ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW

OF

SECRETARIAL AMENDMENT 6

TO THE FISHERY MANAGEMENT PLAN

FOR THE

NORTHEAST MULTISPECIES FISHERY

HADDOCK PROTECTION MEASURES

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1. Introductory Materials

1.1. Summary

The Northeast Multispecies or groundfish fishery is managed by the New England Fishery Management Council (Council). Management of the groundfish fishery under the FMP has been primarily through the use of a minimum mesh size in specified areas, minimum fish sizes, and closed areas. Small mesh fishing (less than the regulated mesh size) was permitted under area, season, and bycatch restrictions. Despite these measures, the groundfish stocks have declined to record or near-record low levels of abundance attributed largely to record high fishing mortality through increased fishing effort.

To reverse this trend and in an effort to rebuild the groundfish stocks, the Council developed and submitted Amendment 5 to the FMP to the Secretary on September 27, 1993. Two of the measures proposed in the Council's Amendment 5 were disapproved by the Secretary during the preliminary evaluation provision of section 304(a)(1)(A) of the Magnuson Act: a proposed winter flounder exemption and a 5,000 pound haddock possession limit, both determined to be inconsistent with the national standards of the Magnuson Act by failing to prevent overfishing.

Amendment 5 proposes to rebuild the cod, haddock, and yellowtail stocks through a step-wise reduction in fishing mortality. On January 3, 1994, the Secretary of Commerce issued an emergency rule to protect haddock which contained the following measures: (1) A 500-pound possession limit of haddock for all vessels permitted under the multispecies fishery, except scallop dredge vessels, which are prohibited from possessing or landing haddock; (2) a January through May closure of the area known as Closed Area II, except for lobster pot and scallop dredge vessels; (3) an expansion of Closed Area II by 20 minutes longitude to the west and 15 minutes latitude to the south; (4) a suspension of the closure of Area I to all vessels except sink gillnet vessels; (5) a prohibition of transfer of fish at sea; and (6) a ban on pair trawling.

In April the New England Fishery Management Council submitted a revion to the disapproved part of Amendment 5 associated with haddock protection measures. The Council's document had as a preferred alternative a 750 pound possession limit for haddock and was disapproved by the Secretary on May 4.

The haddock stocks on both Georges Bank and in the Gulf of Maine are at all time low levels of abundance. Haddock landings in 1993 were the lowest in recorded history. The stock condition and landings will continue to decline until such time as meaningful measures are implemented to eliminate the overfished condition of the stocks and reduce the exploitation rate to levels that will allow significan rebuilding to take place.

The most recent assessment of haddock indicated that the haddock spawning stock biomass on Georges Bank has been reduced from 130,000 metric tons in 1963 to an estimated 10,000 metric tons at the beginning of 1993, significantly lower than the 130,000 metric tons required to provide an annual maximum sustainable yield of 47,000 metric tons. Maintaining stock levels at the current low level potentially jeopardizes potential recruitment to the standing stock. At current

levels of exploitation the stock cannot be rebuilt.

Absent this Secretarial Amendment, there will be no special haddock protection measures in place upon expiration of the emergency rule on June 30.

The objectives of this Amendment include the first two objectives of Amendment 5, as well as reduction of fishing mortality rates to well below that defined by the overfishing threshold, adoption of a trip limit/possession limit level which best balances landing and discard mortality while providing sufficient protection for the resource, and a management strategy which is risk-averse with regard to the conservation of haddock.

The proposed actions include, relative to the status quo of Amendment 5, imposition of a 500 pound possession limit for all vessels permitted in the northeast multispecies fishery and fishing in the EEZ, an extension of Closed Area II to the period January through June in 1995, and a prohibition on possession of haddock by scallop dredge vessels fishing in the EEZ during the January through June period.

The rationale for the choice of a 500 pound possession limit is that the proportion of trips in which the trip limit constrains landings is probably about 15%; there appears to be a significant level of control over the catch of haddock, and an ability on the part of fishermen to meet, but not exceed small trip limits if fishermen move from areas where haddock are encountered after reaching the trip limit; the foregone catches due to discards from trips exceeding the trip limit is small, particularly given the conservation benefit of preserving the historically low haddock resources; and because of the uncertainty with regard to the effect of trip limits, and in light of evidence of continued declines in the stocks, a risk averse management strategy is most prudent.

Extension of Closed Area II to the period January through June contributes significantly to haddock savings as does a prohibition on possession of haddock by scallop dredge vessels during the period of the Area II closure.

Although there are some anticipated shortfalls in ex-vessel revenues due to restrictions on haddock possession, extension of the closed area to trawl vessels, and a prohibition on haddock retention by scallop dredge vessels for the period January through June, these losses will be more than offset by future gains in revenue (and presumably profit) should the measures prove effective in enhancing the probability of haddock stock recovery and rebuilding.

None of the possession limits will greatly impact processing or wholesaling employment in the principal ports and processing centers. Few jobs are likely to be at risk since the proportion of haddock landings to other landings is already small, and since substitutes (other species) and complements (imported haddock) are available.

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protection to the groundfish stocks, especially haddock, and realizing that Amendment 5 would not be in place at the first of the year, on October 28, 1993 the Council requested that the following measures be taken by Secretarial emergency action, to be effective on January 1, 1994:

1. Closure of the area known as Closed Area II (Figure 1)(under the status quo the area is closed by regulation on February 1, 1994; Amendment 5 would continue this timing through 1995 and thence shift to a January 1 closure.);
2. A ban on all pair trawl fishing in the multispecies fishery (part of Amendment 5); and
3. A 4,000 pound haddock possession limit.

The Council further requested suspension of the closure of the area known as Closed Area I (Figure 1) to all gears except sink gillnet gear (part of Amendment 5) and that the Closed Area II expansion in size proposed under Amendment 5 not be implemented.

The National Marine Fisheries Service (NMFS) Northeast Regional Director (Regional Director), in considering the Council's request, found that some of the Council's proposed measures were inadequate in protecting the haddock resource. He informed the Council that, while agreeing with most of the above measures, he favored a zero haddock possession limit and implementation of the Closed Area II size expansion as originally proposed under Amendment 5.

On December 9, 1993, the Council endorsed the Regional Director's proposal with one exception. The Council recommended a range of haddock possession limit between 500 and 1,000 pounds; such limit to be at the Regional Director's discretion. Further, in conjunction with these measures, the Council requested that the Regional Director investigate the appropriateness of the use of scallop gear in Closed Area II during the closure.

More specifically, the Council requested that the following measures be taken by Secretarial emergency action, to be effective on January 1, 1994:

1. Closure of the area known as Closed Area II.
2. Expansion in size of Closed Area II.
3. A ban on all pair trawling and
4. A 500-1,000 pound haddock possession limit.

On January 3, 1994, the Secretary of Commerce issued an emergency rule to protect haddock which contained measures that closely followed the recommendations made by the Council at its December meeting. The rule was made effective from January 3, 1994 through April 2, 1994 and contained the following measures: (1) A 500-pound possession limit of haddock for all vessels permitted under the multispecies fishery, except scallop dredge vessels, which are prohibited from possessing or landing haddock; (2) a January through May closure of the area known as Closed Area II, except for lobster pot and scallop dredge vessels; (3) an expansion of Closed Area II by 20 minutes longitude to the west and 15 minutes latitude to the south; (4) a suspension of the closure of Area I to all vessels except sink gillnet vessels; (5) a prohibition of transfer of fish at sea; and (6) a ban on pair trawling.

2. Introduction

2.1: Background and History

The Northeast Multispecies or groundfish fishery is a historically important fishery pursued off the New England coast. Since 1977, the fishery has been managed by the New England Fishery Management Council (Council). Initially, the species under management were limited to Atlantic cod, haddock and yellowtail flounder. In 1986, with the development and implementation of the Council's Northeast Multispecies Fishery Management Plan (FMP), the management unit was expanded to include American plaice, pollock, redfish, white hake, windowpane flounder, winter flounder, and witch flounder. Three additional species (ocean pout, red hake, silver hake) were added in 1991 through the implementation of Amendment 4 to the FMP.

Management of the groundfish fishery under the FMP has been primarily through the use of a minimum mesh size in specified areas, minimum fish sizes, and closed areas. Small mesh fishing (less than the regulated mesh size) was permitted under area, season, and bycatch restrictions. Despite these measures, the groundfish stocks have declined to record or near-record low levels of abundance attributed largely to record high fishing mortality through increased fishing effort.

To reverse this trend and in an effort to rebuild the groundfish stocks, the Council developed and submitted Amendment 5 to the FMP to the Secretary on September 27, 1993. Two of the measures proposed in the Council's Amendment 5 were disapproved by the Secretary during the preliminary evaluation provision of section 304(a)(1)(A) of the Magnuson Act: a proposed winter flounder exemption that would allow vessels to fish under state regulations in state waters provided that the state's regulations conform with the Atlantic States Marine Fisheries Commission (ASMFC) Winter Flounder Fishery Management Plan; and a 5,000 pound haddock possession limit, determined to be inconsistent with the national standards of the Magnuson Act by failing to prevent overfishing.

The proposed rule for the remaining provisions of Amendment 5 was subsequently published in the Federal Register on October 27, 1993 and comments were accepted through December 6, 1993.

Amendment 5 proposes to rebuild the cod, haddock, and yellowtail stocks through a step-wise reduction in fishing mortality. Specifically, one of the objectives of Amendment 5 is to reduce fishing mortality to a level that will increase the maximum spawning potential (MSP) for cod and yellowtail to 20% in five years and 30% for haddock in ten years.[1] This would be accomplished through measures which include reductions in fishing time, a moratorium on new permits, an increased mesh size, modifications to existing closed areas, additional closed areas and control areas for juvenile fish, and possession limits on regulated species when possessing small mesh.

The Secretary approved Amendment 5 for implementation on January 3, 1994. To afford

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[1] NEFMC, 1993, Final Amendment #5 to the Northeast Multispecies Fishery Management Plan incorporating the Supplemental Environmental Impact Statement, Volume 1, September, p. 16.

Also, the Regional Director established an experimental fishery within the expanded portion of Closed Area II to acquire information on haddock by-catch by the cod fishery in the area. No more than two industry vessels with observers are allowed in the expanded portion of Closed Area II at any one time.

On February 7, 1994 a notice of availability for this amendment, Secretarial Amendment 6 to the Northeast Multispecies Fishery, was published in the Federal Register with a comment period on the draft amendment through March 26. Comments from the Council (letter from the Executive Director to the Regional Director dated March 18, 1994) have been addressed in this revised EA/RIR to Amendment 6. No other comments on the Amendment package were received.

On March 1, 1994, the final rule for Amendment 5 to the Northeast Multispecies Fishery Management Plan was published in the Federal Register (F. R., Vol. 59, No. 40, Tuesday, March 1, 1994). The final rule incorporates on a temporary basis parts of the emergency rule. Specific to haddock, the rule prohibits possession of haddock by persons owning or operating a scallop dredge vessel and limits possession of haddock to 500 pounds on other vessels permitted in the multispecies fishery. According to the final rule, these prohibitions would expire on April 2, 1994, barring extension of the emergency rule.

On April 4, 1994, the emergency rule was extended through June 30, 1994. The extended emergency rule essentially incorporated the provisions of the rule issued on January 3, and further, extended the period of the expanded Area II closure through June 30, 1994.[2] The extended emergency rule also allowed the experimental fishing program described above to continue. To date 6 trips have been conducted in the area under the provisions of the experimental fishery.

On April 1, 1994, the New England Fishery Management Council submitted, "Revised Part of Amendment #5 to the Northeast Multispecies Fishery Management Plan - Haddock Possession Limit," in response to the Secretary's disapproval of that part of the Amendment. The Council's document had as a preferred alternative a 750 pound possession limit for haddock. The Council's resubmission and accompanying Environmental Assessment are included as Appendix 3.

On April 15, 1994 the NMFS published the proposed rule for Secretarial Amendment 6 with a comment period ending on May 14.

On May 4, 1994, during the preliminary evaluation provision of section 304(a)(1)(A) of the Magnuson Act, the Secretary disapproved the resubmitted portion of Amendment 5.

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[2] At the time of the extension of the emergency rule Amendment 5 had been implemented. Thus, several provisions in the original emergency rule which are part of Amendment 5 were not included in the extended rule: expansion (in space) of Closed Area II; closure of Area II through May 31, 1994; suspension of Closed Area I; a prohibition on transfer of fish at sea; and a ban on pair trawling.

2.2. Purpose and Need for Action

The haddock stocks on both Georges Bank and in the Gulf of Maine are at all time low levels of abundance. Haddock landings in 1993 were the lowest in recorded history. The stock condition and landings will continue to decline until such time as meaningful measures are implemented to eliminate the overfished condition of the stocks and reduce the exploitation rate to levels that will allow significant rebuilding to take place.

As discussed in the Regulatory Impact Review for Amendment 5, the most recent assessment of haddock (Stock Assessment Workshop 13, [SAW13]) indicated that the haddock spawning stock biomass on Georges Bank has been reduced from 130,000 metric tons in 1963 to an estimated 10,000 metric tons at the beginning of 1993, significantly lower than the 130,000 metric tons required to provide an annual maximum sustainable yield of 47,000 metric tons. Maintaining stock levels at the current low level potentially jeopardizes potential recruitment to the standing stock. In addition, current exploitation rates on the stock are 35-40% and, based on the latest Canadian assessment, are likely increasing. At current levels of exploitation the stock cannot be rebuilt.

As indicated by SAW13

> *Fishing mortality rates need to be reduced well below the overfishing definition level to enable the stocks to rebuild. This will be necessary for preserving any incoming recruitment for stock rebuilding. Since the abundance of both George's Bank and Gulf of Maine haddock are very low, reducing the exploitation levels below a maintenance level may be necessary until significant rebuilding is observed.*[3]

Moreover, an explicit objective of Amendment 5 is *to rebuild the haddock spawning stock biomass, in addition to reducing the rate at which haddock are fished, by preventing an increase in the fishing effort directed at haddock.*[4] Even assuming that the management measures contained in Amendment 5 are successful in reducing the fishing mortality rate (F) on haddock by 50% on the American side and that an equivalent F reduction was forthcoming by the Canadians, F would still be around 0.3 (annual exploitation rate of 24%). This would maintain the current record low stock sizes, but such an exploitation rate may not be low enough to allow stock rebuilding.

Thus, further reductions in haddock mortality (relative to the provisions of Amendment 5) must be dealt with as soon as possible to achieve the goals of the FMP.

At the time the draft of this Secretarial Amendment was prepared, the Council had not yet submitted revisions to Amendment 5 to replace the disapproved portion related to haddock

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[3] NEFSC, 1992, Report of the Thirteenth Northeast Regional Stock Assessment Workshop (13th SAW), Fall 1991, NEFSC Ref. Doc. 92-02, p. 162.

[4] NMFC, 1993, Final Amendment #5 to the Northeast Multispecies Fishery Management Plan incorporating the Supplemental Environmental Impact Statement, Vol. I, p. 16.

possession limits. Since the emergency rule was scheduled to expire on April 2, 1994, and since the extended emergency rule expires at the end of June, 1994, the Secretary initiated Secretarial Amendment #6 as a "place holder" should the Council fail to submit, in a timely manner, a revised Amendment package to address haddock protection measures.

As indicated above, the Council resubmitted the disapproved part of Amendment 5 related to haddock protection measures on April 1 and the resubmission was disapproved on May 4. Thus, absent this Secretarial Amendment, there will be no special haddock protection measures in place upon expiration of the emergency rule on June 30.

2.3. Objectives of the Amendment

The objectives of Secretarial Amendment 6 include the first two objectives of Amendment 5, namely

1. To reduce fishing mortality to a level that will increase the percent maximum spawning potential (% MSP) for cod and yellowtail to 20% in five years and to 30% for haddock in ten years.
2. To rebuild the haddock spawning biomass, in addition to reducing the rate at which haddock are fished, by preventing an increase in the fishing effort directed at haddock.

Further, although it is clear that haddock protection measures, under Amendment 6, would become part of an overall suite of management measures designed to reduce fishing mortality by 50% over a period of ten years (in the case of haddock), the current status of the stock implies that no significant rebuilding can take place without reduction of fishing mortality rates to well below that defined by the overfishing threshold.

Recognizing that trip limits can be used to provide a disincentive for targeting haddock and thereby contribute to decreased fishing mortality, and recognizing the trade-off between higher and lower trip limits whereby higher trip limits may minimize discards but contribute to increased fishing mortality and lower trip limits may reduce fishing mortality at the expense of increased discards, an additional objective of this Amendment is to adopt a trip limit level which best balances landing and discard mortality while providing sufficient protection for the resource.

Finally, in recognition of the severely depleted haddock resource on both Georges Bank and the Gulf of Maine, and the uncertainty associated with the effect of any specific management action, an objective of this Amendment is to select a management strategy which is risk-averse with regard to the conservation of haddock.

2.4. Proposed Action and its Alternatives

2.4.1. Alternative 1: Status quo (no action alternative).

Inaction with respect to Secretarial Amendment 6 would leave the management program to be implemented under Amendment 5 intact. With respect to haddock, this implies that the expanded Closed Area II is closed to all vessels (except those fishing pots or scallop dredges) from February through May during 1995, and from January through June in 1996 and beyond.

Additionally, since the extended emergency rule expires on June 30, the prohibition on possession of haddock by scallop dredge vessels will also expire.

Below, the first four alternatives to the status quo suggest haddock possession limits for vessels permitted in the multispecies fishery ranging from 0 pounds (no possession) to 4,000 pounds. Following this, two subalternatives are presented: the first relates to the period of the closure of Closed Area II and the second to the possession of haddock by scallop dredge vessels.

It is contemplated that the preferred subalternatives will be combined with the preferred possession limit (for groundfish vessels) into a preferred suite of haddock protection measures.

2.4.2. Alternative 2: 0-pound possession limit on haddock (no possession)

This alternative would disallow possession of haddock on all vessels permitted in the multispecies fishery.

2.4.3. Alternative 3: 500-pound possession limit on haddock (proposed)

This alternative would make permanent the current 500 pound haddock possession limit enacted by emergency rule.

2.4.4. Alternative 4: 750-pound possession limit on haddock

This alternative would adopt the trip limit recommended by the NEFMC in its resubmitted Amendment 5 package directed to haddock protection measures.

2.4.5. Alternative 5: 4,000-pound possession limit on haddock

This alternative would adopt the Council's earlier recommendation of a 4,000 pound possession limit.

2.4.6. Closed area alternatives

Under the provisions of Amendment 5, Closed Area II is expanded in size 20 minutes longitude to the west and 15 minutes latitude to the south. According to Amendment 5, the closure in Area II is to occur in February through May in 1994 and 1995 and in January through June in 1996 and beyond.

Two alternatives are considered:

2.4.6.1. The status quo: Area II will be closed February-May, 1995 and January-June, 1996 and beyond

No fishing vessel may fish or be in Closed Area II during the period February through May 1995 and January through June in 1996 and beyond, except vessels fishing with pot gear, scallop dredges, or vessels seeking safe haven from storm conditions in waters adjacent to the western edge of Closed Area II.

2.4.6.2. Extended closure: Area II will be closed January-June in 1995 and beyond (proposed)

No fishing vessel may fish or be in Closed Area II during the period January through June except vessels fishing with pot gear, scallop dredges, or vessels seeking safe haven from storm conditions

in waters adjacent to the western edge of Closed Area II.

2.4.6.3. Exclusion of scallop dredge vessels from Closed Area II

At its December 9, 1993 meeting, the Council asked NMFS to investigate the appropriateness of closing Area II to scallop dredge vessels. This alternative would prohibit scallop vessels from fishing in Closed Area II during the period of the closure (February-May or January-June).

2.4.7. Possession of haddock by scallop dredge vessels

2.4.7.1. The status quo: no prohibition on possession of haddock

Amendment 5 is silent with respect to possession of haddock by scallop dredge vessels. First, the vessels must have a valid groundfish permit, either a "combination" permit or a possession-only permit. Given this, there would be no specific restriction on the amount of haddock, but the overall multispecies possession limit would apply. This means that these vessels would be limited to a possession limit of 500 pounds of regulated species (one of which is haddock). Thus, the vessel could have on board up to 500 pounds of haddock, provided no other regulated species were on board.

2.4.7.2. January-June prohibition on possession for scallop dredge vessels (proposed)

This is the same as the status quo alternative except that possession of haddock is prohibited during the period January through June. As above, for the period July through December, scallop dredge vessels would be limited by the groundfish possession limit of 500 pounds of regulated species. The regulated species include haddock, thus the vessel could have on board up to 500 pounds of haddock during the second part of the year.

3. Description of the Haddock Resource

The 1993 haddock spawning stock level on Georges Bank is estimated to be 10,000 metric tons which is significantly lower than the 130,000 metric tons required to provide the fishery to take the maximum sustainable yield (SAW13, 1992). While the current fishing mortality rate for haddock of 0.52 is slightly higher than the rate of 0.4 derived from the Council's overfishing definition, continued fishing pressure at this level on the depressed stock will not reduce overfishing and will reduce the likelihood of rebuilding occurring. The most recent Canadian assessment (November 1993) corroborated the U.S. stock assessments by finding an increasing fishing mortality since 1989, with the 1992 value of F at 0.6, and a 1993 value even higher. Even if the most recent F estimated by the Canadians is discounted, the current fishing mortality rate is at least 0.5-0.6 (which corresponds to annual exploitation rate of 37%).

Even assuming that the provisions of Amendment 5 are successful in reducing the fishing mortality rate for haddock by 50% on the American side and that an equivalent F reduction was forthcoming by the Canadians, F would still be around 0.3 (annual exploitation rate of 24%) after a 10 year rebuilding schedule. There is, of course, no assurance that the general restrictions of Amendment 5 will result in a specific reduction in fishing mortality for one of the regulated species.

This "best case" scenario of an annual exploitation rate of 24% (after ten years) would only maintain the current (record low) stock sizes, but may not be sufficiently low to enable the stocks to rebuild. As indicated in the Purpose and Need for Action, the recommendation of the Stock Assessment Workshop (SAW13) was that fishing mortality rates need to be reduced well below the overfishing definition level to enable the stocks to rebuild. Further, the SAW indicated that because the abundance of both Georges Bank and Gulf of Maine haddock are very low, it may to be necessary to reduce the exploitation levels below the maintenance level until significant rebuilding is observed.

The situation for the Gulf of Maine haddock stock is even more problematic than for Georges Bank. As the Status of Fishery Resources off the Northeastern United States for 1993 attests, haddock abundance in the Gulf of Maine is at the lowest level observed.

Finally, the 1993 haddock catch for Georges Bank and Gulf of Maine, combined, is projected to be about 900 metric tons, a little more than 44% of the 1992 total and the lowest level ever recorded.

There is evidence that a reduction in the exploitation rate can have a positive effect on the stock. A review of records for the spawning stock biomass and exploitation rates for the Georges Bank haddock resource show that a resurgence in stock size associated with the 1975 year class followed a period when the exploitation rate was reduced to about 0.1. This is the only actual evidence regarding the level of exploitation that may be required in order to effect stock rebuilding (Figure 2).

Further evidence of the depleted status of the stocks is that recent year classes have been poor when compared to earlier years. Since the 1978 year class (age 1 in 1979), the production of young fish on Georges Bank has been very low. Historically, year classes similar to the 1975 and

1978 year classes were produced regularly, thus sustaining the fishery at an average 47,000 metric tons for the period 1930-1960. The 1992 year class is the best in recent years, even though low by historical standards. If protected, the 1992 year class will begin spawning in 1994, and could contribute to rebuilding the spawning biomass (Figure 3). Furthermore, the stock has apparently responded to the current situation with a shift in its maturity level where haddock are now maturing at a younger age and smaller size, with some individuals of this year class already showing up in the fishery. This development further necessitates quick action over and above that of Amendment 5 to protect this year class.

3.1. Comparison of haddock abundance from the NMFS spring trawl survey: 1982-1985 versus 1989-1992

Survey abundance indices from 1982-1985 period are presented in Figure 4. This period was prior to the Hague Line Boundary decision between Canada and the U.S. Note that these data indicate spawning concentrations of haddock. There are indications of significant concentrations of haddock on the Canadian side, but, nevertheless, at this point in time, a substantial portion of the resource is located on the U.S. side of the boundary, as well as in the Great South Channel and the Gulf of Maine.

Data from the 1989-1992 period, following the Hague-Line decision, indicate very different abundance patterns (Figure 5). Haddock in the Gulf of Maine are notably absent, and spawners in the Channel area are considerably reduced.

3.2. Status of the Gulf of Maine haddock stock

Figure 6 depicts landings of Gulf of Maine haddock from 1976-1992. The Gulf of Maine stock has a long term yield potential of about 5,000 metric tons per year. Landings since 1976 peaked at about 7,000 metric tons, declined to about 200 metric tons in 1992, and are predicted to be less than 100 metric tons for 1993.

The extreme reduction in stock size for Gulf of Maine haddock is illustrated by reductions in NMFS trawl survey catches (Figure 7). The 1989-1992 survey values have successively been the poorest on record. Based on these data, the stock has been declining at an annual rate of 25% for the past 15 years. The trend shows no sign of flattening out. This stock is already near commercial extinction. There is serious concern that unless the trend is reversed, the stock may become threatened or endangered.

3.3. Updated abundance indices

Recent data on the relative abundance of haddock on Georges Bank were compiled from NEFSC spring and autumn bottom trawl surveys and the Canadian bottom trawl survey. Canadian spring surveys have been conducted in March and April each year since 1986 (Table 1) and concentrate on eastern Georges Bank, on both sides of the Hague Line. Recent surveys indicate a relatively strong 1992 year class (age 2 in 1994), which was also indicated by relatively high abundance at age 1 in 1993. The 1993 year class may also be among the largest since 1985.

Research survey indices conducted by the United States are given in Table 2. The spring and

autumn surveys cover the entirety of Georges Bank. Overall, haddock survey abundance indices remain very low, but have increased slightly since 1991. The spring 1994 index of 5.17 represents an increase from previous years. The few fish taken were caught primarily on two large tows on the Canadian side of the Bank. Recent U.S. haddock surveys indices are dominated by the 1992 year class (age 2 fish 1994) as are the Canadian indices. These age 2 fish should recruit to the fishable population in autumn 1994. The 1992 year class appears to be equivalent in strength to the 1983, 1985 and 1987 year classes and, furthermore, the 1991 and 1993 year classes appear to be stronger than those which have recruited since the 1987 year class. However, all of the year classes recruited since 1980 have been less than 1/10th the size of the 1975 and 1978 year classes.

Table 1. Total estimated abundance-at-age (numbers in 000's) of haddock from unit area 5Zj and 5Zm from the Canadian spring surveys.

