THE SOUTH ATLANTIC: A SANCTUARY FOR WHALES

Presented by the
Governments of Argentina, Brazil, Gabon, South Africa and Uruguay
to the 66th Annual Meeting of the International Whaling

Commission Portoroz, Slovenia, October 2016

(also submitted to the Scientific Committee meeting, Bled, Slovenia, June 2016, for review)

NOTE: this document incorporates the Schedule amendment proposed for consideration at the 66th Annual Meeting of the IWC, at Portoroz, Slovenia, October 2016.

EXECUTIVE SUMMARY

Background to the Sanctuary Proposal

The proposal of the South Atlantic Whale Sanctuary (SAWS) is co-sponsored by the Governments of Argentina, Brazil, Gabon, South Africa and Uruguay, with the support of International Whaling Commission (IWC) members. The proposal aims to reassert biodiversity conservation interests in light of the growing regional contribution towards research, in addition to the economic interest of developing countries in the reinforcement of the sustainable, non-lethal and non-extractive use of whales. The present document is a revised version of the original proposal and summarizes the arguments that support the establishment of the Sanctuary.

The South Atlantic Ocean has been the scene of severe exploitation of most of the species of large whales, not only by coastal whaling, but in more recent decades by pelagic fleets foreign to the region and largely detached from the South Atlantic nations' legitimate interests in the management of whale resources. The establishment of whale sanctuaries in accordance with the rules of the ICRW is in line with the application of the Precautionary Principle. In addition, it is entirely consistent with current practices regarding marine conservation worldwide and has the potential to enhance socially important activities such as research and public education, particularly in developing countries. The geographical boundaries of the SAWS are represented in Figure 1 and 2.

SAWS Objectives

The primary goal of the SAWS is to promote the biodiversity, conservation and non-lethal utilization of whale resources in the South Atlantic Ocean. To achieve this goal, its primary objectives are:

1. To maintain or increase current whale stocks levels by mitigating identified threats to whale stocks, as well as to identify and quantify other potential threats;

2. In conjunction with the Southern Ocean Sanctuary, promote the long-term conservation of large whales south of the Equator, embracing the entire range of numerous stocks (i.e. ecologically meaningful boundaries), including breeding and feeding grounds, and migratory routes;

3. To stimulate coordinated non-lethal and non-extractive research in the region, especially by developing countries, and through international cooperation with the active participation of the IWC.

4. To develop the sustainable, non-extractive and non-lethal economic use of whales for the benefit of coastal communities in the region (e.g. whale watching and educational activities).

5. To integrate national research, management efforts and conservation strategies in a cooperative framework, maximizing the effectiveness of management actions, taking into full account the rights and responsibilities of coastal States under UNCLOS.

6. To provide an overall framework for the development of localized measures, in order to maximize the conservation benefits at an ocean basin level.

The SAWS Management Plan

A proposal for a Management Plan (MP) for the SAWS is presented in Annex I. The purpose of the MP is twofold: 1) to inform Sanctuary constituents about the Sanctuary's goals and actions planned for the next ten years, and 2) to propose strategies toward the achievement of the Sanctuary's goals using the best means available, as well as to point out clear performance measures for each proposed action. The Plan is designed to guide management of threats to whales and to monitor its recovery in the South Atlantic Ocean. Implementation of this management plan will require cooperation and coordination among federal government agencies, as well as private organizations and individuals. Information exchange, sharing facilities and staff, and the coordination of policies and procedures within an ecosystem context are features of the management plan. It is noteworthy that the SAWS is the first Sanctuary proposed in the context of the IWC which has presented a Management Plan Proposal to the IWC Scientific Committee even before its creation.

Actions

Two Action Plans comprising 12 actions (Table 1) are proposed: *Research and monitoring Action Plan* and *Education and Outreach Action Plan*. The actions were developed to (1) assess the distribution, status and trends of whale populations, (2) maintain or increase current whale population sizes, (3) stimulate coordinated research in the region, (4) raise awareness and engagement and (5) continue to develop the sustainable, non-extractive and non-lethal economic and educational use of whales.

Table 1. Summary of actions of the South Atlantic Whale Sanctuary Management Plan.

Assessment of the distribution, status and trends of whale populations	
A.1:	Define and refine whale stock identity
A.2:	Determine habitat use patterns and critical areas
A.3:	Produce robust abundance estimates
A.4:	Produce trend estimates
Maintain or increase current whale population sizes	
A.5:	Zero deliberate whale catches in the Sanctuary
A.6:	Reduce mortality due to entanglements in fishing gear
A.7:	Reduce whale-vessel collision rates in breeding grounds
Stimulation of coordinated research in the region	
A.8:	Coordinate whale research in the SAWS
A.9:	Promote data sharing
Raise awareness and engagement	
A.10:	Increase awareness about SAWS
Development of the sustainable, non-extractive and non-lethal economic and educational use of whales	
A.11:	Maintain and improve the quality of existing whale watching activities
A.12:	Contribute to the education of the general public about whales and their ecosystems in the SAWS

