



Serial No. 3043
(A.a.4)

ICNAF Comm.Doc. 73/18

ANNUAL MEETING - JUNE 1973

Note by US Commissioners on ICNAF Conservation Actions

1. The United States has considered the response of the Commission to its proposal to regulate fishing effort and concluded that further attention must be focused urgently on the fisheries management problems in the Convention Area so that remedial measures may be undertaken without delay.
2. We have extensively reviewed ICNAF conservation programs and carefully studied the analyses carried out in the Commission with the cooperation of other member governments, giving particular attention to the work of the ICNAF Assessments Subcommittee and the Special Meeting of Experts on Effort Limitation that met in Woods Hole, Massachusetts, 26-30 March 1973. We are forced to conclude that the current ICNAF approach to conservation is inadequate. The deficiencies in the ICNAF approach are wide ranging and pervasive, extending through all phases of activity from inadequate research through ineffective implementation of regulations. The result will inevitably be further damage to the resources and the fisheries they support.
3. The Assessments Subcommittee made it clear in its report at the January 1973 meeting that fishing activity has continued to expand in Subareas 5 and 6¹ in recent years even though most of the resources fished are either fully exploited or overexploited. The Subcommittee noted that the 1971 total catch in Subareas 5 and 6 was taken at or beyond the maximum sustainable yield (MSY), and that fishing effort in 1971 was significantly beyond the level corresponding to the MSY. The Subcommittee has pointed out that continuing the fishing at the 1971 level or greater would, in the long run, reduce stock abundance, catch per-unit-of-effort, and total catch.
4. Threatened resources and fisheries cannot be protected by relying only on catch quotas for individual species. The Assessments Subcommittee concluded at its Mid-term Meeting in January 1973 that "because of the by-catch problem, catch quotas for the individual species would tend to generate over-exploitation which could be mitigated only by total catch or effort regulation set below the level estimated to achieve the summed MSY's of individual resources, when these resources are fished independently." By-catch problems are particularly acute in Subareas 5 and 6 where intense fisheries exploit a variety of intermixed species. This mixing of species makes selectivity for individual species nearly impossible and undermines in large part the basic premise on which individual species quotas are based, i.e., that catches of individual species can be adequately controlled.
5. This highlights the need for more comprehensive and robust regulatory measures providing much more effective controls. These must be tailored to fit the characteristics of the stock structure and fishing patterns of the area and fisheries concerned. These must also take into full account the research, monitoring, and enforcement capabilities of the Commission.
6. An evaluation of the deficiencies of the current ICNAF approach, together with proposals for remedies, is outlined below for the main areas of ICNAF activity.

CAPABILITY FOR SCIENTIFIC ASSESSMENT OF RESOURCES

7. Insufficient scientific information about the regulated stocks severely handicaps the conservation efforts of the Commission. If the catch quotas, upon which the Commission relies primarily for resource protection, are to be effectively and accurately applied, it should be recognized that the amount of data to be collected and analyzed is extremely large, and the costs involved are much greater than the member nations have been willing to spend. Very few ICNAF member countries make available enough useful information about their commercial catches to provide scientific data for resource assessment purposes, nor alternatively, do they supply enough data obtained from statistically valid research vessel surveys to measure the abundance of exploited stocks. Summary Document 73/2 reports the degree to which the member nations honored their commitment to measure a sample of at least 200 fish for each 1000 tons caught. Only three met this overall commitment, and even they show some deficiencies for some species and some stocks.

¹ Statistical Area 6

8. The Commission now finds itself in a state of greater uncertainty because the assimilation of information on fishery status has not kept up with the increased fishing effort which now exerts heavy pressure on all of the major species. The reaction of the Commission has been to delay action awaiting further refinement of the assessments, or to set preemptive quotas which tend to be based on the most optimistic predictions of fishery status. The USA feels that a different approach is necessary to prevent further depletion. A more comprehensive regulatory regime is required based on more conservative goals.
9. Any regulatory regime requires much better catch statistics than are now being collected. Individual species quotas are desirable to maximize the yields, and, hence benefits from regulation. However, to set them properly requires the maximum amount of data and analyses. The Commission does not now have the ability to do this, and it will be several years, at least, before it is in a position to do so. In the interim, an overall limit on fishing mortality is necessary to maintain stocks at levels which will permit, in the long run, optimization of benefits. The consequences of errors in setting individual quotas for all species without adequate data will in all likelihood lead to decreased yields, and will tend to promote overfishing unless the actions are taken on a very conservative scale.
10. An overall catch or effort quota would require a lesser amount of data, although such an overall limit would also require selected individual species quotas and subsidiary measures to protect individual stocks. The data requirements for these subsidiary measures, however, would be selective and specific, i.e., only a limited subset of species would require precise and full information. These would be developed within the framework of overall resource protection.
11. In summary, the Commission must design regulatory programs that minimize the risk of harm to resources because of error in ICNAF resource assessments. It must take into full account its limited ability to assess resources accurately and design a comprehensive regulatory program that can offer some measure of protection on the basis of the assessments now available. The US proposal to limit effort was chosen in the light of this criteria.
12. It is equally essential to make a major effort to upgrade the assessment capability of the Commission.

