Experimental Flying Squid Fishing off British Columbia, 1985 and 1986

G. S. Jamieson and G. D. Heritage

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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G. S. Jamieson and G. D. Heritage

Department of Fisheries and Oceans
Fisheries Research Branch
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ABSTRACT

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In 1985 and 1986 experimental fishing for flying squid (Ommastrephes bartrami) was conducted from Japanese and Canadian vessels in eastern Pacific Ocean waters off the coast of British Columbia. Squid catch rates were consistent with those of previous years, and for normal operations, ranged from about 250 - 350 kg.km^{-1} of net fished. Pomfret (Brama japonica) and blue shark (Prionace glauca) were the major bycatch species, with flying squid representing from 86 - 96% of the pieces caught. Although still small in terms of total catch, the marine mammal bycatch increased in 1986. Three mammals were caught by the 1 vessel fishing in 1985, and a total of 50 mammals were caught by the 3 vessels fishing in 1986. Salmonid bycatch has consistently been low with less than 770 fish (0.52 pieces.10 km^{-1} in 1985 and 0.34 pieces.10 km^{-1} in 1986) caught in total by all vessels in each year.

RESUME

Jamieson, G. S. and G. D. Heritage. 1987. Experimental flying squid fishing off British Columbia, 1985 and 1986. Can. Ind. Rep. Fish. Aquat. Sci. 179: 103 p.

En 1985 et 1986, des pêches expérimentales du calmar Ommastrephes bartrami ont été effectuées à partir de bateaux du Japon et du Canada dans les eaux de l'est de l'océan Pacifique, au large de la côte de la Colombie-Britannique. Les taux de capture ont été comparables à ceux des années précédentes et, pour les opérations normales, fluctuaient entre environ 250 et 350 kg par kilomètre de filet pêché. La castagnole Brama japonica et le requin bleu (Prionace glauca) ont été les principales espèces capturées accessoirement, Ommastrephes bartrami constituant de 86 à 96% des individus capturés. Même si elles sont demeurées faibles par rapport aux prises totales, les captures accidentelles de mammifères marins ont augmenté en 1986. Alors que trois mammifères ont été capturés par l'unique bateau utilisé en 1985, les trois bateaux ayant effectué des pêches expérimentales en 1986 en ont capturé au total 50. Les captures accidentelles de salmonidés ont été faibles les deux années, soit moins de 770 individus capturés au total par tous les bateaux au cours de chaque année (moyennes de 0,52 par 10 km en 1985 et de 0,34 par 10 km en 1986).

INTRODUCTION

The catch characteristics of flying squid (Ommastrephes bartrami) fishing have been investigated off British Columbia since 1979, when two Japanese fishing vessels participated in experimental flying squid fishing off the west coast of Vancouver Island (Bernard 1980). Experimental fishing was expanded in 1980 (Bernard 1981), and in 1983 fishing was conducted by both a Canadian vessel (Robinson and Jamieson 1984) and a Japanese vessel (Sloan 1984). Results of these studies suggested that flying squid were present off Canada in concentrations sufficient to support commercial fishing, but because most fishing had been exploratory in nature, with areas of squid abundance not usually repetitively fished, fishery potential was only partially established.

All exploratory fishing for flying squid to date has been conducted with drift gillnets, mostly around the outer boundary of Canada's 200 mi (320 km) fishing zone. Fishing in waters in which squid were abundant resulted in a low bycatch of traditionally exploited species [e.g. salmonids, albacore (Thunnus alalunga), and jack mackeral (Trachurus symmetricas)], with pomfret (Brama japonica) and blue shark (Prionace glauca) constituting most of the bycatch. Gillnets are not particularly selective as to species caught and will capture all species that only partially pass through the mesh or become entangled in them (Table 1). It was thus important to have established that flying squid and salmon do not occur together in abundance in a catch (Bernard 1981; Sloan 1984; Robinson and Jamieson 1984), and that there appears to be little cause for concern that properly conducted flying squid fishing will cause depletion of salmon stocks.

In 1985 and 1986, experimental fishing was conducted in a manner better suited to establish the full implications of flying squid fishing. In both years, participating vessels fished as if they were participating in a fully established commercial fishery, with their movements determined by the availability of squid, not the need to sample as many distinct geographic areas as possible. In 1985, only the TOMI MARU #88 participated whereas in 1986, the TOMI MARU #88 and two Canadian commercial fishing vessels, the OCEAN PEARL and the LA PORSCHE, participated. In each year, the objectives were to determine harvest rates over the course of the fishing season, the effect of squid migration on the location of the fishery, the consistency of the bycatch species mix over time, and the biological characteristics of the major species caught. This report describes daily fishing results and presents a general analysis of the data. It does not include detailed biological information on the species caught nor an interpretative analysis of fishing in relation to observed oceanographic parameters. These will be discussed in subsequent manuscripts.

METHODS

Each vessel participating in the Canadian experimental flying squid fishery is required to have a biological observer on board throughout the fishing period to monitor fishing activity and to record biological characteristics of the catch according to a prescribed protocol. The characteristics of the TOMI MARU #88 have been described by Sloan (1984), with the only difference being that in this study the automatic squid jigging machines had been removed. The OCEAN PEARL is a 318 metric ton, 38 m freezer blackcod trap vessel with an additional top afterdeck modification to allow for onboard processing and net storage. During squid fishing, it carried a crew of 18. The LA PORSCHE is an 85 metric ton, 22 m vessel of similar construction and modification with a crew of 9. Freezing capacities per day were about 9.7 t and 3.4 t, respectively, and utilizing maximum freezing capacity, trip duration required to fill the holds would be about 25 days for each vessel (B. Luck, pers. comm.). Fishing operations were basically the same as described by Bernard (1981), Sloan (1984), and Robinson and Jamieson (1984).

In 1985, fishing commenced on July 5 and continued until September 6. In 1986, fishing periods for the TOMI MARU #88, OCEAN PEARL, and LA PORSCHE were June 24-Sept 5, July 27-Sept 12, and Aug 9-Sept 14, respectively. The Canadian vessels began their fishing later in the season because of delays in modifying the blackcod vessels for squid fishing. The Japanese vessel stayed at sea throughout the fishing period whereas the Canadian vessels returned to port periodically, both because their freezer storage space was full, making it necessary to unload some of the catch, and to modify equipment as part of the start-up process.

Fishing was conducted off the coasts of Oregon, Washington, and British Columbia outside the 200-mile (320 km) fishing limit and within this zone in Canadian waters (Figs. 1-4). In 1985, a total of 56 sets were made by the TOMI MARU #88 whereas in 1986, the number of sets made by the TOMI MARU #88, OCEAN PEARL, and LA PORSCHE were 70, 36, and 28, respectively. Green monofilament netting, 8 guage with a stretched mesh length of 121 mm, was used throughout the study. Average net length fished per night for the TOMI MARU #88 in 1985 was 44.2 km, and for each vessel in 1986 was 45.7, 19.4, and 12.6 km, respectively. Although fishing operations were standardized on the Japanese vessel, there were initial startup problems on the Canadian vessels arising from the crew's unfamilarity with the gear and fishing and processing procedures. These were gradually overcome but in the interim, gear was not hauled back as rapidly as desired. One set of the OCEAN PEARL took 3 days to haul aboard, with the portion of the net left in the water continuing to fish throughout this time period. Only the product harvested in the first day was of suitable quality for human consumption, with the product harvested on the second day frozen for bait and the third day's harvest discarded.

The catch of each species was recorded either as total weight or as number of pieces landed. When possible, unit weights of individual specimens were noted and an average unit weight determined. For some species, unit weights could only be estimated. These values (Table 2) were subsequently

used to determine the total weight and/or number of pieces landed for each species, and it is these values that are used in the calculation of species proportion (Tables 3a-3d).

Catch per unit effort (CPUE) was defined in two ways by Sloan (1984) and Robinson and Jamieson (1984): $kg.km^{-1}$ and $kg.km^{-1}\ hr^{-1}$. Time was the duration (hr) between initiation of net setting and initiation of haul back. Both measures of CPUE are again presented in this study.

RESULTS

The species caught during each year of the study by each vessel are listed in Tables 3a-3d, along with their proportion of the total catch. For the 1983 data (Robinson and Jamieson 1984; Sloan 1984), the proportions were calculated on the basis of weight, but this comparison alone is now felt to be less useful because of the large unit weight differences observed among the species caught. Catch by set for each vessel in each year is given in Tables 4a-4d.

There were differences in major species catch proportion (>1% of a vessel's catch in any year) among the vessels in 1986 and between the two years for the Japanese vessel (Table 5). In 1985, as in 1983, pomfret (3.6%) followed by blue shark (2.2%) were the main bycatch species of the TOMI MARU #88 and together with flying squid accounted for 97.2% of the pieces caught in 1985. In the 1986 catch of the TOMI MARU #88, blue shark (7.1%) and pomfret (3.5%) were the main bycatch species, accounting with flying squid for 98.7% of the pieces caught. In contrast, the main bycatch species for both the OCEAN PEARL and the LA PORSCHE were pomfret (2.3 and 7.4%, respectively) and blue shark(0.9 and 4.2%, respectively), accounting with flying squid for 99.0 and 97.3%, respectively, of the pieces caught. In 1986, all three vessels were fishing in the same general area with the same mesh gear, so why this difference in bycatch proportion between pomfret and blue shark exists between the Japanese vessel and the two Canadian vessels is unclear at this time.

As indicated above, all remaining species combined accounted for 0.9-2.8% of the pieces caught by any one vessel in a given year. Of these species, the most abundant were albacore and jack mackerel, which constituted 0.22-1.1% and 0.01-1.4%, respectively, of the pieces caught. Salmonids combined represented from 0.11-0.31% of the pieces caught.

In 1985, the total salmonid bycatch was 769 pieces: 294 chum (38%), 286 steelhead (37%), 138 sockeye (18%), 35 coho (5%), and 16 pink (2%). In 1986, the total salmonid bycatch for all 3 vessels combined was 749 pieces: 349 chum (47%), 225 pink (30%), 122 steelhead (16%), 37 sockeye (5%), 15 coho (2%), and 1 chinook (0.1%).

Marine mammal bycatch increased substantially in 1986 over the previous years (Table 6), with both more species and more individuals of each species caught. A total of 50 animals were entangled and killed by the gear in 1986, in contrast to 6 in 1983 and 3 in 1985. Three mammals were entangled and were released alive in 1986; they are not included in Table 6 since they were not dead.

Bird bycatch (Tables 4a and 4b) was 52 and 198 pieces for the TOMI MARU #88 in 1985 and 1986, respectively, with most of the birds caught being sooty shearwaters (23 and 67%, respectively). The two Canadian vessels combined caught 214 birds in 1986 (Tables 4c and 4d), mostly undetermined species of storm petrels (49%).

Another way of representing species catch rate is by the number or weight of individuals of a species caught per 10 km of net fished (Tables 7a and 8a). This measure of catch rate has the advantage of implying an estimate of species density in the surface waters where squid fishing is conducted. Flying squid catch rate ranged from 1168 - 1366 pieces per 10 km of net (about 1 squid per every 8 m of net) for the TOMI MARU #88 and OCEAN PEARL, and was unexpectedly low for the LA PORSCHE (675 pieces.10 km^{-1}). Salmonid catch rate ranged from 1.6-3.1 pieces.10 km^{-1}, with not much difference between the vessels or years. Major differences were between the marine mammal bycatch of the Japanese vessel between the two years, and between the Japanese vessel bycatch and that of the two Canadian vessels in 1986 (Table 6). The average Japanese vessel bycatch in 1985 was 1 mammal per 825 km of net fished while in 1986 it was 1 per 146 km of net fished. Bycatches for the OCEAN PEARL and LA PORSCHE were 1 mammal per 34 km of net fished and 59 km of net fished, respectively.

Catch per unit effort (CPUE) is also expressed as catch per 10 km of net fished per hour the net was in the water (Tables 7b and 8b). Time is the interval between the initiation of net deployment and the initiation of net haul back. Since the two rates of operation are not equal, with more time required for net haul back, this underestimates the total fishing time period of the net. However, it is assumed to generally reflect the number of nighttime hours the net is fishing, and since the squid at least are only present in surface waters during the night, it is the best measure we currently have of actual fishing duration of the gear. Results will be less meaningful for those species present in surface waters during daylight hours, but which species this includes is not entirely clear at this time.

In an evaluation of commercial potential, weight landed per kilometre of net fished is also a useful measure of relative performance. With an estimated average squid weight of 2.28 kg, CPUE was 311 $kg.km^{-1}$ in 1985, and for the TOMI MARU #88, OCEAN PEARL and LA PORSCHE in 1986, 266, 270, and 154 $kg.km^{-1}$, respectively (Table 9).

DISCUSSION

To date, there have been 4 years of experimental flying squid fishing off the Canadian west coast, spread over a 7 yr period, and although the nature of fishing has varied, with 2 yr of exploratory fishing and 2 yr of intensive fishing, squid CPUE has remained relatively constant, ranging from about 250-350 $kg.km^{-1}$ of net. Unfortunately, apart from demonstrating the wide geographical range of this species and its regular occurrence at a relatively constant density, there is little information that can be derived from these data on total squid population size. Overall level of expended effort has been low and virtually nothing is known about the specific biology of Ommastrephes bartrami in the eastern Pacific Ocean. For example, is this a distinct, largely unexploited stock or simply the eastern extremity of a large trans-Pacific stock, which may be more heavily exploited in the central Pacific? Without detailed biological study, a sustainable exploitation level from a potential regional flying squid fishery cannot be estimated. There is no evidence to suggest that allowing the current few vessels fishing squid off British Columbia to continue fishing will adversely affect future squid landings, and with current market demand and price (about \$3.30 kg^{-1}), squid fishing is still of interest to some British Columbia fishermen (B. Pearl, pers. comm.).

In the evaluation of any experimental fishery, the nature and magnitude of bycatch, if any, is a concern. There are three general categories into which bycatch species can be grouped: unexploited or underexploited species, fully exploited species, and undesirable or endangered species. Most of the bycatch of flying squid fishing falls into the first category, with the notable exceptions being salmonids, marine mammals, and birds. For the species in the first category, catches were only a small percentage of the total catch. None of the bycatch species in the first category are currently exploited by Canadian fishermen in directed fisheries and there is no evidence to date that exploitation at the current relatively low magnitude, through a bycatch, will adversely affect their population dynamics. Of the two major bycatch species, pomfret and blue shark, pomfret is a potential commercial species and should be able to be marketed. However, the problem with retention of any bycatch species is that it takes up hold space and it is often only economic to do so if the price obtained is comparable to that of the species primarily being sought. Currently, all bycatch, except salmonids, which must be retained and turned over to the Department of Fisheries and Oceans on landing, and albacore which is marketed, is discarded at sea, although the TOMI MARU #88 kept some salmon sharks.

Salmonids are fully exploited in coastal waters in the eastern Pacific by regional fishermen and so fall into the second category. Any bycatch by a squid fishery creates potential allocation, and if extensive, recruitment problems. The salmonid bycatch to date (less than 800 pieces per year) has been relatively minor in comparison to the directed commercial fisheries off Washington and British Columbia [6.5 million and 38.8 million pieces, respectively, in 1986 (L. Lapi, pers. comm.)].

Marine mammals and birds fall into the third category. None of the species involved is commercially exploited and while their exact population statuses are in most cases poorly defined, any mortality through fishing is undesirable. It is therefore important to determine the nature and the extent of this bycatch and to try to establish fishing methods that would minimize it. Bird bycatches were not recorded in previous experimental flying squid fishing summaries (Bernard 1980, 1981; Robinson and Jamieson 1984; Sloan 1984) and so no long term pattern is currently discernable. In every year in which experimental flying squid fishing was conducted off British Columbia, there was some incidental catch of marine mammals. Until 1986, the capture rate was relatively low, with less than 6 animals caught per vessel per season. In 1986, the capture rate and number of species taken increased substantially, with Dall porpoise being the most frequently caught (Table 6). Part of the reason for this increase may have been the initial inability of the Canadian vessels to haul their deployed net rapidly due to inexperience in driftnet fishing. However, the general decrease by the TOMI MARU #88 in net length required to catch a marine mammal (Table 6), assuming that Japanese fishing procedures were similar over time, suggests that overall abundance of marine mammals may have been higher in the squid fishing areas in 1986 in comparison to previous years. The marine mammal catch rate of the SIMSTAR cannot be evaluated since with only 1 mammal caught and only 97 km of net fished, data are inadequate to establish a pattern. Only further study of the bycatch issue will determine the bycatch rate that might be expected from flying squid fishing over the long term.

Marine mammals may be caught primarily through accidental entanglement as they try to eat already captured fish from the nets, rather than through simply blundering into the nets. The observers reported seeing marine mammals cruising along the length of the net and periodically taking fish from the net. On one occasion, an observer was watching a Dall porpoise do this near the ship when suddenly the porpoise became entangled. If this is a widespread occurrence, then it stresses the need to retreive the net as rapidily as possible to minimize the time it is in the water. Alternative fishing methods, such as jigging, should also be investigated to determine if flying squid can be caught economically in sufficient quantity with less bycatch.

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Table 1. Scientific and common names of all species caught during 1985 and 1986 offshore squid fisheries.

