



FIELD REPORT - Dolphins of Greece

Project scientists

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Country

Greece

Research site / region

Amvrakikos Gulf, Inner Ionian Sea Archipelago

Research site latitude / longitude

38° 55' 30 N 20° 53' 31 E

Protected area status

National Park

Date field report completed

December 2010

Period covered

January to December 2010

Report completed by

Joan Gonzalvo Villegas



TETHYS RESEARCH INSTITUTE

preserving the marine environment through research, public awareness and education

Dear friends,

Last October our research season came to an end. Behind us are many unforgettable moments shared with all of you, in the good company of the magnificent creatures inhabiting the Amvrakikos Gulf and the neighbouring waters surrounding the island of Kalamos. We also enjoyed each other's company, immersing ourselves in the local gastronomy and discussing our daily experiences.

It is now time for us to look back and make a balance of all the work done so far. It could not happen without you, and we want to express our gratitude for your enthusiasm, interest and hard work.

What started as a preliminary study carried out with limited means has quickly evolved into a fully functional and productive project, which has also expanded its geographical coverage and scope. We started to work with Earthwatch in (2006). Since then we have welcomed 74 teams, totalling 307 volunteers of 27 different nationalities; people with remarkably diverse backgrounds, but sharing a common interest towards nature conservation.

Your support and enthusiasm keep us going. Many of you said the Dolphins of Greece experience helped you look at the sea in a different way, with increasing appreciation for its beauty and fragility. This gives added meaning to what we do.

Once again, thanks for having shared this adventure with us!

The 'Dolphins of Greece' team

SECTION ONE

Top highlight from the past field season

Last September, after almost two years of no recorded sightings of short-beaked common dolphins in the Inner Ionian Sea Archipelago (a former hotspot for the species in the Mediterranean) we finally had an encounter with a group of these beautiful creatures. With the help of our volunteers we remained with them for close to three hours trying to collect as much data as possible on this important sighting. Over 900 pictures were taken with the aim of photo-identifying the members of the group. Their subsequent analyses confirmed our field estimate of a total of twelve individuals; 9 adults, 1 juvenile and 2 calf. The fact that 5 of those identified adults were well known to us from previous years, demonstrates that although the local population of common dolphins has declined abruptly during the last decade, there are a few animals left yet. The animals still present have probably increased their home range in their search for food as consequence of the depletion of local fish-stocks resulting from overfishing. However, the fact that they still visit occasionally their former “home” for short periods of time suggests that, if appropriate management action was taken, common dolphin might re-colonize the Inner Ionian Sea Archipelago, and hopefully get back to their previous high numbers.

These recent findings show how important it is to ensure that regular monitoring of dolphin presence (or absence) continues over time in the area. Hence, last year’s decision to expand our geographical research coverage to this *Natura 2000* area (part of the EU *Natura 2000* conservation network), just a few kilometres away from the Amvrakikos Gulf. This additional effort has allowed us also to gain a better understanding of the movements and degree of residency of bottlenose dolphins inhabiting the coastal waters of western Greece.

Non-technical overview of results

Research conducted by Tethys Research Institute since 1991 in coastal waters of western Greece show that local dolphins are facing significant threats.

Ongoing research in the Amvrakikos Gulf (Fig. 1), (with the support of Earthwatch since 2006) showed that roughly 150 common bottlenose dolphins *Tursiops truncatus* inhabit its semi-closed waters. While this is among the highest densities for this species recorded anywhere in the Mediterranean Sea, this does not necessarily indicate favourable conservation status or pristine habitat. This highly resident population is at risk due to their small population size and low immigration rates, as well as acute and growing anthropogenic impacts. In 2010, a few individuals photo-identified in the Amvrakikos Gulf were subsequently observed in the Inner Ionian Sea archipelago and in the Gulf of Corinth, but no immigration into the Gulf has been recorded so far. It is the first time since we started working in the Gulf that we have managed to detect such “emigration”. This shows that even animals appearing to be resident within a given area (i.e. the Amvrakikos Gulf) can temporarily leave “home” and range over large portions of sea. Such movements may have important implications in terms of population viability and the information gathered must be taken into account in the future design of conservation actions.

The Inner Ionian Sea Archipelago (Fig. 1) — a *Natura 2000* area — is (or used to be) one of the last places where short-beaked common dolphins *Delphinus delphis* can be found in the central Mediterranean Sea. Work carried out by Tethys since 1991 showed that common dolphins in this area declined dramatically from approximately 150 to 15 animals between 1995 and 2007, which is convincingly linked to overfishing. Since last year we expanded the study area and— together with Earthwatch volunteers—we surveyed the crystal-clear waters of the Inner Ionian Sea Archipelago. In 2009, surveys in that area totalled 1,000+ km of navigation and yielded sightings of bottlenose dolphins, but no sightings of common dolphins,

indicating that as we had feared the species had vanished from an area where it was formerly abundant. However, data collected in 2010 showed that a few common dolphins are still present and they likely roam across a much wider area, occasionally moving into their former wonderland.



Figure 1: Map showing the Dolphins of Greece expedition study areas

In the Gulf, conservation priorities should be aimed at curtailing eutrophication (excessive nutrient enrichment which causes algal blooms that can be detrimental to other ecosystem factors) and pollution, as well as restoring water exchange to improve the water and seafloor quality. In the Archipelago area, adequate fisheries management measures are urgently needed for the recovery of the ecosystem and to create conditions for common dolphin recovery.

SECTION TWO – Technical Results

Background information

Tethys Research Institute started its study in the Amvrakikos Gulf in 2001. Surveys were conducted *ad libitum* in the early years. Pre-defined survey transects have been used for the long-term monitoring of the study area since 2006, when we started our collaboration with Earthwatch. Research in the Amvrakikos Gulf was carried out year-round between April 2006 and December (2008). Since 2009 the fieldwork has been done from April to October. Since last year, 2010, we started to survey also the neighbouring waters of the Inner Ionian Sea Archipelago with our teams of Earthwatch volunteers between the months of June and September. These were the months during which Tethys had historically worked in that area since 1991. Due to dolphin decline and shortage of funding, intensive monitoring by Tethys of the Inner Ionian Sea Archipelago was discontinued in (2008). The proximity of the Amvrakikos Gulf, the Dolphins of Greece expedition's main study area, from the Archipelago made its inclusion as a secondary study area feasible by expanding our geographical research coverage (Figure 1). This way, the continuity of the monitoring of such interesting area with the minimum necessary survey effort was guaranteed; a win-win situation.

- Amvrakikos Gulf: dataset 2001—2010 (with Earthwatch since 2006):

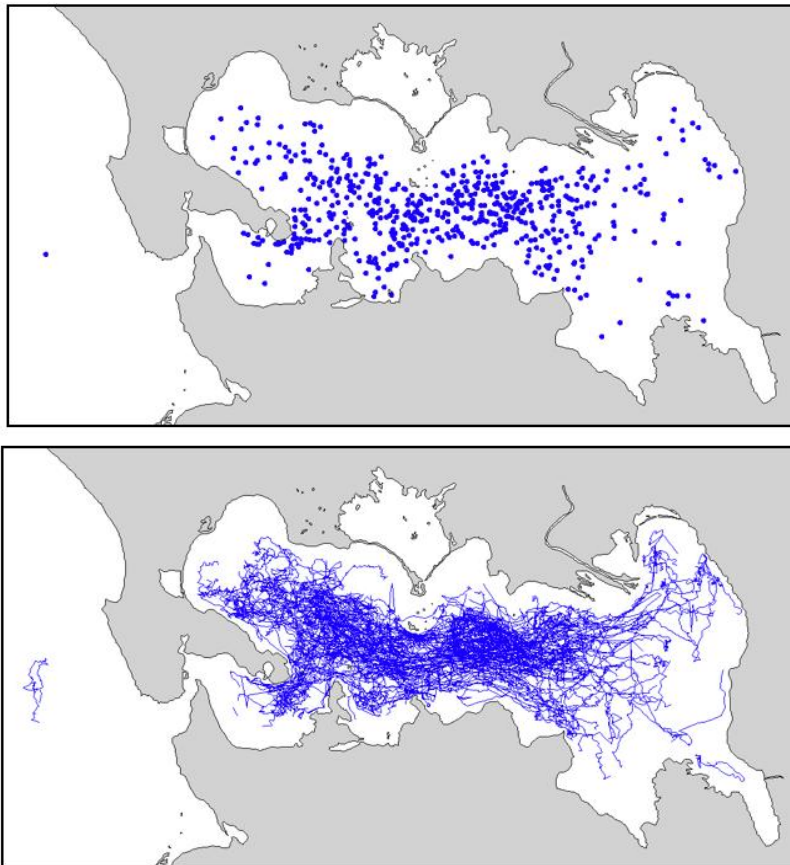


Figure 2: Initial position of sightings (blue dots) and movements (blue lines) in the Amvrakikos Gulf in years 2001-2010.

