PROGRESS REPORT FOR THE 1984 FIELD RESEARCH ON DALL'S PORPOISE INCIDENTALLY TAKEN BY THE JAPANESE SALMON MOTHERSHIP GILLNET FISHERY

Annual Report to the
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by
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Research was conducted in 1984 under the auspices of Article 10 of the International Convention of the High Seas Fisheries of the North Pacific Ocean as amended in 1978, and the Memorandum of Understanding signed in 1981 between the Governments of Japan and the United States. The areas of study by the United States were: A) censusing of marine mammal populations, particularly Dall's porpoise (Phocoenoides dalli); B) monitoring of the incidental take of marine mammals; C) collection of biological samples and data from animals incidentally taken in the salmon gillnets; D) study of response of Dall's porpoise to vessels; and E) analyses of biological specimens. This report describes the studies conducted and preliminary results of the 1983 field work.

A. Censusing of Marine Mammals.

U.S. biologists boarded three Japanese salmon research vessels for five cruises in 1984 (Table 1). Their duties were to collect data on sightings of marine mammals, observe gillnet operations and associated entanglements of marine mammals mammals and birds, and collect biological speicmens from marine mammals incidentally taken in the gillnets. U.S. biologists also boarded U.S. research vessels of the Platforms of Opportunity Program for six cruises to conduct marine mammal sighting surveys (Table 1). Sighting data were also collected aboard the NOAA ship Surveyor during the cruise dedicated to study Dall's porpoise behavior.

There were 371 cetacean and 98 pinniped sightings by U.S. biologists aboard the Japanese research vessels (Table 2). Data collected during these cruises will be provided at the annual meeting of the Scientific Subcommittee.Results of analyses will also be presented at that time.

B. Monitoring Incidental Take

Incidental take of marine mammals in the Japanese salmon mothership fishery was monitored by observers onboard catcherboats. In each mothership fleet one Japanese observer was aboard catcherboats throughout the fishing season. U.S. observers were aboard two catcherboats in each fleet after 10 June when fishing began in the U.S. FCZ.

In 1984, twenty-five percent of the catcherboats (i.e., 11) in each fleet were equipped with modified gillnets with 3 hollow strands present mid-net. One U.S. observer in each fleet was usually placed on catcherboats with modified gillnets while the other observer was placed on a vessel using a standard gillnet. Japanese observers were aboard vessels using a standard gillnet.

Each of the three U.S. observers rotated duty stations between the mothership and the catcherboats. An observer worked on the mothership for three days and then was assigned to a catcherboat for up to six days.

Scoutboats were not included in the monitoring since they did not return to the mothership daily and therefore could not meet the rotation schedule of observers.

On the catcherboats, observers collected marine mammal sighting data for determination of the distribution and abundance of marine mammals in the fishing area, and for each gillnet operation they collected data on environmental conditions, gear characteristics, and marine mammal, chinook salmon and seabird entanglements.

The total number of sets monitored in the U.S. FCZ was 363 out of about 5,694 gillnet operations (6.4%). The total for all areas was 486 out of about 8,333 (5.8%)[1]

A total of 154 Dall's porpoise were observed entangled in gillnets in the U.S. FCZ (Table 4). The largest number observed in a single set was three - a lower value than in previous years (Table 4). In about 69% of the sets, no porpoise were entangled.

Incidental take rates (the number of Dall's porpoise taken incidentally per gillnet operation) were calculated for each observer for standard and modified gillnets and using the data combined for both gear types (Table 5). The observed take rate for operations using standard gillnets varied from 0.18 to 1.40. For modified gillnets the range was similar, 0.08 to 1.33 (Table 5). Small sample sizes preclude comaprisons between individual observers for the various gear types. The observed mean take rates for modified ~~standard~~ gillnets was 0.41 (43 animals in 106 sets) and for standard gillnets was 0.43 (105 out of 245) (Table 6). Therefore there was no difference between take rates in the two types of gear.

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[1] Data on total number of gillnet operations is from report to National Marine Fisheries Service submitted by the Federation of Japan Salmon Fisheries Cooperative Association on 31 August 1984.

The incidental take of Dall's porpoise reported by the salmon mothership fishery was 2,129 inside the U.S. FCZ and 2,670 for all areas (U.S. FCZ as well as north and south of the FCZ). The take rates were 0.37 porpoise per gillnet operation in the U.S. FCZ and 0.49 per set overall.

