

## Composition of the Incidental Kill of Small Cetaceans in the US Purse-Seine Fishery for Tuna in the Eastern Tropical Pacific During 1989

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### ABSTRACT

The composition of the 1989 incidental kill of small cetaceans during 123 fishing trips by the US tuna purse-seine fleet is given by area, species, stock, sex, length, and, for females, reproductive condition. This year was the first of three consecutive years (1989-1991) in which 100% of the fishing trips will be observed. Mortality was reported for spotted dolphins from the northern offshore and southern stocks, spinner dolphins from the eastern stock and northern and southern whitebelly stocks, common, striped, bottlenose and rough-toothed dolphins and a short-finned pilot whale. The number of females from which reproductive samples were collected and for which species/stock was known increased from 767 in 1988 to 1,323 in 1989.

### INTRODUCTION

Dolphins have been taken incidentally in the yellowfin tuna purse-seine fishery in the eastern tropical Pacific Ocean (ETP) since 1959. National Marine Fisheries Service (NMFS) biological technicians have observed at least some of the fishing trips on US vessels since 1968 for the collection of data on mortality, stock identity and life history and have done so in a systematic manner for estimates of fishing mortality since 1975 (Lo *et al.*, 1982). In January 1979, the Inter-American Tropical Tuna Commission (IATTC) began a complementary program on US and non-US vessels and has reported on the total mortality of dolphins in recent years (Hall and Boyer, 1986; 1987; 1988; 1989; 1990).

The composition of the observed kill of dolphins has been reported to the IWC by the NMFS since 1979 (Perrin and Oliver, 1982; Oliver *et al.*, 1983; Wahlen *et al.*, 1986; 1987; 1988; Chivers *et al.*, 1989; 1990). The dolphin species primarily taken are spotted dolphins (*Stenella attenuata*), spinner dolphins (*S. longirostris*) and common dolphins (*Delphinus delphis*), while several other species are taken in low numbers. This report documents the composition of the observed kill on US-registered vessels during 1989.

### METHODS

Data were collected by IATTC and NMFS biological technicians (observers) aboard US-registered tuna purse-seine vessels in the ETP. In previous years, only a sample of the vessels carried observers (Lo *et al.*, 1982) except for 1987 when virtually all fishing trips on US vessels were observed. In 1989, a 3-year program of 100% observer coverage began. However, three 1989 trips were not observed in their entirety. These trips departed in late 1988 and were not initially scheduled to carry observers. Observers were placed on these vessels between 4-21 January 1989. Only 44 of 6,708 fleet days (0.01%) were not observed during 1989.

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The observers collect an extensive set of data on the location, date, time and circumstances of each set as well as information on the school of dolphins. The number of dolphins killed during a set in which mortality occurred is tallied with, when possible, data on the stock, sex and, for spotted dolphins, relative age (colour phase). A subset of the animals killed is brought on board the tuna vessel making them available for the collection of life-history data and samples. The procedures for collection of life-history data have been described by Perrin *et al.* (1976). Samples of data-collection forms are given in Perrin and Oliver (1982), although the life-history form has changed since that report (Fig. 1).

The number of small cetaceans observed killed has been summarised by geographic area, species, sex and length as in previous years' reports and described by Henderson *et al.* (1980). Reproductive condition for females has been summarised by species. For spotted and spinner dolphins, data on kill and reproductive condition have also been stratified by stock using the stock designations of Perrin *et al.* (1985).

### RESULTS

There were 123 trips on US-registered tuna purse-seine vessels fishing in the ETP during 1989, 106 of which reported dolphin kill. These trips resulted in an observed kill of 12,548 small cetaceans. The geographic distribution of purse-seine sets with kill observed is shown by 5° block (Fig. 2) and by species/stock and sex, when available (Tables 1-2).

Life-history data were collected on 90 trips. Data were collected from spotted, spinner, common, striped (*S. coeruleoalba*), and bottlenose (*Tursiops truncatus*) dolphins. This represented a sample of 1,756 females for which length data and/or reproductive samples were collected and 1,384 males for which length was collected, excluding 44 spinner dolphins for which stock was unidentified (Tables 3 and 4). No life-history data were collected from 13 rough-toothed dolphins (*Steno attenuata*) or one pilot whale (*Globicephala macrorhynchus*) observed killed. No reproductive data or samples were collected from striped or bottlenose dolphins.



