

Annex to Resolution 12.17**ACTION PLAN FOR THE PROTECTION AND
CONSERVATION OF SOUTH ATLANTIC WHALES****Introduction**

The present Action Plan for the Protection and Conservation of South Atlantic Whales¹ aims at reasserting conservation interests in the light of the growing and highly qualified regional contribution towards research, in addition to the undeniable economic interest of many developing countries in the reinforcement of sustainable non-lethal and non-extractive uses of whales.

Most species of baleen whales have suffered from modern whaling in the 20th century when approximately 3,000,000 whales around the world were killed, among which approximately 71 per cent were hunted in the southern hemisphere. All large whale species were exploited by commercial whaling in the South Atlantic Ocean. Each species suffered different degrees of exploitation and some were severely depleted. Although protected by an international moratorium on whaling, most of the species that inhabit the South Atlantic Ocean remain endangered or vulnerable.

While species are protected by national laws and enforcement measures in the South Atlantic Range States, as well as at their feeding ground in the Southern Ocean Sanctuary, they remain highly vulnerable during their migration through waters beyond national jurisdiction.

The implementation of the Action Plan for the Protection and Conservation of South Atlantic Whales under the auspices of CMS will address the protection of whales during vulnerable phases of their life cycles and of important habitats to improve the conservation status of the whale baleen species to achieve and maintain a favourable conservation status for all whales and their habitats occurring in the region.

This Action Plan aims to be socially, economically and scientifically useful for the peoples of the South Atlantic coastal States, and to contemplate the widest possible array of regional interests.

The purpose of this Action Plan is twofold: 1) to inform CMS Parties about its goals and actions for the next ten years, and 2) to propose strategies toward the achievement of its goals using the best means available and point out clear performance measures for each proposed action.

This Action Plan is a living document, which will require, for its adequate implementation, to take on board contributions from coastal States' experiences, as well as from CMS, its bodies, and other relevant international instruments and organizations. The Plan will also adapt to Range States' constitutional and legal requirements and management strategies, including through wide consultation with stakeholders, validation and approval by national decision-making processes, taking into account that this Action Plan is not intended to replace or supersede national efforts for cetacean conservation.

The implementation of this Action Plan under the auspices of CMS will provide a global platform for the conservation and sustainable use of whales and their habitats. CMS will bring together Range States and provide the basis for internationally coordinated conservation measures throughout the migratory range.

All the actions presented in this Action Plan will take place in the South Atlantic Ocean (figure

¹ A version of the Action Plan including literature cited and an annex containing details of each of the cetacean species of the South Atlantic Area can be found in UNEP/CMS/COP12/Inf.21.

1) enclosed by the following line: starting from the Equator, then generally south following the eastern coastline of South America and, starting from a point situated at Lat. 55°07,3'S Long. 066°25,0'W; thence to the point Lat. 55°11,0'S Long. 066°04,7'W; thence to the point Lat. 55°22,9'S Long. 065°43,6'W; thence due South to Parallel 56°22,8'S; thence to the point Lat. 56°22,8'S Long. 067°16,0'W; thence due South, along the Cape Horn Meridian, to 60°S to the point at 40°S; until it reaches the coast of South Africa; thence it follows the coastline of Africa to the west and north until it reaches the Equator; thence due west to the coast of Brazil, closing the perimeter at the starting point.

