

M E M O R A N D U M

TO: Council, SSC, and AP Members

FROM: Jim H. Branson
Executive Director

DATE: July 13, 1981

SUBJECT: Halibut Limited Entry

ACTION REQUIRED

Council member's consideration of the report and recommendations of the workshop on limited entry in the Alaska halibut fishery, held in Seattle on May 14 and 15.

BACKGROUND

The Council has been requested, by fishermen and others, to implement some sort of limited entry program in the halibut fishery. To provide information and recommendations to the Council and to the Limited Entry Workgroup, this workshop was held. The Council may wish to consider action to mitigate some of the problems of the halibut fishery.

A report on the workshop and the recommendations for the best policy alternative for the Council to consider will be presented by Rich Marasco, Ed Miles and Jim Richardson.

JR

DRAFT FOR DISCUSSION

APPLICABILITY OF THE THEORY OF LIMITED ENTRY TO THE ALASKAN HALIBUT FISHERY: A WORKSHOP IN FISHERIES ECONOMICS by Jim Richardson, NPFMC Staff Economist, June 1981

Introduction

On May 14 and 15, 1981, a group of scientists met in Seattle to discuss the necessity and desirability of various methods to control effort in the halibut fishery off Alaska. The purpose of the workshop was not to design a limited entry program, but rather to investigate on the basis of available data, the need for some type of program. If a limited entry program were seen to be justified, the workshop participants would then choose among the policy alternatives to determine which would best meet the management goals for the fishery.

Background to the Workshop

The workshop was sponsored by the North Pacific Fishery Management Council (NPFMC) to provide information to the Council and its working groups on the issue of limited entry in the halibut fishery.

Support for a halibut limited entry scheme of some type has been voiced by halibut fishermen. In response to this support, a NPFMC Limited Entry Workgroup was established to consider limited entry issues and provide policy recommendations to the Council. The workgroup has met several times over the past 18 months.

This workshop was set up as a small meeting of fishery economists and other scientists to evaluate data on the present status of the halibut and discuss the economic theory of effort limitation as it might apply to the halibut fishery. The objective of the workshop was to provide some guidance to both the Council and to the Limited Entry Workgroup in considering limited entry schemes for the halibut fishery.

There is no fishery management plan (FMP) in effect for the halibut resource off Alaska. A draft plan developed in 1978 was shelved after negotiations between the U.S. and Canada continued the International Pacific Halibut Convention. The convention retains management authority through the recommendations of the International Pacific Halibut Commission (IPHC). The regulations recommended by the IPHC are usually adopted verbatim by both the U.S. and Canada for their respective halibut fisheries and are given the force of law through each country's regulatory channels.

If some entry scheme were to be implemented in the Alaskan fishery, it might require action by the Secretary of Commerce since it is not clear that the NPFMC has the necessary authority. If this is the case, then the action required of the NPFMC in establishment of a halibut limited entry program would be to recommend to the Secretary of Commerce the program they wish to see implemented. The assumption made in the preparation of this paper is that the NPFMC would want to be specific as to the objectives, method of limitation, exclusion criteria, etc. in their recommendation to the Secretary.

Another possibility would be for the Council to implement a framework FMP for the halibut fishery. The Council could specify a particular limited entry scheme and leave the rest of the fishery management responsibility to the IPHC according to guidelines in the FMP. The Council needs to explore this approach further for legal and political viability.

Status of the Halibut Fishery and Fishery Objectives

There have been significant changes in the halibut fishery in recent years. For example, the number of boats fishing halibut in IPHC Regulatory Area 3 has increased from 458 in 1975 to 1422 in 1980 (see Figure 1 and Table 1A). Over the same time period, the catch quota decreased from 12 million pounds to 10 million pounds. The predictable result from these two trends was the decline in the number of fishing days per year. In 1975, the quota was taken in 128 days. The 1980 quota took only 20 days to harvest. The biological problems caused by this shortened season include the possibility of overharvesting before the fishery can be closed once the quota is reached, and possible detrimental effects on the halibut population from overharvesting certain substocks.

