

AGREEMENT ON THE INTERNATIONAL DOLPHIN CONSERVATION PROGRAM
ACUERDO SOBRE EL PROGRAMA INTERNACIONAL PARA LA CONSERVACION
DE LOS DELFINES

7TH MEETING OF THE PARTIES

MANZANILLO (MEXICO)
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ALLOCATION OF PER-STOCK, PER-YEAR DOLPHIN MORTALITY CAPS

During the 1st Meeting of the Parties, held in July 1999, two proposals for the allocation of stock mortality limits (SMLs) were presented, one for a global allocation for the year 2000, and the other for national limits based on past fishing on the various stocks. It was agreed to adopt a global allocation method for the year 2000. During the 3rd Meeting of the Parties, held in June 2000, it was agreed that “until a new system for addressing the per-stock, per-year mortality caps is established, the global system in effect for 2000 would continue to be used” and that the matter would be discussed in future meetings of the Working Group on Per-stock, Per-year Dolphin Mortality Caps and the Parties.

During the 6th Meeting of the Parties, held in October 2001, three options were presented for the consideration of the Parties for allocation of stock mortality. The Parties agreed to study these options and discuss them at the next meeting.

The first option is the current system of global allocation of SMLs, in which the SMLs are not assigned to countries or vessels but are available to all (Table 1).

A second option is to allocate to each country an SML for each stock in the same proportion as the country's DMLs. Thus, if a country's fleet had applied for 15 DMLs out of a total of 100 DMLs requested for the international fleet, then that country would be allocated 15% of the SMLs for each of the seven major stocks. Table 2 shows the number of SMLs that would be allocated to each country based on the number of DMLs that were assigned for 2002 at the October 2001 meetings. Second-semester DMLs are considered as one-half of a full-year DML. As with DMLs, SMLs not utilized by 1 May would be redistributed amongst the international fleet. Flag changes by vessels would result in a redistribution of the SMLs in accord with the changed distribution of DMLs.

The third option takes account of the number of sets made on a particular stock by a country's fleet during the previous year and its DMLs in the following year. The allocation is weighted by a) the proportion of of the overall DML for the following year issued to that country's fleet; b) the proportion of of the total number of sets on dolphins made by that country's fleet on that particular stock in the previous year; and c) a specified proportion assigned to the national and global portions. The equations for calculating the SMLs for a given country and a given stock are:

$$R_c = (DML_C + \frac{1}{2} DML_{C2}) / (DML_T + \frac{1}{2} DML_{T2})$$

where:

R_c is the ratio of DMLs for that country compared to all DMLs,

DML_C is the number of vessels of country C with full-year DMLs,

DML_{C2} is the number of vessels of country C with second-semester DMLs ,

DML_T is the total number of vessels in the international fleet with full-year DMLs ,

DML_{T2} is the total number of vessels in the international fleet with second-semester DMLs,

and

$$P_{CS} = S_{CS}/S_{TS}$$

where:

P_{CS} is the proportion of sets made by vessels of country C on stock S,

S_{CS} is the number of sets made by vessels of country C on stock S during the previous year,

S_{TS} is the total number of sets on stock S made by the international fleet during the previous year.

With a weighting of 75% national and 25% global, the SML for each country is allocated in proportion to $R_c \times ((0.75 \times P_{CS}) + 0.25)$. Other weights could be used: the closer the national weighting is to 1, the more weight is given to the number of sets on that stock during the previous year. Again, SMLs not utilized by 1 April would be redistributed amongst the international fleet. Flag changes by vessels would result in a redistribution of the SMLs in accord with the changed distribution of DMLs.

The DMLs assigned for 2002 and the number of sets made in 2001 by each fleet requesting a DML are shown in Table 3. The proportion of sets made by the fleets of each country on each stock are shown in Table 4. The proposed SMLs for each country based on this scheme are presented in Table 5. The proportion of sets on each stock is based on 2001 data. For countries whose vessels made less than 30 sets on dolphins in 2001, the international fleet averages of the proportions of sets by stock were used. In practice, if this system were being used in October of any year to assign SMLs in the next year, the weighting for sets on a particular stock would have to be calculated from the last 12 months for which data were available.

