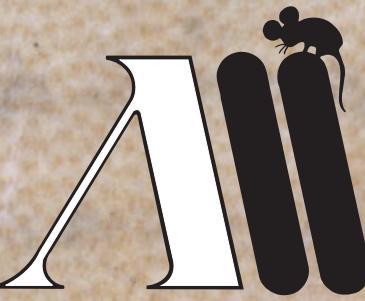


# ANNALES



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Annals for Istrian and Mediterranean Studies  
Series Historia Naturalis, 31, 2021, 2*



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## GREAT WHITE SHARKS, CARCHARODON CARCHARIAS, HIDDEN IN THE PAST: THREE UNPUBLISHED RECORDS OF THE SPECIES FROM TURKISH WATERS

Hakan KABASAKAL & Erdi BAYRI

Ichthyological Research Society, Tantavi mahallesi, Menteşoğlu caddesi, İdil apt., No: 30, D: 4, Ümraniye, TR-34764 İstanbul, Turkey  
e-mail: kabasakal.hakan@gmail.com

### ABSTRACT

*Three previously unpublished records of the great white shark, Carcharodon carcharias (Linnaeus, 1758), in Turkish waters were discovered through social media and internet data mining. Two of the individuals were recorded in the Sea of Marmara and the third in Edremit Bay (northeastern Aegean Sea). Understanding the historical occurrence and abundance of sharks in a given geographic area is critical. Thus, citizen science, social media supported studies, and analyses of historical data, which have produced relevant results in recent years, will undoubtedly help toward a more effective protection and management of this top predator.*

**Key words:** historical data, citizen science, social media, sharks, megafauna

## GRANDI SQUALI BIANCHI, CARCHARODON CARCHARIAS, NASCOSTI NEL PASSATO: TRE RITROVAMENTI INEDITI DELLA SPECIE IN ACQUE TURCHE

### SINTESI

*Tre registrazioni inedite del grande squalo bianco, Carcharodon carcharias (Linnaeus, 1758), in acque turche sono state scoperte attraverso i social media e il data mining di internet. Due degli individui sono stati registrati nel Mar di Marmara e il terzo nella baia di Edremit (Egeo nord-orientale). Comprendere la presenza storica e l'abbondanza di squali in una data area geografica è fondamentale. Quindi, la citizen science, gli studi supportati dai social media e le analisi dei dati storici, che hanno prodotto risultati rilevanti negli ultimi anni, aiuteranno senza dubbio a rendere più efficace la protezione e la gestione di questo grande predatore.*

**Parole chiave:** dati storici, scienza dei cittadini, social media, squali, megafauna

## INTRODUCTION

The great white shark, *Carcharodon carcharias* (Linnaeus, 1758) (Lamniformes: Lamnidae), is a globally widespread apex predator (Moro *et al.*, 2020). It is a large shark with an estimated total length of up to 640 cm (Randall, 1973), occurring circum-globally, but mostly in warm-temperate waters and less frequently in tropical regions, from the surface waters to depths of over 1280 m (Ebert & Stehmann, 2013). Once stigmatised as a man-eating monster, it has now resurrected as a charismatic flagship member of the marine megafauna and one of the stars of conservation action (Mazzoldi *et al.*, 2019).

In truth, historical and contemporary occurrences of *C. carcharias* have always been an attractive topic in the field of shark research (e.g., De Maddalena & Heim, 2012; Kabasakal, 2020a). In a recent study, Moro *et al.* (2020) reported 773 verified historical and contemporary records of *C. carcharias* from several regions of the Mediterranean Sea. Data on the occurrence of the great white shark in Turkish waters include a total of 62 historical and contemporary records (Kabasakal, 2020a).

In the present article, authors report the occurrence of 3 previously unpublished records of *C. carcharias* from Turkish waters, based on historical photographs.

