

# Presence and distribution of small cetaceans in the Northern Aegean and Eastern Mediterranean Seas: a summary of the key findings from the *Song of the Whale* team research project in summer 2013

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## ABSTRACT

The *Song of the Whale* team and collaborators undertook a research project in parts of the Eastern Mediterranean Sea (the Northern Aegean and Levantine Seas) between July and September 2013. The project had several aims: to provide data for remaining systematic survey ‘gaps’ for sperm whales in the Mediterranean; investigate the waters of the northern reaches of the Aegean Sea for the presence of harbour porpoises and, to provide data to help identify risks posed by shipping to cetaceans such as noise pollution and ship-strikes. Over 7000 km of trackline were surveyed using acoustic and / or visual effort. Free-swimming harbour porpoise were encountered for the first time in over 20 years; the porpoise encounters comprised of acoustic detections; north of Thasos Island, Greece and west of Alexandroupoulos, Greece and, in Saros Bay, Turkey, sightings and acoustic detections. All reports of harbour porpoise were within the Thracian Sea. Common bottlenose dolphins were the most frequently sighted cetacean species in the Aegean Sea, while striped dolphins were observed most often in the Levantine Sea. Common dolphin sightings were limited to the Northern Aegean Sea, primarily in the Thracian Sea. Rarely seen rough-toothed dolphins were observed twice in the Levantine Sea, south of Cyprus, while Risso’s dolphins were documented four times in the study area. Seven acoustic detections (no sightings) of beaked whales occurred within the survey area, one in the Ikaria Basin, an area thought to be important for deep diving species, and six along the Anaximander Seamount, south of Turkey. This short document summarises the distribution of small cetaceans during the survey; additional details of all species reported, as well as information on marine debris and noise measurements undertaken, is available in a full report (Ryan *et al.*, 2014).

## INTRODUCTION

The *Song of the Whale* (SOTW) team and collaborators undertook a research project in the Mediterranean Sea between the 18<sup>th</sup> July and the 2<sup>nd</sup> September 2013; this was the first systematic survey for sperm whales (*Physeter macrocephalus*) and harbour porpoises (*Phocoena phocoena*) in the Northern Aegean Sea. Some parts of the eastern Mediterranean Sea that have received limited survey effort were also surveyed. The project had several aims: to fill remaining systematic survey ‘gaps’ for sperm whales in the Mediterranean; investigate the waters of the northern reaches of the Aegean Sea for the presence of harbour porpoises and, to provide data to help identify risks posed by shipping to cetaceans such as noise pollution and ship-strikes. Unfortunately Egyptian waters were not included as originally planned. This brief report explains the key findings from this survey for small cetaceans. For the full report and further details on the methodology and results for all species please see Ryan *et al.*, 2014 ([www.marineconservationresearch.co.uk/downloads/](http://www.marineconservationresearch.co.uk/downloads/)).

## METHODS

The survey comprised two parts:

### **Broad-scale survey of the Northern Aegean Sea and Levantine Sea between Rhodes and Cyprus:**

During the survey single platform visual effort was conducted in daylight hours and in sea states  $\leq 4$  with two observers standing on a raised platform with an eye height of approximately 5 m. A simultaneous acoustic survey was conducted using a towed five element hydrophone array 24 hours a day and in all sea states. Both broadband and low frequency elements were used recording at sample rates of 48 kHz (for sperm whales, mid-

