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SEAMOUNT TRAWL FISHERY IN THE FISHERY CONSERVATION ZONE,
FOREIGN VESSEL OBSERVER REPORT, ASO MARU
(SEPTEMBER 18-26, 1982)

By

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The open season for foreign groundfish trawlers operating inside the U.S. Fishery Conservation Zone (FCZ) of the central Pacific runs from May 1 to October 1. During this period in 1982, there were three separate trawling operations conducted in the FCZ around Hawaii, all by Japanese stern trawlers owned and operated by Nippon Suisan Kaisha, Ltd. of Tobata, Kitakyushu, Japan. This report covers the third and final fishing period of this season (Table 1).

Table 1.--Summary of 1982 seamount trawl catches for all vessels in the central Pacific FCZ.

Vessel	Date	Catch (metric tons (MT))			
		Armorhead	Alfonsin	Other	Total
<u>Takachiho Maru</u>	May 3-17 (14 days)	243.5	13.8	10.2	267.5
<u>Aso Maru</u>	July 17-Aug. 10 (15 days)	25.5	61.7	17.2	104.4
<u>Aso Maru</u>	Sept. 18-26 (9 days)	8.3	5.0	7.8	21.1
Total all vessels	(38 days)	277.3	80.5	35.2	393.0

The Aso Maru (Table 2) began the 1982 seamount trawling season at the Emperor Seamounts outside the FCZ, and then moved inside for a period of 15 days fishing at Hancock Seamounts (Figure 1 and Table 3) as reported by Shippen (1982).¹ After 38 days outside the FCZ, the Aso Maru again moved inside to Hancock Seamounts for the 9-day period of the current report, before returning to Japan. I boarded the Aso Maru from a U.S. Navy tugboat at Midway on September 18. My work on board the Aso Maru was greatly facilitated by the cooperation and hospitality of the officers and crew. For interpretative assistance, I must thank Captain H. Kumamaru, Chief Engineer T. Watanabe, and Chief Officer T. Kondo.

¹Shippen, Nathaniel T. 1982. Seamount fishery, foreign vessel observer report, Aso Maru (July 17-August 10, 1982). Southwest Fish. Cent. Admin. Rep. H-82-16, 7 p. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

Table 2.--Vessel and gear specifications and personnel, Aso Maru.

Vessel:

Permit number	JA820288A
Length	90.45 m
Gross tonnage	3,608.29 short tons
Net tonnage	1,968.81 short tons
Width	16.0 m
Draft	9.80 m
Engine type	6 cylinder diesel
Fuel consumption	3-4 kl/day
Horsepower	3,900
Hull number	96090
Registration number	TOEN-701
Company/owner	Nippon Suisan Kaisha, Ltd.
Vessel type	Independent stern trawler
Year launched	1964
Port of registry	Tokyo, Japan
Home port	Tobata, Kitakyushu, Japan
Radio call sign	JMVD

Gear:

Net dimensions	See Figure 2
Door dimensions	See Figure 2
Main trawl winch	Electric 395 kW
Total wire on drum	1,900 m
Flash freezer capacity	27 MT
Processing speed	2 MT/h

Personnel (51 total ship's complement) and experience in seamount fishery

Captain - Mr. Hideo Kumamaru	4 years
Radio operator	None
Navigation officers (3)	None
Doctor	None
Engineers (4)	None
Oilers	None
Galley crew (4)	None
Deck and processing	None

The deck and factory arrangement of the Aso Maru has been described in detail in previous observer reports² as have the navigation and trawling techniques required by the small area and rough bottom of this fishing

²Evering, George C., Jr. 1979. Seamount fishery, foreign vessel observer report, Aso Maru (May 27-July 10, 1979). Southwest Fish. Cent. Admin. Rep. H-79-14, 10 p. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

