INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

INTERNATIONAL REVIEW PANEL

32ND MEETING

LA JOLLA, CALIFORNIA (USA)
6-7 FEBRUARY 2003

DOCUMENT IRP-32-12

RESEARCH OPTIONS TO EXAMINE THE QUESTION OF COW-CALF SEPARATION DURING THE CHASE

At the 30th meeting of the IRP, held in June 2002 in Manzanillo, Mexico, the Secretariat was asked to prepare operational guidelines to prevent the separation of dolphin cows and calves while cutting out portions of large herds to avoid encircling the entire herd.

At the 31st meeting of the IRP held in October 2002 in La Jolla, the Secretariat reported that it would be difficult to devise guidelines to prevent such separation in the absence of information about it (Document IRP-31-16). The Panel concluded that there was insufficient information at this time to be able to develop guidelines, and asked the Secretariat to develop, for the next meeting of the Panel, research options to examine the question of cow-calf separation during chase, along with a cost analysis. The relevant questions are: does permanent cow-calf separation occur during chase? If so, to what extent, and can chases of cow-calf pairs be avoided?

1. EXISTING INFORMATION

For the first two questions, no evidence is available that indicates that cows and calves separate during chase. Repeated captures of three radio-tagged females with calves demonstrated that the bond remained intact, however, even after up to seven chases over seven days. Of relevance to the third question, a preliminary aerial photogrammetric study of spinner dolphins found that cow-calf pairs are scattered throughout the herd, which would make it difficult to deliberately cut them out of a chase (Scott and Perryman, 1991; Figure 1). The same analysis could be conducted for spotted dolphins from the many aerial photographs available.

More indirect information that could bear on these questions includes: a) the swimming speeds of dolphins, measured during the NMFS CHESS research cruise, and b) the distribution of juvenile dolphins and the duration of chases recorded by observers. Using these two sources of data, one can calculate the maximum distance a mother and calf could potentially be separated during a chase, assuming that the chase speed is fast enough that a calf can no longer keep up with the mother, and that the mother would then allow the calf to fall behind. Figure 2 presents the distribution of the duration of chases that led to sets during 1997-2001. Figure 3 presents the distribution as a cumulative percentage for various years between 1981 and 2001, and shows that the chase duration has decreased over time.

The observer data currently collected do not provide enough information to calculate the actual distance between the sighting location and the set location. However, during the CHESS cruise velocity data were collected from two spotted dolphins equipped with radio tags and data loggers that measured time, depth, and velocity. One dolphin traveled at an average speed of 3.38 knots during chase; another dolphin, a mother accompanied by a calf, averaged 5.66 knots without causing separation of the pair (Chivers and Scott, 2002). By multiplying these average chase speeds to the distribution of chase times, one can obtain a distribution of chase distances (Figures 4-5). Figure 6 shows the cumulative plot of chase distances, based on the high (5.66 kn), low (3.38 kn), and average (4.52 kn) estimates of dolphin speed during chase. These values are maximum estimates because it is assumed that, if separation occurs, it occurs immediately after the dolphin herd has been sighted rather than later during the chase, that the dolphins are chased in a straight line rather than the actual curvilinear chases that could end very close to where

they started, and that a mother-calf pair, once separated, will not attempt to reunite.

2. POTENTIAL RESEARCH PROJECTS

The question of whether cow-calf separation is occurring or not is a particularly difficult one to definitively answer. Any research that showed that separation had occurred could be confounded by the methods used in the study (*e.g.*, tagging, tracking, or aerial photogrammetry). Any research that did not show evidence of separation could be argued to be inconclusive because the likely sample size may be too small to detect a rare event. The projects below are ranked in the order of increasing cost. The first three will provide additional background information, and the last two address the question more directly.