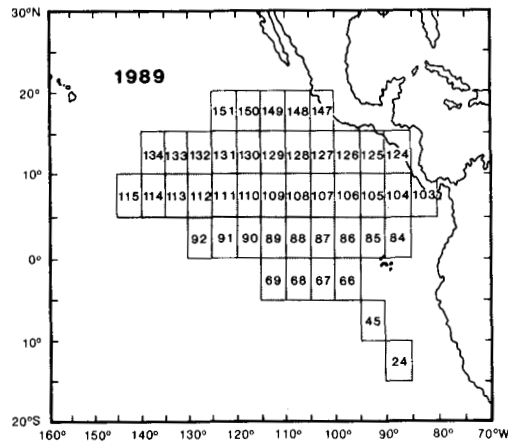


Fig.2. Geographic distribution of the observed incidental kill of dolphins during 1989 on US-registered vessels by 5° block. The numbered blocks without shading are regions where incidental kill was observed but no life-history data were collected. The shaded blocks show those regions where life-history data as well as mortality data, were collected.

Table 2  
Total kill of common, striped bottlenose, rough-toothed and unidentified dolphin species by sex (M = male, F = female) and geographic location (number of the corresponding 5° square shown in Figure 2). One short-finned pilot whale of unknown sex was taken in block 106.

5° block	Common			Striped			Bottlenose			Rough-toothed			Unidentified		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
66	0	0	0	8	3	31	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
90	0	0	0	1	5	7	0	0	0	0	0	0	0	0	0
103	15	22	66	0	0	0	0	0	0	0	0	0	0	0	0
104	99	89	530	0	0	0	0	0	0	0	0	0	0	0	4
105	35	49	563	0	0	0	0	0	0	0	0	13	0	0	0
106	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
110	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
112	0	1	1	9	4	15	0	0	0	0	0	0	0	0	18
113	0	1	1	0	0	0	0	0	0	0	0	0	0	0	28
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
124	3	5	19	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	1	2	0	0	0	0	0	14
126	0	0	0	0	0	0	2	3	6	0	0	0	0	0	0
127	0	0	0	0	0	0	6	2	15	0	0	0	0	0	22
128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
131	0	0	0	1	2	3	0	0	0	0	0	0	0	0	10
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	152	167	1,180	19	14	56	8	6	28	0	0	13	0	0	170

Table 3

Length frequencies of dolphins for which species/block was known. Forty-four (44) spinner dolphins with stock unidentified were excluded. No kill was reported for coastal spotted dolphins.

Length (cm)	Northern offshore spotted		Southern offshore spotted		Eastern spinner		Northern whitebelly spinner		Southern whitebelly spinner		Common		Striped		Bottlenose	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-74	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
75-79	1	3	0	0	0	0	2	2	1	0	0	0	0	0	0	0
80-84	3	3	0	0	1	0	0	3	5	0	0	0	0	0	0	0
85-89	6	4	0	0	0	0	1	1	4	2	0	0	0	0	0	0
90-94	6	7	0	0	0	0	2	1	0	0	0	0	0	0	0	0
95-99	6	3	0	0	2	0	0	3	2	0	0	0	0	0	0	0
100-104	4	9	0	0	2	0	1	1	4	0	0	1	0	0	0	0
105-109	9	3	0	1	1	1	3	1	0	0	0	1	0	0	0	0
110-114	5	7	0	0	0	0	1	2	0	0	0	0	0	0	0	0
115-119	4	5	1	2	0	5	1	1	0	0	1	0	0	0	0	0
120-124	16	11	1	0	1	3	1	1	1	0	2	0	0	0	0	0
125-129	6	8	0	1	2	4	3	3	0	0	1	2	0	0	0	0
130-134	15	13	1	1	3	4	2	2	0	0	2	1	0	0	0	0
135-139	13	14	0	0	4	2	5	6	4	1	0	1	0	0	0	0
140-144	13	12	0	1	3	4	7	4	2	1	0	1	0	0	0	0
145-149	24	22	1	0	15	17	14	7	1	1	3	0	0	0	0	0
150-154	19	29	1	1	10	20	11	8	1	1	3	1	0	0	0	0
155-159	52	37	1	1	19	19	27	19	1	3	4	4	0	0	0	0
160-164	61	55	1	2	21	28	26	40	1	2	2	8	0	1	0	0
165-169	57	61	2	1	18	37	32	44	3	7	12	0	0	0	0	0
170-174	73	81	0	3	27	27	35	60	5	15	6	11	0	0	0	0
175-179	51	99	3	5	27	19	37	57	9	14	9	11	1	2	0	0
180-184	61	131	0	9	17	10	26	26	16	11	11	7	2	2	0	0
185-189	46	151	1	8	6	1	19	11	13	9	8	13	3	1	0	0
190-194	47	119	3	1	0	11	4	4	3	10	18	1	0	0	0	0
195-199	38	61	0	1	2	0	0	1	1	0	14	21	4	2	0	0
200-204	46	12	1	1	0	0	0	0	0	0	8	8	0	1	0	0
205-209	35	5	0	0	0	0	0	0	0	0	7	6	0	1	0	0
210-214	11	1	1	0	0	0	0	0	0	0	2	3	2	1	0	0
215-219	3	1	0	0	0	0	0	0	0	0	3	0	2	1	0	0
220-224	2	0	0	0	0	0	0	0	0	0	4	1	1	0	0	0
225-229	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
230-234	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
235-239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240-244	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	716	968	18	43	182	201	267	309	74	70	109	131	18	12	0	2

