MEMORANDUM

TO: Richard Lauber, Chairman
NPFMC

FROM: John Roos, Chairman
Bycatch Cap Committee

DATE: September 15, 1992

SUBJECT: Summary of first committee meeting

The Council's new Bycatch Cap Committee held its first meeting on September 11, 1992, in Seattle. Committee members include:

John Roos (Chair)	Pacific Seafood Processors Association
Jim Beaton	Yukon Queen Fisheries
Chris Blackburn	Alaska Groundfish Databank
Joe Blum	American Factory Trawlers Association
Kate Graham	American High Seas Fisheries Association
Linda Kozak	Kodiak Longline Vessel Owners' Association
Denby Lloyd	Aleutians East Borough
Mark Lundsten	Longline fisherman
Jerry Nelson	Pot fisherman
Janet Smoker	Fisheries Information Services
Arni Thomson	Alaska Crab Coalition

All were present at the meeting except for Joe Blum who was detained in Washington, DC.

Attachment 1 is the meeting agenda. The committee reviewed its charge from the Council in August which was to review the ". . . entire issue of halibut caps, halibut mortality, the validity of the data used, and the equity of the caps . . .," and heard excellent reports by the staffs of the National Marine Fisheries Service and the International Pacific Halibut Commission. Written materials that accompanied the reports are in Attachment 2.

Attachment 2(a) reviews the history of bycatch controls. Until 1983 most bycatch controls were time/area closures. Amendment 3 to the BSAI FMP implemented PSC caps and a reduction schedule for the foreign fisheries. Domestic fisheries in the BSAI and the GOA early-on had time/area closures and these were supplemented by PSCs, season delays, and the vessel incentive program.

Attachments 2(b) and 2(c) give IPHC views on halibut bycatch. The IPHC believes that the bycatch performance of the foreign fleets in the mid-1980s should be used as a target for DAP bycatch limits and that the halibut caps should be reduced 10% annually for five years starting in 1993, based on individual incentive programs. Their goal is to allow each nation to reasonably harvest its groundfish resources while minimizing halibut bycatch mortality. Attachment 2(c) also describes how mortality estimates are developed, recommends research to determine survival rates and minimize bycatch rates, and suggests five types of management measures to address halibut mortality: individual incentives, cut gangions, on-deck sorting, time-area measures, and allocation among gears or fisheries. IPHC believes that halibut bycatch in Alaska waters is costing the Canadians about 2-3 million pounds

annually. In 1959-1960 the halibut quota was 70 million pounds and the British Columbia quota was 25 million pounds. Foreign trawling started up in the 1960s. By the 1980s the Canadian quota was only 10 million pounds. It is the IPHC's belief that Canadian stocks cannot reach their potential because of the interception of juveniles off Alaska.

Attachment 2(d) is a report from the bycatch plan team presenting a justification for regulatory intervention to control bycatch, goals and objectives of bycatch management, definitions of various terms, and characteristics of a comprehensive long-term solution to the bycatch problem. The team believes that individual bycatch quotas offer the best method to reduce bycatch, recognizing that legal and technical problems may inhibit implementation.

Attachments 2(e-i) summarize halibut bycatch mortality by fishery and target species in 1990-1992, the amounts and value of groundfish foregone due to PSC limits, and the value of the halibut saved, rates of bycatch in various fisheries and gears in 1990, and the methodology and data that NMFS uses to estimate bycatch and manage the fisheries. Attachment 2(j) provides information on the discard condition of halibut in the 1991 groundfish fisheries and the implications of discard mortality rates.

Committee Recommendations

Members of the Cap Committee hold a variety of views, but generally agree that both short-term and long-term solutions to bycatch problems are needed. The Committee only met for one day and is not prepared now to offer extensive evaluations of, or comprehensive solutions to, the bycatch dilemma. The Committee does, however, have several recommendations for Council consideration.

Immediate Action. For 1993, only issues dealing directly with reducing halibut bycatch and mortality, within the existing caps, can be addressed. The Committee discussed the following management options which could be implemented in the short term to reduce halibut bycatch and mortality:

1. Time-area closures such as for the Pacific cod longline fishery during the summer,
2. Cutting of longline gangions in the Bering Sea Pacific cod fishery,
3. Slower trawl speeds,
4. No trawling at night for Pacific cod,
5. On-deck sorting and discard of halibut PSC,
6. Quicker turnaround of halibut bycatch data to the fleet to help them reduce bycatch, and
7. Assigning halibut bycatch mortalities by fishery (e.g., Pacific cod vs sablefish) rather than solely by gear type.

The Committee recognizes that restrictions on trawl speeds would be very difficult to enforce, and that cutting of gangions may pose safety problems to small vessels.

Intermediate Action. Apportionments of the existing halibut PSCs should be examined from the perspective of fairness and the optimal utilization of bycatch in the target fisheries. The Committee may be able to prepare recommendations along these lines for presentation to the Council in December. There also was discussion about calculating bycatch rates on the basis of retained catch, rather than total catch, and the need for an effective vessel incentive program.

Longer-term Considerations. There appeared to be general agreement that PSCs serve as a stop gap, or band-aid approach and that the Council should vigorously pursue more comprehensive management measures to rationalize the fisheries. One idea includes IFQs/IBQs. The Committee

may discuss these issues for halibut and then other PSC species, after recommending corrections to the halibut bycatch regime for 1993.

Committee Requests for Information

The Committee requested the following information for future consideration:

1. Data on migration of halibut from the Bering Sea to British Columbia. What age group migrates and what percentage migrates from and to each area?
2. Formulas used to derive the estimate that one pound of halibut bycatch reduces yield to the target fishery by 1.6 pounds.
3. Percentage of juveniles and adults, and size frequencies for halibut taken in various fisheries.
4. Bycatch data by number and weight for each fishery.
5. Bycatch rates calculated for each target fishery against retained catch.
6. Sample sizes for determining bycatch rates.
7. A review of each target fishery, its use of halibut, and its ratio of economic gain/loss.
8. Further analysis of the adequacy of basket sampling for determining salmon bycatch.
9. Update Attachment 2(f) to include 1992 groundfish catch/value foregone because of halibut PSC, and catch and value to halibut directed fisheries.

Other Meeting Attendees

Steve Pennoyer	Rudy Petersen	Don McCaughran	Ed Wyman
Clarence Pautzke	Joe Terry	Russ Nelson	
Sue Salveson	Galen Tromble	Bob Trumble	
Ron Berg	Sarah Hemphill	Dick Tremaine	
Shari Gross	Thorn Smith	Dave Benson	
George Anderson	Mike Symanski	John van Amerongen	

Derivation and use of Discard Mortality Rate Estimates

Longline and pots--little quantitative data

- Longline
  - Excellent-- 2-5% minimum mortality from longline handling--Peltonen study
  - Poor--1/2 of excellent--Myhre study
  - Dead--100%
- Pots
  - Excellent--0%
  - Poor-Dead--100%

Evaluation

- Use best judgement of researchers--SSC approved methodology
- Credible, repeatable condition data
- Need quantitative data for longline and pot
- Need improvements for trawl
- Need to fix Excellent catagory

Recommended Research Needed for Bycatch Management

Survival rates

- Condition factor--tagging for improved survival estimates
  - Longline
  - Trawl
  - Pot
- Absolute value for "excellent"--cage, tank, smart tag
  - Large halibut
  - Small halibut
- Relation between handling and condition factor

Bycatch Rates

- Halibut and fishing gear interactions--trawl-camera
- Halibut behavior--vision, hearing
- Observer data analysis--time-area; day-night; halibut size; annual changes

Management measures

- Individual incentives
- Cut gangions
- On-deck bycatch sorting
- Time-area measures
- Allocation among gears or fisheries

Swiftsure Bank. As a result, the north Washington coast stayed 1,000 pounds within its sport quota but Canada's sport catches swelled. The catch in Canadian waters by Washington recreational fishermen totaled roughly 123,000 pounds, or about 20% of the Canadian recreational halibut fishery.

In the Strait of Juan de Fuca and Puget Sound, fishermen brought in nearly 57,698 pounds in 1990 — 18,000 pounds more than their quota. Preliminary estimates of catch per unit effort (CPUE) indicated that sport fishermen's CPUE increased significantly from 0.04 fish per trip in 1989 to a record 0.18 fish per trip in 1990.

BYCATCH IN 1990

The ocean is a bountiful web of life, as all fishermen discover when they drop a longline baited for Pacific halibut and pull up yelloweye rockfish, Pacific cod, and sablefish along with their catch. These unintended species are called bycatch. Pacific halibut are bycatch, too — often dragged up on longlines or in pots or trawl nets aimed at other fish and shellfish. No fishery is without bycatch, and the bycatch issue is probably the most complex puzzle to grab hold of the Pacific commercial fishing business in a long time. Pacific halibut fishermen are especially concerned because bycatch is shaved directly off the top of the available catch along with sport harvest and waste, thus reducing the commercial quota (Figure 3). Until we learn how to avoid species we are not targeting, we will have to live with fishery closures, observers, regulations, and penalties — and with the risk of depleting one fisherman's pocket for the benefit of another.

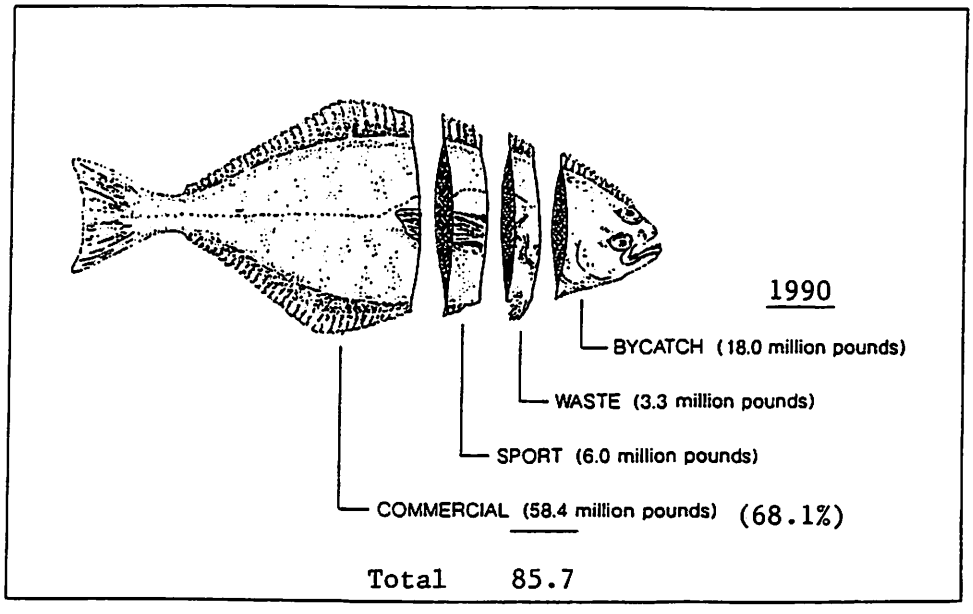

Figure 3. An illustration of how the Pacific halibut allowable catch is divided according to usage, in millions of pounds. (Drawing by Joan Forsberg)

Bycatch Plan Team

I. Justification for Regulatory Intervention

The Bycatch Team prepared the following statement concerning the justification for current and future regulatory intervention to control bycatch in the groundfish fishery.

> The total cost of bycatch includes: (1) benefits foregone from the species taken as bycatch; (2) the total cost of actions taken by groundfish fishermen to reduce bycatch (e.g., increased harvesting costs and foregone catch); and (3) agency costs associated with bycatch management. In the absence of any bycatch management measures, the total cost of bycatch will be too high, the levels of bycatch will be too high, the actions taken by groundfish fishermen to control bycatch will be inadequate, and the total cost will be borne principally by those who benefit from catch in the other fisheries. This is because, without regulatory intervention, groundfish fishermen bear much of the cost of controlling bycatch but do not receive the benefits. Therefore, some actions to control bycatch that would provide positive net benefits to society are not taken because, for the fisherman who decides what actions to take, the costs exceed the benefits. More succinctly, fishermen are making the wrong decisions from society's perspective because there are external benefits and costs. Therefore, regulatory intervention can increase the total benefits derived from the fisheries.

II. Goals and Objectives of Bycatch Management

The Team prepared the following goals and objectives statement.

> The goal of bycatch management is to reduce bycatch to the level beyond which further reductions would be expected to increase the total cost of bycatch by preventing the groundfish OYs from being taken in a cost effective manner.
>
> In interpreting this goal, costs are as broadly defined as is appropriate given the biological, conservation, and socioeconomic goals and objectives of the FMPs, the MFCMA, the Halibut Act, Federal law, and international treaties. The costs include those associated with: (1) not meeting conservation objectives; (2) disrupting and displacing traditional fisheries; (3) foregone catch; (4) decreased product prices; (5) increased harvesting and processing costs; and (6) waste.
>
> The objectives of bycatch management are listed below.
>
> 1. Prevent overfishing and maintain the long term viability of the stocks.
>
> 2. Provide the groundfish fishery with incentives and the freedom to develop and use effective and efficient methods of reducing bycatch mortality.
>
> 3. Use bycatch management measures that minimize the cost of attaining specific reductions in bycatch mortality.
>
> 4. Improve our ability to estimate bycatch mortality and its effects.
>
> 5. Assist the groundfish fishery in identifying effective methods of reducing bycatch rates and discard mortality rates for all species.

III. Definitions of Terms

In order to facilitate discussion of the issue and to avoid one potential source of confusion, the Team will be using the following definitions of commonly used terms.

Bycatch:	Any species, size class, or sex of fish and shellfish that a fisherman catches inadvertently under the current regulatory or economic environment.
Bycatch Mortality:	Any inadvertent fishing mortality.
Target fishery:	A management definition for regulatory use and enforcement purposes that categorizes the aggregate activity of a fishing vessel during a fishing trip.
Cost:	Costs are expressed as the opportunity value foregone or alternate use of the resource. This is not just monetary expenditures made by operators. Components of cost could include use of time, effort, money, etc that reflect their foregone value. The measurements would be compatible with the types of costs listed in Section E.
Benefit:	Benefits reflect the total private and public value or use gained from the resource. Again this is not necessarily limited to actual monetary expenditures.
Total Bycatch Cost:	The total cost of bycatch is the sum of the impact, control, and agency costs of bycatch.
Impact Cost:	Bycatch impact cost is the benefit foregone due to bycatch mortality. For example, it includes foregone benefits to halibut fishermen as the result of halibut bycatch mortality.
Control Cost:	Bycatch control cost is the total cost of actions taken by groundfish fishermen to reduce bycatch. It includes increased harvesting costs and the decrease in benefits to groundfish fishermen associated with foregone groundfish catch.
Agency Cost:	Bycatch agency cost is the cost borne by management agencies as the result of bycatch management.

Additional terms will be defined as is necessary.

IV. Characteristics of a Comprehensive Long-Term Solution to the Bycatch Problem for the Groundfish Fishery

To provide a better understanding of what is meant by a comprehensive long-term solution to the bycatch problem for the groundfish fishery and to prevent false expectations concerning such a solution, the Bycatch Team prepared the following statement.

The following are among the characteristics of a comprehensive long-term solution to the bycatch problem.

1. It is based on a well defined problem and goal.

2. It addresses the source of the problem, not just the symptoms.

3. It provides the flexibility required to:

   a. be extended readily to other bycatch species and fisheries and

   b. remain effective as biological and economic conditions change and as fishing operations respond to the bycatch management measures.

4. It is based on achievable data and information requirements.

5. It may be developed and implemented in stages so that the existing bycatch management measures can be supplemented or replaced gradually if necessary.

6. It will be constrained by a number of factors including:

   a. funding and staffing,

   b. the MFCMA, other laws, and international treaties. and

   c. the race for fish associated with open access fisheries.

7. It will have consistent bycatch management measures among areas, gear types, user groups, and species unless differences are justified.

8. It will maximize the net benefits that accrue to the nation from actions taken to control bycatch. The Council and Secretary must decide how to weight various benefits and costs. The weights given to different benefits and costs determine the net benefits of various alternatives. The benefits include reductions in the types of costs identified in the goal statement (Section E).

V. Process for Selecting Short and Long-Term Alternatives

The Team recommends that the statements concerning the goal and objectives and the characteristics of a comprehensive long-term solution to the bycatch problem for the groundfish fishery be used to identify tentative solutions and that the list of measures to be considered then be narrowed based on feasibility with respect to:

1. time,
2. resources,
3. data,
4. legal issues, and
5. other constraints.

The severity of the problem a measure addresses should also be considered.

Prepared by S. Salveson
National Marine Fisheries Service
Alaska Region
September 7, 1992

Table 1. Halibut bycatch and bycatch mortality statistics for the 1990 - 1992 Alaska groundfish fisheries (number in parentheses reflect IPHC discard mortality assumptions if mortality rate less than 1.0)[1/]

FISHERY	HALIBUT BYCATCH MORTALITY (metric tons) 1990		1991		1992 (through 8/23/92)	
Gulf of Alaska (GOA) - Trawl						
Pollock - bottom trawl	32	(16)	617	(401)	26	(17)
Pollock - pelagic trawl	4	(2)	32	(21)	4	(3)
Pacific cod	1,776	(888)	924	(601)	706	(459)
Deepwater flatfish	1,142	(571)	936	(608)	900	(585)
Shallow water flatfish	-		39	(25)	83	(54)
Rockfish	1,182	(591)	1,216	(790)	643	(418)
Sablefish	92	(46)	6	(4)	2	(1)
Arrowtooth	-		-		1	(1)
Other	-		49	(32)	191	(124)
TOTAL	4,228	(2,114)	3,819	(2,482)	2,556	(1,662)
GOA Hook-and-line						
Pollock	-		-		38	(6)
Pacific cod	385	(50)	947	(152)	1,099	(176)
Deepwater flatfish	-		4	(1)	-	
Shallow water flatfish	-		-		trace	
Rockfish	77	(10)	57	(9)	64	(10)
Sablefish	6,946	(903)	4,144	(663)	2,055	(329)
Arrowtooth	-		-		1	(-)
Other	-		7	(1)	1	(-)
TOTAL	7,408	(963)	5,159	(825)	3,258	(521)
GOA Other						
Groundfish - Pot gear	32	(4)	49	(5)	36	(4)
Groundfish - Jig,other	-		53	(8)	41	(7)
TOTAL	32	(4)	102	(14)	77	(11)
TOTAL GOA HALIBUT BYCATCH	**11,668**	**(3,081)**	**9,080**	**(3,320)**	**5,891**	**(2,194)**

Attachment 2(e)

Table 1 (cont.)

FISHERY	HALIBUT BYCATCH MORTALITY (metric tons) 1990		1991		1992 (through 8/23/92)	
Bering Sea/Aleutians (BSA) - Trawl						
Pollock - bottom trawl	114		1,166	(874)	743	(557)
Pollock - pelagic trawl	112		582	(436)	952	(714)
Pacific cod	3,133		1,818	(1,364)	1,638	(1,228)
Rockfish	233		44	(33)	184	(138)
Flatfish	570		-		-	
Rocksole (+othflats in '92)	-		929	(697)	748	(561)
Yellowfin sole (+othflats in '91)	-		776	(582)	353	(265)
Greenland turbot/Arrowtooth	825		638	(478)	1	(1)
Sablefish	5		1	(1)	1	(1)
Atka mackerel	83		64	(48)	110	(82)
Other	-		72	(54)	-	
JV Flatfish	800		-		-	
TOTAL	5,875		6,090	(4,567)	4,730	(3,547)
BSAI - Hook-and-line						
Pollock	-		4	(1)	-	(-)
Pacific cod	1,730	(225)	2,549	(407)	5,709	(913)
Sablefish	298	(39)	230	(37)	236	(38)
Other	87	(11)	100	(16)	10	(2)
TOTAL	2,115	(275)	2,883	(461)	5,955	(953)
BSAI - Pot						
Pacific cod	21	(3)	38	(4)	59	(6)
TOTAL BSAI BYCATCH MORTALITY	**8,011**	**(6,153)**	**9,011**	**(5,032)**	**10,744**	**(4,506)**
TOTAL BYCATCH MORTALITY	**19,679**	**(9,234)**	**18,091**	**(8,352)**	**16,635**	**(6,700)**

1/ IPHC MORTALITY RATE ASSUMPTIONS:

YEAR	TRAWL GOA	TRAWL BSA	HOOK-AND-LINE	POT
1990	.50	1.0	.13	.12
1991	.65	.75	.16	.10
1992	.65	.75	.16	.10

Table 2. 1990 - 1992 halibut bycatch limits and NMFS's estimate of annual bycatch mortality in the Alaska groundfish fishery based on specified annual halibut mortality assumptions.

Area	Species	Fishery	Bycatch Mortality Allowance (mt)	Bycatch Mortality (mt) [1]	Groundfish Catch * (mt)	
		1990 Halibut				
BSAI						
		MW Pollock	-	-	[1,231,929]	
		Flatfish	567	570	32,257	
		"other"	3,966	4,505	440,569	
		Pot gear	-	3	1,418	
		H&L gear	-	275	58,097	
		JV flat.	800	800	133,320	
GOA		MW Pollock	-	-	[64,947]	
		Trawl	2,000	2,114	137,440	
		H & L	700	963	30,698	
		Pot	-	4	7,024	
	TOTAL		8,083	9,234	851,905	[2,083,834]
		1991 Halibut				
BSAI		MW Pollock	-	-	[1,269,456]	
		Flatfish	800	776	125,358	
		rocksole	1,100	929	46,772	
		Turbot	200	638	6,878	
		"other"	3,233	3,747	238,797	
		H & L	-	461	73,913	
		Pot	-	4	4,370	
GOA		MW Pollock	-	-	[80,790]	
		Trawl	2,000	1,910	120,614	
		H & L	750	833	29,334	
		Pot	0	6	10,605	
		Other	-	0	12	
	TOTAL		8,083	9,304	656,655	[2,006,901]

* Catch figures in brackets [] include midwater pollock harvests.

Table 2 (Cont.)

Area	Species	Fishery	Bycatch Mortality Allowance (mt)	Bycatch Mortality (mt) [1]	Groundfish Catch (mt)
1992 Halibut - through August 23, 1992					
BSAI	Trawl				
	Yellowfin sole		849	353	73,530
	rocksole/ other flats		755	749	59,203
	Turbot/sab/arrow		0	1	7,418
	Pacific cod		1,537	1,638	65,045
	Rockfish		200	184	15,368
	Pollock/ Atka/other		1,692	1,805	1,169,485 57,927
BSAI	H & L		-	953	93,773
BSAI	Pot		-	6	11,368
GOA					
	Trawl		2,000	1,662	170,886
	H & L		750	528	32,783
	Pot		0	4	9,119
	TOTAL		7,783	7,882	1,765,905

1/ ANNUAL HALIBUT MORTALITY RATE ASSUMPTIONS SPECIFIED FOR NMFS'S INSEASON MONITORING OF BYCATCH LIMITS:

	TRAWL		HOOK-AND-LINE	POT
YEAR	GOA	BSA		
1990	.50	1.0	.13	.12
1991	.50	1.0	.16	.12
1992	.65	1.0	.16	.10

Table 3 Fishery closures in 1990 - 1992 due to halibut bycatch.

FISHERY	AREA	DATE
BSAI - 1990		
JV Flatfish	Zone 2H	02/27 - 12/31
JV Flatfish	BSAI	03/05 - 06/24
DAP Flatfish	Zone 1/2H	03/14 - 12/31
DAP Flatfish	BSAI	03/19 - 08/04
DAP plck/cod	Zone 1/2H	05/30 - 12/31
DAP plck/cod	BSAI	06/30 - 12/31
JVP Flatfish	BSAI	07/01 - 12/31
DAP Flatfish	BSAI	11/16 - 12/31
GOA - 1990		
DAP H&L	GOA	05/29 - 06/30
DAP Non-pel	GOA	05/29 - 06/30
DAP H&L	GOA	07/01 - 12/31
DAP Non-pel	GOA	11/21 - 12/31
BSAI - 1991		
Plck/cod	Zone 1/2H	02/17 - 03/31
Plck/cod	BSAI	03/08 - 03/31
Rock sole	Zone 1/2H	03/15 - 12/31
Plck/cod	Zone 1/2H	04/19 - 05/03
Plck/cod	Zone 1/2H	05/03 - 12/31
Plck/cod	BSAI	05/08 - 07/01
Rock sole	BSAI	06/06 - 12/31
Plck/cod	BSAI	07/08 - 12/31
Flatfish	Zone 1/2H	09/16 - 12/31
Flatfish	BSAI	10/15 - 12/31
Gturb/arrowth	BSAI	10/21 - 12/31
GOA - 1991		
Non-pel Twl	GOA	05/08 - 07/01
Hook & line	GOA	07/08 - 12/31
Non-pel Twl	GOA	10/15 - 12/31

Table 3 (cont). 1992 fishery closures through June 16 due to halibut bycatch.

FISHERY	AREA	DATE
BSAI - 1992		
P.cod	BSAI	02/16 - 03/07
Pollock	BSAI	02/16 - 03/06
Rock sole	BSAI	02/23 - 03/29
Rock sole/other flat.	BSAI	04/04 - 06/29
Rockfish	BSAI	04/26 - 06/29
Pacific cod	BSAI	05/06 - 06/29
Pacific cod	BSAI	06/03 - 12/31
Rocksole/other flat.	Zone 1&2H	07/01 - 12/31
Rockfish	BSAI	07/08 - 12/31
Rocksole/other flat.	BSAI	08/24 - 12/31
GOA - 1992		
Non-pelagic trawl fisheries	GOA	03/22 - 03/29
All trawl fisheries except pelagic trawl for pollock	GOA	05/04 - 07/01
All trawl fisheries except pelagic trawl for pollock	GOA	08/05 - 09/30

ESTIMATED COSTS OF THE HALIBUT BYCATCH PROBLEM IN THE 1990-91 ALASKA GROUNDFISH FISHERIES[1]

Impact Costs of 1990 Bycatch Mortality on Directed fishery

1990 halibut bycatch mortality -	9,234 mt	
Foregone value of '90 bycatch to the halibut fishery[2] -		$ 50,787,831

Estimated 1990 Foregone Groundfish Catch and Value[3] Resulting From Halibut Bycatch Management Measures.

Joint Venture flatfish	116,244 mt	$19,528,992[4]
BSAI Rocksole	11,250 mt	9,720,000
BSAI Pacific cod	24,000 mt	25,080,000
GOA sablefish (H & L)	1,500 mt	4,450,500
GOA mixed flatfish	6,000 mt	3,780,000
GOA Pacific cod (trawl)	20,000 mt	20,900,000
Total	178,994 mt	$83,459,492

TOTAL 1990 costs of halibut and groundfish foregone = $134,247,323

Impact Costs of 1991 Bycatch Mortality on Directed fishery

1991 halibut bycatch mortality -	8,352 mt	
Foregone Value of '91 bycatch to the halibut fishery[1] -		$ 45,936,752

Estimated 1991 Foregone Groundfish Catch and Value[2] Resulting From Halibut Bycatch Management Measures.

BSAI Other flatfish	6,000 mt	$ 3,780,000
BSAI Yellowfin sole	10,000 mt	4,490,000
BSAI Rock sole	15,000 mt	12,960,000
BSAI Pacific cod	20,000 mt	20,900,000
GOA Flatfish	6,694 mt	4,217,220
GOA Arrowtooth Flounder	2,545 mt	1,114,710
GOA Rockfish	4,600 mt	3,394,800
GOA sablefish (trawl)	360 mt	325,080
GOA sablefish (H & L)	750 mt	2,225,250
Total	65,949 mt	$52,407,060

TOTAL 1991 costs of halibut and groundfish foregone = $99,343,811

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[1] Estimated costs do not include management costs or costs to the groundfish industry other than foregone groundfish

[2] Estimated unit value of impact costs to the directed halibut fishery is $5,500.09 per metric ton of halibut bycatch (from EA/RIR/IRFA prepared for Amendment 21 to the BSAI FMP).

[3] Values of foregone groundfish harvest are based on average 1990-91 first wholesale values of BSAI groundfish (from EA/RIR/IRFA prepared for Amendment 21 to the BSAI FMP).

[4] JVP value of flatfish based on value paid to U.S. harvesting vessels ($168/mt).

BSAI 1990

Attachment 2(g)

Table 14.--U.S. domestic groundfish catch and Pacific halibut catch (in metric tons (t)) by target fishery and zone in the Bering Sea and Aleutians Islands region, 1990.

Fishery	Zone	Groundfish catch (t)	Pacific halibut			
			Catch (t)	Kg per t of groundfish	% within zone	% of total Pacific halibut bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	426.44	12.1	44.8%	5.8%
	2	12,124.7	82.06	6.8	2.6%	1.1%
	3	17,014.6	66.90	3.9	2.1%	0.9%
	Total	64,354.9	575.40	8.9	-	7.8%
Pollock mid-water (All gears)	1	31,215.3	6.63	0.2	0.7%	0.1%
	2	788,589.8	83.42	0.1	2.6%	1.1%
	3	388,334.3	23.17	0.1	0.7%	0.3%
	Total	1,208,139.4	113.22	0.1	-	1.5%
Pollock bottom (All gears)	1	17,479.8	26.86	1.5	2.8%	0.4%
	2	81,997.3	78.16	1.0	2.5%	1.1%
	3	19,350.2	20.36	1.1	0.6%	0.3%
	Total	118,827.3	125.38	1.1	-	1.7%
Other (Trawl)	1	31,635.3	440.10	13.9	46.2%	6.0%
	2	100,800.4	1,285.40	12.8	40.4%	17.5%
	3	46,717.9	1,509.04	32.3	47.0%	20.5%
	Total	179,153.6	3,234.54	18.1	-	44.0%
Other (Longline)	1	136.8	18.79	137.4	2.0%	0.3%
	2	44,879.7	1,337.50	29.8	42.0%	18.2%
	3	5,940.9	404.07	68.0	12.6%	5.5%
	Total	50,957.4	1,760.36	34.5	-	24.0%
Other (Pot)	1	542.1	3.67	6.8	0.4%	0.0%
	2	511.2	4.08	8.0	0.1%	0.1%
	3	364.8	13.77	37.7	0.4%	0.2%
	Total	1,418.1	21.52	15.2	-	0.3%
Turbot (All gears)	1	71.6	5.79	80.9	0.6%	0.1%
	2	3,776.2	199.08	52.7	6.3%	2.7%
	3	13,361.9	671.79	50.3	20.9%	9.1%
	Total	17,209.7	876.66	50.9	-	11.9%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	3.20	9.1	0.1%	0.0%
	3	110.6	1.64	14.8	0.1%	0.0%
	Total	463.1	4.84	10.5	-	0.1%
Sablefish (Longline)	1	323.6	24.40	75.4	2.6%	0.3%
	2	487.6	48.72	99.9	1.5%	0.7%
	3	2,733.1	212.74	77.8	6.6%	2.9%
	Total	3,544.3	285.86	80.7	-	3.9%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	60.51	8.8	1.9%	0.8%
	3	24,655.7	180.18	7.3	5.6%	2.5%
	Total	31,503.1	240.69	7.6	-	3.3%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	106.33	3.5	3.3%	1.4%
	Total	30,807.7	106.33	3.5	-	1.4%
Total (All gears)	1	116,620.1	952.68	8.2	-	13.0%
	2	1,040,366.8	3,182.13	3.1	-	43.3%
	3	549,391.7	3,209.99	5.8	-	43.7%
	Total	1,706,378.6	7,344.80	4.3	-	-

nf = No fishing.