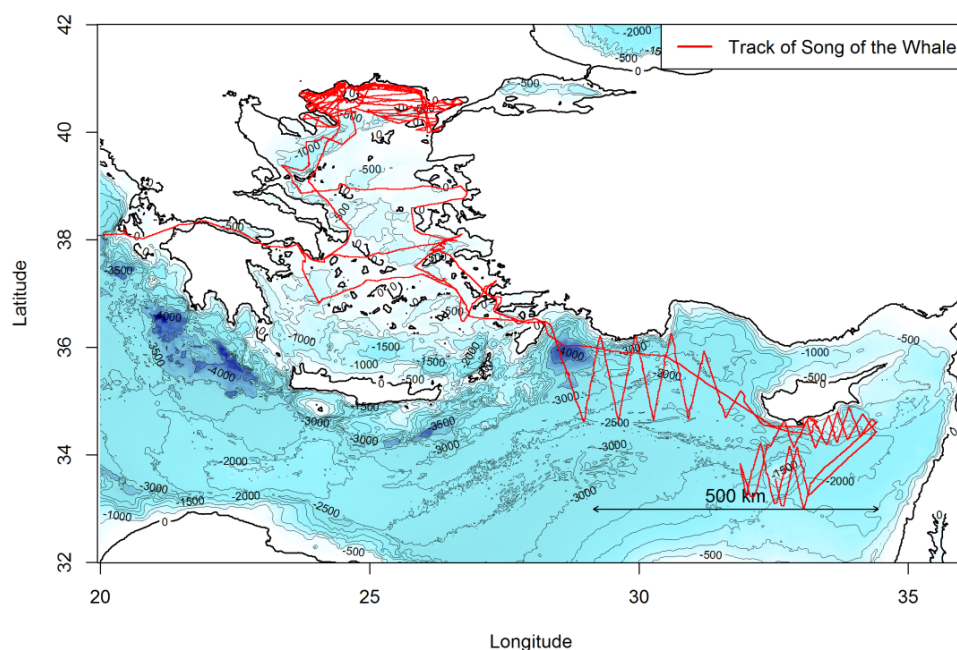
frequency species and ambient noise measurements) and 192 kHz (for beaked whales and other high frequency species).

#### **Fine-scale survey of the Thracian Sea (northern Aegean Sea):**

For the Thracian Sea survey only, both double platform visual surveys (during daylight hours and in sea states  $\leq 3$ ) as well as an acoustic survey (24 hours a day, in all sea states) were undertaken. The double platform visual survey consisted of two pairs of observers (one pair of observers standing on a raised platform by the mast with an eye height of  $\sim 3.5$  m, and the other pair on a raised A-frame platform towards the stern of the boat with an eye height of  $\sim 5$  m). The acoustic survey used two double-element hydrophone arrays recording at a sampling rate of 500 kHz through PAMGUARD software (Gillespie *et al.*, 2009). A low resolution survey was conducted throughout the entire Thracian Sea area, followed by a higher resolution survey covering the coastal waters (Figures 2). Acoustic encounter rates of detections / 100 km surveyed were calculated from the data after post-processing by two independent analysts using PAMGUARD.

## **RESULTS AND DISCUSSION**

A total of 4293 kilometres of survey trackline were covered with acoustic and / or visual effort during the broad-scale survey of the Eastern Mediterranean (broad-scale Aegean survey=942 km and Levantine Sea= 3351 km) (see Figure 1). An additional 3295 km of transects were covered with acoustic effort, of which 757 km included single visual platform effort and 1001 km with double visual platform effort during the Thracian Sea survey (see Figure 2).



