



FINs

Vol.7, N°1, 2017

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ACCOBAMS SURVEY INITIATIVE CONTACT GROUP WORKSHOP IN TUNISIA : TOWARDS THE FIRST CETACEAN MACRO REGIONAL SURVEY IN THE MEDITERRANEAN SEA!

The “ACCOBAMS Survey Initiative” project, officially launched at the last Meeting of the Parties to ACCOBAMS (Monaco, 22-25 November 2016) is a major project for ACCOBAMS. It aims at establishing an integrated, collaborative and coordinated surveillance system for the status of cetacean populations at the whole ACCOBAMS area level, with the final view to strengthen the governance conditions affecting cetacean species. Implemented by the ACCOBAMS Secretariat, in coordination and with the support of riparian countries and local scientists, the ASI will lead as a first step to assess cetacean abundance and distribution at the Mediterranean level during a synoptic survey to be carried out in the summer 2018.

Since the beginning of 2017, while pursuing fundraising effort for conducting the ASI in the Black Sea, the ACCOBAMS Secretariat has been in contact with all ASI Contact Group Members across the Mediterranean region, to assess and prepare the implementation of the “ACCOBAMS Survey Initiative” project in each country, and in particular to assess the authorization requests processes for aerial and/or boat surveys to be conducted in June and July 2018. In continuation to this consultation process, the ACCOBAMS Permanent Secretariat, in collaboration with the Regional Activity Center for Specially Protected Areas (SPA / RAC), organised an ASI Regional Workshop dedicated to the implementation of the ACCOBAMS Survey Initiative, from the 3rd to the 5th of October 2017, in Tunis.

This event gathered the ASI Contact Group members of most of the Mediterranean countries, and provided a unique opportunity for all ASI partners to work together on the preparation and implementation of the survey in 2018. All key aspects for conducting the aerial or ship based surveys were discussed and assessed during plenary and working sessions during the week. Participants prepared the technical and scientific aspects of the survey (scientific protocols, survey design, observation platforms, teams composition and responsibilities, survey period, etc.), administrative procedure and permits authorizations, training and capacity-building actions, and assessed bilateral or multilateral cooperation modalities for specific areas (i.e. Alborán Sea, Adriatic Sea, etc.). They were also consulted on the other main actions of the ASI, in particular the data analysis process to be conducted after the survey, the development of an Information management system for cetaceans data and the communication strategy.



This first ASI regional workshop was considered as a success and allowed each participant to reach an operational vision of the summer 2018 survey, but also of the ASI project as a whole. Building from the work achieved during the event, the ACCOBAMS Secretariat, the ASI Scientific Coordinator and the ASI expert consultants will improve and finalize the scientific and technical approach of the survey, prepare the capacity-building component and proceed with the administrative procedures, to ensure the best preparation for this up-coming challenging large-scale survey!



The first cetaceans large-scale survey covering the whole Mediterranean and Black Seas

**ACCOBAMS SURVEY INITIATIVE CONTACT GROUP
REGIONAL WORKSHOP**

**ATELIER REGIONAL DU GROUPE DE CONTACT
DE L'ACCOBAMS SURVEY INITIATIVE**

3-5 octobre 2017



Technical Partners:



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The first large-scale survey covering
the whole Mediterranean
and Black Seas

TO INCREASE OUR
KNOWLEDGE

TO INCREASE OUR
UNDERSTANDING

TO IMPROVE
CONSERVATION

Summer
2018 in
the
Mediterranean sea

TOWARDS A COMMON OBJECTIVE

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The ASI project is implemented with the contribution
of all the countries Parties to ACCOBAMS and in
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Thanks to the financial support of:



CETACEAN SURVEY IN ROMANIAN TERRITORIAL WATERS OF THE BLACK SEA, BETWEEN CONSTANTA AND VAMA VECHE

Romulus-Marian PAIU,

*Expert in ecology at Mare Nostrum NGO, Romania
and member of the ACCOBAMS Scientific Committee since 2016*

In the frame of the project “Increase the regional capacity for developing cetacean distribution and abundance studies”, financed from the Supplementary Conservation Funds of ACCOBAMS two surveys over an area of 1063 km² in the territorial sea of Romania were designed and carried out, including a strip with a width of 12 nautical miles adjacent to the coast and the internal waters measured from the baselines. The first survey, which is also the subject of the present article, was done between 7-29 of March 2017, over a three day period, due to meteorological conditions.

The survey came as an output for the international training done in the framework of above mentioned project in which were presented the distance sampling methods and Distance software, version 7, as a common tool for designing and analysing the cetacean abundance and density of cetaceans in the Black Sea. In this respect was trained a team of volunteers, lead by one of the experts of MARE Nostrum to execute the vessel survey on abundance, distribution and density of cetacean population in the Romanian territorial waters of the Black Sea in early Spring, in the area between Constanta and Vama Veche, an area with four Natura 2000 protected areas: ROSCI 0269 Vama Veche-2Mai, ROSCI 0273 Marine area from Cape Tuzla, ROSCI0094 Submarine sulphurs springs from Mangalia, ROSPA0076 Black Sea.

The survey plan covered 8 transects, from East to West with a distance of 5 km between, perpendicular to the shore line, summing a total of 211.95 km and was conducted with sea state ≤ Beaufort 4 in an area of 1063 km² and with a coverage of 0.396%.

In total, there were 59 sightings, with 147 cetaceans recorded of just two from the three species of cetaceans known for the Black Sea, with no sightings on transect of common dolphin (*Delphinus delphis ponticus*). Most numerous encounters were Black Sea harbor porpoise (*Phocoena phocoena relicta*) - 36, as for the Black sea bottlenose dolphins (*Tursiops truncatus ponticus*) – 23 sightings.

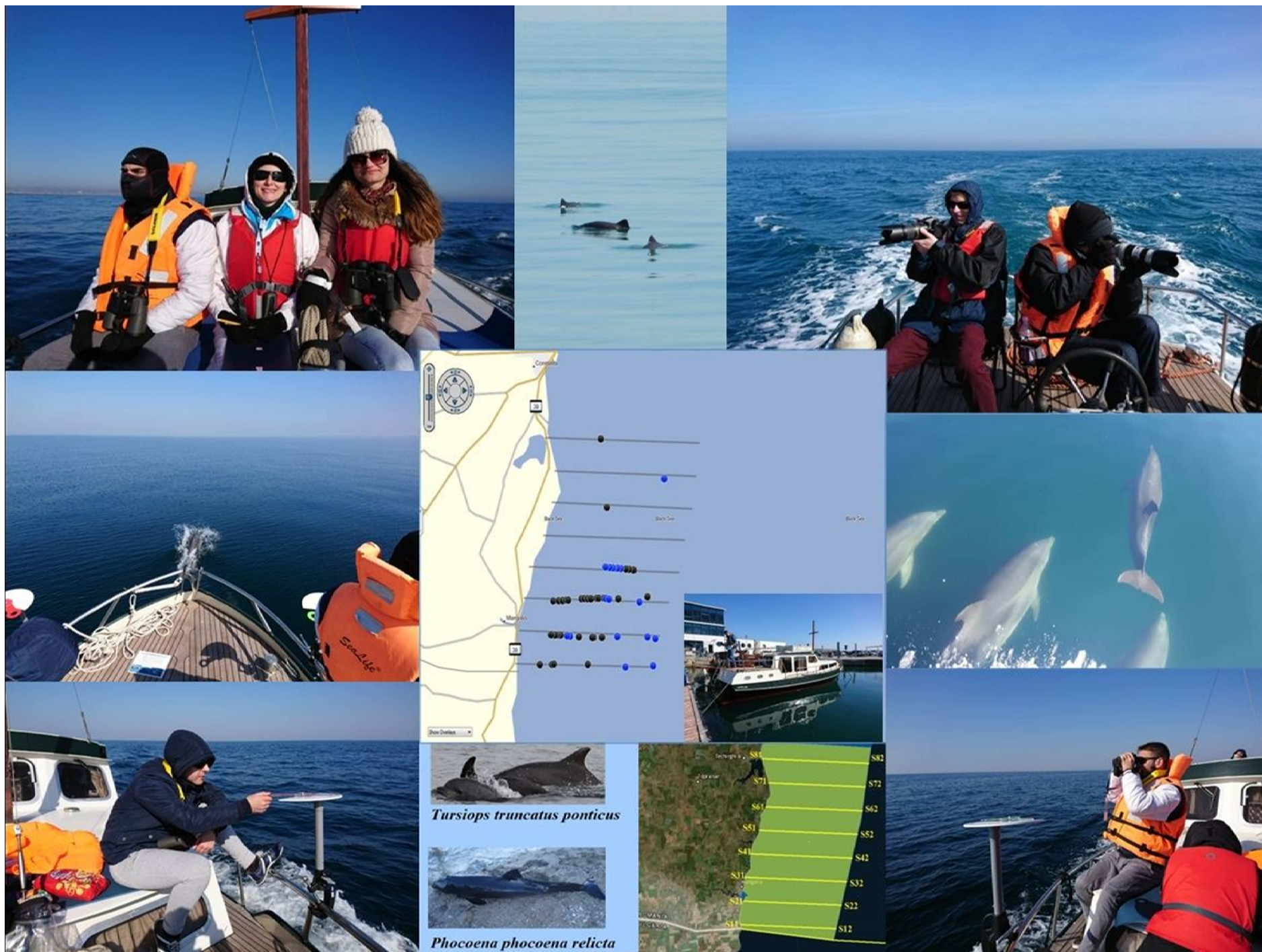
The estimates produced with the Distance Software, using Hazard Rate model showed an abundance of N = 359 (95%CI = 127-1015; CV% = 50.87) for harbor porpoise and N= 667 (95%CI = 214-2080; CV% = 59.92) (Paiu et al, 2017). Similar trend was detected also for the summer survey, but with lower CV%, higher encounter rates for harbor porpoise followed by bottlenose dolphin and common dolphin as presented in the final report of the above mentioned project.