Ommastrephes bartrami	Flying Squid
Onychoteuthis borealijaponica	Nail Squid
Loligo opalescens	Opal Squid
Oncorhynchus gorbuscha	Pink Salmon
Oncorhynchus keta	Chum Salmon
Oncorhynchus kisutch	Coho Salmon
Oncorhynchus nerka	Sockeye Salmon
Oncorhynchus tshawytscha	Chinook Salmon
Salmo gairdneri	Steelhead
Prionace glauca	Blue Shark
Lamna ditropis	Salmon Shark
Alopias vulpinus	Thresher Shark
Isurus oxyrinenus	Bonito Shark
Dasyatis violacea	Pelagic Stingray
Brama japonica	Pomfret
Taractes asper	Rough Pomfret
Thunnus alalunga	Albacore
Trachurus symmetricus	Jack Mackerel
Thunnus thynnus	Bluefin Tuna
Thunnus albacares	Yellowfin Tuna
Seriola lalandi	Yellowtail
Pentaceros richardsoni	Pelagic Armourhead
Erilepis zonifer	Skilfish
Cololabis saira	Pacific Saury
Icosteus aenigmaticus	Ragfish
Mola mola	Ocean Sunfish
Alepisaurus ferox	Longnose Lancetfish
Sebastes melanops	Black Rockfish
Luvarus imperialis	Louvar
Family *Kyphosidae*	Sea Chubs
Phocoenoides dalli	Dall Porpoise
Lissodelphis borealis	Northern Right-whale Dolphin
Lagenorhynchus obliquidens	Pacific White-Sided Dolphin
Orcinus orca	Killer Whale
Globicephala macrorynchus	Short-finned Pilot Whale
Ziphius cavirostris	Cuvier's Beaked Whale
Callorhinus ursinus	Northern Fur Seal
Family *Diomedeidae*	Albatrosses
Family *Procellariidae*	Fulmars, Petrels and Shearwaters
Fulmarus glacialis	Northern Fulmar
Puffinus tenuirostris	Slender-billed Shearwater
Puffinus griseus	Sooty Shearwater
Puffinus creatopus	Pink-footed Shearwater

Table 1 (cont'd)

Family *Oceanitidae*	Storm-petrels
Family *Alcidae*	Murres, Murrelets, Aukletes and Puffins
Uria aagle	Common Murre
Ptychoramphus aleuticus	Cassin's Auklette
Cerorhinca monocerata	Rhinoceros Auklette
Synthliboramphus antiquus	Ancient Murrelet
Subfamily *Sterninae*	Terns

Table 2. Estimated average weights and measured average weights (in kilograms) for all species. T.M. = TOMI MARU No.88, O.P. = OCEAN PEARL, L.P. = LA PORSCHE, number = year (e.g.85 = 1985).

COMMON NAME	AVERAGE WEIGHT (kg) ESTIMATED	MEASURED			
		T.M.85	T.M.86	O.P.86	L.P.86
Flying Squid	2.28	-	-	2.24	-
Nail Squid	1.50	-	-	-	-
Opal Squid	0.11	-	-	-	-
Pink Salmon	1.08	1.85	1.08	-	-
Chum Salmon	2.31	2.99	2.31	-	-
Coho Salmon	2.25	3.06	2.25	-	-
Sockeye Salmon	1.39	2.09	1.39	-	-
Chinook Salmon	6.00	-	6.00	-	-
Steelhead	1.96	3.17	1.96	-	-
Bonito Shark	36.00	-	-	-	-
Blue Shark	4.99	8.13	4.99	-	-
Salmon Shark	24.88	28.92	24.90	-	-
Thresher Shark	260.00	-	260.00	-	-
Pelagic Stingray	1.00	2.00	-	-	-
Pomfret	2.34	2.34	-	-	-
Rough Pomfret	2.34	-	-	-	-
Albacore	5.74	6.16	5.74	-	-
Jack Mackerel	2.40	2.40	-	-	-
Bluefin Tuna	3.50	7.25	3.50	-	-
Yellowfin Tuna	1.29	-	1.29	-	-
Yellowtail	4.00	7.14	-	-	-
Pelagic Armourhead	0.37	-	0.52	-	-
Skilfish	0.50	-	0.50	-	-
Pacific Saury	0.07	-	-	-	-
Ragfish	45.00	-	45.00	-	-
Ocean Sunfish	28.00	4.90	28.00	-	-
Longnose Lancetfish	2.00	2.00	2.00	-	-
Black Rockfish	1.00	-	-	-	-
Louvar	15.00	-	-	-	-
Sea Chubs	-	-	1.00	-	-
Dall Porpoise	148.00	-	-	-	-
Northern Right-whale Dolphin	182.00	-	-	-	-
Pacific White-Sided Dolphin	136.00	-	-	-	-
Killer Whale	2727.00	-	-	-	-
Short-finned Pilot Whale	2283.00	-	-	-	-

Table 2 (cont'd)

COMMON NAME	AVERAGE WEIGHT (kg) ESTIMATED	MEASURED			
		T.M.85	T.M.86	O.P.86	L.P.86
Cuvier's Beaked Whale	4000.00	-	-	-	-
Northern Fur Seal	34.00	-	-	-	-
Albatrosses	5.00	-	-	-	-
Fulmars, Petrels and Shearwaters	0.50	-	-	-	-
Northern Fulmar	0.25	-	-	-	-
Slender-billed Shearwater	0.74	-	-	-	-
Sooty Shearwater	0.74	-	-	-	-
Pink-footed Shearwater	0.74	-	-	-	-
Storm-petrels	0.10	-	-	-	-
Murres, Murrelets, Aukletes and Puffins	0.40	-	-	-	-
Common Murre	0.90	-	-	-	-
Cassin's Auklette	0.20	-	-	-	-
Rhinoceros Auklette	0.26	-	-	-	-
Ancient Murrelet	0.40	-	-	-	-
Terns	0.20	-	-	-	-

Table 3a. Total catch by species and the proportion of the total catch represented by each species for the 1985 TOMI MARU No. 88 offshore squid cruise (* = estimated; 0.00 = rounded number <0.01).

SPECIES	KG	PERCENT	PIECES	PERCENT
Flying squid	771130.	83.66	338188.*	91.43
Pomfret	30872.	3.35	13145.*	3.55
Rough pomfret	20.*	0.00	9.	0.00
Pink salmon	29.*	0.00	16.	0.00
Chum salmon	879.*	0.10	294.	0.08
Coho salmon	107.*	0.01	35.	0.01
Sockeye salmon	288.*	0.03	138.	0.04
Steelhead	905.*	0.10	286.	0.08
Pelagic armourhead	7.*	0.00	35.	0.01
Jack mackerel	12378.	1.34	5149.	1.39
Bluefin tuna	36.*	0.00	5.	0.00
Yellowtail	57.*	0.01	8.	0.00
Ocean sunfish	57.*	0.01	12.	0.00
Albacore	23216.*	2.52	3769.	1.02
Long nose lancetfish	2.	0.00	1.	0.00
Louvar	60.*	0.01	4.	0.00
Salmon shark	14229.	1.54	492.	0.13
Blue shark	67082.	7.28	8249.	2.23
Pelagic stingray	2.	0.00	1.	0.00
Pacific white-sided dolphin	136.*	0.01	1.	0.00
Dall porpoise	148.*	0.02	1.	0.00
Fur seal	34.*	0.00	1.	0.00
Black-footed albatross	10.*	0.00	2.	0.00
Family Procellariidae	1.*	0.00	5.	0.00
Slender-billed shearwater	15.*	0.00	29.	0.01
Sooty shearwater	4.*	0.00	12.	0.00
Ancient murrelet	0.*	0.00	2.	0.00
Rhinoceros auklette	0.*	0.00	2.	0.00
TOTAL KG		921 704		
TOTAL PIECES		369 891		
NUMBER OF SPECIES PRESENT		28		

Table 3b. Total catch by species and the proportion of the total catch represented by each species for the 1986 TOMI MARU No. 88 offshore squid cruise (* = estimated; 0.00 = rounded number <0.01).

SPECIES	KG	PERCENT	PIECES	PERCENT
Flying squid	853300.	79.05	374221.*	88.01
Opal squid	0.*	0.00	1.	0.00
Pomfret	35159.	3.26	14990.*	3.53
Pink salmon	155.	0.01	143.	0.03
Chum salmon	504.	0.05	218.	0.05
Coho salmon	27.	0.00	12.	0.00
Sockeye salmon	39.	0.00	28.	0.01
Chinook salmon	6.	0.00	1.	0.00
Steelhead	192.	0.02	98.	0.02
Sea chubs	5.*	0.00	5.	0.00
Yellowfin tuna	53.	0.00	41.	0.01
Ragfish	135.	0.01	3.	0.00
Black rockfish	1.*	0.00	1.	0.00
Skilfish	11.*	0.00	26.	0.01
Saury	0.*	0.00	14.	0.00
Pelagic armourhead	68.*	0.01	144.	0.03
Jack mackerel	7445.*	0.69	3092.*	0.73
Bluefin tuna	7.	0.00	2.	0.00
Ocean sunfish	140.	0.01	5.	0.00
Albacore	5315.	0.49	926.	0.22
Long nose lancetfish	2.	0.00	1.	0.00
Thresher shark	1300.	0.12	5.	0.00
Salmon shark	16758.	1.55	673.	0.16
Blue shark	151383.	14.02	30324.	7.13
Northern right-whale dolphin	364.*	0.03	2.	0.00
Dall porpoise	2812.*	0.26	19.	0.00
Cuvier's beaked whale	4000.	0.37	1.	0.00
Albatross	5.*	0.00	1.	0.00
Northern fulmar	1.*	0.00	4.	0.00
Sooty shearwater	74.*	0.01	133.	0.03
Murres,auklettes and puffins	0.*	0.00	1.	0.00
Common murre	0.*	0.00	1.	0.00
Cassin's auklet	0.*	0.00	1.	0.00
Rhinoceros auklet	13.*	0.00	57.	0.01

Table 3b (cont'd)

TOTAL KG	1 079 424
TOTAL PIECES	425 195
NUMBER OF SPECIES PRESENT	36

* = estimated

Table 3c. Total catch by species and the proportion of the total catch represented by each species for the 1986 OCEAN PEARL offshore squid cruise (* = estimated; 0.00 = rounded number <0.01).

SPECIES	KG	PERCENT	PIECES	PERCENT
Flying squid	203013.	84.95	90732.*	95.88
Nail squid	6.*	0.00	5.	0.01
Pomfret	5037.*	2.11	2159.*	2.28
Pink salmon	64.*	0.03	64.	0.07
Chum salmon	185.*	0.08	84.	0.09
Coho salmon	6.*	0.00	3.	0.00
Sockeye salmon	1.*	0.00	1.	0.00
Steelhead	13.*	0.01	11.	0.01
Ragfish	45.*	0.02	1.	0.00
Skilfish	2.*	0.00	9.	0.01
Saury	0.*	0.00	1.	0.00
Pelagic armourhead	39.*	0.02	114.	0.12
Jack mackerel	53.*	0.02	24.	0.03
Ocean sunfish	112.*	0.05	4.	0.00
Albacore	1806.*	0.76	316.	0.33
Long nose lancetfish	8.*	0.00	4.	0.00
Thresher shark	520.*	0.22	2.	0.00
Salmon shark	5088.*	2.13	205.	0.22
Blue shark	4189.*	1.75	844.	0.89
Northern right-whale dolphin	182.*	0.08	1.	0.00
Pacific white-sided dolphin	408.*	0.17	3.	0.00
Killer whale	5454.*	2.28	2.	0.00
Short-finned pilot whale	11415.*	4.78	5.	0.01
Dall porpoise	1332.*	0.56	9.	0.01
Unidentified mammals	-	-	2.	0.00
Albatross	5.*	0.00	1.	0.00
Pinkfooted shearwater	1.*	0.00	5.	0.01
Slender-billed shearwater	0.*	0.00	3.	0.00
Sooty shearwater	3.*	0.00	7.	0.01
Oceanitidae	0.*	0.00	3.	0.00
Cassin's auklet	0.*	0.00	7.	0.01
Rhinoceros auklet	0.*	0.00	3.	0.00
TOTAL KG		238 987		
TOTAL PIECES		94 634		
NUMBER OF SPECIES PRESENT		31		

Table 3d. Total catch by species and the proportion of the total catch represented by each species for the 1986 LA PORSCHE offshore squid cruise (* = estimated; 0.00 = rounded number <0.01).

SPECIES	KG	PERCENT	PIECES	PERCENT
Flying squid	54214.	77.21	23785.*	85.61
Pomfret	4830.	6.88	2069.*	7.45
Pink salmon	18.*	0.03	18.	0.06
Chum salmon	103.*	0.15	47.	0.17
Sockeye salmon	10.*	0.01	8.	0.03
Steelhead	17.*	0.02	13.	0.05
Skilfish	12.*	0.02	27.	0.10
Saury	0.*	0.00	10.	0.04
Black rockfish	3.*	0.00	3.	0.01
Pelagic armourhead	10.*	0.01	36.	0.13
Jack mackerel	8.*	0.01	4.	0.01
Yellowtail	4.*	0.01	1.	0.00
Albacore	1720.*	2.45	301.	1.08
Salmon shark	2497.*	3.56	101.	0.36
Blue shark	5819.*	8.29	1170.	4.21
Northern right-whale dolphin	182.*	0.26	1.	0.00
Dall porpoise	740.*	1.05	5.	0.02
Albatross	5.*	0.01	1.	0.00
Pinkfooted shearwater	0.*	0.00	1.	0.00
Sooty shearwater	18.*	0.03	36.	0.13
Oceanitidae	5.*	0.01	104.	0.37
Terns	0.*	0.00	12.	0.04
Murres,auklettes and puffins	0.*	0.00	1.	0.00
Rhinoceros auklet	5.*	0.01	30.	0.11
TOTAL KG		70 220		
TOTAL PIECES		27 784		
NUMBER OF SPECIES PRESENT		24		

Table 4a. Bridge log information and catch, in pieces, for each night's fishing (set) by the TOMI MARU NO.88 in 1985. * = estimated, LST = Local Standard Time.

Table 4a.

SET NO.	1	2	3	4	5	6
DATE	JULY 5	JULY 6	JULY 7	JULY 8	JULY 9	JULY 10
TIME START (LST)	1800	1700	1740	1745	1705	1700
DURATION(HR.MIN)	9.45	10.45	10.05	10.00	10.40	10.45
START N. LAT. (DEG)	47	47	47	47	46	47
(MIN)	6.0	8.0	35.0	31.0	57.0	30.0
W. LONG. (DEG)	128	128	127	127	129	128
(MIN)	51.0	31.0	35.0	50.0	04.0	36.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	47	47	47	47	46	47
(MIN)	22.0	26.0	18.0	45.0	41.0	48.0
W.LONG. (DEG)	128	127	128	127	129	128
(MIN)	12.0	56.0	12.0	16.0	37.0	01.0
LENGTH OF SET KM.	48.8	48.8	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.6	15.4	15.8	15.8	15.1	15.5
END TEMP.(DEG.C)	14.8	15.4	15.8	15.9	15.0	15.6
NO. OF NET GROUPS	8	8	8	8	8	8
TOTAL SQUID (KG)	8560	11174	15388	10021	1730	4213

Table 4a (cont'd)

SET NO.	1	2	3	4	5	6
DATE	JULY 5	JULY 6	JULY 7	JULY 8	JULY 9	JULY 10
CATCH TOTAL (KG)	12560	13801	18001	10800	4963	8094
CATCH TOTAL (PIECES)	5328	5870	7854	4608	1386	3057
INVERTEBRATES						
FLYING SQUID	3754*	4900*	6749*	4395*	758*	1847*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	1480*	850*	1040*	131*	175*	1010*
PINK SALMON	1	..	..	..	..	1
CHUM SALMON	4	5	8	4	1	18
COHO SALMON	1	..	1	..	..	6
SOCKEYE SALMON	5	65	9	4	3	18
STEELHEAD	27	..	41	19	4	28
PEL. ARMOURHEAD	1	..	..	..	1	2
JACK MACKEREL	..	..	..	..	30	..
OCEAN SUNFISH	..	..	1	..	..	1
ALBACORE	..	..	..	..	..	..
OTHERS	..	..	..	1	..	..
SELACHI						
SALMON SHARK	11	8	..	5	24	22
BLUE SHARK	39	41	..	45	390	102
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	5	1	5	4	..	2
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	7	8	9	10	11	12
DATE	JULY 11	JULY 12	JULY 13	JULY 14	JULY 15	JULY 16
TIME START (LST)	1700	1655	1645	1655	1710	1755
DURATION(HR.MIN)	10.45	10.50	11.00	10.50	10.35	9.50
START N. LAT. (DEG)	47	46	46	46	46	46
(MIN)	59.0	45.0	23.0	40.0	35.0	33.0
W. LONG. (DEG)	129	130	131	131	131	131
(MIN)	32.0	38.0	29.0	08.0	05.0	05.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	48	46	46	46	46	46
(MIN)	5.0	43.0	21.0	32.0	28.0	28.0
W.LONG. (DEG)	129	131	130	130	130	13D
(MIN)	06.0	18.0	49.0	29.0	36.0	37.0
LENGTH OF SET KM.	30.5	48.8	48.8	48.8	36.6	36.6
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.9	15.0	15.6	15.6	15.7	15.7
END TEMP.(DEG.C)	15.6	14.7	15.2	15.3	15.6	15.5
NO. OF NET GROUPS	5	8	8	8	6	6
TOTAL SQUID (KG)	1926	9445	9704	21286	26147	21741

Table 4a (cont'd)