During the scientific meeting held in May 2002, it was recommended that alternatives using one-, two-, and three-year histories of set proportions (P_{CS}) be compared. Figures 1-3 show examples for two countries and the international fleet average for three dolphin stocks (northeastern spotted, eastern spinner, and central common dolphins). Figure 1 illustrates an example of stability in set proportions for the three stocks, while Figure 2 illustrates an example of a sudden change in set proportions for central common dolphins. In general, increasing the length of the fishing history in calculating set proportions dampens the year-to-year variability.

Tables 6 and 7 show the 2002 SMLs calculated for each country in using the two- and three-year calculation of P_{CS} , respectively.

Discussion

The main advantages of the current system of global allocation of SMLs are that it is relatively simple to implement and that it avoids partitioning relatively small SMLs among countries. However, it exposes all countries to the risk that a high mortality within one fleet may restrict the activity of the others, a problem which the more complex systems of national allocations avoid.

The second option provides a larger allocation to those countries with larger fleets of vessels with DMLs. By allocating SMLs solely on the current capacity to fish on dolphins (based on the number of DMLs issued), it allows flexibility to change fishing areas, and for new fleets to enter the fishery. However, it would not be efficient in the sense that countries which habitually fished on particular stocks might be assigned SMLs which are too small in some cases and too large in others.

The third option provides a larger allocation to those countries that have made a greater number of sets on a given stock in the recent past and have a greater number of vessels with DMLs. This may produce a more-efficient utilization of the SMLs by allocating a larger proportion of a particular stock to fleets that have a history of setting on that stock. At the same time, it would allow countries the opportunity to enter the fishery, allow vessels to change fishing areas, and allow countries to increase their allocation over time as the numbers of DMLs and sets on a given stock increase.

TABLE 1. Option 1: Current SMLs for 2002 for the seven major stocks and incidental dolphin mortality in 2001. Abundance estimates (N) and coefficients of variation (CV) from Wade and Gerrodette (1993; unpub. data for northern and central common dolphins). Minimum abundance estimates (N_{min}) based on Potential Biological Removal guidelines described in Wade and Angliss (1997).

Option 1		Current SMLs for 2002				
Stock		N (x 1000)	CV	N_{min} (x 1000)	0.1% N_{min}	2001 mortality
Northeastern spotted	NES	730.9	0.142	648.9	649	588
Western/southern spotted	WSS	1,298.4	0.150	1,145.1	1,145	311
Eastern spinner	ESD	631.8	0.238	518.5	518	469
Whitebelly spinner	WBS	1,019.3	0.187	871.9	872	372
Northern common	NCD	713.7	0.367	562.7	563	94
Central common	CCD	239.4	0.383	207.3	207	203
Southern common	SCD	2,210.9	0.217	1,845.6	1,846	46

TABLE 2. Option 2: Numbers of DMLs allocated to national fleets as of January 2002 and number of SMLs allocated to each country requesting DMLs for 2002. Second-semester (SS) DMLs are considered as one-half of a full-year (FY) DML. The DMLs do not reflect changes in the fleets occurring after October 2001.

Option 2		National SMLs in proportion to 2002 DMLs								
		2002 DMLs		SMLs						
				Spotted		Spinner		Common		
		FY	SS	NES	WSS	ESD	WBS	NCD	CCD	SCD
Bolivia	BOL	5		34	61	27	46	30	11	98
Colombia	COL	5		34	61	27	46	30	11	98
Ecuador	ECU	6		41	73	33	55	36	13	118
Mexico	MEX	42	1	294	520	235	396	255	94	838
Nicaragua	NIC	1		6	12	5	9	6	2	19
Panama	PAN	3		20	36	16	27	18	6	59
Peru	PER	1		6	12	5	9	6	2	19
Venezuela	VEN	25		173	306	138	233	150	55	493
Vanuatu	VUT	2		13	24	11	18	12	4	39
RDA		3		27	40	21	33	19	9	64
Total		93	1	648	1,145	518	872	562	207	1,845

TABLE 3. Numbers of DMLs allocated to national fleets as of January 2002 and the numbers of sets made in 2001 on each of the seven major dolphin stocks by each country requesting DMLs for 2002. Second-semester (SS) DMLs are considered as one-half of a full-year (FY) DML. The DMLs do not reflect changes in the fleets occurring after October 2001.

