

## WHALEWATCHING IN THE CANARY ISLANDS (SPAIN): DEVELOPMENT AND MANAGEMENT

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### INTRODUCTION

The Canary Islands are an east-central Atlantic archipelago, located some 60 nm off the northwest African coast (aprox. 28° N- 16°W), consisting of seven main islands (figure 1) of volcanic origin that have a subtropical maritime climate, under the influence of the Canary Current, in the southern part of the North Atlantic subtropical gyre.

In the channel between the SW coast of Tenerife and La Gomera Islands there is a regular short-finned pilot whale (*Globicephala macrorhynchus*) population. Its existence was traditionally known to the local fishermen but it has passed almost unnoticed by the general public until the late 80's. Coinciding with the important tourist development of southern Tenerife in those years, the first trips dedicated to watching pilot whales started in 1991. In the following years whalewatching activities in the area experimented a dramatic increase. This situation caused the arousal of conflicts among the operators and also raised concerns about the potential effects of such activities on the animals.

Aware of these problems, the Spanish Administration considered the establishment of a code of conduct to be followed in the whalewatching operations. At the same time the Autonomous Government of the Canary Islands initiated the study of the whalewatching activities and funded field work to assess the impact of this industry on the pilot whale population.

In November 1995 a resolution of the Canary Islands Autonomous Government regulating the whalewatching activities came into force (Gobierno de Canarias, 1995). This regulation is now being applied and, although some provisions are still pending further development, the effects of its implementation can already be noticed.

The purpose of this paper is to describe the development and present situation of the whalewatching activities in the Canary Islands, summarising the research done on the pilot whale population and to report on the adoption of legal measures to regulate the observation of cetaceans in the wild.

## DEVELOPMENT AND PRESENT SITUATION OF THE WHALEWATCHING

Favoured by its mild subtropical maritime weather the Canary Islands developed a flourishing tourist industry that attracts about 4 million people to the Tenerife Island annually. Most of this contingent has a southwestern destination but the systems of tourist promotion extend the potential whalewatching users to other holiday resorts in the island.

Organised whalewatching activities in Tenerife were initiated at the end of the 80's, mainly directed to the short-finned pilot whale off the southwest coast. The first boats regularly involved in these activities were based in the touristic nucleus of southwest Tenerife (Puerto Colón and Puerto de Los Cristianos) (figure 2). Before that a few boats offered touristic cruises where whalewatching was only an occasional activity. In 1991 The Cousteau Foundation produced a documentary about the pilot whale population for conservation purposes but the consequences were unexpectedly advantageous for the promotion of the whalewatching activities in the area. Soon several european operators started boat services to the pilot whales area with an important annual rate of increase.

However there was not a systematic follow up of the activities and the data on the increase have to be obtained from different sources. The estimated number of users as well as the direct and total income generated by this activity in different years is gathered in Table 1. According to this information in a period of six years the economic and user indexes raised by one order of magnitude. There is very little information with respect to the number of vessels in operation in different years. Montero and Martin (1993) provisionally estimated a number of 40 vessels working daily in 1993. If this estimation was correct the present situation concerning the number of boats is not very different. (Arechavaleta and Montero, 1997).

At present the activity is developed from all ports of the western and southwestern coasts of the island. The most important ports for number of boats and volume of passengers are Los Cristianos and the marina of Puerto Colón, both situated in the important tourist resort of Las Américas-Los Cristianos. Whalewatching is centred in the close pilot whale population. Further north whalewatching operations are directed to the bottlenosed dolphins from the marina of Los Gigantes and the fishing harbour of Playa San Juan.

The boats are very diverse but can be first clasified as sailing and motor boats. The motor boats have a wide variation in power, length and passenger transportation. Motor boat operators can offer longer trips with less travelling time. Sailing boats are also very variable in length. The choice goes from big sailing boats with inboard motors to catamarans and small sailing boats with auxiliary outboard motors. During the whalewatching excursions they rarely used the sail due to the limitations in speed and manoeuvrability. In comparison, sailing boats are slower than the motor boats and carry fewer passengers. In general, sailing boat trips are more expensive than the motor boat ones.

In 1996 approximately 60 boats were involved in whalewatching from the ports of southwest Tenerife, at least during some months. The monthly distribution of the number of boats involved in whalewatching in 1996 is represented in Figure 3. Some 49 boats worked regularly throughout the year. This number remains more or less stable (there are not statistically



significant differences between months) and the oscillations are due to temporal stops because of repairs, financial or personnel problems. From July to October there is an increase in “non habitual” boats, probably due to the good weather and sailing conditions in these months. An increase in the number of private boats in the vicinity of the cetaceans during this months has also been observed.