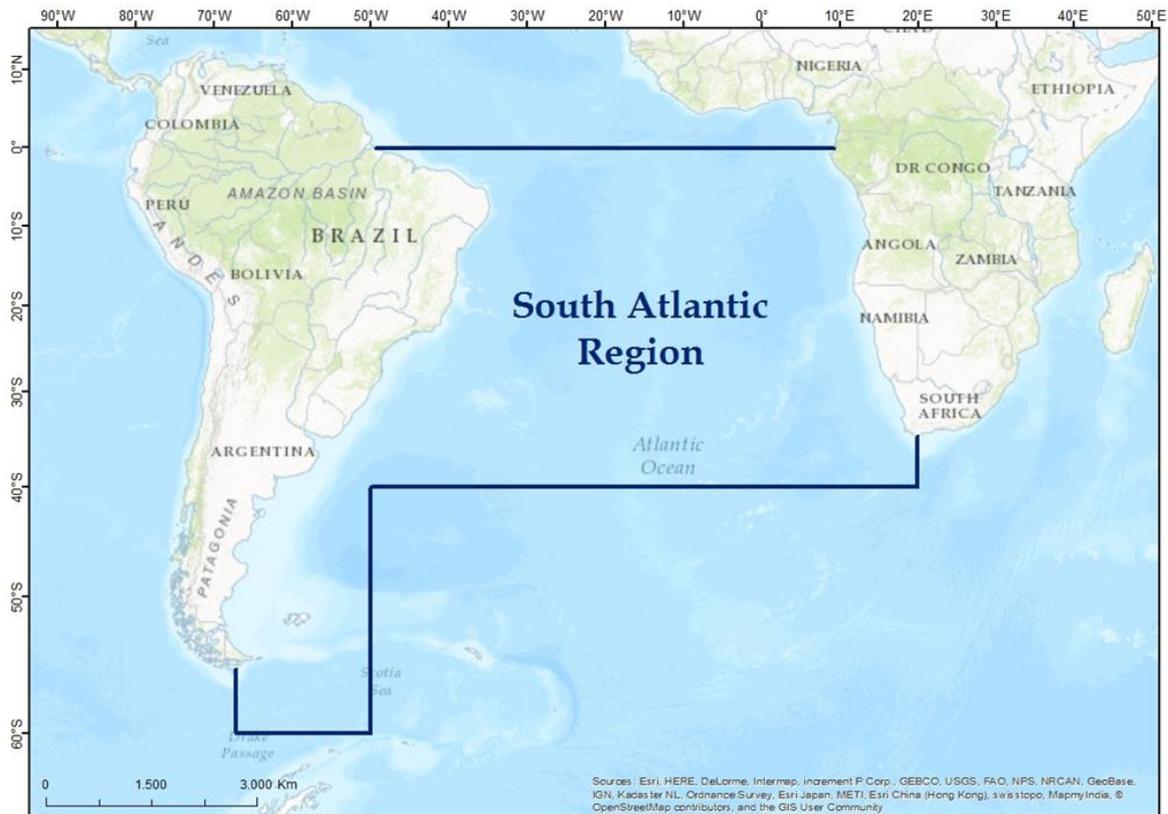


Figure 1 – Area covered by the Action Plan for the Protection and Conservation of South Atlantic Whales

Species and stocks assessment

This Action Plan focuses on all great whale species (all baleen whales, including the Pygmy Right Whale, plus the Sperm Whale) that occur in the South Atlantic area. Table 1 presents a list of the species covered with the current available data on their stock distribution, abundance, trends estimates and main known threats.

Table 1. List of recorded whale species and stocks, their abundance (with coefficient of variation (CV) or confidence interval (CI)), trends and known threats.

Species	CMS Appendix	Stock	Abundance (year)	Abundance CV or 95% CI	Trends	Threats
<i>Eubalaena australis</i>	I	South Western Atlantic	4,030 ¹	Unknown	6.2% year ¹	Vessel collision, fishery entanglement, coastal development, die-offs.
<i>Eubalaena australis</i>	I	South Central Atlantic	80 ¹	Unknown	Unknown	Unknown
<i>Eubalaena australis</i>	I	Southern Africa	4,410 ¹	Unknown	6.8% year ¹	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas exploration
<i>Megaptera novaeangliae</i>	I	Breeding Stock A	6,400 (2005) ²	0.11 ²	7.4% year ³	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas exploration
<i>Megaptera novaeangliae</i>	I	Breeding Stock B1	6,800 ⁴	95% CI: 4,350-10,500 ⁴	Unknown	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas exploration
<i>Megaptera novaeangliae</i>	I	Breeding Stock B2	510 ⁴	95% CI: 230-790 ⁴	Unknown	Vessel collision, fishery entanglement

Species	CMS Appendix	Stock	Abundance (year)	Abundance CV or 95% CI	Trends	Threats
<i>Balaenoptera acutorostrata</i>	---	South Atlantic	Unknown	---	---	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas exploration
<i>Balaenoptera bonaerensis</i>	II	Areas II and III ¹	Unknown	---	---	Vessel collision, fishery entanglement
<i>Balaenoptera musculus</i>	I	Areas II and III ¹	Unknown	---	---	Unknown
<i>Balaenoptera physalus</i>	I/II	Areas II and III ¹	Unknown	---	---	Unknown
<i>Balaenoptera edeni</i>	II	South Atlantic	Unknown	---	---	Vessel collision, fishery entanglement
<i>Balaenoptera borealis</i>	I/II	Areas II and III ¹	Unknown	---	---	Unknown
<i>Caperea marginata</i>	II		Unknown	---	---	Unknown
<i>Physeter macrocephalus</i>	I/II	Divisions 1 and 2 ⁵	Unknown	---	---	Vessel collision, fishery entanglement

¹ IWC - International Whaling Commission (2014). ² Andriolo et al. (2010). ³ Ward et al. (2011). ⁴ Barendse et al. (2011). ⁵ Revision of these regions is recommended as more data becomes available.

Governance

Coordination of the Action Plan

Key stakeholders that may be involved in the development, implementation and review of this Action Plan include, but are not limited to, governmental and non-governmental agencies and organizations, in particular those involved with environmental, marine, scientific and regulatory activities.

Duration of the Action Plan

This Action Plan should be reviewed and refined every ten years to account for ecological, oceanographic and other possible changes.

ACTION PROGRAMMES

Two Action Programmes comprising 11 actions are proposed: *Research and Monitoring Action Plan* and *Education and Outreach Action Plan*.

Outline of the Action Programmes:

Goals. Goals address what is the desired future situation concerning the conservation and management of whale species, with ambitious long-term envisaged outcomes.

Objectives. Objectives focus on measurable outcomes for evaluating progress and success in moving towards future desired conditions.

Strategies. The strategies section explains how to achieve the objectives. Activities are developed and implemented to achieve the proposed goals and objectives.

Performance measure. The performance measure is a direct index of the success or failure of each action. One of the possible next steps would be the development of performance indicators with the support of the Scientific Committee, taking into account, as appropriate, national indicators where they exist.

Implementation of the Action Plan for the Protection and Conservation of South Atlantic Whales

This Plan is designed to guide the management of threats faced by whales in the South Atlantic Ocean and monitor the species' recovery for the next ten years. The implementation of this Action Plan will require cooperation and coordination among national government agencies, as well as private organizations and individuals. Information exchange, sharing facilities and human resources, and the coordination of policies and procedures within an ecosystem context are also features of this Action Plan.