Most of the sightings were of solitary individuals and the largest observed group was 8 for bottlenose dolphins and 4 for harbor porpoises. During the survey, non-typical surface behavior of common dolphins was observed – short showing, no jumping, elusive – more similar to that of harbor porpoises, behavior recorded also by the Bulgarian colleagues.

The information provided could be use as a valuable resource for management of the sea resources, protected areas management plans and MSFD, keeping in mind the important role of cetaceans in the marine ecosystem.

We would like to thank volunteers Anca Maria Gheorghe, Dan Kessler, Marius Oprea, Ali Gean, Mânzală Diana, Ionică Mihai, Ioan Malciu, Alexandru Petraru and Alina Greceanu who has proven that trainings within “Increase the regional capacity for developing cetacean distribution and abundance studies” project have been successful.

Special thanks to Philip S. Hammond for the great support granted for training and data assessment.



Pictures from the March survey, including survey design and sightings

AN OVERVIEW OF “GROUPE DE RECHERCHE SUR LES CÉTACÉS” SUMMER 2017 SURVEY WORK

Adrien C. Gannier
Groupe de Recherche sur les Cétacés
www.cetaces.org

GREC implements a consistent survey methodology for many years: a 12-m sailboat towing an HF hydrophone and sampling in straight lines with continuous visual searching (3 observers) and acoustic monitoring (20 min. sampling-rate). Unusually, throughout summer 2017 GREC’s fieldwork was divided into three main periods.

The early summer was used to sample the area between Port-Cros and Monaco. Segments were designed to focus on continental slope as well as pelagic waters. The striped dolphin, the fin whale and the sperm whale were the three mainly targeted species. This fieldwork was also used to train eleven students involved in GREC’s cetology cursus.

After this local work, we widened our scope by surveying successively Corsican waters and eastern Gulf of Lion. Interestingly, this enabled us to sample, within a few days, waters ranging from 18°C (southeastern Gulf of Lion) to 30°C (northern Tyrrhenian Sea). Maximal cetacean density and diversity were encountered in the central Ligurian Sea.

Last but not least, we focused throughout the summer on the striped dolphins frequently foraging near Antibes’ shore. These dolphins are one of our major concerns because of the numerous anthropogenic activities (the fast-growing “swim-with” business and its inherent cetacean-harassment, for example) taking place in the area. Several dedicated short surveys were performed with a sailboat, providing results that will eventually be compared to data obtained during the previous decades. Shore-based observation was also carried out and was particularly useful to quantify marine traffic in the area. This topic will keep us busy for months to come.



Balaenoptera physalus Ligurian Sea, Adrien Gannier

Despite several adverse weather periods, summer surveys resulted in a total of 116 sightings along a 2700 km effort line (Table 1).

Table 1: GREC summer sightings in the NW Mediterranean Sea, 2017.

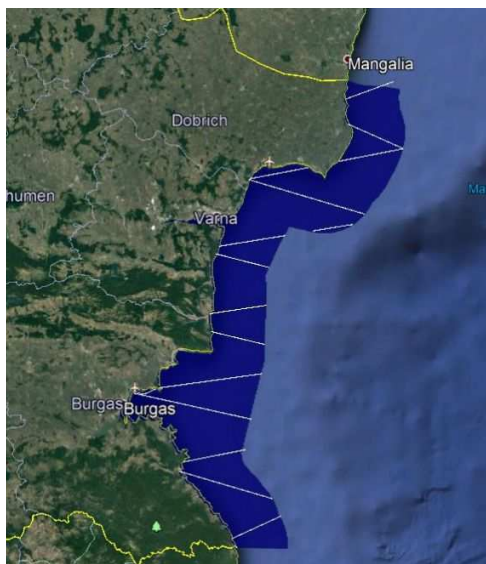
Area	Striped dolphin	Bottlenose dolphin	Risso's dolphin	Cuvier's beaked w.	Sperm whale	Fin whale
Ligurian Sea	52		1	1	17	20
N.Tyrrhenian & SW Corsica	4	1			3	
Provence & E. Lion	13					4
TOTAL	69	1	1	1	20	24

CETACEAN SURVEY IN BULGARIAN TERRITORIAL WATERS OF THE BLACK SEA

Dimitar Popov
Green Balkans

In the period 16-23 June, a team of Green Balkans' experts and volunteers executed a vessel survey on abundance, distribution and density of cetaceans' population in Bulgarian territorial waters of the Black Sea. Territorial sea of Bulgaria has a total area of 6 358 sq. km.

The deployed method was distance sampling along line transects. Survey plan was developed in Distance 7.0 and included 13 transects with total length of 458 km on effort. Main limiting factor for the successful execution of the survey was the meteorological conditions at sea. The survey team successfully covered 424 km on effort from the planned transects during favourable weather (sea state 0-3) conditions within 5 days. During the survey, the observers recorded 242 sightings in total with 350 cetaceans. Most numerous were encounters of Black sea harbor porpoises (*Phocoena phocoena relicta*) – 169, followed by Black sea common dolphins (*Delphinus delphis ponticus*) – 42 and rarest were those of Black sea bottlenose dolphins (*Tursiops truncatus ponticus*) – only 27. In 4 of the sightings species wasn't identified.



The current survey is the second one organized by Green Balkans NGO in past 2 years. This year the effort was bigger – 424 km of tracklines compared to 330 km last year. Number of sightings this year was significantly higher (8 times) – 242 compared to 30 during last year survey held in end of May. Though similar trend in distribution was detected in both years for higher number of sightings and density in the northern and southern sectors compared to central one. Most of the sightings were of solitary individuals and largest observed group this year was 8 bottlenose dolphins compared to 11 last year. During the survey, non-typical surface behavior of common dolphins was observed – short showing, no jumping, elusive – more like that of harbor porpoises. The low number of encounters with bottlenose dolphins (largest Black sea cetaceans) was other surprise – species that was more frequently encountered compared to common dolphins last year.

Data from the survey was analyzed using Conventional Distance Sampling analysis engine of Distance 7.0. Results are shown in table below:

Species	Density of groups, groups / km ²		Density of animals, ind. / km ²		Number of animals		CV %
	DS	95% CI	D	95% CI	N	95% CI	
<i>P. p. relicta</i>	1.2084	0.72052-2.0265	1.5802	0.93946-2.6578	10 047	5 973 – 16 899	24.6
<i>T. t. ponticus</i>	0.10774	0.40698-0.28522	0.21548	0.78729-0.58977	1 370	501 - 3 750	50.64
<i>D. d. ponticus</i>	0.24759	0.13708-0.4472	0.41855	0.22682-0.77237	2 661	1 442 – 4 911	29.89



We would like to thank volunteers Polina Hristova, Teodora Ilieva, Nikolay Davidkov and Antonia Miteva who has proven that trainings within [“Citizens’ support for study of Black Sea cetaceans along Bulgarian coast”](#) project have been successful. Special thanks to captain Georgiev with “Kaliakria” yacht for the professional logistic support.

