Short-beaked common dolphin *Delphinus delphis*: Mediterranean population

Endangered A2abc

Overview of range - The short-beaked common dolphin\(^1\) is a small cetacean species with a wide distribution. Like most other cetaceans, however, it is not panmictic and occurs as a series of geographically separate populations (e.g. Jefferson and Van Waerebeek, 2002). Once one of the commonest species in the Mediterranean Sea, the common dolphin has experienced a generalized and major decrease in this region during the last 30-40 years (Bearzi *et al*., in press). Coastal groups in western Greece seem to exhibit relatively high levels of site fidelity (Politi, 1998), but little is known about the movements and ranging patterns of animals living offshore.

The case for regarding Mediterranean common dolphins as a distinct population is not perfect, and admittedly rests upon a somewhat complicated chain of inference. Genetic studies indicate a significant level of divergence between Mediterranean and Atlantic populations (Natoli *et al*., in press). Differences in contaminant levels between dolphins from the Alboràn Sea (northwestern Mediterranean) and Atlantic Ocean also suggest a certain degree of isolation. Organochlorine concentrations in Alboràn Sea dolphins were about double those typical of dolphins in neighboring North Atlantic waters and showed a completely different profile (proportions between PCB congeners, the DDE/tDDT ratio, etc.) (Borrell *et al*., 2001). Genetic exchange between common dolphins from the Mediterranean Sea and Atlantic Ocean, to the extent that it occurs, appears to involve only animals from the Alboràn Sea (Natoli *et al*., in press), possibly due to oceanographic features such as the Almería-Orán thermohaline front.

At the eastern end of the Mediterranean, there is little indication of movement by common dolphins through the narrow Dardanelles Strait between the Aegean and the Marmara and Black Seas, where common dolphins are known to occur (Öztürk and Öztürk, 1997; Frantzis *et al*., submitted). A preliminary study of skull morphometrics (Amaha, 1994) suggested differences between Black Sea and Mediterranean common dolphins. In contrast, a genetic comparison of relatively small samples (8 Black Sea, 20 central Mediterranean) revealed no significant differences (Natoli *et al*., in press). Clearly, further work based on larger samples is needed to assess and characterize the relationship between Black Sea and Mediterranean common dolphins. It is acknowledged that some genetic exchange might occur in portions of the Aegean Sea where favorable habitat still exists (e.g. in the Thracian Sea; Frantzis *et al*., submitted). However, what remains between the Aegean and Alboràn sectors of the Mediterranean seems to be only isolated, remnant groups (possibly indicative of further population substructure). The once-large aggregate Mediterranean population is now a small fraction of what it was as recently as the middle of the twentieth century (Bearzi *et al*., in press). One note of caution is that there has been relatively little survey coverage of waters along the North African coast.

Range states - Albania, Algeria, Bosnia-Herzegovina, Cyprus, Croatia, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Serbia, Slovenia, Spain, Syria, Tunisia, Turkey, U.K. (Gibraltar).

Main habitat - In the Mediterranean, common dolphins are found in both pelagic and neritic environments, occasionally sharing the former with striped dolphins (*Stenella coeruleoalba*) and the latter

\(^1\) Hereinafter “common dolphin”.
with common bottlenose dolphins (*Tursiops truncatus*) (Bearzi *et al.*, in press). Mixed-species groups of common, striped and Risso’s dolphins (*Grampus griseus*) have been consistently observed in the pelagic waters of the Gulf of Corinth, Greece (Frantzis and Herzing, 2002). Mediterranean common dolphins are typically found in groups of 50-70 animals, with larger aggregations occasionally recorded. In the eastern Ionian Sea coastal waters, however, groups rarely include more than 15 individuals, and groups greater than 40 have not been observed (Bearzi *et al.*, in press).

