

OBSERVATIONS OF CATCH IN THE SUNKEN GILLNET FISHERY
FOR PACIFIC COD IN THE KODIAK AREA, 1981

By:

James E. Blackburn

Regional Information Report¹ 4K92-11

Alaska Department of Fish and Game
Division of Commercial Fisheries
211 Mission Road
Kodiak, Alaska 99615

February 1992

¹The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished division reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

THE DATA CONTAINED IN THIS REPORT HAS BEEN
APPROVED FOR RELEASE TO THE PUBLIC BY
THE ALASKA DEPARTMENT OF LAW, STATE ATTORNEY GENERALS OFFICE.

ACKNOWLEDGMENTS

The author is grateful for the editing by Bruce Barrett and Dave Jackson. The author thanks Bill Nippes and Larry Nicholson for supervision, Lucinda Neel for clerical support, and Patti Roche for preparing the figures.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	i
LIST OF FIGURES	i
INTRODUCTION	1
METHODS	1
RESULTS	3
DISCUSSION	4
LITERATURE CITED	6

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Sunken gillnet catch numbers by species, pounds of halibut, number of hours, and depth fished on five observer trips in the Kodiak area, 1991. Numbers in parentheses are estimates	7
2. Number of animals caught per metric ton of Pacific cod and pollock delivered on four trips observing sunken gillnets used for cod in the Kodiak area in 1981, by trip and species. Delivered weights were expanded to round weight	8
3. Bycatch rates observed by ADF&G groundfish observers in the shorebased bottom trawl fishery targeting cod, 1987-89	9
4. Bycatch rates from NMFS observers in the Pacific cod fishery in the Kodiak INPFC area, 1991	10

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Species composition of the sunken gillnet catch, in percent of numbers caught, based on four observer trips, 1981	11
2. Bycatch of halibut in percent by weight by trip (a), and number of halibut caught per metric ton (b), of Pacific cod and pollock landed by observer trip in the Kodiak sunken gillnet fishery, 1981	12
3. Average number of Tanner crab (a) and red king crab (b) caught per metric ton of Pacific cod and pollock taken on four observer trips in the Kodiak sunken gillnet fishery, 1981	13

INTRODUCTION

In the early 1980's, sunken gillnets were used to commercially harvest Pacific cod in the Kodiak area. A special permit from the Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries was required to fish the gear, and only two operators applied and both received permits. The concern was to minimize bycatch in this fishery. Therefore, the applications for these permits were reviewed to ensure that the proposed fishing did not occur in areas of suspected salmon importance. Permit stipulations were imposed which included the requirement for drop lines off the lead line to keep the gear at least 18 inches off the bottom.

Two vessels participated in the fishery, however, one vessel only had a couple nets and experimented with the gear, while the other had 30 nets that were 50 fathoms long and made repeated deliveries.

In 1981, ADF&G conducted a limited observer program to obtain catch data from the sunken gillnet cod fishery. Salmon, crab, and halibut bycatch were the primary concerns. The purpose of this report is to summarize those findings.

METHODS

In 1981, observers were actively observing the trawl fleet, and when the opportunity to observe the sunken gillnet fishery occurred, forms and procedures from the trawl fishery were used.

The observer recorded set date, time, location, and depth when the gear was deployed. As the gill net came aboard, the catch was hand tallied by species, and as time permitted, length samples were taken. Samples of halibut were measured, and a subjective assessment of their viability was recorded. Note was also taken of the number of fish, by species, retained for sale. The exception was that occasionally only the bycatch from a set was counted by species, and during one trip the results from the individual sets were combined into a single catch report. It was not practical to obtain total fish weights since the catch was sorted as it came aboard. However, samples of Pacific cod were weighed both before and after dressing to estimate weight loss. Total delivery weights were obtained from fish tickets issued at the time of sale. Since the fish were delivered bled and gutted, round weights of landed cod and pollock were estimated from the samples taken. These weights, converted to metric tons were used as the divisor for catch rate figures. Weight of halibut was estimated from individual measurements. Gear length, depth, and mesh size measurements were reported for one trip.