The survey was made possible thanks to the generous funding provided by OceanCare Foundation (www.oceancare.org).

INTERNATIONAL CALL TO PROTECT WHALE MIGRATION CORRIDOR IN SPANISH MEDITERRANEAN WATERS!

Nicolas Entrup

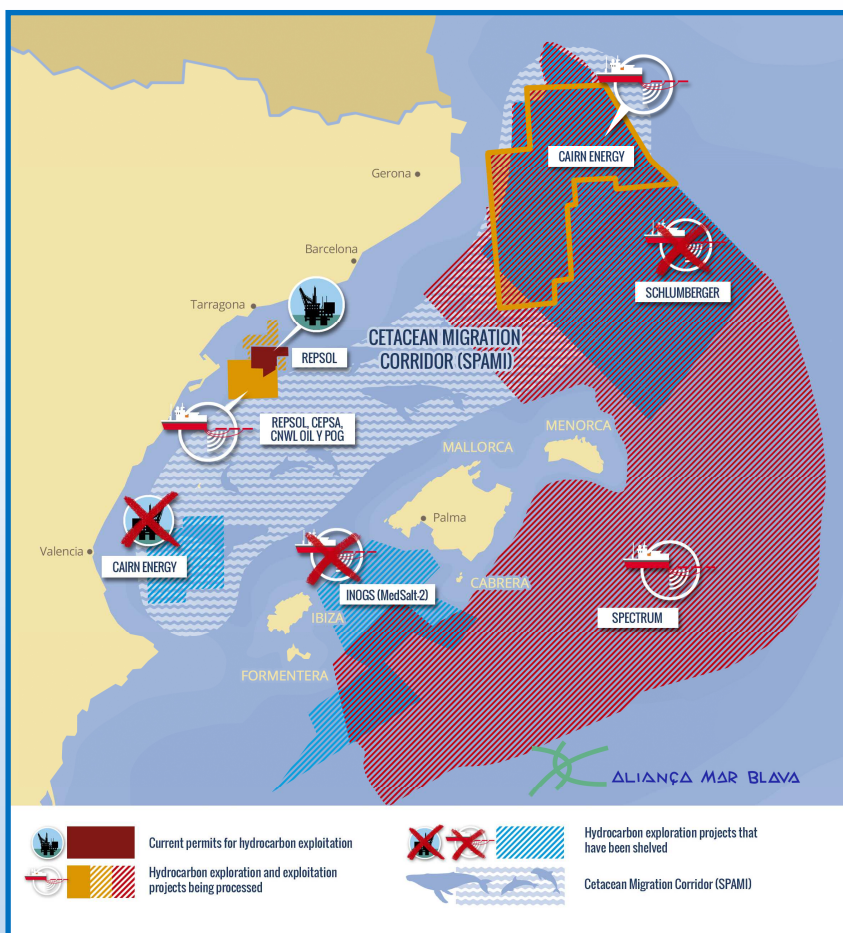
Consultant to OceanCare and NRDC

The waters between the Balearic Islands and the Spanish mainland has been identified as important for primary productivity and habitat for various marine wildlife, including various whale and dolphin species. It is also of particular importance in its role as migratory corridor including the second and third largest species on earth, fin and sperm whales, as well as deep divers such as pilot whales and Cuvier's beaked whales.

These waters are also subject of an intense debate about whether exploration activities for hydrocarbon resources shall be permitted in the region or not. In recent years some applications for undertaking seismic activities have been withdrawn or rejected, others are still pending and await a decision. Applauded by civil society organisations, as well as interest groups from within the private sector and several political parties, the Spanish Environmental Ministry publically stated to initiate the process of declaring these waters as SPAMI, a Specially Protected Area of Mediterranean Importance, under the framework of the Barcelona Convention. The question arising is not just whether a SPAMI will be declared, but whether a management plan foresees to prohibit hydrocarbon exploration activities in the future.

Strong Support to protect the whale migration corridor

The call for the establishment of a SPAMI and preventing the exploration and exploitation of potential hydrocarbon resources in the region has just recently received strong support from the NGO and scientific community. On Friday 1st of September, representatives of the Alianza Mar Blava, OceanCare and NRDC handed over to the Spanish Ministry of Environment a letter signed by 25 scientists and 36 conservation groups, speaking on behalf of millions of supporters on five continents reflecting also about the fact that the region had previously been identified as a "Noise Hot Spot" with an ACCOBAMS Report published early 2016. Such support for a SPAMI comes timely, as the Spanish government is expected to file a decision soon.



Conservationists interpret the upcoming decision over the SPAMI whether it will be testimony for being in line with the objectives of international conservation Treaties and those of the Paris Agreement.

With the announcement of the Environmental Minister in France in June 2017 to ban exploration activities in French waters, the public is now looking at Spain whether it joins forces with its neighbour.

Further News will be reported at
www.oceancare.org

MITIGATING UNDERWATER NOISE IN THE SOUTHEASTERN EUROPEAN PART OF THE MEDITERRANEAN

Nicolas Entrup

Consultant to OceanCare and NRDC

The Paris Climate Agreement set the stage for a change in the international energy policy, promoting a shift towards renewable energy production. However, exploration and exploitation efforts of new hydrocarbon resources continue and may even still be on the rise in some territories, potentially in the southeastern European waters.

People following the work by and discussions within ACCOBAMS bodies and procedures are well aware about the risks and concerns of intense impulsive sound created by airguns. Lots of progress has already been achieved not just due to the development of the ACCOBAMS noise guidelines, but most recently also by the proposed guidelines for how to undertake proper Environmental Impact Assessments (EIAs) prior to anthropogenic noise activities. These guidelines have been recently adopted at the CMS COP in the Philippines and will be a helpful instrument for national bodies to properly review and manage applications to undertake seismic surveys.

In recent years the controversy about the potential impacts of seismic surveys has increased in many parts of the Mediterranean. E.g. following seismic surveys in the Croatian part of the Adriatic Sea without EIAs to be undertaken prior to those in 2013, legislative improvements have been put in place. In the Balearic Islands an enormous civil society movement has evolved out of protests against proposed hydrocarbon exploration activities (see the other article **“International Call to protect whale migration corridor in Spanish Mediterranean waters!”**) and authorities have refused granting licenses in the past years due to environmental concerns. Administrations in other countries, e.g. in Montenegro, are now exposed to similar plans by the oil and gas industry.

To date, there is no comprehensive – and publically available – overview of planned exploration activities in the Mediterranean Sea. However, the so called Noise Hot Spots Report, published early 2016 by ACCOBAMS evaluating noise activities over previous years has been a reason to be concerned.

We believe that there is an urgent need to establish and accelerate appropriate Know-How information flows to various stakeholders in south-east Europe, including civil society organisations (CSOs), academic institutions and decision-makers in government. This has been thoroughly discussed and addressed during the workshop on ‘Mitigating the impact of underwater noise on marine biodiversity with specific focus on seismic surveys in the southeastern European waters in the Mediterranean Sea’ organized in Split in November 2017.

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SOUNDS OF THE SUMMER, DRIVING HABITAT DEGRADATION AND DOLPHIN DISPLACEMENT

Nikolina Rako-Gospić

Blue World Institute of Marine Research and Conservation (BWI)

Whales and dolphins have developed their auditory capabilities to overcome the many challenges of living in the sea. However, the advantages of using sound in the sea (to communicate, locate prey and navigate) has been jeopardized in recent times as the world seas got noisier. Anthropogenic noise has altered the quality of the marine environment with consequences on the physiology, communication, behaviour and energetics of different cetacean species.

The Croatian Adriatic Sea hosts six EU sites of Community Importance (SCIs) for bottlenose dolphins (*Tursiops truncatus*). These Natura 2000 sites represent approximately 11.8% of the Croatian territorial sea. Since 1999, BWI has monitored the bottlenose dolphins inhabiting Cres-Lošinj SCI (HR3000161). This population is characterized as relatively closed with a low degree of individual displacement from the area that appears to be strongly habitat dependant. High sighting frequency and regular re-sightings of known individual dolphins indicate their long-term fidelity to this specific region. However, the Cres-Lošinj SCI, is also a well-known tourist destination and is subject to particularly intense leisure boating during the summer months. As a result the BWI has invested a lot of time and effort studying how the increased anthropogenic noise, related to this intense leisure boating, interferes with the quality of this important bottlenose dolphin habitat.