*Figure 1. Survey tracks conducted in the Aegean and Eastern Mediterranean Sea.*

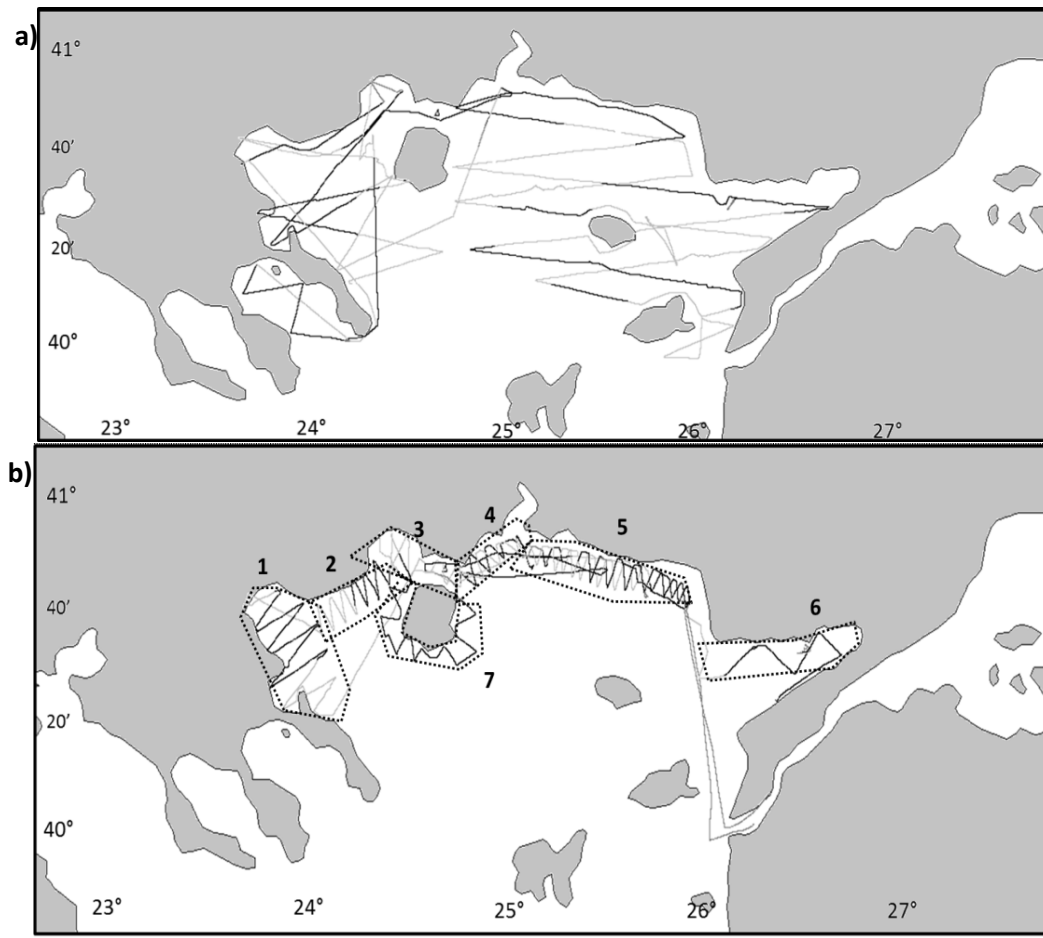


Figure 2. Survey tracks conducted in the Thracian Sea, northern Aegean Sea (black lines represent survey with visual and acoustic effort and grey lines represent the survey with acoustic effort only: a) low resolution transects, b) higher resolution coastal blocks (marked 1-7, black dotted line) and coastal transects.

#### Harbour porpoise (Thracian Sea, northern Aegean survey)

In total, harbour porpoises were seen on nine occasions on two days; all sightings occurred in Saros Bay, Turkey (Figure 3, Table 1). On 12<sup>th</sup> July 2013, four sightings of porpoises were made; one of a group of four animals, two sightings of two animals and a further sighting of a single individual. On 26<sup>th</sup> July, harbour porpoises were sighted on five separate occasions, clustered in to three pairs and two single (Figure 3). One of the pairs included a calf swimming in close association with another animal, presumably the mother. Acoustic detections of porpoises ( $n = 16$ ; 14 of which 'on track') were made throughout the survey in Greek and Turkish waters, four of these were accompanied by visual encounters (Table 1). The detections were made to the north of the Greek island of Thasos, west of the Greek city of Alexandroupolis and in Saros Bay (Figure 3). Each of the reported acoustic detections was separated by a minimum of 12 minutes (i.e. 1.2 km at 6 knots mean vessel speed) and was therefore deemed to be from different groups. Highest acoustic encounter rates were found in Saros Bay (Table 1). The sighting of a calf is a positive sign that breeding may be occurring in the region.

Table 1. Harbour porpoise acoustic detections per 100 kilometres acoustically surveyed. The number of sightings is also listed from the low-resolution survey (high-resolution survey sightings in parentheses).

