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WSG-MP 71-4

COSTS AND PROFITABILITY  
IN THE COMMERCIAL FISHING INDUSTRY:  
THE INSURANCE DILEMMA

By Michael L. Redfield

November 1971

DIVISION OF MARINE RESOURCES  
UNIVERSITY OF WASHINGTON 98195

Prepared under the  
National Sea Grant Program

A WASHINGTON SEA GRANT PUBLICATION



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### ACKNOWLEDGMENT

This publication was supported by the Washington Sea Grant Program, which is a part of the National Sea Grant Program. The Sea Grant Program is supported by the National Oceanic and Atmospheric Administration, U. S. Department of Commerce. The author is a member of the Iowa Bar. He received his B.A. from the University of Kansas, his J.D. from the University of Iowa, and his LL.M. from the University of Washington.

## COSTS AND PROFITABILITY IN THE COMMERCIAL FISHING INDUSTRY:

### THE INSURANCE DILEMMA

Commenting in February 1970 on H.R. 15675, which would have authorized Federal loans to fishermen's marine insurance associations, the Assistant Secretary of Interior, Dr. Leslie Glasgow, wrote: "This Bill is addressed to one of the more serious problems which confront the United States commercial fishing industry. If the industry is to survive and become a viable force in our economy, the cost of doing business must be reduced to a level more near that of its foreign competitors. The present cost of insurance coverage contributes disproportionately to the overall cost of operating a fishing vessel."<sup>1</sup> In discussing the problems plaguing the harvesting segment of the domestic fishing industry, it is sometimes difficult to separate and identify causes and effects, fundamental troubles from their manifestations. The problems can be interrelated in complex ways. Insurance rates are high and are getting higher. In the course of this paper we shall attempt to explore this problem, to discover to what extent it causes and is caused by other problems, and to examine and evaluate several possible methods of resolution.

At the outset it must be said that data on this particular subject are limited. In its report, the Panel on Marine Resources of the Stratton Commission indicated an inability on the part of the Bureau of Commercial Fisheries to deal with economic problems. Citing an almost complete emphasis on biological research by the Bureau, the report stated: "Deficiencies (in economic data) make it almost impossible at the present time to assess the economic health of any segment of the U.S. fishing industry or to forecast the economic results of alternative programs without detailed ad hoc efforts to develop the necessary factual background, case

by case."<sup>2</sup> The Division of Economic Research was found to have begun laying a groundwork of analytical and empirical data. While that effort has continued, data available on the insurance problem remain spotty and limited. The writer understands that at least one study has been completed that is extremely relevant to the problem: the Coast Guard has examined the safety problems in all commercial fisheries of the United States over the past five years. Its work has apparently included an analysis of various alternative safety programs in terms of effectiveness in improving safety, economic impacts on the fishermen, and effects on insurance rates. Unfortunately, the results of this study were not available to the writer, though it was to have been completed in December 1970.

#### DESCRIPTION OF THE PROBLEM:

Generally, there are three kinds of marine insurance carried by fishing vessel owners. Hull and machinery insurance, usually referred to simply as "Hull" insurance, covers total loss of the vessel as well as damage from fire, stranding, and collision, usually with a certain amount deductible per accident. Coverage is generally the market value of the vessel and its equipment, although this may vary regionally.<sup>3</sup> "Net" insurance covers the full value of the net, as depreciated over time, with renovations added to the value. This insurance covers loss or damage, with perhaps a certain amount deductible for certain kinds of damage.<sup>4</sup> Protection and indemnity, or "P & I" insurance, covers illness and injury to crew members, as well as a broad range of possible liability to other parties. The amount carried varies.<sup>5</sup>

Of the three types of insurance, it appears that net insurance represents no particular problem. Principally, it is P & I coverage that causes the most difficulty nationwide, though the relative contributions to total costs of P & I

and Hull coverage vary regionally. In Alaska it appears that Hull insurance is the source of more difficulty than P & I.<sup>6</sup>

As the statement by Dr. Glasgow indicates, the cost of insurance is an important aspect of the problem. Another aspect, not mentioned, is the difficulty of obtaining the coverage, at least in the P & I field. Loss experiences with P & I have caused most American companies to discontinue writing this type of coverage for fishing vessels.

In 1970, in testimony before the Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, Dr. Glasgow indicated that a recent sampling of fishing vessels had shown that the cost of P & I insurance had increased as much as 20% on the West Coast and 36% on the East Coast, compared with the average costs of 1965--67.<sup>7</sup> P & I rates in the New Bedford, Massachusetts, area are reported to have risen from \$125 per man to from \$1,200--\$1,400 per man per year over the past fifteen years, an increase of from 960--1120%.<sup>8</sup> In 1968 total insurance costs per man day for New Bedford scallopers rose 22% -- from \$3.92 to \$4.80. Other fixed costs rose only 11% over the same period, and total trip expenditures rose only 7%.<sup>9</sup>

Figures available on actual costs vary and are sometimes contradictory. The only complete information on rates nationwide that the writer was able to locate was a compilation submitted to the House Subcommittee on Fisheries and Wildlife Conservation by Dr. Glasgow.<sup>10</sup> (See Figure 1) P & I rates per man year are listed. No explanation of the figures is given, and it is assumed that they represent an average in each case. They purport to be rates in effect in 1969. A study published in 1966 indicates that P & I in New England cost \$400 per man per year, for the average boat.<sup>11</sup> Comparison with the Glasgow figures indicates only a 20% rise in cost over a three-year period, which seems quite low

when compared to the rates of increase reported above. Other reports indicate generally higher rates in New England than shown by the Glasgow figures. In testimony before the Subcommittee on Energy, Natural Resources, and the Environment of the Senate Commerce Committee, rates were reported to be as high as \$1,200--\$1,400 per man per year in early 1970 in the New Bedford area<sup>12</sup>, and \$800 top for 1969 in New England generally.<sup>13</sup> Interviews with fishermen in Gloucester in early 1970 brought reports of \$1000 per man rates.<sup>14</sup> In a meeting of the insurance subcommittee of the Associated Fisheries of Maine with representatives of the fishing industry in October 1970, the consensus seemed to be that the cheapest P & I coverage available was \$1,000 per man per year, with \$1,000 deductible. One enterprise -- Forty Fathoms -- was said to be paying \$1,600 per man, with \$5,000 deductible.<sup>15</sup>

The figures given the Subcommittee on Fisheries and Wildlife Conservation by Dr. Glasgow also dealt with Hull insurance costs. These costs were not expressed in rates, but rather in total premiums paid per region. To obtain these figures, the market value of the boats was multiplied by 5% in all regions but the Pacific, where a rate of 5 1/2% was used.<sup>16</sup> A study of the Boston large steel trawler fleet in 1966 showed rates of from 3.5--4.0% of market value for boats up to five years of age, and rates of from 7.0--8.0% for boats over twenty years old.<sup>17</sup> Longnecker indicates that rates of from 5 1/2--9 1/2% were in effect in the Gulf shrimp fishery.<sup>18</sup> Rates as high as 12--14% are reported in Alaska.<sup>19</sup> Again the Glasgow figures seem to be understated.

Total insurance cost for the average West Coast tuna vessel in 1965 was \$27,900<sup>20</sup>; for the average New England groundfish vessel in 1966, \$25,000<sup>21</sup>; for the average menhaden vessel in 1966, \$16,300<sup>22</sup>; and for the average New Bedford scalloper in 1968, \$12,000.<sup>23</sup> To put all these figures into some perspective,

TABLE 1.—U.S. FISHING VESSEL CHARACTERISTICS, BY REGION, ESTIMATES FOR 1970

	New England	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific <sup>1</sup>	Total
Number of vessels (year 1970).....	700	500	1,400	1,200	4,100	5,100	13,000
Median age of vessels (years).....	26	27	22	21	17	25	-----
Median tonnage (tons).....	45	25	9	25	45	15	-----
Median length (feet).....	55	45	35	45	55	35	-----
Average market value (thousands) <sup>2</sup> .....	\$29.5	\$22.4	\$13.8	\$22.4	\$29.1	\$19.3	-----
Total fleet value (thousands).....	\$20,650	\$11,200	\$19,320	\$26,880	\$119,310	\$98,430	\$294,990
Number of fishermen.....	3,800	2,500	4,400	3,400	12,500	16,200	42,800

<sup>1</sup> Includes Alaska.

<sup>2</sup> Includes gear. Estimated on basis of present value of expected future earnings over a 3-year payoff period, at 10 percent discount rate.

TABLE 2.—ESTIMATES OF FISHING VESSEL INSURANCE COVERAGE, PRESENT TOTAL COVERAGE AND POTENTIAL FOR GROUP COVERAGE

	New England	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Total
Number of vessels with hull coverage, 1970.....	1,525	1,375	1,700	1,600	2,050	3,060	7,310
Market value of vessels with hull coverage <sup>1</sup> (thousands).....	\$17,900	\$9,600	\$12,600	\$17,500	\$77,500	\$28,600	\$223,800
Hull insurance premiums paid (thousands) <sup>2</sup> .....	\$895	\$480	\$630	\$875	\$3,280	\$4,870	\$11,630
Number of fishermen covered by P. & I., P. & I. rates per man.....	3,000	550	875	650	2,600	11,100	18,785
P. & I. premiums paid (thousands).....	\$500	\$150	\$450	\$400	\$400	\$360	\$360
Hull plus P. & I. premiums (thousands).....	\$1,500	\$278	\$394	\$264	\$1,040	\$3,330	\$6,776
Hull plus P. & I. premiums (thousands).....	\$2,395	\$728	\$1,024	\$1,159	\$4,920	\$8,200	\$18,406
Estimated vessels that would join associations: <sup>3</sup>							
Percent.....	40	20	20	23	20	40	30
Number.....	236	75	140	120	410	1,227	2,205
Estimated premiums available to associations (thousands).....	\$960	\$150	\$200	\$230	\$930	\$3,280	\$5,800
Possible number of associations at 100 plus vessels per.....	2	1	1	1	4	12	21
Premiums per association (thousands).....	\$480	\$150	\$200	\$230	\$245	\$275	\$275

<sup>1</sup> 75 percent of fleet.

<sup>2</sup> 50 percent of fleet.

<sup>3</sup> 60 percent of fleet.

<sup>4</sup> Includes hull and machinery.

<sup>5</sup> 90 percent of fleet tonnage.

<sup>6</sup> 65 percent of fleet value.

<sup>7</sup> At 5 percent market rate except Pacific which is estimated at 5 1/2 percent.

<sup>8</sup> Estimates based on findings of "Danforth" study (1957), which indicated that in New England and California P. & I. insurance was carried by vessels that represented about 90 percent of the gross tonnage, and in the Gulf area about 20 percent of the gross tonnage.

<sup>9</sup> Judgment.

