REVIEW OF AVAILABLE DATA ON CETACEAN BYCATCH IN STRANDING DATABASES FROM THE ACCOBAMS AREA

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STRANDING DATABASES FROM THE ACCOBAMS AREA**

Presented by Joan Gonzalvo, Task Manager on Interactions with fisheries, and Souad Lamouti, Vice Task Manager on Interactions with fisheries

Issue: reviewing available data on cetacean bycatch in stranding databases

1. Action requested:

The Scientific Committee is invited to:

    a. **note** the Review of available data on cetacean bycatch in stranding databases from the ACCOBAMS Area;
    b. **advise** on recommendations and future actions to be undertaken.

2. Background

Bycatch, or incidental catch in fishing gears, is one of the main threats affecting cetaceans in the ACCOBAMS Area, leading to the mortality of bycaught animals.

In case of stranding, significant valuable information is collected on the carcasses, including evidence that could be used as reliable indicators of bycatch such as net marks, amputations, or nets found in the stomach.

However, no evaluation of the data collected through stranding networks has yet been made in the ACCOBAMS area in order to assess bycatch levels.

In this context, the 2020-2022 ACCOBAMS Program of Work foresees an activity aimed at "assessing/updating the extent of interactions with fisheries/aquaculture (…) including through the use of stranding data" (activity CA2a).

Such activity is implemented through a review of available data on cetacean bycatches in national stranding databases and MEDACES.

The outcome of such review is presented in this document.

Review of Available Data on Cetacean Bycatch in National Stranding Databases

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1. BACKGROUND

This review was produced in response to the 2020-2022 ACCOBAMS Program of Work including an activity aimed at "assessing/updating the extent of interactions with fisheries/aquaculture (...) including through the use of stranding data" (activity CA2a).
In order to implement this activity, the present a review of available data on cetacean bycatch in national stranding databases was produced with the following objectives:

- o collate information on strandings whose causes of death have been related to interactions with fishing gear
- o review the examinations usually performed and what evidences are considered to determine if the causes of death are being due to bycatch (postmortem examination, external evidences...)
- o identify the gaps to be covered in order to improve the data collection for bycatch-related strandings.

A questionnaire (see Annex 1) was prepared for developing this review, which was shared with the experts dealing with cetacean strandings in the ACCOBAMS area for their respective countries. The identification of the recipients of the questionnaire was done by a combination of both professional contacts of the consultants responsible for this review (i.e., Gonzalvo and Lamouti) and through advice provided by ACCOBAMS National Focal Points. The latter were informed by the ACCOBAMS Secretariat of this initiative, who asked them to propose most adequate experts to fill the questionnaire.

2. DEFINITIONS relevant to the questionnaire, which were shared with the respondents to facilitate the compilation of the questionnaire

-HUMAN INDUCED-MORTALITY. Cetacean deaths correlated to human activities (i.e. ship strikes, fishery activities, marine litter or peculiar acoustic sources).

-FISHERY INTERACTION. Any behaviour which drives a marine animal to have a contact with a fishing gear or operation. It can lead to bycatch or intentional injuries (see below), but not necessarily.

-BYCATCH. The entanglement due to direct interaction of cetaceans with operating fishing gears.

-INTENTIONAL INJURY. The situation where a fisherman intentionally hurts the cetacean (i.e., shoot, amputate fin when animals are still alive).

Tier One – External examination and stranding data collection (by a wide range of personnel who have basic training). Tier 1 examiner can report the following fishery interaction: entanglement (active/passive fishing gear).

Tier Two – Post mortem investigations and tissue sampling (by trained responders with expertise in animal dissections and awareness of potential hazards e.g., zoonotic infections). Tier 2 examiner can report the following fishery interaction: entanglement (active/passive fishing gear) and ingestion.

Tier Three – Post mortem examination with diagnostic aims (by experienced professionals, for example veterinary pathologists and/or biologists able to synergize diagnostic results from multiple sources to

provide an overall assessment of health and a cause, mechanism and manner of death). Tier 3 can allow to determine the role of the fishery interaction in the death of the animal, assessing mechanism and manner of death and then the cause.

3. RESULTS

3.1. Participation

The questionnaire was distributed among 24 countries and, at least, a compiled questionnaire was received from most. A separate excel document is attached to this document with the raw data yielded from compiled questionnaires. Countries with more than one Cetacean Stranding Network (hereafter referred as CSN), or with more than one data supplier, provided more than one questionnaire.

Country	Response	# Questionnaires
Albania	No response	-
Algeria	Yes	2
Bulgaria	Yes	1
Croatia	Yes	1
Cyprus	Yes	1
Egypt	No response	-
France	Yes	1
Georgia	Yes	1
Greece	Yes	2
Italy	Yes	1
Liban	No response	-
Lybia	Yes	1
Malta	No response	-
Monaco	No response	-
Montenegro	No response	-
Morocco	Yes	1
Portugal	Yes	1
Romania	Yes	1
Slovenia	Yes	1
Spain	Not for all territories	3
Syria	Yes	1
Tunisia	Yes	1
Turkey	Yes	1
Ukraine	Yes	1

Table 1. List of countries invited to participate in this review. A total of 22 questionnaires were produced.

