

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

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ABSTRACT

Data are presented for 4,642 spotted dolphins, *Stenella attenuata*; 1,745 spinner dolphins, *S. longirostris*; 99 striped dolphins, *S. coeruleoalba*; 1,535 common dolphins, *Delphinus delphis*; two bottlenose dolphins, *Tursiops truncatus*; one Pacific white-sided dolphin, *Lagenorhynchus obliquidens*, and one false killer whale, *Pseudorca crassidens*. Possible source of biases in the samples are discussed.

INTRODUCTION

Data on composition of the U.S. incidental purse-seine kill of small cetaceans have been presented and analyzed in a series of publications (Perrin, Coe and Zweifel, 1976; Perrin, Holts and Miller, 1977; Perrin, Miller and Sloan, 1977; Perrin and Henderson, 1979; Smith, 1979; and Henderson, Perrin and Miller, 1980). Recent studies have shown that the data may be subject to biases, of several kinds. The purpose of this paper is to present the data for 1979 and 1980 and to discuss the biases affecting them.

METHODS

The kill data and the life-history specimens from which the data on reproductive condition were derived were collected by fishery technicians employed by the U.S. National Marine Fisheries Service (NMFS) and the Inter-American Tropical Tuna Commission (IATTC) aboard commercial purse-seiners. Data on kill by time and area reported here were collected only by the NMFS technicians. Data on sex composition, reproductive condition and length frequencies of the kill were collected by IATTC and NMFS technicians. NMFS technicians collected data on 62 cruises in 1979 and 41 cruises in 1980. IATTC technicians collected data on 25 cruises in 1979 and 38 in 1980. The sampling scheme is described in Smith (1979), and copies of the forms used are included here as Appendices 1 and 2. Laboratory procedures for processing the specimens and criteria for sexual maturity were as described in Perrin *et al.* (1975 and 1977). The management units used here are defined in Smith (1979). Dolphins not identified to species are not included in the data presented here. The NMFS observed-kill data are presented by 5°-square areas (Fig. 1). The computer programs used to summarize data on reproductive condition were described by Henderson and Perrin (1980).

RESULTS

Incidental kill data by area and month are presented for 8,026 small cetaceans in Tables 1-5. Sex data for 3,408

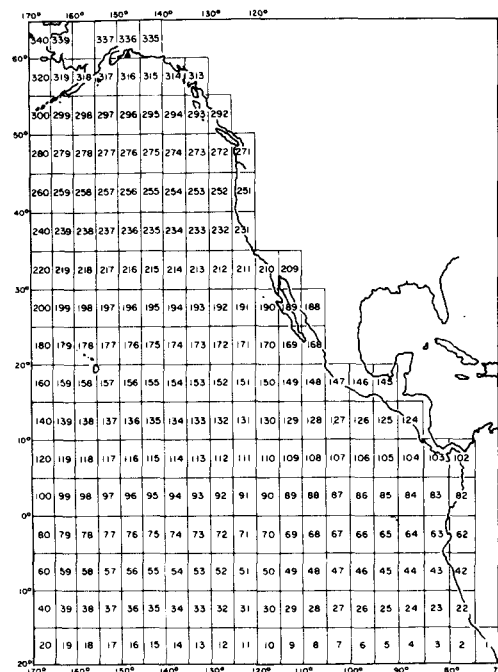
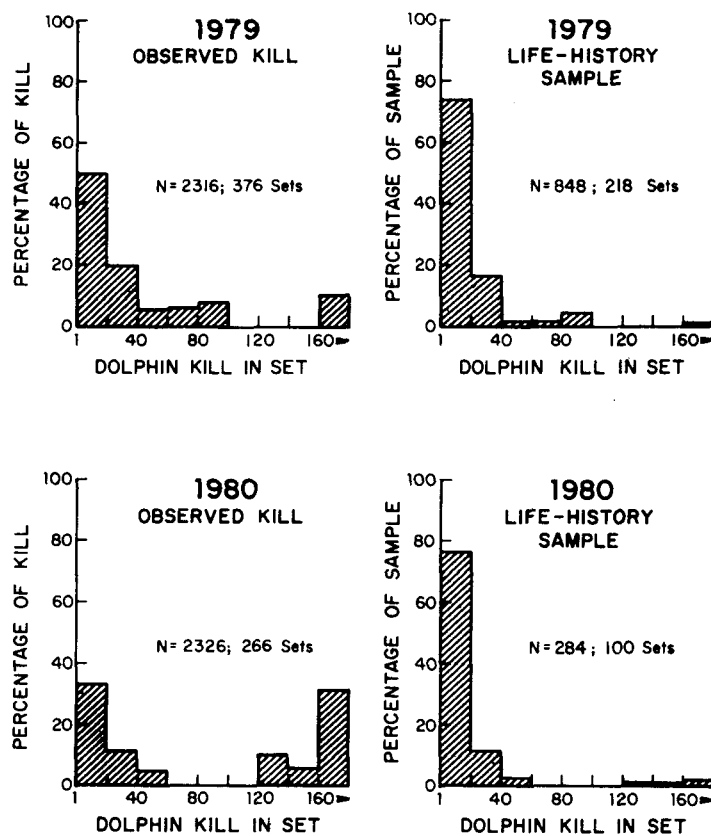


Fig. 1. Statistical reporting blocks (5-degree squares) for eastern tropical Pacific. Dashed line includes usual area of operation of US tropical-tuna purse-seine fishery (area of consideration for this paper). Solid line includes blocks in which data reported here were collected in 1979 and 1980.

dolphins, by area and quarter, are presented in Tables 6-10. Length-frequency data for 3,455 specimens are presented in Tables 11-13 and reproductive-condition data for 1,850 females in Tables 14-16. The tables can be found on pp. 000-00.



	Spinner dolphin		Common dolphin		Striped dolphin	
	Overall kill	Life-history sample	Overall kill	Life-history sample	Overall kill	Life-history sample
Total sets	285	149	83	47	13	8
Total dolphins	1,745	389	1,535	289	99	30
	(% of kill)	(% of sample)	(% of kill)	(% of sample)	(% of kill)	(% of sample)
Kill in set:						
1-19	42.7	86.6	22.9	57.4	73.7	93.3
20-39	10.7	6.7	10.0	12.8	26.3	6.7
40-59	2.9	2.8	15.1	21.8		
60-79	6.9		4.6			
80-99	5.1	1.3	11.5	1.7		
100-119			7.4	6.2		
120-139						
140-159						
> 160	31.7	2.6	28.5			
Total	100.0	100.0	100.0	100.0	100.0	100.0

Fig. 2. Comparisons of kill-size structures of observed kills with those of subsamples from which life-history data and specimens were collected; for spotted dolphin, *Stenella attenuata*, in 1979 and 1980. Includes only data collected by NMFS technicians. The table compares kill-size structures of observed kill with those of subsamples for which life-history data and specimens were collected (same analysis as in Fig.); for spinner dolphins, *Stenella longirostris*; common dolphin, *Delphinus delphis*; and striped dolphin, *S. coeruleoalba*; 1979 and 1980 combined. Includes only data collected by NMFS observers.