	AGE GROUP									
Year	1	2	3	4	5	6	7	8	9+	1-9+
1986	5057	306	8175	997	189	348	305	425	401	16205
1987	46	4286	929	3450	653	81	387	135	1132	11099
1988	971	49	12714	257	4345	274	244	130	686	19670
1989	47	6473	959	2814	241	523	40	36	259	11391
1990	726	108	12302	166	4465	299	1370	144	389	19968
1991	400	2175	137	10776	115	1868	117	497	220	16306
1992	1914	3879	1423	221	4810	18	1277	52	655	14249
1993	3448	1759	545	431	34	1186	19	281	15	7849
1994	4197	15163	5332	549	314	20	915	18	356	26864

Table 2. Stratified mean catch per tow (numbers) for haddock in NEFSC offshore spring and autumn research vessel bottom trawl surveys on Georges Bank (Strata 13-25, 29-30)

SPRING CRUISES

Adjusted for changes in gear, vessel and door usage

Year	0	1	2	3	4	5	6	7	8	9+	Total	Total 1+
1968	0.00	0.44	3.10	0.51	0.77	7.36	1.85	0.28	0.49	0.38	15.17	15.17
1969	0.00	0.00	0.08	0.64	0.28	0.46	4.64	1.13	0.31	0.51	8.03	8.03
1970	0.00	0.73	0.28	0.00	0.36	0.51	0.51	2.19	1.08	0.93	6.58	6.58
1971	0.00	0.00	1.27	0.28	0.00	0.13	0.13	0.10	0.90	0.24	3.05	3.05
1972	0.00	4.41	0.10	0.67	0.13	0.03	0.05	0.15	0.03	1.42	6.99	6.99
1973	0.00	33.62	5.31	0.00	0.59	0.10	0.00	0.20	0.02	1.40	41.23	41.23
1974	0.00	2.34	14.57	3.14	0.00	0.26	0.00	0.02	0.11	0.41	20.84	20.84
1975	0.00	1.03	1.06	3.64	0.69	0.00	0.15	0.10	0.02	0.16	6.84	6.84
1976	0.00	88.54	0.33	0.65	1.01	0.47	0.00	0.05	0.00	0.11	91.17	91.17
1977	0.00	0.67	36.61	0.46	1.34	0.65	0.49	0.00	0.05	0.13	40.40	40.40
1978	0.00	0.08	1.06	17.46	0.39	1.03	0.90	0.18	0.07	0.11	21.28	21.28
1979	0.00	39.58	1.73	1.24	6.25	0.36	0.18	0.41	0.07	0.05	49.87	49.87
1980	0.00	5.70	51.18	0.56	1.14	5.34	0.73	0.41	0.51	0.26	65.83	65.83
1981	0.00	3.76	3.74	22.19	2.49	0.86	2.03	0.28	0.13	0.06	35.53	35.53
1982	0.00	0.86	1.74	1.07	4.63	0.47	0.32	0.70	0.00	0.00	9.79	9.79
1983	0.00	0.47	0.60	0.64	0.24	2.65	0.02	0.05	1.27	0.20	6.14	6.14
1984	0.00	2.29	1.29	0.70	0.69	0.64	0.78	0.08	0.05	0.33	6.84	6.84
1985	0.00	0.00	4.96	0.76	0.40	0.87	0.34	1.17	0.10	0.25	8.85	8.85
1986	0.00	2.49	0.18	2.06	0.24	0.11	0.21	0.12	0.33	0.11	5.85	5.85
1987	0.00	0.00	3.62	0.06	0.81	0.08	0.10	0.05	0.22	0.01	4.95	4.95
1988	0.00	1.55	0.04	0.99	0.13	0.32	0.12	0.11	0.12	0.00	3.38	3.38
1989	0.00	0.03	3.63	0.47	0.74	0.14	0.43	0.06	0.05	0.01	5.56	5.56
1990	0.00	0.89	0.00	5.94	0.34	0.60	0.06	0.14	0.00	0.01	7.98	7.98
1991	0.00	0.56	1.11	0.25	1.93	0.09	0.10	0.03	0.04	0.02	4.13	4.13
1992	0.00	0.40	0.18	0.11	0.07	0.33	0.03	0.03	0.03	0.00	1.18	1.18
1993	0.00	1.17	0.65	0.18	0.14	0.12	0.37	0.06	0.02	0.02	2.73	2.73

AUTUMN CRUISES

Adjusted for changes in vessel and door usage

Year	0	1	2	3	4	5	6	7	8	9+	Total	Total 1+
1963	91.98	27.83	10.11	7.46	9.14	6.52	2.24	1.85	1.29	0.51	158.92	66.94
1964	2.60	123.70	69.86	6.39	1.96	4.18	1.71	0.75	0.28	0.36	211.78	209.19
1965	0.36	11.14	84.82	10.63	1.18	0.88	1.00	0.88	0.28	0.29	111.45	111.09
1966	6.73	1.05	3.17	20.15	3.67	0.57	0.54	0.36	0.13	0.08	36.45	29.72
1967	0.03	7.36	0.39	1.09	7.41	1.78	0.54	0.23	0.36	0.20	19.40	19.37
1968	0.10	0.07	1.05	0.15	0.36	4.23	1.39	0.29	0.18	0.42	8.23	8.13
1969	0.42	0.03	0.00	0.31	0.15	0.18	1.67	0.56	0.10	0.29	3.71	3.28
1970	0.05	4.52	0.23	0.02	0.31	0.29	0.56	1.50	0.52	0.44	8.44	8.39
1971	2.66	0.00	0.34	0.08	0.02	0.24	0.03	0.10	0.82	0.31	4.61	1.94
1972	7.40	2.76	0.00	0.57	0.10	0.00	0.10	0.07	0.03	1.42	12.44	5.05
1973	3.54	9.86	1.76	0.00	0.21	0.05	0.00	0.08	0.02	0.78	16.31	12.77
1974	0.82	1.94	1.08	0.34	0.00	0.02	0.00	0.00	0.00	0.24	4.44	3.63
1975	25.74	0.69	0.78	5.32	1.01	0.00	0.03	0.00	0.02	0.33	33.92	8.19
1976	4.74	70.33	0.57	0.59	0.90	0.33	0.00	0.05	0.11	0.28	77.89	73.16
1977	0.15	2.43	21.32	0.64	0.65	0.72	0.39	0.04	0.01	0.10	26.47	26.32
1978	15.05	0.96	1.18	10.56	0.21	0.29	0.51	0.01	0.00	0.01	28.79	13.74
1979	1.50	51.87	0.04	1.03	4.34	0.29	0.32	0.06	0.01	0.00	59.47	57.96
1980	13.30	3.09	14.48	0.51	0.21	1.93	0.54	0.53	0.10	0.07	34.76	21.46
1981	0.43	6.98	2.36	4.21	0.24	0.47	0.60	0.00	0.00	0.01	15.31	14.88
1982	1.49	0.00	1.45	0.38	1.54	0.15	0.08	0.23	0.02	0.11	5.44	3.95
1983	6.35	0.26	0.23	0.29	0.33	1.03	0.13	0.00	0.11	0.02	8.75	2.40
1984	0.03	3.64	0.96	0.26	0.31	0.07	0.49	0.00	0.00	0.13	5.90	5.86
1985	11.35	0.65	1.53	0.22	0.05	0.10	0.07	0.17	0.00	0.05	14.19	2.84
1986	0.00	5.11	0.09	1.21	0.06	0.13	0.13	0.02	0.03	0.03	6.81	6.81
1987	1.08	0.00	0.79	0.10	0.77	0.06	0.06	0.02	0.02	0.00	3.62	1.82
1988	0.07	3.02	0.18	1.30	0.12	0.40	0.12	0.11	0.00	0.03	5.35	5.28
1989	0.49	0.05	2.81	0.20	0.69	0.09	0.14	0.02	0.02	0.00	4.51	4.02
1990	0.80	0.70	0.03	1.24	0.05	0.18	0.04	0.00	0.00	0.00	3.03	2.23
1991	2.24	0.21	0.25	0.05	0.23	0.02	0.02	0.00	0.00	0.02	3.04	0.80
1992	2.76	2.19	0.22	0.24	0.00	0.47	0.02	0.08	0.03	0.06	6.06	3.30
1993	1.58	4.20	2.09	0.32	0.00	0.06	0.15	0.02	0.00	0.00	8.42	6.84

4. Description of the Haddock Fishery

The recent performance of the haddock fishery was examined for the purpose of determining impacts of the proposed actions and alternatives. In 1992, 4.5 million pounds of haddock were landed with an ex-vessel value of $5.6 million and an average ex-vessel price of $1.24. The 1992 landings were somewhat higher than the 1989 record low landings. For 1993, the haddock catch is projected to be slightly greater than 900 metric tons or just under 2 million pounds, just over 44% of the 1992 total. For 1994, preliminary landings to date (through March) are 54 mt or about 119 thousand pounds (see Appendix 6, Review of haddock landings and discard data, NEFSC, May, 1994). For the first three months of the year, landings have declined by 2/3 relative to the same period in 1993 and in even greater proportion relative to earlier years (Appendix 6). Virtually all landings are taken for commercial purposes.

The following section describes the haddock fishery in terms of gear used, numbers and sizes of vessels used to catch haddock, the areas and seasons fished, where haddock is landed and the species caught in conjunction with haddock. Information for the 1992 fishery is derived from the preliminary 1992 commercial landing statistics collected by the NEFSC, NMFS, and the vessel permit files maintained by NMFS.

4.1. Landings by gear type

The haddock landings by gear type for 1992 are presented in Table 3. The otter trawl is the predominant gear type accounting for 1992 landings of 3.7 million pounds or 84% of the haddock landings. Paired otter trawls, sink gill nets and line trawls are the only other gear types contributing significantly to 1992 landings with reported landings of 573,000 pounds (13%), 98,000 pounds (2%), and 59,000 pounds (1%), respectively. Note that 1992 total haddock landings by scallop vessels is about 6,000 pounds or about 1/10th of 1% of total 1992 landings.

Table 3. Haddock landings (lb) for each gear type for 1992.

Gear Type	Pounds landed	Percent of total landings
Fish otter trawl	3,744,726	84%
Otter trawl paired	572,609	13%
Sink gill net	98,293	2%
Line trawl	59,402	1%
Sea scallop dredge	6,121	<1%
Hand line	2,247	<1%
Danish seine	748	<1%
Scottish seine	189	<1%
Shrimp otter trawl	64	<1%
Offshore lobster trap	3	<1%

4.2. Landings by tonnage class

There were 465 vessels that landed haddock in 1992. This total does not include unidentified-tonnage and under-tonnage vessels. The data in Table 4 indicate the number of vessels contributing to haddock landings by gross registered tonnage (GRT) range.

The vessels are spread across the 5-250 tonnage range, with no particular tonnage range dominating. Vessels have traditionally been defined as small, medium and large on the basis of more inclusive tonnage ranges. The small vessel class (5 - 60 GRT) had 174 vessels, the medium tonnage class (61 - 125 GRT)) had 112 vessels, while the large vessel class (126+ GRT) had 179 vessels.

Table 4. Number of vessels landing haddock in 1992, by tonnage range and percent of landings.

Tonnage range (GRT)	Numbers of Vessels	Contribution to landings
5 - 10	14	
11 - 15	28	
16 - 20	30	
21 - 30	43	
31 - 50	48	
51 - 60	11	Small (174 vessels - 37%)
61 - 70	20	
71 - 90	20	
91 - 105	26	
106 - 125	46	Medium (112 vessels - 24%)
126 - 150	80	
151 - 180	57	
181 - 215	41	
216 - 250	1	Large (179 vessels - 39%)
TOTAL VESSELS	465	

4.3. Relative contribution of haddock to total groundfish catch and value, 1960 versus 1992

In 1960, haddock represented 28% of total landings by weight and 34% of the total ex-vessel value obtained from 14 species of groundfish and flounders (total haddock landings were 45,000 metric tons, while cod and yellowtail flounder together yielded 28,000 metric tons) (Figure 8). This year is typical of the 1930-1960 period, when haddock dominated the value and landings of the groundfish fishery.

By 1992, however, haddock landings (2,200 metric tons) contributed only 2% of total groundfish landings by weight and 3% of the total ex-vessel value (Figure 9).

4.4. Landings by port

Haddock landings in 1992 by major port are presented in Table 5. Gloucester, MA is the leading port with 42% of the total haddock landings. In terms of contribution to total haddock landings, Gloucester is followed by New Bedford, MA (28%), Boston, MA (15%), and Portland, ME

(12%). Other ports where haddock is landed, but in lesser quantities, include Chatham, MA, Newport, RI, Point Judith, RI, and Portsmouth, NH.

Table 5. Haddock landings (pounds) and ex-vessel value (dollars) by port, 1992.

Port	Landings, pounds	Ex-vessel value, dollars
Gloucester	1,869,982	$2,385,209
New Bedford	1,260,086	$1,363,489
Boston	647,913	$ 878,818
Portland	527,902	$ 729,456
Other ports	178,519	$ 224,737

4.5. Cumulative monthly haddock landings, 1990-1993

The annual pattern of cumulative monthly landings of haddock landings for the last four years (through September, 1993) are shown in Figure 10. The 1993 landings are well below the 1990-1992 levels, suggesting total USA landings will be less than 900 metric tons for all of 1993 - the lowest level ever recorded. The rapid increase in landings in June of each year is due to the opening of Closed Areas II and two at the end of May, under the provisions of the pre-Amendment 5 Multispecies FMP. Under the status quo alternative one might anticipate similar landings patterns given that Closed Area I is reopened and Closed Area II opens in June of 1995 (but is closed in June 1996 and thereafter).

4.6. Haddock landings by month, quarter and statistical area

As indicated in Table 6, the 2nd quarter and the month of June specifically, appears to be the most important quarter and month for haddock landings. In 1992, 59.9% of the haddock landings occurred in the 2nd quarter while 33.0% occurred in the month of June. Statistical Areas 561 and 562 in the eastern Georges Bank next to the Hague line were the most important contributors to total landings (Figure 1). Area 562 accounted for 59.3% of the 1992 haddock landings with the majority occurring during the month of June. Area 515, a large area in the middle of the Gulf of Maine, ranks third with seasonal landings peaking during the third quarter and especially during the month of July.

Table 6. 1992 Haddock landings by month, quarter and statistical area (in 1,000s of pounds)

AREA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
464				1.0	.4	1.9		.7					4.0
511		.6				1.0				7			2.3
512	1.7	.6	2.0	2.7	.3	.7	8.9	5.6	5.2	3.9	3.0		34.6
513	4.7	11.3	4.7	12.0	3.2	11.7	6.0	6.1	21.0	21.8	12.9	2.2	117.6
514	6.6	5.4	3.8	3.9	2.9	1.7	7.1	13.1	3.7	9.8	3.1	1.6	62.7
515	26.3	46.8	15.8	46.9	11.5	20.5	81.0	52.3	33.9	24.5	15.3	10.8	385.6
521	50.9	8.0	4.5	5.0	6.0	45.5	24.8	26.0	46.4	22.4	20.2	9.1	268.8
522	10.1	16.4	10.3	26.9	32.7	91.7	23.3	23.6	15.3	16.4	17.8	18.9	303.4
525	13.1	8.2	22.4	55.2	19.3	4.7	5.6			.2		.5	129.2
526	.4	3.1	5.0	3.0	1.1	3.7	.8			.1		3.1	20.3
537	.1	.4	.6		2.2		1.5			.6	.1	.1	5.6
539	.1												.1
561	62.2	50.7	13.9	15.7	85.8	159.1	21.6	38.9	33.5	2.2	.6	6.7	490.9
562	427.3	105.8	84.2	273.2	596.0	1135.5	16.5	.1		3.6	3.3	16.0	2661.5
TOTAL	603.5	257.3	167.2	445.5	761.4	1477.7	197.1	166.4	159.0	106.2	76.3	69.0	4486.6
% TOTAL	13.5%	5.7%	3.7%	9.9%	17.0%	33.0%	4.4%	3.7%	3.5%	2.4%	1.7%	1.5%	100.0%
QUARTER	1028.0			2684.6			522.5			251.5			4486.6
% TOTAL	22.9%			59.9%			11.6%			5.6%			100.0%

4.7. Relative contribution of haddock to total groundfish catch and value, 1992

In terms of the top ten species landed for 9,710 trips in 1992 where haddock was landed, haddock is the 5th most important of the major species in terms of landings and ranked third with respect to ex-vessel value (Table 7). The predominant species landed are cod and pollock. With the exception of cusk, all species included are managed under the Northeast Multispecies FMP. Total landings for all species taken on trips landing haddock for 1992 was 54.3 million pounds. Haddock represented 8.3% of the total landings and 10.4% of the total value for these trips.

Table 7. The top ten species in pounds landed for all trips landing haddock in 1992.

Species	Landings, pounds	Landings, metric tons	Ex-vessel value, dollars
Cod	22,933,528	10,403	$23,822,916
Pollock	8,238,754	3,737	$ 6,296,951
White hake	6,709,475	3,043	$ 3,923,088
American plaice	4,955,009	2,248	$ 4,776,924
Haddock	4,484,402	2,034	$ 5,581,709
Yellowtail flounder	2,614,213	1,186	$ 3,322,717
Cusk	1,789,936	812	$ 1,019,810
Windowpane flounder	1,671,176	758	$ 1,197,802
Winter flounder	1,343,416	609	$ 1,741,885
Witch flounder	1,327,024	602	$ 2,236,135

4.8. Canadian Fisheries Management

Since the haddock stocks are transboundary and since Canadian fisheries management practices as well as fisheries abundance indicators potentially impact U.S. fisheries, in this subsection we briefly review the Canadian fishery management system for groundfish. Canada develops catch levels utilizing a fishing mortality rate of $F_{0.1}$, a conservative management strategy. The Canadian Georges Bank fishery (Statistical Area 5Y and 5Z) operates through a combination of quotas and trip limits. The overall quota is broken down by vessel size and gear class (Table 8). Mobile gear vessels are subject to individual quotas or company quotas (enterprise allocations) depending on vessel size. Once these quotas are achieved, fishing is no longer allowed in the area by the vessel or company. Fixed gear vessels fish under trip limits and once the fixed gear quota is reached, the entire fleet is prohibited from fishing for cod or haddock in this area for the remainder of the year. Larger fixed gear vessels are subject to company quotas.

Table 8. Canadian quotas for haddock and cod (in metric tons) for 1993

		5Y		5Z	
		Inshore	**Offshore**	**Inshore**	**Offshore**
Haddock		-		3,820	1,180
	fixed gear less than 65'	-	-	1,185	-
	mobile gear less than 65'	-	-	2,535	-
	fixed gear 65' - 100'	-	-	50	-
	mobile gear 65' - 100'	-	-	50	-
	vessels over 100'	-	-	-	1,180
Cod		750		14,325	675
	fixed gear less than 65'	750	-	9,615	-
	mobile gear less than 65'	-	-	4,430	-
	fixed gear 65' - 100'	-	-	140	-
	mobile gear 65' - 100'	-	-	140	-
	vessels over 100'	-	-	-	675

Vessels subject to individual quotas are required to land all fish that are caught, which in turn counts against the quota. To aid in monitoring small fish taken in this fishery, Canada uses at-sea observers and will close an area when small fish exceed 15% of the catch. In addition to the quotas there was a minimum mesh size in place of 130 mm (5.1 inches) square mesh or 145 mm (5.7 inches) diamond mesh. There is a spawning area closure for haddock on Georges Bank opposite Closed Area II which is currently closed from March 1 through May 31.

5. Analysis of the Alternatives

5.1. The effect of trip limits

In this section we provide a general discussion of the efficacy of trip limits, present PDT and NEFSC analysis of various trip limits, and draw conclusions about the optimal choice of trip limits. In subsequent sections discussing each alternative, we provide brief, more specific comments on the advantages and disadvantages of each suggested management alternative.

Managing fishing mortality by limits on landings per trip (trip limits) is difficult. There are technical difficulties in establishing and enforcing trip limits. First, for reasons of enforceability, the landings limit must be translated into a possession limit. Otherwise vessels may high-grade (select higher valued sizes) by culling through the catch and discarding those fish in excess of the trip limit. Second, uniform trip limits, irrespective of vessel size or configuration, ignores the variability in the fleet with respect to relative ability and efficiency in catching the species regulated by the trip limit and may disadvantage one vessel with respect to another. Last, to the extent that the gear is not completely selective, multiple species will be caught in any one haul or set. If multiple species trip limits are in force it may become extremely difficult to match actual catch to catch ratios implied by the trip limits.

In the case of the contemplated trip limit on haddock, however, these concerns are more theoretical than practical, since in this case, the trip limit would apply to a single species, taken primarily by a single gear and by a cross-section of vessel sizes.

Of more concern is the difficulty in determining the "correct" poundage value for the trip limit. If the trip limit is set too low relative to the "natural" catch per trip (the average catch of haddock per trip given average abundance and uniform geographical and temporal distribution), discarding will occur. If, on the other hand, the trip limit is too high relative to the average unconstrained catch per trip, there will be no resulting fishing mortality reduction relative to the situation where there is no trip limit.

Compounding the obvious difficulty in determining the "natural" catch per trip is the fact that the creation of trip limits for a valuable species can affect fishermen's behavior. The effectiveness of a particular trip limit, and especially the fisherman's response to an imposed catch ceiling will depend on availability of the species for which a limit is being set, the relative availability of other species, the ex-vessel price of the regulated species, and the price relative to other species targeted in the managed complex.

5.1.1. The PDT Analysis

The New England Fishery Management Council staff and the Groundfish Plan Development Team (PDT) have done considerable analysis related to the behavioral questions raised above. This analysis is reviewed below and is fully developed and discussed in Appendices 5 (PDT Analysis of haddock possession limit alternatives, NEFMC Groundfish PDT, January, 1994) and 6 (Mayo, January groundfish PDT discussions, NEFSC, January, 1994).

Briefly, the PDT considered a behavioral model which formally accounts for the fishermen's

"propensity" to modify fishing practices with respect to haddock catch by continuing to fish as in the past. The propensity to ignore the trip limit depends on all the factors mentioned above and could not be formally analyzed. However, using as a proxy the contribution of haddock revenue to total revenue, the PDT, choose three suites of propensities (actually propensity distributions) for analysis: high, medium, low. Details on the parameters chosen and individual model results are provided in Appendix 5. The PDT chose the "medium" propensity model as most likely reflective of actual behavior in the northeast multispecies fishery. This scenario assumed that on all trips on which haddock comprised 15 percent or less of total ex-vessel revenue vessels would fish as before; on trips where haddock accounted for more than 15 percent and up to 20 percent of total revenue, vessels were assumed to fish as in the past 90 percent of the time and to modify their behavior on 10 percent of their trips; for trips where haddock accounted for more than 20 percent of revenue and up to 25% of total revenue, 20 percent of trips would be affected; and so forth (see Table 1, Appendix 5). For the situation where haddock revenues accounted for more than 50% of total annual revenues, the medium propensity scenario assumed that there would be no propensity to continue fishing as before, that is, all trips would be modified.

A presentation of the medium propensity results in contained in Figure 11. The PDT concluded "that limits between 0 and 750 pounds per trip produce almost identical outcomes and provided the lowest possible total catches (and F). At limits above 750 pounds the total catch increases directly as the limit increases." (Appendix 6, page 2).

In discussing these results one should note two important facts. First, the PDT analyzed a discrete set of trip limits: 0 pounds, 250, 500, 750, and so forth, in 250 pound increments. Thus, it is impossible, by virtue of this analysis, to distinguish between, for example, a 450 pound limit versus a 500 pound limit, or a 505 pound limit versus a 750 pound limit. Second, because of the mathematics of the hypothesized propensity relationship the response of the fishery will be increasing (total mortality will be increasing in greater proportion than the increment in trip limits) over the first part of the response space, will rise sharply over an interval (at around 750 pounds in this case, as indicated in the PDT's memo), and will increase thereafter but in lesser proportion than the increment in trip limits. Put more simply, for the formulation shown, total mortality (landings plus discards) is always increasing, thus, a 500 pound trip limit will have lower total predicted haddock mortality than will a 750 pound trip limit, or any higher trip limit.

A countervailing effect to increasing total mortality with increasing trip limit is that the proportion that discard mortality is of total mortality is decreasing, thus for increasing trip limits the vessel will retain a higher proportion of the haddock catch and benefit from additional revenue.

Choosing the "best" trip limit then involves some tradeoff between increasing total mortality and decreasing total discard mortality.

5.1.2. Other relevant information

It has been suggested that a level of F of about 0.1, as experienced in the late 1970's when some rebuilding was recorded, is necessary to allow haddock stocks to rebuild (Figure 2). Furthermore, there are some indications from U.S. and Canadian surveys that the 1992 year class on Georges Bank is the best since 1987 (Figure 3). The year class is not large, but may represent

some fish worth protecting. The 1992 year class will recruit to the fishery in 1994 and 1995 (some individuals of this year class may already be showing up in the fishery). This may be an opportunity to begin the process of rehabilitating this severely depleted stock. Results from the recently completed 1993 fall survey are now being analyzed.

The question of whether a possession limit would result in reduced fishing mortality and not increased discards is closely related to the ability and willingness of fishermen to avoid catching haddock. An analysis of haddock landings for individual vessels and trips made in 1992 indicates that discards, in fact, would not pose a significant problem (Figures 12 - 13). In 1992, a total of 329 vessels reported at least one trip to Georges Bank, 127 of these (39%) reported no haddock landings. One-hundred and sixty five vessels (50%) reported total annual haddock landings of less than 500 pounds. A total of 204 vessels (62%) had less than 5,000 pounds for the year. The mode to the right (5,000 pounds and greater) represents vessels that target haddock during some portion of the year (e.g., on trips just following the opening of the closed areas).

More importantly, Figures 13 and 14 present the haddock landings by otter trawl trips on Georges Bank for 1992. Of the 4,646 trips reported on the Bank, 3,180 (68%) had no haddock. 3,923 trips (84%) had 500 pounds or less. The mode to the right indicates those trips directly targeting haddock. Furthermore, Figure 15 presents the value of Georges Bank haddock landings as a percent of the entire landings taken by each vessel in 1992. In this case, landings of all species, regardless of area, are included. Note that the value of Georges Bank haddock landings exceeded 10% of revenues for only 21 vessels (6%), and haddock revenues were more than 20% of total revenues for only 5 vessels (1.5%).

High-grading is of particular concern in evaluating the benefits of the trip limits. High-grading can occur when premium valued haddock are selected from subsequent hauls to replace smaller fish of less value from previous hauls to maximize landed value. However, discards of haddock or other species can also occur due to minimum size regulation or market preference. Since size regulation discards occur under the present haddock management system and would also occur under a possession limit system, this type of discarding could be thought of as constant under both management systems. However, if a possession limit is effective, that is, if haddock effort (mortality) decreases, size regulation discards will decrease as well.

5.1.3. Evidence from the 1994 fishery[5]

Total commercial landings of haddock from January - March 1994 are estimated to be 54 metric tons. This represents a decline of about 67% from the same 3-month period in 1993.

Data for 1994 are preliminary and only reflect landings in Gloucester, Boston, Portland and New Bedford. During January - March 1994, 256 trips landed haddock from Georges Bank in these ports. The average landings per trip of Georges Bank haddock was 307 lbs; about 20% of the trips (52/256) landed 500 lbs or more (Table 9). [Haddock landings in excess of 500 lbs per trip were permissible when haddock were landed in five (or fewer) standard totes]. The average trip

[5] The material in this and the following two sections is extracted, in part, from Appendix 6, Review of haddock landings and discard data, NEFSC, May, 1994.

landings of Georges Bank haddock declined from 378 to 273 pounds from January to March (Figure 16). This decline is not unexpected as historical landings patterns indicate that haddock catch rates normally decline from January - March, and then rise during April through June.

Table 9. Analysis of haddock landing from trips in 1994 at selected ports. Data are for haddock landed from Georges Bank. Mean is pounds landed, # is number of trips ≥ 500 lbs.

	Jan			Feb			Mar			All		
Port	n	mean	#≥500	n	mean	#≥500	n	mean	#≥500	n	mean	#≥500
Gloucester	12	370	1	30	370	6	19	165	2	61	306	9
Boston*	23	370	8	28	340	8	15	392	6	66	362	22
Portland	5	439	1	8	432	2	8	419	0	21	429	3
New Bedford	-	N/A	-	52	241	8	56	257	10	108	250	18
All	40	378	10	118	310	24	98	273	18	256	307	52

* Data represent 'hail' weights (e.g., captain's estimates) rather than actual weighout figures.

For haddock caught in the Gulf of Maine, average landings per trip during January - March 1994 was 135 pounds (Table 10). Only five of the 146 trips (3%) landing Gulf of Maine haddock, all in Gloucester (the only port for which data were available), exceeded 500 lbs.

Table 10. Analysis of haddock landing from trips in 1994 at selected ports. Data are for haddock landed from the Gulf of Maine. Mean is pounds landed, # is number of trips ≥ 500 lbs.

	Jan			Feb			Mar			All		
Port	n	mean	#≥500	n	mean	#≥500	n	mean	#≥500	n	mean	#≥500
Portland	42	98	N/A	37	174	N/A	77	150	N/A	156	141	N/A
Gloucester	55	189	3	33	201	2	58	29	0	146	128	5
All	97	150	(3)*	70	187	(2)*	135	98	(0)*	302	135	(5)*

*Applies only to Gloucester

Examination of the frequency distribution of trip landings of Georges Bank haddock during January - March 1994 (Figure 17) reveals two modes: one between 50 and 200 lbs, and a second at 450-500 lbs. The first mode reflects that many trips (104/256) that landed haddock in 1994 caught only small amounts (i.e., less than 250 lbs). The second mode reflects the trip limit/possession limit cap (i.e., 500 lbs); about 15% of the trips catching haddock appear to have been limited by the 500 lb trip limit. It should be noted that these data apply only to trips landing at least 1 lb of haddock. The majority of otter trawl trips on Georges Bank land no haddock (in 1992, 68% of otter trawl trips had no haddock landings).

No information is available on the quantities of haddock discarded from any of these trips.

5.1.4. Evidence from the sea sampling program, 1992 and 1993

The 1992 and 1993 sea sampling tow and trip level data for haddock were reviewed to evaluate whether these data might provide insight on the potential effects of haddock trip limits, particularly in the 0-750 lb range. Tables 11-13 and Figures 18 and 19 provide summaries at the trip and tow level for all otter trawl trips sampled in 1992 and 1993 catching haddock aggregated by Gulf of Maine (areas 511-515) and Georges Bank (areas 521-526 and 561-562).

Table 11. Frequency distributions of sea-sampled otter trawl trips, categorized by the total catch of haddock caught per trip. Data are given for 1992 and 1993 for the Gulf of Maine and Georges Bank.

				Pounds of Haddock Caught											Σ	
	Year	Total # of Trips	# of Trips Catching Haddock	1 - 100	100- 200	200- 300	300- 400	400- 500	500- 600	600- 700	700- 800	800- 900	900- 1000	1000+	> 500	> 750
Gulf of Maine	92	61	24	14	1	1	1	1	2	2	0	0	1	1	6	2
	93	30	13	7	2	1	1	1	1	0	0	0	0	0	1	0
Georges Bank	92	42	24	11	2	1	1	0	2	0	0	0	1	6	9	7
	93	34	23	8	5	2	2	0	0	0	0	1	0	5	6	6

Data for 1993 on Geroges Bank are influenced by trips taken in June, associated with opening of closure Area II

Table 12. Catch and discard statistics for sea sampling trips catching haddock on Georges Bank and in the Gulf of Maine in 1992 and 1993. Data are pounds of haddock caught, landed and discarded.

			Total Pounds						
Area	Year	# Trips	Caught	Landed	Discarded	Catch/ Trip	Landings/ Trip	Discarded/ Trip	% Discard
Gulf of Maine	92	24	9,291	9,115	176	387	380	7	1.9
	93	13	2,276	2,147	129	175	165	10	5.7
Georges Bank	92	24	12,506	12,113	393	521	505	16	3.1
	93	23	37,290	34,412	2,878	1,621	1,496	125	7.7

Data for 1993 on Geroges Bank are influenced by trips taken in June, associated with opening of closure Area II

Table 13. Frequency distributions of sea sampled otter trawl hauls during 1992 and 1993 in the Gulf of Maine and on Georges Bank in relation to the quantity of haddock caught.

		Pounds of Haddock Caught									Σ	
Area	Year	0	1-50	51-100	101-150	151-200	201-250	251-500	501-750	750+	>0	>500	>750
Gulf of Maine	92	445	123	17	4	2	2	4	3	0	155	3	0
	93	204	85	6	3	1	0	0	0	0	95	0	0
Georges Bank	92	637	188	36	11	5	7	6	1	0	254	1	0
	93	426	196	32	14	7	4	12	6	10	281	16	10

Data for 1993 on Georges Bank are influenced by trips taken in June, associated with opening of closure Area II

In 1992, most of the Gulf of Maine tows in which haddock were taken occurred in the Stellwagen Bank-Jeffrey's Ledge area or in the deeper basins of area 515 (Figure 18). In 1993, haddock catches in the Gulf of Maine were considerably lower and were confined mostly to a few tows in the deeper offshore basins (Figure 19). Georges Bank catches in 1992 were divided almost equally between the Great South Channel-Southwest Part and the eastern extent of US jurisdiction near the Northern Edge and the Hague Line (Figure 26). In 1993, Georges Bank haddock catches were almost exclusively taken in the latter region of the Bank along the boundaries of Area II and the Hague Line (Figure 19). Many of the otter trawl sea sampling trips conducted on Georges Bank in 1993 were done so in response to the opening of Area II in June, and thus should not be considered a random sample of haddock catch and discard rates throughout the year. Until the distribution of all fishing trips is compared to the distribution of sea sampled trips, it is premature to conclude that there has been a real shift in the distribution of haddock catches between 1992 and 1993, particularly in light of the poor sea sampling coverage in both years.

In the Gulf of Maine, haddock were taken on 24 of 61 sampled trips in 1992 and on 13 of 30 sampled trips in 1993 (Tables 11-12). Of these, 500 pounds or more of haddock were taken on 6 trips in 1992 and on only 1 trip in 1993; 750 pounds or more of haddock were taken on only 1 trip in 1992 and on no trips in 1993. In 1992, Gulf of Maine haddock were caught in 155 of 600 sea sampled tows (25%); in 1993, 95 of 299 tows (32%) caught haddock. In both years, haddock catches amounted to 100 pounds or less in over 90% of the tows in which haddock were taken (1992: 90%, 140/155 tows; 1993: 96%, 91/95 tows; Table 13).