Table 12.--Incidence rates (weight in kg per metric ton of catch) and average weight (kg) of Pacific halibut taken in domestic groundfish catches in the Bering Sea and Aleutian Islands region by gear type and target fishery, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	17.67	0.51	--	--	2.24	0.73	--	--	ns	ns	8.24	0.56	55.79	1.61	2.01	0.83	--	--	--	--
Feb.	17.24	0.74	--	--	28.72	3.02	--	--	ns	ns	6.23	0.81	21.54	2.08	ns	ns	--	--	--	--
Mar.	11.18	0.81	--	--	10.71	2.50	--	--	276.09	3.76	--	--	23.79	1.92	1.76	1.91	101.44	6.27	--	--
Apr.	16.98	0.73	5.43	1.15	9.12	1.64	--	--	--	--	--	--	32.32	1.33	ns	ns	--	--	--	--
May	18.04	2.65	13.01	0.79	--	--	--	--	51.08	5.40	14.02	1.23	26.41	2.33	4.69	1.60	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.12	4.27	0.00	0.00	115.33	3.44
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	1.15	7.14	3.26	2.59	1.60	7.82	--	--	2.80	8.49	--	--	23.11	7.30	--	--
Sep.	--	--	--	--	0.52	9.11	0.30	12.30	--	--	--	--	0.00	0.00	--	--	ns	ns	--	--
Oct.	--	--	--	--	2.43	9.93	1.72	2.03	--	--	--	--	10.95	13.71	--	--	0.97	2.58	--	--
Nov.	--	--	--	--	7.03	3.06	18.97	1.26	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	31.94	1.07	--	--	--	--	--	--
Year	16.87	0.75	11.14	0.82	4.10	3.40	3.99	1.55	70.03	3.84	9.09	0.66	23.56	1.81	1.99	2.55	7.72	5.55	115.33	3.44
Bottom trawl (pollock target)																				
Jan.	0.39	1.46	--	--	--	--	--	--	ns	ns	1.62	4.93	59.62	3.15	--	--	--	--	ns	ns
Feb.	2.41	0.65	--	--	0.30	2.03	--	--	126.79	4.08	--	--	11.18	3.35	0.63	1.60	0.00	0.00	--	--
Mar.	1.13	0.60	--	--	0.45	1.27	--	--	142.77	12.25	0.00	0.00	1.48	5.08	0.34	4.63	0.00	0.00	--	--
Apr.	1.64	0.95	--	--	0.89	2.76	--	--	--	--	--	--	1.32	2.72	0.54	3.42	0.00	0.00	0.82	5.88
May	5.61	2.50	--	--	0.20	1.67	--	--	--	--	0.45	2.30	3.54	3.59	0.77	3.89	0.75	2.33	1.94	4.36
June	--	--	--	--	--	--	--	--	2.25	3.21	--	--	--	--	0.47	5.27	2.08	5.85	0.36	1.80
July	--	--	--	--	--	--	--	--	1.48	6.64	--	--	0.00	0.00	0.03	8.09	--	--	2.88	19.60
Aug.	--	--	--	--	36.59	6.62	--	--	0.75	7.00	--	--	0.00	0.00	0.08	17.06	0.00	0.00	5.72	29.75
Sep.	--	--	--	--	--	--	--	--	1.12	9.01	--	--	--	--	16.57	12.29	0.00	0.00	1.17	21.87
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.42	7.60	0.00	0.00	1.65	6.21
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.93	6.27
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.56	6.20
Year	1.64	0.90	--	--	0.53	1.63	--	--	3.51	3.73	0.26	3.62	1.68	3.74	0.37	4.91	0.60	4.39	3.03	6.83

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	12.00	1.29	--	--	--	--	--	--	107.97	1.48	9.31	0.26	19.22	1.08	--	--	--	--	12.49	6.31
Feb.	11.91	1.21	--	--	7.92	2.83	--	--	59.77	5.27	ns	ns	17.89	1.95	--	--	--	--	7.27	7.52
Mar.	4.57	0.77	--	--	4.20	3.01	--	--	115.93	6.05	--	--	18.98	1.94	4.80	1.90	93.89	9.27	6.94	9.47
Apr.	8.10	0.82	--	--	9.89	2.40	--	--	39.21	3.33	--	--	15.75	1.20	4.93	3.01	6.12	1.67	4.75	6.76
May	18.92	2.39	10.18	1.12	10.06	1.44	--	--	31.02	3.79	20.92	1.48	45.68	3.09	3.42	3.30	18.06	3.14	3.34	6.76
June	--	--	--	--	11.84	5.85	--	--	13.20	7.20	--	--	ns	ns	2.86	4.02	0.00	0.00	4.81	5.96
July	--	--	--	--	0.00	0.00	--	--	1.49	16.65	--	--	0.00	0.00	4.69	7.74	3.32	6.37	5.08	10.29
Aug.	--	--	--	--	2.75	10.70	--	--	4.24	10.96	--	--	3.05	12.03	8.41	10.85	3.66	10.83	2.68	11.54
Sep.	--	--	--	--	0.00	0.00	--	--	5.61	17.07	--	--	2.41	8.85	11.29	10.52	1.59	15.14	4.77	15.20
Oct.	--	--	--	--	10.17	5.17	--	--	8.04	10.53	--	--	ns	ns	2.71	5.92	0.00	0.00	6.76	9.21
Nov.	--	--	--	--	12.41	2.91	--	--	--	--	--	--	--	--	--	--	--	--	1.91	6.72
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	52.23	0.95	--	--	--	--	0.83	9.01
Year	12.53	1.43	10.18	1.12	8.09	2.17	--	--	54.85	4.98	20.68	1.42	19.05	1.66	4.12	3.42	36.32	8.85	5.08	7.68
Pelagic trawl (pollock target)																				
Jan.	0.18	2.28	--	--	--	--	--	--	<0.01	3.39	--	--	<0.01	1.26	--	--	--	--	ns	ns
Feb.	<0.01	1.40	--	--	0.24	2.86	--	--	<0.01	2.90	--	--	0.00	0.00	--	--	--	--	--	--
Mar.	0.21	1.00	--	--	0.07	2.40	--	--	0.01	15.51	0.00	0.00	0.09	4.28	0.20	3.51	0.00	0.00	--	--
Apr.	0.24	1.40	--	--	0.02	2.20	--	--	ns	ns	--	--	0.04	3.00	0.03	2.48	0.00	0.00	ns	ns
May	0.06	12.66	ns	ns	0.02	1.21	--	--	3.93	2.05	--	--	0.01	3.26	0.01	4.39	0.00	0.00	--	--
June	0.37	4.84	--	--	0.00	0.00	--	--	1.46	2.08	--	--	0.13	2.11	0.05	11.36	0.00	0.00	--	--
July	0.01	4.81	--	--	0.00	0.00	0.00	0.00	0.43	2.50	--	--	0.03	3.60	0.13	6.63	0.01	8.98	--	--
Aug.	0.00	0.00	--	--	0.09	6.87	0.00	0.00	0.07	3.26	--	--	0.05	4.23	0.18	7.71	<0.01	2.41	--	--
Sep.	0.38	8.00	--	--	0.26	5.79	--	--	0.10	4.43	--	--	0.09	5.81	0.04	11.96	0.00	0.00	--	--
Oct.	1.21	7.69	--	--	0.00	0.00	--	--	0.13	4.36	--	--	0.15	4.03	0.03	9.54	0.06	15.95	0.10	29.18
Nov.	--	--	--	--	0.00	0.00	--	--	--	--	--	--	0.00	0.00	--	--	0.00	0.00	0.02	33.91
Dec.	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
Year	0.19	1.28	ns	ns	0.06	2.48	0.00	0.00	0.05	2.58	0.00	0.00	0.06	3.59	0.08	7.60	0.01	12.41	0.08	29.36

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.00	0.00	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	ns	ns
Feb.	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	1.65	1.24	--	--	1.46	4.16	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--
Apr.	3.57	0.81	--	--	0.00	0.00	--	--	ns	ns	--	--	0.04	3.44	0.00	0.00	0.00	0.00	--	--
May	ns	ns	--	--	0.02	1.10	--	--	ns	ns	--	--	ns	ns	0.00	0.00	0.00	0.00	ns	ns
June	--	--	--	--	--	--	--	--	7.50	1.97	--	--	8.49	2.04	1.61	8.17	0.00	0.00	ns	ns
July	0.19	4.11	--	--	--	--	--	--	10.25	2.62	--	--	1.36	2.14	2.09	6.90	0.00	0.00	--	--
Aug.	14.24	1.29	--	--	0.51	6.75	--	--	4.02	1.84	--	--	3.97	1.66	1.19	6.36	0.00	0.00	--	--
Sep.	0.00	0.00	--	--	0.75	3.81	--	--	4.46	4.31	--	--	1.81	3.85	0.56	7.56	0.08	6.37	--	--
Oct.	3.08	2.60	--	--	1.28	2.90	2.25	4.35	10.52	2.30	--	--	7.38	1.99	1.02	9.78	0.00	0.00	0.00	0.00
Nov.	6.32	2.52	--	--	9.68	2.60	30.91	1.55	6.95	1.67	--	--	17.11	1.51	64.41	3.83	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	7.75	1.30	--	--	29.83	0.99	--	--	--	--	ns	ns
Year	2.53	1.09	--	--	0.88	3.08	4.54	2.19	7.69	2.30	--	--	10.18	1.31	1.14	6.93	0.08	6.37	0.00	0.00
Longline vessels (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	397.07	7.68	--	--	36.55	4.12	--	--	--	--	68.22	14.82
Apr.	--	--	--	--	--	--	--	--	190.04	6.38	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	88.30	8.37	--	--	327.28	11.44	22.72	12.52	0.00	0.00	63.18	13.53
June	ns	ns	--	--	--	--	--	--	148.16	16.83	--	--	143.16	10.48	277.86	12.14	167.41	8.19	11.97	29.44
July	ns	ns	ns	ns	--	--	--	--	38.54	15.48	--	--	70.95	15.80	0.00	0.00	ns	ns	6.03	17.06
Aug.	--	--	--	--	--	--	--	--	0.75	9.13	ns	ns	4.15	12.96	46.68	10.06	0.00	0.00	22.40	20.14
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.78	7.25
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.52	10.47
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--					--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	123.14	9.13	ns	ns	117.04	11.23	112.54	12.05	147.39	8.19	48.34	15.30

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	18.98	3.58	10.77	3.87	--	--	--	--
Feb.	--	--	--	--	ns	ns	--	--	ns	ns	--	--	11.63	4.10	10.40	3.99	3.19	4.40	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	11.64	3.65	2.76	3.09	3.52	3.32	170.87	7.68
Apr.	--	--	--	--	--	--	--	--	58.70	7.64	--	--	37.27	3.13	2.67	4.27	13.33	3.25	--	--
May	--	--	--	--	--	--	--	--	519.61	6.27	--	--	39.78	3.87	12.10	4.83	14.56	3.66	86.14	9.87
June	1,512.23	10.93	117.79	4.31	--	--	--	--	608.08	9.97	--	--	199.09	4.43	53.64	6.03	48.23	6.61	2.25	4.76
July	--	--	--	--	--	--	--	--	215.39	5.32	--	--	34.37	7.38	34.83	6.32	22.04	5.20	111.02	8.22
Aug.	--	--	--	--	49.55	6.19	--	--	123.27	2.48	--	--	41.14	8.34	26.30	8.11	24.26	5.35	397.67	36.44
Sep.	--	--	--	--	110.44	11.97	--	--	409.44	4.46	--	--	91.77	8.26	17.19	6.67	18.28	5.66	29.16	9.40
Oct.	--	--	--	--	ns	ns	--	--	278.19	4.78	--	--	54.26	6.94	19.91	6.58	12.53	3.67	15.09	4.43
Nov.	119.92	4.13	--	--	114.40	6.59	--	--	224.25	6.99	--	--	54.09	4.39	22.67	5.28	24.89	3.28	58.07	7.02
Dec.	60.92	5.57	--	--	50.69	4.29	--	--	67.79	3.66	--	--	52.29	3.60	20.33	3.41	25.52	4.00	--	--
Year	1,404.76	11.03	117.79	4.31	79.90	7.71	--	--	326.67	6.10	--	--	50.98	5.50	23.82	5.89	16.41	4.72	29.21	6.73
Longline vessels (other targets)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	1,875.25	9.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78.62	6.59
Apr.	--	--	--	--	--	--	--	--	41.36	5.00	--	--	--	--	--	--	--	--	--	--
May	1,663.27	9.21	--	--	--	--	--	--	61.33	4.58	--	--	--	--	--	--	--	--	304.07	14.73
June	--	--	--	--	--	--	--	--	1.36	6.80	--	--	557.81	9.27	221.26	9.53	16.60	19.31	4.81	15.59
July	--	--	--	--	--	--	--	--	53.31	8.81	--	--	16.51	10.22	1.70	5.06	--	--	22.76	18.18
Aug.	--	--	--	--	--	--	--	--	2.28	10.00	--	--	2.08	14.90	194.47	12.37	--	--	346.16	26.49
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	46.27	12.96	--	--	ns	ns
Oct.	1,785.72	5.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.34	20.15
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.04	2.64
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	1,775.75	8.26	--	--	--	--	--	--	75.38	8.50	--	--	64.29	9.16	174.40	10.80	16.60	19.31	69.35	10.87

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
July	5.94	6.64	0.00	0.00	--	--	--	--	51.96	8.09	--	--	141.39	11.87	20.62	8.70	0.00	0.00	--	--
Aug.	4.18	9.33	--	--	0.83	5.97	--	--	85.01	17.65	--	--	3.16	4.87	12.00	11.43	0.00	0.00	--	--
Sep.	0.00	0.00	--	--	0.49	7.30	--	--	0.39	8.35	--	--	0.61	5.00	3.52	6.56	7.56	6.64	--	--
Oct.	20.01	3.00	--	--	--	--	--	--	26.32	4.13	ns	ns	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	5.11	7.21	0.00	0.00	0.46	6.26	--	--	23.41	4.70	ns	ns	3.62	5.80	15.35	9.58	7.53	6.64	ns	ns

Dashes indicate no fishing in this area.

ns = Fishing occurred but no sampling by observers.

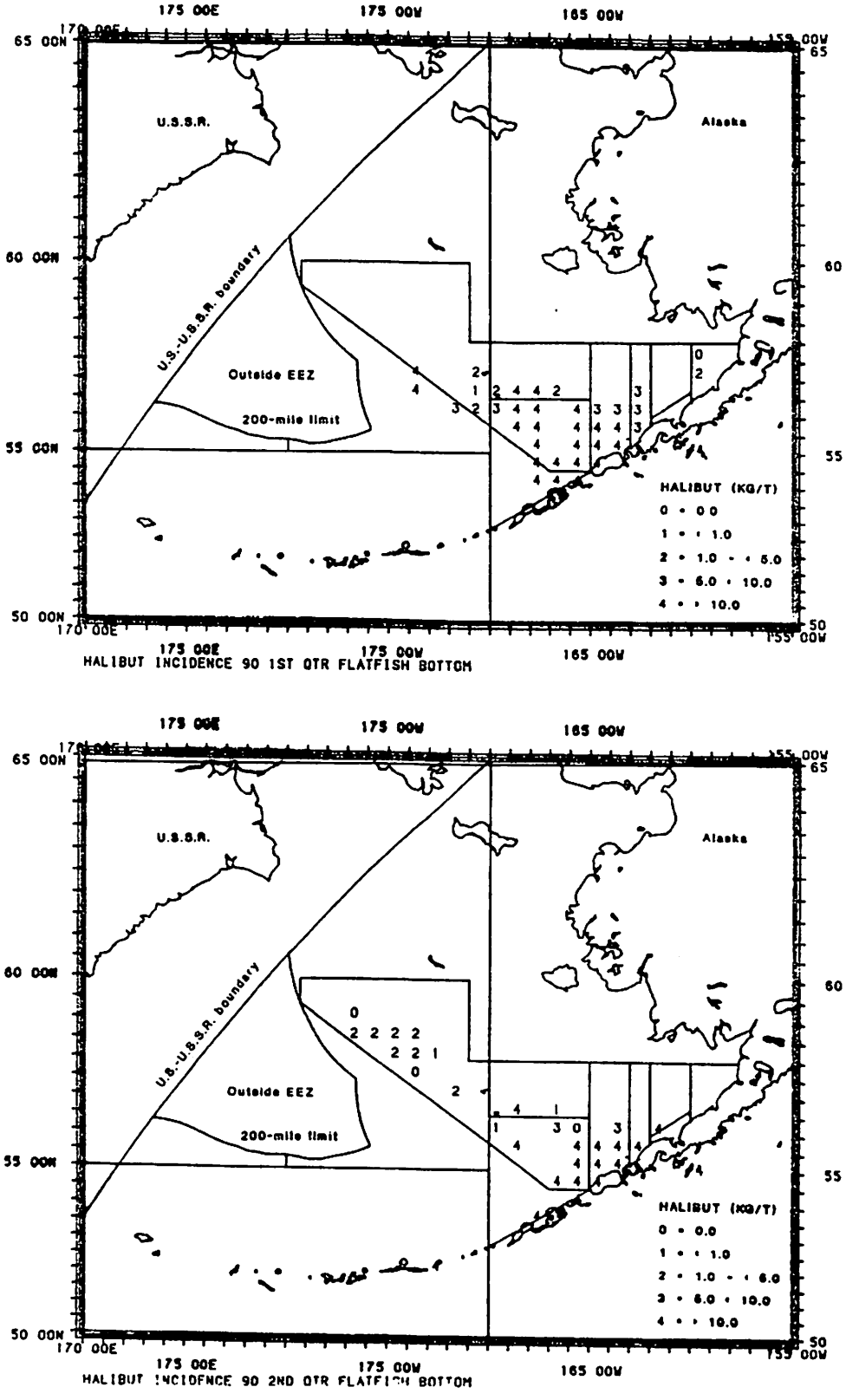
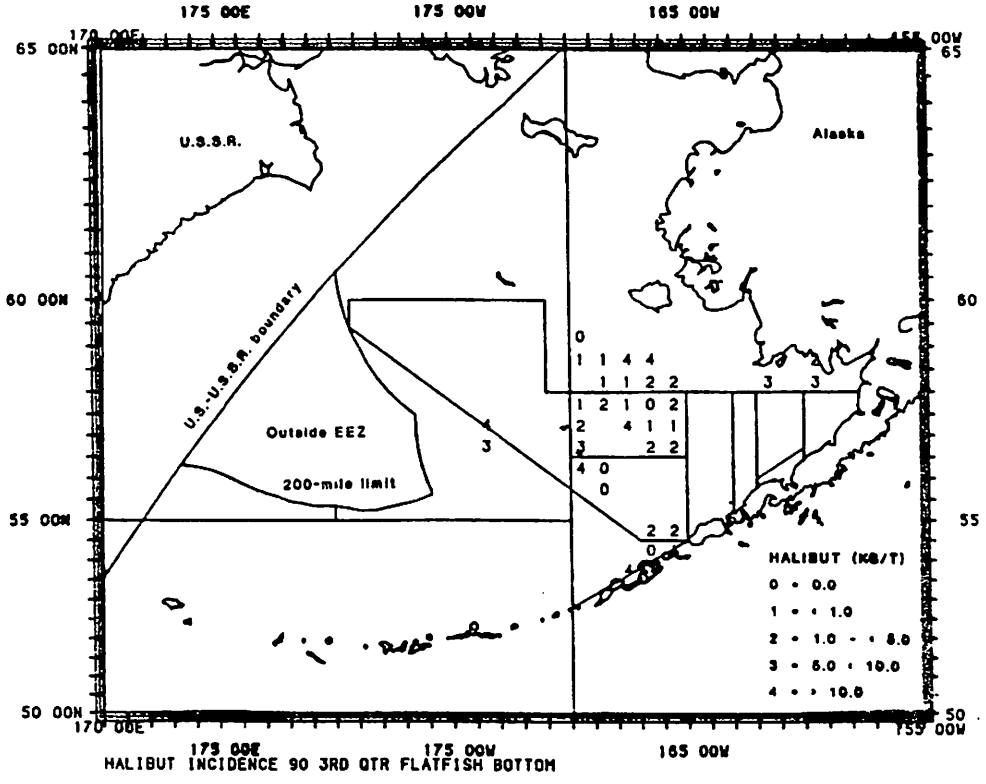
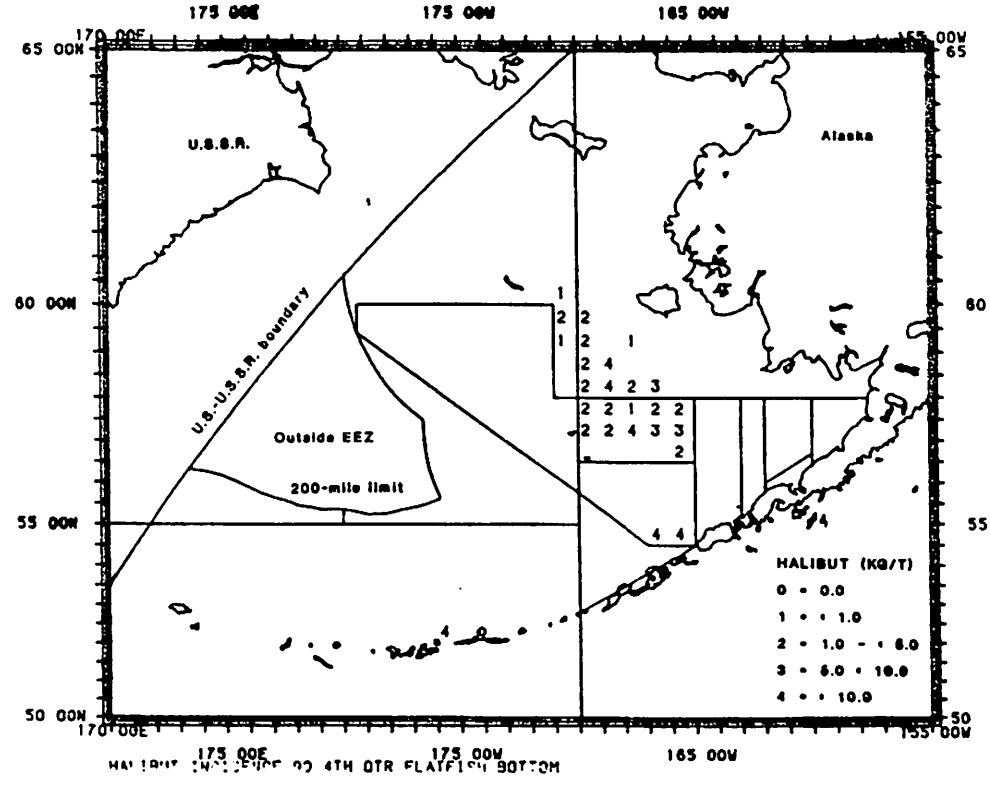


Figure 4.--Average incidence (no./t) of Pacific halibut in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1° longitude areas, 1990.

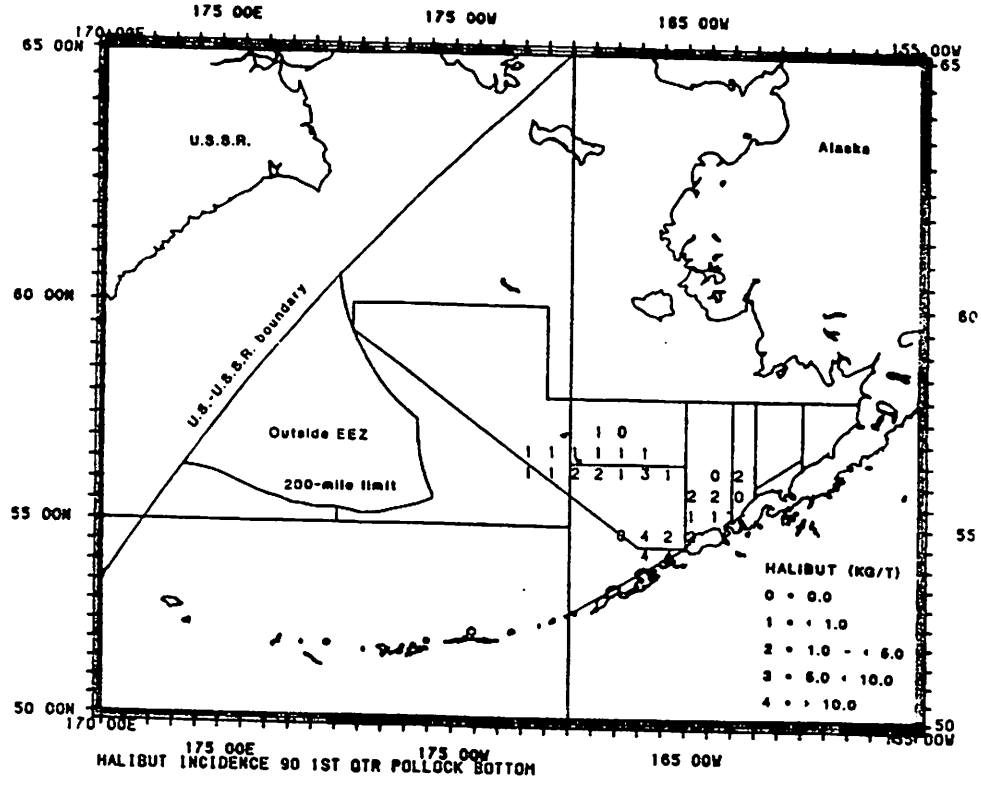


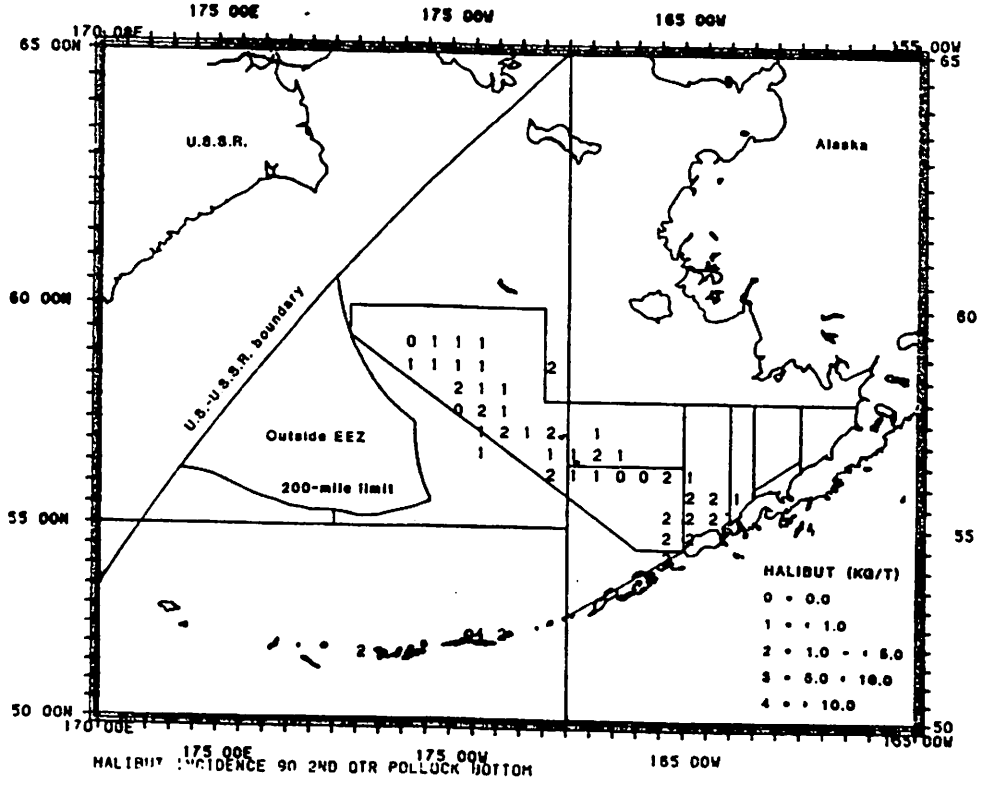
HALIBUT INCIDENCE 90 3RD QTR FLATFISH BOTTOM



HALIBUT INCIDENCE 90 4TH QTR FLATFISH BOTTOM

Figure 4.--Continued.





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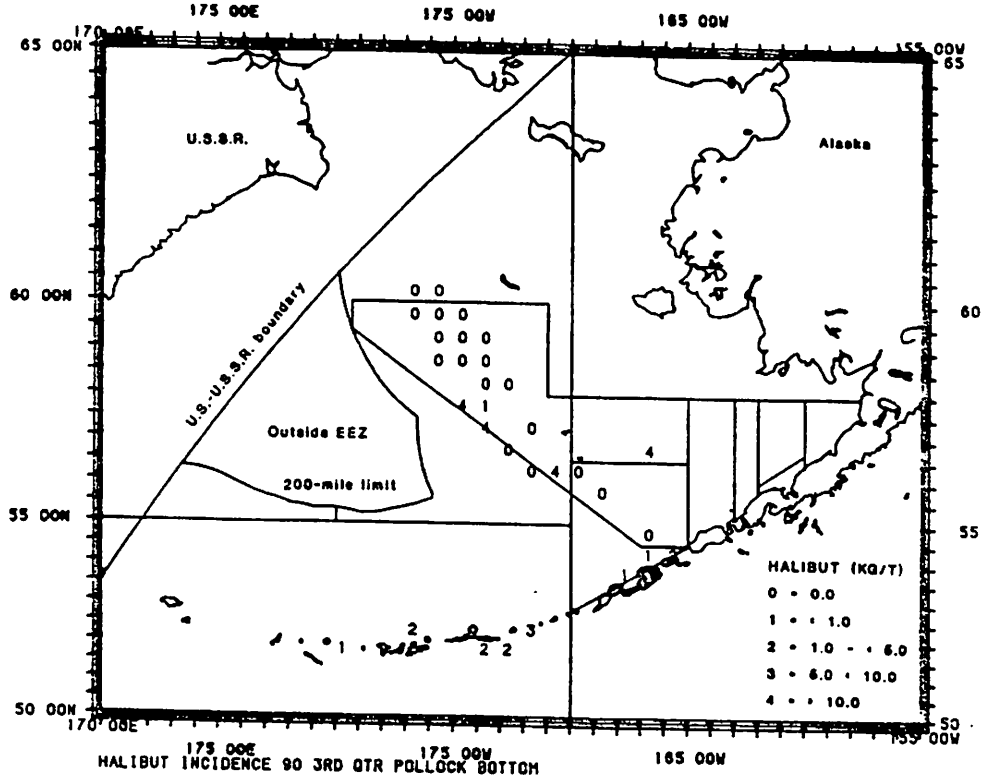

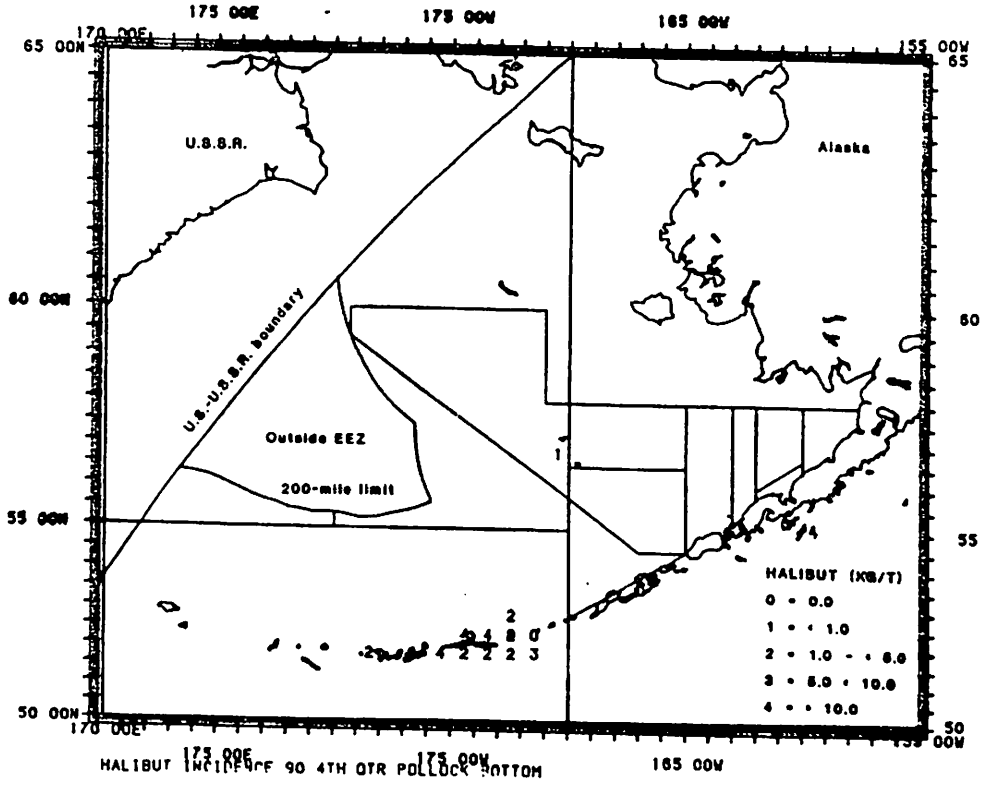

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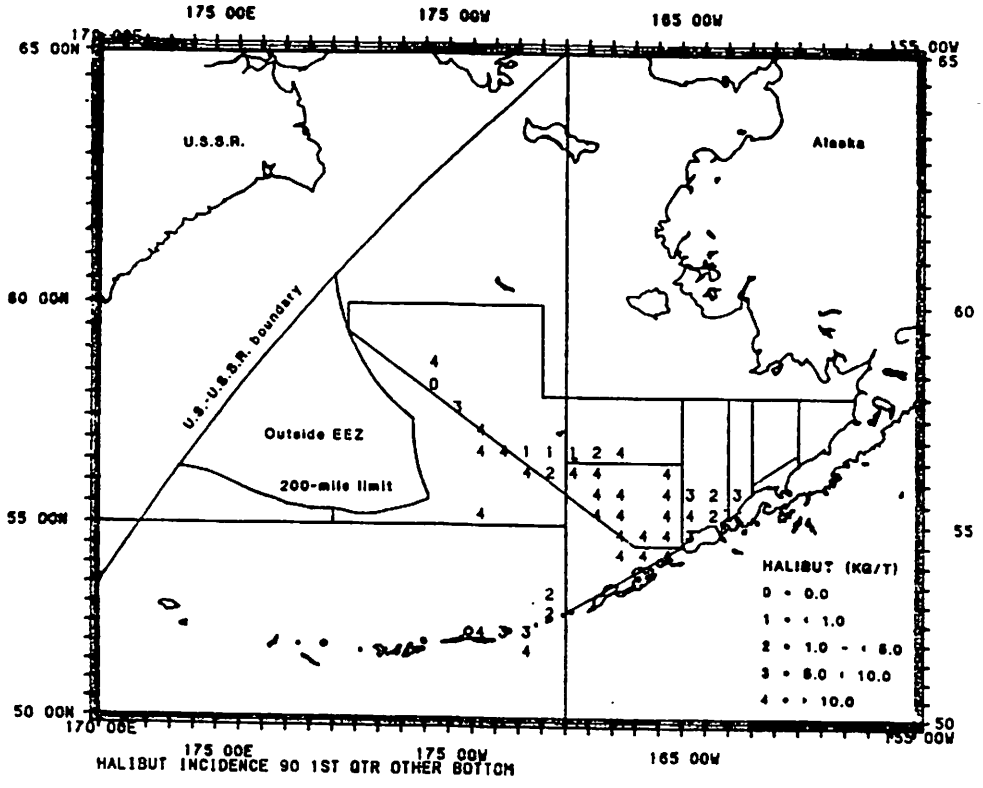

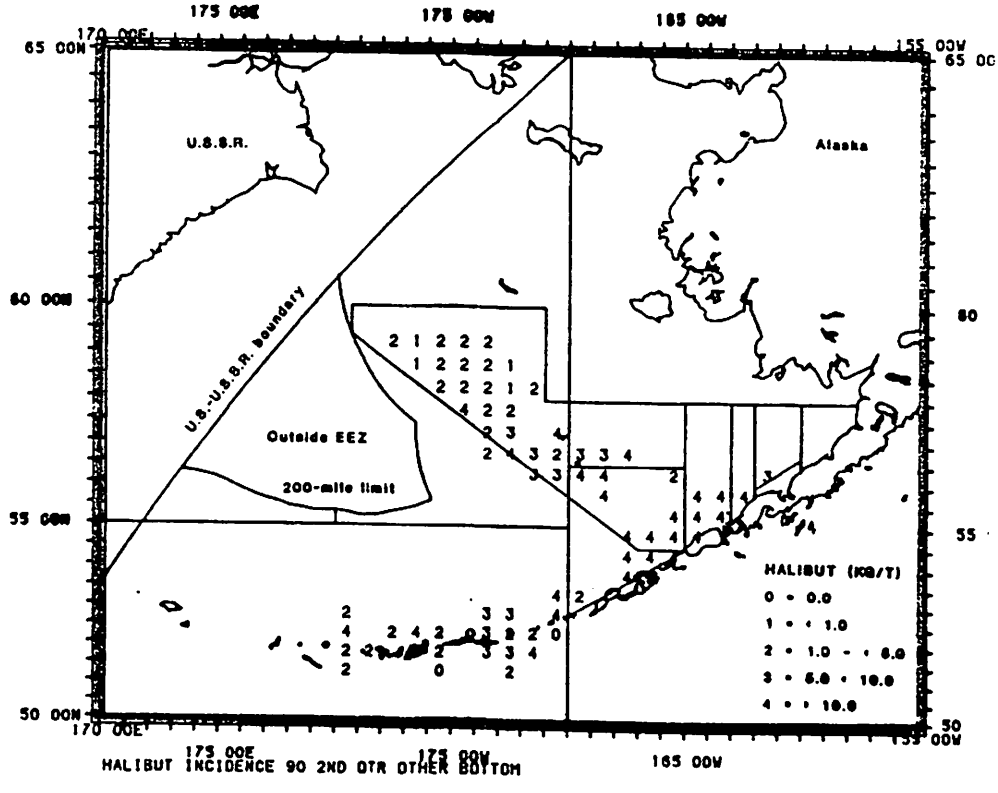

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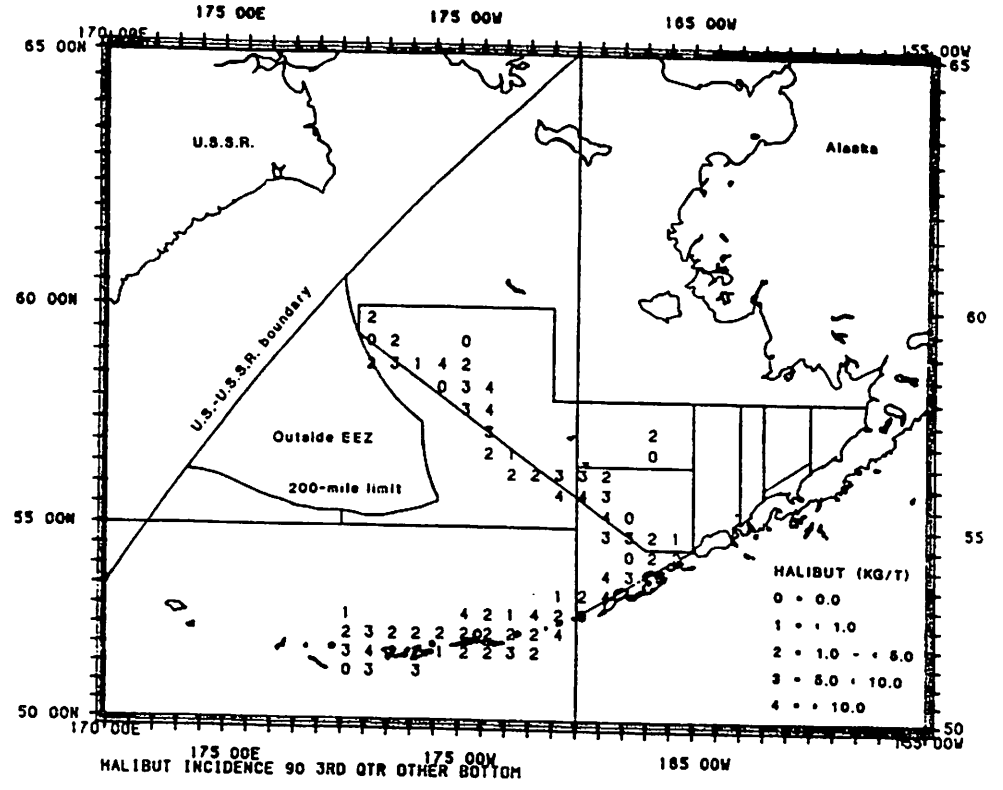