The distribution of the different types of boats by ports is shown in Table 2 (Arechavaleta and Montero, 1997). Puerto Colón is the port with the biggest number of boats in operation (n=28). The predominant type is the small sailing boat but also the biggest motor boat in operation in the whole coast is based here. The second most important port is Los Cristianos with 14 regular boats and three more that work sporadically, the majority are motor boats. In Los Gigantes eight boats were in operation most of them small motor boats. From Playa San Juan at least three vessels operate but only one assiduously.

In relation with the passenger capacity, the boats licensed to carry a maximum number over 20 passengers (high capacity boats) represent 60% of the commercial fleet. The total carrying capacity of the 49 regular boats amounts to 2,409 places of which 700 are offered by the big sailing boats (58.3 persons/boat), 207 by the small sailing boats (15.9 persons/boat), 958 by the big motor boats (159,6 persons/boat) and 532 in the small motor boats (29,5 persons/boat). The port with the biggest transportation capacity is Los Cristianos (n=1,151) followed by Puerto Colon (n=913). The other two ports from further north represent altogether less than 15% of the total transportation volume available (Figure 4) (Arechavaleta and Montero, 1997).

The modalities of whalewatching trips are very varied, but for simplification they can be generalised to the following models:

- 1) Short excursion to see the cetaceans. There is not a preestablished duration nor a timetable for departures, depending on the actual demand. These are carried out by small motor boats.
- 2) Short excursion, between one and a half to two hours of duration to see the cetaceans.
- 3) Short excursion from two to three hours to watch the whales. It also includes a short cruise along the coast with time to swim near the shore.
- 4) Long excursion from four to five hours. It offers the same activities as 3 plus a snack or a meal on board.
- 5) All day excursion, lasting 6-7 hours. The whalewatching is included as one more trip activity.

The majority of the vessels offered type 2 and 3 excursions, nevertheless it is usual for a boat to offer more than one type of excursion at different times of the day or on different days.

Due to the great vessel availability, Puerto Colón is the point where more different types of excursions are on offer. The most frequent kind is type 3. In Los Cristianos it is also possible to select different types of trips. The most frequent are again type 3. Opportunistic dolphin



watches are also made during the trips departing from these two ports. In Los Gigantes the activities are centred around the bottlenosed dolphin population inhabiting the waters close to this tourist resort. The excursions are of type 2 and 3 although some boats navigate to the south looking for pilot whale encounters, in excursions that last about three hours. In Playa San Juan there is only one big sailing boat in operation that cruises along Los Gigante cliffs, usually stopping for cetacean watches (type 5).

Many vessels offer several excursions by day, normally two or three but occasionally four, especially in the summer months. There are boats navigating during most of the daylight period. The maximum whalewatching activity occurs in the central hours of the day. Figure 5 represents the mean number of boats working in 1996, by hourly periods (Arechavaleta and Montero, 1997). However a trend was detected in summertime. Because of the longer daylight period, some boats include an extra trip in the last hours of the day. The timetables usually change according to the season and some trips can either be cancelled or additionally programmed according to the demand.

The price of the excursions depends on the kind of trip. For the short-mean duration trips the prices vary from 1,500 to 4,000 pesetas per adult. The long cruises can cost between 6,000 and 8,000 pesetas.

To assess the economic importance of the whalewatching activity it is also necessary to know the actual number of passengers. Due to the lack of absolute data, an estimation of the number of passengers per day in different ports was made through a systematic sampling of the main ports. The daily number of passengers in Puerto Colón and Los Cristianos is similar, between 800 and 1,000 persons. In Los Gigantes the occupancy varies between 200 and 300 passengers per day. These numbers represent mean values obtained in days with good navigation conditions. The number of daily users tend to increase in summer and the following months due to the greater regularity of the excursions and the improved rate of occupancy during this period. This increase is probably related to the seasonal trend in the tourist flow to the island. According to the tourist industrial sector the low season is from autumn to the beginning of winter. Total number of whalewatching tour users in the area in 1996 was estimated to be around 700,000 persons (Arechavaleta and Montero, 1997).

