

## Vantage point surveys of cetaceans (Mammalia, Cetacea) and their interactions with marine birds

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**Abstract.** Between June and September 2021, observations were carried out from a vantage point near Cape Emine. The surveys cover 20 field days and 160 hours. Near Ahtopol between June and November – 18 field days and 146 hours in 2022. All of the three cetacean species, occurring in the Black sea, were observed in Cape Emine: 336 animals in 143 sightings. The highest number of individuals recorded, was in June: 154 animals in 65 sightings. Near Ahtopol in 2022 only *Phocaena phocaena* (61 individuals and 143 sightings) and *Delphinus delphis* (38 individuals in 1 sighting) were recorded. Interactions with marine birds were recorded during 93 % of observations on cetacean feeding.

**Key words:** cetaceans, marine birds, Black Sea.

### Introduction

Observations from shore, which are the basis of the vantage point method, have been used for many years to study cetaceans (and other marine mammals) and birds in countries such as the Netherlands, UK, Denmark, Germany, Italy, USA, Canada, etc. and have recently been applied in Bulgaria (Delov *et al.* 2015; Goffmann *et al.* 2015). Globally, long-term surveys using this method are also extremely insufficient and only cover the peak periods of activity (Read 2002). Usually during such studies a lot of interactions between cetaceans and marine birds are observed but this type of data are ignored.

This paper, presents the results of the survey, aimed at obtaining valuable and original data on the distribution, ecology and behavior of cetaceans in the Cape Emine and Ahtopol areas with interactions with marine birds.

### Methods

The vantage points selected for the study, were located approximately 300 m north of Cape Emine and from a hill near Ahtopol beach (N 42.704484°, E 27.898643° and 42° 6'7.56"N, 27°55'33.70"E).

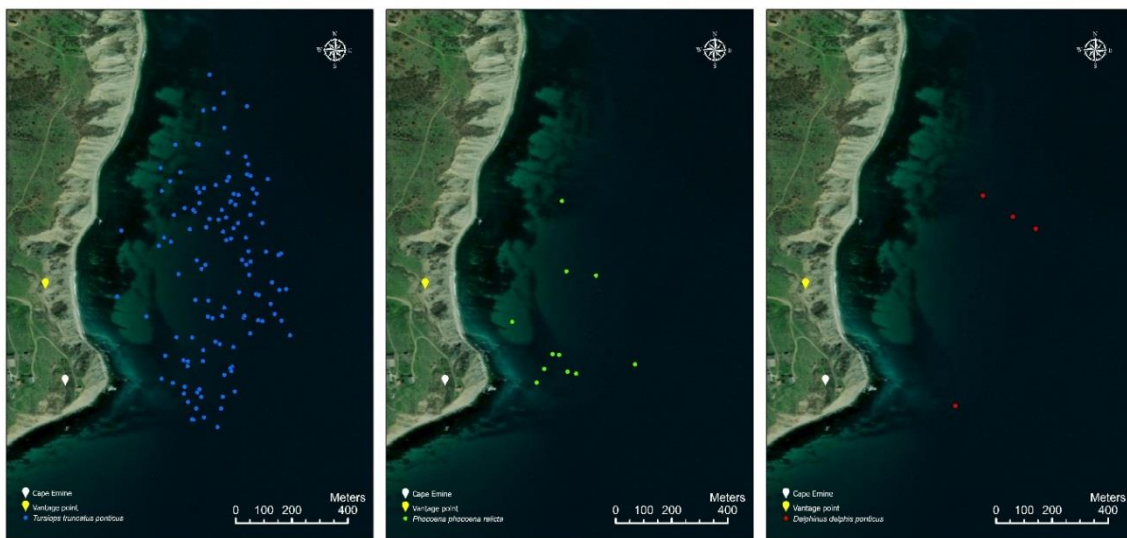
The water area, over which the observations were carried out, is limited in a horizontal plane by an observation angle of 120° and a distance from the observation point of 2.5 km. Thus, the main observation sector covers an area of 6.54 km<sup>2</sup>.

For the vantage point survey, we used (with slight modifications) the methodology developed for the 2014-2015 field surveys of cetaceans in the Bulgarian Exclusive Economic Zone (EEZ) in the Black Sea (Goffmann *et al.* 2015). Eight-hour observations are carried out (08:00h - 16:00h), using optical instruments (“Konus Tornado” and “Barska” 7x50 Binoculars and “Bresser” 20-60x60 Spotting scopes, cameras Nikon D90 75-300 mm; Nikon Coolpix P1000, 24-3000 mm), with wave height up to 0,5-1 m and visibility over 1000 m. All cetacean species, marine birds and their interactions were recorded and if possible

photographed. The behavior was described using “Ad-libitum sampling” according Lehner, (1991).

