

A Guide to  
**Samadai**



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## Preface

Samadai, resting area for spinner dolphins and popular tourist destination, is nowadays a protected area, a milestone achievement that hasn't been completely shining yet. There is a further step to do, a step that would require the involvement of the entire community, including you. This is the reason why we decided to prepare this material and organize a workshop. Samadai is a pearl, for many reasons underestimated and misinterpreted, whose full value still waits to be expressed. We can change this, basically by ameliorating our communication and by increasing sharing and exchanges opportunities. Samadai needs to be revitalized as a more comprehensive experience that goes much beyond the swim-with dolphins opportunity it offers. New approaches, new highlights, new vision for the site, this is what we need. We reckon the present booklet a useful tool to achieve these objectives. The rest is on you, your experience and your passion.

Enjoy!

### **HEPCA Cetacean Research Unit**

*Maddalena Fumagalli*

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The Hurghada Environmental Protection and Conservation Association (HEPCA) is a local non-governmental organization (NGO) specialized in the field of marine and land conservation. HEPCA was founded in 1992 by 12 representatives of the diving community in response to serious environmental threats affecting the Red Sea delicate and pristine ecosystem. Since then the organization has been promoting and endeavouring various activities ranging from mooring installation to community development, awareness, advocacy and, more recently, solid waste management and scientific research. HEPCA, supported by a network of members, partners and sponsors, assists and helps bringing conservation and awareness to the local community whose involvement is indeed crucial to implement actions and campaigns aimed to a sustainable use of the natural resources.

Your direct involvement, support, feedback and criticism are needed to keep on improving and making more effective our actions and projects.

**Do not hesitate to contact us at**  
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[redseadolphinproject.wordpress.com](http://redseadolphinproject.wordpress.com)  
[www.earthwatch.org/exped/costa.html](http://www.earthwatch.org/exped/costa.html)



The Rufford Small Grants Foundation (RSGF) is a charity established specifically for the development of Rufford Small Grants for Nature Conservation (RSGs). Since inception they have given in excess of 1700 grants in 130 countries to finance projects that have the potential to make pragmatic, substantial and long-lasting contribution to nature conservation. A project entitled "Samadai Experience: the balance between marine wildlife conservation and dolphin watching industry has been found?" and including scientific research, education and awareness activities was awarded a grant in November 2011. This manual is one of the products of this project.

For more information check:

[www.ruffordsmallgrants.org/rsg/projects/maddalena\\_fumagalli](http://www.ruffordsmallgrants.org/rsg/projects/maddalena_fumagalli)

## Samadai Reef

Located approximately 6 nautical miles south-east of Marsa Alam, Sha'ab Samadai is a horseshoe-shaped reef, 1.4 Km long and 1 Km wide. The reef is oriented east-west and forms an internal lagoon opened to the south (Figure 1).

The shallow sandy internal lagoon is protected from prevailing winds (usually northerly) and wave motion, thus it is characterized by calm and quiet waters. The lagoon is bordered on the northern side by the main reef and on the southern side by numerous pinnacles. The outer reef presents drop offs and opens directly towards the blue: despite being so close to shore, the depth in the channel between Samadai and the coast of Marsa Alam is approximately 200m, it goes up to 600m on the eastern side.

The three main dive sites offer various possibilities to all sort of divers who can enjoy cave system, eel garden, a little seagrass bed and the biodiversity of the pinnacles. The eventful passage of big pelagic animals, including barracuda, manta, sharks and dolphins and the presence of microfauna, soft corals, hard corals and reef fish make Samadai one of the most interesting and variegated dive destination in the area.

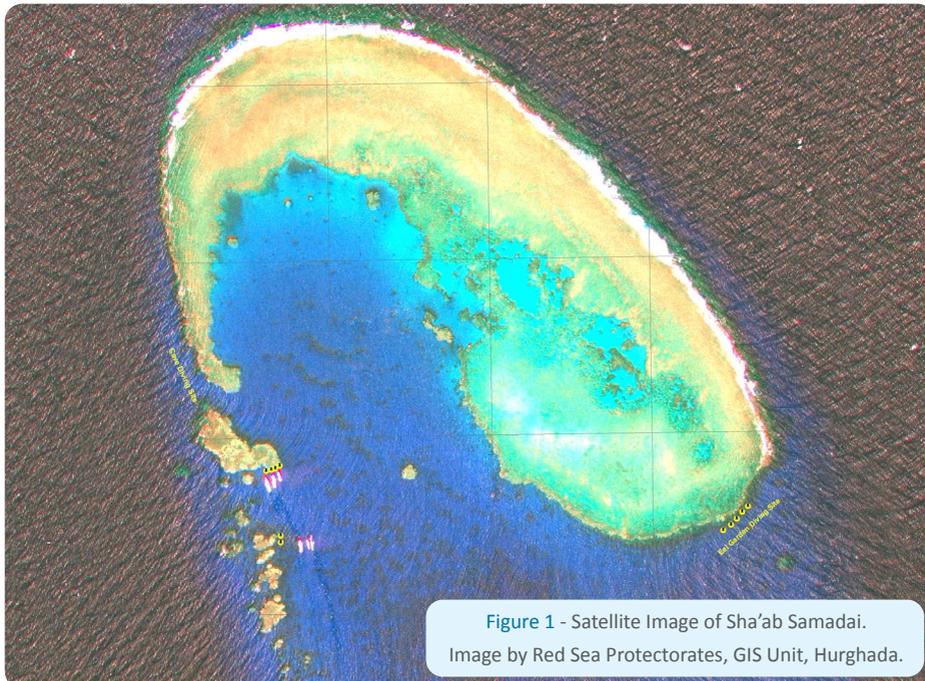


Figure 1 - Satellite Image of Sha'ab Samadai.  
Image by Red Sea Protectorates, GIS Unit, Hurghada.

## Samadai Protected Area

10-15 years ago, Marsa Alam city was pretty different than today: much smaller and with less hotels and resorts. The mass tourism was just starting to come over. Samadai and its dolphins were there, approximately an hour from shore, a perfect combination that made Samadai an heaven on earth for tourists eager to encounter the dolphins and swim with them.



Figure 2A - Marsa Alam town 2004



Figure 2B - Marsa Alam town 2011

As of 2001, Samadai became the centre of “dolphin frenzy” and hundreds of people used to travel from as far as Hurghada to swim and play with the resident spinner dolphins. In a single day Samadai played host to up to 30 boats and 500-800 people: boats were anchoring directly on the reef and guests, including inexperienced snorkelers, let into the water with no regard to the resting dolphins. The community mobilized, calling upon environmental NGOs as well as regional and national authorities to protect this precious sanctuary from an overuse that was unbearable and would have led to a fast deterioration of the site.

**Samadai was then closed to all tourist operations for a few months while a management plan based on the precautionary principle was drafted to fulfil the following:**

- regulate the tourism activities by creating dedicated zones in the reef
- establish best practice guidelines
- implement a proper monitoring programme
- implement a service fee system to contribute to environmental conservation efforts
- implement a public awareness program.

Samadai was then re-opened to tourism as a special protected area in 2004: since then more than 208,000 people have visited it!

## The Management Plan

The measures adopted by the management plan are the following.

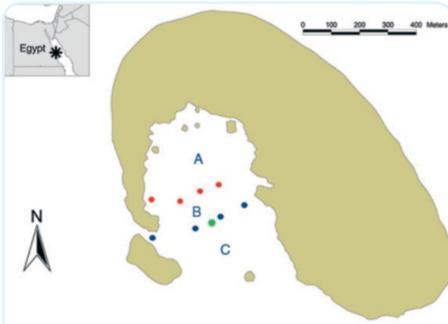


Figure 3 - The design shows Samadai profile with the three zones: Zone A no-entry zone, dedicated to the dolphin; Zone B, only for snorkelers; Zone C, for other activities. The demarcation between zones is marked by orange (A/B line) and white (B/C line) buoys.

**Zoning.** The need to ensure that the dolphins have a safe, exclusive and restricted area within the reef is formalized by the zoning plan (Figure 3): **Zone A**, a clear no-entry zone corresponding with the inner (quieter and more protected) lagoon; **Zone B**, designed for swimmers and snorkelers only, where transit of speedboats is prohibited; **Zone C**, where mooring, diving and other activities can take place.

**Visits limitation.** A maximum of 10 boats have access the reef, for a maximum of 175 snorkelers and 100 divers. Boats carrying snorkelers only are allowed in Samadai from 10am until 2pm, those with divers from 9am to 3pm.

**Guidelines and best practices.** For safety reasons, the code of conduct includes wearing a life jacket as compulsory for all snorkelers.

**Enforcement.** A ranger from the National Parks of Egypt is present everyday to check tickets and monitor activities in the site. For any enquires or report a violation, you can refer to him.

**Entrance fee.** In order to generate an income to be reinvested in ameliorating and maintaining the protected area and possibly sustain other conservation initiatives, an entrance fee has been established and only visitors provided with tickets are allowed in Samadai. **The ticket costs 105 EGP.**

**Scientific monitoring and research efforts:** Previous research efforts, some dating back to 2004, are now being evaluated in a wide time perspective thank to the long-term monitoring endeavoured by HEPCA and its Cetacean Research Unit.