1. Interview experienced captains or crewmembers who have observed chases from helicopters with the aim of gathering any information they have concerning separation of cows and calves. The only cost would be in staff time, which could replace some other activity.
2. The above analysis of potential chase distances could be refined by asking the observers to collect more detailed information about the geometry of the chase and set and more accurate information about the distance between the location of the dolphins at the start of the chase and the location of the set. This would require the observer to obtain additional data at a time when he is already fully occupied, as well as staff time for data analysis..
3. Study trends in calf distribution from existing data; this would provide information about the most suitable times and areas to examine in projects 4 and 5 below. Observers record the presence of spotted dolphin neonates (calves approximately 6 months old or younger), but these data are not currently entered in the database. Hiring technicians to tabulate, enter, and analyze the data would cost at least US$6,000 (2 person-months).
4. More direct information on separation could be obtained by radio tagging females with calves, tracking them after release, and then repeatedly recapturing them to see if the pair separates at some point. Such a study would be complex and controversial, and capturing the mothers for radio tagging could potentially confound the results. It would also be expensive, requiring the charter of a purse seiner for three months or more, a research vessel, and considerable field personnel and equipment . The estimated cost would be well in excess of US$2,000,000[1].
5. Another approach would be to take aerial photographs of a dolphin herd prior to chase to determine the number of cow-calf pairs, and compare them with the numbers observed underwater or from aerial photographs taken after encirclement. This approach would not be confounded by the handling of the dolphins (as is potentially the case in project 4), but it may be difficult to distinguish between calves that have separated from their mothers, mother-calf pairs that have separated from the herd, or calves that are too deep to be photographed. This study would also be expensive, with requirements and cost similar to those of project 4.

[1] Indicative costs: Purse seiner: 90 days @$14,000/day: $1,250,000; Research vessel: 90 days @$10,000/day: $900,000; Helicopter charter: $50,000; Personnel (6) and equipment: $100,000

FIGURE 1. Digitized plot of an aerial photograph of a spinner dolphin herd of about 2300 animals; thin lines divide the herd into three sectors (front, middle, and back) containing equal number of dolphins. Locations of dolphin calves (< 156 cm) are circled. Adapted from Scott and Perryman (1991).
FIGURA 1. Gráfico digitalizado de una fotografía aérea de una manada de aproximadamente 2.300 delfines tornillo; las líneas delgadas dividen la manada en 3 secciones (delantera, media y posterior) que contienen el mismo número de delfines. Crías de delfines (<156 cm) indicadas por círculos. Adaptado de Scott y Perryman (1991).

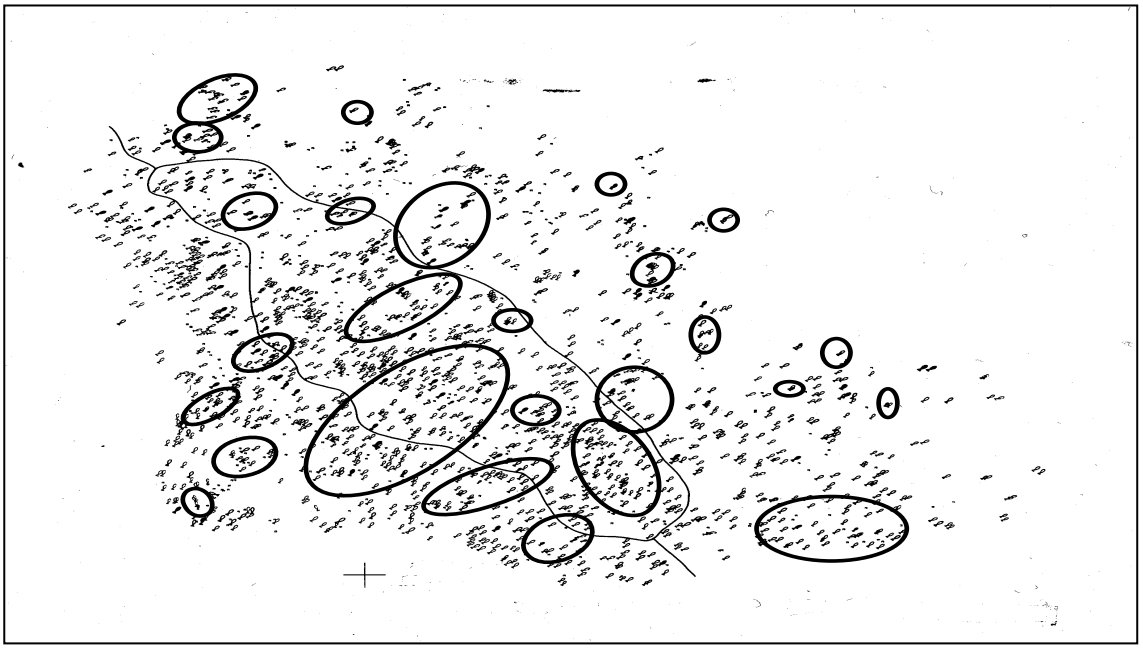

FIGURE 2. Histogram of chase time that led to sets on dolphins, 1997–2001.
FIGURA 2. Histograma de duración de cazas que condujeron a lances sobre delfines, 1997–2001.

