

Black Sea Survey for Basin-wide Assessment of Cetacean Abundance, Distribution and Human-made Threats (BLASSCET project)

Version 2, improved and updated



Photograph by Anna Kryukova

**A proposal prepared for the
Commission on the Protection of the Black Sea Against Pollution
(the Black Sea Commission)**

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Introduction

The Black Sea's marine mammal fauna is very limited, owing to the high degree of geographical isolation of this basin. Only three species (known as Black Sea subspecies) of cetaceans – the harbour porpoise (*Phocoena phocoena relicta*), the short-beaked common dolphin (*Delphinus delphis ponticus*) and the common bottlenose dolphin (*Tursiops truncatus ponticus*) – crown the trophic pyramid of the Black Sea as top predators. All three species, drastically affected by commercial killing in the 20th century, are exposed to ongoing anthropogenic threats which may cause the increased mortality and morbidity, disturbance, habitat deterioration and depletion of food resources.

The future of Black Sea cetacean populations is of national, regional, European and global concern. These species/populations are protected by a long list of legislative and administrative instruments (including CBD, CMS, IWC, Berne Convention, CITES, EC Directive No.92/43/EEC) and, first of all, by the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), and by the Convention on the Protection of the Black Sea Against Pollution (the Bucharest Convention) along with its Biodiversity and Landscape Conservation Protocol.

The IUCN/ACCOBAMS Workshop on the Red List Assessment of Cetaceans in the ACCOBAMS Area (Monaco, March 2006) assessed the conservation status of Black Sea subspecies/populations of the harbour porpoise, common dolphin and bottlenose dolphin as Endangered (EN), however, the scarcity of reliable scientific data did not allow to provide credible population estimates. Basin-wide sighting survey covering the entire Black Sea proper and its greatest gulf, the Sea of Azov, is eligible approach that could be employed to address the current lack of basic information on cetaceans abundance, distribution and evident anthropogenic threats.

Rationale / Background

No credible information exists on the abundance of cetaceans in the Black Sea in whole, but massive directed killing, which continued to the early 1980s, is believed to have considerably reduced the populations sizes (*e.g.*, Reeves *et al.*, 2003). There have been few relatively recent line transect surveys to study distribution and estimate absolute abundance of cetaceans in some areas of the Black Sea and contiguous water bodies. In particular, boat surveys have been performed by Turkish researchers in the Turkish Straits System in October 1997 and August 1998 (Dede, 1999; cited after: IWC, 2004). Aerial surveys in the Azov Sea, Kerch Strait and northeastern shelf area of the Black Sea have been conducted by a joint Ukrainian-Russian team in July 2001 and August 2002 (Birkun *et al.*, 2003). In August–October 2003 the same research team carried out vessel surveys in the entire 12-miles-wide zone of the Ukrainian and Russian territorial waters in the Black Sea and in the Kerch Strait (Birkun *et al.*, 2004). Similar boat surveys were conducted in September 2004 in offshore waters of the northwestern shelf area, in January 2005 in Georgian territorial waters (Birkun *et al.*, 2006), and in September–October 2005 in the central Black Sea, between the Crimea peninsula, Ukraine, and Sinop province of Turkey (Krivokhizhin *et al.*, 2006).

Thus, at present density and abundance estimates (see Annex 1 for details) as well as distribution maps of Black Sea harbour porpoises, bottlenose dolphins and common dolphins are available for relatively small portions of the sea within concise periods from mid summer to mid autumn (the northern and central Black Sea) and in mid winter (the southeastern Black Sea). In respect of this project proposal, focused on region-wide assessment, the preceding research efforts perform a role of pilot initiatives provided essential (but preliminary and incomplete) knowledge and practical skills for potential BLASSCET actors.

Goal of the project

The proposed BLASSCET project is aimed to obtain reliable basic information on cetaceans abundance and distribution in the Black Sea in whole as well as on potential anthropogenic threats to cetaceans on the regional scale, with particular emphasis on the oil spills and floating litter.

This goal was enunciated clearly in the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (1996) and then it was reiterated repeatedly in subsequent documents produced by the Black Sea Commission (BSC) and adopted by the Black Sea states (*e.g.*, Report of the Commission..., 2002). It fully conforms to Resolution 2.19 "Abundance and distribution of cetaceans within the ACCOBAMS area" adopted by the 2nd Meeting of the Parties to ACCOBAMS (Palma de Mallorca, November 2004). The idea of such assessment is supported by the IUCN Conservation Action Plan for the World's Cetaceans (Reeves *et al.*, 2003) and by at least two meetings of the IWC Scientific Committee (Berlin, May-June 2003; St. Kitts, May 2006).

The Black Sea region-wide survey with subsequent synoptic assessment of cetacean abundance and distribution, and identification of potential hot spots is included as an action of primary priority in the Action Plan for Black Sea Cetaceans (Birkun *et al.*, 2006a; see Annex 2, Action 13a) prepared in compliance with the ACCOBAMS International Implementation Priorities for 2002-2006 (Notarbartolo di Sciara, 2002).

Milestones of this proposal preparation and expertise

During the period from September 2004 to October 2005, six scientific meetings, convened with participation of international experts and interested researchers from the Black Sea and Mediterranean Sea countries, considered methodological and logistical aspects of the impending Black Sea basin-wide cetacean survey. These meetings supported by the BSC and ACCOBAMS Secretariats are as follows (noted in chronological order):

- 3rd Joint Meeting of the BSC Advisory Group on Conservation of Biological Diversity and BSC Advisory Group on Environmental Aspects of Management of Fisheries and Other Living Marine Resources (Istanbul, Turkey, 21 September 2004);
- Workshop on obtaining baseline cetacean abundance information for the ACCOBAMS area (Valsain, Spain, 17-19 December 2004);
- 4th Joint Meeting of the BSC Advisory Group on Conservation of Biological Diversity and BSC Advisory Group on Environmental Aspects of Management of Fisheries and Other Living Marine Resources (Istanbul, Turkey, 6 April 2005);
- 3rd Meeting of the Scientific Committee of ACCOBAMS (Cairo, Egypt, 15-17 May 2005);
- Meeting on methodology for surveying the Black Sea (St. Andrews, Scotland, 15-16 September 2005); and
- Workshop on cetaceans surveying in the Black Sea (Istanbul, Turkey, 17-18 October 2005).

