

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)
JUNE 24, 2002

DOCUMENT MOP-7-04

**REPORT ON THE INTERNATIONAL DOLPHIN CONSERVATION
PROGRAM**

1. INTRODUCTION.....	1
2. THE ON-BOARD OBSERVER PROGRAM	2
2.1. Observer coverage	2
2.2. Observer training.....	2
3. DOLPHIN MORTALITY IN 2001.....	2
3.1. Dolphin Mortality Limits (DMLs)	2
3.2. Preliminary estimates of the mortality of dolphins in 2001 due to fishing.....	3
3.3. Reports of dolphin mortality by observers at sea	3
4. INTERNATIONAL REVIEW PANEL	4
5. SYSTEM FOR TRACKING AND VERIFYING TUNA	4
6. OTHER FUNCTIONS PERFORMED BY THE SECRETARIAT.....	4
6.1. Dolphin safety panel alignments	4
6.2. Training and certification of fishing captains	5
6.3. Statements of Participation.....	5
6.4. Other services	5
7. RESEARCH.....	5
7.1. Distribution of fishing effort.....	5
7.2. A preliminary analysis of recent causes of dolphin mortality	6
Figures.....	8
Tables	16

1. INTRODUCTION

In the eastern Pacific Ocean (EPO), schools of yellowfin tuna frequently associate with marine mammals, especially spotted, spinner, and common dolphins. When the purse-seine fishery for tunas in the EPO began around 1960, the fishermen found that their catches of yellowfin in the EPO could be maximized by setting these nets around the herd of dolphins and the associated school of tunas. However, releasing the dolphins caught without losing the tuna proved more difficult, and in the early years of the fishery many dolphins became entangled in the nets and died during this process. As techniques and equipment to solve this problem were developed, this mortality fell, gradually at first and dramatically in the 1990s, thanks to the combined efforts of the fishing industry, governments, the IATTC, environmental organizations, and other interested parties.

The 1992 La Jolla Agreement provided a framework for the international efforts to reduce this mortality, and introduced such novel and effective measures as Dolphin Mortality Limits (DMLs) for individual vessels, an observer program for vessels fishing tunas associated with dolphins, and the International Review Panel to monitor the performance and compliance of the fishing fleet. The Agreement on the International Dolphin Conservation Program (AIDCP), which built on and formalized the provisions of the La Jolla Agreement, was signed in May 1998 and entered into force in February 1999. The Parties to

this agreement committed to “ensure the sustainability of tuna stocks in the eastern Pacific Ocean and to progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem.”

The IATTC provides the Secretariat for the IDCP and its various bodies and coordinates the On-Board Observer Program and the Tuna Tracking and Verification System.

2. THE ON-BOARD OBSERVER PROGRAM

The IATTC’s international observer program and the national observer programs of Ecuador (Programa Nacional de Observadores Pesqueros de Ecuador; PROBECUADOR), Mexico (Programa Nacional de Aprovechamiento del Atún y Protección de Delfines; PNAAPD) and Venezuela (Programa Nacional de Observadores de Venezuela; PNOV) constitute the AIDCP On-Board Observer Program.

2.1. Observer coverage

The AIDCP mandates 100% coverage by observers of fishing trips by purse seiners of carrying capacity greater than 363 metric tons (IATTC Class 6) in the Agreement Area. PROBECUADOR began the year sampling approximately 25% of trips by its fleet and increased its sampling later in the year toward a goal of 34% coverage. The PNAAPD and PNOV each had a goal of sampling approximately half of the trips by their respective fleets during the year. The IATTC program covered the remainder of the trips by the fleets of those three countries, plus all trips by vessels of other fleets, except as noted below.

During 2001, observers from the On-Board Observer Program departed on 698 fishing trips (Table 1). In addition, 54 vessels whose last trip of 2000 carried over into 2001 had observers aboard, bringing the total to 752 trips observed in 2001 by the Program. The Program covered vessels operating under the jurisdictions of Belize, Bolivia, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Spain, the United States, Vanuatu, and Venezuela, and in one case a vessel of unknown registry. Nineteen of these trips were made by vessels which at the time of departure were flying the flag of a non-Party to the AIDCP.

During 2001 the Program sampled 98.2% of trips vessels covered by the AIDCP, and the IATTC program sampled over 69% of all trips. Of the 14 trips not sampled, 10 were made by five Bolivian-flag vessels during the period when the Parties decided to withhold observers from Bolivian vessels pending clarification regarding Bolivia’s participation in the IDCP. After Bolivia began its participation in August, one of its vessels made a trip without an observer because its management refused to accept the assigned observer. Observers were not aboard on three other trips, two by a vessel of unknown registry and one by a Vanuatu-flag vessel (which was in the process of changing its flag to Bolivia), because the managers of those vessels did not request a observers.

2.2. Observer training

In November 2001 a training course for observers was held in Manta, Ecuador. It was attended by 18 trainees for the IATTC program and 5 trainees from the Ecuadorian national observer program.

3. DOLPHIN MORTALITY IN 2001

3.1. Dolphin Mortality Limits (DMLs)

The overall dolphin mortality limit (DML) established for the international fleet in 2001 was 5,000 animals, and the unreserved portion of 4,900 was allocated to 82 vessels that requested and were qualified to receive DMLs. The average individual-vessel DML (ADML) was 59.75 dolphins. Of the 18 vessels that did not utilize their DMLs prior to April 1, 4 forfeited their DMLs, and the other 14 were allowed to

keep them for the remainder of the year under the *force majeure* exemption allowed by the AIDCP. A total of 68 vessels utilized their DMLs during the year. Three vessels were allocated second-semester DMLs of 14 animals each, but none of these were utilized. The distribution of the mortality caused in 2001 by vessels with full-year DMLs is shown in Figure 1.

3.2. Preliminary estimates of the mortality of dolphins in 2001 due to fishing

The preliminary estimate of the incidental mortality of dolphins in the fishery in 2001 is 2,129 animals (Table 2), a 30% increase over the 1,636 mortalities recorded in 2000. The mortalities for 1979-2001, by species and stock, are shown in Table 3, and the standard errors of these estimates are shown in Table 4. The mortalities of the principal dolphin species affected by the fishery show declines in the last decade (Figure 2) similar to that for the mortalities of all dolphins combined (Figure 3). Estimates of the abundances of the various stocks of dolphins for 1986-1990 and the relative mortalities (mortality/abundance) are also shown in Table 2. The stocks with the highest levels of relative mortality were northeastern spotted dolphins and eastern spinner dolphins (0.08%).

The number of sets on dolphin-associated schools of tuna made by Class-6 vessels increased by 4%, from 9,235 in 2000 to 9,577 in 2001, and this type of set accounted for 52.6% of the total number of sets made in 2001, compared to 49.6% in 2000. The average mortality per set increased from 0.17 dolphins in 2000 to 0.22 dolphins in 2001. The estimated spatial distribution of the average mortalities per set during 2001 is shown in Figure 4. Typically, patches of relatively high mortalities per set were found throughout the fishing area, but in 2001 the higher-mortality areas were concentrated more inshore. The trends in the numbers of sets on dolphin-associated fish, mortality per set, and total mortality in recent years are shown in Figure 3.

The catches reported by observers of dolphin-associated yellowfin increased by 50% in 2001 as compared to 2000. The percentage of the catch of yellowfin taken in sets on dolphins increased from 61.8% of the total catch by Class-6 vessels in 2000 to 67.7% of that catch in 2001, and the average catch of yellowfin per set on dolphins increased from 17.2 to 24.8 metric tons. The mortality of dolphins per metric ton of yellowfin caught decreased from 0.010 in 2000 to 0.009 in 2001.

The above figures are based on data from trips covered by observers from all the components of the On-Board Observer Program.

3.3. Reports of dolphin mortality by observers at sea

The AIDCP requires the Parties to establish a system, based on real-time observer reporting, to ensure effective implementation and compliance with per-stock, per-year dolphin mortality caps. This requirement was complied with by requiring all observers aboard tuna purse seiners with a DML to report dolphin mortality by stock weekly via e-mail, fax, or radio. Late in 2001, as some SMLs were approached, the required reporting frequency was increased to twice a week. However, for various reasons the Secretariat received only about 50% of the required reports. Lacking complete real-time data, projections of mortality were made based on the data available, and these extrapolations indicated that restrictions on the fishery were necessary to ensure that no SMLs would be exceeded. Accordingly, the Secretariat recommended to governments that the fishery for tuna associated with the central stock of common dolphins be closed on December 10 for the remainder of 2001, and likewise for northeastern offshore spotted dolphins on December 21.