The implementation of the action plan shall not imply an interference with the sovereign rights of coastal States, but will rather represent an opportunity for cooperation and shared benefits, recognizing the importance of national roles in safeguarding the common heritage represented by whale species and populations of the South Atlantic.

After approval, an operational plan shall be prepared and take into account national and regional whale conservation measures, as well as the role and mandate of the International Whaling Commission and other relevant international organizations, integrated efforts, respective capabilities and the availability of funds.

Limitations

The success of the actions proposed by this Action Plan is closely linked to the availability of budget and logistic/research staff.

PERFORMANCE OF THE ACTION PLAN AND PRIORITIZATION OF ACTIONS

A fundamental aspect of this Action Plan is the requirement of continuous performance evaluations regarding its implementation and development. The progress of this Action Plan should be evaluated in order to assess which aspects need to be improved or given more attention. The assessment of the effectiveness of performance measures for each Action is key to reaching a proper evaluation.

A Performance Evaluation Committee should be created, and performance results will be presented to the Scientific Council and to the Conference of Parties of the Convention on Conservation on Migratory Species of Wild Animals at regular intervals to be defined. This is important as a means of keeping informed the general public, researchers, and other interested parties on this Action Plan's effectiveness; helping identify resource gaps; improving communication among research sites, stakeholders and the general public; and providing basis for managers to comprehensively evaluate their outcomes in both the short and long term. The measures proposed to evaluate the performance of this Action Plan are linked to field monitoring, and are presented in the table of goals that specifies the actions needed to assess threats and monitor population abundance and trends.

A list of priority actions was defined and is presented in the table of this Action Plan's goals.

Research and Monitoring Action Plan

The Research and Monitoring Action Plan (REAP) is key to achieving the main goals of this Action Plan concerning (1) assessing and addressing of threats and (2) monitoring of the recovery of whale populations.

Goal 1. Assess the distribution, status and trends of whale populations

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A1	All species	Define and refine whale stock identity.	Develop multi-methodological approaches, increase sampling effort and area coverage for stock identity.	Whale stocks identified for all species, with great increase on sampling effort and area coverage.	Whale stocks identified for most of species, with moderate increase on sampling effort and area coverage.	Whale stocks identified for some species, with some increase on sampling effort and area coverage.	Whale stocks identified for few species, with poor sampling effort and area coverage.	High	Long term
A2	All species/stocks	Determine habitat use patterns and critical areas.	Develop multi-methodological approaches, increase sampling effort and area coverage for habitat use and critical areas identification.	Critical areas and habitat use identified for all species, with great increase on sampling effort and area coverage.	Critical areas and habitat use identified for most of species, with moderate increase on sampling effort and area coverage.	Critical areas and habitat use identified for some species, with some increase on sampling effort and area coverage.	Critical areas and habitat use identified for few species, with poor increase on sampling effort and area coverage.	Low	Medium term

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A3	All species/ stocks	Produce abundance estimates and trend estimates	<p>Conduct comprehensive field surveys for abundance estimation.</p> <p>Conduct long-term studies to detect temporal trends of whale populations.</p>	<p>Abundance estimates for all species/ stocks</p> <p>Trends estimated for all species/ stocks</p>	<p>Abundance estimates for most of species/ stocks</p> <p>Trends estimated for most of species/ stocks</p>	<p>Abundance estimates for some species/ stocks</p> <p>Trends estimated for some species/ stocks</p>	<p>Abundance estimates for few species/ stocks</p> <p>Trends estimated for few species/ stocks</p>	High	Long term

¹Time scale (short term = 2 years, medium term = 5 years, long term = 10 years)

Goal 2. Maintain or increase current whale populations

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A4	All species/ stocks	Zero deliberate whale catches	<p>a) Maintain the existing international legal protection and measures for whales.</p> <p>b) Report on infractions to zero whale catches.</p>	<p>No deliberate whale catch reported, international legal protection and management measures maintained or increased.</p>	<p>Little deliberate whale catch reported, international legal protection and management measures maintained.</p>	<p>Some deliberate whale catch reported, international legal protection and management measures maintained or decreased.</p>	<p>High deliberate whale catch reported, international legal protection and management measures decreased.</p>	High	Medium term

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A5	All species/stocks	Reduce mortality due to entanglements in fishing gear.	a) Evaluate the degree of overlapping between fisheries and distribution of whale populations. b) Promote cooperation with fishermen, the fishing industry and other stakeholders in order to minimize entanglements c) Develop or implement National Action Plans to mitigate entanglements d) Promote capacity-building. e) Establishing cooperation and partnerships with IGOs (e.g. RFMO) to address and manage whale interaction in marine capture fisheries in areas under their jurisdiction specially at high seas areas.	Pronounced negative trend rates of whales reported dead due to entanglements.	Moderately negative trend rates of whales reported dead due to entanglements.	Moderately positive trend rates of whales reported dead due to entanglements.	Pronounced positive trend rates of whales reported dead due to entanglements.	High	Medium term

