



AWBERY

THE DELINEATION OF CRITICAL HABITATS FOR THE CONSERVATION OF CETACEANS IN THREE UNDERSTUDIED AREAS OF THE MEDITERRANEAN

Tim Awbery¹, Patrick Lyne¹, Lucy Abbiss¹, Harry Clark¹, Rigers Bakiu^{2,3}, Kristian Beqiri^{2,3}, Aleksander Kononi^{2,3}, Sara Todorovic¹, Melis Basmaci¹, Jack Clarkson¹, Laura Rudd¹, Enorha Guimard¹, Liam Van Walsum¹, Natasa Nikpaljevic¹, Aylin Akkaya Bas¹

¹ Marine Mammals Research Association, Montenegro, ² Albanian Centre for Environmental Protection and Sustainable Development (ACEPSD), ³ Agricultural University of Tirana.



Introduction

The delineation of critical habitats forms an important step in the implementation of marine protected areas (MPAs). Whilst MPAs are known as one of the strongest conservation strategies, they cover only 6% of the Adriatic with a single MPA of Karaburun Sazani in the Southern Adriatic. Similarly, only 4% of Turkish waters have been designated MPAs. The Adriatic and Levantine Seas have been identified as cetacean hotspots, yet are under increasing anthropogenic threats including illegal fishing practices, tourism and disturbance from naval sonar and seismic activity, each of which have short and/or long term effects on cetacean species. The current studies run a dedicated cetacean research effort in order to collect missing baseline knowledge and to identify critical habitats for cetaceans in these data deficient areas.

SURVEY SITES: MONTENEGRO & ALBANIA



Figure 1: Montenegro Survey Coverage



Figure 2: Albania Survey Coverage



Figure 3: Turkey Survey Coverage



Results

MONTENEGRO

512 surveys between 5.09.2016 and 27.09.2019 during which two species were encountered;

Bottlenose dolphins (*Tursiops truncatus*)

- 278 groups in 174 sightings.
- Mean group size was 3.6 ± 2 ind. with an encounter rate of 4 groups/100 km².
- Season had no significant effect on sightings with an average 36% sighting success each season.
- Northern Montenegro has the significantly higher sighting success (49%).
- 72 individuals were identified with 60% re-sightings.
- Critical habitats identified the entrance of Boka Kotorsko and coastal waters of Katic, Bar, Utjeha and Ulcinj (Figure 4).

- **Striped dolphins (*Stenella coeruleoalba*)**
- 15 groups in 11 sightings. Mean group size is 19 ± 11 ind.
- Potential critical habitats identified in the offshore waters of Platamuni (Figure 5).

ALBANIA

- 32 surveys between 5.11.2016 and 25.10.2019.
- Two species were encountered; bottlenose and striped dolphins
- A mixed group association of bottlenose and striped dolphins were documented
- Bottlenose dolphins were sighted in 10 groups in 7 survey days. Mean group size was 3.8 ± 2.7 .
- Relatively high sightings in Cape of Rodon (Figure 6).

*As of March 2019

Bottlenose Dolphin Critical Habitats



Figure 5.