TABLE 3.—BOATS AND VESSELS ASSOCIATED WITH EXISTING FISHERY COOPERATIVES, 1960-70

Region	Number of boats and vessels in co-ops <sup>1</sup>	Total number boats and vessels in region <sup>1</sup>	Co-op boats per each 100 boats in region	Index of col. (3), Pacific equals 100
	(1)	(2)	(3)	(4)
Pacific.....	5,300	20,000	26.5	100
New England.....	1,000	10,000	10.0	38
Gulf and South Atlantic.....	450	21,000	2.1	8
Middle Atlantic.....	50	4,500	1.1	4

<sup>1</sup> Approximate.

FIGURE 1

about half of all fixed costs in the Boston haddock fishery in 1969 were chargeable to insurance. Insurance payments were equal to the amount spend on crew provisions and to about half the annual cost of repairs and maintenance.<sup>24</sup> For the average New Bedford scalloper in 1968, insurance equalled about two-thirds of the year's net proceeds. It was estimated that a 10% rise in the insurance cost would result in a 6.7% drop in net proceeds--not an unlikely eventuality, in view of the 22% rise in those costs per man day which occurred in 1968.<sup>25</sup>

The other aspect of the problem, mentioned above, is the growing difficulty of obtaining the insurance. Because of poor experience with both Hull and P & I insurance, most American private underwriters have abandoned the market to their foreign counterparts.<sup>26</sup> Losses for some companies have possibly run as high as 300% of premiums collected.<sup>27</sup> Three companies were reportedly writing insurance on Gulf shrimp vessels in 1968.<sup>28</sup> The number of companies writing coverage on Massachusetts fishing vessels in early 1970 was two or three<sup>29</sup>, with 80% of the Gloucester fleet covered by one company.<sup>30</sup>

#### IMPLICATIONS AND EFFECTS:

Dykstra and Holman list five basic factors that affect the competitive ability of fishermen.<sup>31</sup> They are:

1. Distance to the fishing ground;
2. Distance to the market;
3. Cost of catching.
  - A. Cost of capital.
  - B. Cost of labor.
  - C. Managerial skills (productivity).
4. Cost of processing.

## 5. Tariffs.

Where distances to fishing grounds and markets are fixed, where the processing segment of the industry for the most part is separated from the harvesting segment, and where Government policy forecloses tariffs, the cost of catching becomes the most important of these factors for the fisherman. It is this factor alone that he may be able to influence and that he must influence if he is to survive. It is this factor that usually hurts him most. Compared to those of his foreign competitors, labor costs of the domestic fisherman are much higher. So far as the third cost factor -- managerial skills -- is concerned, inefficiency often holds the status of management policy in this country. It is through reducing efficiency or the time a vessel may productively exploit a fishery, rather than through limiting entry, that this country has regulated fishing effort for management purposes.<sup>32</sup> Thus, one of the prime bulwarks of American competitiveness, the ability to offset higher domestic labor costs by increasing productivity and efficiency, is removed in the case of the fishing industry. Capital costs are also high for the American fisherman. A 1793 law forbids documentation of foreign-built fishing vessels as vessels of the United States.<sup>33</sup> It is also illegal for a foreign flag vessel to fish in American waters or to land a cargo of fish taken on board on the high seas.<sup>34</sup> The effect of these laws is to require American fishermen to purchase and use American-built fishing vessels, which are considerably more expensive than foreign-built ones.<sup>35</sup> Differential construction subsidies<sup>36</sup> designed to offset the high cost of construction in the United States have not had a significant impact, and at the same time have reduced incentives to lower construction costs.<sup>37</sup> High import duties on important gear item contribute to high capital costs.<sup>38</sup>

To the extent that insurance costs are high, they contribute to this otherwise grim cost picture. To the extent that coverage is difficult to obtain,

capital investment is discouraged. Financial institutions may be unwilling to grant loans to fishing vessel owners if they fear they will be unable to obtain insurance on the collateral--the boat.<sup>39</sup> Without his vessel to use as collateral, the typical fisherman will be unable to obtain loan funds.<sup>40</sup> To the extent insurance costs absorb gross revenue and reduce profit, they will in this way also discourage investment.<sup>41</sup> The availability of investment capital to the U.S. fishing industry is a critical problem<sup>42</sup>, even though the industry as a whole is grossly overcapitalized.<sup>43</sup> Overcapitalization, the result of unlimited entry, means a greater number of marginal operators for whom, individually, obtaining money is a problem. Where a vessel is subject to a security interest for a loan already obtained, inability to obtain insurance might well lead the lender to insist on its being tied up, to protect its collateral.<sup>44</sup> This sensitivity to insurance where the vessel is, or is sought to be made, collateral for a loan is a result of the fact that many of the more common types of liability the vessel owner or operator may incur in his operations result in a maritime lien against the vessel, which may be enforced by means of a libel in admiralty.<sup>45</sup> The mortgage may be subordinated to the lien created by certain types of liability.<sup>46</sup>

Fishermen typically operate under a "lay" or "share" system of compensation. Under the system as it operates in Boston<sup>47</sup>, certain shared costs (such as wharfage, scales, exchange fees, bonuses for engineers and mate, sounding machine, watching, radar, fishermen's welfare, ice, and lumpers) are deducted from the "gross stock," or total revenue of the trip. The remaining revenue, or "net stock," is then split, with 60% going to the crew and 40% to the vessel owners. Insurance is a cost which comes out of the owner's share, though this is not universally true.<sup>48</sup> Where this cost is shared, crew shares would be much more directly affected.

While high premiums or unavailability of coverage may, as indicated above, force a boat to cease operations, it appears that in a great number of cases the alternative chosen is to continue operations without coverage. According to the tables prepared for the House Subcommittee on Fisheries and Wildlife Conservation by Dr. Glasgow in early 1970, the percent of fishermen employed in each region who are covered by P & I insurance works out as follows: New England, 79%; Middle Atlantic, 22%; Chesapeake, 20%; South Atlantic, 19%; Gulf, 21%; and Pacific, 69%. For the nation as a whole, the coverage is 44%. The figures on the number of men covered in each region are based on the findings of the "Danforth" study, which was concluded in 1957. Since the total number of men engaged in fishing at that time was greater than at present<sup>49</sup>, and since the level of premiums was much lower then, it appears probable that the percentages stated above are inflated. Whether they are or not, it is clear that a potential social cost exists here because of the high cost of insurance. A majority of the nation's fishermen are working in a hazardous trade without insurance to cover their claims arising out of their employment. This means that in most cases liability will fall upon the vessel itself, or that the claim will be unsatisfied. Where liability falls upon the vessel, it may or may not be enough to compensate the injured party, but the loss will be absorbed by a small number of people, to their considerable detriment.

The Glasgow table indicates that of the total number of vessels in each region, the percent covered by Hull insurance is: New England, 75%; Middle Atlantic, 75%; Chesapeake, 50%; South Atlantic, 50%; Gulf, 50%; and Pacific, 60%. Of the total market value of all fishing vessels in the U. S., about 75% was covered by Hull insurance. Here again there is a potential social cost in terms of losses falling on a relatively few individuals in particular cases.

CONTEXT:

Remedies Available to the Injured Seaman.

The injured seaman has three basic remedies available to him: maintenance and cure; an action against the vessel owner for breach of his warranty of seaworthiness; and an action for negligence under the Jones Act.

The right to maintenance and cure extends to all seamen who are members of the crew of any vessel. The right entitles the seaman to all living and medical expenses until he is cured or until he has made his maximum recovery. It also entitles him to collect the wages he would have received to the end of the voyage or his contractual employment. All injuries except those occasioned by his gross misconduct or insubordination are encompassed, regardless of whether they arose out of his employment, or whether they were or were not due to the negligence of the vessel owner or crew.<sup>50</sup>

The "warranty" of seaworthiness is a fiction by which is imposed on the vessel owner an absolute duty to provide a safe place to work. Breach of that duty, whether negligent or not, gives rise to liability for injuries suffered as a result.<sup>51</sup>

The Merchant Marine, or Jones, Act provides an action for injuries caused by negligence and suffered in the course of employment.<sup>52</sup> In contrast to the claims for unseaworthiness and maintenance and cure, the Jones Act claim is not one arising out of the general maritime law, and the statute provides that it may be tried before a jury.<sup>53</sup> Actions for maintenance and cure and for unseaworthiness, brought under the Federal admiralty jurisdiction, may not be tried before a jury. It has been settled, however, that where these maritime claims are joined with a Jones Act claim, the Federal courts have jurisdiction to hear them on the law side<sup>54</sup>, and they may be submitted to the jury.<sup>55</sup>

Recovery may not be had under both the Jones Act and unseaworthiness claims where joined.<sup>56</sup>

#### Characteristics of the Domestic Fish Products Market.

Since we are dealing with the issue of the cost of catching fish for domestic fishermen, it is important to inquire into the nature of the market for fish in this country. To what extent can harvesting costs be passed on? When they go up, does the whole market go up, or does it shift to imported fish products or non-fish products available at lower prices?

One of the salient features of the U.S. fishing industry over the past three decades has been its lack of growth. Landings have been virtually static at between four and five billion pounds.<sup>57</sup> At the same time world landings have moved from 20 million metric tons in 1950 to 57 million tons in 1966.<sup>58</sup> Domestic demand has increased from about 44 pounds (round weight equivalent) in 1950 to 72 pounds per person in 1967.<sup>59</sup> The entire increase has been met by imports, however.<sup>60</sup> In 1950 imports of fish products accounted for about 25% of domestic supply. Today they account for over 75%.<sup>61</sup>

It appears that in most areas prices are set independently of, and without reference to, domestic fishing costs. "The fisherman, vessel owner, fish processor and distributor are caught in a squeeze caused by increased costs of insurance and equipment and rising imports with little relief from higher prices in marketing the product."<sup>62</sup> "U.S. processing and distribution firms have established extensive collecting networks for raw and semi-processed fishery products in more than 30 countries, primarily in the developing world. This has been accomplished through such instruments as wholly owned fishing and processing firms in those countries, loan of risk capital for vessel and plant

construction to local entrepreneurs, technical assistance for technical advances and quality control, and guarantee of U.S. markets to local enterprises." <sup>63</sup>

Fish are pretty much the same, whether caught by Americans or not. In the absence of laws requiring country of origin labeling, and in the face of a liberal trade policy for all species of fish, imports exert a controlling influence on the level of prices in nearly all our fisheries.

#### HYPOTHESES: CAUSES:

In examining the relatively scanty literature available on the subject, one finds certain factors which are repeatedly cited as causes of the present insurance problem. In the President's fourth report to Congress on Marine Resources and Engineering Development, high insurance rates are cited as "resulting in large measure from the liberal interpretation of the laws concerning vessel owner liability for crew injuries." <sup>64</sup> The Panel on Marine Resources of the Stratton Commission found "Jones Act requirements" contribute to the high cost of insurance. <sup>65</sup>

The "Jones Act requirements" are, as we have seen, that the vessel owner not negligently injure or cause the injury of a member of the crew. This hardly seems a burdensome duty. It is one we all have to bear, and it is a lighter duty than employers bear under workmen's compensation laws. One might just as easily, and with results no less constructive, attribute the insurance problem to the fact that injured seamen and boat owners who have lost their boats bring claims at all. It is true that laws compensating workmen for injuries will cost employers, and that the more injuries these laws are extended to cover, the more it will likely cost. But to suggest that the way to solve the problem is to

contract or eliminate the coverage is not even really a solution for the fishing industry, let alone for the rest of society.