As of May 7, 2002, estimates of dolphin mortality in 2001 (Table 2) are still preliminary, but it appears that the SMLs for neither central common dolphins (207) nor northeastern spotted dolphins (648) were exceeded by the estimated mortalities (203 and 588, respectively). It should be noted that estimation can be inaccurate, and would be unnecessary if all vessels carried observers and complied with the weekly reporting requirement.

Since January 1, 2001, the Secretariat has been reporting weekly to the Parties the cumulative mortality

for the seven stocks of dolphins most frequently associated with the fishery. The most recent reported mortalities for 2002 are shown in Table 5.

4. INTERNATIONAL REVIEW PANEL

The International Review Panel (IRP) follows a general procedure for reporting the compliance by vessels with measures established by the AIDCP for minimizing the mortalities of dolphins during fishing operations to the governments concerned. After each fishing trip the observer prepares a summary of information pertinent to dolphin mortalities, and this is sent to the government with jurisdiction over the vessel by the Secretariat. Certain possible infractions are automatically reported to the government with jurisdiction over the vessel in question; the IRP reviews the observer data for other cases at its meetings, and any cases identified as possible infractions are likewise reported to the relevant government. The governments report back to the IRP on actions taken regarding these possible infractions.

The IRP held the following meetings during 2001:

Meeting	Venue	Dates
26	La Jolla, California	January 29-30
27	San Salvador, El Salvador	June 27
28	Cartagena, Colombia	October 25-26

The minutes of these meetings are available on the IATTC’s website (www.iattc.org). The IRP also publishes an annual report, presented to the Meeting of the Parties, which summarizes the activities, actions and decisions of the Panel and lists the possible infractions identified for the various national fleets.

5. SYSTEM FOR TRACKING AND VERIFYING TUNA

Article V.1.f of the AIDCP calls for the establishment of a system for the tracking and verification of tuna caught with and without mortality or serious injury of dolphins. The Parties developed a tracking and verification system and a standard Tuna Tracking Form (TTF) to be completed at sea by observers. There are two versions of the TTF, which, except for the headings, are identical; Form ‘A’ documents tuna caught in sets without mortality or serious injury of dolphins (“dolphin safe”), and Form ‘B’ documents tuna caught in sets with mortality or serious injury of dolphins (“non-dolphin safe”). Within this framework each Party establishes its own tracking and verification program, implemented and operated by a designated national authority, which includes periodic audits and spot checks for caught, landed, and processed tuna products, mechanisms for communication and cooperation between and among national authorities, and timely access to relevant data. Each Party is required to provide the Secretariat with a report detailing its tracking and verification program.

TTFs were completed for all but two observed trips by Party vessels that departed during 2001 and for which there was catch of tuna. For the two trips for which TTFs were not completed, the Secretariat did not issue TTFs to the observer because it could not confirm that the vessels were under the jurisdiction of a Party at the time of departure.

6. OTHER FUNCTIONS PERFORMED BY THE SECRETARIAT

6.1. Dolphin safety panel alignments

During 2001, the IATTC staff conducted alignments of dolphin-safety panels (DSPs) and inspections of dolphin rescue gear aboard 24 vessels, 23 registered in Mexico, and 1 in Venezuela. A trial set, during which an IATTC technician observes the performance of the net from an inflatable raft during backdown, is made to check the alignment of the DSP. The technician transmits his observations, comments, and suggestions to the captain of the vessel, and attempts are made to resolve any problems that may arise.

Afterward a report is prepared for the vessel owner or manager. This report contains a summary of the technician's observations and, if necessary, suggestions for improving the vessel's dolphin-safety gear and/or procedures.

6.2. Training and certification of fishing captains

The IATTC has conducted dolphin mortality reduction seminars for tuna fishermen since 1980. Article V of the AIDCP calls for the establishment, within the framework of the IATTC, of a system of technical training and certification of fishing captains. Under the system, the IATTC staff is responsible for maintaining a list of all captains qualified to fish for tunas associated with dolphins in the EPO. The names of the captains who meet the requirements are to be supplied to the IRP for approval and circulation to the Parties to the AIDCP.

The requirements for new captains include (1) attending a training seminar organized by the IATTC staff or by the pertinent national program in coordination with the IATTC staff, (2) participation in a trial set that includes direct observations of the backdown channel, and (3) a practical training component, consisting of a trip during which it is intended to fish for tuna associated with dolphins aboard a vessel with a DML, accompanied by either a qualified captain or an approved technical advisor. These workshops are intended not only for captains, who are directly in charge of fishing operations, but also for other crew members and for administrative personnel responsible for vessel equipment and maintenance. The fishermen and others who attend the workshops are presented with certificates of attendance.

The IATTC staff conducted four seminars during 2001, two in La Jolla and two in Mazatlan, Mexico, the latter in conjunction with Mexico's national program. A total of 65 fishermen attended the four seminars.

6.3. Statements of Participation

Statements of Participation are issued by the IATTC staff on request to vessels that carry observers from the On-Board Observer Program. There are two types: the first, issued to vessels of Parties to the AIDCP only, certifies that the vessel has been participating in the IDCP, and that all its trips have been covered by observers; the second, issued to vessels of non-Parties, certifies only that all the vessel's trips have been covered by observers. During 2001 statements of the first type were issued for 124 fishing trips by vessels of Colombia, El Salvador, Guatemala, Honduras, Mexico, Panama, the United States, Vanuatu, and Venezuela, and of the second type for 7 fishing trips by vessels of Belize and Guatemala.

6.4. Other services

The IATTC also offers other services to help governments and fleet managers and operators of individual vessels to reduce dolphin mortality. Publications and videotapes on the subject are available at IATTC field offices. *Trip Analyses*, detailed reports of observed fishing trips, are prepared upon request and, after the required authorizations are obtained, provided to allow performance assessments of vessels and captains.

7. RESEARCH

7.1. Distribution of fishing effort

Figures 5-7 compare the spatial distributions of the fishing effort by vessels carrying observers, in numbers of sets, on floating objects, unassociated schools, and dolphins in 2000 and 2001.

- a. Sets on floating objects: In both 2000 and 2001 the effort was distributed in a very diffuse way over the whole southern and southwestern sectors, with a general southward shift in 2001.
- b. Sets on unassociated schools: The southern axis between 5°N and 5°S apparent in 2000 became more diffuse in 2001.

- c. Sets on dolphins: The traditional dolphin fishing areas have had a clear east-west axis, centered on 10°N, with two areas of high density, one closer inshore and the other around 120°W to 140°W. In recent years the axis has moved south, and the fishery is operating less in the offshore areas than before. This tendency to operate closer inshore was accentuated in 2000 and 2001.

7.2. A preliminary analysis of recent causes of dolphin mortality

Traditionally, the performance of fishers in reducing dolphin mortality has been measured with variables such as the average mortality per set (MPS), success in releasing all dolphins encircled (sets with zero mortality, number of dolphins left in the net after the backdown maneuver), and reduction of factors that cause high mortality (*e.g.*, major malfunctions, net canopies, net collapses). Data on these variables for 1986-2001 (IATTC data bases only) are shown in Figure 8 and Table 6. Determining the factors that contribute to the occurrence of incidental dolphin mortality in the purse-seine fishery is an important aspect of the efforts to reduce that mortality. Previous studies have indicated that mortality of dolphins varied with the catch of tunas, the size of the dolphin herd encircled, the time of the set (day sets *versus* night sets), the duration of the set, the presence of strong currents, gear malfunctions, and the presence of net canopies and collapses. Efforts to reduce dolphin mortalities intensified following the introduction of individual-vessel dolphin mortality limits (DMLs) in 1993, and the mortality per set continues to decrease relative to pre-1993 levels (Figure 9). Nonetheless, some incidental mortalities still occur. The IATTC staff is studying dolphin mortality data to determine which factors lead to these mortalities. This preliminary analysis focuses on the 1993-2000 period.