OPTIONS FOR MANAGEMENT

13. As the Assessments Subcommittee has indicated the by-catch problem will lead a species catch quota system to generate overexploitation even if the individual quotas are accurately set at sustainable yield levels. Closures of fisheries directed toward primary species are the principal national control measure under species quota regulations. Such closures, however, are effective only to the extent a fleet can control its catches both of target species and its by-catches of other regulated species. By-catches in areas of high mixing of species are essentially uncontrollable unless highly selective gear is used. Thus, the Commission can no longer rely on species catch quotas alone in areas of intensive fishing and high mixing of species to protect either the overall biomass or even the individual regulated species.
 14. Designing new management approaches requires a clear understanding both of the nature of the species mixture on key fishing grounds and of the effects of this mixture on the regulatory program.
- Mixing of Species in Subareas 5 and 6
15. In order to illustrate the nature and extent of the by-catch problem, the actual catches in ICNAF Subarea 5 during 1971 have been grouped by the Assessments Subcommittee according to the main species sought in a fishery. The results were reported in the Subcommittee's Report in ICNAF Summ.Doc. 73/1, Proceedings No. 1, Appendix No. 1 (Table 6), and are reproduced in this document as Table 1. It is the best estimate of by-catches that is available at this time. It shows, for example, that the silver hake fishery alone in Subarea 5 takes as an incidental catch "more than 10 percent of the total catch of each of the four categories of flounder, other groundfish, other pelagic fish, and other fish."
 16. The distribution of the major species has also been shown by research vessel surveys in Subareas 5 and 6. These surveys have shown a high degree of species mixture in all parts (and depths to 200 fathoms) of Subareas 5 and 6. Figure 1 shows the parts of Subareas 5 and 6 where the heaviest mixing occurs in spring and fall.
 17. During the winter and spring months the by-catch problem is greatest in Div. 6A and 5Zw where hake, herring, mackerel and yellowtail flounder fisheries are concentrated. During the coldest winter months there is a reasonable separation between the hakes and yellowtail since the hake are concentrated offshore, but this separation breaks down in the spring as the hakes move inshore. (Throughout the year yellowtail flounder are concentrated in the shallower waters.) There are a number of other species such as scup, fluke, butterfish, and squid which also concentrate offshore in the winter and spring. Depth distribution of herring and mackerel varies and therefore the fisheries for these species range both inshore and offshore during spring months.
 18. In the fall the area of heavy mixture of major species includes Georges Bank where herring species

are mixed with cod, haddock, yellowtail flounder and hake.

Deficiencies of Species Quota System in Mixed Species Areas

19. Failure to adapt regulatory programs to this mixture of species has crucial consequences for the current ICNAF regulatory program. Since the rationale behind the setting of species quotas is control of the directed fisheries, an outside estimate of what the maximum effect could be on the catch of an open-ended, species quota system is illustrated by applying the 1971 mixed fishery pattern revealed in Table 1 to the hypothetical fishery in 1973 in which the species quotas for 1971 catches where no quota values are available are completely taken in directed fisheries (Table 2). Such directed fisheries, however, would obviously generate by-catches and the by-catches would in this situation cause the total catch to exceed the total quotas by about 50 percent. All species (or species groups) would be significantly overfished. This illustration also appears in the Report of the Special Meeting of Experts on Effort Limitation (ICNAF Summ.Doc. 73/5).

20. ICNAF regulations currently deal with the by-catch problem by requiring each country to manage its fishery so that the sum of its directed and incidental catches would not exceed its quota allocation. Proper control implies closures of directed fisheries and/or diversion of effort to other fisheries.