3.2. CSNs operative in each country

From the 18 countries participating in the study, only Cyprus, Syria and Georgia declared not to have an operative CSN. However, the Ilia State University (Georgia) reported a database with 147 cetacean stranding records. It is likely that also in Cyprus and Syria, although they have not been able to provide info on any cetacean stranding, there are some research institutes or independent scientist with some valuable data. For instance, the *Action Plan for the Conservation of Cetaceans in Syria*[1] produced in 2008, provides detail on 11 cetacean strandings recorded along the Syrian coast between 1991-2008 by the High Institute of Marine Research, Tishreen University, Lattakia.

All the remaining 15 countries have reportedly a CSN. Greece, Algeria, Portugal and Spain reported to have more than one. While in Greece all three of them declare to cover all the national territory, in Algeria, Portugal and Spain the various CSNs deal with different regions/territories. The majority of CSN have been formally recognized by their respective national authorities.

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[1] Gonzalvo J., Bearzi G. 2008. Action Plan for the conservation of cetaceans in Syria. Regional Activity Centre for Specially Protected Areas. Contract 39/2007_RAC/SPA. 45 pp.

COUNTRY	# CSN	Formally recognized
ALGERIA	3	YES
BULGARIA	1	NO
CROATIA	1	YES
FRANCE	1	YES
GREECE	3	YES
ITALY	1	YES
LIBYA	1	Unknown
MOROCCO	1	YES (?)
PORTUGAL	4	YES
ROMANIA	1	NO
SLOVENIA	1	YES
SPAIN	8	YES
TUNISIA	1	YES
TURKEY	1	NO
UKRAINE	1	YES

Table 2. Number of CSN present in each country.
Those in Bulgaria, Romania and Turkey not formally recognized

In Greece the Pelagos Cetacean Research Institute, the Hellenic Centre for Marine Research and ARIONS maintain their own databases and currently there is no coordination, except occasionally in some mass stranding or specially challenging event (e.g., large whale).

The first CSN in Algeria was established by the University of Oran and it is working in the western part of the country. In addition, Algeria counts with the CSN of CNRDPA covering all the coast (the *Comissariat National du Littoral* also collects data, which is sent to the CNRDPA) and the University of Souq Harass dealing with the Estern part. With support from ACCOBAMS Algeria is re-organizing a better coordinated unique CSN, which is supposed to be led by the CNRDPA.

In Portugal all four regional CSNs operate independently from each other but under the supervision and coordination of the National Stranding Network. Biologists and veterinarians of the regional CSN are on call 24h/24h and a close cooperation with local authorities has been established.

In Spain, the coordination between the 8 CSNs is done through the Spanish Ministry of Environment.

3.3. CSNs organization and personnel

Most CSNs count with biologist and veterinarians among their staff. However, Bulgaria, Georgia, Libya, Morocco, Portugal and Romania do not list any veterinarian among their personnel. Research institutes, universities and governmental organizations play a major role in most CSNs but many of them count also with the participation (in some case playing major roles like direction/coordination) of NGOs.

	PROFESSION			AFFILIATION			
	Biologist	Veterinarian	Other	Government	Research Institute / University	NGO	Other
ALGERIA	●	●	●	●		●	●
BULGARIA	●		●	●		●	●
CROATIA	●	●	●	●	●	●	●
FRANCE	●	●	●	●	●	●	●
GEORGIA	●	●	●	●	●		
GREECE	●	●	●	●	●		●
ITALY	●	●	●	●	●		
LIBYA	●		●	●	●	●	
MOROCCO	●		●	●	●	●	
PORTUGAL	●		●		●	●	●
ROMANIA	●		●	●	●	●	●
SLOVENIA	●		●	●	●	●	●
SPAIN	●	●	●	●	●	●	●
TUNISIA	●	●	●	●	●	●	●
TURKEY	●	●	●	●	●	●	●
UKRAINE	●	●		●	●		●

Table 3. Profile of the staff involved in the CSNs reported in this review (Georgia reportedly has no CSN but some data on cetacean strandings is collected by researchers affiliated with Ilia State University).

3.4. CSNs longevity, data registered and MEDACES

The first established CSN was the French one created in 1972, followed by the one covering the western coast of Algeria since 1976. The large majority of CSNs were established during the two decades between1990-2010. Those established in Ukraine and Libya are the newest ones, being operative since 2017 and 2019, respectively.

Cetacean Stranding Networks	# Strandings	Year Established
ITALY Re.Na.S.Mm	5920	1986; 2015 (officially)
GREECE National Stranding Network	3015	1993
FRANCE RNE	2964	1972
GREECE ARION CSN	2500	1994
TURKEY TUDAV CSN	2000	1998
SPAIN RVCV - Valencia	1500	1990
BULGARIA	1289	2009
MOROCCO INRH	1000	1996-2015
ROMANIA (Mare Nostrum)	979	1998
PORTUGAL ARSN	571	2010
UKRAINE (Schmalhausen Ins. Zoo.)	492	2017
CROATIA	492	2010
SPAIN RVCTRM-Murcia	309	2003
TUNISIA RNE	304	2004
ALGERIA University of Oran	300	1976
SPAIN - Palma Aquarium	198	2014
GEORGIA	147	2012
ALGERIA University of Souk Ahras	100	2006
SLOVENIA (Morigenos)	25	2002
LIBYA LCW	Unknown	2019
Total	**24105**	