Table 4

Reproductive condition of female dolphins for which reproductive samples were collected. 'Maturity undetermined' indicates that some life-history data (such as length) but not complete sets of gonads were collected.

Reproductive condition	Northern offshore spotted		Southern offshore spotted		Eastern spinner		Northern whitebelly spinner		Southern whitebelly spinner		Common	
	N	%	N	%	N	%	N	%	N	%	N	%
Maturity undetermined	256	25.9	12	24.5	62	30.5	66	21.4	17	22.4	20	15.2
Sexually immature	275	27.9	13	26.5	94	46.3	100	32.4	21	27.6	60	45.5
Sexually mature												
Pregnant only	134	13.6	3	6.1	13	6.4	25	8.1	6	7.9	9	6.8
Pregnant and lactating	19	1.9	2	4.1	2	1.0	5	1.6	1	1.3	14	10.6
Lactating only	201	20.4	11	22.4	25	12.3	74	23.9	18	23.7	25	18.9
Resting with a corpus luteum	17	1.7	0	0.0	0	0.0	2	0.6	2	2.6	2	1.5
Resting without a corpus luteum	74	7.5	5	16.3	5	2.5	32	10.1	9	11.8	2	1.5
Post-reproductive	6	0.6	0	0.0	0	0.0	1	0.3	1	1.3	0	0.0
Condition undetermined	5	0.5	0	0.0	2	1.0	4	1.3	1	1.3	0	0.0
Total	987	100.0	49	100.0	203	100.0	309	100.0	76	100.0	132	100.0

Table 1  
Total kill of spotted and spinner dolphins by stock, sex (M = male, F = female) and 5° square (see Fig.2 for location of blocks). No kill was reported for coastal spotted dolphins. 263 spinner dolphins not identified to stock were excluded from the table.

5° block	Spotted dolphins						Spinner dolphins								
	Northern offshore			Southern offshore			Eastern			Northern whitebelly			Southern whitebelly		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
24	0	0	0	1	0	1	0	0	0	0	0	0	7	9	16
45	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1
66	0	0	0	1	0	3	0	0	0	0	0	0	5	4	19
67	0	1	1	8	27	53	0	0	0	0	0	0	58	56	552
68	0	0	0	3	4	17	0	0	0	0	0	0	3	1	9
69	0	0	0	10	25	63	0	0	0	0	0	0	8	9	50
84	13	16	186	0	0	0	4	11	0	0	0	0	0	0	0
85	12	20	73	0	0	0	0	0	4	7	15	0	0	0	0
86	15	19	60	0	0	0	0	0	3	4	16	0	0	0	0
87	1	0	4	0	0	0	0	0	4	9	20	0	0	0	0
88	7	8	33	0	0	0	0	0	1	0	3	0	0	0	0
89	0	8	21	0	0	0	0	0	0	0	1	0	0	0	0
90	1	2	8	0	0	0	0	0	0	0	1	0	0	0	0
91	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
92	3	4	13	0	0	0	0	0	1	0	1	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	55	75	246	0	0	3	1	4	1	0	1	0	0	0	0
106	29	45	138	0	0	0	0	0	3	5	14	0	0	0	0
107	52	81	200	0	0	8	12	42	3	5	9	0	0	0	0
108	34	43	136	0	0	1	6	13	9	12	30	0	0	0	0
109	134	160	497	0	0	1	3	5	29	19	93	0	0	0	0
110	44	69	151	0	0	1	2	5	22	12	58	0	0	0	0
111	70	112	292	0	0	1	3	7	5	5	23	0	0	0	0
112	91	122	597	0	0	0	0	0	31	53	231	0	0	0	0
113	229	268	1,681	0	0	0	0	0	75	81	507	0	0	0	0
114	111	128	375	0	0	0	0	0	149	147	587	0	0	0</	