21. The quota allocations, however, for most species simply do not take into account the by-catch produced by the prevailing species mixtures and fishing techniques. Therefore, until far more selective fishing techniques are instituted, the current species quota system as applied to the existing pattern of fishing will not achieve intended results.

22. It may be argued, of course, that the various species catches can be distributed by a country over its various fisheries so these do not exceed the total allowable. Therefore, we have determined the theoretical directed catch and by-catch of each species in each of the fisheries that would provide total yields approximately equal to the 1973 quotas or 1971 catches for stocks not under quota (Table 3A). However, these theoretical by-catches are not what would be generated by such directed fisheries in mixed fish areas under present techniques of fishing. The interaction of fisheries and species as shown in the 1971 mixed fish pattern would lead instead to substantially different by-catches, and consequently, to substantially different total catches. The difference between such theoretical catches and actual expected catches are shown in Table 3B. The actual expected catches for the following species would exceed the quotas by the percentages shown in brackets: haddock (100%), flounder (22%), other groundfish (8%), herring (29%), and other fish (9%).

23. The following species would be under quota by the percentage indicated: cod (20%), redfish (16%), silver hake (20%), and other pelagics (5%). This underachievement could result in the expansion of effort in the directed fisheries for these species with the accompanying increase in by-catch for those already overharvested.

24. The problem of exceeding quotas under the assumption of repetition of 1971 fishing patterns can be met by reducing the total catches of fisheries. There are a multitude of possible adjustments of national allocations and quotas that could solve this problem. A linear programming model which maximizes the total catch was used to obtain two examples of possible solutions.

25. The first example does not allow any individual quota to be exceeded, but allows any directed fishery to go to zero (Table 4). The result is a catch of 1,069,500 MT, a reduction of 40,000 MT from the sum of the allowable species totals given in Table 3A. However, as a result of the mixing of species and the need to allow for by-catches, the directed fisheries for cod and haddock are eliminated and those for herring, other groundfish and flounder severely reduced. These species groups are of primary interest to the US fishing industry. Obviously, a solution eliminating a large part of the directed fisheries of the USA is not acceptable.

26. The second example (Table 5) illustrates how coastal fisheries might come closer to achieving their quota allocation if assured certain minimum catches in directed fisheries. The USA, however, would still not take its quota allocation for any regulated species. The total catch by all participants is now reduced by 190,000 MT from the allowable species totals given in Table 3A and the directed fishery for silver hake is virtually eliminated. The directed fishery for cod is reduced to a very low level, and directed fisheries for flounder, herring and other groundfish are also reduced substantially. This further illustrates the inadequacy of species quotas alone to achieve conservation goals or to provide for the needs of fishing fleets.

REGULATORY IMPROVEMENTS REQUIRED

27. The US proposal to reduce fishing effort has been put forward to ameliorate some of the grosser deficiencies in the catch quota system noted above. The kind of overexploitation which the Assessments Subcommittee points out is generated by the current species quota system emphasizes the urgency of supplementing the species quota system with an overall limitation.

28. The further analyses conducted by the USA and those carried out within the Commission have now shown, however, that the regulatory problems of the Commission are more serious than anticipated at the Special Meeting of the Commission in January 1973.

29. While it is even clearer that an overall limit on fishing effort is needed to help prevent further degradation of the overall biomass, it is also clear that even such an overall limit in combination with species catch quotas will not prevent serious harm to individual stocks threatened by large by-catches, unless fishing effort is reduced much greater than was originally proposed.

30. What has been demonstrated is that protection for such individual stocks requires that existing catch quotas be supplemented with additional measures requiring either the use of far more selective fishing techniques in mixed fish areas or a very drastic reduction of fishing effort in such areas.

31. A combination of measures may provide the most practical approach to the overall conservation problem, particularly in areas where the mixing of species is heaviest. Accordingly, the USA proposes the following gear regulations in Subarea 5 as supplements to the catch quota system and the previous US proposal to reduce fishing effort 25 percent below the 1971 level:

- (a) All trawl fisheries using gear capable of catching demersal species conducted by vessels over 110 feet inside 40 fathoms in Subarea 5Zw and that portion of 5Ze west of 69°W. longitude be conducted only with trawls having a minimum mesh size in the codend of the net of not less than 130 mm (mañila).
- (b) All trawl fisheries capable of catching demersal species outside of 40 fathoms in Subarea 5Zw and that portion of 5Ze west of 69°W. longitude be carried out with trawls having the minimum mesh size required by ICNAF when fishing for regulated species, but not less than 62 mm when fishing for any species.