The insurance problem is attributable to deeper causes. If premiums are high, it is undoubtedly because claims are high. But claims result from accidents, not the laws that authorize them. To focus on the claims is to fail to trace the problem to its real source. The President's report to Congress recognized that "high vessel casualty rates, resulting in loss of life and property" were a cause of the insurance problem<sup>66</sup>, and, in fact, the next year dropped its reference to "liberal interpretation."<sup>67</sup> A Coast Guard study published in 1968 identifies fishing vessels as having the poorest safety record of any group of U.S. vessels.<sup>68</sup> A study of the Boston large trawler labor force reports high injury and sickness rates.<sup>69</sup>

Data submitted to the House Subcommittee on Fisheries and Wildlife Conservation by Admiral W. J. Smith of the Coast Guard<sup>70</sup> (see Figure 2) shows casualty information for fishing vessels of five net tons or more on the Atlantic, Gulf and Pacific coasts. Casualties are defined as "any vessel casualty involving a death, an injury that incapacitates the injured for more than 72 hours, or property damage in excess of \$1,500; any collision or grounding; plus any death or injury that incapacitates the injured for more than 72 hours (sic) not involving a vessel casualty." According to this data, four types of accident account for over 80% of the total annual casualties nationwide. They are, with the percentage of the total number of casualties they represent respectively: machinery failure, 26%; collision, 21%; grounding, 19%; and flooding and sinking, 17%. While machinery failure represents the most common type of casualty nationally, almost all instances occur on the Gulf coast. In the Atlantic and

**AVERAGE ANNUAL NUMBER OF CASUALTIES<sup>1</sup> BY AREA AND BY TYPE OF CASUALTY<sup>2</sup> FOR U.S. COMMERCIAL FISHING VESSELS 5 NET TONS AND OVER**

Type of casualty	Atlantic coast	Gulf coast	Pacific coast	Total
Collision.....	22.4	62.4	45.3	130.1
Struck submerged object.....	.5	11.4	11.2	23.1
Capsizing.....	5.8	.2	3.6	9.6
Flooding/sinking.....	29.2	45.6	34.7	109.5
Grounding.....	22.6	50.6	46.8	120.0
Fire/explosion.....	5.9	.5	18.4	24.7
Machinery failure.....	5.9	151.4	7.6	164.9
Equipment failure.....	.2	.9	1.2	2.3
Slips and falls on deck.....	.7			.7
Man overboard.....	8.0	10.2	4.9	21.1
Acts of God.....		1.6	2.0	3.6
Disappearances.....	.2	4.2	2.2	6.6
Other.....	.7	6.6	8.1	15.4
<b>Total.....</b>	<b>100.0</b>	<b>345.6</b>	<b>186.0</b>	<b>631.6</b>

<sup>1</sup> A casualty is defined as any vessel casualty involving a death, an injury that incapacitates the injured for more than 72 hours, or property damage in excess of \$1,500; any collision or grounding; plus any death or injury that incapacitates the injured for more than 72 hours not involving a vessel casualty.

<sup>2</sup> This table consists of data taken from reports for fiscal years 1964-67 for vessel casualties involving loss of life, fiscal years 1963-65 for deaths not involving a vessel casualty, and a sample consisting of 100 reports for fiscal year 1967 for vessel casualties not involving loss of life.

**CASUALTY INFORMATION BY AREA<sup>1</sup> FOR U.S. COMMERCIAL FISHING VESSELS 5 NET TONS AND OVER**

Area	Average annual number of total losses <sup>2</sup>	Average annual number of deaths	Average annual number of casualties <sup>3</sup>	Average annual property damage to vessels (thousands)
Atlantic coast.....	37.0	13	100.0	1,942.9
Gulf coast.....	52.6	32	345.6	2,772.2
Pacific coast.....	65.5	37	186.0	4,457.4

<sup>1</sup> This table consists of data taken from reports for fiscal years 1964-67 for vessel casualties involving loss of life, fiscal years 1963-65 for deaths not involving a vessel casualty, and a sample consisting of 100 reports for fiscal year 1967 for vessel casualties not involving loss of life.

<sup>2</sup> The term "total loss" means the number of vessels totally lost.

<sup>3</sup> A casualty is defined as any vessel casualty involving a death, an injury that incapacitates the injured for more than 72 hours, or property damage in excess of \$1,500; any collision or grounding; plus any death or injury that incapacitates the injured for more than 72 hours not involving a vessel casualty.

**CASUALTY EXPERIENCE COMPARISONS<sup>1</sup> FOR U.S. COMMERCIAL FISHING VESSELS 5 NET TONS AND OVER**

Area	Annual average total losses per million vessel days <sup>2</sup>	Annual average deaths per million man-days <sup>3</sup>	Annual average number of casualties per vessel <sup>4</sup>	Annual average property damage per vessel <sup>4</sup> (thousands)
Atlantic coast.....	418.3	45	0.026	\$0.5
Gulf coast.....	110.1	27	0.91	.7
Pacific coast.....	1,108.7	154	1.24	.9

<sup>1</sup> Derived from U.S. Coast Guard and Bureau of Commercial Fisheries files. This table consists of data taken from reports for fiscal years 1964-67 for vessel casualties involving loss of life, fiscal years 1963-65 for deaths not involving a vessel casualty, and a sample consisting of 100 reports for fiscal year 1967 for vessel casualties not involving loss of life.

<sup>2</sup> Based on 72 percent of the vessels on the Atlantic coast; 83 percent on the Gulf coast; and 87 percent on the west coast.

<sup>3</sup> Based on 100 percent of the vessels in all areas.

**FIGURE 2**

Pacific areas, it ranks fifth and seventh, respectively, in number of occurrences per year, and represents less than 10% of total casualties in both cases.

On the Atlantic coast the top four types of casualty, and the percentage of the total number of annual casualties in the area they represent, are: flooding and sinking, 29%; grounding, 23%; collision, 22%; and man overboard, 6%. Together they account for 80% of the total annual casualties.

On the Gulf coast the top four are: machinery failure, 44%; collision, 18%; grounding, 15%; and flooding and sinking, 13%. Together these represent 90% of the total annual casualties.

On the Pacific coast the four most common types of casualties are: grounding, 25%; collision, 24%; flooding and sinking, 19%; and fire and explosion, 10%. These together account for 78% of all annual casualties.

In a detailed 1963 study of safety problems in the trawler fleet at Grimsby, England<sup>71</sup>, Dr. S. R. W. Moore found a high fatal accident rate--twice that of fishermen generally, four times that of miners, and forty times that of workers in manufacturing industries. The rate of incapacity was also high, with over half of all injured incapacitated for an average period of 26 days. Most incapacities were caused by fractures, dislocations, contusions, sprains, strains, and infected wounds. Among crewmen the highest incapacity rate was for deckmen, who were more exposed to the hazards of fishing, handling of trawl gear, and the weather.

Moore's analysis cites three causes for the high rate of serious accidents: first, the method of payment, in which the crew member's income is dependent upon the yield of the voyage, and which therefore encourages risk-taking; second, long hours, lack of sleep, and physical fatigue; and third, poor and delayed treatment of the injured. His recommendations for improving the situation

implicitly recognize other factors as well. For example, his recommendation that conventional side trawlers be eliminated, since most accidents occur in manhandling gear overboard, implies that vessel design makes its contribution to the problem. His recommendation that trawl gear be made safer carries the same implication regarding equipment design. Finally, he recommends that physical examinations be given to crewmen on their initial entry into the trade, and periodically thereafter, implying that certain characteristics of the labor force may contribute to the problem.

In connection with the last point, it is interesting to note that one of the characteristics of the American fisherman is his advanced age. Three fifths of the men in the Boston large trawler labor force were over 55 in 1964.<sup>72</sup> The average age of fishermen in Massachusetts is 57.<sup>73</sup> In the Maine lobster fishery, 68% of the men are over 35, and 9% are over 65.<sup>74</sup> It is a common complaint that the American industry is unable to attract young men to it.<sup>75</sup> This factor of age would seem to be a very significant one. In combination with the long hours, fatigue, and other hazards of the trade, one would expect older men to have, if not a higher rate of accidents, at least a higher rate of serious accidents than younger men.

Many of the conditions complained of by Moore appear to be present in the fisheries of this country. With regard to working and safety conditions aboard fishing vessels, the Stratton Commission's panel on Marine Resources stated: "While there are some exceptions, the general working conditions of the U. S. fisherman are worse than for almost any other major category of labor except migrant farm workers. Less than one third of all U.S. fishing vessels would meet the minimum standards for safety and health of crew members developed for

consideration of the fishing nations by the International Labor Organization."<sup>76</sup>  
The situation was attributed to attempts to cut costs and remain competitive.

Full-time fishermen on Boston trawlers were found to spend an average of 267 days at sea per year -- 22 days more than the average worker spends at his job. And a 12-hour work day was the norm.<sup>77</sup> For some, a 12-hour day may only be a dream. In the words of one Gloucester fisherman, smaller catches may mean "work 24 hours around the clock and sleep between hours."<sup>78</sup> This would undoubtedly contribute to the fatigue mentioned by Dr. Moore. The share system mentioned by him is prevalent in this country<sup>79</sup>, and there is no reason to believe that emergency medical care is any better here than at Grimsby.

One of the primary causes of high rates for Hull insurance generally is the aged nature of the U.S. fishing fleet.<sup>80</sup> In 1966 the average age of the U.S. fishing vessel was 20.3 years.<sup>81</sup> The Glasgow figures indicate that the average in 1970 was 21.9 years, broken down by region as follows: New England, 26 years; Middle Atlantic, 27 years; Chesapeake, 22 years; South Atlantic, 21 years; Gulf, 17 years; and Pacific (75% of the fleet), 25 years.<sup>82</sup> Older boats have more difficulty attracting capital for improvements because they do not have the capability of gearing up easily for different fisheries or because they do not have the capability for year-round operation needed today for profitable fishing.<sup>83</sup> Because of this, deterioration continues and many boats appear to operate in a state of disrepair, which can only contribute to mishaps.<sup>84</sup> Regional variations in the cost of repairs can influence rates, too; for example, the high cost and lack of repair facilities in Alaska seem to have had a direct impact on Hull rates there.<sup>85</sup>

It is difficult to evaluate with any precision the part that the current system for determining liability and damages plays in the problem. Statistical

data on the American judicial system are about as scarce as economic data on the American fishing industry. There is widespread subscription to the view that the system is costly and interminably slow, and there has been considerable debate as to whether it is suited to the task of handling the American accident explosion. It is widely believed that juries are awarding more and more generous amounts to injured claimants, and this is sometimes cited as a contributing factor in the P & I insurance problem. But it is also asserted that juries may be less willing to find liability in the first place. And in any event, how many accident cases actually reach a jury? The percentage is probably quite small.