## MATERIAL AND METHODS

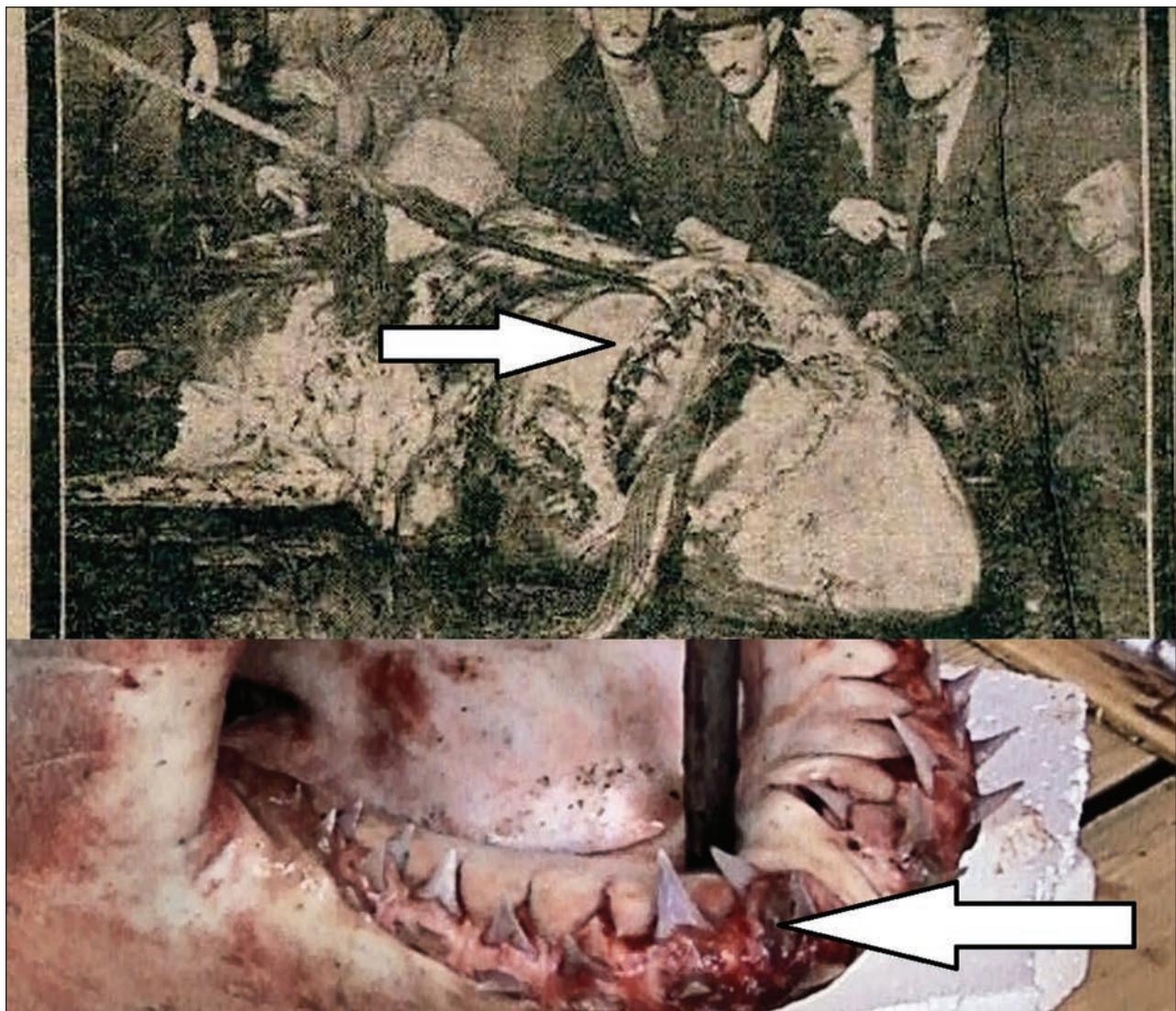
This article is part of an ongoing research begun in the early 2000s for the purpose of collecting and archiving historical and contemporary occurrence data of *Carcharodon carcharias* in Turkish waters, at the initiative of the Ichthyological Research Society. The results of the project called Turkish Great White Shark Data Archive (TGWSDA), comprised of data on 62 specimens and their images, gathered over the past 20 years, were recently published (Kabasakal, 2020a). The data concerning the 3 unpublished records of *C. carcharias* specimens caught in Turkish waters were obtained through data mining in the digitalized media of old newspapers published between the 1900s and the 1930s (2 specimens), as well as in contemporary internet news portals (1 specimen). Historical and contemporary photographs of the great white shark accompanied by informative content were published on social media platforms such as Facebook and Instagram, which are now accepted as important sources of information attracting a remarkably increasing interest of researchers (e.g., Boldroccchi & Storai, 2021; Kabasakal & Bilecenoglu, 2020; Giovos *et al.*, 2021). Since online communities and website administrators may react negatively to the use of their online content by researchers, following the ethical code