DISCUSSION

Several potential sources of bias have been identified and are discussed below. For some, adjustment procedures have been developed; others have not yet been so addressed.

Effects of size of kill

Powers and Barlow (1979) examined the age structure of kill samples in relation to the size of the kill in the purse-seine set from which the samples came. They found that for the spotted dolphin, *Stenella attenuata*, samples from small-kill sets contained proportionately more calves than did those from large-kill sets. This has been interpreted to mean that calves are more vulnerable to death in the purse-seine operation than are adults, and therefore when only a few animals are killed, they tend to be calves. This would mean that the large-kill samples are more representative of the populations at large (or, at least, the animals captured) than are the small-kill samples. The most recent analyses of data for *S. attenuata* to estimate reproductive rates have taken this presumed effect into account by including only samples from net sets in which 40 or more spotted dolphins were killed (Henderson, Perrin and Miller, 1980). Powers and Barlow (1979) did not find a similar effect for the spinner dolphin, *S. longirostris*, and analyses for that species have been based on all samples regardless of kill size (Perrin and Henderson, 1979). The data for other species (*S. coeruleoalba* and *Delphinus delphis*) have not been examined for the presence of a kill-size effect.

An aspect of the kill-size effect that has not been taken into account relates to the fact that the technicians at sea do not process all dead animals that pass across the deck; they are limited to 30–40 dolphins by constraints of time and space. This means that the animals from small-kill (less than 30–40 sets) are usually all examined, whereas only a subsample of the animals from large-kill sets are examined, amplifying the bias caused by the kill-size effect for *S. attenuata* and possibly for *S. coeruleoalba* and *D. delphinus*. The under-representation of animals from large-kill sets in the life-history samples is shown in Fig. 2.

Effect of seasonality

Perrin *et al.* (1976) and Perrin *et al.* (1977) described diffuse seasonality in breeding of spotted and spinner dolphins in the eastern tropical Pacific, with two or more peak periods during the year. Because of the multiple peaks, the diffuseness, and the fact that the length of gestation is nearly a year (11.5 months in *S. attenuata* and 10.6 months in *S. longirostris*), the effect of seasonal sampling bias (as can be seen in Tables 1–5) on estimates of reproductive rates cannot be large. Barlow (1979) examined the effect of seasonality and developed a method to adjust for it. He found a maximum effect on pregnancy-rate estimates of 4% (for eastern spinner dolphins). Barlow also described variation in seasonal breeding peaks between sub-areas of what have been assumed to be areas containing single interbreeding populations. He concluded that the effect of seasonal-sampling bias on estimates of reproductive rates is probably more than the maximum 4% that he found because of this confounding of breeding units in the analyses. Stuntz (1980) also found areal variation in

seasonality, within putative interbreeding populations of the spotted dolphin. This confounding of populations, of course, has other implications for assessment and management. As fishing effort is not evenly distributed by area, the various cryptic subpopulations may differ from each other in status and production.

Other biasing effects

Stuntz (1980) found differences in the age structure of spotted dolphin samples with size of the dolphin school (more calves in smaller schools), tons of yellowfin tuna captured (fewer calves with larger tuna catches) and length of the chasing and corralling phase (see Perrin, 1969, for description of fishing operation) (fewer calves after longer chases) as well as with area and time of year. He pointed out that there are alternative explanations for the observed trends and noted that definitive analyses of the biases must be carried out before the structural (and reproductive) dynamics of the populations can be modeled with any confidence.

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R. B. Miller and V. L. Cass processed the specimens in the laboratory and prepared the data for analysis. M. S. Lowry and T. C. Foster reviewed the final tables. K. S. Raymond prepared the figures, and V. Hostler typed the manuscript.

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Table 1

Kill data for spotted dolphin, *Stenella attenuata*, in observed kill, 1979 and 1980; by stock, five-degree square and month of the year; data collected by NMFS observers on U.S.-registered vessels.