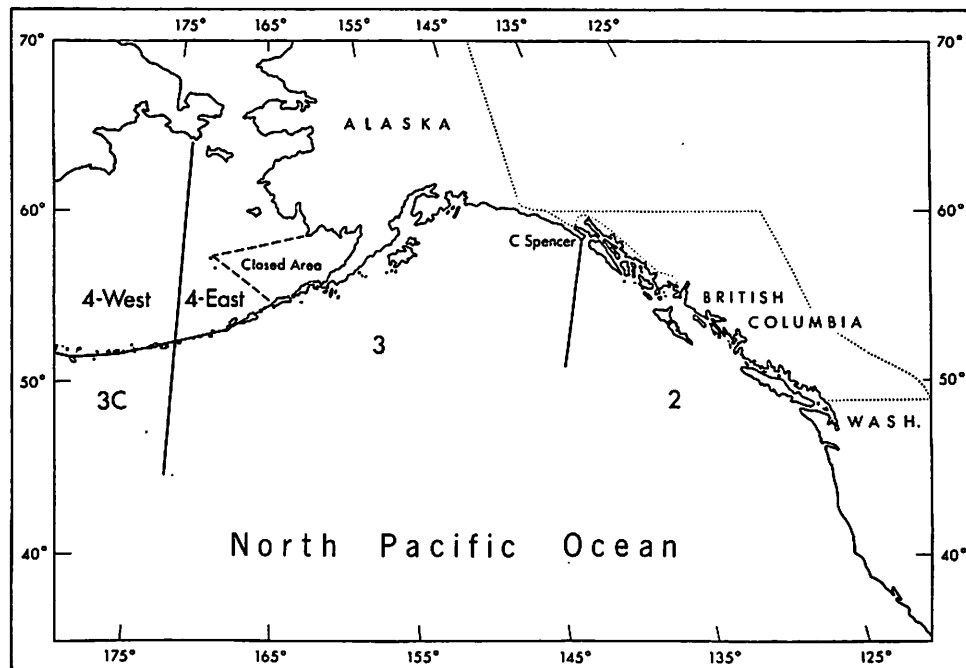


Figure 1. Regulatory areas for the Pacific halibut fishery, 1979.

- Area 2 - South and east of Cape Spencer, Alaska.
- Area 3 - North and west of Area 2, excluding the Bering Sea.
- 3C: West of 173° West longitude.
- Area 4 - The Bering Sea
- 4-East: East of 173° W. longitude, excluding the closed area.
- 4-West: West of 173° W. longitude.
- Closed area: The southeastern flats.

TABLE 1A. RECENT TRENDS IN THE HALIBUT FISHERY IN
IPHC REGULATORY AREA 3

Year	Length of Season ^{1/} (days)	Number of Boats ^{2/}		
		Licensed	Unlicensed ^{3/}	Total
1975	128	154	304	458
1976	96	215	412	627
1977	47	298	448	746
1978	43	313	553	866
1979	32	460	824	1,284
1980	20	599	823	1,422

Source: IPHC Annual Reports, 1975-1979 and personal communication,
IPHC staff, May 1981.

^{1/} The open days refer only to Area 3a. A small amount of halibut are taken from area 3b, however the opening is very long due to light fishing pressure, therefore including 3b would not show the actual trend in the open season.

^{2/} These are U.S. boats only. Until 1980, Canadian boats also fished in Regulatory Area 3.

^{3/} Unlicensed boats are five net tons or under.

A similar trend occurred in IPHC Regulatory Area 2, however changes in the regulations make comparisons across years more difficult than for Regulatory Area 3 (see Figure 1). Until 1979, U.S. and Canadian fishermen both fished throughout Regulatory Area 2, subject to catch quotas. As shown in Table 1B, the open season decreased from 128 days in 1975 to 62 days in 1978. In 1979, with U.S. fishermen restricted to fishing U.S. waters only, the season lasted 23 days. In 1980, the season lasted only 10 days. The total number of boats in the fishery has declined since 1975 as shown in Table 2. These figures may not show the actual trend though, since IPHC includes those boats which landed in both IPHC Regulatory Areas 2 and 3 under Area 3 only (see Table 1A). This prevents double counting the fleet, but may indicate that participation in the fishery is less than it actually is. Regardless, the data show greatly reduced season lengths in both Regulatory Areas 2 and 3 resulting from declining catch quotas and increased participation in the fishery.