<p>A6</p>	<p>All species/ stocks</p>	<p>Reduce whale-vessel collision rates in breeding grounds. Abundance estimates and trend estimates.</p>	<p>a) Initiate a broad and long-term program to evaluate the degree of overlapping between vessel routes and distribution of whale populations. b) Estimate rates of whale-vessel strikes and identify areas of higher risk. c) Incorporate information about areas of risk on international nautical charts. d) Evaluate and propose mitigation actions (e.g. lower vessel speed, changing, vessel routes) if appropriate. e) Contribute data to the IWC f) Establish cooperation and partnership with governments, Intergovernmental Organizations (e.g. IMO and IWC), shipping companies and other stakeholders to incorporate the</p>	<p>Pronounced negative trend in estimated rates of whale-vessel strikes.</p>	<p>Moderately negative trend in estimated rates of whale-vessel strikes.</p>	<p>Moderately positive trend in estimated rates of whale-vessel strikes.</p>	<p>Pronounced positive trend in estimated rates of whale-vessel strikes.</p>	<p>Low</p>	<p>Medium term</p>
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Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
			areas of risk of ship strikes in international nautical charts in order to minimize the probability of whale-vessel strikes (International Whaling Commission vessel-strike database).						

¹Time scale (short-term = 2 years, medium-term = 5 years, long-term = 10 years)

Goal 3. Foster coordinated research in the region

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A7	All species/stocks	Coordinate whale research in the South Atlantic Ocean	a) Organize periodic workshops for the coordination of whale research in the South Atlantic Ocean. b) Standardize research methodologies and promote capacity building. c) Establish a communication network of research institutions.	Relevant research cooperation projects planned and developed. Relevant number of researchers trained.	Some research cooperation projects planned and developed. Reasonable number of researchers trained	Few research cooperation projects planned and developed. Low number of researchers trained.	No research cooperation projects planned and developed. No researchers trained	High	Medium term
A8	All species/stocks	Promote data sharing.	a) Promote the use of and linking to existing database (create only when necessary). b) Integrate information with other existing programmes and databases (e.g. IWC Southern Ocean Research Partnership (SORP)), IWC photo identification catalogues and ship strikes database, Global Biodiversity Information Facility (GBIF)).	Relevant shared databases planned and developed.	Some shared databases planned and developed.	Few shared databases planned and developed.	No shared databases planned and developed.	Low	Medium term

¹Time scale (short term = 2 years, medium term = 5 years, long term = 10 years)

Education and Outreach Action Plan

The Education and Outreach Action Plan (EOAP) is key to increase the development of the sustainable use of whales and to disseminate the information gathered for local, national and international communities.

Goal 4. Raise awareness and engagement

Action	Species/Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A9	All species/stocks	Increase awareness about South Atlantic Whale Conservation.	a) Disseminate and share information about this Action Plan (e.g. social media, press releases). b) Develop a webpage within the CMS portal to spotlight the initiatives and results of this Action Plan's actions.	High number of reports, conferences, press releases, and media campaigns, etc. Internet metrics on this Action Plan's webpage.	Moderate number of reports, conferences, press releases, and media campaigns, etc. Internet metrics on this Action Plan's webpage.	Few number of reports, conferences, press releases, and media campaigns, etc. Internet metrics on this Action Plan's webpage.	No relevant reports, conferences, press releases, and media campaigns, etc. Internet metrics on this Action Plan's webpage.	High	Medium term

¹Time scale (short-term = 2 years, medium-term = 5 years, long-term = 10 years)

Goal 5. Develop sustainable, non-extractive and non-lethal economic and educational use of whales.

Action	Species/ Stock	Objective	Strategy	Indicator				Priority	Time scale ¹
				Successful	Moderately Successful	Moderately Unsuccessful	Unsuccessful		
A10	All species/ stocks	Maintain and improve the quality of existing whale watching activities.	a) Develop international workshop on responsible whale watching considering best practices. b) Stimulate further research to evaluate the status of whale watching procedures in the range countries. c) Stimulate the implementation of IWC's Strategic Plan on Whale Watching.	Strategic Plan on Whale Watching planned and implemented in most countries in the South Atlantic region based on IWC's Handbook on Whale Watching as a guideline and considering research information.	Strategic Plan on Whale Watching planned and implemented in some countries in the South Atlantic region based on IWC's Handbook on Whale Watching as a guideline and considering research information.	Strategic Plan on Whale Watching planned and implemented in few countries in the South Atlantic region based on IWC's Handbook on Whale Watching as a guideline and considering research information.	No Strategic Plan on Whale Watching planned and implemented in countries in the South Atlantic region based on IWC's Handbook on Whale Watching as a guideline and considering research information.	High	Medium-term
A11	All species/ stocks	Contribute to the education of the general public about whales and their ecosystems in the South Atlantic Ocean	a) Identify opportunities in educational policies to include information about this Action Plan. b) Produce content for educational activities.	Educational policies and activities developed in most countries in the region of the South Atlantic Ocean.	Educational policies and activities developed in some countries in the region of the South Atlantic Ocean.	Educational policies and activities developed in a few countries in the region of the South Atlantic Ocean.	No Educational policies and activities developed in countries in the region of the South Atlantic Ocean.	Low	Medium-term

¹Time scale (short term = 2 years, medium term = 5 years, long term = 10 years)

GOALS AND ACTIONS

In this section the Action Plan's goals, actions, strategies and performance measures are contextualized. The methodology suggested to achieve the objectives is not extensively detailed and should be investigated in the referenced literature, as well as in the vast published bibliography.