On Georges Bank, haddock were taken on 24 of 42 sampled trips in 1992 and on 23 of 34 sampled trips in 1993 (Tables 11-12). Of these, 500 pounds or more of haddock were taken on 9 trips in 1992 and on 6 trips in 1993; 750 pounds or more of haddock were taken on 7 trips in 1992 and on 6 trips in 1993. In 1992, Georges Bank haddock were caught in 254 of 891 sea sampled tows (29%); in 1993, 281 of 707 tows (40%) caught haddock.

In both years, haddock catches amounted to 100 pounds or less in over 80% of the tows in which haddock were taken (1992: 88%, 224/254 tows; 1993: 81%, 228/281 tows; Table 13).

In all the sea sampling trips in which haddock were caught, data were also recorded on the quantities of haddock discarded (by weight) on a tow and trip basis. In 1992 and 1993 discarding occurred only because haddock under the minimum legal size were caught. In 1994 both the minimum size and the trip limits were causes for discards. For those trips catching haddock in the Gulf of Maine, the average trip catch of haddock was 387 lbs in 1992 and 175 lbs in 1993 (Table 12). The average discard of Gulf of Maine haddock per trip in 1992 and 1993 was 7 and 10 lbs, respectively, implying discard rates of 1.9% and 5.7%. For those trips catching Georges Bank haddock, the average trip catch of haddock was 521 lbs in 1992 and 1,621 lbs in 1993. The average discard of haddock per trip in 1992 and 1993 was 16 and 125 lbs, respectively, implying discard rates of 3.1% and 7.7%. The high degree of sampling associated with opening of Area II in 1993 probably is the main reason for increased haddock catch and discard rates in 1993 as compared with the previous year.

There was no indication, in either the Gulf of Maine or Georges Bank trips, of any differential discard rate of haddock between trips catching 251-500 lbs of haddock and those catching 501-750 lbs of haddock.

5.1.5. Evidence from the 1994 sea sampling program

Haddock catches were also examined (on a trip and tow basis) in sea sampling trips conducted in 1994: (a) in conjunction with the Area II experimental fishery [6 trips]; and (b) for trips in which fishing took place within or near Area I [4 trips]. Haddock were caught in all of these trips (Tables 14 and 15); total haddock catches [landings and discards: observed tows only] ranged between 9 and 9,674 pounds per trip. The largest haddock catch taken in a single tow was 1,200 pounds.

For the Area II experimental fishery trips, trip catches of haddock ranged between 9 and 1,817 pounds (Table 14). Apart from the trip of vessel #6, trip catches of haddock were all less than 365 pounds. Haddock catches comprised between 0.1% and 5.1% of the trip catches of the 13 'Northeast Multispecies FMP Species', and averaged 2.6% for the six trips combined. Cod was designated by the captain, prior to sailing, as the " primary species sought" in four trips of the trips; 'mixed groundfish' was sought in one other trip, while for the remaining trip, the main species sought was pollock. Trip catches were consistent with these designations. Cod accounted for between 19 and 83% of the kept portion of the individual trip catches, and averaged 50% of the total kept component for the six trips combined.

Within a trip, the largest catch of haddock in a single tow ranged between 9 and 407 pounds. Of the 173 total observed tows for the six trips combined, haddock were captured in 57 tows (33%). However, 36 of the tows in which haddock were caught occurred during a single trip (Trip #6). For the other five trips, haddock occurred in only 21 of 130 tows (16%).

Discarding rates of haddock cannot be reliably derived from the Area II experimental trips since vessels participating in the experiment were required to discard all haddock caught. However, except for the Trip #6, some haddock were kept in all of the trips. This reflects a

misunderstanding by the skippers that haddock could be kept (up to the 500 pound trip limit) if they were taken outside Area II. All six vessels fished both inside and outside of Area II. The trip data presented here have not been partitioned to account for this.

For Area I sea sampling trips, trip catches of haddock ranged between 554 and 9,764 pounds (Table 15), with a total of 11,833 pounds for the four trips combined. Haddock catches comprised between 2.7% and 23.9% of the trip catches of the 13 'Northeast Multispecies FMP Species', and averaged 14.6% over the four trips. Cod was designated as the " primary species sought" in two trips, while 'mixed groundfish' was sought in the other two trips. Cod accounted for between 26 and 72% of the kept portion of the individual trip catches, and averaged 42.5% of the combined total kept component for the four trips. In one trip (Trip #4), retained catches of skates accounted for 66% of the total catch kept.

Within a trip, the largest catch of haddock in a single tow ranged between 121 and 1,200 pounds. Of the 141 total observed tows in the four trips combined, haddock were captured in 80 tows (57%). In Trip #2, in which haddock were taken in 19 of 28 observed tows (68%), catches of haddock exceeded 1,000 pounds in six tows.

Haddock were kept in all four trips; kept haddock catches ranged between 395 and 591 pounds, in accord with the 500 pound trip limit. Haddock discards varied between 113 and 9,268 pounds per trip. Discard ratios of haddock (i.e., pounds discarded/ pounds caught) ranged between 16% and 95%. Because of the low sample size and the influence of one trip accounting for most of the haddock catch and discards, do definitive conclusions can be made regarding the fleet-wide average catch of haddock.

In summary, the imposition of the 500 lb. (or five tote) trip limit in combination with the expansion of closed Area II has contributed to a reduction in haddock landings in the first quarter of 1994. Based on recent abundance data, the decline in haddock landings in 1994 is probably not due to lower haddock abundance. Poor weather conditions in early 1994 probably also contributed to reduced effort overall. The discard of haddock on Georges Bank averaged 3% (1992) and 8% (1993), primarily owing to the catch of undersized fish. The 1994 discard data should not be considered indicative of fleet-wide discard patterns since the current data were collected as part of area-specific experimental fisheries for the purposes of specific management actions. For Area II sea sampling landings of haddock were prohibited, and in any regard would have only amounted to 2,563 lbs. for the six trips sampled (average 427 lbs. caught per trip). Area I discard rates are significantly influenced by a single trip that discarded 9,268 lbs.

Table 14. Summary of sea sampling conducted in the Area II experimental fishery in 1994. Data are from observed tows only.

Trip Number	Dates	Number of Tows	Haddock Kept	Haddock Disc	Haddock Total	Cod % Disc	Cod Kept	Cod Disc	Haddock Total	Haddock lbs/ tow	Largest Tow
1	21-29 Jan	25	177	185	362	51	7,120	51	7,171	14	90
2	5-10 Feb	17	161	67	228	29	1,346	2	1,348	13	82
3	16-23 Feb	41	9	0	9	0	8,524	3	8,527	<1	9
4	6-10 Mar	20	0	28	28	100	2,429	4	2,433	1	13
5	14-22 Mar	27	100	19	119	16	23,000	435	23,435	4	29
6	16-25 Mar	43	0	1,817	1,817	100	16,883	0	16,883	42	407
Total	Jan - Mar	173	447	2,116	2,563	83	59,302	495	59,797	15	407

Table 15. Summary of sea sampling conducted in the vicinity of Area I in 1994. Data are from observed tows only.

Trip Number	Dates	Number of Tows	Haddock Kept	Haddock Disc	Haddock Total	Cod % Disc	Cod Kept	Cod Disc	Haddock Total	Haddock lbs/ tow	Largest Tow
1	16-23 Feb	40	591	113	704	16	11,171	1	11,172	18	262
2	17-22 Feb	28	496	9,268	9,764	95	18,438	172	18,610	349	1,200
3	1-7 Mar	24	395	159	554	29	6,633	49	6,682	23	121
4	18-27 Mar	49	426	385	811	47	4,658	278	4,936	17	231
Total	Feb - Mar	141	1,908	9,925	11,833	84	40,900	500	41,400	84	1,200

5.1.6. Conclusions

Based on the numbers of trips now landing 500 pounds or more of haddock, the proportion of trips in which the trip limit constrains landings is probably about 15%. Tow-by-tow sea sampling data for 1992-1994 indicate that except for rare large tows, the vast majority of hauls yield less than 100 pounds of haddock. Thus, there appears to be a significant level of control over the catch of haddock, and an ability on the part of fishermen to meet, but not exceed small trip limits if fishermen move from areas where haddock are encountered after reaching the trip limit.

Overall, there is little conclusive evidence with which to select a definite trip limit for haddock, since there are so few trips landing in the 250-750 pound range. Nevertheless, data reviewed herein do not support an increase in the trip limit so as to minimize discards of fish that would be discarded and killed. For sea sampled trips conducted in 1992 and 1993 (the last full years of sea sampling conducted) only 7 resulted in catches between 500 and 750 lbs. of haddock (Table 12). For all sea sampled trips conducted during 1992-1994 only 9 trips resulted in catches between 500 and 750 lbs. Clearly, only about 20% of the otter trawl trips would be affected by any trip

limit, and of these only about 15% would be constrained by the 500 lb. limit. Thus, the foregone catches due to discards from trips exceeding the trip limit is small, particularly given the conservation benefit of preserving the historically low haddock resources. Considering this limited evidence, it would appear prudent to maintain low trip limits, rather than risk increased targeting that may result from higher trip limits.

Much of the debate about the appropriateness of a 500 pound versus a 750 pound trip limit has resolved around the above PDT analysis and especially the statistical significance of differences among trip limits in the lower range of those considered, say, 0 to 750 pounds.

The Secretary believes that because of the greatly diminished haddock stocks on Georges Bank and in the Gulf of Maine, and because of the uncertainty with regard to the effect of trip limits, and in light of evidence of continued declines in the stocks, a risk averse management strategy is most prudent. Since it is clear from the PDT analysis that higher trip limits increase total fishing mortality and that at trip limits above 750 pounds (technically at 751 pounds) there is a shift in behavior such that total mortality can sharply increase, a risk averse strategy would be to adopt the next lowest trip interval (in this case 500 pounds) as the most responsible from a conservation perspective.

The Secretary recognizes that the proportion of discards will be higher at this trip limit than at 750 pounds and that, as a result, total revenues realized from haddock will be lower than at the higher alternative, however, the small percentage difference among the lower range of trip limits imply that revenues lost will be an extremely small percentage of total groundfish revenues.

5.2. Alternative 1: Status quo

As noted in the discussion in section II. Purpose and Need for Action, the provisions of Amendment 5 would serve only to halt the increasing level of overfishing and would maintain stock levels at the current depressed levels. Without additional action, overfishing of the stock will not be eliminated and rebuilding of the stocks will not be achieved.

5.3. Alternative 2: 0 pound possession limit (no possession)

The Northeast Fisheries Science Center, the Regional Director, and the National Marine Fisheries Service have consistently stated that the Gulf of Maine and Georges Bank haddock stocks are so reduced as to warrant reduction of fishing mortality to the lowest possible level. However, to the extent that a no possession limit contributes to discard mortality while providing no revenue from haddock to the vessels encountering the species, the no possession alternative is inferior in appropriately balancing the costs and benefits related to imposition of a trip limit.

5.4. Alternative 3: 500 pound possession limit

This alternative would establish a 500-pound possession limit of haddock for all vessels permitted under the multispecies fishery, except scallop dredge vessels, which are prohibited from possessing or landing haddock. As discussed earlier, the measures to be enacted under Amendment 5 will still only result in an F of around 0.3 (annual exploitation rate of 24%).

Although some haddock taken as bycatch would be discarded under a 500-pound possession limit, the overall F on the stock will be lower than if there is no haddock possession limit at all (current Amendment 5 - the status quo), or under any higher possession limit for haddock. If a 500-pound possession limit on U.S. landings were implemented, the exploitation rate will be about 0.1, a level past experience indicates is necessary for some rebuilding to take place. While achieving necessary conservation, the 500-pound limit will provide some important revenue to fishermen, yet this limit will tend to discourage targeting haddock. At a current ex-vessel value of $1.70 (average Portland price during the week of 3 October 1993), a trip limit of even 500 pounds represents upwards of $850 in revenue to the fishermen. Depending on the season, the per pound value of haddock is even higher. For many trips the revenue derived from haddock would help cover the costs of a trip and potentially contribute to modest profit.

Recognizing that some bycatch of haddock is unavoidable, a 500-pound limit will provide conservation benefits compared to the status quo or options which consider higher trip limits, and will, at the same time, mitigate some of the adverse effects on the fleet by allowing some retention, landing and sale. The conservation risks of the limit, relative to lower possession limits, are believed to be small since 68% of all of the otter trawl trips to Georges Bank did not land haddock.

5.5. Alternative 4: 750 pound possession limit

The Secretary reviewed and rejected the Council's resubmitted portion of Amendment 5 related to haddock protection measures which suggested a preferred alternative of a 750 pound haddock possession limit, on the grounds that it failed to prevent overfishing and that the proposed action was not sufficient in scope and substance to warrant review as a proposed rule.

As argued in Section 5.1, there is little quantitative difference in total fishing mortality and total discard mortality between a 500 pound and a 750 pound limit, although clearly, a 500 pound trip limit will contribute to less total mortality than a 750 pound limit. However, the present condition of the haddock stocks warrant a risk averse management strategy; a strategy which will increase the probability of conservation benefits and decrease the probability of choosing a trip limit which could lead to greater than intended mortality should the propensity to not change fishing behavior be greater than anticipated.

5.6. Alternative 5: 4,000 pound possession limit

Likewise, the Regional Director reviewed the Council's suggestion that the emergency rule to be implemented on January 1, 1994 contain a 4,000 pound trip limit and advised the Council that such a measure was unacceptable as it failed to meet the objectives of Amendment 5 in preventing overfishing of haddock and providing an opportunity for rebuilding the stock.

Subsequent information developed by the Groundfish Plan Development Team and reviewed above along with information from the 1994 fishery operating under a 500 pound haddock possession limit indicate that a 4,000 pound possession limit would fail to attain the objectives of Amendment 5 and this Secretarial Amendment (see also Appendices 1 and 2).

5.7. Closed Area Alternatives

The purpose of extending the effective period of the closed area is to protect haddock stocks while they are congregated during spawning. The intent is to increase the opportunity for spawning by providing protection from fishing and by allowing the gradual migration from the area. Three alternatives are examined within the context of this proposed action. Two of these relate to the timing of the closure to groundfish vessels and the third to the suggestion that scallop dredge vessels be banned from Closed Area II during the period of the prohibition on trawling.

Under Amendment 5 (status quo) Closed Area II will increase in size by 15 minutes to the south and 20' to the west along the southern and western boundaries of the existing Haddock Savings Area II (Figure 1). Further, under the status quo, the expanded Closed Area II will be closed to all vessels from February through May in 1995 and from January through June in 1996 and in years thereafter (subalternative 1).

Under subalternative 2, the expanded Closed Area II would be closed to all fishing from January through June, commencing in 1995. Both alternatives provide an exception to the prohibition on fishing for pot vessels targeting lobster and scallop dredge vessels (although for the latter, there is also a proposed ban on possession of haddock during the period of the closure, see Section 5.8).

In order to estimate savings on haddock and the other species under different time options, two assumptions were made: 1) fishing effort does not move to areas that remain open (no displaced effort), savings are assumed to be equal to the amount of fish that would not have been caught if the months under consideration were closed, and 2) displaced fishing effort moves to open areas. In the second case, savings are equal to the savings in (1), minus the amount of fish that is expected to be caught in other 10' squares that remain open during the closure. This displaced effort is assumed to occur in the top 10' squares in total revenue per day. It was further assumed that, for example, the effort displaced from 8 10' squares in sector I would take place in the top 16 10' squares among the rest of the squares. The average catch rates of the top 16 squares in total revenue per day were used to calculate the landings resulting from the displaced effort.

Further, for the purposes of refining the detail of the analysis, the proposed closure period was broken into two parts: a January through May closure (Option 1) and a January through June closure (Option 2).

Savings of haddock and all other species were estimated with the above assumptions and the otter trawl average catch and days fished by 10' squares by months for the years 1989-1990. The savings based on the 1989-1990 average are presented in Table 16 and briefly discussed below.

Table 16. Savings of haddock and all other fish landings (1,000 pounds) resulting from the extension of Closed Area II.

	Time		Option 1		Time		Option 2	
	Haddock		Other Species		Haddock		Other Species	
	#	%	#	%	#	%	#	%
No Displaced Effort								
	1100	29	8184	.7	1256	33	9158	.8
Displaced Effort								
	835	22	(9501)	(.8)	802	21	(16978)	(1)

No Displaced Effort:

With no displacement of effort, a January through May closure would yield a haddock savings of 1.1 million pounds (29 %) and a January through June closure would yield a savings of 1.26 million pounds (33 %) compared to a February through May closure for 1995 under Amendment 5, the status quo.

With Displaced Effort:

With displaced effort relocating as described above, a January through May closure would yield a haddock savings of 835,000 pounds (22 %) while a January through June closure would yield a haddock savings of 802,000 pounds (21 %).

5.7.1. The status quo: Area II will be closed February-May, 1995 and January-June, 1996 and beyond

No fishing vessel may fish or be in Closed Area II during the period February through May 1995 and January through June in 1996 and beyond, except vessels fishing with pot gear, scallop dredges, or vessels seeking safe haven from storm conditions in waters adjacent to the western edge of Closed Area II.

Under either displacement scenario this option in 1995 will result in less haddock savings than under the January-June closure scenario. Of course in 1996 and beyond there is no difference between the alternatives. Given the status of the resource and especially the opportunity to husband a potentially good 1992 year class in 1995, this alternative is inferior to the January-June closure alternative.

5.7.2. Extended closure: Area II will be closed January-June in 1995 and beyond (proposed)

No fishing vessel may fish or be in Closed Area II during the period January through June except vessels fishing with pot gear, scallop dredges, or vessels seeking safe haven from storm conditions in waters adjacent to the western edge of Closed Area II.

The analysis above, indicates that, in 1995, savings in haddock mortality range from 21% to 33%

relative to the status quo (February-May in 1995). This represents a significant savings in total haddock mortality and, as mentioned above, will provide a greater opportunity to begin stock rebuilding.

5.7.3. Exclusion of scallop dredge vessels from Closed Area II

In developing recommendations for the initial emergency rule the Council asked NMFS to investigate the appropriateness of closing Area II to scallop dredge vessels. This alternative would prohibit scallop vessels from fishing in Closed Area II during the period of the closure (February-May or January-June).

To analyze this issue haddock landings in scallop dredges on Georges Bank in pounds by month during 1992 were examined (Table 17). The analysis also provides geographical resolution of the haddock landings by this gear type by differentiating among haddock landings in the area currently set aside for closure (old Area II), the proposed closed area extension (new Closed Area II, status quo) and the remainder of Georges Bank.

Table 17. Landings of haddock (lbs) by scallop dredge vessels in 1992, by month.

	Current	Extended	Outside	All
January	0	0	360	360
February	0	15	440	455
March	0	0	65	65
April	125	0	73	198
May	10	640	300	950
June	3,500	120	470	4,090
July	0	0	3	3
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
TOTAL	3,635	775	1,711	6,121

From January through June, 1992 (corresponding to the months of the proposed closure) 134,778 pounds of scallops were landed from the area then known as Closed Area II. This comprised approximately 1½% of the total of 9,664,470 pounds of scallops landed during that time from all of Georges Bank. Further, 3,635 pounds of haddock were reported to have been landed by

scallop dredges in Closed Area II during the same time period. The exclusion of scallop dredge gear from Closed Area II (not including the proposed area extension) in 1992 would have yielded a total savings resulting from the reduction in scallop landings of 134,778 pounds with a foregone loss of revenues of $655,021, assuming an average 1992 price of $4.86, and a reduction in haddock landings of 3,635 pounds with a foregone loss of revenues of $4,507 (due to haddock landing prohibitions) assuming an average 1992 ex-vessel price for haddock of $1.24. Under the expanded Area II there would be additional savings of haddock of 775 pounds.

The proposed ban on haddock possession by scallop dredge vessels would be in effect for the months of January through June, thus, at least in the context of the 1992 database, all haddock landed by scallop vessels would be saved.

In summary, a ban on scallop dredge vessels in Closed Area II during the period of the closure to trawling would result in foregone scallop revenues of up to $655,000 and a reduction in haddock landings mortality (but not necessarily total mortality should haddock catch simply be discarded) of up 4,400 pounds worth about $5,500. The very high potential cost to scallop vessels of this prohibition, the relatively small savings of haddock, and the possibility that these savings may not be realized at all if landing mortality is simply replaced by discard mortality, this alternative is rejected.

5.8. Possession of haddock by scallop dredge vessels

Under the emergency rule and the extended emergency rule, scallop dredge vessels have been prohibited from retaining haddock. The ban on possession has applied in the entire EEZ and because of the period of the emergency rule, January through June. The intent of the proposed measure is to provide additional protection to the haddock resource by removing any incentive for targeting the species during the period when the stocks are most vulnerable. Additionally, given that Closed Area II is closed to trawl vessels and that all vessels permitted in the multispecies fishery are limited to 500 pounds of haddock (proposed), there is the question of equity in allocation and burden among competing gear types.

5.8.1. The status quo: no prohibition on possession of haddock

Amendment 5 is silent with respect to possession of haddock by scallop dredge vessels. Thus, for vessels that hold moratorium permits for the multispecies fishery or groundfish possession-only permits, there would be no specific restriction on the amount of haddock, but the overall multispecies possession limit would apply. This means that these vessels would be limited to a possession limit of 500 pounds of regulated species (one of which is haddock). Thus, the vessel could have on board up to 500 pounds of haddock, provided no other regulated species were on board.

As indicated in the analysis of the effect of banning scallop dredge vessels from Closed Area II, the status quo alternative would result in 6,000 pounds of additional haddock landings mortality relative to the situation where haddock cannot be retained. Thus, this alternative is inferior to the proposed alternative by failing to increase potential haddock savings and by unfairly exempting one gear group, allowed to operate in an Area closed to another gear group, from a prohibition

on landing haddock.

5.8.2. January-June prohibition on possession for scallop dredge vessels (proposed)

This is the same as the status quo alternative except that possession of haddock is prohibited during the period January through June. As above, for the period July through December, scallop dredge vessels would be limited by the multispecies possession limit of 500 pounds of regulated species. The regulated species include haddock, thus the vessel could have on board up to 500 pounds of haddock during the second part of the year.

Because scallop dredge gear is towed through the same high concentrations of haddock as trawl gear; and because haddock aggregate for the purpose of spawning, protection of the haddock and haddock spawning activity dictates that scallop dredge vessels not be allowed to retain haddock on board during the period of the closure of Area II, which corresponds to the spawning period for the species.

Savings in haddock landings mortality are estimated to be about 6,000 pounds (Table 17). Whether landing mortality would be simply translated to discard mortality is unknown, but presumably, some haddock savings would occur. Although the amount of haddock saved is small, there is concern that management restrictions be fairly applied to all gear groups.

5.9. Impacts on ex-vessel revenues

The status quo alternative includes expanding the Closed Area II in 1994 and extending the closed season for this area from February through May in 1994-1995 to January through June beginning in 1996 under Amendment 5. Previous discussion indicates that the status quo would halt the increasing levels of overfishing and maintain stocks at the current depressed levels. Presumably, this means that catch levels similar to those occurring in 1992 will prevail, that is a harvest of approximately 4.5 million pounds valued at $5.6 million (1992 dollars).

There were 1,650 vessels with otter trawl permits for groundfish in 1992 that comprised the population of potential haddock fishing vessels, out of a total of 3,457 vessels in the Northeast groundfish fishery. Four hundred sixty-five vessels actually landed haddock in 1992. The distribution of these vessels by value of haddock landings are shown in Table 18.

Table 18. Contribution of haddock to vessel ex-vessel revenue, by revenue range, 1992

Revenue Range ($)	Number of Vessels	% of Total Vessels (n= 465)
≤300	178	38.2
301-500	20	4.3
501-1,000	28	6.0
1,001-10,000	125	26.9
10,001-50,000	88	19.0
50,001-100,000	12	2.6
100,001-250,000	12	2.6
250,001-1,000,000	2	0.4

The total value of haddock landed was $5,517,881; the total value of all species landed by the 465 vessels was $152,984,071; thus overall haddock accounted for 3.6% of total landed value.

Twenty-six vessels (nearly 6% of those landing haddock or less than 2% of the population of potential haddock fishing vessels) depended on haddock for over 10% of their gross revenues. There were 115 vessels which depended on haddock for $10,000 per year or more (over 5% of gross income) (Table 19).

Table 19. Dependence on haddock revenue as a share of total revenue by haddock revenue range, 1992

Range($)	Haddock Value($)	Total Value($)	Had/Tot(%)
10,000-50,000	2,041,530	37,881,556	5.4
50,001-100,000	823,263	8,031,184	10.3
100,001-250,000	1,595,756	9,231,137	17.3
>250,000	520,029	1,460,487	35.6

According to Table 6, 70% of the 1992 landings, or 3.2 million pounds valued at $3.9 million, came from Georges Bank (Statistical Areas 561 and 562). As noted above 1,650 otter trawlers held groundfish permits in September, 1992; 329 of these vessels fished Georges Bank, and 202 of them landed haddock in 1992. Landings in excess of 500 pounds were made by 164 of the vessels fishing Georges Bank, 21 vessels reported that 10 percent or more of their revenue came

from haddock, and 5 vessels reported that haddock comprised more than 20 percent of their earnings. The 290 trips to Georges Bank by trawlers which targeted haddock averaged landings of 8,634 lbs/trip. However, the balance of the Georges Bank catches were made on 1,176 trips which averaged 522 lbs/trip.

5.9.0.1. Extend Closure to January through June in 1994-1995

Table 16 indicates that extending the closure period from the status quo to cover the months of January and June in 1994-1995 would decrease the annual landings of haddock from Georges Bank by 21% from the 1989-1990 level, assuming that the displaced effort fished in other areas. Assuming that this percentage can be applied to the 1992 landings from Georges Bank, then extending the closure to January through June in 1994-1995 would reduce landings from the 1992 level by 0.7 million pounds worth $0.8 million per year, for a total, undiscounted reduction from the status quo of approximately $1.8 million. Part of this reduction would be offset by the catch from the effort directed to other areas and species. The reduction in catch from for these two years has not been related directly to recovery of the haddock stock and subsequent increases in yields. Therefore, benefits from this reduction in catch level from the status quo cannot be calculated.

5.9.0.2. Five Hundred Pound Trip Limit

The discussion above suggests that a 500-pound possession limit on haddock would decrease the annual exploitation rate from about 0.24 under the status quo to about 0.1, which would be associated with some stock rebuilding. A 0.1 annual exploitation rate on the 1992 stock would correspond to an annual yield of about 1.9 million pounds worth about $2.4 million at 1992 prices, or a reduction from the status quo of about 2.6 million pounds worth about $3.2 million in 1992. Presumably, as the haddock stock recovers, an annual exploitation rate of 0.1 will correspond to higher annual catches, and the reduction from the status quo would be offset or even surpassed by these higher catches. However, a yield stream from haddock stock recovery resulting from a 500-pound trip limit has not been estimated, and an associated benefit stream for this alternative cannot be calculated.

5.9.0.3. Five Hundred Pound Trip Limit and Closed Area II Time Extension

A combination of the 500-pound trip limit and the extension of the Closed Area II time to include January and June in 1994-1995 would not be greatly different from the effects on landings of a 500-pound trip limit. Presumably, those trips to Georges bank that targeted haddock would be most severely affected. As noted above, in 1992 there were 290 trips to Georges Bank that targeted haddock, averaging 8,634 pounds per trip for a total catch of about 2.5 million pounds. Under the 500-pound trip limit, these landings would be reduced to about 150,000 pounds. Thus, about 2.4 million pounds (over 90%) of the 2.6 million pound reduction in 1992 landings associated with a 500-pound trip limit is a result of curtailing trips to Georges Bank that target haddock. What this does not show is the reduction in fishing mortality provided by the extended closure of the Georges Bank spawning area. With only a 500-pound trip limit requirement, a significant part of the indicated reduction in landings would go over the side dead, as discards. For this reason, the closed area extension will be a much greater factor in reducing haddock

fishing mortality than the calculations would indicate. By precluding fishing in Closed Area II during January and June of 1994-1995, some additional reduction in haddock landings is to be expected. The amount has not been calculated but would be expected to be small. As noted above, however, the reduction in fishing mortality will be significant.

5.10. Impacts on vessel safety

A question has been raised regarding the safety of vessels transiting the shoal portion of Georges Bank if the expanded closed area is adopted. It is apparent from a chart of the geography of the proposed closure areas along with additional charts of haddock catch data by 10' squares for April to June of 1992 that little haddock catch would occur in areas south and west of the expanded closed area. While there would appear to be little reason to transit the area in question, proposed Amendment 5 provides that vessels seeking safe haven from storm conditions in waters adjacent to the western end of the closed area may transit through the closed area providing that: gale, storm, or hurricane conditions are posted for the area by the National Weather Service; such vessels do not fish in the area; fishing gear is stowed in accordance with § 651.20(c)(4) of the proposed rule; and the vessel provides notice to a patrolling U.S. Coast Guard aircraft or vessel in the vicinity of Georges Bank by high frequency radio (2182 khz) of its intention of transiting the closed area and the time and position when the vessel enters the area and the time and position when the vessel exits the closed area.

6. Impacts of the Alternatives

6.1. Physical and Biological Impacts

The biological impacts of the suggested alternatives have been discussed in Chapter 5, sections 1 through 8, primarily in the context of haddock saved.

Analysis of other physical and biological impacts associated with adoption of Amendment 5 can be found in the Supplemental Environmental Impact Statement for Amendment 5 to the Northeast Multispecies Fishery Management Plan which contains detailed sections on the affected environment, and environmental consequences of the Amendment.[6]

The haddock protection measures proposed in this Amendment will not affect the status quo under Amendment 5 with respect to those impacts outlined in the SEIS, except for some incremental habitat protection via the closure of Closed Area II given the expansion of the area in space (status quo) and time (proposed). The benefits of this increased protection are not quantifiable.

6.2. Economic Impacts

The economic consequences of the considered alternatives were discussed and analyzed in Chapter 5, at least in the context of foregone ex-vessel revenue. The general conclusion of that analysis was that although there were some anticipated shortfalls in ex-vessel revenues due to restrictions on haddock possession, extension of the closed area to trawl vessels, and a prohibition on haddock retention by scallop dredge vessels for the period January through June, these losses would be more than offset by future gains in revenue (and presumably profit) should the measures prove effective in enhancing the probability of haddock stock recovery and rebuilding.

Potential economic impacts include, however, impacts at market levels above the harvesting sector. Two identifiable potential impacts include an increase in price due to declines in haddock supplies (relative to the status quo which would produce no additional haddock savings), and impacts on the wholesale and retail markets for haddock. Both kinds of impacts are briefly analyzed below.