The latter two meetings were of crucial importance for this proposal preparation.

St. Andrews meeting was hosted by the Sea Mammal Research Unit (Gatty Marine Laboratory, University of St. Andrews), a world-famed centre of the advanced methodology for cetacean surveying and data analysis. The primary objective of the meeting was to review the proposed methodology for the Black Sea cetacean survey and where necessary suggest modifications to ensure that it reached its own objective of obtaining absolute abundance estimates of the three cetacean species in the Black Sea region and, at the same time, used methods that were compatible with the surveys planned for the entire Mediterranean Sea under the auspices of ACCOBAMS. The discussions of the meeting were about methodological and logistical issues including ship-based and aerial surveys in the context of the Black Sea, suggested research strata, effort to be allocated, and estimated budget for the aerial survey and other essential activities.

Istanbul workshop was hosted by the BSC Secretariat. The main objective of the workshop was to involve Black Sea researchers in the development of ACCOBAMS Survey Initiative, particularly, in its Black Sea component promoted by the BSC Secretariat. Participants supported the idea of basin-wide cetacean survey and outlined steps towards its preparation. Regarding the methodology, it was suggested to combine aerial survey beyond the bounds of territorial waters with a ship-based survey within territorial sea of the Black Sea states. The workshop recommended, as immediate task, to draft the project proposal for its further circulation, approval and submission by the BSC Secretariat to potential donors.

The project proposal (Version 1) was submitted to the BSC Secretariat in November 2005 and distributed among participants of the St. Andrews and Istanbul meetings in December 2005. It was supported by the international and national experts in general and a series of valuable comments was offered regarding the improvement of this document. It was underlined that tight co-operation of Black Sea researchers with St. Andrews colleagues is a crucial provision to put into reality the Black Sea survey initiative. Most essential components of the project (including correct survey design, advanced methodology, training, lending of field equipment, and skilful data analysis) seem to be feasible with kind assistance of St. Andrews specialists from the Sea Mammals Research Unit (SMRU) and Centre for Research into Ecological and Environmental Modelling (CREEM). Organizational and financial details of this co-operation were clarified by e-mail in January–February 2006 and supported by informal meeting of international experts in Monaco on 6 March 2006.

Further developments. The Round table on the Conservation of the Black Sea Cetaceans (Istanbul, May 2006) agreed on the ranking of the proposed basin-wide survey as an action of the highest priority and urgency requiring coordinated effort among nations and full institutional support (i.e., the BSC and ACCOBAMS Secretariats, and the concerned individual Governments). Besides, at the 58th Annual Meeting of the IWC Scientific Committee (St. Kitts, May 2006) the ACCOBAMS Survey Initiative, including its Black Sea component, was endorsed by the Sub-Committee on In-Depth Assessments and the Sub-Committee on Small Cetaceans. The latter sub-committee encouraged regional states to support the project and recommended that it be implemented as soon as possible.

General approach

A broad-scale survey based on common research methodology and international co-operation will be conducted simultaneously for all three cetacean species throughout their range in the Black Sea region. This survey will be designed and performed in accordance with principles of distance/line transect sampling (Buckland *et al.*, 1993), the most preferable technique to realize a goal. This method will be supplemented with collecting of concomitant ecological information about cetacean habitat and conservation threats including sighting records of oil spills and line transect data on floating marine litter. Density and abundance will be estimated with absolute methods supported by Distance 5.0 program package (Research Unit for Wildlife Population Assessment, University of St. Andrews, UK).

Stratification of study area

It was agreed finally by all specialists participated in methodological discussions that study area of this survey (approximately 432,000km² in total) includes the Black Sea, Azov Sea and Kerch Strait interconnecting the both seas. The Turkish Straits System (including the Marmara Sea, Bosphorus and Dardanelles Straits) is not covered by this project proposal. It was agreed also to combine aerial survey beyond the bounds of territorial waters and continental shelf with a vessel-based survey within territorial sea of all six riparian states.

According to the expected distribution and densities of the three cetacean species and with regard to the proposed combined (aerial and ship-based) design of the survey, two primary strata seem to be in concordance with ecological features and accessibility of different maritime areas (Fig. 1):

Stratum A (vessel-based survey) – coastal area representing territorial and internal waters of Black Sea countries and the entire shelf area with a depth of 0–200m (including the entire Sea of Azov and Kerch Strait); and

Stratum B (aerial survey) – offshore Black Sea area representing exclusive economic zones where a depth varies from 200 to 2,212m.



Fig. 1. Approximate location of primary research strata for cetacean survey in the Black and Azov Seas. The boundary between strata A (vessel-based survey) and B (aerial survey) is intended to follow the 200m depth contour line and, where appropriate, the territorial sea boundaries.

The both primary strata will be divided into several survey blocks. The plotting of transects/tracklines in each stratum and block should be done separately; so, their general layout will be adapted to local peculiarities (irregularity of coasts, presence of harbours, prohibited areas, *etc.*).

Survey platforms

At least two vessels and one aeroplane will be sufficient to complete the project. The chosen observation platforms (ships and aircraft) must move with constant speed along the predetermined transects randomly and, at the same time, evenly dispersed over the study area, survey strata and blocks. These platforms need to hold a valid certification for their move across the sea and its airspace in various directions. They should be properly equipped and manned with skilful boat crews and experienced aviator.

Vessel-based platforms. Each ship rented for this project should be large enough to carry 8 passengers/observers and quite high to be mounted with two observation platforms installed one over another with a span of 4m or more. Steady speed should be maintained by boats when they sail over research transects. Ships should be supplied with contemporary navigation system, communication facilities and life saving equipment. They will work simultaneously in different maritime areas, so, regular contacts between them by means of satellite phone and Internet are required.