A compilation of all maritime personal injury cases involving commercial tuna fishermen and tuna vessels or their owners filed in the Superior Court of San Diego County from 1960 to 1968 revealed that only 37% went to judgment or were awaiting trial. The rest were dismissed before trial. The data are incomplete for at least two reasons. In the first place, no information regarding the reason for dismissal is given, except in one case. Undoubtedly some were dismissed because the parties had negotiated a settlement, but we do not know how many. And where settlements were reached, we do not know the amount involved. The data are also insufficient from another standpoint, in that they give us no indication what percentage of the total number of injury cases involving claims these cases represent. We have no way of judging how frequently the judicial system is resorted to.

Of the 35 cases filed during the nine-year period, five resulted in judgments for the plaintiff, and two for the defendant. Comparison of the amount awarded with the amount that was prayed for in each case reveals no apparent pattern. The percentages are: 27%; 19%; 46%; 2%; and 16%. The amounts awarded

are: \$43,378; \$14,146; \$22,880; \$1,116; and \$25,000, respectively. Of course the number of cases involved is simply too small to be dependable for purposes of determining such relationships. A total of \$3,294,857.73 in damages was actually awarded.

It would be dangerous to generalize too much from the data in this study. Recognizing their limitations, however, and the lack of any other data, perhaps we may still draw a few conclusions. The complaint of increasing jury damage awards is not borne out in the San Diego cases, which show no increase in awards over time. While the average amount awarded by juries (\$23,164) was higher than that awarded by judges (\$18,513), the awards by judges tended to be closer to the amount prayed for (an average of 32.5% of the amount prayed for, for judges, and 15% for juries). And aside from the question of whether the amount of awards by juries is increasing, there is a serious question as to whether a sufficient percentage of these cases reach a jury to make the matter significant, except as a factor in negotiations.

In short, there appears to be no demonstrable relationship to the problem of rising premiums in terms of spiraling jury awards, at least on the basis of data available to the writer. This is not to say that the system does not contribute to the overall level of insurance costs and that it might not be a proper focus for action in a plan to reduce these costs.

While the data upon which the above discussion is based are not precise enough to formulate a mathematical model of the system, nevertheless they do suggest the relationships which are at work. In diagrammatic form, the problem might be represented as in Figure 3.

The primary source of the high insurance rates is the inability of many operators to make decent profits. This results because of higher labor costs,

because of the necessity to buy more expensive American-built boats and equipment, and because of the influence of lower import prices and the system of unlimited entry, which reduces the catch of each participant. Low profits mean older equipment, since equipment prices are high and beyond the fisherman's reach, and since low profits discourage loans. Old equipment, in turn, means higher costs because of more frequent breakdowns and repairs and lower efficiency. Low profits mean lower shares, and this discourages entry of younger men into the trade and increases the age of the labor force. Through the influence of the lay system, lower wages and profits increase the incentive to take risks in order to increase the catch. Finally, low profits lead to deteriorating working conditions -- to smaller crews, perhaps, longer hours, more intensive effort, and because of the inability to obtain capital, perhaps equipment is disrepair. Bad working conditions also contribute to a more aged working force by discouraging young men from entering the industry. Old equipment, equipment in disrepair, and a generally older labor force operating under poor working conditions all contribute to increased accidents. Increased accidents lead to increased claims. Adding in the increment attributable to the present system for handling claims, the price of premiums adjusts accordingly, which adds to the overall cost of catching fish.

Figures 4 and 5 present data extracted from the Smith and Glasgow tables on casualties, vessel ages, and insurance rates for the Atlantic, Pacific, and Gulf coasts. According to the view of the problem presented in this paper, we would expect to see a correlation between vessel age and casualty rates on the one hand, and insurance rates on the other. Generalizing for an entire coast is not really satisfactory, since fisheries vastly different in characteristics may be

lumped together. With the data available, however, it is not possible to correlate these factors on a more detailed basis.

In the area of Hull insurance, rates are highest for the Pacific, according to Glasgow, at 5 1/2%, with the Atlantic and Gulf coasts equal at 5%. It can be seen that the Pacific leads the Atlantic and Gulf regions in all categories of casualty rates, and in terms of numbers of total losses, deaths, and property damage. The average age of fishing vessels on the Pacific coast is also higher than that of vessels on the Atlantic and Gulf coasts. The correlation is not as clear with Gulf and Atlantic Hull rates. Casualty rates for the two differ considerably in all four categories. It is perhaps possible that higher Atlantic average vessel age, total losses, and deaths per million man days offset higher Gulf casualties and property damage per vessel to produce equal rates for Hull insurance.

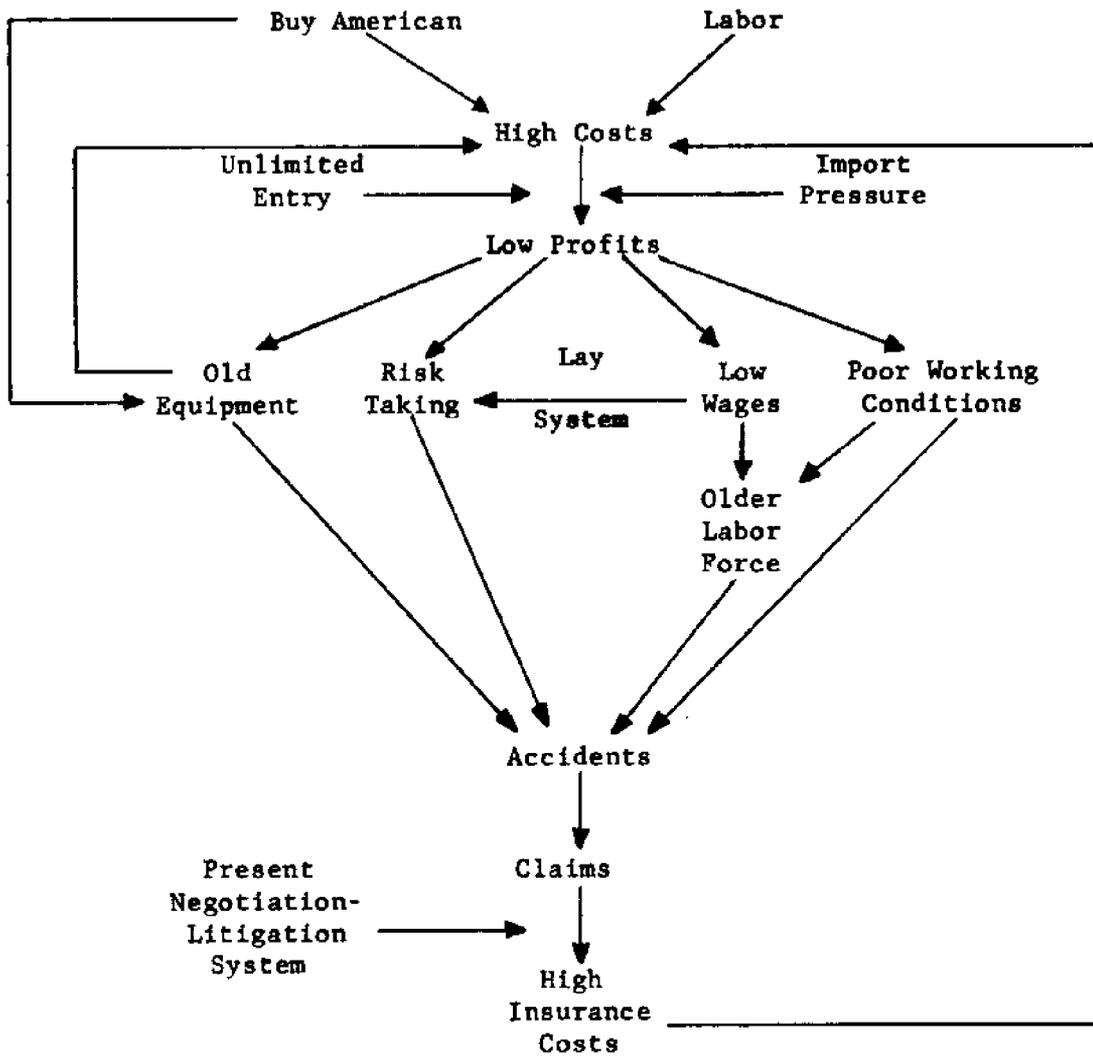


FIGURE 3

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Casualties

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RATES

Total Losses Per Million Vessel Days	=	Pacific .....1108.7 Atlantic.....418.3 Gulf.....110.1
Death Per Million Man Days	=	Pacific.....154 Atlantic.....45 Gulf.....27
Annual Aver- age Casualties Per Vessel	=	Pacific.....1.24 Gulf.....0.91 Atlantic.....0.026
Annual Aver- age Property Damage Per Vessel (x1000)	=	Pacific.....0.9 Gulf.....0.7 Atlantic.....0.5

NUMBERS

Annual Aver- age Total Losses	=	Pacific.....65.5 Gulf.....52.6 Atlantic.....37.0
Average An- nual Deaths	=	Pacific.....37 Gulf.....32 Atlantic.....13
Average An- nual Casual- ties	=	Gulf.....345.6 Pacific.....186.0 Atlantic.....100.0
Average An- nual Property Damage to Ves- sels (x1000)	=	Pacific.....4457.4 Gulf.....2772.2 Atlantic.....1842.9

FIGURE 4

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Vessel Ages

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Pacific.....	25
Atlantic.....	23.1
Gulf.....	17

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Insurance Rates

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P & I (Per Man)

Atlantic.....	451.42
Gulf.....	400
Pacific.....	300

FIGURE 5

In terms of P & I rates, the correlation is again unclear. While the Pacific leads in terms of casualty rates and average vessel age, the Glasgow figures indicate that it has the lowest average P & I rates of the three areas. While the Atlantic leads the Gulf in P & I rates, it exhibits no clear lead in casualty rates, and in fact is lower than the Gulf in average annual casualties per vessel by a factor of about 30.

Lack of a clear correlation between casualties, vessel age, and insurance rates in these data could be the result of several factors. One possible reason for the unexpectedly low Pacific P & I rates may be the existence of a number of private insurance cooperatives there. Table 3 of the Glasgow figures (Figure 1) indicates that of every 100 vessels in the Pacific, 26.5 participate in cooperatives. This is considerably higher than the participation that obtains

on the Atlantic and Gulf coasts, and probably represents between 1/3 and 1/2 of the total P & I coverage in the region. The lower cooperative rates would thus have considerable impact on the average rate figure for the Pacific, and if low enough could perhaps explain the fact that the Pacific has a lower average rate for insurance, despite higher casualty rates, than either the Gulf or Atlantic coasts. It is, of course, possible that the rate data in the Glasgow tables are incorrect. We have seen that the rates appear to be understated. There is no way to evaluate the accuracy with which they reflect regional differences in the cost of insurance, however.