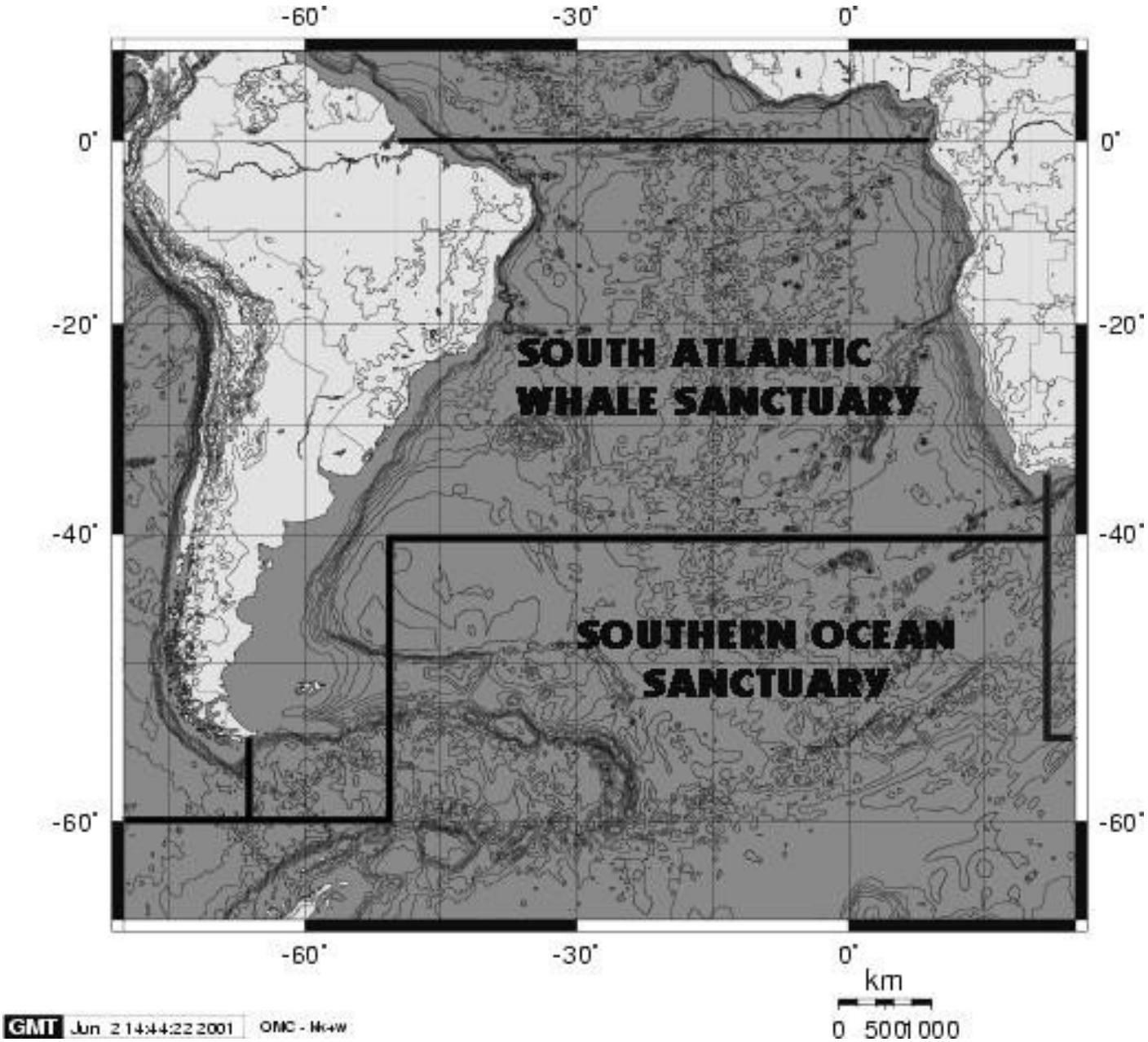

Figure 1. Limits of the proposed South Atlantic Whale Sanctuary, as defined in the Schedule amendment text proposed by Argentina, Brazil, Gabon, South Africa and Uruguay.

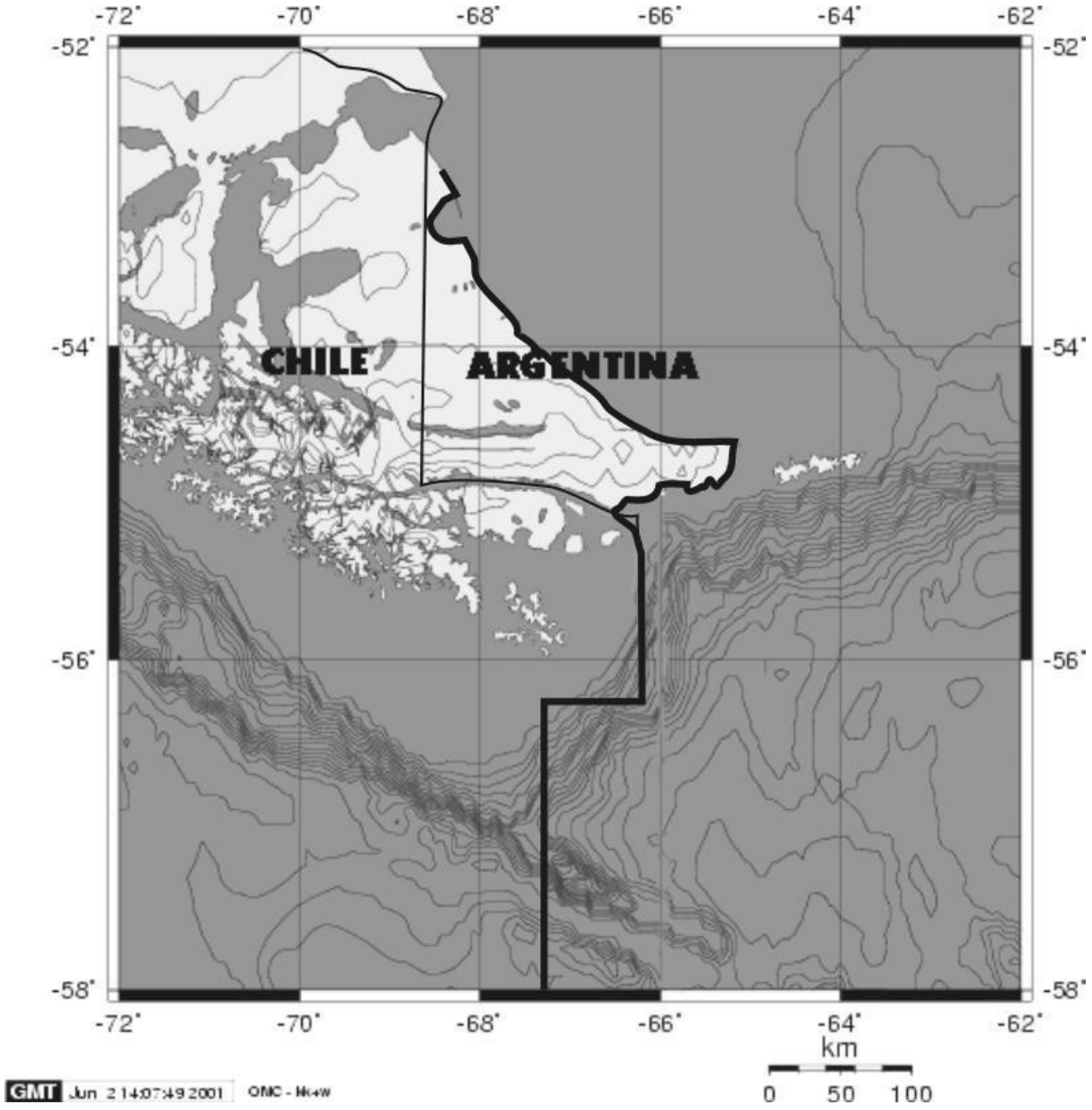

Figure 2. Details of the western boundaries of the proposed South Atlantic Whale Sanctuary, as defined in the Schedule amendment text proposed by Argentina, Brazil, Gabon, South Africa and Uruguay.

INTRODUCTION AND BACKGROUND

The proposal of the South Atlantic Whale Sanctuary is co-sponsored by the Governments of Argentina, Brazil, Gabon, South Africa and Uruguay, with the support of International Whaling Commission (IWC) members, with a view to reassert biodiversity conservation interests in 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.