Several potentially applicable boats were suggested by Black Sea researchers to implement the project (see Annex 3 for details). Two of them, the 'Fregat' and 'Yunus' (Fig. 2), seem to be the most suitable at the moment, taking into account their technical characteristics, running conditions and relatively low operating costs. However, other boats proposed could be considered as a backup (reserve) opportunity at least till the lease contracts are concluded with 'Fregat' and 'Yunus' owners.

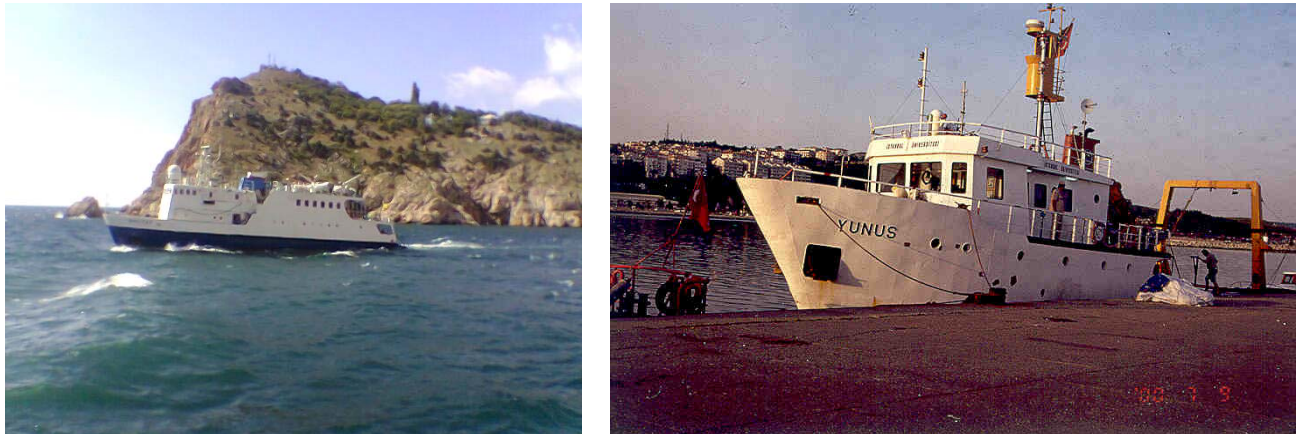
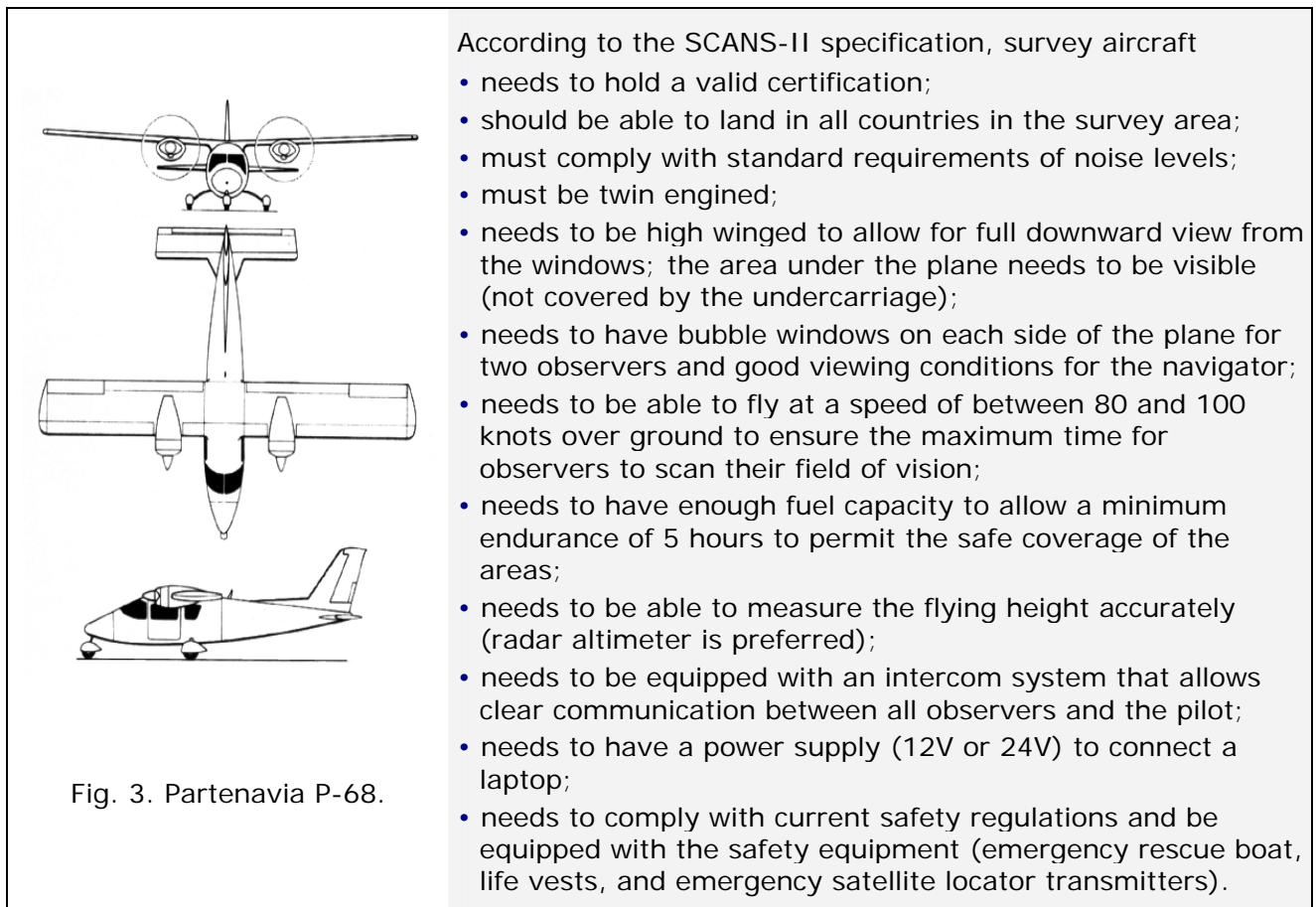


Fig. 2. Survey vessels under consideration: left – 'Fregat', Balaklava (Ukraine), 35m long, cruising speed 10 knots, 18 passengers; right – 'Yunus', Istanbul (Turkey), 29m long, cruising speed 10 knots, 10 passengers.