Not all sets were sampled for species composition since there were also biological objectives the observers were trying to meet. Prohibited species were routinely sampled from all sets, however. Consequently, some of the species catches were estimated here for some of the sets. These estimates are based on numerical expansions of trip averages, averages of all trips, or comments recorded by the observer, whichever was most appropriate.

Estimated catch numbers are identified as such in the tables of data.

RESULTS

In 1981, a total of five trips were made onboard one of two vessels participating in the sunken gillnet fishery. Twenty-six sets were individually examined. The species catch numbers by set and trip are listed in Table 1. Average species composition is illustrated in Figure 1.

The catch in numbers was greatly predominated by Pacific cod, followed by pollock, great sculpin, Tanner crab, halibut, flathead sole, and red king crab. Overall, an estimated 24 Tanner crab, 18 halibut, and 10 king crab per metric ton of cod and pollock were taken (Table 2). The variation in bycatch rates between trips is illustrated in Figures 2 and 3 for halibut and crab.

Most of the halibut examined were released alive. Of 269 halibut surveyed, 200 (74%) were in excellent condition, 11 (4%) were in fair to good condition, and 58 (22%) were dead. The estimated average weight per halibut was 2.2 kg (4.9 lbs).

Gear specifications were reported for trip 413 only. The gear consisted of two 750 fathom long monofilament gillnets each of which was fished as a single string. Each net had fifteen, 50-fathom long panels. Mesh size varied by panel; there were five panels of 6.0 inch, 6.5 inch, and 7.0 inch mesh web per net. Each

panel was 25 meshes deep. The droppers between the lead line and the web were from 18 to 21 inches long.

DISCUSSION

A concern over any groundfish fishing gear is its impact on other resources. The bycatch rate is the usual measure for comparing this impact. The bycatch of sunken gill nets included several species of concern: halibut, red king crab, Tanner crab, herring, salmon, and harbor porpoise (Tables 1 and 2).

To provide some perspective on the bycatch rates Tables 3 and 4 show bycatch rates from the bottom trawl fishery in the Gulf of Alaska. The North Pacific Fishery Management Council (NPFMC) has established bycatch incentive rate standards, above which no vessel should be. The figures for all fisheries other than midwater pollock are 5% by weight for halibut, with no figure for number of fish, and 0.16 salmon/mt (North Pacific Fishery Management Council, Newsletter. Dec 19, 1991, page 9).

The halibut bycatch (18 halibut/mt; 4.2% by weight) from sunken gillnets was within the range (2-105 halibut/mt; 0-24% by weight) reported by Watson (1990) for the 1987-1989 shorebased bottom trawl fishery on cod, and above the rate (2-4% by weight) recorded for the 1991 cod trawl fisheries in federal waters off Kodiak (Table 4). The salmon catch rate, 0.1/mt (Table 2) was comparable to the bycatch rate of the trawl fleet in 1991 (0.10-0.13, Table 4), but less than the 0.4 to 0.8/mt observed in 1987-89 (Table 3). The

Tanner crab catch average (24 crab/mt) was much higher in the sunken gillnet fishery than in the 1987-89 shorebased bottom trawl fisheries for cod (2-4 crab/mt; Tables 2 and 3). Similarly, the king crab catch was much higher in the gill net fishery than in the shorebased trawl fishery (10.2 crab/mt verses <.05 crab/mt).

Four marine mammals were caught, but their condition, alive or dead, was not recorded. The catch rate averaged 0.3 animals per metric ton; human sensitivity to the killing of marine mammals should be considered in evaluating any experimental fishery. The National Marine Fisheries Service (NMFS) is in the process of establishing allowable levels of removal of marine mammals for each species and population (NMFS, 1991a). According to NMFS (1991a) the annual take of harbor porpoise in Alaska by all means is estimated at less than 100. The fishing gear which is discussed in association with harbor porpoise take is gillnet (NMFS, 1991a).

The appearance of any animal in bycatch statistics implies that it was killed, but this is not necessarily the case. Salmon are active fish and easily lose scales so a high mortality would be anticipated. Blackburn and Schmidt (1988) reported conditions from the bottom trawl fishery: 21% of halibut were dead, less than 2% hard shell red king crab were dead, and 17% of Tanner crab were dead. Without recorded information from gillnets firm statements on condition and mortality cannot be made.