Species and Stock	5-DEG SQUARE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ALL MONTHS
SPOTTED DOLPHIN:														
Northern Offshore														
1979	83	0	0	0	1	0	0	0	0	0	0	0	0	1
	84	13	0	6	2	0	0	0	0	0	0	0	0	21
	85	24	13	0	0	0	0	0	0	0	0	0	0	37
	86	0	0	0	0	0	0	0	0	0	0	0	0	4
	87	0	0	0	0	0	0	0	0	0	0	0	0	1
	88	0	0	0	0	0	0	0	0	11	0	2	0	13
	90	0	0	0	0	4	0	0	0	0	0	0	0	4
	103	0	1	0	0	0	0	0	0	0	0	0	0	1
	104	40	0	0	4	0	0	0	0	0	0	0	0	44
	105	5	0	0	5	3	0	0	0	0	0	0	0	14
	106	40	1	16	0	0	0	0	0	0	6	0	0	63
	107	30	1	10	0	0	0	0	8	0	265	0	0	314
	108	4	0	0	0	0	0	0	7	0	10	12	0	33
	109	0	0	0	0	0	0	0	0	0	3	0	0	3
	110	0	0	0	0	0	0	0	7	0	0	0	0	11
	111	0	0	0	0	0	3	1	5	1	0	0	0	10
	112	0	0	0	12	80	2	39	0	0	0	0	0	133
	113	0	0	0	0	4	13	6	4	0	0	0	0	27
	114	0	0	0	0	0	72	2	0	0	0	0	0	74
	125	0	4	7	13	62	0	0	0	0	0	0	0	86
	126	20	29	30	1	0	0	2	0	0	0	0	0	82
	127	6	12	13	7	0	0	0	0	0	6	0	0	44
	128	69	4	16	5	4	1	0	2	15	47	0	0	163
	129	0	0	0	1	4	0	0	0	1	0	1	0	6
	130	0	0	0	3	0	0	0	1	0	0	2	0	6
	131	0	0	0	0	0	0	0	27	0	0	0	0	27
	132	0	0	0	0	0	0	12	5	0	0	0	0	17
	133	0	0	0	0	0	1	13	72	3	0	0	0	89
	134	0	0	0	0	0	30	45	2	1	0	0	0	78
	146	0	0	1	2	0	0	0	0	0	0	0	0	3
	147	0	1	0	2	0	0	30	0	0	0	0	0	36
	148	13	18	0	0	0	7	0	0	2	0	1	0	41
	149	23	0	4	6	1	3	3	0	2	2	3	0	47
	150	0	0	0	0	2	0	1	0	0	0	0	0	3
	151	0	0	0	0	20	0	0	0	0	0	0	0	20
	168	0	0	0	0	0	1	0	0	0	0	2	0	3
	170	0	0	0	0	0	0	1	0	0	0	0	0	1
	Total	287	85	103	64	193	133	155	136	36	344	24	0	1560
1980	83	1	0	0	0	0	0	0	0	0	0	0	0	1
	84	0	0	0	0	0	0	0	0	0	0	0	0	24
	85	0	0	0	0	0	0	0	0	0	0	1	0	1
	86	0	7	0	0	0	0	0	0	0	0	0	0	7
	88	0	0	0	0	0	0	0	0	0	3	0	0	3
	89	0	0	0	0	0	0	0	0	0	6	0	0	6
	90	0	0	0	0	0	0	0	43	20	0	0	0	63
	91	0	0	0	0	0	0	0	2	13	0	0	0	15
	104	0	0	248	6	0	0	0	0	0	0	0	0	254
	105	0	0	2	1	8	0	0	0	0	0	2	15	28
	106	125	9	0	0	0	0	0	3	0	13	35	0	185
	107	10	54	3	1	0	0	0	0	0	144	3	0	215
	108	0	0	0	0	0	0	0	2	3	10	9	0	24
	109	0	0	0	0	1	0	0	0	1	0	32	0	34
	110	0	0	0	0	0	0	0	0	0	0	0	1	1
	111	0	0	0	0	0	0	0	0	0	1	0	0	1
	112	0	0	0	0	0	12	11	16	0	0	0	0	39
	113	0	0	0	0	0	8	12	0	0	0	0	0	21
	114	0	0	0	0	0	2	72	3	0	6	0	0	83
	125	5	0	0	0	0	0	0	0	0	0	0	0	5
	126	0	13	1	0	3	0	0	0	0	0	0	0	17
	127	0	4	0	0	0	0	0	0	1	0	0	0	5
	128	1	0	15	42	17	0	0	10	2	0	0	0	87
	129	2	0	15	11	0	1	0	27	1	32	8	0	97
	130	0	0	0	0	0	0	10	0	6	1	0	0	17
	131	0	0	0	0	0	0	2	17	0	8	0	0	27
	132	0	0	0	0	0	4	4	0	0	0	0	0	8
	133	0	0	0	0	0	1	0	0	4	21	0	0	26
	134	0	0	0	0	0	0	4	1	0	0	0	0	5
	147	0	2	0	0	0	0	0	0	0	0	0	0	2
	149	0	0	1	55	0	0	29	10	0	0	0	0	95
	150	0	0	0	0	1	4	2	0	40	0	0	0	47
	168	1	0	0	0	0	0	0	0	0	0	0	0	1
	169	1	0	0	0	0	0	0	0	0	0	0	0	1
	Total	146	89	285	116	30	32	146	87	106	271	86	51	1445
Southern Offshore														
1979	23	2	0	0	0	0	0	0	0	0	0	0	0	2
	24	57	0	0	0	2	0	0	0	0	0	0	0	59
	25	0	0	0	0	0	0	0	0	0	0	0	3	3
	43	9	0	0	0	0	0	0	0	0	0	0	0	9
	44	220	0	0	3	350	0	0	0	0	0	0	0	574
	45	1	0	0	0	0	0	0	0	0	0	0	17	18
	64	1	0	0	0	0	0	0	0	0	0	0	0	1
	65	4	0	0	0	0	0	0	0	0	0	0	0	4
	66	0	36	0	0	0	0	0	0	0	0	0	0	36
	Total	294	36	0	3	352	1	0	0	0	0	0	20	706
1980	23	12	9	0	0	0	0	0	0	0	0	0	0	21
	24	1	2	0	0	0	0	0	0	0	0	0	10	13
	43	165	2	1	0	0	0	0	0	0	0	0	0	168
	44	4	55	2	0	0	0	0	0	0	568	0	0	629
	45	40	0	0	0	0	0	0	0	0	0	0	0	40
	66	1	0	0	0	0	0	0	0	0	0	0	0	1
	Total	223	68	3	0	0	0	0	0	0	568	0	10	872

Table 1—continued

Species and Stock	5-DEG SQUARE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ALL MONTHS
Coastal														
1979	168	0	0	0	40	0	0	0	0	0	0	0	0	40
Unidentified to Stock														
1979	148	0	0	0	0	0	0	0	10	0	0	0	0	10
1980	84	0	0	0	0	0	0	0	0	0	0	0	1	1
	104	0	0	0	0	0	0	0	0	0	0	0	8	8
	Total	0	0	0	0	0	0	0	0	0	0	0	9	9
All Stocks														
1979	Total	581	121	103	107	545	134	155	146	36	344	24	20	2316
1980	Total	369	157	288	116	30	32	146	87	106	839	86	70	2326

Table 2

Kill data for spinner dolphin, *Stenella longirostris*, in observed kill, 1979 and 1980; by stock, five-degree square and month of the year; data collected by NMFS observers on U.S.-registered vessels.