Aside from the possible adverse biological effects from the short fishing season, there are several possible adverse economic impacts which result. The economic impacts would include the problem of reduced fishermen's incomes. The quota of halibut is not being harvested with the optimum amount of gear, from the viewpoint of economic efficiency. The short fishing season could also be contributing to adverse impacts on the processing and marketing sectors of the halibut industry. With halibut being processed during such a short period of the year, idle capacity during the rest of the year is likely unless the facilities are utilized for processing other species. Possible marketing problems also come from producing a years supply of halibut products in one short period of time. Most halibut products are sold to the restaurant industry. If halibut were caught over a longer portion of the year, the products could be sold fresh rather than frozen, possibly resulting in consumers being willing to pay a higher price for the increased quality, and increased returns to fishermen.

Most fishermen fishing halibut in Alaska also fish for other species. Data on the multi-species nature of the halibut fleet is shown in Tables 5, 6 and 7 prepared by Tetra Tech in their report to the NPFMC, "The Applicability of Limited Entry to the Alaska Halibut Fishery." In 1978, for example, 82 percent of the boats landing halibut also fished for other species. The actual fisheries in which halibut fishermen participated are shown in Table 7 for each boat class (see Table 2 for an explanation of boat classes).

The decision on whether or not halibut should be a multi-species or single species fishery in Alaska is to some extent a political one. If the fishing boats and gear could be fully utilized in other fisheries during the closed season for halibut, overcapitalization for the halibut fishery would not necessarily result in economic inefficiency. Distributional impacts within the fishery would still occur though, even given the assumption above. Tables 16 and 18 show the fleet distribution of fishing income for halibut and other species. The boats having the highest dependence on halibut are the larger ones which may have less mobility among fisheries than some of the smaller boats.

Full utilization in other fisheries is probably not a valid assumption however. In fact, many of the new entrants to the halibut fishery are participating due to a lack of other fisheries open for their participation. It is appropriate therefore to consider alternatives to limit effort in the halibut fishery, keeping the multi-species characteristics of the fishery in mind.

TABLE 1B. RECENT TRENDS IN THE HALIBUT FISHERY IN
IPHC REGULATORY AREA 2

Year	Length of Season ^{1/} (days)	Number of Boats ^{2/}		
		Licensed	Unlicensed	Total
1975	128	150	1,816	1,966
1976	123	174	1,814	1,988
1977	73	209	1,297	1,506
1978	62 ^{2/}	217	1,331	1,548
1979	23 ^{3/}	271	1,477	1,748
1980	10 ^{3/}	336	903	1,239

Source: IPHC Annual Reports, 1975-1979 and personal communication,
IPHC staff, May 1981.

^{1/} These are U.S. boats only. Boats which made landings in both IPHC Regulatory Areas 2 and 3 are included under the totals for Area 3 shown in Table 1.

^{2/} Starting in 1979, the quota for Area 2 was split between U.S. waters and Canadian waters. The 23 day season applies to U.S. waters only.

^{3/} This ten day opening refers to U.S. waters only. Starting in 1980, U.S. fishermen can only fish in U.S. waters and Canadian fishermen can only fish in Canadian waters.

For the reasons discussed above, and based upon the experience of the workshop participants, it was decided that an effort limitation program of some type would benefit the halibut fishery, if the program were designed and implemented properly. The group felt that the first step in being able to evaluate the applicability of various policy measures to Alaska's halibut fishery would be to define management objectives. The objectives agreed to by the workshop participants were consistent with those outlined in the 1978 draft halibut plan, which are to:

- (1) Rebuild the depleted halibut resource to a level of abundance which will produce long-term optimal yield.
- (2) Provide for a viable halibut setline fishery for United States fishermen.

