Survey of the Status of Important Fauna Species in the Ionion Block Lease area

Interim Progress Report

May 2023

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Contents

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Abbreviations and scientific names

Calonectris diomedea	Scopoli's Shearwater
Caretta caretta	Loggerhead Turtle
Chelonia mydas	Green Turtle
Delphinus delphis	Short-beaked Common Dolphin
Grampus griseus	Risso's Dolphin
Hydrobates pelagicus	European Storm-Petrel
ESAS	European Seabirds At Sea (survey method)
Larus audouinii	Audouin's Gull
Larus michahellis	Yellow-legged Gull
Monachus monachus	Mediterranean Monk Seal
n.m.	nautical mile
Phalacrocorax aristotelis desmarestii	Mediterranean Shag
Physeter macrocephalus	Sperm Whale
Puffinus yelkouan	Yelkouan Shearwater
Stenella coeruleoalba	Striped Dolphin
SAC	Special Area of Conservation (Natura 2000 network)
SPA	Special Protection Area (Natura 2000 network)
SDF	Standard Data Form (Natura 2000 datasheet)
Tursiops truncatus	Common Bottlenose Dolphin
WP	Work Package
Ziphius cavirostris	*Cuvier's Beaked Whale*

1 Introduction

In the context of Environmental Monitoring and Recording of Critical Environmental Indicators of Biodiversity, such as marine mammals (cetaceans and monk seals), sea turtles and seabirds, the Hellenic Petroleum Exploration and Production of Hydrocarbons Ionian Single Member Societe Anonyme (HELPE IONIAN S.A.) company has assigned to Nature Conservation Consultants (NCC) Ltd a contract for conducting the present Project, namely the "Survey of the Status of Important Fauna Species in the Ionion Block Lease area".

The Project consists of 4 work packages (WP):

I. **Pelagic boat surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea**, using large sailing and open water RIB vessels.
II. **Aerial surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea,** using a light aircraft, in combination with drone surveys.
III. **Coastal surveys for monk seals, Scopoli's shearwater and Mediterranean shag breeding sites in the coastal zones of the adjacent Natura 2000 sites,** using open water RIB vessels.
IV. **Telemetry for seabirds and marine mammals at Diapontia islets SPA and the surrounding project area,** using a marine ornithological radar.

The present document consists of the **Interim Progress Report** of the **Work Packages WP I-IV.** It presents the field surveys carried out during the first trimester of the project (March - May 2023) and the preliminary results in each Work Package of the project "Survey of the Status of Important Fauna Species in the Ionion Block Lease area".

The present project is the 2023 continuation of the ongoing project "Survey of the Status of Important Fauna Species in the Ionion Block Lease area", which started in 2022.

2 Description of the Project Area

The **Project Area** is located in the North Ionian Sea, west-southwest of Corfu and Paxoi Islands and west of Lefkada Island, approximately from the latitude town Palaiokastrittsa in Corfu in the north and the southern tip of Lefkada Island in the south. It extends between latitudes of 38°34'N in the south and 39°40'N in the north and between latitudes of 19°25'E in the west and 20°37'E in the east. Its total surface area is 6,668 km^2 (Figure 2-1).

The **Wider Project Area** envelops the project area and extends further north and east to additionally include the Diapontia Islands, the west coast of Corfu, Paxoi and Antipaxoi and the west coast of Lefkada Island. The Wider Project Area includes three Natura 2000 sites: SPA GR2230008 Diapontia Nisia, SCI GR2230010 Thalassia Periochi Diapontion Nison and SCI GR2230004 Nisoi Paxoi kai Evriteri Thalassia Periochi (Figure 2-2).

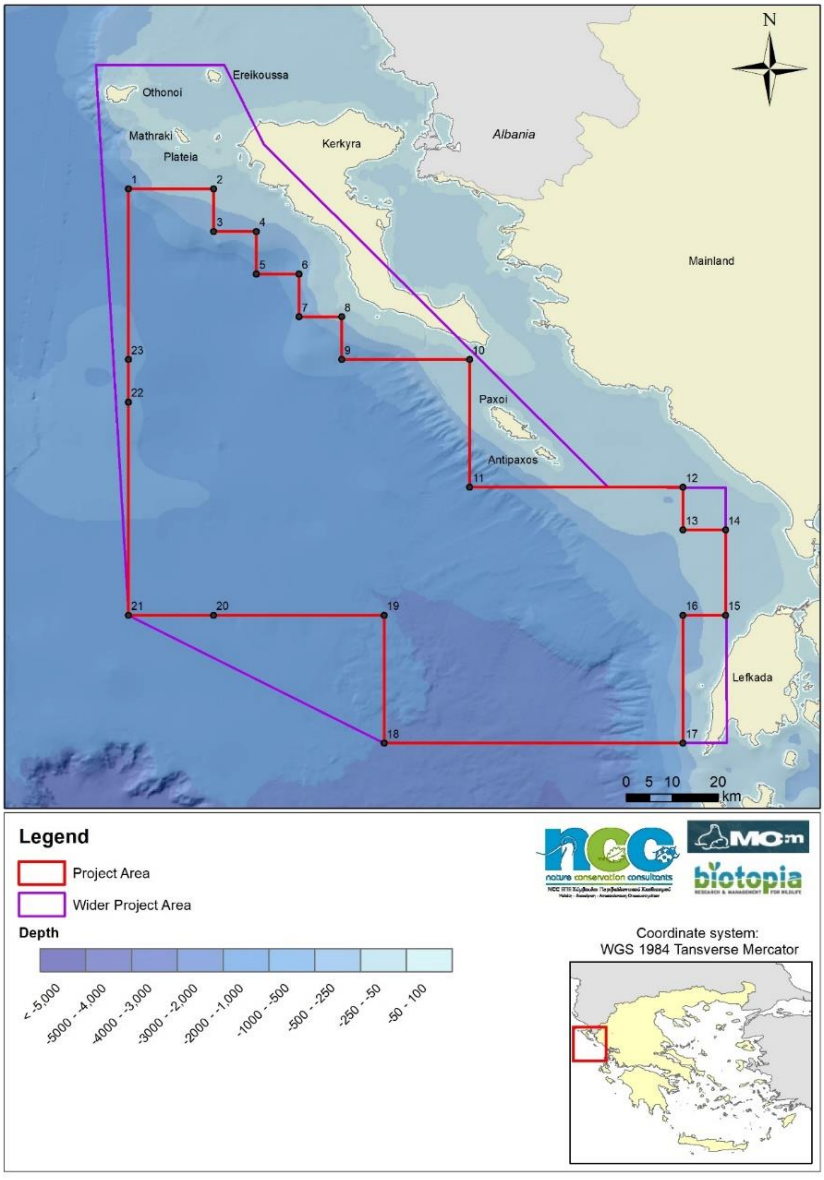

Figure 2-1. Project Area and Wider Project Area

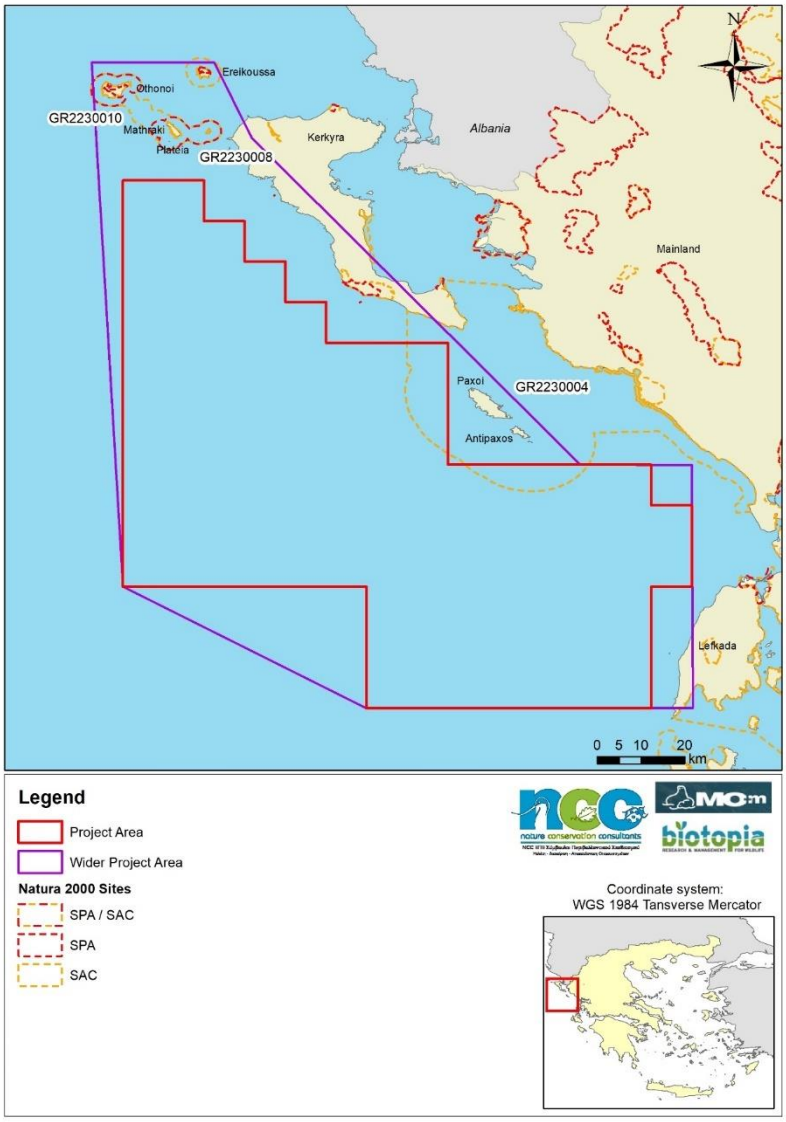

Figure 2-2. Natura 2000 sites in the wider area of the "Ionian block"

The sea depth within the Project Area ranges from 250m in the coastal areas to more than 2,000m at its southern part.

2.1 General information of the main cetacean, seabird and sea turtle species in the Project Area

2.1.1 Cetaceans

Hellenic seas host an unexpectedly high diversity of cetaceans with eight (8) species that are resident in the area, seven (7) of which belong to the Odondoceti suborder: Sperm Whale (*Physeter macrocephalus*), Cuvier's Beaked Whale (*Ziphius cavirostris*), Risso's Dolphin (*Grampus griseus*), Bottlenose Dolphin (*Tursiops truncatus*), Striped Dolphin (*Stenella*

coeruleoalba), Short-beaked Common Dolphin (*Delphinus delphis*) and Harbour Porpoise (*Phocoena phocoena*) along with one representative of the Mysticeti suborder: Fin Whale (*Balaenoptera physalus*). The Harbour Porpoise is restricted to the Thracian Sea and North Aegean Sea, while the others are present one or more seas in Greece (Frantzis et al. 2003).

It is important to note that due to the semi-enclosed nature of the Mediterranean basin, in combination with its very particular oceanographic features and oligotrophic waters especially moving towards the east of the basin, cetacean species populations of the Mediterranean (which occur elsewhere in the world also) are treated separately by the IUCN, when it comes to the designation of their threat status and population trends. In the majority of cases, the Mediterranean subpopulation of cetacean species have at least one level higher in their designated threat status than the global population for the same species or are classified as Data Deficient.

The Wider Project Area is located along the Hellenic Trench, which is one of the most important areas for cetaceans in Greece. With the exception of the Harbour Porpoise (found only locally in the north-eastern Aegean), the remaining 6 commonly occurring species of cetaceans inhabiting Greek waters have been sighted or recorded as stranding in the Wider Project Area.

Table 2-1. General types of habitats, bathymetric characteristics and distance from coast of recorded presence in Greek seas of common cetacean species that are present in the Wider Project Area (from Frantzis 2009).

Species	Common name	Habitat		
		Type	Depth	Distance from coast
Physeter macrocephalus	Sperm whale	Slope, secondarily pelagic	1235 m (510-2933 m)	8.1 km (1.6-25.2 km)
Ziphius cavirostris	Cuvier's beaked whale	Slope, probably pelagic as well	1066 m (491-2279 m)	8.6 km (2.1-26.5 km)
Grampus griseus	Risso's dolphin	Slope, probably over its shallower part	737 m (165-1717 m)	8.2 km (0.3-28.3 km)
Tursiops truncatus	Common bottlenose dolphin	Typically, coastal, also over shallow waters "offshore"	121 m (1-1504 m)	3.0 km (0.0-26.0 km)
Stenella coeruleoalba	Striped dolphin	Typically, pelagic and slope	1024 m (75-2920 m)	8.7 km (0.6-37.1 km)
Delphinus delphis	Short-beaked Common dolphin	Coastal and shallow, ("pelagic" and deep only in the Gulf of Corinth)	86 m (11-274 m) Gulf of Corinth: 713 m (275-935)	8.7 km (0.6-37.1 km)

The Wider Project Area includes, coastal areas, continental shelf and slope, as well as pelagic areas. For the purpose of the present study and based on the types of marine habitats typically used by the species present in the Wider Project Area, the focus of pelagic surveys is primarily on the species with regular presence in the Wider Project Area, namely the **Sperm Whale (*Physeter macrocephalus*), Cuvier's Beaked Whale (*Ziphius cavirostris*), Striped Dolphin (*Stenella coeruleoalba*)** and **Risso's dolphin (*Grampus griseus*)** in the pelagic and continental slope areas, and **Short-Beaked Common Dolphin (*Delphinus delphis*)** and **Bottlenose Dolphin (*Tursiops truncatus*)** in coastal areas. Accounts on the biology, ecology, as well as conservation and threat status of the cetacean species of interest are provided below. It should be noted that large data gaps are still present regarding the distribution and abundance of cetaceans in the eastern Mediterranean (Mannocci et al. 2018).

2.1.1.1 Sperm Whale (Physeter macrocephalus)

Figure 2-3. Sperm Whale (Physeter macrocephalus) (© Massimo Demma/ICRAM)

The second largest cetacean found in Greece and the largest Odondocetus found globally is the Sperm Whale (*Physeter macrocephalus*). The Sperm Whale prefers deep water habitats particularly deep continental slope water where they hunt their preferred prey, large mesopelagic cephalopods (Frantzis 2009, Notarbartolo di Sciara et al. 2012).

The Hellenic Trench is considered to be the species core habitat for the eastern Mediterranean sub-population (Frantzis et al. 2014). The total species population size in the Greeks Seas is estimated at 180 – 280 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/), the population size in the Hellenic Trench 200 – 250 individuals (Frantzis et al. 2014) and the estimated population size in the Ionian Sea, including international and Italian waters 62 individuals (95% CI: 24-165 individuals, in Lewis et al. 2003), however this is likely to be an underestimation (Frantzis 2009).

