

# CETACEAN DIVERSITY OFF LA REUNION ISLAND (France) implication for the new Marine Protected Area

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### ABSTRACT

Although some large scale cetacean surveys have been conducted in the western Indian Ocean, La Réunion coastal waters have never been surveyed for cetaceans. From 2004 on, dedicated cetacean surveys have been conducted off La Réunion, in the main objective of assessing cetacean diversity and collecting photo-identification data on the most common species encountered. Surveys were conducted year round, on regular basis (one-day survey a week on average in 2006), off the southern and western coast of the island, up to 5 NM off shore. Two 5-meter long inflatable boats were used. In 2004-2007, 278 days at sea were achieved, including 1246 hours of searching effort and 183 sightings. For each species encountered, the mean sighting rate was computed, together with mean bottom depth, distance from coast and school size. Nine species were sighted in the survey area (and 2 additional species stranded alive). The most frequent species sighted were the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), the spinner dolphin (*Stenella longirostris*) and, from June to November the humpback whale (*Megaptera novaeangliae*). The bottlenose dolphin (*T. truncatus*), the pantropical spotted dolphin (*S. attenuata*), the melon-headed whale (*Peponocephala electra*), and the Fraser's dolphin (*Lagenodelphis hosei*) had lower sighting rate and occurred in deeper waters. The short-finned pilot whale (*Globicephala macrorhynchus*), the Antarctic minke whale (*Balaenoptera bonaerensis*) and the sperm whale (*Physeter macrocephalus*) were rarely sighted in the study area. Photo-identification data indicated a resident population of Indo-Pacific bottlenose dolphin (54 individuals photo-identified), restricted to waters less than 50m deep. The distribution of sightings indicated that the newly created Marine Protected Area (February 2007) hosts the 3 shallow water species, and encompass the majority of *T. aduncus* sightings. This study demonstrates the need for MPA management plans to take account of cetacean conservation issues.

### INTRODUCTION

La Réunion (55°E33'/21°S07') is an oceanic island located within the Indian Ocean whale sanctuary. The continental shelf of La Réunion is very narrow and the depth increases very rapidly near the shore.

In February 2007, a **marine protected area** (MPA) was created on the western coast of the island. The MPA was not purposefully designed for cetaceans because basic knowledge on local cetacean communities was not available to decision makers.

Whale watching is increasing in the western coast of the island and to date no regulation exists to control this activity. Dedicated cetacean survey were initiated in 2004 by a local NGO



### METHODS

- Dedicated boat surveys conducted throughout the year in 2004-2007.
- Survey area: up to 6NM off the south and west coast of La Réunion
- Survey boat: Two 5m long inflatable boats, at 6 knots.
- Sighting data recorded: Species identification  
Time, Position, Bottom depth, Distance to shore  
Group size estimate  
Main activity (Socializing, Foraging, Travelling, Resting)  
Photo-identification

For each species, **monthly encounter rate** was expressed as the number of sightings per hour of searching effort achieved per month.



### RESULTS

Ten species of cetacean were encountered out of 238 sightings. The 3 most common species were frequently observed in the MPA.

#### Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)

The Indo-Pacific bottlenose dolphin was the most frequent species encountered and **43.2% of sightings were located in the MPA**. Sightings occurred in shallow waters (mean bottom depth of 20m) and was thereby observed very close to shore. Group sizes were relatively small, with a mean of 8 individuals per school.



This restricted spatial range suggests little possible movement and gene exchange with other populations in the area (Mauritius being the nearest island, 210km apart).

*T. aduncus* was sighted every month and no consistent seasonal trend was observed (Figure 4). Monthly encounter rate did not vary significantly between months (Kruskal-Wallis Test = 9.154, p=0.608, df=11). Calves were observed in 37.5 % of the groups (from 1 to 2 calves per group) and were encountered each month.

**63 dolphins were photo-identified**, 56% of them seen more than once. Resightings occurred:  
- between months (27 dolphins seen on different months)  
- between years (20 dolphins seen in different years).

Within and between year resightings strongly suggest that a resident population of *T. aduncus* inhabits La Réunion coastal waters. Calves were observed year-round, which tends to suggest that calving did not occur seasonally.