The workshop participants determined that in order to work toward achievement of the objectives, it would be necessary for the Council to adopt the following management policies:

- (1) initially, prevent any expansion of fishing effort in the halibut fishery; and
- (2) move to implement a program which will reduce the level of potential effort in the halibut fishery over time.

The remainder of the workshop was devoted to discussion of the various policy alternatives, exploring the pros and cons of each to find the best solution for the Alaskan halibut fishery.

Discussion of Policy Alternatives

The discussion on policy alternatives was split into two parts; what should be done as an immediate measure, and what should be done as a longer-term measure. Of the two, the first is easier politically to implement. The amount of effort in the halibut fishery should be limited to that amount fished in some base year. The second policy, that of reducing the amount of effort in the fishery, is harder to implement. It requires some difficult decisions on the criteria by which participants are excluded from the fishery. These allocative decisions will generate a great deal of political pressure by those excluded, which the Council may not be willing to bear. The group discussed this point and were somewhat split in their opinions. Some felt that if the Council were not committed to implementing management policies one and two then they should not take partial action. The other opinion expressed was that a moratorium on participation in the halibut fishery could freeze effort at the present level and keep the fishery from further overcapitalization and biological stress. If a moratorium could achieve this, it would be worthwhile.

The various policy alternatives are discussed below, with some analysis of the effectiveness of each in mitigating the existing problems in the fishery.

The Status Quo. The first policy discussed was the status quo; leaving the fishery managed as it is at present. Given the recent history of the fishery, this alternative is not consistent with achievement of the stated objectives. If the trend for new entrants to the fishery continues as it has in the past, and no dramatic change occurs to the halibut population, then the season length would continue to decline. The problems caused by the short fishing

season would be exacerbated in future years, probably forcing the present full time halibut fishermen to participate in other fisheries. Halibut could become an incidentally caught species in the groundfish longline and trawl fisheries and the troll salmon fishery at some point in the future.

A Moratorium on Effort. To prevent further new entrants from entering the halibut fishery and exacerbating the existing problems, some type of moratorium is required. To be most effective, the moratorium would place a ceiling on nominal fishing effort. The usual approach to accomplish this is to limit the amount of one component of effort which a fisherman can use. A limit could be placed on the number of boats for example, however this would lead to an increase in some other component of halibut fishing effort. It was suggested that placing a limit on the number of standard skates^{1/} used in the fishery would have a more restrictive effect on effort than some other component of effort. Future increases in the amount of potential effort in the fishery would be halted at that amount in the fishery when the moratorium came into effect.

The initial number of skates in the fishery could be determined in a number of ways. One way would be to allocate to each vessel the number of skates fished in the past year (or series of years) as recorded by the IPHC. Alternative methods would be to allocate skates by the number of pounds landed during a base period, the size of the boat, or other criteria.

Implementation of a moratorium would tend to prevent further expansion of effort in the fishery, but it would not be a measure sufficient to extend the length of the fishing season. Extending the length of the fishing season by reducing fishing effort would improve the economic viability of the halibut fishery, one of the above stated fishery objectives. Policy alternatives which would help achieve this objective were discussed during the remainder of the workshop. It was felt by the workshop participants that a successful program would need a mechanism which would effectively reduce the amount of effort in the fishery. The following alternatives were discussed as possibilities for consideration.

Regulated Phase-Out. One of the first alternatives discussed was a regulated phase-out of fishing effort, to be implemented along with the moratorium on new entry into the fishery. There are several ways in which the phase-out could occur. One way would be to make allocations according to some qualifying criteria such as was done for the salmon limited entry program. Examples of possible criteria are: years of participation in the fishery, amount of landings of halibut, dependence on the halibut fishery, etc. A cut-off point would be established for fishermen; those above the cut-off point would remain in the fishery, and those below would be out. Licenses allocated could be attached to the individual fishermen, but the allocation would be for the number of skates which could be fished. It was felt that licenses should be made transferable to allow fishermen to make adjustments in their production to achieve the greatest output for their level of production inputs.