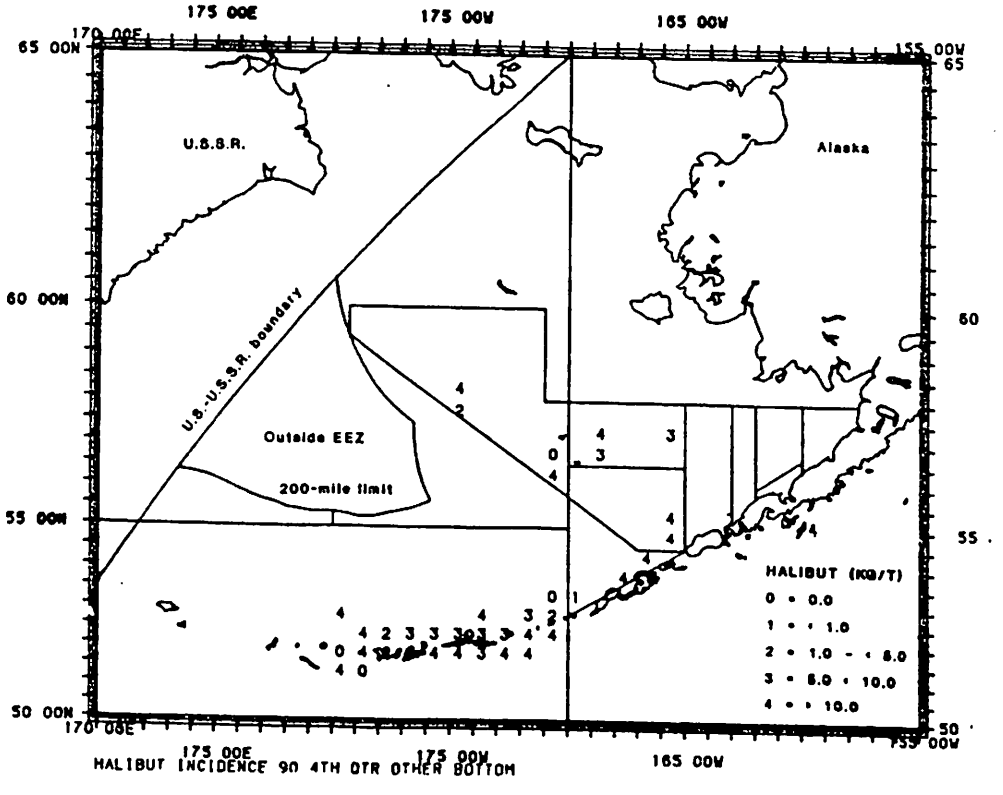
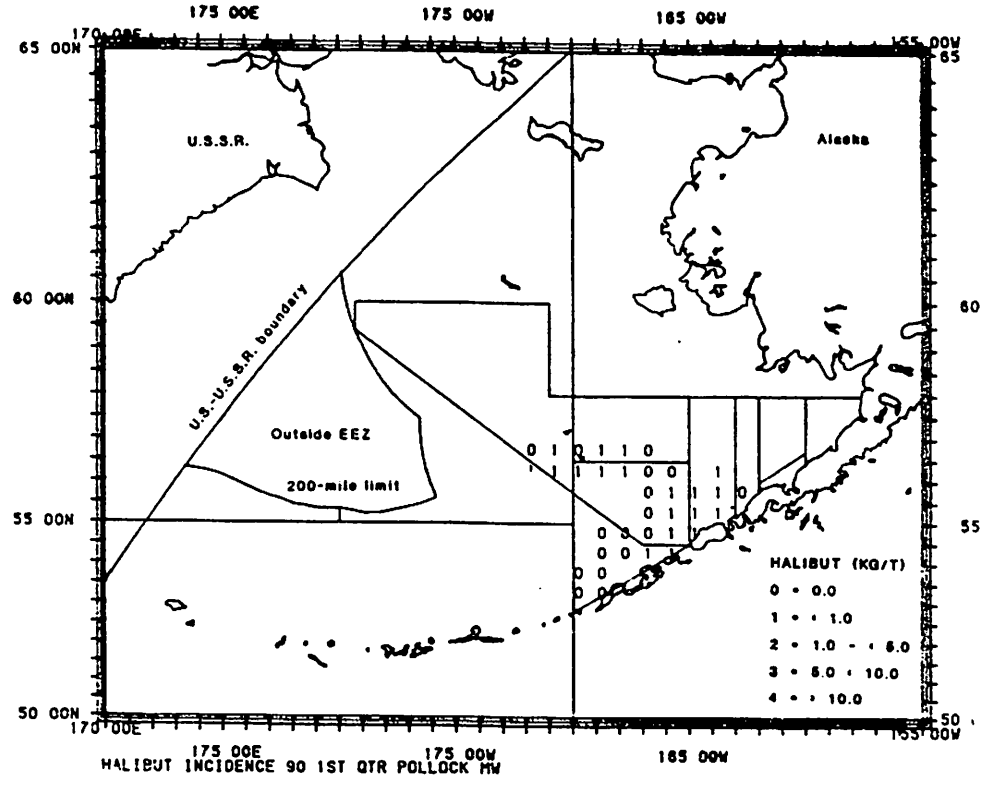
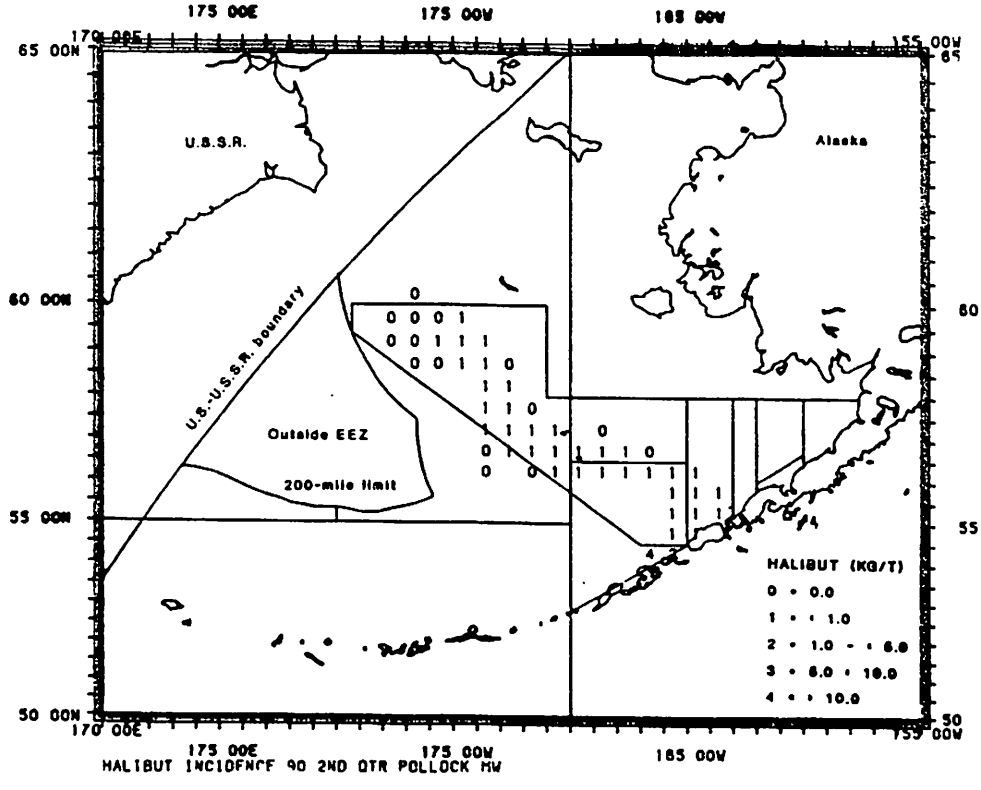


Figure 4.--Continued.





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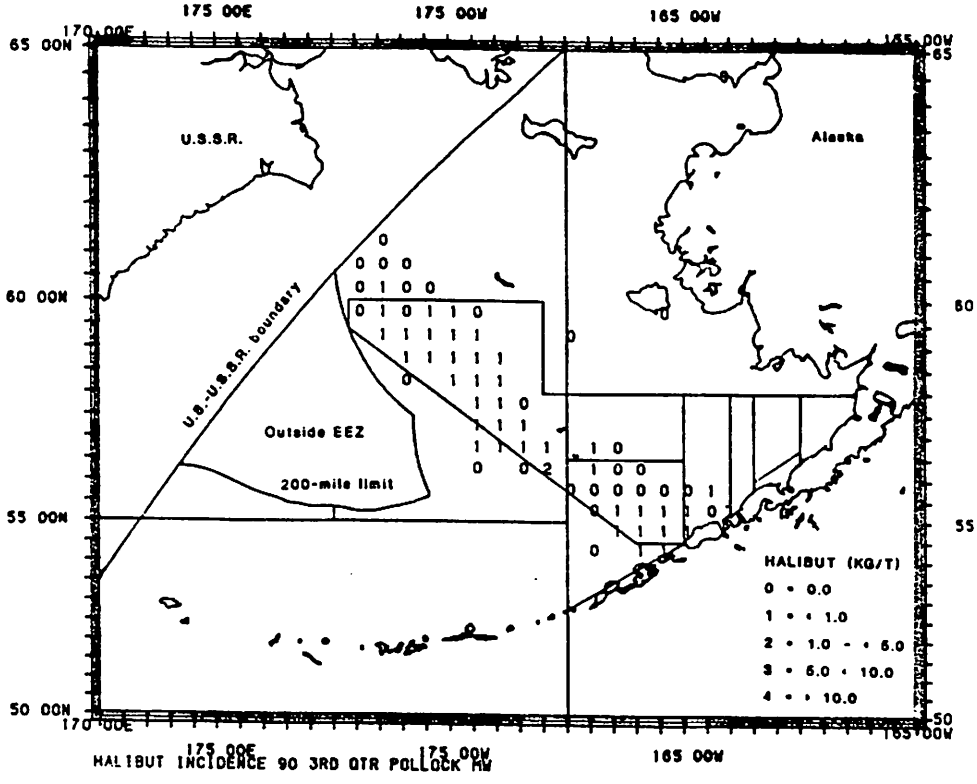

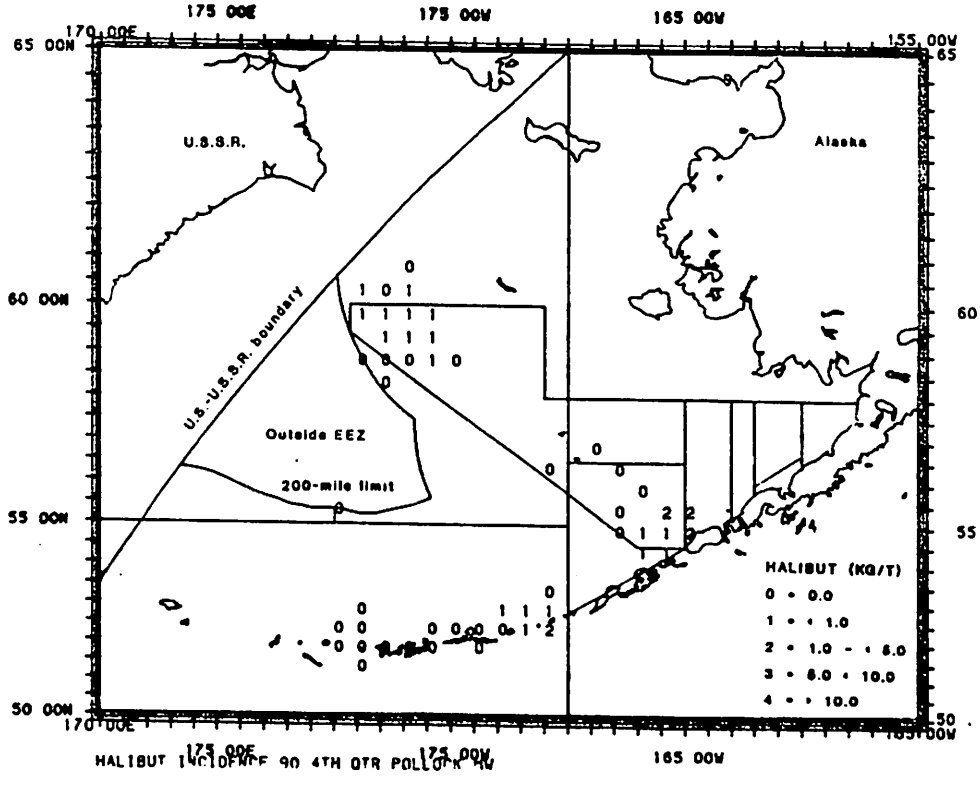

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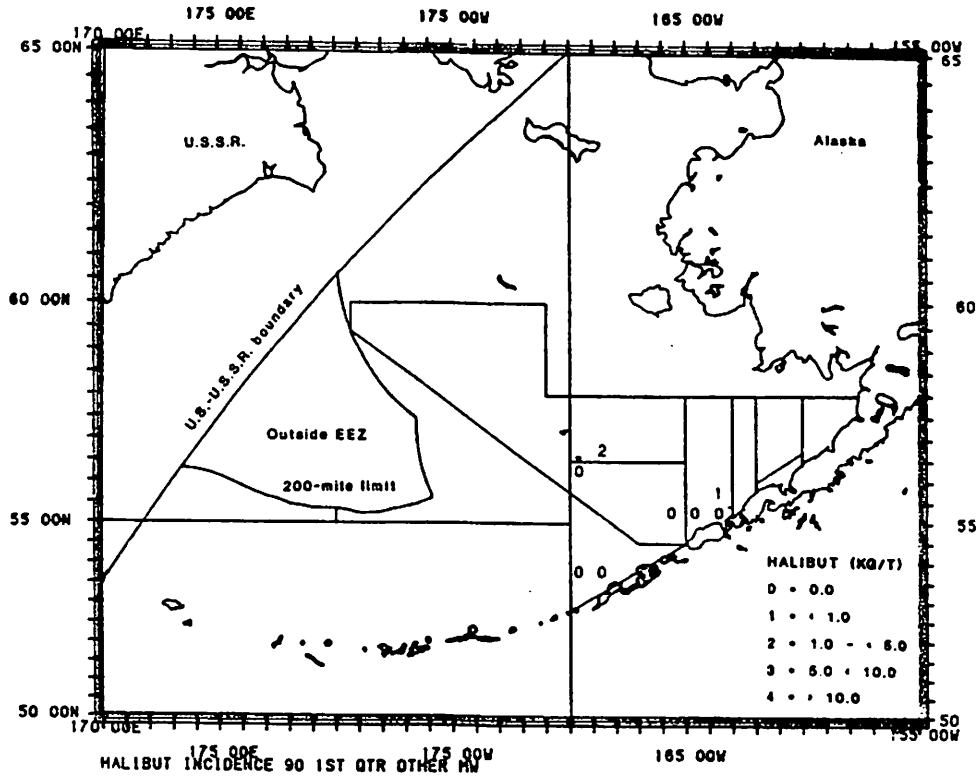

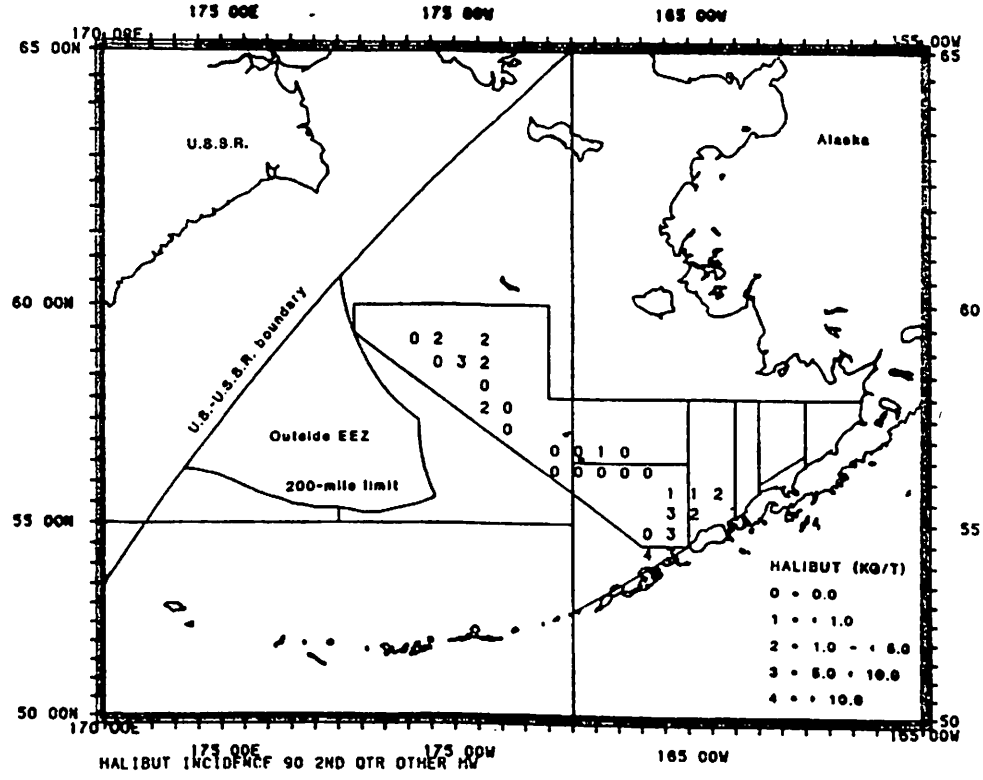

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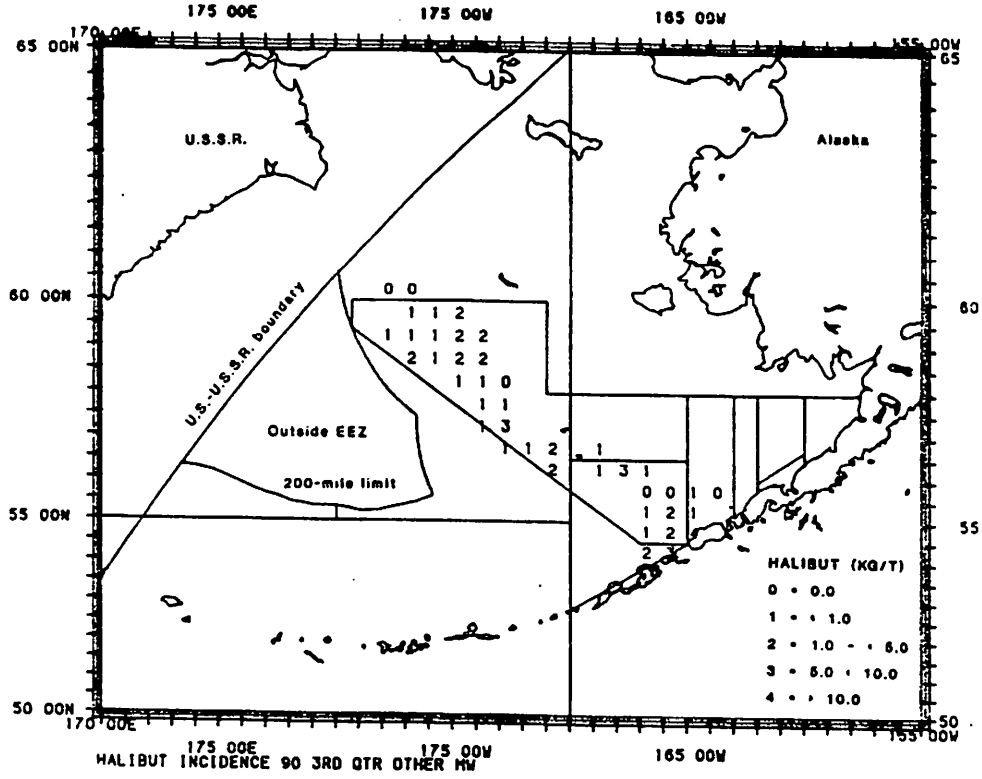

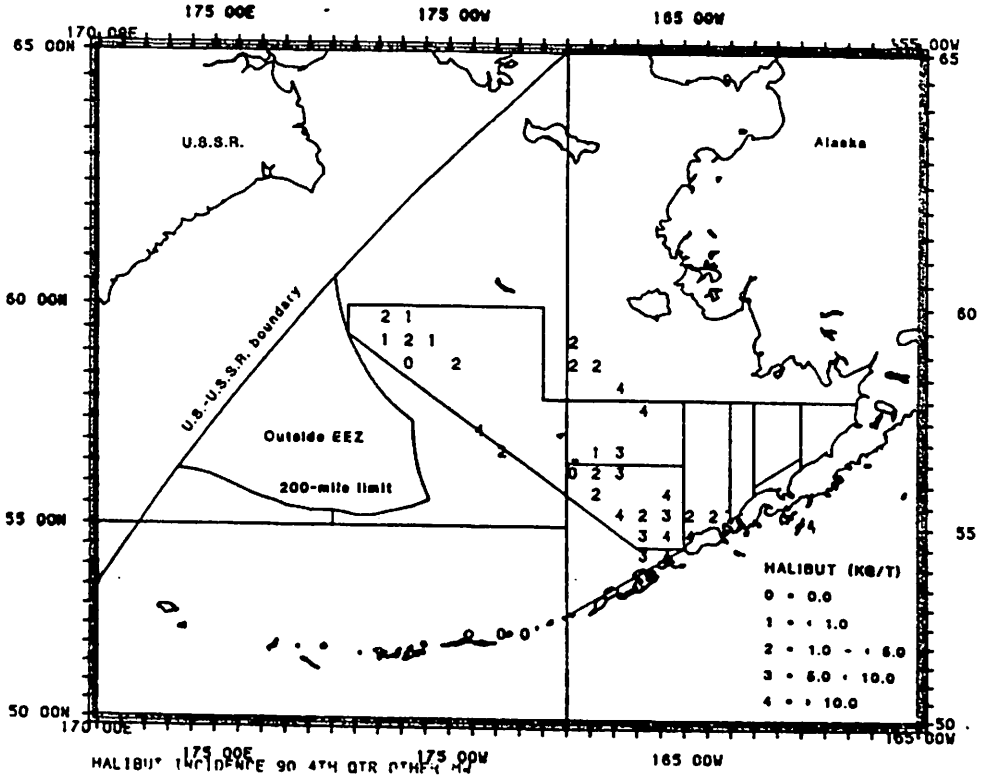

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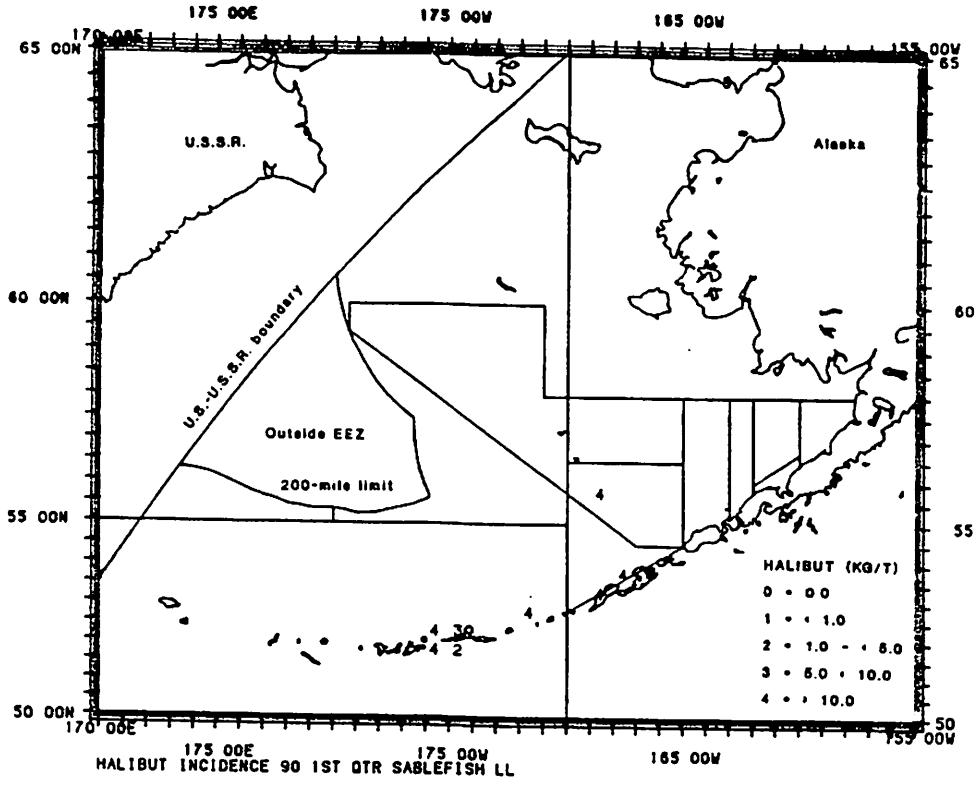

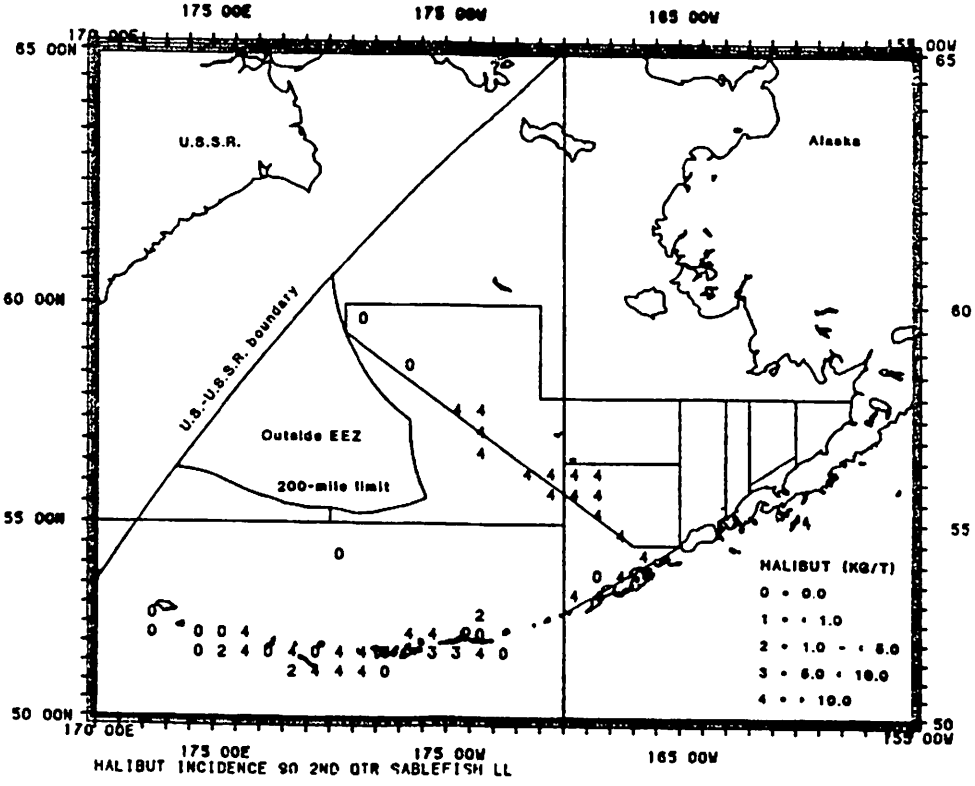

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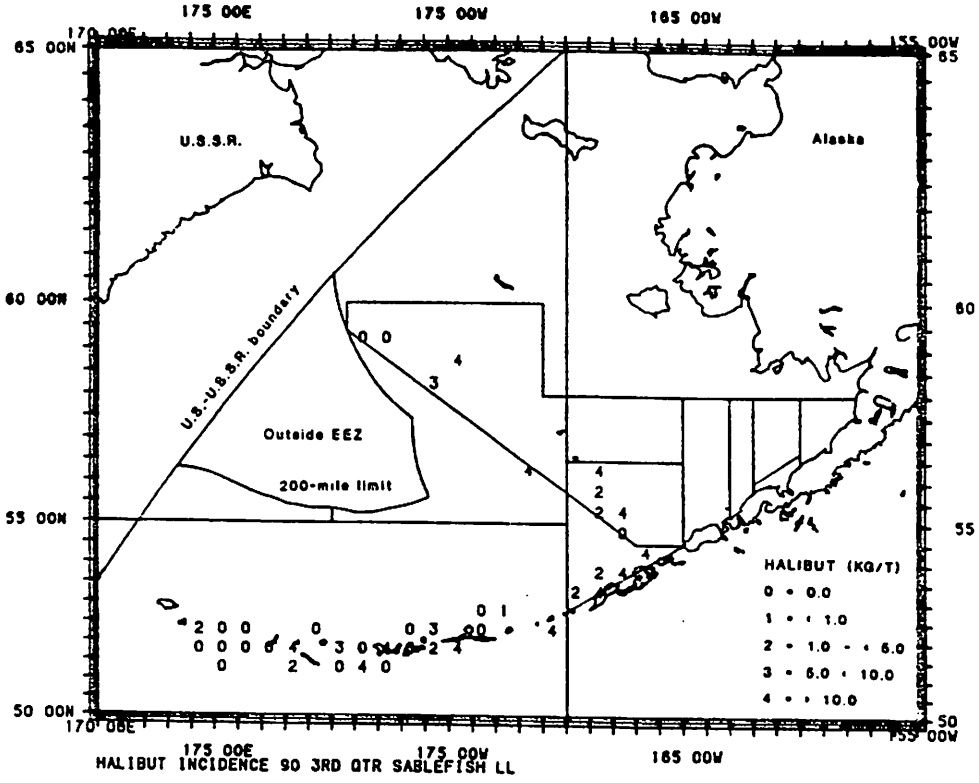

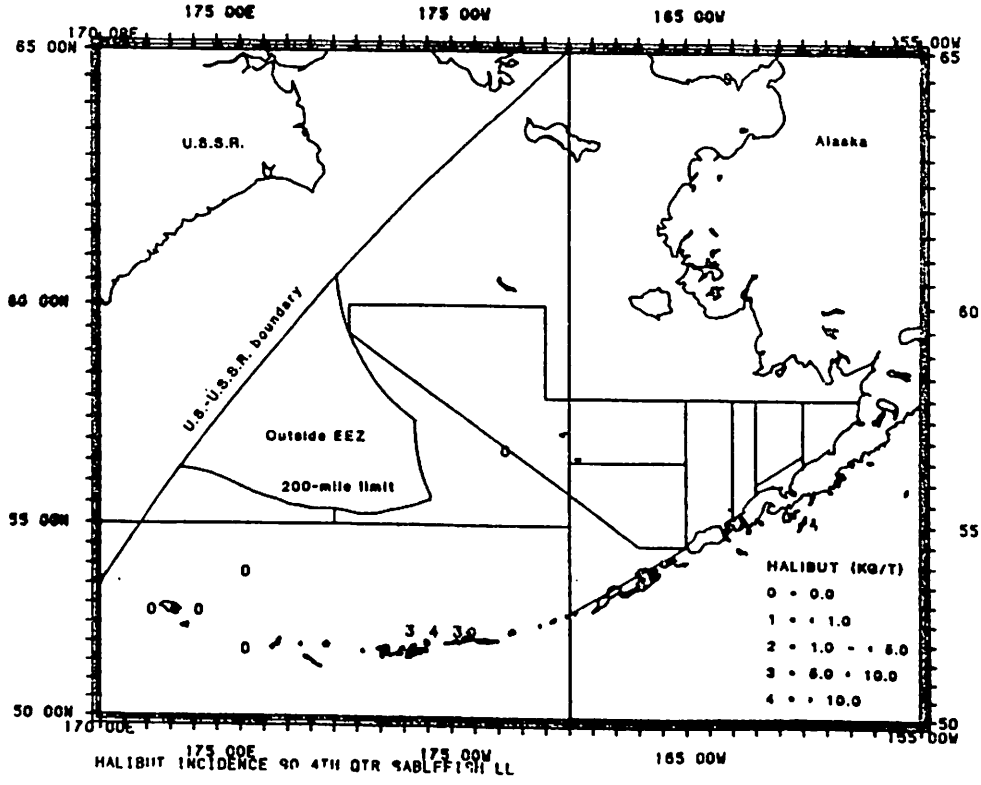

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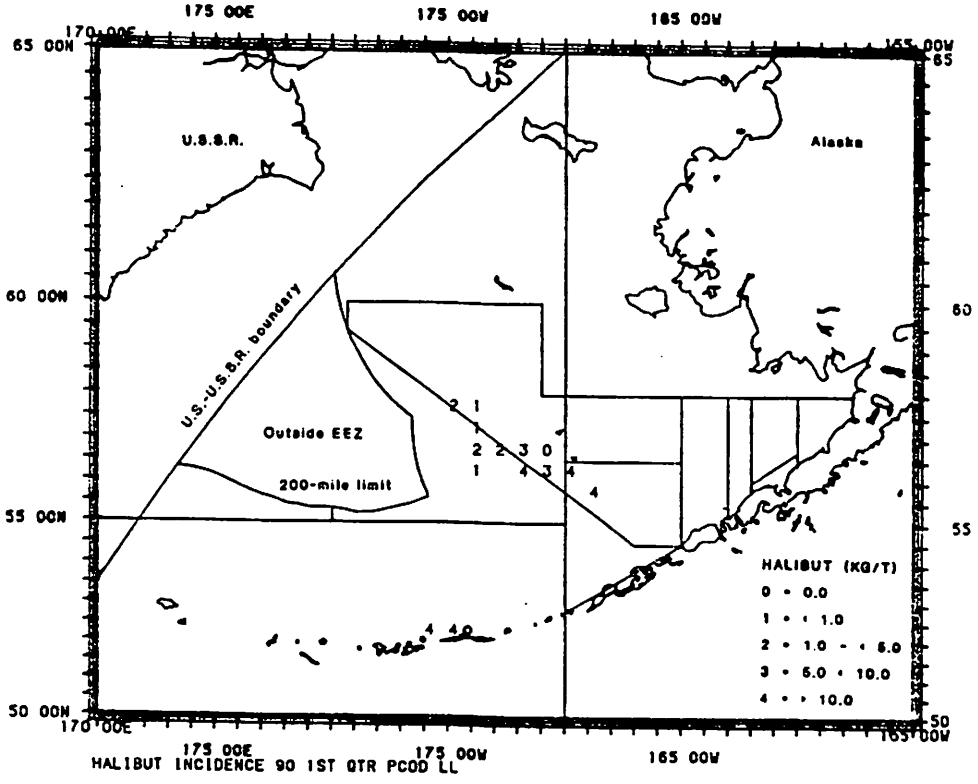
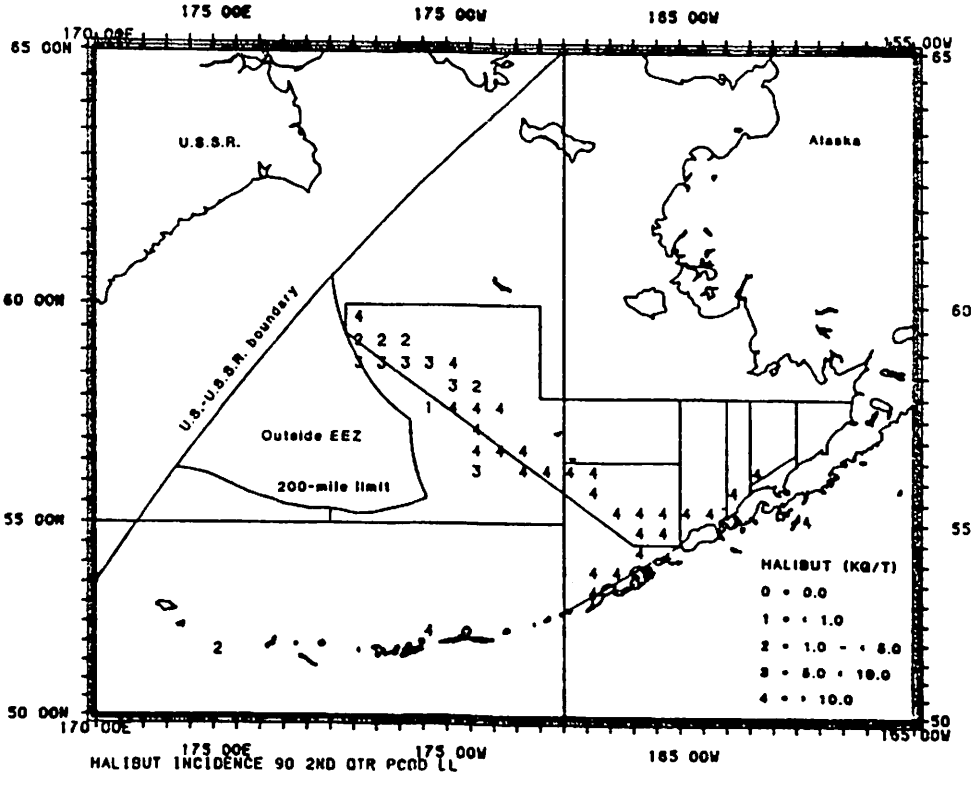
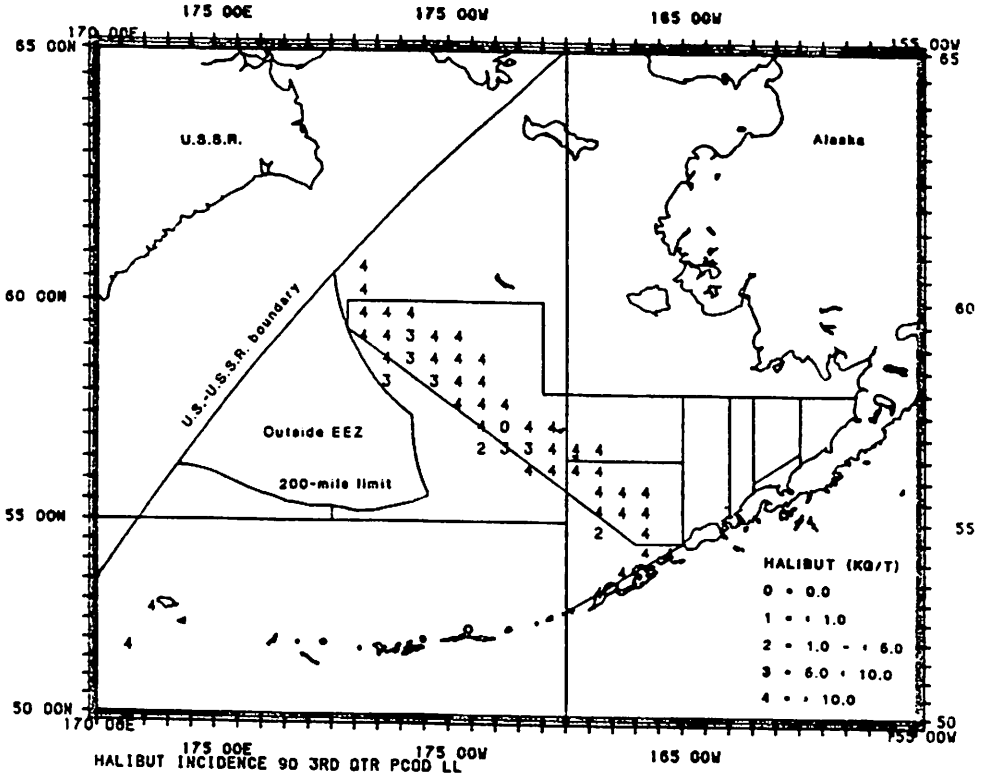


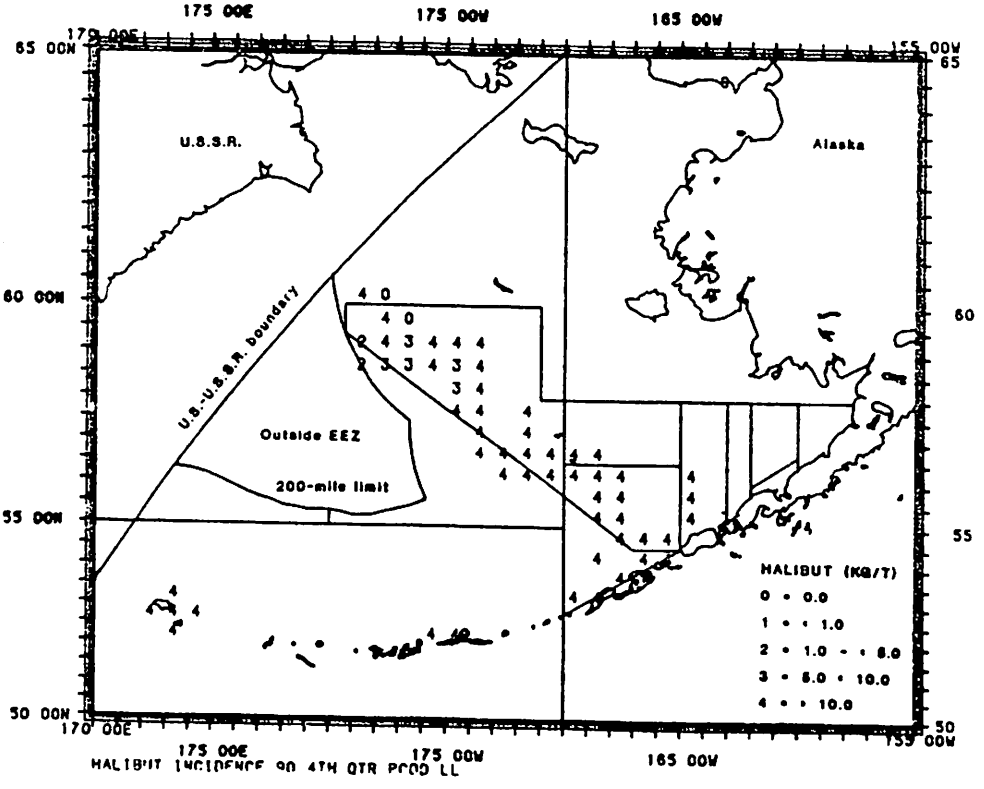
HALIBUT INCIDENCE 90 1ST QTR PCOD LL



HALIBUT INCIDENCE 90 2ND QTR PCOD LL

Figure 4.--Continued.





