 days.

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APPENDIX I

Funding Sources Applicable for Fishery Harbor Development

Economic Development Administration (EDA), Department of Commerce. The EDA was established following the passage of the Public Works and Economic Development Act of 1965. The Act's intent was to enable areas to help themselves establish stable and diversified economies through the creation of long term employment opportunities. Its underlying philosophy is that long term employment can best be created by encouraging private businessmen to establish new businesses or expand existing ones in designated distressed areas. EDA is not specifically port-oriented, but deals with a variety of projects designed to lessen unemployment. To qualify for EDA funds, a community must first be judged eligible for assistance on the basis of economic conditions. This means an average unemployment of at least six percent over one year. Other criteria include average median family income, loss of population due to economic conditions and the rate of a community's rise in unemployment.

EDA allocates funds through its local offices according to geographical location. Once a section of the country qualifies, it is included in the EDA organization as an Econo-
mic Development District. Before any funds are dispersed, each District must draw up an Overall Economic Development Program, which is a schematic explanation of the economic climate and potential plans for remedying the disability of the District. EDA financial assistance is in the form of:

1) Direct grants up to 50 percent of the total project cost.

2) Combined direct and supplementary grants up to 80 percent of the total project cost. (Urban Development Action Grants).

3) Long-term loans up to 100 percent of costs for public works and development facilities.

4) Guarantee of loans for working capital up to 90 percent of the outstanding unpaid balance.

Prior to budgeting cutbacks initiated by the Reagan Administration, the EDA was considered to be the primary source of funding for port development. These projects were aimed primarily at alleviating economic distress or high rates of unemployment in designated areas and not at aiding the port industry. The EDA has allocated funds in the following areas of study between 1966-1980 which could be applicable to fishery harbor development:

<table>
<thead>
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<th>Area</th>
<th>1966-1979</th>
<th>1980</th>
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<tr>
<td>Fishing Industry Studies</td>
<td>$1,766,000</td>
<td>36 projects (0)</td>
</tr>
<tr>
<td>Harbor Development</td>
<td>$1,359,000</td>
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</tr>
<tr>
<td>Industrial Parks</td>
<td>$3,609,000</td>
<td>164 projects (8)</td>
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</table>

The use of EDA generated funds for fishery harbor development in Connecticut should be considered limited.

Coastal Zone Management Programs, Department of Commerce. Two programs which are included in the Coastal Zone Management Act
(CZMA) could be useful in developing fishery harbors. The first is the Coastal Fisheries Assistance Program (CFAP). The objective of this program is to assist states in the management of their living resources within the territorial sea and to encourage the use of these resources. Implemented through sections 305 and 306 of the CZMA, the funds available are channeled through the appropriate state agency. Areas that are most likely to be funded by this program include:

1) The state's fisheries: identification of problems, issues and opportunities.
2) Information and data collection.
3) State objectives, policies and strategies.
4) Implementation of state fisheries management strategy and programs.

Funds from this program for harbor development would be limited, but could prove useful in the planning stages of development. The second program is the Coastal Energy Impact Program (CEIP), implemented under the CZMA Amendments of 1976. To qualify, states must be receiving development (305) or administrative (306) grants or have their programs approved by the Secretary of Commerce. The CEIP is designed to assist coastal states and local governments that are affected by coastal-dependent energy activity. The program is administered in five ways:

1) Loans to provide new or improved public facilities and services made necessary by coastal energy activity.
2) Bonds issued by coastal states to secure funds for facility construction.
3) Repayment grants to meet credit assistance obliga-
tions.

4) Grants to cover the loss of valuable environmental or recreational resources as a result of coastal energy activities.

5) Grants to study and plan for economic, social and environmental consequences resulting from the siting, construction and operation of expanded facilities.

**Saltonstall/Kennedy Funds (S/K). National Marine Fisheries Service, Department of Commerce.** The final program available through the Department of Commerce is the Saltonstall/Kennedy Program or Import Duties Fund. These funds originate from 30 percent of the gross receipts collected by the U.S. Customs on fisheries products imported into the United States. The fund is to be used to promote domestically produced fisheries products by conducting a fishery educational service and fishery technological, biological and related research programs. The fund has traditionally been used to cover the operating costs of the National Marine Fisheries Services, but has been directed toward industry projects in recent years. The American Fisheries Promotion Act mandated that 50 percent of all S/K monies must be used for fisheries development. The creation of Regional Fisheries Development Foundations has helped the industry to have a greater input in deciding how the funds will be allocated. To date, port development has not been funded by the S/K program. The majority of the projects funded have been directed towards increasing the harvesting, marketing and quality of seafood products. With increased harvesting and marketing efforts, it may be only a matter of time before harbor improvements are
recognized as necessary.

The S/K program still remains viable despite attempts to curtail it. A total of 25 million dollars has been made available for fiscal years 80 through 83. The New England Fisheries Development Foundation received $949,900 for their 1981-82 fishery development projects. Port development has not been funded by the S/K program to date because:

A) The capital intensive nature of port development would leave limited funds for other projects.

B) Competition between ports for S/K money limits the regional and industry wide benefits which would normally occur from S/K funded projects.

Maritime Administration (MARAD) Department of Transportation. The Maritime Administration administers a number of programs related to water transport and port development. Communities may request aid in the form of technical advice and planning assistance for projects related to the development of ports. MARAD will provide on-site consultations with project directors, as well as recommendations for construction problems and alternative plans. The amount of financial assistance available through MARAD is limited, the majority of its work being in port research and planning.