proposed by Monkman *et al.* (2017), all internet content scraping activity was performed responsibly to avoid compromising any personal data or image. An individual shark record was considered valid if the respective digital photograph provided a clear side view of the specimen, or in the case of video footage, if the shark was visible for a reasonable enough time, ca. 5 seconds, allowing the capture of a still image for the identification of the shark species. The species identification of the specimens in the extracted photographs followed the descriptive characters presented by De Maddalena & Heim (2012) and Ebert & Stehmann (2013). Moreover, to crosscheck the validity of the identification, the extracted images of the historical specimens were compared to photographs of contemporary specimens of *C. carcharias* captured in an identical or similar perspective. To provide a visual guideline for a quick crosscheck, the historical and the contemporary photographs of the respective great white shark were shown side by side. The examined photographs are preserved in the personal archive of the first author and available for inspection on request. The length and weight data of the examined specimens of *C. carcharias* are based on the information provided in the accompanying news content related to the respective great white shark.

## RESULTS AND DISCUSSION

The examined three specimens (Figs. 1 above, 2 left, centre, 3 centre) were identified as *Carcharodon carcharias* (Linnaeus, 1758) on the basis of the following characteristics: all three specimens had prominent triangular teeth. Likewise, the snouts exhibited a strong and conical structure. In addition, the black spots on the tip of the nose of specimen 3, captured on 14 July 2010, and the black spots on the ventral surfaces of the pectoral fin tips (Fig. 3 centre) were consistent with the black spots seen on the same body parts in the contemporary comparison photographs of great white shark (Figs. 3 left, right). The dental structure and the black mottling of the examined specimens both coincided with the descriptive characters stated by De Maddalena & Heim (2012) and Ebert & Stehmann (2013).

Specimen 1 (Fig. 1) was caught off the Prince Islands in the northeastern Marmara Sea on 2 February 1926 (Fig. 4; spec. 1). Information about the capture of specimen 1 was obtained from the news compiled by Malkoç (2018) from the newspapers of the period. According to the news published in İkdam, one of the newspapers of the period, on 2 February 1926, the great white shark caught by Yakup Kapitan and Kalkavanzade İbrahim Kapitan was misidentified as *dogfish* (*camgöz* in Turkish), and unfounded rumours of a human skeleton, three