To calculate the revenues from tickets sales, a mean value of 3,000 pesetas per passenger and excursion was used. Direct revenues from Tenerife whalewatching activities during 1996 were estimated to be around 2,000 million pesetas. To obtain total revenues from this activity other indirect economic incomes should be taken into account, such as souvenir and film sales, additional travel costs and onboard bar consumption. Also accomodation, food and travel expenditures should be considered in the cases of tourists that come to the island exclusively for whalewatching. For 1995, the Canaries Government made an estimation of 6,000 million pesetas of indirect revenues on the basis of 500.000 whalewatching users in Tenerife.

The developing of the whalewatching activities in Tenerife seems to have reached a halt in the biennium 1996-7, maybe as a consequence of the management decisions recently taken or because of the saturation in the capacity of tourist infrastructures, or both. In the last years there has been a trend to increase the length and the carrying capacity of the boats. In the short and medium term it is foreseeable that the big enterprises take over from the smaller



ones diminishing the impact on the pilot whale population. Nevertheless the analysis of the future trends of whalewatching is rather speculative. Whalewatching activities could evolve in other ways because they are highly dependent on a changeable social, economic and political context.

Other whalewatching areas are developing in the Canary Islands. Commercial cetacean watch tours are already in operation in La Gomera and La Palma Islands.

In southern La Gomera Island there is an area with a high degree of cetacean sightings. The most frequently sighted species are the bottlenosed dolphin, pilot whales and ziiphiids (*Mesoplodon spp.*). There are fewer activities in comparison with Tenerife but they already have certain importance. The operations are carried out by 5 boats (not all regularly involved in whalewatching) with a capacity for 6-8 passengers. The boats made two trips daily and work all year round, weather and sea conditions permitting. Between 300-400 people participate monthly in whalewatching tours. Annual revenues are estimated at 13-18 million pesetas.

Whalewatching operations in La Gomera fulfil some of the requirements for its potential developing, but there are two possible limiting factors. On the one hand the tourist industry of the island is mainly based on short one day visits, and on the other hand, in this area there is high percentage of days (about 20%) with no cetacean sightings.

Whalewatching cruises started very recently (summer of 1996) in La Palma Island. The species sighted are the bottlenosed dolphin, the spotted dolphin and the common dolphin. The area of whalewatching is situated off the west coast of the island. The spotting of dolphins cannot be guaranteed because it only occurs about 70% of the days. At present one boat is working daily all year round, offering the tourists a visit to a cave, the opportunity to swim on a beach and dolphin watches.

In the Canary Islands there are other suitable areas for cetacean watches. The waters around the eastern islands of Gran Canaria, Fuerteventura and Lanzarote are rich in cetacean sightings, and it is possible that some resident populations might be found there. The tourist infrastructures are also very important and well established, helping the potential for whalewatching activities in these islands.

## **THE PILOT WHALE POPULATION OF TENERIFE**

The studies about the cetacean populations in the Canary Islands are very recent (Vonk and Martin, 1988; Martin et al., 1992). Several papers have been published dealing with the strandings, distribution and biology of cetacean species around the Islands (Vonk and Martin, 1989; Escorza et al. 1992; Montero and Martin, 1992; 1994; Martin et al., 1995). The narrow continental shelf and the prevailing hydrographic conditions favoured the presence of a relatively high number of cetacean species. At least 24 species belonging to 6 families are known to the area, most of them pelagic. Some species are present all year round while others are seen seasonally or occasionally. In general data concerning resident populations in Canary



waters are scarce, with the exception of the Channel between Tenerife and La Gomera Islands. Permanent concentrations of short-finned pilot whales and bottlenose dolphins have been verified in this area.

The area occupied by the pilot whales is located in the channel between southwest Tenerife and La Gomera Islands and has an approximate extension of 180 square km. Bathymetrically, on the Tenerife's side, the area is characterised by a narrow continental shelf with steep slopes reaching the 1000m depth contour quickly. The mid-channel area is canyon with a mean depth of 1500 m that widens and deepens further south.

The oceanographic conditions in the Canary region are very variable throughout the year due to the influence of the northeastern trade winds, but the presence of Mount Teide (3718m) in the island of Tenerife has an important effect on the Tenerife-Gomera channel. The existence of a permanent cyclonic eddy in the inter-islands channel and an anticyclonic one to the south of these islands conditions the hydrography of the area. The cyclonic current engulfs a cold mass of water in mid channel (Molina et al., in press).