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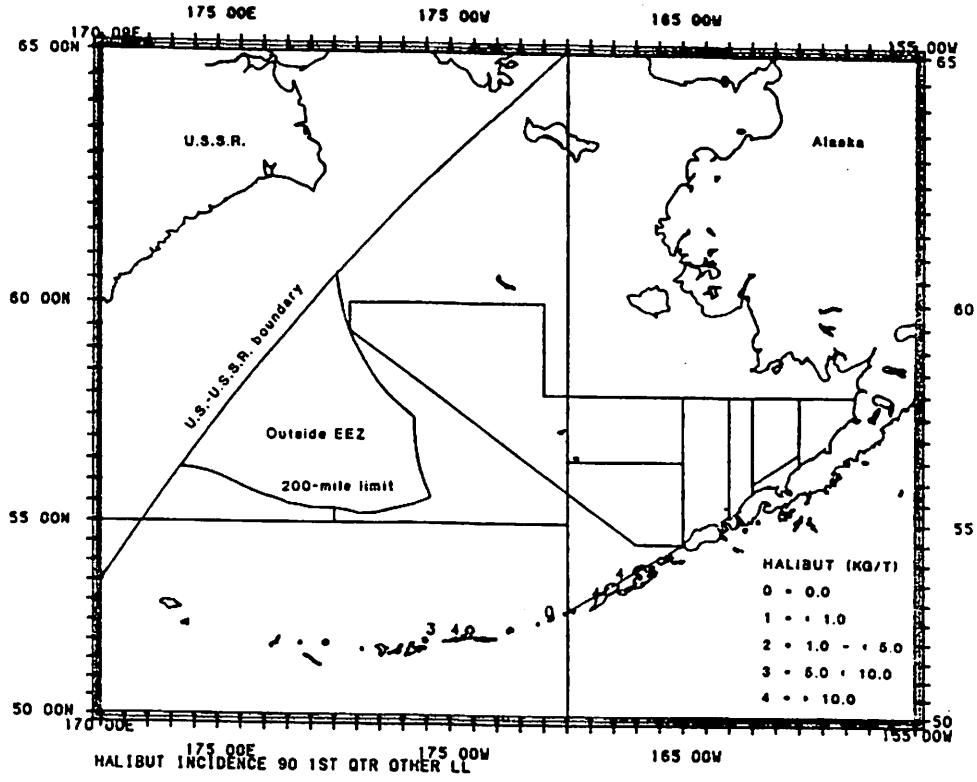

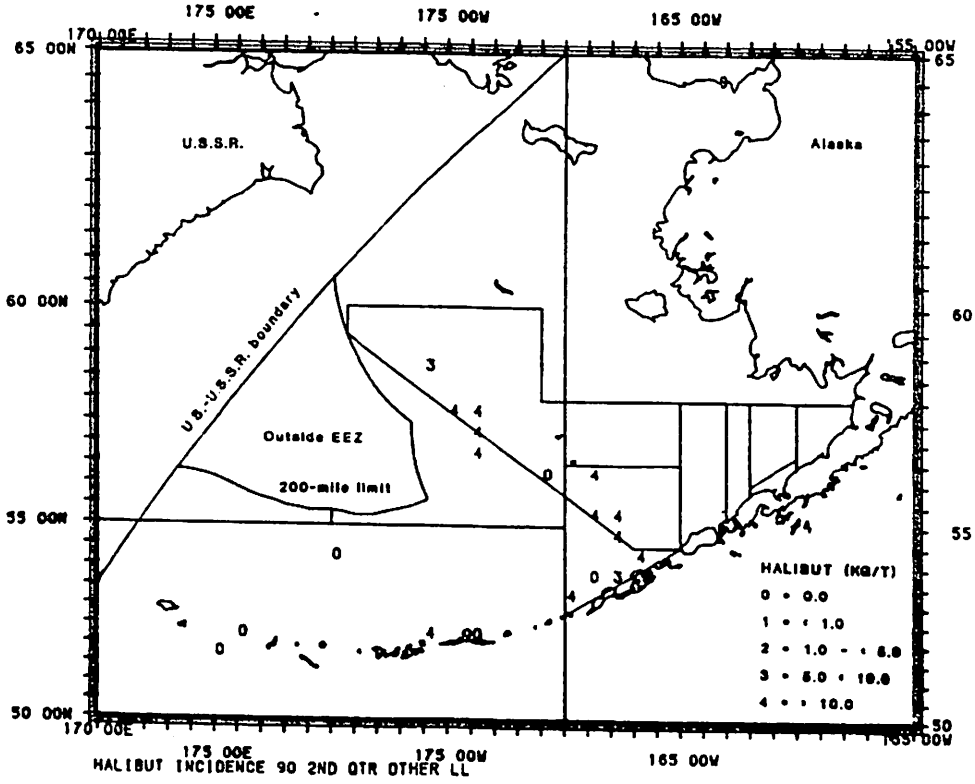

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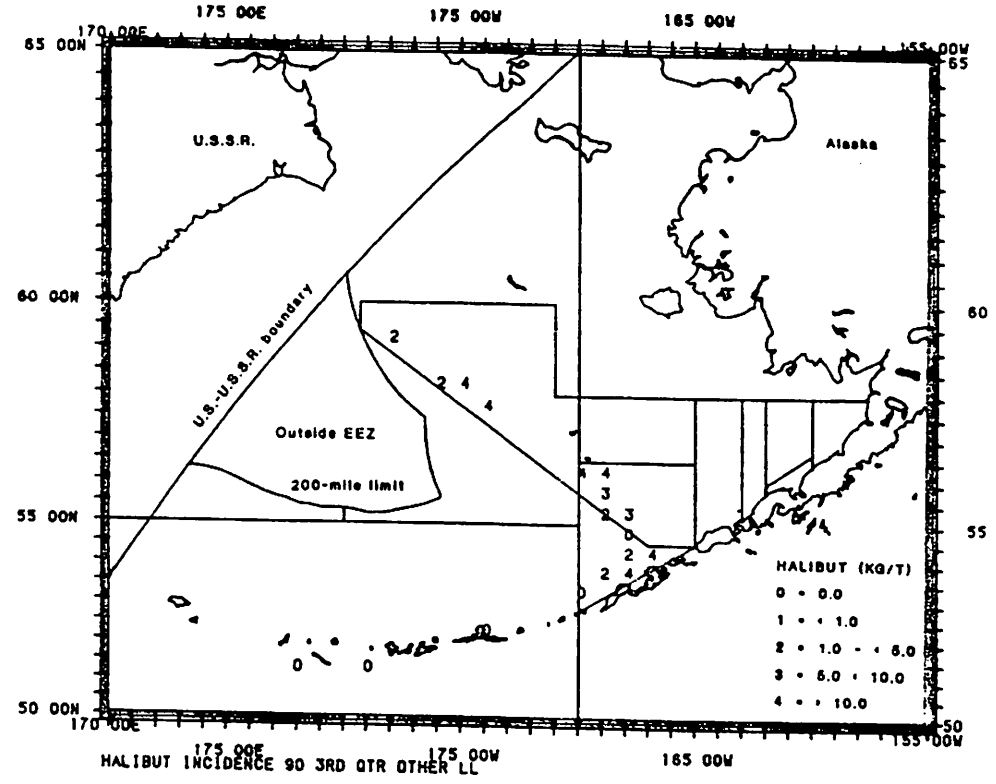

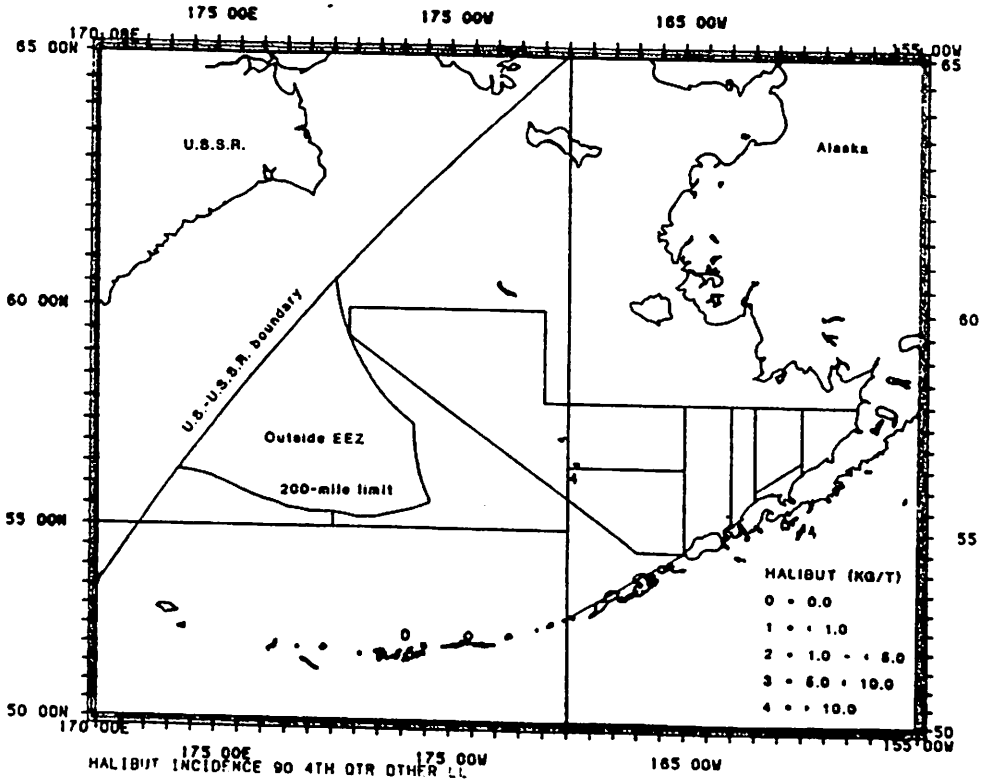

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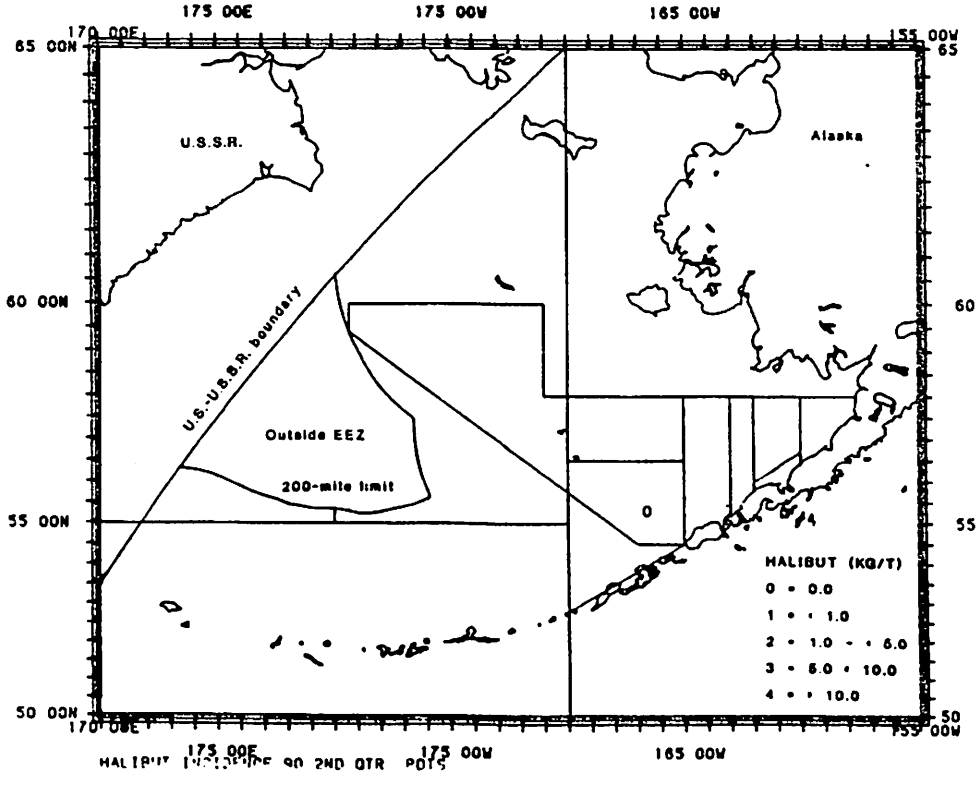

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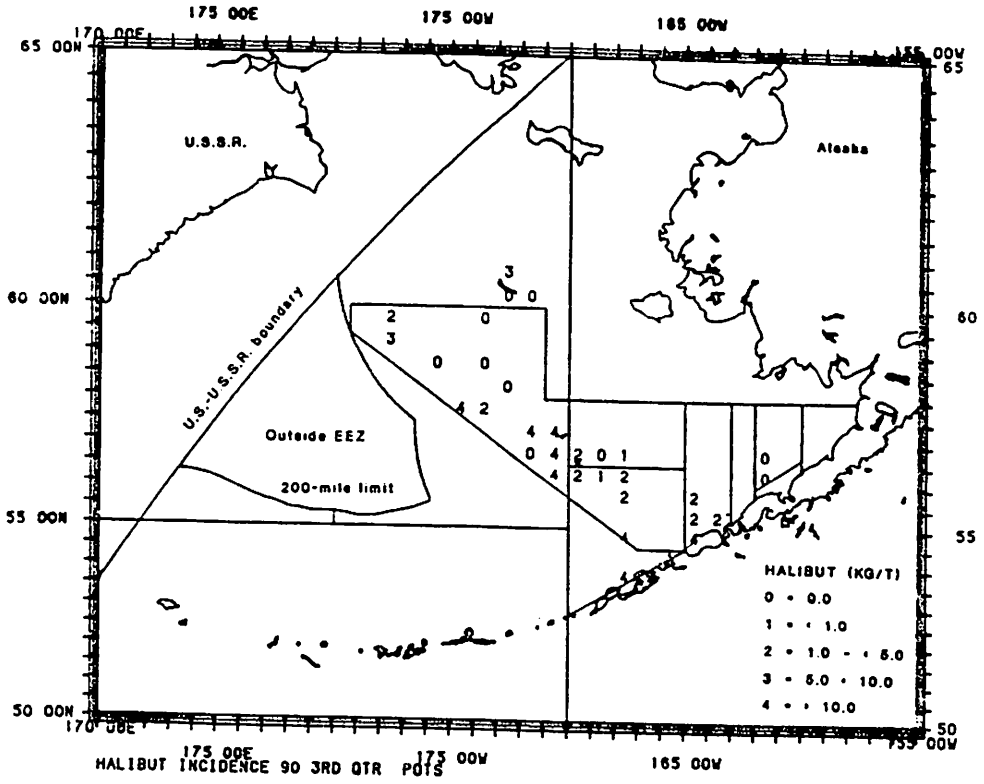


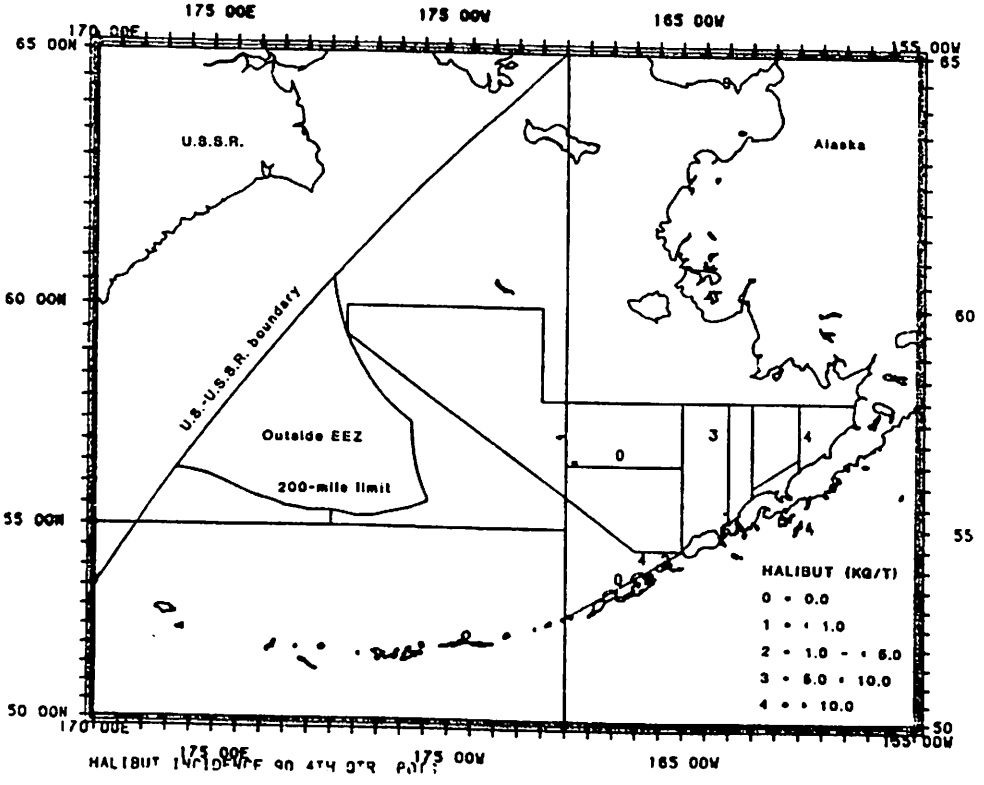


Figure 4.--Continued.

Table 13.--Estimated incidental catch of Pacific halibut (metric tons) by U.S. domestic vessels in the Bering Sea and Aleutian Islands region by area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	777.53	3.95	131.44	28.09	1,973.27	96.45	1,231.13	198.98	52.54	359.38	4,852.75	66.1%
Pelagic trawl	23.28	0.03	9.42	23.97	65.46	--	111.45	95.68	2.88	7.22	339.38	4.6%
Longline	33.36	2.73	15.18	--	491.82	11.68	274.28	1,110.50	84.04	107.57	2,131.15	29.0%
Pot	3.52	0.14	0.13	--	13.54	0.02	0.80	3.14	0.22	0.00	21.51	0.3%
Total	837.68	6.84	156.17	52.06	2,544.08	108.15	1,617.66	1,408.30	139.68	474.17	7,344.80	
Percent by area	11.4%	0.1%	2.1%	0.7%	34.6%	1.5%	22.0%	19.2%	1.9%	6.5%		

GOA 1990

Attachment 2(h)

Table 44.--U.S. domestic groundfish catch and Pacific halibut catch and mortality (in metric tons (t)) by target fishery and area in the Gulf of Alaska region, 1990.

			Pacific halibut catch				Pacific halibut mortality			
Fishery/gear	Area*	Groundfish catch	Weight (t)	Kg per t of ground-fish	% within area	% of total bycatch	Weight (t)	Kg per t of ground-fish	% within area	% of total bycatch
Flatfish (All gears)	Eastern	57.8	2.43	42.0	0.1%	<0.1%	1.21	20.9	0.3%	<0.1%
	Central	22,979.2	1,031.43	44.9	12.4%	8.5%	515.38	22.4	21.5%	16.2%
	Western	2,047.6	78.83	38.5	7.1%	0.6%	39.33	19.2	11.0%	1.2%
	Total	25,084.6	1,112.69	44.4	--	9.2%	555.92	22.2	--	17.4%
Pollock mid-water (All gears)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	45,267.1	4.38	0.1	0.1%	<0.1%	2.19	<0.1	0.1%	0.1%
	Western	6,321.2	0.42	0.1	0.0%	<0.1%	0.21	<0.1	0.1%	<0.1%
	Total	51,588.3	4.80	0.1	--	<0.1%	2.40	<0.1	--	0.1%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	18,406.7	53.22	2.9	0.6%	0.4%	26.34	1.4	1.1%	0.8%
	Western	884.8	0.78	0.9	0.1%	<0.1%	0.39	0.4	0.1%	<0.1%
	Total	19,291.5	54.00	2.8	--	0.4%	26.73	1.4	--	0.8%
Other (Trawl)	Eastern	27.4	0.55	20.1	0.0%	<0.1%	0.28	10.2	0.1%	<0.1%
	Central	44,106.0	1,501.49	34.0	18.0%	12.4%	750.74	17.0	31.3%	23.5%
	Western	32,277.9	266.17	8.2	24.0%	2.2%	133.08	4.1	37.3%	4.2%
	Total	76,411.3	1,768.21	23.1	--	14.6%	884.10	11.6	--	27.7%
Other (Longline)	Eastern	249.5	23.09	92.5	0.9%	0.2%	3.00	12.0	0.7%	0.1%
	Central	3,040.2	191.93	63.1	2.3%	1.6%	24.95	8.2	1.0%	0.8%
	Western	2,451.4	215.48	87.9	19.4%	1.8%	28.02	11.4	7.9%	0.9%
	Total	5,741.1	430.50	75.0	--	3.5%	55.97	9.7	--	1.8%
Other (Pot)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	5,478.8	285.71	52.1	3.4%	2.4%	34.28	6.3	1.4%	1.1%
	Western	159.7	3.74	23.4	0.3%	<0.1%	0.45	2.8	0.1%	<0.1%
	Total	5,638.5	289.45	51.3	--	2.4%	34.73	6.2	--	1.1%
Sablefish (Trawl)	Eastern	879.5	25.21	28.7	0.9%	0.2%	12.61	14.3	2.9%	0.4%
	Central	1,215.5	43.78	36.0	0.5%	0.4%	21.88	18.0	0.9%	0.7%
	Western	383.5	25.40	66.2	2.3%	0.2%	12.70	33.1	3.6%	0.4%
	Total	2,478.5	94.39	38.1	--	0.8%	47.19	19.0	--	1.5%
Sablefish (Longline)	Eastern	11,468.0	2,409.55	210.1	89.0%	19.8%	313.24	27.3	72.0%	9.8%
	Central	10,855.3	4,268.94	393.3	51.2%	35.1%	554.96	51.1	23.1%	17.4%
	Western	1,868.8	315.36	168.8	28.4%	2.6%	41.00	21.9	11.5%	1.3%
	Total	24,192.1	6,993.85	289.1	--	57.6%	909.20	37.6	--	28.5%
Rockfish (All gears)	Eastern	9,805.1	245.73	25.1	9.1%	2.0%	104.88	10.7	24.1%	3.3%
	Central	15,840.4	955.00	60.3	11.5%	7.9%	467.49	29.5	19.5%	14.7%
	Western	8,325.1	203.43	24.4	18.3%	1.7%	101.72	12.2	28.5%	3.2%
	Total	33,970.6	1,404.16	41.3	--	11.6%	674.09	19.8	--	21.1%
Total (All gears)	Eastern	22,487.3	2,706.56	120.4	--	22.3%	435.22	19.4	--	13.6%
	Central	167,189.2	8,335.88	49.9	--	68.6%	2,398.21	14.3	--	75.2%
	Western	54,720.0	1,109.61	20.3	--	9.1%	356.90	6.5	--	11.2%
	Total	244,396.5	12,152.05	49.7	--	--	3,190.33	13.1	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 42.--Incidence rates (kg of fish per metric ton of catch and average weight (kg)) of Pacific halibut taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type and target fishery, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	1.99	0.81	--	--	--	--	22.93	7.68	--	--	--	--	--	--	--	--
Feb.	11.32	1.38	--	--	--	--	13.22	2.50	--	--	--	--	ns	ns	--	--
Mar.	224.24	1.93	21.37	0.88	--	--	52.38	3.02	64.31	1.12	38.96	6.15	23.15	8.51	--	--
Apr.	31.29	1.51	33.85	3.97	--	--	49.85	5.56	--	--	111.16	10.28	4.24	8.20	--	--
May	159.81	8.02	47.86	5.10	25.38	2.22	45.23	12.28	--	--	94.24	8.98	16.22	6.44	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	3.48	6.74	83.00	8.88	38.40	3.84	36.47	15.67	--	--	--	--	0.00	0.00	--	--
Aug.	13.10	3.56	39.59	4.48	153.41	2.64	117.96	3.16	25.11	9.00	--	--	--	--	--	--
Sep.	59.24	9.34	--	--	119.52	2.84	39.96	5.14	86.01	10.12	--	--	--	--	--	--
Oct.	5.67	6.13	79.22	2.37	104.28	2.43	81.68	5.03	23.63	7.28	--	--	--	--	--	--
Nov.	--	--	97.66	2.64	0.00	0.00	105.07	3.89	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	31.21	4.40	46.06	4.78	44.96	3.28	68.10	5.88	28.44	4.48	52.73	8.59	12.91	7.24	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.03	2.95	0.00	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.91	0.96	--	--	--	--	--	--	--	--
Mar.	15.60	3.29	--	--	--	--	60.57	1.91	--	--	--	--	--	--	--	--
Apr.	9.52	4.84	--	--	--	--	5.91	2.680	--	--	--	--	--	--	--	--
May	--	--	0.00	0.00	--	--	3.37	19.88	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	7.92	8.23	--	--	8.60	8.64	--	--	--	--	--	--	--	--
Aug.	1.96	0.05	--	--	--	--	3.12	18.56	--	--	24.92	22.66	--	--	--	--
Sep.	34.84	15.99	--	--	--	--	4.64	10.12	--	--	--	--	--	--	--	--
Oct.	2.65	8.72	--	--	31.55	5.07	31.16	9.64	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	2.97	7.19	3.91	8.23	31.55	5.07	5.60	9.27	0.00	0.00	24.92	22.66	--	--	--	--

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	16.55	0.53	ns	ns	ns	ns	24.78	3.83	--	--	--	--	ns	ns	--	--
Feb.	22.29	1.71	ns	ns	10.85	1.51	18.58	2.05	12.16	1.31	--	--	ns	ns	--	--
Mar.	11.16	2.27	39.22	7.82	49.84	2.29	38.98	5.37	69.29	1.12	52.28	6.47	27.50	7.29	2.51	6.25
Apr.	13.35	2.33	36.43	6.95	37.57	1.91	69.58	7.64	ns	ns	29.72	8.43	22.23	12.83	ns	ns
May	59.30	6.98	26.45	5.99	43.68	2.06	47.79	6.86	ns	ns	20.05	11.39	3.88	5.19	ns	ns
June	2.09	3.37	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	11.75	12.15	13.94	9.05	19.13	4.85	28.00	9.81	--	--	38.91	15.86	8.56	29.60	--	--
Aug.	6.90	7.80	46.40	6.29	33.28	4.98	53.85	9.01	29.34	23.80	17.57	21.30	ns	ns	--	--
Sep.	14.66	8.97	70.22	4.72	98.80	2.99	76.31	4.72	17.47	6.76	--	--	--	--	--	--
Oct.	11.20	5.56	87.27	4.39	34.90	2.63	98.55	5.57	23.68	4.07	--	--	--	--	--	--
Nov.	50.01	5.17	332.75	3.87	--	--	45.35	5.22	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	9.96	3.24	23.14	6.58	45.14	2.87	28.42	5.81	19.08	4.30	19.94	11.76	20.26	10.95	2.51	6.25
Pelagic trawl (pollock target)																
Jan.	0.00	0.00	--	--	<0.01	0.40	<0.01	2.40	0.00	0.00	--	--	--	--	--	--
Feb.	0.00	0.00	--	--	0.05	46.00	0.06	22.80	<0.01	2.55	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.00	0.00	--	--	0.04	9.30	0.00	0.00	0.00	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.14	13.88	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.04	7.10	--	--	0.00	0.00	--	--	--	--
July	--	--	--	--	--	--	0.04	25.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.08	32.16	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.04	8.19	0.00	0.00	--	--	--	--	--	--
Oct.	0.06	6.92	--	--	--	--	0.03	10.04	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.06	6.92	ns	ns	0.04	16.25	0.04	12.03	<0.01	2.55	0.00	0.00	--	--	--	--

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	5.40	2.10	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	6.62	1.28	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.00	0.00	--	--	--	--
June	--	--	--	--	--	--	0.00	0.00	--	--	0.66	12.64	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Oct.	5.08	4.17	ns	ns	--	--	0.50	6.55	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	5.08	4.17	ns	ns	--	--	0.64	2.88	ns	ns	0.58	12.64	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	55.00	4.00	ns	ns	--	--	--	--	--	--
Feb.	155.13	6.70	--	--	32.47	10.39	58.26	7.94	32.88	9.44	--	--	--	--	--	--
Mar.	61.19	6.93	ns	ns	--	--	36.14	8.39	ns	ns	--	--	ns	ns	--	--
Apr.	227.89	6.17	ns	ns	360.83	6.47	1,162.36	7.24	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	651.17	7.39	190.51	5.46	--	--	ns	ns	ns	ns	--	--
June	1,994.01	9.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	16.24	3.47	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	381.64	6.95	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	81.68	4.85	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Total	129.83	6.48	ns	ns	216.11	6.84	138.31	6.47	32.88	9.44	ns	ns	ns	ns	ns	ns

Table 42.--Continued.

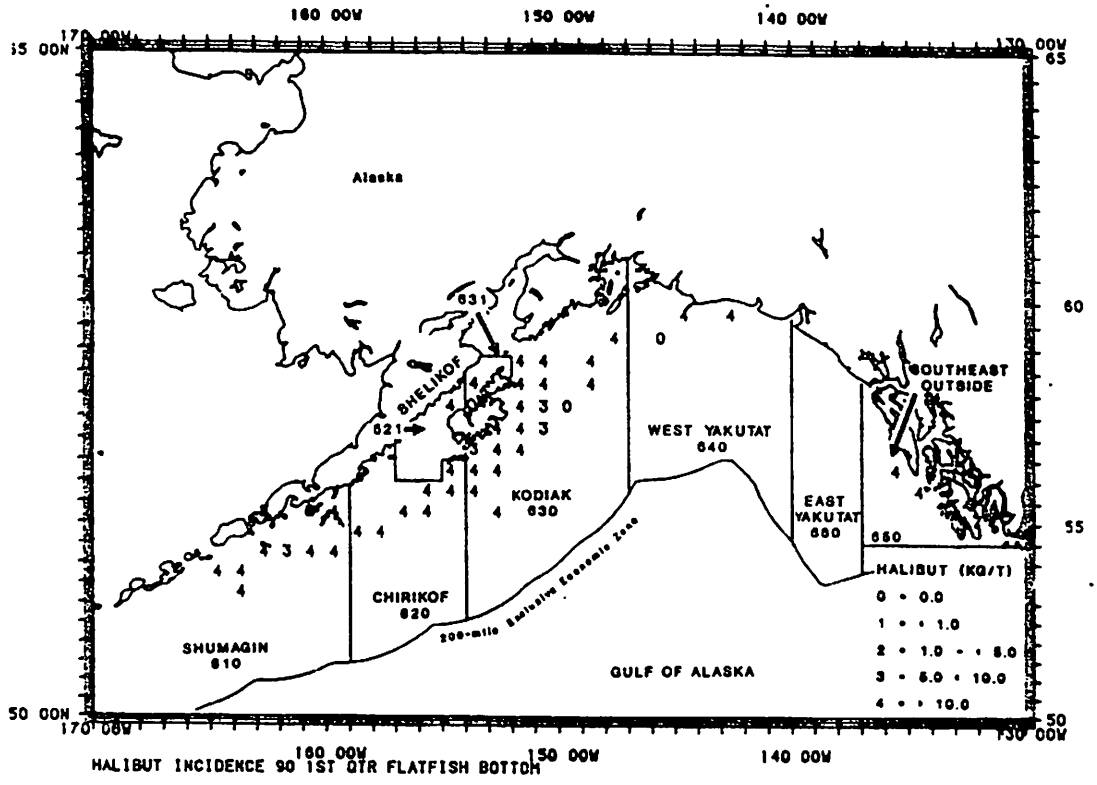
	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	227.21	7.03	214.74	8.98	2,211.52	13.360	614.99	10.81	ns	ns	52.04	8.25	283.22	8.23	0.00	0.00
May	67.39	9.82	95.42	6.28	0.00	0.00	342.77	9.28	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	150.15	7.49	150.82	7.84	1,490.44	13.36	456.92	10.09	ns	ns	52.04	8.25	283.22	8.23	0.00	0.00
Longline vessels (other target fisheries)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	1,373.08	8.15	598.82	12.64	3,622.12	13.36	165.23	9.12	--	--	--	--	ns	ns	ns	ns
May	--	--	--	--	--	--	2,618.70	13.77	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	1,373.08	8.15	598.82	12.64	3,622.12	13.36	910.76	12.94	--	--	ns	ns	ns	ns	ns	ns

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.00	0.00	1.53	3.33	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	4.19	4.00	--	--	--	--	--	--
May	--	--	ns	ns	--	--	55.33	8.68	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	31.41	7.11	ns	ns	--	--	--	--	--	--
July	0.00	0.00	ns	ns	--	--	38.93	8.05	ns	ns	--	--	--	--	--	--
Aug.	0.00	0.00	316.25	19.65	80.44	10.47	109.88	8.30	ns	ns	--	--	--	--	--	--
Sep.	0.00	0.00	ns	ns	16.62	5.32	44.82	4.01	7.77	5.00	--	--	--	--	--	--
Oct.	0.00	0.00	ns	ns	7.86	3.66	36.01	4.47	70.02	3.27	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	41.90	3.58	31.04	3.00	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	0.00	0.00	316.25	19.65	19.50	5.91	52.01	6.37	9.55	3.39	--	--	--	--	--	--

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observer.