Species and Stock	5-DEG SQUARE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ALL MONTHS
SPINNER DOLPHIN:														
Northern Whitebelly														
1979	85	6	7	0	0	0	0	0	0	0	0	0	0	13
	86	0	0	0	0	0	0	0	0	0	1	1	0	2
	87	0	0	0	0	0	0	0	0	0	3	0	0	3
	88	0	0	0	1	0	0	0	0	0	0	0	0	1
	89	0	0	0	0	0	0	0	1	0	0	0	0	1
	90	0	0	0	0	1	0	0	0	0	0	0	0	1
	91	0	0	0	1	0	0	0	0	0	0	0	0	1
	106	0	0	4	0	0	0	0	0	0	0	0	0	4
	107	1	0	0	0	0	0	0	0	0	0	0	0	1
	108	2	0	0	3	0	0	0	0	0	2	0	0	7
	109	0	0	0	0	0	0	0	0	0	2	0	0	5
	111	0	0	0	0	0	1	2	2	0	0	0	0	5
	112	0	0	0	0	10	0	0	4	0	0	0	0	14
	113	0	0	0	0	0	2	0	7	0	0	0	0	9
	114	0	0	0	0	0	40	2	0	0	0	0	0	42
	128	1	0	0	0	0	0	0	0	2	0	0	0	3
	131	0	0	0	0	1	0	0	4	0	0	0	0	5
	132	0	0	0	0	0	0	1	3	0	0	0	0	4
	133	0	0	0	0	0	0	9	35	30	0	0	0	74
	134	0	0	0	0	0	12	267	0	0	0	0	0	279
	150	0	0	0	0	0	2	0	0	0	0	0	0	2
	151	0	0	0	0	2	0	0	0	0	0	0	0	2
	Total	10	7	4	5	14	57	281	56	32	8	1	0	475
1980	86	0	14	0	0	0	0	0	0	0	0	0	0	14
	89	0	0	0	0	0	0	0	0	0	2	0	0	2
	90	0	0	0	0	0	0	0	0	2	1	0	0	3
	91	0	0	0	0	0	0	0	0	2	1	0	0	3
	105	0	0	0	0	0	0	0	0	0	0	0	2	2
	107	7	12	0	3	0	0	0	0	0	0	0	0	22
	108	0	0	0	0	0	0	0	0	0	0	1	0	1
	109	0	0	0	0	0	0	0	0	1	0	0	0	1
	111	0	0	0	0	0	0	0	0	0	2	0	0	2
	112	0	0	0	0	0	1	2	9	0	0	0	0	12
	113	0	0	0	0	0	2	2	2	0	1	0	0	7
	114	0	0	0	0	0	2	105	0	0	11	0	0	118
	129	0	0	0	0	0	0	0	0	0	7	0	0	7
	130	0	0	0	0	0	0	4	0	0	0	0	0	4
	131	0	0	0	0	0	2	0	11	0	6	0	0	19
	132	0	0	0	0	0	0	9	0	0	0	0	0	9
	133	0	0	0	0	0	0	0	0	2	2	0	0	4
	134	0	0	0	0	0	0	0	4	0	0	0	0	4
	149	0	0	0	0	0	0	7	0	0	0	0	0	7
	150	0	0	0	0	0	0	0	0	1	0	0	0	1
	Total	7	26	0	3	0	7	129	26	8	26	8	2	242

Table 2—continued

Species and Stock	5-DBG SQUARE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ALL MONTHS
Southern Whitebelly														
1979	24	11	0	0	0	0	0	0	0	0	0	0	0	11
	44	62	0	0	3	116	5	0	0	0	0	0	0	186
	45	9	0	0	0	0	0	0	0	0	0	0	0	9
	46	0	0	0	0	0	0	0	0	0	0	1	0	1
	65	8	0	0	0	0	0	0	0	0	0	0	0	8
	Total	90	0	0	3	116	5	0	0	0	0	1	0	215
1980	23	4	1	0	0	0	0	0	0	0	0	0	0	5
	43	4	0	0	0	0	0	0	0	0	0	0	0	4
	44	1	22	0	0	0	0	0	0	0	286	0	0	309
	Total	9	23	0	0	0	0	0	0	0	286	0	0	318
Eastern														
1979	107	0	0	1	0	0	0	0	0	0	0	0	0	1
	108	0	0	0	0	0	0	0	0	0	6	0	0	6
	109	0	0	0	0	0	0	0	0	0	1	0	0	1
	125	0	2	7	0	0	0	0	0	0	0	0	0	9
	126	1	10	39	0	4	0	26	0	0	0	0	0	76
	127	4	3	94	1	4	0	0	0	0	0	0	0	106
	128	11	2	0	2	1	2	0	0	0	0	0	1	43
	129	0	0	0	0	0	0	0	20	5	0	0	0	1
	133	0	0	0	0	0	0	0	1	0	0	0	0	1
	147	0	1	0	0	0	0	12	0	0	0	0	0	13
	149	0	0	0	1	0	0	0	0	0	0	0	0	1
	150	0	0	0	1	0	0	0	0	0	0	0	0	1
	Total	16	18	141	5	5	2	38	1	20	12	1	0	259
1980	86	0	5	0	0	0	0	0	0	0	0	0	0	5
	125	0	1	9	0	0	0	0	0	0	0	0	0	10
	126	0	1	1	0	3	0	0	0	0	0	0	0	5
	127	0	1	0	0	0	0	0	0	2	0	0	0	3
	128	8	0	17	3	1	0	0	8	0	0	0	0	37
	129	0	0	3	2	1	0	0	0	4	16	0	0	26
	130	0	0	0	0	0	0	0	4	0	0	0	0	4
	131	0	0	0	0	0	0	0	3	0	6	0	0	9
	147	0	3	0	0	0	0	0	0	0	0	0	0	3
	149	0	0	0	0	0	0	0	7	1	0	0	0	8
	Total	8	11	30	5	5	0	0	11	13	11	16	0	110
Unidentified to Stock														
1979	107	3	0	0	0	0	0	0	0	0	0	0	0	3
	108	0	0	0	0	0	0	0	0	0	1	0	0	1
	113	0	0	0	0	0	1	0	0	0	0	0	0	1
	114	0	0	0	0	0	2	0	0	0	0	0	0	2
	126	0	0	1	0	0	0	0	0	0	0	0	0	1
	128	0	0	0	0	0	0	0	64	1	0	0	0	65
	133	0	0	0	0	0	0	1	0	0	0	0	0	1
	148	0	0	0	0	0	0	0	0	0	3	0	0	3
	168	0	0	0	0	0	0	0	0	0	1	0	0	1
	Total	3	0	1	0	0	3	1	0	64	2	4	0	78
1980	114	0	0	0	0	0	0	3	0	0	0	0	0	3
	128	0	0	0	0	0	0	0	2	0	0	0	0	2
	129	0	0	0	0	0	0	0	2	0	5	21	0	28
	130	0	0	0	0	0	0	1	0	0	0	0	0	1
	131	0	0	0	0	0	0	0	5	0	4	0	0	9
	132	0	0	0	0	0	2	2	0	0	0	0	0	4
	150	0	0	0	0	0	0	0	1	0	0	0	0	1
	Total	0	0	0	0	0	2	6	9	1	9	21	0	48
All Stocks														
1979	Total	119	25	146	13	135	67	320	57	116	22	7	0	1027
1980	Total	24	60	30	8	5	9	135	46	22	332	45	2	718

Table 6

Sex data for spotted dolphin, *Stenella attenuata*, in observed kill, 1979 and 1980; by stock, five-degree square and quarter of the year; data collected by IATTC and NMFS observers on U.S.-registered vessels.