On-track Acoustic Detections $n$ / 100 km (SE of $n/100$ km)	No. of Sightings
Combined high and low resolution survey results: 0.35 (<0.01)	9
<b>High resolution coastline survey results (Areas shown in Figure 1):</b>	
Area 1 – 0 (0)	0 (0)
Area 2 – 0.7 (0.02)	0 (0)
Area 3 – 2.3 (0.05)	0 (0)
Area 4 – 0.8 (0.03)	0 (0)
Area 5 (Alexandroupolis)– 0.9 (0.02)	0 (0)
Area 6 (Saros Bay) – 3.6 (0.04)	5 (4)
Area 7 (South of Thasos)– 0 (0)	0 (0)

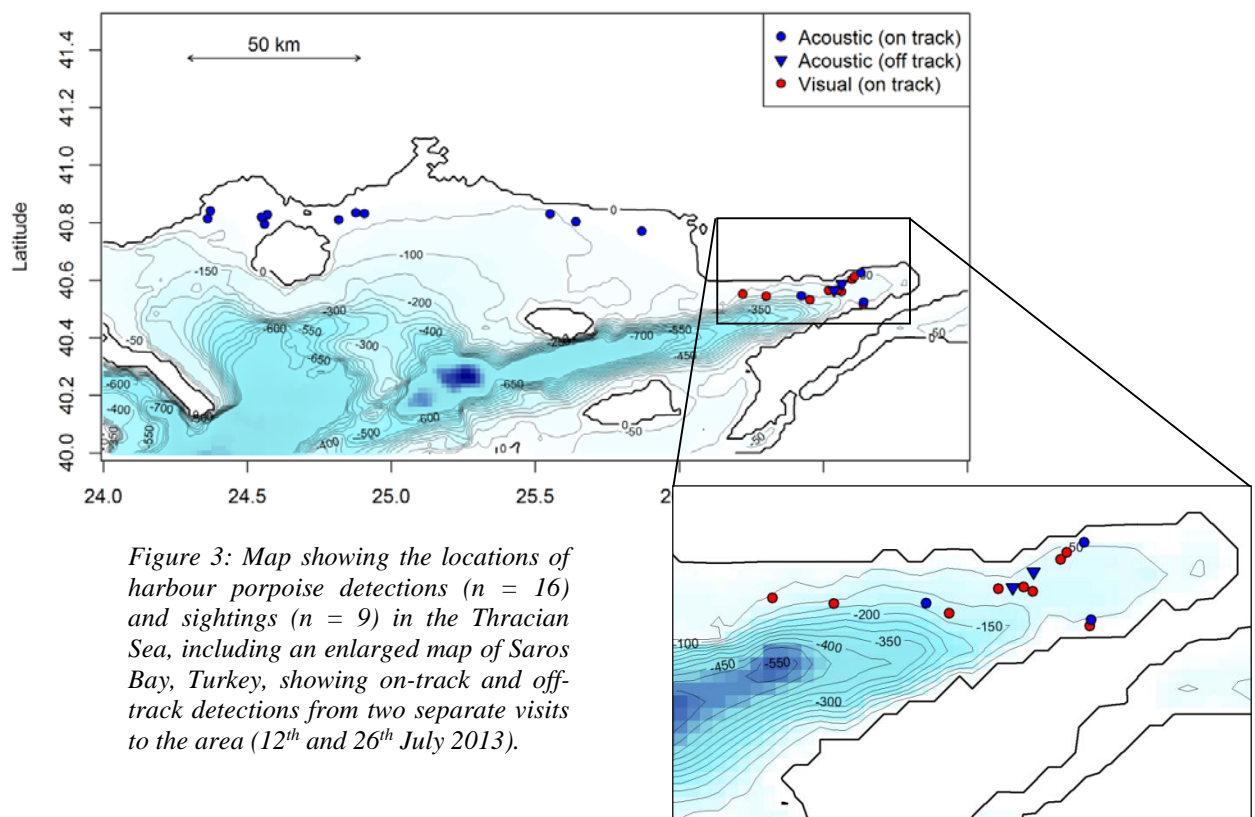


Figure 3: Map showing the locations of harbour porpoise detections ( $n = 16$ ) and sightings ( $n = 9$ ) in the Thracian Sea, including an enlarged map of Saros Bay, Turkey, showing on-track and off-track detections from two separate visits to the area (12<sup>th</sup> and 26<sup>th</sup> July 2013).

