

RESEARCH REPORT ON 1987 RESEARCH ON DALL'S PORPOISE

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by

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Research was conducted in 1987 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 1987 between the Governments of Japan and the United States. Areas of study by the United States were 1) incidental take of marine mammals by the Japanese salmon mothership fishery and high seas squid gillnet fisheries; 2) collection of biological specimens and data from marine mammals incidentally taken; and 3) collection of marine mammal sightings data.

MONITORING INCIDENTAL TAKE

The U.S. monitoring program was modified to improve the accuracy of the estimates of incidental take of Dall's porpoise in the U.S. Exclusive Economic Zone. With the revised monitoring program, estimates of incidental take will be within +/- 10% of the true value with 90% confidence limits.

In 1987, 5 U.S. and 1 Japanese observer monitored the incidental catch of marine mammals and other species in each of the three mothership salmon fleets inside the U. S. EEZ. Outside the EEZ, one Japanese observer in each mothership fleet recorded the incidental take of marine mammals. A total of 303 gillnet sets (11%) were monitored inside the U.S. EEZ in 1987 (Table 1).

Fishing began in 12 June 1987 inside the EEZ and ended on 12 July. Fishing outside the EEZ in the Bering Sea began on 1 July. Fishing effort was low inside the U.S. EEZ for the remainder of the season, with only 11 fleet days occurring after 1 July.

Using the mean observed take rate (0.26 porpoise per set) and total number of fishing operations inside the EEZ, an estimated take of 741 Dall's porpoise (95% confidence limits: 558-925) (Table 2) was calculated for the 1987 fishing season inside the U.S. EEZ, including north of the Aleutian Islands where Bering Sea stock of Dall's porpoise probably occur. This estimate is calculated in the same way as estimates from previous years (Jones et al. 1986). The total incidental take of Dall's porpoise inside the U.S. EEZ reported by the fishery was 676. In addition, 43 Dall's porpoise were reported taken south of the EEZ, and 82 north of the EEZ in the Bering Sea, for a total reported take of 801 Dall's porpoise (Table 2).

Under the 1987 U.S. Marine Mammal Protection Act permit, there are separate quotas in the U.S. EEZ for the North Pacific and Bering Sea stocks of Dall's porpoise. The quota for the North Pacific stock is 5250 for the period from 1987 to 1989, with no more than 2494 porpoise to be taken in any one year. The quota for the Bering Sea stock in the U.S. EEZ is 789 porpoise during the three year period, with no more than 448 to be taken in any one year.

Estimates of the incidental take by subarea and stock of Dall's porpoise were made (Table 1). Although the take rates varied substantially between subareas, the take rates for the two porpoise stocks were similar. The estimated incidental take for the North Pacific stock is 796 and for the Bering Sea stock, 240 porpoise.

The low take rate inside the EEZ compared to other years (Figure 1) could be related to the difference in the fishing periods between different years. Therefore, incidental take rates for the month of June for each year were calculated to compare rates for this time period. Take rates for June inside the EEZ varied from 0.26 (1987) to 0.54 (1985) (Table 3). The conclusion is that the low take rate for 1987 was not due to the timing of the fishing effort inside the EEZ. Other factors such as water temperature and distribution of the fishing effort will be examined.

Two types of nets were used in the fishery in 1987. Nine catcherboats (21%) in each fleet used nets with three strands of multifilament material along the midline of the net sections. The remaining vessels used three strands of hollow tube material along the midline. One observer in each fleet monitored the multifilament nets while the remaining observers monitored hollow tube nets. Observed catch rates by individual observers varied from 0.07 to 0.67 porpoise per set in the hollow tube nets (Table 4). There was more variation in the rates for the multifilament nets, reflecting the smaller sample sizes. The observed take rates for the multifilament nets were 0 to 1.25 porpoise per set (Table 4).

The take rates of the two types of nets were compared using the Chi Square Goodness of Fit Test. The take rate for the hollow tube nets was 0.24 (n = 242) and for the multifilament nets was 0.34 (n = 61) (Table 4). There was no significant difference between the two types of nets.

The maximum number of porpoise caught in one gillnet set in 1987 was 3 (Table 5). The largest number seen in one set was 8 in 1982.

Of the porpoise not returned by the catcherboats to the motherships, 24% (194) were released alive, 30% (240) were lost during retrieval operations, and 3% were not returned by the scoutboats.

One northern fur seal was caught and released alive in good condition. In addition 8 northern fur seals were momentarily entangled (generally for less than 30 sec) while playing in the net near the catcherboats during the retrieval. The animals either freed themselves or were freed by manipulation of the net in the water by the fishermen. One harbor porpoise was taken (dead) in the gillnets.

RESEARCH ONBOARD SALMON MOTHERSHIPS

One U.S. marine mammal biologist was onboard each Japanese salmon mothership operating inside the U.S. EEZ to collect biological data and samples from all marine mammals returned by the catcherboats to the

mothership. When the mothership operated outside the U.S. EEZ in the Bering Sea, a Japanese national trained by the U.S. biologist collected samples and data from the porpoise.