Data in the Amvrakikos Gulf were collected during a total of 61 months spent in the field over 10 years of research, totalling 782 hours spent with dolphins. A total of 640 daily surveys were conducted between 2001 and (2010). The navigation effort totalled 28,446 km and resulted in 580 sightings of bottlenose dolphins (Figure 2), and 423 of loggerhead turtles. Since 2005

dolphin behaviour was sampled based on 5 min observation intervals. A total of 6,330 units (“samples”) of behaviour were recorded. These samples include position, group size and composition, group formation, dolphin activity and behavioural events, presence of birds and bird data, and several other variables. Individual dive intervals were also recorded starting in 2006, totalling 643 individual dive times, to investigate bottlenose dolphin surfacing patterns and feeding behaviour.

- Inner Ionian Sea archipelago: dataset 1991—2010 (with Earthwatch since 2009):

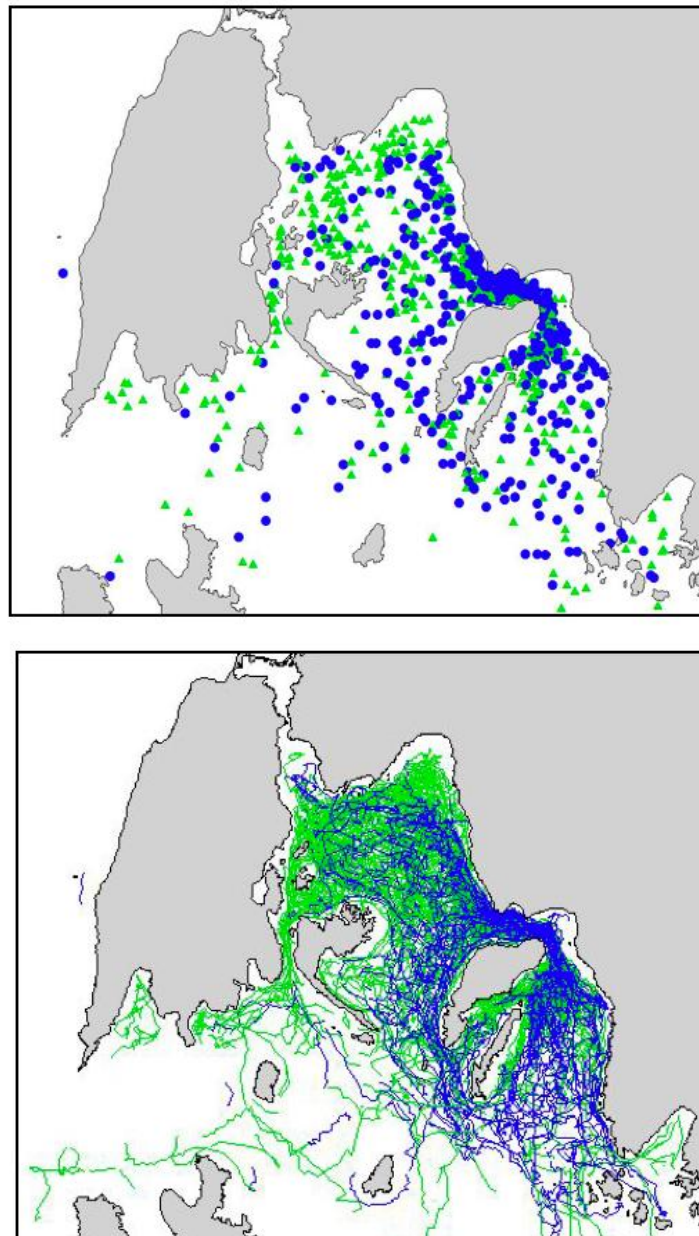


Figure 3: Initial position of sightings (blue dots) and movements (blue lines) of bottlenose dolphins and common dolphins (green triangles, green lines) in the Inner Ionian Sea Archipelago in years 1991-2010.

Data in the Inner Ionian Sea archipelago were collected during a total of 95 months spent in the field across 20 years of research, totalling 1,913 hours spent with dolphin groups. A total of 1,272 daily surveys were conducted between 1991 and (2010). The navigation effort totalled 73,848 km. Across 20 years, 503 sightings of common dolphins and 459 sightings of bottlenose dolphins were recorded (Figure 3). Dolphin behaviour has been recorded since

1996, sampled at intervals of 3 min (1996-2001) and then 6 min (2002-2010). Individual dive intervals were also timed between 1996 and 1999. A total of 23,687 record units (“samples”) of behaviour were recorded: 8,906 for bottlenose dolphins and 14,781 for common dolphins. These samples include position, group size and composition, group formation, directionality and speed of movement, surfacing pattern, dive duration, dolphin activity and behavioural events, presence of birds and bird data, and several other variables. In addition, a total of 15,472 individual dive times of common dolphins and 5,435 of bottlenose dolphins were timed to investigate dolphin surfacing patterns and feeding behaviour.

The summary of the research effort done in 2010 is shown in Table 1.

Table 1: Summary of research effort for year 2010 in the Amvrakikos Gulf and Inner Ionian Sea Archipelago. Dd = Common dolphin *Delphinus delphis*, Tt = Bottlenose dolphin *Tursiops truncatus*, Cc= Loggerhead sea turtle *Caretta caretta*.

Study Area	Months at sea	Days at sea	Km surveyed total	Km surveyed on effort	Time spent with dolphins		Sightings			Behavioural samples		# Selected photos for Photoidentification	
					Tt	Dd	Tt	Dd	Cc	Tt	Dd	Tt	Dd
Amvrakikos Gulf	7	88	3,557	1,234	97 h 36 min	--	80	--	32	1,093	--	4330	
Inner Ionian Sea Archipelago	4	20	1,241	911	18 h 9 min	2 h 46 min	12	1	--	155	27	1,992	920

RESULTS AND PROGRESS AGAINST OBJECTIVES

Objective 1: Dolphin population numbers and trends

By the end of the 2010 research season our Amvrakikos catalogue included 35,818 photos. This was achieved by obtaining colour photographs of the dolphins’ dorsal fins suitable for individual identification based on long-term natural markings, followed by careful selection, based on consistent criteria regarding photographic quality and dorsal fin distinctiveness.

At the moment of the production of this report, the analysis of the photo-identification work of year 2010 was still in process. However, a total of 127 well-marked bottlenose dolphins were photographically identified between 2003 and (2009). Our most recent estimate is of 142 individuals (coefficient of variation = 0.113) residing in the Gulf in (2009). No apparent trend in the abundance of the total population between 2004 and 2009 was observed. Moreover, based on year 2010 preliminary data, the population appears to remain stable. Years 2001-2003 were years of preliminary work with insufficient effort, so were excluded from the analysis.

