

Dolphins and Whales off La Gomera –

Species Diversity in a Changing World





Dolphins and whales of La Gomera.
Drawings: Katrin Wähler.

1	DOLPHINS AND WHALES – The highest developed lifeforms in our oceans	2
2	WHALE WATCHING – Humans as guests at sea	8
3	LIFE IN THE OCEAN – Threatened from all sides	12
4	M.E.E.R. STUDIES – Insight leading to conservation	18
5	THE CANARY ISLANDS – A dynamic habitat for dolphins and whales	22
6	LA GOMERA – The most species diverse habitat for cetaceans in Europe!	28
7	M.E.E.R. INVESTIGATIONS – Results from more than a decade of study	38
8	SPECIES DIVERSITY IN A CHANGING WORLD – What will the future be like?	44
9	WHAT CAN I DO? Practical advice to protect our oceans	52

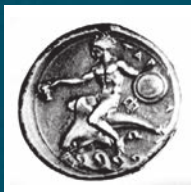
1 DOLPHINS AND WHALES –

The highest developed lifeforms in our oceans

2 / 3

Dolphins and whales fascinate human beings. Almost all of us are affected by their beauty, elegance and their apparent joyful nature. Since ancient times there has been a secret friendship between cetaceans and humans. There are many myths and legends about these marine mammals and countless books have been written. Their images appear everywhere in the media and in advertisings. Whales and dolphins appeal to us in an almost magical way.

01



02



03



01 Ancient coin showing dolphin and human.

02 Dolphin fresco at Knossos Palace on Crete
(Minoan culture, ca. 2,000 B.C.)

03 Totem: Many indigenous people worship
whales and dolphins.



In dolphins, mothers and juveniles often stay closely together for years.

1 DOLPHINS AND WHALES –

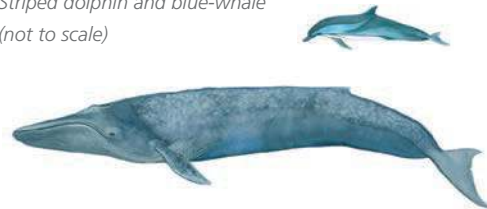
The highest developed lifeforms in our oceans

4 / 5

There are about **85 species of dolphins and whales** around the globe. They live in all oceans. Freshwater dolphins even have adapted to continental fluvial habitats. The order cetacea (whales and dolphins, from the *Latin: Cetus*) is divided into two sub-orders:

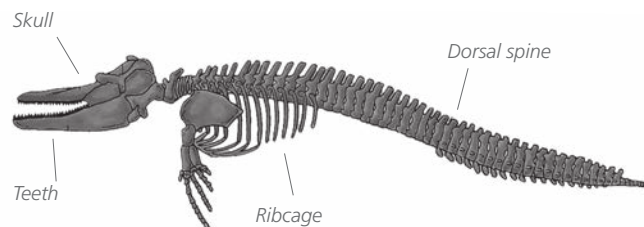
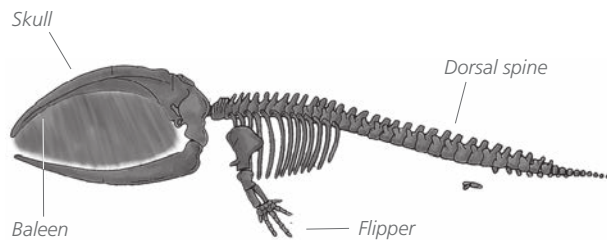
1. Baleen whales (*Mysticeti*, 13 species), consist of most large whales including the blue whale, the largest animals that ever lived on our planet. They have so called baleen plates instead of teeth and feed on krill and small fish, large amounts of which they filter from the water. Many baleen whales migrate from the polar to the tropical seas every year.

Striped dolphin and blue-whale (not to scale)



2. Toothed whales (*Odontoceti*, ca. 70 species), include all dolphins as well as sperm whales, beaked whales and many more. They have between 2 and 250 teeth and mostly hunt fish and molluscs like squid. Many toothed whales have a restricted distribution or form locally resident populations.

These sub-orders are further divided into families and genera. All dolphins belong to the toothed whales – you could call them the small cousins of the large whales.

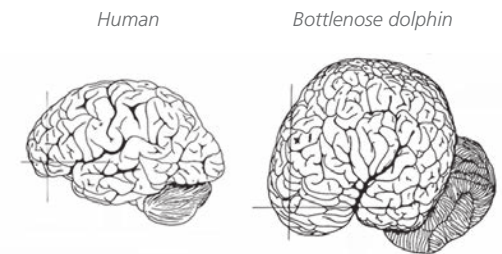


As mammals which evolved from **terrestrial ancestors**, dolphins and whales have populated our planet for many millions of years, much longer than human beings have existed. Today, they are considered the “highest” developed form of life in the ocean. Their **bodies** are perfectly adapted to life in water: streamlined shape, an extremely smooth and sensitive skin, an isolating fat layer and physiological adaptations to deep diving make them evolutionary survivalists.

During their long evolution, they have developed some of the most complex social systems known in animal kingdom. Their typically **large brain** (the largest brain on earth is the sperm whales’: it weighs about 8 kg!) enables them to perform cognitive tasks like logical thinking, building abstract concepts and answering problems. Even **tool use** has been observed in dolphins. A larger part of their behaviour is learnt and not genetically determined. This is underlined by the fact that different populations of the same species perform distinguished

behaviours and hunting tactics, etc. They have adapted their way of life perfectly to different environments.

Brain comparison: human – dolphin (to scale)



Dolphins belong to the toothed whales.



1 DOLPHINS AND WHALES –

The highest developed lifeforms in our oceans

6 / 7

During their long life span (right whales may live more than **200 years**, the life of a dolphin can be 50 years or longer!), these animals, without doubt, develop **personalities** on the base of their individual experiences. This gives them an individual or **personal dignity**. Only recently it was discovered that bottlenose dolphins and orcas possess self consciousness. This cognitive feature, which originally was attributed exclusively to humans, up to now has been detected in very few animal species like the great apes and elephants – and in cetaceans. It's no overstatement to call dolphins and whales **the crown of creation in the seas**.

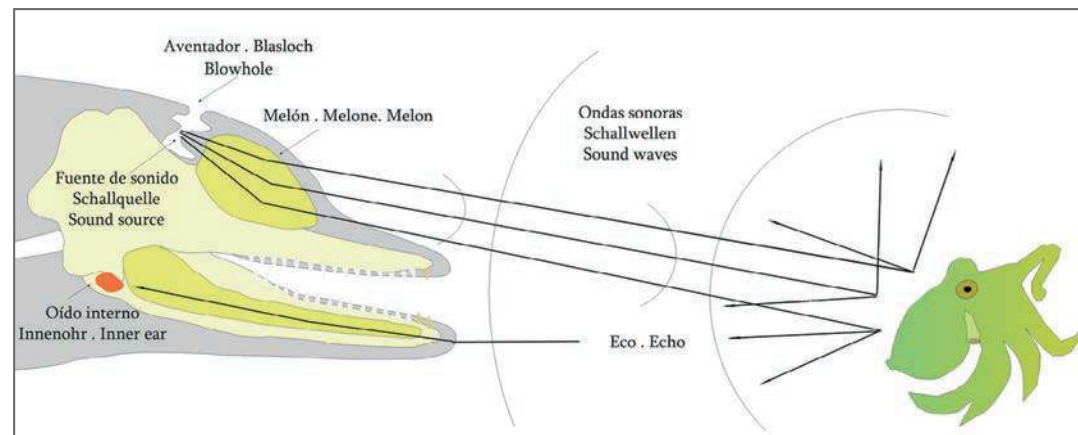


Dolphins sometimes play with marine turtles.

The perception of dolphins and whales is centred on **acoustics**. We humans primarily orientate ourselves with our eyes whereas cetaceans predominantly use their ears. They produce sound pulses, which are called “clicks”. The echo of the clicks is transformed – like in bats – into sophisticated information about their surroundings. This so called **echolocation** works

very well even in complete darkness at night or at great depths and therefore is much superior to eyesight.

Many species create a great variety of different other sounds like whistles, grunts, squawks, creaks, chirps or the famous songs of the humpback whale. These sounds have **communicative** functions. And especially dolphins appear to have a lot “to tell”. Some groups even use specific dialects and therefore can be distinguished acoustically from their conspecifics.



way of life. The communities benefit from **mutual assistance** and thus improve their hunting success or effectively scare off predators. Their young are intensely cared for, because other group members look out for them. In this way they learn how to live in a group, they literally “go to school”. Maybe that's the reason why dolphin groups are called **schools**.

Because their communities show such features like strong and **stable bonds**, the distribution of knowledge from one generation to the next (= traditions) and group-specific **dialects**, we have to speak about **cultural development**. The cultures of cetaceans are possibly much older than our own...

*Diagram of dolphin echolocation.
Graphic: Volker Böhlke*

Communication is most important, because most dolphins and many whales live in social groups. The individuals within a population know each other well and build **strong bonds**. In some species like pilot whales, all members of a group stay together for a lifetime – which may last up to 70 years! The social structure of dolphin societies is an essential aspect of their



Two rough-toothed dolphins petting each other.



Cetaceans distribute knowledge from one generation to the next, thus developing traditions and cultures.

2 WHALE WATCHING –

Humans as guests at sea

8 / 9



Atlantic spotted dolphins often are curious and playful.



Pilot whales being observed off La Gomera.

Whale Watching is the observation of whales and dolphins in their natural environment. Globally, 75% of cetacean observation is conducted from boats. And worldwide there also are numerous locations where they can be observed from land. The advantage of such landbased whale watching is the virtual absence of disturbances to the animals. Most cetacean observation is still based on large whales, but watching dolphins and other small cetaceans is steadily on the rise. Therefore, the predominance of *dolphin watching* like on La Gomera is still an exception.

Another type of whale watching is **swimming with whales or dolphins**, which in the Canary Islands is prohibited by law. And finally there are so called **solitary sociable dolphins**. These are small cetaceans (mostly bottlenose dolphins), which in certain areas become strikingly accustomed and friendly towards humans. Sometimes these animals turn into “local heroes” and attract masses of people even from all around the globe.

Commercial whale watching started in **1955 in California** and initially developed slowly. In 1982 there were only twelve countries worldwide where whale watching was offered. In 1995 this number rose to 65 countries with 5.4 million whale watchers. The growth curve meanwhile has become very steep. The number of whale watchers in 1998 was estimated at nine million.

Today it is estimated that at least **12 million** people go whale watching every year; you can watch cetaceans in **more than 90 countries**, on every continent. Whale watching has become a **billion dollar business** and in many places is an important source of income.