A major drawback to this alternative is that it is very difficult to implement. Alaska's salmon limited entry program was subject to political and legal pressure to allow inclusion of those legislated out of the fishery. The

^{1/} A standard skate is 1,800 feet long, with 100 hooks at 18-foot intervals.

program was therefore less effective than it was designed to be. In addition, the fishermen excluded from the halibut fishery on a qualification system similar to the salmon limited entry program would most likely be the smaller boats and marginal operators. If they were removed from the fishery, significant reduction in fishing effort would not be realized. The participation criteria could be designed to encourage specific fleet composition and still result in the desired decrease in total effort.

Transferable and Non-Transferable Licenses. This policy alternative would allow a transition period for those fishermen who would be phased out of the fishery. At the time of a moratorium, licenses to fish a certain amount of gear would be allocated to all fishermen participating in the fishery. Some of the licenses would be permanent and transferable. Others would be non-transferable and would expire when the fisherman with that license quit fishing. The criteria by which fishermen were assigned transferable or non-transferable licenses would be to some extent a political allocative decision on the part of the NPFMC. Examples of possible criteria would include boat size, years of participation in the fishery, etc. This type of limited entry program was implemented in British Columbia, using A and B licenses. Class A licenses were permanent and transferable; class B licenses were not transferable and were only valid for a specific time period.

A program of this type would not be successful in reducing the total amount of fishing effort unless an effective input restriction was used (e.g., skates for the halibut fishery). The British Columbia experience shows that merely freezing the number of boats only serves to shift capitalization to other non-restricted inputs of production. The incentive still exists under this type of system for an individual fisherman to do what he can to maximize his share of the quota. Since total potential fishing effort is not effectively reduced under this system, the short fishing season problem would not be alleviated.

Buy-Back Programs. Another policy alternative which would provide a reduction of effort following a moratorium on new entrants to the fishery is a buy-back program. This type of program would purchase the halibut fishing rights from fishermen willing to sell them. These rights would then be retired, reducing the amount of effort in the fishery.

The direct beneficiaries of such a program are those fishermen who remain in the fishery. If public funds were used to finance a buy-back program, the result would be a redistribution of government tax revenues to a small group of fishermen. It would be more equitable if those remaining in the fishery assumed the costs of the buy-back program. This could be accomplished by a tax on landings for example. Another source of buy-back financing discussed was a transfer tax on limited entry license sales. The transfer tax would apply each time a limited entry license was sold. There is a potential problem from fishermen exchanging permits at less than market value, but this potential problem could be reduced by giving the state first right of refusal for purchase of the license. This could also apply to transfers within a family so the tax would be based on benefits received by all fishermen.

The state has not been successful in its buy-back program for the salmon fishery, so there has not been a successful precedent in Alaska for this approach. Also, even after a successful buy-back program occurred, the

incentive for an individual fisherman to increase his fishing efficiency (effort) would still exist, because he would want to maximize his share of the catch quota.

Individual Fisherman Quotas: A Share System. The alternative favored by the workshop participants for application to Alaska's halibut fishery was the individual fishermen's quota or a share system. If successfully applied, this policy would allow achievement of the fishery objectives stated earlier. Under this type of effort limitation program, the amount of halibut available in the catch quota would be allocated to the participants in the fishery. The individual fishermen would actually be assigned a number of shares of the halibut resource, allowing him to take that amount of halibut at any time during the year. It was recommended that the smallest assigned unit in the fishery would be ten shares. The number of shares allocated to fishermen would be according to criteria such as landings during a base period, history of participation in the fishery, etc. The fishing shares would be transferable and could be freely traded or sold between fishermen. The share allocation would be a share of the total halibut quota, and the number of actual pounds allocated each year would vary on the basis of the strength of the halibut resource.

There are many advantages, and some disadvantages of the proposed share system. Because the halibut catch would be subject to the limits of a quota, based upon the status of the halibut resource, the objective of contributing to the rebuilding of the halibut resource could be attained.