2.1.1.2 Cuvier's Beaked Whale (Ziphius cavirostris)

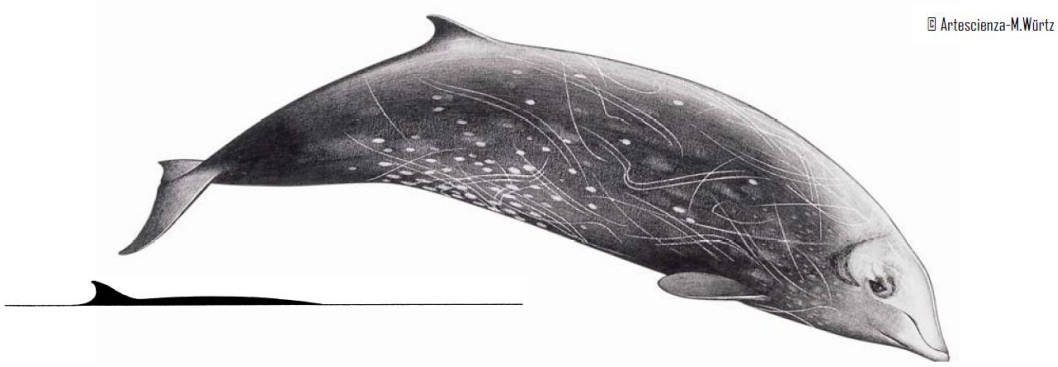

Figure 2-4. Cuvier's Beaked Whale (Ziphius cavirostris) (©Artescienza-M.Würtz)

Cuvier's Beaked Whale, a medium sized odondocetus, shares the same habitat and distribution as that described for the Sperm Whale, namely the continental slope. Almost all past species sightings occurred above depths of 500-1,500m (Frantzis et al. 2003). It is the only beaked whale common in the Mediterranean Sea. In Greece, the majority of past sightings are associated with the Hellenic Trench, from eastern Rodos Island to northwest Corfu Island (Frantzis et al. 2003, Frantzis 2009) with the highest number of sightings south of Crete and west of Lefkada (Frantzis et al. 2003, Podestà et al. 2016). Along the Hellenic Trench the species feeds almost exclusively on mesopelagic and bathypelagic cephalopods (Frantzis

2009). Several sightings and numerous strandings have been recorded in the Wider Project Area (based on Frantzis 2009).

The Hellenic Trench is one of the species high-density areas in the Mediterranean. The total species population size in the Greeks Seas as well as in the Wider Project Area is unknown (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/). It is worth noting that Greek seas are considered to host quite a significant portion of the Mediterranean population (Frantzis 2009).

2.1.1.3 Risso's Dolphin (Grampus griseus)

Figure 2-5. Risso's dolphin (Grampus griseus) (© Massimo Demma)

Risso's dolphin is the largest dolphin that commonly occurs in the Greek Seas. The sightings and strandings records indicate that the species is present in all parts of the Greek Seas, however the only known area where the species is predictably present is the Myrtoon Sea extending south to the north-western Crete. The species is present in the Ionian Sea, as confirmed by strandings which have been recorded from north Corfu Island to south Peloponnese. No sighting records have been made in the Ionian Sea which indicates that either the species is present in low numbers or it is present outside warm period when past surveys have been made. The strandings in the Ionian Sea have been recorded from the end of September until late April. The species is present primarily along the continental slope, preferably deep water and shelf break where the slope is the steepest, but also close to the coast, particularly when the shelf is narrow (Frantzis 2009). The species feeds mainly with squid and occasionally with fish.

The total species population size in the Greeks Seas is estimated to be 100 – 600 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/). The population size in the in the Wider Project Area is unknown.

2.1.1.4 Bottlenose dolphin (Tursiops truncatus)

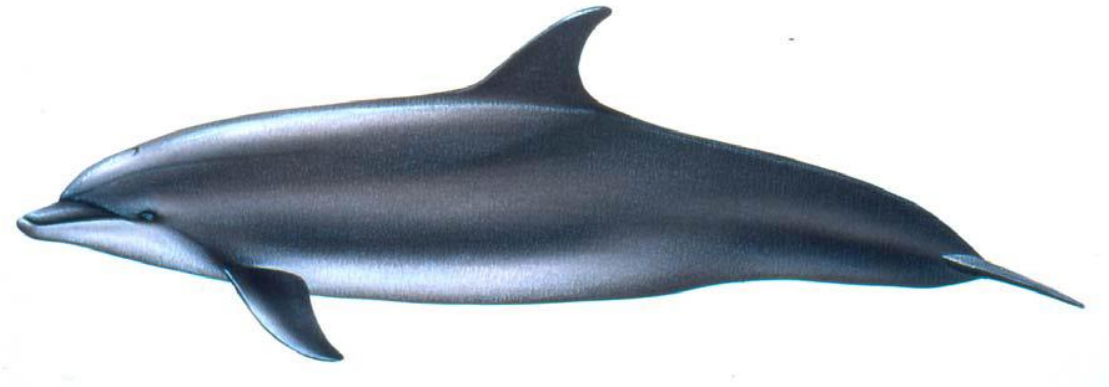

Figure 2-6. Common bottlenose dolphin (Tursiops truncatus) (© Artescienza-M.Würtz)

The bottlenose dolphin is the most common species of dolphin found in coastal shallow waters of the Mediterranean (Frantzis 2009). It is homogeneously distributed across all Greek Seas as it has been sighted in most coastal areas, straights and gulfs. (Frantzis 2009). The Bottlenose Dolphin in Greece, similar to Short-beaked Common Dolphin prefers the continental shelf usually staying within a depth of up to 200m (Frantzis 2009). It is known to consume a variety of prey items being quite adaptive.

The total species population size in the Greeks Seas is estimated to be 3,800 – 9,000 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/). The population size in the in the Wider Project Area is unknown.

2.1.1.5 Striped dolphin (Stenella coeruleoalba)

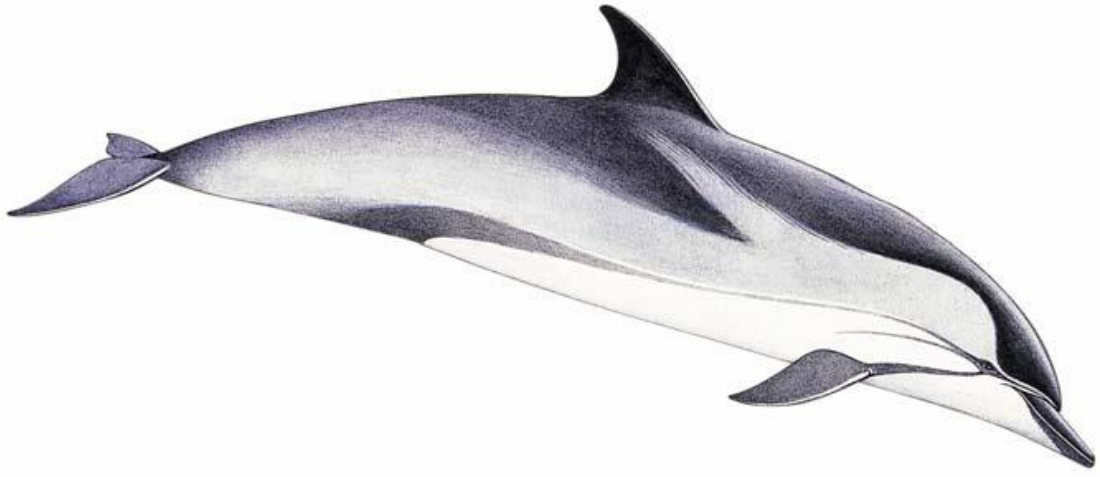

Figure 2-7. Striped dolphin (Stenella coeruleoalba) (© Massimo Demma/ICRAM)

The Striped Dolphin, a small delphinid, has a year-round presence in Greek waters. It is the most abundant dolphin species in Greece and the Mediterranean overall (Frantzis 2009). Its

distribution in Greece is widespread and it occurs in all deep (>500m), pelagic waters and the continental slope but it can also inhabit intermediate depths of 200-500m (Frantzis 2009). The Striped Dolphin is frequently sighted along the length of the Hellenic Trench. The species diet includes mainly cephalopods, as well as fish and crustaceans.

The total species population size in the Greeks Seas is estimated to be 20,000 – 80,000 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/). The population size in the in the Wider Project Area is unknown.

2.1.1.6 Short-beaked common dolphin (Delphinus delphis)

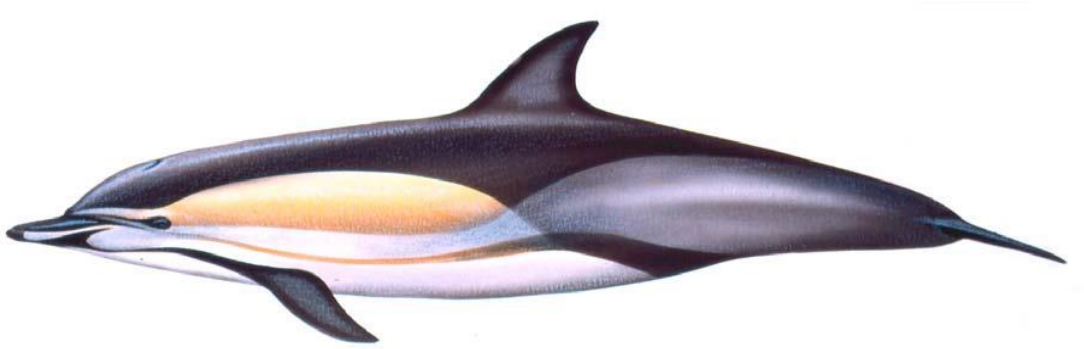

Figure 2-8. Short-beaked common dolphin (Delphinus delphis) (© Artescienza-M.Würtz)

The Short Beaked Common Dolphin (or simply Common Dolphin) is a small delphinid with a year-round presence in Greek waters. Its distribution in Greece is patchy and their presence seems to be mostly limited to the central and northern Greek Seas (Frantzis 2009). In general, it prefers shallow (<200m) and coastal waters, with exception of Gulf of Corinth where it exhibits preference to pelagic habitats (Frantzis 2009). It exhibits flexible feeding habits. The distribution of the Common Dolphin in the Ionian Sea the is limited to shallow waters between north Lefkada, Kefallonia and south Zakynthos and the mainland. In the Inner Ionian Sea, the main prey includes shoaling fish e.g., anchovies and sardines.

The total species population size in the Greeks Seas is estimated to be 750 – 4,200 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/).

The population of Common Dolphins of the Inner Ionian Sea has been the focus of regular surveys for years and has been well documented (Bearzi et al. 2008B). The local population counted 150 individuals until the mid-90s and their range seemed to cover the entire Inner Ionian. Since then, the population has declined dramatically with only an estimated 15 individuals encountered over the past years mostly sighted in southern Lefkada (Bearzi et al. 2008B).

2.1.2 Seals

2.1.2.1 Mediterranean Monk Seal

Figure 2-9. Striped dolphin (Stenella coeruleoalba) (© Massimo Demma/ICRAM)

The Mediterranean Monk Seal is the only pinniped (seal) living in the Mediterranean region, the rarest extant member of the Phocidae family and one of the rarest marine mammals in the world.

Mediterranean monk seals were once widely and continuously distributed in the Mediterranean and Black Seas, and in the North Atlantic waters from Morocco to Cap Blanc, including the Canary, Madeira and the Azores Islands. A few individuals have been recorded in Senegal, the Gambia and the Cape Verde Islands in the southern end, as well as in Portugal and Atlantic France in the northern end of the species' distribution. Today the distribution of the Mediterranean is highly fragmented and consists of three to four isolated subpopulations (Karamanlidis et al. 2016). In the Mediterranean Sea, the stronghold of the species has been on islands in the Ionian and Aegean Seas, and along the coasts of Greece and western and southern Turkey ((Güçlüsoy, Kiraç, Veryeri, & Savaş 2004, Gücü, Gücü, & Orek 2004, Anonymous, 2007). In the North Atlantic, two subpopulations exist: one at Cabo Blanco (also known as Cap Blanc) at the border of Mauritania and Western Sahara (González & Fernandez de Larrinoa 2012, Martínez-Jauregui et al. 2012), and one at the Archipelago of Madeira (Pires, Neves, & Karamanlidis, 2008). An unknown number of monk seals might still survive at the Mediterranean coasts of eastern Morocco (and perhaps Algeria) (Mo, Bazairi, Bayed, & Agnesi, 2011), but without on-going systematic conservation actions the fate of this subpopulation is unknown.

The total species population size in the Greece is estimated to be 300 – 400 individuals (2013-18 Habitats Directive Article 17 Reporting at https://nature-art17.eionet.europa.eu/article17/).

2.1.3 Sea turtles

There are three species of sea turtles that regularly occur in the Mediterranean: **Loggerhead Turtle (*Caretta caretta*)**, **Green Turtle (Chelonia mydas)** and **Leatherback sea turtle (*Dermochelys coriacea*).** The sea turtles live almost exclusively in the marine environment with females returning to land for dig nests and lay eggs, while males almost never return to land. The range of all three species extends along the Wider Project Area (Legakis & Maragou

2009, 2013-18 Habitats Directive Article 17 Reporting: species range), however only Loggerhead Turtle and Green Turtle have been recorded in the area (2013-18 Habitats Directive Article 17 Reporting: species distribution). Among these two the Loggerhead Turtle is the species of interest due to its regular presence, while the Green Turtle is regular but rare visitor in the area. The Leatherback sea turtle to is only considered in Greece to be a visitor from the Atlantic (Casale & Margaritoulis 2010).

2.1.3.1 Loggerhead turtle (Caretta caretta)

Figure 2-10. Loggerhead Turtle (Caretta caretta)

The Loggerhead turtle is an oceanic turtle with a global distribution. It is a migratory species and may travel thousands of kilometres to forage and to return to its breeding sites. After hatching, logger-head turtles adopt an oceanic lifestyle in major current systems (Bolten and Witherington 2003). After 4-19 years spent in the oceanic zone, they move to neritic areas where they forage and mature over 10-39 years (Avens and Snover 2013). After attaining sexual maturity, they migrate between neritic foraging grounds and nesting areas. The Mediterranean, where the species is nesting in the eastern basin (Legakis & Maragou 2009), the breeding population of the loggerhead turtle is spread over tens of rookeries which are estimated to produce over 7,200 nests annually (Casale & Margaritoulis 2010) with the majority of nests being found in Greece. The country's two most important nesting beaches are located on Zakynthos (Laganas Bay) and on Peloponnese (Kyparissia Bay), which host 43% and 19% of all nests in Greece, respectively (Legakis & Maragou 2009). The average number of nests per season for the period 1984-2007 at Laganas Bay and at Kyparissia Bay are 1,244 nests/season (range: 833-2,018 nests/season) and 621 nests/season (range: 286-927 nests/season) (Casale & Margaritoulis 2010). Currently, Kyparissia Bay hosts the largest Loggerhead turtle nesting aggregation in the Mediterranean Sea (Rees et al. 2020).

In Greece and in the Central Mediterranean, the turtles after hatching disperse mainly in the Ionian, south-central Mediterranean and Adriatic Seas (Casale & Mariani 2014). Loggerhead turtles, especially juveniles, forage in almost all oceanic areas in the Mediterranean. Water circulation system has the greatest effect on their distribution (Casale et al. 2018). The neritic foraging areas (i.e., those located above continental shelf) are more frequently used by larger turtles, including adults (Casale et al. 2018, Figure 2-11). Loggerhead turtles generally overwinter within or close to their foraging areas, however some may move from cold areas e.g., Adriatic Sea during winter (Casale et al. 2018).