### Where do the money go?

The income generated by the ticket system, according the management plan, is allocated as follows: **30%** goes to **HEPCA** for the maintenance of the mooring system; **30%** to the Red Sea Protectorates (EEAA, the National Parks of Egypt) and **40%** to Marsa Alam city council.

## Spinner dolphins

Samadai is known as “**Dolphin House**” since the waters of its lagoon are regularly visited by pods of spinner dolphins spending there most of the daylight hours.



## Characteristics and taxonomy

Human beings have always had the tendency to organize and classify the surrounding natural diversity in categories based on similarities between organisms. This effort was essential to better understand and grasp the amazing variability of forms, shapes and colours observed in the world.

**So where are spinner dolphins collocated in the constellation of living being inhabiting the planet?**

### Mammal

Dolphins are mammals. Like all other members of the group, they **breathe air** through lungs extracting oxygen from other air gases (differently from fish that extract oxygen from water using gills). They are **endotherm\*** or warm-blooded: they can keep their body temperature constant and independent from the external temperature, by producing heat. To decrease the heat loss mammal “developed” **hair or fur**. Mammals have **mammary glands** producing milk to feed their infants. Those characteristics are common to almost all the about 5,600 species of mammals existing nowadays, going from human beings, to mice, bats and blue whales.

### \*ENDOTHERMIA

An endotherm is an animal that generates and controls its internal heat so that its body core temperature is independent from the ambient temperature.

Mammals are also homeotherms, meaning that they hold their body temperature constant.

Dolphins’ metabolism is much higher than terrestrial mammals’ (from this the need to ingest more than 650 fish a day!) and generate heat enough to keep the animal warm in the aquatic environment, where heat loss is 25 times faster than in air.

Other mechanisms involved in the thermoregulation (i.e the ability to maintain the body temperature) include insulation provided by a thick layer of blubber and a vascular adaptation in a counter-current heat exchange system that regulates blood temperature in core and peripheral areas.



### Marine Mammals

Dolphins are classified within the **marine mammals**, a group composed by those mammals depended on aquatic environment for their survival, including sea otters, the polar bear, pinnipeds (seals, sea lions and the walrus), sirenians (manatees and the dugong) and cetaceans (dolphins, whales and porpoises).



### Cetacean

Dolphins, whales and porpoises can be divided into two main categories: baleen whales or Mysticetes, characterized by the presence of baleen plates, and toothed whales or Odontocetes, characterized by the presence of teeth.



### Odontocetes

The group includes 70 different species of toothed whales, from the large Sperm whale to the smallest porpoise, classified into subgroups called “families”.



### Delphinids

Among the Odontocetes, this is the largest division in terms of number of species. Bottlenose, Risso's, Spinner and Common dolphin, as well as Killer, False killer and Pilot whales, among others, belong to the family Delphinids.



### Stenella

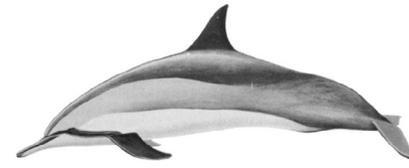
Among the Delphinids, *Stenella* is the scientific name of a group composed by five members: spinner dolphins and its closest relatives (Figure 4)



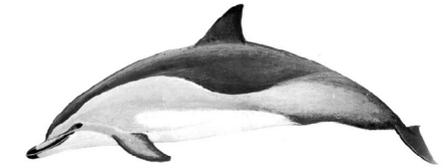
Pantropical spotted dolphin  
*Stenella attenuata*



Atlantic Spotted Dolphin  
*Stenella frontalis*



Spinner dolphin  
*Stenella longirostris*



Clymene dolphin  
*Stenella clymene*



Striped dolphin  
*Stenella coeruleoalba*

Figure 4 - *Stenella* species: spinner dolphin and closest relatives (Images taken from “Marine Mammals of the world”, UNEP/FAO).

## Dolphin or whale?

If the killer whale is a delphinid why is it commonly called “whale” and not dolphin? Good question. There is a common misunderstanding due to the fact that in the English language any cetaceans bigger than 4m is called “whale”. Killer whales, as well as sperm whales and pilot whales do have teeth and belong to the Odontocetes beyond doubt.

### Nomenclature

Common names: Spinner dolphin (ENG); stenella dal lungo rostro (ITA), dauphin longirostre (FRA), langschnauzen-dolphin (DEU), estenela giradora (ESP).

**Scientific name:** *Stenella longirostris*  
Latin is the language used to indicate scientific names (always in italic). *Stenella* is a Latin word deriving from the ancient Greek “**stenos**” meaning “**narrow**”. The second part of the Latin name, longirostris, indicates the species and literally means “**long rostrum**” (long beak) directly referring to this morphological characteristic of the species.

To find out more about marine mammals and their classification, please have a look at the Tree of Life web project at tolweb.org.

While some of the official common names refer to the long “**beak**” of the dolphins, others are inspired by a particular aerial behaviour called “**spin**” performed by the species. From this particular behaviour derives the English name “**spinner dolphin**”.

## Why do scientific names are in Latin?

The naturalists, philosophers and religious desire to describe nature in treatises and books is a constant in human cultural history. In the late 18th century, Carolus Linnaeus defined a system to name organisms that is still in use today called “**Binomial nomenclature**”: every species recognised must have a Latin name composed of two words whose combination is unique (e.g. *Stenella longirostris*). The advantages of the adoption of such a system include economy (of words and effort to remember), uniqueness and clarity. This system prevents modern scientists from naming a plant “*Plantago foliis ovato-lanceolatus pubescen tibus, spica cylindrica, scapo tereti*” (Plantain with pubescent ovate-lanceolate leaves, a cylindrical spike and a terete scape), for example, and prevent confusion and difficulty in translation by allowing universal understanding: “spinner dolphin”, “*stenella dal lungo rostro*” and “*estenela giradora*” are the same species, *Stenella longirostris*.



Figure 5 - Universal understanding of Latin name. John Edward Gray (1800 – 1875) who named and described the *Stenella* species and Ahmed Hassan, Egyptian football player.

## Appearance and morphology

Spinner dolphins appearance can vary greatly: in fact, four subspecies have been identified already worldwide (Figure 6). They are all spinner dolphins, but a further classification was needed to better explain the differences between them. In the Red Sea, spinner dolphins display the tripartite coloration pattern of the Hawaiian subspecies, with a dark-gray cape, light-gray lateral and white ventral field. (Figure 7). The species ranges from 129 to 235 cm in size, with adult males slightly bigger than adult females.

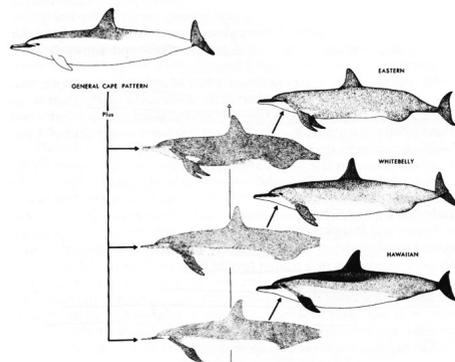


Figure 6 - *Stenella longirostris* subspecies.

Figure 7 - Spinner dolphin from the Red Sea.



## Distribution

The spinner dolphin is a pantropical species ranging through tropical and subtropical regions in both hemispheres (from 40°N to 40°S) (Figure 8).

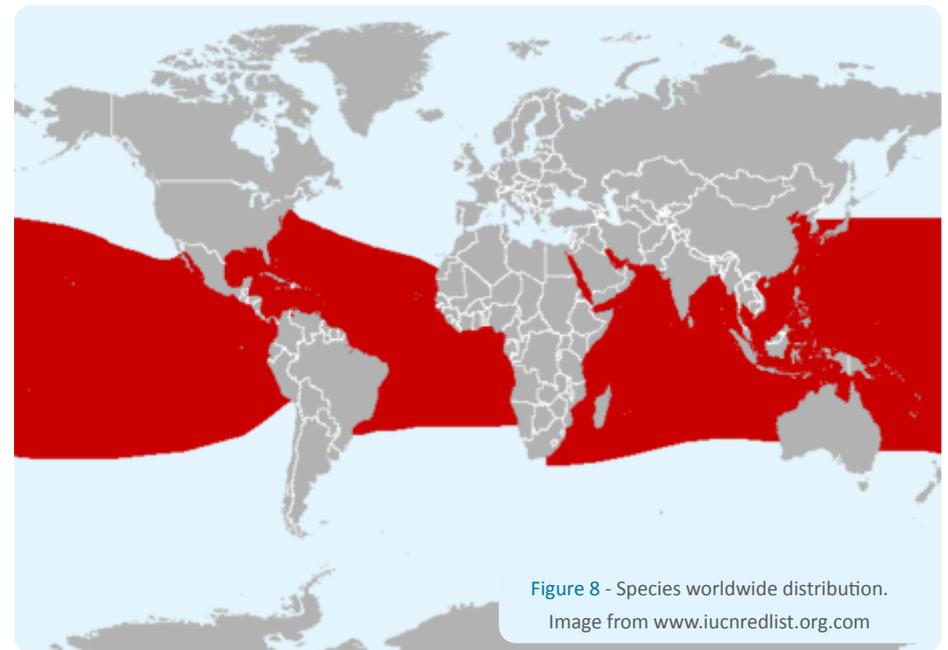


Figure 8 - Species worldwide distribution. Image from [www.iucnredlist.org.com](http://www.iucnredlist.org.com)

## Habitat and Ecology

In most tropical regions, the species is associated with inshore waters, islands or banks: these areas provide sheltered and shallow waters where the animals can safely rest during the day. Spinner dolphins, in fact, present an evident bipartite daily pattern (Figure 9): they feed at night and sleep, socialize and recover during daylight hours in the so called “resting areas”. In the Eastern Tropical Pacific, however, spinner dolphins live in the high seas many hundreds of kilometres from the nearest land and do not show the pattern described above. In this case spinner dolphins occur in very large numbers (thousands) and they are often associated with pantropical spotted dolphins (*Stenella attenuata*). The presence of huge groups of dolphins has not been reported from the Red Sea, although associations between the two species of *Stenella* have been observed in the open sea. In Egyptian waters, Samadai and Satayah Reefs are known to be resting areas for the species.