Table 4. Number of cetacean stranding records reported by the CSNs participating in this review, together with the year they were establishment

The Mediterranean Database of Cetacean Strandings (MEDACES) was set-up, under the Barcelona Convention extended to the ACCOBAMS area, to co-ordinate all national and regional efforts for riparian

countries. Colleagues from Bulgaria, Croatia, Romania and Spain reportedly share yearly their data with MEDACES. Some others, namely Algeria, Greece, Morocco, Slovenia, Tunisia and Ukraine, do it whenever possible, while the rest CSNs did not respond to this question about data sharing with MEDACES.

3.5. Implementation of the *TIERED APPROACH*

All CSNs participating in this review reported to follow a Tiered Approach (see definitions in page 2). Currently, 11 CSN are capable of perform the examination of the strandings they are dealing with to Tier 3 level, 5 CSN operate at Tier 2 level and three of them are currently able to perform only an external examination and basic stranding data collection (Tier 1).

CSN	TIERED APPROACH	YEAR OF IMPLEMENTATION			# Strandings		
		TIER 1	TIER 2	TIER 3	TIER 1	TIER 2	TIER 3
Laboratory of environmental monitoring network (Algeria)	YES		2010			50	
University of Souk Ahras (Algeria)	YES	2006					
Bulgaria	YES	2010			60%		
Croatian National Stranding Network	YES			1990	188	304	
French National Stranding Network (RNE)	YES	1972	1999	2009	2971	190	60
Georgia	YES	2012	2017				
Greek National Stranding Network	YES	1993	1993				
ARION Cetacean Stranding Network	YES	1994	1996	1996	425	45	70
(Re.Na.S.Mm) - Italy	YES			2002	30%	20%	50%
Libyan Cetaceans Watch (LCW)	YES	2019					
INRH Stranding Monitoring Network - Morocco	YES						
Algarve Regional Stranding Network (ARSN)	YES	1978	2010	2010	955	475	475
Romania (Mare Nostrum)	YES	1998	2012	2015	660	91	35
Slovenia (Morigenos)	YES			2002		1	24
Valencia Strandings Network - Spain	YES	1988	1990	2006		710	797
RVCTRM - Spain (Murcia)	YES	2003	2003	2003		120	181
Palma Aquarium Foundation - Spain (Mallorca)	YES	2014	2014	2015	164	24	10
Tunisia-National Stranding Network	YES	2004	2004			90%	70(20%) *
TUDAV Cetacean Stranding Network - Turkey	YES		1993	2008		600	50
Ukraine (Schmalhausen Institute of Zoology)	YES	2017	2019				

*Data as provided. They have been contacted for clarification (pending)

Table 5. Tiers covered by each CSN (since when) and number of cetacean strandings that went through each Tier

CSN	# records	fisheries related interaction	Interaction with fisheries	Cause of death		
				Entanglement in fishing gear	Intentional injuries	Othrer diseases pathologies
Algeria - University of Oran LRSE	300	30	15	7	8	2
Algeria- University of Souq Ahras	100+	15				
Bulgaria	1289	88		88		
Croatia	492	96	96	66	11	85
France-Réseau National Echouage (RNE)	2964	49	49	29	0	29
Georgia	147	11		7	4	4
Greece- National CSN	3015	104				
Greece-ARION CSN	2500	281	70	6	79	81
Italy- Re.Na.S.Mm	5920	38	38	17	0	0
Morocco-Réseau de Suivi des Echouages de l'INRH (RSE)	1000		100	20	210	
Portugal- Algarve Regional Stranding Network (ARSN)	571	181	181	181	14	18
Romania-Mare Nostrum NGO CSN	979	210	140	70		31
Slovenia-Morigenos CSN	25	9	9	5	0	14
Spain-Valencia Stranding Network	1500	38				
Spain-Murcia-RVCTRM	309	21	17	3	1	33
Spain-Palma-Aquarium Foundation	198	20	7	13		4
Tunisia-National Stranding Network	304	5	45		30	5
Turkey-TUDAV CSN	2000	93		93		
Ukraine- Schmalhausen Institute of Zoology	492	30+				4
TOTAL	24105*	1319*	767	605	357	310

*at least

Table 6. Total number of cetacean strandings (records) for each CSN, number of strandings presumably caused by some sort of fishery interaction and causes of death identified after going through the Tiered Approach.

3.6. Data on all cetacean species included in the CSNs withing the last 5 years (since June 2016)

Participants in this review were asked to provide detail on all cetacean strandings they had recorded in their CSNs since June 2016 (5 years before the questionnaire were distributed). The table below shows the number of strandings reported by each one of the 18 CSNs that were able to respond. In total, they reported 4,690 cetacean strandings for 27 different species. Another three generic categories of records were also reported, namely *cetacean*, *Balaenoptera sp* and *Delphinidae*, when species identification had not been possible.