Because presently so few dolphin sets result in mortalities (Table 6), the focus of this analysis is to determine those factors that increase the probability of at least one dolphin mortality occurring in a given set. In addition, it seeks to identify aspects of typical fishing operations that may contribute to an increased likelihood of dolphin mortality. Therefore, sets during which extreme conditions occurred, such as an unusually long backdown or the encirclement of an extremely large herd of dolphins, were not considered in the analysis. The factors studied included: (1) indicators of environmental variability (visibility, weather, presence of strong current, season), (2) area of fishing operations (approximating historical presence of the fishery), (3) operational problems (gear malfunctions, net collapses, net canopies, coverage of the backdown channel by the dolphin safety panel), (5) temporal aspects of the fishing operations (start time of the set, and duration of approach, chase, encirclement, net roll, and backdown), (6) the use of dolphin rescue equipment and personnel during backdown (speedboats, rafts, swimmers, divers), (7) characteristics of the biomass of tunas and dolphins associated with the set (species and number of dolphins encircled, number of dolphins in the whole herd, tons of tuna caught). The existence of relationships between the probability of at least one dolphin mortality in a given set and these variables were explored using logistic regression techniques. The data for each of the eight years was analyzed separately.

Preliminary results suggest that the likelihood of the occurrence of at least one dolphin mortality per set increased predictably across years for only five of the factors considered. As in previous studies, it was found that the likelihood of dolphin mortality increased significantly with the presence of a net canopy and, to a lesser extent, a net collapse. It also increased with the duration of backdown and the tonnage of tuna caught, and when either spinner dolphins or common dolphins were present in the captured herd. In some years the probability of mortality decreased when the dolphin safety panel covered the backdown channel adequately, and sometimes increased in the presence of a strong current. In addition, in certain years, the duration of the approach and chase significantly affected the probability of mortality. However, the direction of the effects was not consistent from year to year, suggesting that they may be spurious.

Of the five variables found to consistently increase the likelihood of at least one dolphin mortality per set, the presence of a net canopy may be the most important. It was greater than the effect of a net collapse, of spinner dolphins in the net, and of the tuna catch, and often greater than that of duration of backdown. Also, in general, extended backdowns contributed more to the likelihood of mortality than did large

catches of tunas, net collapses, or the presence of spinner dolphins.

Selecting one specific factor as the most important is complicated by the presence of interactions and the non-linear relationship between some of these factors. For example, the duration of backdown tends to increase non-linearly with biomass in the net for all indicators of biomass associated with the set, although the rate of increase of the probability of mortality with increasing biomass is greatest at smaller biomasses (*i.e.*, small herds of dolphins, small catches of tunas). The fact that this involves all indicators of biomass is not surprising, since tuna catch, dolphin herd size, and the number of dolphins encircled are all positively correlated. In addition, the presence of a net canopy was found to increase non-linearly with the duration of backdown, although both factors contribute significantly to the probability of mortality. However, the presence of a net collapse showed little relation to the duration of backdown, probably because the use of speedboats to maintain the backdown channel shape is generally effective in preventing net collapses during backdown. On the other hand, extended backdowns tend to cause the floor of the net to rise toward the surface, which can result in canopies along the sides of the backdown channel. Thus, extended backdowns may contribute to an increased probability of dolphin mortality by (1) keeping animals in close contact with the net for extended periods of time and (2) contributing to the formation of net canopies. Another factor consistently contributing to the formation of net canopies is the presence of a strong current, which can also lead to net collapses.

Future analyses will further explore non-linear dependencies between factors, and also revisiting spatial and temporal effects and two-variable interactions. Analyses of factors affecting the magnitude of dolphin mortality in a set will also be conducted. The results of these analyses will be compared to results obtained for the pre-1993 period.

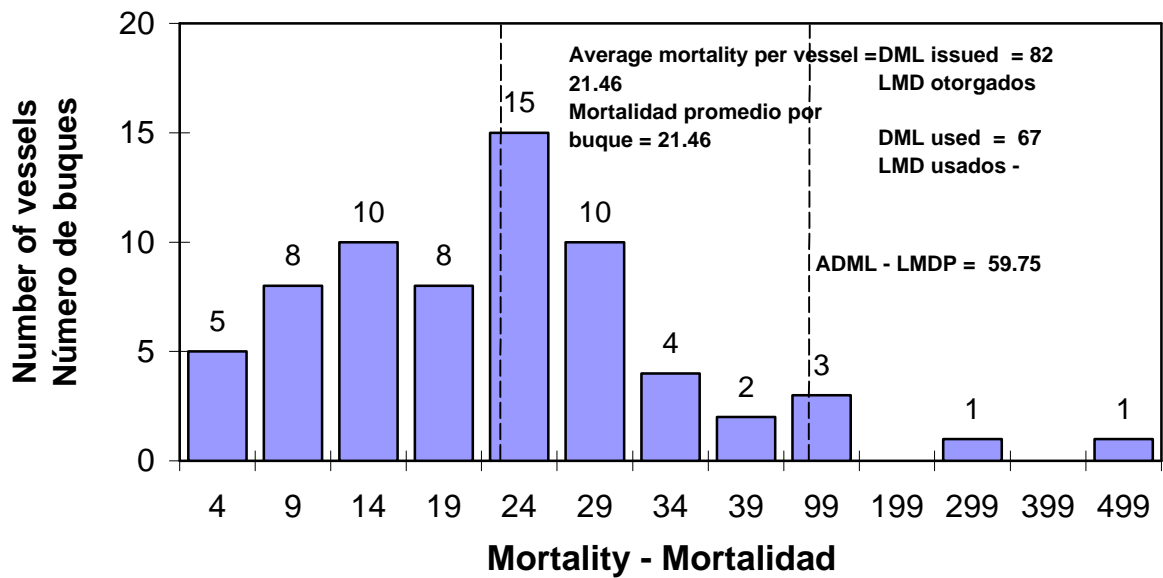


FIGURE 1. Distribution of dolphin mortality caused by vessels with full-year DMLs during 2001.

FIGURA 1. Distribución de la mortalidad de delfines causada por buques con LMD de año completo durante 2001.