The prospect of creating a South Atlantic Whale Sanctuary began at the 50th Meeting of the IWC (IWC-50), held in the Sultanate of Oman in 1998, when Brazil stated its intention to propose the establishment of a Whale Sanctuary in the South Atlantic Ocean. Since that meeting, many consultations have been held in order to ensure that the proposed Sanctuary would encompass ecologically meaningful areas to improve the protection of South Atlantic whale stocks, while also socially, economically and scientifically useful for the peoples of the South Atlantic coastal States, contemplating the widest possible array of regional interests. The proposal was first evaluated at the IWC 53, in 2001, in the United Kingdom. Later, Argentina, South Africa and Uruguay joined Brazil as co-sponsors of the Proposal. At IWC 64, held in Panama in 2012, Argentina, Brazil, South Africa and Uruguay, requested a new evaluation of the proposal. The amendment to the International Convention for the Regulation of Whaling (ICRW) Schedule did not achieve the necessary three-quarters of Member-States votes. The proposal, however, was supported by a clear majority of Member States, reaching 64% of the votes. More recently, Gabon has joined as co-sponsored of the current Proposal.

The present document is a revised version of the original proposal and summarizes the arguments that support the establishment of the Sanctuary. Its structure was revised to incorporate discussions made by Member States, as well as the IWC Scientific Committee, and other independent scientists, natural resources and government managers from within and outside the region.

It is important to recall that Article V of the ICRW contains provisions under which the IWC may amend the Schedule by adopting regulations with respect to the conservation and use of whales, including the designation of sanctuary areas. These areas may be used for a variety of purposes, especially those regarding research, management and conservation.

Until today, the IWC has adopted three whale sanctuaries, two of which are still in force. In 1948, at its first meeting, the Commission suggested that parts of the IWC management areas I and VI designated in 1938 as a sanctuary by the International Whaling Conference in London should maintain such status. The designated sanctuary had the purpose of protecting whales from commercial hunting in part of their Antarctic feeding grounds, which had not previously been subjected to pelagic whaling. Its boundaries encompassed the Southern Ocean south of 40ºS between 70ºW and 160ºW. That Sanctuary was maintained until 1955.

In 1979, at the 31st IWC Annual Meeting, the Republic of Seychelles proposed the establishment of a sanctuary in the Indian Ocean. It became effective on that same year and was established initially for a period of ten years. The Indian Ocean Sanctuary (IOS) was renewed in 1989 for another three years and indefinitely in 1992, and was subject to further review in 2002, when a proposal to abolish it was rejected by the Commission. It will therefore remain in force for an indefinite period of time, comprising the waters of the Northern Hemisphere from the coast of Africa – including the Red and Arabian Seas and the Gulf of Oman – to 100ºE, and the waters of the Southern Hemisphere north of

40^{o} S from 20ºE to 130ºE.

A third whale sanctuary was proposed by France at the IWC 44th Annual Meeting in 1992, encompassing the waters of the Antarctic Ocean south to the Antarctic Convergence. It was named "The Southern Ocean Sanctuary" (SOS) and was adopted by the Commission at its 46th Annual Meeting in 1994. This sanctuary is reviewed at succeeding ten year intervals and comprises effectively the waters of the Southern Hemisphere from 40ºS, 50ºW eastward to 20ºE, then southward to 55ºS, eastward 130ºE, northward to 40ºS, eastward to 130ºW, southward again to 60ºS, eastward to 50ºW and finally northward to the initial point.

The South Atlantic Ocean was the scene of reckless slaughter of most of the species of large whales, not only by coastal whaling that goes back to early settlement times, but in more recent decades by pelagic fleets foreign to the region and largely detached from the South Atlantic nations' legitimate interests in the management of whale resources (Figures 3 and 4). Some of these fleets have consistently captured protected species and disregarded regulations set forth by the IWC itself, therefore imposing further damage on species and stocks and preventing until today an adequate evaluation of the impacts of pelagic whaling in the regional context. Since the inception of the ICRW in 1946, world perspective on conservation and proper management of natural resources in general, and marine resources specifically, has evolved dramatically. In particular, a number of international conventions have included new obligations for management activities regulating the use of oceans. It is therefore a *sine qua non* condition for the proper management of whales that these developments are taken into account.

The United Nations Convention on the Law of the Sea (UNCLOS) entered into force in 1994 and deals with all matters related to oceans and seas, providing rules for the regulation of their uses. UNCLOS also establishes a framework for the development of conservation and management measures concerning marine resources and scientific research within the Exclusive Economic Zones (EEZs), as well as on high seas.

Part 12 of UNCLOS outlines provisions for the protection and preservation of marine ecosystems. These provisions are also applicable to fishery industries on a global scale. All States are obliged to undertake measures to protect the marine environment and to control, reduce and manage pollution of the sea (Articles 192 and 194). The provisions relating to the protection and preservation of the marine environment emphasize the importance of cooperation between States and the need for States to undertake surveillance of activities they permit or engage in, in order to determine whether these activities are likely to have significant adverse impacts on the marine ecosystem and its various components (Article 204(2)).

Parties to the UNCLOS are required to establish measures for the conservation and management of marine living resources in their EEZs. These measures must take into account *inter alia* the effects of harvesting target species on species that are associated with or dependent upon the harvested species whilst ensuring that living resources are not endangered by overexploitation (Article 61(2) & (4)). Additionally, UNCLOS addresses highly migratory species, marine mammals, and anadromous and catadromous stocks to ensure that these species are conserved and managed in their State of origin and external areas (Articles 64-67). In reference to marine mammals, the provisions of Article 65, reasserting the right of coastal States to adopt strict conservation measures in relation to their management, explicitly recognize the special status of these animals.

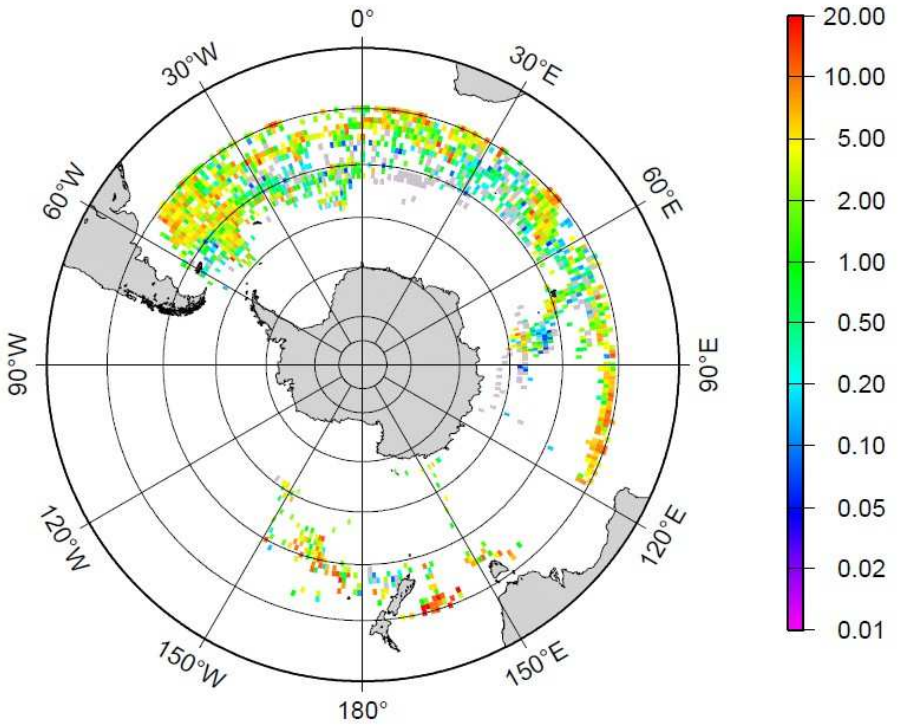

Figure 3. Sei whale catches (1964-65 to 1970-71), evidencing the high levels of catches inside the limits of the SAWS.