SET NO.	7	8	9	10	11	12
DATE	JULY 11	JULY 12	JULY 13	JULY 14	JULY 15	JULY 16
CATCH TOTAL (KG)	4932	11806	10863	23866	28601	23708
CATCH TOTAL (PIECES)	1826	4691	4443	9538	11858	9928
INVERTEBRATES						
FLYING SQUID	844*	4142*	4256*	9335*	11467*	9535*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	864*	131*	58*	29*	29*	..
PINK SALMON	..	..	..	..	..	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	..	..	1	..	..
SOCKEYE SALMON	15	..	..	3	..	..
STEELHEAD	16	4	..	..	..	..
PEL. ARMOURHEAD	1	6	5	9	1	..
JACK MACKEREL	..	310	..	..	210	290
OCEAN SUNFISH	1	..	1	1	..	..
ALBACORE	..	..	..	..	..	..
OTHERS	1	2	11	5	..	1
SELACHI						
SALMON SHARK	12	12	3	11	10	3
BLUE SHARK	72	80	107	140	135	97
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	..	4	2	4	6	2
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	13	14	15	16	17	18
DATE	JULY 17	JULY 18	JULY 19	JULY 20	JULY 21	JULY 22
TIME START (LST)	1730	1650	1740	1855	1845	1655
DURATION(HR.MIN)	10.15	10.55	10.05	8.50	9.00	10.50
START N. LAT. (DEG)	46	46	46	46	47	47
(MIN)	38.0	32.0	54.0	21.0	18.0	35.0
W. LONG. (DEG)	131	131	131	130	130	130
(MIN)	07.0	07.0	28.0	57.0	23.0	48.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	46	46	46	46	47	47
(MIN)	31.0	16.0	39.0	9.0	29.0	32.0
W.LONG. (DEG)	130	130	130	130	130	130
(MIN)	38.0	34.0	52.0	21.0	59.0	06.0
LENGTH OF SET KM.	36.6	48.8	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.2	14.9	15.3	15.1	15.4
END TEMP.(DEG.C)	15.2	15.1	14.9	15.3	15.0	15.6
NO. OF NET GROUPS	6	8	8	8	8	8
TOTAL SQUID (KG)	7019	18698	9384	9509	20382	29374

Table 4a (cont'd)

SET NO.	13	14	15	16	17	18
DATE	JULY 17	JULY 18	JULY 19	JULY 20	JULY 21	JULY 22
CATCH TOTAL (KG)	9535	23024	13998	13154	23343	31493
CATCH TOTAL (PIECES)	3685	9232	5633	5330	9478	13102
INVERTEBRATES						
FLYING SQUID	3078*	8200*	4115*	4170*	8939*	12883*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	29*	..	72*	43*	29*	43*
PINK SALMON	..	..	..	..	1	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	1	..	..	..	4	1
SOCKEYE SALMON	..	..	3	..	2	1
STEELHEAD	1	3	7	2	8	2
PEL. ARMOURHEAD	..	..	2	..	3	2
JACK MACKEREL	470	876	1308	1020	372	36
OCEAN SUNFISH	..	1	..	..	1	..
ALBACORE	..	1	10	11	11	2
OTHERS	..	..	2	..	1	..
SELACHI						
SALMON SHARK	4	6	5	8	10	11
BLUE SHARK	102	140	109	76	97	118
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	1
BIRDS						
OTHERS	..	5	..	..	..	2
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	19	20	21	22	23	24
DATE	JULY 23	JULY 24	JULY 25	JULY 26	JULY 27	JULY 28
TIME START (LST)	1945	1655	1710	1715	1725	1800
DURATION(HR.MIN)	8.00	10.50	10.35	10.30	10.20	9.45
START N. LAT. (DEG)	47	47	47	47	47	47
(MIN)	37.0	42.0	50.0	45.0	40.0	59.0
W. LONG. (DEG)	130	130	130	130	130	131
(MIN)	31.0	22.0	10.0	30.0	30.0	13.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	47	47	47	47	47	47
(MIN)	33.0	40.0	34.0	34.0	28.0	46.0
W.LONG. (DEG)	129	129	129	129	129	130
(MIN)	51.0	51.0	36.0	53.0	53.0	37.0
LENGTH OF SET KM.	48.8	36.6	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.5	15.8	15.6	15.6	15.6	15.5
END TEMP.(DEG.C)	15.5	15.7	15.8	15.7	15.6	15.5
NO. OF NET GROUPS	8	8	8	8	8	8
TOTAL SQUID (KG)	22775	19732	9996	13976	5950	10063

Table 4a (cont'd)

SET NO.	19	20	21	22	23	24
DATE	JULY 23	JULY 24	JULY 25	JULY 26	JULY 27	JULY 28
CATCH TOTAL (KG)	24225	20869	11063	15462	7180	11300
CATCH TOTAL (PIECES)	10159	8757	4516	6405	2785	4574
INVERTEBRATES						
FLYING SQUID	9989*	8654*	4384*	6129*	2609*	4413*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	40*	34*	68*	110*	51*	85*
PINK SALMON	..	..	..	..	..	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	..	2	..	..	..
SOCKEYE SALMON	2	..	2	3	..	..
STEELHEAD	3	..	8	3	..	7
PEL. ARMOURHEAD	2	..	..	..	..	..
JACK MACKEREL	12	12	12	60	58	24
OCEAN SUNFISH	1	..	..	1	..	..
ALBACORE	1	..	..	2	..	..
OTHERS	..	..	2	..	..	..
SELACHI						
SALMON SHARK	6	7	10	9	9	6
BLUE SHARK	98	49	28	86	58	39
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	1	..	..	..	..
BIRDS						
OTHERS	5	..	..	2	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	25	26	27	28	29	30
DATE	JULY 29	JULY 31	AUG. 1	AUG. 2	AUG. 4	AUG. 5
TIME START (LST)	1710	1710	1715	1710	2030	2045
DURATION(HR.MIN)	10.35	10.35	10.30	45.08	7.15	7.00
START N. LAT. (DEG)	48	48	48	48	48	48
(MIN)	3.0	13.0	23.0	22.0	23.0	29.0
W. LONG. (DEG)	130	130	130	130	130	129
(MIN)	54.0	44.0	18.0	25.0	00.0	30.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	47	48	48	48	48	48
(MIN)	57.0	..	11.0	17.0	22.0	29.0
W.LONG. (DEG)	130	130	130	129	129	129
(MIN)	14.0	08.0	54.0	42.0	27.0	56.0
LENGTH OF SET KM.	48.8	48.8	48.8	48.8	30.0	30.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.5	15.1	15.0	15.3	15.7	15.5
END TEMP.(DEG.C)	15.5	15.2	15.2	15.5	15.7	15.5
NO. OF NET GROUPS	8	8	8	8	5	5
TOTAL SQUID (KG)	13264	9506	11629	65411	32574	30908

Table 4a (cont'd)

SET NO.	25	26	27	28	29	30
DATE	JULY 29	JULY 31	AUG. 1	AUG. 2	AUG. 4	AUG. 5
CATCH TOTAL (KG)	15046	11902	14870	67497	37018	35108
CATCH TOTAL (PIECES)	6092	4501	6294	29061	14818	14179
INVERTEBRATES						
FLYING SQUID	5817*	4169*	5100*	28689*	14286*	13556*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	170*	179*	1023*	179*	187*	187*
PINK SALMON	3	..	..	..	..	..
CHUM SALMON	1	1	..	..	..	..
COHO SALMON	1	..	2	..	..	..
SOCKEYE SALMON	..	2	..	..	..	..
STEELHEAD	1	22	4	2	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	25	12	12	..	..	..
OCEAN SUNFISH	..	1	..	..	..	..
ALBACORE	..	..	16	..	..	..
OTHERS	..	..	1	..	..	..
SELACHI						
SALMON SHARK	12	17	16	11	19	16
BLUE SHARK	62	98	120	180	326	420
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	31	32	33	34	35	36
DATE	AUG. 6	AUG. 7	AUG. 8	AUG. 9	AUG. 10	AUG. 13
TIME START (LST)	1925	2010	1805	1910	2040	1840
DURATION(HR.MIN)	8.20	7.35	9.40	8.35	7.05	9.05
START N. LAT. (DEG)	48	48	48	48	48	48
(MIN)	33.0	29.0	20.0	33.0	39.0	58.0
W. LONG. (DEG)	129	129	129	129	129	130
(MIN)	29.0	35.0	36.0	36.0	40.0	40.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	48	48	48	48	48	48
(MIN)	34.0	21.0	22.0	27.0	35.0	34.0
W.LONG. (DEG)	129	129	129	129	129	129
(MIN)	49.0	10.0	01.0	21.0	30.0	41.0
LENGTH OF SET KM.	24.0	36.6	36.0	18.0	12.0	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.6	15.5	15.6	15.3	15.1	14.9
END TEMP.(DEG.C)	15.4	16.0	16.0	15.4	15.6	14.9
NO. OF NET GROUPS	4	6	6	3	2	8
TOTAL SQUID (KG)	19700	28883	21693	1866	1503	14376

Table 4a (cont'd)

SET NO.	31	32	33	34	35	36
DATE	AUG. 6	AUG. 7	AUG. 8	AUG. 9	AUG. 10	AUG. 13
CATCH TOTAL (KG)	22270	31792	24502	2422	1809	15569
CATCH TOTAL (PIECES)	9025	13000	9892	906	700	6461
INVERTEBRATES						
FLYING SQUID	8640*	12667*	9514*	818*	659*	6305*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	136*	38*	51*	34*	17*	76*
PINK SALMON	..	..	..	..	..	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	..	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	..	1	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
OCEAN SUNFISH	..	..	..	..	..	1
ALBACORE	48	72	..	9	4	6
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	9	12	6	2	2	5
BLUE SHARK	192	211	320	43	18	68
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	37	38	39	40	41	42
DATE	AUG. 14	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19
TIME START (LST)	2045	1720	2120	1740	1715	1740
DURATION(HR.MIN)	7.00	10.25	6.25	10.05	10.30	10.05
START N. LAT. (DEG)	48	48	48	49	49	49
(MIN)	47.0	37.0	57.0	20.0	26.0	32.0
W. LONG. (DEG)	129	130	130	131	131	131
(MIN)	51.0	00.0	29.0	33.0	39.0	38.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	49	48	49	49	49	49
(MIN)	..	22.0	9.0	11.0	17.0	22.0
W.LONG. (DEG)	129	129	131	130	130	130
(MIN)	50.0	33.0	00.0	54.0	59.0	58.0
LENGTH OF SET KM.	28.0	48.8	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.9	14.9	15.0	14.9	14.7	15.0
END TEMP.(DEG.C)	14.9	15.6	14.9	14.9	15.1	15.2
NO. OF NET GROUPS	4	8	8	8	8	7
TOTAL SQUID (KG)	2911	11924	12033	19378	20649	21564

Table 4a (cont'd)

SET NO.	37	38	39	40	41	42
DATE	AUG. 14	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19
CATCH TOTAL (KG)	4960	16352	15376	22303	22798	23784
CATCH TOTAL (PIECES)	1609	6014	5890	9093	9389	9803
INVERTEBRATES						
FLYING SQUID	1276*	5229*	5277*	8499*	9056*	9457*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	136*	264*	230*	302*	51*	..
PINK SALMON	..	..	..	..	1	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	3	4	1	1	..
SOCKEYE SALMON	..	..	1	..	..	..
STEELHEAD	13	7	16	6	11	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
OCEAN SUNFISH	..	..	..	..	..	..
ALBACORE	6	185	76	36	138	..
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	4	6	6	6	5	6
BLUE SHARK	174	320	280	243	126	340
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	43	44	45	46	47	48
DATE	AUG. 20	AUG. 21	AUG. 22	AUG. 25	AUG. 26	AUG. 27
TIME START (LST)	1720	1705	1740	1700	1715	1700
DURATION(HR.MIN)	10.25	10.40	10.05	10.45	10.30	10.45
START N. LAT. (DEG)	49	49	49	49	49	50
(MIN)	37.0	48.0	28.0	51.0	57.0	5.0
W. LONG. (DEG)	131	131	131	133	132	132
(MIN)	43.0	50.0	10.0	05.0	02.0	00.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	49	49	49	49	49	50
(MIN)	39.0	47.0	22.0	39.0	51.0	5.0
W.LONG. (DEG)	131	131	130	132	131	131
(MIN)	01.0	09.0	31.0	27.0	21.0	19.0
LENGTH OF SET KM.	48.8	48.8	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.2	15.5	15.4	15.1	15.0
END TEMP.(DEG.C)	15.2	15.4	15.5	15.5	15.2	14.6
NO. OF NET GROUPS	7	7	7	7	7	7
TOTAL SQUID (KG)	11140	11562	11872	7472	9898	7278

Table 4a (cont'd)

SET NO.	43	44	45	46	47	48
DATE	AUG. 20	AUG. 21	AUG. 22	AUG. 25	AUG. 26	AUG. 27
CATCH TOTAL (KG)	14206	16792	15881	13126	18616	10185
CATCH TOTAL (PIECES)	5403	5872	5852	4656	6447	3628
INVERTEBRATES						
FLYING SQUID	4885*	5071*	5207*	3277*	4341*	3192*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	38*	179*	51*	682*	981	46*
PINK SALMON	..	2	..	..	1	2
CHUM SALMON	3	8	4	6	13	9
COHO SALMON	3	..	..	2	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	1	4	5	2	3	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
OCEAN SUNFISH	..	..	..	..	..	..
ALBACORE	108	304	285	494	951	258
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	5	9	2	6	6	10
BLUE SHARK	360	295	298	186	150	110
OTHERS	..	..	..	1	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	..	..	..	..	1	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	49	50	51	52	53	54
DATE	AUG. 28	AUG. 29	AUG. 31	SEPT. 1	SEPT. 2	SEPT. 3
TIME START (LST)	1725	2035	1705	1730	1705	1735
DURATION(HR.MIN)	10.20	7.10	10.40	10.15	10.40	10.10
START N. LAT. (DEG)	50	48	51	52	52	52
(MIN)	24.0	24.0	12.0	7.0	30.0	32.0
W. LONG. (DEG)	130	130	133	134	135	134
(MIN)	56.0	06.0	47.0	51.0	20.0	34.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	50	48	51	52	52	52
(MIN)	31.0	25.0	5.0	16.0	26.0	36.0
W.LONG. (DEG)	130	129	133	135	134	135
(MIN)	29.0	25.0	26.0	31.0	37.0	14.0
LENGTH OF SET KM.	34.0	48.8	48.8	48.8	48.8	48.8
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.6	15.4	15.3	15.3	14.7	14.5
END TEMP.(DEG.C)	14.0	15.4	15.2	15.1	14.9	14.8
NO. OF NET GROUPS	5	7	7	7	7	7
TOTAL SQUID (KG)	225	4639	5764	12260	18067	3691

Table 4a (cont'd)

SET NO.	49	50	51	52	53	54
DATE	AUG. 28	AUG. 29	AUG. 31	SEPT. 1	SEPT. 2	SEPT. 3
CATCH TOTAL (KG)	893	7057	8300	15616	20740	5847
CATCH TOTAL (PIECES)	200	2526	3143	6061	8540	2052
INVERTEBRATES						
FLYING SQUID	98*	2034*	2528*	5377*	7924*	1618*
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	..	179*	213*	298*	285*	221*
PINK SALMON	..	..	2	..	2	..
CHUM SALMON	14	..	14	15	69	38
COHO SALMON	..	..	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	1	2	..	1	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
OCEAN SUNFISH	..	..	..	..	..	..
ALBACORE	..	141	265	175	103	36
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	7	1	9	16	16	19
BLUE SHARK	80	170	110	180	140	120
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
OTHERS	1	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4a (cont'd)

SET NO.	55	56
DATE	SEPT. 4	SEPT. 6
TIME START (LST)	1730	1700
DURATION(HR.MIN)	10.15	10.45
START N. LAT. (DEG)	52	48
(MIN)	25.0	40.0
W. LONG. (DEG)	134	133
(MIN)	58.0	38.0
DIRECTION (DEG.TRUE)	-	-
FINISH N. LAT. (DEG)	52	49
(MIN)	36.0	1.0
W.LONG. (DEG)	135	133
(MIN)	34.0	27.0
LENGTH OF SET KM.	48.8	48.8
DEPTH (M)	0- 10	0- 10
START TEMP.(DEG.C)	14.5	15.4
END TEMP.(DEG.C)	14.5	15.2
NO. OF NET GROUPS	7	7
TOTAL SQUID (KG)	7044	2253

Table 4a (cont'd)

SET NO.	55	56
DATE	SEPT. 4	SEPT. 6
CATCH TOTAL (KG)	8125	4301
CATCH TOTAL (PIECES)	3282	1459
INVERTEBRATES		
FLYING SQUID	3089*	988*
OTHERS	..	..
FISH		
POMFRET	..	311*
PINK SALMON	..	..
CHUM SALMON	57	2
COHO SALMON	..	1
SOCKEYE SALMON	..	..
STEELHEAD	1	..
PEL. ARMOURHEAD	..	..
JACK MACKEREL	..	..
OCEAN SUNFISH	..	1
ALBACORE	..	15
OTHERS	..	..
SELACHI		
SALMON SHARK	4	10
BLUE SHARK	131	130
OTHERS	..	..
MAMMALS		
OTHERS	..	1
BIRDS		
OTHERS	..	..
TURTLES		
OTHERS	..	..