6.2.1. Impact on price

Edwards and Murawski (1993) estimated a haddock price equation in examining potential resource rents from efficient exploitation of the groundfish resource. Their price equation is

$$P = 0.80 - 0.0045Q + 0.0105T \quad (1)$$

where P is haddock ex-vessel price (in 1989 dollars), Q is haddock landings (in millions of pounds) and T is the time period ($T_1 \equiv 1962$).

Equation (1) indicates that for every 10 million pounds of haddock not landed, price will increase

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[6] NEFMC, Final Amendment #5 to the Northeast Multispecies Fishery Management Plan incorporating the Supplemental Environmental Impact Statement, Volume I. See especially Chapters 6 and 7.

by about 5 cents. Given this relative insensitivity of price to changes in supply, it is very unlikely that there would be any significant impacts on wholesale or ex-vessel prices as a result of the anticipated haddock savings provided by the proposed management measures. Of course, to the extent that price does increase, revenue losses to fishermen foregoing the landing of haddock will be mitigated.

Estimating the actual contraction in supply is difficult. Projected landings for 1994 are about 2 million pounds. Relative to recent landings of about 4.5 million pounds, the total price change due to this effect would be about 1 cent per pound.

6.2.2. Imports of haddock

If haddock landings are limited to 500 pounds per trip, U.S. consumers and the U.S. processing sector will have to look to other sources of supply. Several areas in the Canadian fishery will be closed, at least seasonally, to haddock retention. Canada has been the major source of fresh haddock imports to the U.S. and with reduced landings from Canada, the other primary source is Iceland. The primary sources of supply for frozen product are Iceland and Norway, with Canada supplying only 8% of the total.

It is interesting to note that in 1992, U.S. landings accounted for only 9% of the total U.S. supply of haddock (Table 20). Canada supplied approximately 47% of the total U.S. supply (Table 21, 22).

Table 20. U.S. haddock landings, fresh and frozen imports, 1992, in metric tons.

Category	Metric tons
U.S. Landings	2,034
U.S. Imports - Fresh	10,971
U.S. Imports - Frozen	10,071
Total U.S. Supply	23,076

Table 21. U.S. imports of fresh haddock, 1990-1992.

	1990		1991		1992	
FRESH	MT (000)	Value (000)	MT (000)	Value (000)	MT (000)	Value (000)
Canada	8.8	$18,609	8.9	$22,254	10.0	$25,050
Iceland	0.6	3,395	1.4	8,483	1.0	6,193
Norway	0	0	0	0	0	0
Faroe Islands	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0
Denmark	0	0	0	0	0	0
Other	1	5.8	1	8.9	0	0
TOTAL	9.4	$22,010	10.3	$30,746	11.0	$31,243

Source: U.S. Bureau of the Census

Table 22. U.S. imports of frozen haddock, 1990-1992.

	1990		1991		1992	
FROZEN	MT (000)	Value (000)	MT (000)	Value (000)	MT (000)	Value (000)
Canada	0.9	$ 3,315	0.9	$ 5,248	0.8	$ 4,365
Iceland	3.4	17,252	5.9	34,232	5.0	28,122
Norway	2.0	10,765	1.9	10,431	2.3	11,711
Faroe Islands	0.9	4,087	2.1	13,077	0.7	4,083
United Kingdom	0.3	2,139	0.5	3,215	0.6	3,132
Denmark	1.7	8,628	0.4	2,420	0.5	2,496
Other	0.1	544	0.1	407	0.3	1,406
TOTAL	9.3	$46,730	11.9	$69,029	10.1	$55,315

Source: U.S. Bureau of the Census

Given the relatively small proportion that U.S. haddock landings are to total U.S. supply, reductions in U.S. supply are not likely to significantly impact trade in haddock.

With regard to the qualitative impacts of reductions in the U.S. supply of haddock it is important to note that cod is a close substitute for haddock, at least at the retail and restaurant market level. To the extent that cod (or other species) can substitute for haddock, market sectors above the ex-vessel level will not be impacted substantively by the marginal decrease in total supplies predicted by the collective haddock savings estimated above. Moreover, it is clear that other countries are capable of covering any shortfall of U.S. derived supplies by a modest increase in product exported to the U.S.

6.2.3. Landings by port by trip limit

An additional consideration in examining the economic impact of various trip limits is how various ports might be differentially impacted. Recall that in 1992 Gloucester accounted for 42% of haddock landings, New Bedford 28%, Boston 15% and Portland 12% (Table 5).

These same 1992 data were examined with respect to otter trawl fishery performance by port of landing by haddock landings category (Table 23). For each major port, and all other ports combined, the number of trips, total landings, and total revenue in the following categories were examined: no haddock landed, 1-500 pounds landed, 501-750 pounds landed, 751-4000 pounds landed and greater than 4000 pounds landed. The proportion each landings category contributes to total haddock revenues in a port is shown in the rightmost column of Table 23.

Three general conclusions emerge from this examination. First, the larger haddock trips contribute greatly to the share of total revenue. The contribution to total 1992 haddock revenue from trips landing in excess of 750 pounds is 88% in Gloucester, 83% in New Bedford, 73% in Boston, 78% in Portland and 69% in all other ports combined. Second, the share of total revenue in the landings category 501-750 pounds is relatively small (3% Gloucester, 4% New Bedford, 8% Boston, 4% Portland and 2% in other ports), indicating little differential impact engendered by a 500 pound trip limit as opposed to a 750 pound trip limit. Last, the shortfalls in haddock revenues due to the imposition of the proposed 500 pound trip/possession limit differs among ports. Gloucester and New Bedford, by virtue of their importance in total haddock landings as well as the importance of large trips, may see landings revenues decline by more than $1 million in their ports because of landings restrictions for haddock. In contrast, the collection of other ports, which in 1992 accounted for nearly 83,000 otter trawl trips would experience a shortfall in total revenues of in the order of $70 thousand.

Table 23. Distribution of haddock landings and revenue, 1992, by major port

Category (lbs/trip)	Trips	Landings (1,000s of lbs)	Cumulative Landings (1,000s of lbs)	Ex-vessel Revenue ($1,000s)	Cumulative Revenue ($1,000s)	Proportion of Haddock Revenue (%)
Gloucester						
No haddock	15379					
1-500	974	104	104	152	152	9
501-750	58	37	141	53	205	3
751-4000	173	300	441	389	594	23
>4000	86	861	1302	1114	1708	65
New Bedford						
No haddock	10121					
1-500	623	113	113	145	145	11
501-750	71	45	158	58	203	4
751-4000	230	459	617	528	731	39
>4000	91	635	1252	627	1358	46
Boston						
No haddock	3084					
1-500	472	99	99	159	159	19
501-750	70	45	144	68	227	8
751-4000	125	217	361	295	522	36
>4000	36	250	611	304	826	37
Portland						
No haddock	11755					
1-500	796	85	85	124	124	19
501-750	29	18	103	24	148	4
751-4000	114	189	292	275	423	42
>4000	23	186	478	237	660	36
Other Ports						
No haddock	82707					
1-500	733	24	24	28	28	28
501-750	6	4	28	2	30	2
751-4000	24	41	69	45	75	45
>4000	4	28	97	24	99	24

6.3. Social Impacts

In March 1991 the NMFS provided guidance on the need for and use of Social Impact Assessments. In the following sections we review information on the fleet configuration, include additional information on employment, describe the ports affected by this Amendment, and discuss the social impacts that may arise as a result of adoption of this Secretarial Amendment.

6.3.1. Social Impact Assessment

6.3.1.1. Introduction

In 1992, there were 3,457 vessels (>5 GRT) in the Northeast groundfish fishery, employing between an estimated 6,250 (NMFS NEFSC; January 13, 1994) and 13,050 fishermen (Amendment 5, SEIS/IRFA; September, 1993). Of these vessels, 1,650 (47 percent) held otter trawl permits for groundfish in September 1992, and thus were the most likely possible participants in the haddock fishery (otter trawlers caught 84 percent of all haddock landed). In 1992, 465 vessels (13 percent of those permitted for otter trawls) landed haddock catches. It is estimated that these vessels employed some 2,500 fishermen, either full-time or seasonally. Haddock landings and processing are concentrated in the ports of Gloucester, New Bedford, Boston and Portland; these ports accounted for 96 percent of the reported landings of 2,034 metric tons of haddock in 1992. Since, however, haddock is also landed in smaller ports, two such (Chatham ,MA and Newport, RI) will be discussed in this document.

In addition, approximately 1,899 boats (<5 GRT) held permits in the groundfish fishery in September, 1992 (Amendment 5, SEIS/IRFA; September, 1993). Some 13 percent (N = 238) of these small boats held otter trawl permits for the groundfish fishery in 1991. However, NMFS data indicate that, like small vessels and unlike medium and large vessels, the majority of haddock caught by these boats is with gears other than otter trawl (Table 24). The small boat fleet "is perhaps the most diverse of all the vessel groups in the region in terms of the types of gear used, species targeted, and seasonality and level of individual effort... This region-wide diversity combined with the lack of systematically collected data makes assessing the impacts of the proposed management measures on this segment of the industry tenuous and problematic" (Amendment 5, SEIS/IRFA; September, 1993; p.181). There are currently no published estimates available for employment in the small boat fleet, though, NMFS tentatively estimates total boat employment at 1,410 for groundfish. Neither are there good data on the contribution haddock catches make to the seasonal round of harvesting by these boats.

In the processing sector of the domestic groundfish fishery, it is estimated that some 2,120 persons were employed in 1991 in the four principal ports (Amendment 5, SEIS/IRFA). NMFS estimates that average annual processing employment is 6,473 for New England, and average annual wholesaling employment for New England is of the order of 4,070 (NMFS NEFSC; January 13, 1994).

Table 24. Haddock Landings, 1992: Percent by Vessel Size and Gear Type

Tonclass	Gear			
	Otter Trawl	Gillnet	Bottom Longline	Other Gear
	%	%	%	%
Boat	2	61	38	0
Sm Vessel	5	56	31	0
Med Vessel	>1	88	1	10
Lg Vessel	85	>1	>1	14
ALL	83	2	1	14

6.3.1.2. Port Profiles

Most haddock landings come from large vessel ports (Table 25). The principal port for haddock landings was Gloucester, which handled 42 percent of all haddock reported landed. However, haddock landings comprised only 2 percent by weight of total landings in Gloucester, and 7 percent of total landed value. A similar situation exists in New Bedford, where 28 percent of all haddock reported caught is landed; haddock landings represent 1 percent of all landings by weight and value in 1992 in New Bedford. In Boston, which handles 14 percent of haddock landings, haddock comprises 5 percent of total landings and 7 percent of landed value. Portland receives 12 percent of reported landings; haddock comprises 1 percent of Portland's total landings and 2 percent of total landed value. Of small and medium boat ports, only Chatham, MA and Newport, RI land significant levels of haddock. Here, two large vessels ports (Gloucester and New Bedford), one medium Vessel port (Newport), and one small vessel port (Chatham) will be profiled.

Table 25. Haddock Landings, All Gears, 1992: Percent by Vessel Size Within Ports					
CITY	Boats	Sm Vessels	Med Vessels	Lg Vessels	ALL
	%	%	%	%	TOT. LBS
Gloucester	1	1	9	90	1860115
New Bedford	0	<1	23	77	1260086
Boston	0	<1	13	87	647063
Portland	<1	6	11	83	524293
Newport	0	<1	77	23	58895
Chatham	49	51	0	0	20276
ALL PORTS	1	24	15	60	4436984

A small boat is usually a "day boat", i.e., the skipper leaves in the wee hours of the morning and returns around sunset. Larger boats most frequently are "trip boats", leaving port either for 2-5, 7-10, or 10-15 days at a time and having much larger ranges[7]. These differences have implications for the social structure of the communities and the families of fishermen as well as for fishing effort.

Many fishermen have very strong feelings about the choice of day versus trip fishing, due to issues such as time spent with family and predictability of schedule (Binkley, 1990; Gatewood and McCay, 1990; Apostle, 1985; Pollnac & Poggie, 1988). Miller & Van Maanen (1981:30-31) note that in Gloucester the most important division among fishermen is between inshore and offshore draggermen. Day fishermen often have a strong commitment to day fishing in order to spend time with family and be active in the community. Nor is community a factor only for inshore vessels. In a survey of Nova Scotian offshore fishermen, Binkley (1990) found that community attachment was of "extreme importance" in measures of job satisfaction.

Furthermore, small boats -- especially gillnetters[8] -- often rely on gear switching, unlike large boats for whom such switching is often prohibitively expensive (Dewar, 1983:24) and who must therefore cover more area in search of their initial target species (what some have called a biosystem approach) rather than staying in a smaller zone and adjusting to what is there (an ecosystem approach). Ninety three percent of gillnet vessels in the Northeast, for instance, fish with other gear (usually otter trawls or shrimp trawls) for 20% of the year. Shrimp trawls have a

[7] There is some division by age among the fishermen with respect to day versus trip boats as well, with younger men more likely to work on the long trip boats and older men, near retirement, more likely to work day boats. Said one fisherman in his mid thirties about his decision to leave a freezer boat for a boat which makes 2-4 day trips, "I'm not 25 anymore."

[8] While gillnetters may prefer gillnetting, they do use other gears by season. In contrast, otter trawlers do not do significant amounts of fishing with other gears (Pollard, NMFS F/NEC, pers. com.), though they may fish for different species.

6 month off season in which they use otter trawls, gillnets, and lobster traps." (Clay 1993:4-5) Otter trawls are more likely to switch among species than gears. "For example, the owner-operator of a 65 foot dragger out of Gloucester, MA says that in winter he fishes first for groundfish, in inshore waters from Cape Cod north along the Boston traffic lane and then out to Murray Basin. Then, if fishing is poor, he'll go further offshore -- around Wilkinson Basin -- and fish for flatfish. He prefers not to do that, though because 'flatfish are boring.' (Clay 1993:4)"

6.3.1.2.1. Gloucester[9]:

6.3.1.2.1.1. Landings and value

Gloucester boats landed 107.2 million pounds of fish in 1991, considerably less than the 150.9 million pounds landed in 1983, but the value increased to $40 million ($2 million more than in 1983)[10]. According to National Marine Fisheries Service (1992), Gloucester still ranks first in New England for poundage landed (eleventh nationally), and tenth place nationally in value. The landings include a variety of groundfish, dominated by cod and pollock. Large quantities of whiting are also landed July through November. Monkfish is an incidental catch.

6.3.1.2.1.2. Vessels

Approximately 120 vessels use Gloucester as home port according to the NMFS port agents. Of these, there are about 32 large trawlers, 40 gillnetters, 14 medium-sized vessels (including 2 hookers), 25 day boats, 4 purse seiners, 1 scalloper, 1 large hook boat, 3 or 4 Scottish seiners and 1 menhaden boat. In addition, in 1992, there are 20 to 36 transient vessels, including six Maine boats in Gloucester for the herring season.

The port agents emphasize the fluidity of the fleet, with a large number of temporary and transient vessels landing in Gloucester on any given day. Their characterization of boat size (i.e., large, medium and small) actually is an indication of fishing patterns rather than tonnage[11]. Large vessels are those that characteristically fish at least 7 to 8 days, have a crew of approximately 6 and generally take 2 trips per month. The medium vessels are those fishing 2 to 4 day trips with one or two day layovers, making at least 4 trips per month, weather permitting. The small vessels are day boats.

Of the transient or temporarily Gloucester-based vessels, the majority come from Maine. The attraction is price and/or that during certain times of the year, draggers catch lobsters which cannot be legally landed in Maine by otter trawlers.

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[9] This port profile is excerpted in its entirety from Hall-Arber (1993). Any inadvertent changes in tone or intent due to deleted sections are the responsibility of the authors of this document, not Dr. Hall-Arber.

[10] Reportedly, some vessels that traditionally landed in Gloucester or Boston are now taking out in Portland, Maine.

[11] The way a fleet is characterized is pertinent to management since regulations are often linked to vessel size (e.g., under 30 feet are exempted), but in fact, the port agents's "size" characterization being based on fishing pattern perhaps more accurately reflects an operational definition of size that is commonly used in the fishing community. This could change if 90 foot vessels start taking day trips to avoid new management regulations.

In the last decade, the drop in the numbers of vessels whose home port is Gloucester has been sharp, in 1983 there were 235 vessels over 5 tons, currently there are fewer than 120 over 5 tons. One of the NMFS port agents noted that 90 boats sank in the '80's. Some of the sinkings have been investigated for insurance fraud. Many of the old, wooden-hulled vessels that sank have been replaced with newer vessels, but the NMFS port agents indicate that the fleet is still relatively old with a number of wooden, Eastern rigs, antiques at 50 years old. The newest vessel is four years old.

A couple of vessels have up-to-date electronics, but most have a minimum due to the expense. The larger, more advanced vessels in New England were built by processors who will not invest in the fishing industry now because of the uncertainty of its future. New, offshore vessels cost in the million dollar range, inshore vessels about $100,000.

6.3.1.2.1.3. Ownership and operation

A majority of the vessels are owner-operated. At least one individual owns two vessels, operates one. Twenty-eight of the 32 largest draggers belong to the Cape Ann Vessel Association. Twenty-seven of these are owned and operated by Sicilians, all but two owners are immigrants.

Crews, while theoretically composed of 6 members, usually run short one or two men these days, but are fairly stable. The trip lengths widely vary depending on catch. Commonly, port agents and representatives of fishermen say that the large vessels take 7- to 10-day trips, layover 2 or 3 days. A number of the wives say that the boats are currently taking 10- to 12-day trips. Steaming time to Georges is 18-20 hours.

There are 500 to 700 fishermen in town, ages range from 18 to 60 years old. The majority of skippers on the large vessels are fairly young, between 30 and 40 years old, with the exception of the whiting fleet that is said to be composed of fishermen getting ready to retire. The young skippers are just building their homes, investing in their vessels, not planning to leave fishing for 20 years or so.

6.3.1.2.1.4. Selling the catch

Most sell to one or the other of the six or seven fresh fish buyers in Gloucester. Only four of these dealers are capable of handling the largest vessels (take out, store, sell), particularly if more than two come in at one time. The inshore vessels box, unload to trucks and ship directly to New York's Fulton market. The majority of the fish, inshore and offshore, ends up in Boston for auction or is sent to dealers in New York, the rest is sold directly to small processors in Gloucester.

The quantities of fish are still relatively high, although the volume is greatest in the lower valued species. For example, in the winter much of the catch is herring which is shipped to Maine. Whiting also provides a high volume catch during parts of the year. Now that a long-time processor of fish waste is out of business, however, fewer fisherman land the high volume, oily fish that once comprised a large percentage of the catch[12].

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[12] The fish waste processing plant was old and for many years was the source of unpleasant odors that permeated

Wheeling and dealing is said to be a part of fish dealing in Gloucester, "as well as everywhere else." Both dealers and vessel-owners can benefit. One scam said to be used to benefit owners is a kickback on the sale of fuel and food. (Since the crew is paid a share after expenses, the price of fuel and food is inflated on paper and the extra given back to the owner under the table.)

Another way the owners can benefit to the detriment of their crew is to borrow money from the dealer and pay back in fish that does not appear on the weighout. Some owners will only sell to dealers for cash, offering more opportunity for manipulation.

The dealers manipulations of price, etc. are similar to those described for New Bedford. One woman complained that a dealer had refused to pay the agreed-upon price to her husband, claiming that the processor to whom he sold had refused part of several catches because they were spoiled, but later the processor contacted the fisherman directly, requesting more of his high quality, daily catch. The processor assured the fisherman that he had never turned down his product.

Nevertheless, some say that processors and dealers are more honest than they once were since the fishermen are better educated, more alert to the potential for rigging scales, etc. Fishermen are also said by some to take greater pride in their product and take better care of it than they once did. An increase in attention to quality product and utilization of everything that is caught is "an important factor in the evolution and success of fishery management, " said one observer.

Occasionally fishermen complain about dealers and imagine that they can eliminate the middleman. However, one informant pointed out that the dealers have to have a facility to unload and ship the product, sufficient capital to carry accounts, and a sales force[13].

There is potential for growth, at least one informant suggested, in dealing in imported fish. This is not a cash operation, however, and is very different from current fish-dealing practices. The fish is frozen, with a long shelf-life, so it is a business comparable to dealing in other commodities, such as grain.

6.3.1.2.1.5. Dockage and use of piers

Some boats tie-up at the wharves owned by dealers and in return they buy their fuel from that dealer as well as sell their catch to him. Others tie-up at the State Fish Pier for a fee.

6.3.1.2.1.6. Town's economic base

Although fishing dominates Gloucester's image and attracts tourists, there is a vocal group of waterfront owners who, it is said, would prefer to sell their land for shopping malls and

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the town, leading to citizen's complaints and the levying of fines.

[13] Complaints about middlemen is an international phenomenon, common in both industrial and artisanal fisheries. The United Nations FAO Council's Ad Hoc Working Group on Artisanal Fisheries of the Committee for the Eastern Central Atlantic Fisheries (CECAF) concluded that "the generalized dislike of the middleman [was] usually based on ignorance of their true functions as risk takers and financiers..." (CECAF, 1980:6). Other researchers support the idea that intermediaries perform vital functions (Löfgren, 1982; Pollnac, 1982; Blake, 1977).

condominiums. However, a large portion of the harbor is designated as working harbor, a marine-industrial zone from which residential building is banned.

Some individuals estimate that at least 40 percent of the community's employment and revenue is dependent on the fishing industry. Although fishermen make up a little less than 10 percent of the employed males in the labor force of Gloucester (about 600 fishermen of 7,290 employed males), fish landings were sold for $40 million and the multiplier effects are said to triple or quadruple the economic benefits of landings. The multiplier effects include employment in support industries such as suppliers of fuel, ice, food, equipment, transport and processing of product, etc. In addition, property taxes, income tax and federal and state corporate taxes on vessels are generated by the fishing-related businesses.

Others say that most people in the community do not view fishing as an important industry, since they see that the city government has a budget of $44 million dollars and may employ more people than the fishing industry. Many in the fishing community claim that there has been an influx of people who have little understanding of the fishing industry and its benefits for the community.

Part of the reason for this lack of understanding may be attributable to the fact that the fishing community has traditionally been rather insular, interacting only with others in their business, with little input into broader issues facing Gloucester. Contributing to the insularity of the fishing community is its strong ethnic identity, particularly in the offshore fleet.

6.3.1.2.1.7. Incomes and standard of living

Reports on incomes are highly varied. Some claim that incomes have remained fairly high, at least among the large vessels. These offshore boat crews average $30-40,000 per year while their captains earn $50-55,000 annually[14]. The medium and small vessels incomes are more variable. The highliners' crews earn an average of $20-25,000 and captains earn $35-40,000 per year, though they can make more if they "hit shrimp." On other vessels, not considered highliners, crews may earn $15-20,000 annually and captains $20-25,000.

Vessel owner-operators also have extremely variable income. One wife of an offshore vessel owner-operator noted that their annual income was about $40,000. In this case, the boat share covers the vessel's mortgage ($4,000 per month), boat insurance ($7,000 per month) and the family's health insurance ($500/month), in addition to the normal operating costs. The owner-operator's income is derived primarily from his portion of the "crew share."

Other informants maintain that fishermen are barely making a living, that the Gloucester fleet is down to "barebones" and the fishermen are no longer "getting rich." Some fishing industry observers agree, pointing out that income figures should be described in terms of an hourly wage and compared with hourly wages of workers in other dangerous occupations to avoid misrepresentation.

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[14] In 1980, interviews by Peterson and Pollnac suggested that earnings in excess of $15,000 to $20,000 were typical of offshore fishermen in the '70's and '80's (Doeringer, et al., 1986:54).

Most fishermen do own their own homes if they bought before the market "went out of whack." As elsewhere, the homes have been used as collateral on many vessels. The average house in Gloucester was bought for $50-75,000 if purchased before the mid-1980's. In 1990, the median house price in Gloucester was $177,100 according to U.S. Census data. The higher values may have helped to fuel overcapitalization in the fishing fleet, second mortgages offering capital for new high-tech equipment.

Most vessel owners also own trucks and cars and crew members own cars. Occasionally, managers and others cite new vehicles as evidence of a thriving industry. Fishermen owner-operators point out, however, that the tax system (i.e., depreciation deduction) dictates the frequency with which a work vehicle is purchased.

Some say that the fishermen who complain that they are not making enough money are probably not working as long or hard as they should. "If you're a fisherman, you should be out fishing, not coming in at one o'clock in the afternoon." Others note that changes in work patterns are affected by fish species, abundance and regulations, as well as changing attitudes towards familial responsibilities. For example, a catch of dogfish requires early afternoon landings for delivery of a quality product.

According to U.S. Census data, the median annual income for the 11,550 households in Gloucester is $32,690. For the 7,634 of these households that are families, the median is even higher at $39,827. Non-family household income is much lower at $17,258 and the overall per capita income is $16,044 (fishing and non-fishing).

6.3.1.2.1.8. Community organization

6.3.1.2.1.9. Ethnicity and families

The dominant ethnic group in Gloucester is Italian. Although major immigration waves stopped in the mid-70's, there are still a significant number of fishing community members who immigrated more recently, and many who speak only Italian or Sicilian. Some say that "everyone in Gloucester is related, depending on which village in Italy they (or their parents) came from." In general, interaction among fishing and non-fishing families is limited. In fact, there is little interaction among Italian and non-Italian families, even within the fishing community. One informant maintained that no Italian groundfishermen are in political office and that their wives are to be too busy with care of their families to run for a city office.

In the few fish cutting plants still operating in Gloucester, contract labor is used. This temporary labor force is generally brought in from Lowell or Boston and is often Cambodian or Cape Verdean.

6.3.1.2.1.10. Wives and familial considerations

Kinship is significant in the Italian fishing fleet[15]. Relatives often fish on the same boat, contribute

[15] Doeringer et al (1986:59) note that "family participation...is commonplace. Sons and nephews are expected to work on the boats, wives help with the accounting, and uncles, fathers and grandfathers provide funding for new boats, as well as advice and representation at shoreside meetings."

to younger relatives' purchases of vessels or new equipment and sponsor new immigrants, guaranteeing jobs on their vessels for the newcomers[16].

Estimates of the numbers of wives who work varies, but it may be as many as 60 percent. Those with extended families, who can call on their parents to care for their children, find it easier to work. Wives who work frequently do so for the benefits, particularly health insurance.

Some of the wives still keep the books for their husband's vessel, but there are at least six settlement houses in Gloucester. Gloucester fishermen's wives have organized and as a group have played an active role in management council hearings, at least since the 1970's. In addition, they have worked to promote the use of seafood, demonstrating cooking techniques in many public events.

Wife has to be mother and father to the children when her husband is out fishing for ten days at time, yet has to answer to her husband as well. The younger generation of men is said to be more involved with family decision-making.

Fishermen and their families socialize together, particularly within the Italian community. Conversations always revolve around fishing no matter what the occasion for the gathering, weddings, baptisms, etc.

6.3.1.2.1.11. Education and alternative employment

Among the older generation of fishermen still fishing, many left high school to go fishing[17]. A number of immigrants completed the fifth grade in Italy, said by some to be roughly equivalent to a high school education. Now, most young people finish high school and several have gone on to college before entering the fisheries. One gillnetter has a Harvard degree, another fisherman has an MBA and more than one is a lawyer.

The 1990 Census found that seventy-five percent of the population of Gloucester over 25 years old had at least graduated from high school and 20.4 percent has at least graduated from college. This places fishermen in the lower educational ranks in the community, making them less competitive for alternative jobs.

Despite regulations, the appeal of fishing-freedom to "be my own boss," working outside, making a decent living-proves irresistible to many. Most immigrants wanted their children to be educated and to work in a more prestigious occupation than fishing, but the high cost of college and graduate school, the lack of employment opportunities in today's poor economy, and the decent income still possible in fishing attracts some young people, although not as many as in the 1970's and '80's when fishing was considered a good investment.

There are three fresh-fish processing plants left in Gloucester (Connolly, Star Fisheries and Ocean

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16 Doeringer et al (1986:59) point out that these economic guarantees are "legal as well as kinship commitments." Consequently, these limit the flexibility normally associated with decisions about expansion and contraction of the fleet (or even crew size).

17 "In 1980, less than 14 percent of the commercial fishermen had education beyond high school and 43 percent had not graduated from high school" (Doeringer et al. 1986:51)

Crest) plus maybe a few more one- and two-men operations, most owned by people nearing retirement. Fairtry recently closed. Evidently there is insufficient product being sold in Gloucester to keep more processors active. Women (spouses and daughters of fishermen) are often employed in unskilled labor positions in leather goods and frozen fish block processing plants.

Generally, Gloucester is considered an economically depressed area with high unemployment. Tourism provides seasonal work opportunities, but at relatively low wages. However, there are a number of outside agencies expressing an interest in Gloucester's revitalization.

A group of people in Gloucester are encouraging the community to come up with innovative ways to increase the benefits the city derives from fishing. Some of the ideas center on "value-added" industries that would be eminently suited for the State Fish Pier. For example, deriving pharmaceuticals from sealife, development of new products such as minced fish to replace hamburger and liquid protein additives made from fish, and making fish meal from fish waste processing. Other ideas include providing a base for deep sea mining operations and encouraging recreational fishing with a municipal marina. Aquaculture might also be considered[18].

There are constraints on the development of new and related industries. Gloucester has major road access only from the south, the land is dominated by granite ledges and wetlands, the city relies on a surface supply of water, waste water disposal is a problem and there are no farmlands begging for development.

6.3.1.2.1.12. Management and enforcement

6.3.1.2.1.13. Compliance, reporting violations and sanctions

Reportedly, liners[19] have not been used for the last three years. Most of the fishermen are afraid they'll be caught if they cheat and have to pay large assessments. However, some observers say that current fines are just "the cost of doing business" and don't change compliance rates, instead, they suggest, boats that don't comply should be tied up.

Asked whether they would report observed violations, most fishermen or their wives hesitated, then admitted that it would be unlikely. One woman explained that all the fishermen are friends, "they've baptized and confirmed each other's kids." One noted that as times become more difficult, however, as those who "you watch go inside" (e.g., closed areas) are "able to give their wives diamonds and you aren't..." [Pause indicating that attitudes about reporting violations may change.]

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[18] A number of the people involved in these efforts are active fishermen or representatives of fishermen. These developments are viewed as ways to add value to the fishing that does remain, providing employment opportunities that maintain the link with fishing, and in general, help Gloucester remain economically viable as a community.