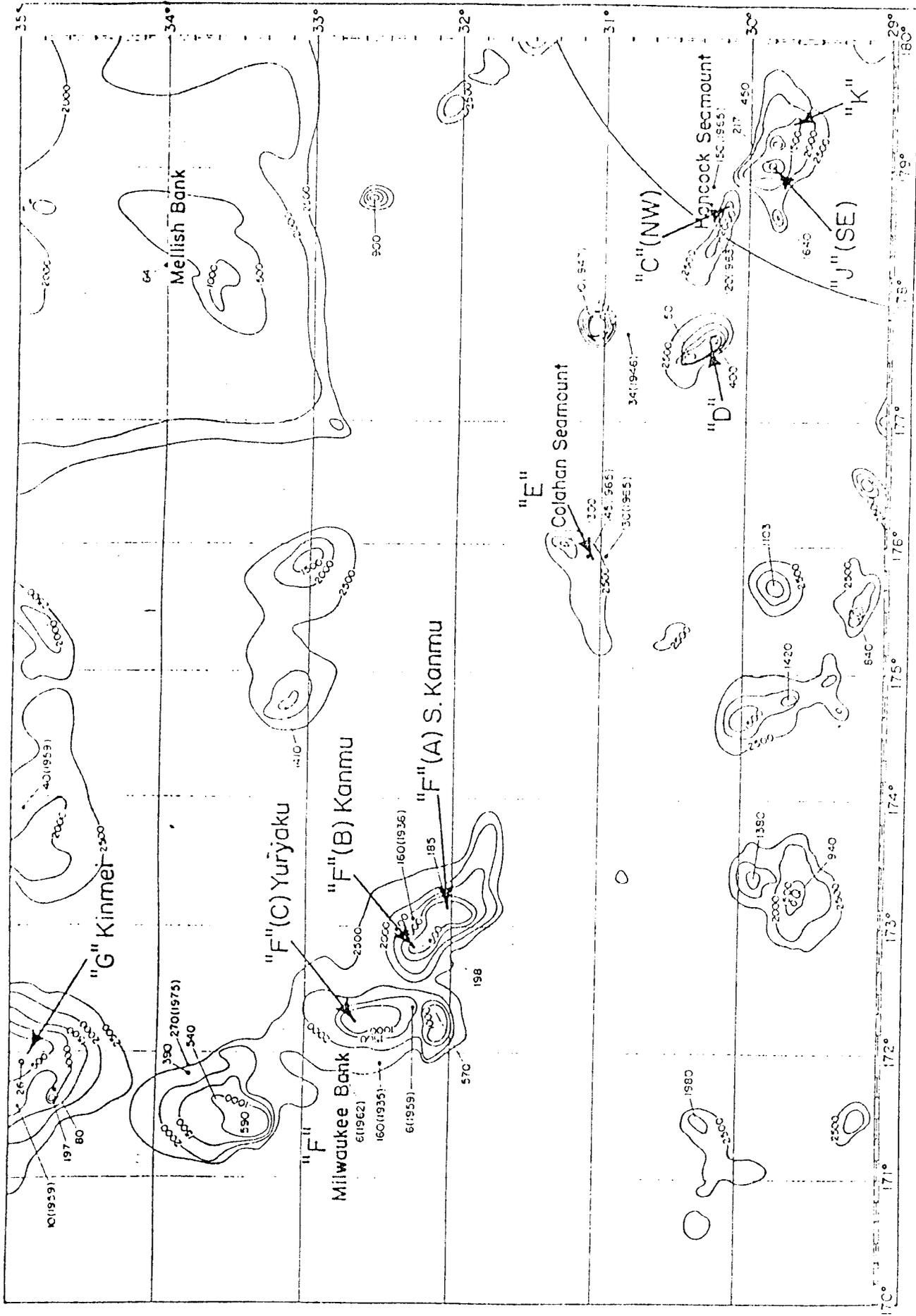


Figure 1.--Locations of seamounts and guyots northwest of the Northwestern Hawaiian Islands. Year of discovery is indicated for each guyot, and the 200-mile line is shown. Depths in fathoms.

ground. The Aso Maru trawled day and night, making repeated passes over the seamount during each haul. Although Captain Kumamaru has had several years' previous experience at Hancock Seamounts using the same gear (Figure 2), catch rates were extremely low during this fishing period. The Aso Maru caught only 2 to 4 tons per night (Tables 4-6). By comparison, the catch rates obtained by the Takachiho Maru, the first trawler to fish this season, averaged 10 to 20 tons per night (Barnett 1982³). All catch rates this year have been greatly below those of any previous season and evince the continued trend of lower availability of these fish stocks.

SAMPLING METHODS

Sampling was conducted during hauls made at night and early morning, these being the times of maximum catch. Hauls made after sunrise and before late evening were regularly the lowest in volume and generally contained no target species. Even at night, I was frequently unable to sample some hauls due to low volume. Approximate catch volumes were noted on almost every haul for comparison with vessel records.

Table 3.--Area of operation.