Cetacean Stranding Networks	# Strandings	# Species
ITALY Re.Na.S.Mm	804	3
BULGARIA	621	3
MOROCCO INRH	590	18
FRANCE RNE	495	8
UKRAINE (Schmalhausen Ins. Zoo.)	491	3
ROMANIA (Mare Nostrum)	451	3
GREECE ARION CSN	260	12
SPAIN - Palma Aquarium	198	9
SPAIN RVCV - Valencia	197	2
GEORGIA	107	3
PORTUGAL ARSN	102	12
TUNISIA RNE	93	7
TURKEY TUDAV CSN	92	3
CROATIA	82	4
SPAIN RVCTRM-Murcia	69	6
GREECE National Stranding Network	30	4
LIBYA LCW	5	3
SLOVENIA (Morigenos)	3	1
Total	**4690**	**27**

Table 7. CSNs providing detail on the cetacean strandings recorded since June 2016 and number of species included in their respective data sets

From all those strandings listed in the table 7, respondents were able to provide detail for the following categories (see definitions in page 2) for 2,838 records.

-FISHERY INTERACTION (n=300)

-BYCATCH (n=417)

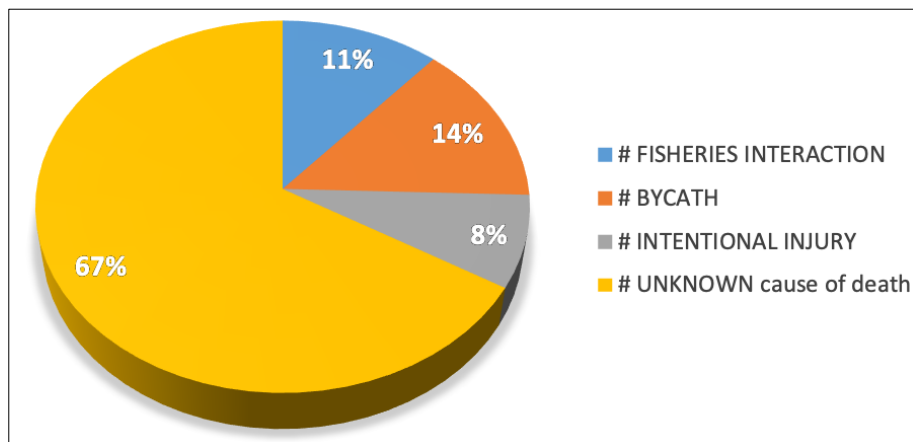-INTENTIONAL INJURY (n=207)

-UNKNOW cause of death (n=1914)

Figure 1. Causes of death (somehow related to fisheries) reported for the strandings recorded in the CSNs during the last five years.

Species	#CSN	# FISHERIES INTERACTION	# BYCATH	INTENTIONAL INJURIES	UNKNOWN cause of death	TOTAL
Stenella coeruleoalba	12	44	52	58	654	808
Tursiops truncatus	17	141	90	52	314	597
Delphinus delphis	12	45	43	50	238	376
Phocoena phocoena relicta	2	31	152	0	221	344*
Phocoena phocoena	6	4	44	8	99	155
Delphinidae	4	12	0	12	65	89
Tursiops truncatus ponticus	2	3	22	0	64	89
Balaenoptera acutorostrata	4	1	2	9	34	46
Ziphius cavirostris	9	1	0	3	38	42
Physeter macrocephalus	7	2	7	0	28	37
Grampus griseus	7	4	0	3	27	34
Balaenoptera physalus	8	0	0	3	28	31
Cetacean	2	0	0	0	26	26
Balaenoptera sp	1	0	0	1	23	24
Globicephala melas	5	5	0	1	18	24
Delphinus delphis ponticus	2	5	4	1	12	22
Globicephala macrorhynchus	2	0	0	4	3	7
Kogia breviceps	2	0	0	0	6	6
Megaptera novaeangliae	3	0	0	0	5	5
Balaenoptera borealis	1	1	1	0	1	3
Balaenoptera edeni	1	0	0	1	2	3
Pseudorca crassidens	1	1	0	0	2	3
Balaenoptera borealis	1	0	0	1	1	2
Kogia simus	1	0	0	0	2	2
Mesoplodon bidens	1	0	0	0	1	1
Orcinus orca	1	0	0	0	1	1
Steno bredanensis	1	0	0	0	1	1
Balenoptera acutorostrata	1	0	0	0	0	0
Mesoplodon bidens	1	0	0	0	0	0
Physeter catodon	1	0	0	0	0	0
TOTAL	118	300	417	207	1914	2838

*Likely underestimated since Ukraine reported ">30" cases for both *fisheries interaction* and *bycatch* but the values entered for this calculations were 30 for each category, respectively.

Table 8. Total numbers for all cetacean species reported by the 18 CSNs, with detail on the most likely fisheries-related cause of death, from the last five years (since June 2016).

Out of 27 species reported, those with 100+ records each were the striped dolphin, followed by the bottlenose dolphin, common dolphin and the Harbour Porpoise. The bottlenose dolphin, probably as a consequence of its opportunistic behaviour and predominantly coastal occurrence, is the species most frequently recorded interacting with fisheries and with a higher risk of bycatch. The bottlenose dolphin (either *T. truncatus* or *T. truncatus ponticus*) was also the only species present in all 18 CSNs. The other two most frequent species were the common dolphin (including both *D. delphis* and *D. delphis ponticus*) and the striped dolphin, both present in 14 and 12 CSNs, respectively.