LITERATURE CITED

- Blackburn, J. and D. Schmidt. 1988. Injury and apparent mortality rates from incidental trawl catches of halibut, king crab, and Tanner crab in the Kodiak Area, 1978-81. Regional Information Report No. 4K88-21. Alaska Department of Fish and Game, Division of Commercial Fisheries, 211 Mission Rd., Kodiak.
- National Marine Fisheries Service. 1991a. Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations. Draft Legislative Environmental Impact Statement. NMFS, NOAA, U.S. Dept. of Commerce. June 1991.
- National Marine Fisheries Service. 1991b. Regional Office inseason bulletin board reports on bycatch rates by fishery. NMFS, P.O. Box 021668, Juneau.
- Watson, L.J. 1990. A review of the Westward Region groundfish management program, 1987-1989. Regional Information Report No. 4K90-25. Alaska Department of Fish and Game, Division of Commercial Fisheries, 211 Mission Rd., Kodiak.

Table 1. Sunken gillnet catch numbers by species, pounds of halibut, number of hours, and depth fished on five observer trips in the Kodiak area, 1981. Numbers in parentheses are estimates.

MONTH	HOURS NET OUT	DEPTH FATH- OMS	-----BYCATCH-----					-----CATCH-----				COMMENTS		
			-HALIBUT- NUMB	LBS	RED KING CRAB	TANNER CRAB	PORPOISE	SALMON	HERRING	PACIFIC COD	POLLOCK		FLND ^a	OTHER ^b
Trip 326 ^c														
	Unk		42	(182)	3	16	0	0	0	(730)				Trip Total
Trip 413														
	May	14	70	5	23	1	0	0	0	57	44	9	0	
	May	15	65	9	39	0	5	0	0	129	59	4	0	
	May	20	65	18	101	1	6	0	0	73	170	6	2	
	May	22	65	28	100	1	44	0	0	367	267	4	2	
	May	17	65	13	49	0	4	0	0	19	111	6	1	
	May	19	65	9	22	1	0	0	0	18	56	0	1	
	TRIP TOTAL			82	334	4	59	0	0	663	707	29	6	
Trip 414														
	May	19	85	8	100	0	1	0	0	163	11	9	5	1 Rockfish
	May	20	85	0	0	0	0	0	0	45	10	5	2	
	May	26	75	13	56	0	8	0	0	173	12	12	9	
	May	25	60	0	0	0	0	0	0	60	(18)	(4)	(3)	
	May	19	75	8	26	0	0	0	0	13	12	4	5	
	May	19	70	22	152	0	0	0	0	63	14	7	3	1 Scallop, 1 Skate
	May	15	60	6	59	0	1	2	0	132	32	4	8	2 Scallop, 2 rockfish
	May	13	55	4	39	0	0	0	0	61	25	1	1	
	May	16	55	6	25	1	3	0	0	70	69	4	2	
	May	17	63	1	29	0	3	0	0	18	38	5	6	
	TRIP TOTAL			68	486	1	16	2	0	798	241	55	44	
Trip 415														
	May	23	83	12	48	5	6	0	0	(31)	(25)	(5)	(7)	1 rockfish
	May	36	85	10	40	26	35	0	1	(58)	(43)	(10)	(12)	1 king salmon, 1 rockfish
	May	22	55	4	16	4	2	0	0	(61)	(59)	(11)	(17)	
	June	22	55	23	86	50	130	1	0	475	320	39	81	
	June	35	55	23	130	10	37	1	0	206	128	75	61	
	June	18	48	17	76	28	33	0	0	253	293	55	54	1 hair crab
	June	18	45	7	37	8	7	0	0	104	70	22	17	
	June	14	42	10	37	27	33	0	0	(225)	(137)	(40)	(38)	1 rockfish
	TRIP TOTAL			106	470	158	283	2	1	1413	1075	257	287	
Unnumbered trip														
	Sept	15	48	0	0	0	0	0	0	2	0	31	6	Net badly tangled when retrieved
	Sept	14	60	42	(182)	1	2	0	0	(35)	(16)	(500)	(240)	2,000 lbs; 60% Sculpin, 25% sole, 13% cod and 2% pollock
	TRIP TOTAL			42	182	1	2	0	0	37	16	531	246	
TOTAL ALL TRIPS ^c														
				298	1472	164	360	4	1	2911	2039	841	577	

^aFLND - Flathead sole, yellowfin sole, arrowtooth flounder, and starry flounder.