Whale watching can be a contribution to **environmental awareness**, if the principles of sustainability are applied. It serves as an alternative to dolphins in captivity, too. Finally, it can be an economically more effective use of cetaceans especially for those countries still hunting whales, e.g., in Iceland, where whale watching operators now earn more money than the whalers ever did.

2 WHALE WATCHING –

Humans as guests at sea

10 / 11

But there can be **negative outcomes**, too, e.g. if the animals are always surrounded by many boats and the sound of the engines and propellers leads to them having to perform evasive manoeuvres and causes stress in the animals. Sometimes even **collisions** happen or animals are injured by propellers. Where disturbance persists, **stress** can lead to a higher susceptibility to diseases which in the long term results in decreasing populations and/or their migration to other areas.



This Atlantic spotted dolphin probably was hit by a propeller.

In 1996 the Canaries' government passed a number of laws to regulate whale watching activities. Since then, a minimum distance of 60 metres from the cetaceans has to be maintained and you can only approach them from behind and at a certain angle giving sufficient space to the animals. The complete **regulations** are displayed in the exhibition. However, up to now, an effective control of compliance to these regulations is scarce.

Generally, the golden rules of whale watching – independent from all binding or non-binding regulations – are:

- We humans are guests at sea and should behave accordingly.
- The cetaceans should determine shape and intensity of the encounters

Creating **wrong expectations** can also be harmful to the cetaceans. For example many operators attract their clients with statements like a "sighting guaranteed". This leads to increased expectations by the tourists and creates **pressure on the operator** to fulfil those expectations, which in turn can lead to inappropriate behaviour like the non-compliance to rules and regulations, etc.



Two pilot whales being observed.

M.E.E.R. is co-operating with tour operators that are dedicated to fulfilling these rules. That is why such trips where tourism is combined with scientific research and public education are an example of **ecological whale watching**. Because of this approach, the project M.E.E.R. La Gomera was awarded the **international environmental award Tourismus & Umwelt** in 2001.



The international environmental award granted to M.E.E.R. in 2001.



This flag identifies licenced whale watching operators in the Canary Islands.

How do I recognise ecological whale watching operators?

You can identify ecological whale watching against unsustainable cetacean observation by asking yourself the following questions.

- How many boats operate in the same area? Can you assess the "pressure" on the animals?
- Is there a strong competition between operators? What kind of marketing strategy and advertising is displayed?
- Do operators care about possible disturbances to the animals? Is there a code of conduct?
- Does the operator have a licence? Do they know the regulations, if they exist?
In the Canaries: Does the boat carry the yellow flag saying „Barco Azul/Blue Boat“?
- Is detailed information displayed or offered?
- Does the operator incorporate scientific research?
- Does the operator support conservation organisations or is he supported?
- If you witness insensitive conduct or a breach of regulations: talk to those in charge and tell them of your concerns.

A bottlenose dolphin got caught in a plastic bag off La Gomera.

Although today we know that dolphins and whales are highly developed, social animals which behave peacefully towards humans, our behaviour towards them is most inappropriate. With our lifestyle (especially in the affluent countries) we put the seas under pressure and cause damage which cannot easily be reversed.

Overfishing

Many fish species and other marine life formerly considered inexhaustible have now become rarities. Cod and lobster, once a cheap meal for people, are now served as specialties. This is mainly caused by **unrestricted global fishing**, first of all industrial high seas fisheries. About three quarters of the global stocks of commercially fished species are either **fully exploited**, overfished or already broke down. Also, 90% of high sea predators (sharks, marlins, etc.) have disappeared from our oceans.

The stocks around the Canary Islands are no exception. However the massively intensified **fish farming** which thrives on some of the islands is no solution, because on average you need several kilograms of wild fish as a food source for every kilogram of farmed fish (in tuna this amounts to up to 20 kg!). Although more and more soy is used for the production of farming food and the quantity of applied antibiotics is decreasing, the negative impact on the natural environment through aquaculture is still too high.

To avoid an impending breakdown, a drastical shortening of fisheries subsidies, the reduction of fishing fleets and quota as well as a **change of consumer behaviour** is urgently needed.



Farmed fish being „harvested“.

Advice for an ecologically orientated consumption of sea food can be found in chapter 9.

Bycatch & direct hunt

Every year more than **300,000 dolphins and whales** (and the same number of seals plus a million seabird) die, because they are “accidentally” caught in nets or lines. Many die a painful death or will be – heavily injured – thrown back into the sea. Hardly any other human behaviour is less respectful towards sentient beings and their habitat. In the Canaries, cetaceans or sea turtles are accidentally caught regularly, too. Already there are other solutions at hand: “intelligent” nets, displacing devices and flaws in fishing gear could stop or reduce the senseless die-off. But there is not enough political will to push through such unpopular and “un-economic” measures.

Additionally, whales are **hunted in many countries**. Not only by the Japanese for so called “scientific reasons”, but also for economic purposes. Thousands of dolphins are slaughtered, either because they are said to reduce fish stocks or because their meat is eaten or simply used as bait.



Two turtles got entangled in a discarded fishing net.

Pollution

The seas have become more and more polluted with **toxic chemicals** and other baneful substances. Persistent organic pollutants from industry, **waste water** of uncountable cities as well as oil and an ever increasing amount of solid waste (mostly plastics, fishing nets, etc.) literally turn the seas into waste disposals. **Heavy metals** exceedingly concentrate in the bodies of the long-lived whales and dolphins and affect their immune system. Often a stranded whale after death has to be disposed of as “hazardous waste”! **Plastic bags** can be swallowed and lead to suffocation or ileus, oil slick destroys the cetaceans’ environment and oil vapour harms their respiratory tract. The plastic products we carelessly consume every day end up in the food chain as so called **microplastics**: due to weathering and degradation microscopical particles are formed which then are ingested by many organisms with their food.

In the Canary Islands, the runoff from **banana plantations** is especially problematic, because it is heavily contaminated with fertilisers and pesticides. And of course there are also the considerable quantities of domestic litter which we encounter at sea. Rethinking is urgently needed within the industry, and also within each one of us.



High speed ferry in the Canaries. In the foreground, a dolphin is leaping.

Ocean noise

Jacques Cousteau once called the oceans a “silent world”, but this has changed dramatically. Within the past decades **ambient noise** in the ocean has, on average, **doubled every ten years**. This is primarily caused by the booming shipping industry, seismic surveys and the exploration for oil and gas. Another threat is **military sonars**, louder than anything else, with a deadly impact on certain whale species. In the Canaries, several cetacean mass strandings were attributed to the use of such sonar systems. Meanwhile the Canarian government has **prohibited** these types of manoeuvres within the archipelago.

The turning of whole coastlines into tourist complexes and the general economic development also come with destruction of valuable living space and acoustically affect cetaceans, just as the increase of marine leisure traffic, and a profit-oriented whale watching industry.

Because cetaceans predominantly find their ways acoustically, their communication and orientation can be affected or their hearing will be damaged. There is evidence that whales react to ships many kilometres away. As of today there are **no international regulations** restricting the intensity of sound in the sea. Here, action is required by the politicians.

Vessel-whale collisions

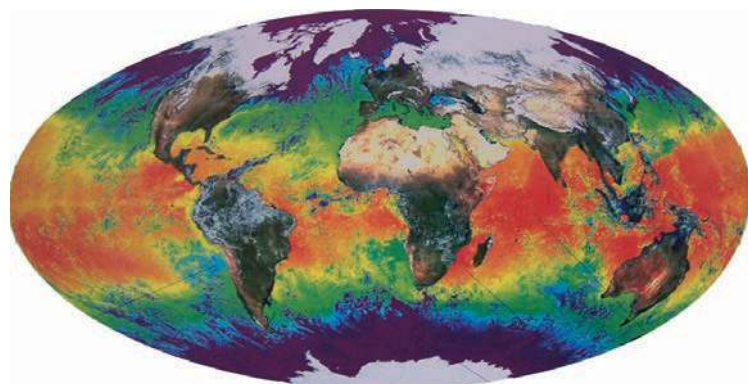
Collisions between ships and cetaceans are a growing concern world wide, and especially in the Canary Islands. Every year whales which were hit by a vessel are found on the coasts of the Canaries. Regularly sperm whales are found, cut in half or missing large parts of their bodies – a fact attributed to the large



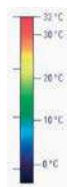
This young sperm whale was found on Tenerife. Almost half of it is missing.

high speed ferries. Also, a growing number of dolphins encountered off La Gomera show cuts and scars which probably have been caused by boat propellers.

Dozens of strandings have been reported as resulting from ship strike in the Canaries, and every year more add to the list. Hardly anywhere on the globe as many whales are hit by vessels! The species mainly affected is the **sperm whale**. Most whales come ashore on Tenerife, where high-speed ferries operate most frequently. Concerning this issue, the Canaries have become a major focus internationally. *M.E.E.R.* has for a long time demanded the introduction of **speed restrictions** and specialised on-board observers in waters highly populated by cetaceans. Where no demonstrably **effective measures** are taken to mitigate collision risk, high speed vessels should be kept out of especially vulnerable habitats.



Sea surface temperatures in the oceans.



Copyright:
NASA/SeaWiFS

Climate change

No other problem affects the oceans more profoundly, and at the same time is less predictable, than climate change. Already today we have to deal with its effects. **Rising temperatures** change distribution patterns of species; some spread out and others recede. The water temperature in the Canarian archipelago rose about 0.8°C during the past ten years. Marine productivity is affected, current systems may change. Higher carbon dioxide values in the atmosphere lead to **acidification of the sea water**, harming organisms using calcium carbonate to build up their shells (plancton, corals, snails, mussels, etc.). Higher UV-A/UV-B radiation caused by the ozone

hole disturbs the life cycle of micrororganisms with **unforeseen consequences** for the whole food chain which is based on them. In this way the biological diversity can decrease, which in turn relates to dolphins and whales. Rising water temperatures can also have a direct influence on their prey species. The sensitive equilibrium is disrupted slowly but steadily. Up to now the oceans can still buffer a lot of the global changes – but how long will they withstand the ever increasing pressure?



Malnutrition can be identified in this bottlenose dolphin: the ribs are visible.



Orcas at Loro Parque on Tenerife.

Dolphins in captivity

Dolphins swim fast, dive deep and travel substantial distances every day, i.e. **dolphins need space**. A dolphinarium, independent of its size, will never be able to meet requirements of animals designed for the open seas over millions of years of evolution. In captivity, dolphins are missing the most basic traits like natural salt water, currents, live food, a diverse environment and the natural rhythms of the tides. Most importantly, the animal's social group is practically non-existent. This is not animal welfare!