The situation in the Inner Ionian Sea Archipelago is quite the opposite. Common dolphins in this area declined dramatically from approximately 150 to 15 animals between 1995 and (2007). Monitoring done in subsequent years (2008-2010) showed that a few animals are still present and they likely roam across a much wider area, occasionally moving into their former wonderland. Hence, ensuring that regular monitoring of dolphin presence (or absence) continues over time is critical. Bottlenose dolphins are also present in this area and, although they are found in relatively small numbers, they seem to have stable trends. About 25 bottlenose dolphins have shown high levels of site fidelity. In 2010, we had our first sighting of striped dolphins (*Stenella coeruleoalba*) ever, although we had a few reports of sightings for this species in areas nearby, confirming that groups of striped dolphins occasionally enter these waters.

Objective 2: Dolphin movement patterns, ecology, behaviour and habitat-use

Bottlenose dolphins living in the Amvrakikos Gulf are members of a highly 'resident' community (most individuals being regularly re-sighted), displaying unique behaviour and ecology. In 2010, three dolphins, which had showed strong site fidelity towards the Gulf since 2003, were subsequently observed in the Inner Ionian Sea archipelago and in the Gulf of Corinth, but no immigration into the Gulf has been recorded so far. This is the first time since we first started to work in the Amvrakikos Gulf in 2001 that such emigration has been recorded.

Bottlenose dolphins are found in Inner Ionian Sea Archipelago in relatively small numbers. Of the ~100 individuals photo-identified in this area, about a quarter have shown high levels of site fidelity, while the others are transients. However, even individuals with high levels of 'residency' were found to make long-distance movements. Six dolphins that were photo-identified in the Inner Ionian Sea Archipelago in previous years were also encountered in 2010 in the central part of the Gulf of Corinth, where colleagues from Tethys Research Institute started another project in (2009). Specially significant was the case of individual labelled as T4 in figure 4, most likely a male based on lack of observed associations with calves across 17 years, encompassing 46 months—was the second most “resident” animal observed in the Inner Ionian Sea Archipelago, where he was encountered for 15 consecutive years, from July 1993 to September 2007, across a total of 43 months. T4 was observed in the Gulf of Corinth in April 2009, he returned to the Inner Ionian Sea Archipelago between July and September 2009, and was re-sighted in the Gulf of Corinth in May (2010). From June 2006 this dolphin had what appeared to be a portion of trammel net stuck into his blowhole and protruding for about 20–30 cm. A fragment of net about twice as long, suggesting progressive extrusion, was still present in April 2009, but had disappeared by July (2009). This incident, which apparently had a favorable outcome, did not prevent wide-ranging movements.

The reported movements of nine individuals photo-identified up to 265 km apart in western Greece (Figure 4) shows that while bottlenose dolphins in coastal Mediterranean waters may display a high degree of site fidelity, they can also move extensively across geographical areas. Even animals appearing to be resident within a given area can temporarily leave “home” and range over large portions of sea. Such movements may have important implications in terms of population viability, particularly in areas with low bottlenose dolphin densities as in the open coastal waters of western Greece. Research effort resulting in extensive photo-identification catalogues, as done in the context of the Dolphins of Greece expedition, can increase understanding of bottlenose dolphin movement patterns in the region and inform management action. (See Bearzi *et al.* 2010 in Journal of Ethology)



Figure 4: Re-sighting patterns of nine bottlenose dolphins photo-identified in the Amvrakikos Gulf, Inner Ionian Sea Archipelago, and Gulf of Corinth. Individuals T1, T2, and T3 were males (M) based on photographs of their genital area. T4 was most likely a male based on absence of associations with a calf throughout the whole study period. All other individuals were of unknown gender (U)

Objective 3: Dolphin social organisation

Extensive photo-identification data collected so far are being analyzed to study the social organization of bottlenose dolphins living in a semi-closed system. Patterns of association between mother-calf pairs and reproductive success will be also investigated.

Objective 4: Comparative studies

Data obtained in the Amvrakikos Gulf have been compared with information on bottlenose dolphins and common dolphins living in the Inner Ionian Sea Archipelago, outside the Gulf. Comparisons between these geographically contiguous but separated dolphin communities shed light on the ecological factors that determine differences on the carrying capacity of different ecosystems, and on fisheries-related issues.

While the Amvrakikos Gulf is shallow, murky, highly eutrophic and characterised by abundant epipelagic prey, the surrounding Ionian Sea waters are deep, transparent, oligotrophic, and heavily overfished primarily by purse seiners and trawlers (See Gonzalvo *et al.* 2010 in Fisheries Management and Ecology). These highly intrusive and unsustainable fisheries are banned within the Gulf. Bottlenose dolphins within the Amvrakikos Gulf regularly and consistently engaged in specialised and cooperative surface feeding behaviour. Data based on fish scales sampled during dolphin feeding activities suggest that sardines are an important prey item for bottlenose dolphins in the Amvrakikos Gulf, but not elsewhere in the Mediterranean Sea (see Objective 3 and Bearzi *et al.* 2008 in Mammal Review).

Similar behaviour was rare or absent in bottlenose dolphins in the Inner Ionian Sea Archipelago, where this species seem to target primarily demersal fish prey. In these waters, common dolphins are the ones targeting mostly small epipelagic fish (i.e. sardines and anchovies), which local fish stocks have been largely overfished leading to a dramatic decline of the local common dolphin population (see Bearzi *et al.* 2008 in Endangered Species Research).

While in the Gulf, priority should be given to curtail eutrophication and pollution as well as restoring water exchange to improve the water and seafloor quality, in the Inner Ionian Sea Archipelago adequate fisheries management measures are urgently needed for the recovery of the ecosystem and to create conditions for common dolphin recovery (see Gonzalvo *et al.* 2010 in Fisheries Management and Ecology for detail on measures suggested to address the situation).

Objective 5: Operational interactions with fisheries: depredation of fishing gear and gear destruction by dolphins and sea turtles

Since 2005, we have established contacts with fishermen operating in the study area, organized informal meetings and developed a friendly relationship with many of them. This helped gather information on the level of conflict between bottlenose dolphins and artisanal fisheries, difficult to obtain otherwise. We also conducted direct observations from fishing boats and created a catalogue of the fishing fleet operating in Vonitsa and in nearby areas. Ongoing research aims to evaluate the significance of the fishery-dolphin interactions and quantify the economic loss suffered by artisanal fishermen as a result of conflict. We have prepared a questionnaire that will provide information on fishing gear depredation and damage, the incidence of dolphin bycatch, as well as past and present occurrence of fish and ecosystem status for both study areas. Such interviews should be carried out without the participation of volunteers, which might cause a reaction of suspiciousness in the interviewed fishermen. The feasibility of this initiative will depend on time availability, due to the project busy schedule, and resources.

We recorded or directly investigated dolphin mortality events in the Gulf (animals found stranded or floating adrift). We measured, sexed and inspected some of these animals, looked for signs of bycatch in fishing gear or killing, and took biological samples. The information

gathered was shared with the Greek Ministry of Agriculture and the Pelagos Cetacean Research Institute, Athens. See table 2 for detail on dolphin carcasses examined to date.