The upwelled waters contribute to the biological productivity of the area, where different resources such as flying squids (Hernández García, 1991) and scombrid fishes (García Cabrera and Pereiro, 1974) are located. Local concentrations of cephalopod resources (A. Brito, com. pers.) coincide with the areas used most by the pilot whales. The stomach contents of two short-finned pilot whales from the Canary Islands, made up entirely of cephalopods, points out the possible role of these resources to explain the presence of this pilot whale population in the area (Hernández García and Martín, 1994).

Studies on the short-finned whale population of SW Tenerife were initiated in 1989. The behaviour, social structure and reproductive biology of this population were investigated by means of photo-ID study (Heimlich-Boran and Heimlich-Boran, 1992). A total of 650 individual animals were identified, of which 31 groups with 388 animals were classified as residents and 15 groups with 117 specimens were considered as visitors to the area (Heimlich-Boran, 1993). Photo-id studies were continued and extended to the south of La Gomera Islands during 1996. Some animals included in Tenerife's catalogue were recognised in the waters south of La Gomera, suggesting that the area of distribution of this pilot whale population could be larger than thought (Montero and Arechavaleta, 1997).

The core unit of the resident pilot whale groups is formed by at least one adult female and her immature offspring. The social organization of the regular users is stable with no significant differences in the number of transient visitors throughout the year (Heimlich-Boran, 1993). The number of groups present in the area remains stable but there is an increment of the number of components in spring and summer months. An increase of adult males and females as well as young specimens in spring with respect to winter was also observed. The hypothesis of a reproductive cycle with diffuse seasonality could be compatible with these findings (Montero and Arechavaleta, 1997).

The daily movements (Heimlich-Boran, 1993), the distributional (Montero and Arechavaleta, 1996) and diurnal activity patterns (Montero and Martín, 1993; Martín, 1996) of the Tenerife-Gomera population have been described. Studies about the acoustic behaviour of this short-



finned pilot whale population are also in progress (Martin and Santiago, 1996).

## IMPACT STUDIES

In 1992 the Tourist and Transport Department of the Canary Islands Government sponsored a research project to study the impact of the commercial whalewatching operations on local *Globicephala* population, with the aim to establish the guidelines to an effective management of these activities both from the point of view of the tourist industry and the protection of the natural resources (Montero and Martín, 1993).

Different behavioural aspects were studied to determine the effect of the boats on the groups of pilot whales. Data on group spacing showed significant differences between the presence and absence of vessels around the groups (in and out of a 40 m. radius limit). In the presence of vessels the animals widen the distances between them, halving the spacing index values. (The spacing index = Minimum distance/ Maximum distance). The shortest distance is determined by the mother-calf association that tends to remain stable in both situations. The disgregation of the group occurs with the nearing of the vessel and is instantaneous. The situation continues during prolonged periods of time and finally the group gets together again (Montero and Martín, 1993).

The presence of the boats in the vicinity of the whales does not appear to significantly alter most respiration parameters. Only final dive times are more prolonged during the approximation of the boats (Heimlich-Boran et al., 1994). This reaction could be interpreted as an escape manoeuvre. The presence of the boats seems to increase the number of deep dives, changing the natural patterns of respiration and also alters the activity patterns of the animals, inducing stops or starts of movement and changes in speed and direction. The changes in the activity patterns are greater in the resting groups but they affect the travelling groups as well (Montero and Arechavaleta, 1997).

Some quantitative aspects of the interaction between the animals and the boats were studied. The results suggest that the activity changes induced by the presence of boats are alike independently of the number of animals in the group. It seems also that the response generated by the simultaneous presence of one, two or three vessels in the vicinity of the animals is similar (Montero and Arechavaleta, 1997).

The changes in the activity patterns point out the existence of some short term impacts. Its use as an index for measuring short term impacts seems to be convenient because it is easy to define and measure.

However, the verification of changes in some behavioural parameters does not necessarily mean that a long term impact is affecting the short-finned pilot whale population.

There are other aspects of the whalewatching activities to be taken into account, such as the type of vessels (length, engine noises, etc.), manoeuvres, position with respect to the whales, distances, etc., but they are very variable and hence difficult to measure in routine observation conditions. They could be better controlled and studied through an experimental approach.