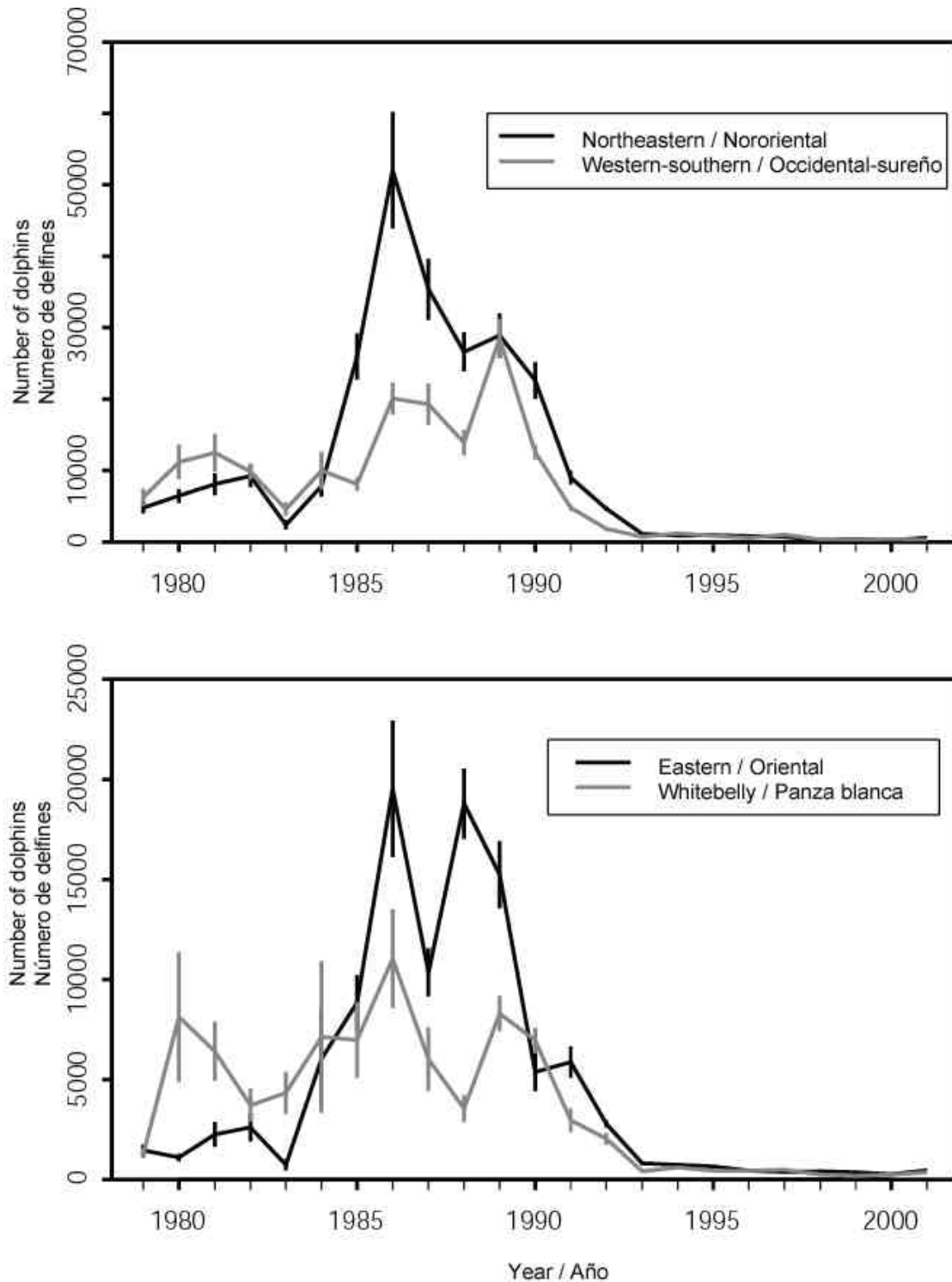


FIGURE 2. Estimated mortalities for the stocks of spotted (upper panel) and spinner (lower panel) dolphins in the eastern Pacific Ocean, 1979-2001. Each vertical line represents one positive and one negative standard error.

FIGURA 2. Mortalidad estimada de los stocks de delfines manchados (panel superior) y tornillo (panel inferior) en el Océano Pacífico oriental, 1979-2001. Cada línea vertical representa un error estándar positivo y un error estándar negativo.

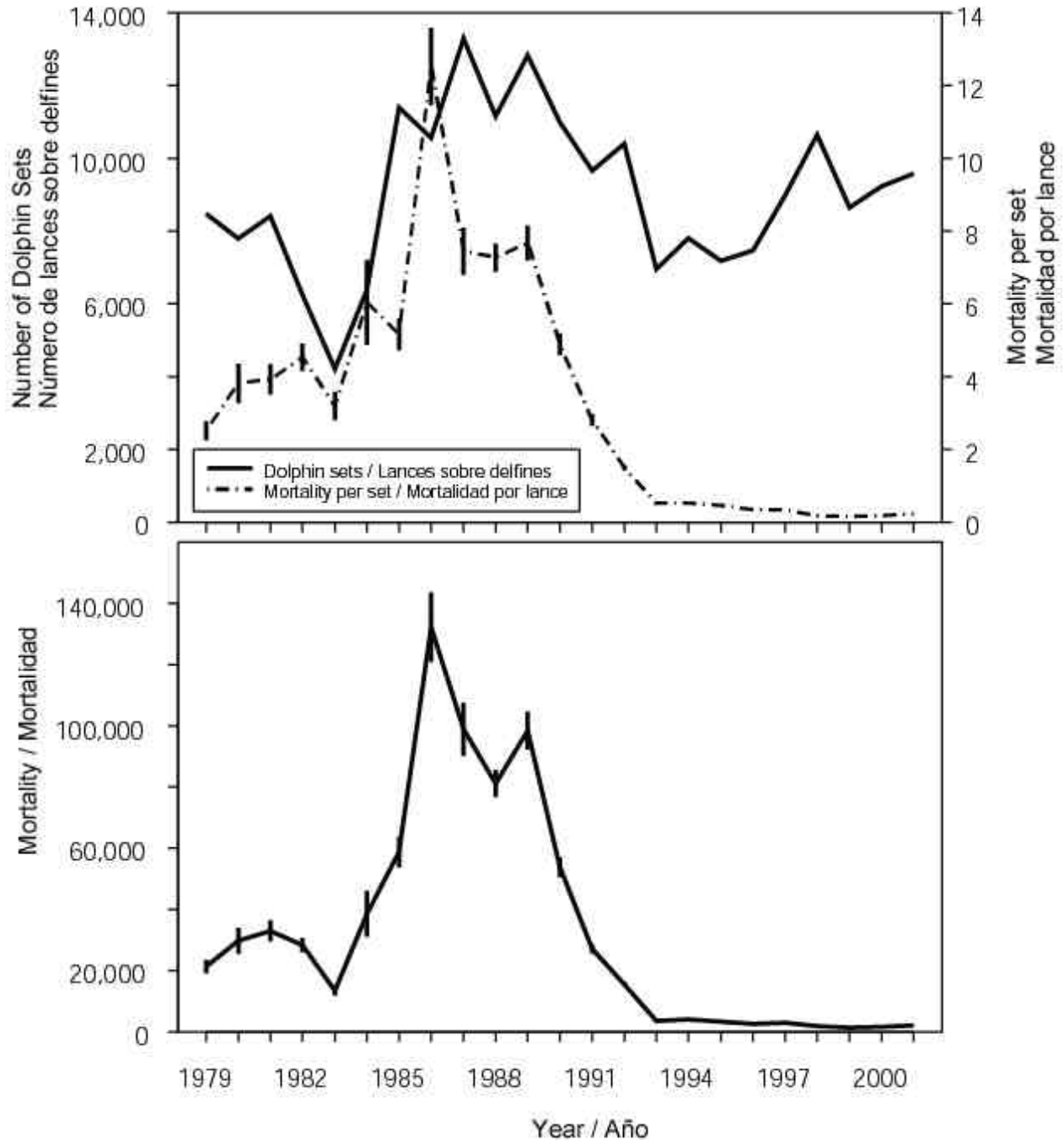


FIGURE 3. Total number of dolphin sets and average mortality per set (upper panel) and estimated total mortality (lower panel) for all dolphins in the EPO, 1979-2001. Each vertical line represents one positive and one negative standard error.

FIGURA 3.: Número total de lances sobre delfines y mortalidad media por lance (panel superior) y mortalidad total estimada (panel inferior) para todas especies de delfines en el OPO, 1979-2001. Cada línea vertical representa un error estándar positivo y un error estándar negativo.

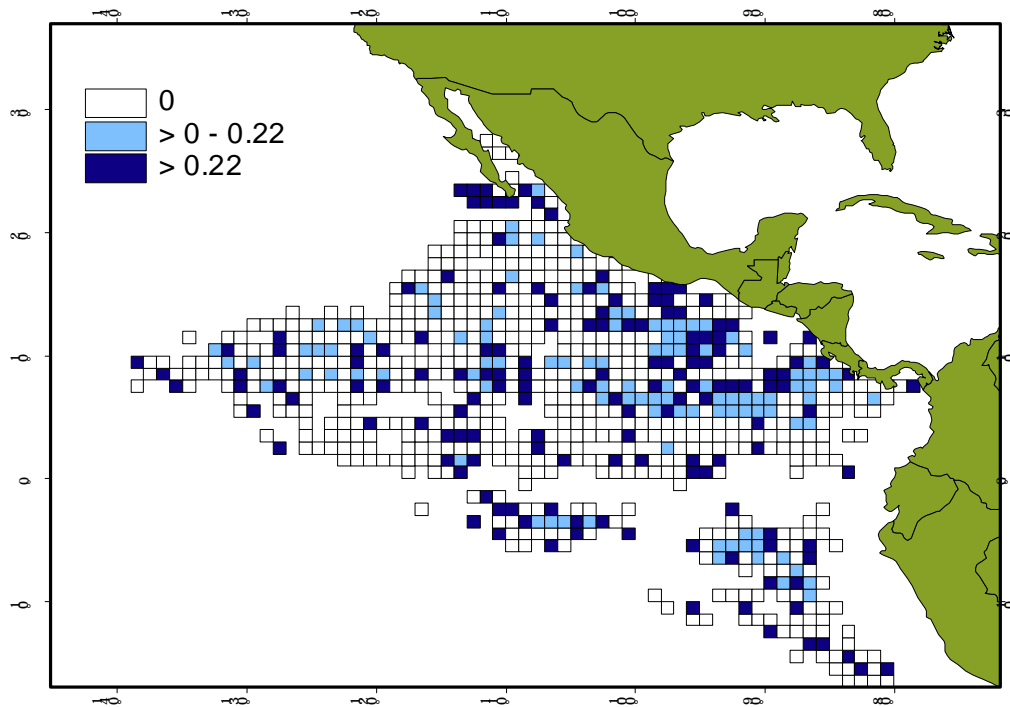


FIGURE 4. Spatial distribution of the average mortality of dolphins per set for all stocks combined, 2001.