Table 2: Dolphin carcasses found stranded or adrift in the Amvrakikos Gulf and Inner Ionian Sea Archipelago between 2001 and (2010). Tt = *Tursiops truncatus*, Dd = *Delphinus delphis*, Gg = *Grampus griseus*, Sc = *Stenella Coeruleoalba*

Date	Circumstances	Study area	Location	Species	Gender	Body length	Causes of death
28-09-1997	Floating adrift	Inner Ionian Sea	Off Episkopi, island of Kalamos	Dd	Female	94 cm	Unknown
26-08-1999	Stranded	Inner Ionian Sea	Between Paleros and Pogonia	Dd	Male	140 cm	Unknown
5-07-2002	Stranded	Inner Ionian Sea	Between Mytikas and Paleros	Tt	Male	285 cm	Unknown
6-08-2003	Floating adrift	Inner Ionian Sea	Near Mytikas	Tt	Unknown	--	Unknown
18-05-2005	On land	Inner Ionian Sea	Near Paleros	Dd	Unknown	140 cm	Both lobes of the flukes cut by a knife, suggesting a bycatch event
19-07-2005	Floating adrift	Inner Ionian Sea	North of Kalamos	Tt	Male	200 cm	Both lobes of the flukes cut by a knife, suggesting a bycatch event
28-09-2006	Stranded	Amvrakikos	East of Vonitsa	Tt	Male	210 cm	Unknown
20-06-2007	Stranded	Amvrakikos	Drimo, between Vonitsa and Amfilochia	Tt	Male	257 cm	Unknown
03-07-2007	Floating adrift	Amvrakikos	About 6 km east of Vonitsa	Tt	Male	105 cm (newborn)	Unknown
03-09-2007	Floating adrift	Amvrakikos	Near Mytikas	Tt	Female	120 cm	Unknown
10-06-2008	Stranded	Ionian Sea	Gyros beach, north of Lefkada	Gg	Female	297 cm	Unknown
03-07-2008	Agonizing	Amvrakikos	--	Tt	Unknown	Unknown (newborn)	Unknown
08-09-2009	Stranded	Amvrakikos	East of Vonitsa	Tt	Male	270 cm	Unknown
11-09-2008	Stranded	Ionian Sea	Mylos beach, north of Lefkada	Tt	Male	234 cm	Entanglement on fishing gear (trammel net)
24-05-2010	Floating adrift	Amvrakikos	--	Tt	Male	125 cm (calf)	Unknown
03-08-2010	Stranded	Ionian Sea	Kathisma beach, west of Lefkada	Sc	Male	90 cm (calf)	Unknown

Sightings and findings of loggerhead sea turtles during the surveys at sea were systematically recorded in the Inner Ionian Sea archipelago (N=33), in the Amvrakikos Gulf (N=423). All dead turtles were photographed. Individual body lengths of sea turtles encountered at sea were estimated visually. Measures from dead animals were taken whenever possible. Samples and photographs are available for investigation by expert groups. A total of 21 dead loggerhead sea turtles were found floating adrift between 2001 and 2010 in Amvrakikos; one of them presented clear signs of by-catch in a trammel net (i.e. a piece of net protruding from the beak and

entangled around the turtle's head), three had fishing hooks implanted in their body, and one bore signs of collision, possibly with a speedboat.

Objective 6: Bottlenose dolphin interactions with fish farms

Fish and shell farms in the Amvrakikos Gulf were plotted by recording the GPS position of buoys delimiting the farms. Fish farms in the Gulf totalled approximately 710 fish cages (either for fish of commercial size or hatcheries). A precise count of fish and shell farm numbers is hampered by the difficulty of defining what is a 'farm unit', since most farms are patchy assemblages of a large number of cages (or buoys, as in the case of shell farms). However, about 24 fish farm and five shell farm "clusters" could be counted. Gilthead seabream *Sparus aurata* is the main fish species farmed in the Gulf. Bottlenose dolphin visits to fish farms are recorded during dedicated fish farm surveys performed on a monthly basis. However, bottlenose dolphin interactions with fish farms appear to be relatively uncommon in the Amvrakikos Gulf.

Fish farms in the Inner Ionian Sea archipelago were recorded based on direct observations and/or located through high-definition satellite photos from *Google Earth* (2007). No shell farms exist in this area. Fish farms in the Inner Ionian Sea archipelago were regularly inspected during the surveys, and dolphin activity around fish farm cages recorded. No interactions were ever observed between common dolphins and coastal fish farms. Conversely, bottlenose dolphins were often seen approaching fish farms and apparently searching for prey in their proximity. This behaviour has been observed with increasing frequency in recent years.

The fact that bottlenose dolphins inhabiting the Inner Ionian Sea Archipelago interact significantly more with fish farms than their conspecifics of the Amvrakikos Gulf might indicate an adaptation to limited prey availability as result of overfishing in coastal open waters, in contrast with the rich eutrophic waters of the Gulf, where industrial fisheries are prohibited and dolphins seem to thrive on abundant prey resources.

Objective 7: Overfishing, habitat degradation, and decline of fish resources

Fishery landings in Greece increased until 1994 due to the fleet modernization and geographic expansion of the fisheries over this period. However, declining trends since the mid 1990s suggest that such effects have ceased and fisheries have become unsustainable.

A 12-month assessment of fishing effort and catch, together with circumstantial evidence, suggested that decline of common dolphins was caused largely by prey depletion resulting from overfishing. We analysed the impacts of various fishing gear and estimated the degree of resource overlap between common dolphins and local fisheries. The total biomass removed annually by 308 fishing boats in the study area averaged 3,571 tonnes, while that consumed by common dolphins was 17 tonnes. Resource overlap between common dolphins and fisheries – expressed as an average Pianka index of 0.5 - differed according to fishing gear, being higher for purse seiners (0.7) and beach seiners (0.4) and lower for bottom trawlers (0.1), trammel boats (0.2) and longliners (0.0). Only about ten active purse seiners (4% of the total active fishing fleet) were responsible for 33% of the biomass removal, and likely had the greatest impact on prey of common dolphins (see Bearzi *et al.* 2010 in *Aquatic Conservation*; Gonzalvo *et al.* 2010 *Fisheries Management and Ecology* for detail on proposed measures).

In the Amvrakikos Gulf the situation is quite different. The main anthropogenic factors threatening its semi-closed waters include eutrophication (due to reduced water circulation) and chemical pollution. Water exchange with the open sea is likely to have been reduced by the construction of the port which led to a reduction in the width of the narrow channel that links the Gulf with the open sea. Changes in freshwater input from rivers due to hydroelectric and other dams worsened the situation. Once one of the richest fishing areas of Greece, the Amvrakikos Gulf has experienced severe degradation and its stocks of commercially valuable fish have declined to such an extent that fishing is no longer a viable activity. Reduced water exchange

resulted in increasing eutrophication, leading to bottom anoxia. This had a major negative impact on local fisheries, which once relied on the valuable bottom-dwelling shrimp that are now largely vanished.

Objective 8: Interactions between dolphins and sea birds

A rich and diverse bird fauna inhabits the Amvrakikos Gulf. A total of 174 sightings of pelicans were recorded: 10 in 2005, 26 in 2006, 46 in 2007, 47 in 2008, 21 in 2009 and 24 in (2010). These included the white pelican *Pelecanus onocrotalus* and possibly the endangered Dalmatian pelican *Pelecanus crispus*, a rare species which colonies are known to nest in the area. Pelicans were photographed whenever possible to allow for species identification by bird specialists. Other unusual bird species recorded during the surveys included Cory's shearwater *Procellaria diomedea*, Manx shearwater *Puffinus puffinus*, herons (especially the grey heron *Ardea cinerea*, often seen in the proximity of fish farms), great white egrets *Egretta alba*, little egrets *Egretta garzetta*, one black-winged stilt *Himantopus himantopus*, kingfishers *Alcedo atthis*, unidentified *Anatidae* and several other unidentified bird species. A flying flock of greater flamingos (*Phoenicopterus ruber*) including about 100-200 individuals was observed in September 2005 in the western part of the Gulf, another two flocks of about 100 and 200 individuals were observed in October (2010). Seagulls and terns of various species were especially abundant throughout the Gulf, and consistently associated with dolphins during surface foraging. Cormorants were seen in large quantities in winter months.

Birds interacting with dolphins during surface foraging and other activities are routinely photographed. This will allow future analyses on the bird species involved and on the seasonality and pattern of interactions.

PARTNERSHIPS

Work by Tethys in western Greece has benefited from the commitment and support of a number of people and organizations. In addition to funding received from the Earthwatch Institute, work has benefited from funding, institutional support or logistic support given by **OceanCare**. In early years, funding came from a **Pew Marine Conservation Fellowship** and a **Pew Collaborative Initiatives Fund** granted to Giovanni Bearzi. Institutional support was provided by the UNEP/CMS Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (**ACCOBAMS**), UNEP's Regional Activity Centre for Specially Protected Areas (**RAC/SPA**), and **WDCS** The Whale and Dolphin Conservation Society.