Total incidental take of Dall's porpoise for the fishing season was estimated using data collected by observers aboard the catcherboats and total number of gillnet operations (for methodology see Jones et al., 1984). The estimated incidental take inside the U.S. FCZ is 2,443 (95% confidence limits: 1,971-2,832)(Table 7). In the Bering Sea area outside the U.S. FCZ the estimate is 342 Dall's porpoise (95% confidence limits: 205-479). The total incidental take for all areas over the season is 3,355 (95% confidence limits: 2,636-3,973)(Table 7).

U.S. biologists aboard salmon research vessels observed 76 standard research gillnet operations (10,670 tans) plus six operations with reduced number of tans used. In the standard operations eight Dall's porpoise were entangled, a take rate of 0.75 porpoise per 1,000 tans of research net (about 0.28 per 330 tans, the length of commercial gillnets).

Other species observed entangled during salmon gillnet operations were: 3 northern fur seals (Callorhinus ursinus), 1 unidentified pinniped in the mothership fishery and 4 northern fur seals onboard research vessels.

C. Research Aboard Salmon Motherships

One marine mammal biologist was onboard each Japanese salmon mothership operating inside the U.S. FCZ. These biologists collectedbiological samples and data from marine mammals taken incidentally by the fishery. They also were responsible for transmitting data on the daily incidental take of marine mammals to the U.S. National Marine Fisheries Service for monitoring catch quotas.

A total of 936 Dall's porpoise were returned and dissected onboard the four motherships inside the U.S. FCZ in 1984. Forty-five Dall's porpoise were collected aboard the motherships south of the U.S. FCZ and dissected by U.S. biologists after boarding the vessels. Japanese nationals dissected 119 Dall's porpoise during fishing operations north of the U.S. FCZ in the Bering Sea. The total number of porpoise dissected (1,100) represents about 41% of the total number of animals taken by the fishery. Approximately 23% of the animals were released alive, 28% were lost during retrieval operations, and 7% were dead but not returned to the motherships (Table 8).

D. Response of Dall's Porpoise to Survey Vessels

In 1982 and 1983, the response of Dall's porpoise to a survey vessel was studied in the inland waters of Prince William Sound, Alaska, using a chartered vessel with a helicopter. In 1984, this study was continued, and expanded to include offshore areas. The NOAA ship Surveyor with a UH1H (Bell 205) helicopter onboard operated in the eastern North Pacific approximately 150 to 200 miles offshore and in Prince William Sound from 12 June to 13 July.

The helicopter used was considerably noisier than that used previously and significantly affected the behavior of the animals. Data are currently under analysis.

E. Analyses of biological specimens

Analyses of biological specimens in 1984 have included the following:

1. Age determination of animals collected from the Bering Sea and subsamples from 1981 collected in the U.S. FCZ.
2. Completion of laboratory analysis of food habits of animals from the Bering Sea and western North Pacific.
3. Completion of examination of ovarian samples from 1983; samples from 1984 are currently being processed.
4. Identification of symbiotic diatom colonies collected from porpoise in the Bering Sea and western North Pacific in 1982; additional specimens collected in 1983 are now being examined.

Results of these analyses will be presented to the Scientific Subcommittee.

References

Jones, L. L., Bouchet, G. C., Rice, D. W. and A. A. Wolman. 1984. Progress Report on Studies of the Incidental Take of Marine Mammals particularly Dall's porpoise by the Japanese Salmon Fisheries, 1978-1983. Doc. submitted to the Scientific Subcommittee of the Ad Hoc Committee on Marine Mammals, International North Pacific Fisheries Comm. 62 pp.

TABLE 1.--Dall's Porpoise Sighting Surveys Aboard Japanese and U.S. Platforms of Opportunity Program Research Vessels, 1984.

Vessel	Dates	Area
NOAA Ship *Surveyor*	3 May-31 May	eastern North Pacific
Oshoro Maru	6 June-8 July	Japan to Juneau, Alaska
Oshoro Maru	13 July-4 Aug	Alaska to Hawaii
Oshoro Maru	10 Aug-22 Aug	Hawaii to Japan
Kumamoto Maru	18 June-27 July	western North Pacific
Iwaki Maru	3 June-6 July	western North Pacific
NOAA Ship *Surveyor*	12 June-3 July	eastern North Pacific

TABLE 2.--Marine mammal species sighted by U.S. scientists aboard Japanese salmon research vessels, 1984 (excluding last segment of *Oshoro Maru* cruise).