FIGURA 4. Distribución de la mortalidad media de delfines por lance para todos los stocks combinados, 2001.

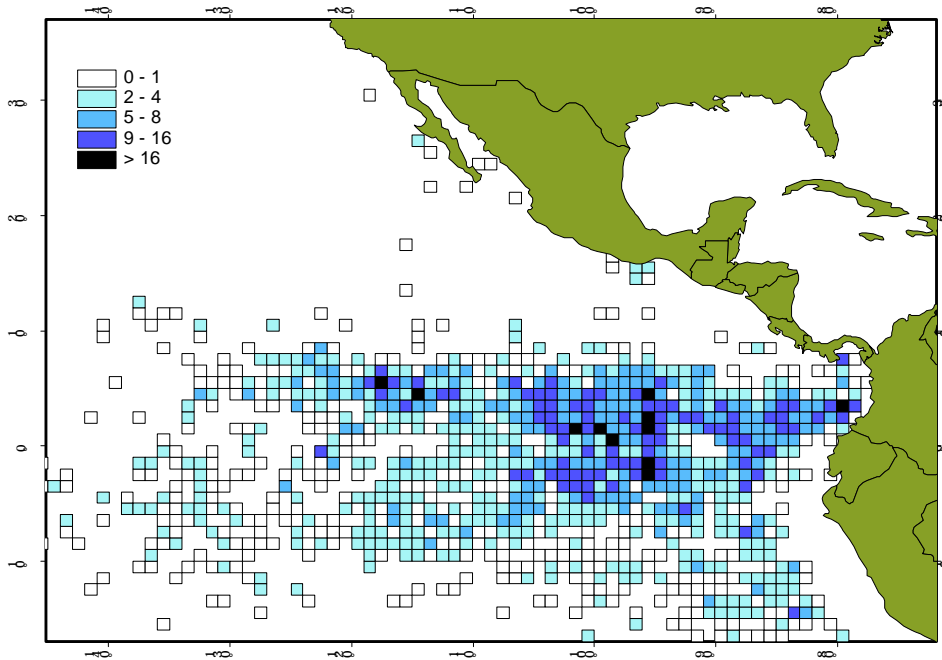


FIGURE 5a. Spatial distribution of sets on floating objects, 2000.

FIGURA 5a. Distribución espacial de los lances sobre objetos flotantes, 2000.

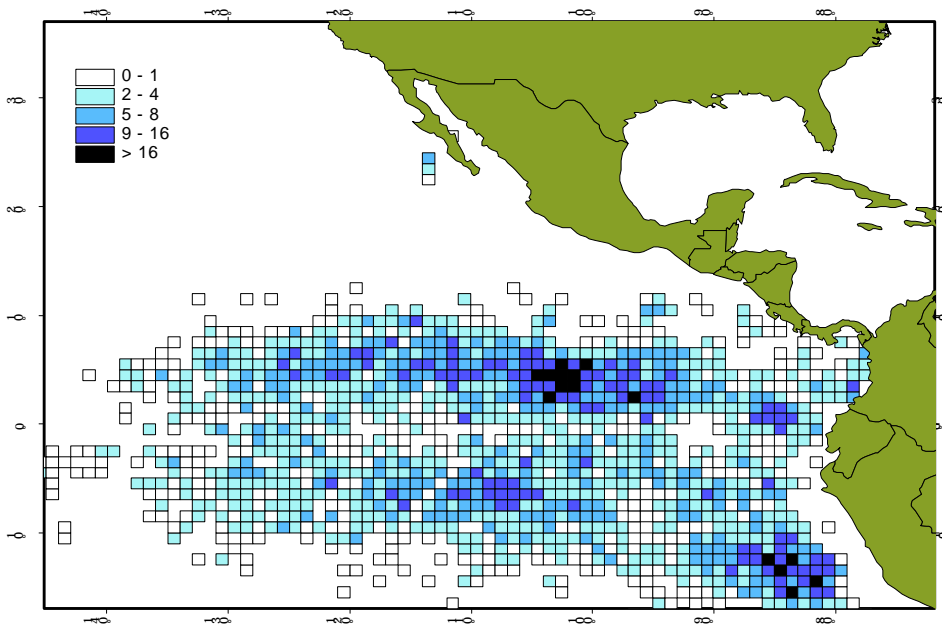


FIGURE 5b. Spatial distribution of sets on floating objects, 2001.

FIGURA 5b. Distribución espacial de los lances sobre objetos flotantes, 2001.

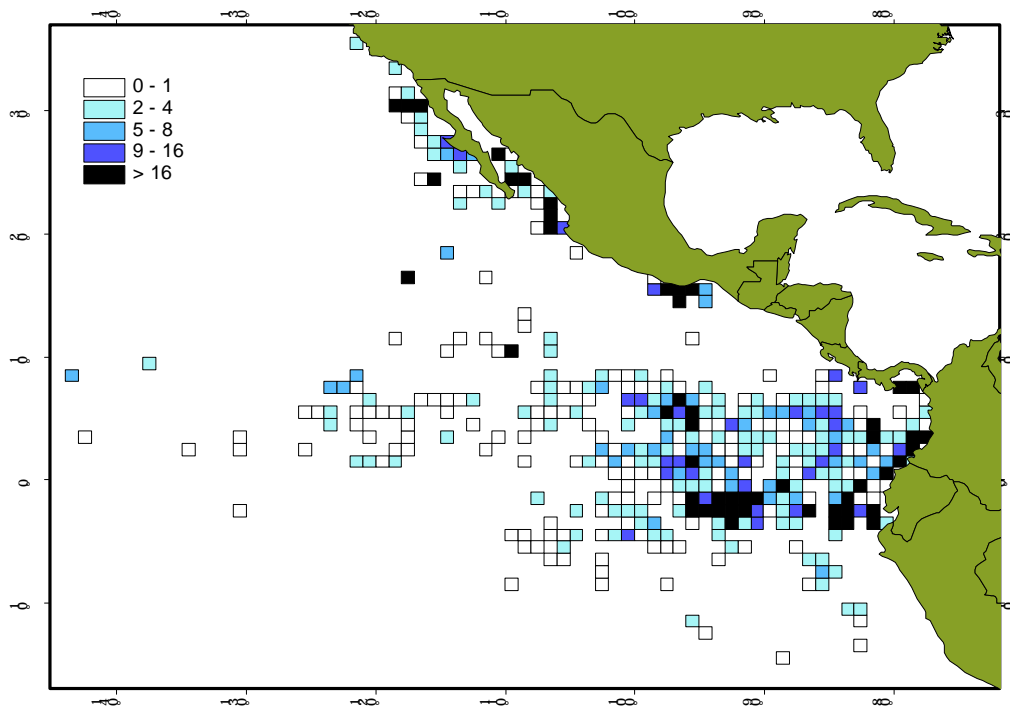


FIGURE 6a. Spatial distribution of sets on unassociated schools, 2000.
FIGURA 6a. Distribución espacial de los lances sobre cardúmenes no asociados, 2000.