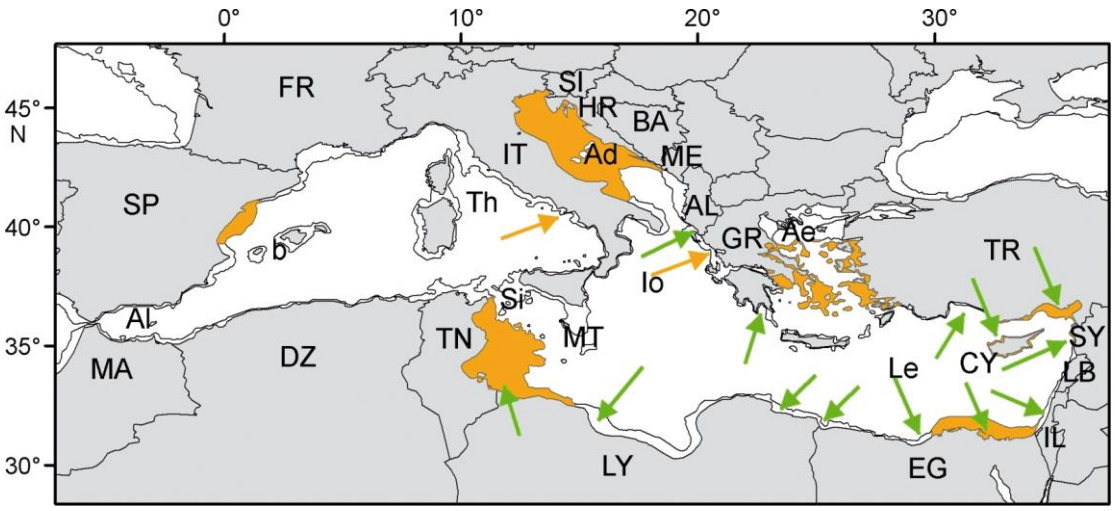

Figure 2-11. Neritic foraging and wintering sites for loggerhead turtles (orange areas and arrows) and green turtle (green arrows) (adopted from Casale et al. 2018).

Migration corridors, are areas which are frequently used by migrating turtles, mainly for adult breeding migration and particularly for post-breeding migration from breeding areas to foraging grounds. Therefore, these migratory corridors are used at the end of the breeding season, in May and June by males, while in July and August, mostly by females (Casale et al. 2018). The main migration corridors are presented in Figure 2-12.

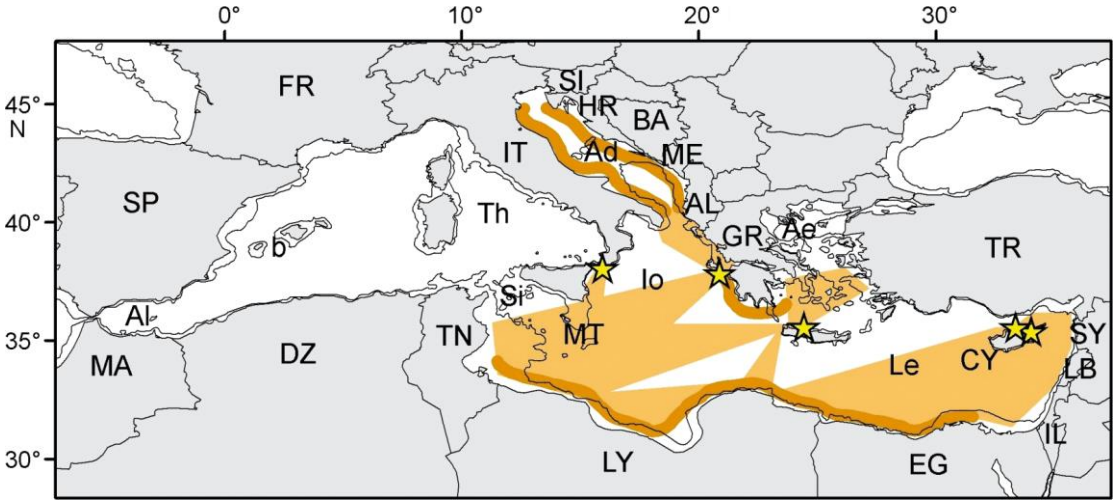

Figure 2-12. Main known migratory corridors for adult loggerhead turtles to and from breeding sites (stars). Light brown areas represent migratory funnels in the open sea while darker strips represent paths along the coasts, typically in shallow waters (adopted from Casale et al. 2018).

The movements of the Loggerhead turtles nesting in the Ionian Sea, particularly those from Zakynthos has been well studied by satellite or GPS telemetry (e.g., Zbinden et al. 2008, Schofield et al. 2010a-c, Schofield et al. 2013, Luschi & Casale 2014). The data from 75 tracked turtles breeding on Zakynthos showed after breeding the turtles migrate to neritic sites with waters shallower than 100m, with the majority of turtles migrate north to the Adriatic Sea and Amvrakikos Gulf (42%) or south-west to Libya and Tunisia (32%), while the remaining either stay in the Ionian Sea or move to the eastern or western Mediterranean (Zbinden et al. 2008, Schofield et al. 2013). After leaving their foraging areas (in October – November) the tracked turtles move to their overwintering areas further south (Zbinden et al. 2008). The main

foraging and overwintering areas are presented in the Map 11, below. The main foraging areas are located over the continental shelves and slopes (Ullmann & Stachowitsch 2015) in the Northern and Southern Adriatic Sea, Ionian Sea, the Strait of Sicily and the Tunisian shelf. A small proportion (~7%) were resident to Zakynthos. Significantly more males than females remain within 100km of Zakynthos (Schofield et al. 2013).

2.1.3.2 Green turtle (Chelonia mydas)

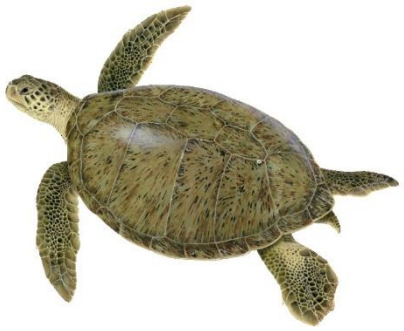

Figure 2-13. Green turtle (Chelonia mydas)

The green turtle (*Chelonia mydas*) is an migratory oceanic turtle with a global distribution. Their nesting sites in the Mediterranean are located mostly in Turkey, Cyprus and Syria (Figure 2-11) with an average of 1500 nests per year. No regular nesting areas are located in Greece. They use mostly marine areas in the Levantine basin, but also forage in Greece and Libya, as well as occasionally in the Adriatic Sea and the western Mediterranean basin (Figure 2-14). In Greece local concentration have been found in Lakonikos Bay, southern Peloponnese. Stranding data indicate that there is a more frequent presence of adult green turtles in southern Aegean (Casale & Margaritoulis 2010).

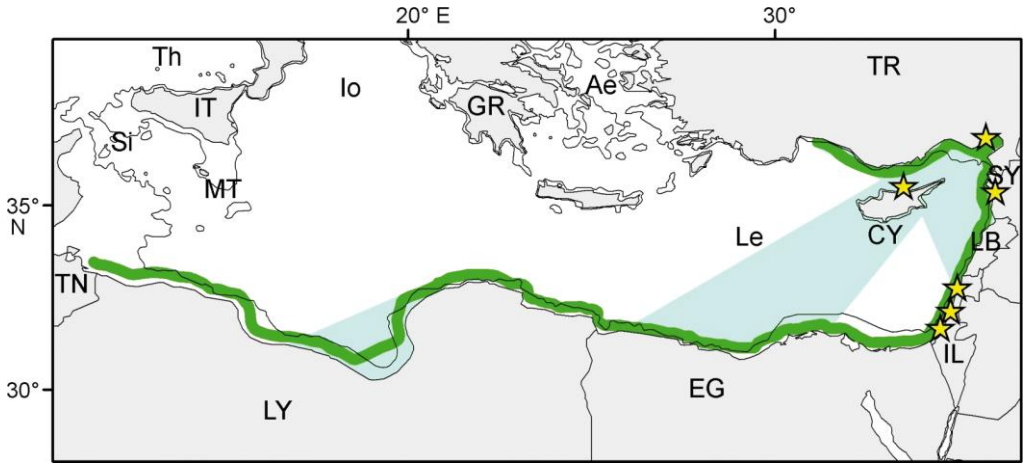

Figure 2-14. Main known migration corridors for adult female green turtles during reproductive migrations from the breeding sites (stars) (adopted from Casale et al. 2018).

2.1.4 Seabirds

For the purpose of the present study, only those seabird species which are exclusively associated with the marine environment and the pelagic area, that have been recorded in the

Ionian Sea in the past and their presence in the wider Project area has been either confirmed. These species include pelagic seabird species**: Scopoli's Shearwater (*Calonectris diomedea*), Yelkouan Shearwater (*Puffinus yelkouan*)** and **European Storm-petrel (*Hydrobates pelagicus*)**, as well as coastal seabird species which could be present in the pelagic areas due to shallow waters in the Project area or due to human activities, i.e. **Yellow-legged Gull (*Larus michahellis*) and the Mediterranean Shag (*Phalacrocorax aristotelis desmarestii*).**

2.1.4.1 Scopoli's's Shearwater (Calonectris diomedea)

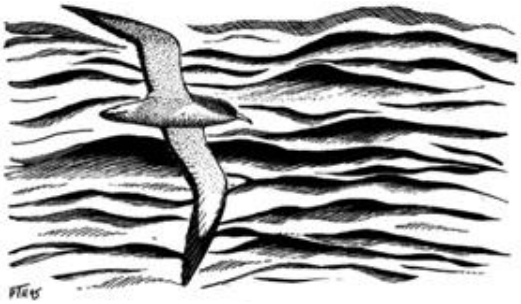

Figure 2-15. Scopoli's Shearwater (Calonectris diomedea) (© Paul Hirst)

Scopoli's Shearwater (C*alonectris diomedea*) breeds across Mediterranean with the majority of the population spending the non-breeding season in the Atlantic. In the past it was considered conspecific with the Cory's Shearwater (C*alonectris borealis*) which breeds in the Atlantic. In Greece the species breeding in the Aegean and Ionian Sea with the largest known colony being located at Strofades Islets, south of the Zakynthos Island in the Ionian Sea, with an estimated breeding population of 5,550 pairs (Karris et al. 2017). Other large colonies occur mainly in the southern, central and eastern Aegean Sea although breeding has also been confirmed in the northern Aegean Sea (Fric et al. 2012). The only other known breeding area in the Ionian Sea s at Diapontia islands at Kerkyra (within the Wider Project Area) with much smaller breeding population of 60-100 pairs (Fric et al. 2012).

2.1.4.2 Yelkouan Shearwater (Puffinus yelkouan)

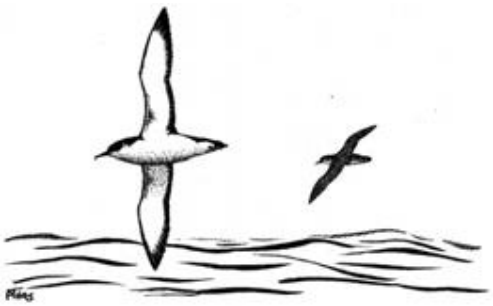

Figure 2-16. Yelkouan Shearwater (Puffinus yelkouan) (© Paul Hirst)

Yelkouan Shearwater is an endemic species to the Mediterranean and the Black Sea. The known species colonies in Greece are located in the Aegean Sea, while no colonies have been found so far in the Ionian Sea. The main known colonies are located the North, East and Central Aegean Sea (Fric et al. 2012), with the largest being on Gyaros island in the Northern

Cyclades (Fric & Portolou 2016). During the non-breeding season Yelkouan Shearwaters disperse widely within the Mediterranean Sea (mainly Adriatic and Aegean Seas) and the Black Sea. Additionally, 4,000-6,000 individuals are estimated to overwinter in the Aegean Sea The main foraging areas of the Yelkouan Shearwaters are rich coastal and pelagic fishing grounds in the North, Central and East Aegean Sea, while the species is less common in the South Aegean and Ionian Seas (Fric et la. 2012).

The global species population is estimated at 15,337-30,519 pairs with a decreasing population trend (30% in the next 54 year i.e., three generations). Ten colonies in the Mediterranean Sea have disappeared during the last 60 years (Derhe 2012B, BirdLife International 2015, Birdlife International 2018B). The national population is estimated at 4,000-7,000 pairs (without the inclusion of the Gyaros colony which is estimated at 3,090-7,450 pairs), equivalent to 22% percent of the global population (more than 38% with the inclusion of the Gyaros population). The national population trend is estimated to be stable.

2.1.4.3 European Storm-petrel (Hydrobates pelagicus)

Figure 2-17. European Storm-petrel (Hydrobates pelagicus) (© Paul Hirst)

European Storm-petrel is the smallest seabird species in the Western Palaearctic. Its distribution is limited mainly to the Northeast Atlantic Ocean and the West Mediterranean Sea, while the Aegean Sea comprises the easternmost part of its range. The Mediterranean subspecies *Hydrobates pelagicus melitensis* comprises less than 5% of the overall global population (i.e., 12,000-17,500 breeding pairs) with the main colonies located in Malta, Sicily and the Balearic Islands. The species occurs in all Greek seas mainly in spring and summer during the breeding period. Up to date only two colonies have been located, one in the Central Aegean Sea and another in the Cyclades. Storm-petrels, usually individual birds, or very small groups, are regularly observed in the Cyclades, Dodecanese, Central and southwest Aegean Sea and the Karpathian Sea suggesting potential existence of other breeding colonies (Fric et al. 2012).

2.1.4.4 Mediterranean Shag (Phalacrocorax aristotelis desmarestii)

Figure 2-18. Mediterranean Shag (Phalacrocorax aristotelis desmarestii) (© Jens Overgaard Christensen)

Mediterranean Shag is a cormorant species, resident and widely spread in Greece which usually occurs in coastal waters. Shags breed colonially, forming small, loose (rarely dense) colonies, on cliff ledges or small caves or even under thick vegetation. Nesting sites are re-used in successive years by the same birds. They often roost in large groups (Fric et al. 2012). It is a good swimmer and a foot-propelled diver which feed on benthic and pelagic fish in waters with depths up to 80 m which are usually located in coastal zones within a 20 km radius around their colony or roosting sites (Wanless *et al.* 1991; Velando and Friere 1999).

The Greek national population size is 1,300 -1,450 pairs (Fric et al. 2012), equivalent to 2% of the species European population (BirdLife International 2015, BirdLife International 2018D). The population in Greece is considered to be stable (Fric et al. 2012).

2.1.4.5 Yellow-legged Gull (Larus michahellis)

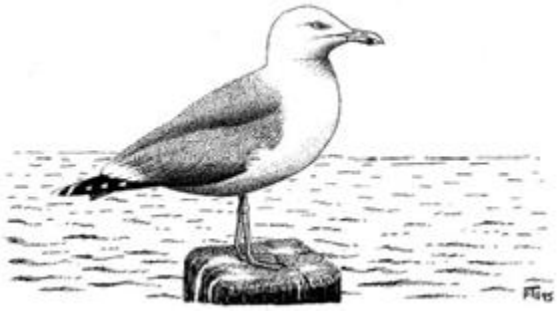

Figure 2-19. Yellow-legged Gull (Larus michahellis) (© Paul Hirst)

The Yellow-legged Gull is the most common gull species in Greece. It is widely distributed around the southern regions of the Palaearctic, from the western part of the Black Sea across to the Mediterranean, Iberian Peninsula, and reaching the Macaronesian region. Breeding grounds are centred mainly around the Mediterranean but reach also the Black Sea, Caspian Sea and eastern Atlantic. In Greece, the species is resident and widespread all along the coastline of mainland Greece and of the islands of the Aegean and Ionian Seas.

In Greece, the largest breeding colonies are located on uninhabited islets of the Evvoikos and Saronikos Gulfs that surround Attica, the most urbanised area in the country, although colonies occur on most Greek islets (Fric et al. 2012). Wintering grounds include the coast of

southwest Asia, most of the European coast up to Denmark and the coast of Africa from Western Sahara through the eastern Mediterranean (del Hoyo *et al.* 1996).

3 Methodology

3.1 Boat surveys

Pelagic surveys for cetaceans, sea turtles and seabirds were carried out in March and May 2023 using a 13m sailing boat.