Table 4b. Bridge log information and catch, in pieces, for each night's fishing (set) by the TOMI MARU NO.88 in 1986. * = estimated, LST = Local Standard Time.

SET NO.	1	2	3	4	5	6
DATE	JUNE 24	JUNE 26	JUNE 27	JUNE 28	JUNE 29	JUNE 30
TIME START (LST)	1800	1650	2005	1630	1730	1910
DURATION(HR.MIN)	10.00	10.40	7.25	11.00	10.00	8.20
START N. LAT. (DEG)	46	42	44	44	44	44
(MIN)	54.5	41.0	16.8	36.1	30.6	32.7
W. LONG. (DEG)	129	130	131	131	130	130
(MIN)	11.5	53.7	09.9	09.1	44.7	01.5
DIRECTION (DEG.TRUE)	55	142	50	110	90	270
FINISH N. LAT. (DEG)	47	42	44	44	44	44
(MIN)	9.4	16.7	28.3	26.1	30.2	33.2
W.LONG. (DEG)	128	130	130	130	130	130
(MIN)	38.8	27.7	51.4	26.9	00.0	35.1
LENGTH OF SET KM.	42.0	49.0	30.0	52.5	52.5	45.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	13.8	14.9	14.5	14.3	14.6	14.5
END TEMP.(DEG.C)	14.3	14.9	14.3	14.4	14.5	14.6
NO. OF NET GROUPS	6	7	4	7	7	6
TOTAL SQUID (KG)	192	834	5709	18988	30857	29477

Table 4b (cont'd)

SET NO.	1	2	3	4	5	6
DATE	JUNE 24	JUNE 26	JUNE 27	JUNE 28	JUNE 29	JUNE 30
CATCH TOTAL (KG)	1227	6357	6592	21958	33737	32319
CATCH TOTAL (PIECES)	312	2312	2800	9164	14374	13800
INVERTEBRATES						
FLYING SQUID	84*	365*	2503*	8328*	13533*	12928*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	2	..
SKILFISH	..	..	..	..	..	..
POMFRET	158*	105*	65*	396*	192*	350*
PINK SALMON	3	..	..	..	..	..
CHUM SALMON	15	..	..	..	..	..
COHO SALMON	1	..	..	..	..	..
SOCKEYE SALMON	2	..	..	..	..	..
STEELHEAD	4	..	..	..	..	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	1	..	..	..	..	..
JACK MACKEREL	..	814*	94*	94*	155*	95*
ALBACORE	..	41	2	9	5	30
OTHERS	3	1	2	..	..	2
SELACHI						
SALMON SHARK	12	4	7	9	7	5
BLUE SHARK	18	980	126	326	480	390
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	2	..	..	..	..	..
BIRDS						
SOOTY SHEARWATER	9	1	1	2	..	..
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	7	8	9	10	11	12
DATE	JULY 1	JULY 2	JULY 4	JULY 5	JULY 6	JULY 7
TIME START (LST)	1825	1730	1640	1645	1630	2000
DURATION(HR.MIN)	10.05	10.50	10.35	10.30	10.45	7.50
START N. LAT. (DEG)	44	44	44	45	44	46
(MIN)	36.5	38.6	55.0	20.7	34.3	10.4
W. LONG. (DEG)	130	130	130	131	130	131
(MIN)	28.0	22.8	30.1	04.4	35.7	08.8
DIRECTION (DEG.TRUE)	90	90	110	90	90	90
FINISH N. LAT. (DEG)	44	44	44	45	44	46
(MIN)	36.4	39.2	42.2	20.8	33.2	10.6
W.LONG. (DEG)	129	129	129	130	129	130
(MIN)	57.0	51.5	50.2	21.7	50.3	24.0
LENGTH OF SET KM.	37.5	37.5	52.5	52.5	52.5	52.5
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.7	14.6	14.1	14.5	14.8	14.0
END TEMP.(DEG.C)	14.8	14.6	14.1	14.2	14.6	14.4
NO. OF NET GROUPS	5	5	7	7	7	7
TOTAL SQUID (KG)	28547	26590	8339	962	1507	5228

Table 4b (cont'd)

SET NO.	7	8	9	10	11	12
DATE	JULY 1	JULY 2	JULY 4	JULY 5	JULY 6	JULY 7
CATCH TOTAL (KG)	31043	28891	12113	3611	7363	10851
CATCH TOTAL (PIECES)	13169	12339	4736	1300	2156	3881
INVERTEBRATES						
FLYING SQUID	12520*	11662*	3657*	421*	660*	2292*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	5	1	1	..	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	111*	81*	269*	25*	136*	111*
PINK SALMON	..	..	..	..	..	1
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	..	..	..	1	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	..	..	..	..	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	1	1	5
JACK MACKEREL	62*	208*	127*	129*	58*	472*
ALBACORE	14	3	72	10	42	4
OTHERS	..	..	..	..	1	..
SELACHI						
SALMON SHARK	3	4	5	8	7	9
BLUE SHARK	453	380	604	705	1250	986
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	1	..	..	..	..	1
BIRDS						
SOOTY SHEARWATER	..	..	1	1	..	..
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	13	14	15	16	17	18
DATE	JULY 8	JULY 9	JULY 10	JULY 11	JULY 12	JULY 13
TIME START (LST)	1635	2015	1700	1645	1750	1635
DURATION(HR.MIN)	10.55	7.15	10.30	10.45	9.40	10.55
START N. LAT. (DEG)	46	46	46	46	47	47
(MIN)	13.0	16.1	12.3	37.1	31.1	.3
W. LONG. (DEG)	131	131	131	131	130	131
(MIN)	48.9	23.2	32.9	09.1	36.1	01.2
DIRECTION (DEG.TRUE)	90	45	90	110	105	100
FINISH N. LAT. (DEG)	46	46	46	46	47	46
(MIN)	12.8	33.1	14.3	29.1	24.6	52.4
W.LONG. (DEG)	131	131	130	130	129	130
(MIN)	04.5	01.3	47.1	27.4	51.2	18.6
LENGTH OF SET KM.	52.5	37.5	52.5	52.5	52.5	52.5
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	13.9	14.0	13.9	13.7	13.6	13.4
END TEMP.(DEG.C)	13.9	13.9	13.8	14.0	14.0	13.8
NO. OF NET GROUPS	7	5	7	7	7	7
TOTAL SQUID (KG)	33968	5838	4330	6479	7666	2020

Table 4b (cont'd)

SET NO.	13	14	15	16	17	18
DATE	JULY 8	JULY 9	JULY 10	JULY 11	JULY 12	JULY 13
CATCH TOTAL (KG)	39343	9410	9950	12245	13913	7203
CATCH TOTAL (PIECES)	16352	3613	3421	4269	5658	2680
INVERTEBRATES						
FLYING SQUID	14898*	2560*	1899*	2841*	3362*	885*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	3	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	153*	102*	175*	252*	1662*	1153*
PINK SALMON	..	..	2	..	2	2
CHUM SALMON	..	1	..	..	..	1
COHO SALMON	..	..	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	1	1	..	..	2	2
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	8	6	6	..	1	5
JACK MACKEREL	158*	117*	306*	141*	7*	13*
ALBACORE	..	..	5	30	..	..
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	13	3	5	12	12	5
BLUE SHARK	1120	820	1020	990	610	610
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	1	..	..	..	..
BIRDS						
SOOTY SHEARWATER	1	2	3	..	..	4
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	19	20	21	22	23	24
DATE	JULY 14	JULY 15	JULY 16	JULY 17	JULY 18	JULY 19
TIME START (LST)	1720	1640	1715	1905	1730	1635
DURATION(HR.MIN)	10.10	10.50	10.25	9.55	10.30	10.55
START N. LAT. (DEG)	47	47	47	47	47	47
(MIN)	41.1	35.8	33.0	32.0	27.8	53.2
W. LONG. (DEG)	129	129	129	129	129	129
(MIN)	35.7	13.5	18.2	06.7	04.0	17.2
DIRECTION (DEG.TRUE)	100	100	100	95	110	100
FINISH N. LAT. (DEG)	47	47	47	47	47	47
(MIN)	36.1	26.3	26.6	30.7	19.2	47.6
W.LONG. (DEG)	128	128	128	128	128	128
(MIN)	51.3	31.6	35.1	28.8	20.5	31.5
LENGTH OF SET KM.	52.5	52.5	52.5	45.0	52.5	52.5
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.1	13.9	13.8	14.4	14.5	14.5
END TEMP.(DEG.C)	14.0	14.0	14.0	14.2	14.3	14.8
NO. OF NET GROUPS	7	7	7	6	7	7
TOTAL SQUID (KG)	9724	28226	32139	15300	3785	7794

Table 4b (cont'd)

SET NO.	19	20	21	22	23	24
DATE	JULY 14	JULY 15	JULY 16	JULY 17	JULY 18	JULY 19
CATCH TOTAL (KG)	15376	33464	38007	19266	7213	11179
CATCH TOTAL (PIECES)	5871	13561	16274	7780	2441	4219
INVERTEBRATES						
FLYING SQUID	4264*	12379*	14096*	6710*	1660*	3418*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	1	..	1
SKILFISH	..	..	..	..	..	..
POMFRET	794*	478*	418*	410*	294*	264*
PINK SALMON	2	..	5	3	..	6
CHUM SALMON	1	..	6	1	2	1
COHO SALMON	..	..	1	..	..	1
SOCKEYE SALMON	3	1	..	..	..	..
STEELHEAD	..	5	3	3	2	1
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	..	..	..	..	..	..
OTHERS	..	..	1	..	..	2
SELACHI						
SALMON SHARK	14	7	13	12	1	12
BLUE SHARK	793	690	1720	630	480	510
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	1	1	1	2
BIRDS						
SOOTY SHEARWATER	..	1	10	9	1	..
OTHERS	..	..	..	..	..	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	25	26	27	28	29	30
DATE	JULY 20	JULY 22	JULY 23	JULY 24	JULY 25	JULY 26
TIME START (LST)	1640	1645	1825	1720	1755	1905
DURATION(HR.MIN)	10.50	11.15	9.20	10.10	9.50	8.40
START N. LAT. (DEG)	48	48	48	48	48	47
(MIN)	10.7	4.3	30.2	29.3	24.9	30.9
W. LONG. (DEG)	129	129	129	129	129	130
(MIN)	58.9	36.8	53.8	32.1	39.6	30.1
DIRECTION (DEG.TRUE)	100	130	100	100	100	100
FINISH N. LAT. (DEG)	48	47	48	48	48	47
(MIN)	.3	46.6	22.7	20.5	17.5	27.4
W.LONG. (DEG)	129	129	129	128	128	130
(MIN)	16.3	06.5	10.9	50.8	57.5	06.4
LENGTH OF SET KM.	52.5	45.0	52.5	52.5	52.5	30.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.0	13.9	13.6	13.8	13.9	14.4
END TEMP.(DEG.C)	14.2	14.1	13.5	13.5	13.6	14.2
NO. OF GROUPS.	7	6	7	7	7	4
TOTAL SQUID (KG)	7634	3464	10071	8885	6511	3143

Table 4b (cont'd)

SET NO.	25	26	27	28	29	30
DATE	JULY 20	JULY 22	JULY 23	JULY 24	JULY 25	JULY 26
CATCH TOTAL (KG)	9055	4523	11710	11769	10084	4113
CATCH TOTAL (PIECES)	3682	1747	4786	4389	3427	1574
INVERTEBRATES						
FLYING SQUID	3348*	1519*	4417*	3896*	2855*	1378*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	162*	94*	111*	132*	183*	76*
PINK SALMON	4	5	5	4	2	..
CHUM SALMON	4	1	4	3	2	..
COHO SALMON	..	..	..	1	..	..
SOCKEYE SALMON	5	..	7	1	..	..
STEELHEAD	5	5	15	9	2	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	..	2	1	1	..	3
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	10	9	16	26	15	6
BLUE SHARK	143	110	210	310	360	110
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	1	..	..	1	2	..
BIRDS						
SOOTY SHEARWATER	..	2	..	..	6	..
OTHERS	..	..	..	5	..	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	31	32	33	34	35	36
DATE	JULY 27	JULY 28	JULY 30	JULY 31	AUG. 1	AUG. 2
TIME START (LST)	1700	1840	1630	1810	1900	1900
DURATION(HR.MIN)	10.45	9.20	11.30	9.50	9.00	9.00
START N. LAT. (DEG)	46	47	48	48	48	48
(MIN)	37.9	34.0	20.9	18.5	14.5	8.4
W. LONG. (DEG)	130	129	133	132	132	132
(MIN)	25.9	23.0	17.3	57.1	28.1	23.4
DIRECTION (DEG.TRUE)	95	95	90	90	90	90
FINISH N. LAT. (DEG)	46	47	48	48	48	48
(MIN)	35.0	29.2	20.8	19.3	13.7	8.6
W.LONG. (DEG)	129	128	132	132	132	131
(MIN)	38.0	42.1	32.3	19.0	09.7	57.6
LENGTH OF SET KM.	52.5	52.5	52.5	45.0	22.5	30.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.7	14.5	13.5	14.0	14.2	14.7
END TEMP.(DEG.C)	14.8	14.4	13.9	14.1	14.4	14.9
NO. OF NET GROUPS	7	7	7	6	3	4
TOTAL SQUID (KG)	2983	2566	28066	29156	30804	27744

Table 4b (cont'd)

SET NO.	31	32	33	34	35	36
DATE	JULY 27	JULY 28	JULY 30	JULY 31	AUG. 1	AUG. 2
CATCH TOTAL (KG)	7248	6881	29991	31790	32762	30322
CATCH TOTAL (PIECES)	2178	1910	12723	13391	14013	12796
INVERTEBRATES						
FLYING SQUID	1308*	1125*	12309*	12787*	13510*	12168*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	..	..	2	2	..
POMFRET	145*	102*	162*	179*	153*	200*
PINK SALMON	..	1	2	..	..	..
CHUM SALMON	..	..	2	..	..	..
COHO SALMON	..	1	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	..	..	..	..	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	3	5	2	6
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	7	3	1	1	2	1
OTHERS	..	..	..	..	1	..
SELACHI						
SALMON SHARK	7	8	4	6	..	..
BLUE SHARK	710	670	240	410	340	420
OTHERS	..	..	1	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
SOOTY SHEARWATER	1	..	..	1	3	1
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	37	38	39	40	41	42
DATE	AUG. 3	AUG. 4	AUG. 5	AUG. 6	AUG. 7	AUG. 8
TIME START (LST)	1905	1800	1905	1635	1730	1055
DURATION(HR.MIN)	8.55	10.00	9.25	11.25	10.40	17.05
START N. LAT. (DEG)	48	48	48	48	48	48
(MIN)	10.5	25.1	30.0	36.2	41.2	38.1
W. LONG. (DEG)	132	132	132	132	132	132
(MIN)	15.2	36.5	15.0	23.1	19.2	09.5
DIRECTION (DEG.TRUE)	270	90	90	90	90	90
FINISH N. LAT. (DEG)	48	48	48	48	48	48
(MIN)	10.7	24.9	29.7	35.9	41.2	37.7
W.LONG. (DEG)	132	131	131	131	131	131
(MIN)	40.0	53.5	45.0	39.7	42.4	57.5
LENGTH OF SET KM.	30.0	52.5	37.5	52.5	45.0	15.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	14.9	15.0	15.0	15.0	15.1
END TEMP.(DEG.C)	14.8	15.2	15.1	15.3	15.1	15.0
NO. OF NET GROUPS	4	7	5	7	6	2
TOTAL SQUID (KG)	20706	25398	17000	16597	6052	4386

Table 4b (cont'd)

SET NO.	37	38	39	40	41	42
DATE	AUG. 3	AUG. 4	AUG. 5	AUG. 6	AUG. 7	AUG. 8
CATCH TOTAL (KG)	23656	28634	19409	19254	8718	5061
CATCH TOTAL (PIECES)	9566	11687	7945	7733	3113	2112
INVERTEBRATES						
FLYING SQUID	9081*	11139*	7456*	7277*	2654*	1923*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	153*	175*	166*	153*	153*	89*
PINK SALMON	..	1	2	..	1	..
CHUM SALMON	..	..	..	..	..	..
COHO SALMON	..	..	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	1
STEELHEAD	..	1	..	..	1	1
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	11	2	2	2	..	..
JACK MACKEREL	..	..	..	..	..	16*
ALBACORE	..	..	..	..	..	..
OTHERS	..	1	..	..	..	..
SELACHI						
SALMON SHARK	5	7	8	8	8	2
BLUE SHARK	310	360	310	290	290	70
OTHERS	1	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
SOOTY SHEARWATER	5	1	1	3	6	10
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	43	44	45	46	47	48
DATE	AUG. 9	AUG. 10	AUG. 11	AUG. 12	AUG. 13	AUG. 14
TIME START (LST)	1645	1655	1730	1655	1830	1720
DURATION(HR.MIN)	11.00	11.15	10.30	11.05	9.30	10.25
START N. LAT. (DEG)	49	49	49	50	50	51
(MIN)	28.6	25.4	36.2	1.1	47.8	50.3
W. LONG. (DEG)	132	131	133	134	135	135
(MIN)	08.8	55.5	04.3	03.8	18.0	27.9
DIRECTION (DEG.TRUE)	90	90	90	270	90	100
FINISH N. LAT. (DEG)	49	49	49	50	50	51
(MIN)	27.5	25.2	35.9	1.2	45.8	44.0
W.LONG. (DEG)	131	131	132	134	134	134
(MIN)	24.3	09.7	21.0	48.0	41.3	45.9
LENGTH OF SET KM.	52.5	52.5	52.5	52.5	45.0	47.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.5	15.7	15.7	15.3	14.5
END TEMP.(DEG.C)	15.0	15.6	15.7	15.9	15.2	14.6
NO. OF NET GROUPS	7	7	7	7	6	7
TOTAL SQUID (KG)	13158	5882	4624	5236	3978	10438