Spinner dolphins do not undertake long migration, on the contrary evidences suggest they could show fidelity to the region they inhabit: in fact, maximum recorded movements for an individual are 113 Km (over more than 1000 days) in the Hawaii and 550 Km (over 6 days) in the Eastern Tropical Pacific.

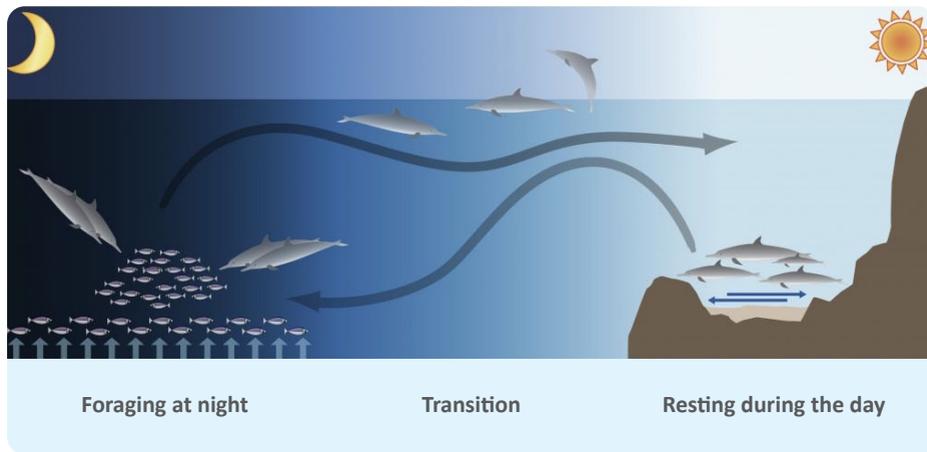


Figure 9 - Spinner Dolphin daily cycle.

Image by NOAA Pacific Islands Fisheries Science Centre, Pacific Islands Regional Office.

## Feeding habits

Spinner dolphins feed in the open sea on fish, squid and crustaceans at night. These organisms belong to the so called **mesopelagic boundary community**. During the day this community remain in the depth, probably too deep (>400m) for spinner dolphin to perform cost effective feeding dives, but migrates both to the surface (about 200m deep) and closer to the coast at night, making the preys within easier reach. The hunting is carried out in a highly cooperative way: after finding concentrations of prey, the spinners would pull into a circular formation and swim up and down vertically to concentrate the prey. Dolphins would then alternatively come in the shoal from different directions, feed for a few seconds, and retreat back to the circle. This would last for about five minutes and then the group would surface, take one breath and then dive down and begin the process anew. If a member of the pod would retreat for any reasons, the entire feeding strategy would collapse. Main prey reported from the Egyptian Red Sea (Figure 10) include small mesopelagic fish (species unidentified) and cephalopods (Ommastrephidae and Enoploteutidae).

Every dolphin consumes a single fish at a time: it has been estimated that their 3,200-calorie-per-day diet corresponds to at least 650 fish eaten each night, without considering the extra energy required to forage, another 200 to 300 fish. Dolphins do swallow the entire fish that is then digested in the stomach.

The “feeding grounds” of the spinners don’t necessarily correspond to a specific and marked off geographic area, as they can move following water and organisms movements. Also moon phases are thought to play a role.

**“The degree of synchrony** they display when feeding is **incredible** – especially considering that they’re doing it at **night**, several meters below the surface where they can’t see their **prey** or each other.”

*Kelly Benoit-Bird*

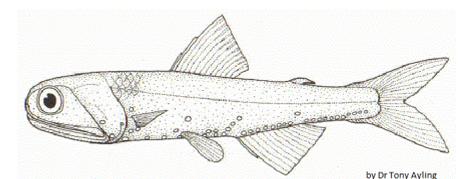
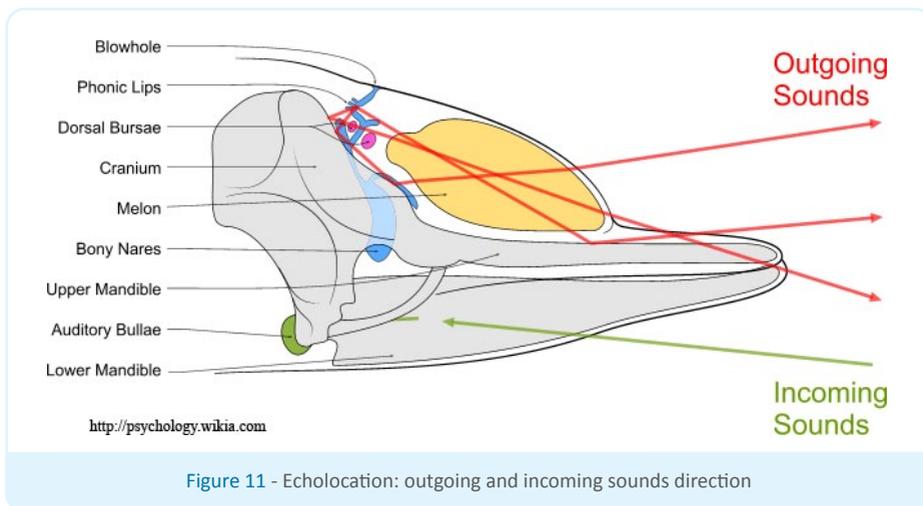


Figure 10B - Myctophidae (or lanternfish) one of the possible fish prey

**How do we know what do they feed on?** Since it is very difficult to follow groups in the open sea at night, post-foraging investigations are carried out. In most cetacean species, the collection and analysis of faeces content can allow the identification of species eaten through morphological or genetic analyses of indigested material. Another technique (applied in Samadai), consists in collecting and analysing spinner dolphins regurgitation. Examination of stomach content from stranded individuals can also provide useful information.

**How can they successfully feed in the dark?** How can dolphins navigate without seeing? They see, but not with their eyes. Cetaceans rely more on sound than on sight because, in the water, sounds propagate much faster and to longer distances than light. This comes especially useful in the dark, either at night or in deep waters: cetaceans use **echolocation**, a complex system of sound production, reception and elaboration. This system involves specific organs and a very developed nervous system and it is able to produce an “**acoustic image**” of the surroundings. Echolocation works as a sonar. A sound is produced at the level of the phonic lips in the blowhole area (Figure 11). It is sent out by the animal (outgoing sound) through the melon that acts as a lens to concentrating the sound, allowing the propagation in the 3-dimensional space and increasing precision and directionality. When the sound hits an object, it would generate an “**echo**”, a sound that travels back to the animal (incoming sound), is received on the lower jaw, transferred to the inner ear and eventually elaborated in the brain. The more sounds are sent out, the more “echos” come back, the more detailed the understanding of what it is around. Through echolocation, they get information on distance, size, shape, speed, direction of movement of other organisms or objects around them. The echolocation has an extremely high resolution: dolphins in aquariums have been reported to be able to distinguish between objects smaller than 1,3cm in diameter at more than 15m away.



## Is Echolocation hard to understand?

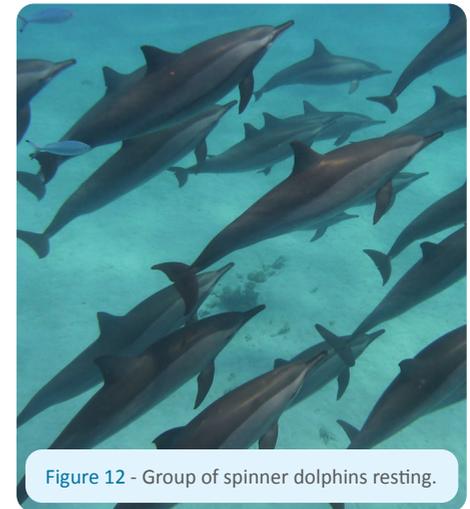
A quick example to make it easier. Imagine yourself in a pitch dark room. You have the chance to switch on the light only for a split second. You do it and you have an instant frame of what surrounds you. Switch it on more times, more frequently, and you will be able to start detecting the details. The mechanism is the same, the difference is in the systems used.

### Resting

Foraging in the open sea, exposed to wave motion and potential predators, carrying out numerous dives and, at the same time, caring for other members of the pod is a very highly energetic activity. Furthermore, the echolocation is a very energy-consuming system.