GOAL 1. ASSESS THE DISTRIBUTION, STATUS AND TRENDS OF WHALE POPULATIONS

The distribution, abundance and stock structure of baleen whales and the Sperm Whale in the South Atlantic are poorly understood. This lack of information has serious management implications since resource managers require reliable data on stock structure and abundance, along with knowledge of the distribution patterns of the species to be managed. With the exception of the Southern Right Whale and the Humpback Whale, which have been studied for a longer time in the South Atlantic area (e.g. Payne, 1983; Best, 1981; Findlay et al., 1994; Martins et al., 2001; Zerbini et al., 2006) and consequently have the best baseline information on some of these parameters, most species still need systematic research to establish a baseline.

This first Goal proposes four Actions to assess the distribution, status and trends of whale populations in the South Atlantic Ocean.

Action 1. Define and refine whale stock identity

The selection of the appropriate management unit is critical to the conservation of animal populations (Clapham et al., 2008). The understanding of the stock structure is fundamental in assessing the effects of previous exploitation and in making management decisions. Stocks have been regarded as population units that can be managed effectively (Donovan, 1991) and are referred to groups of individuals of the same species that are demographically, but not necessarily genetically, isolated (Taylor, 2005; Clapham et al., 2008).

Stock structure can be assessed using different tools, such as genetics, tagging, photo-identification, acoustics, differences in parasites and contaminant loads, or morphological and demographic data (e.g. Dizon et al., 1992; Gorbics and Bodkin, 2001). A multidisciplinary approach to assess stock structure has been recommended by a number of authors (Donovan, 1991; Clapham et al., 2008) because it increases the power to detect differences of importance to management.

Action A1 aims at defining the stock identity of whales in the South Atlantic area, as well as to refine the existing information on Humpback and Southern Right Whales.

Strategy

Develop multi-methodological approaches, increase sampling effort and area coverage for stock identity.

A multi-methodological approach for assessing whale stock identity and also refine the current knowledge on the subject comprises the concomitant application of several methodologies, including (1) genetics, (2) isotopes, (3) contaminant load, (4) acoustics, (5) satellite tagging, (6) photo-identification, (7) parasite load and (8) morphology and demography (e.g. Dizon et al., 1992; Zerbini et al., 2006; Delarue et al., 2008; Vighi et al., 2014).

In order to increase the sampling effort and area coverage for stock identity, dedicated vessel survey programmes must be created, mainly in areas less studied such as in offshore regions of the South Atlantic. This platform of observation is especially useful for sampling tissue

through biopsies and carrying out the studies 1, 2, 3, 4, 5 and 6. The development of studies 7 and 8 depends on the sampling of carcasses and consulting of scientific collections.

Performance measure

Action A1 will be considered fully successful if all whale species have their stocks satisfactorily identified, with great increase on sampling effort area coverage in the South Atlantic Ocean during the Action Plan's period.

Action 2. Determine habitat use patterns and critical areas

The understanding of the distribution and habitat use of a species is required for many aspects of conservation planning and resource management. It has been demonstrated that environmental heterogeneity influences marine mammal habitat use, with the presence of distinct core areas within individuals' home-ranges (e.g. Ingram and Rogan, 2002; Whitehead and Rendell, 2004).

In order to make recommendations regarding habitat management, it is of paramount importance to have a comprehensive understanding about the habitat use of the species. In this sense, identifying critical areas within the whale species' range and recognizing their critical habitats are central components of THIS Action Plan.

Action A2 aims at determining the habitat use patterns and critical areas for the whale species in this Action Plan.

Strategy

A multi-methodological approach to determine habitat use and critical areas should include dedicated vessel and aerial surveys, applying traditional detection and analytical methods as well as new technologies. The development and application of acoustic detection methods (Mellinger and Barlow, 2003; Wade et al., 2006) in large scales is highly recommended to achieve the objectives of this Action Plan, especially in regard to the most elusive and low-density species. Habitat use at an individual level can be assessed through photo-identification and tagging studies, in order to examine the ranging patterns of individual animals. Sampling effort and area covered in the surveys must be increased in relation to previous studies.

Performance measure

Action A2 will be considered fully successful if all whale species have critical areas determined with great increase on sampling effort and area coverage in the South Atlantic Ocean during the Action Plan's period.

Action 3. Produce abundance estimates and trends

Knowledge of population size plays a crucial role in wildlife conservation and management. Population abundance is fundamental in evaluating management strategies and it is required as a means to assess population trends. Trends in population abundance are used to monitor species affected by human activities. It is an important component of population management (Forney, 2000). In the context of the South Atlantic Ocean, producing trends estimates of the whales' populations is key to the understanding whether the species are recovering, and what is its pace.

In this sense, this Action Plan stimulates systematic research in order to produce abundance estimates for whales and compute population trends for the whale species in the South Atlantic area.

Strategy

Comprehensive field surveys for abundance estimation must be conducted. Abundance may be estimated through traditional methods such as surveys applying distance sampling (e.g. Buckland *et al.* 2001) and through capture-recapture methodologies using the recording of individuals' unique characteristics (e.g. Katona and Whitehead, 1981; Payne *et al.*, 1983), as well as through the application of new alternative approaches.