Most dolphins kept in dolphinariums today were **caught from the wild**. If these animals survive the extremely stressful moments of being caught, the transportation and acclimatisation to a new and sterile environment, they will, most of all, miss the conspecifics of their group or family. Neither their trainer's care and sympathy nor anything else can replace the original **social context** of a wild creature. Accordingly, life expectancy of dolphins in captivity is greatly reduced compared to their natural habitat.

Keeping dolphins in tanks **disrespects their dignity**. Dolphinariums are economic businesses with the aim of maximising profit. Often, the educational value for the visitors is overestimated. The lack of space in the tanks doesn't enable them to behave naturally. The trained performances do not represent what these animals are really like. Nowadays, we are taught to be aware of the **interdependence** of our natural environment. Therefore, we should cease to present animals, pulled out of their natural context, to entertain the public.

4 M.E.E.R. STUDIES – Insight leading to conservation

18 / 19



With modern equipment dolphin and whale sounds are recorded.

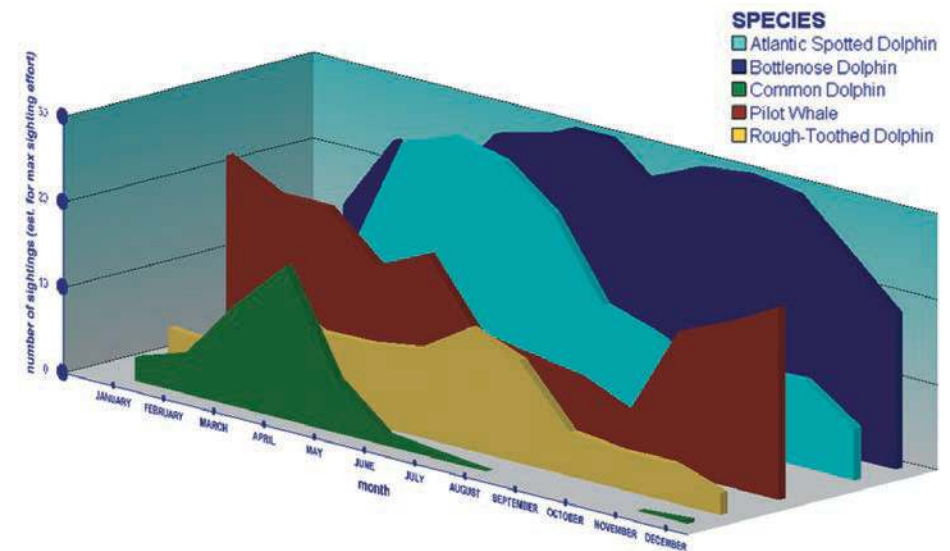


Mammals Encounters Education Research

M.E.E.R. e.V. was founded in 1998 and sees its primary purpose in **scientifically investigating** dolphins and whales. Our findings shall serve as the **basis for action** for decision makers and thus encourage and advance the conservation of cetaceans off La Gomera. The association developed from a pioneer study by Fabian Ritter, now president of M.E.E.R. What began as a diploma study has become an internationally prestigious research project which combines scientific investigation with tourism in an exemplary way. Through continuous and **mostly voluntary work** the association made La Gomera's waters – concerning abundance and distribution of cetaceans – one of the best studied areas in the Canaries and in Europe.

Sighting data

Since 1995 **sightings of dolphins and whales** are documented throughout the year during regular whale watching trips. Date, time of day and geographical position are noted down, the species is identified and the group size is estimated. Additionally, the presence of calves and/or juveniles is recorded. With this simple but highly effective method we were able to detect a high diversity of species off La Gomera. With **thousands of sightings** in our data base we can draw exact conclusions about abundance and distribution of the species and about when they predominantly give birth to their young. Some of the main findings are presented in chapters 6 to 8.



Seasonal abundance of cetacean species off La Gomera (1995-2007).



Observations of dolphins and whales can also be conducted from land.

The research rests on several pillars:

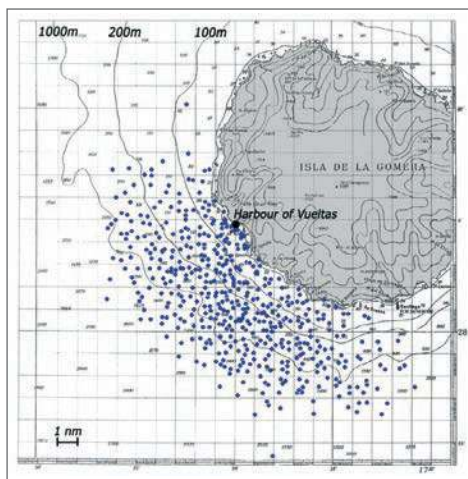
- Continuous collection of sighting data
- Behavioural observations and
- Co-operation with organisations and institutes

Behavioural observations

Through dedicated behavioural observations we capture the type and nature of interactions between the cetaceans and whale watching boats. Thus we can determine their responsiveness towards “visits by humans” and characterise the different species. Therefore, these findings enable us to design rules on how whale watchers should deal with the different species’ temper and thus disturb them as little as possible. In 2003, we published a **detailed research report** laying down scientifically based rules for the Canaries. Our research is designed to enable us to learn how to adapt **our** behaviour to the animals’ – and not vice versa.

Co-operations

We are coordinating our efforts with several **organisations and research institutions**. For example, we have co-operated with the following universities: Berlin (Humboldt Universität and Freie Universität), Universidad de La Laguna (Tenerife), University of Marburg, Universities of Vienna and of Salzburg (Austria) and the University of Trier. We also have a relationship with the School for Applied Science Eberswalde with its faculty “Sustainable Tourism” and the organisation *Canarias Conservacion* (Tenerife).



Distribution map of bottlenose dolphins off La Gomera.

Recording of sighting data.



Photo-ID image of a rough-toothed dolphin.

Several **masters’ theses** have evolved from this collaboration. Furthermore, we routinely publish our results in scientific journals and present them at **international conferences**, symposia, scientific workshops, etc. Marine biologist and co-founder of M.E.E.R., Fabian Ritter, has been a member of the German delegation to the Scientific Committee at the *International Whaling Commission (IWC)* since 2003.

M.E.E.R. is also a member of several international **research societies** (e.g. the *European Cetacean Society* and the *Sociedad Española de Cetaceos*) and conservation alliances, e.g. the *Global Campaign Against Whaling* and the *Deepsea Conservation Coalition*.

Other studies

There are many more studies which we have either conducted or hosted. These include the first **landbased observations** of cetaceans from La Gomera’s coast and several surveys with tourists on La Gomera and Tenerife as well as a study on the effect of whale watching trips on the environmental awareness of the participants.

With multiple species we apply the **photo-identification** (photo-ID) method, i.e. animals will be photographed and identified individually through the recognition of natural markings like the shape of the fin, pigmentation patterns, etc. In this relation a photo-ID study on rough-toothed dolphins hosted by M.E.E.R. has to be mentioned. Here we could substantiate the hypotheses that there is a resident population, and first insights into the social life of this species could be gathered. This was the first study of this kind in the world.

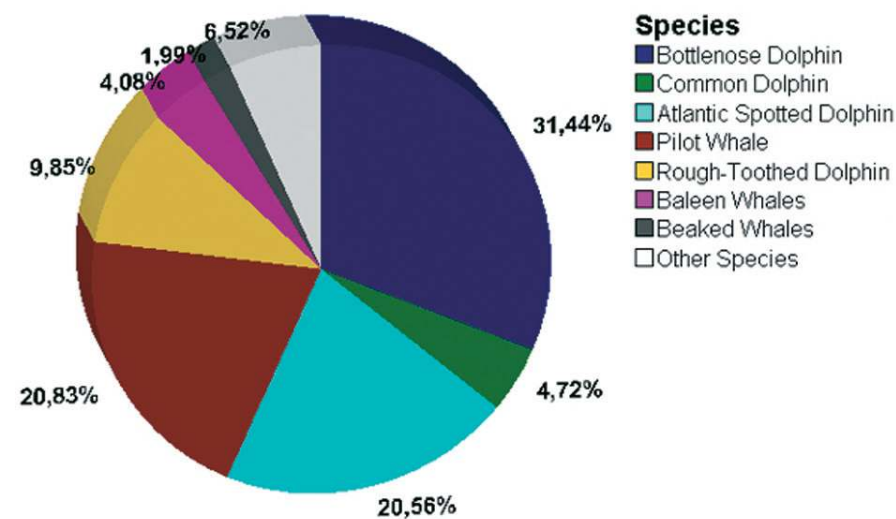
Finally, we are involved in the field of **ship strikes**, which is an especially sensitive issue in the Canaries. We have presented several studies during the past years, partly in co-operation with Canarian scientists. In this context Fabian Ritter is the German representative at the *International Whaling Commission’s Ship Strike Working Group*.



A spotted dolphin leaping hilariously.

Until 2008, **28 dolphin and whale species** have been recorded for the Canary Islands, this represents around one third of all known cetaceans. If we only consider those species actually distributed in the Northeast Atlantic Ocean, the Canaries' species stand for impressing two thirds of them. At least five species are known to permanently inhabit the archipelago. Some species are regularly seen or come here seasonally; still others appear as irregular "guests".

Especially **during springtime** there are enormous aggregations of different dolphin and whale species. Their observed behaviours and the continuous presence of **juveniles and calves** tell us that this area is an important feeding and breeding ground. The archipelago constitutes a very suitable habitat especially for toothed whales. To explain the high abundance of dolphins and whales in the Canary waters we have to look at the large interrelations beyond the archipelago's boundaries.