In the context of the work done by Tethys in Greece, over the years, contacts were established and various kinds of collaboration were developed with representatives of the institutes listed below:

- Agreement on the Conservation of Cetaceans of the Mediterranean Sea, Black Sea and contiguous Atlantic Area (ACCOBAMS)
- Aristotle University of Thessaloniki, Greece
- BlueWorld Institute of Marine Research and Conservation, Croatia
- Cetacean Specialist Group, IUCN Species Survival Commission
- Chantecaille, international
- Cultural Center Mytikas, Greece
- Development Agency for South Epirus and Amvrakikos (ETANAM), Greece
- EarthOcean, Australia
- Earthwatch Institute, international
- Fisheries Center, University of British Columbia, Vancouver, Canada
- Fishermen Cooperative, Paleros, Greece
- Fishermen Cooperative, Preveza, Greece
- Fishermen Cooperative, Vonitsa, Greece
- Hellenic Centre for Marine Research (HCMR), Greece
- High School, Vonitsa, Greece
- Higher Technological Education Institute of Mesolonghi, Greece
- MedSharks, Italy
- Medasset, Greece
- Ministry of the Environment, Physical Planning and Public Works, Greece - Nature Management Section
- Ministry of Agriculture, Greece - General Directorate of Development & Protection of Forests and Natural Environment, Directorate of Aesthetic Forests, Woodland and Hunting
- MOm, The Hellenic Society for the Study and Protection of the Monk Seal, Greece
- Morigenos - Dolphin Research and Marine Conservation, Slovenia
- Municipality of Paleros, Greece
- Municipality of Mytikas and Kandila, Greece
- Municipality of Vonitsa, Greece
- Oceana Europe
- OceanCare, Switzerland
- Pelagos Cetacean Research Institute, Greece
- Pew Institute for Ocean Science
- Primary School Mytikas, Greece
- Primary School, Vonitsa, Greece
- Secondary School, Vonitsa and Katouna, Greece
- Small-Scale Hellenic Fishermen Confederation, Greece

- UNEP's Regional Activity Centre for Specially Protected Areas (RAC-SPA)
- University of Barcelona, Spain - GRUMM (Group of Study and Conservation of Marine Mammals)
- University of Durham, U.K. - Department of Biological Sciences
- University of Padua, Italy - Department of Experimental Veterinary Science
- University of Patras, Greece
- WDCS The Whale and Dolphin Conservation Society (international)
- World Wildlife Fund (WWF), Greece
- Zoological Station 'Anton Dohrn', Naples, Italy

CONTRIBUTIONS TO CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

INTERNATIONAL:

Work by the Tethys Research Institute in western Greece shed light on the status of local dolphins and identified the main threats affecting the animals. This resulted in a number of conservation initiatives, endorsed inter alia by the UNEP's Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS). Collaboration with WDCS - The Whale and Dolphin Conservation Society, OceanCare and other international conservation organizations resulted in a number of conservation actions.

The area of Kalamos was proposed as Marine Protected Area (MPA) at the 3rd Meeting of the Parties to UNEP/CMS Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS, 2007). The ACCOBAMS Scientific Committee also recommended the Parties to consider the Amvrakikos Gulf as a candidate MPA. Both candidatures were based on evidence provided by Tethys.

Tethys is a member of the Cetacean Alliance, a non-profit network of non-governmental organisations committed to preserving marine biodiversity and reducing human impact on cetacean populations. The network includes NGOs with bases in Argentina, Australia, Austria, Croatia, Germany, Greece, Italy, Slovenia, Spain, Switzerland, the UK and the US. NGOs in the network have a collective membership of over 100,000.

<http://www.cetaceanalliance.org/>

In January 2010, Tethys researchers attended the 6th Meeting of the Scientific Committee of ACCOBAMS, held in Casablanca (Morocco), and presented updated information on the situation of dolphins in western Greece. This resulted in formal Recommendations by the Scientific Committee of ACCOBAMS, which were presented at the ACCOBAMS Meeting of the Parties in November 2010:

Amvrakikos Gulf:

The Scientific Committee agreed that by applying the standard criteria provided by the IUCN Red Listing system, this 'subpopulation' would qualify as Endangered. Hence, the Scientific Committee encourages Greece to implement conservation actions in the Amvrakikos Gulf, which has a range of designations but to date, no concrete protection for bottlenose dolphins.

Inner Ionian Sea Archipelago:

The Scientific Committee reiterated that the implementation of the Mediterranean Common Dolphin Conservation Plan (Bearzi *et al.* 2004, see below) is a high priority in the region. Based on Tethys data, it was highlighted the case of Kalamos, where research indicates a high risk of local disappearance of common dolphins in the very near future unless fishery management measures are implemented immediately to

reduce overfishing, as advocated and described in a Call for Action signed by 13 local and regional NGOs (see “National or regional” contributions below).

Bearzi G., Notarbartolo di Sciara G., Reeves R.R., Cañadas A., Frantzis A. (2004). *Conservation Plan for short-beaked common dolphins in the Mediterranean Sea*. ACCOBAMS, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. 90 pp.

NATIONAL OR REGIONAL:

Scientific research done by Tethys documented ecosystem damage caused by overfishing in the Inner Ionian Sea Archipelago - a *Natura 2000* area. Following several months of meetings and contacts with different NGOs, fishermen representatives and stakeholders, in May 2009 a Call for Action to save the last common dolphins around Kalamos was launched by 13 regional and local NGOs. These organisations joined forces to call for urgent fisheries management action that may result in ecosystem recovery, protect biodiversity, preserve fish stocks, and ensure the long-term sustainability of fisheries in the area. This call for action is consistent with the recommendations to preserve marine biodiversity made in UNEP’s Mediterranean Action Plan, and with the strong calls for the conservation of Mediterranean common dolphins made by the Parties to the UNEP/CMS Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), also ratified by Greece.

<http://www.cetaceanalliance.org/call/index.htm>

LOCAL:

Since 2009, Tethys has attended a number of meetings with stakeholders and with the Management Body of the Amvrakikos Wetlands. This body was established after the creation of the Amvrakikos Gulf National Park on March 21st, (2008). Our research personnel collaborate with local authorities, researchers from the University of Patras and Thessaloniki, the Hellenic Centre for Marine Research (HCMR), the Development Agency for South Epirus and Amvrakikos (ETANAM), and local fishermen representatives. Local fishermen have requested our presence as independent observers on a number of occasions, when meeting with the authorities to discuss the dramatic problems faced by the Gulf, particularly increasing eutrophication and pollution. In such events, our aim is to manifest the uniqueness of the Gulf and its increasing vulnerability to human impact, as well as to call for timely management action.

DISSEMINATION

PEER REVIEWED SCIENTIFIC PUBLICATIONS:

Author: Gonzalvo J., Moutopoulos D.K., Bearzi G., Stergiou K.I.

Full reference: Gonzalvo J., Moutopoulos D.K., Bearzi G., Stergiou K.I. (2010). Fisheries mismanagement in a *Natura 2000* area in western Greece. *Fisheries Management and Ecology*. DOI: 10.1111/j.1365-2400.2010.00764.x

Audience: Scientific community

Acknowledged Earthwatch? Y

Author: Bearzi G., Bonizzoni S., Gonzalvo J.

Full reference: Bearzi G., Bonizzoni S., Gonzalvo J. (2010). Mid-distance movements of common bottlenose dolphins in the coastal waters of Greece. *Journal of Ethology*. DOI: 10.1007/s10164-010-0245-x

Audience: Scientific community

Acknowledged Earthwatch? Y

Author: Piroddi C., Bearzi G., Christensen V.

Full reference: Piroddi C., Bearzi G., Christensen V. (2010). Effects of local fisheries and ocean productivity on the northeastern Ionian Sea ecosystem. *Ecological Modelling* 221(11):1526-1544

Audience: Scientific community

Acknowledged Earthwatch? N

Author: Bearzi G., Agazzi S., Gonzalvo J., Bonizzoni S., Costa M. & Petroselli A.