Aerial platform. It was recommended by international experts to use a 'Partenavia P-68' type of aircraft (Fig. 3). In 2005, three such aeroplanes, supplied with bubble windows and long endurance tanks, were successfully used for similar purpose in the European Atlantic and North Sea (SCANS-II project supported by the EU LIFE Nature programme).



Other important requirements are as follows:

- accurate information on location (GPS) is required throughout the survey. This and other information (survey height, speed) should be available through NMEA outputs from the aircraft instruments;
- the seats should be located parallel to or facing the windows to allow the seating to be as comfortable as possible;
- there needs to be the option to darken the upper part of the bubble windows to reduce reflection on the window;
- a pilot of survey aircraft should have relevant experience of survey flying especially at low altitudes over water.

At present, there is no suitable aeroplane in the Black Sea countries. However, at least three highly skilled pilots and properly equipped Partenavia-planes exist in West Europe including Denmark, Germany and France (see Annex 4 for contact details). It was advised by SCANS-II co-ordinators to conclude a contract with one of these pilots (along with appropriate aircraft) for conducting flights over the Black Sea.

Required observation effort

It was estimated by participants of the St. Andrews meeting (September 2005) that the required effort for the Black and Azov Sea survey is approximately 12,075km (or roughly, 12,000km), if the 'racetrack' method of aerial survey (Hiby, 1999) is used over the entire study area. This value includes additional effort (around 15%) for doing circles back and re-surveying the trackline when a sighting is made. In case of the combined (aerial and ship-based) survey, such additional effort will be applied to the deep-water area only (stratum B; see Fig. 1). In that way, the required observation effort comes to 11,450km in total including 4,260km of vessel effort and 7,190km of aircraft effort (Table 1).

Table 1. Approximate estimation of the required effort

Survey stratum	Area, km ²	Observation effort, km
A (shallow area, ship-based survey)	175,000	4,260
B (deep-water area, aerial survey)	257,000	7,190
Black Sea in tote	432,000	11,450

Timing of the survey

Currently, the survey activities are planned for 2007. Summertime from the mid June to mid August is the best season for such kind of field work because of predominance of calm weather in the most parts of the Black Sea within this time frame. Accurate timing of the survey depends on predetermined stable velocity of observation platforms including the aeroplane and boats.

Permanent speed of 10 knots (approx 18.5km/h) is recommended for boats when they sail over survey tracklines. The daytime from 7:00 to 19:00, *i.e.* 12 hours per day are assigned for observation activities (nights can be used for skips from one transect to another). Therefore, every day each vessel doing survey will cover 222km (and sometimes technical passages at night). Thus, in theory, two ships are in need of 10 days of ceaseless (day after day) sailing to complete surveying of the shallow area

(stratum A). However, from practical point of view, this term is non-realistic because additional time will be spent for arrival and departure of research teams (2 days), pre-survey training and preparations *in situ* (e.g., setting up the observer platforms, making sure the equipment is working, etc.) (3 days), and also for stops in few ports in order to complete customs formalities and replenish resources (fuel, fresh water and food) (3 days). Besides, additional time (4 days) should be allocated for shifting both vessels to their starting points and for coming back to their home harbors at the end of the survey. Extra 7 days should be kept in reserve with due regard to possible stormy weather and rough sea (over Beaufort sea state 3) when correct observations become impossible. No special days of rest or holidays/weekends are planned for the survey period. Consequently, it seems realistic that the ship-based survey will be completed during 29 days in total.

It is envisaged that the aerial survey of the offshore stratum B could be carried out simultaneously with the ship-based survey during 14 days in total. In accordance with preliminary estimation (St. Andrews meeting, September 2005), it may take overall 75 hours of flying, including 42 hours for survey, 5 hours for training, about 20 hours for aircraft transit from the country of origin (West Europe) to the Black Sea and backwards, and 8 standby hours. Survey aircraft is expected to be operational during weekdays and weekends. Surveying will take place throughout daylight hours when weather permits.

Research teams and institutional partnership

As a result of previous cetacean surveys, practical experience on line-transect method was obtained by at least 16 observers in four Black Sea countries including Georgia (2 persons), Russia (4), Turkey (minimum, 2) and Ukraine (8). Some of those trained people are interested to participate in the BLASSCET project. They will form proficient core of three research teams allocated on the board of vessels and aeroplane. However, this project is in need of 19 observers including three team leaders and one project coordinator. Each boat should carry 8 observers (besides a crew) forming two rotating shifts of four persons, and the flying research team will consist of 3 members (two observers and one navigator) besides a pilot. All persons involved in the survey should have international passports (with necessary visas of Black Sea countries) and

medical/accident insurances. Moreover, certain people should remain on the coast and provide logistical assistance being in contact with the project coordinator, team leaders and local authorities.

Most researchers participated in the Workshop on cetaceans surveying in the Black Sea (Istanbul, October 2005) offered their help for this project development and implementation. They represent different institutions which may be denoted as potential partners of the BLASSCET project:

- Black Sea Technical University (Fisheries Department), Trabzon, Turkey;
- Brema Laboratory, Simferopol, Ukraine;
- Institute of Ecology and Evolution, Moscow, Russia;
- Institute of Fisheries and Aquaculture, Varna, Bulgaria;
- Institute of Marine Ecology and Fisheries, Batumi, Georgia;
- Institute for Marine Research and Development, Constantza, Romania;
- Institute of Oceanology, Varna, Bulgaria;
- Istanbul University (Faculty of Aquatic Science), Istanbul, Turkey;
- Turkish Marine Research Center (TUDAV), Istanbul, Turkey.