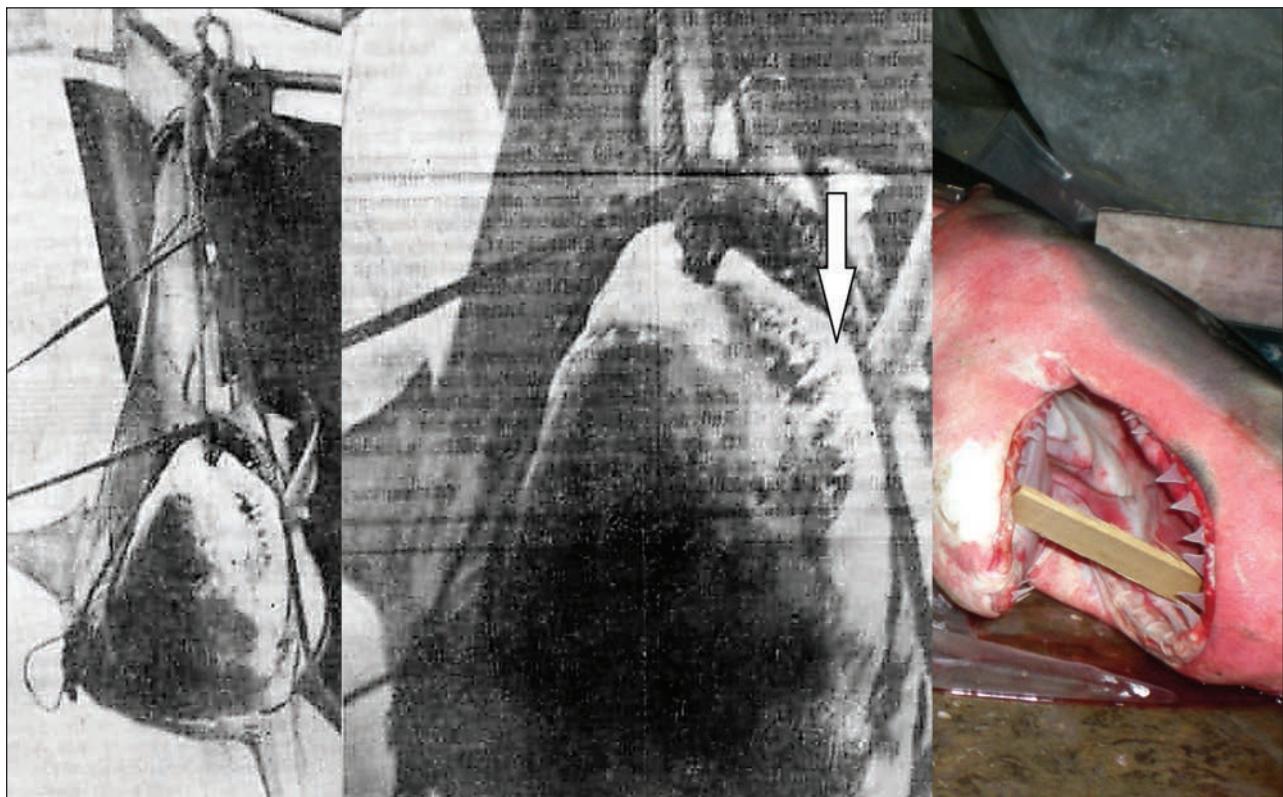


**Fig. 1: (Above)** Great white shark (spec. 1) caught on 2 February 1926; **(below)** comparison specimen published in Kabasakal et al. (2009). Arrows indicate teeth on the lower jaw.

**Sl. 1:** (Zgoraj) Beli morski volk (osebek 1), ujet 2. februarja 1926; (spodaj) primerjalni osebek, objavljen v Kabasakal et al. (2009). Puščice kažejo na zobovje spodnje čeljusti.

pairs of boots, and a fez – traditional Ottoman men's headwear – having been found in the stomach of the shark were also mentioned. According to the newspaper report, the great white shark was estimated to be 500 cm long, 150 cm wide, and weighing 2000 kg (Malkoç, 2018). The newspaper article further reported that the shark had teeth the size of a big human finger and its mouth opening was 68 cm wide. The shark, which was displayed to the public in Istanbul, was the subject of news in several other newspapers over the following days, accompanied by exaggerated claims that its weight, initially stated at 2000 kg, was 3000 or even 5000 kg (Malkoç, 2018).