Number of sets on each stock in 2001											
		2002 DMLs		Spotted		Spinner		Common			Total
		FY	SS	NES	WSS	ESD	WBS	NCD	CCD	SCD	
Bolivia	BOL	5		166	52	30	48	0	9	0	305
Colombia	COL	5		329	294	103	139	0	26	0	891
Ecuador	ECU	6		0	0	0	0	0	0	0	0
Mexico	MEX	42	1	2,726	1,238	1,221	900	135	0	8	6,228
Nicaragua	NIC	1		62	51	5	25	0	0	8	151
Panama	PAN	3		96	76	22	46	0	11	0	251
Peru	PER	1		0	0	0	0	0	0	0	0
Venezuela	VEN	25		1,460	963	647	544	0	908	49	4,571
Vanuatu	VUT	2		107	91	52	52	0	39	1	342
RDA		3									
Total		93	1	4,946	2,765	2,080	1,754	135	993	66	12,739

TABLE 4. Proportions of the total number of sets on the seven major dolphin stocks made by each national fleet. For countries with national observer programs for which set data by stock were not available, the totals were extrapolated from data from trips by vessels of that country covered by the IATTC program. For countries whose vessels made less than 30 sets on dolphins in 2001, the international fleet averages of the set proportions (P_{CS}) were used.

Proportion of sets on each stock									
		Spotted		Spinner		Common			Total
		NES	WSS	ESD	WBS	NCD	CCD	SCD	
Bolivia	BOL	0.544	0.170	0.098	0.157	0.000	0.030	0.000	1.00
Colombia	COL	0.388	0.330	0.116	0.156	0.000	0.295	0.000	1.00
Ecuador	ECU	-	-	-	-	-	-	-	-
Mexico	MEX	0.438	0.199	0.196	0.144	0.022	0.000	0.001	1.00
Nicaragua	NIC	0.411	0.338	0.033	0.166	0.000	0.000	0.053	1.00
Panama	PAN	0.382	0.303	0.088	0.183	0.000	0.044	0.000	1.00
Peru	PER	-	-	-	-	-	-	-	-
Venezuela	VEN	0.319	0.211	0.142	0.119	0.000	0.199	0.011	1.00
Vanuatu	VUT	0.313	0.266	0.152	0.152	0.000	0.114	0.003	1.00
Average		0.388	0.217	0.163	0.138	0.106	0.078	0.005	1.00

TABLE 5. Option 3: National SMLs for the seven major dolphin stocks using the proportion of sets on each stock from 2001 (rounded down to the nearest whole number).

Option 3		National SMLs for 2002						
		Spotted		Spinner		Common		
		NES	WSS	ESD	WBS	NCD	CCD	SCD
Bolivia	BOL	41	56	24	48	29	9	97
Colombia	COL	33	73	25	48	29	9	97
Ecuador	ECU	41	73	33	55	36	13	118
Mexico	MEX	310	504	251	400	263	78	830
Nicaragua	NIC	7	14	4	9	5	1	22
Panama	PAN	20	42	14	30	17	6	58
Peru	PER	6	12	5	9	6	2	19
Venezuela	VEN	154	303	132	222	145	73	502
Vanuatu	VUT	12	26	10	19	11	4	39
RDA		24	42	20	32	21	12	63
Total		648	1,145	518	872	562	207	1,845

TABLE 6. Option 3: National SMLs for the seven major dolphin stocks using the proportion of sets on each stock from 2000 and 2001 (rounded down to the nearest whole number).

Option 3		National SMLs for 2002						
		Spotted		Spinner		Common		
		NES	WSS	ESD	WBS	NCD	CCD	SCD
Bolivia	BOL	35	68	23	49	29	9	97
Colombia	COL	31	75	24	52	29	9	97
Ecuador	ECU	38	84	31	57	35	12	120
Mexico	MEX	322	475	256	396	261	78	832
Nicaragua	NIC	7	12	4	9	5	2	21
Panama	PAN	21	45	13	26	17	5	58
Peru	PER	6	12	5	9	5	2	19
Venezuela	VEN	150	304	130	225	146	75	498
Vanuatu	VUT	12	28	10	18	11	4	39
RDA		26	42	22	31	24	11	64
Total		648	1,145	518	872	562	207	1,845

TABLE 7. Option 3: National SMLs for the seven major dolphin stocks using the proportion of sets on each stock from 1999 to 2001 (rounded down to the nearest whole number).