Methodological and equipping support

Basic methodology, common for cetacean surveying in the Mediterranean and Black Seas, was considered by the Workshop on obtaining baseline cetacean abundance information for the ACCOBAMS area (Valsain, December 2004). In particular, valuable recommendations were given concerning visual ship-based line transect surveys. The so-called $g(0)$ problem and problem of cetaceans responsive movement were addressed and, as a result, the double-platform approach together with 'passing' mode were recommended to overcome these difficulties. Besides, a group size estimation procedure was suggested.

Crucial improvement of methodological capability of the BLASSCET initiative was attained thanks to experts participated in the Meeting on methodology for surveying the Black Sea (St. Andrews, September 2005). A number of suggestions were made to improve the project concept, design and methods applicable onboard. Some of the latter are listed below:

- record angles and radial distances to the initial position of sighting;
- use measuring sticks to estimate distances;
- use angle boards to measure angles;
- observers should search ahead of the vessel from -10° to 90° each side;
- use reticle binoculars for searching far ahead of the vessel;
- record data on the headings of the animals to explore the responsive movement of the animals before detection.

It is undoubtedly generous that the SMRU (University of St. Andrews, UK) in the person of Dr. Phil Hammond, SCANS II project co-ordinator, and his colleagues kindly offered to lend necessary field equipment for the Black Sea basin-wide survey. Some of those essential tools (two angleboards, two 7x50 binoculars with reticles, proper software, sighting protocols from SCANS II, *etc.*) were already delivered to the Brema Lab (Ukraine) and used during pilot cetacean survey conducted in the central Black Sea in September–October 2005 (Krivokhizhin *et al.*, 2006). During the St. Andrews meeting a detailed explanation was also provided on appropriate searching methods; the use of angleboards; the manufacture and use of measuring sticks; the use of reticle binoculars and the transformation of the readings into distances; the data collection requirements; and the protocol to be followed if double-platform line-transect survey is carried out.

It was agreed that just before the survey some experienced SMRU specialists will provide *in situ* field trainings for three research teams involved in aerial and vessel-based components of the project. The CREEM (University of St. Andrews, UK) will help Black Sea scientists to develop survey design and data analysis.

Coordination of the project

The implementation of the project will be under supervision of the BSC Permanent Secretarian (www.blacksea-commission.org) acting also as the Black Sea Subregional Coordination Unit of ACCOBAMS. The ACCOBAMS Permanent Secretariat and ACCOBAMS Scientific Committee (www.accobams.org) iteratively expressed their intent to promote development of this project. The Scientific Committee agreed during its 3rd Meeting (Cairo, May 2005) to appoint Alexei Birkun, Jr. (Brema Laboratory, Ukraine) as one of three co-coordinators of the ACCOBAMS Survey Initiative for the

Mediterranean and Black Sea; Birkun should take the lead in the Black Sea, and other two nominated persons – Ana Cañadas and Caterina Fortuna – should take the lead in the Mediterranean Sea. The Workshop on cetaceans surveying in the Black Sea (Istanbul, October 2005) designated Birkun as a coordinator of this project, whereas Konstantin Mikhailov (Bulgaria), Irakli Goradze (Georgia), Gheorghe Radu (Romania), Dmitriy Glazov (Russia), Ayaka Öztürk (Turkey) and Sergey Krivokhizhin (Ukraine) were appointed as national responsible persons. Glazov was asked also for coordinating of correspondence group, Krivokhizhin – for completion of the survey design.

Further implementation of the project is in need of competent management provided by specially appointed implementing organization (IO) vested with credentials from the BSC and ACCOBAMS Secretariats for:

- (a) various negotiations concerning the Black Sea region-wide cetacean survey;
- (b) task-oriented accumulation and expenditure of funds;
- (c) issuing and signing appropriate documents including contracts; and
- (d) submission of applications to national authorities for necessary permits.

It may be proposed for consideration that some international NGO, for instance, the Black Sea Council for Marine Mammals (BSCMM), is commissioned to execute IO functions. This NGO, registered by the Ministry of Justice of Ukraine on 12 August 2005 (Reg. No. 2295), grants institutional and individual membership to organizations and private persons interested in research and conservation of Black Sea cetaceans and can host relevant international initiatives.

Provisional timeline

If the survey is planned to be realized in the mid summer 2007, the spade-work and, first of all, fund-raising should be completed by March 2007 at the latest. In this case a timeline of BLASSCET project implementation appears to look as follows (Table 2).

It could be expedient to divide the project into three phases (sub-projects) with separate budgets:

- phase 1 – Design and Preparation of the Survey;
- phase 2 – Surveying the Study Area;
- phase 3 – Analysis of the Data.

Table 2. Provisional timeline of the BLASSCET project

October 2006 – February 2007	<ul style="list-style-type: none"> • Accumulation of funds by pushing ahead fundraising activities. • Preparation of detailed work/management plan and survey design. • Negotiations regarding the renting of vessels and airplane, drafting appropriate contracts. • Applications for doing the survey in territorial waters (should be submitted to responsible national authorities six months before the survey).
March – May 2007	<ul style="list-style-type: none"> • Selection of observers, forming research teams, appointment of three survey team leaders and their substitutes, allocation of roles and responsibilities. • Preparation of survey protocols, manuals and forms, delivering them to survey team leaders and observers. • Conveyance of field equipment from Scotland to the Black Sea. • Conclusion of contracts on renting the boats and airplane. • Other essentials preparations (visas, insurances, term of reference for flights over the Black Sea, <i>etc.</i>).
June 2007	<ul style="list-style-type: none"> • ‘Prelaunch’ meeting of three team leaders and project co-ordinator. • Final preparations to the survey.
July 2007	<ul style="list-style-type: none"> • Training of observers just before the survey. • Aerial and ship-based survey in the Black and Azov Seas (29 days).
August – September 2007	<ul style="list-style-type: none"> • Data analysis.
October 2007	<ul style="list-style-type: none"> • Preparation of final report by project co-ordinator.
November – December 2007	<ul style="list-style-type: none"> • Preparation of scientific publications, dissemination of information.