Striped Dolphin Potential Critical Habitats

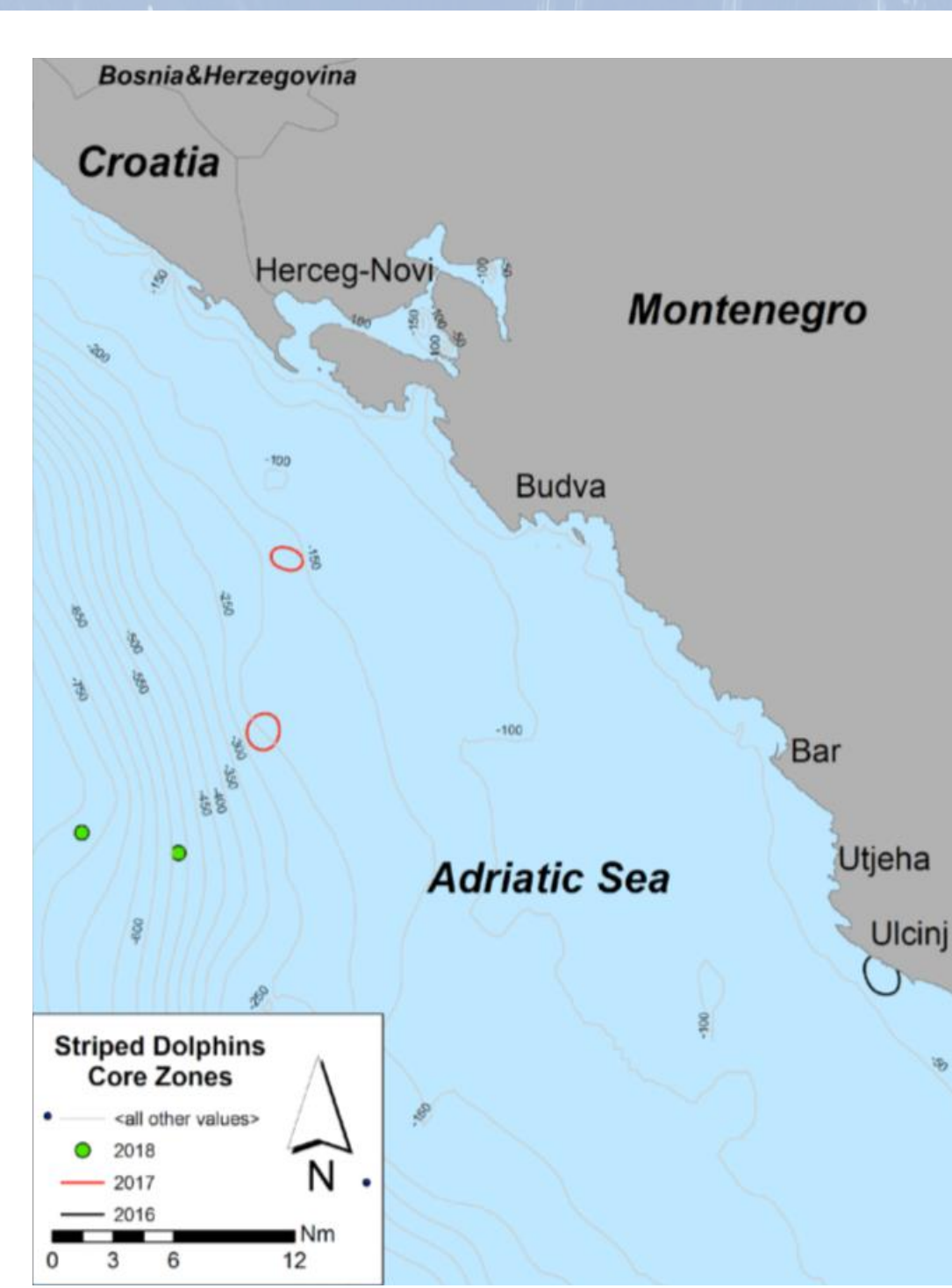


Figure 6.

TURKEY

- A total of 4384.76 km in 49 survey days were covered between 14.04.2018 and 26.07.2019.
- 146 encounters over 35 different days
- 2.78 groups of small cetaceans per 100 km and 0.55 groups of deep diving species (sperm whales and beaked whales) per 100 km.
- Bottlenose dolphin were found in groups of 1-10 individuals.
- Common dolphins were found in groups of 4-20 individuals.
- Sperm whales were found in groups of 1-5 individuals.
- The sighting rate of small cetaceans was 9.17 times higher than for deep diving ones.
- Majority of sightings around the Fethiye Canyon (Figure 7.)