Full reference: Bearzi G., Agazzi S., Gonzalvo J., Bonizzoni S., Costa M., Petroselli A. (2010). Biomass removal by dolphins and fisheries in a Mediterranean Sea coastal area: do dolphins have an ecological impact on fisheries? *Aquatic Conservation: Marine and Freshwater Ecosystems*. DOI: 10.1002/aqc.1123

Audience: Scientific community

Acknowledged Earthwatch? Y

Author: Bearzi, G., Fortuna, C.M. & Reeves, R.R.

Full reference: Bearzi, G., Fortuna, C.M. & Reeves, R.R. (2008) Ecology and conservation of common bottlenose dolphins *Tursiops truncatus* in the Mediterranean Sea. *Mammal Review*. 39(2):92-123

Audience: Scientific community

Acknowledged Earthwatch? N

Author: Bearzi G.

Full reference: Bearzi G. (2007). Marine conservation on paper. *Conservation Biology* 21(1):1-3

Audience: Scientific community

Acknowledged Earthwatch? Not applicable

Author: Bearzi G., Agazzi S., Bonizzoni S., Costa M., Azzellino A.

Full reference: Bearzi G., Agazzi S., Bonizzoni S., Costa M., Azzellino A. (2007). Dolphins in a bottle: abundance, residency patterns and conservation of bottlenose dolphins *Tursiops truncatus* in the semi-closed eutrophic Amvrakikos Gulf, Greece. *Aquatic Conservation: Marine and Freshwater Ecosystems* 18(2):130-146.

Audience: Scientific community

Acknowledged Earthwatch? N (publication based on work done prior to collaboration with Earthwatch)

Author: Bearzi G., Agazzi S., Gonzalvo J., Costa M., Bonizzoni S., Politi E., Piroddi C., Reeves R.R.

Full reference: Bearzi G., Agazzi S., Gonzalvo J., Costa M., Bonizzoni S., Politi E., Piroddi C., Reeves R.R. (2008). Overfishing and the disappearance of short-beaked common dolphins from western Greece. *Endangered Species Research* 5:1-12.

Audience: Scientific community

Acknowledged Earthwatch? N (publication based on work done prior to collaboration with Earthwatch in that specific area)

Author: Bearzi G., Politi E., Agazzi S., Azzellino A.

Full reference: Bearzi G., Politi E., Agazzi S., Azzellino A. (2006). Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). *Biological Conservation* 127(4):373-382.

Audience: Scientific community

Acknowledged Earthwatch? N (publication based on work done prior to collaboration with Earthwatch)

Author: Gonzalvo J.

Full reference: Gonzalvo J. (2007). Marine conservation as a common goal: the benefits of communication between marine biologists and artisanal fishermen. Pp. 15-16 In: D. Maldini, D.

Meck Maher, D. Troppoli, M. Studer, J. Goebel (Eds.) Translating scientific results into conservation actions: new roles, challenges and solutions for 21st Century scientists. Earthwatch Institute, Maynard MA, USA.

Audience: Marine conservation community

Acknowledged Earthwatch? Y

Publication type: Red List assessment

Author: Bearzi G.

Full reference: Bearzi G. (2006). Short-beaked common dolphin *Delphinus delphis* (Mediterranean subpopulation). 2003 Assessment. Pp. 130-136 in Reeves R., Notarbartolo di Sciara G. (compilers and editors). The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain.

Audience: Marine conservation community

Acknowledged Earthwatch? Not applicable

Publication type: Red List assessment

Author: Bearzi G., Fortuna C.M.

Full reference: Bearzi G., Fortuna C.M. (2006). Common bottlenose dolphin *Tursiops truncatus* (Mediterranean subpopulation). Pp. 64-73 in Reeves R., Notarbartolo di Sciara G. (compilers and editors). The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain.

Audience: Marine conservation community

Acknowledged Earthwatch? Not applicable

Publication type: Reports, management plans or policies

Author: Bearzi G., Bonizzoni S., Gonzalvo J., Agazzi S., Pereszlényi Z., Costa M.

Full reference: Bearzi G., Bonizzoni S., Gonzalvo J., Agazzi S., Pereszlényi Z., Costa M. (2009). Ionian Dolphin Project. Report to the Hellenic Ministry of Agriculture, General Directorate of Development & Protection of Forests and Natural Environment, Directorate of Aesthetic Forests, Woodland and Hunting on the activities conducted between 1991 and 2009 in the eastern Ionian Sea, Greece. Tethys Research Institute Report. 37 pp.

Audience: Hellenic Ministry of Agriculture

Acknowledged Earthwatch? Y

Publication type: Report

Author: Bearzi G

Full reference: Bearzi G. (2006). Endangered Mediterranean common dolphins: the story so far. Paper submitted to the 58th Annual Meeting of the International Whaling Commission, St. Kitts and Nevis, West Indies, 23 May – 20 June (2006). 3 pp.

Audience: International Whaling Commission

Acknowledged Earthwatch? Not applicable

Publication type (from the list above): Academic dissertations

Author: Aina Pascual Cuadras

Full reference: Aina Pascual Cuadras. (2009). Distribution and habitat preferences of common bottlenose dolphins *Tursiops truncatus* in the Amvrakikos Gulf, Greece. MSc in Biodiversity, University of Barcelona, Spain.

Audience: Academic/Scientific community

Acknowledged Earthwatch? Y

Publication type (from the list above): Academic dissertations

Author: Christina Geijer

Full reference: Christina Geijer. (2009). Evaluation of group definitions in a population of bottlenose dolphins (*Tursiops truncatus*), western Greece. MSc in Nature Conservation, University College London, U.K.

Audience: Academic/Scientific community
Acknowledged Earthwatch? Y
Publication type (from the list above): Academic dissertations

Author: Zsuzsanna Pereszlényi
Full reference: Zsuzsanna Pereszlényi. (2009). Feeding behaviour of common bottlenose dolphins *Tursiops truncatus* in the Amvrakikos Gulf, Greece. MSc in Biology, University of Pécs, Hungary.
Audience: Academic/Scientific community
Acknowledged Earthwatch? Y
Publication type: Conference proceedings

Author: Agazzi S., Bearzi G., Costa M., Bonizzoni S., Politi E
Full reference: Agazzi S., Bearzi G., Costa M., Bonizzoni S., Politi E. (2008). Abundance trend of short-beaked common dolphins in the eastern Ionian Sea: one of the least central Mediterranean stocks is vanishing. Proceedings of the 22nd Annual Conference of the European Cetacean Society. Egmond aan Zee, The Netherlands, 10-12 March 2008
Audience: Scientific community
Acknowledged Earthwatch? Not applicable
Publication type: Conference proceedings

Author: Gonzalvo J., Bearzi G., Agazzi S., Piroddi C.
Full reference: Gonzalvo J., Bearzi G., Agazzi S., Piroddi C. (2008). Fisheries and the decline of short-beaked common dolphins in western Greece. Proceedings of the 22nd Annual Conference of the European Cetacean Society. Egmond aan Zee, The Netherlands, 10-12 March 2008
Audience: Scientific community
Acknowledged Earthwatch? Not applicable

DIGITAL:

Publication type: Blog
<http://dolphinsinabottle.blogspot.com>
Acknowledged Earthwatch? Y
Blog dedicated to the 'Dolphins of Greece' project.
This new blog has a much more personal perspective than the Tethys' blog (<http://istitutotethys.blogspot.com>). Created in 2009, it is intended to provide updates on what is happening 'behind the scenes' during the field work season.

Publication type: Web site section
http://www.tethys.org/dolphins_of_greece/index.htm
Acknowledged Earthwatch? Y
Page dedicated exclusively to Dolphins of Greece expedition slideshow.

Publication type: Web site section
<http://tethys.org/idp/home.htm>
Acknowledged Earthwatch? Y
A dedicated web site featuring research updates, photo albums and other information to let the general public know about the work done by Tethys in western Greece. Regularly updated as new information becomes available.