32. These gear restrictions will reduce by-catches in some of the more serious problem areas. Thus, these measures in combination with an overall limit on fishing intensity will begin to provide a basis for a system of national catch quotas in Subareas 5 and 6 that can achieve their intended effect.

33. Failure to correct the problems noted through carefully selected new regulatory approaches will have very serious consequence for US fisheries. As other members are aware, major international fisheries carried out in Subareas 5 and 6 are supported by coastal resources which the USA has a special interest in maintaining. The dangers of inadequate conservation have been highlighted in the past in these areas by the collapse of the haddock resources, the depletion of the herring resources, and the general decline in the overall biomass substantially below a level producing maximum sustainable harvests, all of which occurred under the management of ICNAF.

34. Now the USA faces further depletion of key resources such as flounder because of large uncontrolled by-catches in other fisheries. In the circumstances, we believe the other members of the Commission will understand the urgency with which the USA puts forward its proposals to alleviate the by-catch problem.

INTERNATIONAL ENFORCEMENT

35. We have pointed out before that the efficacy of international conservation programs depends not only on effective enforcement by all nations, but also on demonstrating to the fishermen of all nations that effective enforcement is taking place. Both elements are essential to establish reasonable confidence in comparable enforcement by all participating governments. This confidence, however, does not now exist under the ICNAF regulatory program.

36. It has been eroded by anomalies in enforcement actions of the various participants, limitations in the ICNAF Joint International Enforcement Scheme, and finally by the failure of the Commission to consider with sufficient care the practicability from the enforcement standpoint of alternative approaches to conservation. The result is a serious credibility problem.

37. For example, the Commission presently relies primarily on a catch quota system requiring very sophisticated techniques of enforcement, including detailed logbook records describing catches and fishing operations. Complete records of all species caught are particularly important for groundfish operations in areas where the mixing of regulated species must inevitably produce a varied catch. Yet the catch reports and logbook records of the various fishing vessels of other member countries that US officials have had the opportunity to examine under the ICNAF Joint International Enforcement Scheme in a large percentage of cases do not adequately reflect the catches that would be expected in such areas.

38. It was frequently observed, particularly in bottom trawling operations, that vessel logs identified only the primary species caught and lumped all of the remainder into the category of "unclassified". Thus, we are forced to question the ability of the Flag State to determine the accuracy of their vessels' catch of all species under quota and thus to insure compliance with ICNAF catch quota regulations.

Accurate determination of catches when detailed logbook records are not kept would seem impossible when by-catches of non-target species are processed into fish meal or otherwise handled in such a way that they cannot later be identified as to species.

39. In saying this we are not doubting the good faith of the Parties to the Convention. We are convinced, however, that more rigorous national systems, with appropriate internal checks, are needed to insure compliance with regulations by individual vessels.

40. In like manner, the Joint International Enforcement Scheme must be improved both as a means of supplementing national efforts and of demonstrating that there is comparable enforcement of the regulations by all participating governments.

41. As a first step, it is essential that the existing reservations to the ICNAF Joint International Enforcement Scheme which limit opportunities for inspections of catch and gear be removed. The mere existence of these reservations raises questions in the eyes of fishermen of other countries over the commitment of the Commission to full enforcement of regulations. This difficulty can only be eliminated by removal of the reservations. Furthermore, the questions that arise when international inspectors observe apparently inadequate logbooks might be clarified in some instances through inspections of catches and gear.

42. More fundamental changes, however, are needed to restore confidence in comparable enforcement by all parties. Too frequently, Flag States apparently are unable to confirm reports of violations by their vessels called to their attention by other governments. For example, the USA during the last several years has called to the attention of several governments the presence of their trawl or longline vessels in areas of Subarea 5 closed to fishing with gear capable of catching demersal species during the spring of the year. No action against these vessels, however, was reported in the Annual Returns of Infringements (ICNAF Comm.Doc. 71/6 and 72/4) distributed at the Annual Meetings of the Commission in 1971 and 1972.

43. Some members have reported their inability to confirm the location of vessels reported by other members to be in violation of closed areas when the logbooks and other documents of the vessels in question are later examined. This is not surprising since the Flag State investigation usually takes place long after the fact.

