

## **Focusing on the past 20 years, what is the influence that a change in tourism numbers and type could be having on the residing populations of sperm whales and bottlenose dolphin in the bay of Los Cristianos.**

### **Aim:**

To identify and visually represent the relationship between a change in the amount of tourists who are taking part in marine tourism and the regularity of interactions with the bottlenose dolphins and sperm whales who reside to the south-west coast of Tenerife. As well as creating an image of both local and tourists opinions on how the eco-tourism of whale watching is shaping Tenerife's resident cetacean species.

### **Objectives:**

- Undertake a series of open interviews and a management questionnaire with marine activity businesses, hotel activity coordinators and tourists on whale watching boats to develop an image of how the locals and tourists see Tenerife, Tenerife's resident cetaceans and eco-tourism.
- Produce temporal and spatial maps to visually analyse the hot-spots of boat interactions with the species in question and see how if either species has seen considerable change. Further use of the maps for discussions about cetaceans behaviour during interactions with the boats.
- Collect and measure marine tourism through available online sources, such as local government websites, the licenced boats in the port of Los Cristianos (inc. whale watching licences) and the licenced whale watching boats.
- Develop a hypothesis for the change (or lack of change) in cetaceans behaviour and sightings whilst considering both the tourism data and results from the interviews and questionnaires to discuss whether opinions correlate to the changes in data.

This research project is designed to investigate whether there has been a notable change in average sum of interactions with the resident bottlenose dolphin and sperm whales of Tenerife due to a change in the amount of tourists who are visiting Tenerife each year for marine-based activities, and how they're spending their holidays. If marine tourism numbers has increased and so has how often cetacean interactions occur, then it can be discussed on why this is perhaps through looking at their behaviour during interactions. As all of the variables (tourism numbers, type and interaction count with each species) could go either up or down, it does not prove that there is a direct correlation. Thus, having data on behaviour during interactions, more specific values of marine activity such as licenced whale watching boats, and undertaking interviews and questionnaires with a mix of local marine businesses and tourists, will provide enough discussion between the collected datasets.

With the help of an organisation called AWdF (The Atlantic Whale and Dolphin Foundation), I shall be gathering data by going out on boats and will further have access to this same data on interactions and behaviour during these interactions that the AWdF have collected on local whale watching boats for the past 23 years around Tenerife. With this I will create temporal maps to show hotspots of marine activity and cetacean activity over the past 20 years to try and show any significant changes in either. I will also gather datasets from readily available government websites on tourism arrivals in Tenerife, licences whale watching boats and other relevant statistics that demonstrate change in tourism numbers and type, which will be displayed through figures and can be compared to interaction count. Furthermore, after conducting open interviews and management questionnaires I to both local marine business owners I will use the answers to see if it correlates with the trends in

tourism changes. This gives a more down to earth and local opinion on the matters of marine activity and how eco-friendly it is, if it is becoming more or less eco-friendly and how they believe the pattern of boats is impacting cetacean sightings and behaviour during interactions. For an island community such as Tenerife, I think that having a local view is very important to any matter concerning their livelihoods and the environment that they live in.

The AWdF are a conservational NGO and have had a research station set up in Arona, a town in the mountains above Puerto Colon, since 1997 in order to gather data on the cetaceans down in the bay off Puerta Colon and Los Cristianos. They gather data by going out on local whale watching boats and noting interaction counts and other information such as species, number of adults, juveniles and calves, general behaviour, etc. and through mark and recapture method. As well as this data collection, they also have a key goal to raise awareness to tourists on how they can be more sustainable and get involved with conservation for cetaceans, plastic pollution etc., by running activities such as petitions on the whale watching boats to help contribute to. Other examples of the work that the AWdF do include running children’s conservation workshops, research initiatives, giving grants and other forms of aid to ecotourism accommodation and being actively involved in activity projects all around Tenerife, as well as cetacean project across the Atlantic through the Atlantic Ocean Cetacean Network (AOCN).

In 2001, an article was published in the Journal of Sustainable tourism which had examined the change of whale hunting in Tonga to whale watching. This happened in numerous places following the IWC (International Whaling Commission) stating that whale watching could be counted as a legitimate form of ecotourism, with Tonga being one of the most prominent examples (Orams, 2002; Hoyt, 2001). A study from the UNEP (United Nations Environmental Program) says that a reported US\$1.6 billion was made in expenditure in 2003, from 13 million participants (2013). Since then the field of how much whale-watching has made is very sparse and has not much data. Tenerife’s main source of income never used to be from tourism. The economy of the island used to be predominantly reliant on agriculture and trade up until the 1970s, when it started to become more touristic (Cabildo de Tenerife, 2020). In 2017, about 5.7 million tourists visit the island each year, generating about 32% of the islands GDP. With this huge amount of tourism, and a large number of cetacean species recognised in the local marine habitat, whale watching boats have increased largely in numbers too – going from just 37 licensed boats in 2008 to 111 licensed boats in 2018 (International Whaling Commission, 2020).