Specimen 2 (Fig. 2, left, centre) was caught off Büyükada in 1936 (Fig. 4; spec. 2). The news accompanying the photograph of this great white shark stated it was 500 cm long and weighing 3000 kg. Since the information about this specimen appears to be limited to one newspaper clipping, this is all the data available on it. Finally, specimen 3 (Fig. 3, centre) was caught more recently, on 14 July 2010, off the coast of Küçükkyuyu (Edremit Bay; Fig. 4, spec. 3). According to the local news portal Çanakkale İçinde (2010), the great white shark, which was entangled in unspecified nets deployed by fisherman Ahmet Karabiyik, was 150 cm long and weighed 30 kg. Specimen 3 was incidentally caught in the



**Fig. 2:** (Left, centre) Great white shark (spec. 2) caught off Büyükada in 1936; (right) comparison specimen published in Kabasakal and Gedikoğlu (2008). Arrows indicate the characteristic triangular dentition of *Carcharodon carcharias*. Sl. 2: (levo, sredina) Beli morski volk (osebek 2), ujet blizu Büyükada v letu 1936; (desno) primerjalni osebek, objavljen v Kabasakal & Gedikoğlu (2009). Puščice označujejo značilno trikotno zobovje belega morskega volka.

recently documented nursery ground of *C. carcharias* in the northeastern Aegean Sea (Kabasakal, 2020b). Specimens 1 and 2 were incidentally caught in blue-fin tuna, *Thunnus thynnus*, handline fishing, which was common in Marmara between the 1900s and the 1930s, while specimen 3 was incidentally caught in coastal artisanal net fishery.

With the addition of these individuals to those registered with the TGWSDA, the number of great white sharks recorded to date in Turkish waters has increased to 65. This figure corresponds to 8.4 percent of the total number of individuals ( $n=773$ ) reported from the Mediterranean by Moro *et al.* (2020). This study is a recent example that researchers are hesitant to accept the status quo, demonstrating that the use of historical photography/data, data mining in social media or the internet, and citizen science, can yield remarkable and highly accurate results in shark research. The number of studies on Mediterranean great whites and other sharks using similar methodologies is increasing (e.g., Kabasakal, 2003, 2020a; Zogaris & De Maddalena, 2014; Bolodroccchi & Storai, 2021; Giovos *et al.*, 2021; Jambura *et al.*, 2021).

Scientists tend to value anecdotal historical reports less than more recent data collected in the field; however, Kwok (2017) describes historical photographs or old newspapers as “gold mines” of researchers working in fields such as ecology, and data mining such sources as “travelling in time.” Therefore, comparison with current photographs can be seen as a valid way of verifying the historical material in question.

Understanding the historical occurrence and abundance of sharks in a given geographic area is critical. When the current absence of sharks begins to overshadow their historical occurrence and abundance, it may lead to the shifting baseline syndrome, particularly in the younger generation of researchers, which prevents a full appreciation of the population collapse of cartilaginous fish in the Mediterranean. Zogaris and De Maddalena (2014) also drew attention to this, emphasising the importance of historical and anecdotal studies in combating this syndrome. To give an example, when the historical finds of great white sharks in the Sea of Marmara that were frequently mentioned in old fishing books and old newspapers, were uncovered years later through this type of re-