44. This apparent inability of governments to act when clear violations are reported by third parties contributes to the decline in credibility in the Commission's regulatory program.

45. For these reasons, the USA proposes that the ICNAF Joint International Enforcement Scheme be modified to authorize the inspectors of the fishery control services of Contracting Governments to detain any vessel of a participating member country found to be in clear violation of the ICNAF fishery regulations, until such vessel can be delivered to authorized officials of the Flag State.

46. This would guarantee availability of evidence of the violation to the Flag State, which would retain full responsibility for judicial action and imposition of penalties. Vessels detained could be turned over either to enforcement officers of the Flag State authorized to participate in the ICNAF Joint International Enforcement Scheme, or if necessary, to diplomatic officials of the Flag State.

47. Such procedures are incorporated in a number of international fisheries treaties including those under which fur seals, salmon, and halibut are managed in the North Pacific Ocean and the Bering Sea, and have been a major factor in maintaining confidence in such management programs.

48. Incorporation of this procedure in the ICNAF Joint International Enforcement Scheme would be an important step in restoring credibility for the ICNAF management programs.

49. An equally important and necessary step is for the Commission to give careful weight to enforcement aspects at the inception of regulatory programs. By taking these matters into account when regulatory options are considered, with a view toward selecting those most likely to offer clearly visible compliance (other factors being equal), the Commission will be able to minimize potential credibility problems in the future. The USA has taken into account these criteria in deciding upon the regulatory proposals it is presenting at the forthcoming Annual Meeting.

Table 1. Interrelationships between main species fisheries and the associated by-catch of other species based on 1971 data for Subarea 5.

A. Species affected, i.e. for which given percentage of total catch is taken as by-catch in fishery considered.

Fishery (main species sought)	>10	5-10	2-5
Cod	Had		
Haddock	Cod		Red, Flo, OG
Redfish			Cod, Had
Silver hake	Flo, OG, OP, OF	Cod, Had, Her	Red
Flounder	Cod, Had, Red	OG	
O. Groundfish		SHa, OF	Cod, Had, OP
Herring	OP, OF	Red, SHa, OG	Cod, Flo
Other Pelagic	Red, OF	SHa, Flo, OG	Her
Other Fish		OG	SHa, Flo

Note: For example, the silver hake fishery takes more than 10% of the total catch of each of the four categories of flounder, other groundfish, other pelagic fish, and other fish.

B. Fisheries which take given percentage of species considered.

Species	>10	5-10	2-5
Cod	Had, Flo	SHa	Red, OG, Her
Haddock	Cod, Flo	SHa	Red, OG
Redfish	Flo, OP	Her	Had, SHa
Silver hake		OG, Her, OP	OF
Flounder	SHa	OP	Had, Her, OF
O. Groundfish	SHa	Flo, Her, OP, OF	Had
Herring		SHa	OP
Other Pelagic	SHa, Her		OG
Other Fish	SHa, Her, OP	OG	

Note: For example, more than 10% of the total haddock catch is taken as by-catch in each of the cod and flounder fisheries.

Source: ICNAF Summ. Doc 73/1, Proceedings No. 1, Report of the Meeting of the Standing Committee on Research and Statistics, Appendix I, Report of the Assessments Subcommittee.

Table 2. Simulated 1973 catches assuming quotas (or 1971 catches where no quotas are applicable) are taken in the respective main species sought fisheries in Subareas 5 and 6. Simulation based on 1971 fishing patterns.

	SPECIES CAUGHT								Total		
	Cod	Haddock	Redfish	Halibut	Silver hake	Flounder	Other groundfish	Herring		Other pelagic* fish	
	(1,000 Metric Tons)										
S	45.0	8.3	0.8	0.2	1.0	2.5	6.0	**	**	0.2	64.3
P	8.1	6.0	0.8	**	**	2.5	3.9	0.0	**	0.0	21.3
E	2.2	0.8	30.0	**	0.5	1.1	2.6	0.1	**	**	37.3
C	4.6	2.0	2.0	**	170.0	11.6	35.5	33.2	33.2	26.4	318.5
I	12.0	4.5	3.1	**	2.6	51.0	9.0	0.5	0.7	0.6	84.0
E											
S											
S	4.6	1.4	0.4	0.1	18.4	9.0	80.0	9.4	8.3	10.7	142.3
O											
U	0.5	0.2	0.7	0.0	5.8	0.7	3.3	175.0	19.2	8.9	214.3
G											
H											
T	0.5	**	4.2	0.0	16.2	5.5	14.8	49.0	462.0	54.1	586.3
	0.3	0.2	**	0.0	31.7	5.0	39.7	8.8	17.5	90.0	193.2
	77.8	23.4	42.0	0.3	246.2	89.2	194.8	276.0	540.9	190.9	1582.5
Difference between Catch and "Quota" Allocation	32.8	17.4	12.0	0.2	76.2	38.2	114.8	101.0	78.9	100.9	572.1