Visual-based surveys

The method applied for visual surveying seabirds, cetaceans and sea turtles in the Pelagic surveys area was the **European Seabirds at Sea (ESAS)**, based on Tasker *et.al* 1984 and Champhuysen & Garthe 2004 and adopted to Greek/Mediterranean conditions through the LIFE-Nature project for the Identification of Marine Important Bird Areas (marine IBAs) in Greece, entitled "Concrete Conservation Actions for the Mediterranean Shag and Audouin's Gull in Greece, including the Inventory of Relevant Marine IBAs", LIFE07 NAT/GR/000285, (http://www.ornithologiki.gr/en/seabirds), as described in Fric & Gaganis 2009.

In summary, the method is aiming at systematically recording seabirds, cetaceans and sea turtles as well as human activities in the survey area, in transects by trained observers, from a boat which is moving at a constant low speed (<15 knots). Swimming seabirds, cetacean, fish and sea turtles are being recorded continuously in a 300m wide strip transect in **5-minute intervals**, while flying birds are recorded with **1-min snapshot**. Scanning angle is 180° (*i.e. in front of the survey vessel*). The perpendicular distance of swimming fauna is recorded relative to the transect line ahead of the ship: **A = 0-50m, B = 50-100m, C = 100-200m, D = 200-300m, E = >300m, W = within 300m, but no distance recorded**. For flying birds, coded with **F**, there is no distance indication. Boat position (**poskey**), namely geographical longitude and latitude, are recorded every 5 min. The marine species are spotted by a naked eye or binoculars and are identified by binoculars.

Figure 3-1. ESAS fieldwork

A method described by Heinemann (1981) is used to determine the distances at sea and more particularly the distance of 300*m* from the observing platform which determines the width of the line transect by using a calliper or a ruler. During ESAS surveys data is recorded regarding (A) boat route, (B) marine species and (C) human activities in the survey area, which may have an effect on the presence and behaviour of the marine species.

Survey boat data include: start and end location date, time and geographical location of each line transect, sea state, visibility and floating matter (including fishing vessels). Species data recorded include: species, number of individuals, age (if applicable), distance from the observation vessel, location within or outside 300m line transect, flight direction (for birds), behavior and association with human activities or other species. Datasheets for observation vessel data and species data are provided in Annex I.

The **survey design for cetaceans** is similar to the established methodology designs for such surveys, used over the past 4 decades (Buckland et al. 2001, Buckland et al. 2004) and used a grid of parallel line transects, that provided comprehensive coverage of the study area.

The transect lines acted as the basis for the daily track line followed by the vessel providing a roughly uniform coverage of the study area. Attempts were made when selecting the orientation of the transect lines, to have them move across (at an angle to) the depth gradient in the area as opposed to moving along (parallel to) the depth gradient. This was done to allow for the coverage of different depth levels during navigation of each transect, in order to minimize detection bias on individual transect lines when mapping sighting data.

When a group of cetaceans is sighted (group defined 'dolphins observed in apparent association, moving in the same direction and often, but not always, engaged in the same activity' (Bearzi et al. 2005) by any of the on-effort observers, the systematic search effort is interrupted while the vessel diverted from the track line toward the sighted animals in order to achieve more accurate determinations of the species, the group size, group age class composition and group activity of the group sighted. In addition to basic environmental data (e.g., Beaufort sea state, visibility conditions etc.) collected at regular 1 hour intervals as well as at the start and at the end of each transect line, data collected for each sighting includes the time, GPS coordinates, initial bearing and radial distance to the cetacean group (used to calculate the perpendicular distance of the sighting to the track line), species identity, group size, group age class composition (3 age classes: Calf < 1/2 length of adult, Juvenile < 2/3 length of adult and adult) and the general activity in which the group is engaged in at the time of approach (e.g. foraging, travelling, milling). For the purpose of the correct identification of the species as well as the correct recording of group size and group age class composition attempts are made to approach the animals to obtain photographs. Where possible the photographs taken are also used for the photo-identification of individuals. This is done to ensure the same group of animals was not counted twice during the same survey day.

Encounter Rates are calculated as the number of encounters / 100km of "on effort" navigation.

The navigation schedule coincided with the Visual boat-based surveys.

In case a group of cetaceans or seabirds was spotted, a drone was used in order to more accurately identify the species and assess the number of the individuals, record their behaviour and gather the relevant photographic evidence.

The numbers of individuals of each species recorded by ESAS surveys were transformed into species densities per km^2, taking into account the *2x300m=600m* transect survey width and the distance travelled by the survey vessels per 5-minute time interval *distance travelled = boat speed x 5 min*. The locations of number of recorded individuals per species and the density of individuals per species were overlaid 4 geographical minutes (4'x4') reference grid in WGS84 projection coordinate system.

Taking into account that more than one may have crossed each 4'x4' reference grid cell, for each cell the following variables were calculated:

- The **average** over all survey trips of the **total number of individuals per species** recorded in a 4'x4' grid cell per trip
- The **maximum** over all survey trips of the **total number of individuals per species** recorded in a 4'x4' grid cell per trip
- The **average** over all survey trips of the **average density of individuals per km^2 per species** in a 4'x4' grid cell per trip
- The **average** over all survey trips of the **maximum density of individuals per km^2 per species** in a 4'x4' grid cell per trip
- The **maximum** over all survey trips of the **average density of individuals per km^2 per species** in a 4'x4' grid cell per trip
- The **maximum** over all survey trips of the **maximum density of individuals per km^2 per species** in a 4'x4' grid cell per trip

It should be noted that individuals recorded outside transect are excluded from density calculation. The densities of the species per reference grid cell are representative of the **habitat suitability**. The variable "**average** over all survey trips of the **average density of individuals per km^2 per species** in a 4'x4' grid cell per trip" was used as a measure of habitat suitability for each species. This variable was classified into 4 classes:

- ***Most suitable habitats*** – top 5% of positive (i.e., non-zero) densities in grid cells
- ***More suitable habitats*** – 25-5% top values of positive densities in grid cells
- ***Suitable habitats*** – 75-25% top values of positive densities in grid cells, and
- ***Presence*** – remaining grid cells with species presence (bottom 25% values).

To further analyse the **patterns of seabird movements** in the area for each grid cell the **prevailing flight directions** were calculated. Additionally, **locations of interactions of seabirds with fisheries** were identified in association with their abundance in absolute numbers.

Finally, for each grid cell the **number of species of interest recorded** in the grid cell was calculated to identify those areas where the **species richness** is the greatest.

Acoustic surveys

The acoustics detection team worked in cooperation with the visual observers, detecting cetacean vocalizations by using a hydrophone array towed behind sailing boat. The hydrophone array system consisting of High Frequency Magrec HP03 hydrophone elements, comprising a HP03 preamp (Low cut filter set at 2kHz) with a nominal sensitivity of 1.5kHz – 150kHz along with a topside Magrec HP/27ST Amplifier along with a Lenovo Thinkpad Laptop using the PAMGUARD acoustic analysis software specifically developed for cetacean monitoring, covering the range of possible vocalizations for species likely to be encountered during our surveys. The towed hydrophone system was submerged and active, and a PAM operator was active on the equipment during all "On Effort" times during the survey. The hydrophone system consists of 2 hydrophones which record in 2 different channels. The visual observers and PAM operator rotated every 1.5 hour to minimize fatigue.

The PAM operator immediately informed the visual observer team of any acoustic detection.

The hydrophone recordings were analysed by PAMGUARD software using "*whistle and moan detector"* module.

3.2 Aerial surveys

Aerial surveys for cetaceans, sea turtles and seabirds were carried out using i) a Cessna C172 Skyhawk 2 high wing, ultralight aircraft and ii) a DJI drone.

3.2.1 Aircraft surveys

A high wing, light aircraft (Cessna C172 Skyhawk 2) was used, based at Messolonghi Airport (ICAO designator GR-0008). This four-seater aircraft offers an excellent view from its cockpit and thus was considered suitable, reliable and cost-effective for such a mission. The flight was performed along the project area of the Northern Ionian Sea at an altitude of 1000 ft and an average Speed Over Ground of 90 knots. The flights were performed under ideal weather conditions (wind speed less than 10 knots, clear sky and visibility more than 10 km). In every case where an "object of interest" was spotted, the airplane left its track and performed one or more circles over the object in order to visually identify it. Furthermore, the object was photographed so that a proper record of its observation and identification is kept. The photographic operation was performed using a full frame DSLR (Nikon D750) with a 70-200mm F/2.8 Tamron SP lens. All photographs were georeferenced since the camera was equipped with a GPS Unit (Nikon GP-1A).

Figure 3-2. The aircraft used, at Corfu airport

Figure 3-3. View from the aircraft's cockpit

In the following example, the staged photographic identification process of an initially "object of interest" located on the shore is clearly shown.

Figure 3-4. A: Recording an "object of interest", B: Approaching, C: Identifying

3.2.2 Drone surveys

Drones have been deployed from the sailing boat, during the ESAS surveys, to improve the spatial coverage of the transects grid in specific areas of interest.

Drone flights were performed only in calm sea conditions (0-2 BF) and the flight altitude varied between 30m and 200m depending on the target species.

Two different deployment protocols were followed:

1. Transects of a total length of 1km each, perpendicular to the main transect lines of the ESAS Surveys, were performed in certain sites, where suitable habitats for marine mammals and sea turtles existed. The flight altitude was determined to 200m and the drone camera was set vertical to the flight direction. Georeferenced 4K video footage was recorded to be further analyzed for the presence of target species.
2. In cases when encounter of the target species was obtained through the ESAS transects or through boat transport movements, the drone was deployed in altitudes of 30-50m, depending on the species, to record the numbers and characteristics of the animals of interest. This method has been used to record marine mammals, seabirds and sea turtles.

Figure 3-5. A: Drone surveys

3.3 Coastal surveys

3.3.1 Coastal surveys for the Scopoli's Shearwater

At known colonies of the species, such as the one at Diapontia islands, an adaptation of the existing raft counting method has been developed, with the RIB boat following the birds gathering in front of the colony before sunset, to create the raft. When a raft is spotted, the number of birds is counted using binoculars and ZOOM cameras. The DJI Mini 2 drone is then deployed flying at 30m above sea level to take photos and 4k video of the raft, in order to provide more accurate estimations.

At a second stage, after sunset, the raft is further monitored using a 640x480 thermal camera, to assess the movements of birds from the rafts to the colonies, as well as the timeline of the birds entrance and flights to the colony sites. In this respect, breeding birds are distinguished from prospectors to provide more precise estimates of the colony size.

3.3.2 Coastal surveys for the Mediterranean Shag

Coastal surveys for the Mediterranean Shag involves the recording of the species individuals, age and activity while the survey vessel travels at a low speed along the survey coastline at a distance of 50-100m from the shore. The species are identified by binoculars, data is recorded on field maps and their locations are recorded by a portable GPS unit. Simultaneously, apparently active or suspected nesting sites are recorded.

The data recorded during field surveys included:

- Date / time of the observation
- Location of the observation (GPS waypoint name, latitude, longitude)
- Seabird species
- Number of individuals
- Number of adult and juvenile individuals (for the Mediterranean Shag)
- Identification of colony/nest sites, number of nests, suitable nesting habitat, roosting sites
- Potential localised threats
- Comments

3.3.3 Coastal surveys for the Mediterranean Monk Seal

Evaluating Habitat Availability and Suitability

To evaluate habitat availability and suitability for the Mediterranean monk seal in the project area its entire coastline is circumnavigated with an inflatable boat, at a distance of about 50 m from the shoreline to locate all potentially suitable coastal caves for resting and/or pupping. Once a cave is located, it is approached swimming and its suitability evaluated, based on a set of physical and environmental features (Dendrinos et al., 2007).

If a cave is evaluated as suitable monk seal habitat, geotagged photos are taken and its GPS position is recorded. It should be noted that Mediterranean monk seals tend to be more selective in their choice of caves used for pupping than for resting (Karamanlidis, Pires, Silva, & Neves, 2004).

Previous research has indicated that the physical and environmental features used in this study are the most important predictors of the selection of a coastal cave as a pupping site by monk seals in Greece. Suitable pupping sites tend to have among other, multiple entrances, beaches in their interior with a soft substrate, a low risk of pup washout and are not easily accessible to humans (Dendrinos et al., 2007).

During the aforementioned research efforts the field team of MOm tries also to collect information that could lead to a preliminary assessment of the demographic composition of the Mediterranean monk seal population in the area (Dendrinos, Kotomatas, & Tounta, 1999). During the cave inspections, researchers search for the presence of recent signs of cave use, such as tracks, scats, pieces of fur or blood. If a seal is encountered, photographs or video are taken in order to enable future individual identification.

Finally, during the circumnavigation of the coastline the research team collects information on human activities and threats to the Mediterranean monk seal in the region, and more

specifically information on the overall intensity of human activity and to a lesser extent on fishery – seal interactions in the area.

Collection of reports on Mediterranean monk seal sightings

Apart from performing visits to the seal shelters the researchers MOm collect and evaluate reports of seal sightings conducted by other observers (such as local citizens, tourists, divers, professional and amateur fishermen). Location, date and time of the observation, behaviour of the animal, as well as visible characteristics (size, developmental stage, coloration, external pelage marks or scars, overall status of the animal) are recorded. This method of data collection is based on the methodology of the operation of the National Rescue and Information Network (Adamantopoulou et al., 1999). Although this information originates from non-scientists, it forms a considerable source of relevant data, which, upon careful evaluation and analysis, complements the work conducted directly in the field. In addition, the collection of data by non-scientists in combination with the data collected by researchers allows for the immediate reaction of the field team of MOm in cases of emergency, such as animals needing aid or dead animals.

3.4 Telemetry for seabirds and marine mammals

A marine ornithological radar (HALO 24) is used to track and record the flights of seabirds from and to the Diapontia island colonies, assess their seasonal distribution/occurrence within the project area, the use of this area as foraging habitat, the interaction with marine mammals in foraging aggregations, and to further assess the overall sensitivity of the Diapontia islets breeding population to the potential impacts of the hydrocarbon research/exploration activities.

Marine radar surveys were carried out during day and night using a sailing boat. Bird flights were recorded by the marine radar and stored in a geodatabase using specialised software.

Combining the data of the radar, with the boat surveys and the existing telemetry data, the patterns of space use by the species for foraging in the “Ionian block” lease area will be further explored.

4 Results

4.1 Boat surveys

A total of **267 nautical miles** of boat-based visual surveys and cetacean surveys were carried out on 14-15/3/2023 and 22-24/05/2023in the southern, eastern, northern and central part of the Pelagic Survey Area, as well as in the surrounding areas in the Wider Project Area, to assess the presence, abundance and distribution of the cetacean, sea turtle and seabird species of interest.