Species and Stock	5-DEG SQUARE	QUARTER 1		QUARTER 2		QUARTER 3		QUARTER 4		ALL QUARTERS		
		M	F	M	F	M	F	M	F	M	F	
Northern Offshore												
1979	66	0	0	0	0	0	0	0	1	1	0	1
	82	0	0	0	0	0	0	0	0	0	0	0
	85	4	9	13	0	0	0	7	9	16	0	0
	86	0	0	0	0	0	0	1	0	1	7	16
	87	0	0	0	0	0	0	1	0	1	0	0
	88	0	0	0	0	0	0	4	4	8	0	1
	90	0	0	0	3	0	3	0	1	1	0	0
	104	0	1	1	4	0	4	0	0	0	0	0
	105	2	4	6	1	6	7	0	0	0	0	0
	106	5	19	24	0	0	0	5	5	10	3	2
	107	11	10	21	0	0	0	0	4	6	35	55
	108	1	5	4	0	0	0	0	0	0	18	27
	109	1	8	9	0	0	0	0	0	0	1	2
	110	0	0	0	2	0	2	2	1	3	2	5
	111	0	0	0	1	0	1	1	0	1	0	0
	112	0	0	0	7	12	19	7	11	18	5	10
	113	0	0	0	2	5	7	7	8	15	6	2
	114	0	0	0	22	26	48	2	1	3	2	9
	122	5	5	10	34	29	63	1	1	1	0	0
126	14	23	37	0	1	1	9	3	11	0	0	
127	15	27	42	2	3	5	0	0	0	0	0	
128	30	28	58	7	23	30	2	3	5	10	18	
129	0	0	0	0	4	4	0	0	0	2	7	
130	0	0	0	0	0	0	0	0	0	6	10	
131	0	0	0	0	0	0	0	0	0	3	0	
132	0	0	0	0	0	0	9	9	18	0	8	
133	0	0	0	0	0	0	18	29	47	1	2	
134	0	0	0	9	18	27	3	5	8	0	0	
146	0	1	1	0	0	0	0	0	0	0	0	
147	0	0	0	1	1	2	0	0	0	0	0	
148	4	8	12	0	3	3	6	6	12	0	1	
149	2	3	5	6	7	13	3	0	3	0	5	
150	0	0	0	1	1	2	0	0	0	1	1	
151	0	0	0	3	8	11	0	0	0	0	0	
168	0	0	0	0	0	0	0	0	0	4	2	
Total	94	149	243	105	147	252	89	100	189	109	181	
1980												
66	1	1	2	0	0	0	0	0	0	0	0	
82	1	0	1	3	0	0	0	0	0	0	0	
85	0	0	0	0	0	0	0	0	0	0	0	
86	1	0	0	0	0	0	1	0	1	14	10	
87	0	0	0	0	0	0	0	0	0	0	0	
88	10	12	22	0	0	0	0	0	0	0	0	
89	4	5	7	0	0	0	0	0	0	2	2	
90	4	0	4	0	0	0	0	0	0	5	12	
91	2	0	2	0	0	0	0	0	0	6	4	
104	15	15	30	4	2	6	0	0	0	0	0	
105	3	2	5	0	1	1	0	0	0	4	8	
106	13	19	32	0	0	0	0	0	0	7	12	
107	11	20	31	1	0	1	2	1	3	24	24	
108	1	0	1	0	0	0	10	22	32	3	5	
109	0	0	0	0	0	0	0	1	1	1	12	
111	0	0	0	0	0	0	1	6	7	0	0	
112	0	0	0	4	9	13	21	38	59	0	0	
113	0	0	0	3	3	6	10	11	21	1	3	
114	0	0	0	3	0	3	2	6	8	2	2	
125	7	7	14	2	3	5	0	0	0	0	0	
126	7	6	7	0	0	0	0	0	0	0	0	
127	1	3	4	9	3	12	0	0	0	0	0	
128	3	10	13	24	27	51	8	11	19	0	0	
129	7	7	14	2	3	5	8	13	21	6	12	
130	0	0	0	0	0	0	12	22	34	1	1	
131	0	0	0	0	0	0	13	6	19	0	0	
132	0	0	0	1	0	1	16	12	28	0	1	
133	0	0	0	1	0	1	4	9	13	3	1	
134	0	0	0	0	0	0	1	1	2	0	0	
148	0	0	0	0	7	7	0	0	0	0	0	
149	0	0	0	17	19	36	1	2	3	0	0	
150	0	0	0	1	0	1	2	7	9	0	0	
159	0	1	1	0	0	0	0	0	0	0	0	
Total	82	109	191	75	78	153	115	173	288	80	113	
Southern Offshore												
1979	23	0	0	0	0	0	0	0	0	1	1	
	24	9	10	19	1	1	2	0	0	0	0	
	25	0	0	0	0	0	0	0	0	2	1	
	43	6	5	11	0	0	0	0	0	0	0	
	44	36	27	63	80	90	170	4	2	6	2	2
	45	0	0	0	0	0	0	0	0	1	4	
	64	0	1	1	0	0	0	0	0	0	0	
66	13	15	28	0	0	0	0	0	0	0		
Total	64	58	122	81	91	172	4	2	6	5	8	
1980	23	2	4	6	0	0	0	0	0	0	0	
	24	0	1	1	0	0	0	0	0	4	3	
	43	19	11	30	0	0	0	0	0	0	0	
	44	8	11	19	0	0	0	0	0	5	1	
	45	0	1	1	0	0	0	0	0	0	0	
	67	19	26	45	0	0	0	0	0	0	0	
Total	48	54	102	0	0	0	0	0	0	9	4	
Coastal												
1979	147	0	0	2	5	7	0	0	0	0	0	
	168	0	0	0	4	8	12	0	0	0	0	
Total	0	0	0	6	13	19	0	0	0	0	0	
All Stocks												
1979	Total	158	207	365	192	251	443	93	102	195	114	189
1980	Total	130	163	293	75	78	153	115	173	288	89	117

Table 7

Sex data for spinner dolphin, *Stenella longirostris*, in observed kill, 1979 and 1980; by stock, five-degree square and quarter of the year; data collected by IATTC and NMFS observers on U.S.-registered vessels.