* Consists of 97.5 percent mackerel

** Less than 0.1 Metric Tons

Table 3. Simulation of effects of By-Catch Interactions on attempts to achieve 1973 species quotas (or 1971 catches for countries and species without quota allocations) in Subareas 5 and 6. Simulation based on 1971 Fishing Patterns.

3A. Theoretical catches to achieve allowable species catches assuming fisheries and species do not interact.

	SPECIES CAUGHT								
	Cod	Haddock	Redfish	Silver hake	Flounder	groundfish	Herring	Other pelagic* fish	Total
	(1,000 Metric Tons)								
Cod	15.7	1.5	.4	1.3	1.0	2.0	-	.1	22.2
Haddock	7.7	2.1	.9	.1	2.1	2.9	-	-	15.8
Redfish	1.7	.1	18.4	.9	.5	1.0	-	-	22.6
Silver hake	3.1	.4	1.2	99.3	3.4	14.2	8.5	15.7	156.3
Flounder	10.2	1.4	3.1	6.6	36.5	5.8	.3	4.1	68.4
Other groundfish	2.3	.3	.3	10.0	2.9	28.4	3.0	4.3	55.3
Herring	1.4	.2	1.6	16.0	1.0	4.9	158.0	34.2	230.1
Other pelagic	.5	-	3.6	12.3	1.6	10.0	21.3	398.9	434.6
Other fish	.1	-	-	10.0	.7	11.0	1.4	4.8	24.9
Total	42.7	6.0	29.5	156.5	49.7	80.2	193.3	462.1	1109.0
"Quota" (1973)	45.0	6.0	30.0	170	51.0	80.0	175.0	462.0	1107.4

Note: Theoretical total catch differs from "quotas" when unallocated portion of a quota differs from combined 1971 catch by countries without specific quota allocation.

* Consists of 97.5 percent mackerel

Table 3. Simulation of effects of By-Catch Interactions on attempts to achieve 1973 species quotas (or 1974 catches for countries and species without quota allocations) in Subareas 5 and 6. Simulation based on 1971 Fishing Patterns.

3B. Variance between theoretical catches (Table 3A) and expected catches due to fishery-by-catch interactions.

	SPECIES CAUGHT						
	Cod	Haddock	Redfish	Silver hake	Flounder	Other groundfish	Herring pelagic* Other fish
	(1,000 Metric Tons)						
Cod	-	-1.5	0.0	0.9	0.3	-0.6	0.0 0.1 0.0
Haddock	4.8	-	0.6	0.1	0.2	1.5	0.0 0.0 0.0
Redfish	0.4	-0.4	-	0.6	-0.2	-0.5	-0.1 0.0 0.0
Silver hake	-2.0	-1.8	-1.5	-	-8.2	-6.7	-13.4 0.3 -1.8
Flounder	1.6	-1.8	0.9	4.7	-	-0.6	-0.1 3.6 0.0
Other groundfish	0.8	-0.2	0.2	3.4	-0.2	-	-0.4 1.3 0.0
Herring	0.8	0.0	0.8	10.3	0.0	1.1	- 16.4 4.2
Other pelagic	0.3	-0.3	3.2	-1.5	-3.9	-1.3	-17.8 - 5.4
Other fish	0.0	0.0	0.0	1.2	-0.7	1.1	-1.1 1.2 -
Variance of total theoretical catches from expected catches	+6.7	-6.0	+4.2	+19.7	-12.7	-6.0	-32.9 +22.9 -7.0

* Consists of 97.5 percent mackerel

Table 4

Simulation of Effect of By-Catches on 1973 Catches when
Maximizing Overall Total Catch without Exceeding
Individual Species Quotas in Subareas 5 and 6

Species sought	Total allowable catch constraint	Directed catch	Total catch
(1,000 Metric Tons)			
Cod	45	0	14
Haddock	6	0	6
Redfish	30	24	30
Silver Hake	170	140	170
Flounder	51	14	42
Other Groundfish	80	27	80
Herring	175	95	175
Other Pelagic	462	425	462
Other Fish	90	13	90
Total	1109.		1069.