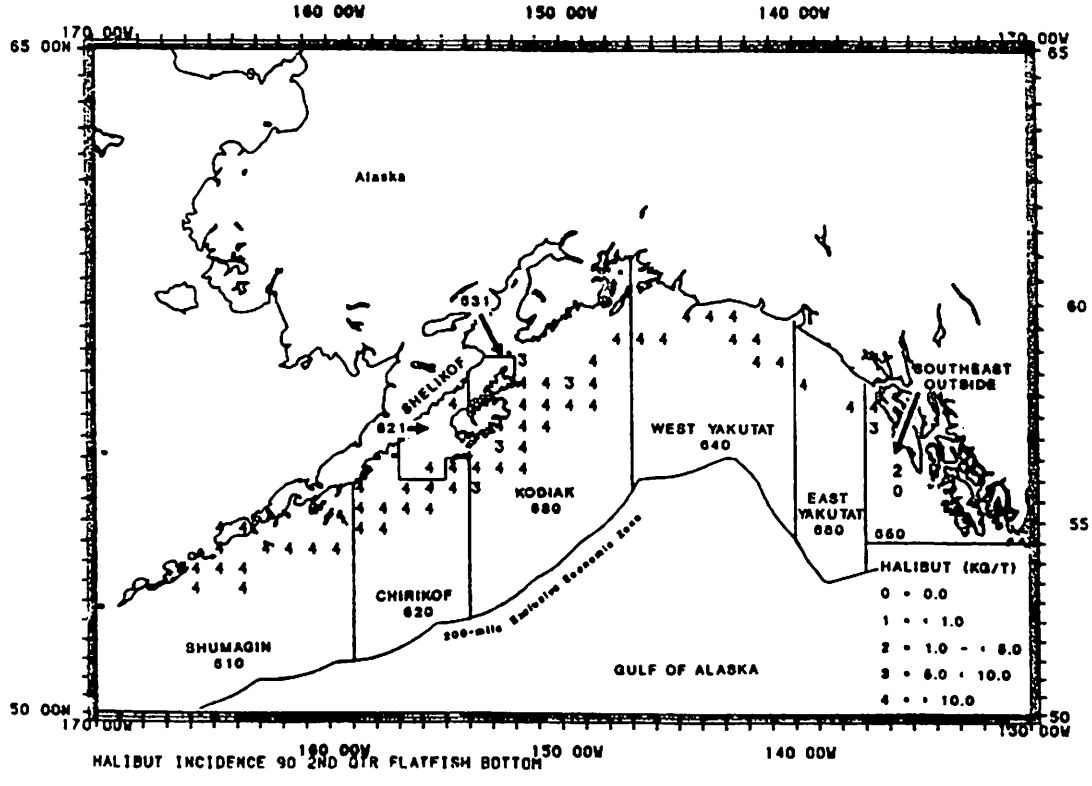
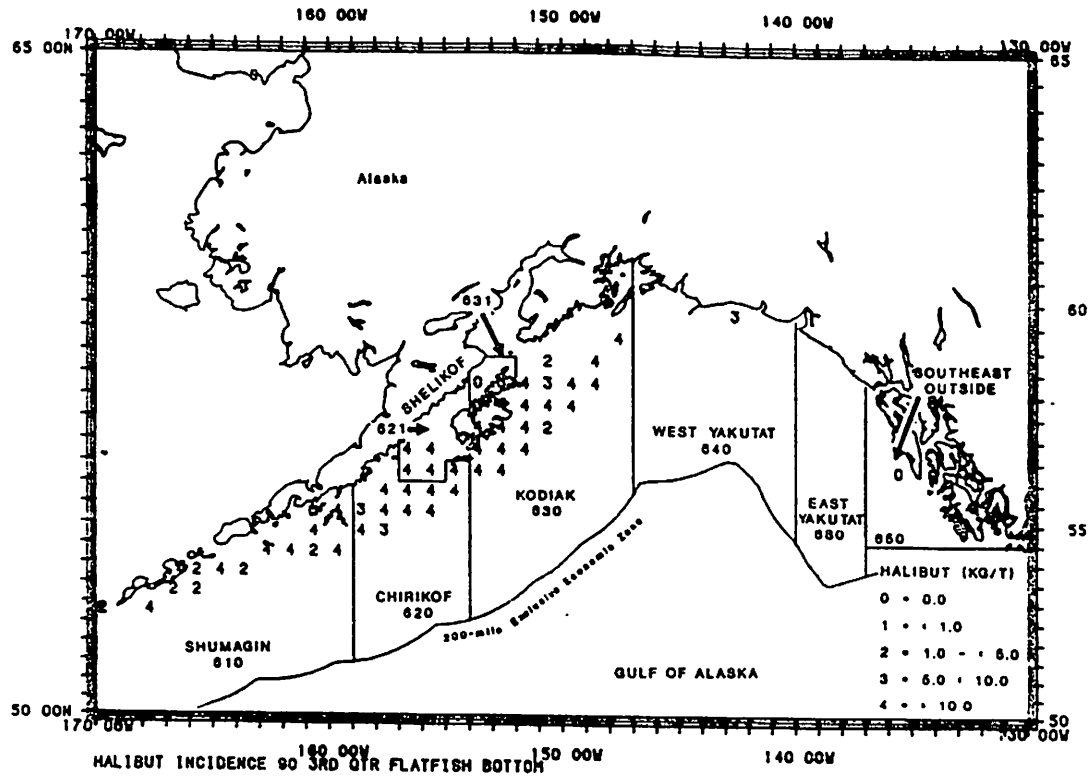


Figure 13.--Average incidence (no./t) of Pacific halibut in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1° longitude areas in the Gulf of Alaska region, 1990.



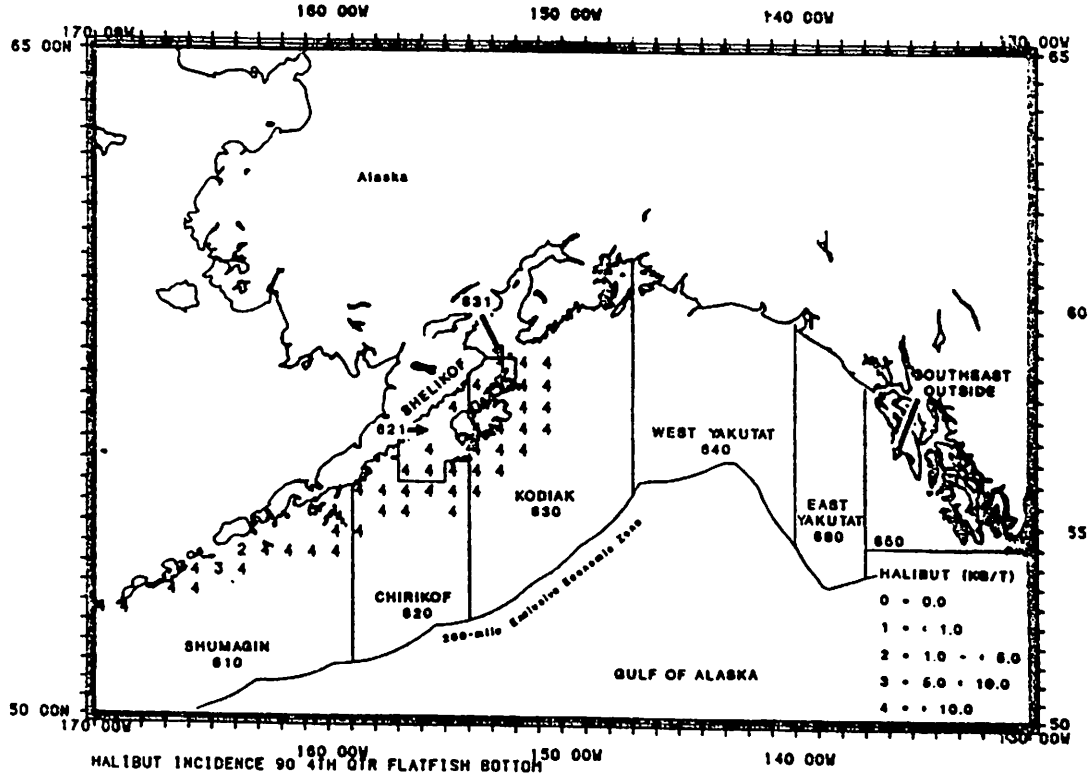
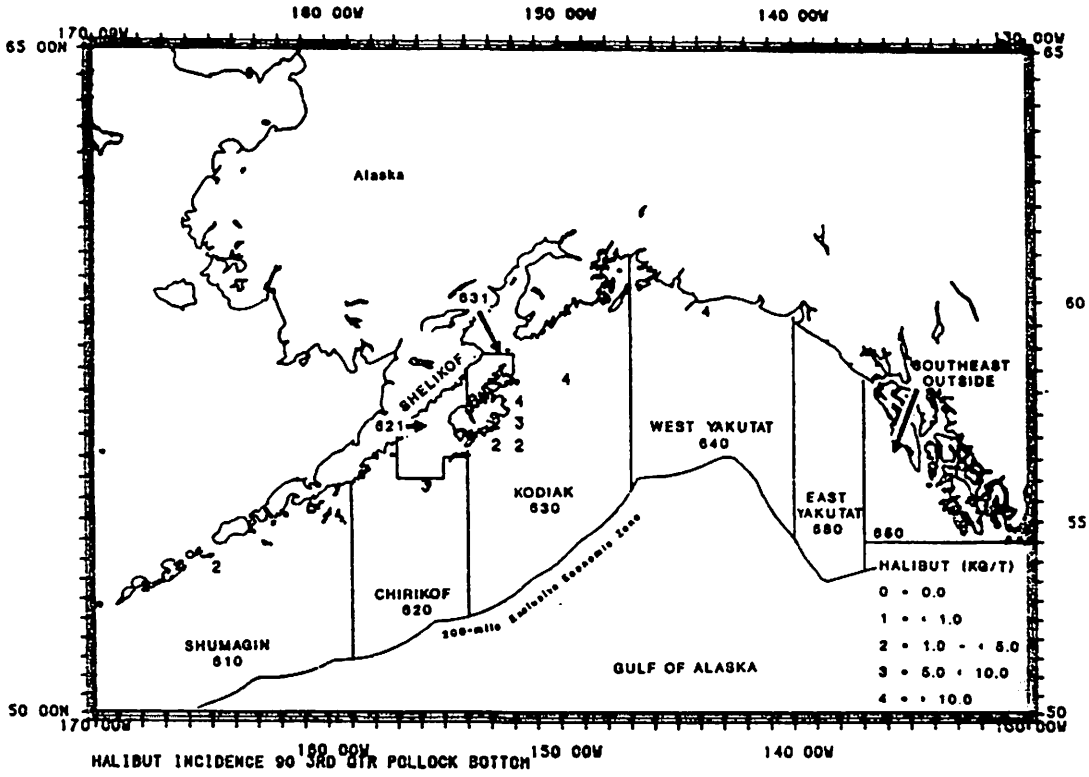
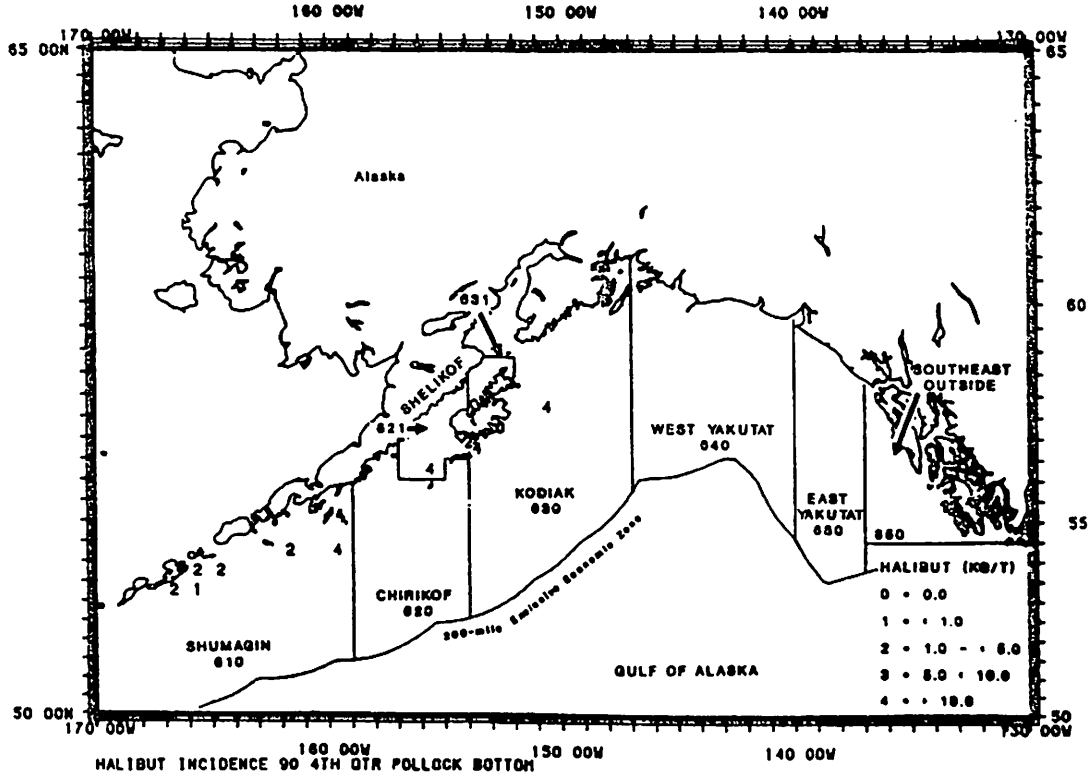


Figure 13.--Continued.

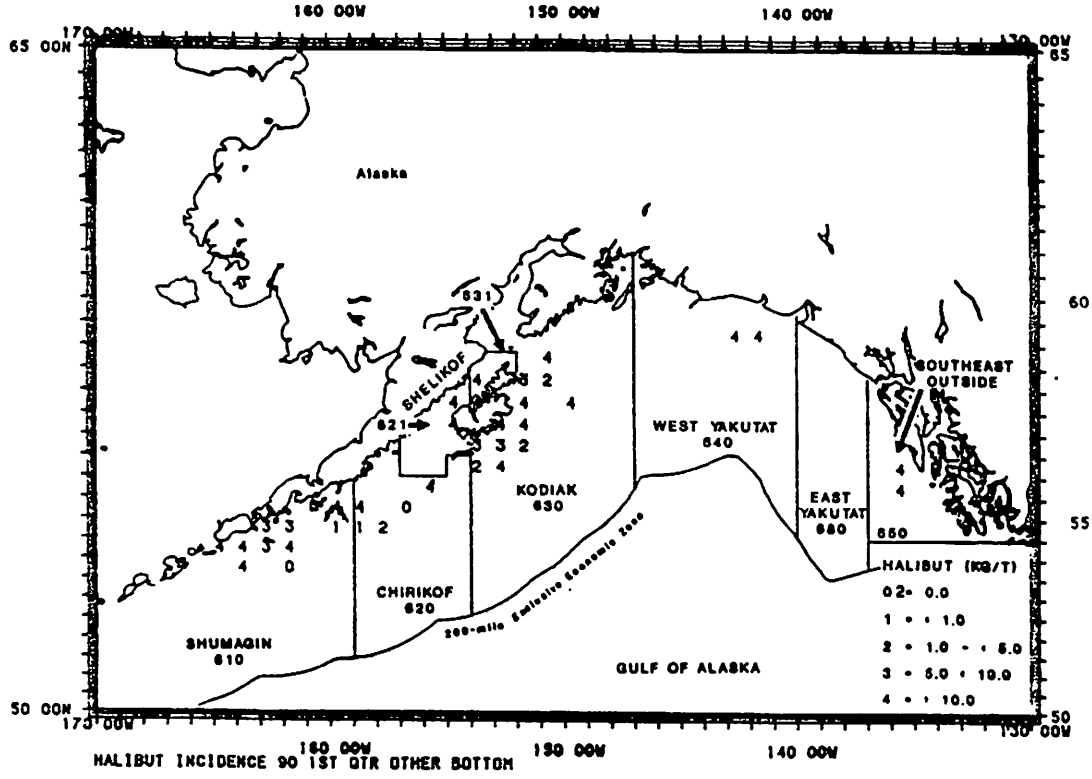


HALIBUT INCIDENCE 90 3RD QTR POLLOCK BOTTOM

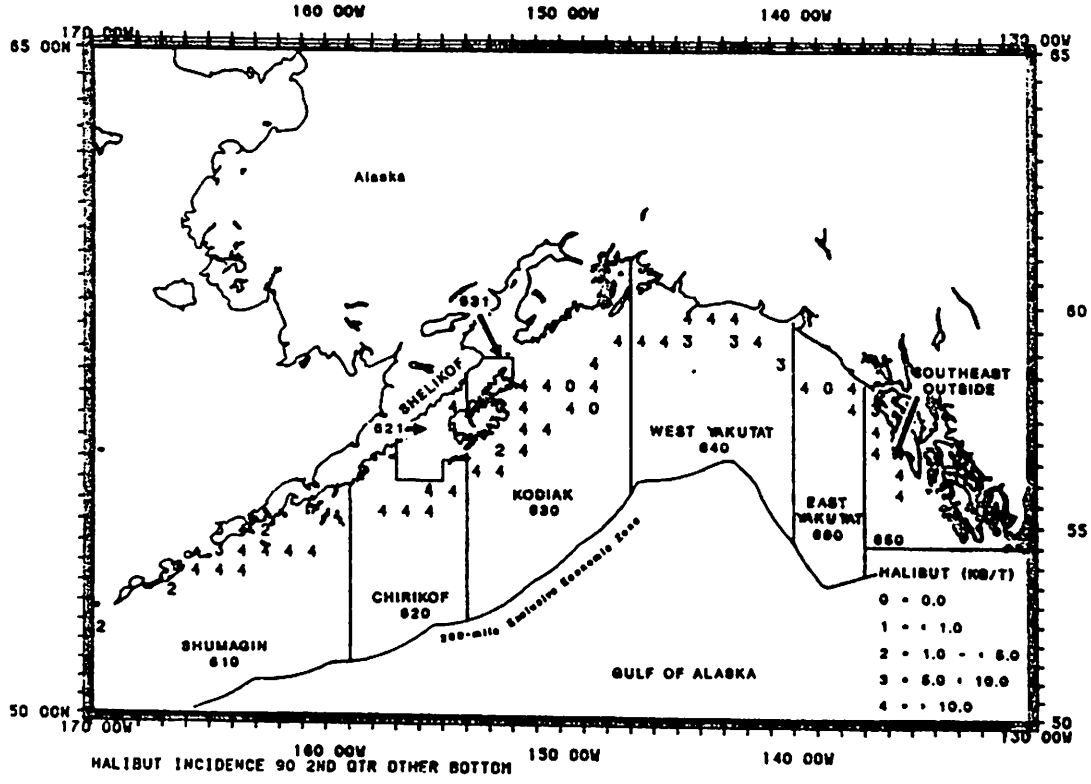


HALIBUT INCIDENCE 90 4TH QTR POLLOCK BOTTOM

Figure 13.--Continued.

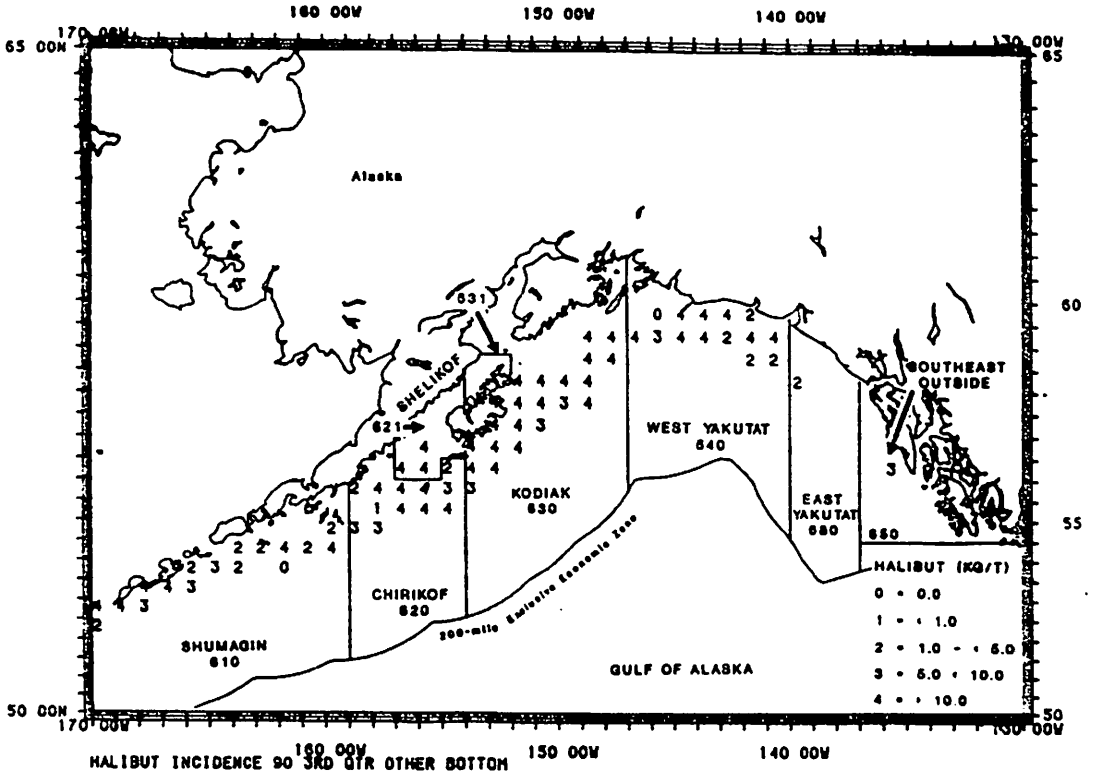


HALIBUT INCIDENCE 90 1ST QTR OTHER BOTTOM

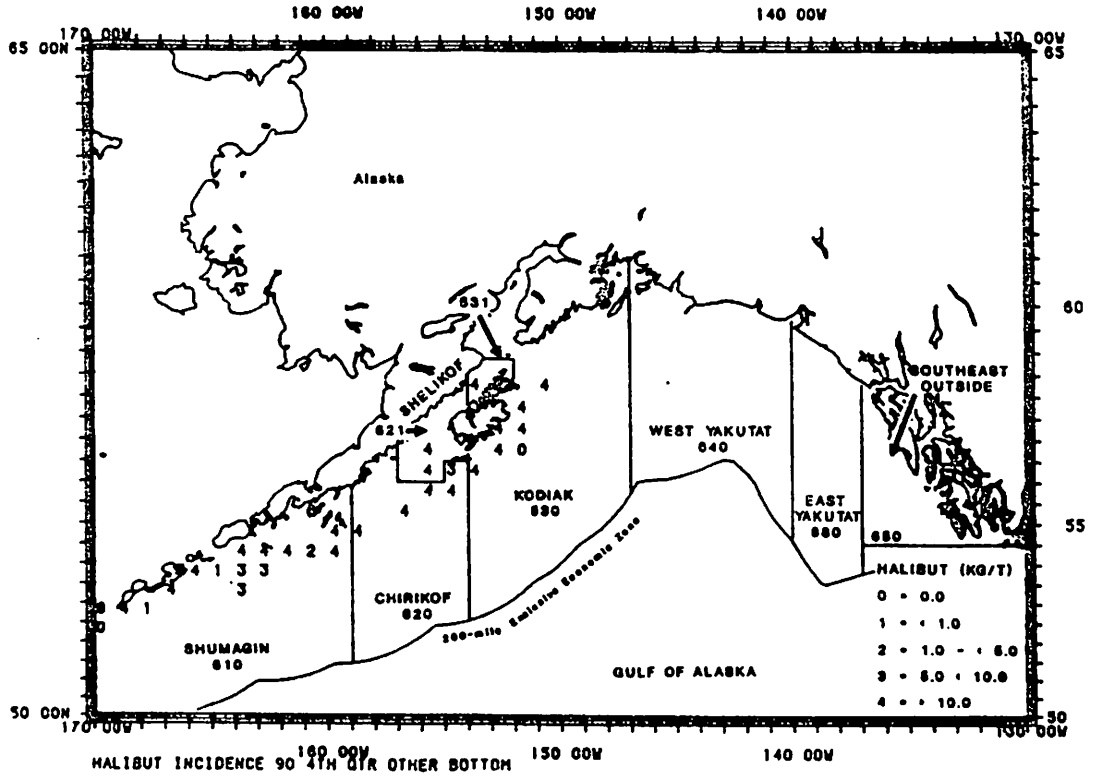


HALIBUT INCIDENCE 90 2ND QTR OTHER BOTTOM

Figure 13.--Continued.

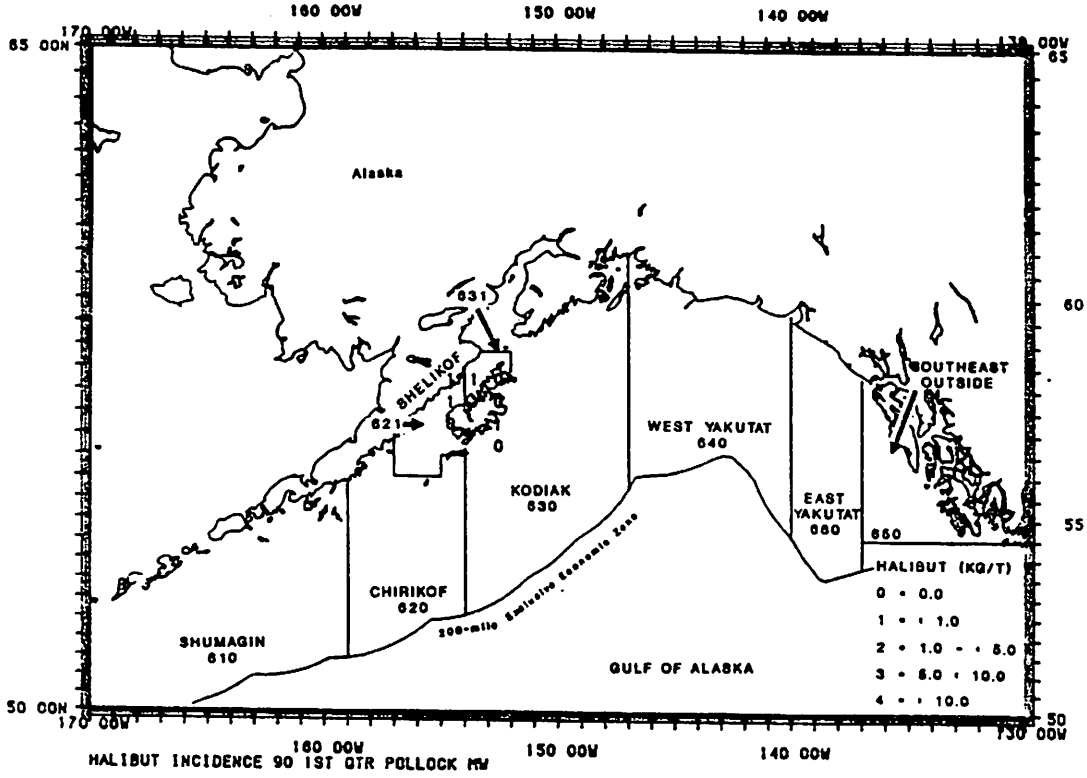


HALIBUT INCIDENCE 90 3RD QTR OTHER BOTTOM

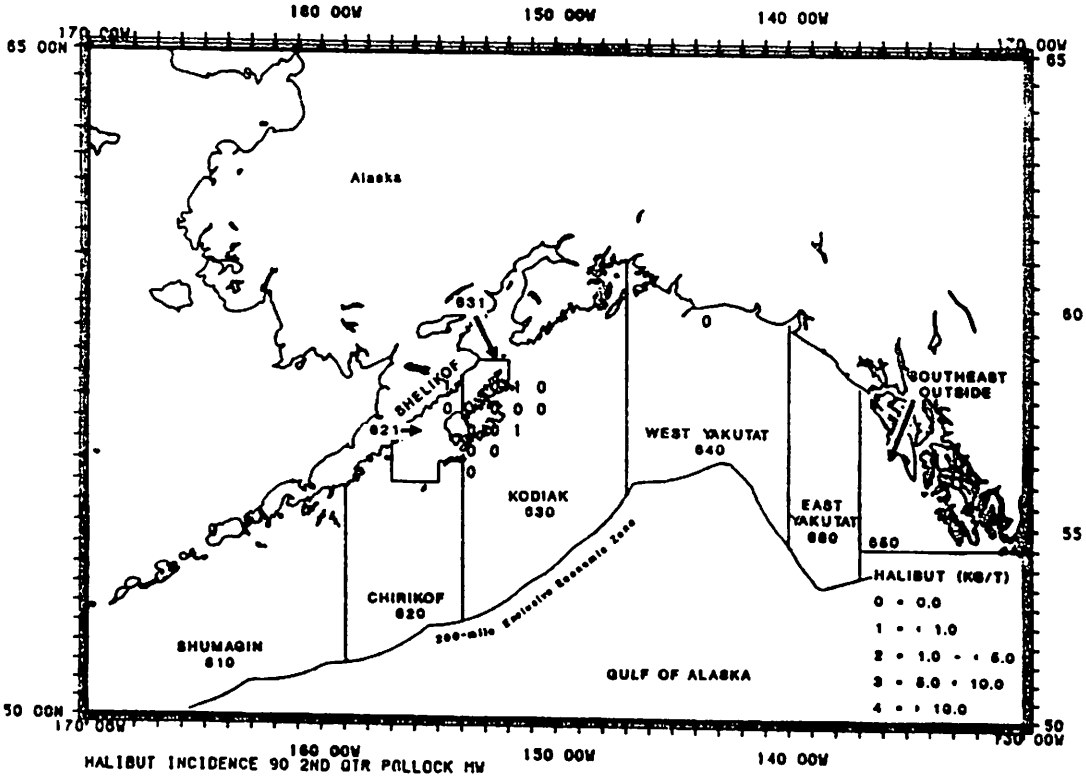


HALIBUT INCIDENCE 90 4TH QTR OTHER BOTTOM

Figure 13.--Continued.

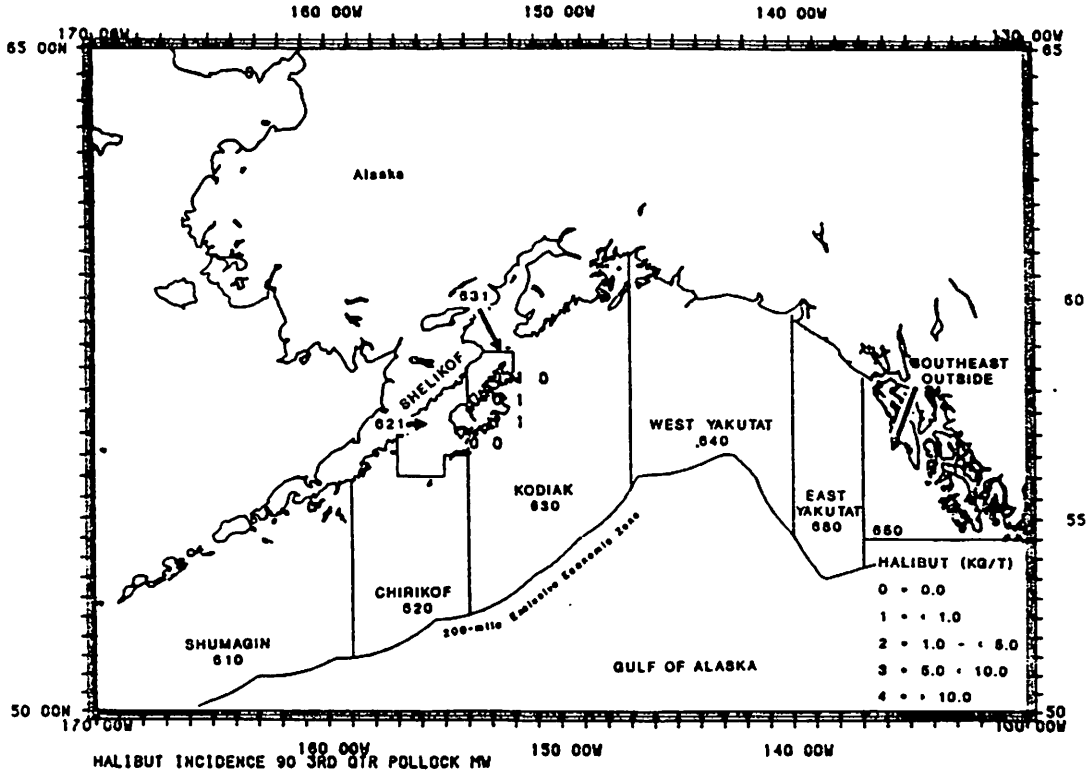


HALIBUT INCIDENCE 90 1ST QTR POLLOCK MW



HALIBUT INCIDENCE 90 2ND QTR POLLOCK MW

Figure 13.--Continued.