Species and Stock	5-DEG SQUARE	QUARTER 1			QUARTER 2			QUARTER 3			QUARTER 4			ALL QUARTERS		
		M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Northern Whitebelly																
1979	85	3	1	4	0	0	0	0	0	0	0	0	0	3	1	4
	86	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2
	91	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
	106	2	2	4	0	0	0	0	0	0	0	0	0	2	2	4
	108	2	0	2	1	1	2	0	0	0	1	3	4	4	4	8
	110	0	0	0	0	0	0	0	0	0	1	2	3	1	2	3
	111	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
	112	0	0	0	0	0	0	2	2	4	0	0	0	2	2	4
	113	0	0	0	0	1	1	3	4	7	0	0	0	3	5	8
	114	0	0	0	18	18	36	0	2	2	1	0	1	19	20	39
	126	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
	128	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
	132	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
	133	0	0	0	0	0	0	20	18	38	0	0	0	20	18	38
	134	0	0	0	4	7	11	0	0	0	0	0	0	4	7	11
150	0	0	0	0	2	2	0	0	0	0	0	0	0	2	2	
Total	7	6	13	24	30	54	25	27	52	4	6	10	60	69	129	
1980	85	0	0	0	0	0	2	0	2	31	49	80	33	49	82	
	88	3	2	5	0	0	0	0	0	0	0	0	3	2	5	
	89	0	0	0	0	0	0	0	0	0	1	1	0	1	1	
	90	0	0	0	0	0	0	1	0	1	0	1	1	1	2	
	91	0	0	0	0	0	0	0	0	0	1	1	0	1	1	
	107	2	6	8	1	0	1	0	0	0	0	0	0	3	6	9
	108	0	0	0	0	0	0	3	1	4	0	0	0	3	1	4
	109	0	0	0	0	0	0	0	1	1	1	1	2	1	2	
	111	0	0	0	0	0	0	3	2	5	1	0	1	4	2	6
	112	0	0	0	2	0	2	3	3	6	0	0	0	5	3	8
	113	0	0	0	0	1	1	1	4	5	0	0	0	1	5	6
	114	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1
	128	2	0	2	0	0	0	0	0	0	0	0	0	2	0	2
	129	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
	130	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
131	0	0	0	0	2	2	5	3	8	0	0	0	5	5	10	
132	0	0	0	0	0	0	5	5	10	0	0	0	5	5	10	
133	0	0	0	0	0	0	6	10	16	0	0	0	6	10	16	
134	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	
Total	7	8	15	3	3	6	32	29	61	33	54	87	75	94	169	
Southern Whitebelly																
1979	24	4	3	7	0	0	0	0	0	0	0	0	4	3	7	
	44	12	10	22	19	13	32	0	0	0	2	0	2	33	23	56
	45	2	3	5	0	0	0	0	0	0	0	0	0	2	3	5
Total	18	16	34	19	13	32	0	0	0	2	0	2	39	29	68	
1980	23	17	12	29	0	0	0	0	0	0	0	0	17	12	29	
	43	1	1	2	0	0	0	0	0	0	0	0	1	1	2	
	44	5	3	8	0	0	0	0	0	0	6	4	10	11	7	18
	66	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1
	67	2	1	3	0	0	0	0	0	0	0	0	0	2	1	3
Total	26	17	43	0	0	0	0	0	0	6	4	10	32	21	53	
Eastern																
1979	106	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
	107	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
	108	0	0	0	0	0	0	0	0	0	1	8	9	1	8	9
	109	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
	110	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2
	125	5	6	11	0	1	1	0	0	0	0	0	0	5	7	12
	126	13	16	29	0	0	0	6	4	10	0	0	0	19	20	39
	127	33	25	58	0	2	2	5	1	6	0	0	0	38	28	66
	128	11	12	23	2	1	3	3	5	8	4	5	9	20	23	43
	130	0	0	0	0	0	0	0	0	0	7	5	12	7	5	12
	131	5	8	13	0	0	0	1	0	1	1	0	1	7	8	15
	132	0	0	0	0	0	0	0	0	0	3	6	9	3	6	9
	133	0	0	0	0	0	0	1	0	1	1	1	2	2	1	3
	146	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
	Total	67	68	135	2	4	6	18	10	28	19	26	45	106	108	214
1980	109	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
	125	3	3	6	0	0	0	0	0	0	0	0	0	3	3	6
	126	5	2	7	2	0	2	0	0	0	0	0	0	7	2	9
	127	0	3	3	0	1	1	0	0	0	0	0	0	0	4	4
	128	3	10	13	1	1	2	6	6	12	0	0	0	10	17	27
	129	0	1	1	2	2	4	0	0	0	6	4	10	8	7	15
	130	0	0	0	0	0	0	3	5	8	1	1	2	4	6	10
	131	0	0	0	0	0	0	0	0	3	0	0	0	3	0	3
	132	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
	133	0	0	0	0	0	0	2	0	2	0	0	0	2	0	2
	149	0	0	0	0	0	0	3	2	5	0	0	0	3	2	5
Total	11	19	30	5	4	9	17	14	31	8	5	13	41	42	83	

Table 7—continued

Species and Stock	5-DEG SQUARE	QUARTER 1			QUARTER 2			QUARTER 3			QUARTER 4			ALL QUARTERS		
		M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Unidentified to Stock																
1979	107	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1
	130	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2
	132	0	0	0	0	0	0	0	0	0	0	2	2	0	2	2
	133	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1
	168	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
	Total	0	0	0	0	0	0	0	0	0	2	5	7	2	5	7
1980	128	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
	129	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
	131	0	0	0	0	0	0	2	3	5	0	1	1	2	4	6
	132	0	0	0	0	0	0	2	0	2	0	0	0	2	0	2
	133	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
	Total	0	0	0	0	1	1	5	3	8	1	1	2	6	5	11
All Stocks																
1979	Total	92	90	182	45	47	92	43	37	80	27	37	64	207	211	418
1980	Total	44	44	88	8	8	16	54	46	100	48	64	112	154	162	316

Table 8

Sex data for common dolphin, *Delphinus delphis*, in observed kill, 1979 and 1980; by stock, five-degree square and quarter of the year; data collected by NMFS observers on U.S.-registered vessels.