Army Corps of Engineers (COE), Department of Defense. The Army Corps does not offer direct grants or loans, but provides actual navigation improvements and maintenance of those improvements once it has committed itself to a project. The Corps principle function in terms of fishery harbor development is harbor and channel improvements. The approval process takes from twelve to fourteen years, and is completely
dependent upon continued participation and support of the community in which the project is to be constructed.

One recent example of Army Corps involvement in the development of a fishing harbor is in Bristol, Rhode Island. COE engineers have recently finished a review of figures supplied by the local commercial fishing industry which highlight the benefits of the harbor construction to the fishing industry. As a result of these benefits, the Army Corps has indicated that the federal government might be willing to pay a larger share of the development costs. At present, the local share of the 6 million dollar project would be 46 percent of 2.76 million dollars. The project was approved in 1968 but funds for its design were not appropriated until ten years later.

The role of the Army Corps in the development and improvement of harbor facilities is expected to continue on a limited basis. Due to the lengthy review and approval process, the use of Army Corps funds for fishery harbor development could only be advised for long term development projects. Conversations with representatives of the Army Corps have indicated that the Corps will suffer personnel and program cutbacks in 1982-1983. Major Corps projects already under review are expected to continue. The addition of new projects will be subject to the availability of funds.

Small Business Administration (SBA). The SBA was created by Congress to encourage, assist and protect the interest of small businesses in the United States. Through its various
programs, the SBA seeks to identify the problems of small businesses and helps them compete with larger corporations on an equitable basis. Three types of financial aid are available to the fishing industry from SBA:

1) Loans and Loan Guarantees - direct loans for up to two-thirds of project costs. Applicable to all phases of vessel and onshore facility construction; limited to firms with less than 250 employees who are not eligible for NMFS programs.

2) Local Community Development Program - provides loans for 30 percent of small business capital investments to firms not eligible for NMFS support; cannot be used for working capital or basic infrastructure.

3) Disaster and Economic Injury Programs - direct funding or loan guarantees for continuation or re-establishment of a business which sustains economic injury due to: national or physical disasters; displacement or impact by Federally-aided construction projects; national disease or toxicity in products for human consumption; energy shortages; or requirements imposed by State or Federal safety or environmental regulations.

To a community with sound financial credit, the SBA programs could prove helpful in obtaining funds for harbor development. The only SBA program which is expected to be eliminated is the direct loan program. The remaining programs will continue; suffering a 25 percent reduction in funding.

Farmers Home Administration (FmHA), Department of Agriculture. The Farmers Home Administration is an agency within the Department of Agriculture which attempts to stimulate the growth of businesses. Two programs could be of use in fishery harbor development. First, the Guaranteed Business and Industrial Loan program provides guarantees of loans of up to 90 percent of the principal and interest to all types of business
and industry in rural areas. Second, the Industrial Development Grant Program provides direct grants and loans to public bodies in rural areas. The FmHA will guarantee loans by private lenders to qualifying applicants and will indemnify up to 90 percent of the lender's loss. Interest rates are determined by the market rate except in instances where public entities borrow for the purpose of providing community facilities, in which case the interest rate is substantially lower. FmHA programs are active despite hard economic times.

Farm Credit System. The Farm Credit System is a federally chartered cooperative banking system owned and controlled by its borrowers. The Farm Credit Administration, an independent federal agency, supervises the System. Borrowers are required to purchase some stock in the system to assist in capitalization. The System sells notes, bonds, money, markets, lends money from its own stock, and borrows funds for re-lending. Two programs exist under the Farm Credit System, the Production Credit Association the Bank for Cooperatives. The Production Credit Association gives loan coverage of up to 75 percent of project costs on a short term basis (usually 7 years). This program is usually employed to obtain short term working capital.

The Bank for Cooperatives program will make loans to meet any credit need which will enable an eligible cooperative to perform its marketing, supply or business service functions. Such activities may include construction or expansion of facilities and the purchase of land and facilities. The terms
of the loans are flexible and tailored to the specific needs of the borrowers.

Since the Farm Credit System is self-supporting, it will not suffer directly from government cutbacks. However, the present state of the economy will lessen the availability of cash for loan programs. The recent Farm Credit Act Amendments (94 Stat. 3437, 1980) will give greater flexibility to the System in the lending of funds to shoreside facilities associated with commercial fishing. The Act states: "Loans made by the Federal land banks to farmers, ranchers and producers or harvesters of aquatic products (emphasis added) may be for any agricultural or aquatic purpose and other credit needs of the applicant, including financing for basic processing and marketing directly related to the applicants operations...".

Department of Housing and Urban Development (HUD), Community Development Block Grants (CDBG; Urban Development Action Grants (UDAG). The objective of these programs is to support activities that expand opportunities for low and moderate income people by improving the community's public service facilities to allow growth of industry. Of particular concern are employment opportunities for persons residing within the recipient community. Fishery harbor and onshore support facilities can easily be funded by this program if the community meets HUD eligibility criteria.

Commercial Fisheries Research and Development Act of 1964 (PL 88-309). This Act, passed in 1964, authorized the Secretary of Interior to cooperate with appropriate state agencies
in carrying out projects designed for the research and development of commercial fisheries resources. Federal funds from this Act have traditionally been used to supplement existing state funding and to facilitate increased research. In June of 1981, Congress voted to reauthorize this bill and continue its funding at a level of five million dollars for the next three years. In terms of major port development, these funds are of little significance. However, they were employed in the past to lessen planning costs.