[19] The cod-end, the bag-like portion of a dragger's net, is supposed to be constructed with 5 and 1/2 inch mesh, to allow juveniles to escape. To circumvent this obligation, some fishermen doubled up on the net, sometimes using a smaller mesh net inside the regulation-sized net, or rigging the two nets so that the mesh was effectively smaller.

6.3.1.2.2. New Bedford[20]:

6.3.1.2.2.1. Landings and value

In 1991 New Bedford, Massachusetts had landings with the highest value of any port in the country. Catches of yellowtail flounder, scallops, cod and other groundfish caught on Georges Bank provided the bulk of the 106.4 million pounds of fish worth $157.7 million landed in the city (National Marine Fisheries Service, 1992). Ninety percent of the sea scallops landed in New England are landed in New Bedford.

With multiplier effects, the city's economy may benefit from the fishing industry by $500 million. Approximately 2,000 men are directly employed as fishermen (10 percent of the 20,997 males employed in New Bedford). Thousands of other people are employed in supporting services such as processing, manufacturers of equipment, transport companies, supply houses, oil companies, welders, pipe fitters, stores, settlement houses, etc.

6.3.1.2.2.2. Vessels

NMFS reports that approximately 412 boats land in New Bedford annually, though of these many are transient boats that only land in summer months. The agency estimates that 280 vessels use New Bedford as their home port. Of these, approximately 144 are draggers, the majority of which are large, that is, over 50 gross tons and 75 feet or over. One hundred fifteen of the vessels are large scallopers, usually over 103 feet, with the possible exception of two or three medium size scallopers. These numbers reflect a marked decrease in dragging and significant increase in scalloping since 1985 when Doeringer et al. (1986:35) found that the New Bedford fleet had about 200 draggers and 55 to 60 scallop boats.

In addition, there are a number of gillnetters, a few offshore lobster boats, tuna fishermen (purse seines), swordfishermen (driftnets) and a few vessels that seek underutilized species such as squid, dogfish, butterfish and whiting.

The size and value of the scallop fishery to New Bedford makes it imperative that some detailing of its organization and operation be considered in the port profile that is otherwise primarily concerned with the groundfishery.

6.3.1.2.2.3. Ownership and operation

About half the vessels are owner-operated. Few people own more than one or two vessels although there is one individual who owns seven scallopers and another who owns seven draggers. There are a number of individuals who own one dragger and one scalloper.

Large draggers ideally carry six men, but many work "short-handed" now with four or five men. The smaller catches require fewer crew members to sort, ice, and shovel the fish into the hold. Some fishermen expressed concern about safety noting that only two men are on deck at "set out" and "haul back" when going short, a situation that may have serious consequences on large vessels. In the early '70's many of the vessels carried as many as nine men.

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[20] This port profile is excerpted in its entirety from Hall-Arber (1993). Any inadvertent changes in tone or intent due to deleted sections are the responsibility of the authors of this document, not Dr. Hall-Arber.

Steaming time for draggers can be anywhere from 6 to 12 hours to reach the shoals or yellowtail flounder areas, 18 to 20 hours to Georges Bank for cod and haddock.

Scallopers generally carry a crew of nine men. A ten- or eleven-member crew is said to be ideal, but owners do not have to file withholding tax if they carry fewer than ten. Some scallopers will increase the numbers of crew members during the summer to handle larger catches, a few taking as many as 14 men. On their 10- to 15-day trips, the scallopers steam 18 to 24 hours to Georges Bank (60% of the fleet). Most scallopers lay over three or four days between trips to maintain the vessels, replenish supplies, spend time with families.

A small group of scallopers, 19 boats at most, fish back to back. These usually have three crews for two boats (or four or five crews for three boats) so that when a boat returns and unloads, it can be turned around quickly and leave with a fresh crew.

6.3.1.2.2.4. Crew

Draggers are more inclined to keep the same crew members for several years than are scallopers. A dragger may lose one or two members when winter sets in, but the majority will stay at least three to five years. Many young crew members try to move up to mate with the goal of eventually buying their own boat. It is not uncommon, however, to find boats with crew members who have fished together for over 20 years.

On scallopers, captain and mate or engineer may be related, but the crew tends to be younger and more mobile than on draggers. In addition, there are fewer opportunities for upward mobility than on draggers. Though crew members may make a bit more money than they do on draggers (on the average), the work is physically very hard. The gear is heavy, lots of stones and rocks come up in the dredge and have to be removed. The rings have to be replaced on the chain bags and the trips are long. Crew members sometimes quit just to take a vacation.

6.3.1.2.2.5. Living conditions on board

Working conditions can be harsh, especially in bad weather, but many of the newer, large vessels have pleasant accommodations for crew with staterooms (two or three men), flush toilets, rugs on the floor, radio, TV, VCR[21]. Small vessels still make do with bunks, galley and table all together in a cramped space near the bow, and a bucket in the engine room for privacy. Common to both large and small vessels, however, is a shortage of leisure time. Only during long steams to and from the grounds or during meals do fishermen have "time-off," and reading is the primary recreation.

Owner-captains increasingly have cellular phones which afford them more privacy (particularly valued for business reasons) than do VHF marine-band radios; however, high service charges limit their use. Many still rely on marine radio-telephone for their calls to shore and the radio talk among boats continues for camaraderie and security.

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21 One observer pointed out that rugs are not simply for "adornment," but contribute to safety.

6.3.1.2.2.6. Weather

The large size of the vessels allows fishermen to go out in heavier weather than they did traditionally. Lately, the boundaries of fishing weather have been pushed out farther due to the high costs of living, the scarcity of fish, and the prices that have not kept pace with the prices of gear. Scallopers, in particular, will fish worse weather than they used to.

Despite recent implementation of the Vessel Safety Act mandating a sharp increase in safety equipment, fishing vessels and fishermen continue to be lost. Some fishermen cite the pushing of weather limits due to regulations as one of the contributing factors.

6.3.1.2.2.7. Expenses

Fuel, ice, food for crews and replacement gear add up to considerable expense. One of the expenses that is frustratingly high for some owners is the interest on their mortgage. Because of the uncertainty of catch due to diminished stocks and regulatory changes, many owners have been unable to refinance vessels bought at 15 percent to take advantage of the much lower interest rates now available.

Insurance rates are also extremely high, often as high or higher than the mortgage. Fishing is a dangerous occupation, particularly on the west coast, and personal injury settlements have been high. Mortgage and insurance on a 70-80 foot, ten-year old otter trawl can run $6-8,000 per month. Scallopers, with larger crews, may cost $8-10,000 per month for mortgage and insurance, plus $900 per month in unemployment tax.

Settlement houses charge $170-$200 per month to handle a vessel's taxes, paperwork, checks to crew, etc.

Electronics are relied on to a greater extent than in the past. One fishermen noted that while scanners are not common, most people have Loran's for navigation. His grandfather, in contrast, relied on landmarks to locate his favorite fishing spots, using the techniques of triangulation and dead-reckoning.

6.3.1.2.2.8. Selling the catch

New Bedford has an auction owned by processors and dealers. Like the Boston auction, the dealers bid on the product, sight unseen. In New Bedford, a whole boatload is bought at a time, whatever the mix. Before the 1985 strike by the union, the auction was a public auction, but faced with harassment (e.g., car-bashing) and demands made by the union, the dealers started their own auction.

The New Bedford auction is said to "set the price or standard," at least for scallops and, probably, yellowtail it reflects what dealers are selling for and what is bought from outside of New Bedford. Canadian, Chinese, Peruvian, and Icelandic scallops all compete with New Bedford scallops. Groundfish prices may be set by the Boston auction, since it handles larger volumes of groundfish.

New Bedford has over 20 dealers who purchase seafood from fishing vessels. Boats often have a commitment to sell to a specific dealer on a regular basis. Not all vessels "go on the board," i.e., use the auction. Some vessel owners allow their skippers to decide whether to sell at the auction, or sell directly to a dealer.

Among fishermen interviewed, New Bedford has a reputation for wheeling and dealing. Some informants even suggested that there were connections to organized crime among the dealers. Others, however, claimed that this is a stereotype espoused because of some Italian names in the business, a stereotype actually based on the reputation of certain dealers in New York and New Jersey.

A couple of informants were quite open about the power of the dealers in their relationships with fishermen. "Price-fixing and price-cutting are accepted as a way of life, we don't know any other way," one former fisherman said. Two or three dealers are said to control the prices paid to fishermen, getting together at the Seafood Exchange. The dealers bid on the catches, but often pay the fishermen less than bid, claiming that the fish was not first quality. Even if an outraged fishermen has a NOAA inspector certify his catch, the fisherman has no power to force the dealer to pay what he bid. "There are 14,000 pounds of fish on the floor, what's he going to do? Shovel it back into the hold?" queried a fisherman.

The other dealers are bound by the prices set by the powerful dealers otherwise they lose their sales, undersold by the larger dealers. It is clear that fishermen everywhere face constraints imposed by the harvest of a highly perishable product with wide daily fluctuations in supply and demand, a circumstance that seems to give dealers a wider range of options than it does fishermen.

[O]ne fisherman who said he has never had a problem with dealers owing to his consistently high quality product, said that most fishermen like the system of selling the whole catch to one dealer, so it can all be unloaded at once, payment is given and the fishermen can go home.

6.3.1.2.2.9. Dockage and use of piers

There has always been a shortage of dock space. Most boats tie up at the five city-owned piers and a number take out (i.e., unload) in New Bedford, but tie-up at the Fairhaven piers. During holidays, such as Christmas, New Year's and the blessing of the fleet and during storms, the boats are rafted, tied four or five abreast.

Three hundred boats pay $250 annually for the right to tie-up at the city piers, but it is "first come, first serve." There is room for 75 vessels to be tied directly to the piers; lighting, but no security is provided. It is nerve-wracking to have a vessel "rafted (i.e., tied up to others) even two or three deep," fears of fire and of damage are high when many vessels are in port at the same time.

Private contractors pay the city $250 annually for a pier user fee which allows them to service the vessels. This permit entitles them to one unit such as a truck or other vehicle, additional units cost $50 each.

According to the city regulations, vessels are not allowed to unload to trucks at the city-owned piers, they must unload only to the 15 to 20 processing plants that are clustered at the South Terminal. This limits opportunities to evade the "price-fixing, price-cutting," since fishermen can't unload to trucks that could then transport the catch to Boston, Portland or New York fish auctions and/or directly to smaller markets.

6.3.1.2.2.10. Town's economic base

Moody's 1990 Municipal Credit Report describes New Bedford as a primarily residential community with "a large local fishing industry and a significant manufacturing component [that] add diversity to the economic base." Since 1990, however, New Bedford has lost some of its manufacturing component. Polaroid, which in 1990 was still producing film and was considered by Moody's as a major employer and taxpayer, has closed its plant. Acushnet, a manufacturer of golf balls remains, as does some apparel manufacturing. Moody's report notes that the resident population remains poor and the per capita income has declined relative to the state since 1979. In 1990 the city's debt burden was modest, but Moody's report pointed out that this would be rising significantly due to sewer improvements mandated by the Clean Water Act.

6.3.1.2.2.11. Incomes and standard of living

Skippers used to make up to $100,000 per year. Now the range is more apt to be $60-80,000 annually. Deckhands reportedly make anywhere from $30-50,000 per year on a decent boat[22]. "Per men," captain, mate, cook and engineer, often receive a stipend for their extra responsibilities. The stipend varies, sometimes it is fixed at $100 per trip, other times it is a percentage of the catch. As in most fishing communities, the majority of the fishermen's income is not based on a salary, but rather is a share of the proceeds from the sale of the catch after expenses are paid.

[T]he income of fishermen is based on extremely long hours devoted to a dangerous occupation and does not entail paid vacations, weekends-off or retirement pensions. Nevertheless, many fishermen say fishing provides them with a "good living," one that would be difficult to achieve in another occupation with the same level of satisfaction, particularly given the average educational level[23].

At one time, New Bedford had a strong fishermen's union. Fishermen could count on social security and a pension when they retired. Because crews were larger, boat owners paid withholding tax for their employees. Now on most boats, crew members are considered for tax purposes to be self-employed and thus responsible for paying their own withholding tax. Many young men fail to do so. An organization has recently been formed that is lobbying for changes in the tax regulations that would require withholding on boats with eight or more crew members.

As expenses for fishing vessels have increased, crews are bringing home less. Nevertheless, most consider themselves middle-class. The 38,646 households comprising New Bedford's population (fishing and non-fishing included), according to the 1990 U.S. Census data, have a median income

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22 In 1979, almost half of the New Bedford fishermen earned $20,000 or more per year (Doeringer et al, 1986:53).

23 Fishing as a "way of life" and satisfactory occupation has been analyzed by several social scientists. See, for example, The Structure of Job Satisfaction Among New England Fishermen by Pollnac and Poggie, 1979. For a discussion of differences in satisfaction under different working conditions, see Binkley, 1990. Gatewood and McCay, 1990, analyze different patterns of job satisfaction in New Jersey's diverse commercial fisheries and comment on the implications of these differences for fisheries management.

of $22,647. Of the 26,677 that are families, the median income is $28,373 and non-family households have a median of $10,179. Per capita income is $10,923.

Captains and "per men" usually own their own homes or condominium, a car or two, and often a truck. In 1990, the median house price in New Bedford was $115,900. Crew members usually own at least a car. Owners often have large mortgages on their vessels with their homes as collateral.

Some say that the income does not truly compensate for the danger and grueling hours fishermen put in, but that fishing "gets in your blood" and is a satisfying occupation. The struggle with management, however, is causing a lot of discontent and concern. "I hate it, despise it," one fisherman said, "nightmares, headaches, ulcers."

6.3.1.2.2.12. Community Organization

6.3.1.2.2.13. Ethnicity and families

In the dragger fleet, Portuguese predominate. Some are immigrants, others are second generation, but many maintain a strong Portuguese identity[24]. A lack of fluency in English contributes to the formation and maintenance of a close community.(Doeringer et al., 1986:57). Traditionally, family ties among crew members were common[25]. Brothers, brothers-in-law, cousins, uncles still do fish together if they "get along." However, an awareness of the dangers of wiping out a whole group of men in one family should the vessel go down is a matter of concern to some.

At one time Norwegians dominated the scallop industry and they retain a major presence as captains, while the crews tend to be of a mixed heritage. Now, most scallop fishermen are second- and third-generation American, a mixture of Norwegian, Newfoundlanders, and a few Portuguese. In the summer, fishermen from Maine and various southern states expand the scallop fleet.

6.3.1.2.2.14. Wives and family considerations

Many wives work, though not necessarily in the fishing industry. Wives of Portuguese crew members often work in fish processing plants. Second and third generation women are more apt to have jobs as secretaries, teachers, accountants, etc.

Few wives actually "keep the books" as they did in the past, most owners rely on settlement houses to pay crew, taxes, and other bills.

Family ties tend to be maintained and extended in fishing communities, to provide a support network for wives and children of active fishermen. Grandfathers who are retired fishermen often play an important role in their grandchildren's lives, being present for school plays and activities fishing fathers often miss. These networks are perceived as essential to many wives and would

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[24] As described in the Gloucester port profile, some fishermen guarantee jobs for their immigrant relatives, reducing the flexibility in hiring that is otherwise valued in running a fishing boat.

[25] "Fifty-seven percent of fishermen interviewed in 1978 [in New Bedford] had at least one kinsman among the crew they fished with" (Doeringer et al, 1986:59)

make it difficult if not impossible to move to different ports.

Although wives often mention the difficulties involved in raising a family with a fisherman husband-father absent for so much of the time, they also note that there is a measure of independence that is appealing, particularly in contrast to the "catering he expects when he's around."[26].

Fishermen and their families tend to socialize with others in the industry regardless of whether or not they are relatives.

6.3.1.2.2.15. Education and alternative employment

The educational level runs the gamut from grammar school to college- or service academy-educated. However, many in the industry have not graduated from high school. In fact, in 1980, the median level of education was only nine years. Less than ten percent had education beyond high school and two-thirds had not graduated from high school (Doeringer et al., 1986:51).

Until the last few years, the income of fishermen was quite good compared to shoreside jobs, even for those with college education. One fishermen mentioned that 14 years ago he was making $500 per month in the military service when his cousin showed him a $1,000 check for a ten-day trip so he decided to quit the service for fishing.

Despite the lowering of incomes in the last two years or so, the lack of alternative employment, particularly in the poor economy of today, keeps young people moving into the fishing industry. While perhaps lower than in the past, incomes for fishermen, crew members as well as "per men," are still significantly higher than equivalent jobs ashore. Among successful scallopers, crewmen can make $35-40,000 per year; skippers make $70-80,000 annually.

Nevertheless, there are boats barely surviving. One groundfisherman mentioned 10-day trips, 16 hours per day working, and a paycheck of $85 for the 10 days. The Mariner's Assistance Program tries to help crew members of boats that have several poor trips in a row.

The 1990 U.S. Census found that of the 64,554 people in New Bedford over the age of 25 years, 49.7 percent were at least high school graduates and 9.7 percent were at least college graduates. Currently, the trend is said to be towards increased education with parents encouraging their children to prepare for alternative employment. However, New Bedford has lost much of its alternative economic base in recent years. Polaroid, Goodyear, Revere and Continental have all shut down.

Stereotypes of the requirements of crew of the different gear are still told. Scallopers are described as "seafarmers" having "weak minds and strong backs." Draggers are said to require more experienced fishermen, particularly skilled net menders. Also, fishing over the shoals requires "everyone to know what they are doing." The switch to steel-hulled boats has made obsolete the old saying about "iron men on wooden boats," giving way, one informant joked, to

[26] Other positive benefits are noted in Doeringer et al (1986:64) such as "living near the shore," "spontaneity of the unpredictable schedule" and the positive effects fishing has on their husbands.

"iron boats with foolish men."

The practice of young men fishing with anyone who will take them (usually an uncle, brother or father) on weekends and summer vacations, when they are in high school, often for a reduced share, can "hook" the youth on fishing. Fishing becomes a secure "fall-back" occupation for many.

Fishing attracted many participants because of the "freedom, the money to be made, the independence and the perception that success depended on what one did with oneself." Some fishermen are losing the satisfaction derived from the freedom and independence factors due to the perception of being hemmed in by multiple regulations.

6.3.1.2.2.16. Social welfare issues

Most agree that the fishing community is no different from the larger community. There are some problems, but no worse or better than among other groups. Whether problems will increase with changes in management is difficult to predict. Individuals cope with change in different ways.

One difference between scallopers and draggers is that on the former, there is less apt to be the perception of upward mobility. Crew on scallopers are not generally "being groomed" to be captains, while on draggers young fishermen believe they may have an opportunity to become a "per man" or eventually, captain.

6.3.1.2.2.17. Management and enforcement

Some fishermen report violations, but often don't like to do so. Some fear their voice will be recognized, others maintain that there is not a lot of respect for law enforcement because of a perceived lack of fairness[27]. Complaints are voiced about the frequency with which some boats are boarded and the complete absence of boarding of other vessels.

Some estimate a 70 percent compliance with mesh regulations and higher compliance with closed areas. More people are being caught, so more people are complying with the regulations. However, this reported compliance rate is lower than similarly obtained, anecdotal data from Maine and Gloucester.

More than one fisherman blamed fishermen's greed for the conditions of the stocks. "People never cared about the future, just that one trip [they were making]. They've done everything to violate every law, cheat, smuggle, do anything to make a living. They're hungry and greedy people, killing the goose that laid the golden egg." Others disagree, saying that they believe in conservation, but have been discouraged by the lack of enforcement of regulations.

Some blame the government for the programs that have encouraged the entry of more boats and more technically-sophisticated equipment into the fisheries. Guaranteed loans, in particular, are viewed as largely responsible for the overcapitalization in the industry. Before the loan program,

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[27] The lack of participants' aid in pressuring others in the fishery to conform to regulations is a common problem in offshore fisheries. In contrast, Acheson (1988) describes the effective control and management of the inshore lobster fishery by local lobster fishermen through their formation of "harbor gangs."

a vessel purchaser had to pay 50 percent down, then pay off the boat in five years. With the loan program, buyers only had to put down 12 percent and were given 15 years to pay off the debt at a low interest rate.

6.3.1.2.3. Newport[28]:

"Fishing is an $85 million industry in Rhode Island. One representative of a local fishermen's association said that an estimated 8,000 people are directly or indirectly make (sic) their living off of fishing in Rhode Island. The group of people that they said make their living in this manner includes fishermen, processing plant employees, and truck drivers who transport fish to the markets. A great deal more people are affected by fisheries economically through a multiplier effect, including mechanics and boatyard workers, electricians, repairmen, waitresses in restaurants that serve seafood to tourists, and local gas station owners and employees.

Squid was the number one species caught in Rhode Island in 1992 with 42.7 million pounds landed, Rhode Island was the leading state in squid landings, with 38% of the national total (U.S. Department of Commerce 1993:xii). Whiting landings were the second highest with 18,158,000 pounds landed. Two ports, Point Judith and Quonset Point, accounted for 95% of the squid landed in Rhode Island during 1992.

Three ports make up the bulk of landings in Rhode Island: Point Judith, Quonset Point, and Newport. Point Judith is generally a "wetfish" port, where the fish is most often landed on ice and packaged at port. Since the fish is packaged at port, there is value added to the product, which causes a significant multiplier effect for the community. Newport is similar. Newport's commercial fishing fleet resembles New Bedford's in its make-up of groundfishing boats and lobster boats. Yet boats landing in Newport have also begun targeting squid, mackerel, butterfish, scup and dogfish. Quonset Point is strictly a large factory freezer vessel port; five freezer vessels target squids, butterfish, and mackerel. As opposed to wetfish ports, there is very little associated value added with factory vessels, and they have few relationships with landbased processors since everything is done on board.

The importance of fishing in an area is reflected in the number of organizations which represent the local fishermen in political and management situations. Rhode Island has at least four fishermen's organizations which either in whole or in part represent Rhode Island fishermen: East Coast Fisheries Association, Rhode Island Inshore Fishermen's Association, Rhode Island Fishermen's Alliance, and The Offshore Fishermen's and Lobstermen's Association. East Coast fisheries represents a wide range of individuals and groups involved in all segments of the industry. According to one of their representatives, the average vessel they represent is seventy-five feet with a five man crew and worth half a million dollars. East Coast Fisheries and the Atlantic Offshore Lobstermen's Association represent individuals along the Mid and Northeast Atlantic coast. The Rhode Island Inshore Fishermen's Association represents inshore trawlers,

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[28] This port profile is excerpted in its entirety from McCay, Blinkoff, Blinkoff & Bart (1993). Any inadvertent changes in tone or intent due to deleted sections are the responsibility of the authors of this document, not Dr. McCay et al.

and the Alliance represents all other inshore Rhode Island fishermen.

Newport is a fairly large coastal town known for its colonial history, its yachting and its mansions along famous Bellevue Avenue. The well maintained and restored historic homes which dot its narrow streets exemplifies (sic) the town's obsession with connecting present day Newport to its historic past as an 18th century economic and maritime center. Newport also proudly displays proudly its association with the America's Cup. The waterfront is occupied primarily by various marinas, hotels, shops, and condominiums.

Within Newport there are three commercial fishing packing and distributing businesses. One mainly deals with draggers, gill-netters and some scallopers, and brings in a great deal of groundfish. Another is a lobster house, but they also handle the trappers. And there is a trap company located in Newport. Species caught in traps are discussed below. The dealer that handles mostly draggers packs and distributes the majority of species of important to this study. The trap company also deals with these species but not in as large of quantities.

Approximately 15 large draggers were tied up at the fish house that deals with draggers during a recent visit to Newport. The fishhouse owner, the local port agent, and fishermen spoken with on this day said that having 15 boats in port at the same time was unusual, and had to do with a storm moving through the area. Most of the boats that offload at the Newport fish house are not from Newport. They are from other ports such as New Bedford, various Long Island ports, Cape May, and Pt. Judith. These boats are going primarily for squid at the time of our visit, which was in December. This particular fish house owner does not own any of the boats that offload at his dock.

Some people interviewed for [the McCay et al.] study feel that Newport would not mind seeing the commercial ports close, since Newport is more of a yachting and sailing town than a commercial fishing port. A strong division exists between those who use the water and waterfront for these different activities. The commercial fishing areas of the waterfront and the commercial fishing people seem particularly resilient. The fish house that deals primarily with draggers has been at their location for fifty-two years, and the owner does not see his business as getting pushed out by yachters. While his business dates back several decades, the history of offloading fish at this location goes back even further. Before this fishhouse another fishhouse was in that location.

It is worth noting that many feel Newport retains a traditional style of commercial fishing. Exactly what the people in Newport mean by "traditional way" is difficult to measure. Yet it appears that the fishermen feel there is something about dealing with commercial fish landings in Newport that is akin to the way things used to be. For example, the fish house that deals primarily with draggers has been in Newport for 50 years and their reputation for honesty leaves fishermen comfortable about their dealings with this local fish dealer. The port agent in Newport said that fishermen may go out of their way to offload at this fish house rather than go to another port.

A fishermen's interest group representative said that Newport's commercial fishing industry is psychologically different than Point Judith and Quonset Point. "It is more like New Bedford as

far as business goes," he said, "and lobsters are the backbone of Newport. There are wetfish trawlers but the majority of boats target groundfish or fluke. Newport is not a big squid or whiting port, having only 15 or so trawlers working out of the port. In this regard, Newport tends to be closer to New Bedford operationally."

6.3.1.2.3.1. Newport's Fleet and Crews

Except during storms, there are usually no more than a half-dozen commercial vessels tied up in Newport. Groundfishing boats, a few scallopers, gill-netters, and draggers make up the range of boats in Newport. Newport also does a great deal of lobstering, and has a significant trap and pot fishery... One boat out of Newport targets tilefish.

The fishermen who make up the crews in Newport are not necessarily from Newport, but some local people from the area do work on the boats. Some crew members come from Point Judith, New Jersey, New York, and New Bedford. Typically the owners of the boats do not work the boats. Often the owners used to fish but do not anymore. As with almost all of the ports, crews are paid on the share system.

While some crew members have fished for a living for a long time, others have not. Many fishermen fish because fishing is all they have ever done and therefore they do not have expertise in something else, said the Newport port agent. Similarly, some fishermen are college educated and could do other things, but they choose not to. Many fishermen are self-educated and conservation minded.

While Newport is a tourist town, the ability to get a non-fishing job in Newport is difficult. The market is extremely tight, and one person who had tried getting a job in Newport said that many jobs are based more on who you know than what you know. It would be inaccurate to suggest that fishermen could easily find employment in Newport simply because it is such a busy, wealthy, tourist town.

The Rhode Island port agents mentioned that there are more land based fisheries jobs around Point Judith. In Point Judith one could get a job with one of the many large dealers that are established in the town, and there is a major fish processing company in Narragansett. Newport fishermen do not have this option.

6.3.1.2.3.2. Description of the Species Landed and Gear Used in Newport

The total value of landings in Newport for 1992 was $14.5 million. [The top ten species were lobster (44.1%), sea scallop, angler, summer flounder, scup, Loligo squid, American plaice, cod, yellowtail flounder, and witch founder.] Data are confidential for all species except lobster, and thus we do not provide the breakdown by species.

Lobster pots account for almost half of the landings in Newport...A third of Newport landings are associated with otter trawls. The dragger fishery concentrates primarily on northeastern groundfish, as well as Loligo squid. Scup, butterfish, Atlantic mackerel, black sea bass, and weakfish are minor components of this fishery.

The monkfishery in Newport is gaining steam. In 1992, the fishermen did not have to bother removing monkfish tails, which used to be a standard way to prepare the fish. With this savings

of time, and an increasing market, fishermen had a great winter of monkfishing, said the Newport port agent.

In the summertime there is a scup pot fishery in Newport. The scup fishery has been good enough that draggers have taken off summers to set pots for scup. But scup landings are declining and the future of the fishery is in question, said the Newport port agent. The scup pot fishery is a state water fishery, and the decline in the fishery is enough for the state to consider limiting effort in the fishery. The scup are mostly landed by floating traps, followed by otter trawls.

Newport's port agent says that weakfish landings in Newport are very small. Trappers catch the majority of weakfish, but large amounts are also landed by draggers and gill-netters. The trap fishermen are catching them in the summer.

Dogfish are popular among gill-netters, and once in a while draggers will bring in dogfish. The fishermen do not make money by landing dogfish unless they can bring in a good catch everyday. Sometimes draggers will make a tow for dogfish on their way into port because they can land the fish and get them in before they turn, said one port agent.

Newport's small gill-net fishery (0.9% of the total landed value) relies heavily on anglers, as well as its traditional cod, tautog, and bluefish catches. Newport's gill-netters also land the majority of spiny dogfish. They also land large amounts of weakfish and small amounts of loligo squid.

The gill-netters can afford to target blues because they only go out for a few hours and within twenty miles of the shore. Due to their short trips and inshore activity, gill-netters' expenses are much less than the draggers. Accordingly, gill-netters can afford the time and money to target bluefish while draggers can not.

The sea scallop fishery (12 % of landed value) has a significant by-catch of anglers as well. In fact, most anglers are landed by scallop dredgers and draggers, with some landed by gill-netters as well. Small amounts of black sea bass, scup, and summer flounder are also by-catches of the scallop fishery.

Draggers catch most of the summer flounder, but small portions of summer flounder are caught with floating traps and by scallop dredgers. Newport draggers also account for significant butterfish landings.

6.3.1.2.4. Chatham[29]:

Chatham is a seasonal resort community. It is a wealthy community and property values are very high. Sportfishing and commercial fishing are important to the community. However they do not seem to be the mainstays of the community's economy. Land for boatyards and marinas is scarce for instance, because the land is used for residential homes and areas.

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[29] This port profile is excerpted in its entirety from McCay, Blinkoff, Blinkoff & Bart (1993). Any inadvertent changes in tone or intent due to deleted sections are the responsibility of the authors of this document, not Dr. McCay et al.

The town's population increases four to five times during the summer. Chatham has within it a number of ponds so there is quite a bit of waterfront property. On a typical fall morning, ten or more small boats will be in one of these ponds with someone clam raking. Many sail boats and pleasure boats are anchored or docked in these ponds as well.

6.3.1.2.4.1. Chatham's Fisheries

Chatham's fishing community is divided between two ports, Chatham Harbor on the east coast of the town, and Stage Harbor on the south side of town. The Chatham Wharfinger estimates that 90% of the fleet resides in Chatham Harbor. Sixty-five vessels have docking permits in Chatham Harbor, and forty-five or so fish year round, he said. The Chatham Harbor fleet is made up of gill-netters, draggers, tub trawlers (longliners), a Scottish seiner, and lobster boats. Groundfishing is the mainstay of this fleet...