3.7. Evidences of fishery interaction observed more frequently during post-mortem examination

The table below shows which one of the following were reportedly more often observed when examining cetacean stranding and trying to establish if there had been any fisheries interaction involved.

- External presence of fishing gears (*fishing gears or part of them still presented on the body or part of it -rostrum/mandible, head, pectoral flippers, dorsal fin, peduncle, fluke, rope around the tail stock that was added to enable removal from a net*)
- Marks/linear signs (*fresh fine or deep skin linear lesions with alteration of skin, colour, furrows and impressions encircling or present at the level of the whole body, rostrum/mandible, head, pectoral flippers, dorsal fin, peduncle, fluke, prescapular; lacerations at the gape of the mouth; linear necrotic and fibrotic lesions*)
- Sharp and penetrating wounds (*amputation of fins, flukes, or tail, penetrating incision into the abdominal cavity*).
- Fractures (*in the mandible or other parts of the cranium, ribs, broken/lost teeth*).
- Presence of fishing gear around larynx
- Presence of fishing gear or fragments in the gastrointestinal tracts
- Presence of recent feeding

(No responses to this question were provided by Cyprus and Syria, which have no operative CSN. Likewise, no responses arrived either from two active CSNs; the Tunisian National Stranding Network and the Eastern Algerian Regional Intervention Network on Marine Mammal Strandings)

CSN	External presence of fishing gears	Marks/linear signs	Sharp and penetrating wounds	Fractures	Fishing gear around larynx	Fishing gear or fragments in the gastrointestinal tracts	Recent feeding
Laboratory of environmental monitoring network (Algeria)	1	2	3	4	5	6	7
Bulgaria	2	3	1	4	5	6	7
Croatian National Stranding Network	5	7	4	6	3	2	1
French National Stranding Network (RNE)	6	2	3	4	7	6	2
Georgia	7	5	5				
Greek National Stranding Network	1	6	2		6		
ARION Cetacean Stranding Network	6	1	2	3	4	5	7
(Re.Na.S.Mm) - Italy	5	5	1	1	7	7	5
Libyan Cetaceans Watch (LCW)	1	4	5	2	6	7	3
INRH Stranding Monitoring Network - Morocco	2	3	1	4	6	7	5
Algarve Regional Stranding Network (ARSN)	3	1	5	7	7	6	1
Romania (Mare Nostrum)	4	1	2	3	5	7	6
Slovenia (Morigenos)	1	7	7	7	2	3	4
Valencia Strandings Network - Spain	3	4		5			1
RVCTRM - Spain (Murcia)	3	2	5	4			1
Palma Aquarium Foundation - Spain (Mallorca)	1	3	2	4	6	7	5
TUDAV Cetacean Stranding Network - Turkey	7	2	1	5	7	7	3
Ukraine (Schmalhausen Institute of Zoology)	1	7	7	1	1	1	1

Table 9. Classification of the evidences of fishery interaction observed more frequently during post-mortem examination, being 1 the most frequent and 7 the rarest.

The most frequently observed evidences of fisheries interaction during post-mortem examination were external presence of fishing gears, sharp and penetrating wounds, presence of recent feeding and marks/linear signs. These were followed to some lesser extend by fractures, fishing gear around larynx and fishing gear or fragments in the gastrointestinal tracts.

3.8. Needs for improving data collection and identification of causes of death

When asked about what would be needed to improve the data collection of their CSNs and their capacity for identifying the causes of death of the cetacean stranding they are dealing with, out of the 22 questionnaires received, the majority of respondents (72%) identified as their most urgent need training, followed in terms of importance by funding. It is worth mentioning that, from those who answered to this question, those dealing with two of the best established CSNs, namely Spain-University of Valencia (coordinator of MEDACES) and the Italian *Rete Nazionale Spiaggiamenti Mammiferi Marini (Re.Na.S.Mm)*, were the only ones responding differently. While the Spanish colleagues from Valencia asked for more uniformity in the criteria to identify cause of death, the Italians had no request at all. Only 21% of the questionnaires were sent with this question answered.
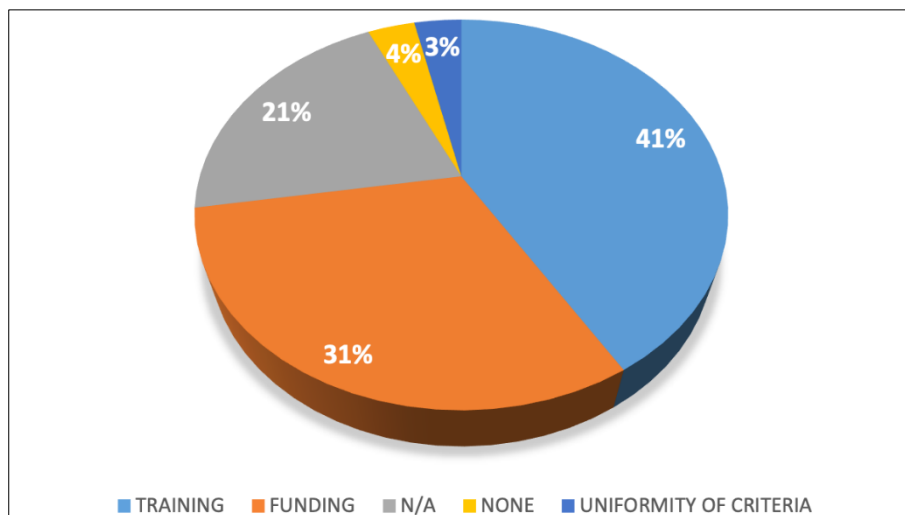
Figure 2. Most urgent need/s for CSNs