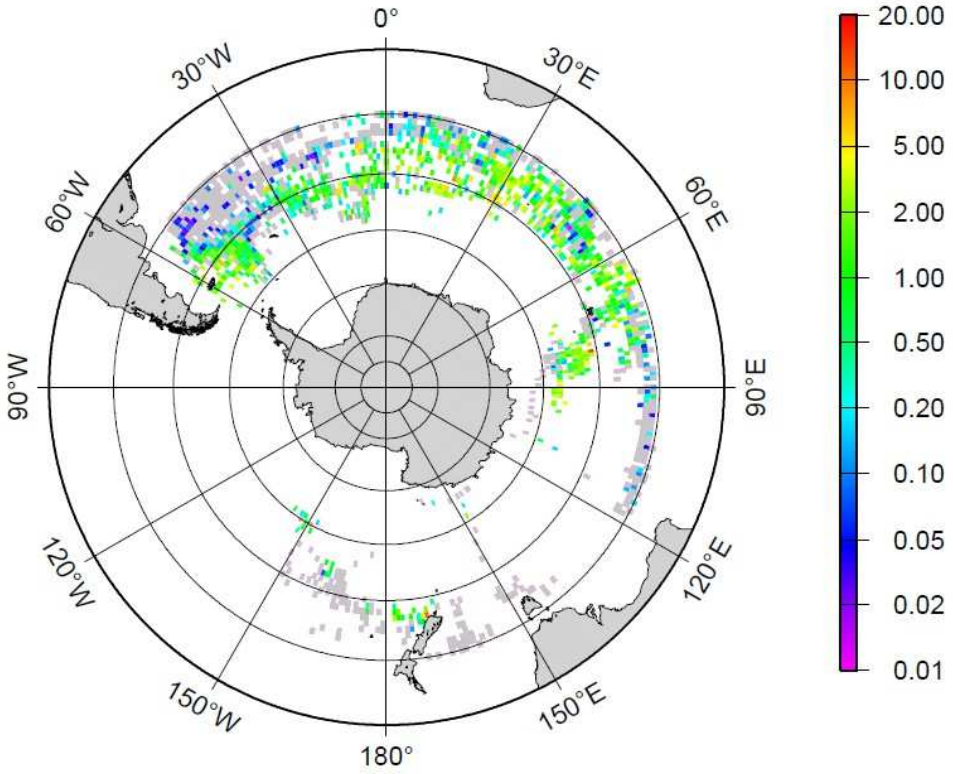

Figure 4. Fin whale catches (1964-65 to 1970-71), evidencing the high levels of catches inside the limits of the SAWS.

All States, therefore, are obliged to undertake measures to conserve the living resources of high seas and, in doing so, States must cooperate with each other and establish regional or sub-regional coordination as appropriate to promote this objective.

The Convention on Biological Diversity (CBD) was signed on 5 June 1992 in Rio de Janeiro, Brazil, and entered into force on 23 December 1993. It was conceived to provide an international framework for the conservation and sustainable development and use of biodiversity. The Convention applies to all terrestrial and marine biodiversity, and outlines measures for conserving biodiversity as obligations of all Parties. General measures for conserving biodiversity and ensuring sustainable development include developing national policies, strategies and programmes that should *inter alia* reflect the principles espoused in the Convention (Article 6(a)). The Convention also urges Parties to integrate biodiversity conservation policies and strategies with cross-sectoral plans (Article 6(b)).

Measures outlined for the *in situ* conservation of biodiversity encompass certain key issues. These include *inter alia* protected areas, ecosystems and habitats. With respect to protected areas and ecosystems, the Convention sets the following obligations on all Contracting Parties:

- Establish a system of protected areas for conserving biodiversity;
- Develop guidelines for the selection, establishment and maintenance of protected areas;
- Regulate and manage biological resources that are important for conserving biodiversity within protected areas and in *ex situ* circumstances;
- Rehabilitate and restore degraded ecosystems, *inter alia* through the development and implementation of management plans and strategies;
- Promote *in situ* protection of ecosystems, natural habitats and the maintenance of viable populations of species; and
- Promote sustainable development in areas adjacent to protected areas with a view to protecting these areas and to complement protected areas.

Parties to the CBD are required to regulate and manage threatening processes affecting or likely to affect biodiversity in an adverse manner (Article 8(l)).

Still in relation to the CBD, the *Jakarta Ministerial Statement on the Implementation of the Convention on Biological Diversity* (Jakarta Mandate on Coastal and Marine Biodiversity) was issued during the second meeting of the Conference of the Parties (COP) to the CBD, held in Jakarta in November 1995, as a result of the COP identifying marine and coastal biodiversity as a high priority issue. The Mandate essentially reaffirms the importance of the conservation and sustainable use of coastal and marine biodiversity and urges the COP to initiate the immediate development and implementation of actions concerning this issue. The Mandate specifically links conservation, the use of biodiversity and fishing activities, and establishes a new global consensus on the importance of marine and coastal biodiversity. At the 7th meeting of the parties to the Convention on Migratory Species (CMS) in 2002, fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*) and sperm whales (*Physeter macrocephalus*) were listed on Appendix I and II, and the Antarctic minke (*Balaenoptera bonaerensis*), Bryde's (*Balaenoptera edeni*) and pygmy right (*Caperea marginata*) whales on Appendix II of the Convention. These listings indicate that CMS has also identified a need to give greater protection for these six whale species and their habitats, breeding grounds and migration routes.

It is important to note that international instruments such as the ICRW must be interpreted and applied within the framework of the entire legal system prevailing at the time of its interpretation. This understanding is supported *inter alia* by cases brought forward at the International Court of

Justice, which already in 1997 referred to the existence of a duty of the States to take into account newly evolving environmental principles when applying existing international instruments.

In summary, the concern with the health of the oceans and of marine biodiversity has been growing steadily at the international level in the last few decades, as duly highlighted in the final document of the Rio+20 Conference - "The Future We Want". Overexploitation of marine resources, climate change, pollutant impacts, ocean acidification, and particularly conservation of marine biodiversity beyond national jurisdiction, coupled with a greater understanding of the synergies of living organisms in the oceans, have raised high alert signals on the impacts of human activities in these sensitive ecosystems. Similarly, in several international fora, measures are being taken with the purpose of protecting biodiversity in general or targeting specific species, ranging from appropriate management of fish stocks to full protection of highly endangered species.

These issues have become a priority concern regionally and internationally, as seen in the case of the protection of sharks and rays, approved in 2013 within the framework of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The same applies to the increasing international adhesion to the Convention on Migratory Species (CMS), reaffirming the countries' commitment in joining the global efforts for the protection of migratory species.