Chatham Harbor has a fifty foot limit on boats. Due to the small boat size, most vessels make day trips or take a short trip between two or three days. The Chatham Wharfinger mentioned that the boats have to go further and further offshore to the grounds and therefore even the smaller boats are making overnight trips. The boats in Chatham are owner and family operated.

The crew sizes vary depending on the gear. Gill-netting boats and draggers carry a three person crew, and tub trawlers carry a one or two person crew. Most boats work on the share system, but some may pay crew members by the trip. Stage Harbor does not have the 50' boat limit, and during the summer 60 - 70 foot boats dock in this harbor.

The total landed value of fish in Chatham in 1992 was around $11 million. Groundfish and shellfish --bay scallops, quahogs, and mussels-- comprise the majority of the landed value for Chatham, accounting for over 80% of the landed value...

6.3.1.2.4.2. Dock Space

Chatham has a town dock called "The Fish Pier." Boats using the pier tie up to moorings out in the water. Fishermen must have a permit to unload their fish at the town docks and they pay for the permit by paying a fee per pound of fish landed.

The town has made the fish pier a tourist attraction. The tourists can come to the pier and buy fresh fish on the spot. In this way the town fosters a working relationship between the fishing industry and the tourist industry. The tourists know they will get fresh fish at the pier.

Commercial fishermen are beginning to have a problem with recreational fishermen. Mooring spaces are in short supply. However, this problem is not serious yet.

Not all fishermen use the town dock, some dock their boats in water near their homes for instance. One informant bought a place 25-30 years ago. Fishermen have also used boatyards in the area to work on their boats, but the last boatyard with a railway to haul out boats is to be sold off soon. After this yard is gone, the fishermen will have to hire someone to come in and haul out their boats.

Chatham Harbor is not a deep water port; therefore all the boats are under 50 foot. Half the fleet longlines for codfish. Chatham has 50 or so boats that go year round. The draggers are relatively

new to this area, coming in within the last 15 to 20 years.

One informant interviewed for this study has a small inshore dragger. He said that there is not enough squid to target because the fishing boats of the mid-Atlantic states place tremendous pressure on the stocks. The whiting is gone too, he said. He recalls that some used to say that the fishermen would start targeting skates but he says there are no skates inshore anymore either. There are still skates on Georges Banks, however, he remarked.

One fishery he feels that has saved some Cape Cod fishermen is a new dogfish fishery. One informant said that the fishery may be in trouble because the boats are targeting pregnant females.

6.3.1.2.4.3. Scottish Seines

One man fishes a Scottish seine out of Chatham. He is catching whiting and flounder, with a boat just under fifty feet. This is a new fishery to the area. Currently only one boat is doing this in town.

6.3.1.2.4.4. Markets

In the 1940's and 1950's there was one fish buyer who owned all the boats in Chatham and he was the only fish dealer in town. Other buyers came in and made fishermen independent. Before that fishermen relied on this one owner for loans.

New technology has improved business for Chatham fishermen. One fisherman said the cellular phone has saved him at least $2000 per year because he can call to get a buyer as soon as he finds out a boat is coming in. The quality of the seafood they catch has also improved due to plastic liners and refrigeration or ice, including the addition of RSW's or refrigerated seawater systems on the boats...

Most of the fishermen in Chatham are independent, but they have people they sell fish to year after year. However, they are not legally obligated to sell to one buyer. If they do not like the price they are offered they go elsewhere.

6.3.1.2.4.5. Social Nature of the Fishery

All the boats in Chatham are owner operated. Kinship used to be a very important factor in the fishing communities and people here had the traditional New England reserve towards newcomers. However one informant thinks that this does not exist very much anymore in Chatham. Now only twenty percent of the fishermen were actually born in Chatham. Everything has changed since one informant moved to Chatham in 1960. "This [building that we were sitting in]," he said, "is the last fishing shanty in town. In the old days fishermen had more time to sit around and talk and drink but not anymore."

6.3.1.2.4.6. Age, Ethnicity, and Gender

One informant is second generation Portuguese. Other people have ties with Nova Scotia. Women have fished on boats and in fact one woman is a partner in a trap company and plans to run her own boat in the future..."

6.3.2. Impacts of the proposed regulations

Fishermen either operate in specialized fisheries seeking particular species using specialist gear, or they operate in a multispecies generalized fishing mode. The first group of fishermen typically operate from larger fishing centers, such as Gloucester or New Bedford, on larger vessels which range widely seeking target species. The second group of fishermen fish closer to home ports such as Chatham and Newport, on smaller vessels harvesting fish as seasons and opportunities offer. Haddock are a relatively small part of all trips of which they form part of the catch (Table 26). Further, the data in the paragraphs above suggest that haddock catches are a relatively minor portion of earnings for most fishermen, although loss of even 5 percent of revenue could place boats and small- or medium-sized vessels at financial risk.

Table 26. Haddock as a Percentage of Total Landings, All Gears, 1992: Percent by Trip Level of Haddock Within Ports

CITY	1-500 lbs	1-750 lbs	1-4,000 lbs
	%	%	%
Gloucester	9	10	24
New Bedford	11	13	38
Boston	12	15	29
Portland	6	7	14
Newport	6	7	16
Chatham	6	N/A	N/A

6.3.2.1. Status Quo

The Status Quo or "No Action" alternative would consist of the current provisions of Amendment 5 to the Multispecies Plan (Amendment 5, SEIS/IRFA; September, 1993): no possession limit, a expansion in size of the Area II closure effective immediately, and an expansion in time of the Area II closure effective in 1996. Thus, the primary difference between the status quo and this Amendment revolves around the question of trip limits. Lack of a possession limit would encourage vessels to remain in areas where a few concentrations of haddock still remain, and would anger the many fishermen who feel the government has been extremely lax in its protection of haddock, and who have protested the re-opening of Area II in June of 1993 and the failure to re-close Area I in March of 1994 -- in both cases because of the danger to spawning aggregations.

6.3.2.2. Expanded Time/Area for Area II, Opening of Area I, and a Pounds Per Trip Possession Limit

6.3.2.2.1. Change in Areas I and II

It is estimated that the extension of Closed Area II in time (January through June) and area, which would occur under all scenarios including the status quo, will likely have a minimal impact on most fishermen's earnings and employment. It will be the larger, specialized vessels from the larger ports most likely to be impacted, but there is insufficient information available on the fishery and fishing practices to provide more than an estimate.

Gloucester fishermen dislike the expanded area more than the expanded time. In previous years, vessels would fish along the edge of Area II, picking up stragglers. The expanded area eliminates that possibility, in part because the edge is now in deeper waters than previously. With this area off limits, some large vessels are fishing further inshore and competing with the smaller boat fleet. This has caused some tensions on the docks.

Chatham fishermen are neutral with regard to the Area II expansion, and believe that Area I should be closed as well - to protect the small spawning accumulations. Similarly, Boston fishermen say that the expanded size of Area II hurts only the poachers, and that Area I should remain closed because of small spawning aggregations. Further, they approve of the extension in time of Area II, to protect the spawning population. A compromise position calls for a return to the old Area II borders, but coupled with either a permanent closure of this restricted Area II or an opening triggered only by a survey showing that the spawning aggregations had definitely dispersed. Portland, because haddock is such a small part of their income, are more worried that expansion of Area II will limit their fishing grounds for cod than they are about haddock. Like Chatham, they are generally in favor of any closures which protect spawning stock and juvenile haddock. It was a Portland vessel which drove the April effort to close Area I due to aggregations of small haddock.

6.3.2.3. Possession Limits

The Areas II time/area closure would be coupled, in all cases but the status quo, with some level of possession limit. Below, four alternative possession limits are examined: 0 lbs, 500 lbs, 750 lbs, and 4,000 lbs.

None of the possession limits will greatly impact processing or wholesaling employment in the principal ports and processing centers. For instance, a 500 lb cap will yield landings of some 1,100 metric tons/annum of haddock if all 465 vessels which landed in 1992 continue landings. The impacts of this drop would be greatest in Boston and Gloucester, but few jobs are likely to be at risk since the proportion of haddock landings to other landings is already small, and since substitutes (other species) and complements (imported haddock) are available.

6.3.2.3.1. Zero Possession Limit:

Given the fact that cod and pollock are still mainstays of much of the otter trawl fleet, and that haddock, cod, and pollock are found in conjunction, a 0 lbs possession limit would inevitably lead

to discards. Initial landings data for January, February and March of 1994, for instance, show a monthly average of 54 trips of 1-500 lbs in New Bedford, of 20 trips in Gloucester (with only 80% of data available), of 21 trips in Boston, and of at least 8 trips in Portland (only Georges Bank data available). To achieve a 0 lbs possession limit, fishermen would have to stay out of groundfishing altogether or to consistently discard haddock. Either of these scenarios would lead to considerable ill will against the government. The former would also have strong economic and social dislocation effects. The latter would also lack conservation value.

6.3.2.3.2. 500 Lb. Possession Limit:

The average haddock catch from Georges Bank in 1992 of 522 lbs/trip is marginally more than the trip limits proposed in this amendment. Further, the average haddock catch from all areas combined was 462 lbs/trip. Thus a 500 lb/trip cap proposed is not seen as having a significant impact on earnings and employment for the majority of fishermen and vessels, although the 26 vessels (estimated employment of 130-150 fishermen) whose vessel revenues from haddock caught on Georges Bank exceeded 10 percent in 1992 would be significantly impacted.

Reactions of fishermen to this limit vary by port, according to NMFS port agents. In Gloucester, a 500 lb limit seen as only contributing to discards, because vessels which find cod and haddock together will often stay for the cod even if it means throwing haddock overboard. Boston fishermen, on the other hand, say that with a 500 lb limit they will move away from an area if they begin catching larger amounts of haddock, but would stay on the grounds if a larger limit were granted. New Bedford fishermen feel haddock are so scarce that these regulations are very far down on their list of worries. They would, however, like to preserve the right to take large tows when they are found. Portland fishermen have similar sentiments. Chatham fishermen believe that 500 lbs should be the maximum possession limit; given that no trips from Chatham in 1992 exceeded 500 lbs, this is an easy position for them to take. Newport fishermen are concerned that a 500 lb limit will encourage high grading.

It is interesting that Boston and New Bedford, for whom the 500 lb limit would encompass a smaller percentage of trips than Gloucester, are in favor or generally indifferent to this level. (See Table 27 below.) This is probably related to Gloucester's stronger history of fishing on Georges Bank, and the fact that it is the Georges Bank vessels which will receive the strongest economic impacts. It may also indicate a stronger cultural or social attachment to the haddock fishery or that fishing ground. "Murawski indicates that certain areas of Georges Bank off the northern New England coast continue to be fished -- especially by Gloucester fishermen -- even though other areas are currently more productive (S. Murawski, NMFS F/NEC pers. com.). Historical data (Goode & Collins, 1887) and port agents in Gloucester confirm that Georges is a favorite fishing area for Gloucester boats. In addition, Miller & Van Maanen (1981:36) note: "Many of the Gloucester boats have fished the same grounds for years and their charts reflect this fact for they are full of markings indicating safe lanes and alleys." [Finally,] Weighout summary trip files show that percentage of trips to the NOAA/NMFS/NEFSC statistical areas encompassing Georges Bank by vessels by principal port for Gloucester show a significant rise in trips to Georges Bank statistical areas between 1972 and 1982, but no significant (at α=0.05) movement between 1982 and 1992 -- when stocks were dropping (Table 27). [This is not to say, however, that tradition is

followed blindly.] With respect to draggers, Gloucester port agents add that, despite favoring Georges Bank, the lower concentrations of fish there in the past 12-15 years have meant that Gloucester boats today are also found frequently on Jeffreys Ledge and Stellwagen Bank." (Clay 1993:3)

TABLE 27. Percentage of trips to Georges Bank, 1972, 1982, and 1992

GLOUCESTER	1972	1982	1992
Georges Bank Trips	23	88	73
Total Trips	71	203	192
Georges Bank/Total	32%	44%	38%

6.3.2.3.3. 750 Lb. Possession Limit:

Because this catch level is above the current average, but not by much, it would have similar constraining power to the 500 lb limit. Most trips would be unaffected, but fishermen would still be unable to take advantage of large "pockets" of haddock. Gloucester fishermen feel the difference between 500 and 750 lbs is insignificant. Perhaps half of the Gloucester fleet would view the small increment as a gesture of goodwill on the part of managers; the other half would see the addition of a few "crumbs" as almost an insult. They would, however, fish up to the 750 lb limit were it approved. Boston fishermen, however, dislike the 750 lb limit. At 500 lbs they will steam away from concentrations of haddock. At 750 lbs there begins to be a temptation to stay. Chatham fishermen are vehemently opposed to any limit over 500 lbs. Newport fishermen like 750 lbs because it would limit high grading; they rarely catch much over 500 lbs per trip, but this would give a cushion.

6.3.2.3.4. 4000 Lb. Possession Limit:

This possession limit would allow fishermen to take advantage of the occasional good catch of haddock. To bring up a tow with 2-4,000 lbs of haddock, and then have to throw the majority overboard is seen as waste. Once the fish are dead, most fishermen believe they should be able to keep them. Throwing dead fish overboard is not conservation. On the other hand, a possession limit this large would encourage fishermen from all ports to stay in areas where concentrations of haddock are found. Thus, fishing mortality is likely to be higher -- even though the average trip would probably be unaffected by this high a limit. Of the ports discussed, only Gloucester strongly favored a possession limit of 2,000 lbs or more. In Gloucester, as can be seen from Tables 28 and 29 below, while 81% of trips brought in 500 lbs or less, 43% of landings came from the 6% of trips that brought in over 4,000 lbs each.

Table 28. Haddock Landings, All Gears, 1992: Percent by Trip Level of Haddock Within Ports					
CITY	1-500 lbs	1-750 lbs	1-4,000 lbs	> 4,000 lbs	ALL
	%	%	%	%	TOT. LBS
Gloucester	7	9	27	43	1860115
New Bedford	9	13	49	51	1260086
Boston	16	24	59	41	647063
Portland	21	26	64	36	525293
Newport	25	27	74	26	58895
Chatham	100	0	0	0	20276

Table 29. Haddock Trips, All Gears, 1992: Percent by Trip Landings Level of Haddock Within Ports					
CITY	1-500 lbs	1-750 lbs	1-4,000 lbs	> 4,000 lbs	ALL
	%	%	%	%	TOT. TRIPS
Gloucester	81	84	94	6	1905
New Bedford	63	69	91	9	1057
Boston	67	77	95	5	746
Portland	85	89	98	2	1296
Newport	90	91	99	1	183
Chatham	100	0	0	0	1925

7. Relationship to Applicable Law

7.1. Environmental Assessment

7.1.1. Analysis of Environmental Impacts

Environmental impacts were estimated according to NOAA Administrative Order 216-6 regarding the determination of environmental significance. The seven criteria in Section 13(b) and evaluation of the proposed action according to these criteria are presented below. Additionally, effects of groundfish fishing activity, or the lack thereof in certain instances are discussed in the final environmental impact statement for Amendment 5 to the Fishery Management Plan for the Northeast Multispecies Fishery:

a. Can the proposed action reasonably be expected to jeopardize the long-term productive capability of any stocks that may be affected by the action?

The proposed actions are intended to reverse the declining stocks of haddock and to provide further protection for cod. Continued declines that could occur under the status quo alternative will jeopardize the available spawning stock reducing the likelihood of rebuilding. The proposed action will not jeopardize the long-term productive capability of the haddock stocks. The proposed action to extend the closed area will benefit those groundfish species taken along with haddock in those areas.

b. Can the proposed action reasonably be expected to allow substantial damage to the ocean and coastal habitats?

None of the alternatives would contribute to ocean or habitat damage. The closure alternative would reduce vessel activity and any potential damage to the northern edge of Georges Bank.

c. Can the proposed action be reasonably expected to have a substantial adverse impact on public health?

None of the alternatives would have any substantial impact, positive or negative, on public health or safety.

d. Can the proposed action reasonably be expected to affect adversely an endangered or threatened species or a marine mammal population?

None of the alternatives are expected to have an impact on endangered or threatened species or on any population of marine mammals.

e. Can the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target resource species or any related stocks that may be affected by the action?

The proposed action is expected to provide short-term protection to the stocks of haddock located off the New England coast. Inaction would allow the further depletion of these historically important resources.

f. Are the environmental impacts of the proposed action controversial?

The depletion of the haddock stocks through overfishing could lead to possible stock or market collapse. The continued overfishing of this historically important species would be considered controversial.

g. Social and economic factors.

There are no significant social and economic consequences of any of the alternatives, including the economic and social impacts described in Chapter 6, that would have a significant impact on the human environment.

7.1.2. Finding of No Significant Impact

In view of the discussion and analysis presented above, it is hereby determined that the proposed action to establish emergency regulations to implement a 500 pound possession limit of haddock for all vessels permitted in the northeast multispecies fishery and fishing in the EEZ, extend the closure of Closed Area II to January through June in 1995, and exclude scallop dredge gear from Closed Area II during closure of the area would not significantly affect the quality of the human environment with specific reference to the criteria contained in NAO 216-6, implementing the National Environmental Policy Act. Accordingly, the preparation of a supplemental environmental impact statement on this proposed action is not necessary.

_____ _____

Assistant Administrator for Fisheries, NOAA — Date

7.2. Regulatory Impact Review

7.2.1. Rationale for the Proposed Action

The proposed actions include imposition of a 500 pound possession limit for all vessels permitted in the northeast multispecies fishery and fishing in the EEZ, an extension of Closed Area II to the period January through June in 1995, and a prohibition on possession of haddock by scallop dredge vessels fishing in the EEZ during the January through June period.

The rationale for the choice of a 500 pound possession limit is that the proportion of trips in which the trip limit constrains landings is probably about 15%; there appears to be a significant level of control over the catch of haddock, and an ability on the part of fishermen to meet, but not exceed small trip limits if fishermen move from areas where haddock are encountered after reaching the trip limit; the foregone catches due to discards from trips exceeding the trip limit is small, particularly given the conservation benefit of preserving the historically low haddock resources; and because of the uncertainty with regard to the effect of trip limits, and in light of

evidence of continued declines in the stocks, a risk averse management strategy is most prudent.

Extension of Closed Area II to the period January through June contributes significantly to haddock savings as does a prohibition on possession of haddock by scallop dredge vessels during the period of the Area II closure.

Although there are some anticipated shortfalls in ex-vessel revenues due to restrictions on haddock possession, extension of the closed area to trawl vessels, and a prohibition on haddock retention by scallop dredge vessels for the period January through June, these losses will be more than offset by future gains in revenue (and presumably profit) should the measures prove effective in enhancing the probability of haddock stock recovery and rebuilding.

None of the possession limits will greatly impact processing or wholesaling employment in the principal ports and processing centers. Few jobs are likely to be at risk since the proportion of haddock landings to other landings is already small, and since substitutes (other species) and complements (imported haddock) are available.

7.2.2. Impact on small businesses

All of the vessels participating in the New England Groundfish Fishery may be considered "small entities". The population of groundfish vessels potentially fishing for haddock is defined as the 1,650 vessels holding otter trawl permits in 1992. As noted in the description of the fishery in (Chapter 4), the analysis of the alternatives (Chapter 5), and the economic and social impacts of the proposed actions (Chapter 6), fewer than 2% of the population of potential haddock fishing vessels depend on haddock for more than 10% of their annual revenues, and fewer than 7% depend on haddock for over 5% of their annual revenues. Since none of the proposed alternatives appear to decrease total revenues for more than 20% of the population of small entities by more than 5%, the alternatives are not considered to have a significant economic impact on a substantial number of small entities.

7.2.3. Regulatory Flexibility Act

The final regulatory flexibility analysis, contained herein, concludes that this rule will not have a significant economic impact on a substantial number of small entities. As a result, a Regulatory Flexibility Analysis was not prepared.

7.2.4. Executive Order 12866 (Cost-Benefit)

Based on the findings of the regulatory impact review, the Assistant Administrator determined that this rule is not a significant regulatory action requiring a regulatory impact analysis under Executive Order 12866.

7.3. Consistency with the National Standards

Section 301(a) of the Magnuson Fisheries Conservation and Management Act requires that any fishery management plan or amendment to that plan be consistent with the following national standards.

1. *Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.*

The suite of proposed measures are designed to prevent continued overfishing of the Gulf of Maine and Georges Bank haddock stocks.

2. *Conservation and management measures shall be based upon the best scientific information available.*

Appendices 1 through 6 contain the bulk of the scientific information available at the time of this Amendment. In addition the NEFMC's SEIS for Amendment 5 to the Northeast Multispecies FMP contains useful information, including data useful for Social Impact Analysis. Last, the NMFS landings databases were examined for information on catch and revenue distributions.

3. *To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.*

The proposed measures are designed to more effectively manage two haddock stocks: the Gulf of Maine resource and Georges Bank resource. Management measures chosen are comprehensive and coordinated.

4. *Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.*

The proposed measures do not discriminate between residents of different states, nor is there any explicit allocation objective in proposing protection measures for two severely depleted stocks.

5. *Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no such measures shall have economic allocation as its sole purpose.*

To the extent possible, the proposed regulations do not promote inefficiency in the utilization of fishery resources nor is economic allocation intended.

6. *Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fisheries resources, and catches.*

To the extent practicable, especially with regard to the choice of a risk-averse management strategy, variations among and contingencies in fisheries have been taken into account.

7. *Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.*

The management measures chosen are those that minimize costs, that is the sum of both the short term costs to the industry due to shortfalls in landings revenue and the long term costs, should inaction, or too limited action, lead to continued declines in resource health and abundance.

7.4. Endangered Species Act (Section 7) Consultation

The Regional Director determined that fishing activities conducted under this rule will not affect endangered or threatened species or critical habitat under the Endangered Species Act.

7.5. Consistency with Coastal Zone Management Act

The NMFS determined that this rule does not affect the coastal zone of any state with an approved coastal management program. This determination was submitted for review by the responsible state agencies under section 307 of the Coastal Zone Management Act. The state agencies agreed with the this determination.

7.6. Paperwork Reduction Act

This rule does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

7.7. Executive Order 12612 (Federalism)

This rule does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 12612.

7.8. Marine Mammal Protection Act

The Regional Director has determined that fishing activities conducted under this rule will have no adverse impact on marine mammals.

8. List of Agencies and Persons Consulted in Formulating the Proposed Action

8.0.1. Federal Agencies:

National Marine Fisheries Service

U.S. Coast Guard

New England Fishery Management Council

8.0.2. State Agencies:

Through participation on the New England Fishery Management Council:

Connecticut Department of Environmental Protection

Maine Department of Marine Resources

Massachusetts Division of Marine Fisheries

New Hampshire Department of Fish and Game

Rhode Island Department of Marine Resources

9. List of Preparers

National Marine Fisheries Service, Northeast Region, Northeast Fisheries Science Center and the Office of Fisheries Conservation and Management, incorporating information provided by the Northeast Fisheries Science Center, NMFS, the Groundfish Plan Development Team, NEFMC, and the New England Fishery Management Council.

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The following documents were prepared for the New England Fishery Management Council's Groundfish Plan Development Team by the Fisheries Analysis Division of NMFS, Northeast Region. These documents were incorporated into the discussion of the proposed action and alternatives.

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Figure 1

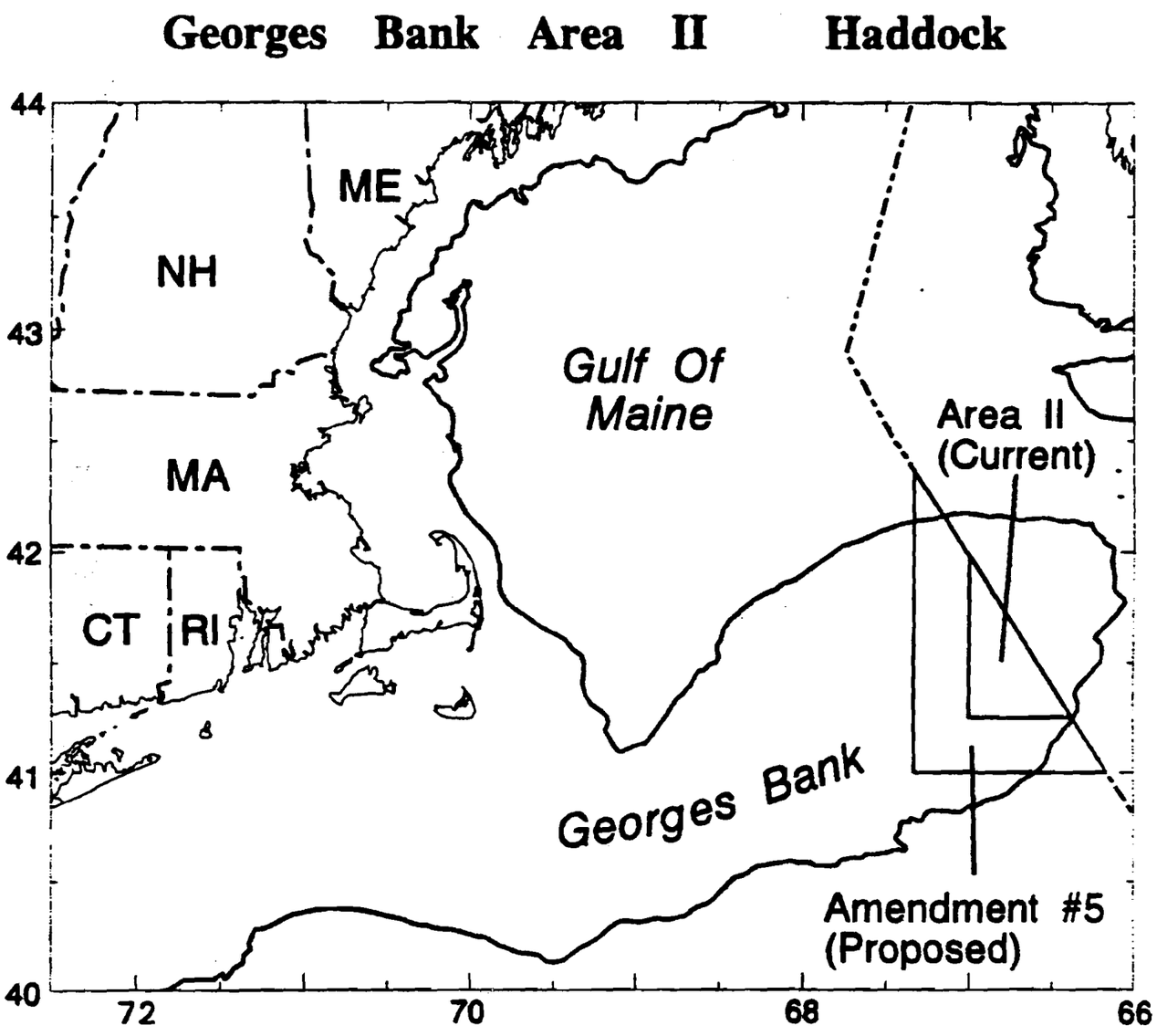

Georges Bank Area II Haddock
44
43
42
41
40
72
70
68
66
ME
NH
MA
CT
RI
Gulf Of Maine
Area II (Current)
Georges Bank
Amendment #5 (Proposed)