Based on the data collected about dolphin spatial distribution, combined with concurrent acoustic monitoring in this area, Rako et al. (2013) found a significant drop in dolphin encounters during the summer seasons in the noisy parts of this Natura 2000 SCI. These areas were characterized by particularly intense boating pressure. Moreover, the encounters observed in the noisy areas had a lower total number of dolphins encountered and a complete absence of new-born calves.

This suggests a temporal displacement of more sensitive animals and indicates negative consequence of boating (in terms of both noise and physical presence of boats) on the distribution of nursing females. Recent findings of the BWI show that, in the periods of high anthropogenic pressure, female dolphins that were sometimes accompanied by their calves were more likely to apply the higher risk strategy of feeding behind the nets of bottom trawlers within this region. The use of this feeding strategy could be to supplement the energy consumed trying to avoid anthropogenic disturbance and additionally support the high energetic outputs related to caring for their offspring (Rako-Gospić et al. 2017).

Underwater noise within this area not only affects distribution and habitat use, but also interferes with communication of dolphins. A recent study indicates that boating noise evokes significant shifts in dolphin vocal behaviour, most likely to facilitate transmission of acoustic signals and avoid masking.



Spectrogram of a bottlenose dolphin whistle

In conditions of elevated low frequency noise (below 2 kHz), dolphins shift their whistle frequencies to a higher frequency range. Conversely, in the conditions of elevated noise across a higher frequency range, dolphins whistle with a reduced maximum and start frequencies, and with fewer frequency modulations (Rako-Gospić et al. 2016). In noisy conditions, the maintenance of acoustic contact between the individuals is of particular importance for sensitive mother–calf groups.

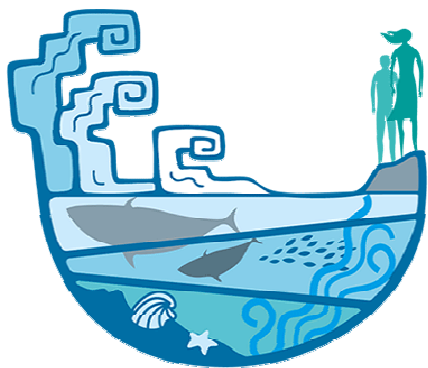


The overall results of BWI indicate that localized acoustic impact by the boat noise may have serious long-term consequences on this small and relatively closed population.

Seasonal displacements could easily turn into long-term abandonment of their preferred feeding and nursing sites as the human pressure becomes incompatible with dolphin welfare. Although regulatory measures within this Natura 2000 SCI need to be developed and applied by the 2020 deadline, appropriate conservation measures such as a summer speed limit and mandatory code of conduct are urgently required to mitigate the impact of boating noise on this coastal habitat.

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International Marine Protected Areas Congress Chile 2017

The **ACCOBAMS Permanent Secretariat** participated in the IMPAC4 Conference, la Serena, Chile, 4-8 September 2017. Among the topics addressed, the evaluation of MPA efficiency was one of the concerns expressed. The ACCOBAMS Executive Secretary took the opportunity to present the ACCOBAMS Survey Initiative and the ongoing process allowing the identification of new relevant Cetacean Critical Habitats (CCH).

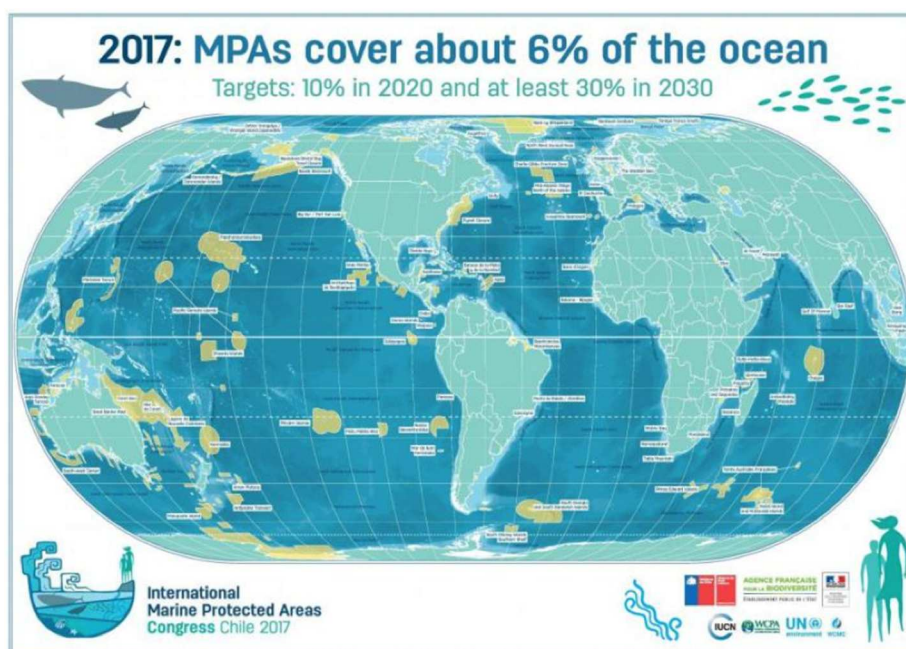
Recently, an effort to the identification of Important Marine Mammal Areas (IMMAs), defined as *'discrete portions of habitat, important for one or more marine mammal species, that have the potential to be delineated and managed for conservation'*, was launched in the Mediterranean Sea by the IUCN MMPATF, ACCOBAMS and the Tethys Research Institute.

In parallel, the ACCOBAMS Permanent Secretariat is undertaking an initiative to revise the CCH by crossing information from:

- areas of importance for cetaceans : information based on the Mediterranean IMMAs but also, in a next future, on the results of the ACCOBAMS Survey Initiative, which will serve this process in areas with less knowledge on cetaceans;
- areas with threats for cetaceans through a spatial mapping, by national experts, of direct threats to cetaceans in the ACCOBAMS area.

Through this process, areas in need of protection due to the occurrence of significant interactions between cetaceans and human activities will be clearly identified and the implementation of sustainable conservation actions at the regional level should be facilitated. The threat-based management approach developed by ACCOBAMS for cetaceans should facilitate the evaluation of MPA efficiency in Cetacean Critical Habitats.

Léa David (Task manager for MPA), Florence Descroix-Comanducci (Executive Secretary) & Majlis Salivas (Programme Officer)

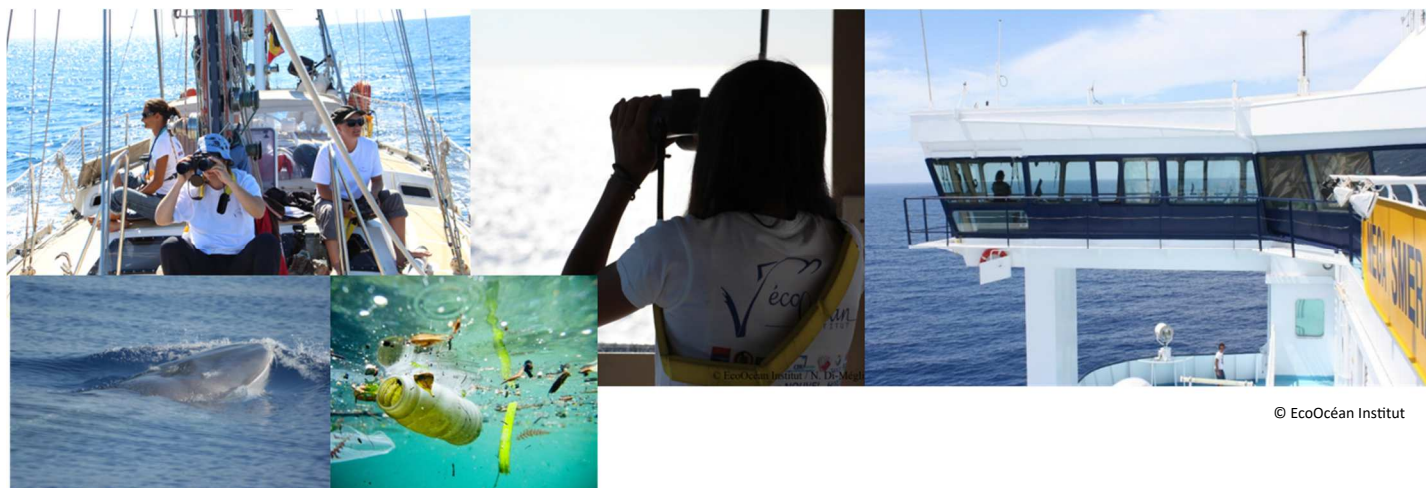


Recently EcoOcéan Institut (EOI) and colleagues from the GIS3M compared the distribution and composition of sightings of fin whale, sperm whale and pilot whale in the north-western Mediterranean Sea in summer for two decades: 1992-2002 (data from EOI and partners (EPHE, Participe Futur, Cybelle Planète, SCS) and 2005-2015 (data from EOI and partners (Participe Futur, Cybelle Planète, SCS and WWF-France). We show that both parameters have changed, highlighting the fact that for these three species, the north-western Mediterranean Sea is nowadays really a birthing area, with statistically more neonates and young individuals sighted in the last decade than in the previous one, and this is more obvious for sperm whales (Di-Méglio *et al.*, 2016; Tardy *et al.*, 2016). EOI uses these findings to help greatly the designation of the north-western Mediterranean Sea as Important Marine Mammal Area (IMMA), recognised by a panel of world experts of the IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force (IUCN MMPATF, 2017).