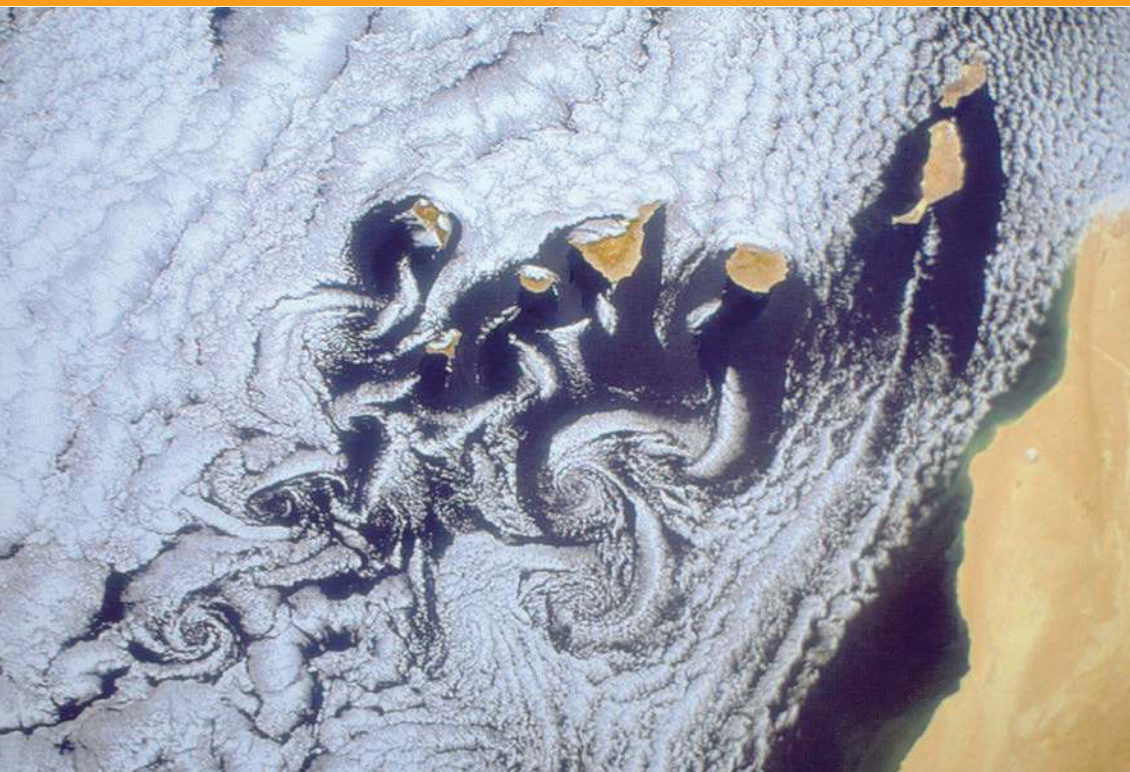


Relative abundance of cetaceans off La Gomera (1995-2007).

5 THE CANARY ISLANDS –

A dynamic habitat for dolphins and whales

24 / 25



Such patterns of currents (uncovered by clouds on this image) also can be seen in the sea. Copyright: NASA/Seawifs.

Ecosystemic context

The Canary Islands are influenced by the **North Atlantic current system**, the best known section of which is the Gulf Stream. A branch of this current turns south roughly at the height of the Azores and is called the **Canaries Current**. Through the constantly blowing northeastern trade winds it persists as a stable oceanographic phenomenon. Its relatively cool water masses follow the same direction from Northeast to Southwest and they are comparably rich in oxygen and nutrients. Together with the intense radiation from the sun, this supports the pri-

mary production of algae, which in turn are the food basis for all other organisms. This holds true especially for the eastern Canary Islands, because on their way through the archipelago nutrients will be degraded and thus relatively little reaches the western islands.

The **currents vary** in their strength seasonally and also from one year to the other. If the trade winds blow with less intensity, warmer nutrient poor waters will be brought from southwesterly regions.

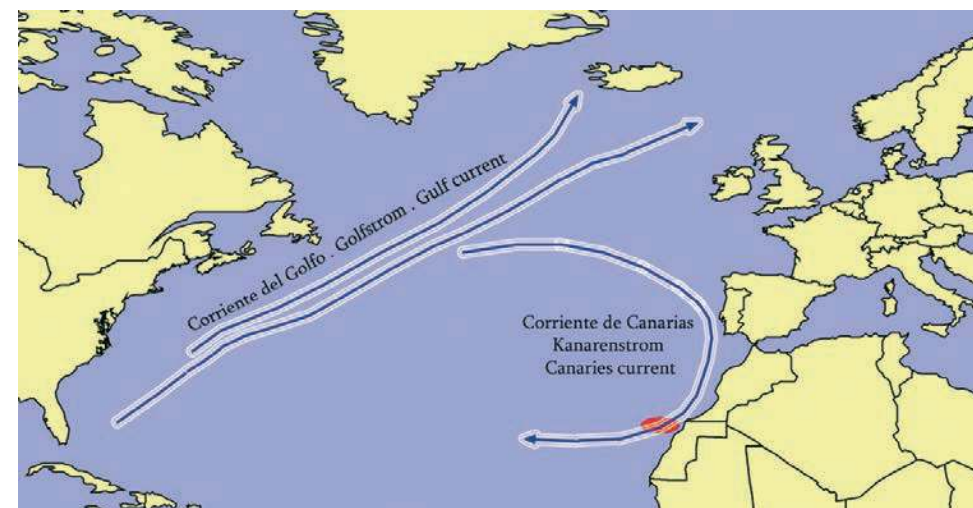
Local peculiarities

In general, Canary waters have to be called nutrient poor. But when the water masses pass the islands, eddies are created on their lee sides. These **eddies transport water from the depth** to the surface and thereby locally increase the level of nutrients and plancton. Higher quantities of plancton attract plancton-feeding organisms (like copepods and small fish), which in turn are consumed by larger fish, and so forth. At the end of this (food) chain we find tuna, sharks, dolphins, whales, etc. – and humans.

The areas on the **lee sides of the islands** are important for the high species abundance yet in another respect. Here, the waters are calm enough for whales to rest on their migrations or simply breathe with more ease. For newborns, this can play a particularly critical role.

The **local dynamics** around the islands in this way create special conditions attracting dolphins and whales. A similar situation can be reported from other areas. The Azores, the Hawaiian Islands, Cape Verde and the Galapagos Islands – each one a high seas archipelago – are inhabited by a high cetacean species diversity, too.

Ocean currents in the North Atlantic Ocean (schematic). Map: Volker Böhlke.



5 THE CANARY ISLANDS –

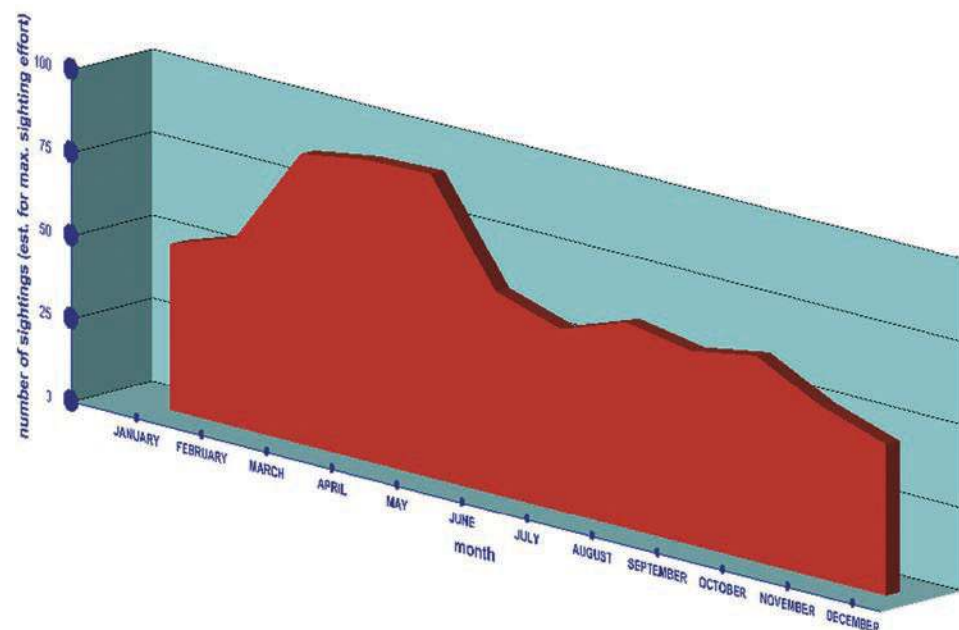
A dynamic habitat for dolphins and whales

26 / 27

Habitat selection primarily is driven by the presence of **food resources** and suitable conditions for **rearing offspring** – both of which appears to be the case in the Canaries. As an example, the underwater canyon between the islands of La Gomera and Tenerife is an important habitat for certain squid species, the main prey of pilot whales. At the same location, the whales find calm waters almost throughout the year where they can rest and care for their young. For these reasons the waters southwest of Tenerife are the core habitat for pilot whales. To the contrary, striped dolphins predominantly hunt at night time and prefer schooling species (like lantern fish) which they pursue at night when the fish

come closer to the surface. Atlantic spotted dolphins prey on other fish species near the surface, while rough-toothed as well as bottlenose dolphins hunt flying fish, etc. In this way, the habitat is **shared by many cetaceans** without much competition.

Most species give birth to and rear their young within the archipelago. Very regularly you can observe adult dolphins together with juveniles or calves and newborns, the latter still being suckled. The large baleen whales, although mostly staying for short periods of time, often are accompanied by offspring, too. This raises the significance of the living space for cetaceans even more.



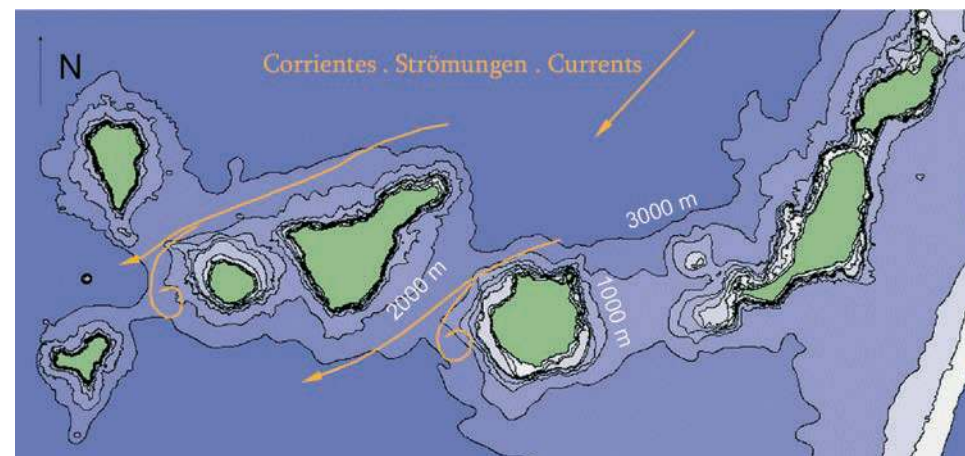
Seasonal abundance of cetacean sightings off La Gomera (1995-2007).



A rainbow is created from a pilot whale's breath.

As far as we know, the **species composition** of the cetacean fauna is similar within the whole archipelago. However, in the East of the islands largely species from temperate waters are found, while in the West and southwest of the islands tropical species are more common. Around individual islands certain species are seen with greater regularity, as for example Risso's dolphins in the North of Gran Canaria, rough-toothed dolphins south of La Gomera, sperm whales in the area between Tenerife and Gran Canaria or beaked whales off El Hierro.

In summary, the Canary archipelago represents **one of the most valuable and species diverse habitats for cetaceans** in Europe. In fact, there are only very few areas of the same size where one can find a comparably diverse cetacean fauna on our globe. Hence, cetaceans also are a most significant natural richness of the Canaries.



