

INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

**INTERNATIONAL REVIEW PANEL**

**50<sup>TH</sup> MEETING**

DEL MAR, CALIFORNIA (USA)  
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**POSSIBLE EFFECTS OF MODIFYING THE REQUIREMENTS OF THE  
AIDCP REGARDING NIGHT SETS**

**1. INTRODUCTION**

The operational requirements set out in Annex VIII of the AIDCP prohibit making night sets, defined as those sets in which the backdown maneuver is not completed within thirty minutes after sunset.

During the 23<sup>rd</sup> Meeting of the Parties in September 2010, the Secretariat was asked to "*evaluate the impact on dolphin mortality of increasing by 30 minutes the time for determining whether a set was a night set*", and was also asked for "*information on dolphin mortality in sets defined as night sets.*"

**1. DEFINITIONS**

For this analysis, two categories of sets on dolphins were defined, night sets and daytime sets. Daytime sets are defined as sets on schools of tunas associated with dolphins in which dolphins were captured and in which the backdown maneuver finished 30 minutes or less after the moment at which the sun goes down below the horizon (sunset); night sets, identified in Annex VIII, paragraph 3.d of the AIDCP, are those in which the backdown maneuver finishes more than 30 minutes after sunset.

**2. DATA COLLECTED BY OBSERVERS**

Table 1 summarizes the data for the last period before the ban on night sets (1991) from the AIDCP database (including all the data from national programs), and the same data for 2010. It shows the number of sets in each of the categories defined above, the total mortality of dolphins in those sets, the index of mortality by category (MPS), the total tonnage caught (t) of the three commercially important species of tunas (yellowfin, bigeye, and skipjack), the proportion of the total catch (as a percentage), by set type, and the catch rate per set (CPS). The data for 1991, the last year during which there were no restrictions on making night sets for the international fleet, are shown in bold type. 1991 was chosen as the base year for projecting the additional mortality that might result from a modification of the prohibition of night sets; it was not considered appropriate to use a range of years as a base case due to the strong tendency over time in the frequency of night sets in the years prior to the ban. Data for United States flag vessels were excluded, since during various years there were regulations in force regarding night sets for some fishing captains, and this could bias the results. Therefore, the data used were those for when it is certain that there were no restrictions and for when there were, in order to compare the years.

The last two columns of the table identify the quotient of the mortality rates by category. For example, the mortality per set observed for night sets in 1991 was 3.18 times greater than for daytime sets.

**ESTIMATES**

Two estimates were obtained. In the first, it was assumed that there were no restrictions of the time backdown with captured dolphins finished; in the second, the frequency of sets in 1991 with a backdown that lasted more than 30 minutes after sunset was calculated.

The proportion of night sets in 1991 was 4% of the number of day sets, and it was maintained at that level. To estimate an expected mortality per night set in 2010, we use the MPS (day in 2010) multiplied by the quotient night/day in 1991. Similarly for CPS of tunas.

The expected changes based on the assumptions made would be:

Scenario A) Elimination of ban on night sets

$$4\% \text{ of } 11,541 \text{ day sets in } 2010 = 467 \text{ additional dolphin sets}$$

$$467 \text{ sets} \times \text{MPS (night)} = 467 \times (0.108 \times 3.180) = 467 \times 0.318 = + 148.4 \text{ dolphins}$$

$$467 \text{ sets} \times \text{CPS (night)} = 467 \times (13.53 \times 0.85) = 467 \times 11.5 \text{ MT} = + 5,370 \text{ MT tunas}$$

Scenario B) Change of 30 minutes in the definition of night set

The figures in this case would amount to 53% of the previous values, since 53% of all night sets happen in those 30 minutes (95/177 in table below).

$$53\% \text{ of dolphin mortality} = + 78.7 \text{ dolphins}$$

$$53\% \text{ of tuna catch} = + 2,846 \text{ MT tunas}$$

In the second scenario, the frequency of sets in 1991 whose backdown finished more than 30 minutes after sunset, in intervals of 10 minutes until an hour after sunset, was calculated. The result was as follows:

| Interval (min) | Number | %   |
|----------------|--------|-----|
| 31-40          | 41     | 23  |
| 41-50          | 30     | 17  |
| 51-60          | 24     | 14  |
| 60+            | 82     | 47  |
|                | 177    | 100 |

It was shown previously that the variance in the mortality in night sets is greater than in daytime sets, due possibly to the lack of visibility and thus the speed of the crew's reaction in such circumstances.

Finally, it should be noted that the observers are instructed to document any mortality they believe occurred, but can record only dolphins that they actually saw dead. It is possible that darkness could impede, to some degree, their ability to observe some mortality.