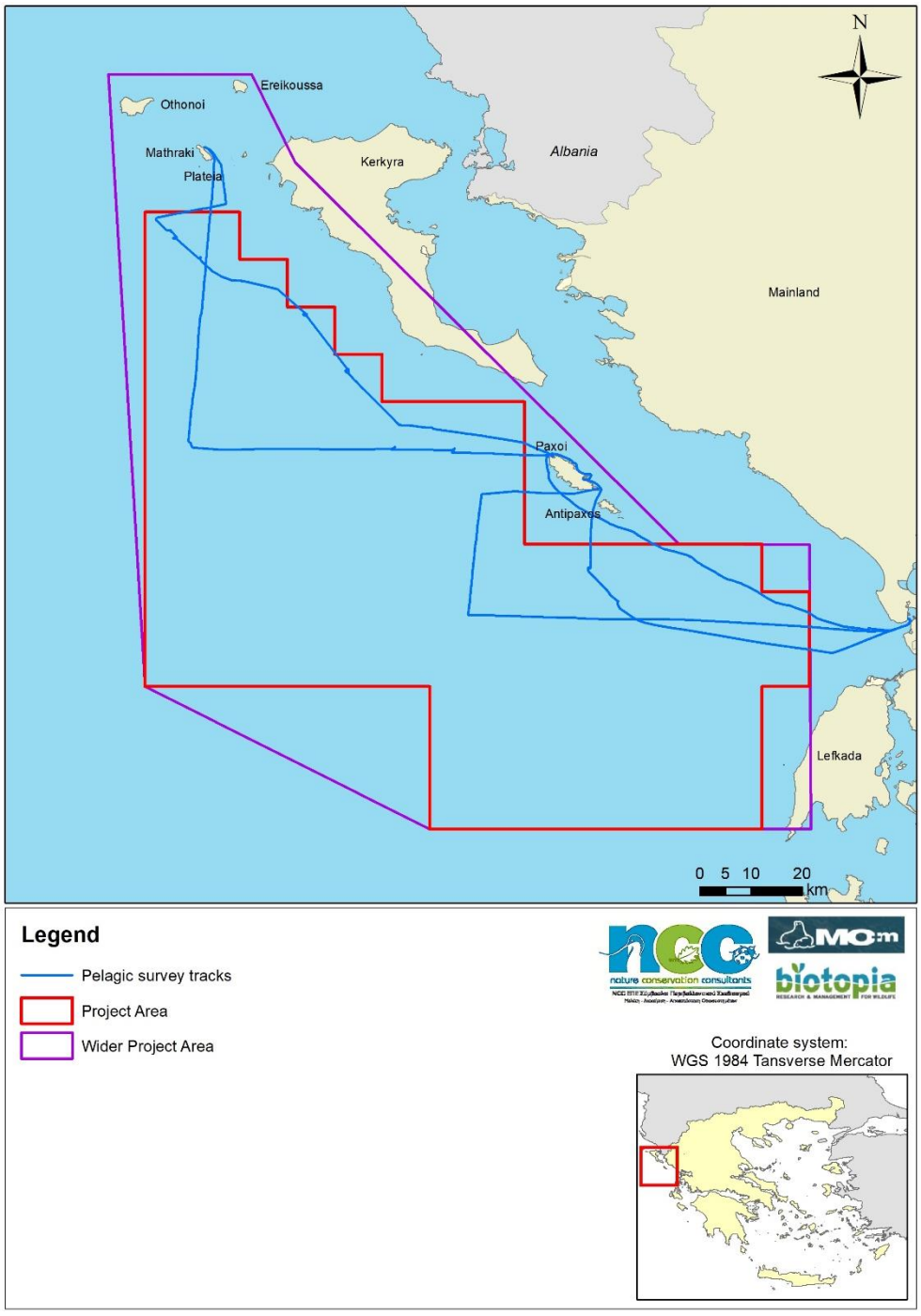

Figure 4-1. Visual boat-based survey tracks

During the survey, 3 cetacean species: **Cuvier's Beaked whale** (*Ziphius cavirostris*), **Striped dolphin** (*Stenella coeruleoalba*) and **Bottlenose dolphin** (*Tursiops truncatus*), 1 sea turtle species (**Loggerhead turtle** (*Caretta caretta)* and 6 seabird species: **Scopoli's Shearwater** (*Calonectris diomedea*), **Yelkouan Shearwater** (*Puffinus yelkouan*), **Mediterranean Shag** (*Phalacrocorax aristotelis desmarestii*), **Sandwich Tern** (*Sterna sandvicensis*), Mediterranean Gull (*Larus melanocephalus*) and **Yellow-legged Gull** (*Larus michahellis*) and were recorded. Bottlenose dolphins and Sandwich Tern were recorded in the vicinity of the Wider Project Area, while all the rest of the species of interest were recorded within the Project Area, in the case of the Mediterranean Shag within the Wider Project Area.

*Table 4-1. Species recorded in the Pelagic surveys area and the project area (species of interest are marked with **bold**).*

Species	Common name	Number of individuals	Project Area	Wider Project Area
Ziphius cavirostris	Cuvier's Beaked whale	8	√	√
Stenella coeruleoalba	Striped dolphin	61	√	√
Tursiops truncatus	Bottlenose dolphin	3		
Caretta caretta	Loggerhead Sea Turtle	1	√	√
Calonectris diomedea	Scopoli's Shearwater	110	√	√
Puffinus yelkouan	Yelkouan Shearwater	8	√	√
Phalacrocorax aristotelis desmarestii	Mediterranean Shag	1		√
Sterna sandvicensis	Sandwich Tern	1		
Larus melanocephalus	Mediterranean Gull	1	√	√
Larus michahellis	Yellow-legged Gull	136	√	√

Provided on the maps below are the locations of the recorded species and their abundance.

Additionally, during acoustic surveys using towed hydrophone cetaceans were recorded in at the northern and central part of the Project Area.

Cetaceans

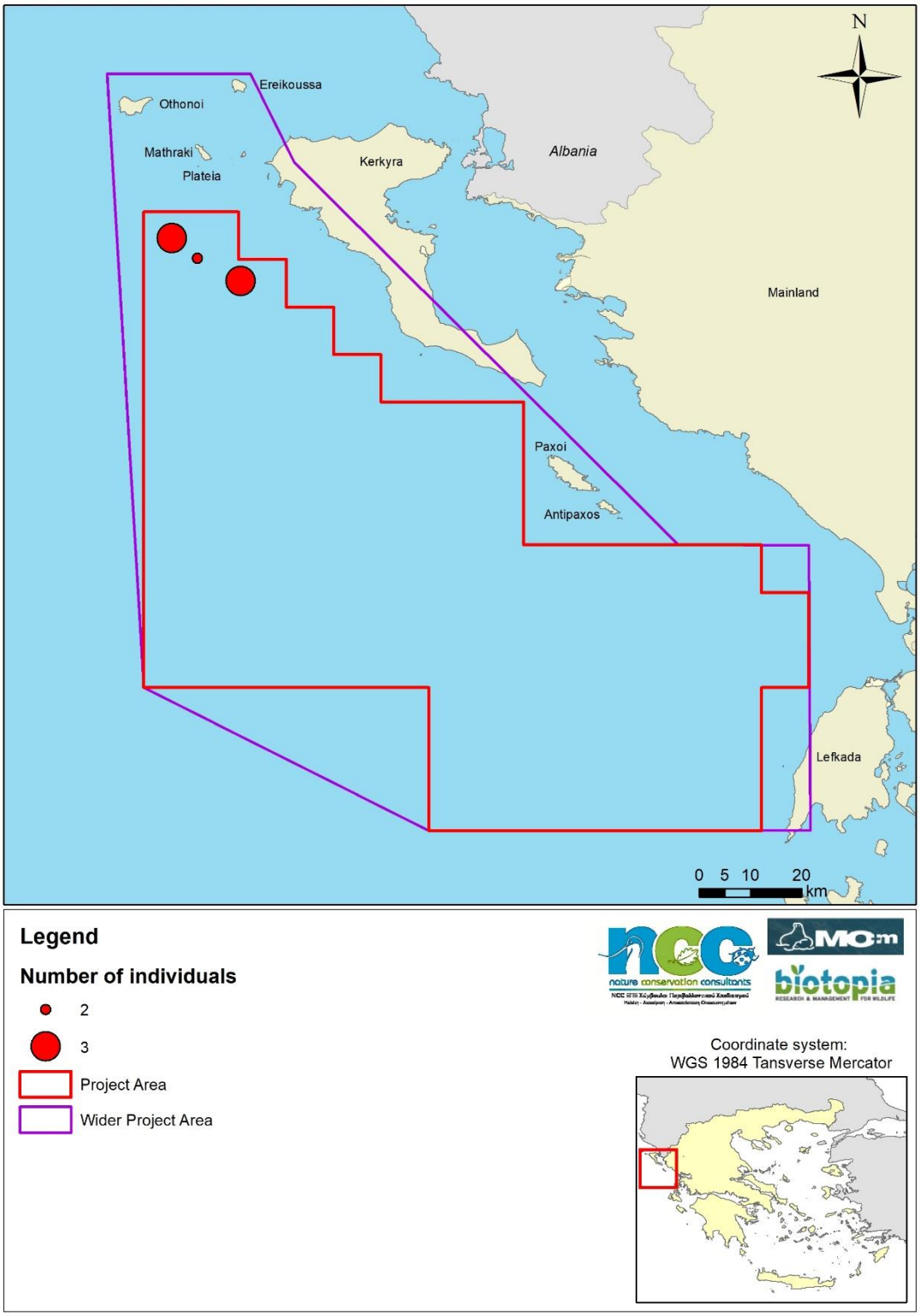

Figure 4-2. Locations of Cuvier's Beaked whale records.

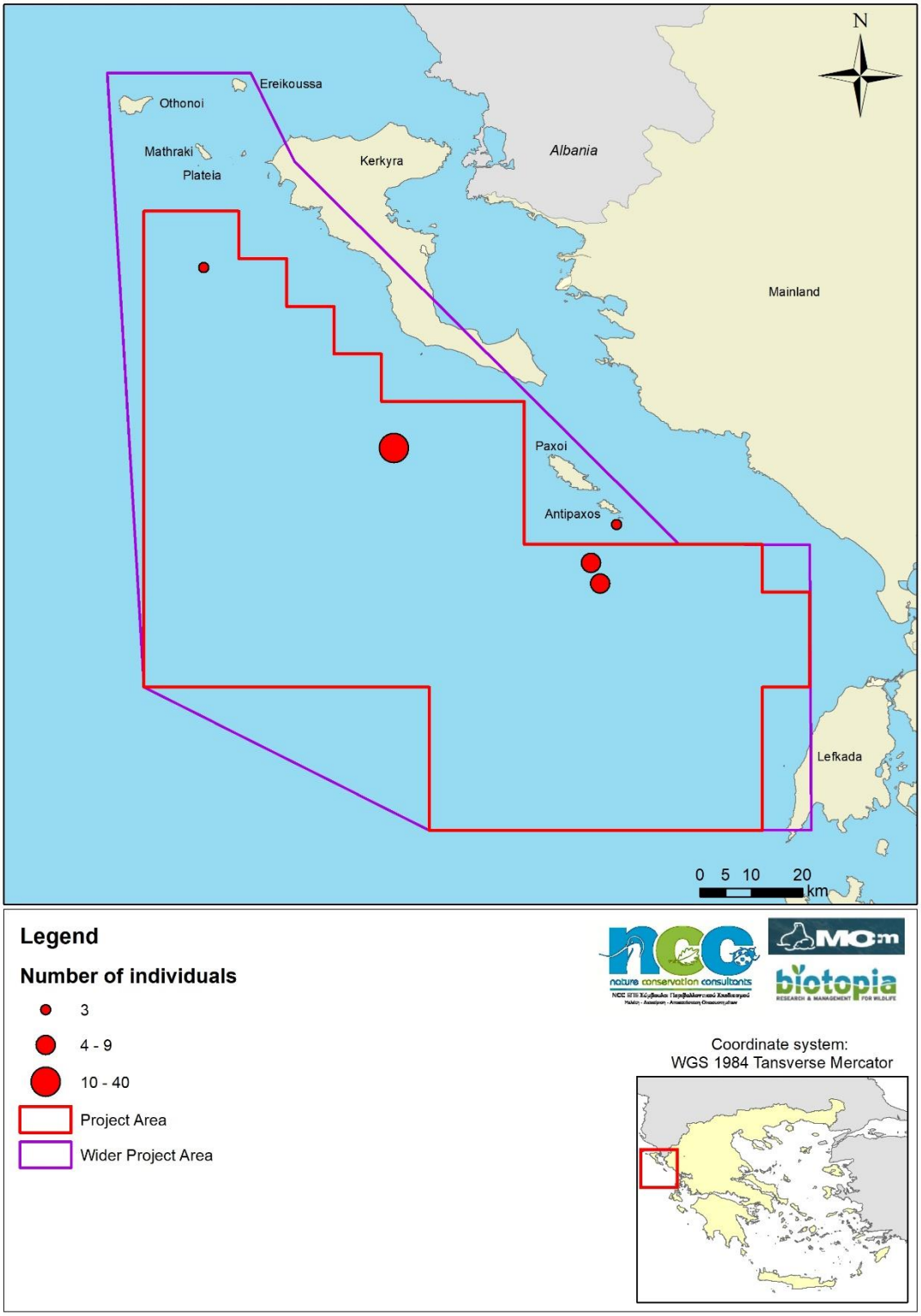

Figure 4-3. Locations of Striped dolphin records.

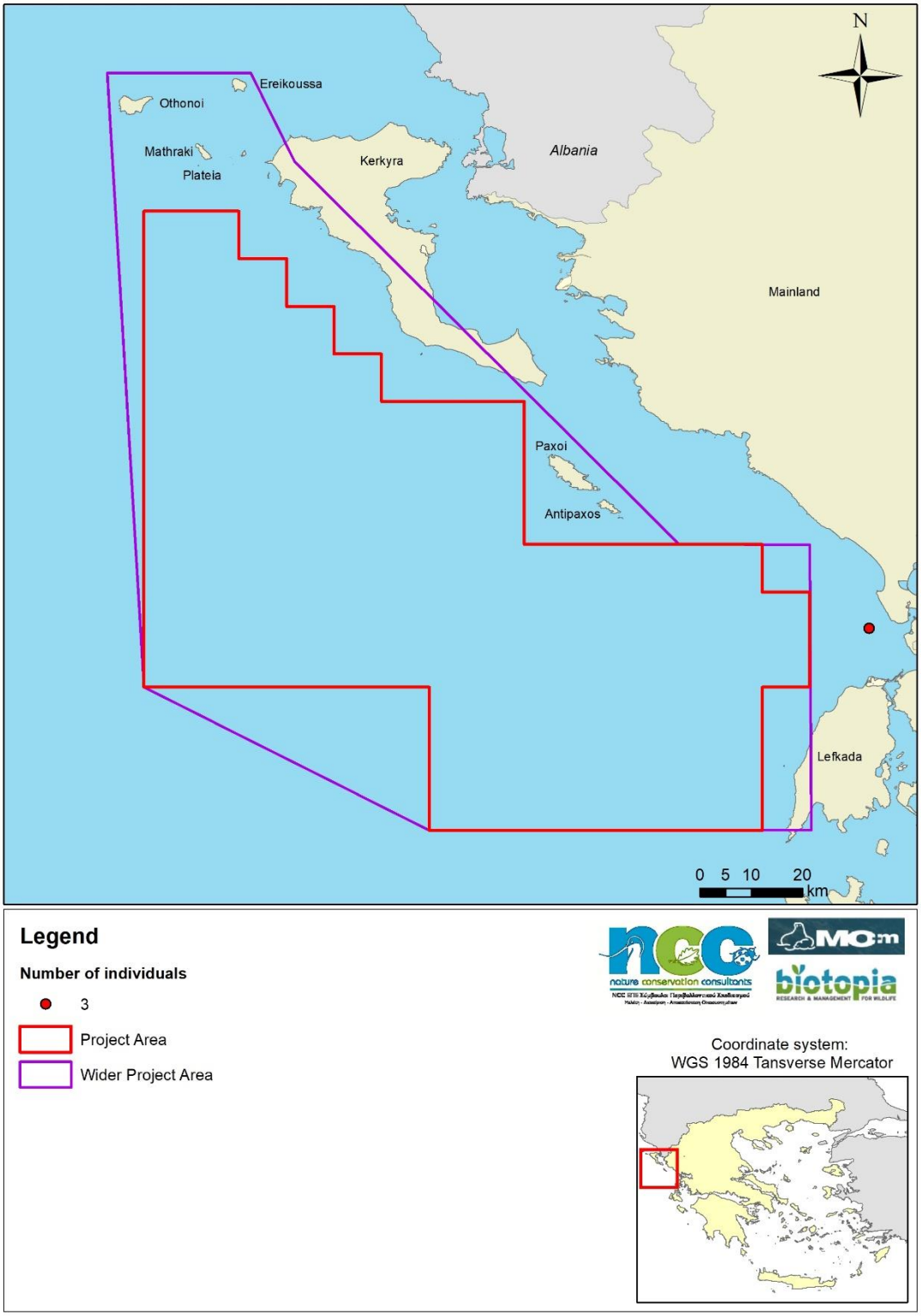

Figure 4-4. Locations of Bottlenose dolphin records.