## REFERENCES

- Chivers, S.J., Hohn, A. A. and Miller, R. B. 1989. Composition of the 1987 incidental kill of small cetaceans in the US purse-seine fishery for tuna in the eastern tropical Pacific. *Rep. int. Whal. Commn* 39:315-9.
- Chivers, S.J., Miller, R.B. and Hohn, A. A. 1990. Composition of the 1988 incidental kill of small cetaceans in the US purse-seine fishery for tuna in the eastern tropical Pacific. *Rep. int. Whal. Commn* 40:455-8.
- Hall, M.A. and Boyer, S.D. 1986. Incidental mortality of dolphins in the eastern tropical Pacific tuna fishery: description of a new method and estimation of 1984 mortality. *Rep. int. Whal. Commn* 36:375-81.
- Hall, M.A. and Boyer, S.D. 1987. Incidental mortality of dolphins in the eastern tropical Pacific tuna fishery in 1985. *Rep. int. Whal. Commn* 37:361-2.
- Hall, M.A. and Boyer, S.D. 1988. Incidental mortality of dolphins in the eastern tropical Pacific tuna fishery in 1986. *Rep. int. Whal. Commn* 38:439-41.
- Hall, M.A. and Boyer, S.D. 1989. Estimates of incidental mortality of dolphins in the eastern Pacific fishery for tropical tunas in 1987. *Rep. int. Whal. Commn* 39:321-2.
- Hall, M.A. and Boyer, S.D. 1990. Incidental mortality of dolphins in the tuna purse-seine fishery in the eastern Pacific Ocean during 1988. *Rep. int. Whal. Commn* 40:461-2.
- Henderson, J.R., Perrin, W.F. and Miller, R.B. 1980. Rate of gross annual production in dolphin populations (*Stenella* spp. and *Delphinus*) in the eastern tropical Pacific, 1973-1978. Southwest Fisheries Center, La Jolla, CA, Admin. Rep. LJ-80-02, 51pp.
- Lo, N.C.H., Powers, J.E. and Wahlen, B.E. 1982. Estimating and monitoring incidental dolphin mortality in the eastern tropical Pacific tuna purse-seine fishery. *Fish. Bull.*, US 80(2):396-401.
- Oliver, C.W., Walker, G.J. and Miller, R.B. 1983. Time/area distribution and composition of the incidental kill of small cetaceans in the U.S. purse-seine fishery for tuna in the eastern tropical Pacific during 1981. *Rep. int. Whal. Commn* 33:603-15.
- Perrin, W.F. and Oliver, C.W. 1982. Time/area distribution and composition of the incidental kill of dolphins and small whales in the U.S. purse-seine fishery for tuna in the eastern tropical Pacific, 1979-80. *Rep. int. Whal. Commn* 32:429-44.
- Perrin, W.F., Coe, J.M. and Zweifel, J.R. 1976. Growth and reproduction of the spotted porpoise, *Stenella attenuata*, in the offshore eastern tropical Pacific. *Fish. Bull.*, US 74(2):229-69.
- Perrin, W.F., Scott, M.D., Walker, G.J. and Cass, V.L. 1985. Review of geographical stocks of tropical dolphins (*Stenella* spp. and *Delphinus delphis*) in the eastern Pacific. NOAA Technical Report NMFS 28 (unpublished). 28pp.
- Wahlen, B.E., Walker, G.J., Miller, R.B. and Oliver, C.W. 1986. Composition of the incidental kill of small cetaceans in the US purse-seine fishery for tuna in the eastern tropical Pacific, 1982 through 1984. *Rep. int. Whal. Commn* 36:369-74.
- Wahlen, B.E., Miller, R.B. and Macky, C.J. 1987. Composition of the incidental kill of small cetaceans in the US purse-seine fishery for tuna in the eastern tropical Pacific during 1985. *Rep. int. Whal. Commn* 37:353-5.
- Wahlen, B.E., Miller, R.B. and Ladiana, S.J. 1988. Composition of the incidental kill of small cetaceans in the US purse-seine fishery for tuna in the eastern tropical Pacific during 1986. *Rep. int. Whal. Commn* 38:403-5.