## MANAGEMENT

It is appropriate to summarise here the factors that contribute to the extraordinary evolution of the whalewatching activities in the Canary Islands. Three different kind of factors can be mentioned:

a). Climate and oceanographic conditions. The smooth and temperate weather with excellent sailing conditions and sheltered waters to the south of the Tenerife Island provide opportunities to carry out maritime activities all through the year.

b). Tourist development. The important tourist industry of Tenerife is based on an important and diversified infrastructure, offering different leisure, sport and recreational activities. The whalewatching industry took advantage of this situation that guarantees a high number of potential users.

c). Characteristics of the short-finned pilot whale population. The pilot whale population off Tenerife has an important resident component located very close to the coast, allowing easy access from shore all year round. The prevailing resting behaviour of the animals facilitate their location and observation.

In this favourable context whalewatching activities grew uncontrolled leading to a situation with important operational problems: the legally constituted companies suffered the competition from boats that undertook whalewatching activities furtively. On the other hand the proliferation of boats in the vicinity of the cetaceans gave rise to environmental concerns due to the risk of physical damage and harassment of the cetaceans.

Both the Central Spanish and the Canary Administrations realised the importance of the urgent adoption of guidelines for the use of the boat trips approaching the whales, following the experience of other whalewatching areas around the world (IWC, 1994).

As a first management measure, the Tourism Department of the Canary Government created in 1995 the "Instituto de Cetáceos de Canarias" to study the local cetacean populations and the impact of whalewatching, to follow up the tourist operations and to undertake education and promotion activities. Also in 1995 the Canary Government adopted a Decree regulating the activities of the observation of cetaceans within the jurisdiction of the Autonomous Community of the Canaries, with the aim of establishing the conservation means necessary to protect the cetaceans.

The Decree contains three fundamental elements: the establishment of a system of permits to carry out commercial whalewatching activities, a Code of Conduct to be adopted by the boats approaching the whales and the requirement of the presence of an onboard monitor-guide. The permits are authorised by the Vice Council of Environment for limited periods of time (maximum six months).

The application for a permit involves the attachment of the accreditation as a tourist company and the navigation permits. It also request information about the whalewatching activities (species of cetaceans to be viewed, location) and a detailed description of the proposed



commercial operation (number and characteristics of boats, number of boats operating simultaneously, title and professional experience of the captain, duration, frequency and dates of the excursions, maximum authorised number of passengers).

The Code of Conduct must be followed by the boats involved in the observation of cetaceans. The code is structured in Basic obligations such as a maximum number of three vessels watching simultaneously within 200 m of the same group of whales and a minimum approach distance of 60 m; Methods of approach, with approach speeds and limits and orientation of approach; and Behaviour with cetaceans, with guidelines to follow in case of any signs of alarm or stress from the animals and to coordinate the approach of two or more vessels to the same group of whales.

Failure to comply with the Code of Conduct leads to the immediate loss of license with the consideration of an administrative offense and, as such, will be punished by the application of sanctions (between 50,000 and 10 million pesetas), according to an established system of infractions.

The provision about the presence of a monitor-guide onboard is pending on the determination of their characteristics and means of accreditation. Meanwhile the vessels must take a monitor responsible for the excursion. It is planned that during 1997 a training course for monitor-guides will be organised.

In order to guarantee the efficacy of the Decree a programme of surveillance and control was put in operation at the beginning of 1996. An inboard motor patrol boat, the "*Calderón*", surveys the whalewatching area daily. Its missions are to inform about the Code of Conduct and to report on the infractions observed.

At present more than 60 sanction procedures are in progress. Some questions have been raised about the system of reporting the infractions and in relation with the sanctions procedure. The Administration has been dealing with these subjects for them to be solved satisfactorily.

The results of the surveillance programme fulfill expectations, contributing in a significant way to the compliance with the Code of Conduct and to the disappearance of the unauthorised commercial operations (Urquiola, 1996).

From the management point of view it is also important to mention the existence of other maritime uses in the area that interact in different ways with the pilot whales and the whalewatching. The proximity of the holiday resorts enhance the practice of sports and recreational activities, such as sport fishing, motonautic, sailing and scuba diving. In the channel between Tenerife and La Gomera there is an intense merchant and passenger maritime traffic, with two different kind of vessels: the great tonnage and slow moving ferries and the high speed hydrofoils. Commercial fishing is also very important locally (tuna fish, cephalopods, as well as demersal and coastal pelagic fishes are the most important catches), accounting for nearly half of the catches of the Canary Archipelago in 1990 (Instituto Canario de Estadística, 1991).