There is one further explanation possible, short of abandoning the model proposed, for the variations from the correlations expected. It is possible that the system for handling claims plays a much more important part in determining insurance costs than the writer has suspected, and that variations in this system may cause it to contribute more or less to costs from region to region. It will be remembered that the data available on this factor were from one small area only. It was not possible to compare such data regionally. An effort to collect and compare data on claims, negotiated settlements, and judge and jury awards from different areas of the country would undoubtedly be very desirable, and would perhaps lead to better understanding of the insurance problem here under consideration.

#### CRITERIA DEVELOPMENT:

One of the first criteria to suggest itself obviously is the reduction of the cost of insurance to fishermen. It is not possible here to suggest a specific target figure, since it would surely vary. Ideally, all costs would be low enough to allow domestic fishermen to compete with imports, to earn

good incomes, and to achieve a good return on investment. Since it is not clear how close to this goal elimination of all insurance costs would take us, it is perhaps best simply to state this objective as the maximum reduction in insurance expenses possible, and consistent with, the other stated objectives. Obviously this reduction ought not to result in an offsetting increase in other cost items.

A second criterion by which to judge alternative proposals is the adequacy of the level of compensation they would provide for injured seamen and other parties. Present levels taken for all injured seamen are probably inadequate, given the figures on P & I coverage adduced above. In all cases, compensation should be adequate to cover all medical and other expenses occasioned by injury. It should be geared to income-replacement in cases of disability, to ensure no fall in standard of living as a result of work-connected injury. The writer's feeling is that some recovery for unusual pain and suffering ought to be allowed. This is a most difficult subject, however, for it introduces uncertainty into the system, and makes prediction of recoveries more difficult. Pain and suffering are impossible to value objectively, and this opens the possibility of tremendous awards. Perhaps an upper limit should be imposed on these awards, or perhaps they should be determined by judges rather than by juries.

The best alternative will be the one that does the best job in terms of the above criteria and in terms of other benefits produced, at the least possible cost. The information with which we must work is not complete enough to allow anything approaching precise prediction of cost and benefit values. (In this connection, the Coast Guard study mentioned at the beginning of this

paper should be of considerable value, with its data on cost impacts of safety programs and effects on insurance rates). The evaluation of alternatives with regard to the criteria advanced will therefore be in general terms.

#### SPECIFICATION OF ALTERNATIVES:

The array of possible alternatives is extensive. They include schemes involving continued reliance on private insurance with present remedies or with altered ones, and schemes involving altered sources of compensation with present or altered remedies.

#### Continued Private Insurance:

In view of the impact that high accident rates have on insurance premiums, one obvious first step would be to adopt measures designed to prevent accidents. These measures might include making passage of safety and emergency medical care tests part of licensing requirements for skippers and mates; safety regulations for vessels, gear, and procedures; with regular Coast Guard inspection and enforcement; and perhaps standards of design for vessels and equipment constructed in the future.

As an additional step, the Government might provide supporting services in the form of patrols with medical and weather personnel aboard to provide advice and assistance. An experimental program of this type was tried in Great Britain for a period of five months in 1968.<sup>86</sup> The British Board of Trade chartered a stern trawler, "Orsino," manned and equipped it, and sent it out to patrol the fishing grounds. The "Orsino" kept track of each fishing vessel daily by radio, and weather and medical advice were provided by the same means, as necessary. The doctor made the rounds of vessels to visit

the sick and injured, and more serious cases were taken on board the "Orsino", where facilities were available to treat them. The five-month cruise cost was \$150,000.

In another alternative envisioning continuation of the private insurance system, the Government--Federal or State--might institute a subsidy program designed to attack high premium costs more directly. A certain percentage of each premium might be paid by the Government. Taking another approach, the Government might pay a percentage of each claim, or pay that part of claims exceeding a specified amount.

At the meeting of the insurance subcommittee of the Associated Fisheries of Maine referred to earlier, a four-point program was proposed for further exploration:

1. Have the Federal Government establish parties under which vessel owners would receive subsidies for the cost of P & I insurance coverage above a certain level--possibly for all costs above \$600 per man (per year), with a \$500 deductible clause.
2. Insurance companies would be required to cover only up to \$100,000 per claim. Claims above this amount would be underwritten by the Federal Government.
3. To qualify for the program, standards for vessel safety would be established by the Bureau of Commercial Fisheries.
4. The Federal Government would establish parity zones, so that the cost of insurance borne by the vessel owners would

vary, depending on the degrees of risk existing in different areas of the country.<sup>87</sup>

Still another proposal advanced has been the scheduling of awards for specific injuries, as is done under workmen's compensation programs, with perhaps Government payment of extraordinary claims. Coupled with a simple administrative procedure for paying scheduled claims, it is contended that this would eliminate the confusion and litigation attending more common and minor accident claims, make recoveries more predictable, and generally reduce the costs attributable to the present claims procedure.

A measure more sweeping in its effects would be the elimination of the requirements that prohibit domestic fishermen from buying and using foreign-built vessels, and of duties on foreign-made gear and equipment. This action would aim to improve the safety record of the domestic fishing industry as a whole by reducing overall costs, and thus the profit squeeze, which appears to contribute to the accident problem, and by reducing barriers to modernization of the fleet.

Another broad measure would be institution of a system of limited entry to secure a smaller number of more efficient and profitable participants. With careful economic regulation, the resulting healthy economic condition of the industry might be expected to reduce accident and casualty rates.

One final alternative is advanced by the writer. To his knowledge it has never been committed to paper, but it deserves consideration since it is the alternative that has been followed to date. This course is to continue to do nothing to alleviate the problem of insurance costs, in the belief that marginal operators will be forced out of the industry, to its economic benefit.

#### Alternate Sources of Compensation:

One alternative given serious consideration, made the subject of legislation, and actually pursued successfully in several areas is that of self-insurance, in which fishermen associate and create their own insurance fund. The legislation being commented upon at the beginning of this paper would have authorized Government loans to help start such associations.

Another alternative is the creation of a government operated workmen's compensation program for seamen's injuries. This might simply entail extension of the Longshoremen's and Harborworker's Act to cover seamen. This would again involve scheduling of injury awards, definite recovery regardless of fault, and an administrative rather than judicial procedure for claim processing.

#### DISCUSSION:

The Coast Guard study just completed will presumably have detailed projections of the cost implications of various safety measures as well as the ability of the industry to bear them. One would expect such measures to have an impact on accident rates if uniformly applied and enforced. The impact would not likely be immediate, however. It might take a period of years before the average vessel owner were able to recoup his outlays in meeting the standards, through savings in premiums. Moreover, one would expect that rather stringent regulations would be necessary to overcome the pressures created where profits and income are down. Regulation of the practices that probably contribute so much to the accident problem--operating round the clock, cutting back the number of crewmen, cost-cutting measures that lead to the fatigue, lack of sleep, and long hours mentioned by Dr. Moore--might well force out most marginal operators. Institution of regulations requiring certain

structural, instrumental, or equipment changes in the vessel might similarly force many marginals out of business, because of their inability to obtain the funds necessary for compliance.

It is not clear to what extent Hull insurance rates would or could be lowered through these measures. To the extent that Hull insurance rates are high because of the age of a boat, or the fact that it has a wooden rather than steel hull, or the fact that, as in Alaska, facilities for repair and maintenance are scarce and expensive, or because of local weather and sea conditions, they would be unaffected by improvements in navigational instrumentation, licensing of skippers, and the like. The data submitted by Admiral Smith, however, indicate that most vessel casualties arise out of groundings, collisions, machinery failures, and flooding and sinking<sup>88</sup>, most of which would appear to be susceptible to reduction by means of such measures.

Judged alone by the criteria selected, it would appear that in most cases this alternative, if expanded enough to have a real impact on accident rates, would lead to costs that would largely offset, and in some instances exceed, savings in insurance costs, at least on a short-term basis. Improvements in insurance rates could be expected as the measures became widely implemented and accident rates began to drop. Most of the effect would probably be felt in the P & I area.

This alternative would work no immediate change in the level of compensation to injured crewmen. As insurance rates began to drop, however, the percentage of crewmen covered would likely increase as more owners found themselves able to afford coverage. To the extent that safety measures reduce accidents, they will reduce the magnitude of the injured seaman problem.

It is not clear what this alternative would cost to administer and enforce. The Coast Guard already has inspection responsibilities and experience, and the additional burden of inspecting fishing vessels might at most entail a slight incremental cost for a few additional personnel. Licensing and testing would likewise entail little added cost. Instruction in emergency medical care and safety practices could undoubtedly be handled by Coast Guard personnel already knowledgeable in these areas. Standards of design for vessels and equipment could be relatively inexpensively enforced by requiring submission of all plans to an authority such as the Coast Guard for review and approval.

Government supported and advisory patrols would operate on the problem in three ways. By providing information and warnings on local weather and sea conditions, they might help reduce vessel casualties caused by these factors. By remaining in contact with all vessels in the area, they would more quickly be aware of when a vessel had suffered major difficulty and would be in a position to respond more quickly with aid than at present. This would reduce the number of vessels lost without a trace, and would possibly reduce the loss of life associated with such major casualties. By providing ready access to medical advice and facilities, these patrols would improve the care given immediately following injury, which would help reduce the rate of serious injury.

The usefulness of these patrols would be limited primarily to personal injury mitigation, and thus to improving the P & I situation. To the extent that they would reduce vessel losses by transmitting weather and sea reports, they would be doing something that could be done just as well and more cheaply

by shore-based transmitting facilities, at least for continental shelf operations. A program of this nature would operate best as a complement to a program of safety regulation as discussed above. By itself it would do little to reduce the rate of all accidents.

Implementation of this alternative would result in no increase in other cost items for fishermen, unless it were to be required that all vessels be equipped with radio receiving and transmitting equipment for communicating with patrol vessels. This alternative would also work no immediate change in the level of compensation to injured crewmen. To the extent that rates were eventually lowered as a result of this sort of program and that presently uninsured crews thereby became covered, the level of compensation for those crews would be improved. If this plan was implemented on a nationwide scale, the cost could be considerable. The British experiment, with one chartered vessel, over a five-month period cost \$150,000.

Direct Government subsidies for the payment of premiums would immediately result in lower insurance costs for fishing vessel owners in both Hull and P & I categories. It would accomplish this more quickly and directly than any other alternative, and it would do so without effecting an increase in any other cost item for fishermen. The level of compensation for injured crewmen who are not now covered by P & I insurance, but who would become so with the availability of the "cheaper" insurance, would be increased overall.