Table 4b (cont'd)

SET NO.	43	44	45	46	47	48
DATE	AUG. 9	AUG. 10	AUG. 11	AUG. 12	AUG. 13	AUG. 14
CATCH TOTAL (KG)	16092	7855	6569	7272	5677	12589
CATCH TOTAL (PIECES)	6828	3002	2436	2721	2130	5013
INVERTEBRATES						
FLYING SQUID	5771*	2579*	2028*	2296*	1744*	4578*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	..	..	..	..	2
POMFRET	880*	209*	166*	153*	111*	98*
PINK SALMON	2	..	1	1	1	6
CHUM SALMON	4	..	..	..	2	29
COHO SALMON	..	..	..	..	..	2
SOCKEYE SALMON	2	..	..	1	1	..
STEELHEAD	4	..	..	2	2	1
SAURY	..	..	1	..	..	..
PEL. ARMOURHEAD	1	..	1	16	2	2
JACK MACKEREL	24*	..	2	..	..	..
ALBACORE	..	..	..	1	..	..
OTHERS	1	..	..	..	..	1
SELACHI						
SALMON SHARK	6	3	6	10	4	17
BLUE SHARK	130	210	230	240	260	270
OTHERS	1	..	1	..	..	..
MAMMALS						
OTHERS	1	1	..	..	..	..
BIRDS						
SOOTY SHEARWATER	1	..	..	1	3	6
OTHERS	..	..	..	..	..	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	49	50	51	52	53	54
DATE	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20
TIME START (LST)	1705	1800	1750	1735	1745	1845
DURATION(HR.MIN)	10.55	10.00	10.10	10.25	10.15	10.15
START N. LAT. (DEG)	51	52	52	51	51	51
(MIN)	59.2	.8	21.7	31.1	29.1	34.3
W. LONG. (DEG)	135	135	137	136	136	136
(MIN)	58.9	16.2	09.4	33.2	33.2	31.8
DIRECTION (DEG.TRUE)	90	70	90	95	95	90
FINISH N. LAT. (DEG)	51	52	52	52	51	51
(MIN)	58.4	1.9	21.6	51.2	27.4	34.5
W.LONG. (DEG)	135	135	136	135	135	135
(MIN)	16.6	54.6	27.4	51.2	49.7	50.2
LENGTH OF SET KM.	47.0	47.0	47.0	47.0	47.0	47.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.3	14.1	14.0	14.2	14.3	14.4
END TEMP.(DEG.C)	14.3	14.1	13.9	14.4	14.6	14.8
NO. OF NET GROUPS	7	7	7	7	7	7
TOTAL SQUID (KG)	20400	6698	2924	27506	37400	26554

Table 4b (cont'd)

SET NO.	49	50	51	52	53	54
DATE	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20
CATCH TOTAL (KG)	22629	9067	5746	29599	39960	28505
CATCH TOTAL (PIECES)	9433	3338	1674	12423	16877	12051
INVERTEBRATES						
FLYING SQUID	8947*	2937*	1282*	12064*	16403*	11646*
OTHERS	..	..	1	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	..	..	..	3	2
POMFRET	132*	102*	81*	89*	128*	132*
PINK SALMON	12	8	12	4	5	1
CHUM SALMON	39	27	11	..	1	..
COHO SALMON	..	..	3	..	..	..
SOCKEYE SALMON	..	..	1	..	1	1
STEELHEAD	6	1	4	1	4	1
SAURY	..	..	..	..	..	10
PEL. ARMOURHEAD	1	1	3	3	..	4
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	..	..	..	..	..	..
OTHERS	..	..	..	..	1	..
SELACHI						
SALMON SHARK	18	15	62	21	10	12
BLUE SHARK	270	240	210	240	310	240
OTHERS	..	..	1	..	..	..
MAMMALS						
OTHERS	1	2	..	..	..	..
BIRDS						
SOOTY SHEARWATER	6	4	2	1	11	2
OTHERS	1	1	1	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	55	56	57	58	59	60
DATE	AUG. 21	AUG. 22	AUG. 23	AUG. 24	AUG. 25	AUG. 26
TIME START (LST)	1910	1715	1740	1750	1715	1920
DURATION(HR.MIN)	9.50	11.05	10.20	10.10	10.45	8.50
START N. LAT. (DEG)	51	51	52	52	52	53
(MIN)	25.2	40.5	25.6	35.3	42.3	11.9
W. LONG. (DEG)	136	136	136	136	137	135
(MIN)	23.6	39.6	18.2	34.4	19.7	53.9
DIRECTION (DEG.TRUE)	90	85	90	90	90	90
FINISH N. LAT. (DEG)	51	51	52	52	52	53
(MIN)	25.1	43.4	24.6	35.1	42.2	12.7
W.LONG. (DEG)	135	135	135	135	136	135
(MIN)	39.1	59.1	34.8	50.6	38.0	10.1
LENGTH OF SET KM.	47.0	47.0	46.5	46.5	46.5	46.5
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.5	14.5	15.1	15.1	14.7	14.8
END TEMP.(DEG.C)	14.8	15.2	15.3	15.0	14.9	15.4
NO. OF NET GROUPS	7	7	7	7	7	7
TOTAL SQUID (KG)	15402	5780	20468	7378	9180	18428

Table 4b (cont'd)

SET NO.	55	56	57	58	59	60
DATE	AUG. 21	AUG. 22	AUG. 23	AUG. 24	AUG. 25	AUG. 26
CATCH TOTAL (KG)	18258	11032	24218	11765	12768	21587
CATCH TOTAL (PIECES)	7108	2999	9360	3775	4410	8436
INVERTEBRATES						
FLYING SQUID	6755*	2535*	8977*	3235*	4026*	8082*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	1	..	..	7	..
POMFRET	128*	76*	72*	200*	145*	162*
PINK SALMON	1	1	3	2	2	7
CHUM SALMON	..	1	3	..	8	12
COHO SALMON	..	..	..	..	..	1
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	..	1	..	1	1
SAURY	2	..	1	..	..	..
PEL. ARMOURHEAD	5	7	..	2	11	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	18	58	121	25	17	..
OTHERS	1	..	..	..	..	..
SELACHI						
SALMON SHARK	16	20	11	10	12	10
BLUE SHARK	180	300	170	300	180	160
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	1	..	..
BIRDS						
SOOTY SHEARWATER	2	..	1	..	1	..
OTHERS	..	..	..	..	..	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	61	62	63	64	65	66
DATE	AUG. 27	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 1
TIME START (LST)	1740	1825	1720	1900	1800	1715
DURATION(HR.MIN)	10.20	9.35	10.40	9.00	10.30	11.15
START N. LAT. (DEG)	53	52	52	52	50	51
(MIN)	24.8	36.3	36.9	.2	59.6	3.4
W. LONG. (DEG)	135	135	137	135	134	135
(MIN)	51.8	42.9	04.9	20.1	57.6	28.0
DIRECTION (DEG.TRUE)	90	100	90	90	270	90
FINISH N. LAT. (DEG)	53	52	52	52	51	51
(MIN)	24.4	30.1	37.1	.7	.5	5.7
W.LONG. (DEG)	135	135	136	134	135	134
(MIN)	08.5	00.3	24.5	39.2	27.3	51.1
LENGTH OF SET KM.	45.0	45.0	44.0	44.0	35.0	39.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.2	15.1	14.6	15.2	15.6	15.5
END TEMP.(DEG.C)	15.5	15.1	14.6	15.2	15.6	15.7
NO. OF NET GROUPS	7	7	7	7	6	7
TOTAL SQUID (KG)	7480	3298	1496	2482	4624	3604

Table 4b (cont'd)

SET NO.	61	62	63	64	65	66
DATE	AUG. 27	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 1
CATCH TOTAL (KG)	10872	6977	5631	4094	11094	5454
CATCH TOTAL (PIECES)	3710	1792	936	1400	2387	2076
INVERTEBRATES						
FLYING SQUID	3280*	1446*	656*	1088*	2028*	1580*
OTHERS	..	..	..	..	..	..
FISH						
YELLOWFIN TUNA	..	..	..	..	..	..
SKILFISH	..	1	4	..	..	..
POMFRET	153*	123*	76*	111*	132*	141*
PINK SALMON	19	..	2	..	..	..
CHUM SALMON	26	5	2	3	..	..
COHO SALMON	..	..	..	..	..	..
SOCKEYE SALMON	1	..	..	..	..	..
STEELHEAD	4	1	..	1	..	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	4	..	8	6	..	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	..	12	6	3	110	92
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	8	10	11	8	6	3
BLUE SHARK	160	190	170	180	110	260
OTHERS	1	..	..	..	..	..
MAMMALS						
OTHERS	..	1	..	..	1	..
BIRDS						
SOOTY SHEARWATER	2	3	1	..	..	..
OTHERS	52	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4b (cont'd)

SET NO.	67	68	69	70
DATE	SEPT. 2	SEPT. 3	SEPT. 4	SEPT. 5
TIME START (LST)	1730	1700	1710	1800
DURATION(HR.MIN)	11.15	11.45	11.35	10.30
START N. LAT. (DEG)	50	49	49	49
(MIN)	34.2	49.3	42.4	17.2
W. LONG. (DEG)	134	133	133	132
(MIN)	04.1	54.9	52.3	06.5
DIRECTION (DEG.TRUE)	90	90	90	90
FINISH N. LAT. (DEG)	50	49	49	49
(MIN)	34.2	49.5	42.0	16.7
W.LONG. (DEG)	133	133	133	131
(MIN)	29.0	23.3	17.6	35.1
LENGTH OF SET KM.	39.0	38.5	37.5	37.5
DEPTH (M)	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.2	16.4	16.9	16.9
END TEMP.(DEG.C)	15.5	16.4	16.7	16.8
NO. OF NET GROUPS	7	7	7	7
TOTAL SQUID (KG)	5678	8908	4284	4352

Table 4b (cont'd)

SET NO.	67	68	69	70
DATE	SEPT. 2	SEPT. 3	SEPT. 4	SEPT. 5
CATCH TOTAL (KG)	8103	11067	8203	9130
CATCH TOTAL (PIECES)	3026	4335	3140	3125
INVERTEBRATES				
FLYING SQUID	2490*	3907*	1878*	1908*
OTHERS	..	..	..	..
FISH				
YELLOWFIN TUNA	..	4	23	..
SKILFISH	..	2	..	..
POMFRET	128*	111*	98*	111*
PINK SALMON	..	..	..	..
CHUM SALMON	..	..	1	..
COHO SALMON	..	..	..	..
SOCKEYE SALMON	..	..	..	..
STEELHEAD	..	..	..	..
SAURY	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..
JACK MACKEREL	..	..	..	..
ALBACORE	24	69	78	3
OTHERS	..	..	..	..
SELACHI				
SALMON SHARK	23	2	2	3
BLUE SHARK	360	240	1060	1100
OTHERS	..	..	..	..
MAMMALS				
OTHERS	..	..	..	..
BIRDS				
SOOTY SHEARWATER	..	..	..	..
OTHERS	1	..	..	..
TURTLES				
OTHERS	..	..	..	..

Table 4c. Bridge log information and catch, in pieces, for each night's fishing by the OCEAN PEARL in 1986. * = estimated, LST = Local Standard Time.

SET NO.	1	2	3	4	5	6
DATE	JULY 27	JULY 28	JULY 29	JULY 30	JULY 31	AUG. 1
TIME START (LST)	2000	0800	1831	2000	2100	2100
DURATION(HR.MIN)	8.00	19.00	23.59	7.00	6.15	7.00
START N. LAT. (DEG)	48	47	47	48	48	48
(MIN)	23.1	37.9	50.0	6.2	40.6	47.9
W. LONG. (DEG)	129	130	130	130	131	132
(MIN)	15.8	20.7	00.1	10.2	23.4	17.2
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	48	47	47	48	48	48
(MIN)	24.5	39.9	50.D	7.2	41.7	48.5
W.LONG. (DEG)	129	130	129	129	131	131
(MIN)	29.7	38.6	40.0	50.1	42.0	50.0
LENGTH OF SET KM.	19.0	25.0	25.0	25.0	25.0	13.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.6	15.0	15.1	15.0	15.D	14.9
END TEMP.(DEG.C)	14.4	15.0	15.4	15.0	15.0	15.0
NO. OF NET GROUPS	3	4	4	4	4	2
TOTAL SQUID (KG)	1104	1920	3663	4520	10751	20226

Table 4c (cont'd)

SET NO.	1	2	3	4	5	6
DATE	JULY 27	JULY 28	JULY 29	JULY 30	JULY 31	AUG. 1
CATCH TOTAL (KG)	1706	2565	4601	5129	12004	20996
CATCH TOTAL (PIECES)	623	1018	1843	2224	4482	9413
INVERTEBRATES						
FLYING SQUID	502	873	1665	2059	4087	9222
OTHERS	..	..	..	..	1	..
FISH						
POMFRET	62	52	96	93	300	148
PINK SALMON	2	1	1	4	2	3
CHUM SALMON	2	1	1	1	..	..
STEELHEAD	1	..	..	1	..	..
PEL. ARMOURHEAD	..	..	..	..	2	1
JACK MACKEREL	..	4	2	..	2	4
ALBACORE	..	2	3	4	..	..
OTHERS	..	1	1	..	2	..
SELACHI						
SALMON SHARK	3	3	1	3	6	12
BLUE SHARK	48	80	71	58	79	23
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	1	..	2	..	..	..
BIRDS						
OTHERS	2	1	..	1	1	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4c (cont'd)

SET NO.	6	6	9	10	11	12
DATE	AUG. 1	AUG. 1	AUG. 9	AUG. 10	AUG. 11	AUG. 14
TIME START (LST)	2100	2100	0440	0800	1240	2000
DURATION(HR.MIN)	32.00	56.00	22.20	21.00	15.00	7.20
START N. LAT. (DEG)	48	48	48	48	49	50
(MIN)	47.9	47.9	57.1	57.6	41.6	25.4
W. LONG. (DEG)	132	132	131	131	131	132
(MIN)	17.2	17.2	10.6	20.8	57.9	20.2
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	48	48	48	48	49	50
(MIN)	48.5	48.5	56.8	58.3	42.8	20.7
W.LONG. (DEG)	131	131	130	131	132	132
(MIN)	50.0	50.0	51.8	36.7	12.4	00.9
LENGTH OF SET KM.	6.5	7.0	25.0	18.0	18.0	25.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.0	15.7	16.0	16.3	16.0
END TEMP.(DEG.C)	15.3	15.0	16.3	16.3	16.0	16.4
NO. OF NET GROUPS	1	1	4	3	3	3
TOTAL SQUID (KG)	21226	17505	8545	2940	3960	2200

Table 4c (cont'd)

SET NO.	6	6	9	10	11	12
DATE	AUG. 1	AUG. 1	AUG. 9	AUG. 10	AUG. 11	AUG. 14
CATCH TOTAL (KG)	22055	17915	9028	3427	4772	12090
CATCH TOTAL (PIECES)	9441	7992	4028	1400	2081	1074
INVERTEBRATES						
FLYING SQUID	9194	7957	3884	1336	1800	1000
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	192	..	110	35	260	24
PINK SALMON	..	..	..	..	..	3
CHUM SALMON	..	..	..	..	1	20
STEELHEAD	..	..	1	..	..	2
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	5	4	2	..	..	..
ALBACORE	1	..	..	..	2	..
OTHERS	..	..	4	..	1	..
SELACHI						
SALMON SHARK	6	6	4	6	4	6
BLUE SHARK	43	21	23	22	13	12
OTHERS	..	..	..	..	..	1
MAMMALS						
OTHERS	..	1	..	1	..	5
BIRDS						
OTHERS	..	3	..	..	..	1
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4c (cont'd)

SET NO.	13	14	15	16	17	18
DATE	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20
TIME START (LST)	1500	1900	1800	2200	2000	1900
DURATION(HR.MIN)	12.00	11.00	11.00	8.00	10.00	10.00
START N. LAT. (DEG)	52	52	52	52	51	51
(MIN)	3.7	7.4	9.9	3.9	40.1	40.7
W. LONG. (DEG)	136	136	136	135	135	135
(MIN)	20.3	09.0	35.2	02.2	59.2	45.6
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	52	52	52	52	51	51
(MIN)	1.2	7.6	7.5	4.0	40.3	41.2
W.LONG. (DEG)	136	136	136	135	135	135
(MIN)	05.1	22.0	50.8	19.0	42.3	58.8
LENGTH OF SET KM.	18.0	18.0	20.0	21.0	14.0	20.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.9	14.4	14.4	14.9	15.0	15.3
END TEMP.(DEG.C)	14.6	14.5	14.4	14.9	15.7	15.8
NO. OF NET GROUPS	3	3	3	3	2	3
TOTAL SQUID (KG)	7113	3300	3696	13200	14080	12709

Table 4c (cont'd)