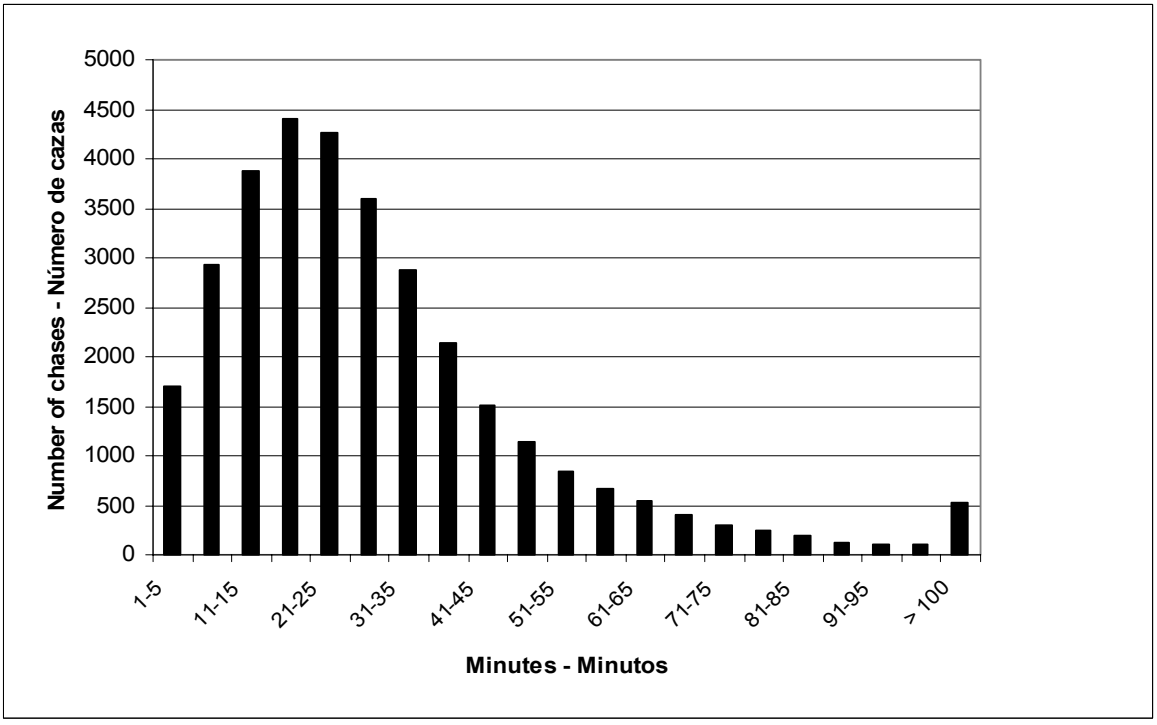

FIGURE 3. Cumulative percentage of chase times for specific years.
FIGURA 3. Porcentaje acumulativo del duración de cazas para años específicos.