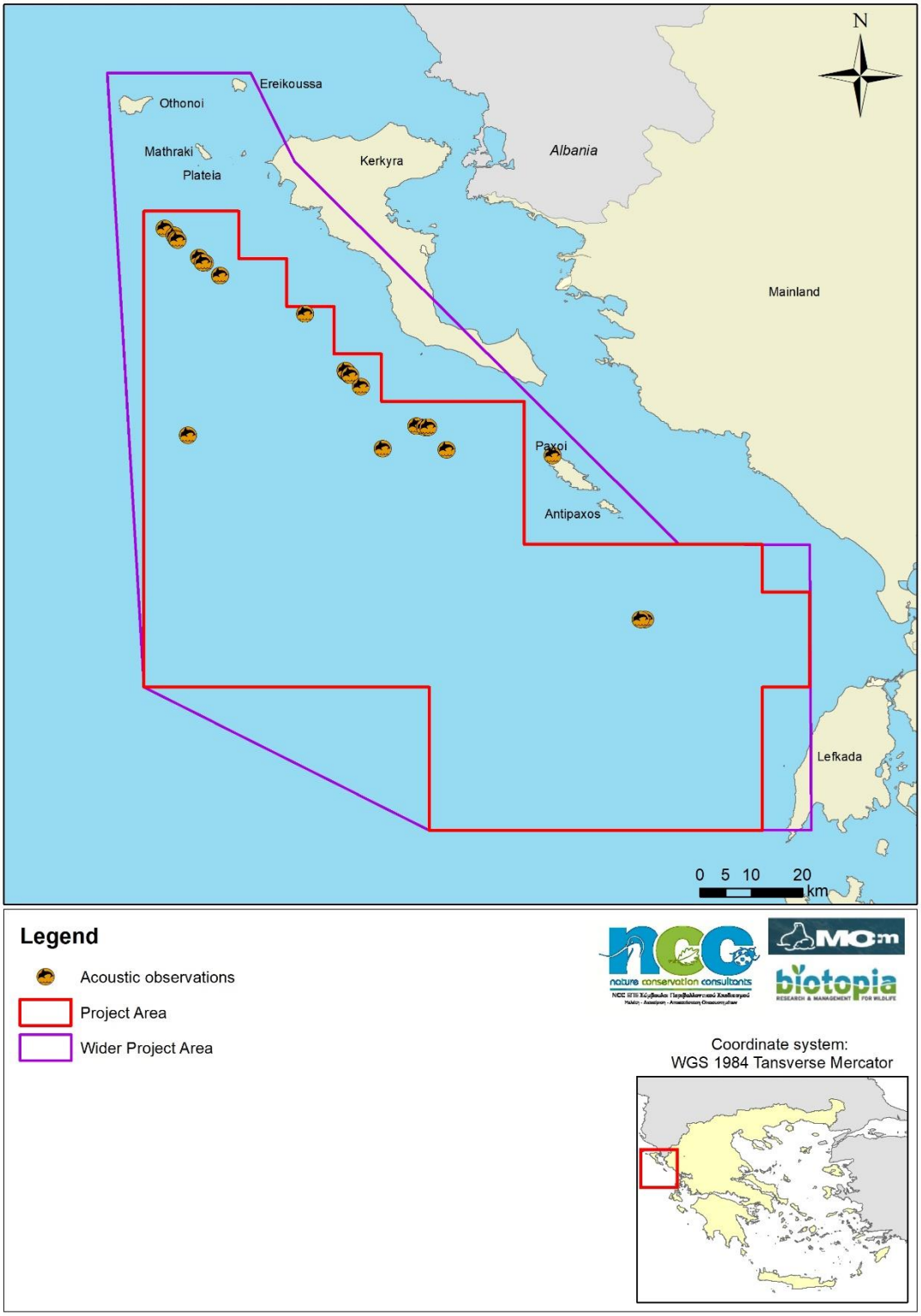

Figure 4-5. Locations of cetaceans recorded by acoustic surveys.

Sea turtles

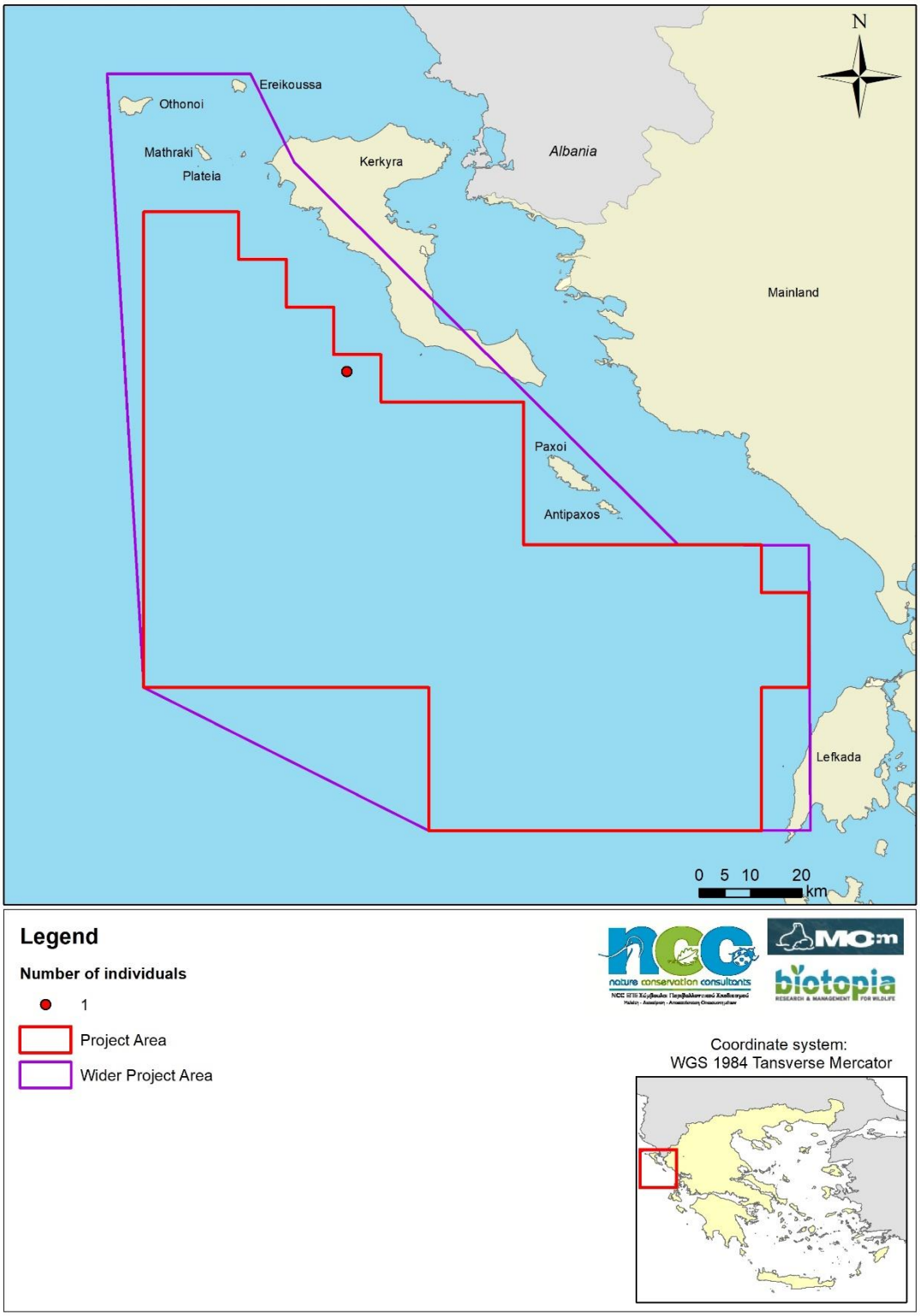

Figure 4-6. Locations of Loggerhead Sea Turtle records.

Seabirds

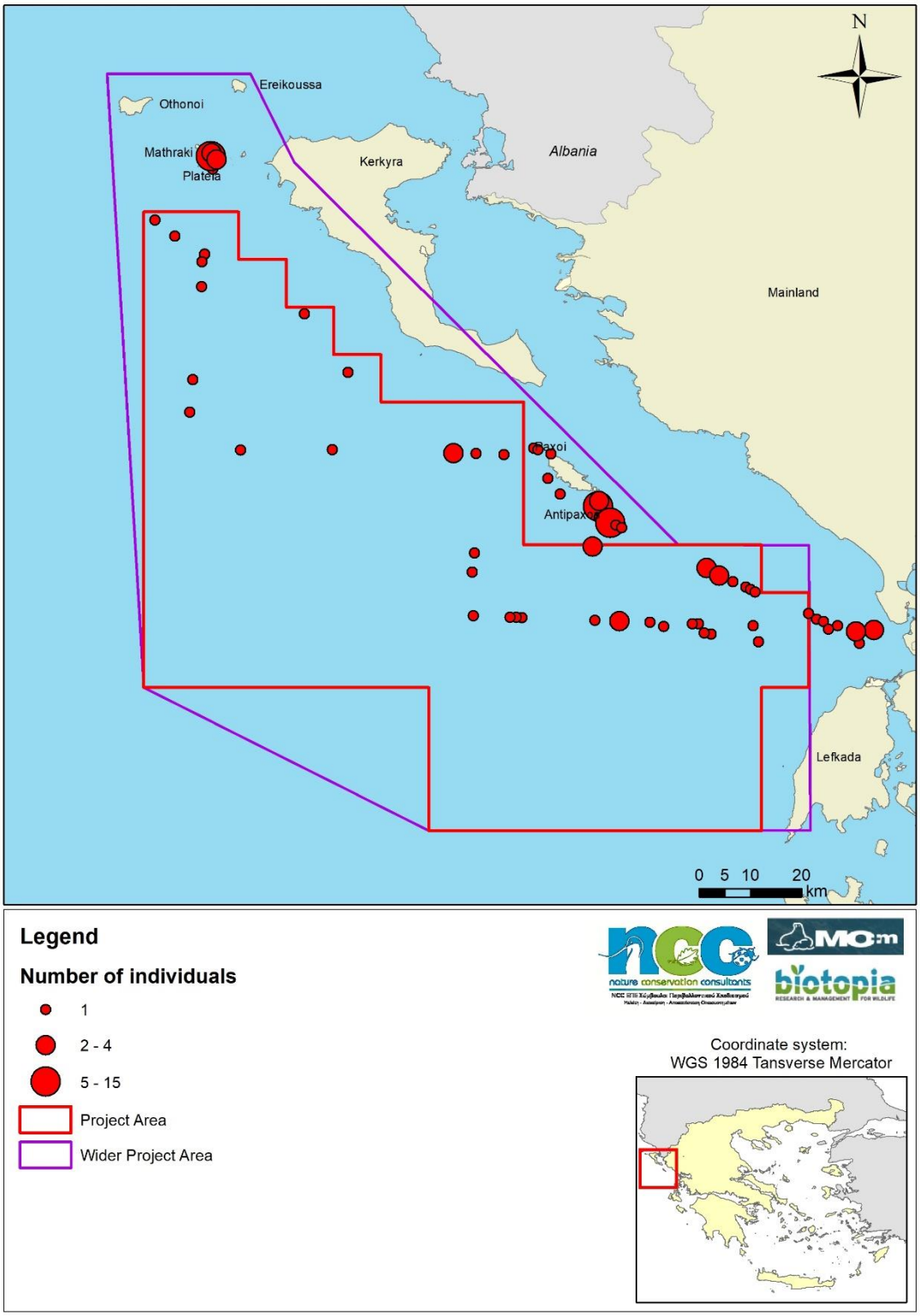

Figure 4-7. Locations of Scopoli's Shearwater records.

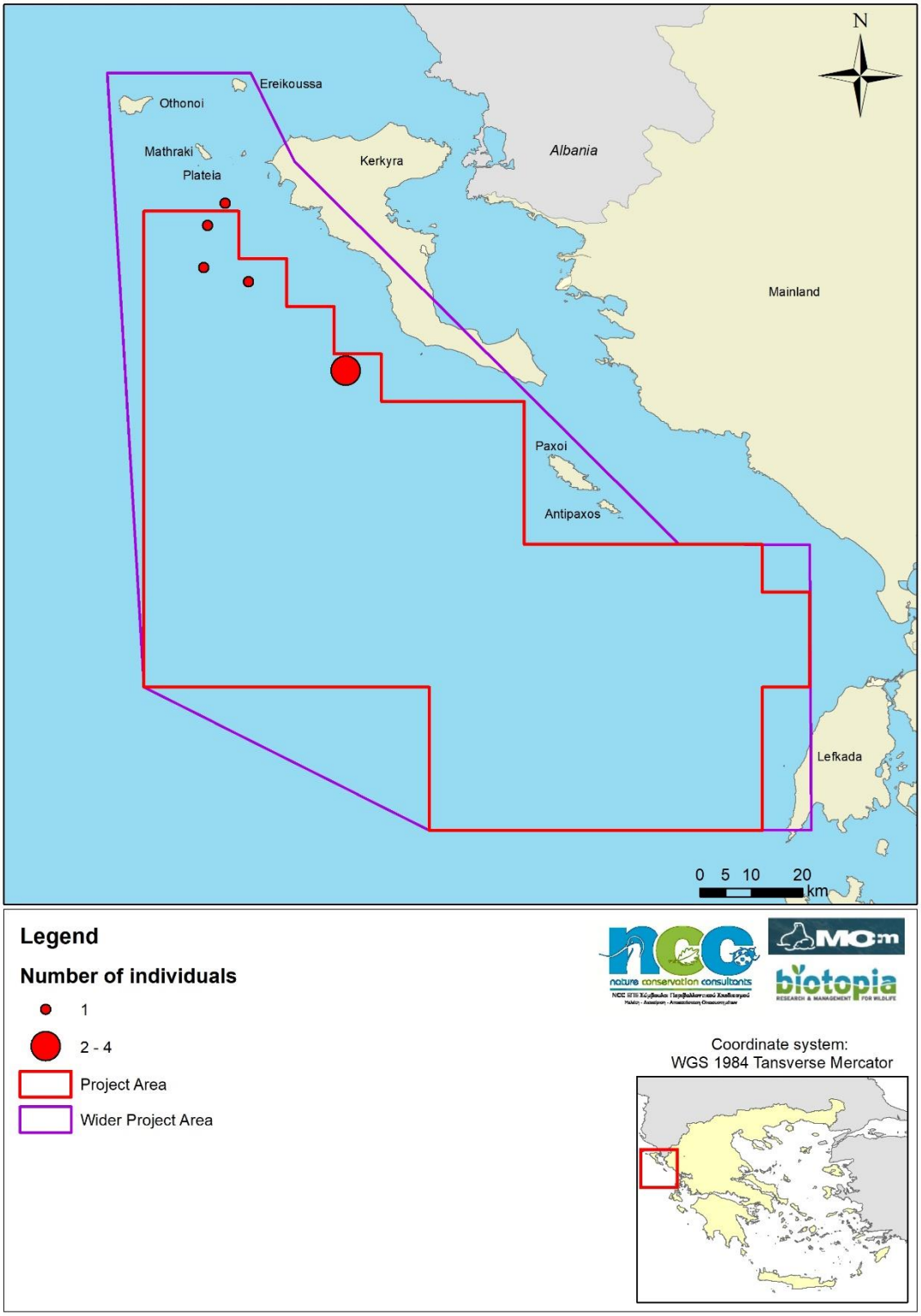

Figure 4-8. Locations of Yelkouan Shearwater records.