In addition to this Regulation other legal measures are being studied to protect the cetacean



populations better. Owing to the developing of a Law for the Conservation of the Biodiversity, sanctions are to be included against behaviour detrimental to the conservation of the cetaceans. There is also a common initiative between the European Commission and the Spanish Administration (Ministry of the Environment) to include some of the areas inhabited by the bottlenosed dolphin and the pilot whale populations of the Canary Islands in the Community network of Zones Natura 2,000.

The Departments of Tourism and Environment of the Canary Islands are undertaking educational programmes directed at the crews of the whale watch companies and at the local communities, to spread the knowledge about the natural patrimony of the islands. They are also promoting informative campaigns oriented to the potential users of whalewatching activities in the Canary Islands.

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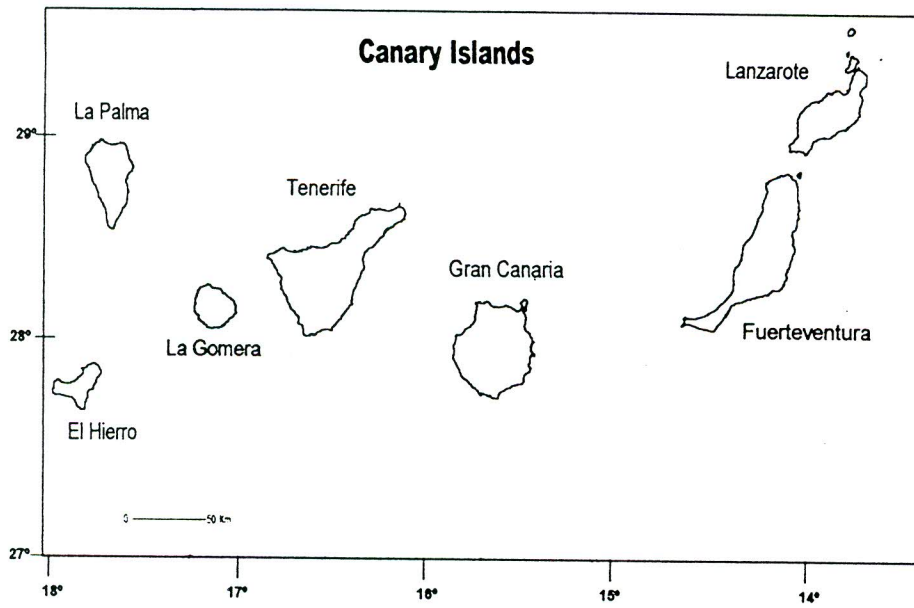


Figure 1.

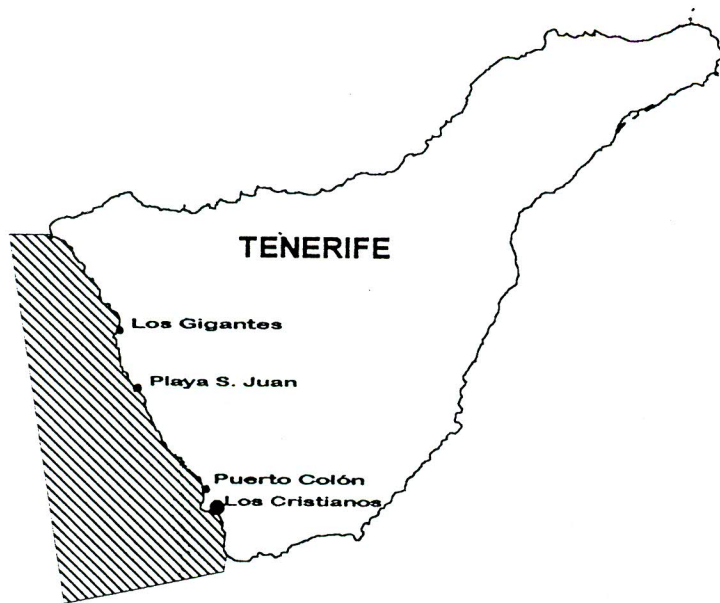


Figure 2. Area of whalewatching in Tenerife.