The cost of this alternative would be comparatively high. It would in fact be difficult to justify, on any responsible basis at least, without some sort of additional requirements aimed at reducing the real cost of insurance. Vessel owners might thus be required to meet certain safety requirements, such

as outlined earlier, in order to qualify for this subsidy. To the extent these requirements offset the lowering of insurance costs by making other expenditures necessary for qualification, they would discourage those operators now carrying no insurance from obtaining it through the program. Thus these requirements would likely damp out the increased levels of compensation for injured crewmen, not now covered, referred to in the preceding paragraph. Use of this subsidy in conjunction with a program of safety regulation would, however, alleviate one difficulty attending a program of safety regulation alone. The subsidy would in effect eliminate the lag between the time expenditures were made to comply with the regulations and the time the expenditures would bear fruit in terms of lower insurance costs. Through adjustments in the amount of the subsidy, the overall level of costs could either be held at the present level or reduced to a lower level, with an amount equal to or perhaps less than the subsidy channeled from insurance into safety improvements in the vessel.

Subsidization of awards for injuries and property damage, alone, would be subject to the same objections as subsidization of premiums alone. In neither approach would there be anything operating to reduce the causes of the insurance problem. Assuming combination with safety requirements, this alternative would work to lower insurance costs both in a "real" and an "artificial" way. The attack on vessel accident rates would do so naturally. Putting a ceiling on the liability of underwriters and guaranteeing the amount by which awards exceed this ceiling, or guaranteeing payment of a certain percentage of any award, would operate to lower the premiums artificially. Presumably, underwriters would be able to lower rates immediately upon

institution of such an arrangement. The effect of this type of subsidy on negotiation, settlement, and litigation of claims might well be such as to require Government participation in these matters to safeguard its interests. This expense would be less under a ceiling, rather than percentage arrangement, since the Government would not have to involve itself with minor claims for less than the ceiling amount. Because of the required participation in the claims process, this alternative would be considerably more expensive to administer than the preceding one involving premium subsidy.

The four-point proposal arising out of the meeting of the insurance subcommittee of the Associated Fisheries of Maine combines a premium subsidy, with the Government paying the amount by which premiums exceed \$600 per man, and a claim subsidy, with the Government paying the amount by which claims exceed \$100,000. The injured party would be required to sue the Federal Government for any such amount of his claim over \$100,000. The proposal envisions certain unspecified safety standards being required to be met for qualification to participate in the program. Finally, it advocates (as the writer understands it) the use of Government subsidies to eliminate differences in insurance rates due to local weather and other natural conditions.

We have already discussed the joining of a program of safety regulation with premium and award subsidies. Safety requirements would add to the cost of catching fish, but the subsidy could be used either to cancel this increase by lowering insurance costs immediately, or even to lower the overall level of costs. The effect would be to divert funds now going into insurance premiums to safety improvements, through the use of public funds. The use of the award subsidy would seem to accomplish nothing that could not be accomplished

by use of the premium subsidy alone. It would, considering the comparatively small number of awards of over \$100,000, have little effect on insurance rates, yet would probably involve the Government in all cases where a claim of over \$100,000 was made. An attempt to force a separate action against the Government for any amount over \$100,000 claimed, assuming it were successful, would represent a wasteful multiplication of suits in an already pressed judicial system. While it might discourage some frivolous claims, it would force needless additional legal expenses upon those for whom an award of \$100,000 was, in fact, inadequate. The writer is unable to comment upon the use of public funds to eliminate rate differences caused by local weather and other natural conditions, except to say that he has not seen an allegation that this represents a significant problem.

Scheduling of awards for specific injuries might, in making recoveries more predictable, contribute to a lowering of P & I rates. Much would depend on the level at which awards were scheduled. To accomplish predictability, such awards would have to be made the exclusive remedy for injured crewmen. In order to make this acceptable to them, it would undoubtedly be necessary to guarantee recovery in every case of work-connected injury. There might or might not be bars to recovery, such as contributory negligence or gross negligence on the part of the crewman. The writer has never been convinced that these bars, and one finds a variety of them in workmen's compensation laws, represent legitimate policy. They merely shift the loss from the industry concerned to the public in many cases, and increase the expense of processing claims. The writer sees no reason why an employee's contributory negligence, drunkenness, or the like should have this effect. The standard should not be fault, but whether the injury is work-connected.

This alternative would operate on those contributions to the present high cost of P & I insurance attributable to the present system for handling claims. The effects of alleged "high" and increasing jury awards and "liberal interpretation" would be eliminated. The expense of the present system could be further reduced by substituting a simple administrative procedure for processing claims. Existing state or federal workmen's compensation boards could be utilized, with little extra expense.

The scheduling system could attempt to set a specific recovery for every type of injury, or it could leave some extraordinary items unscheduled, with recovery to be determined according to the damage proved. Elements of damage such as pain and suffering, obviously difficult to schedule, might thus be left to determination according to the facts of each case. This practice would subvert the predictability which is the main feature of this system, and for this reason such unscheduled, flexible items ought to be kept to a minimum. To retain some predictability, even for such extraordinary items, a ceiling might be imposed on the amounts recoverable. If no such limit were desired, the liability of the insurer might be limited, with the Government paying the amount awarded over the limit.

Awards for partial or complete disability could be predetermined with a formula based on income and designed to preserve the injured party's standard of living in the event of lost earning power. There would be some difficulty in this, not found in the case of most other workmen, because of the fluctuating nature of fishermen's incomes. A satisfactory formula could doubtless be worked out, however, which would come fairly close to this goal.

If designed in this manner, the scheduling arrangement would fully meet the compensation criterion advanced at the outset. It is not clear

how P & I premiums under this system would compare with those presently found. In meeting the compensation criterion, particularly in meeting the pain and suffering aspect of it, the savings would be reduced somewhat. The level of recoveries would be reduced from that obtaining under present seamen's remedies, but this saving would be reduced by the elimination of those injuries which presently go uncompensated (e.g., because of bars to recovery under present laws). Even if premiums were in fact lower under this system, the accident problem would remain. High premiums do not presently form an incentive for boat owners to improve safety. There is no reason to believe that high rates under a scheduling system would do so. For this reason, and for the reason that this system would not affect Hull insurance rates, a program of safety regulation would be a desirable adjunct. As we have seen, such a program would be relatively inexpensive to enforce and administer, and would thus add little expense to the scheduling. This, of course, would add to the expense considerably.

The fisherman's vessel is, of course, his major capital item. Excluding foreign-built vessels and raising the prices of foreign-built gear and equipment through duties double the cost of these items. Beyond all doubt this has had a tremendous impact on the domestic fishing industry. It has worked to sacrifice its welfare for that of the domestic shipbuilding industry. This would not be so if subsidy money were available to all who needed new vessels, equipment and gear. Where it is not available to all, it works an extreme hardship on those who are excluded yet must pay the subsidy-inflated prices.

Allowing domestic fishermen to purchase and use cheaper foreign-built vessels and equipment would do much to lower the cost of catching fish, an

important factor in the insurance problem. By facilitating modernization, it would reduce repair costs, days lost because of breakdowns, and accidents caused by aged and deteriorated vessels and equipment. It would permit use of more efficient vessels, capable of being easily adapted to different species. This alternative would not likely result in significant short-term improvements in the insurance picture. The process of modernization would probably take some time, because of the shortage of capital in the industry, and because of its history of poor return on investment. Lowering of vessel and equipment costs would likely act as a spur to investment, but the magnitude of this effect is impossible to predict. According to the view of the problem taken in this paper, the cost of insurance would be expected to decline as other costs declined and the general economic health of the industry improved. Hull premiums, based on the value of the hull, would decrease as foreign competition lowered vessel and equipment values. Hull rates would decrease as would P & I rates, as the economic health of the industry improved.

This approach would result in no increases in other cost items for fishermen, and would cost nothing to administer. Indeed, the present program of vessel construction differential subsidies would be discontinued. The "cost" of all this would be borne by the shipbuilding industry, which would lose what was always its subsidy and not the fishing industry's. Of course, if the shipbuilding industry were found unable to survive the loss and remain on its feet, the Government might always simply give it an allowance to keep it going, which would result in a saving to the public in the amount presently spent on materials. If this were considered too blatant a course of action, some other more covert method could undoubtedly be found of getting the money

into the proper pockets. The Government is nowhere more imaginative than in devising subsidies.

The effect on the level of compensation for injured crewmen would again be indirect. As insurance rates and profitability improved, the percentage of men covered by P & I would likely increase, thus improving at least the chance of compensation in the event of injury for those men newly covered.

Limited entry is a method of regulating the amount of fishing effort brought to bear in a particular fishery, while at the same time promoting the efficient use of fishing resources therein. Without regulation of this sort, new participants will be attracted to a fishery so long as it remains profitable, with the result that profits will be split up in ever smaller shares. Inefficiency will have to be forced on all as a method of regulating effort. Under strictly limited entry, only that number of participants which, operating at top efficiency, is necessary to take the available catch would be allowed to fish. Under this arrangement the resources used in the fishery would be used in the most efficient manner possible. Assuming it were possible, in the present state of our capability, to determine this theoretical optimum, we would be under no compulsion to adhere to it. We might, for one reason or another, wish to limit entry to achieve some lesser level of efficiency, with greater participation. It is not the object of this paper to discuss the complex area of fisheries management in any detail. The point here is to merely indicate that regulating entry is another way of regulating the economic health of the industry, and, to the extent that it tends to be tied to that state of health, of regulating the insurance problem. Limited entry is such a sweeping measure in its effects that one hesitates to advance the insurance

problem as a justification for it. Much more compelling arguments exist, and have been advanced, for restricted entry. Given the apparent political temperature of the issue, they would all likely be necessary to justify its institution.

Limited entry, for those allowed to participate, would not increase costs. It would make larger catches possible for each participant, and therefore would increase profitability. With better profits, the pressures which now contribute to accidents would decrease. New capital would be attracted and modernization of vessels and equipment would be expected. This would contribute to improved safety. Imposition of safety regulations would further improve the accident and casualty situation if needed, and a healthier industry would be better able to bear the costs associated therewith.

Restricted entry would not deal directly with the level of compensation to injured crewmen. Again, however, lowered insurance costs, combined with increased profitability, would increase the percentage of crewmen covered by insurance. With fewer participants, in fact, the coverage might well be 100%.

The expense associated with a program of restricted entry would arise chiefly from the rather extensive amount of detailed data needed to operate such a system of economic and biological management. The information requirements would probably greatly exceed those existing under present management strategies and objectives. Costs could be rather high.

One of the easiest decisions to make, of all the alternatives discussed, would be to continue to do nothing. Indeed, there appear to be possible justifications for such a decision. It is extremely doubtful that the U.S. commercial fishing industry would die out if the problem were left untreated.

More marginal operators would be forced out as costs continued to rise and as boats were sold to satisfy claims. But this would contract participation, and at some point it would become profitable enough for the survivors to enable them to reverse the problem, would it not? It looks like limited entry without the distasteful necessity for officially excluding some applicants. But it would not really be limited entry, because there would be no official prohibition of entry. The only barrier to entry would be the high costs associated with participation. Any time the fishery became decently profitable because of drop-outs, there would probably always be someone around with enough capital to enter. Thus the profit margins for participants would remain low. The problem would remain as it is today essentially, with considerable intervening cost in terms of uncompensated claims, unemployment, depressed incomes, and the like. In doing nothing, we would be achieving not quite in proportion to our efforts.

