

**FURTHER CONSIDERATION OF GROUND FISH MINIMUM MESH SIZE.**

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### Introduction.

In ICNAF there is considerable interest in extending mesh regulation where feasible to all species of groundfish in all Subareas. At the present time there are either regulations or Commission recommendations for regulation for 4-1/2 inch minimum mesh size for all species of groundfish in Subareas 1 and 2; for all species of groundfish in Subarea 3 except for redfish in divisions 3N, 3O, and 3P; for cod, haddock, and flounders in Subarea 4; and for cod and haddock in Subarea 5.

The present report discusses the possible effect of extending mesh regulation to species other than cod and haddock in Subarea 5. The relative importance, in terms of pounds landed, of the various species taken in the Subarea is presented in Table 1. It will be noted that industrial species rank high in this list even though the industrial plants were running at a much lower level in 1960 than in previous years. We have no analysis of the species composition of the industrial landings for that year, but the data for 1958, when the plants were running at greater capacity, will serve to indicate the relative importance of the different species in the New England industrial trawl fishery. These are presented in Table 2.

### Sizes of mesh now in use.

The Boston haddock fleet composed of large trawlers regularly uses 4-1/2 inch mesh under the international mesh regulation. Smaller vessels out of Boston and other ports may engage primarily in haddock fishing on some trips and for redfish or whiting or industrial species on other trips. In this case they may register as haddock boats and use 4-1/2 inch mesh for the haddock trips; then cancel their certificates and use smaller mesh nets to engage in other fisheries. In the case of whiting fishing they are likely to catch haddock and cod as well as whiting as these species are frequently found together. Under present regulations a vessel fishing with small mesh may land 5,000 pounds or 10 percent of its trip in cod or haddock or, if it is appropriately registered, land any amount of haddock per trip provided its total landings for the year do not exceed 10 percent haddock and 10 percent cod.

Large mesh is also used on vessels directing their fishing for yellowtail and other flounders, in this case voluntarily. However, here too we have a mixed fish problem. Some vessels engage variously in fishing for yellowtail and for smaller species such as scup, butterfish, and whiting which are used for human food, and for whiting and other smaller species such as red hake which are used for industrial purposes. These vessels usually carry small mesh nets in order to retain these smaller species.

Table 1.--Landings of the more important species of groundfish in United States from Subarea 5 in a typical year (1962).

	<u>000's of pounds (Round, fresh)</u>
Haddock	119,957
Silver Hake	97,448
Yellowtail	56,301
Industrial	53,702
Cod	41,063
Redfish	27,648
Winter Flounder	15,536
Pollock	12,236
Scup	8,659
Red Hake	5,448
White Hake	5,179
American Plaice	4,248
Fluke	3,339
Witch	2,152

Table 2.--Species composition of industrial landings in New England in 1958.

	<u>000's of pounds</u>
Red Hake	62,522
Silver Hake	21,785
Big Skate	8,599
Eel Pout	7,626
Little Skate	7,198
Angler	6,638
Spiny Dogfish	5,813
Long Horn Sculpin	1,838
Sea Robin	1,766
Butter Fish	1,747
Blueback	1,528
Alewife	1,201
Four-Spot Flounder	1,073
Other	7,484
Total	136,819

From Edwards and Lawday, 1960. Special Scientific Report No. 346.

### Extend the 4-1/2 inch mesh regulation?

One may say at the start that extending the 4-1/2 inch mesh regulation to all species of groundfish in Subarea 5 cannot be seriously considered. This size is too large to provide maximum sustained yield for such important species as redfish and whiting, and would seriously reduce the catch. Although it would have little effect on vessels fishing specifically for yellow-tail flounder, it could not be applied to the yellowtail flounder fishery without causing serious complications with vessels that fish variously for yellowtail and other species, a problem already encountered in the haddock regulation.