SET NO.	13	14	15	16	17	18
DATE	AUG. 15	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20
CATCH TOTAL (KG)	7462	3625	4528	13876	20573	13043
CATCH TOTAL (PIECES)	3296	1551	1740	6098	6643	5848
INVERTEBRATES						
FLYING SQUID	3233	1500	1680	6000	6400	5777
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	32	11	30	26	211	48
PINK SALMON	3	10	4	5	..	..
CHUM SALMON	6	5	6	8	..	1
STEELHEAD	1	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	..	..	..	..	..	8
OTHERS	..	1	4	3	..	..
SELACHI						
SALMON SHARK	8	8	6	16	20	6
BLUE SHARK	12	16	7	38	10	5
OTHERS	..	..	1	..	..	..
MAMMALS						
OTHERS	..	..	2	..	2	..
BIRDS						
OTHERS	1	..	..	2	..	3
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4c (cont'd)

SET NO.	19	20	21	22	23	24
DATE	AUG. 21	AUG. 22	AUG. 23	AUG. 24	AUG. 25	AUG. 26
TIME START (LST)	2130	1900	1800	1816	1730	0700
DURATION(HR.MIN)	8.30	11.00	11.00	10.44	12.00	21.00
START N. LAT. (DEG)	51	51	52	52	53	53
(MIN)	40.1	36.5	20.0	40.0	20.0	20.0
W. LONG. (DEG)	136	136	136	136	135	135
(MIN)	00.0	17.0	00.0	29.0	28.3	15.1
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	51	51	52	52	53	53
(MIN)	41.0	40.0	20.0	40.0	20.0	20.0
W.LONG. (DEG)	136	136	136	136	135	135
(MIN)	18.5	00.0	41.5	11.4	46.4	30.3
LENGTH OF SET KM.	21.0	27.0	20.0	21.0	20.0	16.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.6	15.5	15.4	15.6	15.5	15.8
END TEMP.(DEG.C)	15.6	15.4	15.6	15.3	15.5	15.8
NO. OF NET GROUPS	3	3	3	3	3	2
TOTAL SQUID (KG)	10534	2400	7620	2750	8800	2384

Table 4c (cont'd)

SET NO.	19	20	21	22	23	24
DATE	AUG. 21	AUG. 22	AUG. 23	AUG. 24	AUG. 25	AUG. 26
CATCH TOTAL (KG)	10744	5678	8304	3147	9235	2595
CATCH TOTAL (PIECES)	4835	1101	3426	1339	4103	1127
INVERTEBRATES						
FLYING SQUID	4788	1000	3300	1250	4000	1084
OTHERS	..	..	..	..	..	..
FISH						
POMFRET	13	56	27	52	56	7
PINK SALMON	1	1	3	4	3	7
CHUM SALMON	1	..	9	1	4	4
STEELHEAD	..	1	..	..	2	1
PEL. ARMOURHEAD	1	..	..	1	..	..
JACK MACKEREL	..	..	..	..	..	..
ALBACORE	31	..	62	10	..	..
OTHERS	..	1	..	1	1	1
SELACHI						
SALMON SHARK	..	11	6	6	6	4
BLUE SHARK	..	26	19	13	28	16
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	4	..	..	..	..
BIRDS						
OTHERS	..	1	..	1	3	3
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4c (cont'd)

SET NO.	26	27	28	29	30	31
DATE	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 2	SEPT. 5
TIME START (LST)	1830	1800	1900	1715	1900	1830
DURATION(HR.MIN)	10.30	11.30	10.00	11.45	10.00	11.30
START N. LAT. (DEG)	53	52	51	51	50	51
(MIN)	22.0	26.9	50.0	22.8	43.3	10.0
W. LONG. (DEG)	136	137	136	135	130	140
(MIN)	00.0	05.0	26.7	51.6	59.8	38.0
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	53	52	51	51	50	51
(MIN)	1.0	27.1	52.1	27.8	46.9	10.0
W.LONG. (DEG)	135	137	136	136	130	140
(MIN)	45.3	20.9	28.0	07.4	42.5	19.0
LENGTH OF SET KM.	26.0	26.0	26.0	26.0	26.0	26.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.0	15.4	15.0	16.5	14.8
END TEMP.(DEG.C)	15.0	15.0	14.8	15.0	16.6	14.9
NO. OF NET GROUPS	3	3	3	3	3	3
TOTAL SQUID (KG)	2964	658	593	829	473	1979

Table 4c (cont'd)

SET NO.	26	27	28	29	30	31
DATE	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 2	SEPT. 5
CATCH TOTAL (KG)	3223	692	710	1032	837	2187
CATCH TOTAL (PIECES)	1390	311	280	493	259	982
INVERTEBRATES						
FLYING SQUID	1347	300	250	450	200	870
OTHERS	..	..	..	..	..	1
FISH						
POMFRET	7	3	10	6	11	8
PINK SALMON	5	1	..	..	1	..
CHUM SALMON	4	4	3	2	..	..
STEELHEAD	1	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	100
JACK MACKEREL	..	..	1	..	..	..
ALBACORE	..	3	15	15	..	..
OTHERS	..	..	..	..	..	1
SELACHI						
SALMON SHARK	5	..	..	..	6	..
BLUE SHARK	21	..	..	20	38	1
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	2
BIRDS						
OTHERS	..	..	1	..	3	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4c (cont'd)

SET NO.	32	33	34	35	36
DATE	SEPT. 6	SEPT. 7	SEPT. 8	SEPT. 9	SEPT. 12
TIME START (LST)	1830	1900	2300	1900	1900
DURATION(HR.MIN)	10.30	12.00	8.30	12.30	26.00
START N. LAT. (DEG)	51	51	51	52	48
(MIN)	10.0	25.0	45.0	7.5	53.6
W. LONG. (DEG)	139	139	138	138	127
(MIN)	31.0	09.0	09.5	00.0	57.4
DIRECTION (DEG.TRUE)	-	-	-	-	-
FINISH N. LAT. (DEG)	51	51	51	52	48
(MIN)	10.0	23.8	45.0	8.0	53.0
W.LONG. (DEG)	139	138	137	137	127
(MIN)	13.2	48.0	57.0	41.8	49.6
LENGTH OF SET KM.	26.0	23.0	26.0	26.0	26.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.2	15.3	14.9	14.7	15.4
END TEMP.(DEG.C)	14.8	15.4	15.0	14.5	15.4
NO. OF NET GROUPS	3	3	3	3	3
TOTAL SQUID (KG)	2396	1782	2871	1320	2

Table 4c (cont'd)

SET NO.	32	33	34	35	36
DATE	SEPT. 6	SEPT. 7	SEPT. 8	SEPT. 9	SEPT. 12
CATCH TOTAL (KG)	3166	2251	4009	1719	63
CATCH TOTAL (PIECES)	1084	925	1480	687	15
INVERTEBRATES					
FLYING SQUID	1008	810	1305	600	1
OTHERS	3	..	..	..	..
FISH					
POMFRET	14	48	68	35	8
PINK SALMON	..	..	..	..	..
CHUM SALMON	..	..	..	..	..
STEELHEAD	..	..	..	..	..
PEL. ARMOURHEAD	8	..	..	..	1
JACK MACKEREL	..	..	..	..	..
ALBACORE	28	38	60	34	..
OTHERS	..	..	1	..	..
SELACHI					
SALMON SHARK	23	..	11	2	1
BLUE SHARK	..	28	34	15	4
OTHERS	..	..	..	..	..
MAMMALS					
OTHERS	..	..	2	..	..
BIRDS					
OTHERS	..	1	..	1	..
TURTLES					
OTHERS	..	..	..	..	..

Table 4d. Bridge log information and catch, in pieces, for each night's fishing (set) by the LA PORSCHE in 1986. * = estimated, LST = Local Standard Time.

SET NO.	1	2	3	4	5	6
DATE	AUG. 9	AUG. 10	AUG. 11	AUG. 12	AUG. 14	AUG. 15
TIME START (LST)	1850	2400	2100	1920	2050	2050
DURATION(HR.MIN)	10.10	12.30	9.30	10.00	8.55	8.40
START N. LAT. (DEG)	49	49	49	50	50	50
(MIN)	5.6	6.2	34.9	22.9	37.8	48.5
W. LONG. (DEG)	131	131	131	131	133	134
(MIN)	04.1	23.6	42.5	54.2	12.9	30.6
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	49	49	49	50	50	50
(MIN)	6.3	6.9	33.9	25.0	38.8	49.8
W.LONG. (DEG)	130	131	131	132	133	134
(MIN)	52.3	17.9	51.1	04.0	21.2	39.0
LENGTH OF SET KM.	15.0	7.5	10.0	15.0	10.0	10.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.1	15.6	16.2	15.8	15.0	14.9
END TEMP.(DEG.C)	15.1	15.4	15.9	15.6	14.9	15.0
NO. OF NET GROUPS	2	1	2	3	2	2
TOTAL SQUID (KG)	2462	945	419	1328	1261	924

Table 4d (cont'd)

SET NO.	1	2	3	4	5	6
DATE	AUG. 9	AUG. 10	AUG. 11	AUG. 12	AUG. 14	AUG. 15
CATCH TOTAL (KG)	3118	1262	780	1959	2056	1676
CATCH TOTAL (PIECES)	1280	509	311	729	750	625
INVERTEBRATES						
FLYING SQUID	1201	468	195	664	671	494
OTHERS	..	..	..	..	..	..
FISH						
BL ROCKFISH	..	..	..	..	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	16	14	83	29	60	96
PINK SALMON	..	..	2	4	..	..
CHUM SALMON	..	..	..	..	2	2
SOCKEYE SALMON	..	..	1	7	..	..
STEELHEAD	..	..	..	..	..	2
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	2	..	..	..
JACK MACKEREL	..	..	..	..	..	..
YELLOWTAIL	..	..	..	..	..	..
ALBACORE	..	..	..	..	..	2
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	2	2	..	7	1	10
BLUE SHARK	59	23	28	9	6	12
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	1	2	..
BIRDS						
ALBATROSSES	..	..	..	..	..	..
PINK. SHEARWATER	..	..	..	..	..	..
SOOTY SHEARWATER	..	..	..	..	..	2
OCEANITIDAE	2	2	..	6	3	..
TERNS	..	..	..	2	4	2
MURRES,AUK,PUF	..	..	..	..	..	..
RHINO. AUKLET	..	..	..	..	1	3
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4d (cont'd)

SET NO.	7	8	9	10	11	12
DATE	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20	AUG. 27
TIME START (LST)	2050	2020	2015	2010	2050	2130
DURATION(HR.MIN)	9.10	9.40	9.45	9.20	23.40	7.30
START N. LAT. (DEG)	51	51	51	51	51	52
(MIN)	31.4	29.8	5.2	24.2	25.7	22.9
W. LONG. (DEG)	135	135	134	135	135	133
(MIN)	26.7	14.8	50.5	51.4	47.5	43.8
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	51	51	51	51	51	52
(MIN)	31.4	30.2	4.9	23.2	27.2	23.1
W.LONG. (DEG)	135	135	134	135	135	133
(MIN)	34.5	06.6	41.9	42.1	55.1	39.5
LENGTH OF SET KM.	10.0	10.0	10.0	10.0	10.0	5.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	14.8	14.6	15.0	14.7	15.1	15.6
END TEMP.(DEG.C)	14.7	14.8	15.0	14.7	15.2	15.8
NO. OF NET GROUPS	2	2	2	2	2	1
TOTAL SQUID (KG)	1176	2156	898	7613	2294	161

Table 4d (cont'd)

SET NO.	7	8	9	10	11	12
DATE	AUG. 16	AUG. 17	AUG. 18	AUG. 19	AUG. 20	AUG. 27
CATCH TOTAL (KG)	2259	2695	1298	8290	3167	242
CATCH TOTAL (PIECES)	798	1081	494	3571	1168	96
INVERTEBRATES						
FLYING SQUID	660	1003	394	3445	1077	70
OTHERS	..	..	..	..	..	..
FISH						
BL ROCKFISH	..	..	..	..	..	3
SKILFISH	..	..	..	..	..	..
POMFRET	102	51	68	89	..	5
PINK SALMON	4	1	1	2	..	1
CHUM SALMON	4	5	3	1	..	13
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	1	1	1	..	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	1	..	..	2	..	..
JACK MACKEREL	..	..	..	..	..	..
YELLOWTAIL	..	..	..	..	..	..
ALBACORE	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	6	9	5	5	13	1
BLUE SHARK	12	11	22	20	78	3
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	2	..	..	..	..	..
BIRDS						
ALBATROSSES	..	..	..	..	..	..
PINK. SHEARWATER	..	..	..	..	..	..
SOOTY SHEARWATER	..	..	..	..	..	..
OCEANITIDAE	3	..	..	4	..	..
TERNS	4	..	..	..	..	..
MURRES,AUK,PUF	..	..	..	..	..	..
RHINO. AUKLET	..	..	..	2	..	..
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4d (cont'd)

SET NO.	13	14	15	16	17	18
DATE	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 1	SEPT. 2
TIME START (LST)	1940	2100	2050	2040	1930	2015
DURATION(HR.MIN)	10.20	8.15	8.30	8.50	19.30	16.15
START N. LAT. (DEG)	53	52	52	52	52	52
(MIN)	8.5	33.3	1.4	1.4	2.1	6.2
W. LONG. (DEG)	135	136	135	136	136	136
(MIN)	26.2	14.1	59.5	00.5	11.9	22.9
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	53	52	52	52	52	52
(MIN)	6.5	33.4	3.4	3.2	3.2	3.9
W.LONG. (DEG)	135	135	136	136	136	136
(MIN)	12.8	59.5	13.8	13.5	13.5	14.8
LENGTH OF SET KM.	15.0	15.0	15.0	15.0	10.0	10.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.4	14.8	15.0	15.0	15.0	15.0
END TEMP.(DEG.C)	15.6	14.7	15.0	15.0	15.0	15.0
NO. OF NET GROUPS	3	3	3	3	2	2
TOTAL SQUID (KG)	1378	783	5443	5789	2863	936

Table 4d (cont'd)

SET NO.	13	14	15	16	17	18
DATE	AUG. 28	AUG. 29	AUG. 30	AUG. 31	SEPT. 1	SEPT. 2
CATCH TOTAL (KG)	1630	963	5349	6119	3372	1317
CATCH TOTAL (PIECES)	661	392	2256	2600	1365	485
INVERTEBRATES						
FLYING SQUID	551	313	2177	2517	1193	390
OTHERS	..	..	..	..	..	..
FISH						
BL ROCKFISH	..	..	..	..	..	..
SKILFISH	..	..	..	..	..	..
POMFRET	38	47	18	16	70	39
PINK SALMON	2	..	..	..	..	..
CHUM SALMON	9	..	..	1	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	2	1	2	2	..
SAURY	..	..	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..	..	..
JACK MACKEREL	..	..	..	..	..	..
YELLOWTAIL	..	..	..	..	..	..
ALBACORE	..	4	7	8	8	11
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	6	3	4	4	6	5
BLUE SHARK	22	8	41	39	58	30
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	..
BIRDS						
ALBATROSSES	..	..	..	..	..	..
PINK. SHEARWATER	..	..	..	..	..	..
SOOTY SHEARWATER	2	4	..	1	2	..
OCEANITIDAE	12	6	7	12	26	10
TERNS	..	..	..	..	..	..
MURRES,AUK,PUF	1	..	..	..	..	..
RHINO. AUKLET	18	5	1	..	..	..
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4d (cont'd)

SET NO.	19	20	21	22	23	24
DATE	SEPT. 3	SEPT. 5	SEPT. 6	SEPT. 7	SEPT. 8	SEPT. 9
TIME START (LST)	2120	2100	1955	2030	2000	1950
DURATION(HR.MIN)	8.55	9.15	10.35	11.00	10.30	11.10
START N. LAT. (DEG)	52	51	50	51	51	51
(MIN)	4.9	14.7	59.7	16.6	26.3	59.9
W. LONG. (DEG)	137	140	139	139	138	137
(MIN)	00.5	33.0	28.9	04.3	04.1	53.6
DIRECTION (DEG.TRUE)	-	-	-	-	-	-
FINISH N. LAT. (DEG)	52	51	50	51	51	51
(MIN)	8.2	13.1	58.4	14.0	23.5	57.1
W.LONG. (DEG)	137	140	139	138	137	137
(MIN)	13.0	19.5	15.8	51.1	52.6	41.2
LENGTH OF SET KM.	15.0	15.0	15.0	15.0	15.0	15.0
DEPTH (M)	0- 10	0- 10	0- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.0	14.4	15.0	15.0	14.9	14.4
END TEMP.(DEG.C)	14.7	14.6	15.0	15.0	14.8	14.4
NO. OF NET GROUPS	3	3	3	3	3	3
TOTAL SQUID (KG)	684	446	1974	1504	797	1728

Table 4d (cont'd)

SET NO.	19	20	21	22	23	24
DATE	SEPT. 3	SEPT. 5	SEPT. 6	SEPT. 7	SEPT. 8	SEPT. 9
CATCH TOTAL (KG)	906	627	2235	2363	992	1847
CATCH TOTAL (PIECES)	364	274	845	775	363	694
INVERTEBRATES						
FLYING SQUID	285	165	731	557	295	640
OTHERS	..	..	..	..	..	..
FISH						
BL ROCKFISH	..	..	..	..	..	..
SKILFISH	..	15	3	9	..	..
POMFRET	35	52	..	24	12	9
PINK SALMON	..	..	..	..	..	..
CHUM SALMON	..	..	..	..	..	..
SOCKEYE SALMON	..	..	..	..	..	..
STEELHEAD	..	..	..	..	..	..
SAURY	..	..	10	..	..	..
PEL. ARMOURHEAD	..	27	..	..	3	1
JACK MACKEREL	..	..	..	1	..	..
YELLOWTAIL	..	..	..	..	1	..
ALBACORE	3	9	47	160	25	10
OTHERS	..	..	..	..	..	..
SELACHI						
SALMON SHARK	..	2	2	..	1	2
BLUE SHARK	32	3	50	23	24	22
OTHERS	..	..	..	..	..	..
MAMMALS						
OTHERS	..	..	..	..	..	1
BIRDS						
ALBATROSSES	..	..	..	..	..	..
PINK. SHEARWATER	..	..	..	..	..	..
SOOTY SHEARWATER	1	1	2	1	2	6
OCEANITIDAE	8	..	..	..	..	3
TERNS	..	..	..	..	..	..
MURRES,AUK,PUF	..	..	..	..	..	..
RHINO. AUKLET	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
TURTLES						
OTHERS	..	..	..	..	..	..