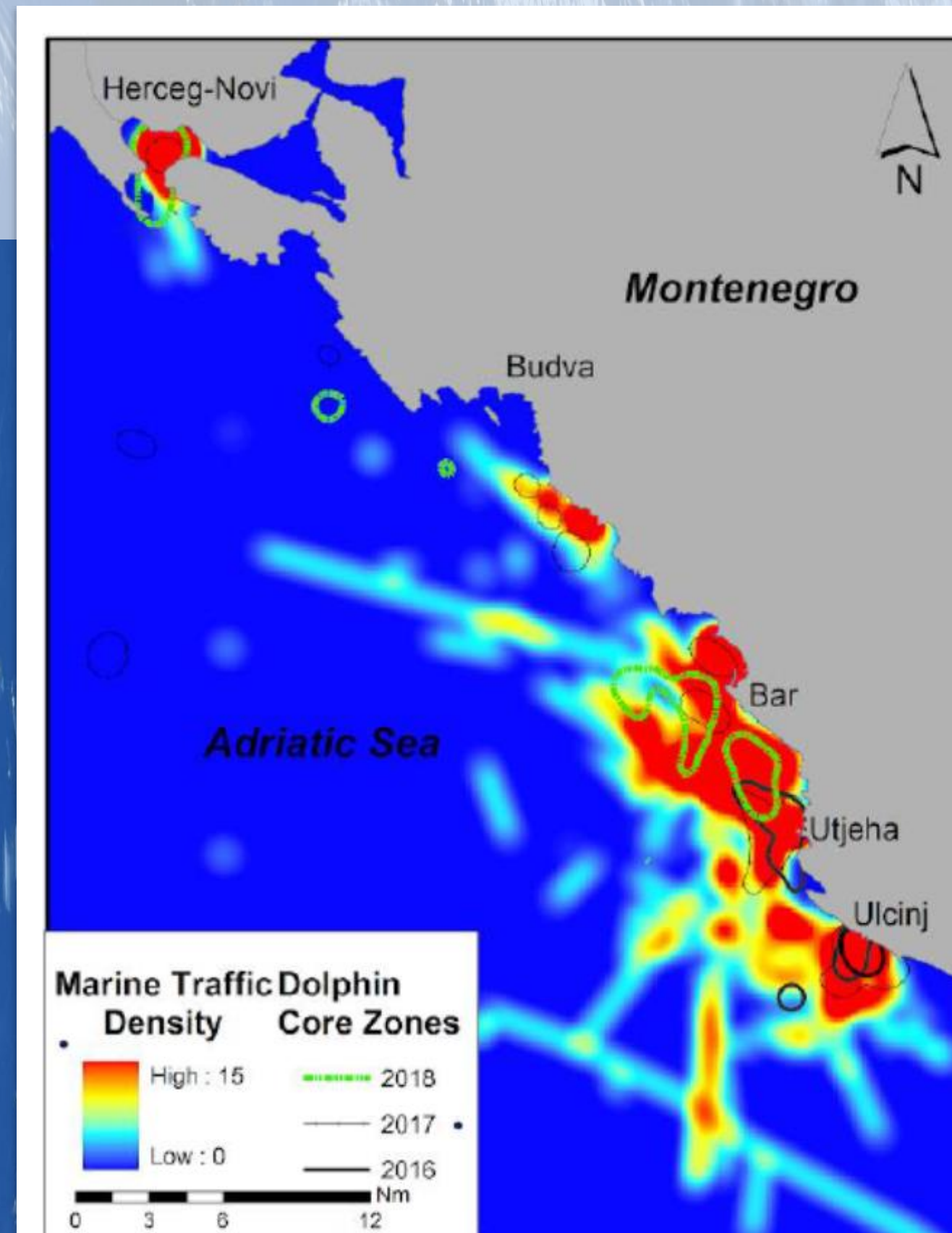


Figure 8

Methodology

Continuous land and boat surveys have been carried out in Montenegro since September 2016 in order to record the patterns and changes to cetacean behaviour as well as to understand the spatial and temporal distribution of cetaceans and marine traffic. Stranding surveys were carried out in Montenegro from January to April 2019 following extensive seismic work. Land surveys have been conducted on an opportunistic basis in Albania since December 2018. A seasonal boat survey has been undertaken in the Levantine Sea since April 2018 following land and boat surveys in Antalya bay in 2015 and 2016.

LAND SURVEYS

Theodolite stations were set for Montenegro and Albania, in 5 and 3 locations respectively (Figure 1,2). Vertical and horizontal angles of cetaceans and marine traffic were transferred into geographical positions using Pythagoras software.

BOAT SURVEYS

Boat surveys were conducted in Montenegro following 3 routes ; Bar to Utjeha, Budva to Kotor, Herceg Novi to Deep Seas (Figure 1). Survey route and dolphin sightings were recorded in Logger 2010. Photographs of each individual dolphins were taken for photo-identification – using discovery software.

Boat surveys in the Levantine Sea followed 22 equal spaced zigzag lines with a total length of 644 km and covering an area of 23.438 km² and consisted of both acoustic and visual surveys.

Discussion

- Critical habitats for bottlenose dolphins are delineated in the entrance of Boka Kotorsko and coastal waters of Katic, Bar, Utjeha and Ulcinj. Offshore waters of Platamuni may hold critical habitat(s) for striped dolphins, specifically between 300-700m contours.
- Selected critical habitats show a considerable overlap with marine traffic (Figure 8).
- Selected critical habitats show a striking overlap with proposed MPAs in Montenegro, thus highlighting the importance of cetacean research on MPA selection.
- 71 individuals of bottlenose dolphins are identified
- Albania Dolphin Research is in its preliminary stage but frequent dolphin sightings occur at the Cape of Rodon.
- The study in Turkey is the first dedicated survey effort and has demonstrated the year round presence of cetaceans.
- Bottlenose dolphins and beaked whales weren't sighted in Antalya Bay despite a heavy cetacean presence recorded there in 2015 and 2016.