MASS MEDIA:

Publication type: print (newspaper/magazine coverage)
Author: Rowan Hooper "Japan Times" July 2010

Audience: General public

“Viewing dolphins as Taiji could show them”

<http://search.japantimes.co.jp/cgi-bin/fe20100711rh.html>

Publication type: print (newspaper/magazine coverage)

Author: Rowan Hooper “New Scientist” July 2010

Audience: General public

“Dolphin tracking in a giant Greek ‘bathtub’”

<http://www.newscientist.com/article/mg20727683.100-dolphin-tracking-in-a-giant-greek-bathtub.html>

http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B83WY-50GTFT7-M-1&_cdi=33799&_user=10&_pii=S0262407910616570&_origin=search&_coverDate=07%2F10%2F2010&_sk=997927231&_view=c&_wchp=dGLbVzb-zSkWb&_md5=d767a55b7b21f9cb1f6a5e0e68ac7f9a&_ie=/sdarticle.pdf

Publication type: print (newspaper/magazine coverage)

Author: Andrea Catherwood for “The Independent” August 2009

Audience: General public

“Dolphins off the port bow ... but for how much longer?”

<http://www.independent.co.uk/travel/europe/dolphins-off-the-port-bow--but-for-how-much-longer-1769375.html>

Publication type: Broadcast production

Author: earthOCEAN

Title: Disappearing Dolphins

Audience: General public

“Disappearing Dolphins” (2007) is a video produced by earthOCEAN that focuses on the reasons behind the decline of common dolphins in western Greece. It documents the work of Tethys researchers in the Amvrakikos Gulf and around the island of Kalamos, also suggesting management solutions to prevent ecosystem collapse. It features Earthwatch volunteers “in action” during data collection at sea and processing digital images once at the field base. Duration: 17 min 27 sec. The video can be watched online (Flash and QuickTime players) with supporting education materials in English and subtitles in the following languages: English - Spanish - French - Italian - German - Greek - Arabic.

<http://www.whaletrackers.com/whales-mediterranean-sea/disappearing-dolphins/>

Publication type: Magazine feature

Title: Requiem for a dolphin: How this mother mourned her new-born baby.

Audience: Wildlife enthusiasts

Published in BBC Wildlife magazine, December 2007

Publication type: Broadcast production

Author: Bearzi G., Bonizzoni S.

Title: DolphinPeople

Audience: General public

Dolphin People (2005): A story featuring the work of three enthusiastic and dedicated researchers who study coastal dolphins in western Greece. The video highlights the importance of personal commitment to protect endangered marine mammal populations. Duration: 13 min 24 sec. Language: Italian with English subtitles.

<http://www.cetaceanalliance.org/dolphinpeople/>

One of two video documentaries featuring the work on common dolphins by Tethys researchers and carrying a strong conservation message were produced in 2004 and 2005 in collaboration with WDCS and OceanCare. In 2007, these two documentaries were re-edited and made available online.

Publication type: Broadcast production

Author: Bearzi G.

Title: Mediterranean Coastal Dolphins

Audience: Anyone

Mediterranean Coastal Dolphins (2004): A short video on the decline of coastal dolphins in the Mediterranean Sea. Duration: 3 min 34 sec. Language: English.

http://www.cetaceanalliance.org/coastaldolphins_video/

One of two video documentaries featuring the work on common dolphins by Tethys researchers and carrying a strong conservation message were produced in 2004 and 2005 in collaboration with WDCS and OceanCare. In 2007, these two documentaries were re-edited and made available online.

MEETINGS AND CONFERENCES:

Publication type: Presentation/lecture

Title: Bearzi G., Simmonds M., Lüber S. (2010). Disappearing dolphins: does conservation action stand a chance of becoming common practice?

Audience: special event organised during the 4th Meeting of the Parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), Monaco, 9-12 November 2010.

Audience size: 200

Acknowledged Earthwatch? Y

Publication type: Presentation/lecture

Title: Bearzi G. (2010). Twenty years of cetacean research in the Mediterranean: what for?

Audience: Department of Biological and Environmental Sciences and Technologies, University of Salento, Lecce (Italy)

Audience size: 40

Acknowledged Earthwatch? Y

Publication type: Meeting

Title: 6th ACCOBAMS Scientific Committee Meeting, Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. Casablanca 11-13 January (2010).

Documents presented:

Gonzalvo J. and Bearzi G. (2010). Vanishing of short-beaked common dolphins from one of their last Mediterranean strongholds: the announced result of fisheries mismanagement.

Gonzalvo J. and Bearzi G. (2010). Bottlenose dolphins in the Amvrakikos Gulf, Greece, qualify as Endangered based on IUCN Red List criteria

Audience: ACCOBAMS Scientific Committee

Audience size: 40

Acknowledged Earthwatch? : Y

Publication type: Presentation/lecture

Title: Gonzalvo J. (2009). The dolphins of the Amvrakikos Gulf, Greece. Workshop on 'Cetacean research and conservation in the Mediterranean Sea: 1986-2009', Milan Civic Aquarium, Italy

Audience: Scientific community

Audience size: 40

Acknowledged Earthwatch? Y

Publication type: Workshop

Title: Bearzi G. (2008). Delfini e pesca in Mediterraneo: depredazione e interazioni trofiche in aree marine soggette a varie misure di tutela. Proceedings of the Workshop 'Pesca e gestione delle Aree Marine Protette'. Porto Cesareo (Lecce), Italy, 30-31 October (2008).

Audience: Scientists, authorities and fishermen representatives

Audience size: 100
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Bearzi G. (2008). Dolphins of the Ionian Sea: Research and conservation. Audience: Lega Navale Italiana, Porto Cesareo (Italy)
Audience size: 30
Acknowledged Earthwatch? Y

Publication type: Workshop
Invited participant, international workshop on 'The Economics of the Global Loss of Biological Diversity' organised by the European Commission and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany, Brussels (Belgium). 2008
Audience: EU Authorities, scientist and stakeholders
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Bearzi G. (2007). Science-based management of Mediterranean coastal dolphins. Pew Fellows Program in Marine Conservation Annual Meeting. Morro Bay, California, 30 November - 4 December (2007).
Audience: Scientific community
Audience size: 200
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Bearzi G. (2007). Science-based management of coastal dolphins in the eastern Ionian Sea. 8th Meeting of Focal Points for Specially Protected Areas (SPAs). Palermo, Italy, 6-9 June (2007).
Audience: Environmental managers
Audience size: 80
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Bearzi G. (2007). The endangered Mediterranean common dolphins: is there anyone interested in their conservation? 3rd Meeting of the Parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), Dubrovnik, Croatia, 22-25 October 2007
Audience: Environmental managers
Audience size: 100
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Gonzalvo, J. (2007). Marine conservation as a common goal: the benefits of communication between marine biologists and artisanal fishermen. At "Translating scientific results into conservation actions: new roles, challenges and solutions for 21st Century scientists". Workshop held at the Earthwatch Institute Conference 1-3 March 2007, Boston MA, USA.
Audience: Earthwatch community
Audience size:
Acknowledged Earthwatch? Y

Publication type: Presentation/lecture
Title: Gonzalvo, J. (2007). The Ionian Dolphin Project. Studies on two populations of dolphins in the Eastern Ionian Sea coastal waters, Greece". Presentation organized by the New England Aquarium, 5th March 2007, Boston MA, USA.