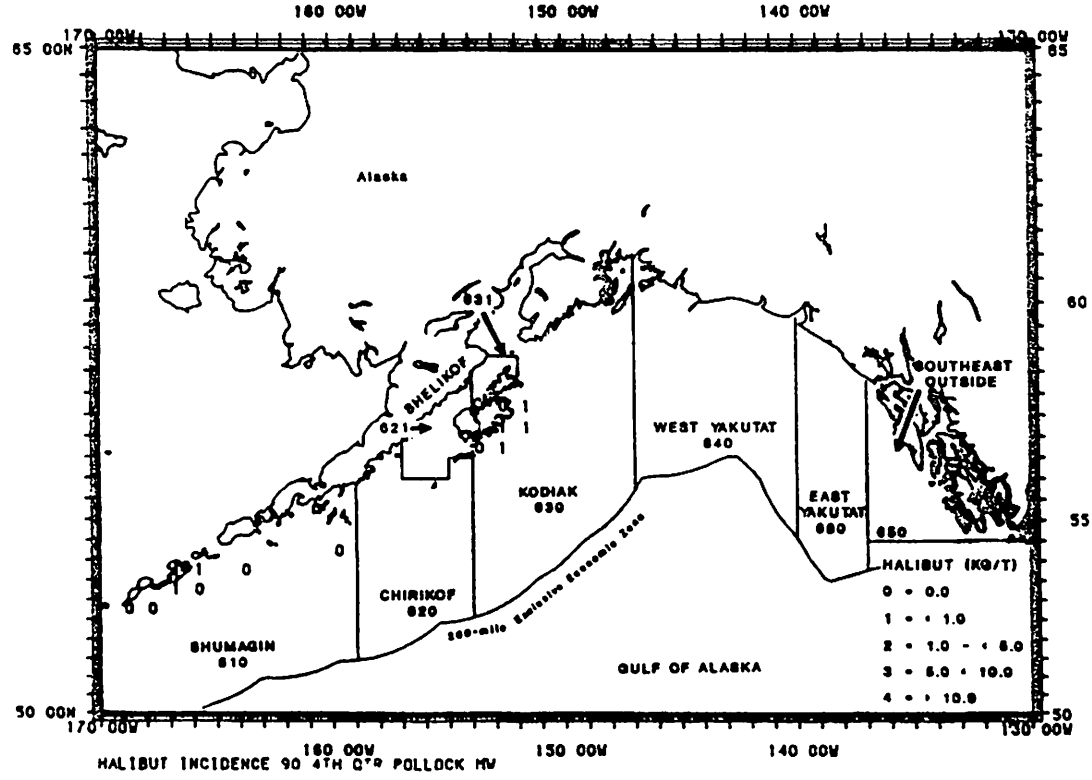
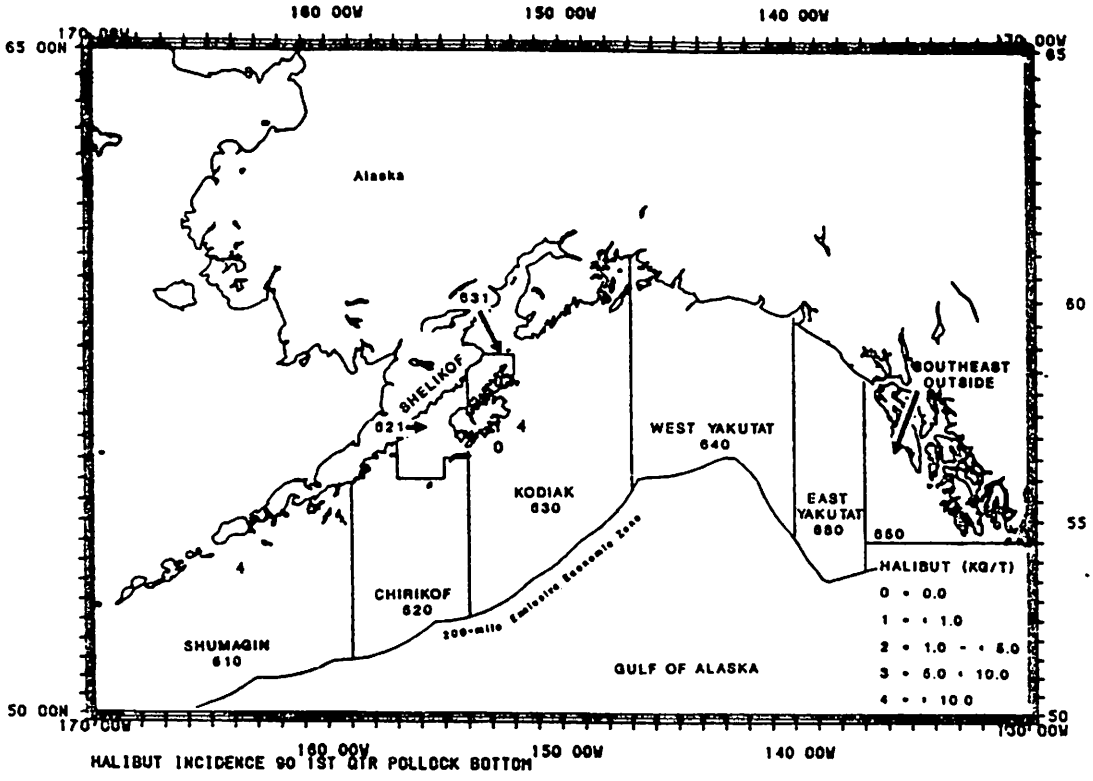
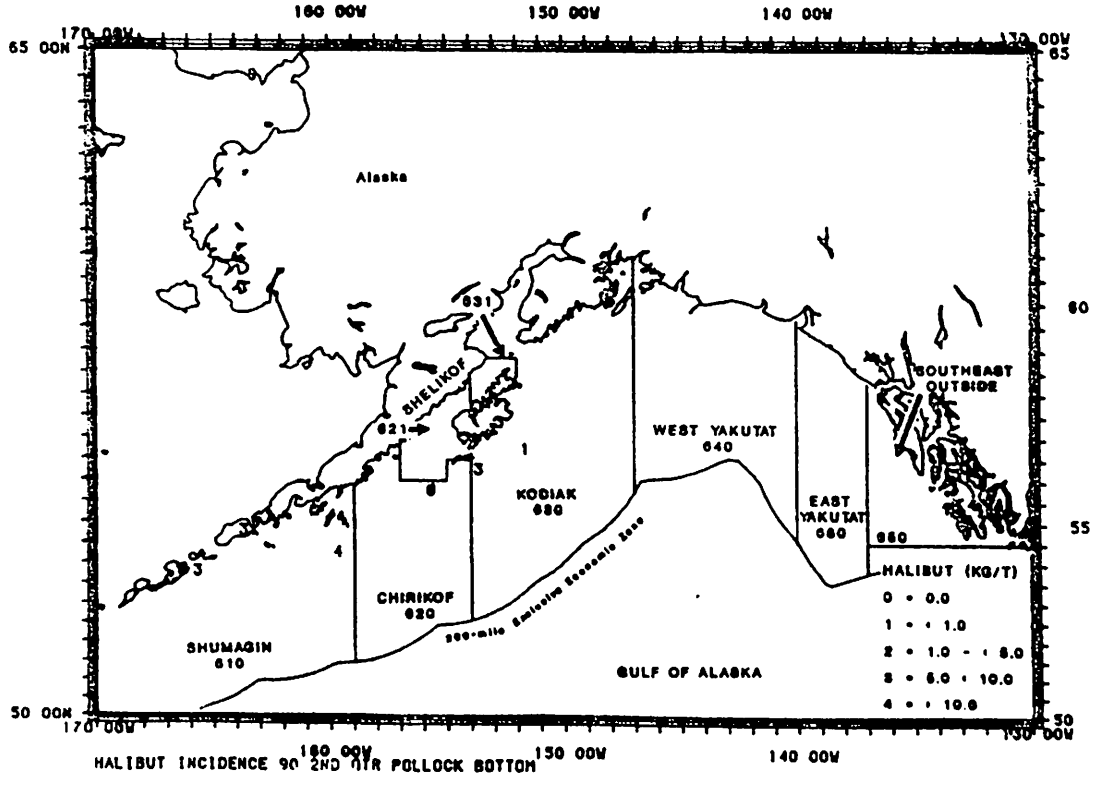


Figure 13.--Continued.





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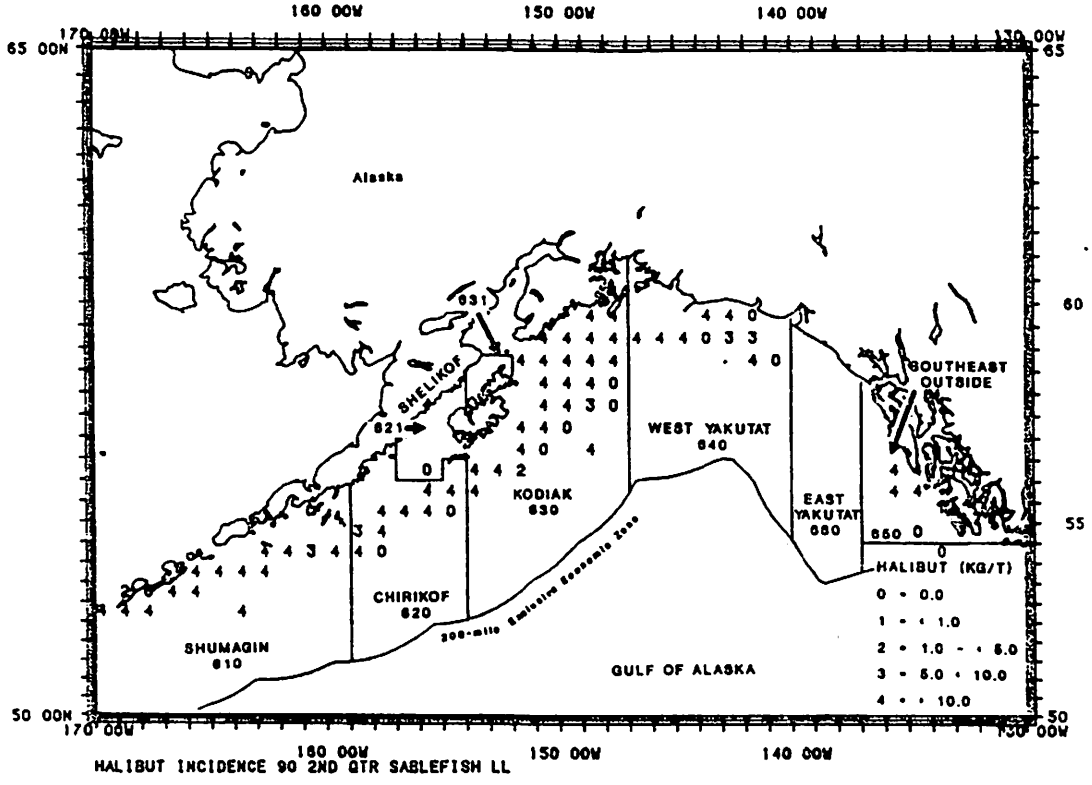

HALIBUT INCIDENCE 90 2ND QTR SABLEFISH LL

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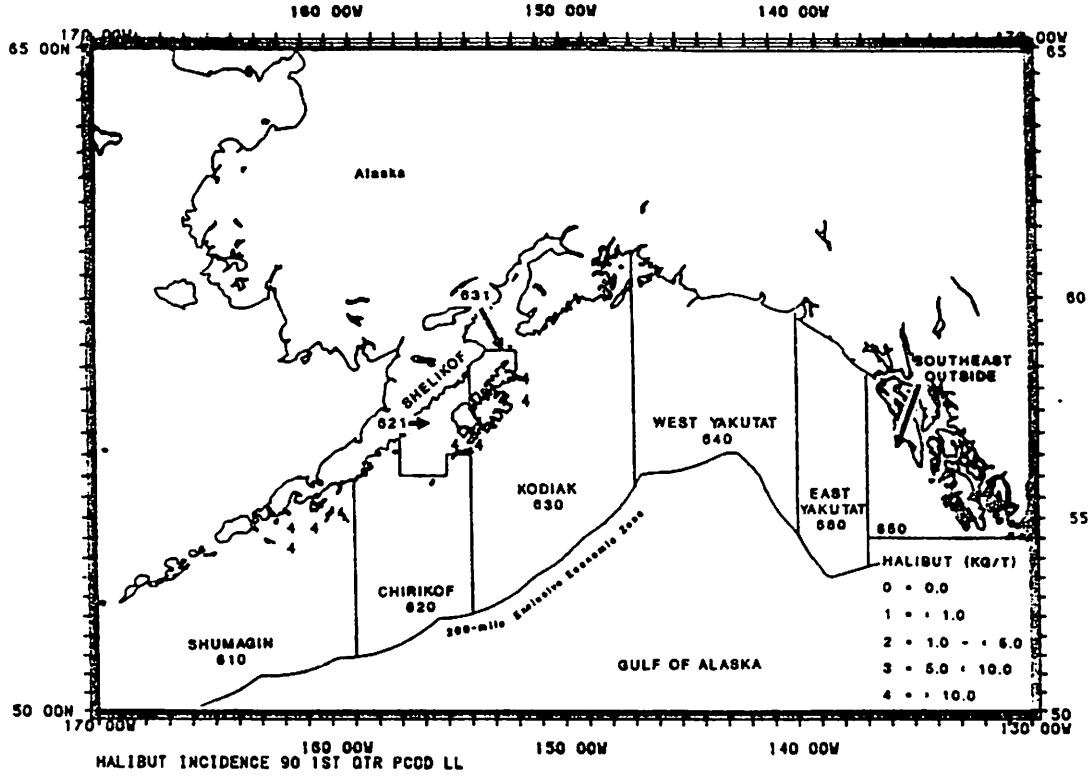

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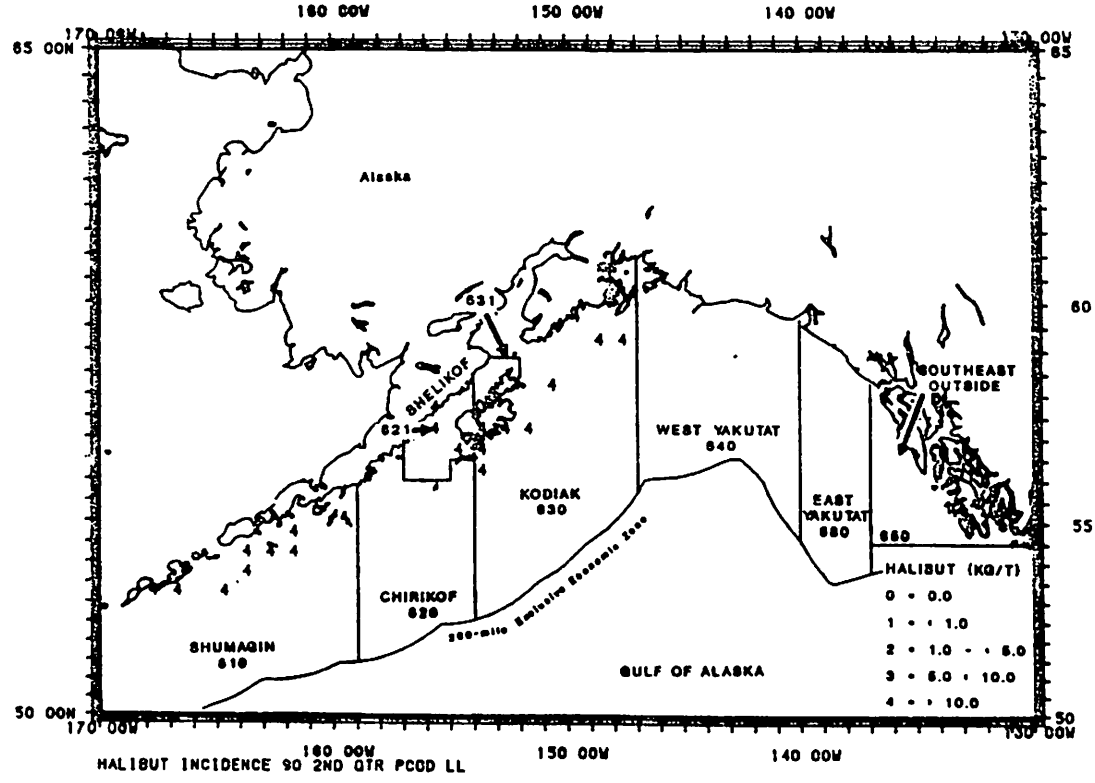

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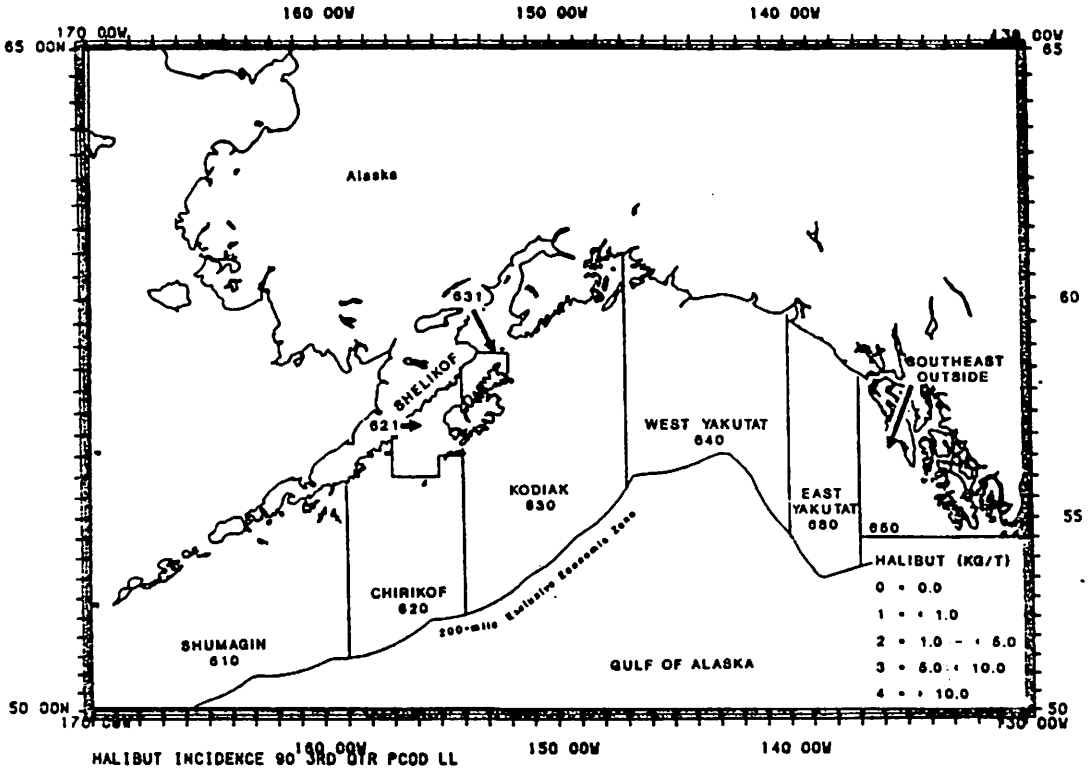

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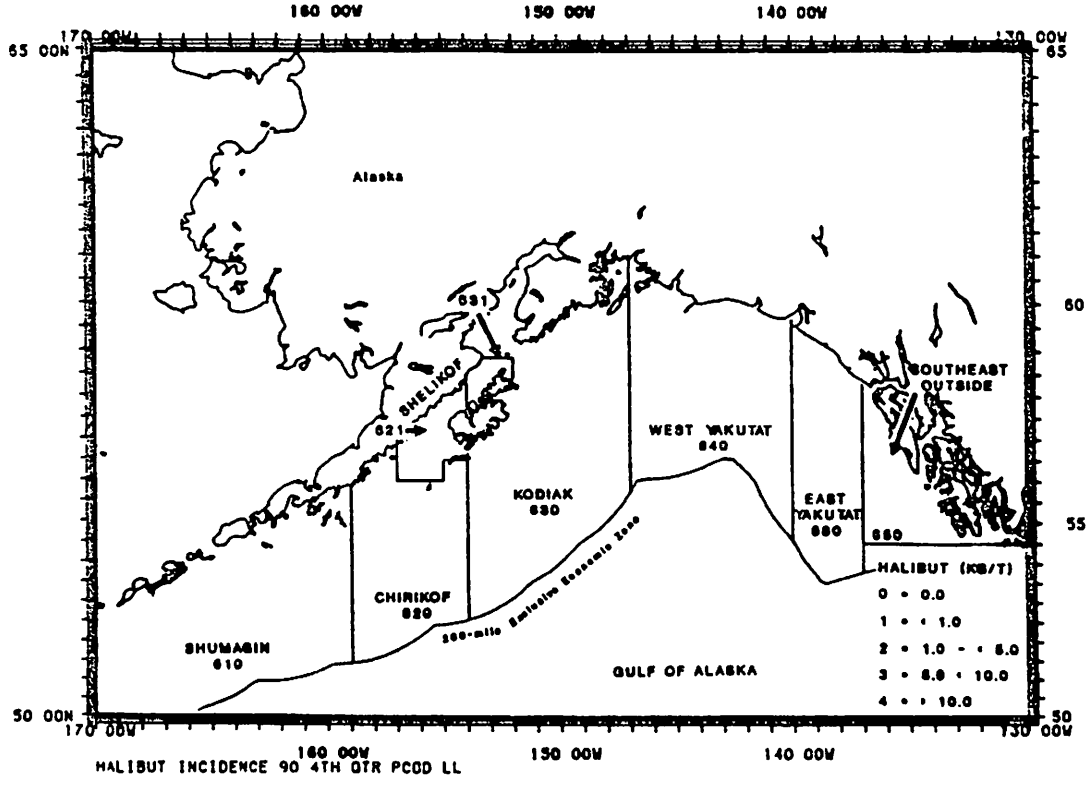

HALIBUT INCIDENCE 90 4TH QTR PCOD LL

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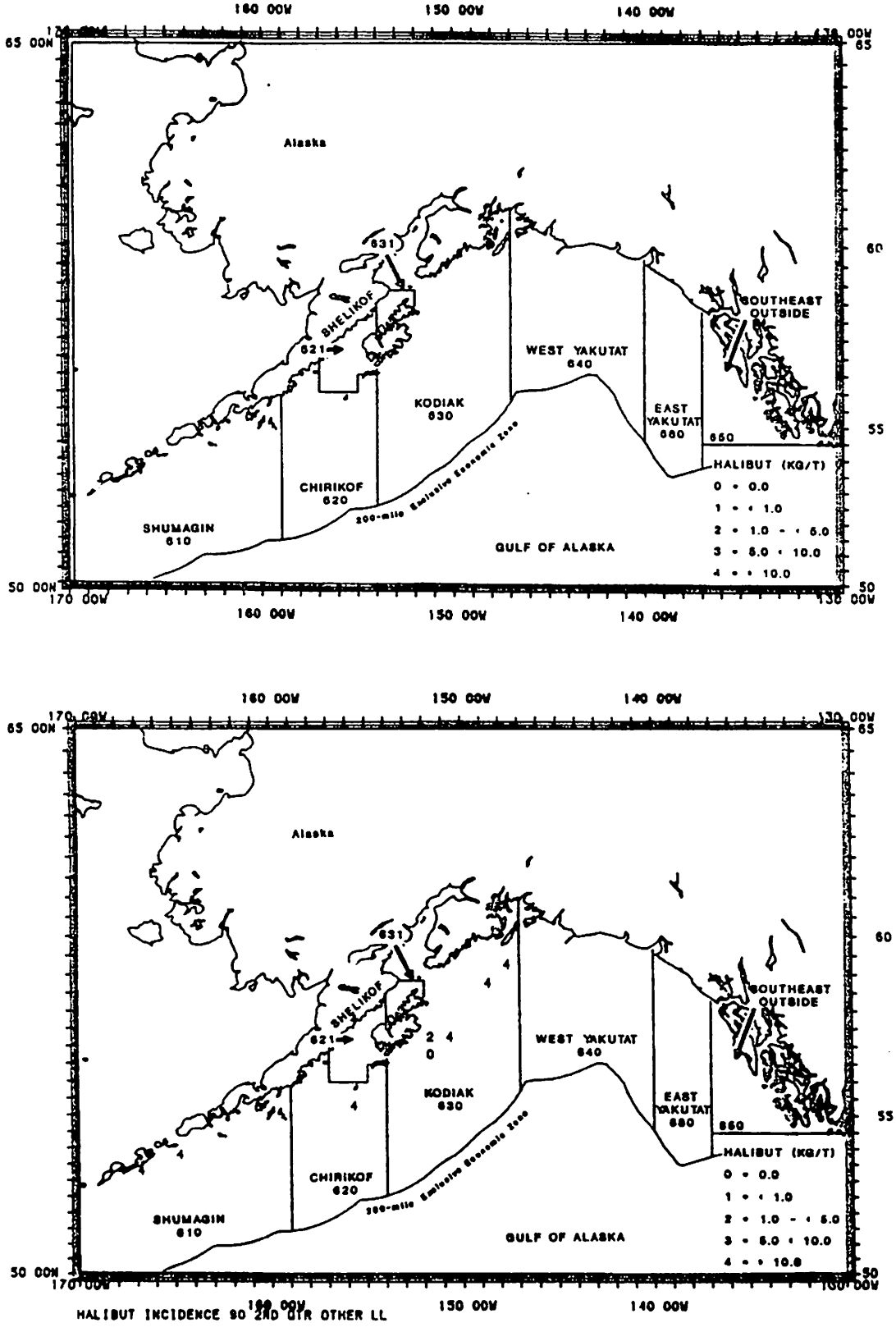

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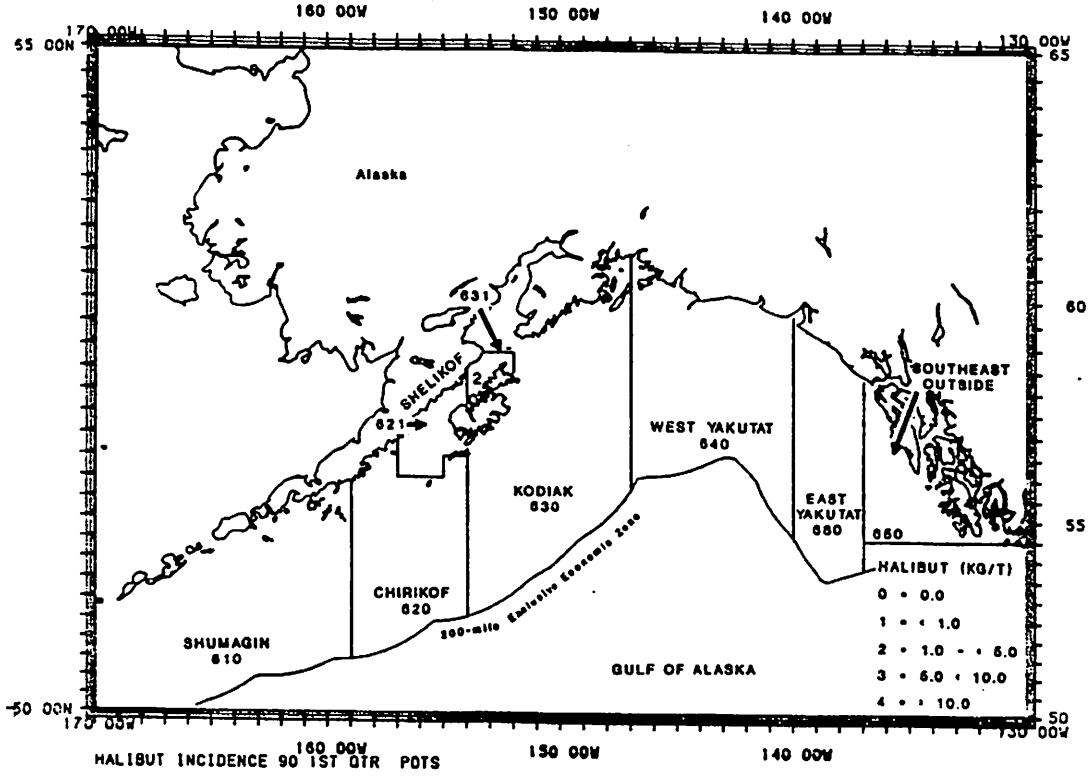

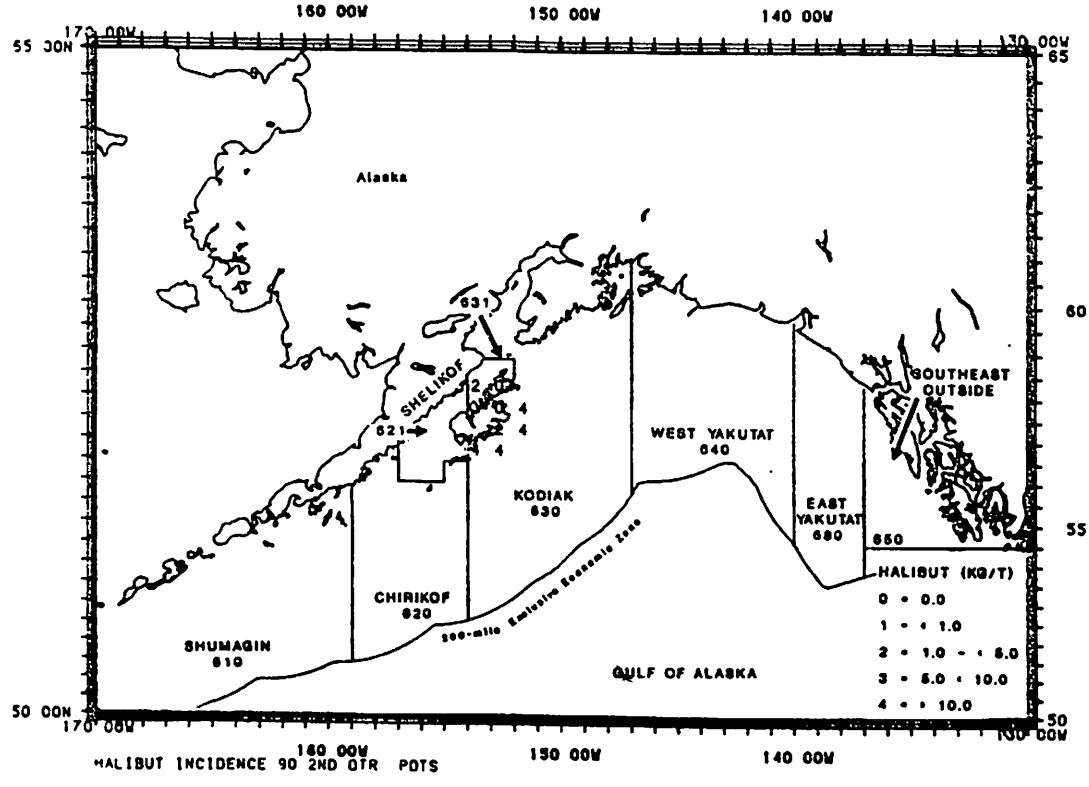

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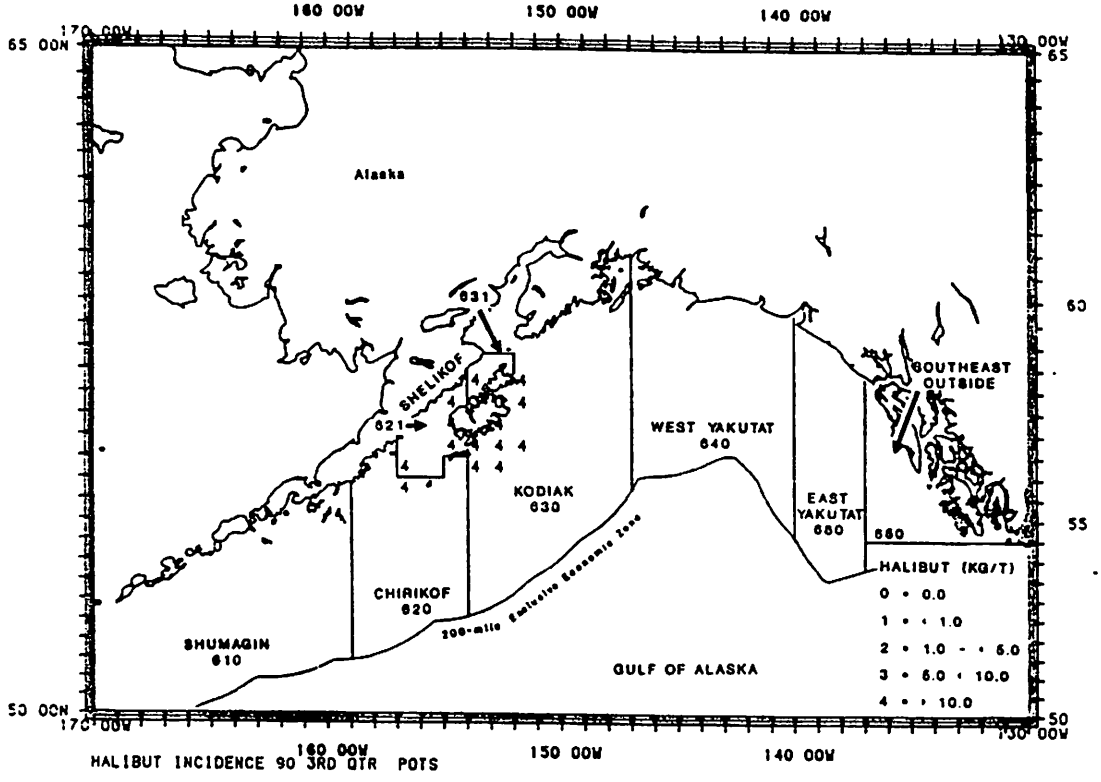


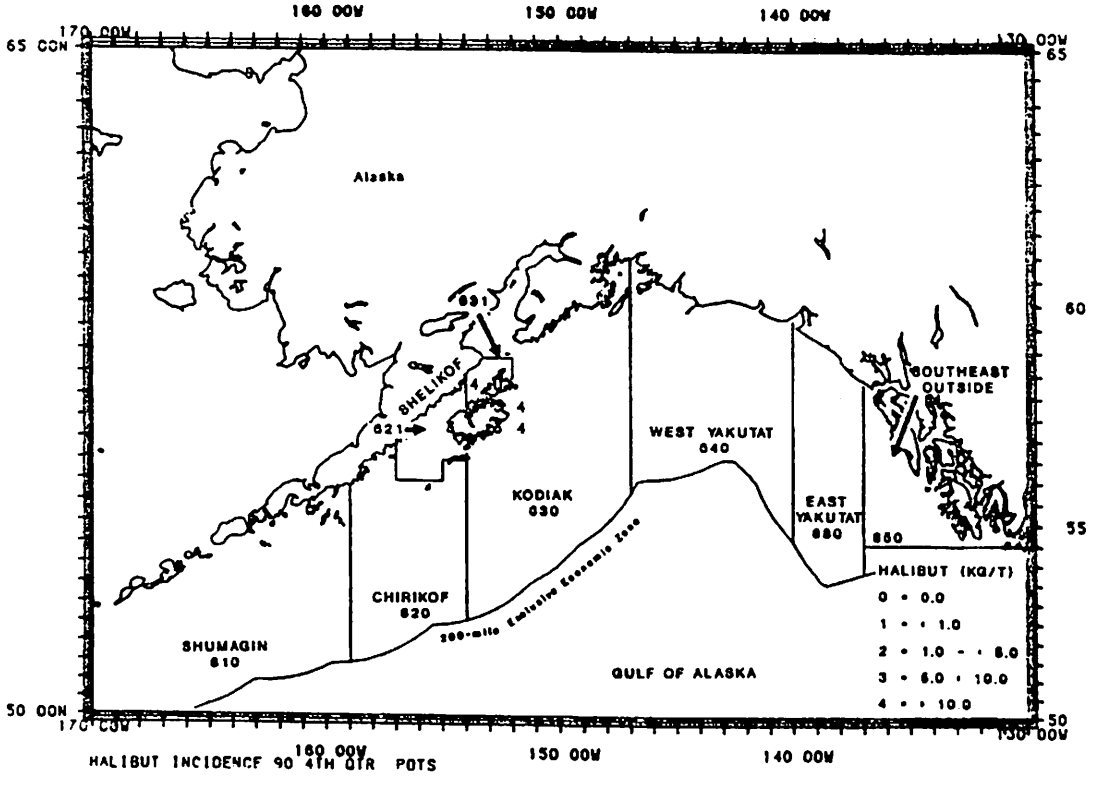


Figure 13.--Continued.

Table 43.--Estimated incidental catch and mortality* of Pacific halibut (by metric tons) by U.S. domestic vessels in the Gulf of Alaska region by gear type and area, 1990. (Dashes indicate area not fished.)

	Total catch (t)									
Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	573.61	966.78	98.05	2,459.15	13.51	166.55	29.04	29.63	4,336.33	35.7%
Pelagic trawl	1.19	0.03	0.02	22.92	0.08	0.13	--	--	24.38	0.2%
Longline	531.06	445.28	1.56	4,039.88	2.86	232.27	2,026.16	222.83	7,501.89	61.7%
Pot	3.74	28.19	0.64	247.22	9.66	--	--	--	289.45	2.4%
Total	1,109.61	1,440.28	100.28	6,769.17	26.11	398.95	2,055.19	252.46	12,152.05	
Percent by area	9.1%	11.9%	0.8%	55.7%	0.2%	3.3%	16.9%	2.1%		

	Mortality (t)									
Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	286.81	483.39	49.03	1,229.58	6.76	83.28	14.52	14.81	2,168.17	68.0%
Pelagic trawl	0.59	0.02	0.01	11.46	0.04	0.07	--	--	12.19	0.4%
Longline	69.04	57.89	0.20	525.18	0.37	30.19	263.40	28.97	975.25	30.6%
Pot	0.45	3.38	0.08	29.67	1.16	--	--	--	34.73	1.1%
Total	356.89	544.67	49.32	1,795.89	8.33	113.54	277.92	43.78	3,190.33	
Percent by area	11.2%	17.1%	1.5%	56.3%	0.3%	3.6%	8.7%	1.4%		

* Pre-assigned mortality rates in effect in 1990 were as follows: trawl vessels--50%, longline vessels--13%, and pot--12% vessels.

1992 Prohibited Species Bycatch Estimation

National Marine Fisheries Service
Alaska Region

Prohibited species bycatch estimates are based on two primary data sources: Weekly Production Reports submitted by processors and Weekly Observer Reports submitted by domestic groundfish observers. The estimation procedures are designed to match groundfish production with the most appropriate bycatch rate. Estimates of bycatch for observed catcher/processors, for example, are computed using the production and observer reports each week for each specific vessel. Estimates of bycatch for shore plants are made using observer data from vessels delivering to a plant as long as there are at least three vessels observed during the week.

When processor specific matches between observer reports and production reports are not available, matches are made using combinations of gear, area and target fishery. This ensures, that to the extent data is available, PSC bycatch rates are matched with harvest data from the same gear, area and target fishery.