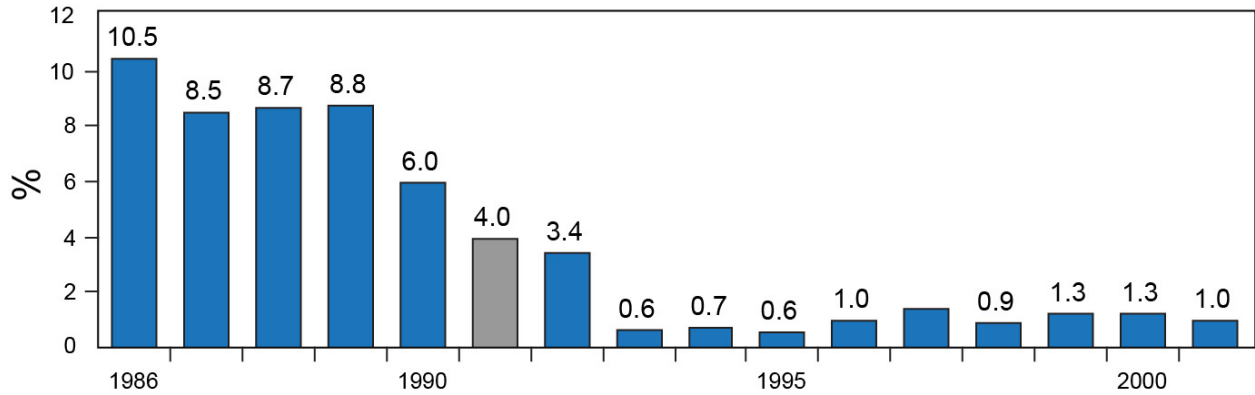
The expected changes would be an increase in dolphin mortality of 148.4 individuals in the first case (allowing all night sets) and of 78.7 individuals in the second case (changing the period by 30 minutes). The increases in tuna catches would be 5,370 MT and 2,846 MT respectively. The variances of these figures would be considerable, but the population impacts can be assessed from the point estimates.

**TABLA 1.** Datos recopilados por los observadores, 1991 y 2010. MPL: mortalidad por lance; CPL: captura por lance; LN: lance nocturno  
**TABLE 1.** Data collected by observers, 1991 and 2010. MPS: mortality per set; CPS: catch per set; NS: night set

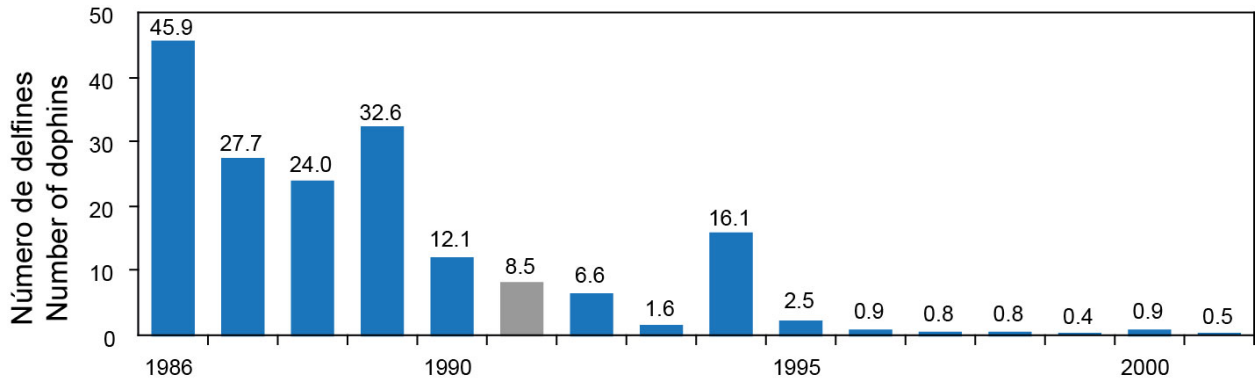
|             | <b>Lances diurnos observados</b> |               |               |             |             |              | <b>Lances nocturnos observados</b> |              |              |             |             |              | <b>Índice dif.</b> | <b>% LN</b> |
|-------------|----------------------------------|---------------|---------------|-------------|-------------|--------------|------------------------------------|--------------|--------------|-------------|-------------|--------------|--------------------|-------------|
|             | Lances                           | Mortalidad    | Captura (t)   | % Capt.     | MPL         | CPL          | Lances                             | Mortalidad   | Captura (t)  | % Capt.     | MPL         | CPL          |                    |             |
|             | <b>Daytime sets observed</b>     |               |               |             |             |              | <b>Night sets observed</b>         |              |              |             |             |              | <b>Diff. index</b> | <b>% NS</b> |
|             | Sets                             | Mortality     | Catch (t)     | % Catch     | MPS         | CPS          | Sets                               | Mortality    | Catch (t)    | % Catch     | MPS         | CPS          |                    |             |
| <b>1991</b> | <b>4,234</b>                     | <b>11,294</b> | <b>65,833</b> | <b>96.7</b> | <b>2.67</b> | <b>15.55</b> | <b>177</b>                         | <b>1,502</b> | <b>2,271</b> | <b>3.33</b> | <b>8.49</b> | <b>12.83</b> | <b>3.18</b>        | <b>4.01</b> |
| <b>2010</b> | 11,641                           | 1,155         | 157,560       | 99.99       | 0.10        | 13.53        | 5                                  | 14           | 18           | 0.01        | 2.80        | 3.60         | 28.22              | 0.04        |

Difference Index = Quotient between night set mortality and day set mortality

**FIGURA 1.** Porcentaje anual de lances nocturnos, 1986-2001.  
**FIGURE 1.** Annual percentage of night sets, 1986-2001.



**FIGURA 2.** Tasa de mortalidad en lances nocturnos, 1986-2001  
**FIGURE 2.** Mortality rate in night sets, 1986-2001.



**FIGURA 3.** Cociente de mortalidad en lances nocturnos y diurnos, 1986-2001.  
**FIGURE 3.** Quotient of dolphin mortality in night sets and daytime sets, 1986-2001.