Following the stepwise mode, current effort and currently available funds could be focused almost immediately on the survey design and other essential preparations. In other case (if the required funds are waited/accumulated in tote during indefinitely long period, for instance, till February or March 2007) the organizers lose time only, and, probably, no significant progress will be achieved in 2007 as it has already happened in 2006.

Expected results

The final report of BLASSCET project will provide scientific community, intergovernmental conservation structures and national authorities with reliable estimation of absolute abundance and precise information on basin-wide distribution of three cetacean species (harbour porpoise, short-beaked common dolphin and common bottlenose dolphin) in the Black Sea region. Besides, the spotting of oil spills

and quantitative assessment of floating marine litter will be carried out on the regional level. The results will contribute to the implementation of most actions listed in the Conservation Plan for Black Sea Cetaceans, including:

- action 1 – Broadening the ACCOBAMS scope;
- action 2 – Proper conservation status of cetacean populations;
- action 4 – Improvement and harmonization of national legislation;
- action 6 – Strategy for reducing cetacean bycatches;
- action 7 – Mitigation of conflicts between cetaceans and fishery;
- action 9 – Mitigation of disturbance caused by shipping;
- action 10 – Management of threats from gas-and-oil producing industry;
- action 11 – Network of existing protected areas eligible for cetaceans;
- action 12 – Special marine protected areas for cetacean conservation;
- action 14 – Cetacean photo-identification programme;
- action 15 – Regional cetacean stranding network;
- action 16 – Strategies for capacity building and raising awareness; and
- action 18 – Measures for responding to emergency situations.

Budget

It is estimated that this project costs about 250 thousand Euro. The approximate breakdown of costs is shown in Table 3.

Comments to the budget

Item 3: The cost of one fly hour was taken from SCANS-II (2005); it consists of all relevant costs including fuel expenses and rewards for the pilot.

Items 8 and 10: Two different trainers are required to provide observers with vessel-based and aerial training on modern modifications of line transect sampling.

Item 12: This amount (34,105€) allocated for data analysis consists of:

7,500€ (or 5,000£) – costs for St. Andrews input into analysis of double-platform shipboard data;

15,000€ (or 10,000£) – costs for St. Andrews input into analysis of aerial "racetrack" data;

2,640€ (or 1,760£) – payment for participation in the 'Distance' training in St. Andrews, 2 Black Sea participants;

5,965€ – travel from the Black Sea to St Andrews and back (2 persons), and stay in St. Andrews during Distance training and one week afterwards (15 days in total) for Black Sea data treatment together with St. Andrews specialists; and

3,000€ – honorarium of Black Sea researchers involved in the analysis.

Table 3. Approximate breakdown of costs estimated for the BLASSCET project

Item	Calculation	Funds requested, €
RENT OF VEHICLES (OBSERVATION PLATFORMS)		
1. 'Fregat' boat, Ukraine	\$1,800 x 29 days = \$52,200	44,370
2. 'Yunus' boat, Turkey	\$1,500 x 29 days = \$43,500	36,975
3. 'Partenavia P-68' aeroplane, W Europe	€625 x 75 fly hours (during 14 days)	46,875
Subtotal		128,220
TRAVELS		
4. Travel of co-ordinator beyond survey		2,000
5. Travel of observers to start point/back	€330 x 19 persons	6,270
6. Subsistence of observers (boat survey)	€50 x 29 days x 16 persons	23,200
7. Subsistence of observers (aerial survey)	€70 x 14 days x 3 persons	2,940
8. Travel and accommodation of trainers	7 days, 2 persons	2,000
Subtotal		36,410
SALARY		
9. Salary for co-ordinator	3 months (preparation, reports, etc.)	1,500
10. Salary for trainers	2 persons x 1 week	4,000
Subtotal		5,500
SURVEY DESIGN AND DATA ANALYSIS		
11. Survey design	3 months	5,000
12. Data analysis	3 months	34,105
Subtotal		39,105
EQUIPMENT, MATERIALS AND COMMUNICATION		
13. Field equipment	lent by SMRU (from SCANS II)	0
14. Shipping of field equipment		3,000
15. 'Panasonic Toughbook' notebook	€5,320 x 3 splashproof laptops	15,960
16. Satellite and mobile communication	€1,100 x 2 phones + €1,525 (service)	3,725
17. Consumables		500
Subtotal		23,185
OTHER COSTS (7%)		
18. Customs, harbor and airport fees; vizas and medical insurances for 19 observers; insurances for equipment lent by SMRU and other equipment; etc.		15,000
Subtotal		15,000
IN TOTAL		247,420