In parallel, EOI provides information for the monitoring of cetaceans inside the Pelagos Sanctuary on the long term. As part of the Fix Line Transect Network (Arcangeli, 2010; Arcangeli *et al.*, 2014), EOI collects data from ferries in a coordinated and standard way with other partners (CIMA Foundation, ISPRA, Accademia del Leviatano, Univ. di Pisa,...) since several years, and these data fill indicators of quantities, distribution and evolution (David *et al.*, *in press*).

Another big issue of our work is anthropogenic threat. After mapping high risk areas of ship strike for fin whales (David *et al.*, 2011) and sperm whales (Di-Méglio *et al.*, *in press*) in the north-western Mediterranean Sea, we bring new insights and numbers of Near Miss Event, for both species in the Pelagos Sanctuary, as a proxy of ship strikes. We now pursue this work within the FLT, in validating the high risk areas and studying the behaviour and context of NME to understand why ship strikes occur. These findings should help greatly to understand where and why these events occur and take targeted measures to mitigate this threat.

Finally, we analysed this year ten years of data collection on floating macro-litter and cetaceans simultaneously, and proved that concentration areas of marine litter in the north-western Mediterranean Sea are also areas mainly exploited by cetaceans, from three feeding diets (Di-Méglio and Campana, 2017). This kind of pollution, overwhelmed by plastic, is known as a direct (ingestion, entanglement) and also indirect (contaminant) threat for the cetacean community, and these results raised knowledge about quantity, distribution, nature of this pollution and the overlap with cetacean habitats.



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IMPORTANT MARINE MAMMAL AREAS IN THE ACCOBAMS MEDITERRANEAN REGION

Erich Hoyt and Giuseppe Notarbartolo di Sciara

Co-chairs, IUCN SSC/WCPA Marine Mammal Protected Areas Task Force

Important Marine Mammal Areas—IMMAs—are a new tool for conservation, modelled after the Important Bird and Biodiversity Area (IBA) concept. IMMAs are defined as discrete portions of habitat, important to marine mammal species, that have the potential to be delineated and managed for conservation. IMMAs are an advisory expert-based classification, and have no legal standing as MPAs but are intended to be used in conservation planning by governments, intergovernmental organisations, conservation groups, and the general public. Some may become part of future MPA or zoned protection areas while others will be valuable for marine spatial planning (MSP) or to monitor areas for climate change, bycatch, noise, ship strike and other threats faced by marine mammals. In some cases IMMAs may reveal that existing MPAs, management zones or protection measures may need to be altered based on new emerging evidence. Marine mammals, like seabirds, are important indicator species for ecosystem health and biodiversity, aided by their high visibility. They are also umbrella species able to bring many other species under protection.

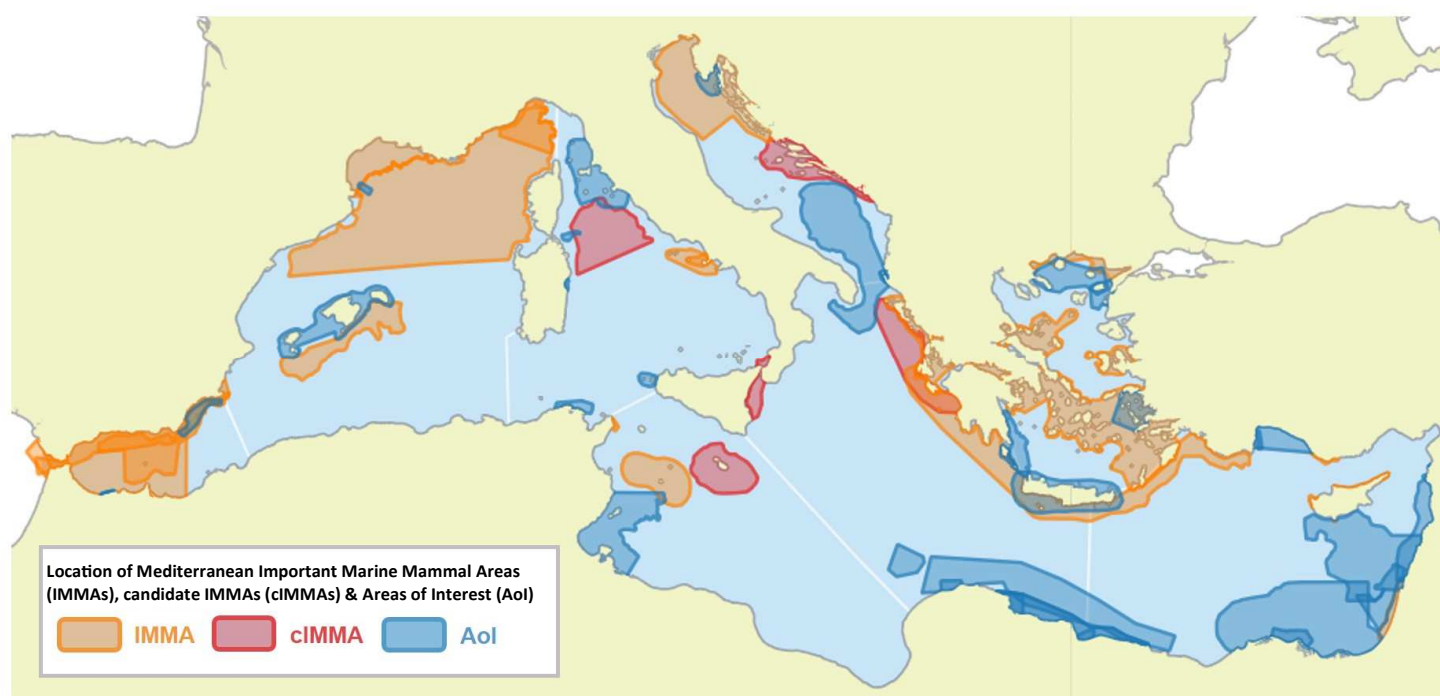
In order to define IMMAs in the Mediterranean Sea, a 5-day workshop (24-28 October 2016) was organised by the IUCN Marine Mammal Protected Areas Task Force and sponsored by the MAVA Foundation. The workshop was attended by 34 expert participants from 18 countries including Albania, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey and the United Kingdom. Malta, Duke University and UNEP's World Conservation Monitoring Centre attended as observers. ACCOBAMS—the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area—joined the Task Force as a partner, also helping with the organisation along with the Tethys Research Institute.

The workshop considered many areas of interest (Aols) which were submitted to the workshop by participants, as well as by the wider marine mammal research and conservation community. The experts agreed to propose 41 cIMMAs based on the best evidence available. They ranged in size from 50 km² for species such as the Mediterranean monk seal to over 134,000 km² across the Ligurian Sea and Northwest Mediterranean for fin and sperm whales. Nine marine mammal species were proposed for cIMMAs from a total of 11 being evaluated by the participating experts. Some cIMMAs featured multiple species of marine mammals.

At the close of the workshop, the MMPA Task Force described the steps towards the identification of a 'Transboundary Managed Area' in the Strait of Sicily. The area has high conservation value in terms of marine biodiversity but is also affected by several anthropogenic threats such as fishing and maritime traffic, and needs to be managed in order to preserve its biodiversity.