A total of 348 Dall's porpoise including 1 truei-color type, and 1 harbor porpoise were examined on the motherships in 1987. This represents 43% of the total reported incidental take and 34% of the estimated incidental take of the mothership fishery. Of the porpoise examined, 17 (5%) were caught south of the U.S. EEZ, 13 (4%) in the northern U.S. EEZ, 25 (7%) in the Bering Sea north of the U.S. EEZ and 293 (84%) in the southern U.S. EEZ. Three newborn porpoise were returned to the motherships, the earliest on 29 June.

COLLECTION OF SIGHTINGS DATA

Marine mammal and debris sightings were collected aboard Japanese salmon catcherboats and research vessels, and U.S., Korean and Taiwanese research vessels. In the salmon mothership fishery, there were approximately 677 hours of sighting surveys conducted.

There were 7 sightings of gillnet, 3 of trawl net, 1 of cargo net and 1 unidentified net in the salmon mothership fishing area. There was one entanglement (animal could not be identified) in a piece of trawl net.

ADDITIONAL RESEARCH

Two research cruises dedicated to Dall's porpoise research were conducted in 1987. A study of the accuracy of angle and distance estimations during marine mammal sighting surveys was conducted in southeast Alaska from 21 March to 4 April. Devices to improve the estimates were tested.

The second cruise was a study of the distribution of Dall's porpoise, northern fur seals and other marine mammals and seabirds in the squid fishing area in October. Oceanographic and prey resource data were also collected to relate marine mammal distribution to oceanographic conditions and prey abundance.

Four cooperative research cruises on foreign vessels were conducted in the squid fishing area during the squid fishing season in 1986 and in 1987. During the 1986 cruises, 1,485 km of gillnet were fished, the equivalent of approximately 99 salmon gillnet sets. During these operations 9 Dall's porpoise (take rate of 0.09 porpoise per 15 km of gillnet), 16 northern fur seals (0.16 per 15 km), 8 Pacific white-sided dolphins (0.08 per 15 km), and 43 northern right whale dolphins (0.43 per 15 km) and 1 striped dolphin were taken. Results for the 1987 cruises are not currently available.

SUMMARY

Based on 303 (out of 2,808) observed gillnet sets in the U.S. EEZ, the incidental kill rate of Dall's porpoise in 1987 was 0.26 porpoise per gillnet set. The estimated incidental take in the western North Pacific was 796 (quota in the U.S. EEZ was 2494 in any one year) and 240 in the Bering Sea (quota in the U.S. EEZ was 448 in any one year). The majority of the porpoise in the Bering Sea area were taken outside the U.S. EEZ. One northern fur seal was caught and released alive. One harbor porpoise was taken dead. Nine vessels in each mothership fleet used nets with three strands of multifilament material along the midline of the net, while the remaining vessels used nets with three strands of hollow tubes along the midline. The take rates for the multifilament nets observed was 0.34 porpoise per set and 0.24 for the hollow tube nets. There was no significant difference between the two types of nets.

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TABLE 1: Incidental Take Rates of Dall's Porpoise by Area and Porpoise Stock in the Japanese Salmon Mothership Fishery, 1987. Data collected by U.S. and Japanese observers on salmon catcherboats. N is the number of observations.

Area ¹	N	Take Rate	95% Confidence Limits	Estimated Take
South of U.S. EEZ	9	0.11		42
EEZ-S	296	0.26	0.20-0.33	697
EEZ-N	7	0.57		74
Bering Sea	<u>17</u>	0.18	0.03-0.38	<u>125</u>
TOTAL	329			938
No. Pacific stock	305	0.26	0.20-0.33	796
Bering Sea stock	<u>24</u>	0.29	0.10-0.49	<u>240</u>
TOTAL	329			1,036

- 1) EEZ-S = area south of the Aleutian Islands south of 53°N within the U.S. EEZ.
 EEZ-N = area north of the Aleutian Islands north of 53°N within the U.S. EEZ.
 Bering Sea = area north of 56°N

Table 2.--Incidental take of Dall's porpoise by Japanese salmon gillnet fisheries.