#### Humpback whale (*Megaptera novaeangliae*)

Humpback whale was the second most frequent species encountered, from early June to early November. The **MPA encompasses 26% of humpback whale sightings**. Whales were generally observed in waters less than 100 m deep, thus usually very close to shore.



The restricted inshore habitat also makes this species particularly exposed to whale watching activities, which is increasing in the area.

Out of the 70 sightings, 41% consisted of single animals, 50% of paired individuals (59% of which were mothers with calves) and 7% of "mother-calf-escort". An active group of six whales was encountered in one occasion. New-born calves were mainly observed during August-October.

The consistent observation of new-born calves strongly suggests that La Réunion represents a breeding area for humpback whales, with at least some whales showing a relatively long residency around the island.

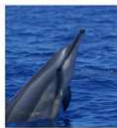
**45 whales were photo-identified:**  
- no match was observed between years.  
- 14 whale re-sighted within the same season (at 1 day to 2 months interval)



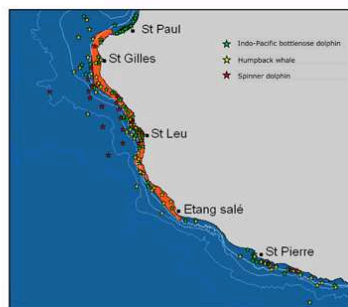
Over the 4 years, whales wintering in La Réunion had never been re-sighted in subsequent years, suggesting changes in wintering destination from one year to the next.

#### Spinner dolphin (*Stenella longirostris*)

The spinner dolphin was the 3rd most frequent species sighted. It was sighted all months except April. **26.7% of the sightings occurred within the MPA**. The species showed a wide depth range (3-720m), with late afternoon sightings tending to occur in deeper waters than morning sightings (Pearson Correlation= 0.608, p= 0.003). This tendency to use inshore waters in early morning and to move further offshore later in the afternoon, suggest a daily pattern in habitat use.



The coastal waters of the western coast of La Réunion, including the MPA, might provide a resting area for spinner dolphins.

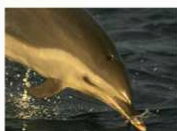


#### Common bottlenose dolphin (*Tursiops truncatus*)

*T. truncatus* was observed in the study area, although at a lower encounter rate than *T. aduncus*. The species used deeper waters (425.6m) and was thus **never sighted in the MPA**. The species was observed each month, except in April and July. Therefore the spatial distribution of the two *Tursiops* species did not overlap.



Other species were sighted at a lower rate.



**Pantropical spotted dolphin** (*Stenella attenuata*)  
Encounter rate: 0.009/hr  
Group size: 79 individuals  
Mean bottom depth: 881m



**Melon-headed whale** (*Peponocephala electra*)  
Encounter rate: 0.008/hr  
Group size: 477 individuals.  
Bottom depth: 823m



**Fraser's dolphin** (*Lagenodelphis hosei*)  
Encounter rate: 0.004/hr  
Group size: 158 individuals  
Bottom depth: 777m  
Always associated with *P. electra*



**Short-finned pilot whale** (*Globicephala macrorhynchus*)  
Encounter rate: 0.001/hr  
Group size: 50 individuals  
Bottom depth: 1250m



**Sperm whale** (*Physeter macrocephalus*)  
Encounter rate: 0.002 /hr  
Group size: 8 individuals  
Bottom depth: 550m

**Antarctic minke whale** (*Balaenoptera bonaerensis*)  
Encounter rate: 0.001/hr  
Group size: 1 ind.  
Bottom depth: 10 m

### CONCLUSION

The study demonstrates:

- A resident population of Indo-Pacific bottlenose dolphin and a regular occurrence of common bottlenose and spinner dolphins
- La Réunion represents a breeding site for humpback whale.
- The frequent use of the newly created MPA by the three most common species (Indo-Pacific bottlenose dolphin, the humpback whale and the spinner dolphin), thereby the importance of the MPA as an ecological niche for cetaceans.

Concrete cetacean conservation measures need to be included in the MPA management plan, especially to control whale watching, which is increasing off the western coast of La Réunion.

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