Following the workshop, the independent review panel—comprised of Randall R. Reeves, Philip S. Hammond and Robert L. Brownell, Jr., with Reeves as chair—examined the 41 cIMMA submissions to assess whether the criteria were applied correctly and verified that the available supporting evidence was sufficient to support each of them. Their decisions were finalised in July 2017. In total, 26 IMMAs were accepted for full status by the review panel, after receipt of revisions or additional information that was required before their confirmation as IMMAs meeting the IUCN Task Force criteria. Five cIMMAs, determined as not meeting the standard at this time, were considered to show substantive evidence of their merit as cIMMAs and could be assessed later by an interim Task Force regional working group for the Mediterranean; these remain as cIMMAs. Four other cIMMAs were determined to have insufficient evidence at this time to be considered as either IMMAs or interim cIMMAs. Two of these four have been merged with existing Areas of Interest (Aoi) while the other two became new Aoi, joining the working list of 37 Aoi to make a total of 39 Aoi for the Mediterranean Region. These 39 Aoi, given further monitoring and survey effort, may be able to be reassessed as cIMMAs in a future IMMA expert identification event.

The Task Force is already making plans for future IMMA workshops in other regions of the ocean. A second workshop covered the vast South Pacific and was held in Apia, Samoa, in March 2017. From 2018-2021, further workshops will bring together marine mammal experts from the North East Indian Ocean and South East Asian Seas, the Western Indian Ocean and Arabian Seas, Australia-New Zealand and South East Indian Ocean, the South East Tropical and Temperate Pacific Ocean, and the Southern Ocean. Many of these southern hemisphere workshops will be funded as part of the Global Ocean Biodiversity Initiative (GOBI) and the German government's International Climate Initiative (IKI); the French Agency for Biodiversity has expressed its intention of supporting the Southern Ocean Workshop. Other Task Force sponsors for the IMMA work include Tethys Research Institute, Whale and Dolphin Conservation, Animal Welfare Institute, the Eulabor Institute, the Pacific Life Foundation, The Ocean Foundation and the French Agency for Biodiversity (Agence Française pour la Biodiversité).



The boundaries and supporting evidence for the approved IMMAs in the Mediterranean are available in the IMMA e-Atlas on the Task Force website (<https://www.marinemammalhabitat.org/imma-eatlas/>). The *Report of the Regional Workshop on Mediterranean Important Marine Mammal Areas* is available at <https://www.marinemammalhabitat.org/downloads/>.

26 IMMAs				5 cIMMAs
Akamas and Chrysochou Bay IMMA	Central Aegean Sea IMMA	Ionian Archipelago IMMA	Northern Sporades IMMA	Central South Coastal Adriatic Sea cIMMA
Akrotiri IMMA	Chios and Turkish Coast IMMA	Kélibia IMMA	Shelf of the Gulf of Lion IMMA	Central Tyrrhenian Sea cIMMA
Alborán Corridor IMMA	Cilician Basin IMMA	Lampedusa IMMA	Straits of Gibraltar and Gulf of Cadiz IMMA	East Sicily and Strait of Messina cIMMA
Alborán Deep IMMA	Coastal Shelf Waters of the Southeast Levantine Sea IMMA	North Western Mediterranean Sea, Slope, and Canyon System IMMA	Waters of Ischia and Ventotene IMMA	North East Ionian Sea cIMMA
Alborán Sea IMMA	Gulf of Ambracia IMMA	Northern Adriatic IMMA	Western Ligurian Sea and Genoa Canyon IMMA	Waters Surrounding the Maltese Islands cIMMA
Balearic Islands Shelf and Slope IMMA	Gulf of Corinth IMMA	Northern Coast of Cyprus IMMA		
Campanian and Pontino Archipelagos IMMA	Hellenic Trench IMMA	Northern Coast and Islands of the Thracian Sea IMMA		

CONSERVATION SCIENCE FOR MARINE MEGAFaUNA IN THE ACCOBAMS AREA

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The topical issue on European Marine Megafauna, recently issued as Volume 141 of Deep-Sea Research part-II (July 2017) has put together twenty-six papers describing new research on cetaceans, pinnipeds, seabirds, sea turtles and large fish in the eastern North Atlantic and the Mediterranean and Black Seas. The common thread of all these papers was to provide new data on abundance, distribution and habitat of these species in a conservation perspective. This is of particular interest to researchers, conservationists and managers from all countries of the ACCOBAMS area.

Marine megafauna includes sea mammals, birds, reptiles, large fish and elasmobranchs (Figure 1). Overall, marine megafauna species are large vertebrates that depend on marine resources for their food. These mobile species are generally at the top of their trophic food webs and have none or few predators. From the tiny storm-petrel to the gigantic blue whale, this group is biologically diverse. Our perception of marine megafauna as a coherent group is based on ecological similarities and shared conservation issues. These species are exposed to similar threats and generally show limited resilience due to their intrinsic life history traits such low fecundity rates and high longevity. Consequently they share common conservation challenges (e.g. Hooker and Gerber, 2004; Lascelles et al., 2014).



Figure 1: Marine Megafauna. From upper left to lower right panel: Leatherback turtle (*Dermochelys coriacea*, credits: C. Dars), Grey seal (*Halichoerus grypus*, credits: G. Dorémus), Basking shark (*Cetorhinus maximus*, credits: G. Gautier), European storm-petrel (*Hydrobates pelagicus*, credits: O. van Canneyt), Short-beaked common dolphin (*Delphinus delphis*, credits: G. Gautier) and Sunfish (*Mola mola*, credits: O. van Canneyt).

The conservation of marine megafauna intrinsically deserves particular attention. First, these species can be exposed to intense and cumulative pressures. Over-exploitation, incidental catches, high contaminant burdens, entanglement in or ingestion of macro- and micro-litter, underwater noise, collisions, global environmental changes and reductions in the availability of food resources are widespread pressures shared by several or all the taxa constitutive of marine megafauna. Consequently, many marine megafauna populations currently have a critical conservation status (Lascelles et al., 2014). Moreover, the low fecundity and long generation time often limit the capacity of collapsed populations to quickly recover. The recovery process typically takes decades in cetaceans, petrels or sharks; and their current conservation status often results from pressures of the last century cumulated with current pressures (e.g. Baker and Clapham, 2004; Lotze et al., 2011).

Beyond species themselves, marine megafauna are a key element of many marine conservation strategies. Including some of the most charismatic marine species, large marine vertebrates are generally used as flagships to mobilize society at large on conservation issues. Moreover, they can function as umbrella species due to their large home ranges and high trophic level. Indeed, conservation measures focusing upon marine megafauna often benefit lower trophic level species, positively impacting marine habitat protection (Hooker and Gerber, 2004). They also have the potential to act as sentinel species and inform the ecological status of other less visible compartments of marine ecosystems (Simberloff, 1998; Zacharias and Roff, 2001).

With 23 parties from all around the Mediterranean and Black Seas and the adjacent Atlantic Ocean ACCOBAMS is a legal conservation tool based on cooperation and aiming at reducing threats to cetaceans (<http://www.accobams.org/about/introduction/>). This intergovernmental Agreement is particularly committed to promote cooperation between riparian Countries to preserve all species of cetaceans and their habitats within the geographical Agreement area, notably by improving current knowledge on these animals. In this respect this topical issue on European Marine Megafauna is an important contribution to providing and sharing new scientific results on cetaceans and other marine top predators in the area. No less than thirteen papers report on studies conducted from within the ACCOBAMS area (Figure 2).