### Results and Discussion

Between June and September 2021, observations near Cape Emine cover 20 field days and 160 hours, near Ahtopol between June - November –18 field days, 146 hours. As a result 336 individuals, in 143 sightings at C. Emine were recorded including *Delphinus delphis ponticus* (Barabash, 1935), *Tursiops truncatus ponticus* (Barabash-Nikiforov, 1940) and *Phocoena phocoena relicta* (Abel, 1905) - Fig. 1. The activity zone was: *T. t. ponticus*  $\approx$  0,37 km<sup>2</sup>, *P. p. relicta*  $\approx$  0,11 km<sup>2</sup> and *D. d. ponticus*  $\approx$  0,06 km<sup>2</sup>. Near Ahtopol between June and November – 18 field days and 146 hours in 2022. Only *Phocaena phocaena* and *Delphinus delphis* were recorded – 61 individuals and 143 sightings.



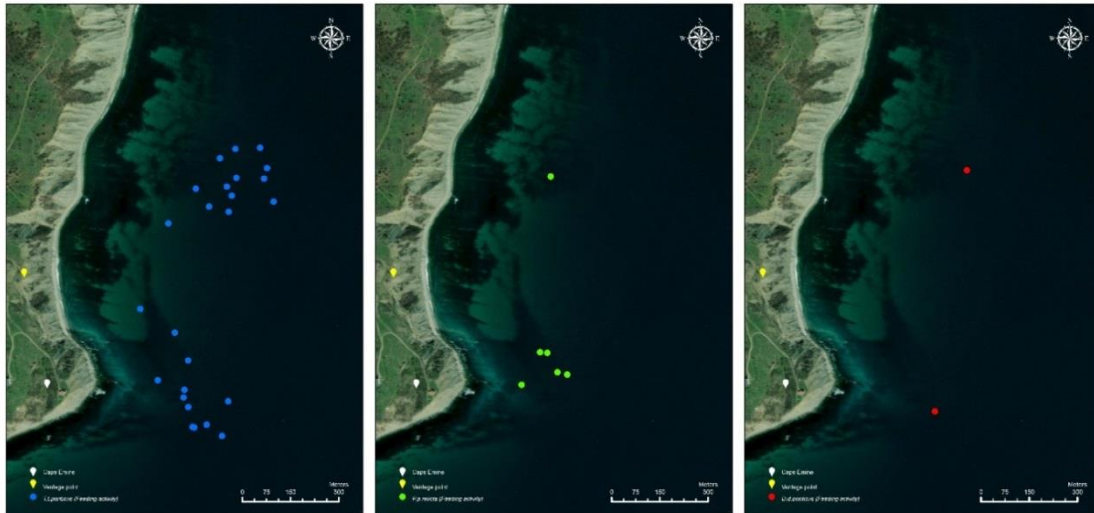
**Fig. 1.** Cetacean sightings at Cape Emine (white dot) between June-September, 2021 (blue – *T. t. ponticus*, green – *P. p. relicta*, red – *D. d. ponticus*, yellow - vantage - point).

Most of the in cetacean activity (70%) in Cape Emine and Ahtopl was between 7:00h and 12:00h). In Cape Emine the distance from shore was 80-550m., average: *P. p. relicta* – 232 m and 325 m near Ahtopol, *T. t. ponticus*  $\approx$  316 m and *D. d. ponticus* – 368,5 m. Single animals, pairs and groups of three are the most common, but up to 7 individuals have also been registered. The common dolphin was observed in November at Ahtopol, when a school of this species pressed large pods of Mediterranean horse mackerel towards the surf zone of Ahtopol beach. In doing so, many fish were thrown onto the sand. This attracted significant numbers of *L. michahellis* and *Chroicocephalus ridibundus* (Linnaeus, C 1766). Also, the fish were collected by people.

The number of registrations of feeding animals, for the entire observation period, is 34, which is close to 24% of all registrations in Cape Emine. Two clearly defined areas (of 0,04 km<sup>2</sup> each), used by cetaceans for feeding, have been identified (Fig. 3). The average feeding area was: *T. t. ponticus* - 0,17 km<sup>2</sup>; *P. p. relicta* - 0,03 km<sup>2</sup>. The average distance from shore, during feeding, was: *P. p. relicta* – 199 m, *T. t. ponticus*  $\approx$  283 m and *D. d. ponticus* – 292 m. During cetacean feeding, the constant presence (96% of registrations) of yellow-legged gulls (*Larus michahellis* J. F. Naumann, 1840) and great cormorants (*Phalacrocorax carbo* Linnaeus, 1758) was noticed.