Finally, at sunrise, when the mesopelagic boundary community starts its migration to the depth, dolphins can sleep, rest and recover after nocturnal activities.

Dolphins sleep with half of the brain at the time, while the other half is operative and regulates basic functions such as breathing and swimming. The echolocation system requires both hemispheres to be active, therefore when a dolphin sleep, the system is disabled: in this situation orientation and perception of the surroundings rely only on the eye sight. Moreover, since every half of the brain controls the functionality of an eye only, dolphins can see only on one side. Some groups would rest in the open sea where they often associate with other species in order to “use” them as “sentinel” in case of predators; others opt for sheltered, shallow and sandy bottomed sites such as bays and internal lagoons of reefs. These areas are unlikely inhabited by predators and even in case a shark would suddenly appear, the clear uniform sandy bottom would make it easier to spot.



### How do dolphins sleep?

Dolphins can't have the luxury of sleeping heavily like we do because the function of breathing is a voluntary act in cetaceans. This means that they have to “order” themselves to breathe. In human beings the respiration act is involuntary, therefore we can be unconscious (for example when anesthetized or when we faint) but still breathing. A senseless dolphin would suffocate instead. In order to allow the function of breathing, the part of the brain responsible for that must always be operative. In fact, dolphins are known to rest their brain alternately working with one cerebral hemisphere at the time. They sleep while swimming slowly, coordinated, usually close to each other, and regularly surfacing to take a breath. (Figure 12)

## Gender and age classes

While observing a spinner dolphin group, you may notice at first sight differences in the external morphology of the individuals, would this be the size of the animal or a specific anatomical feature. All these information help assess age and gender. Figure 13 lists age classes identified by body length, anatomical features and dolphin behaviour.

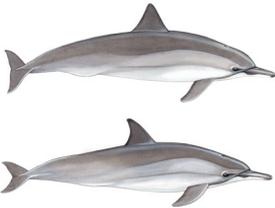
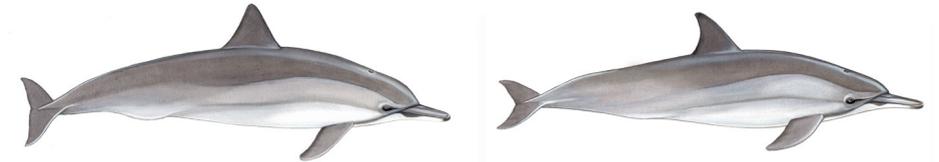
	<p><b>Age Class</b> Newborn</p> <p><b>Length (cm)</b> 75 – 105</p>	<p><b>Anatomical features</b> Foetal crests on both sides of the body, folded fins and flukes.</p>	<p><b>Behaviour</b> Strictly associated with the mother in typical formation, clumsy swimming.</p>
	<p><b>Age Class</b> Calf</p> <p><b>Length (cm)</b> 105– 128</p>	<p><b>Anatomical features</b> Head relative larger than adults, smaller fins, juvenile locomotion.</p>	<p><b>Behaviour</b> Associated with the mother in typical formation.</p>
	<p><b>Age Class</b> Juvenile Subadult</p> <p><b>Length (cm)</b> 128 – 170</p>	<p><b>Anatomical features</b> Fins smaller and bodies less robust than adults.</p>	<p><b>Behaviour</b> Independent individuals, usually playful and highly social</p>
	<p><b>Age Class</b> Adult</p> <p><b>Length (cm)</b> 170– 235</p>	<p><b>Anatomical features</b> Sexual characteristics (see on the next page)</p>	<p><b>Behaviour</b> Independently ranging, females associated with their babies in typical formation.</p>

Figure 13  
Age classes for spinner dolphins identified by body length, anatomical features and dolphin behaviour.

To assess the gender of a dolphin some anatomical features must be taken into account (Figure 14). Adult males can be recognised by an evident anal hump and by a dorsal fin with a shape varying from a right triangle to an erect isosceles triangle.

The association with a newborn or a calf as well as pregnancies (unusually large and bloated abdomen; Figure 15) can help recognize females which are otherwise similar to juveniles.

In youngsters and sub-adults characters such as anal hump and the triangular dorsal fin, which are strictly related to sexual maturity, are not developed yet.



**Gender Class**  
Male

**Length (cm)**  
Up to 235

**Anatomical features**  
Dorsal fin very triangular, in old males leaning forward. Postanal hump.

**Behaviour**  
Usually elusive, associated with other males.

**Gender Class**  
Female

**Length (cm)**  
Up to 220

**Anatomical features**  
Dorsal fin falcate. Slim and smooth silhouette (unless pregnant).

**Behaviour**  
Associated with other females or with her calf.

Figure 14  
Gender classes for spinner dolphins identified by body length, anatomical features and dolphin behaviour.



Figure 15 - Pregnant female (left) and mother-calf pair in typical position (right).

A way to definitely determine the gender of a dolphin is to observe the genital area (Figure 16): males have the genital slit clearly separated by the anus, while in females genital slit and anus form a single longer slit, bordered by the two mammary slits.

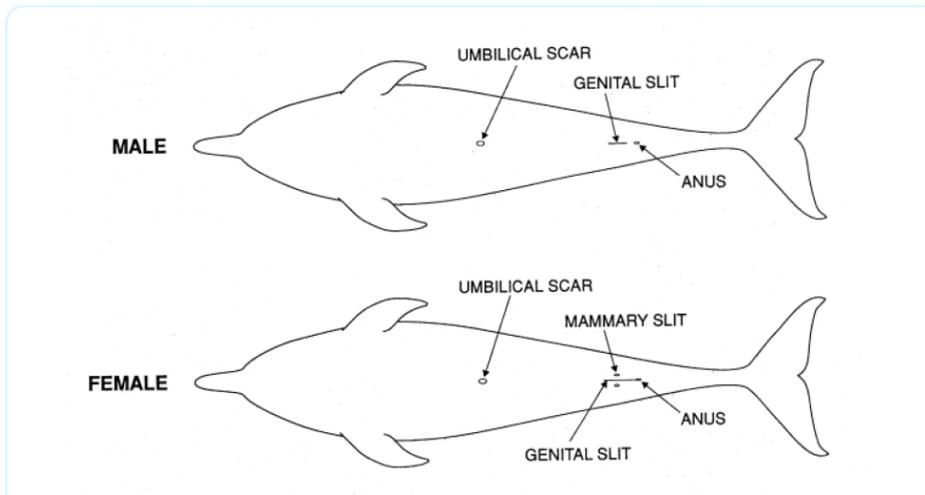


Figure 16 - Schematic drawing of the ventral side of a male and female dolphin. The position of genital slit and anus as well as the presence of mammary slits are features used for gender determination.

## Reproduction

Spinner dolphins are **polygynous** and promiscuous meaning that males copulating with more females. Males become sexually mature between 7 and 10 years of age, females between 4 and 7. Pregnancy lasts approximately 11 months and female dolphins usually give birth to a single newborn at the time (Figure 17). Nursing can last for few years (from 1 to 3) and calving interval is generally 3 years. Although mating behaviours are observed throughout the year, breeding is considered to be seasonal with one or two annual reproductive peaks. Data collected in Samadai and Satayah suggest the presence of at least a reproductive peak in summer months (June to August).



Figure 17 - Mother and calf pair.

## Conservation status

The International Union for the Conservation of Nature (IUCN) publishes a Red List of Threatened Species which is widely recognized as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. With regard to spinner dolphins a million individuals are estimated to exist worldwide. However numerous populations in the Atlantic, Indian and Pacific Oceans, as well as in the Red Sea, have not been surveyed yet. Since population trends are still unknown, the consequences of the impacts from the various threats the species may face cannot be fully estimated. Major conservation concerns identified for small dolphin such the spinner are discussed below.

### Fisheries

Spinner dolphins are accidentally caught (by-catch) in purse-seine, gillnet, and trawl fisheries. They often remain entangled in large numbers in these fishing gears, most of the time dying of asphyxiation (they drown). Dolphins taken incidentally in the net are discharged or re-used in other activities: in the Philippines and Venezuela, for example, they are used as shark bait and for human consumption. Intentional catches are reported from the Caribbean, Sri Lanka, the Philippines, Taiwan, and Indonesia.

### Tourism

Tourism industry has emerged as a major threat only lately. Not only the tourism development may affect spinner dolphin habitat and abundance, but dolphin watching and swimming-with programmes have proven to affect dolphin habits and behaviours, in particular in their resting areas. Possible consequences include (but are not limited to) displacement from their preferred habitats, chronic and acute stress, disruption of group structure, cohesion and behaviours.

### Marine debris

The ingestion of marine debris, and in particular plastic bags, is likely to cause diminished food consumption and internal injuries that can lead to intestinal blockage, starvation, and finally death. Entanglement in marine debris affect swimming and feeding ability, causing injuries, fractures, weakening and possibly dead.

### Anthropogenic noise

Dolphins mainly rely on sound for navigation, feeding and communication. Noise deriving from boats offshore drilling, seismic surveys, explosions, dredging, construction, and sonar heavily affect marine mammals. Some of the consequences include temporary or permanent loss of hearing, disruption of foraging and resting, difficulties in communication, change in habitat use, chronic and acute stress, and often stranding.

