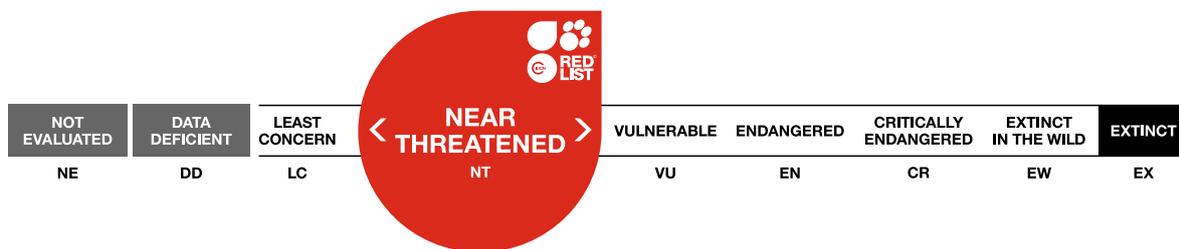


Steno bredanensis Mediterranean subpopulation, Rough-toothed Dolphin

Assessment by: Kerem, D., Frantzis, A., Scheinin, A. & Goffman, O.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Cetartiodactyla	Delphinidae

Scientific Name: *Steno bredanensis Mediterranean subpopulation* (Lesson, 1828)

Synonym(s):

- *Delphinus bredanensis* Lesson, 1828 *Delphinus bredanensis* G. Cuvier in Lesson, 1828
- *Steno rostratus* Desmarest, 1817

Parent Species: See [Steno bredanensis](#)

Common Name(s):

- English: Rough-toothed Dolphin
- French: Dauphin à Bec Etroit
- Spanish; Castilian: Delfin de dientes rugosos, Delfin de Pico Largo
- Arabic: ةنشخلال نانسالا وذن يفلدلا
- Greek, Modern (1453-): Στενόρυγχο δελφίνι
- Hebrew: נש מולת ויפלוד
- Italian: Steno

Taxonomic Source(s):

Society for Marine Mammalogy (SMM). 2020. List of Marine Mammal Species and Subspecies. May 2020. Yarmouth Port, MA: Committee on Taxonomy, Society for Marine Mammalogy. Available at: <https://marinemammalscience.org/species-information/list-marine-mammal-species-subspecies/>. (Accessed: 26 June 2020).

Taxonomic Notes:

Many current publications erroneously attribute the name *Steno (Delphinus) bredanensis* to G. Cuvier in Lesson (1828), rather than to Lesson (1828) (Smeenk 2018). The latter attribution (Lesson, 1828) is now followed by the Committee on Taxonomy (2020).

Justification of a Mediterranean subpopulation of Rough-toothed Dolphin (em style="text-decoration-line: underline;">Steno bredanensis)

This text addresses two definitions of a species' subpopulation, taken from the Red List Guidelines (IUCN Standards and Petitions Subcommittee 2019) and the website of the IUCN Red List, to show how Rough-toothed Dolphin in the Mediterranean meets these definitions:

1. *Geographically separate subpopulations of a species are defined as those populations that are so isolated from others of the same species that it is considered extremely unlikely that there is any genetic interchange. In general, listings of such subpopulations should be restricted to those that have been isolated for a long period of time.*

Evidence gathered from dedicated surveys and opportunistic sightings over the last 45 years show the

Rough-toothed Dolphin to be restricted in the Mediterranean Sea to the central and eastern parts of the basin, and within this area to maintain two seemingly disparate fragments, one in the Levant Basin (westernmost sighting off north-western Cyprus) and the second in the Ionian Sea (westernmost record in Donnalucata, Sicily) (Kerem *et al.* 2016). As of today, there are 27 records from the former and six from the latter. The closest Atlantic resident population is around Madeira Island, Portugal (Alves *et al.* 2018), roughly 3,000 km west of Donnalucata. The distance could theoretically be covered over a month of continuous straight travel (Wells *et al.* 2008) but should be considered extremely unlikely.

The lack of sightings in the western Mediterranean Sea cannot be passed over by a dearth of survey effort. On the contrary, the Alboran Sea and the Strait of Gibraltar have been extensively surveyed over the last decades with no records of the species (A. Cañadas and R. de Stephanis pers. comm. September 2015).

The distance to the northernmost record of Rough-toothed Dolphin in the Red Sea (Eritrea; Notarbartolo di Sciarra *et al.* 2017) is about 2,000 km, but all Levantine DNA sequences differ markedly from Indian Ocean (Oman) ones.

2. Geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

There is at present not a sufficiently large genetic database from which to calculate migration rates. Preliminary genetic evidence suggests an Atlantic origin of the Mediterranean subpopulation with long separation (see Population section). Tissue samples from the Ionian fragment were not included in the above-mentioned preliminary analysis, yet all three Levantine sequences had private alleles.

Assessment Information

Red List Category & Criteria: Near Threatened D1 [ver 3.1](#)

Year Published: 2021

Date Assessed: March 30, 2020

Justification:

The Rough-toothed Dolphin is widely distributed in temperate and tropical waters worldwide but little is known about its occurrence in the Mediterranean Sea. Preliminary genetic results and the lack of sightings in the Alboran Sea and Gibraltar, suggest little exchange of individuals with the nearest Atlantic population around Madeira Island. The information from the few sightings and strandings since 1985 indicates confinement to the Sea's eastern basin and occurrence in two main isolated localities, the Ionian Sea and the Levant Basin.

The taxon cannot be assessed against criteria A and C, since there are no data from which to infer trends, and there is insufficient data to perform a quantitative analysis, as required for assessment against criterion E.

Inferences can be drawn to evaluate abundance for criterion D. Using vessel line transect data from

2021, a rough estimate of 1,200 mature individuals was calculated for the combined populations. Even given the poor precision (more details in 'Population' below), the subpopulation abundance is well above 250 mature adults, such that criterion D is not met for Endangered or Critically Endangered. While it is plausible that there could be fewer than 1,000 mature individuals which would result in a VU listing under Criterion D, the most likely inferred number is 1,200 mature, justifying an Near Threatened listing.

In order to improve the knowledge of this population and facilitate the adoption of adequate conservation measures, further research and monitoring are called for. Effort should be mainly invested on more line transect vessel surveys in its suspected Extent of Occurrence, stressing waters so far un-surveyed or scarcely surveyed. Acoustic monitoring during surveys should be a prerequisite, considering its highly identifiable whistle characteristics. Particular attention should be paid to stranded and bycaught individuals of this species. Such events should be reported and thoroughly investigated to gain information on biology and threats.

Geographic Range

Range Description:

The Mediterranean subpopulation of the Rough-toothed Dolphin is presently confined to the Sea's eastern basin, i.e. does not extend west beyond the Sicily Straits. With the rather limited information available, there are two seemingly isolated localities in which photo-authenticated sightings have occurred: the Ionian Sea and the Levant Basin. This pattern was true for 2013 (the latest record being a sighting on August 2013; Kerem *et al.* 2016) and proved to hold from then on: the new sightings since that date in the Levant Basin are three sightings (2016, 2017, 2019) made by yachtsmen between Cyprus and Israel (Israel Marine Mammal Research and Assistance Centre, unpublished), two more during dedicated cetacean surveys offshore from Cyprus in 2017, one southeast of Larnaca and one south of Limassol (Department of Fisheries and Marine Resources, Cyprus, unpublished), and one offshore Egypt in 2018 (ACCOBAMS 2021). Three new sightings in the Ionian Sea were made during dedicated cetacean surveys (S. Frey pers. comm. 2016 to D.K and A.F, ACCOBAMS 2021, Caruso *et al.* 2019).

All of the above-mentioned sightings in the open sea were made from sailing platforms. The 2018-2019 ACCOBAMS Survey initiative (ASI) included, in addition to ship surveys, an extensive aerial survey effort in which no Rough-toothed dolphin identifications were made (ACCOBAMS 2021). Since this species is hard to identify from the air, mainly because it can be confused with Bottlenose Dolphin, it is possible that some sightings of the latter were misidentified Rough-toothed Dolphins. In this regard, an unexpected potential aerial sighting of *S. bredanensis* (unconfirmed with photos but otherwise credible) was recorded offshore from northeastern Corsica (Ligurian Sea) in 2019 (G. Doremus, Observatoire Pelagis, pers. comm.). Until other authenticated sightings of the species in that area, or elsewhere in the western Mediterranean, become available, the confinement of the species to the eastern Basin should stand.

The lack of an obvious oceanographic barrier between the two localities within the eastern Mediterranean, would suggest that the distribution pattern may reflect uneven survey effort in the basin rather than actual fragmentation. Nevertheless, no concrete knowledge is available so far on the degree of continuity or isolation between the two geographical areas of the species' distribution, such that the area of occupancy for the subpopulation cannot be estimated. With current knowledge, the

suspected extent of occurrence encompasses the offshore pelagic waters of the entire eastern Basin, to the exclusion of the Adriatic, an aptly monitored sea from which, to date, no records have been reported.