Species and Stock	5-DEG SQUARE	QUARTER 1			QUARTER 2			QUARTER 3			QUARTER 4			ALL QUARTERS		
		M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
COMMON DOLPHIN:																
Baja Neritic																
1979	168	4	9	13	16	21	37	0	0	0	0	0	0	20	30	50
1980	169	2	4	6	0	0	0	0	0	0	0	0	0	2	4	6
Northern Tropical																
1979	168	30	28	58	5	3	8	0	0	0	0	0	0	35	31	66
	169	1	1	2	0	0	0	0	0	0	0	0	0	1	1	2
	Total	31	29	60	5	3	8	0	0	0	0	0	0	36	32	68
1980	168	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1
	169	6	6	12	0	0	0	0	0	0	0	0	0	6	6	12
	Total	7	6	13	0	0	0	0	0	0	0	0	0	7	6	13
Central Tropical																
1979	103	10	4	14	3	3	6	0	0	0	0	0	0	13	7	20
	104	20	27	47	37	45	82	0	0	0	0	0	0	57	72	129
	105	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
	106	6	7	13	0	2	2	0	0	0	0	0	0	6	9	15
	125	3	3	6	7	11	18	0	0	0	0	0	0	10	14	24
	126	7	2	9	0	0	0	0	0	0	0	0	0	7	2	9
	134	0	0	0	1	2	3	0	0	0	0	0	0	1	2	3
	Total	46	46	92	48	63	111	0	0	0	0	0	0	94	109	203
1980	104	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
	105	0	0	0	4	11	15	0	0	0	0	0	0	4	11	15
	Total	0	0	0	5	11	16	0	0	0	0	0	0	5	11	16
Southern Tropical																
1979	64	3	4	7	0	0	0	0	0	0	0	0	0	3	4	7
All Stocks																
1979	Total	84	88	172	69	87	156	0	0	0	0	0	0	153	175	328
1980	Total	9	10	19	5	11	16	0	0	0	0	0	0	14	21	35

Table 11

Length frequencies for spotted dolphins, *Stenella attenuata*, and striped dolphins, *Stenella coeruleoalba*, in observed kill, 1979 and 1980; by stock, year, and sex; data collected by IATTC and NMFS observers on U.S.-registered vessels.

Length (cm)	Spotted dolphins								Striped dolphins							
	Northern Offshore				Southern Offshore				Coastal		Central Tropical		Northern Tropical			
	1979		1980		1979		1980		1979	1980	1979	1980	1979		1980	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
75-79			1													
80-84	3						1									
85-89	3			3		3	1									
90-94	4	3	2		4	7			1							
95-99	2	8	4	4	4	3			1	1						
100-104	2	2		3	3		1				1					
105-109	1	5	5	5		2										1
110-114	1	2	2	3		2										
115-119	3	2	2	2		1		1								
120-124	5	3	2	2			1						1			
125-129	3	4	5	5	3	2	1									
130-134	4	3	4	4	2	3	1									
135-139	6	12	8	5	2	1										
140-144	7	11	6	5	2	4										
145-149	8	12	11	5	4	3	1	1								1
150-154	7	18	16	8	6	3	1	2	1							
155-159	24	13	24	20	10	8	2	2								
160-164	36	34	31	31	12	7	2	3								1
165-169	30	36	32	37	8	9	5	2								
170-174	35	32	23	35	8	18	5	3	1							
175-179	23	50	29	37	18	11	4	5					1	2		
180-184	23	69	18	54	11	25	10	5	1				1	1	1	
185-189	22	96	23	75	9	25	7	16			1		1	1	1	
190-194	25	81	30	81	9	15	5	11			1		1	1	1	3
195-199	42	50	29	44	8	7	4	5	1	1	1		1	3	2	2
200-204	26	16	21	14	13	2	6	1		2			1	3	3	4
205-209	28	2	19	2	5	1	1	1						2	2	2
210-214	18	1	9	2	5	1						1		3	2	1
215-219	7		7	2		1					1					1
220-224	2		3	1	1					1	1			2		
225-229		2												1		
230-234			2													
235-239											1					
240-244											1					
Total	400	579	368	488	153	157	58	59	6	9	6	3	15	17	17	12

Table 12

Length frequencies for spinner dolphins *Stenella longirostris*, in the observed kill, 1979 and 1980; by stock, year, and sex; data collected by IATTC and NMFS observers on U.S.-registered vessels.

Length (cm)	Northern Whitebelly				Southern Whitebelly				Eastern				Unidentified			
	1979		1980		1979		1980		1979		1980		1979		1980	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
75-79																
80-84	1	1		1												
85-89					2	1				1						
90-94							2				1					
95-99								2				1				
100-104									1					1		
105-109				1				1				1				1
110-114									1	2						
115-119									2		1					
120-124	2	2	3	1	4				4	3		2				
125-129		2	1	2			1	1	2	3		1				
130-134	4	2	2				1	1	2	2						1
135-139	1		2	5	2				5	3	1	1				1
140-144	1		1		1			1	3	5	2					1
145-149	4	2	3	1			2		7	5	2					1
150-154	3	2	4	6	3		1	1	10	8	5	5				
155-159	4	2	3	5		3			13	11	3	5				
160-164	3	13	2	7	4	2	3	1	13	12	5	4	1	1	2	2
165-169	2	6	9	13	1	4	2	4	7	15	6	4				
170-174	5	11	13	20	3	5	7	2	16	18	6	6				1
175-179	13	12	16	17	5	6	3	4	10	14	7	9				1
180-184	8	7	10	13	11	4	2		13	9	1	2				
185-189	4	4	7	5	2	4	6	3	4		2					
190-194	5	2	2		1			3			1					
195-199		1					2									
200-204			1													
205-209							1									
210-214																
215-219																
220-224																
225-229																
230-234																
235-239							1									
Total	60	69	79	97	39	29	34	21	111	111	41	42	2	5	6	5

Table 13

Length frequencies for common dolphin, *Delphinus delphis*, in the observed kill, 1979 and 1980; by stock, year and sex; data collected by IATTC and NMFS observers on U.S.-registered vessels.

