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SIGHTINGS OF SOUTHERN RIGHT WHALES, *EUBALAENA AUSTRALIS*, OFF URUGUAY

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The southern right whale (*Eubalaena australis*) is a migratory species exclusively distributed in the Southern Hemisphere and generally observed between 20º and 60º S (Cummings, 1985). During summer, individuals can be found at feeding areas in high latitudes. In early winter, migrations are bound to medium and low latitudes where reproduction and birth take place (Whitehead *et al*., 1986; Payne *et al*., 1990).

The population of southern right whales was depleted between the 18th and 19th centuries by the whaling industry (IWC, 2001). According to Bannister (1990, 2001), Cooke *et al*. (2001), Best *et al*. (2001) and Groch *et al*. (2005), the southern right whale populations are currently recovering.

In 1789 a whaling factory was established in Punta del Este (Maldonado, Uruguay) by the *Real Compañía Marítima* (Acosta y Lara, 1987). Few records are available on the number of captured whales, since the warehouses and offices of *The Real Compañía* were burned down in 1806, during the British Invasions. During the year when the company was founded (1789), four whales were caught. In 1791, 30 whales were captured and in 1795, 20 were caught in Maldonado Bay. A permit to catch whales in Maldonado Bay was granted to a British whaler in 1823, but there are no records on the actual number of captures (Acosta y Lara, 1987). Although capture records are not complete, historic accounts suggest the existence of an important number of whales in Uruguayan waters during commercial exploitation (Díaz de Guerra, 2003).

Prior to 1972, records of southern right whales were rare and the species was not included in the Uruguayan mammal sistematic list (Ximenez *et al*., 1972). Since 1975, opportunistic records of southern right whales have been made off Uruguay (Mermoz, 1980; García, 2000). During the last 10 years, public interest in these cetaceans has grown and reports on sightings have become more frequent. However, we still know little about this species in Uruguay due to the lack of systematic studies.

Opportunistic sightings during the 1975-1990 period were made. A network of observers, distributed in eight points along the Uruguayan coast was constituted, covering an extension of 350km of the La Plata river and the Atlantic Ocean (Figure 1). During the 2001-2003 period, between August and November, 18 land-based surveys were carried out from nine fixed points. Sighting points were distributed along 220 km (Figure 1) and they were selected because of their appropriate height, providing good visibility. Their height varied form 10 meters at the smaller sand dunes, 30 meters at the lighthouses to 50 meters at the tallest sand dunes. Scannings with binoculars were done every 30 minutes, with duration of 10 minutes each, from the nine fixed points simultaneously, to assess the presence of the whales in the study area. Each sampling was made between 09:00 a.m. and 05:00 p.m. in one day after a 15-day period. The

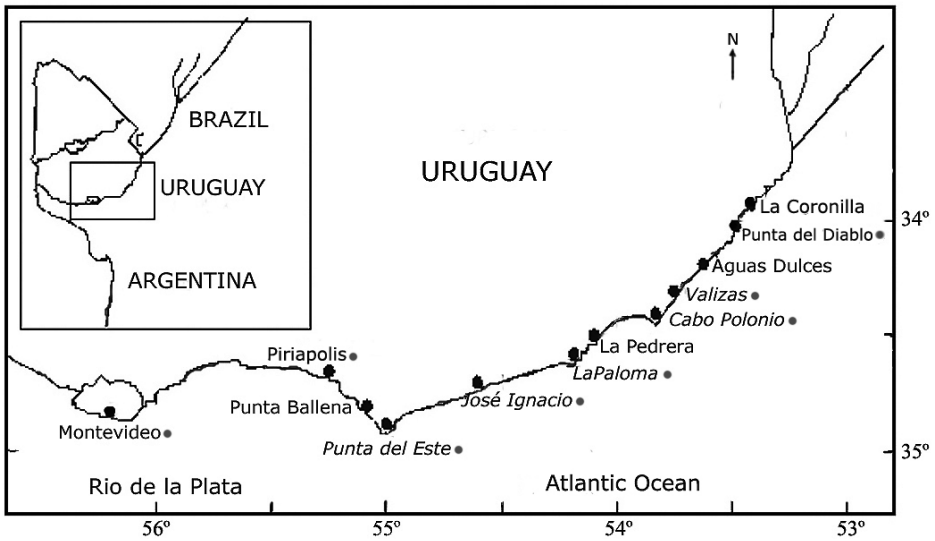

Figure 1. Right whale sighting localities on the Uruguayan coast. Localities indicated with a dot correspond to the observations made during the 1975-1990 period. Localities in italics are those which bear data for both periods and the others correspond only to the 2001-2003 period.

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distance between fixed points differed, so four of them had overlapping areas. Accordingly, in order to avoid re-counting due to the overlapping areas, the observation field from each fixed point was previously delimited with geographic references such as islands and imaginary lines traced between a rocky cape and the horizon.