Note: Allowances for by-catches require elimination of directed fisheries for cod and haddock and severe reductions in those for herring, other groundfish, and flounder.

Table 5

Simulation of Effect of By-Catches on 1973 Catches when Maximizing Overall Total Catch and Preserving Part of Directed U.S. Coastal Fishery, without Exceeding Individual Species Quotas in Subareas 5 and 6

Species sought	Total allowable catch constraint	Directed Catch	Total catch
(1,000 Metric Tons)			
Cod	45	8	19
Haddock	6	0	6
Redfish	30	19	22
Silver Hake	170	3	40
Flounder	51	33	46
Other Groundfish	80	23	59
Herring	175	125	175
Other Pelagic	462	440	462
Other Fish	90	27	90
Total	1109		919

Note: Allowances for by-catches require elimination of directed fisheries for haddock, virtual elimination of directed fisheries for silver hake, substantial reductions in directed fisheries for cod, flounder, herring and other groundfish.

The following minimum catches are assured for U.S. directed fisheries:

	(1,000 Metric Tons)
Cod	8
Haddock	0
Redfish	19
Silver Hake	3
Flounder	33
Other Groundfish	9
Herring	23
Other Pelagic	9
Other Fish	3

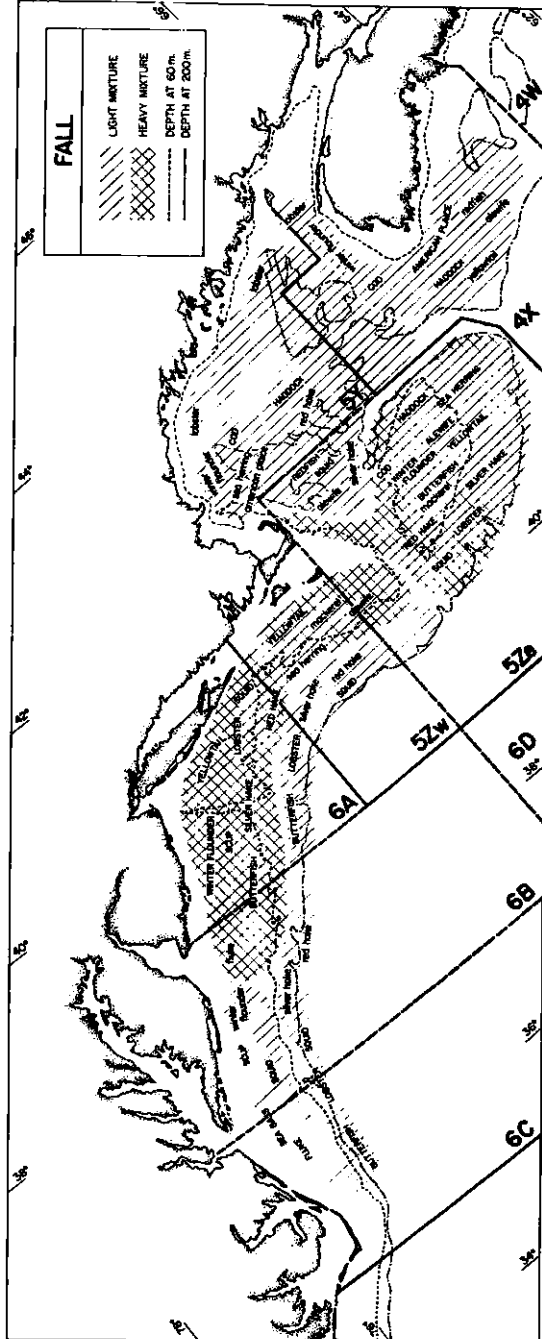
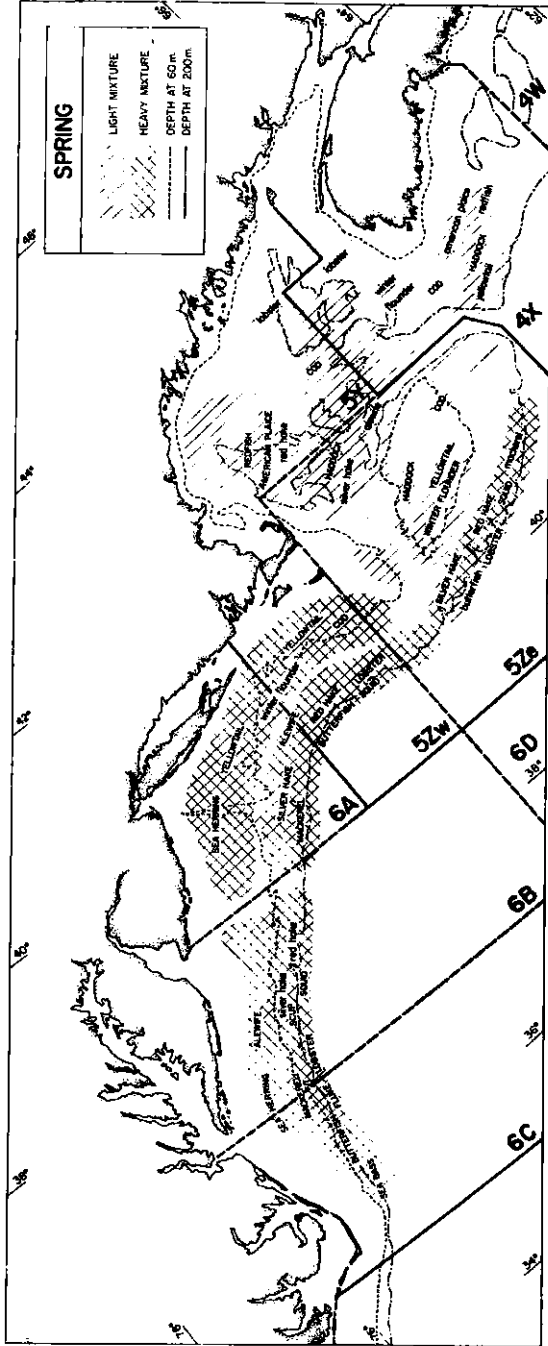