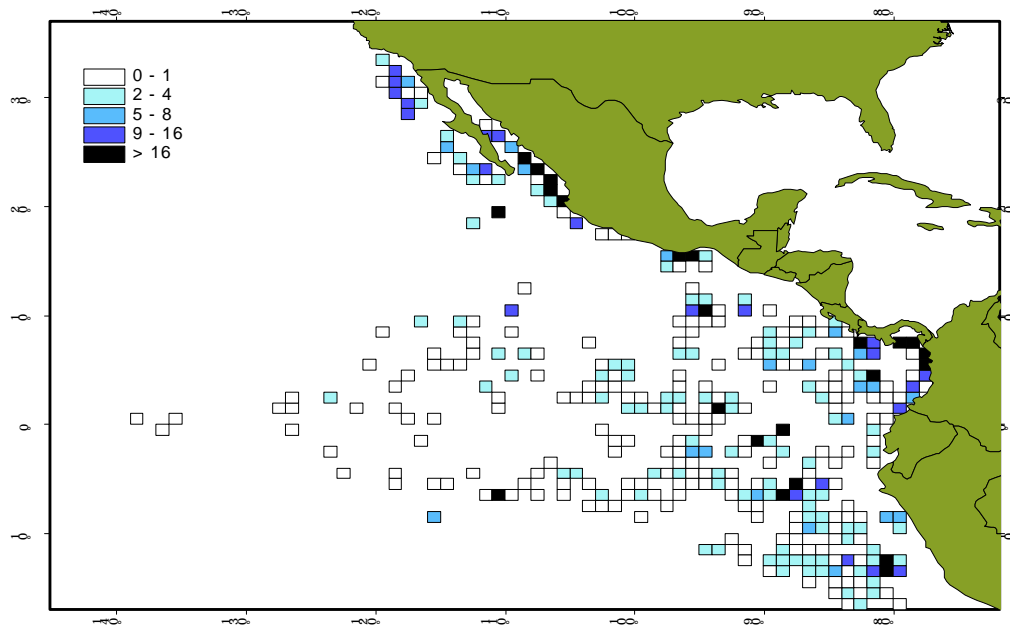


FIGURE 6b. Spatial distribution of sets on unassociated schools, 2001.
FIGURA 6b. Distribución espacial de los lances sobre cardúmenes no asociados, 2001.

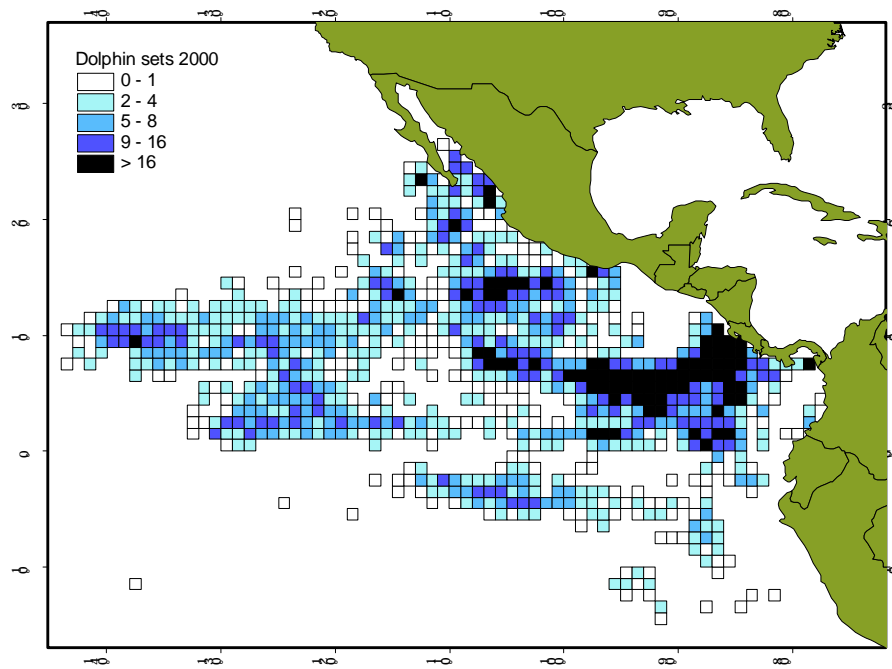


FIGURE 7a. Spatial distribution of sets on dolphins, 2000.
FIGURA 7a. Distribución espacial de los lances sobre delfines, 2000.

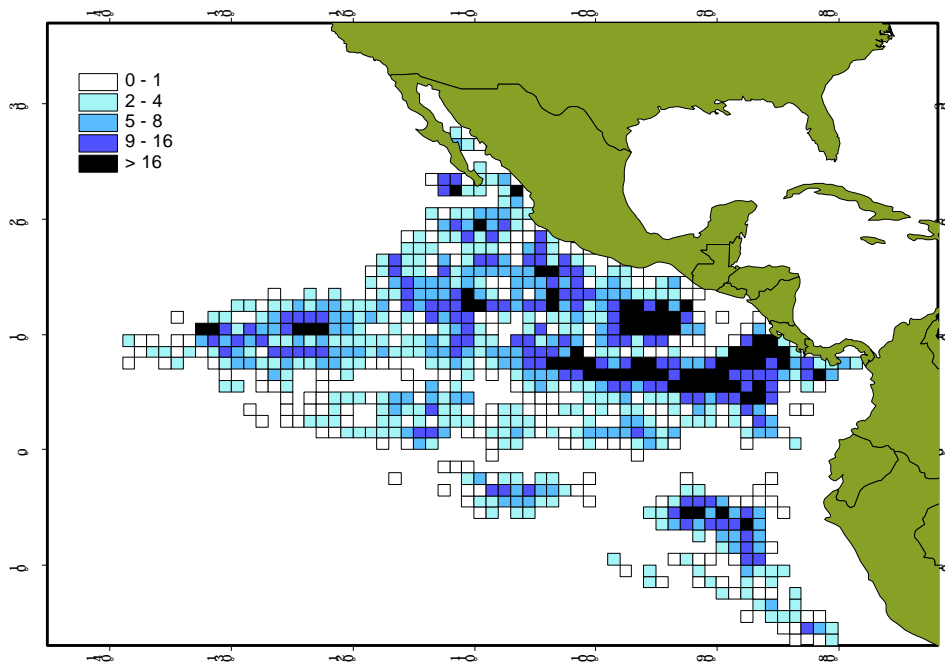


FIGURE 7b. Spatial distribution of sets on dolphins, 2001.
FIGURA 7b. Distribución espacial de los lances sobre delfines, 2001.

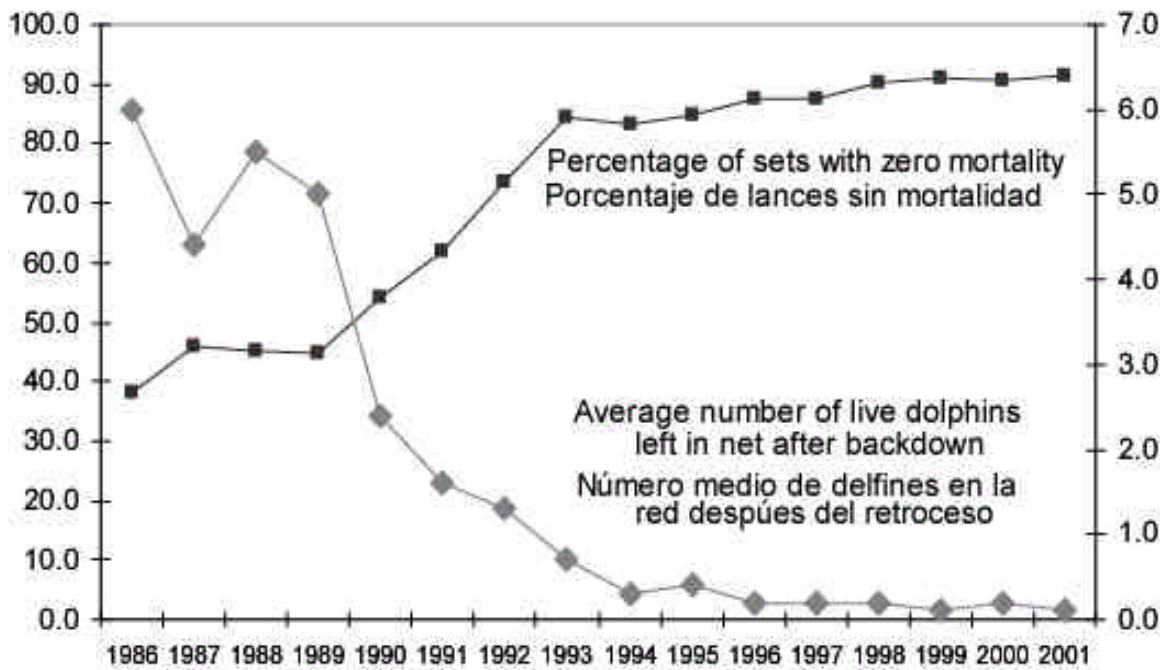


FIGURE 8. Trends in indicators of performance in releasing dolphins alive, 1986-2001.
FIGURA 8. Tendencias en los indicadores de desempeño en la liberación de delfines vivos, 1986-2001.