This alternative is superior to the others discussed in improving the economic viability of the halibut fishery. By essentially providing property rights to a portion of the halibut quota to an individual fisherman, he would have the opportunity to minimize his production costs. If a fisherman wished to expand to a higher level of production, he would be able to purchase some shares to allow that. Conversely, if a fisherman were not able to, or did not wish to catch his share, then he would be able to sell that share to another fisherman who could. The transferability of the shares should, over time, ensure that returns to fishermen are maximized, since each would have an incentive to produce his production in the most efficient (least cost) manner possible.

Another advantage of this system would be possible improvements in halibut products reaching the final consumer. Fishermen would be able to catch their quota in a manner which would best meet the market demands. Halibut could become available on restaurant menus year-round as a fresh product. It is also possible that processing companies would provide incentives for fishermen to take the quota over a shorter period of time if the economic feasibility of their processing operation required a short, intense season. The advantage of the share system over some of the other alternatives is that production decisions could be made by those in the fishery on an economic basis, rather than operating in response to regulatory requirements which may not be the most efficient way to operate.

There are a couple of drawbacks to the share system which were discussed. Probably the most important is the possibility of enforcement problems. Halibut could be caught all year rather than during a short season, which would make it more difficult for enforcement people to catch those fishing illegally. It was decided however, that the problems of enforcement and the

costs of cheating due to the share system would perhaps be not significantly greater than under other policy alternatives, including the present situation. If enforcement was seen to be a problem by the NPFMC, than a system to cope with the problem could be devised.

Another problem with the quota system is that it is a relatively new concept, and could be met with resistance by fishermen, despite of its advantages. To varying degrees, fishermen are risk takers and want the opportunity to make a big catch that will provide them with an economic windfall. Putting an upper limit on the amount a fisherman can catch changes the nature of his business to some extent. Although this problem may be more perceived than real due to the transferability of the shares, it may make acceptance of the share system by fishermen difficult.

A last problem which was discussed was the concern expressed by fishermen that a system of this type would allow large companies to buy up fishing rights and gain monopoly control of the halibut fishery. This problem could be mitigated by restrictions within the system implemented, however existing anti-trust legislation probably provides sufficient protection.

Summary

It is difficult to thoroughly explore and discuss all the issues relating to a limited entry program in the halibut fishery during a one and a half day workshop. Due to the long experience of many of the participants however, it was possible to provide direction for further action to evaluate and implement a limited entry program.

The workshop served to emphasize that there are no easy or obvious solutions to the problems of the halibut fishery in Alaska. The present status quo presents dangers to the continuation of a viable fishery. Some reduction of effort is the key to long run economic viability of the halibut fishery. Many policy alternatives were discussed which would result in decreased effort but there are significant problems with each approach. (The share system was agreed to as the approach which would best facilitate achievement of the fishery objectives.) To obtain support from the fishing industry for the share system concept will probably take considerable effort. Fishermen need to be informed of both the favorable and unfavorable aspects of the share system.

The next step is to further evaluate the benefits and costs of implementing the share system and perhaps other alternatives. The Limited Entry Workgroup of the NPFMC perhaps is the group that should take the lead in the further analysis necessary. The Council might also (or alternatively) wish to form a special workgroup, like a PDT, to work with implementing limited entry in the halibut fishery.

As the final recommendation of the workshop it was suggested that if the NPFMC wants a limited entry program implemented, action should be begun as quickly as possible. Recent entry trends indicate that increasing participation in the fishery is likely to continue, making effective effort reductions more difficult. The NPFMC could, as an initial step, recommend that the Secretary of Commerce serve general notice to the halibut fishery that 1980 will be considered the base year for participation in the fishery, and new entrants after that date will not receive licenses when some sort of program is implemented.

WORKSHOP PARTICIPANTS: HALIBUT LIMITED ENTRY

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TABLE 2. CLASSIFICATION OF HALIBUT VESSELS

Class 0 =	Undefined vessels. Includes Canadian vessels, United States vessels of unknown tonnage, packers, and trucks which transfer halibut between ports ^a .
Class 1 =	Vessels less than 5 net tons (nt) and less than 26 ft.
Class 2 =	Vessels less than 5 nt and greater than or equal to 26 ft.
Class 15 =	Vessels greater than or equal to 5 nt and less than or equal to 15 nt.
Class 25 =	Vessels greater than or equal to 16 nt and less than or equal to 25 nt.
Class 35 =	Vessels greater than or equal to 26 nt and less than or equal to 35 nt.
Class 45 =	Vessels greater than or equal to 36 nt and less than or equal to 45 nt.
Class 55 =	Vessels greater than or equal to 46 nt and less than or equal to 55 nt.
Class 65 =	Vessels greater than or equal to 56 nt.