Distance sampling methods may be applied by vessel or aerial surveys. Aerial surveys cover more area in much less time, but need to be corrected for visibility biases (Marsh and Sinclair, 1989). In order to improve corrections for such biases, it is recommended the inclusion of new technologies such as satellite tagging with time-diving recorders (Heide-Jorgesen *et al.*, 2007), the combination of two simultaneous observation platforms (Zerbini *et al.*, 2011), among others.

Long-term studies should be conducted to detect temporal trends of the whale populations. The most direct method to assess population trends is through the temporal analysis of abundance estimates. Nevertheless, absolute population abundance estimates may be only feasible for coastal species with well-defined stocks breeding grounds, such as the Humpback Whales and Southern Right Whales in the South Atlantic area. Consequently, it is recommended the application of alternative indexes of population size, a statistic assumed to be correlated to actual population size (Bowen and Siniff, 1999) for the remaining whale species. Temporal variation in sighting rates and acoustic detection rates collected in systematic and carefully designed long-term surveys may be applied as alternative indexes to produce trends.

Performance measure

Action A3 will be considered fully successful if abundance and trend estimates are produced for all whales in the South Atlantic Ocean during the Action Plan's period.

GOAL 2. MAINTAIN OR INCREASE CURRENT WHALE POPULATION SIZES

One of the main objectives of this Action Plan is to maintain or increase current whale stock levels by mitigating known threats to whale stocks. Several anthropogenic factors are known to affect the conservation of whale stocks worldwide. Present and potential threats to whale stocks and their habitats in the South Atlantic Ocean include contaminants, acoustic and noise pollution, hydrocarbon exploration and exploitation, interaction with fisheries, collision with ships, climate change and die-offs. However, in the South Atlantic area, two threats in particular are considered to be more dangerous: entanglements in fishing gear (nets or ropes) and collision with ships.

The second Goal of this Action Plan proposes three Actions aiming at maintaining or increasing current whale stock sizes in the South Atlantic Ocean: ensure zero deliberate whale catches, reduce mortality by fishery and reduce whale-vessel collision rates.

Action 4. Zero deliberate whale catches in the South Atlantic area

The South Atlantic area must be regarded as a non-take zone for stocks of all whales. No animal should be deliberately caught for commercial, scientific or aboriginal subsistence purposes.

Strategy

In order to guarantee the South Atlantic area as a non-take zone for whales, it is essential to maintain the existing international legal protection and management measures for whales. Any infraction to the zero whale catches must be reported.

Performance measure

Action A4 will be considered fully successful if no whale catch is reported in the South Atlantic area.

Action 5. Reduce mortality due to entanglements in fishing gear

Entanglement in commercial fishing gear is one of the main causes of serious injury and mortality in large whales (Knowlton and Kraus, 2001; Robbins and Mattila 2004, Johnson *et al.* 2005). Since the interaction with fisheries may potentially compromise the recovery of whale stocks, it is important to develop management strategies aimed to prevent this. Action 5 aims to evaluate, monitor and reduce the magnitude of this anthropogenic impact on whales' stocks in the South Atlantic Ocean. All these actions should be done in cooperation with intergovernmental organization IGOs (e.g. RFMO) to address and manage whales' interaction in marine capture fisheries in areas under their jurisdiction specially at high seas areas.

Strategy

In order to reduce mortality due to entanglements in fishing gear it is necessary to evaluate the degree of overlapping between different types of fisheries and the distribution of whale populations. This should integrate data on spatial distribution and density of whale stocks, historical or achieved by Actions 2 and 3, with data on distribution and density of the fishery effort. Spatial analysis methods should be applied in order to identify higher risk areas.

It is also recommended to promote cooperation with fishermen, the fishing industry and other stakeholders in order to minimize entanglements. In some regions, cooperation with the fishermen may be the only way to achieve data on distribution of the fishery effort and entanglement rates. After the risk areas and fisheries in the South Atlantic Ocean are identified, cooperation with all stakeholders is required in order to achieve the reduction of entanglements.

It is important to recognize that similar actions have already been recommended regionally in National Action Plans. In this manner, the implementation of these Plans should be reinforced where they are available and new ones should be developed elsewhere.

The participation of marine mammal experts in national forums on fishery management is advised in order to discuss specific management questions, such as the proposition of non-fishery zones, restrictions in fishing gear and the reduction of lost or abandoned fishing gear in the sea. In this context, it is worth noting that the Marine and Coastal Protected Areas (GEF MAR) Project has been created to support the creation and implementation of a marine and coastal protected areas (MCPAs) system in Brazil to reduce the loss of biodiversity.

The establishment of cooperation and partnerships with intergovernmental organizations (IGOs), including regional fisheries management organizations (RFMOs) is key to address and manage whales' interaction in marine capture fisheries and to take related actions for areas under their jurisdiction especially at high seas areas.

Finally, promoting capacity-building in all countries in the South Atlantic area is recommended.

Performance measure

Action 5 will be considered successful if the indexes of whales killed due to entanglements show negative trends during the Action Plan's period. Entanglement indexes are difficult to achieve and should, if possible, be collected through a cooperation system with fishermen and the fishing industry, including log-books and on-board observers. As an alternative, stranding data may be applied in combination with other entanglement indexes.