Argentina, Brazil, Gabon, South Africa and Uruguay strongly encourage other countries, not only in the South Atlantic, but all over the world, to create sanctuaries for cetaceans in their waters. As whales are highly migratory animals, a concerted multilateral effort is required to guarantee their conservation and help the recovery of some of the highly exploited populations. Many other species that are dependent on the existence of whales would benefit from this cooperation.

The sponsors of the SAWS and other IWC members have taken a conservationist approach with the view to help enhance the recovery of depleted whale populations (many hold as few as a tenth of the original number of individuals, and some are endangered). This includes direct efforts to research and develop non-lethal and non-extractive uses such as whale watching. Whale watching constitutes an entirely viable use of whale resources, but is in need of sounder scientific basis for its management.

In light of the **International Workshop on the South Atlantic Whale Sanctuary**, held in March 19- 21, 2014 at Praia do Forte, Bahia, Brazil, in which delegations from several IWC member countries engaged in discussions regarding the SAWS proposal, the following preliminary conclusions could be highlighted:

i) The Proposal of the SAWS is in full accordance with the provisions of the International Convention of 1946 related to management, and it thus would contribute to the achievement of the Convention's objectives;

ii) It fully meets the interests of the region's coastal communities, many of which have already been benefitting from the gradual recovery of whale species and populations, whose conservation in the long-term may potentially extend social-economic benefits to thousands of other citizens in our countries;

iii) It provides a platform for cooperation and exchange of non-lethal research activities on cetaceans and for the sustainable management of whale watching tourism, and significantly broadens the region's relevance in the international market for this type of ecotourism;

iv) It can be considered a crucial element in the negotiations on the future of the International Whale Commission, in the context of the efforts undertaken by the countries in the region to take into account different perspectives concerning the management of whale resources and to protect their respective interests in the non-lethal management of cetaceans within the scope of international law.

It is also worthy of note that the SAWS co-sponsors are all members of the Zone of Peace and Cooperation of the South Atlantic (ZPCSA), established in 1986 by the United Nations General Assembly through Resolution 41/11. The ZPCSA Ministerial Meeting held in Uruguay, in 2013, issued the Declaration of Montevideo, which, in its paragraph 93, reaffirms the support of all Member States of the Zone to the establishment of the SAWS. In the same manner, the Member States of the Community of Portuguese Language Countries (CPLC) have formally renewed their support to the SAWS in the CPLC Ministerial Declaration, signed in New York on September 2015.

The establishment of whale sanctuaries in accordance with the rules of the ICRW is, therefore, in line with the application of the Precautionary Principle established in the Principle 15 of the 1992 UNCED Rio Declaration. In addition, it is entirely consistent with current practices regarding marine conservation worldwide and has the potential to enhance socially important activities such as research and public education, particularly in developing countries.

THE SOUTH ATLANTIC OCEAN: A BRIEF OVERVIEW

The South Atlantic is a dynamic system, where vital parts of biological cycles of a large number of species of whales take place. These cycles are greatly determined by major oceanographic features present in the ocean basin (Figure 5).

The Benguela System is the dominant oceanographic feature on the West Coast of South Africa. It can be classified as the eastern boundary Current of the South Atlantic Ocean, and is typified by cool surface waters and high biological productivity. The latter is the consequence of wind-induced upwelling, in which the prevailing southerly winds drive surface water northwards and away from the coast so that cooler water rises from the depths to replace it. This deeper water is rich in nutrients, which, when exposed to sunlight provide ideal conditions for the growth of phytoplankton. This in turn forms the basis for zooplankton blooms, shoals of fish and abundant predators. The rate of upwelling is not uniform along the whole West Coast, and two of the areas of maximum upwelling occur in the vicinity of Cape Town. The first is the western seaboard of the Cape Peninsula and the second is Cape Columbine, the western-most headland along much of the Western Cape coast. From these centers of upwelling, tongues of cold water extend northwards and westwards, creating preferred habitats for a number of marine species.

The Angola Current forms the eastern section of a large, cyclonic gyre in the Gulf of Guinea. In the upper layer (0-100 m), it seems to be formed mainly by the southeast branch of the South Equatorial Countercurrent and the southward-turning waters from the north branch of the Benguela Current. The influx of waters originating north of the equator is only moderate. However, in layers deeper than 100 m, northern waters become more important in feeding the Angola Current. The current is a fast, narrow, and stable flow that reaches 250-300 m depths and covers both the shelf regions and the continental slope, and shows marked temporal variation. At approximately 15°S, the southward-flowing Angola Current converges with the northward-flowing Benguela Current to form the Angola-Benguela Front (ABF). The ABF demarcates the warm, nutrient-poor Angola Current water

and the cold, nutrient-rich Benguela Current water, creating a transition zone between the tropical ecosystem in the north and the upwelling-driven ecosystem in the south. It is typically characterized at the surface by a temperature gradient reaching 4°C per 1° latitude.

The South Equatorial Current (SEC) is a broad, westward flowing current that extends from the surface to a nominal depth of 100 m. Its northern boundary is usually near 4°N, while the southern boundary is usually found between 15-25°S, depending primarily on longitudinal location and the time of the year. The relatively cool Benguela Current flows northward to feed the southern branch of the SEC. The SEC flows westward toward the Brazilian shelf, and splits at the São Roque Cape, near 16°S with one branch, the stronger of the two, heading northwards as the North Brazil Current (NBC) and the other, weaker southwards branch, as the Brazil Current. Some of the NBC waters retroflect and feed the North Equatorial Counter Current, which in turn, helps feed the northern branch of the SEC. It divides seasonally near the eastern tip of Brazil where residual alongshore velocities are northward for half the year (peaking during May and June) and southward for the other half of the year.

The Brazil Current is a western boundary current carrying warm subtropical water, which runs south along the coast of Brazil from about 9°S to about 38°S and is generally confined to the upper 600m of the water column. It separates slightly from the coast near 12°S where the continental shelf becomes wider. At about 20° 30'S, the current encounters the Vitória-Trindade Ridge, a zonal seamount chain where it has been observed to flow through the inshore passage rather than the passages farther east. In this region, a cyclonic gyre seaward of the Brazil Current, centered at about 17°S and 34°W has been observed and attributed to the southernmost meanders of the South Equatorial Current that are reflected northward by this same seamount chain.

The Malvinas Current is a branch of the Circumpolar Current and flows northward along the continental shelf of Argentina until it reaches the Brazil Current offshore and north of the La Plata River estuary. The combined flow of the two currents causes a strong thermohaline frontal region, called the Brazil-Malvinas Confluence (BMC) in which the Brazil Current breaks off into two branches, one turning to the north forming a recirculation cell, while the other continues southward and veers northeast at about 45°S, becoming the South Atlantic Current. Mean conditions of circulation vary significantly, and more recent evidence shows that it is likely related to meteorological anomalies.