Table 4d (cont'd)

SET NO.	25	26	27	28
DATE	SEPT. 11	SEPT. 12	SEPT. 13	SEPT. 14
TIME START (LST)	2005	2020	2340	2000
DURATION(HR.MIN)	9.55	10.10	7.50	10.30
START N. LAT. (DEG)	50	50	49	49
(MIN)	2.7	1.6	10.4	3.7
W. LONG. (DEG)	133	133	131	131
(MIN)	18.8	11.5	01.3	03.4
DIRECTION (DEG.TRUE)	-	-	-	-
FINISH N. LAT. (DEG)	50	49	49	49
(MIN)	1.1	33.6	10.2	2.4
W.LONG. (DEG)	133	132	130	130
(MIN)	07.9	33.6	49.4	51.9
LENGTH OF SET KM.	15.0	15.0	15.0	15.0
DEPTH (M)	D- 10	0- 10	0- 10	0- 10
START TEMP.(DEG.C)	15.0	16.2	16.2	16.4
END TEMP.(DEG.C)	15.3	16.2	16.2	16.4
NO. OF NET GROUPS	3	3	3	3
TOTAL SQUID (KG)	890	1200	1708	996

Table 4d (cont'd)

SET NO.	25	26	27	28
DATE	SEPT. 11	SEPT. 12	SEPT. 13	SEPT. 14
CATCH TOTAL (KG)	2507	3272	4519	3400
CATCH TOTAL (PIECES)	1016	1281	1750	1251
INVERTEBRATES				
FLYING SQUID	556	857	1220	996
OTHERS	..	..	..	..
FISH				
BL ROCKFISH	..	..	..	..
SKILFISH	..	..	..	..
POMFRET	386	300	351	59
PINK SALMON	1	..	..	..
CHUM SALMON	6	1	..	..
SOCKEYE SALMON	..	..	..	..
STEELHEAD	1	..	..	..
SAURY	..	..	..	..
PEL. ARMOURHEAD	..	..	..	..
JACK MACKEREL	..	1	2	..
YELLOWTAIL	..	..	..	..
ALBACORE	6	1	..	..
OTHERS	..	..	..	..
SELACHI				
SALMON SHARK	1	1	2	1
BLUE SHARK	52	117	173	193
OTHERS	..	..	..	..
MAMMALS				
OTHERS	..	..	..	..
BIRDS				
ALBATROSSES	..	..	..	1
PINK. SHEARWATER	..	1	..	..
SOOTY SHEARWATER	7	2	2	1
OCEANITIDAE	..	..	..	..
TERNS	..	..	..	..
MURRES,AUK,PUF	..	..	..	..
RHINO. AUKLET	..	..	..	..
OTHERS	..	..	..	..
TURTLES				
OTHERS	..	..	..	..

Table 5. Percentage of the total catch (pieces) represented by each major species caught by each vessel in 1985 and 1986.

SPECIES	PERCENTAGE OF CATCH			
	TOMI MARU #88		OCEAN PEARL	LA PORSCHE
	1985	1986	1986	1986
Flying Squid	91.43	88.01	95.88	85.61
Pomfret	3.55	3.53	2.28	7.45
Blue Shark	2.23	7.13	0.89	4.21
Albacore	1.02	0.22	0.33	1.08
Jack Mackerel	1.39	0.73	0.03	0.01

Table 6. Marine mammal bycatch in the offshore squid fishery during the years 1983, 1985 and 1986. T.M. = TOMI MARU No.88, Sim. = SIMSTAR, O.P. = OCEAN PEARL, L.P. = LA PORSCHE

SPECIES	NUMBER OF MARINE MAMMALS					
	1983		1985	1986		
	T.M.	Sim.	T.M.	T.M.	O.P.	L.P.
Dall porpoise	2	1	1	19	9	5
Short-finned Pilot whale	1	-	-	-	5	-
Pacific white-sided dolphin	-	-	1	-	3	-
Harbour porpoise	2	-	-	-	-	-
Northern right-whale dolphin	-	-	-	2	1	1
Killer whale	-	-	-	-	2	-
Cuvier's beaked whale	-	-	-	1	-	-
Fur seal	-	-	1	-	-	-
Unidentified	-	-	-	-	2	-
TOTALS	5	1	3	22	22	6
Total net fished (km)	1376.4	97.3	2475.1	3204.5	750.5	352.5
Average net length (km) to catch 1 mammal	275.3	97.3	825.0	145.7	34.1	58.7
Average time (days) to catch 1 mammal =	9.0	25.0	18.7	3.2	1.6	4.7

Table 7a. CPUE (pieces.10 km^{-1}) by species for each vessel in 1985 and 1986. - = no catch, 0.00 = rounded number < 0.01.

SPECIES	CPUE (pieces.10 km^{-1})			
	TOMI MARU #88 1985	1986	OCEAN PEARL 1986	LA PORSCHE 1986
Flying Squid	1366.40	1167.80	1208.95	674.75
Nail Squid	-	0.00	0.07	-
Opal Squid	-	-	-	-
Pink Salmon	0.06	0.45	0.85	0.51
Chum Salmon	1.19	0.68	1.12	1.33
Coho Salmon	0.14	0.04	0.04	-
Sockeye Salmon	0.56	0.09	0.01	0.23
Chinook Salmon	-	0.00	-	-
Steelhead	1.16	0.31	0.15	0.37
Bonito Shark	-	0.00	-	-
Blue Shark	33.33	94.63	11.25	33.19
Salmon Shark	1.99	2.10	2.73	2.87
Thresher Shark	-	0.02	0.03	-
Pelagic Stingray	0.00	-	-	-
Pomfret	53.11	46.78	28.77	58.69
Rough Pomfret	0.04	-	-	-
Albacore	15.23	2.89	4.21	8.54
Jack Mackerel	20.80	9.65	0.32	0.11
Bluefin Tuna	0.02	0.01	-	-
Yellowfin Tuna	-	0.13	-	-
Yellowtail	0.03	-	-	0.03
Pelagic Armourhead	0.14	0.45	1.52	1.02
Skilfish	-	0.08	0.12	0.77
Saury	-	0.04	0.01	0.28
Ragfish	-	0.01	0.01	-
Ocean Sunfish	0.05	0.02	0.05	-
Longnose Lancetfish	0.00	0.00	0.05	-
Black Rockfish	-	0.00	-	0.09
Louvar	0.02	-	-	-
Sea Chubs	-	0.02	-	-
Dall Porpoise	0.00	0.06	0.12	0.14
Northern Right-whale Dolphin	-	0.01	0.01	0.01
Pacific White-Sided Dolphin	0.00	-	0.04	-
Killer Whale	-	-	0.03	-
Short-finned Pilot Whale	-	-	0.07	-
Cuvier's Beaked Whale	-	0.00	-	-

Table 7a (cont'd)

Fur Seal	0.00	-	-	-
Albatross	0.01	0.00	0.01	0.03
Family Procelleriidae (unidentified)	0.02	-	-	-
Northern Fulmar	-	0.01	-	-
Slender-billed Shearwater	0.12	-	0.04	-
Sooty Shearwater	0.05	0.42	0.09	1.02
Pink-footed Shearwater	-	-	0.07	0.03
Family Oceanitidae (unidentified)	-	-	0.04	2.95
Family Alcidae (unidentified)	-	0.00	-	0.03
Common Murre	-	0.00	-	-
Cassin's Auklette	-	0.00	0.09	-
Rhinoceros Auklette	0.01	0.18	0.04	0.85
Ancient Murrelet	0.01	-	-	-
Terns	-	-	-	0.34
Turtle (unidentified)	-	0.00	-	-
Leatherback Turtle	-	-	-	-

Table 7b. CPUE (pieces.10 km^{-1} hr^{-1}) by species for each vessel in 1985 and 1986. - = no catch, 0.00 = rounded number < 0.01. Time is the duration (hr) between start of net set and start of net haul.

SPECIES	CPUE (pieces.10 km^{-1} hr^{-1})			
	TOMI MARU #88 1985	1986	OCEAN PEARL 1986	LA PORSCHE 1986
Flying Squid	128.43	113.52	93.11	64.04
Nail Squid	-	-	0.01	-
Opal Squid	-	0.00	-	-
Pink Salmon	0.01	0.04	0.07	0.05
Chum Salmon	0.11	0.07	0.09	0.13
Coho Salmon	0.01	0.00	0.00	-
Sockeye Salmon	0.05	0.01	0.00	0.02
Chinook Salmon	-	0.00	-	-
Steelhead	0.11	0.03	0.01	0.04
Bonito Shark	-	0.00	-	-
Blue Shark	3.13	9.20	0.87	3.15
Salmon Shark	0.19	0.20	0.21	0.27
Thresher Shark	-	0.00	0.00	-
Pelagic Stingray	0.00	-	-	-
Pomfret	4.99	4.55	2.22	5.57
Rough Pomfret	0.00	-	-	-
Albacore	1.43	0.28	0.32	0.81
Jack Mackerel	1.96	0.94	0.02	0.01
Bluefin Tuna	0.00	0.00	-	-
Yellowfin Tuna	-	0.01	-	-
Yellowtail	0.00	-	-	0.00
Pelagic Armourhead	0.01	0.04	0.12	0.10
Skilfish	-	0.01	0.01	0.07
Saury	-	0.00	0.00	0.03
Ragfish	-	0.00	0.00	-
Ocean Sunfish	0.01	0.00	0.00	-
Longnose Lancetfish	0.00	0.00	0.00	-
Black Rockfish	-	0.00	-	0.01
Louvar	0.00	-	-	-
Sea Chubs	-	0.00	-	-
Dall Porpoise	0.00	0.01	0.01	0.01
Northern Right-whale Dolphin	-	0.00	0.00	0.00
Pacific White-Sided Dolphin	0.00	-	0.00	-
Killer Whale	-	-	0.00	-

Table 7b (cont'd)

Short-finned Pilot Whale	-	-	0.01	-
Cuvier's Beaked Whale	-	0.00	-	-
Fur Seal	0.00	-	-	-
Albatross	0.00	0.00	0.00	0.00
Family Procelleriidae (unidentified)	0.00	-	-	-
Northern Fulmar	-	0.00	-	-
Slender-billed Shearwater	0.01	-	0.00	-
Sooty Shearwater	0.01	0.04	0.01	0.10
Pink-footed Shearwater	-	-	0.00	0.00
Family Oceanitidae (unidentified)	-	-	0.00	0.28
Family Alcidae (unidentified)	-	0.00	-	0.00
Common Murre	-	0.00	-	-
Cassin's Auklette	-	0.00	0.01	-
Rhinoceros Auklette	0.00	0.02	0.00	0.08
Ancient Murrelet	0.00	-	-	-
Terns	-	-	-	0.03

Table 8a. CPUE (kg.10 km^{-1}) by species for each vessel in 1985 and 1986. - = no catch, 0.00 = rounded number < 0.01.

SPECIES	CPUE (kg.10 km^{-1})			
	TOMI MARU #88 1985	1986	OCEAN PEARL 1986	LA PORSCHE 1986
Flying Squid	3115.55	2662.82	2705.04	1537.99
Nail Squid	-	-	0.08	-
Opal Squid	-	0.00	-	-
Pink Salmon	0.12	0.48	0.85	0.51
Chum Salmon	3.55	1.57	2.46	2.92
Coho Salmon	0.43	0.08	0.08	-
Sockeye Salmon	1.16	0.12	0.01	0.28
Chinook Salmon	-	0.02	-	-
Steelhead	3.66	0.60	0.17	0.48
Bonito Shark	-	0.00	-	-
Blue Shark	271.03	472.41	55.82	165.08
Salmon Shark	57.49	52.29	67.79	70.84
Thresher Shark	-	4.06	6.93	-
Pelagic Stingray	0.01	-	-	-
Pomfret	124.73	109.72	67.11	137.02
Rough Pomfret	0.08	-	-	-
Albacore	93.08	16.59	24.06	48.79
Jack Mackerel	50.01	23.23	0.71	0.23
Bluefin Tuna	0.14	0.02	-	-
Yellowfin Tuna	-	0.16	-	-
Yellowtail	0.23	-	-	0.11
Pelagic Armourhead	0.03	0.21	0.52	0.28
Skilfish	-	0.03	0.03	0.34
Saury	-	0.00	0.00	0.00
Ragfish	-	0.42	0.60	-
Ocean Sunfish	0.23	0.44	1.49	-
Longnose Lancetfish	0.01	0.01	0.11	-
Black Rockfish	-	0.00	-	0.08
Louvar	0.24	-	-	-
Sea Chubs	-	0.02	-	-
Dall Porpoise	0.60	8.77	17.75	20.99
Northern Right-whale Dolphin	-	1.14	2.42	5.16
Pacific White-Sided Dolphin	0.55	-	5.44	-
Killer Whale	-	-	72.67	-
Short-finned Pilot Whale	-	-	152.10	-

Table 8a (cont'd)

Cuvier's Beaked Whale	-	12.48	-	-
Fur Seal	0.14	-	-	-
Albatross	0.04	0.02	0.07	0.14
Family Procellariidae (unidentified)	0.00	-	-	-
Northern Fulmar	-	0.00	-	-
Slender-billed Shearwater	0.06	-	0.00	-
Sooty Shearwater	0.02	0.23	0.04	0.51
Pink-footed Shearwate	-	-	0.07	0.00
Family Oceanitidae (unidentified)	-	-	0.00	0.14
Family Alcidae (unidentified)	-	0.00	-	0.00
Common Murre	-	0.00	-	-
Cassin's Auklette	-	0.00	0.00	-
Rhinoceros Auklette	0.00	0.04	0.00	0.14
Ancient Murrelet	0.00	-	-	-
Terns	-	-	-	0.00

Table 8b. CPUE (kg.10 km^{-1} hr^{-1}) by species for each vessel in 1985 and 1986. - = no catch, 0.00 = rounded number < 0.01.

SPECIES	CPUE (kg.10 km^{-1} hr^{-1})			
	TOMI MARU #88 1985	1986	OCEAN PEARL 1986	LA PORSCHE 1986
Flying Squid	292.84	258.84	208.33	145.96
Nail Squid	-	-	0.01	-
Opal Squid	-	0.00	-	-
Pink Salmon	0.01	0.05	0.07	0.05
Chum Salmon	0.33	0.15	0.19	0.28
Coho Salmon	0.04	0.01	0.01	-
Sockeye Salmon	0.11	0.01	0.00	0.03
Chinook Salmon	-	0.00	-	-
Steelhead	0.34	0.06	0.01	0.05
Bonito Shark	-	0.00	-	-
Blue Shark	25.47	45.92	4.30	15.67
Salmon Shark	5.40	5.08	5.22	6.72
Thresher Shark	-	0.39	0.53	-
Pelagic Stingray	0.00	-	-	-
Pomfret	11.72	10.66	5.17	13.00
Rough Pomfret	0.01	-	-	-
Albacore	8.82	1.61	1.85	4.63
Jack Mackerel	4.70	2.26	0.05	0.02
Bluefin Tuna	0.01	0.00	-	-
Yellowfin Tuna	-	0.02	-	-
Yellowtail	0.02	-	-	0.01
Pelagic Armourhead	0.00	0.02	0.04	0.03
Skilfish	-	0.00	0.00	0.03
Saury	-	0.00	0.00	0.00
Ragfish	-	0.04	0.05	-
Ocean Sunfish	0.02	0.04	0.11	-
Longnose Lancetfish	0.00	0.00	0.01	-
Black Rockfish	-	0.00	-	0.01
Louvar	0.02	-	-	-
Sea Chubs	-	0.00	-	-
Dall Porpoise	0.07	0.85	1.37	1.99
Northern Right-whale Dolphin	-	0.11	0.19	0.49
Pacific White-Sided Dolphin	0.05	-	0.42	-
Killer Whale	-	-	5.60	-
Short-finned Pilot Whale	-	-	11.71	-
Cuvier's Beaked Whale	-	1.21	-	-

Table 8b (cont'd)

Fur Seal	0.01	-	-	-
Albatross	0.00	0.00	0.00	0.01
Family Procelleriidae (unidentified)	0.00	-	-	-
Northern Fulmar	-	0.00	-	-
Slender-billed Shearwater	0.01	-	0.00	-
Sooty Shearwater	0.00	0.02	0.00	0.05
Pink-footed Shearwater	-	-	0.00	0.00
Family Oceanitidae (unidentified)	-	-	0.00	0.01
Family Alcidae (unidentified)	-	0.00	-	0.00
Common Murre	-	0.00	-	-
Cassin's Auklette	-	0.00	0.00	-
Rhinoceros Auklette	0.00	0.00	0.00	0.01
Ancient Murrelet	0.00	-	-	-
Terns	-	-	-	0.00

Table 9. Comparison of CPUE (kg squid.km^{-1}) among all vessels that participated in the offshore squid fishery in recent years.