Action 6. Reduce whale-vessel collision rates in breeding grounds

Vessel-whale collisions are of growing concern worldwide (Ritter, 2012). It is not known how many whales are affected annually by vessel collisions, although it is widely accepted that numbers are underestimated and likely increasing (IWC, 2008). Vulnerability to vessel strikes varies among species, but most interactions are with Right, Fin, Humpback and Sperm Whales (Van Waerebeek et al., 2007; Van Waerebeek and Leaper, 2008). Depending on the size of the whale stock and the rate of collision, this can be a concerning factor in the recovery of some species. Action 6 aims to evaluate, monitor and reduce the magnitude of this anthropogenic impact on whales' stocks in the South Atlantic Ocean in cooperation with Governments, Intergovernmental Organizations (e.g. International Maritime Organization and International Whaling Commission), shipping companies and others stakeholder as appropriate. The cooperative work is necessary to incorporate the areas of risk of ship strikes in international nautical charts and propose actions to minimize the risk of whale-vessel strikes.

Strategy

A broad and long-term programme to evaluate the degree of overlap between vessel routes and the distribution of whale populations should be initiated. This should integrate data on spatial distribution and density of whale stocks, historical or achieved by Action 2 and 3, with data on distribution and density of the vessel routes. The probability of whale-vessel strikes in an area may be modelled based on vessel size and speed, route lengths, stock density and the surfacing behaviour of whales (Bezamat et al., 2015). Rates of whale-vessel strikes may be also estimated through photography marks in breeding grounds where a systematic research effort has been conducted. Marks verified in stranded animals may also be an alternative approach to estimate collision rate.

As a management action, the information about areas of risk should be incorporated on international nautical charts in order to minimize the probability of whale-vessel strikes. If appropriate, mitigation actions such as lower vessel speed and changing vessel routes should be evaluated and proposed.

This Action must contribute with data to the IWC vessel-strike database and other relevant assessments. In this sense, every case should be informed to the IWC ship strikes database (<http://www.iwcoffice.org>).

Finally, it is important to establish cooperation and partnerships with Governments, Intergovernmental Organizations (e.g. International Maritime Organization and International Whaling Commission), shipping companies and other stakeholder as appropriate to incorporate the areas of risk of ship strikes in international nautical charts in order to minimize the probability of whale-vessel strikes

Performance measure

Action 6 will be considered successful if the indexes of collision rates show negative trends during the Action Plan's period.

GOAL 3. FOSTER COORDINATED RESEARCH IN THE REGION

Action 7. Coordinate research on whales in the South Atlantic Ocean

The central spirit of this Action Plan is the cooperation and collaboration among nations and researchers towards the conservation and management of whales in the region. The coordination of the whale research in the South Atlantic area is considerably beneficial to the achievement of several objectives of this Action Plan and may be done in several ways. Action 8 proposes strategies to stimulate the coordinated research in the South Atlantic area.

Strategy

Workshops for the coordination of research on whales in the South Atlantic Ocean should be organized periodically during the Action Plan's period. The meetings' main objectives shall be to elaborate a standardized research protocol among nations, establish a network of research institutions and continuing evaluate the performance of the Action Plan.

The standardization of research methodologies is of paramount importance to the achievement of this Action Plan's objectives. Several actions of this Action Plan depend upon solid collaborative research, especially those in Goals 1 and 2. Standardization of methodologies allows researchers of different geographical areas to compare and integrate their data more properly. An effort to elaborate a detailed protocol of methods should initiate in the first workshop relating to this Action Plan.

Building local human capacity through training and collaboration is also a strategy to be followed. The training of researchers is considered an important component of this Action Plan, in order to improve and maximize research expertise. Training may take place during collaborative field surveys and laboratory research, as well as during the aforementioned workshops. In this context, research cooperation projects are highly recommended.

Finally, to establish a communication network of research institutions is recommended.

Performance measure

The success of this Action will be measured by (1) the number of research cooperation projects and (2) the number of researchers trained. Since the goal is to maximize both the number of cooperation projects and the number of researchers trained, there is no specific metric to be achieved for both indexes. It is expected that both indexes increase their numbers during the Action Plan's period. This must be a continuous strategy during the lifetime of the Action Plan.

Action 8. Promote data sharing

Data sharing is fundamental to a rapid transformation of research results into knowledge and procedures to improve the conservation status of whales' stocks. Data sharing among researchers is a central component to the success for the research coordination in the South Atlantic area. Making data available to other investigators is essential to put South Atlantic researchers "on the same page", improve the quality of the data interpretations, accelerate the achievements of results and facilitate data-driven management and conservation decisions. In order to increase the success probability of the Actions from Goals 1 and 2, Action 8 aims to promote data sharing among South Atlantic scientists.

Strategy

To encourage data sharing, it is important to promote the use and linking of existing database

and create a new one only when necessary. Those datasets should be continuously updated with research guidelines and protocols, taxonomic and distribution maps, and biological and ecological datasets during this Action Plan's lifetime.

Besides that, information collected and generated during this Action Plan's lifetime should be integrated with other existing programs and databases, such as the IWC SORP (International Whaling Commission's Southern Ocean Research Partnership), IWC photo-identification catalogues and ship strike database, and the Global Biodiversity Information Facility.

Performance measure

The success of this Action will be measured by the number of records shared among databases. There is no specific metric to be achieved, although it is expected that this index presents an increasing trend during this Action Plan's period. This must be a continuous strategy during the lifetime of this Action Plan.