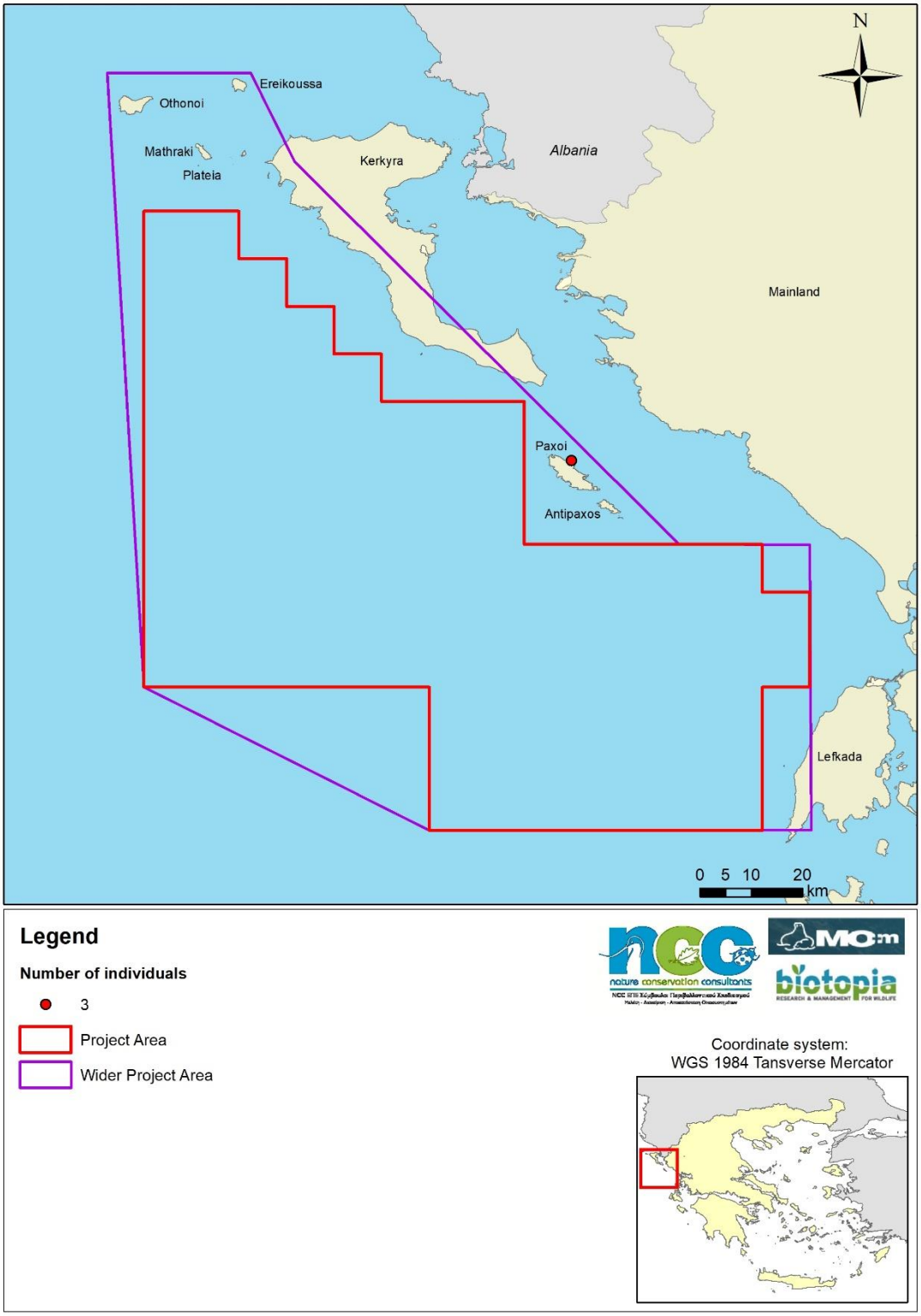

Figure 4-9. Locations of Mediterranean Shag records.

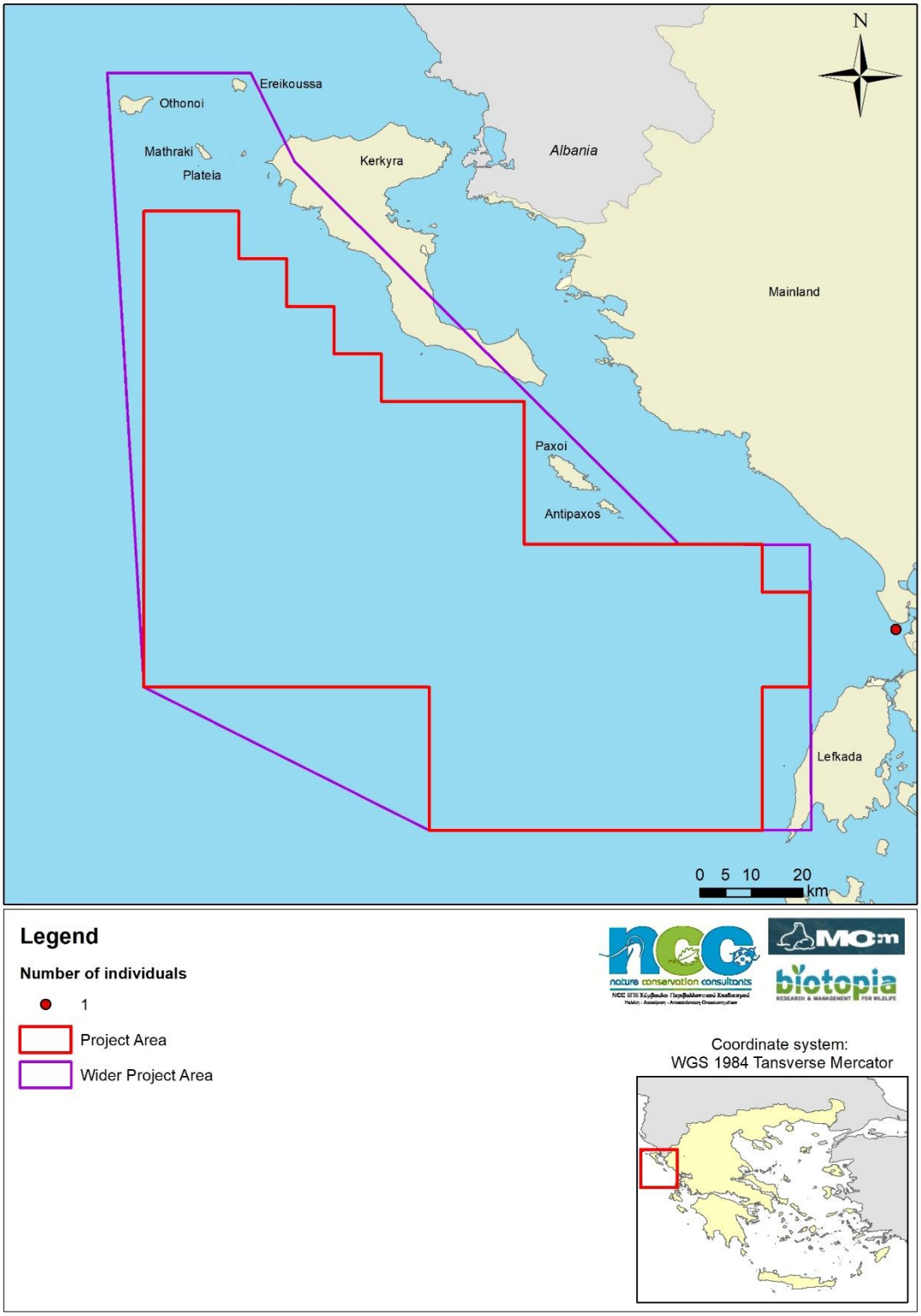

Figure 4-10. Locations of Sandwich Tern records.

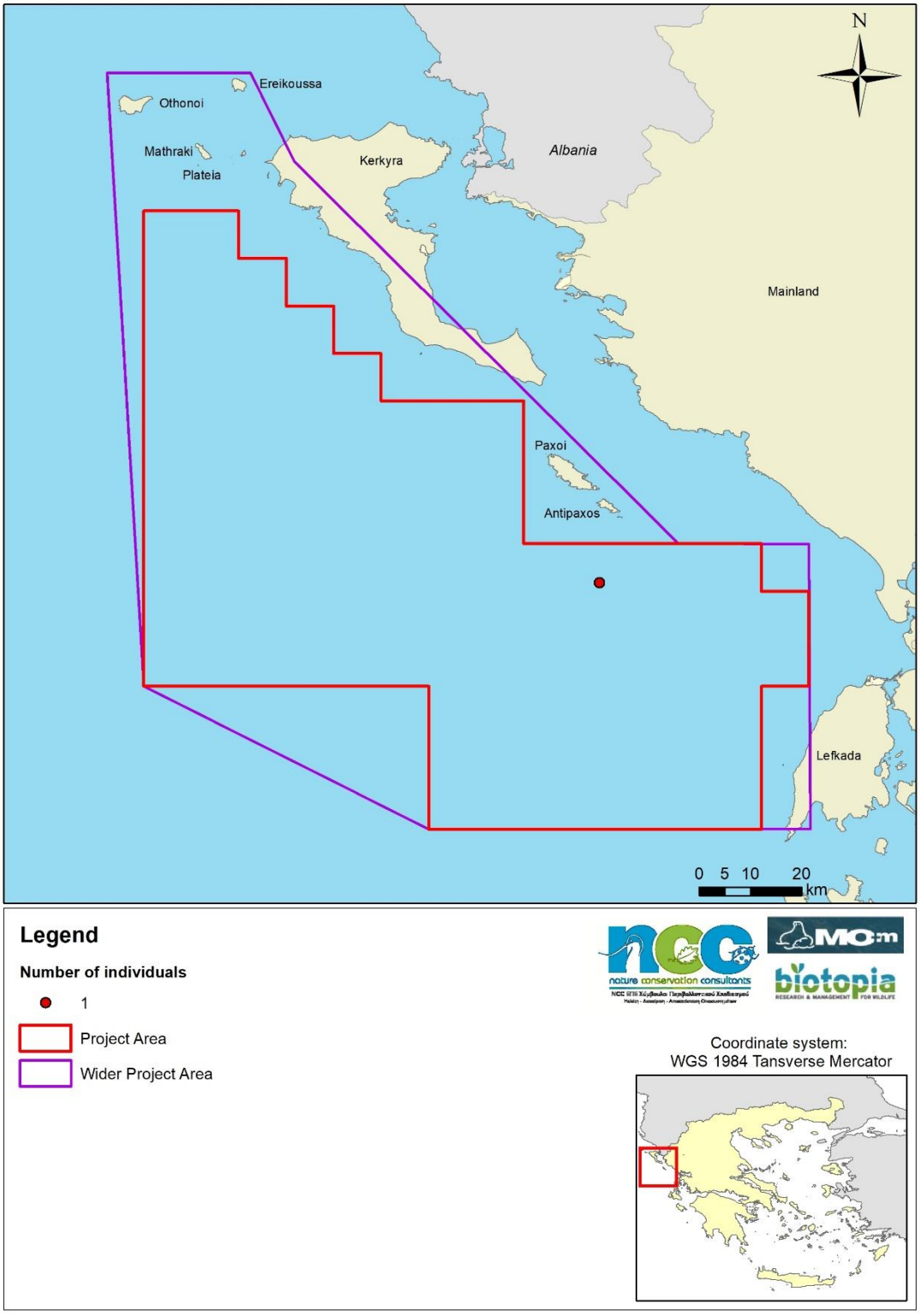

Figure 4-11. Locations of Mediterranean Gull records.

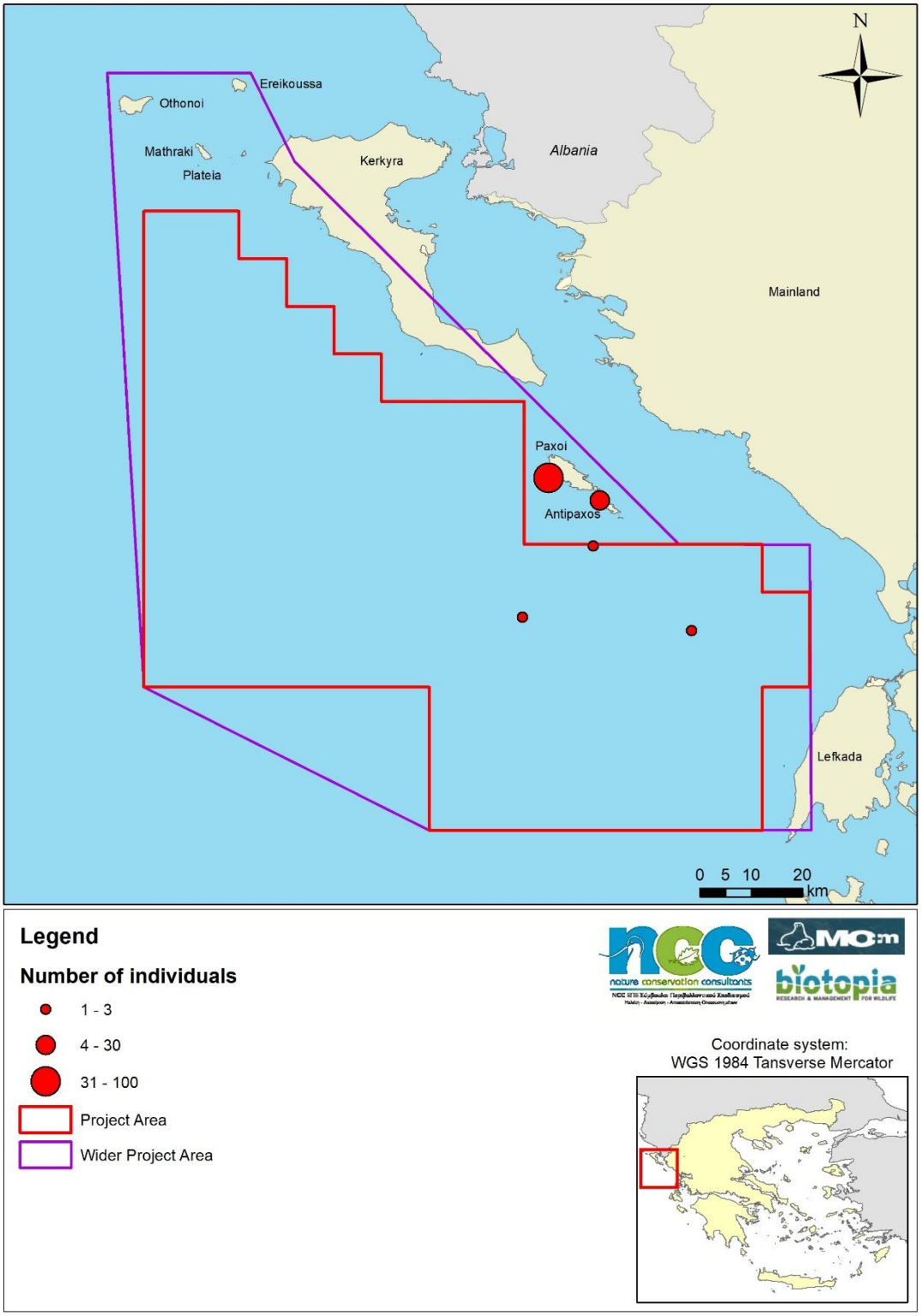

Figure 4-12. Locations of Yellow-legged Gull records.