3.9. Further considerations (additional comments)

Some respondents provided additional comments at the end of the questionnaire. These were mostly used to state that they had compiled the questionnaire to the best of their knowledge, to mention some of the difficulties they had encountered to respond or, primarily, to provide additional detail on the situation of their CSN, on how it operates, in which direction they would like to move forward on the cetacean strandings-by-catch issue and to thank ACCOBAMS for this initiative. All additional comments provided are literally transcribed in Annex 2 below.

4. CONCLUSIONS

All ACCOBAMS parties (24 countries) were invited to participate in this review. At least one compiled questionnaire was sent by most. From the 18 countries participating in the study, only Cyprus, Syria and Georgia declared not to have an operative CSN. The current situation of cetacean stranding monitoring varies greatly among countries. Some of them have well-established official national CSNs and keep databases encompassing either all or part of their coast, while others are highly depending on the enthusiasm of few individuals working largely independently with quite limited resources.

The Mediterranean Database of Cetacean Strandings (MEDACES) aims at centralising the information of cetacean strandings on the Mediterranean coast. Colleagues from Bulgaria, Croatia, Romania and Spain share yearly their data with MEDACES, while some others do it whenever possible or do not do it at all. This database is currently supported by the Spanish Ministry of the Environment, ACCOBAMS and the UNEP-MAP-SPA/RAC. A possibility to encourage data sharing and coordination may be to make compulsory the contribution to MEDACES by all projects getting support from these organisms.

CSNs vary widely based on the scientific requirements, political drivers, resources, infrastructure and personnel experience. A tiered approach to carcass triage allows investigations to be conducted at a number of levels, depending on the resources, facilities or experience of the stranding network. Whilst an ideal 'gold standard' around a thorough and detailed post-mortem investigation conducted by well-resourced and experienced veterinary pathologists is desirable, it is not often the case. The tiered approach offers a framework for data collection and interpretation appropriate and optimized to the resources available. The responses provided by the participants in this review show that these resources are not always the same for all countries; different degrees of adoption of the tiered approach among countries. 11 CSN have reported to work at Tier 3 level, 5 CSN at Tier 2 level and the other three perform only an external examination and basic stranding data collection (Tier 1). Making sure that all CSNs are able to conduct their examinations up to Tier 3 level should be considered a high priority.

For a large majority (67%) of the close to 3,000 strandings reported in the five years previous to this review, it was not possible to establish precisely the cause of death. The remaining 33% of strandings were somehow related to fisheries, since they were recorded as caused by bycatch, fishery interaction or as result of intentional injuries. That large number of cases in which the cause of death was not identified indicates that there is still, at least in many cases, large room for improvement. Not surprisingly, training and funding are the most frequently reported needs by the respondents to improve data collection and capacity for identifying the causes of death of a stranded cetacean.

- Annex 1 -

QUESTIONNAIRE ON CETACEAN BYCATCH IN STRANDING DATABASES

The 2020-2022 ACCOBAMS Program of Work includes an activity aimed at "assessing/updating the extent of interactions with fisheries/aquaculture (...) including through the use of stranding data" (activity CA2a).

This activity will be implemented through the preparation of a review of available data on cetacean bycatch in national stranding databases and MEDACES. The objectives of this review are to:

- o collate information on strandings whose causes of death have been related to interactions with fishing gear
- o review the examinations usually performed and what evidences are considered to determine if the causes of death are being due to bycatch (postmortem examination, external evidences...)
- o identify the gaps to be covered in order to improve the data collection for bycatch-related strandings.

The questionnaire below has been prepared to support the development of this review.

When answering this questionnaire, keep in mind the following DEFINITIONS

-HUMAN INDUCED-MORTALITY. Cetaceans deaths correlated to human activities (i.e. ship strikes, fishery activities, marine litter or peculiar acoustic sources).

-FISHERY INTERACTION. Any behaviour which drives a marine animal to have a contact with a fishing gear or operation. It can lead to bycatch or intentional injuries (see below), but not necessarily.

-BYCATCH. The entanglement due to direct interaction of cetaceans with operating fishing gears.

-INTENTIONAL INJURY. The situation where a fisherman intentionally hurts the cetacean (i.e., shoot, amputate fin when animals are still alive).

We would greatly appreciate if you could ANSWER AS MANY OF THE FOLLOWING QUESTIONS AS POSSIBLE and to the best of your knowledge.

1. Name:

2. Surname:

3. Country:

4. Affiliation:

5. Is there any **C**etacean **S**tranding **N**etwork (**CSN**) operating in the country?   Yes   No

6. How many?

7. If more than one CSR; how are they organized? Is there any kind of coordination between them?

If your response is *more than one*, please, fill a different questionnaire for each Cetacean Stranding Network you are reporting for.