While a detailed biogeographic description of the South Atlantic is beyond the scope of this document, it is worth noting that the Biogeography of the South Atlantic Ocean is highly influenced by these major currents (and therefore the definition of its ten recognized biogeographic zones is intimately related to them) and so is the distribution of cetacean species; however, knowledge about the reasons for some habitat preferences (e.g., in some coastal breeding sites of migratory species) is still lacking.

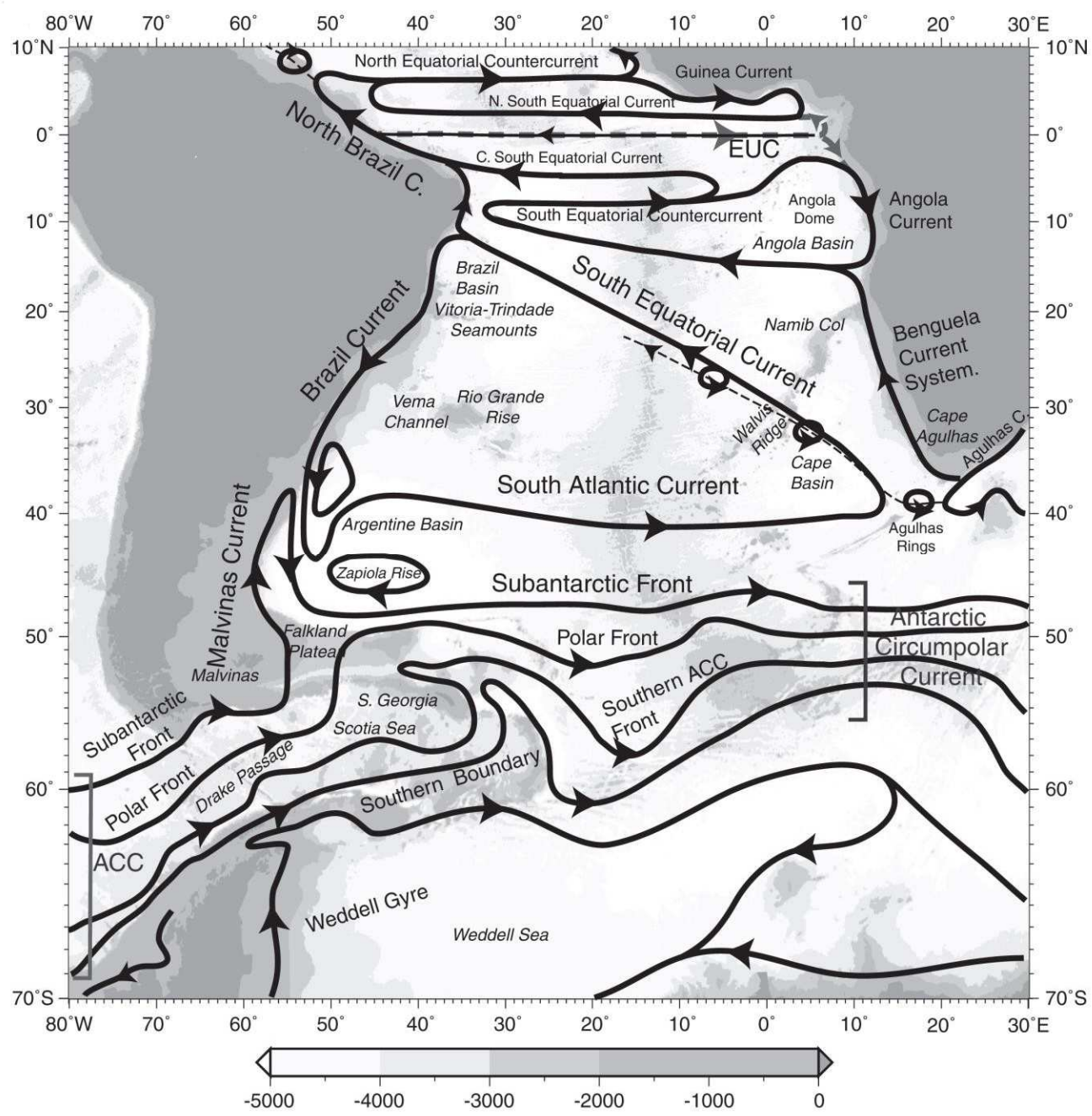

Figure 5. Major currents influencing ecological processes and biodiversityin the South Atlantic Ocean.

Soucrce: Talley et al. 2011. Introduction to Physical Oceanography 6th Ed. Academic Press.

WHALES AND WHALING IN THE SOUTH ATLANTIC OCEAN

As stated above, the underlying purpose of the South Atlantic Whale Sanctuary (SAWS) is to promote biodiversity, conservation and the non-extractive and non-lethal utilization of whale resources in the South Atlantic. Thus, the intended SAWS encloses examples of:

i) Whale stocks which are depleted but known to be recovering (e.g. southern right whales,

humpback whales);
ii) Whale stocks which are depleted where the current trend is unknown (e.g. fin and sei whales);
iii) Whale stocks which are depleted where there is evidence that little recovery has taken place (e.g. the stock of blue whales that surrounds *Islas Georgias del Sur* area and those killed off northeastern Brazil until the 1960s);
iv) Whale stocks (such as Antarctic minke whales) for which there are population estimates agreed by the IWC Scientific Committee, but the trends are unknown;
v) Whale stocks whose current trends and sizes are absolutely unknown (e.g. pygmy right whales, sperm whales);
vi) Whale stocks which are experiencing unprecedented high mortality rates (e.g. southern right whales at *Península Valdés*, Argentina).

The SAWS would give complete protection from commercial whaling to stocks in all of the six categories listed above, as well as promote nonlethal biological studies on whale stocks in the context of the biological characteristics of these creatures.

Modern whaling has been seen as possibly the largest hunt in human history. It is estimated that approximately 3,000,000 whales have been killed around the world between 1900-1999, from which about 71% were hunted in the southern hemisphere. Fin, sperm, blue, humpback, sei and mink whales were by far the most hunted species in the Southern Ocean (species-specific catches ranging from about 117,000 to 700,000), while catch numbers for right and Bryde's whales are comparatively low (*ca* 4,000 and 7,000, respectively). Together, the South Atlantic and Antarctic Oceans were host to a large proportion of these catches.

All large whale species were exploited by commercial whaling in the South Atlantic Ocean. They were captured in both feeding and breeding grounds. Each large whale species suffered different degrees of exploitation and some were severely depleted. Between the XVII and the XIX centuries, right, humpback and sperm whales were captured by early whalers in the eastern South American and the southwestern African coasts. The faster species - blue, fin, sei, Bryde's and minke whales - became available to whaling after the introduction of modern whaling techniques (e.g. the harpoon gun, steam- powered vessels).