Option 3		National SMLs for 2002						
		Spotted		Spinner		Common		
		NES	WSS	ESD	WBS	NCD	CCD	SCD
Bolivia	BOL	35	66	25	48	29	10	98
Colombia	COL	31	73	24	52	29	9	98
Ecuador	ECU	36	88	32	56	35	12	119
Mexico	MEX	316	470	256	394	261	82	834
Nicaragua	NIC	7	12	4	9	5	2	20
Panama	PAN	22	42	14	25	17	6	58
Peru	PER	6	12	5	9	5	2	19
Venezuela	VEN	157	313	128	230	146	69	496
Vanuatu	VUT	12	28	10	18	11	4	39
RDA		26	41	20	31	24	11	64
Total		648	1,145	518	872	562	207	1,845

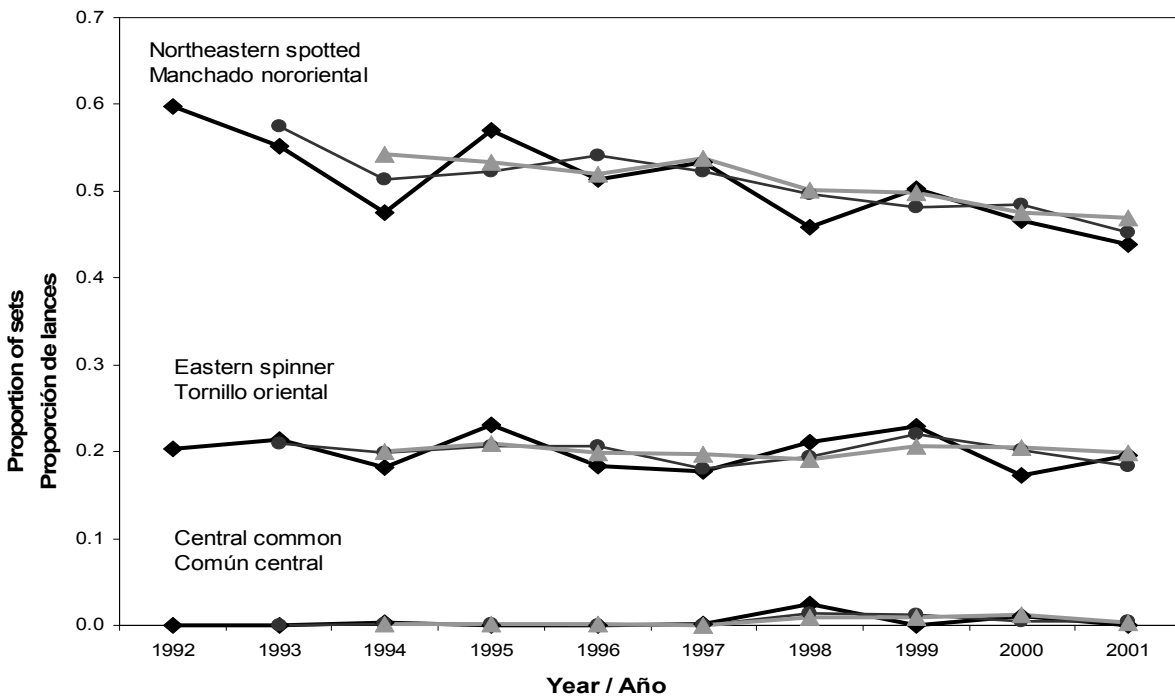


FIGURE 1. Proportions of sets made on three stocks of dolphins by the Mexican fleet, 1992-2001. For each stock, the set proportions are plotted for each year (bold lines with squares), and as running averages of two years (thin line with dots) and three years (thick grey line with triangles).