The 1992 bycatch estimation system has the following steps:

1. **Import Observer Data.** Vessel specific observer rate data is transmitted to the Regional Office by the observer program in Seattle and imported into a DBASE compatible file. This data file includes vessel and processor identifiers, week, zone, gear, target, metric tons of groundfish sampled, and the number or weight of each prohibited species corresponding to the sampled groundfish.

2. **Compute bycatch rates.** Sampled groundfish weights (in metric tons) and PSC amounts (in kilograms or numbers) are summed for all observer reports meeting the selection criteria. The total PSC amount is divided by the total sampled groundfish amount, giving an overall bycatch rate which is, in effect, weighted by the size of the sampled groundfish weights. Several different average bycatch rates are computed, ranging from very specific to very general. The following rates are computed:

    a. Processor specific rate. These bycatch rates are computed for each prohibited species (halibut, bairdi Tanner crab, red king crab, chinook salmon, other salmon, herring) for each unique combination of week, processor, area, gear and target fishery.

    b. 3-week moving average rate. These bycatch rates are computed for each prohibited species for each unique

combination of week, area, gear and target fishery using observer data from the previous, current, and next week. Rates are recomputed for each week of the year after every data feed. For the most recent week, only the current and previous weeks are used. These rates will be used when a processor specific rate is not available.

c. Region-wide rate. These rates incorporate all data from a specific gear and target for the year to date, and are used when no other rate is available.

3. **Determine Targets for Weekly Reports.** Assign each weekly report in the NMFS weekly processor report database to one of the target fisheries specified in Table 1, using the same algorithm used by the observer program in assigning targets to observer reports.

4. **Compute Total Groundfish for Each Cell.** Groundfish harvests for each cell are totaled from the NMFS weekly processor report database. A cell is a unique combination of week, processor, area, gear and target.

5. **Assign Bycatch Rates to Cells.** Processor specific rates are assigned first, then 3-week average and region-wide rates are assigned as needed. Except for the processor specific rate from a catcher-processor vessel, rates are applied only if they represent 3 or more observer reports. If fewer than 3 observer reports are available, the system proceeds to the next rate assignment. For shore plants, processor specific rates are used only if observer reports are available from 3 or more vessels delivering to a plant. In the event that a fishery has been totally unobserved, a default rate based on the previous year's data is assigned.

6. **Compute Bycatch Estimates.** Estimate bycatch of each prohibited species by multiplying the bycatch rate times the groundfish tons for the cell.

Table 1. Target fishery definitions for PSC bycatch calculations.

Bering Sea / Aleutian Islands

Target	Definition	Name
P	PLCK >= .95 of total groundfish	Pelagic Pollock
T	GTRB dominant retained species	Turbot
C	PCOD dominant retained species	Pacific Cod
R	RSOL+FLOU+YSOL dominant retained species AND YSOL < 70% of all flatfish	Rock Sole
Y	RSOL+FLOU+YSOL dominant retained species AND YSOL >= 70% of all flatfish	Yellowfin sole
B	PLCK dominant retained species and < 95% total	Pollock
W	ARTH dominant retained species	Arrowtooth Flounder
K	POPA+ROCK+SRSN+THDS dominant retained species	Rockfish
S	SABL dominant retained species	Sablefish
A	AMCK dominant retained species	Atka Mackerel
O	all other	Other

Gulf of Alaska

Target	Definition	Name
P	PLCK >= .95 of total groundfish	Pelagic Pollock
C	PCOD dominant retained species	Pacific Cod
K	POPA+ROCK+SRRE+THDS+DEM1+SLR1 dominant retained species	Rockfish
B	PLCK dominant retained species and < 95% total	Pollock
D	DFL1 dominant retained species	Deep Water Flats
H	SFL1 dominant retained species	Shallow Water Flats
S	SABL dominant retained species	Sablefish
O	all other	Other

INFORMATION ON THE DISCARD CONDITION OF HALIBUT IN THE 1991 GROUNDFISH FISHERY OFF ALASKA AND IMPLICATIONS ON DISCARD MORTALITY RATES

By

Gregg Williams, IPHC, and Tom Wilderbuer, NMFS
September, 1992

Introduction

National Marine Fisheries Service (NMFS) observers collect information on the condition of discarded halibut, evaluating each fish based on objective criteria. Previous analyses (e.g., Williams 1990, Wilderbuer 1991, Williams and Wilderbuer 1991) have developed methodology for estimating discard mortality rates. This analysis is a continuation of the earlier work, and specifically examines observer data on discard condition from the 1991 fishery.

Description of Data

One of the duties of NMFS observers is to examine discarded halibut for release condition. The condition is determined by checking for external injuries, body movement, gill color, and operculum (gill cover) pressure. Each fish is classified as being in Excellent, Poor, or Dead condition as a result of this examination.

In 1991, observers examined 207,718 bycaught halibut for discard condition: 166,023 from trawlers, 39,766 from longline vessels, and 1,929 from vessels fishing groundfish pots.

Objectives for this Analysis

The first objective is to determine if any changes can be identified between 1990 (the subject of the last analysis) and 1991. Changes would suggest that fishing practices and/or fishermen's behavior can be altered to improve survival of discarded halibut, absent of any other causes.

Second, one of the main objectives of this analysis is to determine if differences in condition and discard mortality rates exist between target fisheries, especially the trawl fisheries. Just as bycatch rates differ between fisheries, we would expect differences in release condition and subsequently in discard mortality rates due to the different fishing practices followed in the various fisheries.

Trends in Condition Data

This section describes (1) changes from 1990 to 1991 and (2) our examination of differences in condition by target fishery[1]. Additionally, we also looked at condition as it relates to catch size. We used the proportion of fish released in excellent condition (*p*E) as a proxy for overall condition in describing trends. Tables 1 and 2 provide summary information on each target fishery and associated halibut bycatch.

Changes Between 1990 and 1991. In general, halibut caught in trawls and pots in 1991 were released in better condition than those released in 1990. For example, *p*E increased from 22% to 27% in BSAI trawls and from 25% to 32% in GOA trawls. Conversely, the proportion Dead (*p*D) decreased roughly 10% in both the BSAI and GOA.

In contrast, longline-caught halibut were released in worse condition in 1991. A decrease of 10% was observed in BSAI longline fisheries (from 79% to 69%), but the decrease was even greater in the GOA, where *p*E declined 12% (86% to 74%).

These differences are shown graphically in Figures 1 through 3.

Target fishery and halibut condition. Assigning the data to specific target fisheries made it apparent that certain fisheries discarded halibut in worse condition than others. For the trawl fisheries, one trend was common to both the BSAI and the GOA. Off-bottom fisheries discarded halibut in the worst condition, as *p*E was lowest for midwater pollock and Atka mackerel fisheries. We attributed this tendency to the large catches (average 30-60 mt) common to these fisheries.

Within each region, certain patterns were evident. In the BSAI, bottom trawl pollock and Pacific cod were quite similar, which should not be too surprising considering their overlapping nature. The rock sole and 'other flatfish' fisheries were also similar in *p*E, although the latter fishery had a much greater proportion Dead. Halibut discarded from the trawl rockfish fishery were in surprisingly good condition (*p*E = 39%), which is probably due to the larger size of halibut caught in rockfish trawls, or perhaps comparatively short tow duration.

In the GOA trawl fisheries, similarities among fisheries were not quite as obvious. The rockfish fishery was one of the worst in discard condition, exceeded only by the midwater pollock fishery. This occurred in the rockfish fishery despite having the highest average weight per halibut (8.2 kg) and that more than half of the halibut were greater than 80 cm (roughly 10 pounds), factors which should contribute to overall better condition. The bottom trawl pollock and cod fisheries were not as similar as their BSAI counterparts. The cod fishery had a higher *p*E, whereas the combined Poor and Dead was higher for pollock. Between the flatfish fisheries, condition was

[1]Target fishery was determined using definitions based on total catch and species composition.

highest in the Deepwater fishery, probably due to the larger size of halibut noted in the catch.

Discard condition was more variable within the longline fisheries. In the GOA, the sablefish fishery showed to have the poorest condition, probably due to its fast-paced nature. However, in the BSAI, the cod fishery had the poorest release condition. Although it is unclear why this occurs, we speculate that the smaller halibut caught by BSAI cod fishermen may be more vulnerable to injuries caused by horning or improper gaff use.

Condition observations in pot fisheries for cod were almost identical between the BSAI and GOA. Overall condition was only slightly poorer in the GOA, where smaller halibut were apparently caught.

Graphs depicting the distribution of discard condition by target fishery are provided in Figures 4 through 6.

Implications on Discard Mortality Rates

The presumable improvement in overall discard condition in trawl fisheries would indicate that the discard mortality rate in 1991 was lower than in 1990, and could be reduced slightly in both regions. But the apparent differences in discard condition among fisheries suggests that it may be appropriate to determine fisheries-specific discard mortality rates. However, some of the differences between fisheries are not that great, and the numerous assumptions required of the estimation methodology probably preclude specific point estimates for each individual fishery.

Instead, fisheries similar in nature and discard condition distribution could be grouped together and a common rate assigned. As a first recommendation, we suggest the following grouping of trawl fisheries:

Bering Sea/Aleutians:

1) MWT pollock, atka mackerel;
2) Rock sole, other flatfish;
3) Pacific cod, BT pollock;
4) Rockfish; and
5) Arrowtooth, turbot, and Other species.

Gulf of Alaska:

1) MWT pollock;
2) Rockfish, BT pollock, shallow water flatfish, Other species, Pacific cod; and
3) Deep water flatfish.

For longline fisheries, the distribution of condition data suggests that the sablefish fishery in the GOA may have a higher discard mortality rate than the other longline fisheries. As we stated earlier, the nature of the GOA sablefish fishery means that halibut will be released in poorer

condition, so a higher discard mortality rate should not be unexpected.

Groundfish pot fisheries for Pacific cod were almost identical between the GOA and BSAI. We suggest a single discard mortality rate for pot fishing.

Summary and Recommendations

Halibut discard condition improved in 1991 in trawl and pot fisheries, and decreased in longline fisheries. Examination of the data for each gear type revealed wide variability between individual target fisheries, probably reflecting the different fishing practices involved.

Rather than recommending single discard mortality rates for all trawl or longline fisheries, we recommend further analysis of target fishery differences. Additional information on halibut length distributions, haul duration/soak time, and variability among vessels with each fishery should provide further information on fishery differences. Also, condition data for a portion of 1992 will be available.

Also, we plan to include discussion of the relative merits of the 3-category condition model currently used. Members of the industry have suggested that the results from the 5-category model used by Hoag (1975) may not be directly applicable to the data as currently collected.

Results will be available at the November Plan Team meetings.

References Cited

Hoag, Stephen H. 1975. Survival of halibut released after capture by trawls. International Pacific Halibut Commission, Scientific Report No. 57, 18 p.

Wilderbuer, Tom. 1991. Halibut viability for observations of the 1990 Bering Sea Pacific cod trawl fishery. Document submitted to the Halibut Bycatch Working Group of the International Pacific Halibut Commission, July 1991. 5 p.

Williams, Gregg H. 1990. Review of 1989/1990 halibut condition data to estimate discard mortality rates. Appendix 2 *[IN]* Stock assessment and fishery evaluation (SAFE) Report for the 1991 Gulf of Alaska groundfish fishery. North Pacific Fishery Management Council, November, 1990.

Williams, Gregg H. and Tom Wilderbuer. 1991. Revised estimates of Pacific halibut discard mortality rates in the 1990 groundfish fisheries off Alaska. Appendix III *[IN]* Stock assessment and fishery evaluation (SAFE) Report for the 1992 Gulf of Alaska groundfish fishery. North Pacific Fishery Management Council, November, 1991.

Table 2. Summary information on catch size and halibut bycatch in 1991 longline and groundfish pot fisheries.

LONGLINE

Fishery	No. sets sampled[1]	Avg. Catch (mt)	Halibut Bycatch				
			Avg. Wgt. (kg, rd wt)	% ≤ 80 cm	% Excellent	% Poor	% Dead
GOA							
P. cod	247	5.8	8.3	64	79	15	7
Sablefish	191	2.2	12.1	40	61	29	11
Rockfish	21	2.1	11.1	35	75	15	10
BSAI							
P. cod	1,646	17.7	5.2	86	69	26	5
Sablefish	23	4.6	20.0	57	82	8	10
Rockfish	18	3.5	9.0	68	67	15	19

[1]Sampled for halibut condition.

GROUNDFISH POTS

Fishery	No. sets sampled[1]	Avg. Catch (mt)	Halibut Bycatch				
			Avg. Wgt. (kg, rd wt)	% ≤ 80 cm	% Excellent	% Poor	% Dead
GOA P. cod	245	1.6	4.2	91	96	2	3
BSAI P. cod	238	3.0	6.1	66	97	1	3

[1]Sampled for halibut condition.

Table 1. Summary information on catch size and halibut bycatch by trawl fishery in 1991.

GULF OF ALASKA

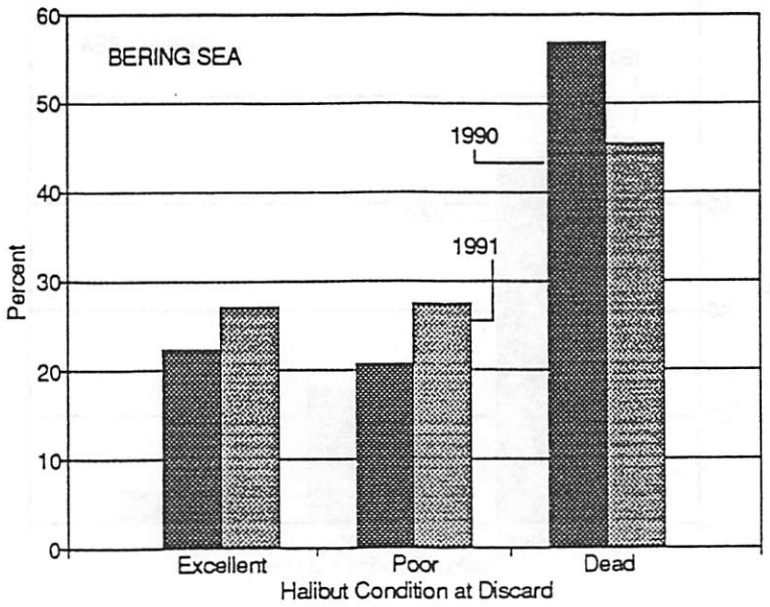
Trawl Fishery	No. tows sampled[1]	Avg. Catch (mt)	Halibut Bycatch Avg. Wgt. (kg, rd wt)	% ≤ 80 cm	% Excellent	% Poor	% Dead
MWT Pollock	80	27.6	5.1	87	12	22	66
Rockfish	305	12.9	8.2	43	21	29	50
BT Pollock	30	11.5	1.6	97	25	46	29
Sh. Flatfish	54	7.4	2.3	86	28	28	44
Other	739	10.4	5.5	72	30	29	41
Pacific cod	1,213	11.9	2.0	94	34	33	34
Dp. Flatfish	53	7.6	4.5	75	45	18	37

[1]Sampled for halibut condition.

BERING SEA/ALEUTIANS

Trawl Fishery	No. tows sampled[1]	Avg. Catch (mt)	Halibut Bycatch Avg. Wgt. (kg, rd wt)	% ≤ 80 cm	% Excellent	% Poor	% Dead
MWT Pollock	954	59.9	5.0	82	7	13	81
Atka mackerel	233	23.6	1.7	88	9	30	61
Rock sole	1,142	18.9	0.8	98	17	29	54
O. flatfish	1,515	16.7	1.4	95	19	9	72
Pacific cod	2,331	13.3	0.9	99	27	31	42
BT Pollock	1,895	23.6	1.2	94	30	29	42
Rockfish	205	13.8	2.1	95	39	27	35
Arrowtooth	321	10.2	3.9	77	62	16	22
Turbot	184	11.3	8.6	52	62	24	14
Other	26	9.6	2.0	91	84	8	9

[1]Sampled for halibut condition.



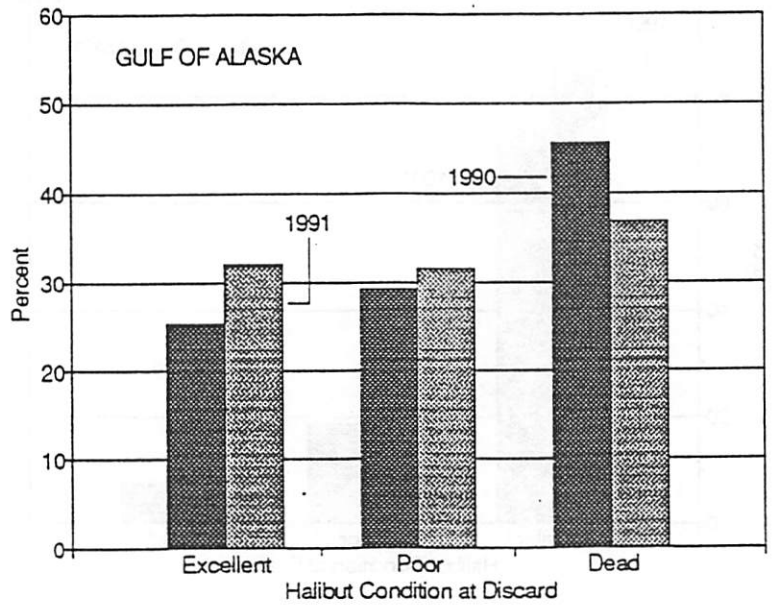


Figure 1. Comparison of 1990 and 1991 discard condition in BSAI and GOA trawl fisheries.

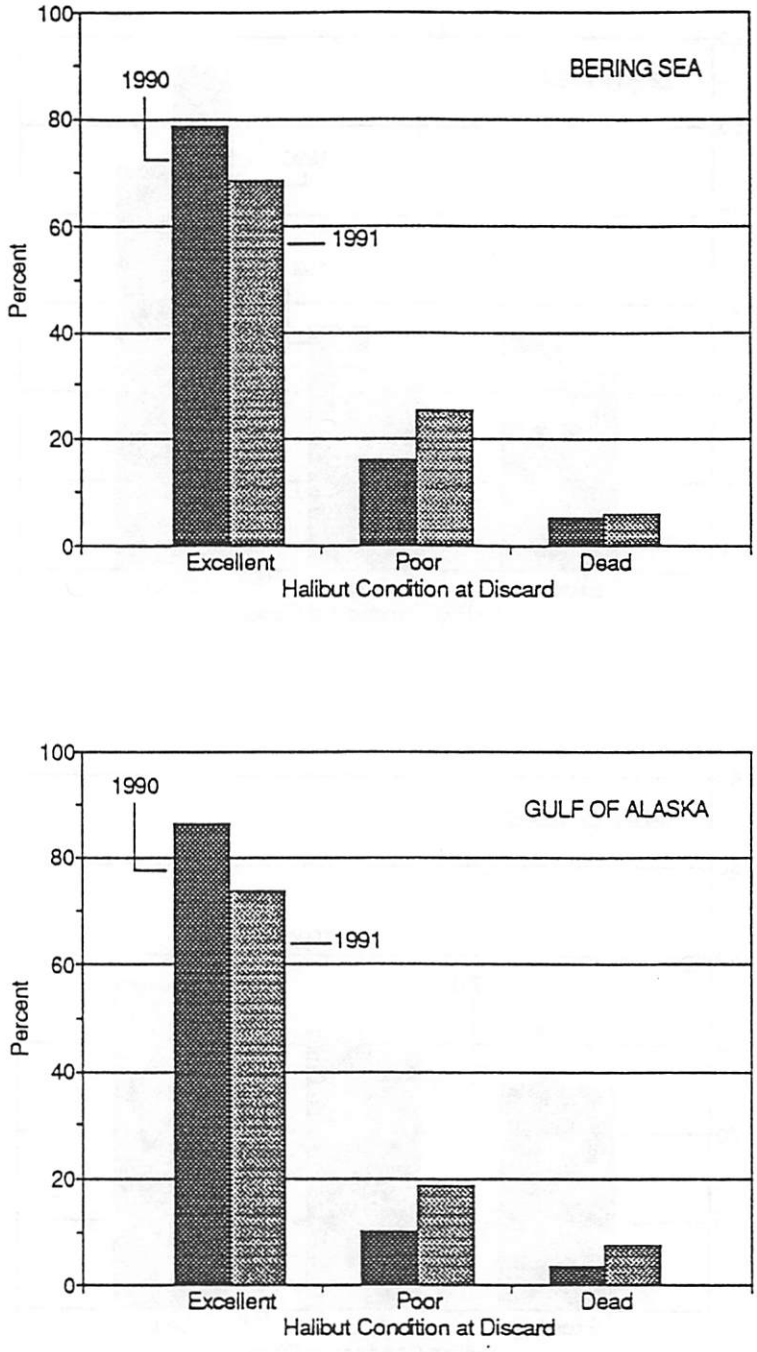
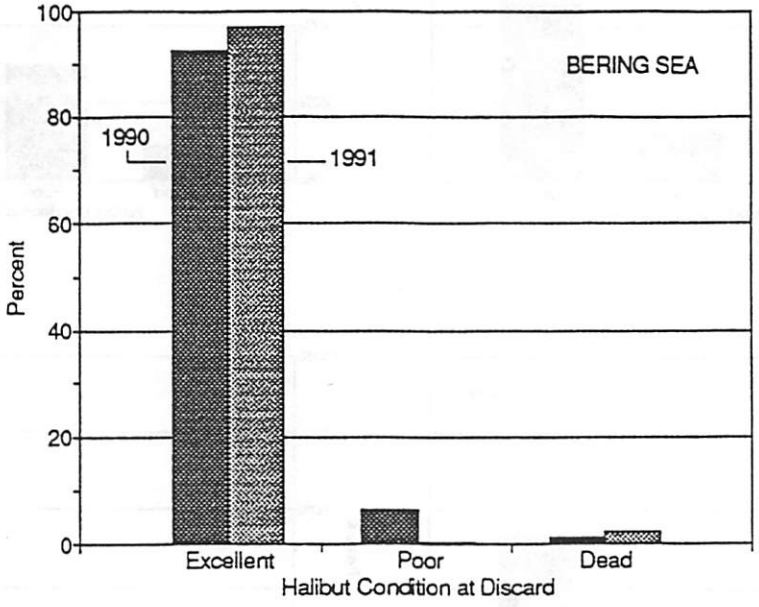


Figure 2. Comparison of 1990 and 1991 discard condition in BSAI and GOA longline fisheries.



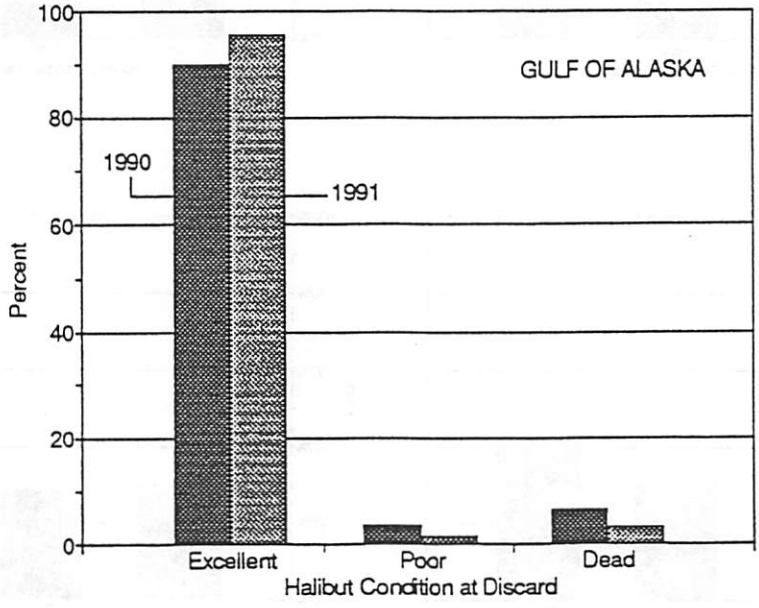


Figure 3. Comparison of 1990 and 1991 discard condition in groundfish pot fisheries.

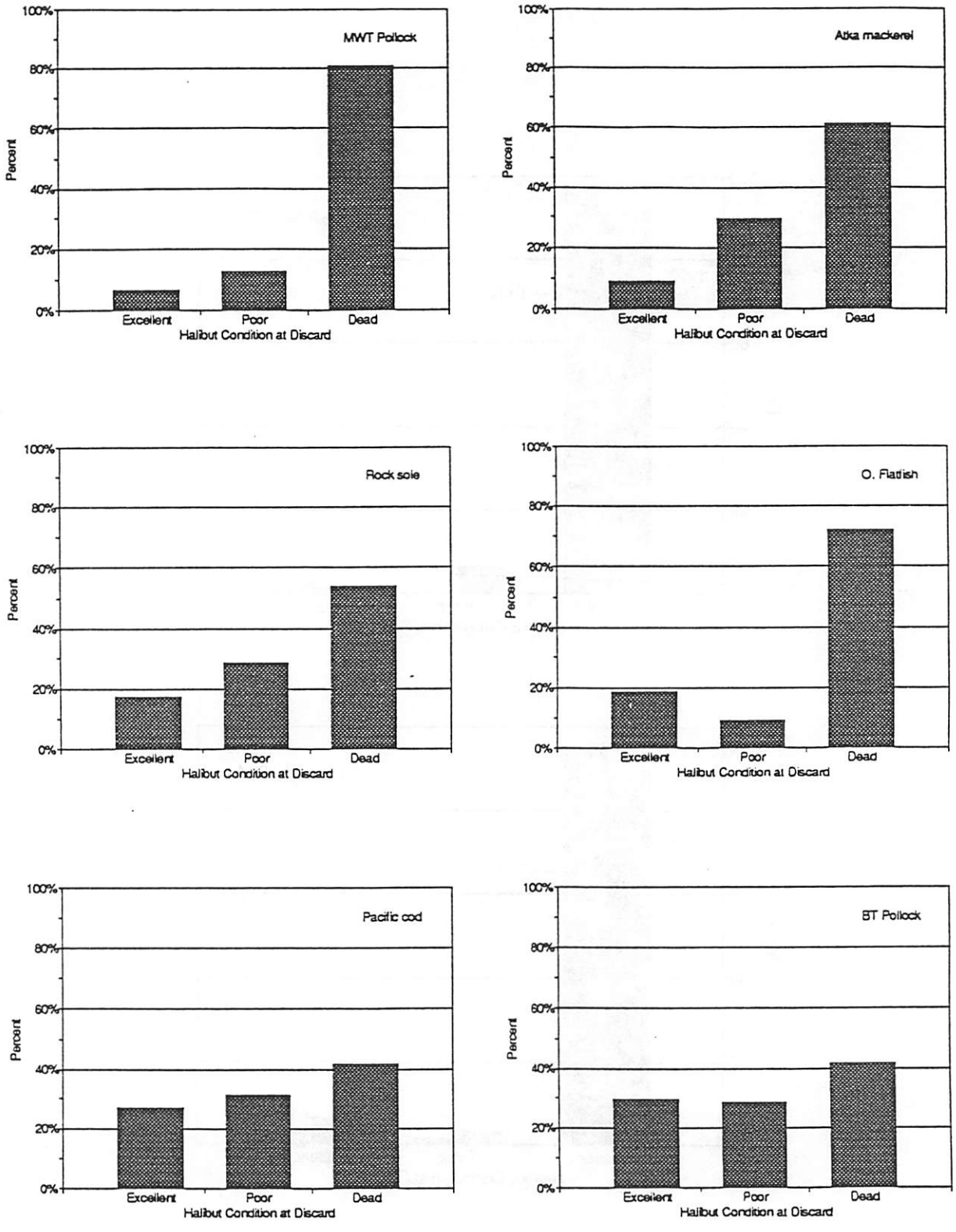


Figure 4. Distribution of halibut condition among 1991 BSAI trawl fisheries.

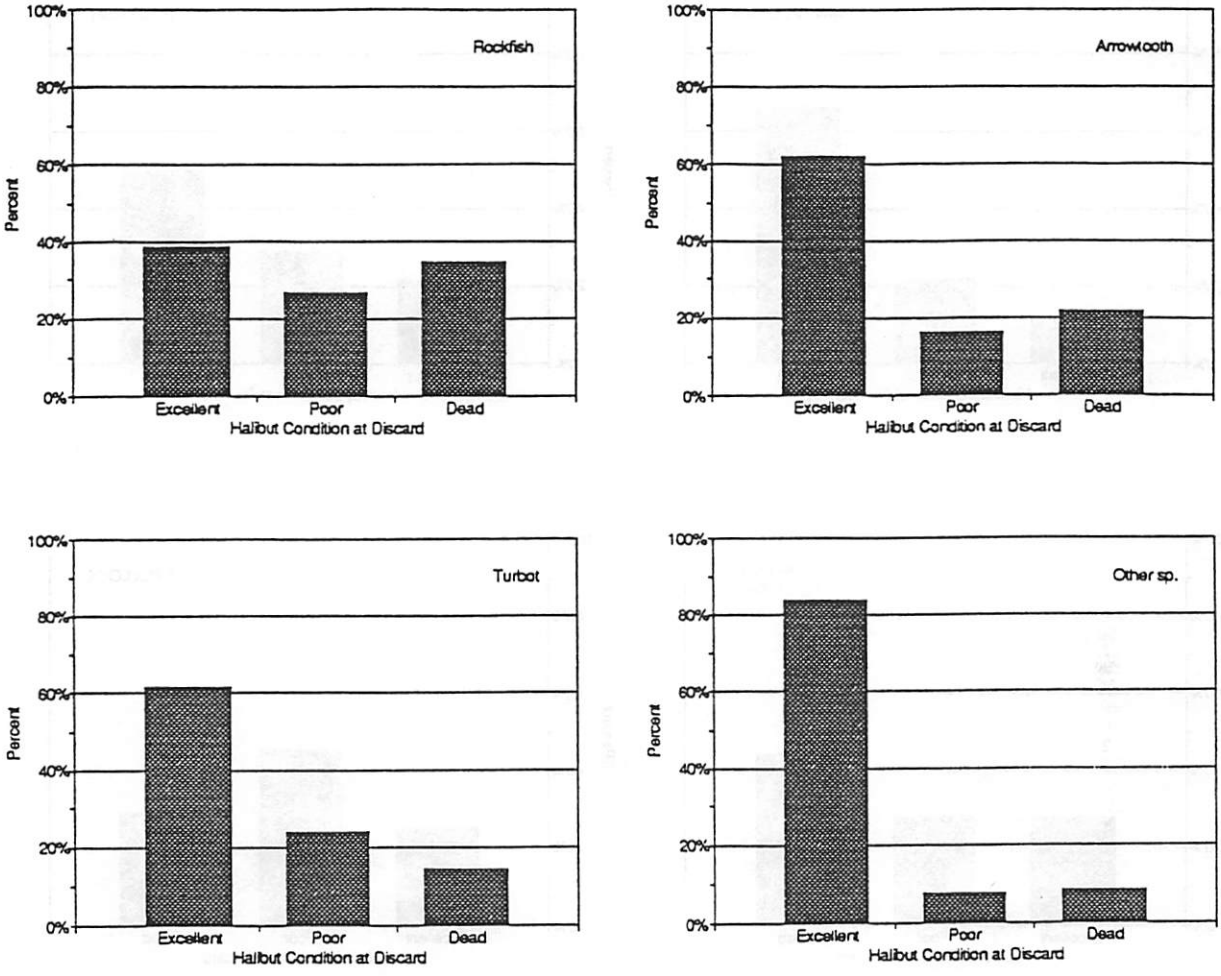


Figure 4. (continued) Distribution of halibut condition among 1991 BSAI trawl fisheries.

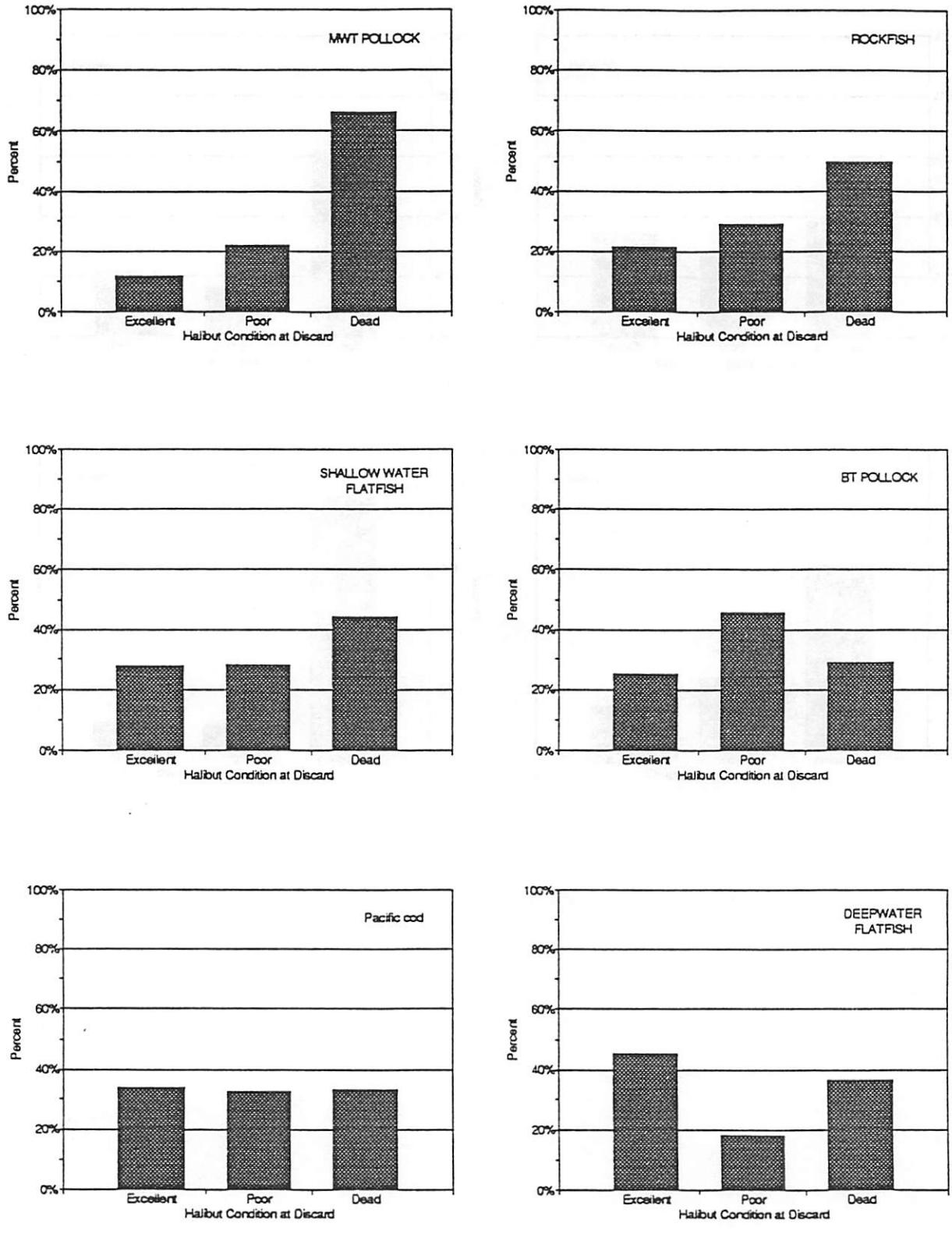


Figure 5. Distribution of halibut condition among GOA trawl fisheries.

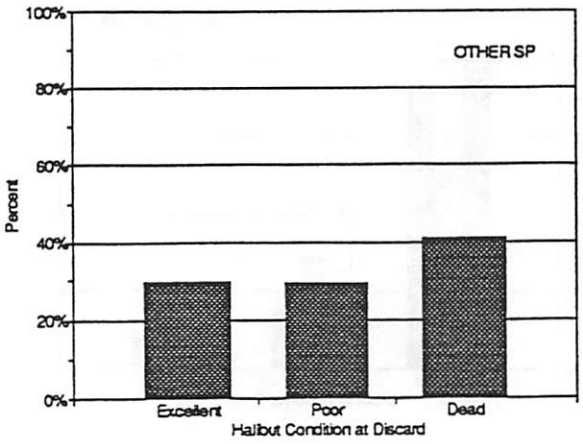
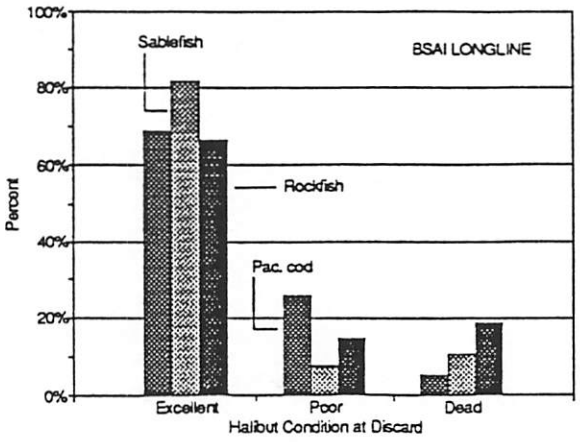
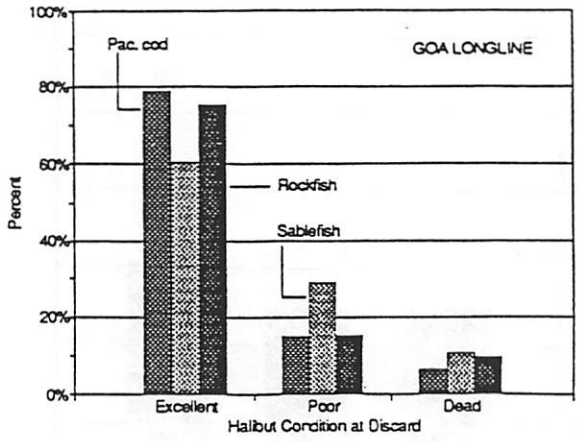


Figure 5. (continued) Distribution of halibut condition among GOA trawl fisheries.