In the Antarctic (feeding grounds), large whales were taken and processed by both shore based stations established in Subantarctic islands as well as factory ships, while in tropical to temperate waters (breeding areas) they were primarily processed in land stations, though some factory ships did operate in the area. Up until the XX century, main continental whaling stations operating around the South Atlantic were, in South America, Cabo Frio and Costinha, in Brazil, both Brazilian-Japanese enterprises; and, in Africa, Cap Lopez in Gabon; Lobito, Elephant Bay, Mossamedes, Porto Alexandre and Baía dos Tigres in Angola, Walvis Bay and Luderitz in Namibia; Saldanha Bay (Donkergat and Salamander) and Hangklip in South Africa.

In Antarctic waters, the main species killed were blue, fin, sei, humpback and minke whales, while in the tropical/subtropical whaling (and breeding) grounds off the western African and the eastern South American coasts, the main species taken were right, blue, fin, humpback, sei, Bryde's, minke and sperm whales.

It is worth noting that the South Atlantic was a region intensely targeted by 'pirate' or illegal whaling. Its most blatant example is possibly the slaughter of endangered Southern right whales by pelagic fleets which continued until the 1970s, causing significant damage to the recovery of this species. Between 1960/61 and 1967/68, within the proposed Sanctuary, around 1300 southern right whales were killed off the coast of South America, and around 330 in the Southeast Atlantic north

of 40^{o}S. Other large whales were also subject to excessive and unreported catches by the same fleets, and the extent of the damage to species/stocks and implications for the future of these stocks in the South Atlantic are still under scrutiny.

The effects of coastal whaling in parts of the South Atlantic, as already noted, are only partially documented, and in Brazil Southern right, minke, sperm and humpback whales were killed in the 20th century by foreign and locally owned coastal whaling stations which impacted breeding populations in addition to the large catches taken in the Antarctic feeding grounds. The western South Atlantic humpback whale population was depleted to less than 4% of its pre-exploitation size in the late 1950s. It is also known that shore stations targeted right whales in Uruguay, and similarly there is scarce data, uncovered so far, to estimate the true scale of such operations.

Cetacean Species in the South Atlantic: Status of Current Knowledge

No less than 51 species of cetaceans inhabit the waters of the South Atlantic Ocean. Six of these (blue, fin, sei, Antarctic minke, humpback and southern right whales) are highly migratory baleen whales that feed in the Antarctic and Subantarctic oceans during summer and breed in tropical, subtropical and temperate waters in winter and spring. Three of these species, the Bryde's, pygmy right and common minke whales, present a more limited distribution and a less marked migratory pattern. Bryde's whales inhabits only tropical and subtropical waters as far south as 40ºS. Different forms of Bryde's whales have been identified in inshore and offshore waters and there is evidence that Bryde's whales in the Atlantic Ocean belong to a different stock from the ones in the South Pacific and Indian Oceans. Pygmy right whales live only in temperate waters between approximately 30ºS and 50ºS. Little is known about the distribution and migratory links of common minke whales in the South Atlantic; however, they are observed in Brazil throughout the year, peaking between June and August, and in Uruguay and northern Argentina in April and May, suggesting seasonal north-south movement. The sperm whale, a member of the toothed whale suborder, inhabits pelagic waters from tropical to polar environments. Breeding herds are restricted to tropical/subtropical waters north of 40ºS but mature males may migrate closer to the Antarctic continent. Sperm whales are also found in the South Atlantic Ocean basin, as well as many other smaller whale species. There are also several other species whose distribution encompasses international waters and various with largely unknown offshore distribution, but which seems very likely due to their biological characteristics. Annex II to this document presents a list of all cetacean species inhabiting the proposed South Atlantic Whale Sanctuary and what is currently known about their distribution and population status.

PRESENT AND POTENTIAL THREATS TO WHALE STOCKS AND THEIR HABITATS WITHIN THE PROPOSED SANCTUARY

It is customarily accepted that IWC-established whale sanctuaries have been mainly directed at preventing direct takes of whales in a given geographical area. Nevertheless, in line with the expanding scope of the IWC agenda to address whale conservation and management issues beyond the decisions on lethal takes, it is proposed that the SAWS should have among its objectives the coordination of regional efforts to ensure the recovery of cetacean resources and its non-extractive and non-lethal use by coastal States. Through regional cooperation and coordination, both at scientific and natural resource management levels, the SAWS can contribute to assess and, taking fully into account the sovereign actions and rights of coastal States, address cetacean conservation issues on a broader context. This section outlines some issues that are regionally important to

consider for the adequate conservation of cetacean species and which can be tackled by a cooperative effort within the SAWS.

Fisheries Interactions

Cetacean bycatch is known to occur in several fisheries in the South Atlantic and, nowadays, potentially represents the most significant source of human-induced mortality for these animals. Although limited schemes to monitor cetacean bycatch exist in some countries, there are no estimates of bycatch rates for most South Atlantic fisheries. High-seas fisheries for squid, shrimp and hake in the Western South Atlantic have impacted small cetacean populations, and concerns apply not only to cetacean by-catch, but also to the high level of wastefulness in relation to discarded catch. Trawling operations off Patagonia have been singled out as a potential threat to the survival of dusky dolphins (*Lagenorhynchus obscurus*) in the region.

In Brazil, gillnets are responsible for the by-catch of a number of small cetaceans. Franciscanas (*Pontoporia blainvillei*), Guiana dolphins (*Sotalia guianensis*) and bottlenose dolphins (*Tursiops truncatus*) are the most threatened species by coastal fisheries. Despite extensive researches with these species have been conducted for a number of years, only recently specific management recommendations were put into force by the Brazilian Government to reduce bycatch. This includes law enforcement in order to reduce the size of fishing nets and the adoption of fishery-exclusion areas. While coastal fisheries are recognized as being responsible for high rates of incidental captures, the knowledge of the impact of offshore fisheries on cetaceans is still incipient. Longline fisheries are known to impact killer (*Orcinus orca*), false killer (*Pseudorca crassidens*) and long-finned pilot (*Globicephala melas*) whales. New deep-sea fisheries, which are required by law to have on-board observers, are allowing a new understanding of the magnitude of these impacts. There are records of entanglements of Southern right,humpback whales and Sperm whale along the coast of Brazil. At least 23 humpbacks whales, 38 right whales and 1 sperm whale were observed entangled between 1999 and 2015, with an increase in the cases involving humpback whales in the last year.

In Uruguay, gillnet fisheries in coastal areas have the highest records of cetacean entanglements, with few records for large whales. The main species incidentally captured is the Franciscana, which have been systematically impacted by fisheries since 1940. It is estimated tha gillnet fisheries have killed 289 (95% CI: 266-350) franciscanas in 2006. Occasionally, bottlenose dolphins are also captured. The impact of longline fishery on cetaceans populations in Uruguay is low compared with other Uruguayan fisheries, with bycatch records of few dolphin species (common dolphins and killer whales).