Fig. 1. Generalized picture of the species mixture problem in relation to bottom trawling. Species distribution based on plots of individual catches in groundfish surveys as described in Res.Doc. 73/9.

Serial No. 3043

(A.a. 4)

ICNAF Comm.Doc. 73/18Addendum IANNUAL MEETING - JUNE 1973Summary of US Proposals in Commissioners Document 73/18

1. That the Commission implement a more comprehensive and robust regulatory program tailored to fit the characteristics of the stock structure and fishing patterns of the area and fisheries concerned, taking into full account the research, monitoring, and enforcement capabilities of the Commission (Para. 5).
2. That all Contracting Governments be required to measure a sample of at least 200 fish for each 1,000 tons caught (Para. 7).
3. That the US proposal on the limitation of effort be adopted (Para. 11).
4. That either the use of far more selective fishing techniques in mixed fisheries be required or that a very drastic reduction of fishing effort in such areas be required (Para. 21 and 30).
5. That the following supplemental mesh regulations be adopted:
 - a) All trawl fisheries using gear capable of catching demersal species conducted by vessels over 110 feet inside 40 fathoms in Subarea 5Zw and that portion of 5Ze west of 69°W longitude be conducted only with trawls having a minimum mesh size in the codend of the net of not less than 130 mm (manila).
 - b) All trawl fisheries capable of catching demersal species outside of 40 fathoms in Subarea 5Zw and that portion of 5Ze west of 69°W longitude be carried out with trawls having the minimum mesh size required by ICNAF when fishing for regulated species, but not less than 62 mm when fishing for any species (Para. 31).
6. That the catch reports of vessels be required to adequately reflect the catches in the area, including all by-catches and discards (Para. 37 and 38).
7. That the existing reservations to the ICNAF Joint International Enforcement Scheme which limit opportunities for inspections of catch and gear be removed at this Annual Meeting (Para. 41).
8. That international inspectors make a required inspection of catches and gear when observing apparently inadequate logbooks (Para 41).
9. That the ICNAF Joint International Enforcement Scheme be modified to authorize the inspectors to detain any vessel found to be in clear violation of the ICNAF fishery regulations (Para. 45).
10. That the Commission be required to give careful weight to enforcement aspects at the inception of regulatory programs (Para. 49).