A. U.S. EEZ by Mothership Fishery

Year	Fish. effort ¹	No. of sets	No. dead ²	Reported by Japan			Estimated from observer data (95% Conf. limits)
				Alive	Lost	Total	
1978	1.68	5,091	333	-	20	353	-
1979	.00	6,060	600	-	-	600	-
1980	2.14	6,543	806	-	32	838	-
1981	2.02	6,121	690	158	288	1,136	1,850 (1,493-2,206)
1982	2.05	6,217	1,284	366	745	2,395	4,187 (3,494-4,881)
1983	2.05	6,217	1,201	452	746	2,399	2,906 (2,442-3,389)
1984	1.88	5,694	1,071	479	579	2,129	2,443 (1,971-2,832)
1985	1.87	5,670	1,091	597	735	2,423	2,760 (1,710-3,517)
1986	1.52	4,621	857	332	418	1,607	1,456 (1,155-1,798)
1987	0.93	2,808	323	157	196	676	741 (558- 925)

B. All areas by Mothership Fishery

Year	Fish. effort ¹	No. of sets	No. dead ²	Reported by Japan			Estimated from observer data (95% Conf. limits)
				Alive	Lost	Total	
1978	2.72	8,284	353	-	146	499	-
1979	2.80	8,611	622	-	61	683	-
1980	3.15	9,551	924	-	75	999	-
1981	2.90	8,788	792	200	362	1,354	2,862 (2,100-3,109)
1982	2.94	8,909	1,594	505	1,090	3,189	5,903 (4,924-6,879)
1983	2.95	8,967	1,429	574	983	2,986	4,280 (3,562-4,997)
1984	2.74	8,333	1,304	621	745	2,670	3,355 (2,636-3,973)
1985	2.31	7,048	1,213	690	844	2,747	3,239 (1,856-4,349)
1986	1.92	5,814	988	393	484	1,865	1,719 (1,224-2,160)
1987	1.18	3,888	367	194	240	801	1,011 (739-1,244)

C. Landbased fishery

Year	Fish. effort ¹	Reported by Japan	Estimated based on mothership data
1978	3.37	303	-
1979	3.22	127	-
1980	3.14	139	-
1981	3.23	696	2,936
1982	2.96	1,691	6,010
1983	3.11	1,291	4,429
1984	2.26	813	3,356
1985	2.44	781	2,979
1986	1.44	404	1,392

¹ Effort in millions of tons where 1 ton equals about 50 m length.² The majority of animals in this category are returned to the mothership for examination.

Table 3: Incidental Take Rates of Dall's Porpoise by the Japanese Salmon Mothership Fishery in the U.S. Exclusive Economic Zone for the Month of June and for All Season, 1981-1987. Numbers in parentheses are sample sizes.

YEAR	TAKE RATES	
	JUNE	SEASON
1981	0.28 (221)	0.29 (398)
1982	0.46 (195)	0.64 (409)
1983	0.42 (185)	0.46 (420)
1985	0.35 (187)	0.43 (355)
1986	0.53 (155)	0.47 (373)
1987	0.26 (256)	0.26 (303)

TABLE 4. Observed incidental take rates of Dall's porpoise by the Japanese salmon mothership fishery, 1987. Number of observed gillnet sets in parentheses.

A. U.S. Exclusive Economic Zone, Hollow-tube nets				
Observer	KIZAN	MEIYO	NOJIMA	
1	0.43 (7)	0.67 (9)	0.20 (15)	
2	0.07 (14)	0.18 (11)	0.39 (13)	
3	0.08 (12)	0.36 (11)	0.08 (13)	
4	0.08 (13)	0.27 (11)	0.33 (12)	
5	0.31 (13)	0.06 (16)	0.33 (10)	
6	0.25 (20)	0.24 (21)	0.33 (21)	
Mean	0.22 (79)	0.27 (79)	0.28 (84)	0.24 (242)

B. U.S. Inclusive Economic Zone, Multifilament nets				
Observer	KIZAN	MEIYO	NOJIMA	
1	0.40 (10)	0 (6)	0 (1)	
2	0 (1)	0 (4)	0.50 (4)	
3	0.25 (4)	0.75 (4)	1.25 (4)	
4	1.00 (4)	0.25 (4)	0 (4)	
5	0.25 (4)	-	0 (7)	
6	-	-	-	
Mean	0.43 (23)	0.22 (18)	0.35 (20)	0.34 (61)

C. U.S. Exclusive Economic Zone, All Gear				
Observer	KIZAN	MEIYO	NOJIMA	
1	0.41 (17)	0.40 (15)	0.19 (16)	
2	0.07 (15)	0.13 (15)	0.41 (17)	
3	0.31 (16)	0.47 (15)	0.35 (17)	
4	0.12 (17)	0.27 (15)	0.25 (16)	
5	0.29 (17)	0.06 (16)	0.18 (17)	
6	0.25 (20)	0.24 (21)	0.33 (21)	
Mean	0.26 (102)	0.26 (97)	0.29 (104)	0.26 (303)

D. Bering Sea				
	KIZAN	MEIYO	NOJIMA	Total
Outside				
U.S.EEZ	0.17 (6)	0.33 (6)	0 (5)	0.18 (17)
Northern				
U.S. EEZ	0.50 (6)	1.00 (1)	-	0.57 (7)
Mean	0.33 (12)	0.43 (7)	0 (5)	0.29 (24)

FIGURE 1. Incidental take rates of Dall's porpoise in Japanese salmon gillnets in the North Pacific, U.S. Exclusive Economic Zone. Vertical bars are the 95% confidence limits for the combined gillnets.