## Samadai Dolphins

Samadai has been in the spot light since the beginning of the year 2000's, both because of its popularity and, afterwards, for the concerns over the conservation status of its dolphins.

Several monitoring and research projects have been endeavoured in the site (Figure 18) in order to better understand the ecology of Samadai spinner dolphins, evaluate possible similarities with populations already described elsewhere and possibly implement dedicated management interventions.



Figure 18 - School of spinner dolphins.

From 2004 to 2005 the rangers of Marsa Alam carried out a monitoring programme to assess the daily presence of the animals, their permanence in the site as well as information on groups size and composition. In 2006 a new project was endeavoured in collaboration with the Egyptian NGO Abu Salama Society and the Italian Cooperation in Egypt. This project provided more detailed information about spatio-temporal reef use, behaviour, feeding habits and estimation of the population abundance. A photo-identification catalogue (Figure 19) of spinner dolphins visiting Samadai was produced, allowing a deeper understanding of the ecological importance of the reef. The uniqueness of the site requires a constant and long-term monitoring comparable to those already undertaken in few other resting areas elsewhere in the world. Aware of this urgent need, HEPCA has been leading since 2010 a regular data collection in the site aimed at providing trends and status of the spinner dolphin of Samadai.



Figure 19 - Pictures of two different dolphins (dorsal fin) used to identify individuals.

## Photo Identification

“Photo” and “identification” are concepts everyone is familiar with, provided that he/she has an ID card, driving or diving licence. Photo-identification (or PhotoID) is a technique aimed at identifying an individual from a photograph and, from the recognition, obtain more detailed information about its habits and behaviour. PhotoID is nowadays applied on various species, including dolphins, lions, whales, sharks and turtles.

**Target** – In humans, we discriminate between individuals by looking at their faces. What about other animals? In dolphin studies the target is the dorsal fin, the only body part that surfaces when the dolphin breathes. The trailing edge of the dorsal fin carries a unique sequence of marks and notches which allow a firm individual identification (Figure 19). When photo-identification is performed underwater, a rare event worldwide but common in the Egyptian Red Sea, other body marks can also be used. However not all individuals are marked and thus recognizable: most of the youngsters and juveniles haven't accumulated significant marks yet.

**Method** – The visual observation *per se* is not enough to provide evidence of an identification. A photo is an unbiased, cheap, fast, easy and universal tool to verify a record. Useful images for photoID are well focused, perpendicular and clear shots of the entire dorsal fin.

**Applications** - I know that individual... and? Photo-identification allows recognition of animals in time and space disclosing fundamental information about population abundance (how many dolphins visit Samadai?), residency (how often do the individuals I know come to the reef?), social structure (who is associated with whom? Do I recognize sub-groups or alliances?), geographic range (do I see these individuals in other reefs?) and demographic parameters (what is the survival rate of the animals? What is the population growth? How old can they grow?). These findings are essential to plan and enhance any conservation measure.

## Characteristics of the groups

Data collected since 2004 show that the groups visiting Samadai can range in size from a few to up to 170 individuals, with unpredictable day by day patterns. Although the biggest groups seem to be present during spring/summer months (from April to June), the occasional occurrence of massive groups in other periods of the year cannot be excluded. In terms of composition, newborns presence shows a peak between June and August, while calves are usually present throughout the year.

## Temporal and spatial use of the reef

Dolphins are regularly found in Samadai with a 75% presence rate. What factors actually determine their presence and absence is still under investigation even if the first analysis done suggest a correlation between dolphin presence and rough sea conditions.

As described for other population worldwide, spinner dolphins in Samadai choose the sheltered lagoon for their daily rest, enter early in the morning (around sunrise) and leave in the afternoon before the sunset. During the day, they would spend the morning hours resting in a group formation defined “**tight**”, meaning that the animals are very close to each other, often in contact with the pectoral fins. Around noon dolphins begin to awake: this phase is marked by increased activities including aerial behaviours, whistling, chasing, mating. The structure of the group becomes looser (i.e. inter-individual distance augment) with the formation of subgroups. This is also the time for social interactions. Not all the individuals “wake up” at the same time: it is reasonable to think that some segments of the population need more time to rest. In the late afternoon, when supposedly all animals are awake, the group would co-ordinately leave the site moving back to the feeding grounds.

Spinner dolphins do prefer the calmer waters of the very inner lagoon (zone A), especially its western portion. While resting, the group would not move extensively and excursions in zone B and C are rare. It has been observed that the size and composition of the group seem to affect (positively or negatively) the movement patterns, the level of awakening, as well as the permanence in the reef.

In particular small groups of adult males would swim in the entire lagoon and leave earlier; massive groups are likely to show higher level of activity; groups mainly composed by females are usually quieter and swimming gently in a limited area of the zone A. According to the theory, we would expect them to rest in early morning hours in the most protected part of the reef and possibly swim in zone B and C after the awakening but there is no rule.



## Behaviour

Spinner dolphins are highly social animals, travelling in large schools and organized in social structures with variable level of complexity. Communications among individuals are performed making use of three channels: visual, acoustic and physical.

**Visual communications** include, for example, the adoption of specific posture such as the S-shaped (or shark) position, considered a threatening message in which the animal arches its back and stretches the pectoral fins (see the picture below).

**Acoustic communications** include whistles and sounds generated by aerial behaviours with parts or the entire body of an animal hitting the sea surface producing splashes and loud sounds. This is especially needed whenever animals cannot keep visual contact (dark, distance, etc).

**Physical communication** is the most frequent during the long permanence in the resting area, where sound productions is very limited and animals swim close to each other. A large set of contacts take place, including appendages-appendages, beak-appendages and beak-body contacts, among others. The time spent in the resting areas, in fact, serve multiple purposes: to rest but also to socialize and practice particular behaviours (mating, for example).

Behaviours displayed by spinner dolphins in Samadai do not differ significantly from the those described in literature: they display the typical daily cycle, engage playful interactions, mating or pseudo-mating contacts, they regurgitate in morning hours, nurture their calves and newborns in the safe waters of the resting area, a sort of playground for the youngsters. Males seem to travel in alliances and are generally very elusive, seldom showing what we could describe as “**aggressive**” behaviours among themselves.

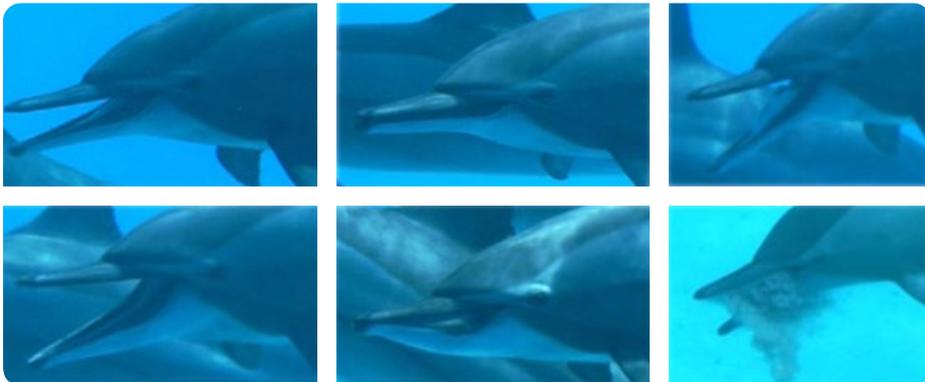
A description of the behaviours most frequently observed in Samadai reef is listed below.



**Mating:** male/s swims upside-down under the female which is pushed toward the surface. Mating attempts have been seen also between males, juveniles and mother-calf pairs.



**Milking:** in females, mammal slits are located to the sides of the genital area and are easily reachable by the calf.



**Regurgitation:** spinner dolphins use to regurgitate to expel indigestible fish vertebrae and cephalopods' beaks that could wound the soft tissue of the digestive system. The sequence involve ingestion of water (few gulps), followed by contraction and eventually regurgitation.



**Playing:** dolphins are social and playful animals. They can play with each other, with other organisms in the water (including people), and even with marine debris (plastic bags). While engaging these interactions, dolphins may whistle, speed up, swim in circles, bump into or chase each other. The contacts may be so intense that they leave scars on the body of the animals, sometimes permanent.



**Aerial behaviours:** basically, any behaviour appreciable from the surface can be classified as aerial. It includes **jumps and leaps**, with the entire body of the animal out of the water; **spyhope**, when the animal surfaces with the head in vertical position, sometimes up to the belly; **breach**, when a part of the body emerges and splashes heavily on the sea surface; **slap** when an appendage or the head hit the sea surface (single or repeated).



**Whistling:** every dolphin is thought to have a "signature whistle" which is its prerogative. Whistles production involves the transit of air through a blowhole which is connected to the lungs. While whistling, dolphins leave bubbles behind.



**S-shaped position:** In this threatening posture, the dolphin faces the object of threat, usually with mouth agape or snapping, with a sharply arched neck and anterior back, with flukes flexed. The pectoral fins are typically spread and may be scissored up and down in slicing motions. Adults and juveniles have been observed adopting the posture.