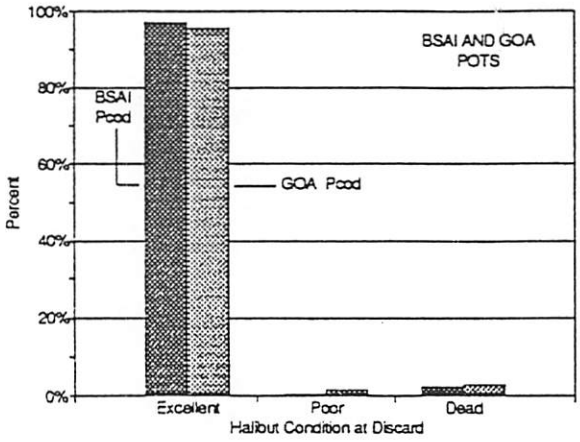


Figure 6. Distribution of discard condition in 1991 longline and pot fisheries.

MEMORANDUM

TO: Council, AP, and SSC Members

FROM: Clarence G. Pautzke
Executive Director

DATE: September 17, 1992

SUBJECT: Other Groundfish Issues

ACTION REQUIRED

(c) Receive staff status report on the Council's Discard/Full Utilization Committee.

(d) Review necessity of various outdated groundfish regulations

(e) Petition from St. Paul Island.

(f) Review request for experimental fishing.

(g) Request for pollock product yield experiments.

BACKGROUND

Discard/Full Utilization

At the April 1992 meeting, the Council established a committee to address the issue of utilization of discarded catch. This committee was comprised of Rick Lauber (Committee Chair), Wally Pereyra and Larry Cotter.

The committee met in Seattle on June 4 to scope out the issues present in utilizing discarded catch, receive staff reports on the current magnitude of discarded catch in the North Pacific fisheries, and to define the committee's objectives. Attached as Item D-8(c)(1) is a summary of this meeting. Discarded catch data aggregated by fishery and by species, generated from both the reported catch data and from the observer program database, will be provided at the Council meeting.

The Council will receive a report on the Discard Committee's first meeting and can assist the committee by determining how to proceed.

Archaic Groundfish Regulations

Item D-8(d)(1) is a letter to Steve Pennoyer in response to his request to the Council regarding the necessity for the Salmon FMP. I expanded his request to include various archaic regulations, such as foreign groundfish regulations, and asked what the process is to withdraw out-dated regulations.

Item D-8(d)(2) is his response. The Council would need to submit amendments to the FMPs to accomplish this task. If the Council makes this request to clean up the FMPs and regulations at this meeting, the Regional staff could prepare the necessary documents for Council review and approval at the January 1993 meeting.

Petition from St. Paul Island

The City of St. Paul has petitioned the Council to request NMFS to authorize and support independent research on the origin and migration of pollock stocks in the Eastern Bering Sea. Item D-8(e)(1) is the petition.

Review Request for Experimental Fishing

Item D-8 (f)(1) is a letter from Terra Marine Research & Education requesting the Council to review and discuss a proposal for an experimental fishing permit. The permit would allow for a research experiment on retention and distribution of PSC species to needy persons. This proposal has not been formally submitted to the NMFS RD for consideration; rather, the applicants are requesting Council review first so that they may incorporate any Council concerns in their formal proposal.

Request for Product Yield Experiments for Pollock

Natural Resource Consultants, Inc. has expressed interest in conducting pollock yield studies and suggests forming an industry steering committee to provide oversight and secure industry participation.
Item D-8(g)(1) is NRC's letter presenting this proposal and requesting Council and SSC review. The Council can review this proposal and provide recommendations.

SUMMARY OF JUNE 4 MEETING OF THE DISCARD COMMITTEE

The NPFMC Discard Committee, consisting of Larry Cotter, Rick Lauber (Committee Chair), and Wally Pereyra, met at the AFSC on June 4, 1992. This was the committee's first meeting. Industry representatives and NMFS, NPFMC, IPHC, and ADF&G participated in the Committee's discussion of discard issues. The following statements summarize what occurred at the meeting.

1. The Committee received reports from AKR and AFSC staff concerning the levels of discards in the groundfish fisheries off Alaska in 1990 and 1991.

2. The need for similar information from other fisheries that the Council manages was agreed to. These are the BS/AI king and Tanner crab, halibut, and salmon troll fisheries.

3. The committee agreed to address discard problems in all of these fisheries; however not necessarily simultaneously.

4. The need to improve estimates of total catch was identified.

5. There was a discussion and some uncertainty about EPA requirements to grind up all discards.

6. The discards resulting from capturing too much fish in a single tow and the non-catch fishing mortality of size selective trawl gear were discussed.

7. The sources of the problem of discards and eliminating the principal source of the problem with individual transferable quotas (ITQs) for groundfish and other species were discussed.

8. The need for prompt action as well as progress on solutions that might take several years to implement was discussed, as was the desire to prevent immediate partial solutions from delaying more complete solutions.

9. The need to have unambiguous and noninflammatory definitions of terms was recognized.

10. The current groundfish management was identified as a source of the discard problem.

11. The potential adverse and beneficial ecological effects of discards and the definition of discards were discussed.

12. The importance of the public's perception of the problem of discards and the need to respond to it both by making progress on solving the discard problem and by attempting to eliminate misconceptions concerning the problem were discussed.

13. It was recognized that the problems of discards are that they can have adverse effects on: (1) the environment, (2) the quantity and quality of the food and byproducts produced from fishery resources and the net value of those products, (3) the effectiveness of the fishery management regimes, (4) the public's perception of the industry and fishery management.

14. The Committee developed the following statement as the goal of discard management.

> Increase the quantity and quality of food and byproducts produced from the fishery resources harvested in the BS/AI and GOA by reducing the amount of harvest discarded to the maximum extent practicable while recognizing the contributions of these fishery resources to our marine ecosystems and the economic and social realities of our fisheries.

15. Several alternatives for achieving this goal were discussed briefly but it was determined that more time would be required to develop a list of alternatives to recommend to the Council. The Committee will try to develop such a list for the September Council meeting.

16. The Committee asked staff to prepare the following:

    a. estimates of observer coverage in terms of groundfish catch,

    b. a comparison of discard estimates based on weekly processor reports and observer reports,

    c. discussion of the best estimates of discards,

    d. estimates of discards that identify whether discards were required by fishery closures,

    e. an evaluation of differences of discard rates between vessels with and without observers,

    f. discussion of the positive and negative effects of discards on the ecosystem,

    g. discussion of the effects of current fishery regulations on discards,

    h. estimates of discards for each fishery by species, size, sex, season, and area, where fisheries are defined by gear and target species and include the BS/AI and GOA groundfish and halibut fisheries, the BS/AI king and Tanner crab fisheries, and the salmon troll fishery,

    i. frequency and magnitude of net bleeding,

    j. concentration/distribution of discards among vessels within a fishery, and

    k. evaluation of factors affecting validity of observer estimates of discards.

17. The Committee agreed to hold a work session in Sitka during the week of the June Council meeting.

North Pacific Fishery Management Council

Richard B. Lauber, Chairman
Clarence G. Pautzke, Executive Director

605 West 4th Avenue
Anchorage, Alaska 99501

Mailing Address: P.O. Box 103136
Anchorage, Alaska 99510

Telephone: (907) 271-2809
FAX: (907) 271-2817

August 19, 1992

Steve Pennoyer, Director
NMFS-Alaska Region
P.O. Box 21668
Juneau, AK 99802

Dear Steve:

I received your August 12 letter to Chairman Lauber requesting the Council to consider in September the necessity for various regulations, specifically for the salmon FMP. Though I imagine the intent of the President's memorandum is to reduce the regulatory burden on U. S. fisheries, I am wondering if this would not be a good time to delete many of the foreign groundfish fisheries regulations now on the books in sections 611.92 and 611.93. Possibly the snail regulations in section 611.94 also could go. There may be other foreign or joint venture regulations that are now outdated as well.

In any case, I think the Council will need your assessment of the necessity of the foreign regulations now that we are in an era of overcapitalized U.S. fisheries. We also will need to know the process for deleting unnecessary regulations, including those for the salmon plan if that is the conclusion of the Council. Is this a simple regulatory amendment? How much analysis will be required, if any? How do we delete references in the fishery management plans? Will plan amendments and supporting analyses be required?

This may be a very good opportunity to tidy up the regulatory books a bit, but I think the Council will need your assessment of how much effort will be required.

Sincerely,

Clarence Pautzke
Executive Director

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

August 12, 1992

Richard B. Lauber
Director, North Pacific
Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99510

Dear Rick,

NMFS and NOAA are reviewing existing fishery management plans (FMPs) and regulations with respect to whether they are still necessary for Federal fishery conservation and management. Our review is in response to the President's January 28, 1992, memorandum regarding reduction in the burden of Federal regulations. Four FMPs and their regulations may be candidates for withdrawal (Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic, High Seas Salmon Fishery Off Alaska, and Precious Coral Fishery of the Western Pacific).

Please request the Council to consider the necessity of the FMP for the High Seas Salmon Fishery Off Alaska. The Council also could review any of its regulations and make recommendations about their necessity. We need to advise the Central Office about Council recommendations by December 31, 1992.

Sincerely,

Steven Pennoyer
Director, Alaska Region

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

September 8, 1992

SEP 15 1992

Clarence Pautzke
Executive Director
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99510

Dear Clarence,

I received your letter suggesting that the Council consider deleting foreign groundfish regulations under 50 CFR parts 611.92 and 611.93. Your suggestion supports efforts the National Marine Fisheries Service (NMFS) has undertaken to review the necessity of certain fishery management plans and regulations in response to the President's January 28, 1992, mandate to reduce the burden of Federal regulations.

We agree that archaic regulations governing foreign fishing for Alaska groundfish in U.S. waters should be deleted. The Council would need to submit amendments to the groundfish fishery management plans to accomplish this task. The analyses and accompanying paperwork, however, would not be time consuming for this administrative action. Given Council endorsement for this action, I believe Regional staff could prepare the necessary documents for Council review and approval at the Council's January 1993, meeting. Although a foreign fishery for snails in U.S. waters is not anticipated, we believe regulations that govern this fishery should remain at 50 CFR part 611.94 until the Council receives a clearer signal from the U.S. fishing industry of its interest in this resource.

The Council has twice considered whether to withdraw the Fishery Management Plan for the High Seas Salmon Fishery off Alaska (Salmon FMP), and twice the Council voted to retain it. At this time, the Salmon FMP presents us with some international and domestic issues that NMFS and the Council need to review before deciding if we should withdraw the Salmon FMP and rescind its regulations.

Next February, the International Convention on the Fisheries of the North Pacific Ocean will be replaced by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. This change will have unknown effects on The North Pacific Fishing Act and its implementing regulations at 50 CFR part 210, particularly the regulation banning net fishing for salmon by Americans seaward of the 3-mile limit of State fishery jurisdiction. We've brought this issue to the attention of NOAA General Counsel, and the legal staff is investigating.

Another issue is the Pacific Salmon Treaty. A lawsuit against the Secretary of Commerce (Confederated Tribes vs. Baldrige) was suspended when the Pacific Salmon Treaty was signed, because the treaty imposed a harvest limit on the Southeast Alaska chinook salmon fishery. Should the Treaty be terminated for any reason, the Salmon FMP could be needed to control the salmon fishery.

We recommend that the Council task the Salmon Plan Team, in consultation with the NOAA Office of General Council, to review these and other issues and report to the Council at its April meeting.

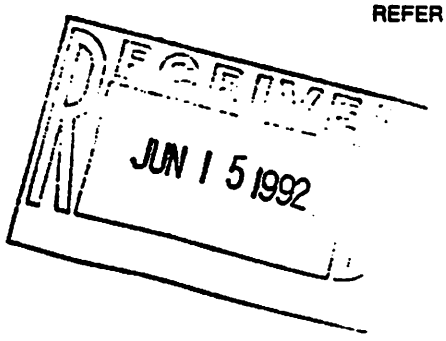
Sincerely,

Steven Pennoyer
for Director, Alaska Region

cc: F/CM, GCAK

CITY OF SAINT PAUL
POUCH 1
SAINT PAUL ISLAND, ALASKA
99660
(907) 546-2331
Telecopy (907) 546-2365

IN REPLY
REFER TO:



June 15, 1992

Rick Lauber, Chairman
North Pacific Fishery Management Council
321 Highland Drive
Juneau, Alaska 99801

Dear Mr. Chairman:

I am enclosing herewith a petition asking that the Council direct NMFS to authorize and support independent research on the question of whether the pollock stocks presently designated as "Eastern Bering Sea" are in fact one stock, and whether those fish spend a substantial portion of their lives in waters outside U.S. jurisdiction. If so, the EBS stocks are clearly at risk unless controls are imposed on the harvest within the Russian EEZ and the international zone.

Such controls would necessarily have to be imposed through treaty negotiations with Russian authorities. As time goes on, the temptation for the Russian fisheries industry to cash in on a massive pollock harvest will increase, so the sooner negotiations begin, the more likely it will be that an effective Bering Sea management regime can be established.

The people of St. Paul realize that the issue of Bering Sea pollock stock distribution and migration is a contentious issue, but we believe that if the Russian scientists are correct, the economy of our island may be in permanent jeopardy.

Please contact me if the Council would like further information or details on this matter.

Sincerely yours,

Larry Merculieff

Larry Merculieff
City Manager

cc: Clarence Pautzke, Executive Director
North Pacific Fishery Management Council
P. O. Box 103136
Anchorage, Alaska 99510

CITY OF SAINT PAUL
POUCH 1
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IN REPLY
REFER TO:

PETITION TO NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

I. STATUS OF PETITIONER. The City of St. Paul is an incorporated second class city located on St. Paul Island, one of the Pribilof Islands in the Bering Sea. The majority of the residents of the city are indigenous Aleuts, descendants of persons who were brought to the Pribilofs against their will by Russian fur traders in the 18th century in order to harvest fur seals.

II. RECENT HISTORY OF ST. PAUL RESIDENTS. For many years the main occupation of St. Paul residents was the harvest of fur seals under federal regulation and license. When the commercial fur seal harvest was terminated by Congress in 1984, the villagers of the Pribilof Islands were successful in obtaining federal and state funds for the construction of harbors both on St. Paul and St. George. The St. Paul harbor was completed in 1989. It was designed to service the Bering Sea fishing fleet, thus replacing the jobs that were lost when the federal government ended the seal harvest. Naturally, the success of the St. Paul harbor depends on the long-term viability of the Bering Sea fisheries, mainly pollock.

In addition, a small but locally important tourism industry has been established on St. Paul, based on the presence of large numbers of marine mammals and nesting seabirds during the summer months. Over the past few years, populations of fur seals, sea lions, and sea birds have declined dramatically, threatening the fledgling St. Paul tourism base. Reasons for such rapid population declines are probably complex, but the available evidence suggests that food stress is a major contributing factor.

Since pollock of varying age classes constitute a major part of the diet of all the affected species, a decline in pollock stocks will probably result in an even steeper rate of decline in the very species that tourists come to see on St. Paul Island. Indeed, there is much

evidence which suggests that pollock are a "keystone" species essential for the nutritional needs of many other animals.

The decline of species dependent on pollock as a food source also adversely affects the subsistence lifestyle of the entire Bering Sea region which is characterized by small villages inhabited mostly by indigenous people.

For these reasons, the long-term health of the Bering Sea pollock stocks is critical to the economy of St. Paul Island and to the culture of its people.

III. THEORIES REGARDING EASTERN BERING SEA POLLOCK STOCKS.

There are several theories regarding the possible distribution and migratory patterns of EBS pollock stocks. One such theory, adopted by NMFS for the purpose of managing the Bering Sea fishery, is that EBS pollock comprise three more or less distinct stocks: the so-called "Aleutian" stock, the "basin" stock, and the "shelf" stock. Alternatively, the "Aleutian" stock is regarded as a part of the "basin" stock. Under either variation it is assumed that a relatively small percentage - say, 20% - of EBS pollock migrate into Russian or international waters, where they are subject to a harvest unregulated by U. S. authorities. The Russian fleet, including joint ventures, is assumed to concentrate its harvest on Western Bering Sea stocks originating in the Russian 200-mile zone.

Russian (and reportedly Japanese) scientists view the Bering Sea pollock stocks differently. Russian research indicates that the pollock presently designated as "EBS" are essentially one stock. After spawning along the slope and on the shelf, eggs, larvae and young fish drift with the prevailing current in a northwesterly direction across the shelf and concentrate, for reasons probably related to food requirements, in the plankton-rich waters south of Point Navarin on the Russian side. There is an existing Russian fishery in this area which reportedly harvests up to 800,000 metric tons of young pollock per year. As the young fish mature, they migrate eastward across the basin to the EBS spawning grounds. After spawning, mature fish then migrate annually from the spawning grounds across the international zone (the "doughnut hole") into the Kamchatka basin in Russian waters for feeding purposes, then back to the EBS to spawn again.

If the Russian EBS pollock stock theory is correct, an individual EBS pollock will run an increasingly intense gauntlet of targeted fisheries from about age 2 until its demise. Russian scientists believe that about 80% of EBS pollock stocks spend a substantial part of their lives in the Russian EEZ. The combined harvest potential of Russian-U.S., Russian-Vietnamese, and Russian-Japanese joint ventures plus the Russian fleet itself appears much too large for WBS production alone, supporting the hypothesis that this harvest will include EBS fish in very large numbers.

IV. CONCLUSION. The City of St. Paul urges that the North Pacific Fishery Management Council direct NMFS to support independent research, using available Russian and Japanese data and the best available fishery stock assessment technology, to resolve this issue of stock distribution and migration patterns. If the current NMFS view of EBS pollock distribution and migration is correct, no harm will be done and much doubt will be laid to rest. If the Russian view is correct, action can then be taken to avoid an unregulated massacre of EBS pollock stocks outside U.S. jurisdiction.

DATED this 20th day of June, 1992.

THE CITY OF ST. PAUL

By: LARRY MERCULIEFF
City Manager

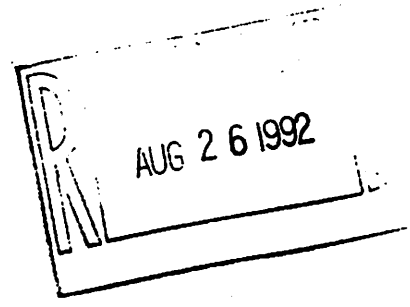
AGENDA D-8(f)(1)
SEPTEMBER 1992

TERRA MARINE RESEARCH & EDUCATION

7052 New Brooklyn Rd.
Bainbridge Island, WA 98110
(206) 842-3609 Phone & Fax

Northwest Chapter

August 21,1992



Mr. Clarence Pautzke
North Pacific Fishery Management Council
P.O.Box 103136
Anchorage, Alaska 99510

Dear Mr. Pautzke,

We would like to have the enclosed proposal discussed by the Council and by the Advisory Panel during the September meeting. The introduction describes fully the nature of the proposal and the reason for our request.

As the meeting agenda has not yet been distributed we can't request a specific placement for this item. This is further complicated by the fact that I will be out of the country until a few days before the meeting. However, Steve Hughes at NRC has offered to make those arrangements with you, on our behalf, as soon as they receive the agenda.

Due to the nature of our proposal the timing for this hearing is very important. We appreciate every effort you can make to help us in that regard.

Sincerely,

TE Donnelly

Tuck Donnelly
President, TMRE Northwest Chapter

cc Mr. Richard B. Lauber
Chairman, NPFMC

Steve Hughes,
Natural Resources Consultants

TERRA MARINE RESEARCH & EDUCATION

7052 New Brooklyn Rd.
Bainbridge Island, WA 98110
(206) 842-3609 Phone & Fax

Northwest Chapter

PROHIBITED SPECIES BYCATCH
EXPERIMENTAL RETENTION AND DISTRIBUTION PROPOSAL

INTRODUCTION

The attached DRAFT PROPOSAL FOR EXPERIMENTAL FISHERIES PERMIT APPLICATION has been written with the intent of defining the broad guidelines by which a formal EXPERIMENTAL FISHERIES PERMIT APPLICATION would be circumscribed.

Regulations Pertaining to Experimental Fisheries, Citation: 57 FR 10430, March 26, 1992 states:

"For limited experimental purposes, the Regional Director may authorize, after consulting with the Council, fishing for groundfish in a manner that would otherwise be prohibited. No experimental fishing may be conducted unless authorized by an experimental fishing permit issued by the Regional Director to the participating vessel owner in accordance with the procedures specified in this section." and "An applicant for an experimental fishing permit need not be the owner or operator of the vessel(s) for which the experimental fishing permit is requested."

Terra Marine Research and Education intends to be the applicant for such a permit as described in the attached proposal. Due to the controversial nature of Prohibited Species Bycatch (PSC) retention Terra Marine is requesting that the Council discuss the proposal at the September, 1992 meeting, in advance of a formal application. We would like this opportunity so that we can amend our application to the Regional Director in such a way as to make it acceptable to the Council. Also, by defining the parameters for this experiment the applicant is then able, with certain assurances, to elist industry participation and delineate the logistical details of the experiment; both of which are required for the Permit Application. It is our hope to have our Permit Application completed and submitted to the Regional Director prior to the Council's December meeting.

Drafts of of this proposal have been provided to the Pacific Seafood Processors Association, Fishing Vessel Owners Association, American Factory Trawlers Association, and the International Halibut Commission for their review and comment. It has also been given to individual fishing industry company executives and to Steve Hughes at NRC. From this effort we have received a tremendous amount of constructive input which has been incorporated into the attached proposal.

Terra Marine Research and Education will have at least two representatives in Anchorage for the September meeting to support this proposal, to answer questions, and to work with the Council to create a viable PSC retention and distribution experiment.

Draft proposal for EXPERIMENTAL FISHERIES PERMIT application.
Revised August 20, 1992

Format based on REGULATIONS PERTAINING TO EXPERIMENTAL FISHERIES
CITATION: 57 FR 10430, MARCH 26, 1992

GULF OF ALASKA: 672.6
BSAI: 675.6

(a) General
(b) Application
1. Date of application: to be determined

2. Applicant: TERRA MARINE RESEARCH AND EDUCATION
N.W. CHAPTER
7052 NEW BROOKLYN ROAD
BAINBRIDGE ISLAND, WA 98110

(3) Statement of Purpose and goal of the experiment for which the experimental fishing permit is needed, including a general description for the disposition of all species harvested under the experimental fishing permit:

The purpose of the experiment is to develop and test a plan, consistent with the intent of all existing fisheries regulations, with the observer plan, and with present enforcement procedures, which would enable the prohibited species bycatch (PSC) to be diverted into the non-profit food distribution network of the United States.

The goals of the experiment are to establish a resource protection measure that would, at the same time, reduce to a minimum the tremendous waste, with the attendant moral and biological implications, resulting from the present practice of discarding these catches. Further, it seeks to provide a source of much needed high-protein food to the people in our country who are desperately in need of such food. The program will attempt to establish the foundation for an acceptable disincentive policy, which would discourage the taking of prohibited species and which would be integrated into a new PSC retention and distribution plan. Among options to be explored will be that the retention of dead PSC become a requirement and that processing and packaging costs be paid by the fishing vessel. It must be determined whether this would be effective as a disincentive and whether it would unfairly penalize the vessel owners and crew. It must also be determined whether its effectiveness

as a disincentive could ultimately lower the retained PSC to such an amount that the maintenance of a distribution program would no longer be justified.

In the present economic environment, the sources of funding and direct contributions of food for the hunger network have been greatly reduced. Despite this situation, we continue, for lack of an enforceable PSC utilization plan, to throw away millions of pounds of quality fish that could be distributed charitably throughout the country.

(4) Technical details about the experiment, including:

(i) Amounts of species to be harvested that are necessary to conduct the experiment;:

SPECIES: The PSC to be retained for this experiment are salmon and halibut.

To successfully evaluate the proposed program there must be enough volume to adequately represent a full production test in each of the three catching/processing modes; i.e. catcher/processor, catcher boat/mothership, and catcher boat/shoreplant in both the trawl fishery for cod and pollock and in the hook and line fishery for cod and sablefish. The following examples are used to demonstrate how the quantity for retention would be determined. Actual quantity would depend on the fishery and production capacity represented by the participating vessels.

EXPERIMENTAL TRAWL FISHERY

During the 1992 "A" pollock season (January 26 to May 3) the average chinook bycatch was approximately .04 chinook per metric ton and the average halibut bycatch was approximately 4 kg per metric ton. (Information from NMFS Bulletin Board Service: averages calculated from 1992 Halibut and Chinook Salmon Bycatch by target fishery, and week in the Bering Sea and Aleutian Islands)

Data obtained from NMFS Bulletin Board Service and averaged through May 3 in the trawl pollock fishery 1992 Halibut and Chinook Salmon bycatch by Target Fishery, Zone, and Mode in the Bering Sea and Aleutian Islands, indicates that the bycatch amount varies significantly by mode. See the following table.

AVERAGE CHINOOK SALMON AND HALIBUT BYCATCH BY MODE

	Salmon/mt	Halibut kg/mt
Mothership	.04	2.8
Shoreplant	.065	1.6
Catcher/Processor	.024	4.6

TOTAL CHINOOK SALMON AND HALIBUT BYCATCH CALCULATED FROM ABOVE AVERAGES (BY MODE)

	No. of Salmon	Kg of Halibut
Mothership	18,518	1,296,309
Shoreplant	30,092	740,748
Catcher/Processor	11,111	2,129,650

The mortality rate in the Bering Sea is considered to be 100% for trawl caught salmon and 75% for trawl caught halibut.

The experiment would require an amount of fish equal to the industry average for one vessel representing each of the three processing modes over a period to coincide with the fisheries' first 1993 openings. (NOTE: The actual amount to be requested for the experiment will be determined by the capacity and fishery of the participating vessels.) The season and target fishery (trawl pollock and cod) were chosen because they represent, in general, a consistently higher volume of PSC than other fisheries and seasons and would therefore result in more meaningful experimental results.

For example, experimental fisheries permits might be requested for the following (calculated using 75% mortality rate for halibut):

1. A catcher boat for a mothership, capable of delivering 100 metric tons of pollock daily, to be allowed to retain up to 4 chinook salmon per day and up to 210 kg of halibut per day, on average, for the duration of the "A" pollock season.

2. A catcher boat for a shoreplant, capable of catching up to 100 metric tons of pollock daily, to be allowed to retain up to 6.5 chinook salmon per day and up to 120 kg of halibut per day, on average, for the duration of the "A" pollock season

3. A catcher processor, cabable of catching 450 metric tons of pollock daily, to be allowed to retain up to 10.8 chinook salmon per day and up to 2070 kg of halibut per day, on average, for the duration of the "A" pollock season.

(ii) Area and timing of the experiment:

Bering Sea and Aleutian Islands with all species retained experimentally to be landed in Dutch Harbor.

Timing to coincide with 1993 "A" BSAI pollock season and 1993 cod season beginning January until closure.

(iii) Vessel and gear to be used:

Vessels: To be determined. See above examples.
Gear: Any legal midwater or bottom trawl gear.

EXPERIMENTAL HOOK AND LINE FISHERY

The seasonal fluctuations in bycatch rates in the hook and line fishery do not appear so dramatic and the data appears less conclusive. Based on 1991 data (NMFS Bulletin board service HALIBUT AND CHINOOK BYCATCH BY TARGET FISHERY, ZONE, AND MODE and HALIBUT AND CHINOOK BYCATCH BY TARGET FISHERY AND WEEK, BERING SEA AND ALEUTIAN ISLANDS) it appears that the halibut bycatch rate in the Pacific Cod fishery is slightly higher towards November and December and slightly lower around mid March to mid May. In the Sablefish fishery it appears slightly higher during July and August and slightly lower in October and November. The data for 1 year alone is not conclusive though there is some similarities with the same data for the first half of 1992.

The following tables represent NMFS data from January 1 to July 12, 1992. Halibut mortality rate in the hook and line fishery, BSAI is here estimated at 16%.

AVERAGE HALIBUT BYCATCH BY MODE: BSAI THROUGH 7/12/92

	PACIFIC COD		SABLEFISH	
	Total	16% mort	Total	16% mort
Cat/Proc	66.5mt	10.48 mt	142.9 mt	22.86 mt
Mothershp	43.4	6.94	72.3	11.57
Shoreplnt	125	20.00	116	18.56

HALIBUT BYCATCH BY TARGET: BSAI THROUGH 7/12/92

	Pacific Cod	Sablefish
Total	1047.5 mt (2,304,500 lb)	161 mt (354,816 lb)
16 % mort	167 mt (368,720 lb)	25.76mt (106,260 lb)

AVERAGE HALIBUT BYCATCH: ALL MODES BSAI THROUGH 7/12/92

	Pacific Cod	Sablefish
Total	85.5 kg/mt	114.6 kg/mt
16% mort	13.7 kg/mt	18.3 kg/mt

As with the the experimental trawl fishery, the applicant intends to apply for experimental fishing permits for vessels fishing with hook and line, and representative of each of the three processing modes. The actual amount of bycatch to be retained will be determined by the capacity of the participating vessels and will be consistent with the averages of the processing modes being represented.

The timing of the experimental hook and line fishery will be June and July of 1993. The timing was chosen because there appears to be a fairly high bycatch rate in both target fisheries which would enrich the data. It was also chosen because it allows enough time following the trawl experiment to take advantage of the lessons learned in that experiment and apply them constructively to the hook and line experiment.

The area of the experiment, as with the first one, will be the Bering Sea and Aleutian Islands (BSAI) with all species retained experimentally to be landed at Dutch Harbor. This will enable us to maintain continuity in the logistical support operations (storage, shipping, etc.).

(iv) Experimental design (e.g., sampling procedures, the data and samples to be collected, and analysis of the data and samples):

The experiment is designed to quantify effort in 3 areas.

1. The processing effort will be measured in hours per ton. A detailed processing log will be kept in each instance

where PSC have been retained, processed, packaged , and frozen. The log will identify the species, round weight, process (gutted, H and G, etc), and processing time (man-hours). Logging procedures will be consistent with all current requirements and accepted standards. (NOTE: Sample report forms will be attached to formal application). Where PSC and target species are the same and are processed in the same plant the PSC will be processed as a separate batch and treated as a full production run with all associated record keeping. Observer approval will be required at the onset and conclusion of processing. In all cases, the PSC will be handled, packaged, and in every respect treated with the same regard as commercial product. All packages will be clearly labled with the words "PROHIBITED SPECIES BYCATCH-NOT FOR SALE" as well as color coded to minimize any confusion between commercial product and PSC. All packages will be marked with the date, the name of the processing facility, the contents, and package weight.

In all cases a NMFS observer will already be on the processing site. All PSC processing will take place after the observer has performed his normal duties of counting, sampling etc. The observer will be required to initial the PSC processing log.

2. The enforcement effort will be documented in hours per ton. The NMFS observers will add to the processing log, at the time they initial their approval, the actual time required in addition ot their normal duties to adequately monitor the offloading, handling, and processing of the PSC. If the existing demands of the observers preclude additional work, the applicant will contract additional observer support from a contractor certified by NMFS for the 1993 DAP groundfish observer program.

3. The delivery effort will be measured two ways.

a. The proportion of PSC determined to have reached qualified end users. PSC will be distributed through NMFS approved charitable food distribution networks. Detailed records will be maintained by all participants. Documentation will include the end user distribution by distribution date, processing date, weight, species, product quality, and processing facility.

b. Cost of delivery will be documented, including all storage and handling costs.

The data will be analyzed to determine the following:

1. Cost effectiveness compared to commercially available product.

2. Overall success of delivery will be measured as a ratio of the amount of product processed to the amount received in good condition by qualified end users.

The enforcement effort will be analyzed to determine if these activities in anyway hindered or overburdened existing operations.

The processing effort will be analyzed to determine if a long term PSC disincentive program could be created whereby the vessel which catches the fish could be reasonably expected to provide for the processing and packaging of the PSC product in conjunction with other disincentives.

All participants will comply with existing fisheries regulations. PSC which have a chance of surviving, as determined by the NMFS observer, will be returned to the sea immediately, in as good a condition as possible. All records will be made available to NMFS Enforcement for review upon request.

TERRA MARINE RESEARCH & EDUCATION

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Northwest Chapter

WHAT IS TERRA MARINE RESEARCH AND EDUCATION ?

Terra Marine is a Nonprofit Corporation established in 1986 to conduct research and education in the marine sciences and related fields. It seeks funding and provides logistical support for groups and individuals engaged in projects designed to further our understanding of marine and coastal ecosystems, as well as projects designed to minimize impact and enhance responsible utilization of marine resources.

Terra Marine Research and Education, Northwest Chapter was opened in 1992 in response to the need expressed by both the commercial fishing community and representatives of charitable food distribution services to provide an alternative to the discard of prohibited species bycatch that is fair to fishermen but which would at the same time protect the resource, eliminate the waste of millions of pounds of fish, and provide a new high-protein food source to the hunger network. Northwest Chapter also conducts other research and educational projects in this region.

The following organizations have sponsored or participated directly in past Terra Marine research activities:

British Broadcasting Corporation
California Academy of Sciences
Channel Islands National Marine Sanctuary
International Whaling Commission
Los Angeles County Museum of Natural History
National Oceanic and Atmospheric Administration
New Mexico State University
The Nature Conservancy
Oceanic Society
San Diego Museum of Natural History
Santa Barbara Botanic Garden
Sea World Research Institute/Hubbs Marine Research Center
Southern California Academy of Sciences
University of Mexico
Unversity of Southern California

NRC
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September 2, 1992

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Alaska Region
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Mr. Clarence G. Pautzke
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Dear Rick, Steve, and Clarence:

Over the past two or three years increased concern has been expressed about the accuracy of product recovery rates, particularly with regard to pollock and its many product forms and variations in yield which occur due to normal seasonal changes in the condition of this species.

Bob Czeisler of the mothership *Ocean Phoenix* asked me some time ago if I would be interested in doing some pollock yield studies aboard their processing ship. Bob and I have since talked with several other industry members about the NPFMC's and NMFS's need to address this issue squarely, but on a broader scale to include shore-plants and factory trawlers, as well as motherships. The hope would be that if such studies were properly designed and conducted, the results would be adopted by the agencies and directly applied in management, i.e., back calculation of catch from product recovered, better economic analysis, etc.

I don't know whether NMFS is planning to conduct specific product yield tests, but it has not happened to date in spite of a growing need for these data.

Given NPFMC/NMFS support for conducting these studies and their use of the results, subject, of course, to SSC evaluation of test methods and data analysis, NRC would be interested in conducting these studies. I would propose to form an industry steering committee composed of representatives of motherships, catcher vessels, factory trawlers and shore-based processors to (1) secure industry participation and partial funding, if necessary, and (2) provide oversight of the overall design of the tests and reporting of results to management.

The study, in my view, should be conducted in February as a period representative of the winter "A" season fishery, again in June, and again in September to address both the "B" season and the pending question of optional timing of this season. Tests should be conducted by a small team working in facilities representative of the three noted processing modes over a short period of time.

I agreed to draft these thoughts for your consideration, since the product recovery rate issue is of real concern to the industry. If you agree and are interested in having this work done as a joint industry/government study, NRC would be interested in being involved.

Sincerely,

NATURAL RESOURCES CONSULTANTS, INC.

Steve

Steven E. Hughes
Vice President

SEH:jmc

cc: Robert Czeisler, *Ocean Phoenix*
Joseph Blum, AFTA
John Iani, PSPA