Audience: Aquarium staff and collaborators
Audience size: 100
Acknowledged Earthwatch? Y

Publication type: Local community meetings and events
Title: Invited speaker, Festa del Delfino (5th Edition), Lacco Ameno, Isola d'Ischia (Italy) (2006)
Audience: General public
Audience size: 50
Acknowledged Earthwatch? Y

Publication type: Meeting
Title: Bearzi G. (2007). The endangered Mediterranean common dolphins: is there anyone interested in their conservation? 3rd Meeting of the Parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). Dubrovnik, Croatia, 22-25 October, 2007
Audience: Environmental managers
Audience size: 100
Acknowledged Earthwatch? Y

EDUCATIONAL RESOURCES:

Publication type: Resource pack
Title: Our Friends the Dolphins
Audience: Children
Acknowledged Earthwatch? N

In 2007, an educational children booklet ('Our Friends the Dolphins') designed and written by Giovanni Bearzi was translated into Greek and made available to local school teachers. It is also available online in ten languages <http://www.cetaceanalliance.org/dolphinfriends/index.htm>
Other (specify):

DEVELOPING ENVIRONMENTAL LEADERS

Capacity building and education activities including lectures and direct involvement in field work and data analysis have benefited a large number of students, researchers and volunteers from around the world since we first started to work in Greece. Significant effort has been made during the past years in the context of the Dolphins of Greece expedition to deliver conservation messages effectively to young generations of students, who are our potential "future environmental leaders".

Since 1991, Tethys has organised a series of courses on dolphin research and conservation opened to students and interested people. The courses were held on board sailing vessels between 1991 and 1994, and from 1996 at Tethys field stations situated along the Ionian Sea coast. In the Amvrakikos Gulf, courses were organised starting in 2006 in collaboration with the Earthwatch Institute. In 2008, Tethys field base in the island of Kalamos was closed. Since 2009, research carried out in the Inner Ionian Sea Archipelago is carried out also with teams of Earthwatch volunteers, who are based in the Amvrakikos Gulf and work on both study areas. A total of 1,048 volunteers from over 40 nations, encompassing the five continents, participated in these field courses: 741 at the Kalamos field station (1996-2008), 307 at the Vonitsa field station (2006-2010) and others from sailing boats used in early years.

Since 2001, Tethys also organised a series of capacity building initiatives aimed to develop expertise on cetacean research and conservation, and encourage collaboration among researchers and institutes working in the Mediterranean and Black Seas, in collaboration with ACCOBAMS. Training courses organised at the former Kalamos field station alternated

theoretical seminars with field data collection and practical experiences at sea. Participants were asked to engage in report writing, abstract writing, and preliminary data analysis. Practical work such as photo-identification at sea, matching, and behavioural data collection was included. By working side by side with Tethys researchers, participants acquired essential background for field studies and learned how to plan and develop their own research project, how to analyse the data, convey the results to colleagues and the general public, and ultimately contribute to dolphin conservation.

These initiatives have included:

- 2001 Training course on cetacean research and conservation for Israeli researchers;
- 2002—2003 Individual capacity building on cetacean research and conservation for Bulgarian and Romanian researchers (in collaboration with ACCOBAMS);
- 2003 Training course on photo-identification methods for Georgian, Russian and Ukrainian researchers (in collaboration with ACCOBAMS);
- 2004 Training course on cetacean research methods and conservation strategies for Slovenian and Greek researchers (in collaboration with ACCOBAMS);
- 2005 Training course on cetacean research methods and conservation strategies for Libyan and Lebanese researchers (in collaboration with ACCOBAMS);
- 2007—2009 Training course for school teachers from Greece, UK and USA (in collaboration with the Earthwatch Institute).
- 2006—2010 Involvement of school teachers from a number of nationalities through funding provided by their own schools or by local trusts, to participate at the Dolphins of Greece expedition

In the context of the Year of the Dolphin (2007-2008), 200 copies of an educational booklet in Greek (“All About Dolphins! A multilingual educational manual”) produced by UNEP/CMS in 2007 were made available by WDCCS – The Whale and Dolphin Conservation Society. These copies were used by local educators to support educational programmes including dolphin conservation during the 2007-2008 school terms.

In May 2007 a beach-cleaning event was organised in Paleros, to raise environmental awareness among local children. In the morning of June 11th, 2007, more than 300 school children between 4 and 8 years of age devoted more than three hours to the collection of paper, plastics and other debris from the local beach. The success of this initiative encouraged the planning of other similar events in subsequent years and since then it has been repeated yearly.

Lectures and presentations were given annually since 1997 to inform the local community about the work done by Tethys in western Greece and raise awareness about dolphins and marine conservation. A total of 2,520 individuals (age: 4-80 years) attended public presentations given by Tethys personnel between 2004 and (2010).

“Dolphin Day” events were organised by Tethys in the summers of 2004 and 2006, in collaboration with the Municipality of Vonitsa, Mytikas and Paleros. Drawings made by local children following lectures at local schools, featuring dolphins and the threats that they are facing, were put on display. Activities for local kids were organised, including body painting and games. Videos on cetaceans were displayed to launch the evenings, also including footage from the study area. Presentations were centred on the status of dolphins in Greece coastal waters.

In 2008, Tethys researchers held a videoconference with a group of disabled children from a Middle School in Los Angeles, California, facilitated by science teacher Larissa Karan. These children, living in the most densely populated area of Los Angeles, could ask questions to a Tethys researcher.

In addition, in 2008 presentations and video projections featuring dolphin conservation in Greece were given at the European Cetacean Society Conference (Egmond an Zee, Holland; audience approximately 200 people), at the Royal Geographical Society, London, UK (audience over 400 people), at the theatre of Paciano, Italy (with Giuseppe Notarbartolo di Sciarra, Sidney Holt and Leslie Busby; audience about 50 people), and at the Lega Navale Italiana of Porto Cesareo, Italy (audience about 40 people).

In 2009, Tethys researchers held a videoconference with approximately 200 students (12-17 years old) of Pentucket Middle School in West Newbury, Massachusetts, USA, with the aim of stimulating younger generations to care about dolphins and marine conservation. The work done by Tethys was presented to the students, followed by a round of questions.

As a result of collaboration with local educators, in July 2009 Tethys researchers made an oral presentation in the context of an 'Event for the Protection of the Environment' held in Vonitsa, Greece. The goal was to stimulate the local community to care about dolphins and marine conservation. This event was attended by approximately 400 people, including students and educators of Vonitsa and visiting students from France, Italy and Poland.

In 2010, Tethys researchers held several videoconferences covering a total audience of over 500 students (10-15 years old) from The Collegiate School for boys in New York City. This was possible thanks to a teacher who joined the research team as a *Life From The Field* fellow (an Earthwatch initiative to support the participation of teachers for educational and outreach purposes). As a follow-up, Tethys researchers gave support and provided information to this teacher for the preparation of educational materials, which she used to introduce marine conservation issues in the education programme of her school.

LONG TERM IMPACT OF PROJECT

TAXA OF CONSERVATION SIGNIFICANCE ENHANCED, RESTORED OR MAINTAINED:

Species name: Common bottlenose dolphin *Tursiops truncatus*

Current IUCN Red List category and criteria: Global population classified as Least Concern in the IUCN Red List. Mediterranean subpopulation formally proposed as Vulnerable

- Bearzi G., Fortuna C.M. (2006). Common bottlenose dolphin *Tursiops truncatus* (Mediterranean subpopulation). Pp. 64-73 in Reeves R.R., Notarbartolo di Sciarra G. (compilers and editors). The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain.
- Bearzi G., Fortuna C.M., Reeves R.R. (2010). Common bottlenose dolphin *Tursiops truncatus* (Mediterranean subpopulation). IUCN Red List of Threatened Species, Updated regional assessment - Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain.

Species name: Short-beaked common dolphin *Delphinus delphis*

Current IUCN Red List category and criteria: Global population classified as Least Concern in the IUCN Red List. Mediterranean population was classified as Endangered in the IUCN Red List. In 2006 they have been included in Appendix I and II of the Convention on the Conservation of Migratory Species (Bonn Convention - CMS).

- Bearzi G. (2006). Short-beaked common dolphin *Delphinus delphis* (Mediterranean subpopulation). 2003 Assessment. Pp. 130-136 in Reeves R.R., Notarbartolo di Sciarra G. (compilers and editors). The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain.

HABITATS ENHANCED, RESTORED OR MAINTAINED

Despite an intense dedication for a number of years, no direct management action taken so far. (See Bearzi G. (2007). Marine conservation on paper. *Conservation Biology* 21, 1:1-3.)