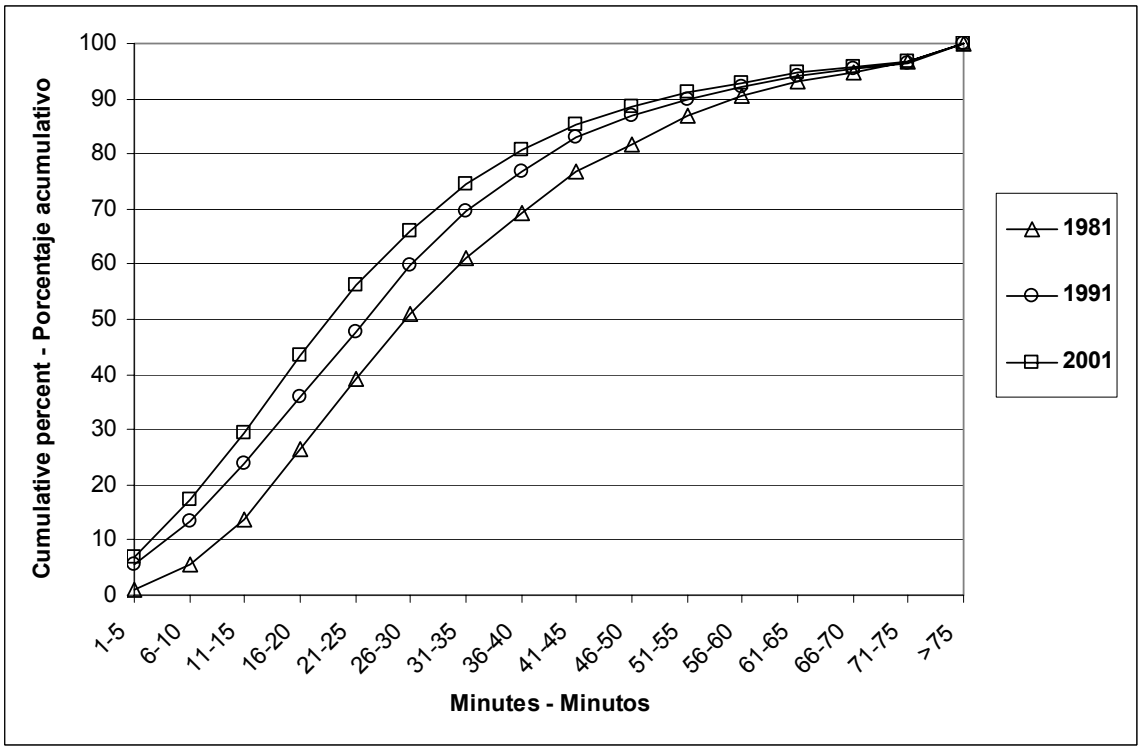

FIGURE 4. Maximum chase distances, in statute miles, based on dolphin swimming speed of 3.38 knots, 1997–2001.
FIGURA 4. Distancias máximas de caza, en millas, con base en una velocidad de natación de delfines de 3.38 nudos, 1997–2001.