Emperor Seamounts	Nippon Suisan designation	Position	
		Latitude N	Longitude E
Kinmei	G Bank	35°00'	171°45'
Milwaukee group			
Yuryaku	FC Bank	32°40'	172°15'
Kanmu	FB Bank	32°15'	172°47'
South Kanmu	FA Bank	32°02'	173°06'
Colahan	E Bank	31°00'	175°55'
Unnamed	D Bank	30°26'	177°28'
<u>Fishery Conservation Zone</u>			
Northwest Hancock	C Bank	30°16'	178°42'
Southeast Hancock	J Bank	29°48'	179°04'
Southeast Hancock	K Bank	29°40'	179°20'

³Barnett, William B. 1982. Seamount trawl fishery, foreign vessel observer report, Takachiho Maru (May 3-17, 1982). Southwest Fish. Cent. Admin. Rep. H-82-12, 12 p. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812

Japanese independent

Type of Vessel stern trawler

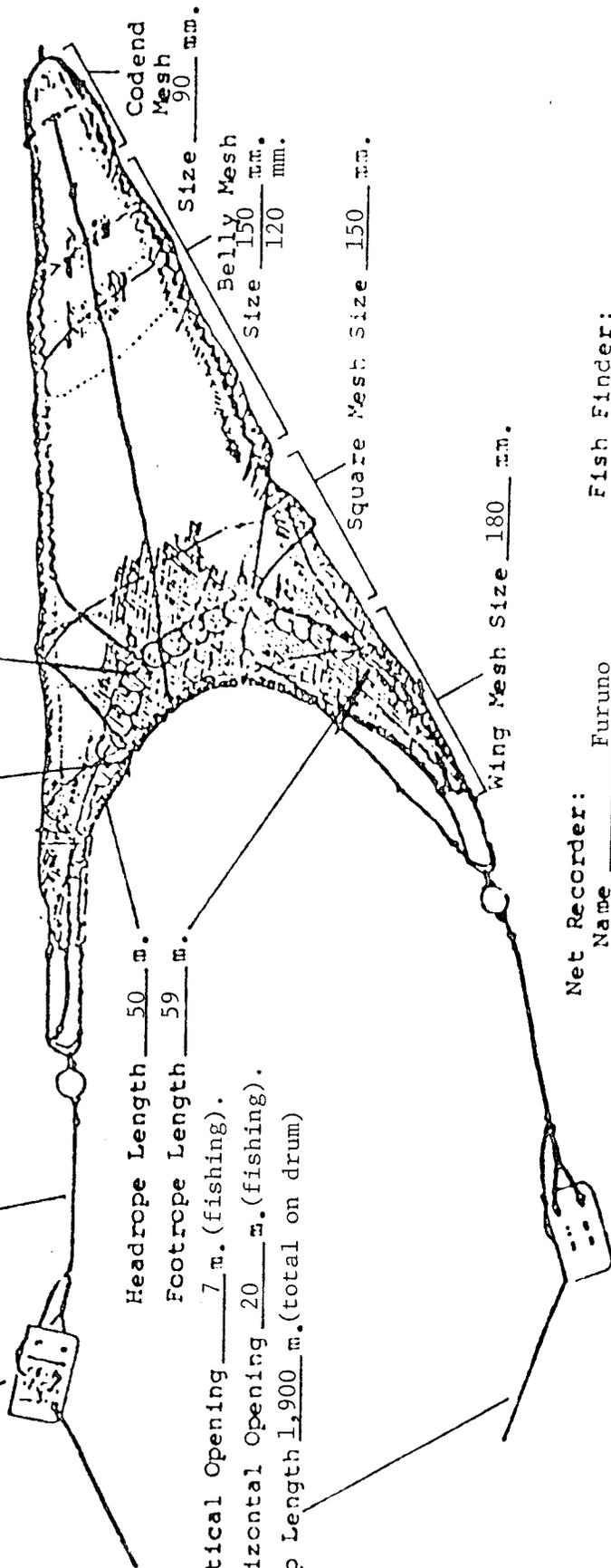
Observation Period September 18-October 6, 1982

Trawl Doors: Shape Rectangular
Type Steel, convex
Dimensions 2.2 m. x 4.4 m.
Weight 3261.5 kg.

Dandyline Length 110 m.

Floats: Number 40
Size 360-440 mm
Material Cyclocac - plastic
Shape Spherical

Bobbins: Number 104
Size 150 x 200 mm
Material Steel, rubber
Shape Cylinder, sphere



Headrope Length 50 m.