At least two trained observers worked at each sighting point. During both periods, location of the sighting, the number of individuals, presence or absence of calves and group size were recorded. The surveys were done when weather conditions were considered ideal: calm seas, wind speed lower than 15 knots and good visibility. However, in some case the surveys were also conducted in non-ideal conditions (*e.g.* lack of sufficient personnel, less desirable weather conditions). A sighting was defined as the observation of a whale either solitary or in a group. A temporal, geographical (sightings per locality) and group size analysis was made thorough sighting frequencies. For the 2001-2003 period, the number of whales per land-based survey was defined as the sum of the maximum amount of individuals recorded in each fixed point along a survey. Similarly, the number of whales per year was defined as the sum of the number of whales recorded in each land-based survey along the year. Both these figures may have been overestimated since whales may move along the coast and recounting was assumed (but not corrected for) in both the sampling method and the analyses.

1975-1990 period

A total of 67 sightings were made (n = 190 individuals) during this period, 64 of which occurred on the Atlantic coast and the rest in the La Plata river. Some of these sightings may have been duplicates since the observations were not systematic. Sightings were reported for every year, except in 1977.

During the second half of this period, 68.9% of the total number of observed individuals was recorded. The largest number of individuals was observed in 1985 (n =39) (Figure 2).

All sightings occurred between June and October. The proportion of sightings was similar from July to October (25% in July, 28% in August, 22% in September and 23% in October; Chi-Square = 1.52, df=3, p=0.678). Only 2% of the sightings (n = 3) were recorded in June.

The locality with the highest sighting frequency was Punta del Este (28.8%), followed by La Paloma (21.2%) and Cabo Polonio (10.6%). These frequencies may be biased due to a higher observation availability of these localities. Forty-nine of the recorded sightings (n = 172 individuals) were observed in groups of 2-10 individuals (mean = 3.53, ds = 2.67). The most common group size was of two individuals (39%) followed by group size of four (12%).

A total of 21 mother-calf pairs were observed. These pairs were: 3 in 1975, 2 in 1980, 1 in 1981, 3 in 1985, 4 in 1986, 1 in 1988, 2 in 1989 and 4 in 1990. Half of all mother–calf pairs were observed in July. These records may be overestimated based on the observers' limited experience in distinguishing mother-calf from adult-juvenile pairs.

2001-2003 period

A total of 38 sightings (n = 149 individuals) in this three-year land survey were carried out. The maximum number of individuals per year (n = 84) was recorded in 2001 (Figure 2). Sightings were made between August and October, with a peak in October (51.3%). The maximum number of individuals simultaneously observed at the nine fixed points was 40 in October 2001, and 14 in October 2002 and August 2003. The locality with the highest sighting frequency was La Paloma with 18.4%, followed by José Ignacio and Cabo Polonio with 15.8% (Figure 3). Of the total recorded sightings, 30 (n = 141 individuals) were observed in groups composed of 2-10 individuals (mean = 4.7, ds = 2.7).

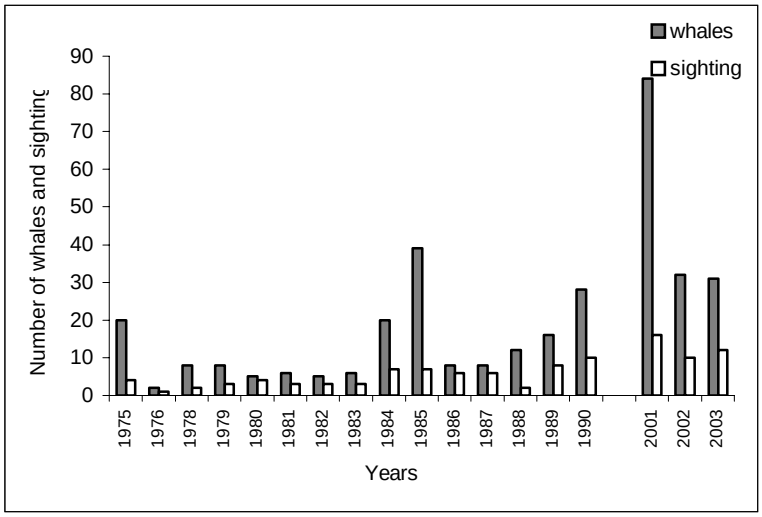

Figure 2. Yearly number of whales and sightings in the periods 1975-1990 and 2001-2003.

Groups of two individuals were sighted more frequently (26%), followed group size of four, five and six individuals (11%) (Figure 4). Two mother-calf pairs were observed in August and November of 2003. Both calves were approximately half the length of their mothers, indicating that they probably were young-of-the-year (Thomas and Taber, 1984).