**Population abundance and key areas of distribution** - Literature and osteological collections unambiguously confirm that common dolphins were widespread and abundant in much of the Mediterranean Sea until the late 1960s, and that their decline occurred relatively quickly (Bearzi *et al.*, in press; and see references contained therein). Today, common dolphins remain relatively abundant in the westernmost portion of the basin, the Alboràn Sea. There are sparse records off the coast of Algeria where, however, survey coverage has been limited. Possibly isolated groups are present around Sardinia and Corsica, particularly off their western coasts (Bearzi *et al.*, in press). Common dolphins are seen in the early summer in the south-eastern Tyrrhenian Sea off the island of Ischia (Mussi *et al.*, in press). The species is also present in the Sicily Channel, with larger groups being observed around Malta (Vella, in press). Common dolphins can be found in portions of the eastern Ionian Sea, particularly around the island of Kalamos (Politi and Bearzi, in press), and in the Gulf of Corinth (Frantzis and Herzing, 2002). Sighting and stranding data indicate a regular presence of common dolphins in the Aegean Sea, particularly in the Thracian Sea, Northern Sporades, the southern Evvoikos Gulf, the Saronic Gulf, and the Dodekanese (Frantzis *et al.*, submitted). Otherwise, these dolphins are rare in, or completely absent from, Mediterranean areas where information is available (Bearzi *et al.*, in press). Mediterranean regions where common dolphins have apparently vanished include the Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.

There is no basin-wide estimate of abundance for common dolphins in the Mediterranean Sea. Line-transect ship surveys of the Alboràn Sea in 1991-1992 produced an estimate of 14,736 (CV=0.38; 95% CI=6,923-31,366), with a density of 0.16 dolphins per km², but no estimates were made for this species elsewhere in the western Mediterranean due to the low number of sightings (Forcada and Hammond, 1998). Vella (in press) combined data from ship and aerial surveys conducted between 1997-2002, and obtained a density estimate of 0.135 dolphins per km² (CV=0.28; 95% CI=0.066-0.290) in the area around the Maltese islands. Around the island of Kalamos in the eastern Ionian Sea, the mean sighting frequency was 0.016 groups per km (or 0.11 dolphins per km) in the years 1993-2000, but in 2001-2002 there was a significant decrease to 0.007 groups per km (or 0.04 dolphins per km) (Student’s t=4.88, p<0.001). The number of individuals encountered in this area has decreased continually, and many individuals that used to be seen regularly until 1996 have disappeared (Bearzi *et al.*, in press).

**Important threats** – A number of factors may have contributed, singly or in synergy, to the decline of common dolphins in the Mediterranean (Bearzi *et al.*, in press). Mediterranean biodiversity is undergoing rapid alteration under the combined pressure of human impact and climate change (Bianchi and Morri, 2000), and it is difficult to discriminate between the effects of environmental shifts due to climate change, whether “natural” or a result of the greenhouse effect, and other factors that may be affecting the availability of dolphin prey, such as overfishing and habitat degradation. In all Mediterranean areas
where common dolphins have been studied consistently, namely the Alboràn Sea, southeastern Tyrrenian Sea, and eastern Ionian Sea, competition with fisheries is a source of concern (Notarbartolo di Sciarra et al., 2002; Bearzi et al., in press) although cause-effect relationships and ecosystem dynamics remain poorly characterized. The role of xenobiotic contamination is controversial but likely significant. High levels of PCBs in Mediterranean dolphins, compared to levels in dolphins from other areas (Fossi et al., 2000; Aguilar et al., 2002), represent a major concern because of the possibilities of immune suppression and reproductive impairment. The high PCB levels in common dolphins from the Alboràn Sea are close to the range at which adverse effects could be expected, based on extrapolation from other species (Borrell et al., 2001). Fossi et al. (2000, in press) found a significant correlation between mixed-function oxidase activity and organochlorine levels in common dolphin skin biopsies, suggestive of exposure to endocrine-disrupting chemicals and potential for transgenerational effects. The cumulative importance of these threats and other factors, including incidental mortality in fishing gear (below), is poorly understood.

Fishery bycatch is a major threat to many cetacean populations, and it could well have played a role in the decline of common dolphins in at least some Mediterranean areas (IWC, 1994). In the Alboràn Sea, for example, drift gillnets are known to have caught a few hundred common dolphins per year (Silvani et al., 1999). This fishery has stopped, but it operated for many years and undoubtedly had some impact on the population. If drift nets were taking common dolphins in the Alboràn Sea, it is reasonable to assume that they were (and are) doing so in other parts of the Mediterranean where drift net fishing and common dolphin occurrence overlap. Bearzi et al. (in press) suggest that bycatch alone is unlikely to be the factor most responsible for the decline of common dolphins in the Mediterranean, but it may have played a significant role at certain times and in certain areas.