^a This class is excluded from further analyses since its composition remains undefined and would not allow meaningful interpretation.

Source: Tables 2,5,6,7,16 and 18 are taken from the report, "The Applicability of Limited Entry to the Alaskan Halibut Fishery", contracted to Tetra Tech Inc. by the North Pacific Fishery Management Council.

TABLE 5. NUMBER OF VESSELS PARTICIPATING IN HALIBUT AND OTHER FISHERIES DURING 1977 AND 1978^a

Halibut Only	1977		Vessel Class			1978	
	No. Vessels Other Fisheries	Total	Halibut Only	Halibut Only	No. Vessels Other Fisheries	Total	
127	255	382	1	214	378	592	
24	235	259	2	47	305	352	
64	517	581	15	64	574	638	
5	169	174	25	9	188	197	
7	97	104	35	11	97	108	
7	36	43	45	6	41	47	
5	11	16	55	4	14	18	
4	21	25	65	9	16	25	
243	1,341	1,584	Total	364	1,613	1,977	
15%	85%	100%	Percentage	18%	82%	100%	

^a See Appendices I and II for distribution histograms of halibut contribution to annual catch by setline and troll vessel class and area (Chapter 4). Appendices IV and V present histograms of the annual gross returns attributable to halibut by setline vessel class (Chapter 6).

TABLE 6. HALIBUT VESSEL PARTICIPATION IN OTHER ALASKAN FISHERIES DURING 1977

Fishery	Vessel Class																Total Spp. Catch (10 ³)
	1		2		15		25		35		45		55		65		
	No. VSL	CTC ^c 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	
P.S. ^a Salmon	4	279	16	1,558	52	5,352	35	7,594	28	5,100	16	4,822	3	702	3	568	25,975
Gillnet Salmon	16	526	70	2,415	15	5,712	16	566	3	44	<3	6	<3	11	<3	4	9,284
Troll Salmon	216	550	157	1,170	289	2,824	99	1,355	45	470	8	87	5	47	6	41	6,544
Pot Blackcod									<3	<1							<1
L.L. ^b Blackcod	3	<1	16	55	50	411	27	597	23	210	9	238	3	92	<3	18	1,621
L.L. Groundfish	25	2	20	22	63	92	17	62	24	32	5	5	<3	<1	3	16	231
Trawl Groundfish			11	1	19	5	5	3	<3	<1	<3	391					400
L.L. Rockfish	18	3	27	13	66	99	35	77	19	38	8	13	3	7	<3	<1	250
Troll Rockfish	22	1	27	2	85	9	22	1	8	2			<3	<1	<3	<1	15
Trawl Rockfish											<3	<1					<1
P.S. Herring			<3	1	4	265	5	663	<3	407	5	1,153			<3	404	2,893
Gillnet Herring	<3	6	8	119	13	83	5	140	<3	16	<3	19					383
Dungeness Crab			3	13	8	45	3	1	<3	7					<3	2	68
King Crab	3	2	11	920	39	340	10	274	11	393	9	944	<3	1	6	969	3,843
Tanner Crab	<3	3	8	432	33	1,177	11	973	9	1,093	10	1,266	<3	154	6	610	5,708
Pot Shrimp	<3	7	8	66	31	221	<3	2									296
Trawl Shrimp					4	15			<3	14							29
Misc. Spp.	<3	1	24	1	38	4	11	1	6	3	7	11			<3	<1	21
Total	307	1,380	406	6,788	809	16,654	301	12,309	176	7,829	77	8,955	14	1,015	24	2,632	57,561