### Apply a smaller minimum mesh size?

Although extension of the 4-1/2 inch minimum mesh regulation to other species cannot be considered for Subarea 5, it is worthwhile looking into the possible effects of applying some smaller minimum mesh size for the Subarea for species other than cod and haddock. In studying this problem it was found that a minimum mesh size of 3-1/2 inches (double manila) for species other than cod and haddock has considerable merit. It would provide a cleaner catch of all species now taken with smaller meshes, reduce the quantity of undesirably small fish caught but not now landed for the food market, reduce the discard of haddock by the mixed groundfish fishery, and would probably increase the long term yield of whiting.

### Silver Hake

This species is marketed for human food, animal food, and for industrial purposes. It is fished with small mesh of different sizes, but mostly below three inches. If we assume present average mesh size to be 2-1/2 inches (double manila); increases to 3, 3-1/2, or 4 inches would have long term benefits after some initial loss. In Table 3 these benefits and losses are tabulated for the total catch of whiting. Since the food fishery is not interested in the smaller sizes of whiting these estimates of initial losses would not apply. They would apply, however, to the industrial fishery. The immediate loss to the landings of silver hake for food would be 8 percent for a 3-1/2 inch (double manila). The long term gains would not be achieved for several years. It would take 8 to 10 years to compensate for the immediate losses.

Figures 1b, 3a, and 3b compare the size compositions of present landings of silver hake with size composition to be expected if a 3-1/2 inch (double manila) net were used.

Table 3.--Effect of increasing mesh size in silver hake nets.

Change in mesh size inches from 2-1/2 to	Percent change in catch	
	Immediate	Long term
3 inches	- 4	+ 4
3-1/2 inches	-22	+13
4 inches	-47	+17

### Red Hake.

This species is taken almost entirely for industrial purposes and comprises some 45 percent of the trawl fish industrial catch in New England when this industry is active (Table 2).

Figure 2a, shows the average size frequency of the catch compared with the expected frequency with a 3-1/2 inch mesh. The initial loss would be about 13 percent by weight. Long term benefits are not known.

### Redfish.

This fishery currently uses nets with mesh size of about 2-3/4 inches (double manila). Our own studies, and that of ICNAF's Assessment Group have not furnished useable estimates of the effects of increasing mesh size on yields of this species. Figure 1a, presents the length-frequency curve of landings for the present fleet compared with length frequency to be expected under 3-1/2 inch regulation. There is very little discarding and the 3-1/2 inch double manila would apparently decrease the immediate landings by about 7 percent by weight. Note that the losses would be in the sizes considered undesirable by the food market. There is some evidence that the large commercial sized catches would reduce considerably the calculated escape rate in which case the initial losses would be less than 7 percent. Long term benefits cannot be estimated at the present time.

### Flounders.

Figure 4 presents length frequencies of the landings for the four larger species of flounder taken in Subarea 5. The 50% selection point of the 3-1/2 inch mesh for these species is considerably below the smallest sizes landed in 1957-59. The inclusion of these species under a 3-1/2 minimum mesh regulation would have little immediate effect on landings. In some years when flounders are unusually abundant and there is a glut on the market, large quantities of small fish are said to be caught and discarded at sea even by vessels using large mesh nets (4-1/2 to 5 inches). The extent of this discard and the viability of flounder under these conditions are unknown. In any case the institution of a 3-1/2 inch mesh regulation is not likely to change either the immediate or long term yield for these four species.

The situation is different as regards one of the smaller species of flounder, the dab. Figure 2b, compares the size distribution of dab caught in 1956-59 with that to be expected if 3-1/2 inch (double manila) mesh were used. In the case of this species the catch would suffer a 21 percent immediate loss. The 3-1/2 inch mesh would, however, retain all fish of a size desirable for food. Whether any long term benefits would accrue is not known. Dab is, of course, one of the minor species in the total New England landings. About 1.8 million pounds were landed in 1960.

## Haddock.

As mentioned above there is some quantity of haddock taken by vessels using small mesh nets. Some of these vessels are seeking haddock while others are catching them incidentally to the catch of other species such as whiting. In any case, they land under some exemption to the haddock regulation. The disposition of these haddock catches depends upon whether or not the industrial plants are operating and accepting trawl fish. The haddock catch is culled on board. The larger sizes are sold to the food market and the smaller ones are either sold as trash or, if the trash plants are not operating, discarded at sea. Discarded haddock are not viable and are lost to the fishery.