Species	Number of sightings	Number of individuals	Mean group size
Dall's porpoise (*dalli* type)	88	303	3.4
Dall's porpoise (*truei* type)	11	22	2.0
Dall's porpoise (mixed group)	2	17	8.5
Dall's porpoise, unknown type	183	661	3.6
Total	284	1,003	3.5
Northern right whale dolphin	1	10	10.0
Pacific whitesided dolphin	3	70	23.3
Bottlenose dolphin	1	8	8.0
Common dolphin	3	145	48.3
Unidentified porpoise/dolphin	14	46	3.3
Sperm whale	4	8	2.0
Humpback whale	10	42	4.2
Killer whale	9	31	3.4
Shortfinned pilot whale	1	25	25.0
Minke whale	8	10	1.3
Right whale	1	1	1.0
Fin whale	2	7	3.5
Sei whale	1	5	5.0
Unidentified large whale	17	28	1.6
Unidentified small whale	16	27	1.7
Unidentified whale	12	14	1.2
Total Cetaceans	387		
Northern fur seal	88	101	1.1
Northern sea lion	6	7	1.2
Unidentified otariid	3	3	1.0
Unidentified pinniped	1	1	1.0
Total Pinnipeds	98		

TABLE 3.--Summary of gillnet operations observed in 1984 by U.S. and Japanese marine mammal observers onboard catcherboats of the Japanese salmon mothership fishery.

Mothership	Area	No. of operations	Numbers of sets observed	Number of days of no fishing	Retrieval dates with no U.S. observer
Jinyo Maru					
	South of FCZ	344	7	0	
	U.S. FCZ-S	1,419	96	2	Jun 10, Jul 7, 25
	U.S. FCZ-N	0	0	0	
	Bering Sea[1]	344	24	3	
	TOTAL	2,107	127	5	
Kizan Maru					
	South of FCZ	300	7	2	
	U.S. FCZ-S	1,345	86	5	Jun 10, Jul 9, 24
	U.S. FCZ-N	49	3	0	
	Bering Sea[1]	330	24	1	
	TOTAL	2,024	120	8	
Meiyo Maru					
	South of FCZ	344	8	0	
	U.S. FCZ-S	1,244	85	5	Jun 10, Jul 16, 25
	U.S. FCZ-N	85	4	1	
	Bering Sea[1]	342	24	0	
	TOTAL	2,015	121	6	
Nojima Maru					
	South of FCZ	344	8	0	
	U.S. FCZ-S	1,353	87	4	Jun 10, Jul 19, 25
	U.S. FCZ-N	44	3	1	
	Bering Sea[1]	286	20	0	
	TOTAL	2,027	118	5	

[1] Bering Sea is defined as the area north of the U.S. Fishery Conservation Zone (FCZ).

TABLE 4. Frequency of numbers of Dall's porpoise entangled per gillnet set in the U.S. Fishery Conservation Zone, 1981-1984. Data collected by marine mammal observers onboard catcherboats of the Japanese salmon mothership driftnet fishery in the western North Pacific.

Year	Number of porpoise per observed set									Total sets	Date fishing ended
	0	1	2	3	4	5	6	7	8		
1981	309	72	14	5	0	1	0	0	0	401	26 July
1982	271	114	32	19	7	3	1	0	1	443	30 July
1983	256	101	30	6	1	1	0	0	0	395	28 July
1984	251	79	24	9	0	0	0	0	0	363	26 July

TABLE 5. Incidental take rates of Dall's porpoise collected by observers in the Japanese salmon mothership driftnet fishery in 1984. Number of operations observed in parentheses.

A. U.S. Fishery Conservation Zone, Standard Gillnets

Observer	Mothership Jinyo	Kizan	Meiyo	Nojima
1	0.83 (12)	0.33 (9)	1.40 (5)	0.50 (4)
2	0.33 (10)	0.50 (6)	0.18 (11)	0.33 (6)
3	0.47 (15)	0.50 (10)	0.30 (10)	0.32 (19)
4	0.56 (34)	0.39 (31)	0.37 (30)	0.19 (31)
5	-	-	1.00 (1)	1.00 (1)
Mean	0.58 (37)	0.41 (56)	0.42 (57)	0.28 (61)