## Individual identification: results

Data analysis led to the identification of 218 animals and more are being added to the catalogue after recent surveys. This figure number includes identifiable individuals (marked) photographed at least once in the waters of Samadai since October 2005. Since a large portion of the population is composed by unmarked individuals (i.e. not identifiable because the edge of their dorsal fin is intact) it is not possible to count all the individuals using Samadai. However, methods do exist to account for this and provide a robust estimation of the population size: HEPCA team made use of one of the most widespread method (based on mark-recapture technique) and estimated that at least 480 animals do visit Samadai. Depending on how frequently their where sighted and over which time frames, animals have been categorized in:



**Resident**  
Encountered in Samadai pretty much throughout the year.



**Long-term resident**  
Spotted the first time in 2005 and still using the lagoon.



**Transient**  
Photographed only few times (often only once or twice in a year).

### WHY DO YOU SPIN?

The SPIN is a curious aerial behaviour shown as far as we know only by spinner dolphins. It consists of an high jump followed by a sequence of up to 14 rotations in the air (spins) before re-entry the water. These energetic patterns are often performed in series by a single animal, either juvenile or adult. Parasite dislodgement, communication and echolocation of the spinning member of the school have been indicated as the possible causes of this behaviour.

## How come that none of the about 500 dolphins is here today?

There is no answer to this question. Science is not able yet to fully understand the ecological and behavioural complexity of these social wide ranging animals. And maybe it will never be. An hypothesis could be that dolphins visit different resting areas (for example Shaab Marsa Alam). It is also likely that they can decide to rest offshore if the sea is calm. Resting in the open sea represent a “good” solution also if the feeding ground is too far from the resting area. Furthermore spinner dolphins have been encountered resting in the open waters in association with other dolphin species (such as Pantropical spotted dolphin). Finally groups of thousands of individuals are known to gather offshore in the Pacific Ocean: the purpose of this behaviour is not clear yet.



Figure 20 - HEPCA briefing. Education and interpretation are important for the success of a protected area and nature-based tourism.

## A visit to Samadai

No matter if you have been working in Samadai for a few months or many years, if you have observed the dolphins and had the chance to interact with them, you probably already know how to behave in order to maximize the chances of a satisfactory encounter for your guests and safe interaction for the dolphins. Beside our behaviour in the water, there are aspects pre- and post-visit that should not be underestimated.

Expectations play an important role in the overall satisfaction of your guests, for example. Interpretation and education are also essential and should be enhanced to improve the overall satisfaction of the visitors (Figure 20). Studies have been published in the last decades about these issues, here you can find some of the main rules of thumb developed that can make the visit to Samadai a successful experience for your guests.

1. Creating a perceived need for information;

2. Providing the needed information in an informed and interesting manner;

3. Facilitating participation in follow-up activities, which incorporate the new information into a changed behavioural repertoire.

“a whale watch tour can be divided into three different stages, each of which bears different information needs. During the pre-contact stage, tourists are excited about the coming experience and have the need for information regarding their safety, the surrounding, and their following encounter with whales. The contact phase is a time when tourists are interacting with whales. During this stage, they have specific questions about the mammals and their behaviour, as well as about the knowledge of the guides. The final, post-contact stage is a time of personal validation, in which participants compare knowledge and expectation with the just experienced encounter.

But do tourists want to be educated? [authors] argue that tourists want to be entertained and are nothing but consumers. According to [other authors] a ‘new tourism’ has been emerging since the early 1990s. In contrast to the ‘old’ tourists, these ‘new’ tourists are more mature and experienced, they want to be different, are more understanding, have special interests and want to learn.”

*Luck M., (2003)*

“Explaining the why and how are vital elements of interpretation.”

*Uzzell D. and Ballantyne R., (1998)*

“Results showed the number of whales and their behaviour, numbers of fellow passengers, cruise duration, boat construction and sea-sickness influenced satisfaction. The geographical proximity of the whales was not a major influence. Many whale-watchers (35%) returned satisfied even when no whales were sighted. Whale-watching is not simply about getting close to whales, many other variables are important.”

*Orams M., (2000)*

In order to incorporate these element throughout the experience, we suggest the following.

## Pre-booking

The excursion to Samadai is usually more expensive than others. This is due to the fact that it includes the 105 EGP entrance fee: remember to tell your guests about that. Stress on the fact that you cannot guarantee that the dolphin will be present nor that the guests will swim with them. It is like going for a safari in South Africa, nobody will ever ensure that they will see lions, but still they will enjoy the visit. It is very important that your guests do not think that they are paying to swim with the dolphins or they will end up disappointed and unsatisfied. Make sure that, if you are not responsible for the pre-booking phase, the agency selling the trip is as transparent.

Change the perspective: explain to potential guests that Samadai is extraordinary not only because of the dolphins but for many other reasons. Very few places in the world are resting areas for dolphins and also beautiful dive sites. Only few people have the privilege to see such a rare and amazing area. Visiting Samadai is giving a real contribution to the conservation of the site and the dolphins because the income generated is reinvested in the area.

In summary, to make the feeling that the 105 EGP are worthy, provide the visitors with the best assistance and interpretation, stress on the conservation significance and enhance what Samadai offers beside the dolphins.

## Programme

As stated before, the satisfaction of your guests relies on what they actually get back from the day at sea. Getting to see or swim with dolphins is an important component indeed, but there are other elements that can fulfil people’s expectations. As you will see later, making them appreciate the coral reef, avoiding the crowd, keeping a responsible behaviour, being friendly and transmit passion, as well as checking the quality of the services provided by the boat operator, taking care of your guests and overwhelm them with information and knowledge on ecosystems and wildlife other than dolphins will be appreciated. You are the leader, if they see you confident, ready and knowledgeable in every situation, half of the work is done.

## Briefing on dolphins

A detailed briefing containing exhaustive and updated information, ideally supported by adequate visual material, would greatly benefit the visitors satisfying their thirst for knowledge and making them feel that their money were well spent.

An ideal briefing should take into account the following.

**How to deliver the information:**

Understand your target and tune the language and the level of information depending on it. For example if you have kids onboard, level the communication to them, the adults will understand anyway. It is very important also to share your knowledge bit by bit throughout the day, instead of playing all your cards in one shot. Your audience will be more receptive after having experienced directly what you are talking about.

**Content:**

The main questions and issues that should be addressed are:

- Samadai management plan: Why? When? How?
- Ecological value of the reef
- Spinner dolphin: biology, behaviour and characteristics of the groups and known individuals
- Samadai Research Project: Why? How?
- Samadai as a model to imitate: Why?
- Why and how your guests presence in Samadai is an active contribution to the conservation of the site

The trip

**Arrival in Samadai**

Once you get to the site, you will screen for dolphins in the lagoon. Check really carefully the Zone A, especially close to the reef. Having a binocular onboard can be very helpful. You check and...

**Oh, there are no dolphins!**

Dolphins might not be present, it may happen, we all know, your guests included. Don't start imagining apocalyptic scenarios with your guests enraged and breathing fire, you have explained them that this can occur. They would be disappointed, but this doesn't mean that they would not enjoy the day or they will go back to shore unsatisfied! You are ready for this situation. Do not give the impression that you are unprepared, be ready with a strong plan B. Dolphins may come later in the day or not at all, in this case explain to your guests what can be the reasons and stress on other aces of Samadai during the visit.



**Dolphins in zone A!**

If you have a binocular, pass it on to the guests and help them spotting the fins, they would appreciate seeing them clearly and understanding that they are actually in the same lagoon. The spinners may start swimming in zone B and C during the day, keep on monitoring their movement and if you notice they start ranging and getting active take your chance!



**Dolphins! Wait, wait, wait..this is not a spinner dolphin!**

Rarely, but it may happen, other species can be spotted in the lagoon or in proximity of the reef, including common bottlenose (*Tursiops truncatus*), and Indo-pacific bottlenose dolphins (*Tursiops aduncus*, in the picture). They are not found as often as the spinners, making their sighting an incredible event.



Indo-pacific bottlenose dolphin (*Tursiops aduncus*)

## Get in the water

Once you are in Zone B, there are two possible scenarios: the dolphins come or they don't. Despite the fact that most of the time we can't see them while bobbing in zone B, they are well aware of our presence. They may decide to approach us or to stay quiet in zone A. The choice of engaging an interaction is on them: there is no way for us to attract them, however several wrong behaviours would definitely make them avoid us.

- **Avoid big crowds:** if there are already dozens of people in the water, delay a bit your session. If not possible, keep your guests spaced out from other groups, do not merge. The higher the number of people, the more frightful the crowd and consequently the disturbance to the dolphins. Go for small, silent and quiet groups of people.

- **Avoid splashes and noise:** don't jump from the zodiac! Clumsy acrobatic performances would generate sounds that disturb the animals. Slip gently in the water instead. Do not shout nor whistle.

- **Approaching the animals:** try as much as possible to keep your guests quiet and calm (not easy job, we know). Always swim gently with fins only. Try not to be exactly on top of them when they surface, but rather on the side of the group. They are faster than us, if they distance you, let them go. If you start frantically running after the group, they would most probably accelerate and disappear in a second. You'd rather stop and monitor their movements, ready in case they invert their direction and come back.

- **Interaction:** if the animals engage an interaction and stay around you and your guests, observe and enjoy. Remember that this interaction is as delicate as a soap bubble: the moment you go beyond and become too invasive and audacious, they would probably interrupt it.