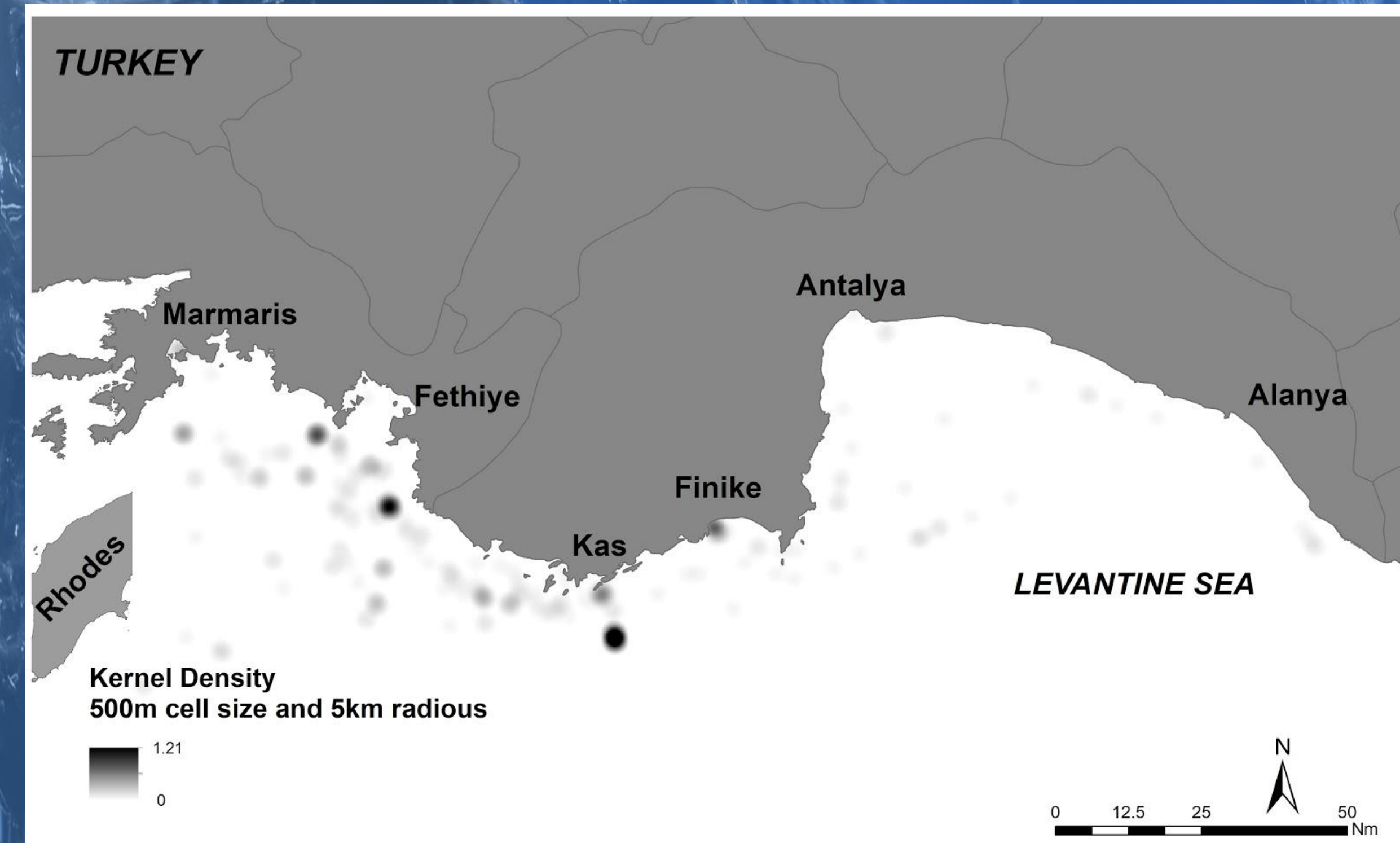


Figure 7.

Conclusion

- It is imperative that these dedicated survey efforts have to continue to fully understand the spatial and temporal variations, behavioural patterns and the effect of threats on small cetaceans of the South Adriatic and the Levantine Sea.
- The collected baseline knowledge with identified critical habitats can contribute to the MPA implementations in the South Adriatic by using cetaceans as indicator and flagship species.
- The future of marine biodiversity depends on transboundary collaborations between all stakeholders.
- The survey effort in the Levantine Sea has shown a year round presence of cetaceans with particular abundance in the Fethiye Canyon but these are preliminary surveys and more work needs to be done to better understand the spatial and temporal distribution in the Levantine.
- There is a need for increased survey effort in Antalya Bay in order to better understand the apparent decline in the bottlenose dolphin population there.

References

Figure 1. : Clarkson, J., Christiansen, F., Awbery, T., Abbiss, L., Bas, A. A., 2019. Non-targeted tourism affects the behavioural budgets of bottlenose dolphins (*Tursiops truncatus*) Montenegro, South Adriatic. Manuscript submitted for publication
Figure 5., Figure 6., Figure 8 : Awbery, T., Nikpaljevic, N., Clarkson, J., Abbiss, L., van der Pouw Kraan, D., Liebig, P., Todorovic, S., Akkaya Bas, A., 2019. Bottlenose and striped dolphins of Montenegro an insight into sighting variations, behavioural patterns, photo-identification, core habitats, marine traffic and conservation initiatives 2017-2018.