| <b>ESTIMATED NUMBER OF USERS AND REVENUES</b><br>(Several sources) |                 |                        |                       |                                   |
|--|-----------------|------------------------|-----------------------|-----------------------------------|
|  | <b>N. users</b> | <b>Direct revenues</b> | <b>Total revenues</b> | <b>Source</b>                     |
| 1991   | 40.000          | 1.144.000 \$           | 4.004.000 \$          | HOYT (1992)                       |
| 1994   | 250.000         | 7.150.000 \$           | 25.025.000 \$         | HOYT (1995)                       |
| 1995   | 500.000         | ± 10.700.000 \$        | ± 54.000.000 \$       | Canarias Government               |
| 1996   | 700.000         | >14.000.000 \$         | -                     | Instituto de Cetáceos de Canarias |

Table 1

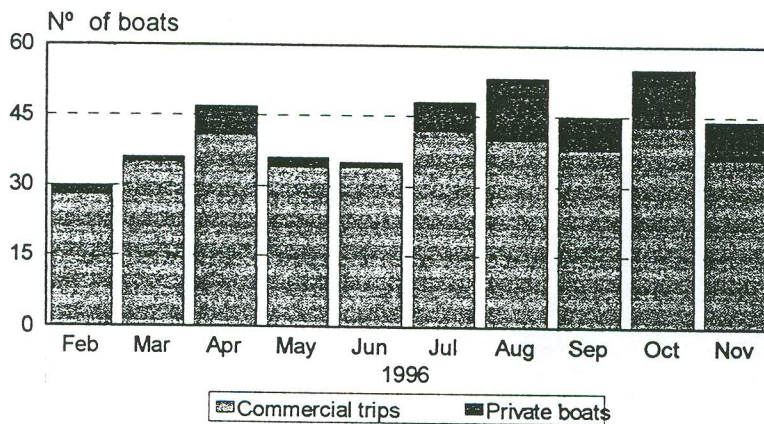
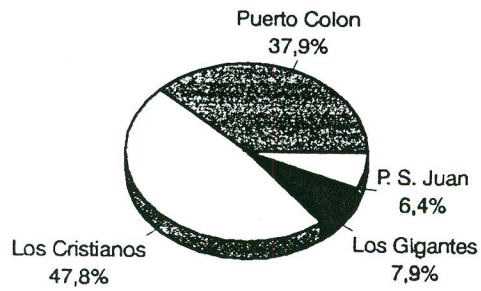


Figure 3. Monthly distribution of the number of boats involved in whalewatching in Tenerife in 1996. (Arechavaleta and Montero, 1997).

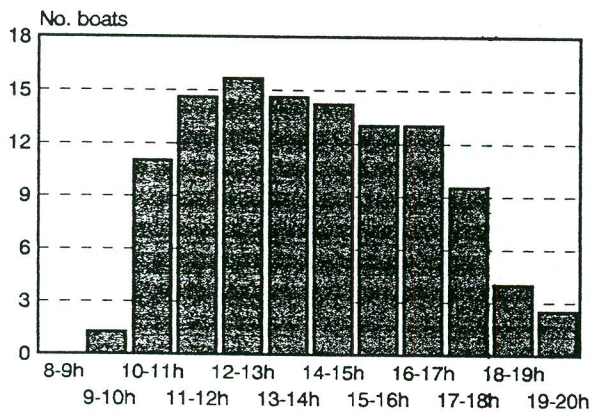
| <b>NUMBER AND TYPE OF BOATS BY PORTS (1996)</b><br>(Arechavaleta & Montero, 1997) |                          |                            |                        |                          |                                      |                              |
|---|--------------------------|----------------------------|------------------------|--------------------------|--------------------------------------|------------------------------|
| <b>PORT</b>   | <b>Big sailing boats</b> | <b>Small sailing boats</b> | <b>Big motor boats</b> | <b>Small motor boats</b> | <b>Total number of regular boats</b> | <b>Total number of boats</b> |
| Puerto Colón  | 8                        | 11                         | 2                      | 7                        | 28                                   | 32                           |
| Los Cristianos  | 3                        | 1                          | 4                      | 6                        | 14                                   | 17                           |
| Playa S. Juan   | 1                        | -                          | -                      | -                        | 1                                    | 3                            |
| Los Gigantes  | -                        | 1                          | -                      | 5                        | 6                                    | 8                            |
| <b>TOTAL</b>  | <b>12</b>                | <b>13</b>                  | <b>6</b>               | <b>18</b>                | <b>49</b>                            | <b>60</b>                    |

Table 2.





**Figure 4. Boat transportation capacity by ports (Arechavaleta and Montero, 1997).**



**Figure 5. Distribution of the number of boats in whalewatching by hourly periods (Arechavaleta and Montero, 1997).**