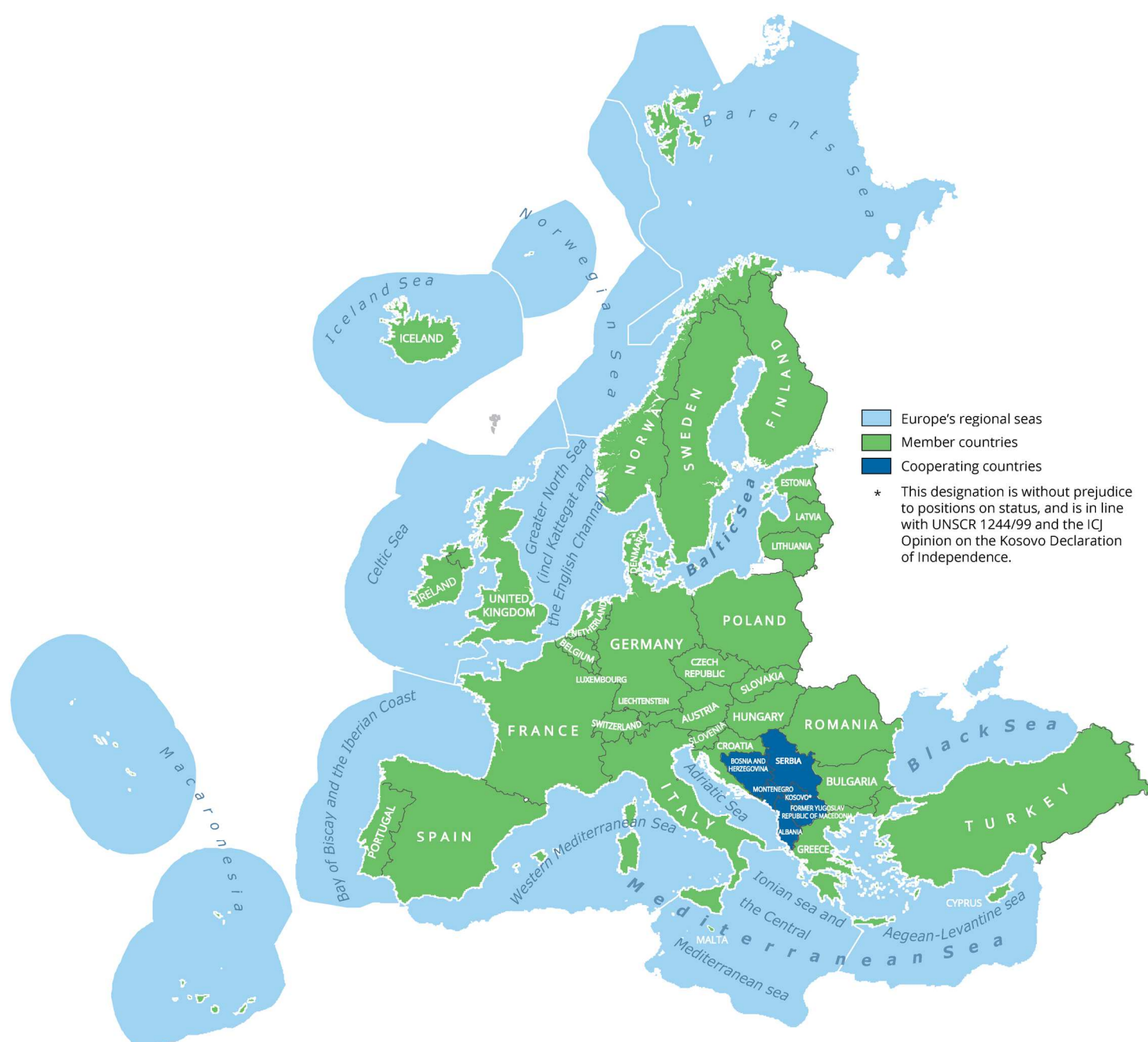


Figure 2: Marine regions as identified by the European Marine Strategy Framework Directive
source: <http://www.eea.europa.eu/about-us/countries-and-eionet/marine-regions>

Distribution patterns and abundance estimation remain critical for many species, especially rare or cryptic species. Laran et al. (2017) and Pettex et al. (2017) documented seasonal variations in abundance for, respectively, the cetacean and seabird communities in the North-western Mediterranean Sea, notably providing new information for the winter season. Panigada et al. (2017) documented not only seasonal but also yearly variations in abundance for cetacean species in the Pelagos Sanctuary and other regions around Italy. In the Tyrrhenian sea, Lauriano et al. (2017) provided a fishery-independent abundance estimate for a commercially exploited species, the swordfish (*Xiphias gladius*). Habitat modelling and distribution mapping of marine megafauna represent another well-covered topic among contributions to the special issue. Pennino et al. (2017) studied, among other species, fin whales in the Western Mediterranean Sea showing the importance of primary productivity and submarine topography in predicting whale habitat.

Lambert et al. (2017a) investigated the habitats of cetacean, seabird in the Western Mediterranean Sea to highlight important seasonal variability in habitat use. Ortega and İsfendiyaroğlu (2017) showed with a combination of land-based and ship-based surveys how the habitat of the vulnerable Yelkouan shearwaters (*Puffinus yelkouan*) shifted from the cold and shallow coastal waters to the deep pelagic waters of the Black Sea between the breeding and non-



breeding season. Bauer et al. (2017) studied the distribution and behaviour of the Atlantic Bluefin Tuna (*Thunnus thynnus*) in the North-western Mediterranean Sea to identify the importance of productivity and mesoscale activity levels in driving the foraging grounds of this economically lucrative species. This topical issue provides thus new robust data on abundance and distribution of marine megafauna and, consequently, brings insights for creating future relevant MPAs or evaluating the relevance of existing MPA networks. Lambert et al. (2017b) assessed for instance the existing network of MPAs along the French Atlantic and Mediterranean coasts using model-based marine megafauna distribution. In a sensitivity analysis, Delavenne et al. (2017) evaluated the impact of using

different sources of data on the design of offshore Natura 2000 areas. As illustrated by Pérez-Roda et al. (2017) tracking data can likewise inform MPA effectiveness.

After deploying Global Location Sensing loggers on breeding Balearic shearwaters (*Puffinus mauretanicus*), Pérez-Roda et al. (2017) highlighted the relevance of the current design of conservation areas in Spain and Portugal for this highly mobile species. Marine megafauna has been under growing environmental and anthropogenic pressures. Distribution and habitat preferences can inform on actual or future exposure of marine megafauna to these pressures. Cañadas and Vázquez (2017) used a two decades-long dataset on the common dolphin (*Delphinus delphis*) to project its distribution under the effect of sea warming. An increase in sea surface temperature would reduce the suitable habitat for common dolphins in the Alboran Sea. Azzellino et al. (2017) evidenced changes in cetacean distribution over the last 25-years from at-sea surveys and strandings in the Ligurian Sea. These changes correlated with a decrease in ecosystem productivity, and may also be linked to fishery activities and marine traffic. Finally, Darmon et al. (2017) analyzed visual observations of both sea turtles and marine debris from aircrafts to provide a risk assessment for litter ingestion or entanglement. These authors thus identified major risk areas for loggerhead turtles (*Caretta caretta*) in the North-western Mediterranean Sea.

Because ecologically meaningful limits are often labile in the marine environment, because marine megafauna use these habitats at large spatial scales and because past and current pressures combine in multiple yet hardly quantifiable ways, research and management efforts bound to political boundaries seldom can provide an appropriate response to actual knowledge and conservation needs. By illustrating these challenges in multiple ways, the present topical issue is an invitation to further develop active regional co-operation in the understanding of the underlying processes and the design of conservation strategies. Although the scope of this special issue is taxonomically and geographically broader than the scope of ACCOBAMS it is clearly in line with some of the Agreement's major priorities in terms of data and knowledge acquisition to inform conservation strategies. We do hope that readers from all around the ACCOBAMS range will have pleasure and find inspiration in reading works from neighbouring areas and other biological models that share so many conservation challenges. All papers are available from the journal web site at : www.elsevier.com/locate/dsr2.

Acknowledgements

Although not exhaustive, the present topical issue on European Marine Megafauna provide a large selection of biological models, study areas and methodologies, and it is our pleasure to acknowledge the efforts of all authors in this endeavour. The edition of the present special issue was funded by *Agence Française pour la Biodiversité* (AFB). *Observatoire PELAGIS* is mostly supported by the French Ministry in charge of the environment (MEEM) and AFB. We are also grateful to editors-in-chief John D. Milliman and Javier Arístegui, and all reviewers who contributed to make this topical issue possible.

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TELLING DOLPHINS APART BY FACES: A NEW WAY OF IDENTIFYING DOLPHINS

Tilen Genov

Morigenos – Slovenian Marine Mammal Society

In a recent study, researchers from Morigenos – Slovenian Marine Mammal Society, an ACCOBAMS Partner, show that individual dolphins can be identified by their faces, “inventing” a novel method of dolphin identification. They presented their findings in a paper published in *Marine Mammal Science*, the central scientific journal for studies of marine mammals: <http://onlinelibrary.wiley.com/doi/10.1111/mms.12451/full>

Individual identification plays a major role in our understanding of the biology, ecology and behaviour in cetaceans, which has also been instrumental in the ACCOBAMS area in a number of study sites. Being able to tell individuals apart can provide invaluable insight into basic biological and scientific questions, but is also highly relevant to science-based conservation. It has long been known that individual dolphins can be identified by natural markings on dorsal fins. But markings on fins can change, and calves are usually not sufficiently marked to allow identification at all. Therefore, additional means of telling dolphins apart can be very useful. In this study, we present a novel identification method of using facial information, with wild common bottlenose dolphins as a case study.