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References

- Birkun, A., Jr., Cañadas, A., Donovan, G., Holcer, D., Lauriano, G., Notarbartolo di Sciara, G., Panigada, S., Radu, G., van Klaveren, M.-C. 2006a. *Conservation Plan for Black Sea Cetaceans*. ACCOBAMS, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. 49pp.
- Birkun, A., Jr., Glazov, D., Krivokhizhin, S., Mukhametov, L. 2003. Distribution and abundance estimates of cetaceans in the Azov Sea, Kerch Strait and northeastern shelf area of the Black Sea: Results of aerial surveys in July 2001 and August 2002. In: Proc. 55th Meet. IWC Scientific Committee (Berlin, 26 May – 6 June 2003), SC/55/SM15, 8pp.
- Birkun, A.A., Jr., Krivokhizhin, S.V., Glazov, D.M., Shpak, O.V., Zanin, A.V., Mukhametov, L.M. 2004. Abundance estimates of cetaceans in coastal waters of the northern Black Sea: results of boat surveys in August-October 2003. P.64-68 in: *Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf.* (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609pp.
- Birkun, A., Jr., Krivokhizhin, S., Komakhidze, A., Mukhametov, L., Shpak, O., Goradze, I., Komakhidze, G., Kryukova A. 2006b. Wintering concentration of Black Sea cetaceans off the Crimean and Caucasian coasts. P.203 in: Abstr. 20th Annual Conf. of the European Cetacean Society (Gdynia, 2-7 April 2006). ECS, Gdynia, 244pp.
- Buckland, S.T., Anderson, D.R., Burham, K.P., Laake, J.L. 1993. *Distance Sampling: Estimating Abundance of Biological Populations*. New York-London, Chapman and Hall, 446pp.
- Hiby, L. 1999. The objective identification of duplicate sightings in the aerial survey for porpoise. P.179-189 in: *Marine Mammal Survey and Assessment Methods*, Garner et al. (eds.), Balkema, Rotterdam, 287pp.
- IWC. 2004. Report of the Sub-Committee on Small Cetaceans. *J. Cetacean Res. Manage.*, 6(Suppl.): 315-334.
- Krivokhizhin, S., Birkun, A., Jr., Shpak, O., Mukhametov, L. 2006. "Offshore" harbour porpoises in the central Black Sea. P.210 in: Abstr. 20th Annual Conf. of the European Cetacean Society (Gdynia, 2-7 April 2006). ECS, Gdynia, 244pp.
- Notarbartolo di Sciara, G. 2002. International Implementation Priorities for 2002-2006. Pp.51-62 in: *Proc. 1st Session of the Meeting of the Parties to ACCOBAMS* (Monaco, 28 February – 2 March 2002). ACCOBAMS Permanent Secretariat, Monaco, 124pp.
- Reeves, R.R., Smith, B.D., Crespo, E., Notarbartolo di Sciara, G. 2003. *Dolphins, Whales, and Porpoises: 2000-2010 Conservation Action Plan for the World's Cetaceans*. IUCN, Gland, Switzerland, 139pp.
- Report of the Commission for the Protection of the Black Sea Against Pollution*. 2002. Implementation of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea: 1996-2001. Istanbul, <http://www.blacksea-environment.org/>

Pilot cetacean surveys conducted in the Black Sea region:

estimates of cetaceans density (individuals per 1 km²) and absolute abundance in the selected maritime areas;
values of 95% confidence interval are in brackets

Surveyed area and observation effort	Survey platform	Research period	Minimum estimates uncorrected for availability or detection bias						References
			harbour porpoises		common dolphins		bottlenose dolphins		
			density	abundance	density	abundance	density	abundance	
Turkish Straits System (Bosphorus, Marmara Sea and Dardanelles)	vessel	October 1997	na		na	773 (292–2,059)	na	495 (203–1,197)	Dede (1999), cited after: IWC (2004)
		August 1998	na		na	994 (390–2,531)	na	468 (184–1,186)	
Azov Sea in whole; 40,280 km ² / 2,735 km	aircraft	July 2001	0.07 (0.03–0.16)	2,922 (1,333–6,403)	0 no sightings		0 no sightings		Birkun <i>et al.</i> (2003)
Southern Azov Sea (within above area); 7,560 km ² / 413 km	aircraft	July 2001	0.12 (0.04–0.36)	871 (277–2,735)	0 no sightings		0 no sightings		
Southern Azov Sea (the same area); 7,560 km ² / 716 km	aircraft	August 2002	0.12 (0.06–0.27)	936 (436–2,009)	0 no sightings		0 no sightings		
Kerch Strait in total; 890 km ² / 353 km	aircraft	July 2001	na (small sample size: 5 sightings / 12 animals)		0 no sightings		0.09 (0.03–0.22)	76 (30–192)	
		August 2002	na (small sample size: 4 sightings / 4 animals)		0 no sightings		0.10 (0.04–0.27)	88 (31–243)	
Kerch Strait; 862 km ² / 310 km	vessel	August 2003	0.06 (0.01–0.28)	54 (12–245)	0 no sightings		0.15 (0.08–0.28)	127 (67–238)	Birkun <i>et al.</i> (2004)
NE shelf area of the Black Sea; 7,960 km ² / 791 km	aircraft	August 2002	na (small sample size: 8 sightings / 15 animals)		na (small sample size: 1 sighting / 1 animal)		0.10 (0.04–0.26)	823 (329–2,057)	Birkun <i>et al.</i> (2003)
NW, N and NE Black Sea (Ukrainian and Russian territorial waters); 31,780 km ² / 2,230 km	vessel	September–October 2003	0.04 (0.02–0.09)	1,215 (492–3,002)	0.17 (0.09–0.31)	5,376 (2,898–9,972)	0.13 (0.08–0.22)	4,193 (2,527–6,956)	Birkun <i>et al.</i> (2004)
SE Black Sea within Georgian territorial waters; 2,320 km ² / 211 km	vessel	January 2005	1.54 (0.89–2.65)	3,565 (2,071–6,137)	4.18 (2.16–8.11)	9,708 (5,009–18,814)	0 no sightings		Birkun <i>et al.</i> (2006b)
Central Black Sea beyond territorial waters of Ukraine and Turkey; 31,200 km ² / 660 km	vessel	September–October 2005	0.26 (0.06–1.27)	8,240 (1,714–39,605)	0.15 (0.05–0.51)	4,779 (1,433–15,945)	0 no sightings		Krivokhizhin <i>et al.</i> (2006)

na – not available.