Fishermen's insurance cooperatives have had a history of success in certain parts of the country. They have been most prevalent on the Pacific coast. Examples of successful cooperatives are the Halibut Producers Cooperative, and the Health Producers Cooperative. Under these arrangements, fishermen join together to create their own insurance fund. Glasgow's third table (Figure 1) indicates that of every 100 boats and vessels, the number participating in cooperatives in each region is: Pacific, 26.5; New England, 10; Gulf and South Atlantic, 2.1, and Middle Atlantic, 1.1.

The proposal to make Federal funds available for the formation of more such cooperatives has been hailed by some as a solution to the problem of high insurance costs. The success of existing cooperatives is cited as

evidence of this proposition. Some existing cooperatives have indeed been successful, with participants not only getting their premiums back, but interest on them as well.<sup>89</sup> But in the words of William Terry, Acting Deputy Director of the Bureau of Commercial Fisheries in 1970: "Some of these (cooperatives) are, on the surface, quite successful, but they are also highly selective. This is to say they take the position of insuring only good risks, and thus they work out very well. The poor risks have to fall back on regular commercial insurance...."<sup>90</sup>

Dr. Glasgow has pointed out two important difficulties with a program of providing Federal funds for the creation of self-insurance cooperatives:

Associations organized to implement a self insurance program are not likely to own property suitable for use as collateral to secure the repayment of loans.

Another consideration must be the institution of a concomitant program for vessel safety. Without some improvement in the rate of loss, the association would save only the sum now taken as profit by commercial carriers. Because insurance rates are thought to be a function of risk undertaken, the elimination of profit alone may not effect a substantial reduction in the cost of insurance. Unless the associations are to be highly selective in their coverage, they will realize no great savings without a significant reduction of the risks involved.

The success of these plans has been accomplished by a reduction of risks which results from the exclusion of many operators whose insurance needs are greatest.<sup>91</sup>

This sort of plan, then, would require a program of safety regulation as well, in order to be successful at lowering insurance costs significantly. Safety standards would result in added costs to vessel owners. To the extent they were unable to bear these costs, some form of assistance would be necessary. The loan to create the reserve for the association might be made larger and premiums excused to allow the money to be applied to safety

improvements instead. The matter would be extremely complex, however, and the basic problem of security for the Government loan would remain. In view of these difficulties it would appear that other methods of lowering premiums and improving safety are clearly preferable. Once safety had in fact been improved generally, operators would be in a better position to form cooperatives without Government aid, and could do so if the need were felt.

#### COMPARISON OF ALTERNATIVES:

We may now summarize the predicted results of the alternatives in terms of the criteria selected. Two alternatives are pretty clearly unacceptable--doing nothing and Government financing of insurance cooperatives. Limited entry could also be excluded. Management of fisheries in this country is a matter left chiefly to the states, at least in waters of the Territorial Sea adjacent to their coasts. For this reason, institution of a system of restricted entry on a nationwide basis would be quite difficult, requiring action by and cooperation among 23 separate coastal states. Limited entry will not be excluded from consideration here, however. It could be instituted in the nine-mile fisheries zone outside the Territorial Sea by the Federal Government. And it is not inconceivable that, should the Federal interest in its fisheries be one day deemed such as to justify a greater involvement in management within the Territorial Sea, it could be initiated uniformly there as well.

Safety measures could be expected to lower both Hull and P & I rates over a period of time. Implementation costs would depend on the specific standards imposed, and their distribution over time would depend on the necessity for and availability of financing. Improvements in the level of compensation

would be delayed, following the decrease in insurance rates, and would consist of expansion of coverage to include men not now covered. Program costs would be minimal.

Government support and advisory patrols would contribute slightly to reduced premiums, primarily in the P & I area, by reducing serious injuries. There would be no implementation cost to the industry, except among owners with no radio communication equipment, in the event such equipment were required. The effect on compensation would again be tied to reduced premiums, and would therefore be slight. The program costs would be relatively high.

Premium subsidies would lower both Hull and P & I rates immediately. There would be no implementation costs. The percentage of men covered would increase relatively quickly. Program costs would be relatively high.

Recovery subsidies would lower rates quickly in both Hull and P & I categories. No implementation costs would result for the industry. With lower rates, the percentage of men covered would increase relatively quickly. Program costs would be relatively high. They would be higher under a percentage arrangement than under a ceiling arrangement because of the increased participation in claims procedures required.

Scheduling would lower rates by an indeterminable amount, depending on the amounts scheduled, the limits on extraordinary recoveries, and the increased number of awards resulting from expanded coverage. There would be no implementation costs to the industry. All compensation criteria would be met. Program costs would be zero, assuming no Government involvement with extraordinary claims, and perhaps moderate in the face of such involvement.

Elimination of the "Made in U.S.A." constraints would lower both Hull and P & I rates over a period of time--perhaps an extended period of time. Other costs would be lowered as well. Increased coverage would be expected to follow lowered insurance rates, again over a period of time. Program costs would be zero, with a possible saving in the amount of present construction differential subsidies, and a loss of present revenues from duties on foreign gear and equipment.

Restricted entry would lower rates, again over an extended period of time. There would be no implementation cost, unless a license fee were required. The percentage of men covered would increase as insurance rates decreased. Program costs would be rather high, owing to the more exacting data requirements.

Lacking precise figures to work with, and recognizing, therefore, the necessary crudeness of the operation, we may attempt to rank the alternatives under various criteria, as shown in Figure 1. In each case, the alternatives are ranked according to their desirability in terms of the particular criterion, with the most desirable ranked above the least desirable. Alternatives judged about equal in performance are ranked together.

There is nothing in the nature of these alternatives to prevent their being combined, as was assumed earlier. No one of the alternatives appears clearly superior in meeting the criteria.

A program of safety measures performs moderately well to poorly under all but the accident reduction criterion. Accidents being the most direct cause of the problem, this criterion is of considerable importance. Indeed it may be considered the primary criterion, for only by reducing accidents may

LOWER RATES (HOW QUICKLY ACHIEVED)

1. Premium subsidy  
Recovery Subsidy
2. Scheduling
3. Safety Measures
4. Elimination of Buy American  
Limited Entry
5. GSAP

FEWER ACCIDENTS (DEGREE LESSENER)

1. Safety Measures
2. Elimination of Buy American  
Limited Entry
3. GSAP  
Premium Subsidy  
Recovery Subsidy  
Scheduling

IMPLEMENTATION COSTS (HOW LOW)

1. Elimination of Buy American  
Premium Subsidy  
Recovery Subsidy  
Scheduling  
Limited Entry  
GSAP
2. Safety Measures

PROGRAM COSTS (HOW LOW)

1. Elimination of Buy American  
Scheduling
2. Safety Measures
3. GSAP  
Limited Entry  
Recovery Subsidy  
Premium Subsidy

COMPENSATION IMPROVEMENT

1. Scheduling
2. Premium Subsidy  
Recovery Subsidy  
Safety Measures  
Elimination of Buy American  
Limited Entry
3. GSAP

FIGURE 6

the need for assistance ever be eliminated. Only three of the alternatives operate on this problem. Of these, the program of safety measures is most effective in terms of maximum reduction achieved, and in terms of the speed with which achieved. For this reason we might conclude that, whatever other measures are selected, a program of safety regulation ought to be a part of the solution.

Combining the rankings of the remaining alternatives, under all but the accident reduction criterion produces the following result:

1. Scheduling.....5
2. Premium Subsidy.....7
3. Recovery Subsidy.....7
4. Elimination of Buy American.....8
5. Safety Measures.....10
6. Limited Entry.....10
7. GSAP.....12

With the exception of Government support and advisory patrols, and possibly limited entry and safety measures, there is little difference in the predicted performance of the alternatives--certainly not enough to eliminate any, given the necessarily crude method of ranking and comparison.

Two additional benefits flow from elimination of the "Made in U.S.A." constraint, however. In the first place, it results in a drastic reduction in capital costs for the industry. In the second place, it contributes to a reduction in accidents in a manner which complements a program of safety regulation, working in the long run to eliminate accident factors, such as the pressure caused by low profits and vessels and major items of equipment

in an old and deteriorated condition, which safety regulations would be least able to deal with. The alternatives ranked above this one produce no comparable benefits. Assuming they are all otherwise fairly equal, these benefits would seem to make elimination of this constraint the alternative of choice.

#### BENEFIT-COST ANALYSIS, ACCORDING TO THE BUREAU OF COMMERCIAL FISHERIES:

Dr. Bell, in his "Guide to Benefit-Cost Analysis for Bureau of Commercial Fisheries Programs," defines two fundamental program areas for the BCF<sup>92</sup>-- programs designed to increase or maintain harvesting productivity and programs designed to increase consumption. Programs designed to increase or maintain harvesting productivity or, in other words, to lower or maintain the cost per pound of fish landed, would include programs of the sort discussed in this paper, whose effect it is to lower the cost of catching fish. In the short run, Bell writes, programs which reduce harvesting cost "may create high profits for industry."<sup>93</sup> Over the long term "new vessels or effort will probably be attracted to the industry thereby expanding the supply of fish and lowering prices...providing that the level of fishing effect (sic) is below that level needed to achieve maximum sustainable yield from the fishery."<sup>94</sup> Where the level is at or near the point of maximum sustainable yield, economic benefits may be negative, since the new effort which may be attracted will produce a contraction in landings and higher prices and costs.<sup>95</sup> For fisheries which are below maximum sustainable yield, however, the long-run economic benefits accruing from a reduction in harvest costs are lower consumer prices and "new employment opportunities for U.S. capital and labor."<sup>96</sup>

In following this, the reader may feel a certain vague uneasiness. This uneasiness may well be motion sickness, induced as Dr. Bell darts about in pursuit of the elusive benefit. We began with a prospective program for reducing harvesting costs. We may well have assumed, therefore, that we were about to help the fisherman. Knowing, as we do, his general economic health, we (and he) may even have been pleased at the prospect. We paused to note the short-term "high profits" created for the industry; then, as new participants began to flood in, we quickly shifted our frame of reference (and our apparent objective as well) from the fisherman to the consumer--just in time to catch him paying less for his fish. "This," as Dr. Bell so succinctly puts it, "makes the consumer better off."<sup>97</sup>

The writer does not doubt that lower prices do, in fact, make the consumer better off. What has our program done for the fishery, however--if we may return to the docks for a moment? Over the long term it has likely done nothing (assuming, of course, that it was originally below the level of maximum sustainable yield). The profit margin for the average fisherman--and a program of cost reduction has meaning for the fisherman only insofar as it was before the program. The economic condition of the fishery will not have been improved. From the standpoint of society as a whole, there will similarly be no benefit. It is true that "employment opportunities for U.S. capital and labor" will have been created. But they will be inefficient opportunities. When the waves subside, the fishery will likely have far more capital and labor employed in it than is necessary to take its yield. And it will in all probability be producing a very low net revenue at best.