- **Never, never, never touch them,** this for several reasons. First of all, our skins are different and the risk to exchange pathogens that might trigger the onset of pathologies is very likely. Second, they are wild animals and should stay wild. They are not pets.

- **Do not try to feed them:** wild animals hunt their prey. Potential habituation to artificial feeding would compromise their ability to effectively forage as well as increase the risk of diseases caused by an improper diet. Dolphins would probably not accept food anyway.

- **Don't leave objects in the water:** we see them playing with marine litter, but all these tools may turn out to be lethal for dolphins or other marine species. Nothing that doesn't belong to the sea should be introduced in the ecosystem.

## On the zodiac

Your objective is to let the guests swimming close to the animals. Any rough or wrong manoeuvre will result in the group speeding up, decreasing your chance to encounter the dolphins. Remember that you are the one leading the encounter, not the guests nor the skipper. Here follows a list of simple rules that skippers must observe:

- Zodiac route must converge to the dolphins' route and stop ahead the animals. People can enter the water waiting for dolphins to approach
- Zodiac must avoid reverse, sudden changes in speed and/or direction, as noise increases exponentially during such manoeuvring
- Zodiac must not corner dolphins against the reef.
- Zodiac should always pay attention to snorkellers.

**One last consideration.** In the previous chapters you have read about spinner dolphins' behaviours and general ecology. You are now able to estimate what are the conditions in which encounters and interactions are more likely to happen: decide if it is really worthy to go in zone B!

## Are we an actual threat to spinner dolphins?

Yes, unfortunately we might be. Studies on short and long-term effects of nature-based tourism are spreading in response to concerns over the sustainability of these practices. Research about potential detrimental consequences of dolphin-watching and swimming-with activities have provided evidences that human impacts can negatively affect cetacean. Human activities influence the natural behaviour of the animals, often leading to extra energetic costs for no benefits and often disrupting critical functions.

Consequences of rest disruption can reflect on other vital ecological activities: the dolphins may not have the energy they need to effectively hunt at night, or may be less responsive in case of a danger, making the individual and the whole group at risk. Also, interactions can alter their communication and disrupt social and behavioural events happening in the resting area, from nursing to mating, leading to possible direct negative effects on the population growth and fitness.

It is very difficult to predict the impact of human activities to a population on the long-term (i.e. in years). However it is likely that chronic disturbances will affect the population revealing their effects when it will be probably too late to intervene. Short-term effects are more evident and are taken into account to identify distress and disturbance such as sudden changes in route and speed, modification of the surfacing pattern and increasing of aerial behaviours.



Dolphin individual sensitivity can be related to age, gender, level of habituation and other factors that may change on a day by day basis. We urge you to be especially careful when watching or swimming-with a group of females and calves. However, in any case and situation, remember that the distress experienced by one is likely to affect (directly or indirectly) the whole group.

## Debriefing

Back to the boat, first of all, check that everybody is fine and ask if they were comfortable in the water. This is the time to drop some more information for example about the species or some particular behaviour you may have observed while snorkelling. It is extremely important also to get guests' feedback: ideas and criticisms are the only tools we have to ameliorate our work. Perhaps your dive centre or operator already uses questionnaire to evaluate guests' satisfaction, if not this could be proposed.

One last thing to do to conclude the day is to thank the guests for visiting Samadai. The essential message you want to convey is that visitors had economically supported the conservation of the protected area and, more importantly, they backed the principles of Samadai: it is possible to find a sustainable compromise between conservation and tourism activities that can generate an income.

## Learn from mistakes, listen to the guests

The following is a short review that report guests comments about Samadai. Data were taken from Trip Advisor, one of the most popular community-based website to share opinions, experiences and suggestions about tourist facilities and attractions. Out of the total 66 reviews available, the 44 in English, French and Italian were considered. The overall evaluation of the Samadai trip is summed up in Figure 21.

### Samadai trip: Overall visitors evaluation

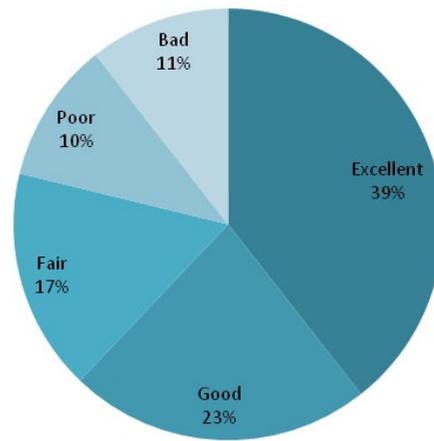
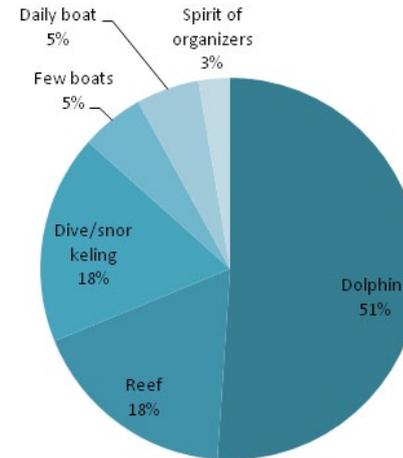


Figure 21

Overall evaluation of visitors on Samadai trip.

Out of the 44 reviews, 21 had an encounter with dolphins, 24 didn't. The lucky ones (the 21 that had seen dolphins up close) reported the following Pros and Cons (Figure 22)

### What made their day



### What made them turn their nose

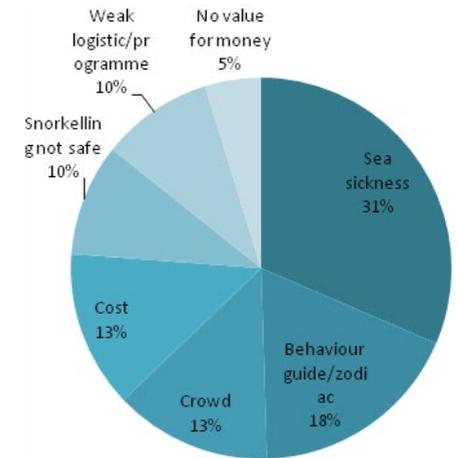
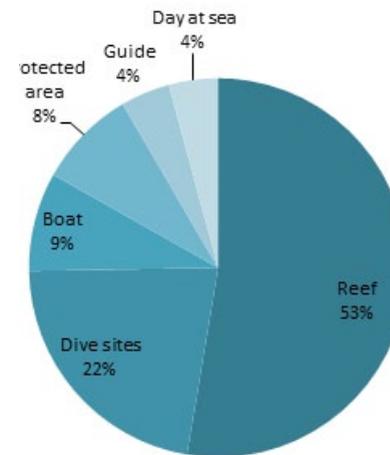


Figure 22 - Visitors feedback after seeing dolphins in Samadai.

The summary of Pros and Cons provided by the 23 guests who did not see dolphins during the visit to Samadai is showed in Figure 23.

### No dolphins..but this made my day



### No dolphins..and on top of that

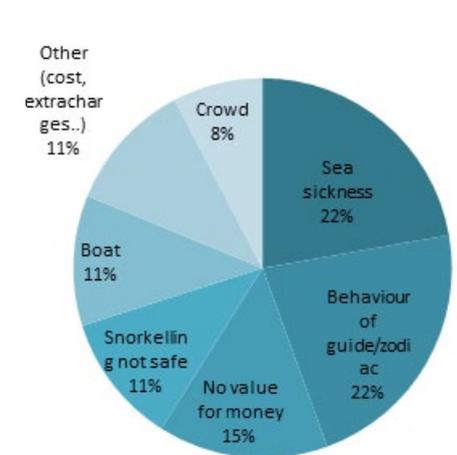


Figure 23 - Visitors' feedback after a trip with no dolphins.

## Frequently Asked Questions (FAQs)



### How likely is it to find dolphins in Samadai?

Dolphins seem to be present in the area the 75% of the time. Their availability to interact with people is unpredictable.

### How deep do spinner dolphins dive?

Spinner dolphins deepest recorded dive reaches depth of about 600m, they could possibly go even deeper. They can hold their breath for about 5 minutes.

### How fast can they swim?

The average speed for spinner dolphins is about 5-6 knots, with peaks of about 21 knots.

### Do they have the sense of smell?

It does not seem possible as, in odontocetes, the olfactory lobes of the brain and olfactory nerves are absent.

### What is the spinner dolphins life expectancy?

It is not sure because of lack of data from wild populations, however it is reckoned that spinner dolphins could live around 20 years.

### If dolphins swallow the entire prey without chewing, why do they need teeth?

Dolphins' teeth differently from humans' are undifferentiated and conical, sharp and strong, designed to grasp, bite and tear food rather than to chew it. Spinner dolphins have 40 to 60 teeth in each row, for a total of about 200 teeth.

### Do they have predators?

Spinner dolphins are prey of several pelagic shark species elsewhere in the world, probably also in the Red Sea, where a few evidences of sharks attacks have been reported. Other cetaceans that may prey on the species are killer whale and possibly false killer whales, both recorded in the Red Sea as well as pygmy killer whales and short-finned pilot whales, whose presence in the Red Sea is unconfirmed.