GOAL 4. RAISE AWARENESS AND ENGAGEMENT

Action 9. Increase awareness about the Action Plan

Support from the population is essential to ensure that governments ratify and give long-term support for this Action Plan. People will only demand action from governments to support this Action Plan if they are aware of the Action Plan's goals and implementation. Therefore, increasing awareness is an essential step in order to achieve this Action Plan's goals.

Strategy: Disseminate and share information about this Action Plan (e.g. social media, press releases).

Even though other actions will raise important scientific information about whale species and stocks in the South Atlantic Ocean, in order to increase awareness in the general population scientific information must be translated to non-scientific terms and disseminated in other fora.

Nowadays social networks have the potential to disseminate information much faster than other traditional ways, such as books and reports.

However, even though they have a smaller audience, traditional news outlets must also be a target when disseminating information about this Action Plan. Press releases must also be produced and sent to news agencies, in order to increase the number of information nodes available.

Performance measure: Number of reports, conferences, press release, and media campaigns, etc.

Since the goal is to share information about this Action Plan, there is no specific metric to be achieved. This must be a continuous strategy during the lifetime of this Action Plan.

Strategy: Develop a webpage within the CMS portal to spotlight the initiatives and results of this Action Plan's actions.

Even though social media is important in the dissemination of information, a stable node must be created in the internet to hold information permanently available about the Action Plan. As it is an CMS initiative, the most logical place to hold this node is the CMS website.

The webpages dedicated to the Action Plan will contain links to reports, scientific articles, infographics, and any other media produced. These can be used as anchor points for

information disseminated through other channels.

Performance measure: Internet metrics on the Action Plan's webpage.

Since the goal is to share information about the Action Plan, there is no specific metric to be reached. Changes in accesses to the webpage over time can be used to gauge the effectiveness of information released in different news channels.

GOAL 5. DEVELOP SUSTAINABLE, NON-EXTRACTIVE AND NON-LETHAL ECONOMIC AND EDUCATIONAL USE OF WHALES

Action 10. Maintain and improve the quality of existing whale watching activities

Whale watching is a significant and growing tourism industry worldwide (Hoyt and Hvenegaard, 2002) and is defined by the IWC as: 'any commercial enterprise which provides for the public to see cetaceans in their natural habitat' (IWC, 1994). It has been recognized as "...contributing largely to the economy, education and to the furthering of scientific knowledge of a number of countries..." (IWC, 1993). Moreover, whale watching tourism is frequently presented as the economic and moral antithesis of whaling (Evans, 2005).

However, exposing animals in their natural environment to millions of tourists may present risks. The potential impact of whale watching on the animals has been studied for decades and several effects have been detected (e.g. Corkeron, 2004). It is crucial to ensure that the economic and conservation value of whale-watching does not cause excessive stress to individual whales or their stocks (Williams et al., 2002). In this sense, Action 10 proposes strategies in order to maintain and improve the quality of existing whale watching activities in the South Atlantic countries.

Strategy

The development of international workshops on responsible whale watching considering best practices is highly recommended by the countries in the South Atlantic area. Those meetings would be important to systematically evaluate the status and development of this activity in different regions of the South Atlantic Ocean. It would also be a forum for knowledge and experience exchange on this activity, which is fundamental to the improvement of its quality.

The status of whale watching procedures in the South Atlantic countries should be continuously evaluated by long term research. Concerns have been expressed regarding concentration of whale watching vessel (or aircraft) traffic, which may negatively affect the whales. Consequently, this Action Plan stimulates research on the short and long-term effects of the presence of tourism platforms on the behaviour, habitat use and distribution patterns of whales (e.g. Lusseau, 2003, 2004; Bain et al., 2006).

Finally, the implementation of IWC's Strategic Plan on Whale Watching is stimulated.

Performance measure

The performance of Action 10 will be measured by the number of Strategic Plans on Whale Watching planned and implemented in countries in the region of the South Atlantic Ocean based on IWC's Handbook on Whale Watching as a guideline and considering research information. Another index of the Action's performance is the number of scientific papers published evaluating whale watching status in the South Atlantic countries. At least one comprehensive assessment is expected to be published in each country where whale watching occurs during this Action Plan's lifetime.

Action 11. Contribute to the education of the general public about whales and their ecosystems in the South Atlantic area

Contributing to spread knowledge throughout all sectors of society is an important role of scientists and educators. This Action Plan's goals will be fully achieved in a broader context if the comprehension about its relevance to the conservation of whales and their ecosystems is not restricted to governmental, academic and environmentalist circles. In this manner, the creation of this Action Plan is a unique opportunity to increase the knowledge on marine mammal conservation and management among the general public. Action 11 aims to propose strategies to better achieve this objective.

Strategy

The first step in Action 11 is to identify opportunities in educational policies towards including information about this Action Plan. In this sense, official national educational programs for undergraduate and graduate students should be consulted and, if appropriate, a collaborative network among researchers and educators should be initiated in order to include the subject in those programmes.

As a means to maximize the outreach of information, it is recommended that appropriate content be offered for educational activities. Information must be diversified in content and format (press, video and digital formats) in order to reach people of different ages and educational levels, as well as to account for the heterogeneity of culture and logistics among the educational systems in the South Atlantic countries.

Performance measure

The performance of Action 11 will be measured by the number of educational policies and activities developed in countries in the region of the South Atlantic Ocean. There is no specific metric to be achieved. However, it is expected that all South Atlantic countries will initiate educational programmes to disseminate information about the Action Plan.