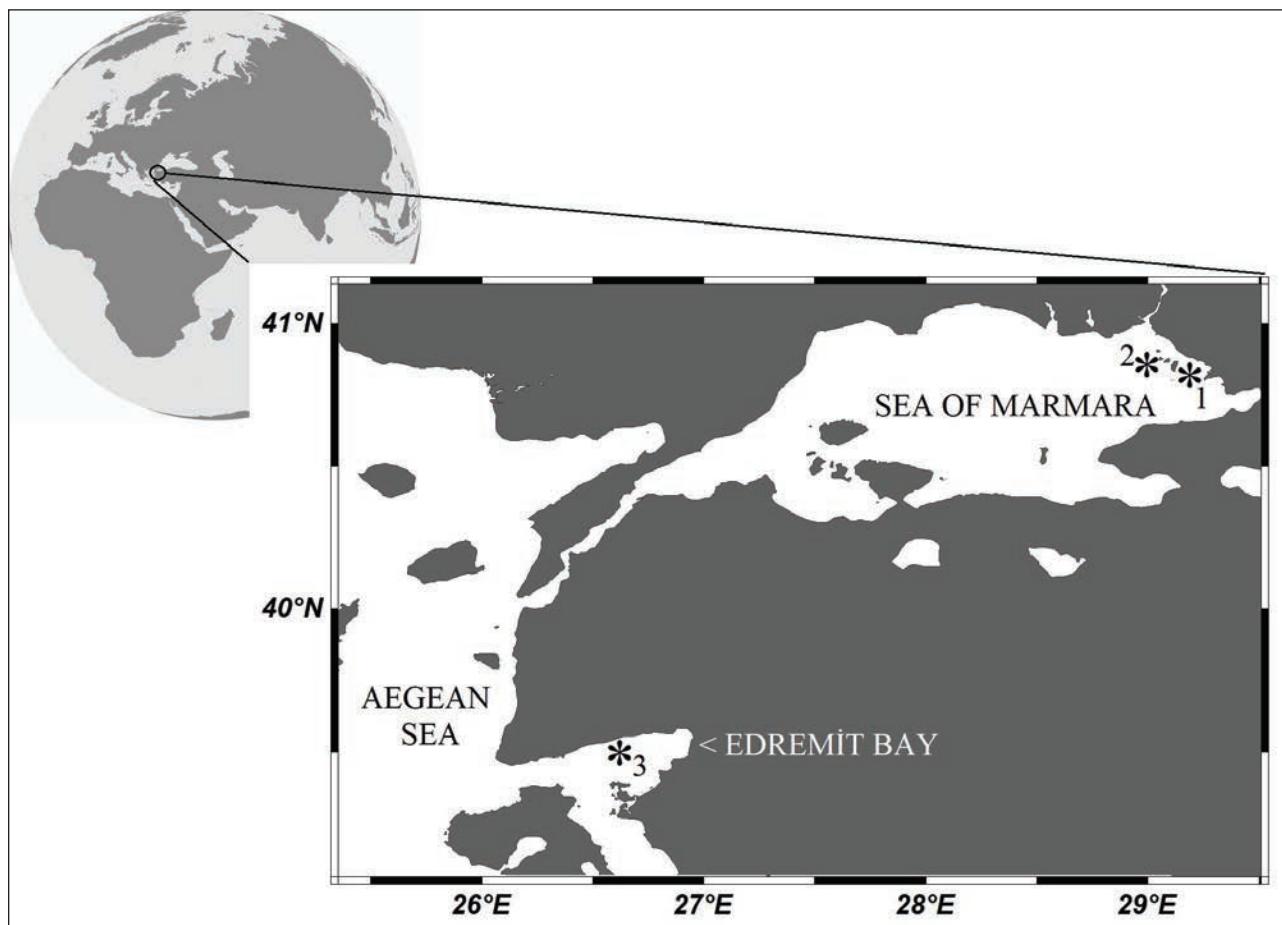


**Fig. 3. (Left, right) Comparison specimen published in Kabasakal and Gedikoğlu (2008); (centre) great white shark (spec. 3) caught on 14 July 2010. Arrows indicate the conical snout, triangular teeth, and black blotches on ventral surfaces of pectoral tips.**

**Sl. 3: (Levo, desno) Primerjalni osebek, objavljen v Kabasakal & Gedikoğlu (2008); (sredina) beli morski volk (osebek 3), ujet 14. julija 2010. Puščice kažejo koničast gobec, trikotne zobe in črne lise na trebušni strani prsnih plavuti.**

search (e.g., Kabasakal 2003, 2020a), the majority of the society and some contemporary researchers were openly suspicious of them. However, the estimation of occurrence of *C. carcharias* in the Marmara Sea and the Strait of Istanbul is based on historical records of 40 specimens captured in bluefin tuna fisheries between 1881 and 1985 (Kabasakal, 2020a). Historical sites of capture of great white sharks in this region were concentrated in the Strait of Istanbul and the pre-Bosphoric waters of the Marmara Sea, in which bluefin tuna fishery has been known since the Byzantine era (4th century CE) (Kabasakal, 2020a). Further studies by De Maddalena and Heim (2012), Boldroccchi *et al.* (2017) and Moro *et al.* (2020) listed, 596, 628, and 773 records of Mediterranean great white shark, respectively, and included historical material as a remarkable part of the data sources analysed. Meticulous analyses of similar historical photographs can even change our perspective on the maximum length that *Carcharodon carcharias* could reach (Castro, 2012; De Maddalena *et al.*, 2001).