Currents in the Canary Islands (schematic). Map: Volker Böhlke



A Bryde's whale and an Atlantic spotted dolphin.

Comparing the Canary Islands with each other, La Gomera holds a special position: **21 species** were documented here, more than around most other islands. Related to the size of the study area, the waters south and southwest to the island are the **most cetacean species diverse habitat in Europe**.

The five most abundant species off La Gomera are the bottlenose dolphin, the short-finned pilot whale, the Atlantic spotted dolphin, the rough-toothed dolphin and the short-beaked common dolphin. Because as a whale watcher you most likely will encounter one of them, they shall be presented here in more detail.

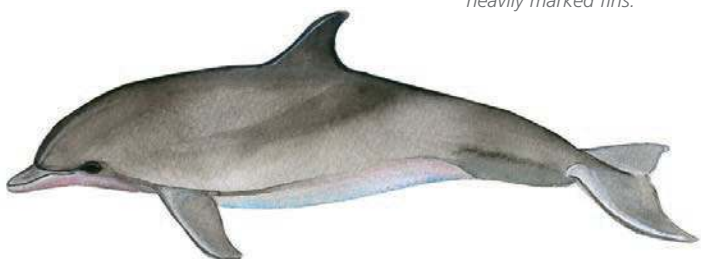
Bottlenose dolphin

(*Tursiops truncatus*)

Almost everyone knows this dolphin, because „Flipper“ was a bottlenose. Up to **3.5 metres** long and weighing up to **500-600 kg** this is one of the largest members of the dolphin family. The colouration is almost uniformly grey with a white or rose belly. The beak is short and stubby and is separated from the melon by a clearly visible crest. The fin is sickle-shaped and in males often carries many scars, scratches and notches.



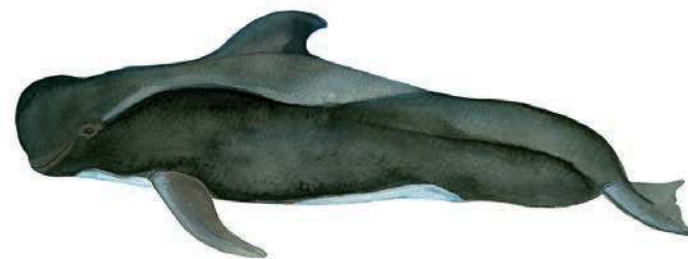
Male bottlenose dolphins often have heavily marked fins.



A group of bottlenose dolphins.

The bottlenose dolphin is the only species **regularly encountered along the coastline**, commonly they can be seen from the shore. But this species is at home at the high seas, too, where it frequently is encountered together with pilot whales. Bottlenose dolphin groups typically comprise around **10-20 animals**. They can swim fast and leap enormously high. At times, they playfully ride in the bow wave of vessels; in other situations they can be wary and shy – especially during foraging and feeding behaviours.

There are defined (sub-) **populations** off Tenerife, La Gomera, Gran Canaria and Fuerteventura. Some groups also wander from one island to the other.



Short-finned pilot whale

(*Globicephala macrorhynchus*)

Although called “whales”, pilot whales belong to the larger dolphins, similar to their close relative, the orca. Pilot whales are black and have a **grey saddle patch** behind the dorsal fin. The head is roundly shaped by a large melon, which sometimes protrudes more than the very short beak. Adult males reach **5.5 metres** in length and thus are considerably larger than females (growing up to 4.5 m). They stand out by their **large fin**, which generally has a broad base and is positioned relatively far to the front. They live in families where the offspring stays together with their mother for a lifetime - which may last up to 70 years! These stable **family groups** mostly consist of **around 15 animals** and almost always comprise several generations.

Pilot whales often stay in areas with a water depth of **ca. 1,000 m**. Thus, the according depth line on a sea chart is a good orientation to find pilot whales. But you also may encounter them between the islands at greater distances to the coast. They principally behave tranquilly and swim slowly. Their behaviour towards boats is quite indifferent. Although they rarely interact much, pilot whales can be easily approached.



Left: The male's fin is big and has a broad base.

Right: Pilot whales often float on the surface for minutes.



Atlantic spotted dolphin

(*Stenella frontalis*)

Spotted dolphins are **small and very agile** animals. They grow up to **2.2 m** and have a sleek body. Their colour is light or dark grey and has an (unconspicuous) flame pattern stretching from the head to the fin. Adults are easily recognisable through the **many spots** on their body. This pigmentation is the stronger the older the animals become. Calves and juveniles usually don't have spots. Younger animals are also lighter than adults. Their belly is white or rose and the beak is comparably long and slim. In adults, its tip can be white. The clearly falcate fin can carry nicks and notches.

Atlantic spotted dolphins live **on the high seas**, but off La Gomera also can be encountered relatively close to the coast, though only very rarely along the shore. They typically travel in schools of some **40-50 dolphins**, and sometimes in groups of several hundreds. They are inquisitive and playful and can perform acrobatic leaps. They are the favourite species of many whale watchers, because they regularly – and at times persistently – **interact with vessels**.



Left: Fin of a spotted dolphin.
Right: Sprinting spotted dolphins.



Above: A young rough-toothed dolphin performing a back somersault.

Left: Rough-toothed dolphins swimming in a tight formation.

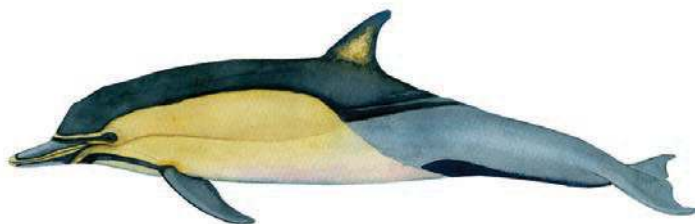


Rough-toothed dolphin

(*Steno bredanensis*)

This species, restricted to tropical and subtropical waters, is **relatively unknown**. They are up to 3 metres long, dark grey and have a conspicuous mottled pigmentation on their back and the flanks. The most obvious identification feature is the „flat forehead“ with a beak merging into the melon without interruption. The fin can be triangular (‐shark like‐), but is variable. Some individuals show an indistinct hump at the leading edge of the fin. The belly is light and may be mottled with white or rose spots

Rough-toothed dolphins are the only species besides the bottlenose dolphin that can be seen swimming **along the coastline**. However, they are much rarer. Mostly they are observed at around 1-3 nautical miles off the coast in waters some hundreds of metres deep. Their groups of typically **5-15 animals** can be widely dispersed. Regularly they are composed of **tight subgroups** where individuals swim together very closely and **completely synchronous**. Rough-toothed dolphins are comparably shy and more difficult to observe, but sometimes also furiously leap several times in a row.



Short-beaked common dolphin

(*Delphinus delphis*)

Common dolphins grow up to **2-2.5 metres** and from a distance appear dark. Only when you are close you can recognize their beautiful colouration on their flanks. An **hour-glass shaped pattern** has a yellowish-ocre front part and a grey rear part. Below the fin this pattern shapes a dark „V“. The belly is white, fin and flippers can be light. Particularly the **light patches** on the fin can make an identification easy. The eyes are shaded; the caudal peduncle mostly is grey.

Common dolphins prefer Canary waters **only from late winter until early summer**. It is not exactly known where they move during the rest of the year. These dolphins mostly are met at greater depths far offshore, however at times they can be encountered within two nautical miles from land.

Common dolphins often are inquisitive and accompany boats while riding their bow. Usually, their groups include **20-40 individuals**, but can be much bigger. They hunt co-operatively and in so doing surround fish schools, what is termed *carousel feeding* by biologists.



Dolphins touch each other frequently and willingly.

Breaching common dolphin.



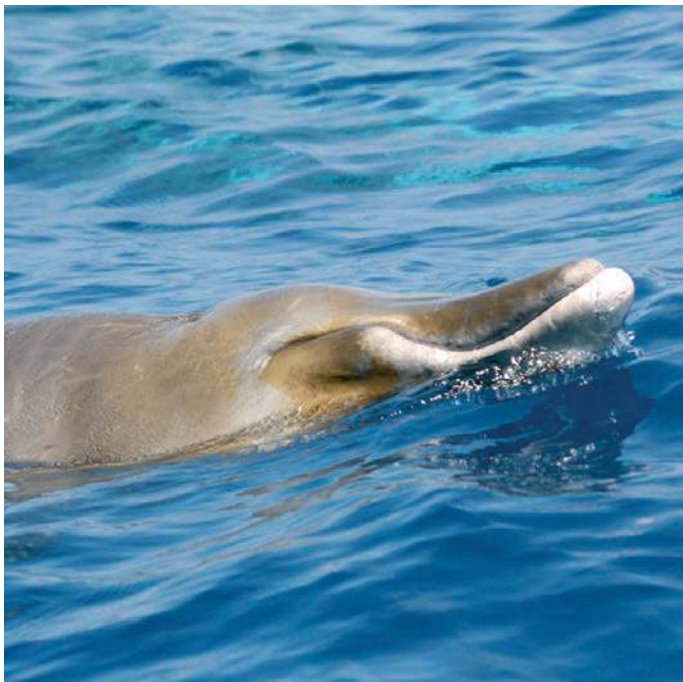
Head of a Bryde's whale.

Large whales

While you will mostly encounter dolphins and other small odontocetes in the Canaries, baleen whales like blue, fin or sei whales are **rarer guests**. Most baleen whales roam through these waters in springtime and autumn during their seasonal migrations. He who once saw a blue whale off La Gomera is extremely lucky, as this has happened only three times until 2008.

However, in certain years conditions become so favourable that e.g. **Bryde's whales**, having a more tropical distribution and not carrying out regular migrations, temporarily settle down here. One of these so called **whale years** was 2005, when from March until November you could encounter Bryde's whales on an almost daily basis off La Gomera and around other Canary Islands.

Another claim to fame within the large whales is the **sperm whale**, which is resident in Canary waters. Their habitat centres between the North of Tenerife and Gran Canaria; at times they **also range the waters of other islands** such as La Gomera. Encountering them belongs to the top whale watching highlights.



The arched lower jaw of this Blainville's beaked whales ist clearly visible.

Beaked whales

The beaked whale family (Ziphiidae) includes approximately 20 species, three of which have been sighted off La Gomera so far. Regularly seen is the **Blainville's beaked whale**, followed by the slightly larger **Cuvier's beaked whale**. Only very rarely the Northern bottlenose whale is seen.

Beaked whales are medium sized toothed whales not easy to observe. Sightings usually are short, because the whales **typically are very shy**. However, sometimes we could observe some very interesting behavioural pattern. Beaked whales like sperm whales belong to those species that can dive very deep (up to 1,500 Meter) and very long (up to 1.5 hours). They almost exclusively feed on squid.