B. U.S. Fishery Conservation Zone, Hollow Tube Gillnets

Observer	Mothership Jinyo	Kizan	Meiyo	Nojima
1	0.14 (7)	0.50 (4)	0.08 (12)	0.18 (11)
2	0.58 (12)	0.75 (12)	0.30 (10)	0.46 (13)
3	1.33 (6)	0.40 (10)	0.11 (9)	-
Mean	0.64 (25)	0.54 (26)	0.16 (31)	0.33 (24)

C. U.S. Fishery Conservation Zone, All Gear Types

Observer	Mothership Jinyo	Kizan	Meiyo	Nojima
1	0.58 (19)	0.45 (20)	0.47 (17)	0.30 (20)
2	0.36 (22)	0.61 (18)	0.24 (21)	0.42 (19)
3	0.81 (21)	0.45 (20)	0.21 (19)	0.32 (19)
4	0.58 (33)	0.39 (31)	0.37 (30)	0.19 (31)
5	-	-	1.00 (1)	1.00 (1)
Mean	0.57 (96)	0.46 (89)	0.33 (88)	0.30 (90)

TABLE 6.--Frequency of numbers of Dall's porpoise entangled per observed gillnet set in standard and modified gillnets in 1984. Percent of total numbers is in parentheses.

Type of gillnet	Number of porpoise per observed set				Total entangled	Total sets
	0	1	2	3		
Standard	166 (68)	58 (24)	16 (7)	5 (2)	105	245
Modified	77 (73)	18 (17)	8 (8)	3 (3)	43	106
Acoustic generators	8 (67)	3 (25)	0	1 (8)	6	12

TABLE 7.--Reported and estimated incidental take and (95% confidence limits of Dall's porpoise by the Japanese mothership fishery based on observed take rates and total fishing effort by area in 1981-1984. Reported incidental take is from annual reports to the International North Pacific Fisheries Commission by the Japan Fisheries Agency.

	U.S. FCZ			All Areas		
Year	Reported	Estimated[1]	n	Reported	Estimated	n
1980	838	5,888	18	1,000	8,970	18
1981	1,136	1,850	398	1,361	1,862	462
		(1,493-2,206)			(2,100-3,109)	
1982	2,395	4,187	414	3,189	5,903	475
		(3,494-4,881)			(4,924-6,879)	
1983	2,399	2,906	413	2,986	4,280	478
		(2,442-3,389)			(3,562-4,997)	
1984	2,129	2,443	363	2,670	3,355	486
		(1,971-2,832)			(2,636-3,973)	

[1] Estimate based upon data of four observers per mothership fleet in 1981-1984 in U.S. FCZ; one observer monitoring 4 or 5 gillnet operations per fleet in 1980. Estimate for "All areas" is based on observed rates in U.S. FCZ.

TABLE 8.--Reported incidental take of Dall's porpoise and fishing effort by Japanese salmon mothership and landbased fisheries and salmon research vessels, 1978-1984. Data from annual reports to the International North Pacific Fisheries Commission by the Japan Fisheries Agency.

	Mothership fishery												
	U.S. Fishery Conservation Zone				Bering Sea				All Areas				
Year	Effort tans[1]	Incidental Take			Effort tans[1]	Incidental Take			Effort tans[1]	Incidental Take			
		Dead	Alive	Lost		Dead	Alive	Lost		Dead	Alive	Lost	Total
1978	1.68	333	-	20	0.19	20	-	7	2.73	353	-	146	499
1979	2.00	600	-	-	0.34	15	-	24	2.80	622	-	61	683
1980	2.14	806	-	32	0.55	66	-	25	3.15	924	-	75	999
1981	2.02	690	158	288	0.39	60	30	54	2.90	792	200	362	1,354
1982	2.05	1,284	366	745	0.49	207	114	267	2.94	1,594	505	1,090	3,189
1983	2.05	1,201	452	746	0.47	152	101	198	2.96	1,429	574	983	2,986
1984	1.88	1,071	479	579	0.43	149	100	116	2.75	1,304	621	745	2,670

Landbased Fishery

Year	Effort tans[1]	Incidental Take	% of Mothership Take
1978	3.37	303	0.61
1979	3.22	127	0.19
1980	3.14	139	0.14
1981	3.23	696	0.51
1982	2.96	1,641	0.52
1983	3.11	1,291	0.43

Research Vessels

Effort tans[1]	Incidental Take	Take Rate per 330 tans
44,622	27	0.20
34,615	20	0.19
38,080	56	0.49
40,739	25	0.20
40,262	50	0.41
39,730	33	0.27

[1] Tans x 10^6, where 1 tan equals 50 m.