Due to the species' preference for warm waters, one may expect seasonal changes in distribution within its suspected range. February is on average (1982-2016) the month with the lowest sea-surface temperature in the eastern Mediterranean basin (Pastor *et al.* 2018). During winter, surface temperatures >22°C are restricted to the southeastern corner of the Levant Basin (*ibid.*), a region into which the population may retreat during the winter months. Indeed, the only record from February is a stranding of a calf on the northern Israeli coast in 2003 (Kerem *et al.* 2016).

Country Occurrence:

Native, Extant (seasonality uncertain): Cyprus; Egypt (Egypt (African part)); Greece (Greece (mainland)); Israel; Italy (Italy (mainland), Sicilia); Lebanon; Libya; Malta

Native, Possibly Extant (seasonality uncertain): Egypt (Sinai); Greece (East Aegean Is., Kriti); Syrian Arab Republic; Tunisia; Turkey (Turkey-in-Asia, Turkey-in-Europe)

Presence Uncertain & Vagrant: France (Corsica)

FAO Marine Fishing Areas:

Native: Mediterranean and Black Sea

Distribution Map



Legend

- EXTANT (SEASONALITY UNCERTAIN)
- POSSIBLY EXTANT (SEASONALITY UNCERTAIN)
- PRESENCE UNCERTAIN

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IUCN Mediterranean Red List 2020



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

Population

Origin

In a preliminary study specifically aimed at discerning the origin of the eastern Mediterranean population (Kerem *et al.* 2016), mitochondrial control region sequences extracted from tissue samples from the Canary Islands (n=5) and from Israel (n=3), were treed together with GeneBank sequences from elsewhere in the Atlantic Ocean (eastern US coast and Brazil; n=7), the Indian Ocean (n=4) and the Pacific Ocean (n=13). All eight sampled individuals had distinct alleles. The Mediterranean alleles were included in the Atlantic cluster and sub-clustered within it, suggesting an Atlantic origin with subsequent isolation (*ibid.*). A more extensive genetic study is needed to rule out exchange with the Red Sea, or the Indian Ocean at large, through the Suez Canal. Such Lessepsian migration of cetaceans has been shown for the Indo-Pacific Humpback Dolphin (*Sousa plumbea*) (Notarbartolo di Sciara *et al.* 2017). The only authenticated evidence so far for the occurrence of the species in the Red Sea is through strandings in the Dahlak Archipelago, Eritrea, ca. 1,850 km from the Mediterranean outlet of the Canal (*ibid.*).

Abundance

Although there are no specific abundance/density estimates of Rough-toothed Dolphin in the Mediterranean, recent density estimates of 'small dolphins' using distance sampling methodology made following vessel line transects (ACCOBAMS 2021) allow a rough estimation. In two of the survey blocks for which such estimations were made (i.e. combined blocks 22W, 22C and 22E in the eastern Ionian Sea (Hellenic Trench) and block 27 in Egyptian waters), Rough-toothed Dolphins were sighted. At both locations the sighted pod contained six individuals and at both locations this number was roughly 10% of the total number of small dolphin individuals (also including False killer Whales, Risso's Dolphins, Bottlenose Dolphins, Striped Dolphins, Common Dolphins and unidentified dolphins).

For the Ionian Sea, the estimated density was 483 individuals per 1,000 km², 10% of which are Rough-toothed Dolphins (assuming equal sighting availability of the involved species). Projected to its currently known extent of occurrence in the Ionian, ~21,500 km² (see 'Extant' area in the species distribution map), an abundance of $21.5 \times 48 = 1,032$ is computed, ~570 of which are assumed to be mature individuals (Taylor *et al.* 2007). A similar computation for Egypt, projected over the extent of occurrence in the Levant Basin (Total small dolphin density = 88 ind/1,000 km², AOO = ~130,000 km²), an abundance of 1,144 is arrived at, or ~630 mature individuals, for a combined number of 1,200 mature individuals for the subpopulation. Coefficients of variation for the estimated densities were 21.82 and 33.67 for the Ionian and Egypt, respectively, resulting in wide confidence intervals, yet, choosing the lower confidence limits, the resulting subpopulation abundance was well over 250 individuals, such that assignments of CR or EN status through Category D are excluded.

Group size

Mean group size in the eastern Mediterranean between 1997 and 2019 was 9.6 (n=21; range=1-40) (Kerem *et al.* 2016 and new sightings since then). The two largest groups of ca. 40 individuals each were observed in the Levant Basin, in 2006 in close proximity, one inside Haifa Port and one outside, 10-15 m seaward of the breakwater (Kerem *et al.* 2012). A large group of 160 (not taken into account in the above mean group size), split into sub-groups, was observed in the Ionian Sea in 1985 (Watkins *et al.*

1987).