Footrope Length 59 m.

Vertical Opening 7 m. (fishing).

Horizontal Opening 20 m. (fishing).

Warp Length 1,900 m. (total on drum)

Codend Mesh
Size 90 mm.

Belly Mesh
Size 150 mm.

Square Mesh Size 150 mm.

Wing Mesh Size 180 mm.

Net Recorder:

Name Furuno
Model Number FNR-50
Frequency 50 Khz

Fish Finder:

Name Kaijo Denki
Model Number W-655-CHR-562-JM
Frequency (Khz) 200/50/24
Paper Type - wet X Dry
Speed of Advance 1 cm/min

Figure 2.--Net dimensions and characteristics, Aso Maru.

Table 4.--Summary of catch and products by species, Aso Maru,
September 18-26, 1982.

Target species

Common name	Pelagic armorhead, boarfish
Japanese name	Kusakari tsubodai
Scientific name	<u>Pentaceros richardsoni</u> Smith
Federal species code ¹	200
Catch	8.3 MT
Product (4.7 MT, 225 cases)	Headed, gutted, and frozen in 21-kg cases. Heads and viscera used for fishmeal and oil.
Common name	Alfonsin
Japanese name	Kinmedai
Scientific names	<u>Beryx splendens</u> , <u>B. decadactylus</u>
Federal species code ¹	201
Catch	5.0 MT
Product (2.6 MT; round: 19 cases, dressed: 105 cases)	Dressed and frozen (large) or whole frozen (small) in 21-kg cases.

Incidental species

Federal species code: 4991; catch = 7.8 MT; frozen product = 3.8 MT
(round: 53 cases; dressed: 91 cases; fillet: 32 cases);
oil² = 1.9 MT; meal² = 1.7 MT (57 bags).

Common name	Mirror dory
Scientific name	<u>Zenopsis nebulosa</u>
Product	Filletted frozen (large only) Meal/oil
Common name	(None)
Scientific name	<u>Hyperoglyphe japonica</u>
Product	Dressed, frozen
Common name	(None)
Scientific name	<u>Ariomma lurida</u>
Product	Whole, frozen
Common name	Mackerel
Scientific name	<u>Scomber japonicus</u>
Product	Whole, frozen

¹Federal Register 43(244):59301, December 19, 1978.

²Includes heads and viscera of target species.

Table 5.--Trawl catch (kilograms) by species and area.

Species	Northwest	Southeast		All FCZ banks
	<u>Hancock Seamount</u> C Bank	<u>Hancock Seamount</u> J Bank	K Bank	
Armorhead	2,604	4,769	900	8,273
Alfonsin	890	470	3,673	5,033
Others	2,406	4,961	427	7,794
Total	5,900	10,200	5,000	21,100

Table 6.--Catch per unit effort (kilograms per minute)
by area and species.

	Northwest	Southeast		All FCZ banks
	<u>Hancock Seamount</u> C Bank	<u>Hancock Seamount</u> J Bank	K Bank	
No. of hauls	19	41	19	79
Total minutes of trawling ¹	1,340	2,425	310	4,075
Armorhead				
Total catch (kg)	2,604	4,769	900	8,273
CPUE (kg/min)	1.9	2.0	2.9	2.0
Alfonsin				
Total catch (kg)	890	470	3,673	5,033
CPUE (kg/min)	0.7	0.2	12.0	1.2
Other species				
Total catch (kg)	2,406	4,961	427	7,794
CPUE (kg/min)	1.8	2.0	1.4	1.9
All species				
Total catch (kg)	5,900	10,200	5,000	21,100
CPUE (kg/min)	4.4	4.2	16.1	5.2

¹Includes turns off the seamount.

When volumes permitted (i.e., when a basketful of fish could be sampled without holding up the factory), a random sample of the catch was shoveled into a basket and sorted by species. The various groups were each weighed in one basket of known weight on a 12-kg spring scale. When any group weighed over 12 kg (including the basket), it was subdivided and weighed in smaller lots. This method was used to estimate the species composition of the haul, although it was frequently necessary to add in the estimated weights of large fish such as sharks and walu, Ruvettus pretiosus, which were never included in the basket samples.