### Can I touch them?

No, it is forbidden by international laws. In principle, we should respect them and their wilderness, as we would do with any other wild animals. They are not pets: we would somehow make them habituated to human contact, drastically and dramatically affecting their natural attitudes. Moreover, physical contacts can lead to the onset of pathologies, diseases and severe infections in the animal or the human, as transmission can go both ways. Finally, it could be dangerous: these are strong and wild animals whose reactions are unpredictable.

### How often do spinner dolphins need to come up for air?

While sleeping in the resting areas, they would surface to breathe every 1 to 2 minutes, spend about 1 minute on the surface performing many consecutive respiration acts and then dive again. Nocturnal feeding dives can last about 5 minutes.

### What diseases can dolphins get?

Dolphins may suffer from viral, bacterial, and fungal infections. The most common are respiratory, skin, and digestive diseases, including but not limited to stomach ulcers, skin diseases, tumours, heart disease, urogenital and respiratory disorders.

### How do they sleep?

Like all the cetaceans, they sleep while swimming because the respiration act is voluntary and they must maintain a certain level of consciousness to perform it. They cannot just lay down and dream. Half of the brain is always awake, while the other rest. This implies a pretty funny consequence since, like in humans, a cerebral hemisphere would control the opposite side of the body and, therefore, dolphins will be sleeping-swimming with an eye open and the other close, according to which hemisphere is active.

### Why there are no other species of dolphins coming to Samadai? The spinners chase them away?

Spinners are not reported to have territorial aggressive behaviours towards other species. They present this unique habit that no other species of delphinids has: spinners are the only ones looking for sheltered lagoons, while other species do not have this ecological need nor such a distinct day/night pattern but alternate throughout the 24h feeding, resting, travelling and social activities. Two other species, common bottlenose and Indo-pacific bottlenose dolphins, also visit Samadai but more rarely: the former usually swims outside the reef, the latter has been seen inside the lagoon with the spinners.

### How is the population going?

About 500 individuals have been visiting Samadai at least once in different groups. The average of the group size is 58 individuals with the smallest group being formed by 3 individuals and the biggest by 170 animals. The large number of animals that seems to use the area is unanticipated considering the small size of the lagoon (350x400m). Data indicate that while some dolphins are migrants, the majority shows a high rate of year-round residency, confirming the essential role that Samadai reef plays for the species in the northern Red Sea.

### Is the population declining?

Data collected since 2005 by HEPCA scientists show that the population seems to be stable. There is no truth in the rumours that report a decrease in the number of Samadai dolphins allegedly occurred since the management plan has been established. Please, be aware that spreading inaccurate and alarmist rumours would only generate false myths difficult to eradicate and can have a detrimental effect for the conservation of the animals and the site.

### How can I contribute?

You have a key role in conservation because, while at sea, you embody the conservation itself. Be informative, clear and passionate, this is the contribution your community needs from you. Besides that, we would appreciate if you could report to HEPCA any unusual behaviours or events you may observe in Samadai and/or participate to our MEGAbase programme which is a community-based monitoring effort to gather information about encounters occurred in the Red Sea. If your guests are willing to engage more, what they can do is to get informed, adopt best practices and spread the word.

## Suggested reading

### Marine mammals

FAO Marine Mammals Guide

<ftp://ftp.fao.org>

*“Encyclopedia of Marine Mammals”*

Edited by William Perrin, Bernd Wursig, J.G.M. Thewissen. Academic Press, 2008.

World Cetacea Database

[www.marinespecies.org](http://www.marinespecies.org)

National Oceanic and Atmospheric Administration (NOAA)

[www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

### Cetacean Threats and Conservation

WDCS Threats to whales and dolphins

[www2.wdcs.org](http://www2.wdcs.org)

The IUCN Red List of Threatened Species

[www.iucnredlist.org](http://www.iucnredlist.org)

### Spinner Dolphin species profile

International Union for the Conservation of Nature (IUCN)

[www.iucnredlist.org](http://www.iucnredlist.org)

Convention on Migratory Species (CMS)

[www.cms.int](http://www.cms.int)

Whale and Dolphin Conservation Society (WDCS)

[www2.wdcs.org](http://www2.wdcs.org)

National Oceanic and Atmospheric Administration (NOAA)

[www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

Australian Government

[www.environment.gov.au](http://www.environment.gov.au)

Spinner dolphins acoustic, population parameters and human impacts research (SAPPHIRE)

[www.nicholas.duke.edu](http://www.nicholas.duke.edu)

*“The Hawaiian Spinner Dolphin”*

by Kenneth Norris, Bernd Wursig, Randall Wells and Melany Wursig. University of California Press, 1994

Images

[www.arkive.org](http://www.arkive.org)

### Research : ecology of spinner dolphins

*“Spinner dolphin (Stenella longirostris) resting habitat in Samadai Reef (Egypt, Red Sea) protected through tourism management”*

by Giuseppe Notarbartolo di Sciara, Mahmoud Hanafy, Moustafa Fouda, Ayman Afifi and Marina Costa. Journal of the Marine Biological Association of the United Kingdom, 2008.  
[sanctuaries.noaa.gov](http://sanctuaries.noaa.gov)

*“Site fidelity and relative abundance of spinner dolphins resting in Samadai reef (Egypt - Red Sea)”*

by Marina Costa, Amina Cesario, Maddalena Fumagalli and Giuseppe Notarbartolo di Sciara, 2012.  
[redseadolphinproject.files.wordpress.com](http://redseadolphinproject.files.wordpress.com)

SAPPHIRE

[www.nicholas.duke.edu](http://www.nicholas.duke.edu)

Pacific Islands Photo ID Network (PIPIN)

[www.pipin.org](http://www.pipin.org)

Selected publications by Dr. Leszek Karczmarski

[www.tamug.edu](http://www.tamug.edu)

*“Rest, nurture, sex, release, and play: diurnal underwater behavior of the spinner dolphin at Fernando de Noronha Archipelago, SW Atlantic”*

by José Martins Silva-Jr, Flavio Silva and Ivan Sazima. Aqua, 2005.  
[mardecetaceos.net](http://mardecetaceos.net)

*“Vomiting behaviour of spinner dolphin (Stenella longirostris) and squid meal”*

by José Martins Silva-Jr, Lizete Pandolfo and Ivan Sazima. Aqua, 2004.  
[mardecetaceos.net](http://mardecetaceos.net)

*“The cetacean offal connection: Feces and vomits of spinner dolphins as a food source for reef fishes”*

by Ivan Sazima, Cristina Sazima and José Martins Silva. Bulletin of Marine Science, 2001.  
[www.ingentaconnect.com](http://www.ingentaconnect.com)

### Dolphin watching and swimming-with guidelines

NOAA Pacific Islands Regional Office *“Swimming with Wild Spinner Dolphins”*

[www.fpir.noaa.gov](http://www.fpir.noaa.gov)

NOAA Pacific Islands Regional Office *“Protect wild Hawaiian spinner dolphins”*

[sanctuaries.noaa.gov](http://sanctuaries.noaa.gov)

(And here, NB: Never attempt to swim with a dolphin. Leave the water if approached by an animal while swimming.)

*“Dolphin Etiquette”*

[www.halekeokeo.com](http://www.halekeokeo.com)

[www.dolphinexcursions.com](http://www.dolphinexcursions.com)

#### **Nature-based tourism impacts**

##### ***“Evaluating the effects of nature-based tourism on cetaceans”***

by Lars Bejder and Amy Samuels. In “Marine mammals: fisheries, tourism and management issues”, 2003.  
whitelab.biology.dal.ca

##### ***“Effect of vessels and swimmers on behavior of Hawaiian spinner dolphins (Stenella longirostris) in Kealake’akua, Honaunau, and Kauhako bays, Hawai’i”***

by Sara Courbis and Gregory Timmel. Marine Mammal Science, 2009.  
www.fpir.noaa.gov

##### ***“A Hard Day’s Night: Spinners Also Need Their Rest”***

by Dave Johnston. Ka Pili Kai, 2006.  
www.fpir.noaa.gov

##### ***“Pattern of use of Maku’a Beach, O’ahu, Hawai’i, by spinner dolphins (Stenella longirostris) and potential effects of swimmers on their behavior”***

by Kerri Danil, Daniela Maldini and Ken Marten. Aquatic mammals, 2005.  
wilddolphin.org

##### ***“Decline in relative abundance of Bottlenose dolphins exposed to long-term disturbance”***

by Lars Bejder, Amy Samuels, Hal Whitehead, Nick Gales, Janet Mann, Richard Connor, Mike Heithaus, Jana Watson-Capps, Cindy Flaherty and Michael Krutzen. Conservation Biology, 2006.  
researchrepository.murdoch.edu.au

#### **Education and interpretation**

##### ***“Wild dolphin based tourism: minimizing the risk and maximising the benefits”***

by Mark B. Orams.  
www.nztri.org

##### ***“Using interpretation to manage nature-based tourism”***

by Mark B. Orams. Journal of sustainable tourism, 1996.  
www.nztri.org

##### ***“Tourists getting close to whales, is it what whale watching is all about?”***

by Mark B. Orams. Tourism Management, 2000.  
www.nztri.org



A Guide to  
**Samadai**

[www.hepca.com](http://www.hepca.com)  
[www.ruffordsmallgrants.org](http://www.ruffordsmallgrants.org)

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