The possibility that the striped dolphin has been increasing in the Mediterranean and has begun to occupy the ecological niche of the common dolphin has been discussed in the literature (Viale, 1985; Aguilar, 2000; Bearzi et al., in press). Such a hypothesis is extremely difficult to prove or disprove, particularly if invoked as a causal factor in the common dolphin’s decline. Even if it were true that striped dolphins have been extending their range to inshore waters traditionally inhabited by common dolphins, it would be unclear whether this process was being driven by competitive exclusion, or was instead a secondary outcome of the common dolphin’s disappearance for some other reason. In any event, competition would not be an issue in areas such as the northern Adriatic Sea, where the common dolphin has disappeared while the striped dolphin rarely occurs.

**Conservation measures** - A large Marine Sanctuary for cetaceans in the Corso-Ligurian Basin has been declared by the Governments of Italy, France and Monaco. Other smaller marine protected areas exist or have been proposed throughout the Mediterranean Sea (Bearzi et al., in press). In 1999, the Spanish Ministry for the Environment included the common dolphin in its National Endangered Species Act as “vulnerable”. The following year, a program was initiated to identify important areas for the conservation of cetaceans in the Spanish Mediterranean with the aim of implementing the European Union's "Habitats" Directive, the Barcelona Convention and the Bonn Convention (Convention on Migratory Species, or CMS) through the creation of marine protected areas. Based on the presence of a relict group of Common Dolphins, the eastern Ionian area around the island of Kalamos has been included by the Greek Ministry of the Environment in the Natura 2000 network ("Site of Community Importance") under the 9243 EEC
“Habitats” Directive. While these types of designations may benefit common dolphins at least indirectly, measures to provide direct benefits, e.g., area-, season-, or fishery-specific reductions in fishing effort, curtailment of inputs of particular pollutants, etc., remain to be identified and implemented. The Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS, 2002) considers the Mediterranean common dolphin as an endangered population. It is expected that efforts to increase understanding of ongoing threats, monitor status, and provide needed protective measures on behalf of the dolphins and their habitat will be organized and implemented through ACCOBAMS.

Rationale for listing – At the outset, it is necessary to acknowledge that definitive quantitative data on absolute abundance and rate and extent of decline are not available for this population, and that it is unlikely that such data will become available in the near future. The Preamble of the 2000 IUCN Red List Categories, under Item 6, states that “the absence of high-quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasized as being acceptable throughout ... so long as these can reasonably be supported.” The abundant qualitative data and limited quantitative data that are available for the Mediterranean population of common dolphins are sufficient to infer a reduction in population size of more than 50% over a 3-generation period (i.e., the past 30-45 years²). The reduction or its causes may not have ceased, are not understood, and may not be reversible. These inferences are based on the expert judgment of researchers from the region who have observed declines in the number of animals (subcriterion a) and in the population’s extent of occurrence, as well as a deterioration in the quality of common dolphin habitat in large portions of the Mediterranean (subcriterion c). Although no formal index of abundance (subcriterion b) is available to demonstrate a numerical decline, there is reason to believe that such a decline has occurred, based on the species’ progressive disappearance from the Adriatic, Balearic, and Ligurian Seas and Provençal Basin, the significant decline in group encounter rates in the eastern Ionian Sea (above), and the reasonable assumption that a decline in abundance has been commensurate with the large (albeit unquantified) decline in extent of occurrence. For additional detail, readers are referred to Bearzi et al. (in press).

Consultation and peer review – This documentation was drafted by Giovanni Bearzi in consultation with Ana Cañadas, Alexandros Frantzis, Giuseppe Notarbartolo di Sciara, Elena Politi, Randall Reeves, and Barbara Taylor. It was reviewed by the CSG membership prior to submission to IUCN.

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² Estimated age at sexual maturation varies with region, from 3 years (Black Sea) to 7-12 years (eastern Pacific) for males and from 2-4 years (Black Sea) to 6-7 years (eastern Pacific) for females (Perrin, 2002). Variation between regions may be partly a result of density-dependent effects due to exploitation. Maximum estimated age is 22 years (Black Sea). These values support an estimate of generation time of 10-15 years.
Sources:


Mussi, B., Miragliuolo, A. & Bearzi, G. (in press a) Short-beaked common dolphins around the island of Ischia, Italy (Southern Tyrrhenian Sea). European Research on Cetaceans, 16.