8. Name of this **C**etacean **S**tranding **N**etwork (if any)

9. Is it formally recognised by the national authorities as a CSN?

   ___YES   ___ NO   ___ I do not know

   10. What is the geographic coverage of this CSN?
   Please, if this CSN does not cover the totality of the national territory, indicate the coordinates of the two points defining the coastline covered. Alternatively, you can also give us the name of the territory, region or cities limiting it.

11. Which organism (e.g., research institute, Ministry, NGO) is responsible of it?

   12. Actors involved in the CSN; professional profile/expertise (Provide numbers for each category, if possible. Otherwise, just mark with an "X")

   ___Biologist

   ___Veterinarian

   ___Other

   13. Actors involved in the CSN; their affiliation (Provide numbers for each category, if possible. Otherwise, just mark with an "X")

   ___Government

   ___Research Institute/University

   ___NGOs

   ___Other

14. When was this CSN first established?

15. In which year was its first ever cetacean stranding recorded?

16. How many cetacean stranding records has this CSN?

17. Are these records reported to and included in the Mediterranean Database of Cetacean Strandings (MEDACES; http://medaces.uv.es)

    ___ YES   ___ NO   ___ I do not know

18. If YES, how often are the cetacean stranding records in this CSN shared with MEDACES?

    ____ Immediately, as they occur   ____ Monthly   ____ Yearly

    ____ When possible   ____ I do not know

Please read the following considerations carefully before continuing with this questionnaire.

*CSNs can vary widely based on the scientific requirements, political drivers, resources, infrastructure and personnel experience. A **tiered approach** to carcass triage allows investigations to be conducted at a number of levels, depending on the resources, facilities or experience of the stranding network[2]. Whilst an ideal 'gold standard' around a thorough and detailed post-mortem investigation conducted by well-resourced and experienced veterinary pathologists is desirable, this capacity is not often the case. The following tiered approach offers a framework for data collection and interpretation appropriate and optimized to the resources available (not always the same in all countries).*

***Tier One – External examination and stranding data collection** (by a wide range of personnel who have basic training). Tier 1 examiner can report the following fishery interaction: **entanglement (active/passive fishing gear)**.*

***Tier Two – Post mortem investigations and tissue sampling** (by trained responders with expertise in animal dissections and awareness of potential hazards e.g. zoonotic infections). Tier 2 examiner can report the following fishery interaction: **entanglement (active/passive fishing gear) and ingestion**.*

***Tier Three – Post mortem examination with diagnostic aims** (by experienced professionals, for example veterinary pathologists and/or biologists able to synergize diagnostic results from multiple sources to provide an overall assessment of health and a cause, mechanism and manner of death). Tier 3 can allow **to determine the role of the fishery interaction in the death of the animal**, assessing mechanism and manner of death and then the cause.*

19. Which of the following Tiers are covered by this CSN and since when?
    ___ Tier One – *External examination and stranding data collection*, since ---------
    ___ Tier Two – *Post mortem investigations and tissue sampling*, since----------
    ___ Tier Three – *Post mortem examination with diagnostic aims, since* -------

20. If your CSN has implemented the above-mentioned **tiered approach**; how many strandings went through each Tier?
    ___ Tier One – *External examination and stranding data collection*
    ___ Tier Two – *Post mortem investigations and tissue sampling*
    ___ Tier Three – *Post mortem examination with diagnostic aims*
    ___ Tiered approach NOT implemented

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[2] ACCOBAMS-MOP7/2019/Doc 33. *Best Practice on Cetacean Post-Mortem Investigation and Tissue Sampling.*

21. How many of the strandings resulted to be related to fishery interaction? _____

    (IF POSSIBLE provide numbers for each one of the three categories below. If needed, read again the definitions included at the beginning of this questionnaire)

    ____ **Interaction with fisheries** has been identified as the most likely cause of death

    ___Death related to **entanglement in fishing gear** (i.e., **bycatch**)

    ___Cause of death has been established as **intentional injuries**

22. How many animals showed also other diseases/pathologies?

23. Please, facilitate the following information for all species included in the CSN <u>within the last 5 years</u> (since June 2016).

(Please, use as many lines as species you have to report; add lines if needed. Keep in mind the definitions included at the beginning of this questionnaire)

Species	# Strandings	# FISHERIES INTERACTION strandings	# BYCATH strandings	# INTENTIONAL INJURIES strandings	# Unknown cause of death

24. During post-mortem examination; which of the following evidences of fishery interaction were observed more frequently? (Please, add numbers besides each one of the options, being 1 the most frequent and 7 the rarest)
____ External presence of fishing gears (*fishing gears or part of them still presented on the body or part of it -rostrum/mandible, head, pectoral flippers, dorsal fin, peduncle, fluke-, rope around the tail stock that was added to enable removal from a net*)

____ Marks/linear signs (*fresh fine or deep skin linear lesions with alteration of skin, colour, furrows and impressions encircling or present at the level of the whole body, rostrum/mandible, head, pectoral flippers, dorsal fin, peduncle, fluke, prescapular; lacerations at the gape of the mouth; linear necrotic and fibrotic lesions*)

____ Sharp and penetrating wounds (*amputation of fins, flukes, or tail, penetrating incision into the abdominal cavity*).