In their interactions with cetaceans, gulls employed two strategies: capture of fish driven by cetaceans to the surface of the water and kleptoparasitism. Between 1 and 11

birds participated in these interactions, and 63% of them were successful - ending with feeding. With a larger group of cetaceans, the number of birds was also greater. Cormorants used only one strategy - to dive and hunt together with cetaceans. Their behavior could not be observed in detail because it took place underwater, they probably took advantage of the better organization of cetaceans in surrounding and directing the fish.



**Fig. 2.** Feeding activity during the 2021 observations at Cape Emine - white dot; blue – *T. t. ponticus*, green – *P. p. relicta*, red – *D. d. ponticus*, yellow - vantage - point.

Their feeding success was higher than that of gulls - 86%. It can be easily established as they always swallow the fish on the surface. However, the gulls increased their successful feedings by a third strategy - kleptoparasitism on the cormorants. In their attacks on cormorants, successful taking of already caught fish was recorded in 38% of cases. The gulls' most preferred co-hunting partners were bottlenose dolphins, followed by common dolphins and, to a lesser extent, porpoises.

Near Ahtopol the most of observations of *P. p. relicta* were during July and August. The proportion of feeding animals registrations, was 87 %. Groups consisted of 1-5 individuals, most often 2 individuals. In addition here also kingfishers (*Thalasseus sandvicensis*, Latham 1787) participated in interactions. They preferred large groups of porpoises, diving from a height of 5-10 m and falling into the water between the cetaceans. The most intense interactions with cetaceans in this area were with yellow-legged gulls. In this case, two strategies can be described. In larger groups of porpoises, gulls also moved in groups, landing in the water around the cetaceans as they surfaced. Cormorants and terns were usually also included in such a cetacean-bird assemblages.

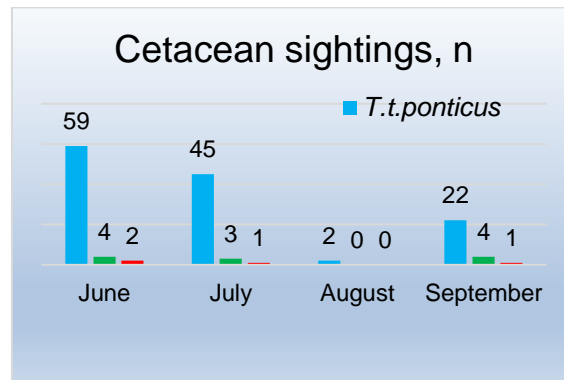
Individual porpoises were followed by gulls alone. In this case, the gulls were exhibiting territorial behavior by chasing away their conspecifics. They waited perched in the sea, carefully watching the adjacent water area in anticipation of the appearance of the porpoise on the surface (Fig 3). Then they quickly flew to the cetacean, trying to catch the chased fish or take away its prey. Such behavior was exhibited by both young and adult individuals.

Feeding success was relatively low at 11%. The highest number of individuals recorded in Cape Emine, was in June: 154 animals in 65 sightings.

A high number of registrations were also observed in July. (Fig. 4). During the period 20.11.2021 - 05.12.2021, from 43 vantage points evenly distributed along the entire Black Sea coast of Bulgaria 15 minute observations have been made. No cetaceans were observed in any of them.



**Fig.3.** *P. p. relicta* – *L. michahellis* feeding duo (photo by V. Delov).



**Fig. 4.** Sightings per month for each species.

### Conclusions

There are significant differences in the number of recorded sightings and individuals. Four seabird species interact with cetaceans during feeding, with the yellow-legged gull being the most active. During the winter, cetaceans avoid the coastal waters of Bulgaria, up to 4 kilometers from the coast.

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### References

- Delov, V., Terziiski, G., Mihailov, K., Klisarova, D & Goffmann, O. (2015). Ocenka na prirodzashtitno systoqnie s predlojenie za referentni stoynosti na morskya svinq (*Phocoena phocoena relicta*). Executive Environmental Agency, Sofia, 55 pp (in Bulgarian).
- Goffmann, O., Kerem, D., Mihailov, K., Dimitrov, K., Delov, V., Terziiski, G., Paiu, M. & Klisarova, D. (2015). Metodika za monitoring na kitopodobni bozainici. Executive Environmental Agency, Sofia, 93 pp (in Bulgarian).
- Lehner., P. N. (1991). Sampling Methods in Behavior Research. Poultry Science 71, 643-649.
- Read, A. J. (2002). Porpoises overview. In: Perrin W., Würsig, B. & Thewissen, J. (Eds.), Encyclopedia of Marine Mammals. Academic Press, London, pp. 982-985.
- Yen, P., Sydeman, W. & Hyrenbach, K. (2004) Marine bird and cetacean associations with bathymetric habitats and shallow-water topographies: implications for trophic transfer and conservation. Journal of Marine Systems 50, 79-99.