^bOTHER - Sculpin, dogfish, wrymouth, and snailfish.

^cTotal does not include trip 326.

Table 2. Number of animals caught per metric ton of Pacific cod and pollock delivered on four trips observing sunken gillnets used for cod in the Kodiak area in 1981, by trip and species. Delivered weights were expanded to round weight.

Species	-----Trip Number-----				AVERAGE
	413	414	415	326	
Pacific Cod (<i>Gadus macrocephalus</i>)	179.4	284.8	214.5	233.9	219.7
Pollock (<i>Theragra chalcogramma</i>)	191.3	86.0	163.2		154.6
Great Sculpin (<i>Myoxocephalus</i> spp.)	1.4	12.1	43.1		24.7
Tanner Crab (<i>Chionoecetes bairdi</i>)	19.2	5.7	43.0	4.9	23.6
Halibut Numbers (<i>Hippoglossus stenolepis</i>)	22.2	24.3	16.1	13.0	18.3
Halibut % by Weight	4.1*	7.9*	3.2*	3.0*	4.2*
Flathead Sole (<i>Hippoglossoides elassodon</i>)	4.9	10.3	27.2		17.3
Red King Crab (<i>Paralithodes camtschaticus</i>)	1.4	0.4	24.0	0.9	10.2
Yellowfin Sole (<i>Limanda aspera</i>)	1.9	2.1	10.8		6.4
Arrowtooth Flounder (<i>Atheresthes stomias</i>)	2.2	7.9	0.0		2.3
Dogfish (<i>Squalus acanthias</i>)	0.3	2.1	0.2		0.6
Rockfish (<i>Sebastes</i> spp.)	0.0	1.1	0.5		0.5
Herring (<i>Clupea harengus pallasii</i>)	0.0	0.0	0.9		0.5
Harbor Porpoise (<i>Phocaena phocaena</i>)	0.0	0.7	0.3		0.3
Scallop	0.0	1.1	0.0		0.2
Starry Flounder (<i>Platichthys stellatus</i>)	0.3	0.0	0.2		0.2
Skate (<i>Rajidae</i>)	0.0	0.4	0.0		0.1
Giant Wrymouth (<i>Delolepis gigantea</i>)	0.3	0.0	0.0		0.1
Salmon (<i>Oncorhynchus</i> spp.)	0.0	0.0	0.2		0.1
Hair Crab (<i>Telmessus</i> sp.)	0.0	0.0	0.2		0.1

* The only figure in the table which is percent by weight.

Table 3. Bycatch rates observed by ADF&G groundfish observers in the shorebased bottom trawl fishery targeting cod, 1987-89.

YEAR	MONTHS	SPECIES	NUMBER/MT	PERCENT
1987	JAN-JUN	HALIBUT	2.0	0.3
1988	JAN-JUN	HALIBUT	14.9	2.8
1989	JAN-JUN	HALIBUT	8.6	2.2
1987	JUL-DEC	HALIBUT	6.7	5.1
1989	JUL-DEC	HALIBUT	104.7	23.7
1987	JAN-JUN	TANNER CRAB	2.2	0.1
1988	JAN-JUN	TANNER CRAB	1.6	0.0
1989	JAN-JUN	TANNER CRAB	4.1	0.2
1987	JUL-DEC	TANNER CRAB	0.5	0.1
1989	JUL-DEC	TANNER CRAB	0.5	0.1
1987	JAN-JUN	KING CRAB	t	t
1988	JAN-JUN	KING CRAB	0	0
1989	JAN-JUN	KING CRAB	0	0
1987	JUL-DEC	KING CRAB	0	0
1989	JUL-DEC	KING CRAB	0	0
1987	JAN-JUN	SALMON	0.4	0.1
1988	JAN-JUN	SALMON	0.6	0.1
1989	JAN-JUN	SALMON	0.4	0.1
1989	JUL-DEC	SALMON	0.4	0.1
1989	JUL-DEC	SALMON	0.8	0.3
1987	JAN-JUN	HERRING	0	0
1988	JAN-JUN	HERRING	0	0
1989	JAN-JUN	HERRING	0	0
1987	JUL-DEC	HERRING	0	0
1989	JUL-DEC	HERRING	0	0