Other species

Besides other cetaceans like striped dolphins, Risso's dolphins, pygmy sperm whales or orcas, which appear only infrequently, these waters also constitute a habitat for other marine species. This includes **seabirds** like Cory's shearwaters, gulls, terns or ospreys. Moreover, in open waters you can regularly encounter **tuna, marlins and sharks**. Finally, encountering **marine turtles** (three species have been seen so far) is another highlight on the excursions.



Cory's shearwaters are elegant sailors.



Loggerhead Turtle with fish shoal.



Portuguese Man-o-War. It's tentacles are extremely poisonous!



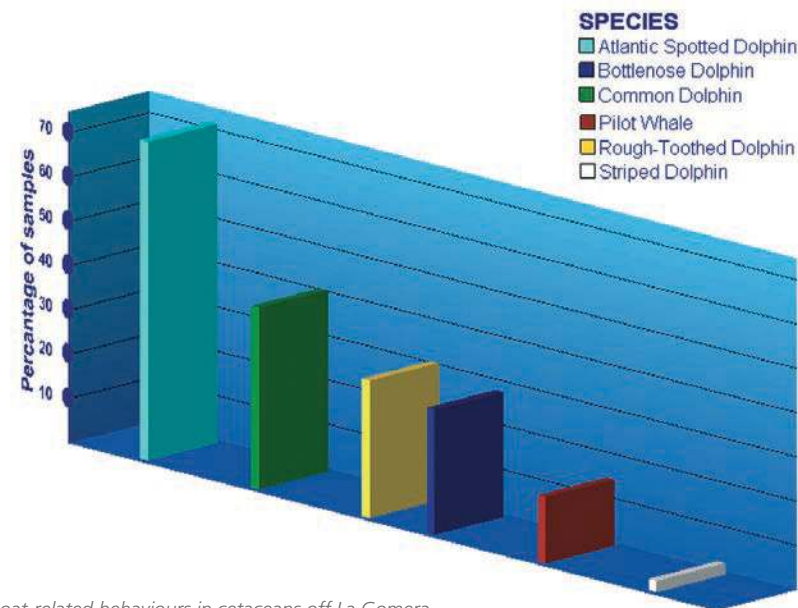
Common dolphins „on the bow“.

M.E.E.R. e.V. primarily is a research institution to scientifically investigate dolphins and whales. Here we present some of our main findings from over ten years of study.

With our **behavioural observations** we want to find out in which way diverse cetacean species react to whale watching vessels. Because they respond differently to the presence of boats, each species appears to have its own character. We have developed a special method to quantify interactions or **boat-related behaviours**. Thus we found that the probability of boat-related behaviours both differs significantly **between** species and also **within** a species in accordance to the actual behavioural state. Our findings allow the development of specific rules

which respect the peculiarity of a species. In this way, the gained knowledge about which type of interaction can be expected in a given species can facilitate the adjustment of our behaviour towards the cetaceans’.

On this ethological basis we recommended the following **species-specific rules** for whale watching: in Atlantic spotted dolphins and bottlenose dolphins feeding and foraging behaviour turned out to be especially sensitive towards disturbances. If these behaviours are identified, their observation should be kept to a minimum of time. In rough-toothed dolphins a sensitive conduct will lead to the animals behaving less warily. Moreover, resting pilot whales should be observed only for limited periods of time.



Frequency of boat-related behaviours in cetaceans off La Gomera.



This dolphin mother carried a dead newborn calf for several days.



Blainville's beaked whales are shy animals and close-up observations are rare.

Our **behavioural studies** led to fundamental insight into the behaviour of some lesser known cetaceans. E.g., we were the first to describe the comportment of Blainville's beaked whales and have also documented the first official sighting of blue whales in the Canaries. In 2001, we were able to observe a rough-toothed dolphin mother carrying its dead newborn calf for a period of several days, a behaviour extremely rarely seen.

The method of **photo-identification** allows the recognition of individual animals. Thus we gain knowledge about groups which repeatedly stay off La Gomera or even show residency. For rough-toothed dolphins, in this way we could prove that there is a local population and La Gomera hence is one of their favourite living spaces. In other species like pilot whales and bottlenose dolphins we regularly recognise some „good old friends“, too.

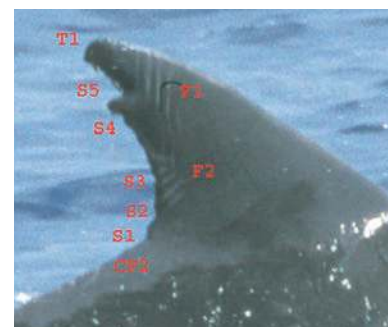


Photo-ID images of a rough-toothed dolphin.



Photo-ID images of a pilot whale.

The first **landbased observations of cetaceans** from La Gomera's coast demonstrated that it is possible to identify different species from a distance and also to study their interactions with boats. This investigation was a pilot study to be continued in the future.

Two of the **Master's theses** supervised by M.E.E.R. dealt with the application of Geographic Information Systems (**GIS**) to represent and analyse sighting data. For instance, the abundance of cetaceans was correlated with sea surface temperature and chlorophyll concentrations with the use of remotely sensed satellite data. In this way it was found that certain species favour distinct environmental conditions.



Photo-ID images of a spotted dolphin.

Other studies hosted by M.E.E.R. examined the environmental awareness of whale watchers. **Surveys** highlighted the importance to comply with the regulations and not to disturb the animals. Most participants also appraised the information offered together with the trips as an essential aspect of whale watching.

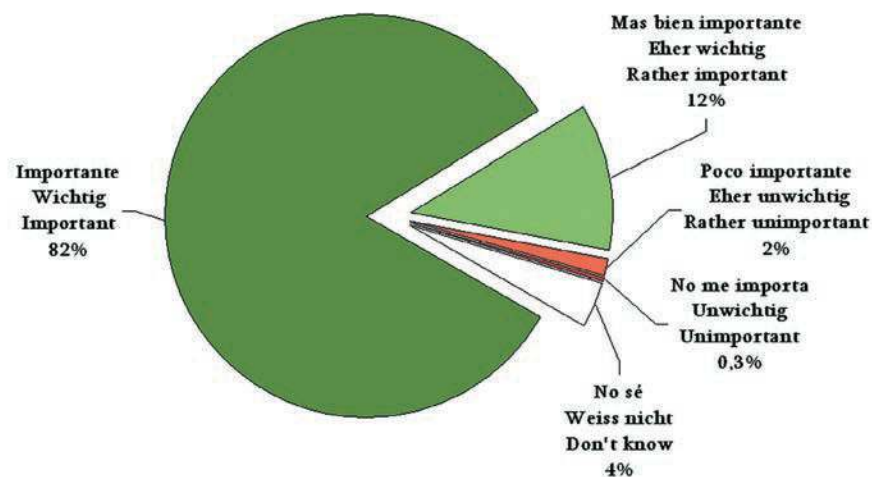
Our studies dealing with the **ship strike issue** attracted international attention. We were the first to quantify the inter-island ferry traffic and calculated that fast and high-speed ferries travel much more than one million kilometres between the islands every year. We uncovered a high collision risk for certain areas within the archipelago. In a study in collaboration with the local organisation *Canarias Conservacion* we provided evidence for the high number of collisions and its significant increase since the introduction of fast inter-island ferries in 1999.



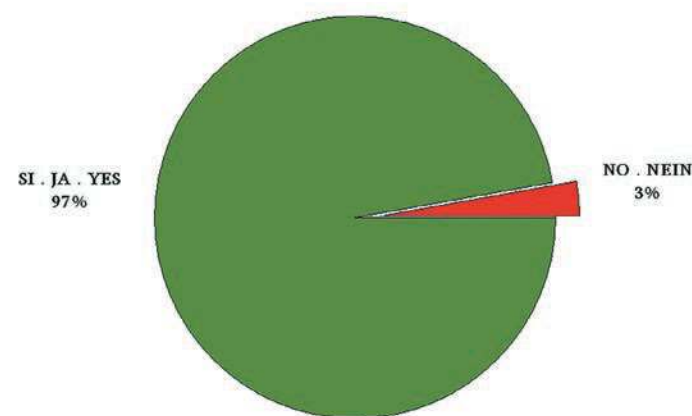
High speed ferry just off the coast of La Gomera.

Our studies identified an urgent need for action and at the same time recommended **specific measures** to mitigate collision risk in the archipelago, thus leading the way to possible solutions. This appears especially significant as our survey showed that most visitors do not necessarily acknowledge speedy travel. Most tourists were aware that fast ferries can harm marine mammals. A **large majority** would accept a slower speed if this lowered the risk to the animals.

How important do you think it is not to disturb the animals with the excursions?



Would you accept a slower travel if this would reduce the risk for the animals?

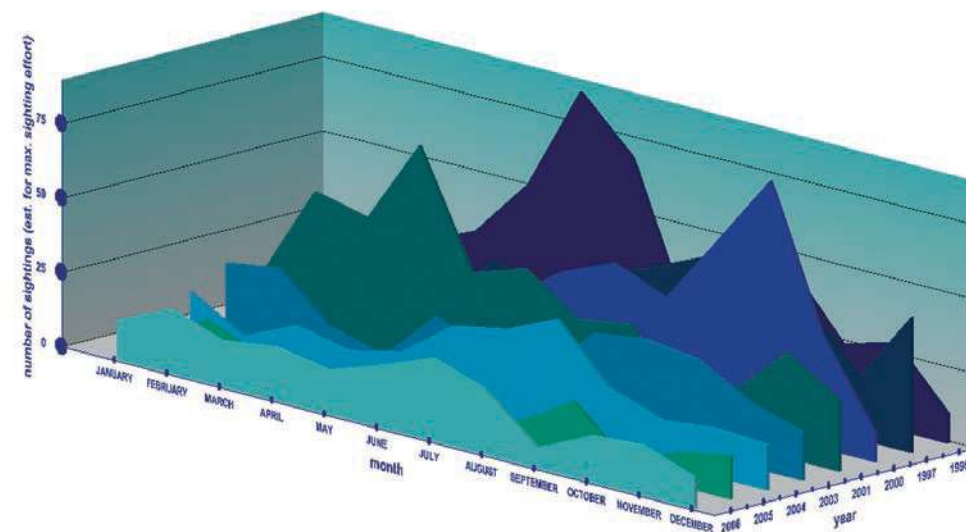


8 SPECIES DIVERSITY IN A CHANGING WORLD –

What will the future be like?

44 / 45

The continuous documentation of sightings for years allows us to monitor abundance and distribution of dolphins and whales off La Gomera over longer periods of time. In doing so, we could detect trends, which on the one hand shed light on the high dynamics of the marine environment, but on the other hand highlight probably problematic developments.



Frequency of bottlenose dolphin sightings off La Gomera per year.