All this need not have been the case, however. Both the interest of the

fishing industry in reasonable profits, and the interest of society in the efficient use of its resources were advanced under the program for a time. They could have remained so with the addition of one more element--that of prohibiting the entry of additional effort. The analysis of the BCF does not reflect these major benefits quickly gained and then lost. To that extent, it does not accurately depict the consequences of these programs, and it is a misleading analysis.

#### CONCLUSIONS:

We have already alluded to the difficulties attending unlimited entry in domestic fisheries. Fish are a common property resource, and as long as it is profitable in the least to catch them, new fishermen will be attracted. Any measure which lowers the cost of insurance, alone or in combination with other costs, will therefore result in additional effort being drawn into the fishery.

In the case of fisheries below the point of maximum sustainable yield, this additional effort will result in an increased catch. New effort will be drawn, reaching and surpassing that level of effort at which maximum net revenue is produced from the fishery. Effort may continue to be drawn until the catch, together with natural mortality, is greater than recruitment, and the stock begins to decline. The fishery may then experience a series of oscillations in which effort is alternately reduced because of higher costs per unit of product, and re-attracted as the stock replenishes itself. Eventually an equilibrium may be reached between population and effort, "which is likely to be marked by a relatively large amount of effort, a low population, and a low sustainable yield."<sup>98</sup> In the case of unregulated

fisheries at or near maximum sustainable yield, the additional effort will result in a declining catch, with a new equilibrium at a lower catch level.

Though variations in biological conditions, prices, demand, the influence of imports, and other factors may alter events somewhat, in general they will proceed in the direction depicted. The conclusion seems inescapable. Without restrictions on additional entry, no relief from high fishing costs can be lasting. To sustain the profitability induced, in the face of unlimited and expanding entry, would require a continuing and ever-increasing dole of public funds ending only with the successful hunting down and boating of the last million-dollar codfish. It must be understood, therefore, that unless we are willing to prohibit additional entry in fisheries now at or near maximum sustainable yield and to restrict such additional entry severely in fisheries below that level, it is useless to expect any reduction in the cost of fishing to last. Accordingly, any solution to the problem of high insurance costs must include limited entry. Used in this manner, it would be quite different from the system of limited entry earlier proposed as an alternative. Its sole purpose would be to maintain the advantage imparted by lowering insurance costs, and it would accomplish this essentially by freezing the level of effort at what it now is. There would be none of the expense associated with using limited entry for achieving economic efficiency or maximum net revenue in a fishery. And there would be no distasteful need to remove present participants from their trade.

The final choice among the alternatives for alleviating the insurance problem must ultimately rest on a more detailed comparison of costs and benefits than has been possible here. On the basis of the limited comparison

we have been able to undertake in this paper, it appears that the optimum solution will consist of a program of safety regulation combined with either scheduling of injury awards, premium or recovery subsidies, or elimination of barriers to the use of foreign-built vessels, gear, and equipment. In the event that the last-named alternative is the final choice, as it seems it should be, or that scheduling is chosen, it may be necessary to provide Federal loan money for the purpose of helping fishermen meet the safety standards imposed. Herein lies another benefit flowing from elimination of the barriers against use of foreign products. With the generally improved health resulting from this lowering of capital costs, the industry would be able to repay the loans at an interest rate which would make the Government outlay more like an investment than a subsidy.

## FOOTNOTES

1. Hearings on Increased Assistance to Commercial Fisheries Before the Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, 91st Congress, 1st & 2d Sessions 138 (1970).
2. Report of the Panel on Marine Resources, Commission on Marine Science, Engineering and Resources, 3 Panel Rep. VII-47 (1969).
3. O. M. Longnecker, in The Place of the Shrimping Industry in the U. S. Fisheries, The Future of the Fishing Industry of the United States, IV University of Washington Publications in Fisheries, New Series 113 (1968), indicates that Gulf shrimp trawler owners generally carry only up to 80% of the current value of the boat.
4. W. Perrin & B. Noetzel, Economic Study of San Pedro Wetfish Boats (Division of Economic Research, Bureau of Commercial Fisheries, Working Paper No. 32, 1969) (\$500 deductible for fire only).
5. Owners of vessels studied in San Pedro generally insure to \$100,000 per single claim, with \$1,000 deductible for property liability. Perrin & Noetzel, supra note 4. With Gulf shrimp vessels, coverage is reportedly carried in an amount equal to the current value of the boat. Longnecker, supra note 3.
6. Hearings on Increased Assistance, supra note 1, at 146.
7. Hearings on Increased Assistance, supra note 1, at 145.
8. Hearings on Fisheries Legislation, 1969-70, before the Subcommittee on Energy, Natural Resources, and the Environment of the Senate Commerce Committee, 91st Congress, 1st & 2d Session. 149 (1970).
9. Hearings on Increased Assistance, supra note 1, at 145.
10. Hearings on Increased Assistance, supra note 1, at 161.
11. F. Bell, The Economics of the New England Fishing Industry: The Role of Technological Change and Government Aid 90 (Research Report to the Federal Reserve Bank of Boston, No. 31, 1966).
12. Hearings on Fisheries Legislation, supra note 8, at 149.
13. Hearings on Fisheries Legislation, supra note 8, at 168.
14. National Fisherman, May 1970, at 22-A.

15. Committee Meeting re P & I Insurance, Letter from Ron W. Green to Prof. William T. Burke, October 29, 1970.
16. Hearings on Increased Assistance, supra note 1, at 161.
17. Bell, supra note 11, at 90-91.
18. Longnecker, supra note 3, at 113.
19. Hearings on Increased Assistance, supra note 1, at 41.
20. The 1969 Fishing Fleet Improvement Act: Some Advantages of its Passage 3 (Division of Economic Research, Bureau of Commercial Fisheries, Working Paper No. 20, 1969).
21. Idem at 2.
22. Idem at 4.
23. Hearings on Increased Assistance, supra note 1, at 145.
24. Hearings on Increased Assistance, supra note 1, at 145.
25. Hearings on Increased Assistance, supra note 1, at 145.
26. Hearings on Increased Assistance, supra note 1, at 138, 146.
27. Longnecker, supra note 3, at 113.
28. Longnecker, supra note 3, at 113.
29. Hearings on Fisheries Legislation, supra note 8, at 159.
30. Hearings on Fisheries Legislation, supra note 8, at 159.
31. J. Dykstra & A. Holman, Cost of Fishing and Foreign Competition... New England, The Future of the Fishing Industry of the United States, IV University of Washington Publications in Fisheries, New Series 105 (1968).
32. W. Royce & E. Hansen, Food Fishery Policies in the Western United States, 43 Wash. L. Rev. 231, 256 (1967).
33. 46 U.S.C. 11.
34. 46 U.S.C. 251.
35. Nearly twice the cost according to a letter from Russell Train to the Senate Commerce Committee. Hearings on Fisheries Legislation, supra note 8, at 63.

55. Fitzgerald v. United States Lines Co., 374 U.S. 16 (1963) (maintenance and cure); Bartholomew v. Universe Tankships, Inc., 263 F. 2d 437 (2d Cir. 1959), cert. denied, 359 U.S. 1000 (1959) (action for unseaworthiness).
56. Pacific S.S. Co. v. Peterson, 278 U.S. 130 (1928); Gilmore & Black, supra note 45, at 289.
57. Report of the Panel on Marine Resources, supra note 2, at VII-18.
58. Report of the Panel on Marine Resources, supra note 2, at VII-18.
59. Report of the Panel on Marine Resources, supra note 2, at VII-18.
60. Report of the Panel on Marine Resources, supra note 2, at VII-18.
61. Hearings on Fisheries Legislation, supra note 8, at 178, 99, 141.
62. Hearings on Fisheries Legislation, supra note 8, at 205.
63. Marine Science Affairs -- A Year of Broadened Participation, Third Report of the President to Congress on Marine Resources and Engineering Development 93 (1969).
64. Idem at 94.
65. Report of the Panel on Marine Resources, supra note 2, at VII-54.
66. Marine Science Affairs -- A Year of Broadened Participation, supra note 63, at 94.
67. Marine Science Affairs -- Selecting Priority Programs, supra note 37, at 85-86.
68. A Study of Cost Benefits and Effectiveness of the Merchant Marine, U.S. Coast Guard, May 1, 1968.
69. V. Norton & M. Miller, An Economic Study of the Boston Large Trawler Labor Force (Fish and Wildlife Service, Bureau of Commercial Fisheries, Dept. of Interior, Circular 248, 1966).
70. Hearings on Increased Assistance, supra note 1, at 235.
71. World Fishing, June, 1969, at 40-41.
72. Norton & Miller, supra note 69.
73. Hearings on Fisheries Legislation, supra note 8, at 141.

74. R. Dow, P. Groggins, & J. Hughes, American Lobster of Great Value But Fishery Has Share of Troubles, National Fisherman, May, 1969, at 11B.
75. Report of the Panel on Marine Resources, supra note 2, at VII-54; Hearings on Fisheries Legislation, supra note 8, at 178, 206.
76. Report of the Panel on Marine Resources, supra note 2, at VII-54; Hearings on Fisheries Legislation, supra note 8, at 178, 206.
77. Norton & Miller, supra note 69.
78. National Fisherman, May, 1970, at 22-A.
79. Fishing Gazette, Vol. 87 No. 2, at 17, 27.
80. Report of the Panel on Marine Resources, supra note 2, at VII-54; Hearings on Increased Assistance, supra note 1, at 118.
81. Marine Science Affairs--A Year of Broadened Participation, supra note 63, at 94.
82. Hearings on Increased Assistance, supra note 1, at 161.
83. Commercial Fisheries Review, Vol. 32 No. 6, at 6.
84. A. Sokolski, E. Carlson, & B. Noetzel, Costs, Earnings and Borrowing Capacity for Selected U.S. Fisheries 54 (Division of Economic Research, Bureau of Commercial Fisheries, Working Paper No. 29, 1969).
85. Hearings on Increased Assistance, supra note 1, at 15-21.
86. World Fishing, June, 1969, at 41.
87. Green Letter, supra note 15.
88. Hearings on Increased Assistance, supra note 1, at 235.
89. Hearings on Increased Assistance, supra note 1, at 80.
90. Hearings on Increased Assistance, supra note 1, at 156.
91. Hearings on Increased Assistance, supra note 1, at 139.
92. A Guide to Benefit-Cost Analysis for Bureau of Commercial Fisheries Programs (Division of Economic Research, Bureau of Commercial Fisheries, Working Paper No. 35, undated), note 1, at 6, 7, 10.
93. Bell, supra note 1, at 12.
94. Bell, supra note 1, at 12-13.

95. Bell, supra note 1, at 17.
96. Bell, supra note 1, at 13.
97. Bell, supra note 1, at 13.
98. F. Christy & A. Scott, The Common Wealth in Ocean Fisheries 9 (1965).