t = Less than 0.05

Source: Watson, L.J. 1990. A review of the Westward Region groundfish management program, 1987-1989. Regional Information Report No. 4K90-25. Alaska Dept. of Fish and Game, Div. of Com. Fish., 211 Mission Road, Kodiak.

Table 4. Bycatch rates from NMFS observers in the Pacific cod fishery in the Kodiak INPFC area, 1991.

PROCESSING MODE	HALIBUT PERCENT	SALMON NO./MT
SHOREBASED TRAWL	2.3	0.13
FACTORY TRAWL	4.0	0.10
MOTHERSHIP TRAWL	2.2	0.10

Source: National Marine Fisheries Service. 1991b. Regional Office inseason bulletin board reports on bycatch rates by fishery. NMFS, P.O. Box 021668, Juneau.

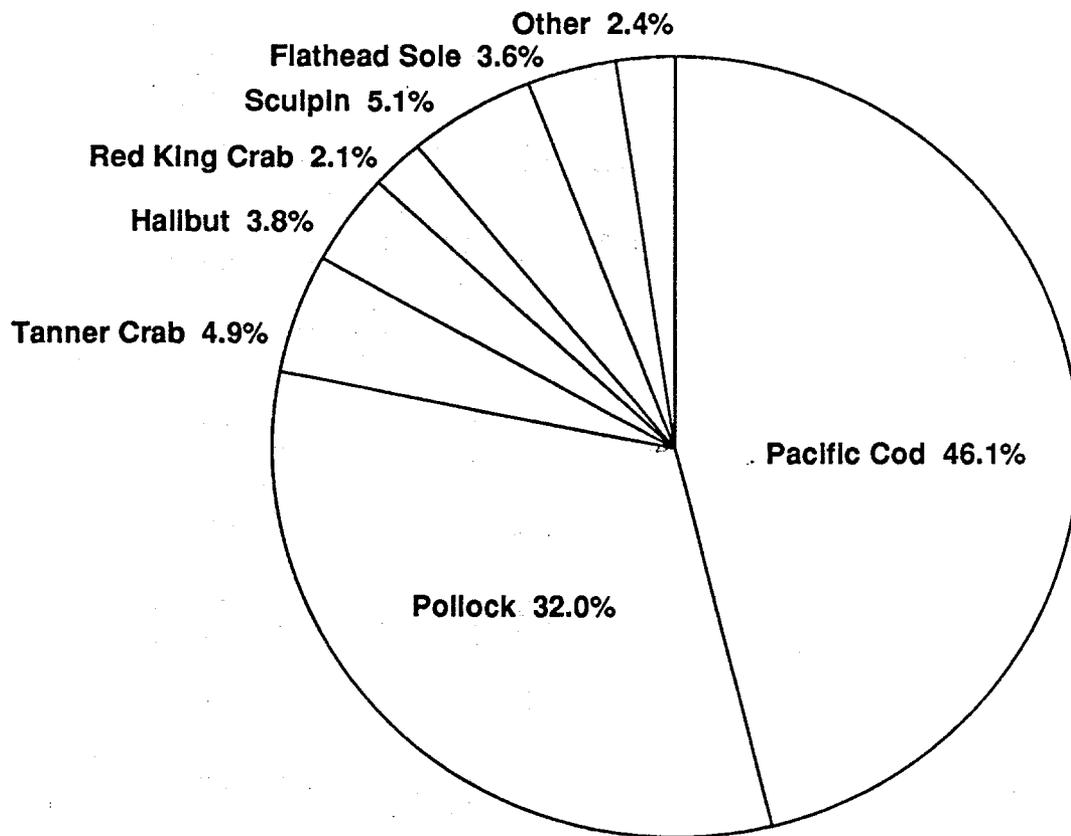


Figure 1. Species composition of the sunken gillnet catch, in percent of numbers caught, based on four observer trips, 1981.