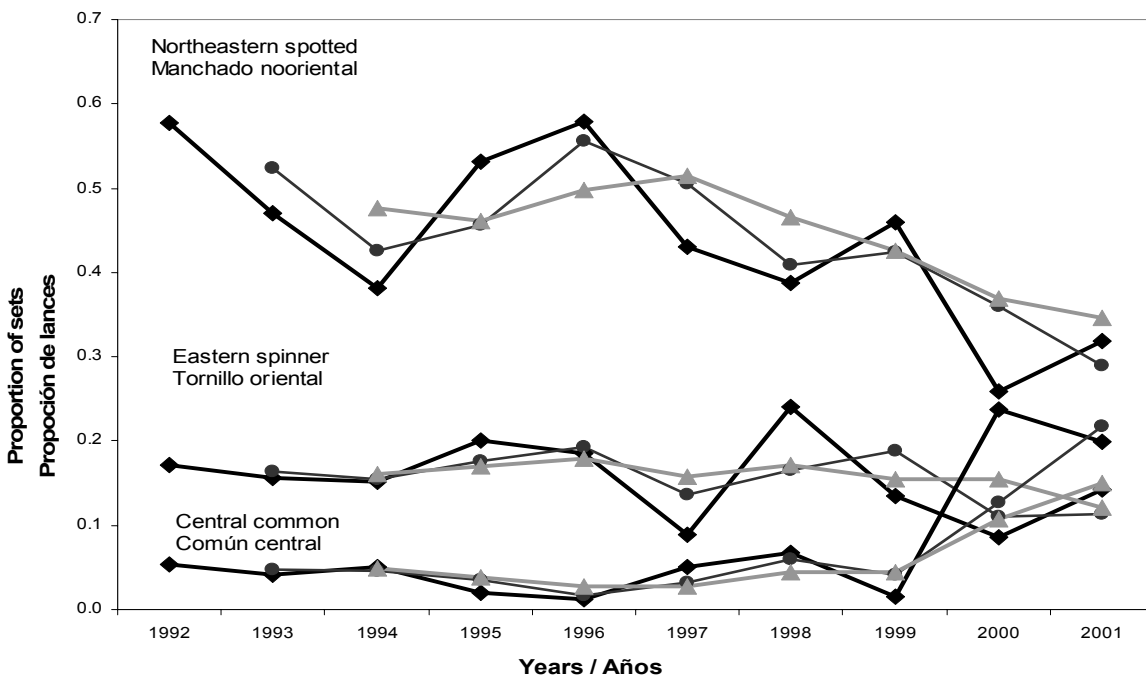


FIGURE 2. Proportions of sets made on three stocks of dolphins by the Venezuelan fleet, 1992-2001. For each stock, the set proportions are plotted for each year (bold lines with squares), and as running averages of two years (thin line with dots) and three years (thick grey line with triangles).

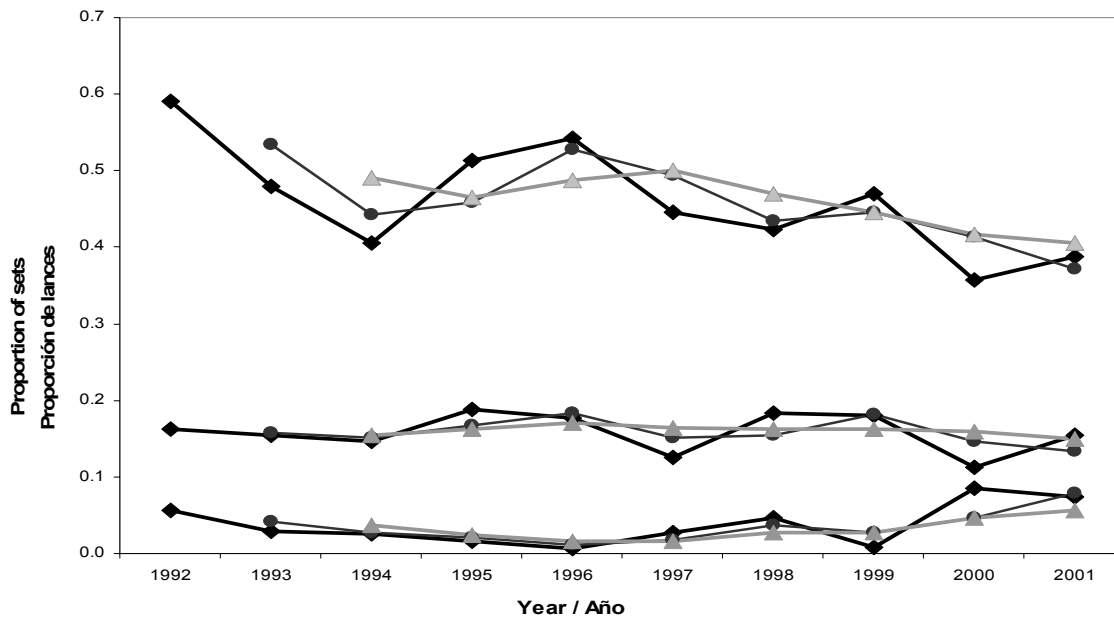


FIGURE 3. Proportions of sets made on three stocks of dolphins by the international fleet, 1992-2001. For each stock, the set proportions are plotted for each year (bold lines with squares), and as running averages of two years (thin line with dots) and three years (thick grey line with triangles).