The random basket sample often did not include enough fish of the target species for the length-weight-sex data form. In this case, up to 30 fish of the target species were selected at random from the conveyor to make up this portion of the sample (Tables 7 and 8). Lengths were determined on a measuring board and weights on a 3-kg handheld spring scale. Sex and body type (i.e., fat or lean) data were also recorded. No otoliths were taken. Armorhead were judged to be one of three types: lean-type fish having less fat, hollow bellies, and generally appearing thinner than the other two types of fish; well filled-out or fat fish, which were noticeably heavier than the leans, but had the same brownish coloration; and fish with the markedly different square body shape and bluish coloration which distinguishes the true fat-type armorhead. Fish in this last group were caught infrequently, but perhaps more than had been caught in other cruises during this and previous seasons.

Alfonsins occurred in distinct large and small size groups.

OBSERVATION SUMMARY

In comparing the results among vessels and seasons, the data collected to date do not allow the identification of any definitive causative factors on fluctuations in the catches. However, certain empirical observations may contribute to a better understanding of this fishery. The following observations are based on my own firsthand experience on the Kitakami Maru (1981), the Takachiho Maru (1982), and the present cruise. A primary problem in making such comparisons is the lack of data over entire seasons. The results from these cruises indicate that the catch rates will be better in the spring and worse in late summer (Table 1). Armorhead seem to diminish dramatically as the summer progresses, suggesting that seasonal behavior may play a major role in the availability of these fish. Such behavior could be related to feeding or reproduction, and could be influenced by temperature, currents, day length, or other physical, chemical, and biological factors. The minor differences in vessel efficiency would probably not cause the observed drop in catch rates, although such differences cannot be completely discounted. One such difference between vessels is that the Takachiho Maru fished exclusively at night. It might be suggested that the respite from trawling during the day allowed the fish time to regroup and settle before each night's fishing, whereas continual trawling by the Aso Maru may have disturbed the bottom and caused the fish to remain dispersed, resulting in lower catches.

Table 7.--Summary of biological observations on 410 armorheads.

Location	Average fork length (mm)	Average weight (kg)	Sex ratio		Body type
			M/F %	Fat/lean %	
Northwest Hancock C Bank	301	0.46	63/37		33/67
Southwest Hancock J Bank	304	0.46	10/90		34/66
K Bank	302	0.47	63/37		42/58
All FCZ banks	302	0.46	44/56		36/64
Range	267-334	0.33-064			

¹See discussion of body types under Sampling Methods.

Table 8.--Summary of biological observations on 127 alfonsins.

Location	Average fork length (mm)		Average weight (kg)		Sex ratio ¹
	Large	Small	Large	Small	M/F %
Northwest Hancock C Bank	306	180	0.66	0.14	46/54
Southwest Hancock J Bank	304	194	0.51	0.18	
K Bank	359	0	1.02	0	80/20
Range	159-427		0.10-1.60		

¹Small fish not measured.

A characteristic of this fishery is that for any given date, the best catches are made before sunrise, generally between 0300 and 0500. This is a period when the fish are most concentrated at fishing depths, and in which markedly fewer incidental species are caught. The size and body-type distributions seem to be similar in day or night catches, but the armorhead taken during the day seemed to have been feeding primarily in the morning. The greatest percentage of full stomachs occurred about 1000.

Food of armorhead seems to be an assortment of benthic caridean shrimps and mesopelagic (salps) organisms. Alfonsins were noted to be feeding upon both forms as well, with a slightly greater incidence of benthic shrimp and fish. Also a large amount of fine silt were generally present in the gut of alfonsins.

To review the season at Hancock Seamounts, catch per unit effort (CPUE) of all species at all seamounts dropped from 36 to 5 kg/min between May and September. The CPUE for armorhead dropped from 33 to 2 kg/min for all banks. The CPUE for alfonsins was erratic, showing no obvious trends. Although some catch rates at K Bank have been exceptionally high, the small size of this bank, short trawling times, and low effort make all conclusions speculative.

Among the banks of this group, J Bank produced slightly more fish per minute early in the season, but catch rates were uniform by the season's end.

I observed no catch of corals of any type, although the vessel carried pieces of black and bamboo coral trawled up outside the FCZ.

ITINERARY (G.m.t. dates)

September	17	- Honolulu (Hickam AFB) to Midway
	18	- Embarked <u>Aso Maru</u> , began sampling
	26	- Ceased fishing, departed FCZ
October	5	- Arrived Tobata, Japan
	15	- Arrived Honolulu

RECORDS

The following records were kept:

- Scientists log
- Daily trawl haul form
- Length/weight/sex log
- Species composition from basket samples
- Time and attendance form
- Radio report files
- Photographs

OBSERVER: William B. Barnett