Figure 2

GEORGES BANK HADDOCK
SPAWNING BIOMASS & EXPLOITATION

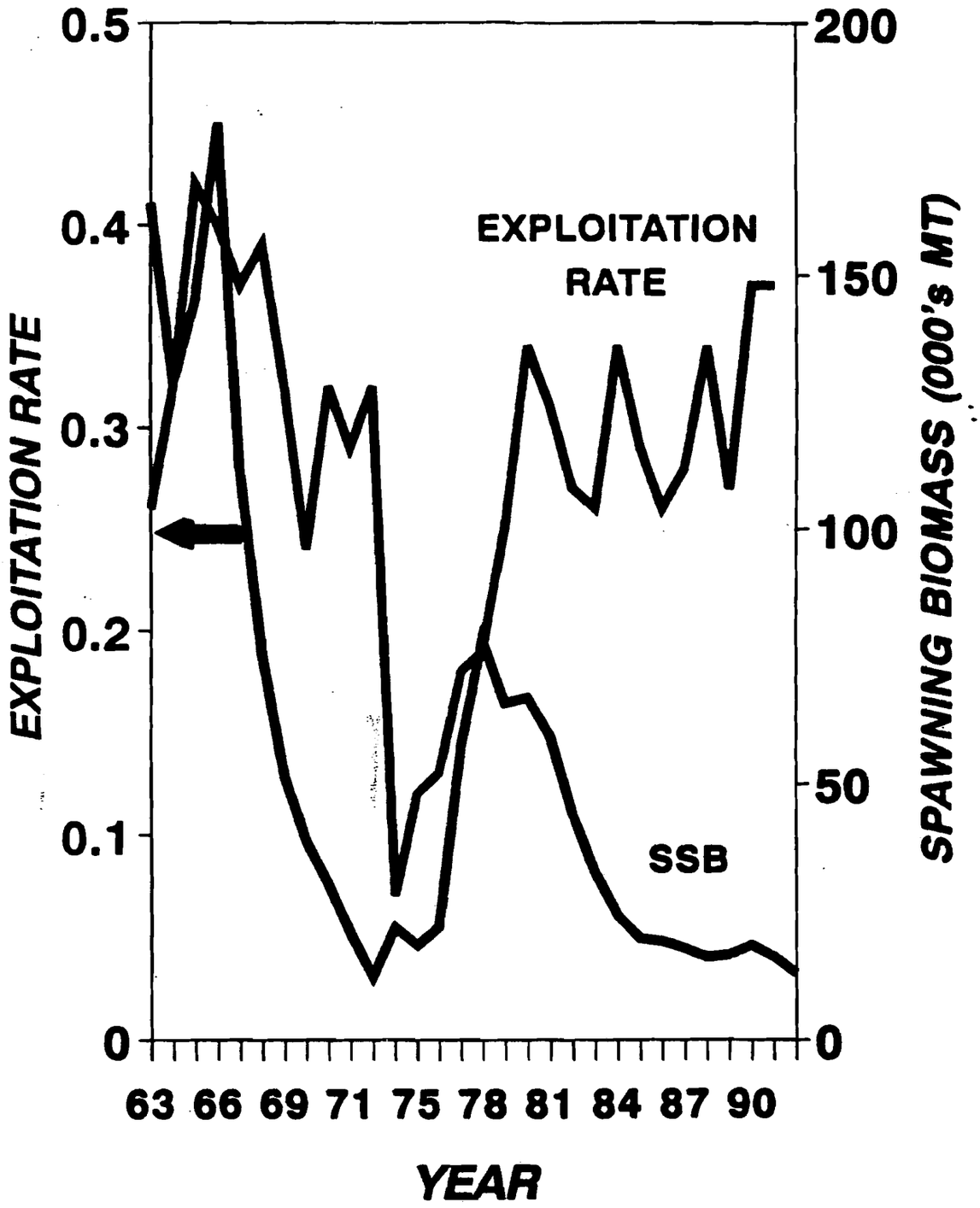


Figure 3

GEORGES BANK HADDOCK

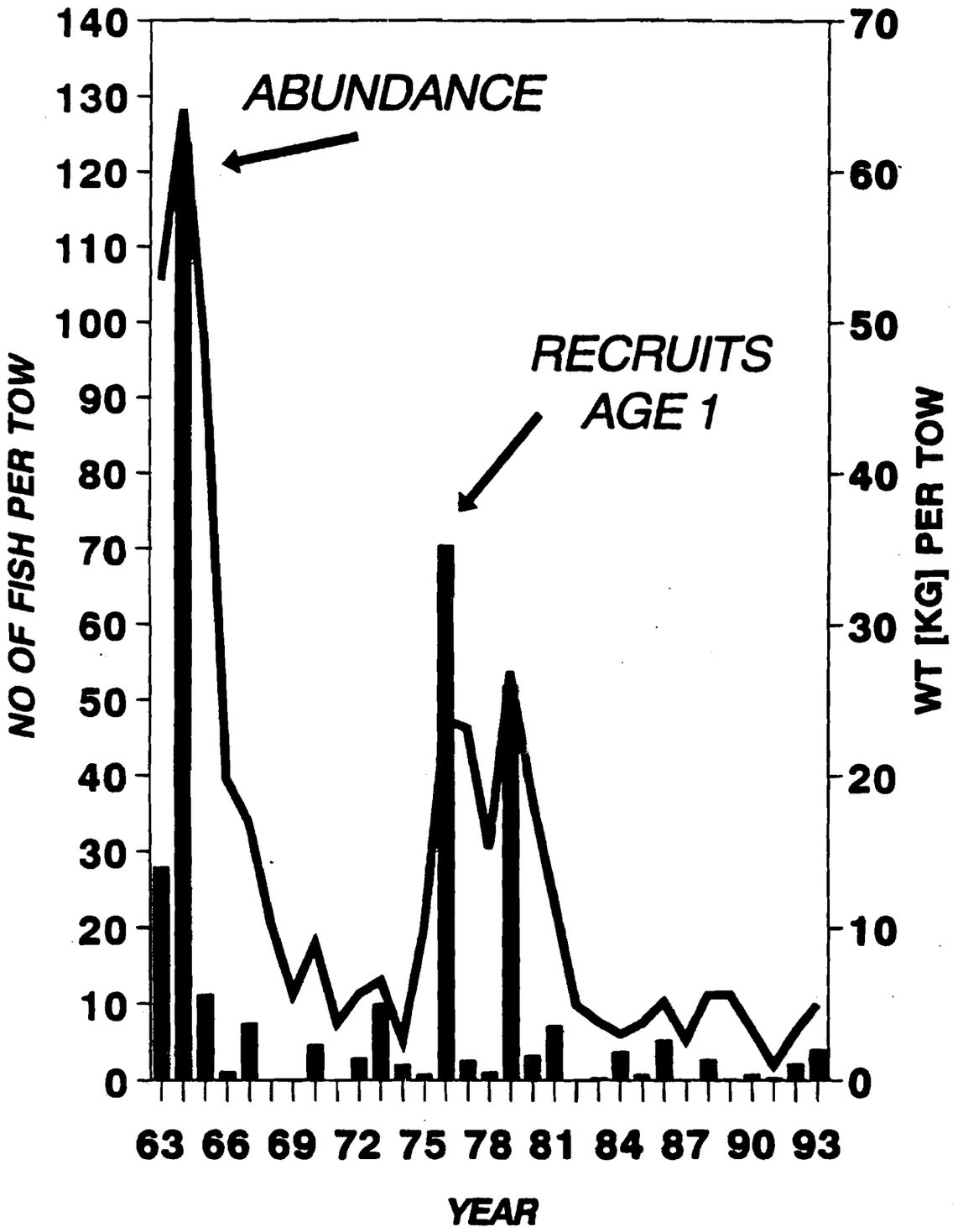


Figure 4

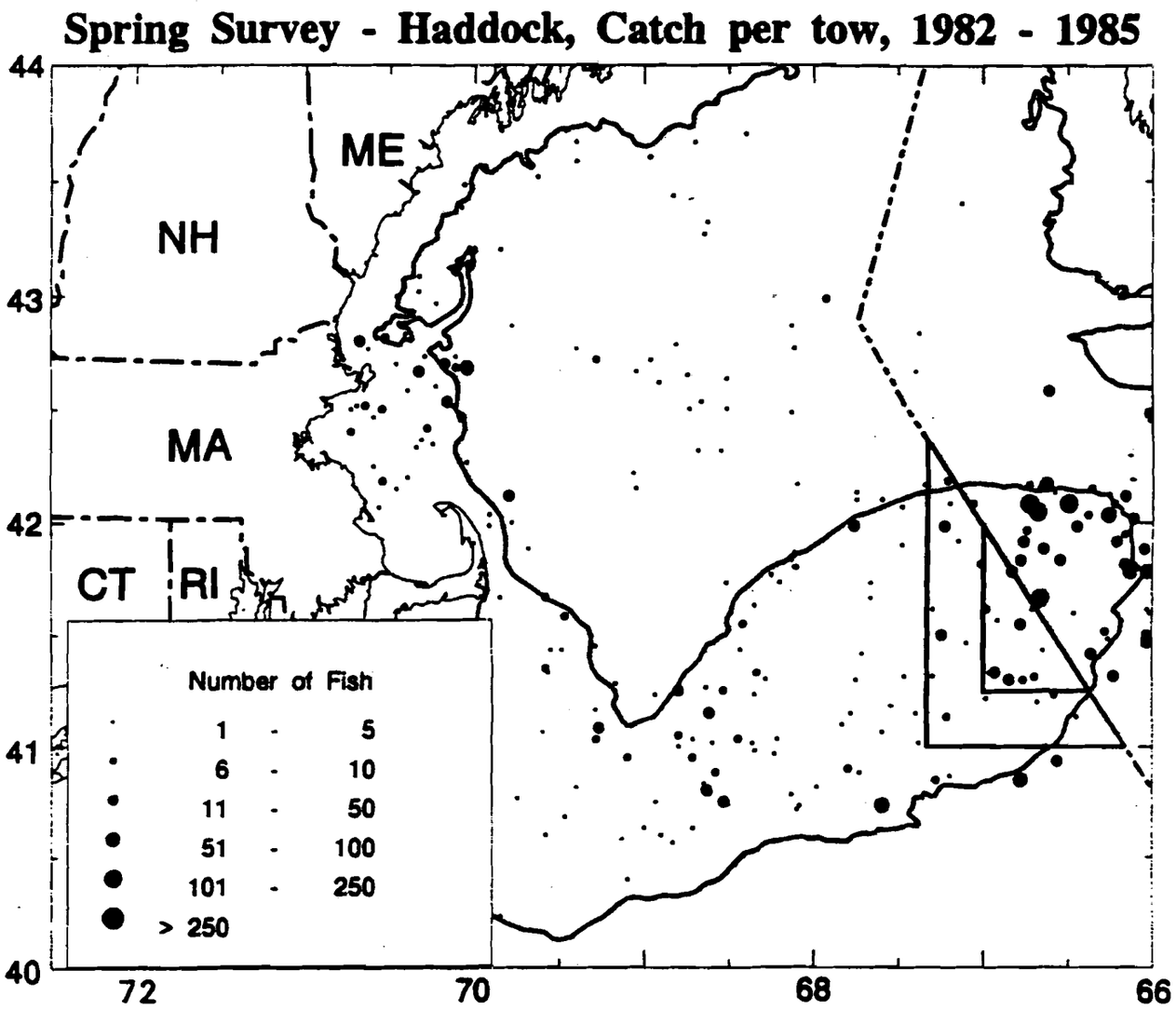

Spring Survey - Haddock, Catch per tow, 1982 - 1985
ME
NH
MA
CT
RI
Number of Fish
1 - 5
6 - 10
11 - 50
51 - 100
101 - 250
> 250
44
43
42
41
40
72
70
68
66

Figure 5

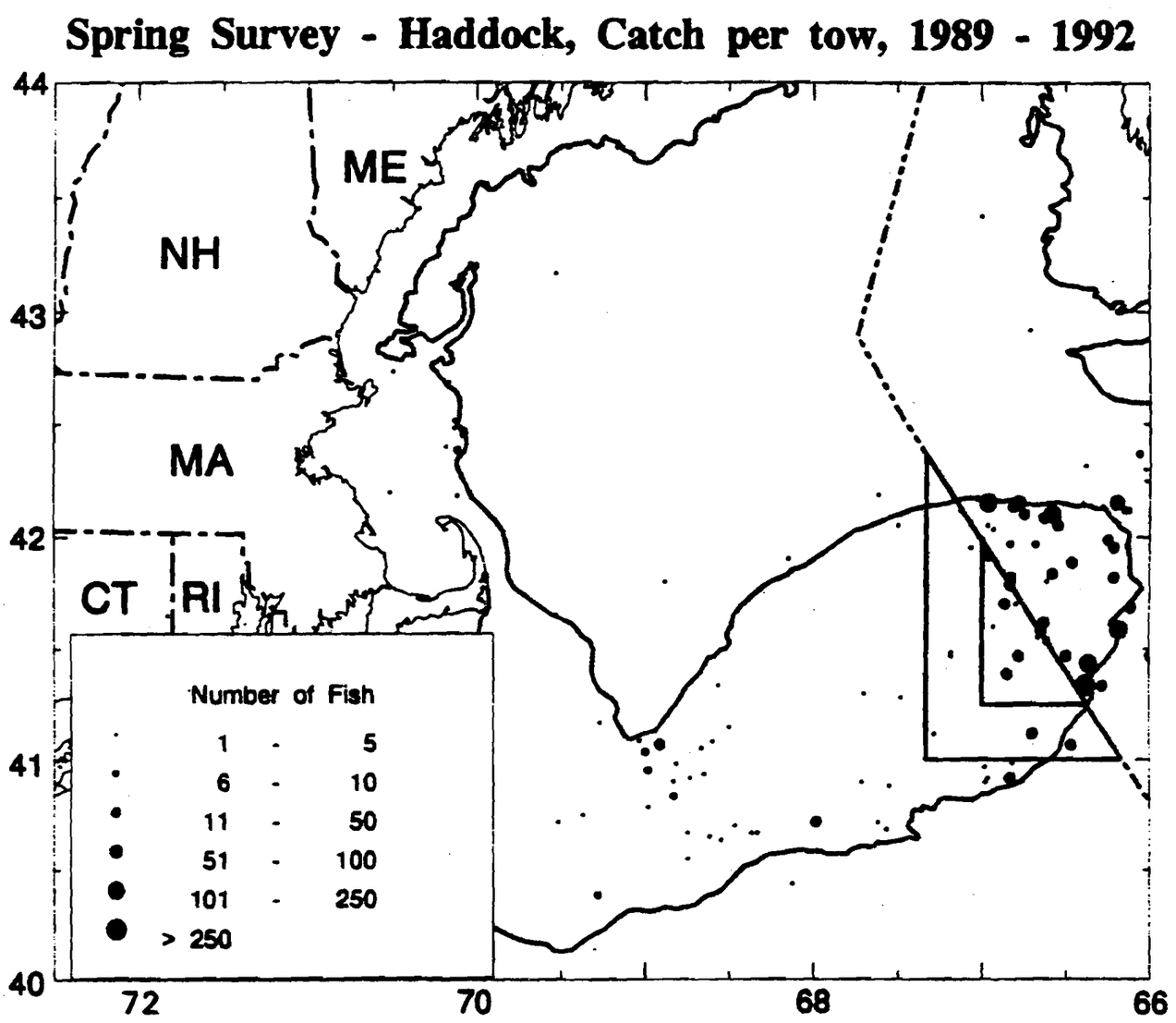
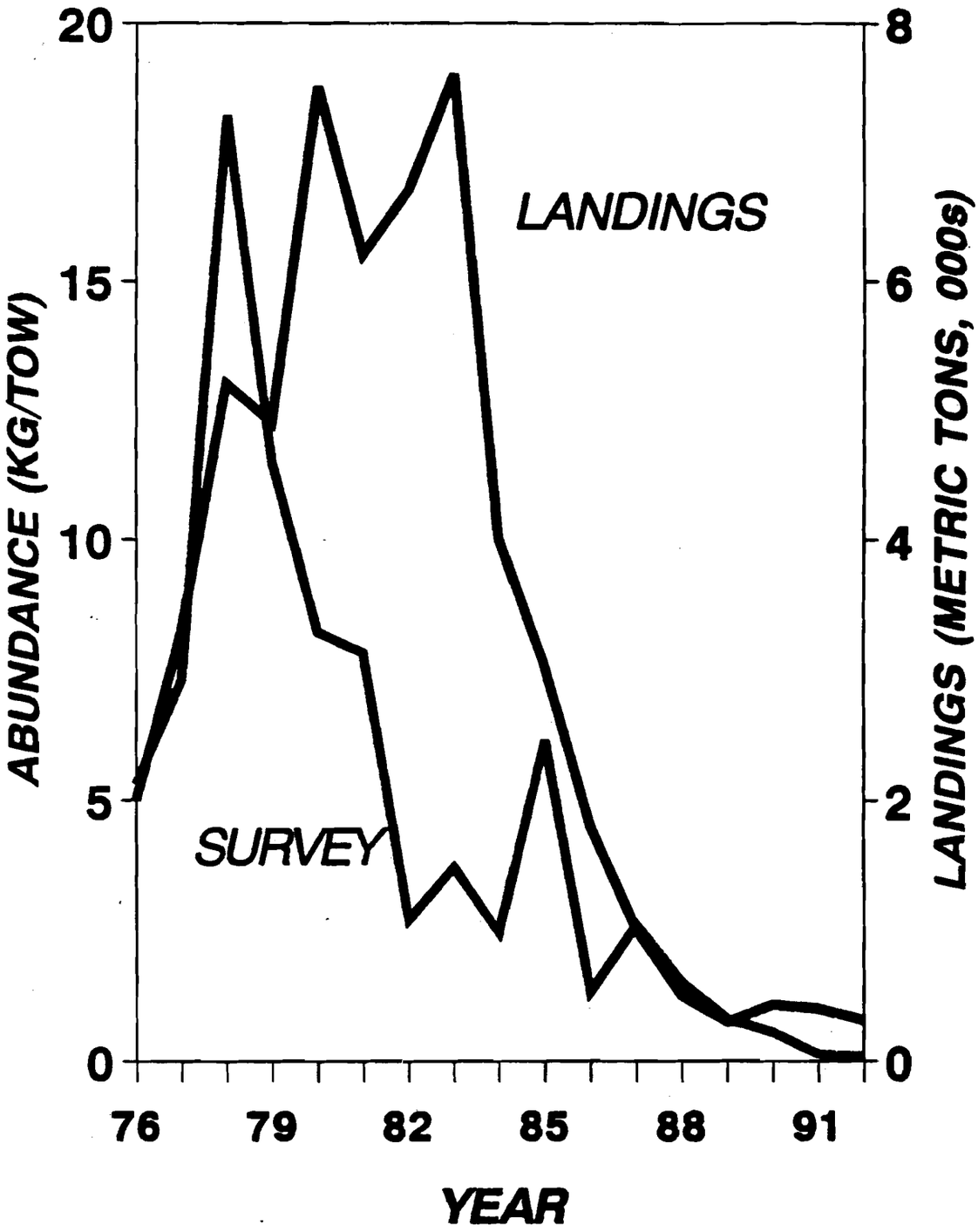

Spring Survey - Haddock, Catch per tow, 1989 - 1992
ME
NH
MA
CT
RI
Number of Fish
1 - 5
6 - 10
11 - 50
51 - 100
101 - 250
> 250
44
43
42
41
40
72
70
68
66

Figure 6

GULF OF MAINE HADDOCK
LANDINGS & SURVEY ABUNDANCE



FALL RESEARCH SURVEY CATCH/TOW
GULF OF MAINE HADDOCK

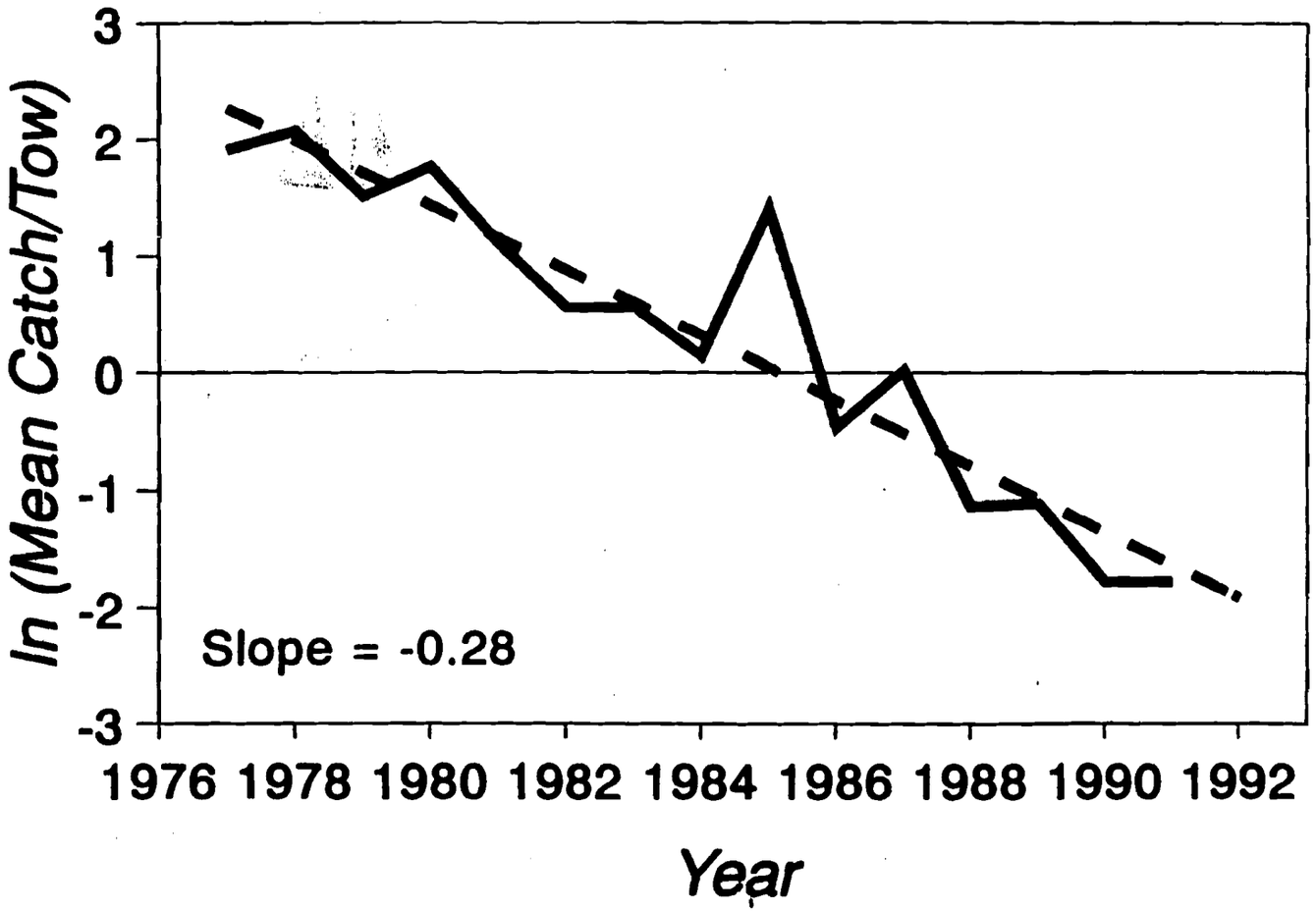
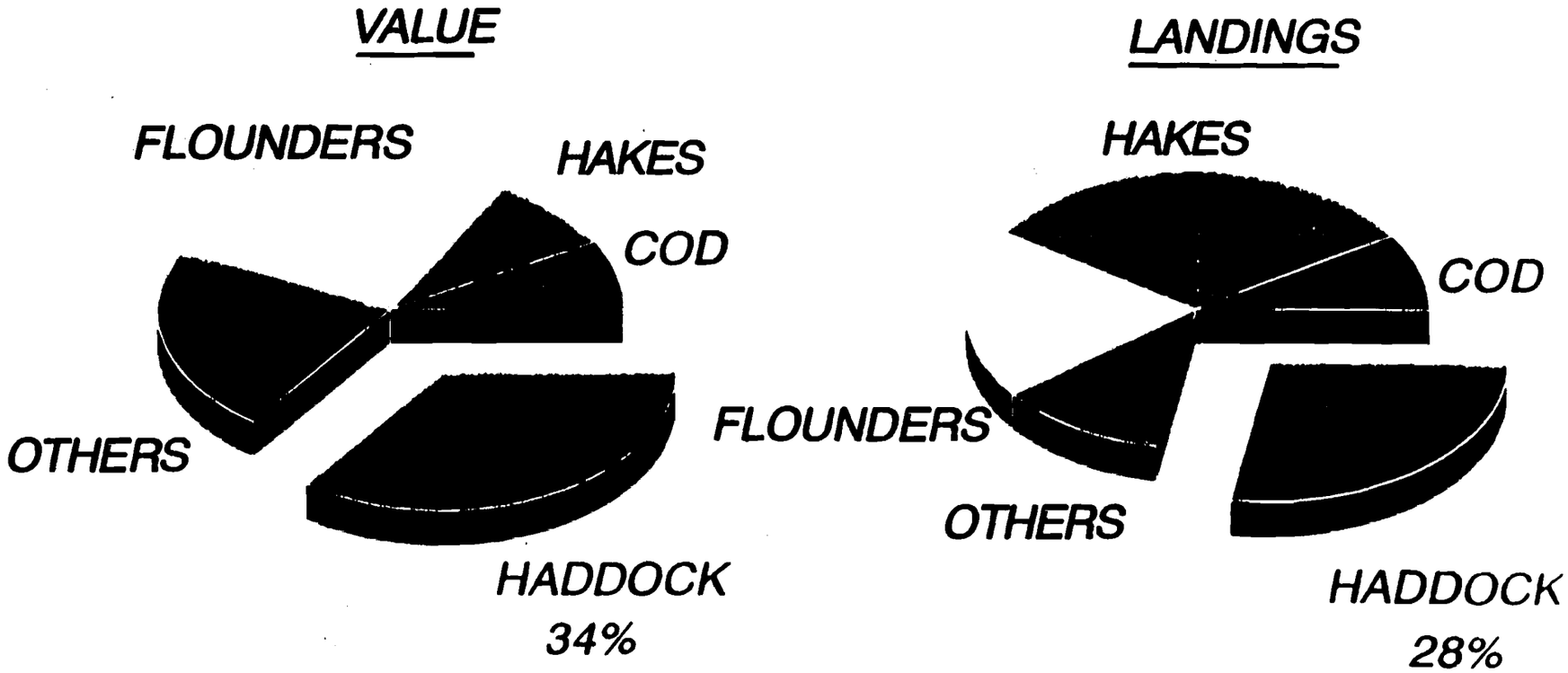


Figure 8

NORTHEAST GROUNDFISH LANDINGS
LANDINGS & VALUE - 1960



NORTHEAST GROUNDFISH LANDINGS
LANDINGS AND VALUE IN 1992

Figure 6

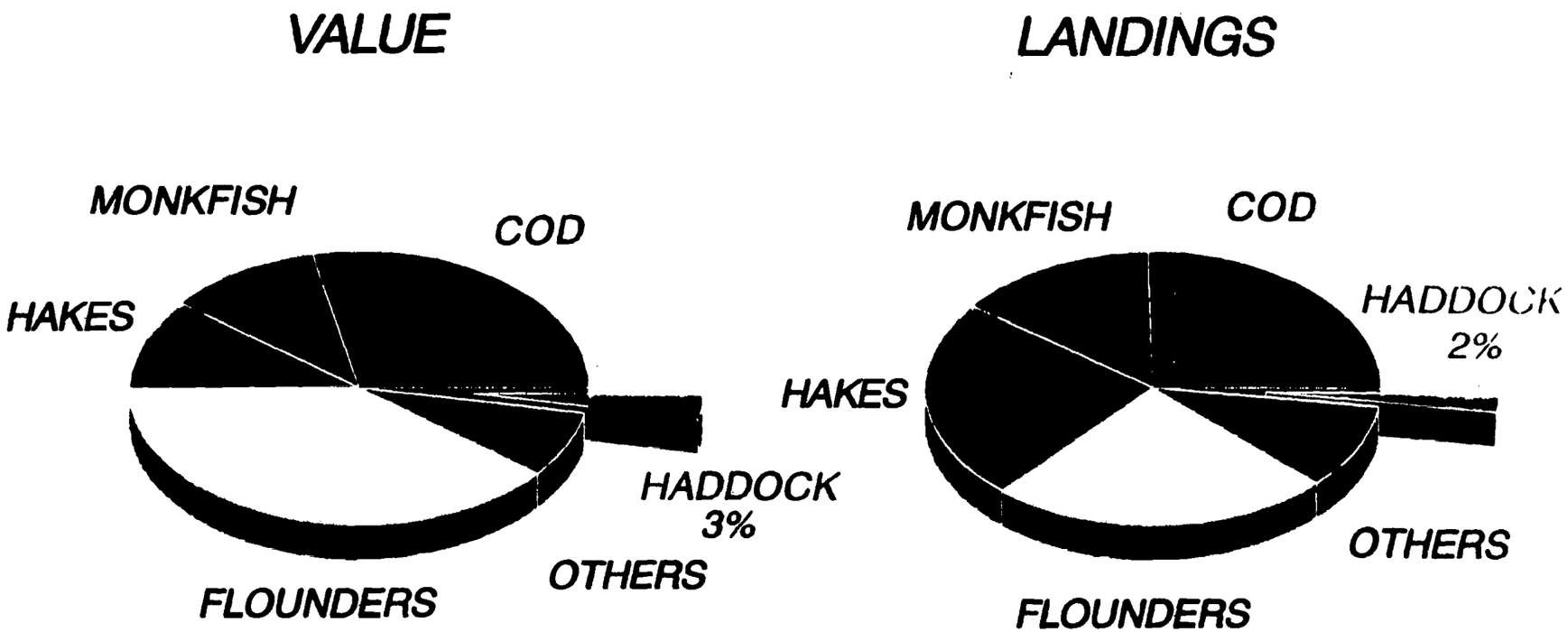
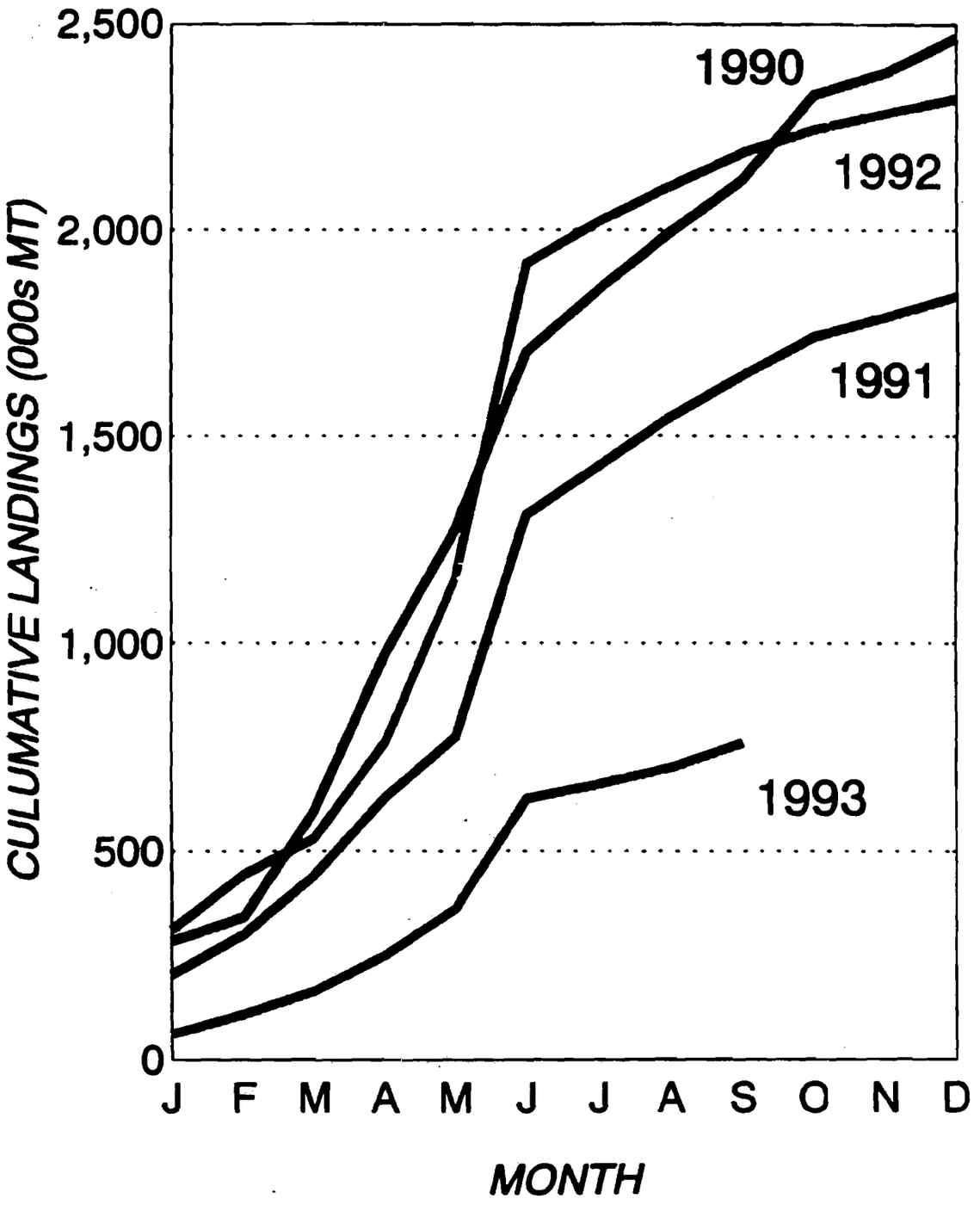
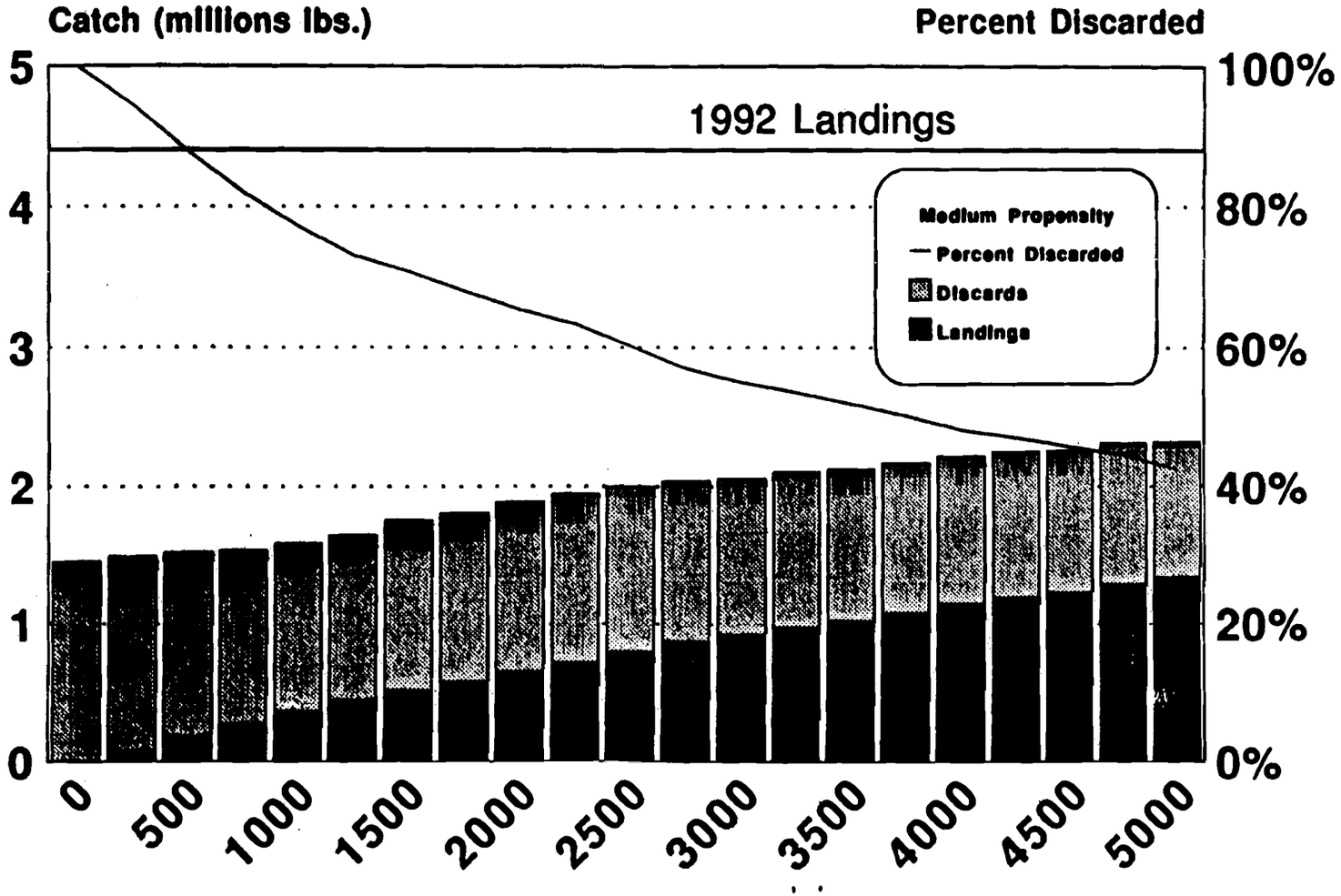


Figure 10

MONTHLY HADDOCK LANDINGS 1990-1993



Estimated Landings and Discards at Various Trip Limits
Georges Bank Haddock



ppensity indicates degree to which
ssels continue fishing as before.