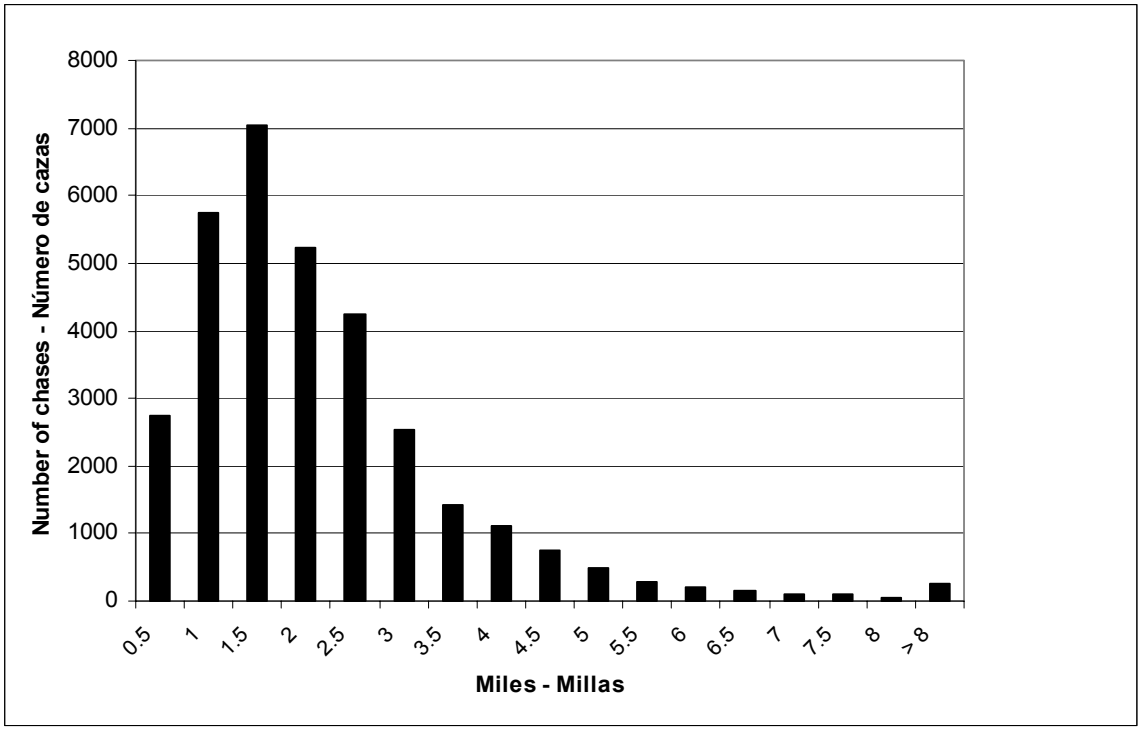

FIGURE 5. Maximum chase distances, in statute miles, based on dolphin swimming speed of 5.66 knots 1997–2001.
FIGURA 5. Distancias máximas de caza, en millas, con base en una velocidad de natación de delfines de 5.66 nudos, 1997–2001.

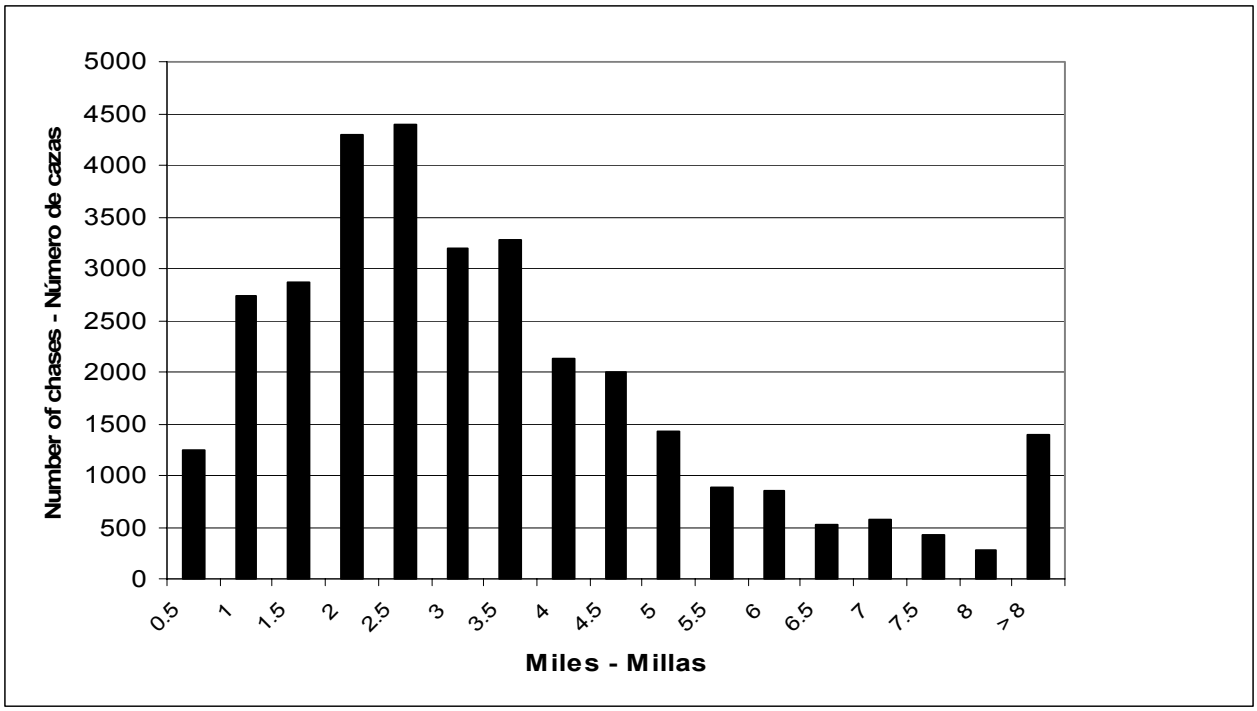

FIGURE 6. Cumulative percentage of maximum chase distances, based on 3 dolphin swimming speeds.
FIGURA 6. Porcentaje acumulativo de distancias máximas de caza, con base en 3 velocidades de natación de delfines.