To sum up the above, when researching great white sharks and other sharks in the Mediterranean, we should not overlook the related historical material. However, we should also acknowledge the importance of following a certain methodology and verifying the reliability of the historical material in question when conducting such studies. Of course, this type of research requires travelling very far back in time and digging deep. (Kwok, 2017). But it appears that social media and citizen scientists could be relied upon for help in performing such work, as both sources have repeatedly proven their potential and importance in shark research in the Mediterranean. (Kabasakal & Bilecenoglu, 2020; Boldroccchi & Storai, 2021; Giovos *et al.*, 2021; Jambura *et al.*, 2021). In a similar study, Boldroccchi and Storai (2021) stated that sightings of blue sharks shared via Facebook and Instagram have increased steadily since 2010, and that social media platforms can now be considered as a primary source of opportunistic shark encounter data. The significant increase in the notifications of great white sharks,



**Fig. 4.** Sites of captures of great white shark, specs. 1, 2 and 3, in the Sea of Marmara and in the northeastern Aegean Sea.

**Sl. 4:** Lokalitete ulova primerkov (1,2 in 3) belega morskega volka v Marmarskem morju in v severovzhodnem Egejskem morju.

especially on Turkish coasts since 2008, is also a result of social media and citizen scientist activity (Kabasakal 2020a; Kabasakal & Bilecenoglu, 2020), and a similar increase has been seen off the Libyan coast, for example (Jambura et al., 2021).

In conclusion, the number of records of great white shark observed in Turkish waters in the past can be expected to increase, as access to historical data, which can help stimulate public engagement and conservation action (McClennahan et al., 2012), becomes easier with the aid of digitisation. *Carcharodon carcharias*, the flagship species of marine megafauna, was classified as vulnerable worldwide

in the most recent IUCN Red List (Rigby et al., 2019). Although not yet part of the scientific canon, citizen science and social media supported studies and analyses of historical data, which have yielded relevant results in recent years, will undoubtedly help toward a more effective protection and management of this top predator.

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## TRIJE NEOBJAVLJENI PRIMERI POJAVLJANJA BELEGA MORSKEGA VOLKA, CARCHARODON CARCHARIAS, IZ TURŠKIH VODA IZBRSKANI IZ PRETEKLOSTI

Hakan KABASAKAL & Erdi BAYRI

Ichthyological Research Society, Tantavi mahallesi, Menteşoğlu caddesi, İdil apt., No: 30, D: 4, Ümraniye, TR-34764 İstanbul, Turkey  
e-mail: kabasakal.hakan@gmail.com

### POVZETEK

*Trije dosedaj neobjavljeni primeri o pojavljanju belega volka, Carcharodon carcharias (Linnaeus, 1758), v turških vodah, so bili izbrskani s podatkovnim rudarjenjem v socialnih medijih in na spletu. Dva primerka sta bila ugotovljena v Marmarskem morju, tretji pa v zalivu Edremit (severovzhodno Egejsko morje). Poznavanje historičnega pojavljanja in abundance morskih psov na določenem geografskem območju je izjemno pomembno. S tega vidika ljubiteljska znanost, raziskave socialnih medijev in analize historičnih podatkov, ki so v zadnjih letih ponudile pomembne podatke, nedvomno veliko pripomorejo k učinkoviti zaščiti in ravnanjem s tem ključnim plenilcem.*

**Ključne besede:** historični podatki, ljubiteljska znanost, socialni mediji, morski psi, megafavna

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