## Delphinids

The Aegean Sea had a much higher delphinid encounter rate than the Levantine Sea. Bottlenose dolphins (*Tursiops truncatus*) were the most commonly sighted species in the Aegean Sea; however they were only sighted once in the Levantine Sea. Striped dolphins (*Stenella coeruleoalba*) were the most commonly sighted species of cetacean in the Levantine Sea (Table 2). Common dolphin (*Delphinus delphis*) sightings were largely confined to the northern Aegean Sea with just two encounters further south in the Aegean and none reported in the Levantine Seas (Figure 4, Table 2). Four sightings of Risso's dolphin (*Grampus griseus*) were recorded during the entire survey (one in the northern Aegean Sea, and three in the Levantine Basin) (Figure 4). Rough-toothed dolphins (*Steno bredanensis*) were encountered twice during the survey in the Levantine Sea (Figure 4). These new records have been included in an IUCN regional assessment for this species in the Mediterranean Sea. Consistent with acoustic recordings of rough toothed dolphins made previously in the Mediterranean Sea, the whistles of this species showed idiosyncratic jumps in frequency that may, in the future, prove invaluable in recognising rough-toothed dolphins from passive acoustic survey data. Contingent on funding, further analysis and description of these findings would contribute to development of automated detection algorithms which

could be applied to previous acoustic survey data, to shed further light on the presence and distribution of this poorly studied species from archived datasets.

*Table 2: Summary of small cetacean sightings during surveys in the Aegean Sea and eastern Mediterranean Sea. (\* included one mixed species sighting with common dolphins and one with striped dolphins).*

Species	groups (n)	group size range	groups 100 km <sup>-1</sup>
<b>Common bottlenose dolphin</b>	51*	1-9	2.215
<b>Short-beaked common dolphin</b>	18	2--2	0.782
<b>Risso's dolphin</b>	1	6-10	0.043
<b>Striped dolphin</b>	30	1-20	1.303
<b>Unidentified dolphin</b>	34	1-10	1.477
<b>Total</b>	<b>134</b>	<b>-</b>	<b>5.821</b>

Species	groups (n)	group size range	groups 100 km <sup>-1</sup>
<b>Common bottlenose dolphin</b>	1	4--5	<0.001
<b>False killer whale</b>	1	3--4	<0.001
<b>Risso's dolphin</b>	3	2--15	0.002
<b>Rough-toothed dolphin</b>	2	3--9	0.001
<b>Striped dolphin</b>	6	2--18	0.003
<b>Unidentified dolphin</b>	1	1	<0.001
<b>Total</b>	<b>14</b>	<b>1</b>	<b>0.008</b>

#### **Beaked whales (Ziphiidae sp.)**

Seven acoustic detections of beaked whale were recorded during the survey, although there were no sightings. Beaked whale clicks were detected in the Ikaria Basin in the central Aegean Sea, an area which appears to be particularly important to deep diving species as several sperm whales were also detected here. A further six distinct detections of beaked whales were made along the Anaximander Seamount, south of Turkey (Figure 4).