While studying common bottlenose dolphins (*Tursiops truncatus*) off the coast of Slovenia and in the Gulf of Trieste (northern Adriatic Sea) during the past 15 years, we discovered that different individuals had different facial features. Initially we did not make much of it, but then we decided to investigate this in a bit more detail. We first searched our digital photographic database for all photographs of dolphin faces, and made sure we could link them to known individuals via dorsal fins. We then designed a study in which participants both experienced and inexperienced in dolphin (fin) photo-identification were asked to match photographs of dolphin faces. Results showed that both groups of participants could tell individual dolphins apart based on their faces significantly above chance, even when comparing the left side of the face to the right one. The study showed that facial features in bottlenose dolphins are stable over the long-term and consistent across the left and right sides.

While this is interesting on its own, it opens up a possibility that dolphins themselves may use visual (in addition to acoustic) cues to identify each other at close quarters. But more importantly, this new method also has implications for the study of these animals. Of course, it cannot replace the identification based on dorsal fins, but it can complement it, by helping document mark changes over time and reduce false negative or positive errors. Unlike dorsal fins, faces are not subject to the same level of change due to external influences, and may therefore be more reliable over long periods. This new method may also enable calves (which tend to have unmarked fins) to be re-identified after they leave their mothers, and can therefore help increase cross-generational knowledge. It may be particularly suited to species that do not carry many markings on dorsal fins, or those that lack dorsal fins altogether.

This study also shows that current cetacean identification methods can still be improved. With increasing prevalence of digital photography and computer-aided matching, it may become more viable to use ‘unconventional’ means of identification.

The paper can be obtained at <http://onlinelibrary.wiley.com/doi/10.1111/mms.12451/full> or from the lead author.



Fig. 1: Left and right side face photographs of 16 bottlenose dolphins showing individually distinct facial features that are consistent on both sides of the face.

IDENTIFICATION AND INITIAL ASSESSMENT OF CETACEAN GROUPINGS IN COASTAL WATERS OF THE NORTH-WESTERN BLACK SEA, UKRAINIAN SECTOR

Pavel Gol'din, Elena Gladilina, Oksana Savenko, Karina Vishnyakova and Oleksandr Neprokin

The project “**Identification and initial assessment of cetacean groupings in coastal waters of the north-western Black Sea, Ukrainian sector**” was conducted by the Ukrainian Scientific Center of Ecology of the Sea (UkrSCES) in Odessa, Ukraine, with the expert support of Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (Gol'din et al. 2017).

The project aimed to increase knowledge about population structure and local distribution of the Black Sea cetaceans, among which there are endangered Black Sea bottlenose dolphins and harbour porpoises. This study was focused on two coastal areas: the shallowest waters near the Dzharylgach Island, and waters near the Danube delta. In addition, the third area important for cetaceans is covered by the study, the Hrigoryevsky Bay, where a major port of Ukraine is situated. Project activities included photo identification boat cruises, linear transect surveys, observations at sea from the platforms of opportunity, observations from coastal platforms and monitoring of strandings. Linear transect surveys of density and abundance were conducted in the Dzharylgach Gulf and the northern Karkinit Gulf, total area up to 259 km² (Fig. 1).

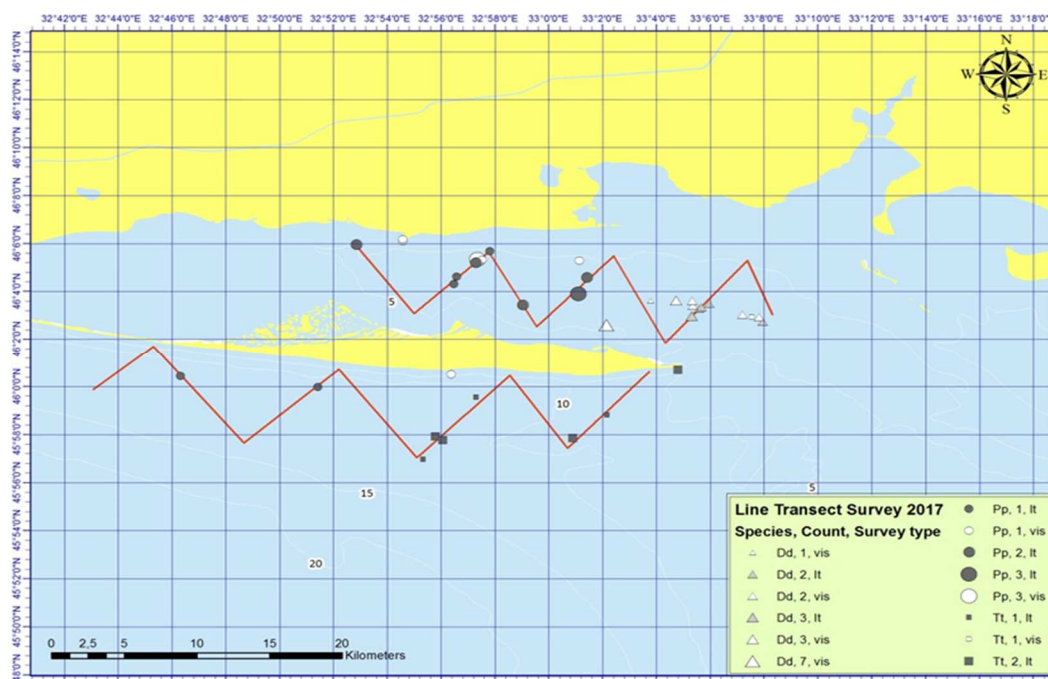


Fig. 1. Line transect survey in the Dzharylgach Area in 2017.

All three cetacean species of the Black Sea, the harbor porpoise (*Phocoena phocoena*), the common dolphin (*Delphinus delphis*) and the bottlenose dolphin (*Tursiops truncatus*) were recorded near the Dzharylgach Island. The **harbour porpoise** was the most abundant species with the abundance estimated as 175 individuals in the Dzharylgach Gulf, the recorded density (1.5 specimens per km²) among the highest in the whole Black Sea (Gladilina et al. 2017). Porpoises were observed both within and outside of the bay, and they tended to sea floor slopes at depths near 5 m. A partially white porpoise with unusually distinct patchy coloration was recorded within the Dzharylgach Gulf.

Common dolphins with the estimated abundance between 59 (linear transect survey) and 158 (photo id effort) occurred in groups up to 12 individuals. There were juveniles and calves in 30% of groups, and courtship behavior was observed. The dolphins were noticeable for their distinctively marked dorsal fins, and 65 dolphins were photo identified, some of them with severe scarring.

Bottlenose dolphins (estimated number between 31 and 44) were recorded in groups up to six individuals. There were juveniles in 27% of sightings, and there was a mother-juvenile aggregation among them. 25 dolphins were photo identified; a few of them were re-sighted during two summer seasons at the same locality, near the tip of the island. They showed distinct hunting and game behavior, with beaching and playing with jellyfish (Fig. 2), and mating behavior. Therefore, at least some of the dolphins were summer residents. Common and bottlenose dolphins showed the clearest patterns of habitat preferences, being restricted respectively to the Dzharylgach and the northern Karkinit Gulf. The common dolphin was the predominating species also in Hrygorivsky Bay, with a few individually distinct animals and frequently occurring mother-calf pairs. Also, harbour porpoises were observed in this port area during the season of migrations.



Fig. 2. A bottlenose dolphin playing with a jellyfish near the Dzharylgach Island.

An unusual trait is the preference of the shallowest habitat by common dolphins in both localities (Savenko et al. 2016). Also, all three cetacean species were recorded both around the Zmiinij Island and in the coastal mainland waters, and 18 bottlenose dolphins were photo identified from the Danube delta region. All the identified bottlenose dolphins were recorded only in a single sea area, either Dzharylgach or Danube delta.

Thus, at least, two areas within the studied region are particularly important cetacean summer habitats:

- (a) waters around Dzharylgach Island, including the Dzharylgach Bay and waters south to the island, 0-14 m deep; and
- (b) waters around Zmiinij Island and west to it.

The summer habitats are particularly important for cetaceans because summer is the calving season, and mother-calf groups, as well as mating pairs, are recorded in the studied areas. In particular, bottlenose dolphins show site fidelity for the tip of the Dzharylgach Island in summer, and they are also distinct in specific forms of behavior.

During 2017 the Ukrainian waters was affected with mass mortality of cetaceans, at least 86 cases reported from the north-western Black Sea coast by August, including live strandings.

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FINS is published twice a year by the ACCOBAMS Permanent Secretariat.

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