^a P.S. = Purse Seine

^b L.L. = Longline

^c 1b

TABLE 7. HALIBUT VESSEL PARTICIPATION IN OTHER ALASKAN FISHERIES DURING 1978

Fishery	Vessel Class																Total Spp. Catch (10 ³)
	1		2		15		25		35		45		55		65		
	No. VSL	CTC ^c 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	No. VSL	CTC 10 ³	
P.S. ^a Salmon	6	180	17	1,459	38	3,359	28	3,739	20	2,978	16	3,496	5	701	3	345	16,257
Gillnet Salmon	29	1,041	79	2,117	183	5,854	25	362	4	87	<3	44	<3	2			9,507
Troll Salmon	327	935	208	1,970	352	4,491	126	2,301	53	1,191	15	244	8	37	6	31	11,200
Pot Blackcod											<3	10					10
L.L. ^b Blackcod	4	<1	10	122	27	351	23	699	14	207	10	131	3	215	3	91	1,816
L.L. Groundfish	21	2	31	50	67	92	23	123	22	29	9	17	4	6	<3	<1	319
Trawl Groundfish	8	<1	11	3	13	12	5	<1	<3	<1	3	209	<3	2	<3	<1	226
L.L. Rockfish	26	2	32	25	70	96	27	41	24	27	5	3	3	12	3	3	209
Troll Rockfish	36	2	49	3	108	7	34	2	17	3	5	1	<3	<1			18
Trawl Rockfish			<3	<1					<3	1	<3	<1					1
P.S. Herring			<3	83	3	80	8	148			4	523	<3	1,109	<3	125	2,068
Gillnet Herring	8	28	13	69	17	76	5	12			<3	11	<3	35			231
Dungeness Crab	5	56	4	15	29	764	6	132	<3	40	<3	19	<3	<1	<3	9	1,035
King Crab	4	5	10	126	35	355	16	218	5	99	10	785	<3	9	3	80	1,677
Tanner Crab	3	134	11	536	37	817	17	1,051	5	358	8	1,278	<3	134	4	653	4,961
Pot Shrimp	<3	1	18	69	26	147	<3	4	<3	1							222
Trawl Shrimp			3	9	7	18					<3	1					28
Misc. Spp.	3	1	24	2	43	5	5	<1	9	2	3	46	<3	2			58
Total	480	2,387	520	6,658	1,055	16,524	348	8,832	173	5,023	88	6,818	23	2,264	22	1,337	49,843

^a P.S. = Purse Seine

^b L.L. = Longline

^c 1b

TABLE 16. GROSS RETURNS OF HALIBUT BY VESSEL CLASS FOR
U.S. SETLINE VESSELS DURING 1977^a

Vessel Class	No. Vessels	Gross Returns Halibut (\$)	Gross Returns All Species (\$)	% Halibut Gross Returns to Total
1	203	195,423	737,893	26
2	135	613,761	2,943,106	21
15	359	2,643,255	9,937,914	27
25	95	3,028,463	7,844,837	39
35	71	3,851,517	7,064,521	55
45	39	3,187,605	7,132,069	45
55	11	1,620,507	1,940,252	84
65	19	1,319,424	2,858,412	46
TOTAL	932	16,459,955	40,459,005	41

^a Detailed distribution of gross returns by vessel class are provided in Appendix IV.

TABLE 18. GROSS RETURNS OF HALIBUT BY VESSEL CLASS FOR
U.S. SETLINE VESSELS DURING 1978^a

Vessel Class	No. Vessels	Gross Returns Halibut (\$)	Gross Returns All Species (\$)	% Halibut Gross Returns to Total
1	352	288,204	1,612,477	18
2	188	811,748	3,679,181	22
15	368	3,660,515	11,575,382	32
25	92	4,456,409	8,319,015	54
35	71	5,630,208	8,433,780	67
45	35	3,563,064	6,195,526	58
55	11	2,526,924	2,939,342	86
65	19	1,338,283	2,012,380	67
TOTAL	1,136	22,275,355	44,767,083	50

^a Detailed distribution of gross returns by vessel class are provided in Appendix V.