Most of the individuals observed in the period 1975-1990 were recorded since the year 1984. The increase could be related to a higher research effort as well as an increase in the southern right whale population in Uruguayan waters. Based on the systematic study carried out during the 2001-2003 period, two possible abundance indexes may be used to infer on the number of individuals present in the study area. The first one may be defined as the maximum number of individuals sighted simultaneously at the nine fixed points in an entire day (n = 40 in October 2001 and n = 14 in September 2002 and August 2003). The second one, as the number of individuals observed by year (n = 84 in 2001, n = 32 in 2002 and n = 31 in 2003). Results could be biased because different visibility and sea conditions may affect the data collection. Moreover, these indexes may be overestimated since the sampling methods did not avoid recounting.

The reasons for the decrease in the number of individuals in the simultaneous counts between years are not clear, neither are those for the decrease in the total number of individuals observed by year. Three years of observation represent a small amount of effort to allow for any conclusions on trends in seasonality. In addition, whales may have been absent from the coast during survey days. However, the decrease we observed is likely not due to a decrease in the population size, as current studies indicate that this species is recovering in different regions of the Southwestern Atlantic (Cooke *et al.*, 2001; Groch *et al.*, 2005).

Considering both periods, the highest number of sightings was recorded in July-October. The observed seasonality in Uruguay coincides with that reported for Península Valdés, Argentina (Payne, 1986) and Santa Catarina, Brazil (Flores *et al.*, 2000; Groch and Freitas, 2000).

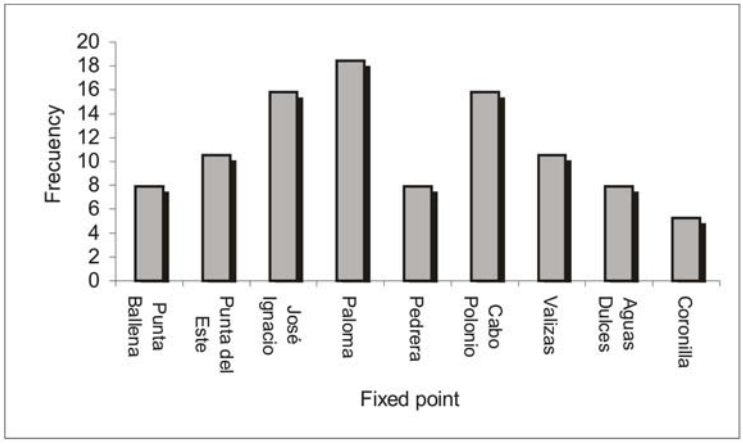

Figure 3. Southern right whale sighting frequency at each fixed point during 2001- 2003. Punta Ballena and La Coronilla represent the southern and northern limits, respectively, of the study site. Data from 2001-2003 period along the Uruguayan coast.

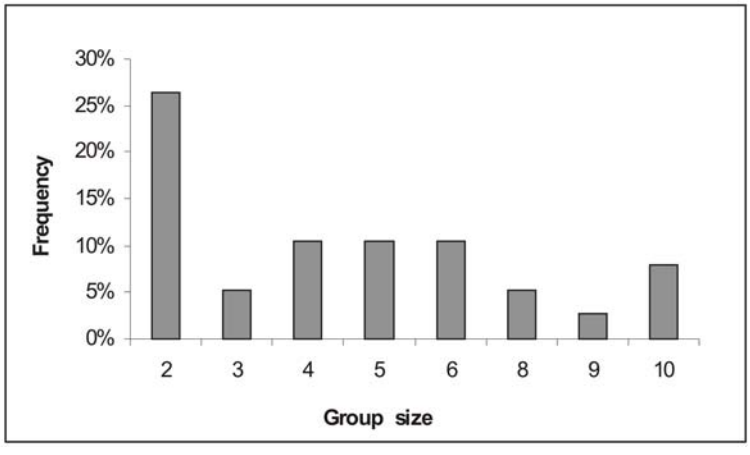

Figure 4. Group size frequency of southern right whales along the Uruguayan coast during 2001- 2003.

During both periods, sighting points were located in urban zones of easy access, therefore, no samplings were made from uninhabited zones or with difficult access. These zones encompass more than the half of the Uruguayan Atlantic coast.

Sightings of mother-calf pairs represent 5.26% (n = 2) of the total number of sightings during 2001-2003. This proportion is relatively low compared to records of the calving grounds of the Southwestern Atlantic. This suggests that the Uruguayan coast is not intensively used as a calving area by southern right whales, as are Santa Catarina, Brazil (Flores *et al*., 2000**;** Groch and Freitas, 2000) and Península Valdés, Argentina (Payne, 1986, Rowntree *et al*., 2001). The Uruguayan coast includes bays and ocean-exposed beaches. Mother-calf pairs might be protected from the wind and swell in some bays, but perhaps not to the extent of those found in calving sites, which could explain our observations. It has been recently suggested that the southeast coast of Brazil may be used as a calving ground because 57.1% of the opportunistic sightings show mother-calf pairs (De Olivera Santos *et al.,* 2001). Further studies are necessary in order to assess the status and identity of southern right whales in Uruguayan waters and to understand different patterns of habitat use. This information will be useful for the conservation and management of the species in Uruguay and in the Southwest Atlantic Ocean.

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