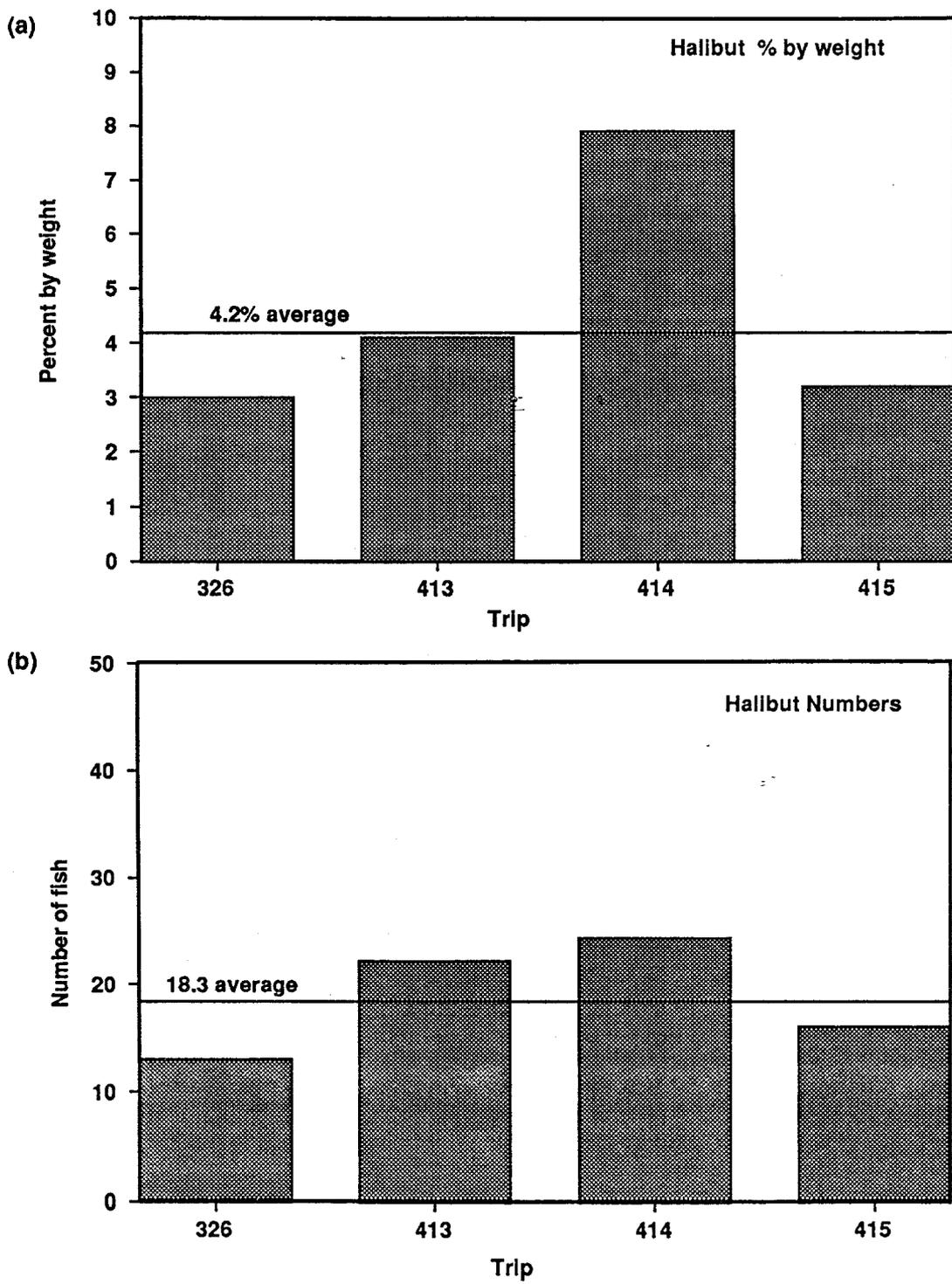


Figure 2. Bycatch of halbut in percent by weight by trip (a), and number of halbut caught per metric ton (b), of Pacific cod and pollock landed by observer trip in the Kodiak sunken gillnet fishery, 1981.