The magnitude of the catch of undersized haddock (i. e., haddock below the sizes taken by the regulation 4-1/2 inch mesh) is difficult to determine as obtaining data on this involves sampling the discard of the small mesh fleet which is composed of smaller vessels and sampling the industrial landings. During the period 1957-59 when the industrial fishery was operating actively in New England, the average landings of haddock for industrial purpose was 3 million pounds per year. These were all undersized fish as defined above, the food market size having been culled out.

Although the industrial fishery is not now operating fully, there is heavy fishing in areas where small haddock abound. In 1962 about 25 percent of the haddock landed in the U. S. (representing about 26 million pounds) was landed under some exemption and, therefore, was presumably caught with small mesh (Table 3). The vessels concerned were in general the same fleets that participated in the industrial fisheries in 1957-59, and generally fish the same grounds. Thus, it is only reasonable to suppose that they are taking undersized haddock as well as larger sizes. Since the food market does not normally accept haddock under 38 cm., the 50 percent selection size of the 4-1/2 inch mesh, the undersized haddock apparently are now being discarded at sea.

No mesh size under 4-1/2 inches will completely eliminate this discard, but a 3-1/2 inch mesh would materially reduce it (Table 4). General use of a 3-1/2 inch mesh by these vessels would reduce the catch of undersized haddock by 80 percent. This would serve to increase the sustained yield of haddock from Subarea 5.

Table 4. -- Analysis of haddock landings by type of certificate for Subarea 5 and for all Subareas, 1962. <sup>1/</sup>

	Subarea 5		All Subareas	
	Haddock Landed 000's pounds (gutted weight)	% Haddock	Haddock Landed 000's pounds (gutted weight)	% Haddock
Registered Cod and Haddock Vessels	78,740	75.0	88,019	74.9
Non-Registered Vessels	26,261	25.0	29,440	25.1
Totals	105,001	100	117,459	100
Non-Registered Vessels Breakdown				
10% Annual Exempted	3,834	3.7	4,088	3.5
Trip Exempted	19,724	18.7	22,649	19.3
Other gear	2,703	2.6	2,703	2.3
Totals	26,261	25.0	29,440	25.1

<sup>1/</sup>--On a trip basis.

Table 5. Sizes of haddock landed by Gloucester industrial fishery, 1957-59<sup>1/</sup>

Length (cm.)	Ipswich Bay number	Stellwagen Bay number	Nausets number	Total Number	Total Percent
> 9			4	4	-
9			9	9	1
12	1	5	9	15	1
15	4	30	5	39	3
18	16	29	23	68	5
21	35	28	85	148	12
24	33	41	117	191	15
27	35	84	141	260	21
30	19	142	103	264	21
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B					B
33	27	78	65	170	14
36	17	12	27	56	4
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A					A
39	10	3	7	20	2
42	3	1	--	4	-
45		1	--	1	-
48			1	1	-
51			1	1	-
Total				1,251	100

<sup>1/</sup> From Edwards and Skerry, 1961.

A-A = 50% selection point of 4-1/2 inch mesh.

B-B = 50% selection point of 3-1/2 inch mesh.

## Conclusions.

1. Extension of the 4-1/2 inch minimum mesh size regulation in Subarea 5 to all species other than cod and haddock is not desirable as it cannot be shown to be beneficial from a conservation standpoint and would be injurious to a number of fisheries.

2. Adoption of a minimum mesh size of 3-1/2 inches (double manila) for species other than cod and haddock is of some merit and is worth considering. It would materially reduce the destruction of undersized haddock; produce cleaner catches of all species by reducing the debris in the net; reduce the quantity of undesirable sizes of many species; and increase the long term yield of whiting. On the negative side it would immediately reduce the amounts landed of red hake (8 percent) and silver hake (21 percent) and possibly some other industrial species unless some exemptions were worked out for these.