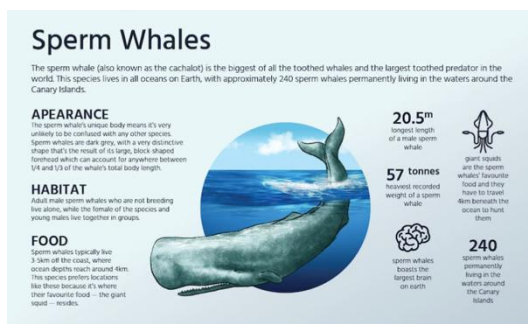
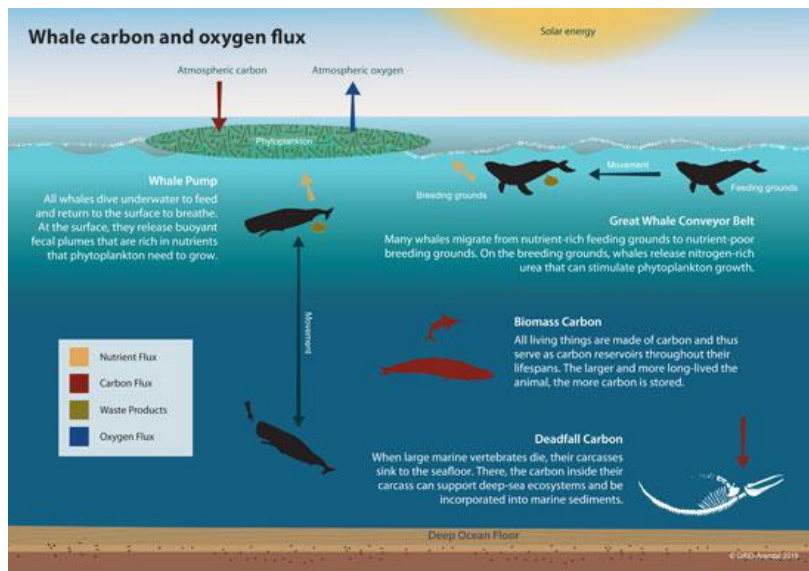


Figure 1: General Information on the Sperm Whale (AWdF)

The coastal area of the Canary Islands boasts being home to around 730 native fish species, 4 species of marine turtles and 28 cetacean species, which accounts for almost 1/3 of all whale and dolphin species (AWdF). This number can vary though, as most of these species are migratory or seasonal, with only 4 cetacean species being residents all year round: the Short-Finned Pilot Whale, Bottlenose Dolphin, Risso’s Dolphin and the Sperm Whale. The 2 that we will be focusing on during this study are the bottlenose dolphin and the sperm whale. Both of these are residential to Tenerife, with one study from 1997 to 2006 saying that the Bottle-nose dolphin was the most sighted species of all cetaceans around Tenerife, accounting for 48.4% of total sighting,

whilst the Sperm whale was only 0.69% of the total spotted (Carrillo et al. 2010). Despite the bottlenose being listed on the IUCN Red List as ‘Least Concerned’, there are many threats (as stated on the AWdF website) such as: pollution; illegal hunting; Drift and gill nets which kill thousands every year. Many thousands more are killed by the dolphin captivity. There are two dolphinariums on Tenerife”(AWdF, N/A; Hammond et al., 2020). The sperm whales are even more threatened, and are labelled as ‘vulnerable’ by the IUCN Red List, with its main dangers being ship-strikes in shipping lanes, fished for biological resource use and pollution (Taylor et al., 2019). There are thought to be

roughly 240 sperm whales who are permanent residents in the waters around the island of Tenerife, which is presumed to be a fairly important habitat for them due them being spotted near the archipelago all year round. However, sadly the numbers seem to be depleting due to a high rate of ship strikes that are occurring follow the new high-speed ferries that started departing from Los Cristianos during the early 2000s, with sperm whales accounting for almost 25% of strandings between 1991 & 2007 (Carrillo & Ritter, 2010; Ritter, Aguilar de Soto & Martin, N/A, Fais et al., 2016). The AWdF have a statement on their website saying that “These huge animals were once frequently seen here, they live just around the coast between Gran Canaria and Tenerife. Sadly, their numbers were decimated by the Fred Olsen ferry through frequent boat collisions”. (AWdF, 2020)



Due to the importance of whales in fighting climate change, it is important that all species can be conserved. Phytoplankton are also very important to this fight, providing 50% of all oxygen and storing 40% of all global CO<sub>2</sub> (this is the same as 1.7 trillion trees according to the IMF). As they're a major food source of whales, it means they are too a carbon sink and a single whale can accumulated an average of 33 tonnes of CO<sub>2</sub> over 60 years, whilst a tree would absorb just 1.3 tonnes. With Tenerife being home to one of the largest collections of these huge marine creatures, the importance of maintaining their habitat as a safe feeding and hunting ground is very key in order for them to try and increase in number (IMF, 2019)

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