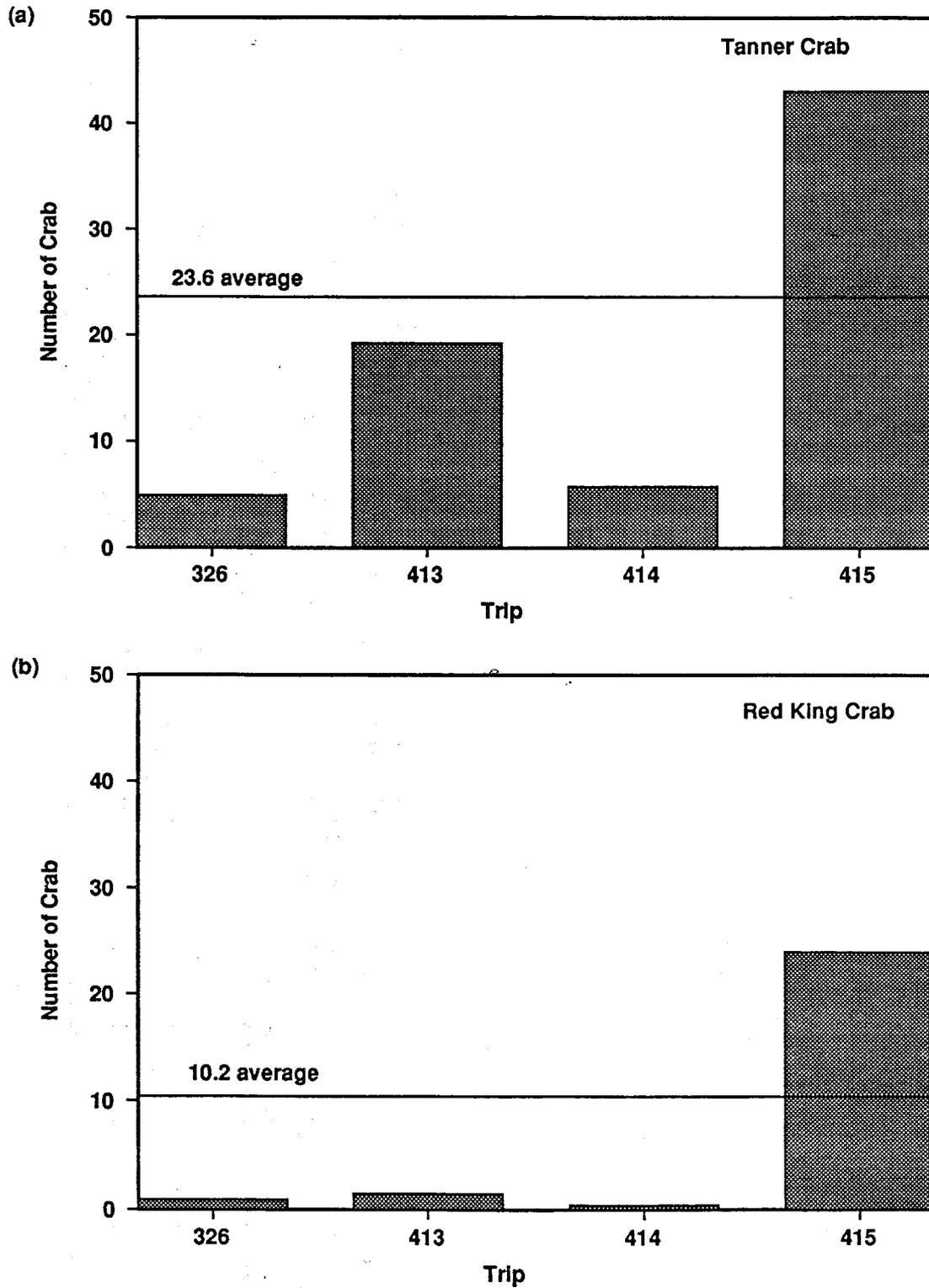


Figure 3. Average number of Tanner crab (a) and red king crab (b) caught per metric ton of Pacific cod and pollock taken on four observer trips in the Kodlak sunken gillnet fishery, 1981.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.