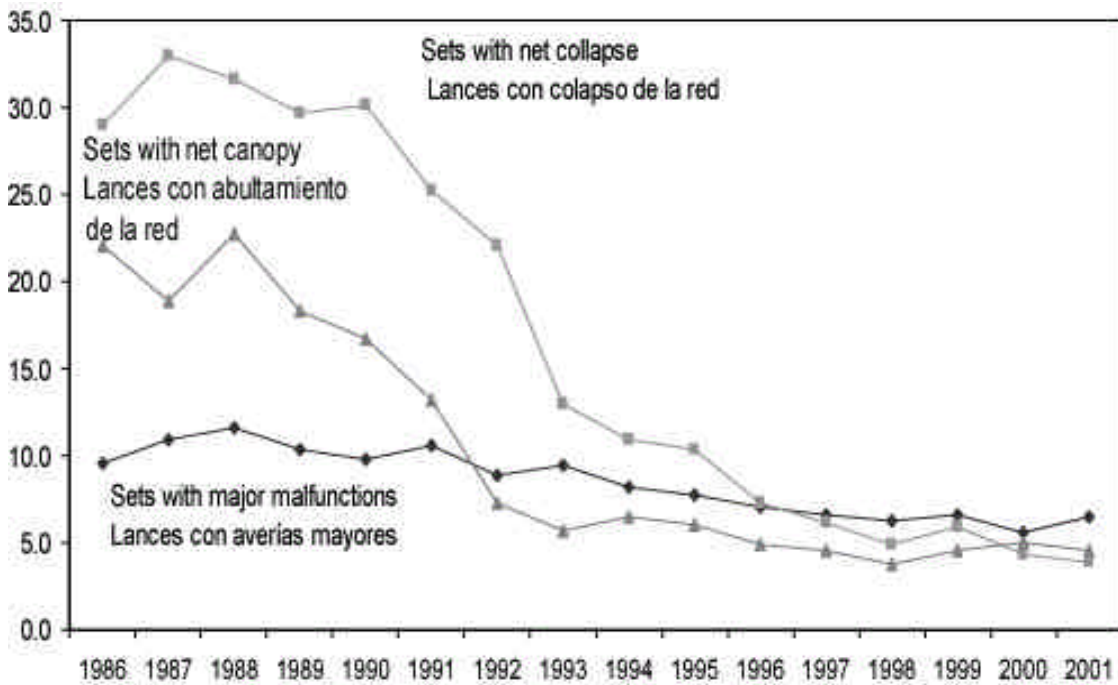


FIGURE 9. Trends in net malfunctions that can cause dolphin mortalities, 1986-2001.
FIGURA 9. Tendencias en averías de la red que pueden causar mortalidad de delfines, 1986-2001.

TABLE 1. Sampling coverage of the IATTC and national programs during 2001 of trips by Class-6 vessels (capacity >400 short tons (>363 metric tons)).

TABLA 1. Cobertura de muestreo de los programas de la CIAT y nacionales en 2001 de viajes de barcos de la clase 6 (capacidad >400 toneladas cortas (>363 toneladas métricas)).

National fleet	Number of trips	Trips sampled by program			Percent sampled	
		IATTC	National	Total		
Flota nacional	Número de viajes	Viajes muestreados por programa			Porcentaje muestreado	
		CIAT	Nacional	Total		
Belize–Belice	BLZ	5	5	-	5	100.0
Bolivia	BOL	25	12 ¹	2 ²	14	56.0
Colombia	COL	25	25	-	25	100.0
Ecuador	ECU	236	176	60	236	100.0
España–Spain	ESP	34	34	-	34	100.0
Guatemala	GTM	27	27	-	27	100.0
Honduras	HND	12	12	-	12	100.0
México	MEX	169	82	87	169	100.0
Nicaragua	NIC	5	5	-	5	100.0
Panamá	PAN	22	22	-	22	100.0
El Salvador	SAL	10	10	-	10	100.0
USA–EE.UU.	USA	18	18	-	18	100.0
Venezuela	VEN	145	72	73	145	100.0
Vanuatu	VUT	30	29	-	29	96.7
Desconocido–Unknown		3	1	-	1	33.3
Total		766³	530⁴	222	752³	98.2

¹ Does not include a partially sampled trip -- No incluye un viaje parcialmente muestreado

² Sampled by the Ecuadorian national observer program (PROBECUADOR) – Muestreado por el programa nacional de observadores de Ecuador (PROBECUADOR)

³ Includes 54 trips which began in late 2000 and ended in 2001 -- Incluye 54 viajes iniciados a fines de 2000 y terminados en 2001

⁴ Includes 1 research trip – Incluye 1 viaje de investigación

TABLE 2. Preliminary estimates of mortalities of dolphins in 2001, estimates of population abundance pooled for 1986-1990 (from Report of the International Whaling Commission, 43: 477-493), and estimates of relative mortality (with approximate 95-percent confidence intervals), by stock. All the data for 2001 are preliminary.

TABLA 2. Mortalidades incidentales de delfines en 2001, estimaciones de abundancia de poblaciones agrupadas para 1986-1990 (del Informe de la Comisión Ballenera Internacional, 43: 477-493), y estimaciones de abundancia relativa (con intervalos de confianza de 95% aproximados), por stock. Todos los datos de 2001 son preliminares.

Stock	Incidental mortality	Population abundance	Relative mortality (%)
	Mortalidad incidental	Abundancia de la población	Mortalidad relativa (%)
Offshore spotted—Manchado de altamar			
Northeastern—Nororiental	588	730,900	0.08 (0.061, 0.101)
Western/southern—Occidental y sureño	311	1,298,400	0.024 (0.019, 0.033)
Spinner dolphin—Tornillo			
Eastern—Oriental	469	631,800	0.08 (0.046, 0.112)
Whitebelly—Panza blanca	372	1,019,300	0.04 (0.023, 0.048)
Common dolphin—Común			
Northern—Norteño	94	476,300	0.02 (0.011, 0.042)
Central	203	406,100	0.05 (0.026, 0.098)
Southern—Sureño	46	2,210,900	<0.01 (0.001, 0.003)
Other dolphins—Otros delfines ¹	46	2,802,300	<0.01 (0.001, 0.002)
Total	2,129	9,576,000	0.02 (0.019, 0.025)

¹ "Other dolphins" includes the following species and stocks, whose observed mortalities were as follows: striped dolphins (*Stenella coeruleoalba*), 3; bottlenose dolphins (*Tursiops truncatus*), 1; and unidentified dolphins, 40.

¹ "Otros delfines" incluye las siguientes especies y stocks, con las mortalidades observadas correspondientes: delfín listado (*Stenella coeruleoalba*), 3; tonina (*Tursiops truncatus*), 1; y delfines no identificados, 40.

TABLE 3. Annual estimates of dolphin mortality, by species and stock. All the data for 2001 are preliminary. The estimates for 1979-1992 are based on a mortality-per-set ratio. The estimates for 1993-1994 are based on the sums of the IATTC species and stock tallies and the PNAAPD total dolphin mortalities, prorated to species and stock. The mortalities for 1995-2001 represent the sums of the observed species and stock tallies recorded by the IATTC, PNAAPD, PNOV and PROBECUADOR programs. The standard errors for 1979-1994 are shown in Table 4. The sums of the estimated mortalities for the northeastern and western-southern stocks of offshore spotted dolphins do not necessarily equal those for the previous stocks of northern and southern offshore spotted dolphins because the estimates for the two stock groups are based on different areal strata, and the mortalities per set and the total numbers of sets vary spatially.