#### **ACKNOWLEDGEMENTS**

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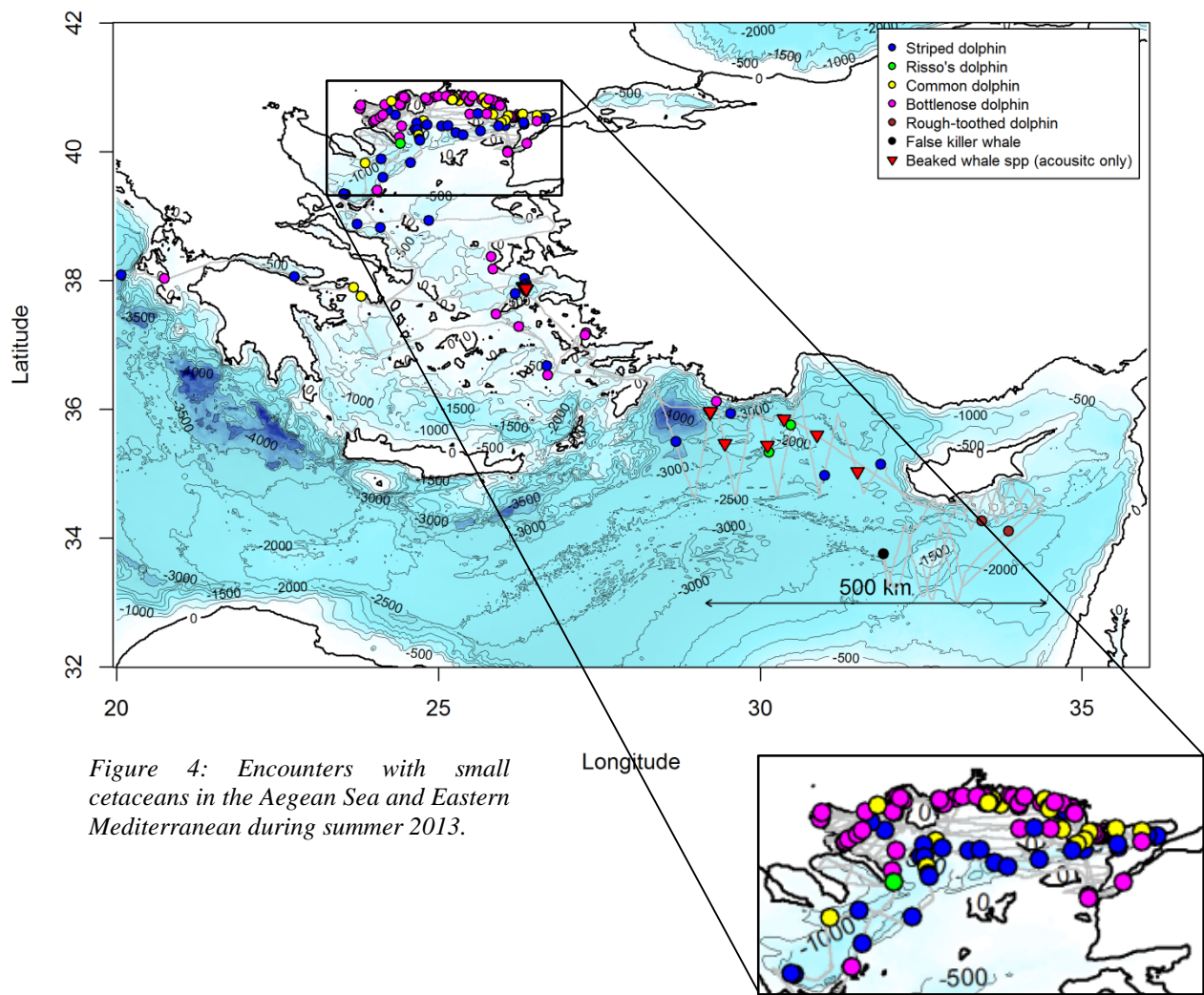


Figure 4: Encounters with small cetaceans in the Aegean Sea and Eastern Mediterranean during summer 2013.

## REFERENCES

- Gillespie D., Mellinger D.K., Gordon J., McLaren D., Redmond P., McHugh R., Trinder P., Deng X-Y., Thode A., 2009. PAMGUARD: Semi-automated, open source software for real-time acoustic detection and localisation of cetaceans. *Journal of the Acoustical Society of America* 125(4): 2547-2547.
- Ryan, C., Cucknell, A.C., Romagosa, M., Boisseau, O., Moscrop, A., Frantzis, A. and McLanaghan, R. 2014. A visual and acoustic survey for marine mammals of the Aegean Sea and Levantine Sea, eastern Mediterranean conducted from R/V Song of the Whale July to September 2013. Report to the International Fund for Animal Welfare. 53 pp.