Length (cm)	Raja Neritic				Northern Tropical				Southern Tropical				Central Tropical			
	1979		1980		1979		1980		1979		1980		1979		1980	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
75-79																
80-84																
85-89																
90-94													2		1	
95-99																
100-104															1	
105-109															1	
110-114																
115-119																1
120-124																
125-129																1
130-134																
135-139						1										
140-144													1			
145-149						2	2							1		
150-154	1			1		1							2			
155-159	2	1		1		1				1			4	2		1
160-164		1			2	4				1			1	5		1
165-169	1	1			1	1	1	1		1			5	5		
170-174	2	5			1	2	1	1		1			6	11		1
175-179	2	11		2	1	7	3	1					4	7		
180-184	4	4			3	8		2		2			8	5		
185-189	2	5			9	3							16	9		1
190-194	2	2	1	1	6	4							10	20		3
195-199	2		1		7		1						9	20		1
200-204	2				3		1						7	10	1	2
205-209													9	7	1	
210-214													9	2		
215-219													5			
220-224													3		1	
225-229																
230-234																
235-239																
Total	20	30	2	4	36	32	7	5	3	4	94	109	5	11		

Table 14

Reproductive condition for 1,276 female spotted dolphins, *Stenella attenuata*, and 17 female striped dolphins, *Stenella coeruleoalba*, in the observed kill, 1979 and 1980; by stock and year; data collected by IATTC and NMFS observers on U.S.-registered vessels.

	Spotted								Striped	
	Northern Offshore				Southern Offshore				Northern Tropical	
	1979		1980		1979		1980		1979	
	N	%	N	%	N	%	N	%	N	%
Maturity undetermined	247	42.8	237	49.2	81	51.7	35	60.4	2	11.8
Sexually immature	123	21.2	105	21.8	17	10.8	6	10.3	8	47.0
Sexually mature:										
Condition undetermined	2	0.3	1	0.2	0	0.0	0	0.0	0	0.0
Pregnant only	42	7.3	30	6.2	9	5.7	6	10.3	0	0.0
Pregnant and lactating	17	2.9	9	1.9	1	0.6	0	0.0	0	0.0
Lactating only	117	20.2	75	15.6	28	17.8	8	13.8	3	17.6
"Resting"										
With corpus luteum	7	1.2	6	1.2	10	6.4	0	0.0	0	0.0
Without corpus luteum	21	3.6	19	3.9	10	6.4	3	5.2	4	23.6
Post-reproductive	3	0.5	0	0.0	1	0.6	0	0.0	0	0.0
Total	579	100.0	482	100.0	157	100.0	58	100.0	17	100.0

Table 15

Reproductive condition for 369 female spinner dolphins, *Stenella longirostris*, in the observed kill, 1979 and 1980; by stock and year; data collected by IATTC and NMFS observers on U.S.-registered vessels.

	Eastern				Whitebelly							
	1979		1980		Northern				Southern			
	N	%	N	%	N	%	N	%	N	%	N	%
Maturity undetermined	43	38.8	21	50.0	18	26.1	61	62.9	18	62.1	14	66.6
Sexually immature	36	32.4	12	28.6	20	29.1	19	19.6	6	20.7	3	14.3
Sexually mature:												
Condition undetermined	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	4.8
Pregnant only	14	12.6	4	9.5	4	5.8	2	2.1	3	10.3	0	0.0
Pregnant and lactating	0	0.0	0	0.0	1	1.4	1	1.0	0	0.0	0	0.0
Lactating only	15	13.5	5	11.9	12	17.4	10	10.3	2	6.9	3	14.3
"Resting"												
With corpus luteum	0	0.0	0	0.0	6	8.7	0	0.0	0	0.0	0	0.0
Without corpus luteum	3	2.7	0	0.0	7	10.1	4	4.1	0	0.0	0	0.0
Post-reproductive	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	111	100.0	42	100.0	69	100.0	97	100.0	29	100.0	21	100.0

Table 16

Reproductive condition for 188 female common dolphins, *Delphinus delphis*, in the observed kill, 1979 and 1980; by stock and year; data collected by IATTC and NMFS observers on U.S.-registered vessels.

	Baja		Northern		Southern				Central			
	Meritic		Tropical		Tropical		Tropical		Tropical		Tropical	
	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980
	N	%	N	%	N	%	N	%	N	%	N	%
Maturity undetermined	20	66.7	20	62.6	0	0.0	0	0.0	33	30.9	0	0.0
Sexually immature	2	6.7	3	9.4	2	50.0	2	50.0	31	29.0	5	45.4
Sexually mature:												
Condition undetermined	0	0.0	0	0.0	0	0.0	0	0.0	1	0.9	0	0.0
Pregnant only	2	6.7	1	3.1	0	0.0	0	0.0	7	6.5	1	9.1
Pregnant and lactating	0	0.0	1	3.1	0	0.0	0	0.0	4	3.7	0	0.0
Lactating only	4	13.3	6	18.7	2	50.0	2	50.0	22	20.6	4	36.4
"Resting"												
With corpus luteum	1	3.3	1	3.1	0	0.0	0	0.0	3	2.8	0	0.0
Without corpus luteum	1	3.3	0	0.0	0	0.0	0	0.0	6	5.6	1	9.1
Post-reproductive	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	30	100.0	32	100.0	4	100.0	4	100.0	107	100.0	11	100.0

Appendix 1

FORM USED BY NMFS TECHNICIANS TO COLLECT INCIDENTAL-KILL DATA ABOARD COMMERCIAL TUNA PURSE-SEINERS

NOAA FORM 88-124
FSW 34 11-78

1979 MARINE MAMMAL SET LOG
TALLY SHEET

CRUISE # _____ NOAA - U.S. DEPT. OF COM.
SET # _____ Page 5

SYMBOLS TO USE:

- v = DEAD
- + = ESCAPED OR RELEASED ALIVE
- ⊕ = ESCAPED OR RELEASED ALIVE BUT INJURED
- ? = STATUS UNDETERMINED
- ⊛ = STATUS UNDETERMINED BUT INJURED

NOTE: "INJURED" MEANS

- 1) BLEEDING
- 2) HAVING OBVIOUSLY BROKEN BONES
- 3) HAVING GONE THROUGH THE POWER BLOCK

NEONATE		TWO-TONE		SPECKLED		SPOTTED		MOTTLED		ADULT		AGE		SPINNERS						OTHER SPECIES (1)			OTHER SPECIES (2)			U	N	I	D											
								M	F	?	M	F	?	M	F	?	M	F	?	M	F	?	M	F	?					M	F	?								

SUBTOTALS

ANIMALS PROCESSED

ANIMALS DUMPED

Spotted Stock Name _____ Other Spinner Name _____ Other Species/Stock (1) Name _____ Other Species/Stock (2) Name _____