TABLA 3. Estimaciones anuales de la mortalidad de delfines, por especie y stock. Todos los datos para 2001 son preliminares. Las estimaciones para 1979-1992 se basan en una razón de mortalidad por lance. Las estimaciones para 1993-1994 se basan en las sumas de las mortalidades por especie y stock registradas por la CIAT y las mortalidades totales registradas por el PNAAPD, prorrateadas a especies y stocks. Las mortalidades para 1995-2001 son las sumas de las mortalidades por especie y stock registradas por los programas de la CIAT, PNAAPD, PNOV y PROBECUADOR. En la Tabla 4 se detallan los errores estándar para 1979-1994. Las sumas de las mortalidades estimadas para los stocks nororiental y occidental y sureño del delfín manchado de altamar no equivalen necesariamente a las sumas de aquéllas para los antiguos stocks de delfín manchado de altamar norteño y sureño porque las estimaciones para los dos grupos de stocks se basan en estratos espaciales diferentes, y las mortalidades por lance y el número total de lances varían espacialmente.

	Offshore spotted ¹		Spinner		Common			Others	Total
	North-eastern	Western-southern	Eastern	White belly	Northern	Central	Southern		
	Manchado de altamar		Tornillo		Común			Otros	Total
	Nor-oriental	Occidental y sureño	Oriental	Panza blanca	Norteño	Central	Sureño		
1979	4,828	6,254	1,460	1,312	4,161	2,342	94	880	21,331
1980	6,468	11,200	1,108	8,132	1,060	963	188	633	29,752
1981	8,096	12,512	2,261	6,412	2,629	372	348	367	32,997
1982	9,254	9,869	2,606	3,716	989	487	28	1,347	28,296
1983	2,430	4,587	745	4,337	845	191	0	353	13,488
1984	7,836	10,018	6,033	7,132	0	7,403	6	156	38,584
1985	25,975	8,089	8,853	6,979	0	6,839	304	1,777	58,816
1986	52,035	20,074	19,526	11,042	13,289	10,884	134	5,185	132,169
1987	35,366	19,298	10,358	6,026	8,216	9,659	6,759	3,200	98,882
1988	26,625	13,916	18,793	3,545	4,829	7,128	4,219	2,074	81,129
1989	28,898	28,530	15,245	8,302	1,066	12,711	576	3,123	98,451
1990	22,616	12,578	5,378	6,952	704	4,053	272	1,321	53,874
1991	9,005	4,821	5,879	2,974	161	3,182	115	990	27,127
1992	4,657	1,874	2,794	2,044	1,773	1,815	64	518	15,539
1993	1,139	757	821	412	81	230	0	161	3,601
1994	935	1,226	743	619	101	151	0	321	4,096
1995	952	859	654	445	9	192	0	163	3,274
1996	818	545	450	447	77	51	30	129	2,547
1997	721	1,044	391	498	9	114	58	170	3,005
1998	298	341	422	249	261	172	33	101	1,877
1999	358	253	363	192	85	34	1	62	1,348
2000	303	428	272	262	56	222	9	84	1,636
2001	588	311	469	372	94	203	46	46	2,129

¹Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins.

¹Las estimaciones de delfines manchados de altamar incluyen mortalidades de delfines manchados costeros.

TABLE 4. Standard errors of annual estimates of dolphin species and stock mortality for 1979-1994. There are no standard errors for 1995-2000 because the coverage was at or nearly at 100% during those years (Table 1). Standard errors for 2001 will be calculated after the logbooks for the unobserved trips become available.

TABLA 4. Errores estándar de las estimaciones anuales de la mortalidad de delfines por especie y stock para 1979-1994. No hay errores estándar para 1995-2000 porque la cobertura fue de 100%, o casi, en esos años (Tabla 1). Los errores estándar para 2001 serán calculados una vez se disponga de las bitácoras de los viajes sin observador.

	Offshore spotted		Spinner		Common			Other
	North-eastern	Western-southern	Eastern	Whitebelly	Northern	Central	Southern	
	Manchado de altamar		Tornillo		Común			Otros
	Nor-oriental	Occidental y sureño	Oriental	Panza blanca	Norteño	Central	Sureño	
1979	817	1,229	276	255	1,432	560	115	204
1980	962	2,430	187	3,239	438	567	140	217
1981	1,508	2,629	616	1,477	645	167	230	76
1982	1,529	1,146	692	831	495	168	16	512
1983	659	928	284	1,043	349	87	-	171
1984	1,493	2,614	2,421	3,773	-	5,093	3	72
1985	3,210	951	1,362	1,882	-	2,776	247	570
1986	8,134	2,187	3,404	2,454	5,107	3,062	111	1,722
1987	4,272	2,899	1,199	1,589	4,954	2,507	3,323	1,140
1988	2,744	1,741	1,749	668	1,020	1,224	1,354	399
1989	3,108	2,675	1,674	883	325	4,168	295	430
1990	2,575	1,015	949	640	192	1,223	95	405
1991	956	454	771	598	57	442	30	182
1992	321	288	168	297	329	157	8	95
1993	89	52	98	33	27	-	-	29
1994	69	55	84	41	35	8	-	20

TABLE 5. Preliminary reports of the mortalities of dolphins in 2002, to April 28.**TABLA 5.** Informes preliminares de las mortalidades de delfines en 2002, hasta el 28 de abril.

Stock	Total mortality	Limit	Used (%)
	Mortalidad total	Límite	Usado (%)
Offshore spotted – Manchado de altamar			
Northeastern--Nororiental	97	648	15.0
Western-southern--Occidental-sureño	38	1,145	3.3
Spinner--Tornillo			
Eastern--Oriental	69	518	13.3
Whitebelly--Panza blanca	68	871	7.6
Common--Común			
Northern--Norteño	30	562	5.3
Central	15	207	7.2
Southern--Sureño	3	1,845	0.2
Others and unidentified--Otros y no identificados	102		
Total	420	5,000	8.4

TABLE 6. Percentages of sets with no dolphin mortalities, with major gear malfunctions, with net collapses, with net canopies, average times of backdown (in minutes), and average number of live dolphins left in the net at the end of backdown.**TABLA 6.** Porcentajes de lances sin mortalidad de delfines, con averías mayores, con colapso de la red, con abultamiento de la red, duración media del retroceso (en minutos), y número medio de delfines en la red después del retroceso.

	Sets with zero mortality (%)	Sets with major malfunctions (%)	Sets with net collapse (%)	Sets with net canopy (%)	Average duration of backdown (minutes)	Average number of live dolphins left in net after backdown
	Lances sin mortalidad (%)	Lances con averías mayores (%)	Lances con colapso de la red (%)	Lances con abultamiento de la red (%)	Duración media del retroceso (minutos)	Número medio de delfines en la red después del retroceso
1986	38.1	9.5	29.0	22.2	15.3	6.0
1987	46.1	10.9	32.9	18.9	14.6	4.4
1988	45.1	11.6	31.6	22.7	14.3	5.5
1989	44.9	10.3	29.7	18.3	15.1	5.0
1990	54.2	9.8	30.1	16.7	14.3	2.4
1991	61.9	10.6	25.2	13.2	14.2	1.6
1992	73.4	8.9	22.0	7.3	13.0	1.3
1993	84.3	9.4	12.9	5.7	13.2	0.7
1994	83.4	8.2	10.9	6.5	15.1	0.3
1995	85.0	7.7	10.3	6.0	14.0	0.4
1996	87.6	7.1	7.3	4.9	13.6	0.2
1997	87.7	6.6	6.1	4.6	14.3	0.2
1998	90.3	6.3	4.9	3.7	13.2	0.2
1999	91.0	6.6	5.9	4.6	14.0	0.1
2000	90.8	5.6	4.3	5.0	14.9	0.2
2001	91.6	6.5	3.9	4.6	15.6	0.1