Excerpt from the Conservation Plan for Black Sea Cetaceans (Birkun *et al.*, 2006a)

ACTION 13: Basic cetacean surveys				
Aim	Target	Recommended actions	Priority	Responsible actors
Obtain and periodically refresh reliable basin-wide information on cetacean abundance and distribution.	Population sizes and distribution patterns of Black Sea harbour porpoises, bottlenose dolphins and common dolphins are known and their temporal and spatial population trends are monitored.	(a) Carrying out basic region-wide survey with subsequent synoptic assessment of cetacean abundance and distribution, and identification of potential hot spots. The Black Sea proper, Azov Sea and Kerch Strait should be included in the survey scope and adequate methodology, agreed with international experts, should be applied for data recording and analysis. This study must also focus on spatial modelling and on the recognition of critical habitats. The results will contribute to the implementation of Actions 1, 2, 4–12 and 14–18.	Primary	Joint research team, represented by specialists from all Black Sea countries, in co-operation with international experts and under the auspices of the Black Sea Commission, ACCOBAMS and national authorities. In the Turkish Straits System the responsibility lies mainly or exclusively with Turkish researchers and government
		(b) Carrying out similar survey using the same methods in the Turkish Straits System (including the Bosphorus Strait, Marmara Sea and Dardanelles) to complete cetacean assessment in the area connecting the Black and Mediterranean Seas.		
		(c) Developing long-term monitoring scheme(s) based on periodic surveying throughout the entire range of Black Sea cetaceans in the Black Sea, Azov Sea and Turkish Straits System. Standard methods should be used so that results could be compared over time (different years and seasons) and from one area to another.	Secondary	
Rationale / Background	No credible information exists on the abundance and distribution of cetaceans in the Black Sea in whole, although massive directed killing which continued to the early 1980s is believed to have considerably reduced the populations sizes. Such baseline research data, gained primarily and then monitored on regular base, are indispensable for all key sectors of cetacean management. A few line-transect cetacean surveys implemented recently in some Black Sea areas could be considered in this context as important introductory initiatives. In particular, aerial surveys were conducted in the Azov Sea, Kerch Strait and northeastern shelf area of the Black Sea (July 2001, August 2002); vessel-based surveys were performed in the Turkish Straits System (October 1997, August 1998), Kerch Strait (August 2003), entire 12-miles-wide zone of the Ukrainian and Russian Black Sea (September–October 2003), offshore waters of the northwestern shelf area (September 2004), Georgian territorial sea (January, May, August and November 2005), and central part of the Black Sea (September–October 2005). Thus, at present certain abundance estimates and cetacean distribution data are available for relatively small portions of the basin. The necessity of multi-national synoptic basin-wide assessment of cetacean populations was enunciated in the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea [18] and reiterated in subsequent documents produced by the Black Sea Commission and adopted by Black Sea states [e.g., 16]. This idea was supported in the IUCN Conservation Action Plan for the World's Cetaceans [15] and by the IWC Scientific Committee [17]. Besides, it fully conforms to Resolution 2.19 adopted by the 2nd Meeting of the Parties to ACCOBAMS (2004). A series of competent meetings considered methodological and logistical aspects of the basin-wide cetacean survey making it more intelligible: the 3rd and 4th Joint Meetings of the CBD and FOMRL Advisory Groups of the Black Sea Commission (Istanbul, September 2004 and April 2005), Workshop on obtaining baseline cetacean abundance information for the ACCOBAMS area (Valsain, December 2004), 3rd Meeting of the ACCOBAMS Scientific Committee (Cairo, May 2005), Meeting on methodology for surveying the Black Sea (St. Andrews, September 2005), and Workshop on cetaceans surveying in the Black Sea (Istanbul, October 2005). The project proposal has been drafted with a budget between 210.000 and 250.000€.			

Annex 3

Information on research vessels available in the Black Sea



1. Akademik (Bulgaria)
2. Steaua de Mare (Romania)
3. Yantar (Russia)
4. Impuls (Russia)
5. Yunus (Turkey)
6. Denar (Turkey)
7. Fregat (Ukraine)

Parameters	Boat names						
	Akademik	Steaua de Mare	Yantar	Impuls	Yunus	Denar	Fregat
Flag	Bulgaria	Romania	Russia	Russia	Turkey	Turkey	Ukraine
Port of registry	Varna	Constantza	Novorossiysk	Novorossiysk	Istanbul	Trabzon	Balaklava
Owner	Institute of Oceanology	Institute for Marine Research and Development	'YugMorGeologiya' Scientific Centre (Gelendjik)		Istanbul University	Black Sea Technical University	'Fregat' Co. (Moscow)
Tonnage, <i>t</i>	1,225	134	237.3	306	200		
Length, <i>m</i>	55.5	25.71	33.9	41	29	24.5	35
Breadth, <i>m</i>	9.8	7.22	7	8	6.8	6.5	7
Draught, <i>m</i>	4.8	2.91	2.7	2.07	3.3	2.7	2.4
Cruise speed, <i>knots</i>	10.5	10	7–9	8–12	10	11	10
Crew, <i>persons</i>	20	7	13	13		5	
Passengers	22	6	10	15	10	9	18
Autonomy, <i>days</i>	35	10	7	10	4–5	10	
Range, <i>n. miles</i>	7,500		1,400	1,870			
Navigation area	Bulgarian sea		unlimited	unlimited	unlimited		unlimited
Daily rate (minimum)	USD3,200	€2,000	USD2,300	USD2,500	USD1,500	USD2,000	USD1,800

Annex 4

Contact details of 'Partenavia P-68' pilots experienced in cetacean surveys

Pilot's name and aircraft's No.	Office phone	Mobile phone	Address	E-mail
Leif Petersen OY-CAG (P-68 B)	+45(0)38791992	+45(0)20311992	Danish Air Survey, Abjergvej 10D, DK-2720 Vanlose, Denmark	survey@petersen.mail.dk
Stefan Hecke D-GBRD (P-68 B)	+49(0)431323828	+49(0)1717704742	FLM, D-24159 Kiel, Germany	stefan.hecke@flm-aviation.de
Celine Lajoux		+33(0)615762485	France	celine_lajoux@hotmail.com