Pilot whales find their prey only under certain ecological conditions.

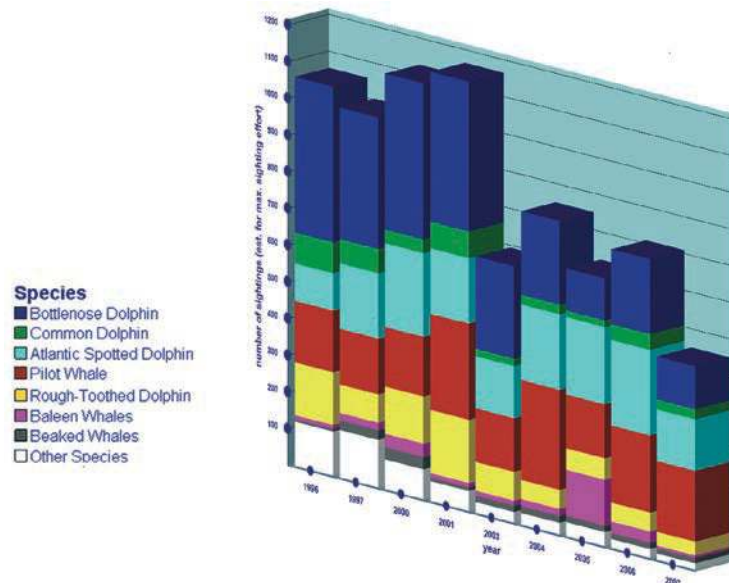
The distribution of **sightings within a year** is not uniform. In general, there is an increase in numbers of encounters during springtime and a secondary peak during autumn. This pattern also varies between years. As an example, the increase during springtime appears earlier in a given year (e.g. in March) or may be delayed. Moreover, the total number of sightings may differ from the general picture. For instance, in autumn 2000 even more sightings than during springtime were recorded.

Additionally the abundance of certain species may **differ from one year to the next**. There are (by us so called) „bottlenose dolphin years” and others where the same species is not as abundant. The same goes for other species, too. Exceptional in this context was the „whale year” 2005 when we most regularly encountered **Bryde’s whales** from March through November. Apparently a group of these baleen whales, otherwise rarely seen, temporarily chose the archipelago as their favourite habitat.

8 SPECIES DIVERSITY IN A CHANGING WORLD –

What will the future be like?

46 / 47



Sighting frequency of cetaceans off La Gomera per year: 1996-2007.

The sighting data **since 1995** also reveal some **long-term trends**. As an example, the overall statistical frequency of sightings decreased, which was especially obvious in bottlenose and rough-toothed dolphins. The reasons are not clear, but it is striking that this presumable worsening predominantly relates to the more coastal cetacean species. In other species like Atlantic spotted dolphins and pilot whales, however, numbers were stable or slightly on the rise. An increase of spotted dolphins' sightings, known to be relatively „interactive“, could thereby point to a potential habituation to the whale watching boats.

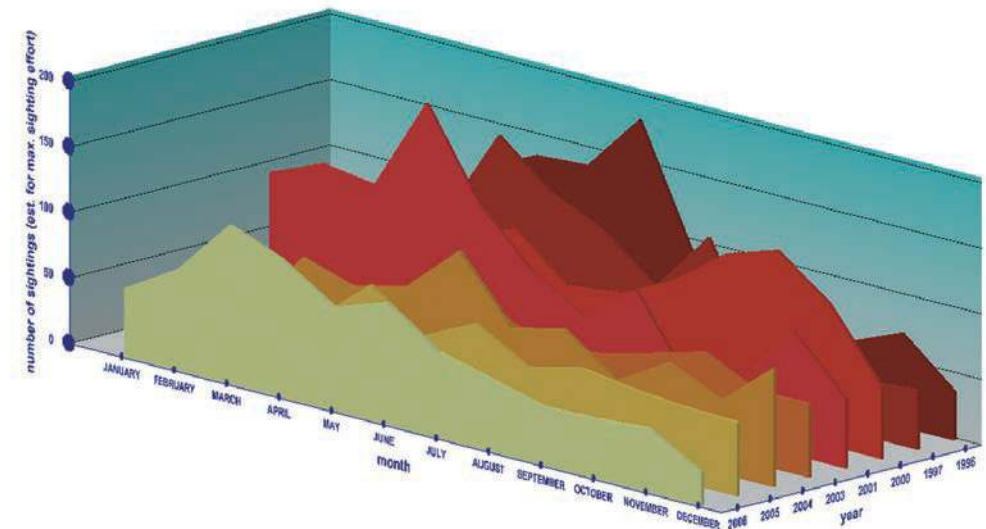
High dynamics are a core feature of marine ecosystems. Temperature, salinity and nutrient content are never the same and thus act upon the species composition of the plancton. Solar radiation, winds and currents influence the available oxygen in water and thus productivity – which in turn affects the abundance of fish and marine mammals. Dolphins and whales **react very sensitively** to such fluctuations and adapt their movements and migrations accordingly. Every fisherman on La Gomera knows about good and bad years for fisheries, too. Because different species (and the different levels of the food web alike) are closely interrelated, such oscillations to a certain degree are purely natural phenomena.



Bottlenose dolphins off Valle Gran Rey.

But this natural dynamics can be overlayed by **unnatural man-made influences**. For instance, an increase of construction activities on La Gomera's coast and intensified fisheries as well as fish farming can have a negative impact on dolphins and whales.

Pollution from waste water and litter, an increased collision risk with vessels, or increasing ocean noise from ships constrain the quality of natural habitats even more.



Seasonal abundance of cetacean sightings off La Gomera. (1995-2006).

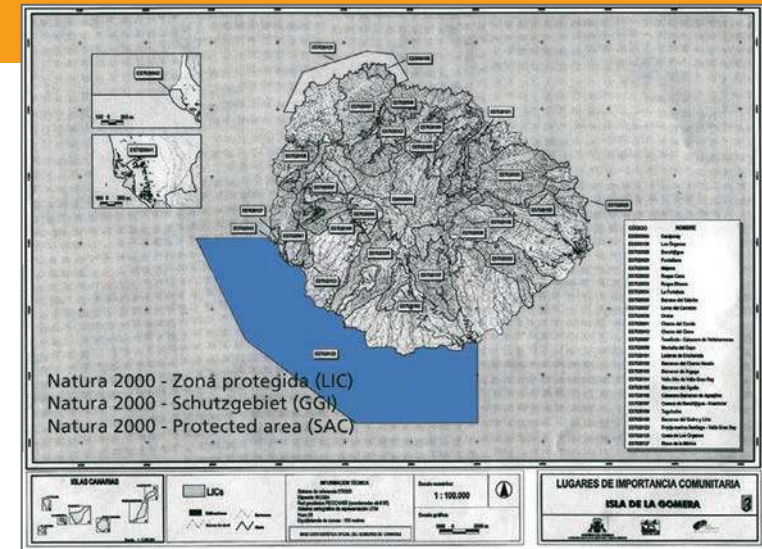
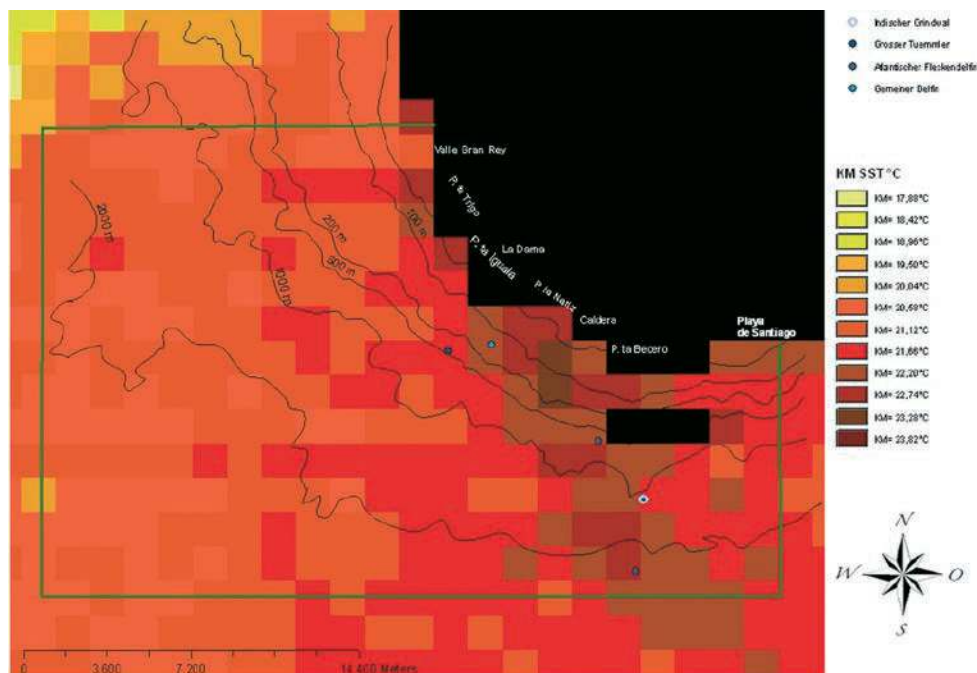
8 SPECIES DIVERSITY IN A CHANGING WORLD –

What will the future be like?

Climate change has become a major focus during the past years. Numerous studies show, in which way the greenhouse effect has an influence on marine environments. It is expected that the global **warming of the seas** has a considerable impact on the species composition (from plancton to fish and cetaceans, etc.) and distribution. Hence, we can assume that there will be changes for the marine mammals, too, possibly with dramatic consequences for the populations. However, direct evidence is hard

to achieve, because **long-term data** is needed from many years. Exactly this type of data has been collected through the continual work of *M.E.E.R.* since 1995. We are currently about to identify long term trends related to climate change. Because dolphins and whales are so called **indicator species** reflecting the status of ecosystems, you can draw conclusions related to the living space as a whole from such trends. Yet, if they already exist, it is extremely difficult to reverse those changes.

Depiction of sea surface temperatures off La Gomera using satellite data. Map: Nina Strüh.



Map of the protected area for loggerhead turtles and bottlenose dolphins off La Gomera. Map: Gobierno de Canarias.

To obtain ecological sustainability, the **precautionary principle** is essential. The dicta of this approach at the same time can enhance local economy on La Gomera: the conservation of natural resources through wise management, scientific research, public education and involvement of local communities pays off in the long term – ecologically as well as economically.



M.E.E.R. claims the necessity to apply a special conservation status to the waters off La Gomera due to their extraordinary cetacean diversity. Up to now, “only” the bottlenose dolphin and the loggerhead turtle are legally protected under the **EU-Habitat-Directive** (also known as „NATURA 2000“), but concrete measures to enforce this program are still due. A sustainable use and future protection of **the ecosystem as a whole including all species of dolphins and whales** are goals we will continue our scientific work for. On the basis of our current research results we already have elaborated a **model for a marine protected area (MPA)** which can lead the way for future developments (see next pages).