____ Fractures (*in the mandible or other parts of the cranium, ribs, broken/lost teeth*).

____ Presence of fishing gear around larynx

____ Presence of fishing gear or fragments in the gastrointestinal tracts

____ Presence of recent feeding

25. What would be needed to improve your data collection and your capacity for identifying the causes of death?

26. Any further comments/info you would like to share with us? (use space below)

THANKS A LOT FOR YOU COLLABORATION

- Annex 2 -

Additional comments shared by respondents at the end of the questionnaire

CYPRUS

There is no CSN operating in Cyprus. Enalia Physis Environmental Research Centre has been collecting information on the bycatch of vulnerable species, including cetaceans, over past four years (2018 – to date) through the Cyprus Bycatch Project Phase I and Phase II. Through the onboard observation programme, we have recorded the bycatch of an individual common bottlenose dolphin on pelagic longlines targeting albacore tuna, however no cetacean standings have been recorded. The results of the data collection programme of the Cyprus Bycatch Project are available in the final technical report here. Cetacean-fisheries interactions have been unofficially reported from pelagic longline and small-scale fishers over the years in Cyprus. These interactions often result in significant damage to the fishing gear, catch and bait, and to the bycatch of dolphins with consequences which may lead to dolphins' injury, death from drowning, and sometimes to the direct killing by angry fishers as retaliatory measure. However, to the best of our knowledge, there are no records cetacean strandings with death relating to fisheries interactions.

BULGARIA

I have been trying to collect and check data for cetacean strandings regularly until 2019. Sources included data from Facebook, personal findings, records of RIOEW-Burgas (covering Southern coast). That data I have submitted to MEDACES. From different sources – PhD thesis of Z. Zaharieva, 2020; National Action Plan for Cetaceans (currently under development) I got data for higher number of cases for that period. In the provided numbers in the table 23, I collated that data. Though I found out that even when higher number of strandings are recorded in those studies they show lower number of interactions with fisheries (bycatch in our case). Here are examples (in brackets are numbers from my database) submitted to MEDACES: 2012 – 4 (13); 2016 – 6 (9); 2017 – 6 (13); 2018 – 4 (7); 2019 – 0 (8) and 2020 – 0 (9). After 2019 I have not been collecting stranding cases so regularly mainly due to other activities incl. bycatch monitoring. Bycatch numbers in 2019 from 4 vessels were higher than total number of stranded cetaceans, thus underlining necessity of onboard bycatch monitoring rather than strandings.

CROATIA

Additionally, in the last 5 years The Blue World Institute reported their observations as: Tier One – 12 cases and Tier Two - 48 cases; 7 interaction with fisheries, 6 death related to entanglement in fishing gear ,1 cause established as intentional injuries, and 3 animals showing also other diseases/pathologies.

LIBYA

I answered within the limits of the information that I am aware of. There are some information that I do not have any knowledge of, such as the number and specializations of some network participants, as well as some stranded cases where I answered the cases I made within the network and I have no knowledge of other cases."

ROMANIA

Thank you for addressing these questions of which answers I hope will lead to a ACCOBAMS strategy/resolution with more coherence and involvement from the Parties to develop, implement and support such CSMN at national level. The answers are based on the Mare Nostrum NGO CSM network results working under the Monitoring and Conservation of Black Sea Cetaceans program. Beside MEDACES, the data are uploaded, also on yearly basis, on the OBIS Seamap platform and soon on the EMODNET Biology.

SPAIN (VALENCIA)

I have some difficulties in answering some of the questions, as to me, it's not very clear the difference between -HUMAN INDUCED-MORTALITY, FISHERY INTERACTION or BYCATCH in stranded animals. Thank you to you! (Clarification was provided about these concepts on the phone)

UKRAINE

Here we provide data covering our ongoing activities. Also, there are historical data covering the period before 2014 which require additional analysis. Also, we are running ongoing bycatch study for which we will be able to provide statistics later"

ALGERIA

(Rough translation from French)

For a better management of the cetacean stranding network;

- The role of the veterinarian in this network should be promoted and developed.

- Establish systems for obtaining the necessary permits for epidemiological surveys. Information on the procedures for obtaining these permits should be made available to veterinary doctors involved in the coordination of stranding networks in southern Mediterranean countries.

- Creation and implementation of national veterinary committees for the management of epidemiological surveillance surveys on cetaceans.

- It is necessary to create a specific software for the management of stranding networks to facilitate: the management of epidemio-surveillance surveys on cetaceans, the management of necropsies, sampling and post-mortem diagnosis for an efficient determination of the causes of mortality of stranded cetaceans.

- Participation of Accobams in the redesign of the Algerian national curriculum in veterinary medicine. Proposal to integrate in the training curriculum a module on cetology adapted to the training in zoological medicine, on the one hand for the management of cetacean health (clinical and complementary diagnosis), post-mortem diagnosis of cetaceans and on the other hand for the epidemio-surveillance of zoonotic diseases transmissible from cetaceans.