Vessel	Date	CPUE (kg squid. km^{-1})	Source
TOMI MARU NO.88	June-Sept 1986	266.3	This study
OCEAN PEARL	July-Sept 1986	270.5	This study
LA PORSCHE	Aug-Sept 1986	153.8	This study
TOMI MARU NO.88	July-Sept 1985	311.5	This study
SIMSTAR	July-Aug 1983	339.2	Robinson and Jamieson (1984)
TOMI MARU NO.88	July-Aug 1983	232.3	Sloan (1984)
TENYU MARU NO.37	July-Aug 1980	332.0	Bernard (1981)
TOMI MARU NO.88	August 1980	165.8	Bernard (1981)

FIGURES

Fig. 1. The geographical distribution of nightly fishing sets by the Tomi Maru No. 88 in 1985.

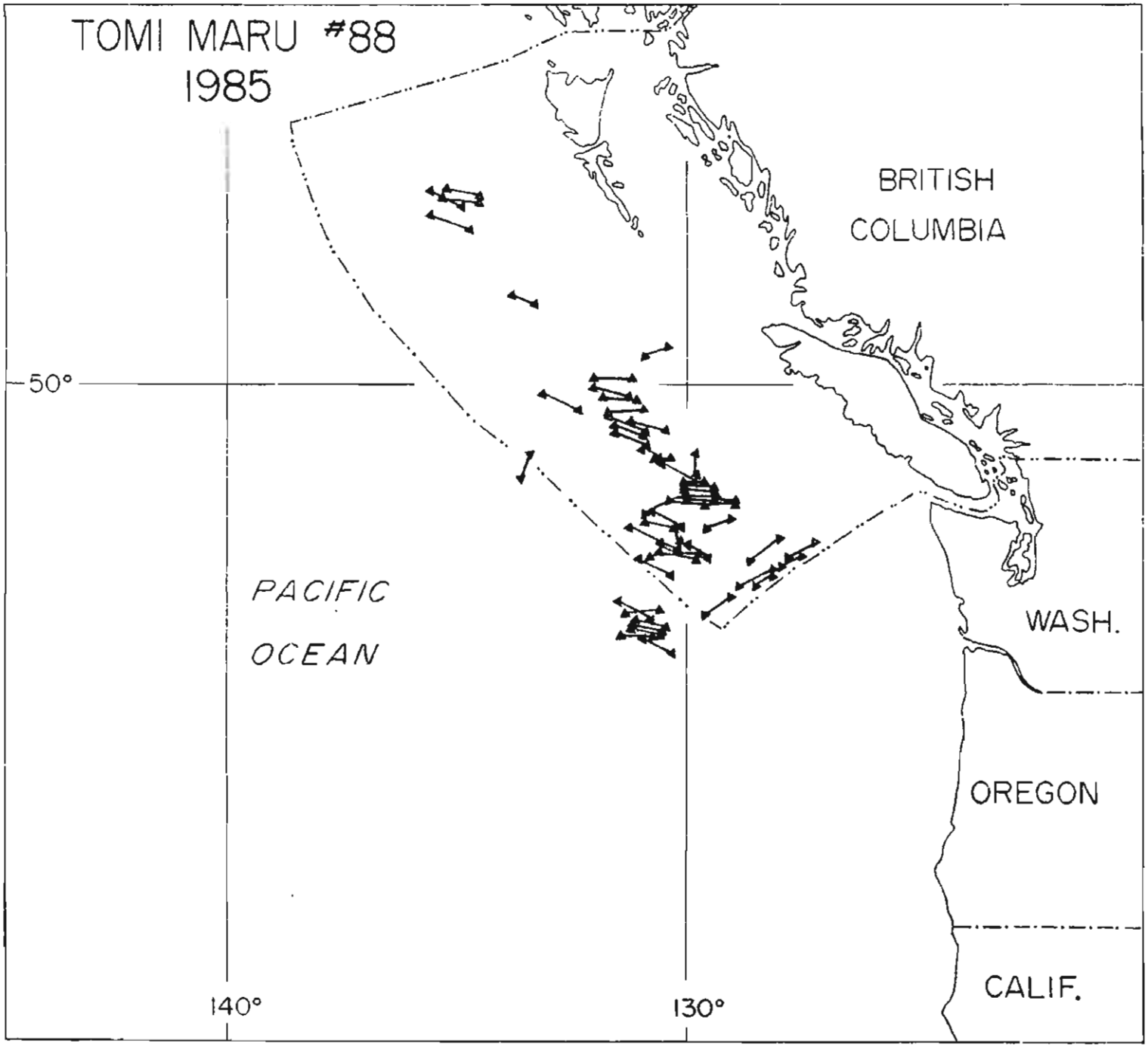

TOMI MARU #88
1985
BRITISH
COLUMBIA
50°
PACIFIC
OCEAN
WASH.
OREGON
CALIF.
140°
130°

Fig. 2. The geographical distribution of nightly fishing sets by the Tomi Maru No. 88 in 1986.

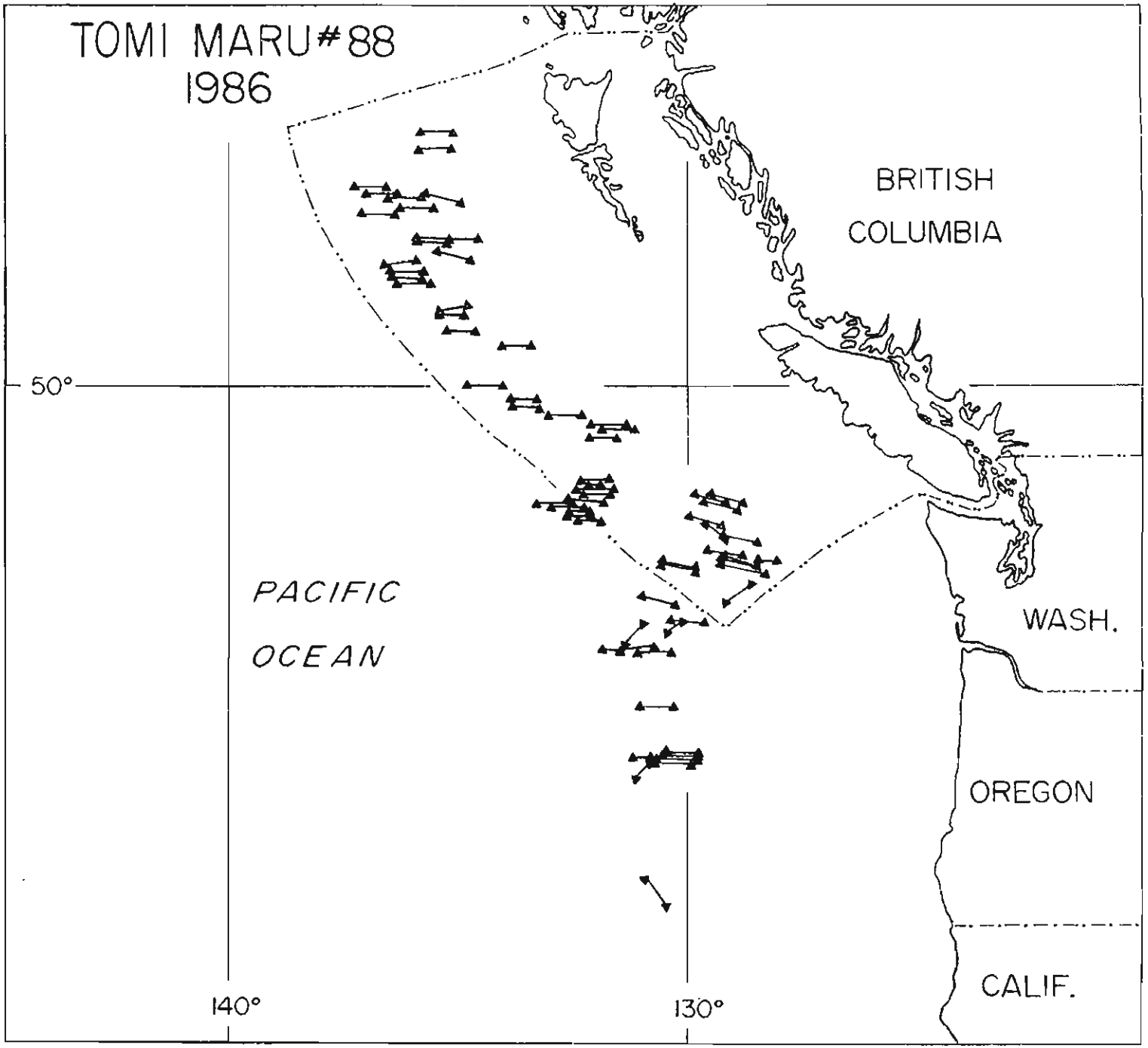

TOMI MARU#88
1986
BRITISH
COLUMBIA
50°
PACIFIC
OCEAN
WASH.
OREGON
CALIF.
140°
130°

Fig. 3. The geographical distribution of nightly fishing sets by the Ocean Pearl in 1986.

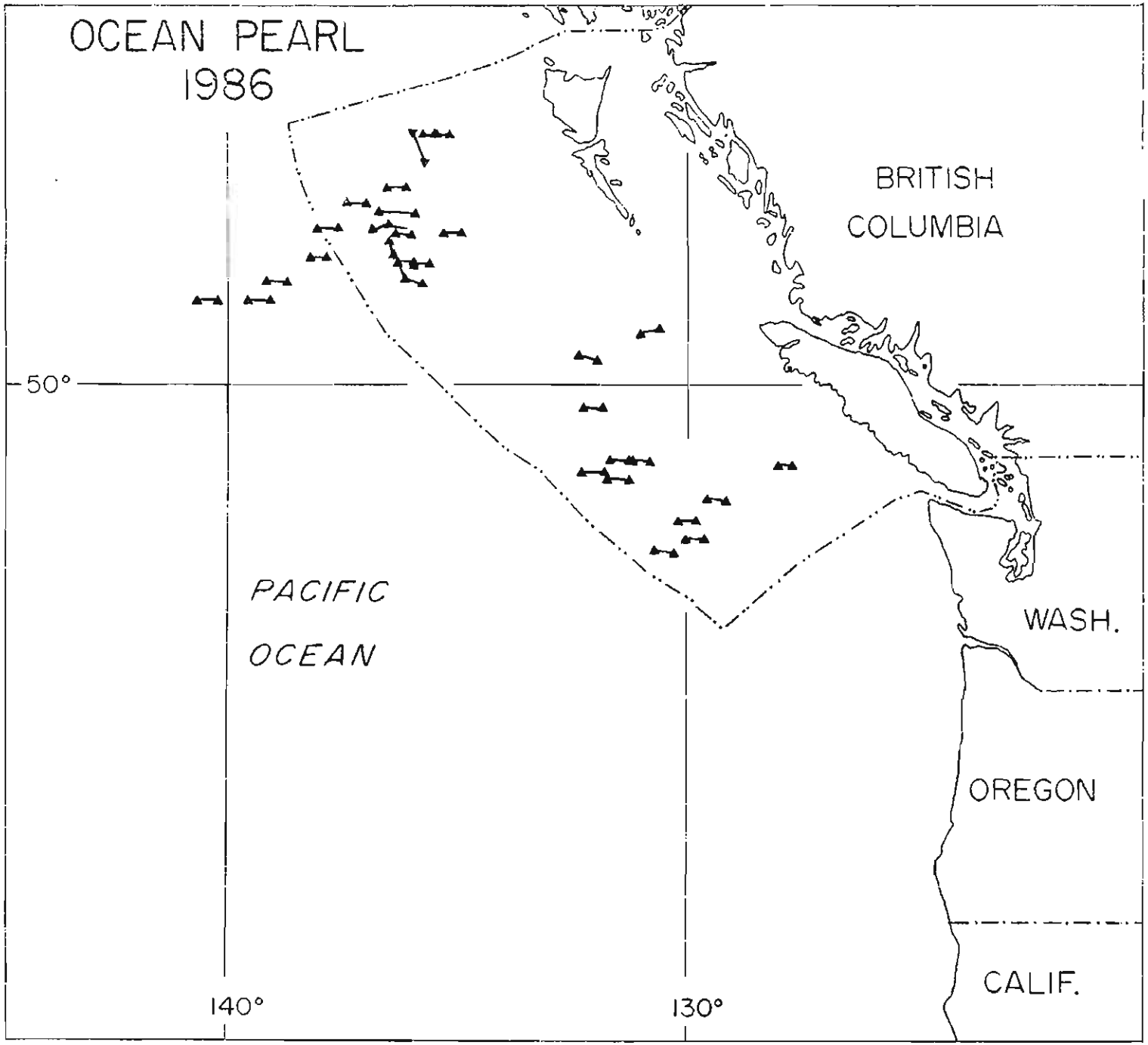
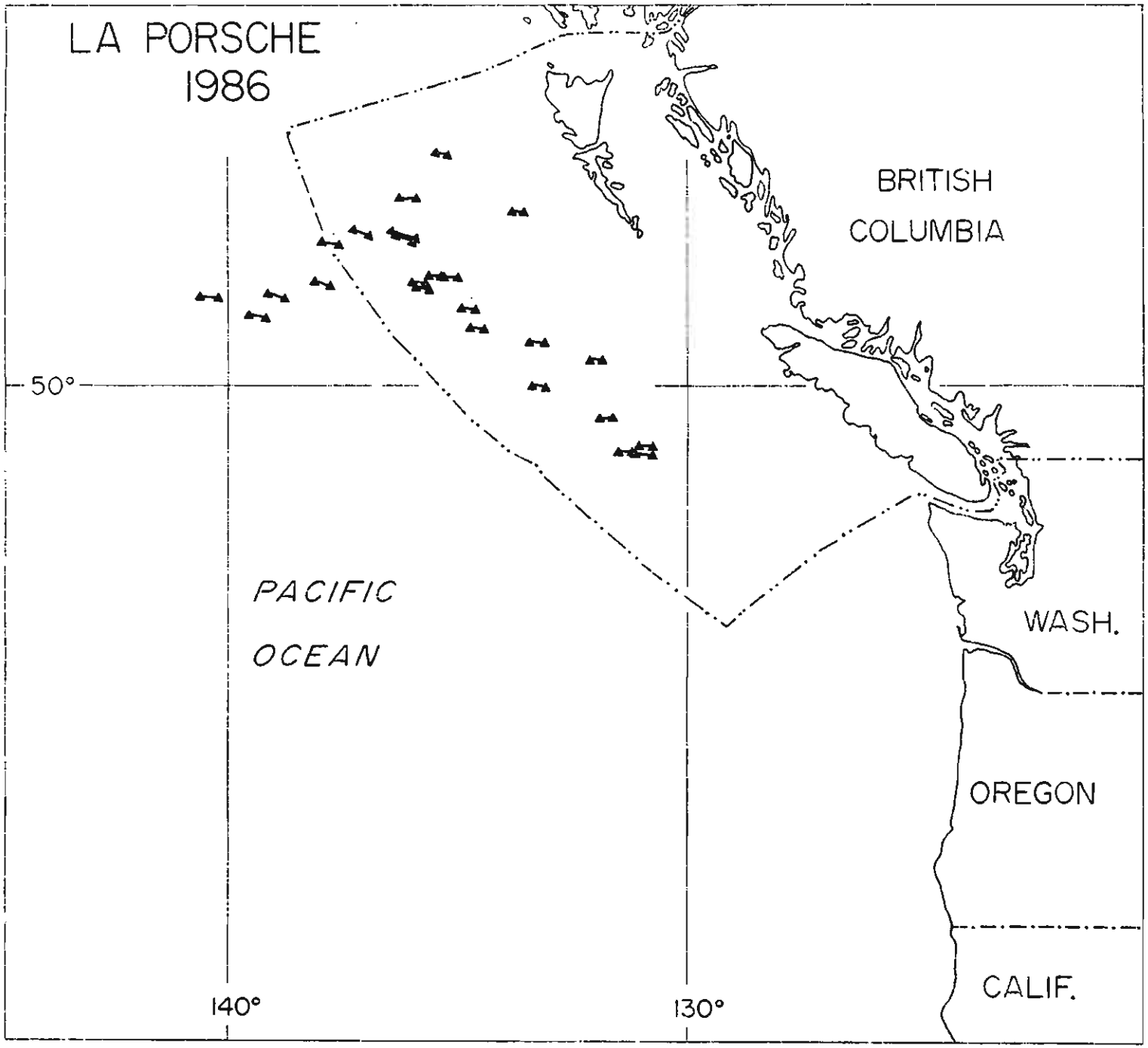

OCEAN PEARL
1986
BRITISH
COLUMBIA
50°
PACIFIC
OCEAN
WASH.
OREGON
CALIF.
140°
130°

Fig. 4. The geographical distribution of nightly fishing sets by the La Porsche in 1986.


LA PORSCHE
1986
BRITISH
COLUMBIA
50°
PACIFIC
OCEAN
WASH.
OREGON
CALIF.
140°
130°