Loggerhead turtle

8 SPECIES DIVERSITY IN A CHANGING WORLD –

What will the future be like?

50 / 51



Whale watching boat „Ascensión del Señor“.

MODEL OF A MARINE PROTECTED AREA (MPA) FOR LA GOMERA

Numerous aspects underline the **need for protection** of La Gomera's waters: first of all the extraordinary species diversity, their significance for important life processes of cetaceans (e.g. as feeding and breeding grounds), their high benefit for local fisheries as well as the economic, recreational and scientific value – and not the least their nativeness.

An MPA would raise the public appraisal and the pride of the local people in recognising the **uniqueness of La Gomera's waters**. It would also contribute to the acceptance of whale watching as a sustainable use of cetaceans and as a worthy source of income. A protected area also is an instrument to harmonise different uses – such as fisheries, recreation and whale watching – without mutual encumbrance or even exclusion.

Should the proposed catalogue of measures (or parts thereof) be realised or the recommended marine protected area be implemented, this also would act as a **lucid signal** to the development of whale watching as a sustainable use of cetaceans – in the Canary Islands and elsewhere.



La Gomera

The following **proposals** are being made, related to different user groups:

- **Fishing rights** should lie exclusively in the hands of local fishermen.
- Big game fisheries and water-based fun-sports (like jetski, waterski, etc.) should be completely relegated from the protected area.
- When together with cetaceans, precedence should be given to **licensed whale watching** boats over private vessels. Highest priority should be given to vessels with researchers on board.
- The intensity of whale watching activities must be regulated. It is recommended to allow a **maximum of ten** licensed whale watching vessels operating within the MPA.
- Vessel design should reduce negative impacts as much as possible, e.g. via reduced **maximum speeds**, silent engines or propeller shrouding.
- Enforcement can be realised through the dispersion of boats by time scale and through a system of **land-based observation locations**, the latter also serving to spot cetaceans and communicate sightings to whale watching vessels.

It is strongly recommended to connect the issuing of licenses and permits to **qualitative features** of the whale watching trips,

- the obligation to present profound information before and during a trip
- the obligation to collect sighting data on a regular basis and
- to regularly reserve a place for researchers to facilitate the collection of scientific data.

Levies set aside as a fund for financing monitoring and enforcement should be included in the ticket price.

A **code of conduct** should be established incorporating **species-specific guidelines**. Finally, no vessel should exceed **15 knots** at any time within the MPA to effectively avoid collisions and reduce underwater noise.



Atlantic spotted dolphins riding on the bow wave.

9 WHAT CAN I DO?

Practical advice to protect our oceans

52 / 53



You can feel the power of the sea every day on La Gomera.

The oceans are in a bad state. Humans are interfering with ecological processes, the sensitive equilibrium is unhinged and whole species become eradicated. No one knows what the consequences will be like.

Should we therefore bury our head in the sand? Surely not! To the contrary, *M.E.E.R.* holds the view that **everyone can contribute to the protection of our seas**. It is not only “the politics” or “the industries” that have to take responsibility. Politicians represent their people – **us**. The industry relies on us to buy its products and make use of its services. In this way every one of us directly or indirectly contributes to each of the issues mentioned.

But if we all are a part of the problem, then we all can be part of the solution, too. This demands us to live regardfully and take responsible decisions. Thereby prioritising the seas – or nature in general – testifies true commitment. It first of all gives us the feeling **not to be indifferent any more**, but to take part in the creation of our common future.

Ocean conservation, applied in everyday life, expresses self-determination and our will to leave a liveable earth to our children. Our decision to make a change also signals to our fellow men:

We have a choice!

Here, you can find practical advice how to act personally as an ocean protector – each and every day!

As a tourist

Before starting a journey, inform yourself about the **environmental policy** of your destination country. E.g. you could choose not to travel to a country still hunting whales or dolphins. Which tour operator you select is also important. There are uncountable „alternative“ operators who for instance carry out an ecological balance sheet of your travel. Check if you could also use trains as means of transportation within the European continent instead of using a plane. If you travel by airplane, make sure that there will be an **emission balance**. If you plan to travel by ship, you should avoid fast or high speed vessels, jetfoils, etc. Choose **ecologically certified** hotels and accommodations. In principle, each of your requests can have an effect – at the travel agency, at the hotel, and so on.

At your destination, you should apply the same ecological standard like at home. This includes saving water and does not stop with waste prevention. If you want to observe whales, find out if there are legal **whale watching regulations** in the according state or country. How is whale watching conducted, as a racket or ecologically sensitive? While selecting a whale watching trip or operator, comply with the criteria for ecological whale watching given in chapter 2.

There is a certain **magic** in observing dolphins or whales. Only very rarely one can have such intense, sometimes even intimate encounters with wild animals. We recommend to use all your senses to engage in this experience. Do not only observe through your camera, because much of the **directness and emotionality** will be lost. Take the opportunity to look into the animals' eyes, observe their movements or listen to their sounds.

As a consumer of seafood

To counteract the increasing crisis of fisheries, a change of our consumption of seafood is urgently needed. With your selection you can help to conserve fish stocks. There are several guides, easily available on the internet, like the *Worldwide Fund for Nature's* (WWF) **shopping guide for fish** or the **international seafood red list** by *Greenpeace*. When buying frozen fish or canned tuna, look out for the logo's given here and only buy products carrying them. In this way you opt for a more ecological alternative. We recommend to always carrying a pocket guide with you.

If you want to have a seafood meal in a restaurant on La Gomera, pick **freshly caught local species** only. These include for instance anchovis („sardina“), mackerel („caballa“), tuna („atún“), amberjack („medregal“), breams (e.g. „sama“, „sago“ or „pargo“), groupers (e.g. „mero“ or „cabrilla“) as well as parrotfish („vieja“), salema („salema“), wahoo („peto“), filefish („gallo“) and moray („morena“). Octopus und squid („calmar“ or „pulpo“) are caught locally, too. To the contrary hake („merluza“), sole („lenguada“), scorpion fish („cantarero“) and wreckfish („cherne“) mostly are **caught off the African coast**. Seabream („dorada“), seabass („lubina“) und meagre („corvina“) almost exclusively are held in **fish farms**. Most frozen fish in the supermarket is imported. Have a close look at the label!

If you buy **fresh fish** e.g. on the market, ask if the seller can guarantee that it comes from sustainable fisheries. Again, your inquiry alone will sharpen the seller's awareness about what his clients' demand. The same applies to seafood ordered in a **restaurant** or snack bar. Also, you should generally avoid fish oil-capsules as so called dietary supplements.

If you possess a **sea water aquarium**, you should absolutely pay heed to the origin of your fish. Tropical and ornamental fish species often are caught in the wild, which can seriously harm natural populations. Hence, we recommend to avoid tropical species and, of course, those ones on the red list. Rather select European or domestic species and always ask your dealer about origin, type of catch and controls.

At home

It may sound strangely, but it's true: **ocean conservation begins at home**. Everything is interrelated to everything else. That's why our personally induced production of carbon dioxide contributes to the acidification of the seas and why using harsh cleaning agents affect the water quality in rivers and seas.

The simplest rules are the most valuable ones, still. This includes saving water as well as preventing waste. Using (preferably green) electricity economically, utilising eco-friendly

detergents, paints and cosmetics, and driving by bike rather than by car should be a „standard“ today. In general, you should buy products and food that were produced without use of chemicals, or fertilizers and pesticides, respectively.

You should not visit zoo's and parks displaying live cetaceans. Moreover, you can easily support those ones dealing professionally with nature conservation. Become a **sustaining member** with *M.E.E.R.* or contribute with a **donation**. You can also **symbolically adopt** one of La Gomera's cetacean species. Or become active by **volunteering** your time and expertise to a conservation organisation. Unpaid work is hold in a high esteem and sometimes even is supported.

If you want to further engage yourself you can also sign petitions and write to local, federal or European politicians and ask them to take action. The internet can be very helpful in doing so.

The most important means for more concious and ecological action is information. Consult books, the internet and other media to inform yourself about dolphins, whales, the seas and their conservation. Start with recommending this exhibition to your friends!



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Complete list of cetaceans sighted off La Gomera (1995-2008)

A. Toothed whales:

- (1) Bottlenose dolphin (*Tursiops truncatus*) - Delfin mular - Grosser Tümmler
- (2) Rough-Toothed dolphin (*Steno bredanensis*) - Delfin de diente rugoso - Rauzahndelfin
- (3) Atlantic Spotted dolphin (*Stenella frontalis*) - Delfin moteado - Zügeldelfin
- (4) Common dolphin (*Delphinus delphis*) - Delfin común - Gewöhnlicher Delfin
- (5) Striped dolphin (*Stenella coeruleoalba*) - Delfin listado - Blau-Weisser Delfin
- (6) Fraser's dolphin (*Lagenodelphis hosei*) - Delfin de Fraser - Borneo-Delfin
- (7) Risso's dolphin (*Grampus griseus*) - Calderón gris - Rundkopfdelfin
- (8) Short-finned pilot whale (*Globicephala macrorhynchus*) - Calderón tropical - Indischer Grindwal
- (9) Orca (*Orcinus orca*) - Orca - Schwertwal
- (10) False killer whale (*Pseudorca crassidens*) - Falsa orca - Kleiner Schwertwal
- (11) Blainville's beaked whale (*Mesoplodon densirostris*) - Zifio de Blainville - Blainville-Schnabelwal
- (12) Cuvier's beaked whale (*Ziphius cavirostris*) - Zifio de Cuvier - Cuvier-Schnabelwal
- (13) Northern bottlenose whale (*Hyperoodon ampullatus*) - Zifio calderón boreal - Nördlicher Entenwal
- (14) Sperm whale (*Physeter macrocephalus*) - Cachalote - Pottwal
- (15) Pygmy sperm whale (*Kogia breviceps*) - Cachalote pigmeo - Zwergpottwal

B. Baleen whales:

- (1) Fin whale (*Balaenoptera physalus*) - Rorcual común - Finnwal
- (2) Sei whale (*Balaenoptera borealis*) - Rorcual tropical - Seiwal
- (3) Bryde's whale (*Balaenoptera edeni*) - Rorcual norteño/Rorcual de Bryde - Brydewal
- (4) Humpback whale (*Megaptera novaeangliae*) - Ballena jorobarta/Yubarta - Buckelwal
- (5) Blue whale (*Balaenoptera musculus*) - Ballena azul - Blauwal
- (6) Northern right whale (*Balaena mysticetus*) - Ballena franca - Nordkaper

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