Current Population Trend: Unknown

Habitat and Ecology (see Appendix for additional information)

In the eastern Mediterranean, the typical habitat is mid-ocean pelagic. Sightings between 1985 and 2019 (n=18; Kerem *et al.* 2016 and new sightings) occurred where the mean water depth was 1,880 m (range: 320-3,137) and at a mean distance from shore of 66 km. The shallowest sighting of 320 m was off Cyrenaica, Libya (Boisseau *et al.* 2010). On two occasions in the Levant Basin (not entered into the above calculation) groups were encountered in very shallow waters of a few meters (Kerem *et al.* 2016). Even when residing in deep water, Rough-toothed Dolphins are considered to be surface feeders, preying on both fish and cephalopods (West *et al.* 2011). Dietary habits in the Mediterranean are virtually unknown (Kerem *et al.* 2016). Waters in the warm, hypersaline and ultra-oligotrophic Levant Basin (Yacobi *et al.* 1995) have been shown to follow semi-tropical dynamics (Malanotte-Rizzoli *et al.* 2014). Mean monthly surface temperatures range between 21°C in February and 32°C in August, with those in the Ionian Sea being 2-3 degrees lower (Pastor *et al.* 2018). Mean group size in the eastern Mediterranean between 1997 and 2019 was 9.9 (n=20; range=1-40) (Kerem *et al.* 2016 and new sightings). The two largest groups of ca. 40 individuals each were encountered in 2006 in the Levant Basin, in close proximity, one inside Haifa Port, Israel and one outside, 10-15 m seaward of the breakwater (Kerem *et al.* 2012). An unusually large group of 160 (not taken into account in the above mean group size), split into sub-groups, was observed in the Ionian Sea in 1985 (Watkins *et al.* 1987). Due to the species' preference for warm waters, seasonal changes in distribution within its suspected range are expected. February is on average (1982-2016) the month with the lowest sea-surface temperature in the eastern Mediterranean basin (Pastor *et al.* 2018). During winter, surface temperatures >22°C are restricted to the southeastern corner of the Levant Basin (*ibid.*), a region into which the population may retreat during the winter months. Indeed, the only record from February is a stranding of a calf on the northern Israeli coast in 2003 (Kerem *et al.* 2016).

Systems: Marine

Use and Trade (see Appendix for additional information)

The species is not utilised.

Threats (see Appendix for additional information)

There is little information available on threats for this species in the Mediterranean. From 1997 to 2013, there were four reports of gill-net bycatch and two live mass strandings (Kerem *et al.* 2016). Gas prospecting and naval exercises deploying active low-frequency SONAR are potential causes for the latter. Bycatch as known so far, only applies to individuals venturing into shallow water.

Conservation Actions (see Appendix for additional information)

The species is included in Appendix II of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in Appendix II of the 1982 Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). There are no current specific conservation actions taking place for the Rough-toothed Dolphin in the Mediterranean, but together with all resident cetaceans, it is covered by the 1996 Agreement on the Conservation of Cetaceans in the Black Sea,

Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), which entered into force in June 2001. The likely small size and the isolation of this population is a matter of concern, given that anthropogenic pressures are increasing for all Mediterranean cetacean species. The fact that there are no further records since 2008 from Israel, where the species has been closely monitored is also a cause for concern. More research is needed on the subpopulation's distribution, abundance and trends, life history, ecology, genetics and threats, on which to base a categorical risk assignment.

Credits

Assessor(s): Kerem, D., Frantzis, A., Scheinin, A. & Goffman, O.

Reviewer(s): Taylor, B.L.

Authority/Authorities: IUCN SSC Cetacean Specialist Group (dolphins, porpoises and whales)

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Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
10. Marine Oceanic -> 10.1. Marine Oceanic - Epipelagic (0-200m)	Seasonal occurrence unknown	Marginal	-
10. Marine Oceanic -> 10.2. Marine Oceanic - Mesopelagic (200-1000m)	Resident	Suitable	Yes

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
3. Energy production & mining -> 3.1. Oil & gas drilling	Unknown	Unknown	Causing/could cause fluctuations	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.3. Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	Unknown	Slow, significant declines	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.4. Unintentional effects: (large scale) [harvest]	Ongoing	Unknown	Slow, significant declines	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
6. Human intrusions & disturbance -> 6.2. War, civil unrest & military exercises	Unknown	Unknown	Causing/could cause fluctuations	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Action in Place
In-place land/water protection
Occurs in at least one protected area: Unknown
In-place education
Included in international legislation: Yes
Subject to any international management / trade controls: Yes

Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.5. Threats

Additional Data Fields

Distribution
Lower depth limit (m): 3,137
Upper depth limit (m): 0
Population
Continuing decline of mature individuals: Unknown
Population severely fragmented: Unknown
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Unknown

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