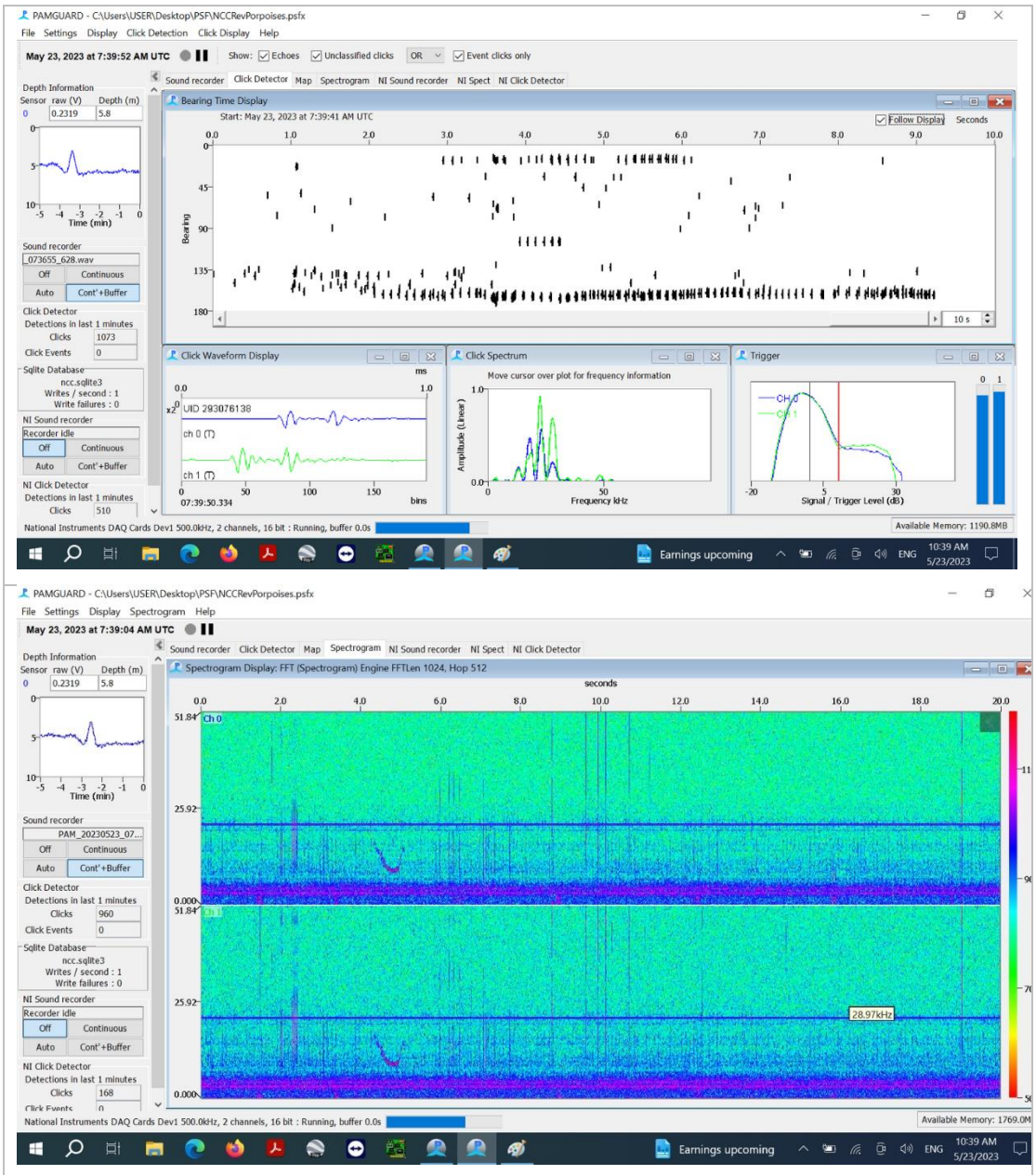

Figure 4-13. Screenshots of the PAMGUARD software with cetacean vocalizations.

Figure 4-14. Cuvier's Beaked whale and Striped dolphins during the boat surveys.

4.2 Aerial surveys

The aerial survey was conducted on the 8th of May 2023 (Figure 4-8). A total of **605 km** were inspected thoroughly, covering the larger part of the Pelagic Project Area.

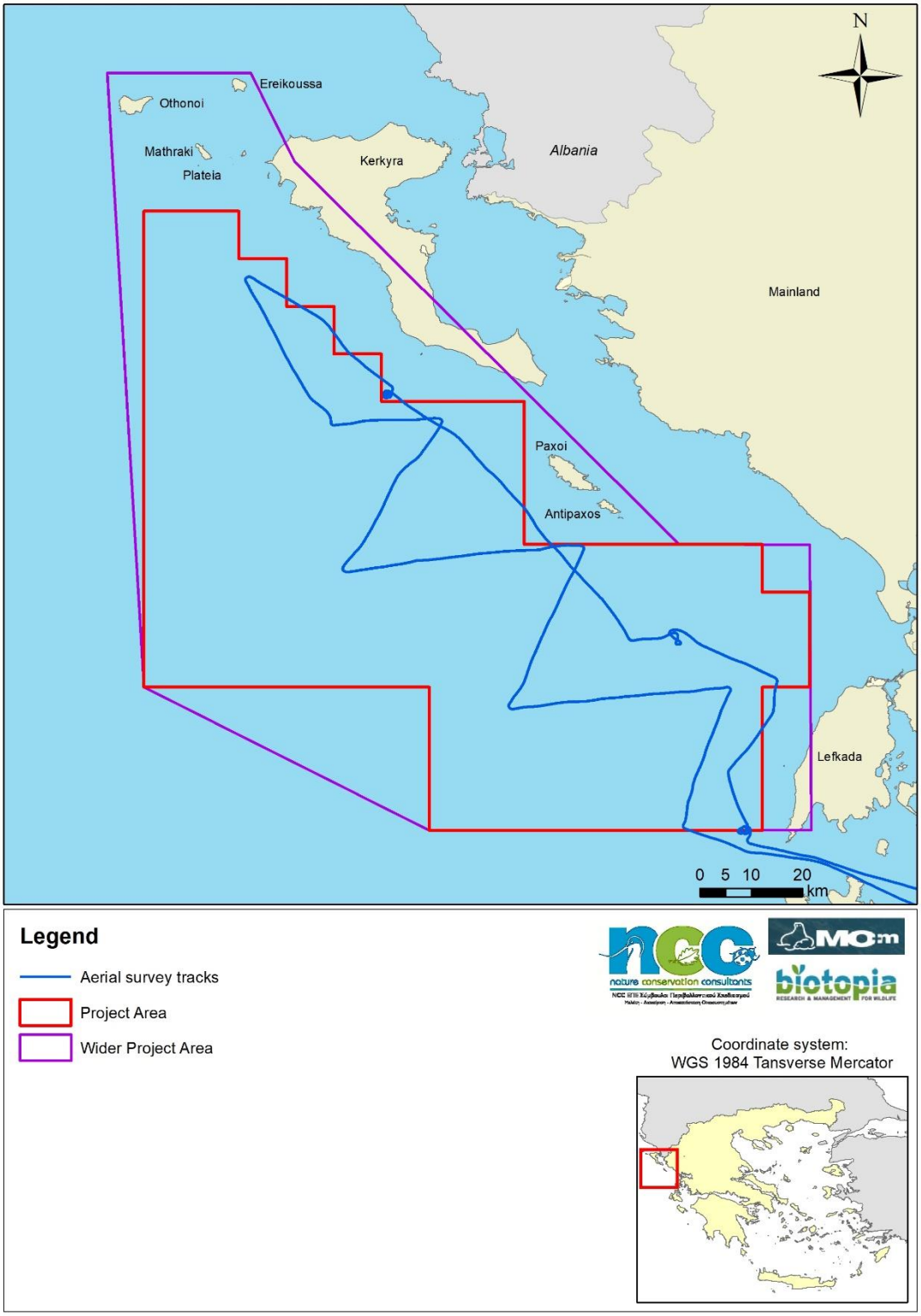

Figure 4-15. Aerial surveys track.

During the aerial surveys 2 individuals of **Cuvier's Beaked whale** (*Ziphius cavirostris*) and 23 individuals of **Striped dolphin** (*Stenella coeruleoalba*) were recorded at the edge of the Project Area. Additionally, marine debris and trawlers were recorded in the central part of the Project Area.

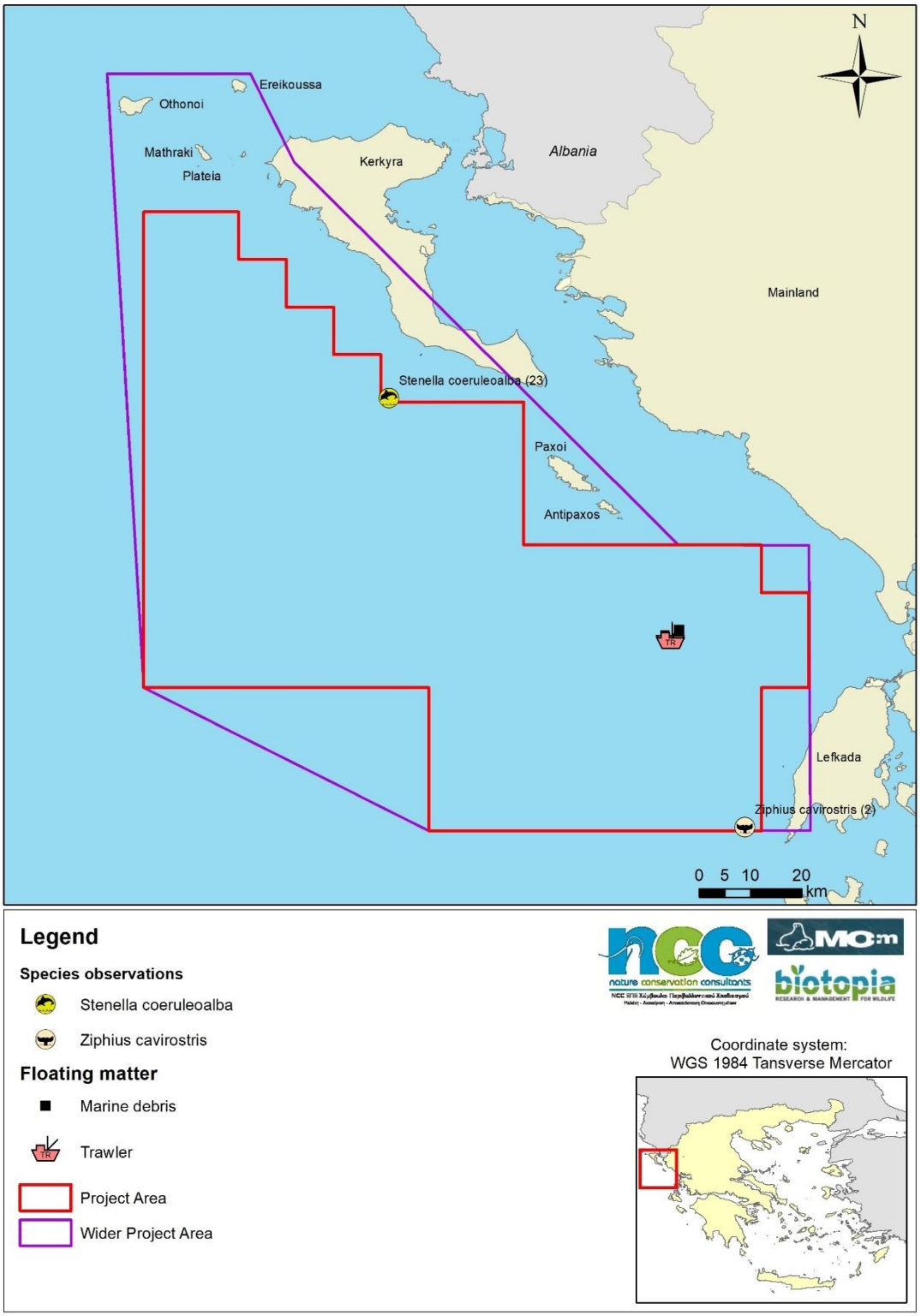

Figure 4-16. Locations of cetaceans and gloating matter recorded during aerial surveys.

It is worth mentioning that during the boat and aerial surveys a Cuvier's Beaked whale with a calve was spotted. Additionally, both Striped dolphins and Bottlenose dolphins with calves were observed. These findings are a strong indication that the wider project area hosts breeding populations of these three cetacean species.

Figure 4-17. Cuvier's Beaked whale with a calve and a group of Striped dolphins during the aerial surveys.

4.3 Coastal surveys

4.3.1 Coastal surveys for the Scopoli's shearwater

Coastal surveys for the Scopoli's shearwater are planned to be implemented during the second trimester of the project (June – August 2023), using the sailing/RIB boat and the drone.

4.3.2 Coastal surveys for the Mediterranean Shag

Coastal surveys for the Mediterranean shag at the Wider Project Area revealed possible breeding of the species on the northeast coast of Paxoi island. During the second trimester of 2023, the survey effort will continue and expand in order to locate more breeding sites of the species within the Wider Project Area.

4.3.3 Coastal surveys for the Mediterranean Monk Seal

Coastal surveys for the Mediterranean Monk Seal are planned to be implemented during the second trimester of the project (June – August 2023), using the RIB boat.

4.4 Telemetry for seabirds and marine mammals

Marine surveillance radar in association with SPx Target Tracker Server Software was used to detect and record seabirds and marine mammals in pelagic areas, as well as seabirds in the vicinity of seabird colonies where other long-range detection methods at night are not available. The initial stage involved testing and setting up of the SPx Target Tracker Server Software. Marine surveillance radar supported by a thermal camera was used at Mathraki Scopoli's Shearwater colony.

5 Conclusions

During the first trimester of the project, most of the scheduled tasks have been performed on time.

Two boat surveys (both visual-based and acoustic) and an aerial survey were carried out in the project area. In total 3 species of cetaceans (Cuvier's Beaked whale, Striped dolphin and Bottlenose dolphin) were spotted. The most numerous species was the Striped dolphin, but the observation of 8 individuals in total of Cuvier's Beaked whales is also considered an important finding. Most important is the fact that calves of Cuvier's Beaked whales, as well as of the two species of dolphins, were recorded during the boat and aerial surveys. These observations indicate that probably the wider project area is used by the cetaceans as a breeding ground.

Additionally, during the surveys, 6 species of seabirds and one species of sea turtle were recorded.

At the same time new innovative field methods were tested, such as the surveys with the ornithological radar. The combination of the data of the radar with the ones of the boat and aerial surveys will provide a more integrated spatial information for the species ecology and movements, within the project area.

During the second and third trimester of the project more intense fieldwork is planned, including boat, aerial, radar and coastal surveys.

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