Figure 11

Figure 12

GEORGES BANK HADDOCK
ANNUAL LANDINGS BY VESSEL -'92

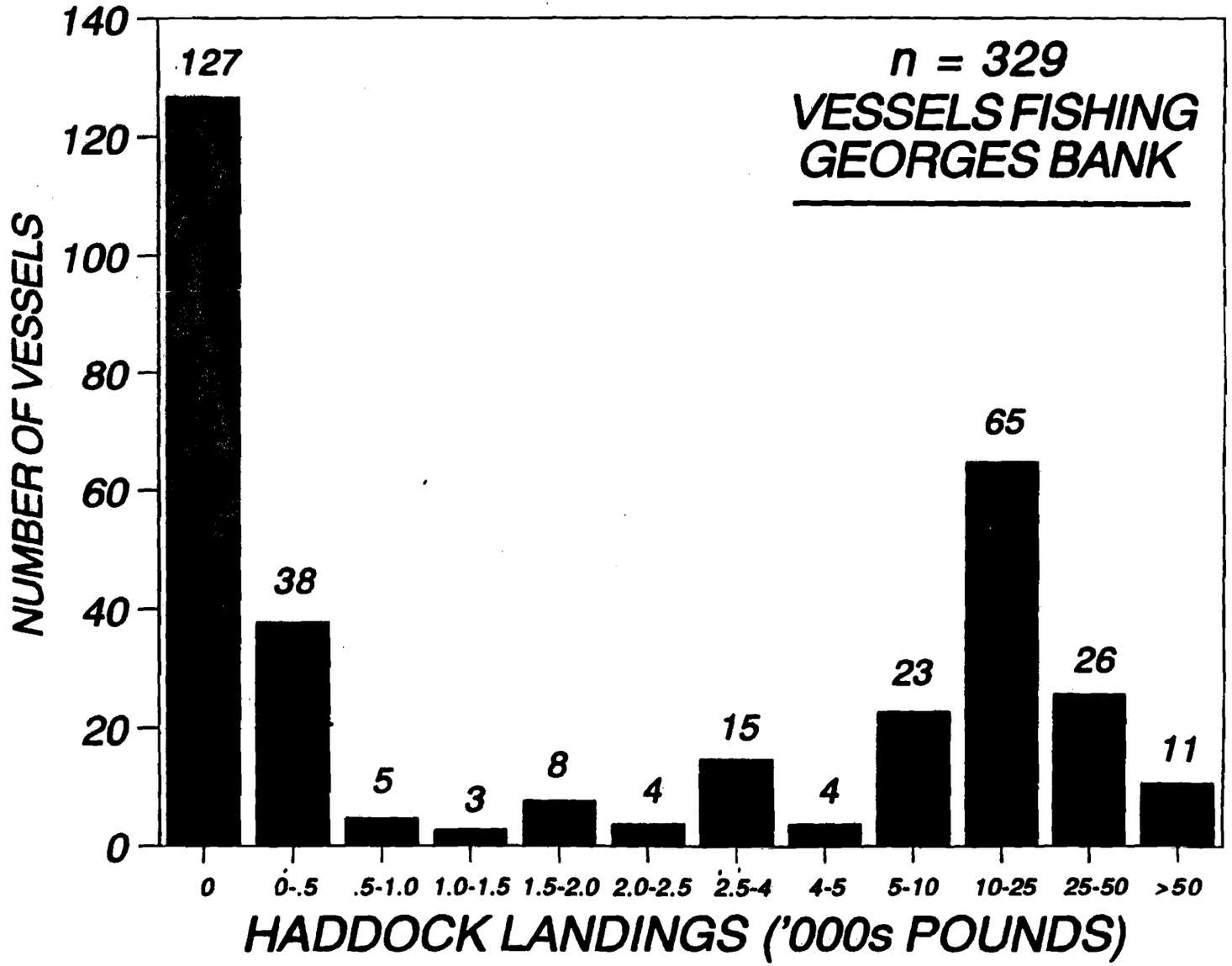


Figure 13

GEORGES BANK HADDOCK LANDINGS BY TRIP -92

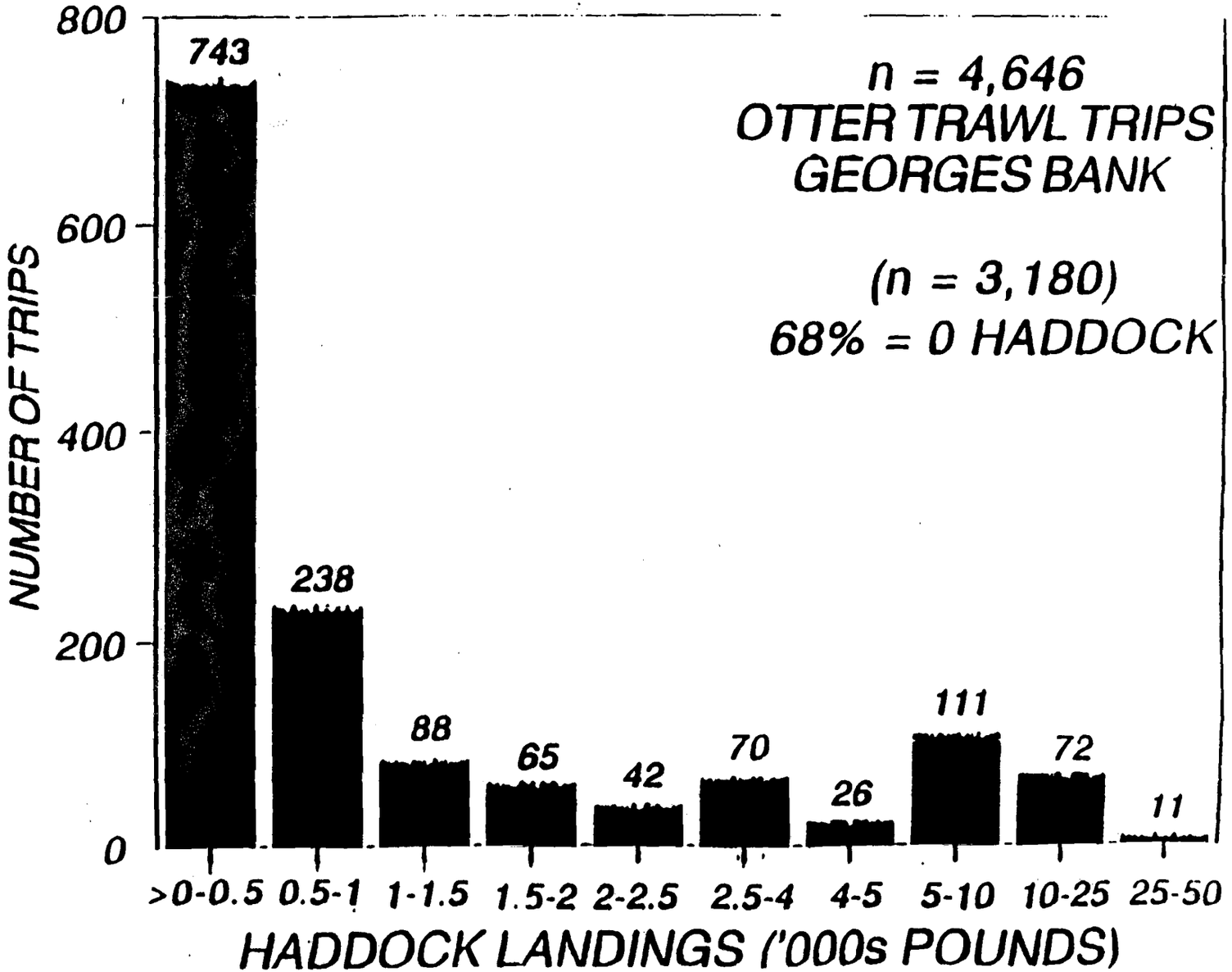


Figure 14

GEORGES BANK HADDOCK LANDINGS BY TRIP - '92

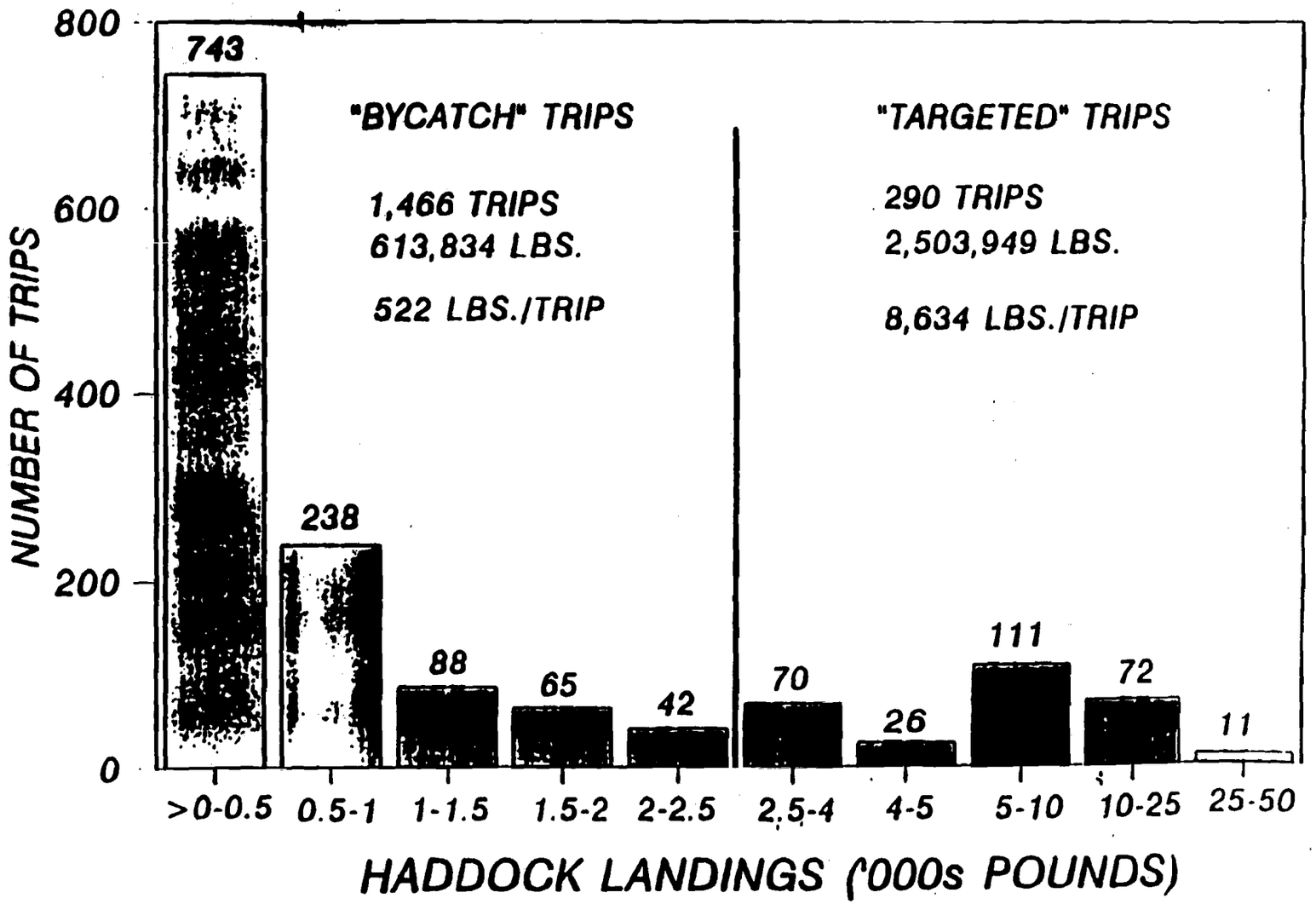


Figure 16

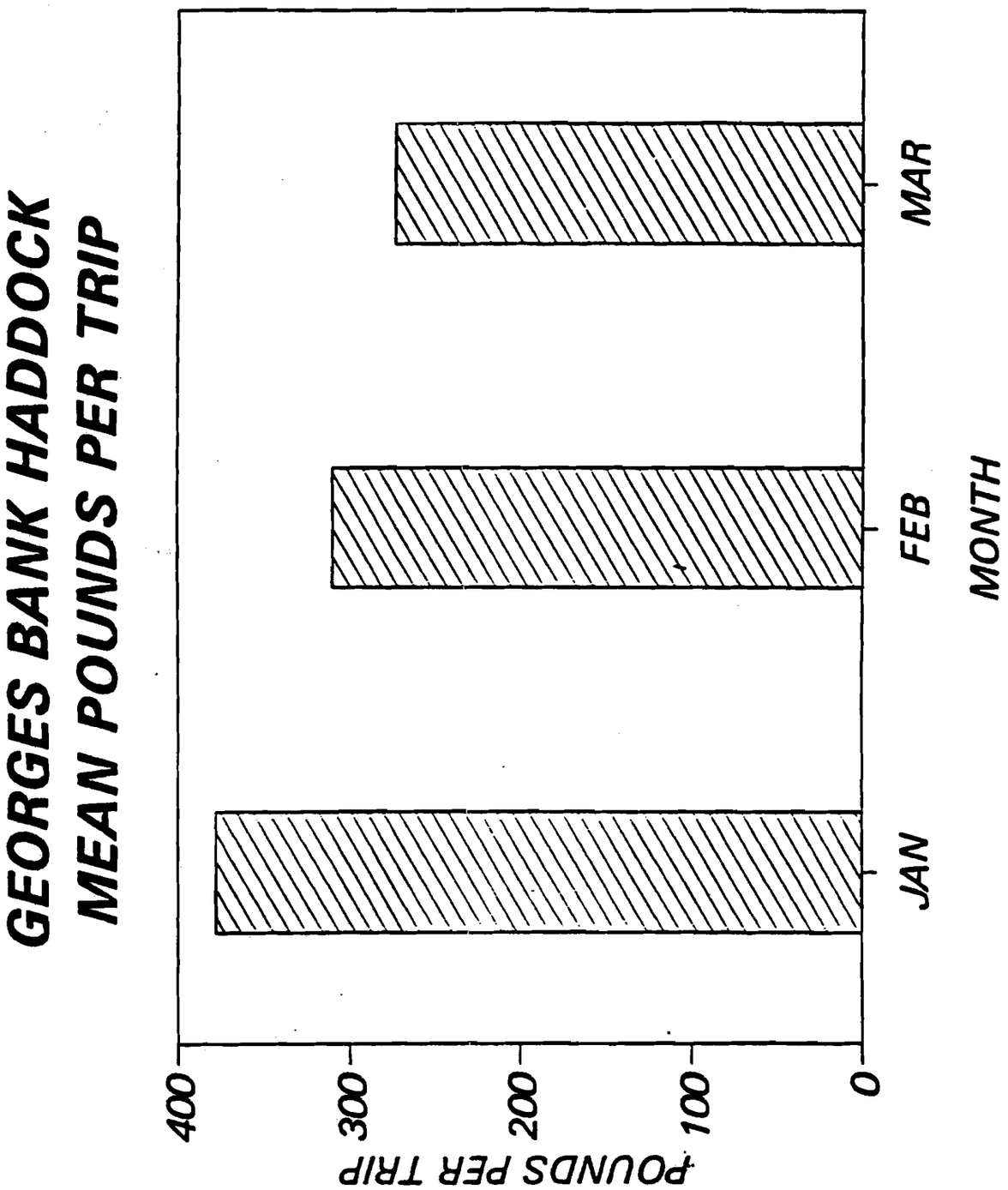


Figure 2

GEORGES BANK HADDOCK LANDINGS BY TRIP - 1994

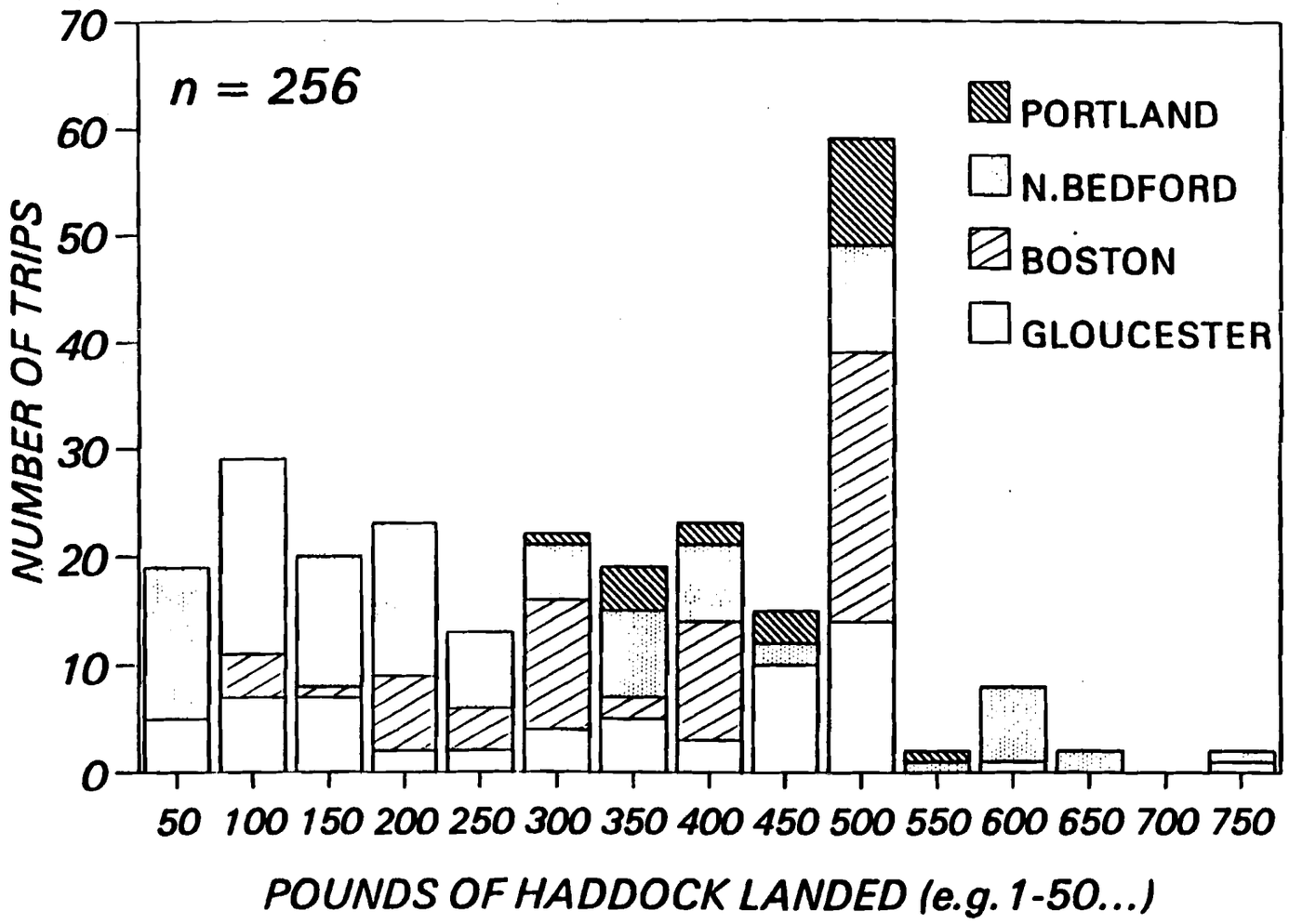


Figure-3

Figure 18

Haddock Sea Sample Tows - 1992

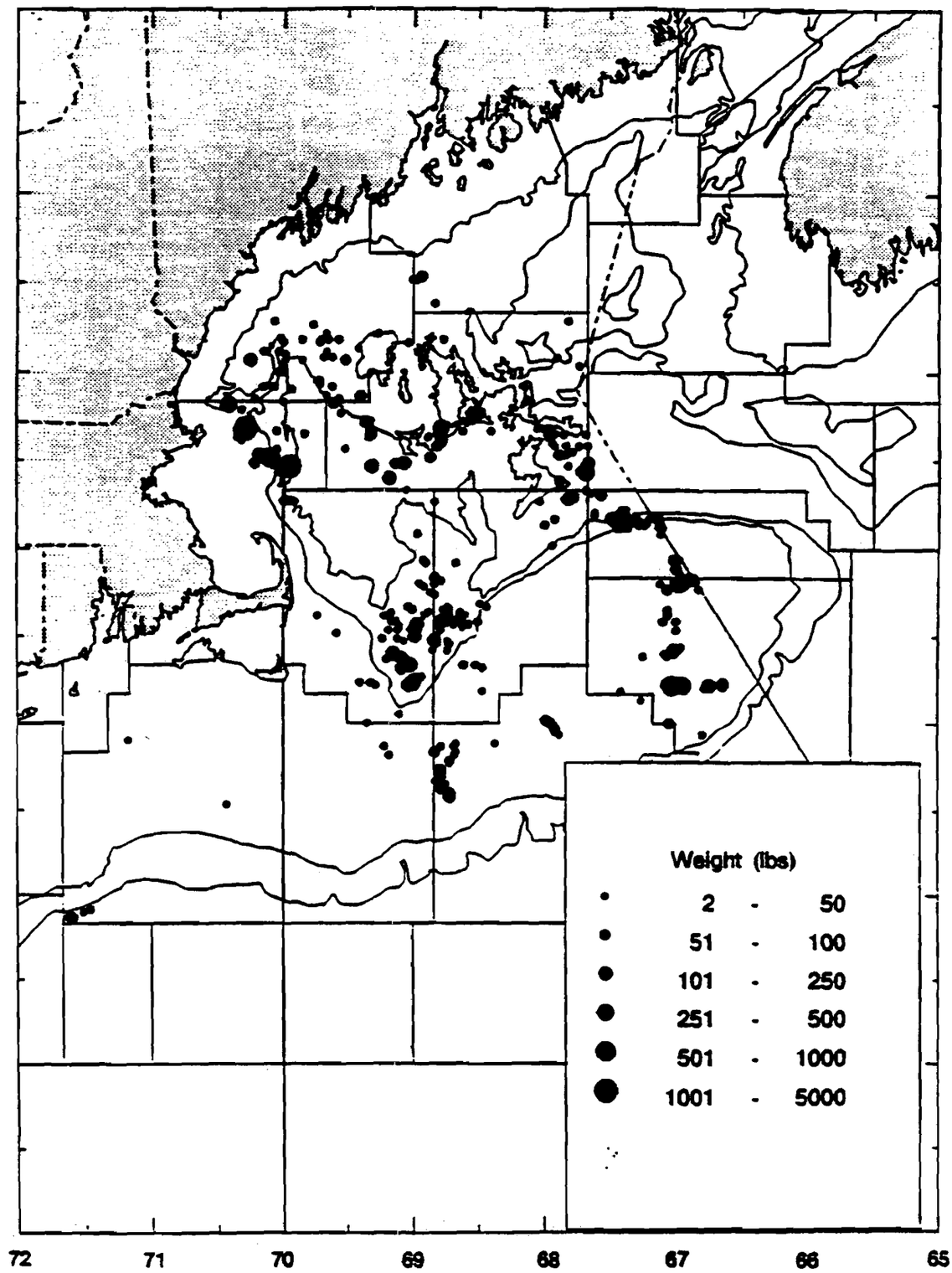
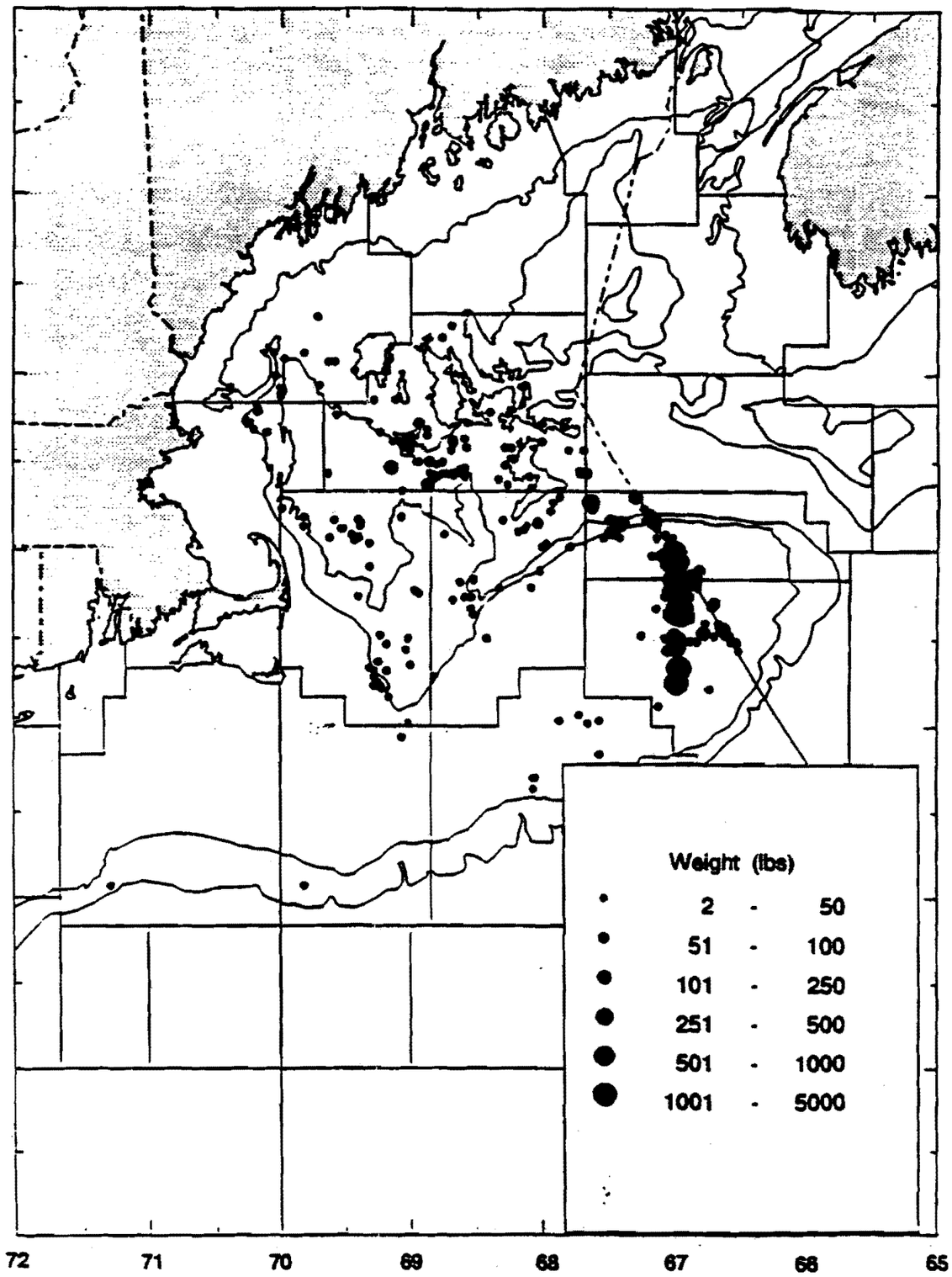


Figure 19

Haddock Sea Sample Tows - 1993



11. Appendices

11.1. Analysis of 5,000 pound limit and 4,000 pound trip limits (NEFSC, 11/5/93)