In Argentina, southern right whales have been photographed carrying ropes that cause lesions on different parts of their bodies. Close to Tierra del Fuego, killer whales and sperm whales have been reported to steal bait and catches from longlines. These operational interactions have not yet been quantified. Between 2002 and 2012, twelve southern right whales were reported entangled or carrying ropes and/or fishing gear at *Península Valdés* and during 2013 in Bahía San Antonio, Río Negro. There are also records of by-catch of Franciscanas, Commerson's dolphins (*Cephalorhynchus commersonii*) and other small cetacean species in gillnets. Several studies have been carried on to mitigate this problem and recently the Secretaría de Ambiente y Desarrollo Sustentable and Subsecretaría de Pesca y Acuicultura began to develop a National Action Plan to reduce the by-catch of Marine mammals.

Fisheries interactions, such as bycatches are known to occur in some African countries. However, the magnitude of such interactions with different types of fisheries remains poorly understood.

The establishment of a sanctuary in the South Atlantic with a management plan allows scope for initiating collaborative research for a better assessment of the magnitude of the impact of fishery entanglements in whale stocks. A coordinated approach to identifying high risk areas, fishing gear, and mitigation measures with support from stakeholders and all states across the region would be one clear benefit of adoption of the sanctuary. Moreover, the promotion of capacity building under the IWC disentanglement program is another benefit of the SAWS to minimize fishery related mortality.

Collisions with Ships

Negative interactions between large whales and vessel traffic are likely to increase both as a result of the recovery of depleted species and populations and of the economic growth of coastal States in the region. Ships are increasing in size, requiring deeper and wider channels. Competition for vital water frontage will increase as the number of larger and faster vessels calling on regional ports increases.

Collisions with Southern right whales and other species have already been recorded both in South Africa and South America. With the recovering of some whale stocks the risk of ship strike increases in Brazil. There are records of ship strike in humpback whales in the Abrolhos Bank. Also in Brazil, propeller-slashed specimens of right whales washed ashore dead and two Bryde's whales also were found dead with propeller-inflicted traumas.

In Uruguay, between 2003 and 2007 seven southern right whales were recorded with large wounds due to collisions with large vessels along shallow coastal waters. Besides other preventive recommendations, the period August - October is considered as a "High Risk Time for Collision" in Uruguayan waters.

In Argentina, at least 26 southern right whales with lesions caused by propellers from vessels of different sizes have been photographed in *Península Valdés* (Instituto de Conservación de Ballenas
/ Ocean Alliance, unpublished). Also, one southern right whale was killed in 2008 when it swam rapidly into the propellers of an Argentine Navy ship as the ship was backing slowly (4 knots) from the pier in Puerto Madryn, Chubut Province. After this event, Prefectura Naval Argentina set a regulation (Disposicion Madr, RIA Nº 069/09) that implements a restriction for navigation through a single corridor and the mandatory reduction of speed below 10 knots for all vessels during southern right whale season between May and December in Golfo Nuevo, *Península Valdés*.

Management measures to reduce the risk of collisions between whales and vessels have generally been localized but may nevertheless involve global bodies and require consultation with stakeholders in the shipping industry over a much larger scale. For example, changes in shipping lanes, including those introduced to protect North Atlantic right whales in the Bay of Fundy, Canada, approaches to Boston, USA, off California coast USA and approaches to Panama Canal, all required decisions by the IMO after widespread consultation. At the Abrolhos Bank, studies aimed at determining the lower cetaceans density areas based on a recent agreement involving environmental authorities, a shipping industry and local NGOs to determine

the best route for barge navigation to avoid collisions. This model could be replicated in other high-traffic areas in the South Atlantic through a co-operative program aimed at minimizing this threat at an ocean basin scale.

The establishment of a sanctuary with a management plan allows scope for better coordination to address ship strikes through measures taken collaboratively through the IMO. A coordinated approach to identifying high risk areas and mitigation measures with support from stakeholders and all states across the region would be one clear benefit of adoption of the sanctuary.

Contaminants

Two major sources of contaminants are most relevant to the South Atlantic: runoff and sewage from human settlements and land-based activities, and offshore mineral exploitation. Pollution from coastal and land- based sources includes a vast array of potentially harmful substances which can impact cetaceans directly or through the degradation of important coastal breeding/feeding areas. The offshore exploitation of marine minerals can cause several environmental impacts to marine ecosystems, considering that habitat destruction is the main factor affecting the decline of the number of species around the world. Besides direct interference on the sea-bottom, marine mineral activities can cause an increase in the water turbidity, affecting the local primary production. These activities can introduce and promote nutrient availability causing eutrophication. Otherwise it can introduce toxic substances that may be incorporated by the organisms, causing growth changes and alterations on the rates of reproduction and survival of the species. Current methods to identify the environmental impacts associated with the offshore mineral exploitation are centered on the surveillance of pollutant introduction and bio-availability, on the verification of measurable environmental changes, and on the establishment of the relationship between the environmental response and pollutants.

In Western Africa, due of the lack of detailed scientific data on coastal, marine and freshwater environments, a certain degree of uncertainty prevails in assessing the pollution loads in general. Since the last decade, the United Nations Environment Programme (UNEP), as well as the Intergovernmental Oceanographic Commission (IOC/UNESCO) identified an urgent need for more precise qualitative and quantitative assessment of the significant sources of land-based pollution. Nevertheless, relevant information does exist which can be mentioned in the context of potential threats to cetacean conservation. Over- exploitation and impacts from the land-based settlements and activities in terms of industrial, agricultural, urban and domestic sewage run-off and other mining activities such as oil and gas are of particular concern along the coasts of Angola and Gabon.

Between Mauritania and Namibia, along the Atlantic coast, more than 46 million inhabitants occupy a narrow coastal margin some 60 km wide. The highest population density centres are located in some key cities along the coast. These high population concentrations could explain the rapid population growth rate and the migration movements between rural and urban areas, which result in an increase of the mean urban population growth and a rapid expansion of the coastal populations, which in this region represents an average of more than 25 per cent of the countries' population. Similar assertion can be extrapolated to other African coastal nations, as well as for Brazil, Uruguay and Argentina.

In South Africa it is estimated that over 33% of the population lives within 60km of the coast. In the Western and Eastern Cape Provinces approximately eighty percent of the population resides in the narrow coastal strip. Development and other pressures on the coast have recently increased dramatically, and it is expected that this trend will continue. Since 1965, fourteen major deep-sea

outfalls have been constructed in South Africa, which discharge industrial and sewage waste water in excess of 600,000 m^3 per day. There are also a number of outfalls with shorter pipelines along the coast, some discharging within the surf zone. In total, marine outfalls account for approximately eighty-six percent of the total discharges. Current volumes discharged appear to cause little long-term impacts, but this may change as volumes increase with an increasing coastal population.

In Namibia, pollution problems in the Erongo region are associated with commercial and urban activities, especially in and around the Walvis Bay harbour area. The fishing industry is still a major polluter of the seawater in the Walvis Bay due to lack of discharge treatment measures. Effluent wash water is led directly into the sea in the vicinity of water intake for the fish processing plants. Minor oil spills, discharge of waste containing traces of anti-fouling paints, sewage from ships and heavy metals from the export of semi- processed mine ore also contribute to the pollution of the sea water in the harbour and bay area.

In Angola, major identified contamination problems, besides the sewage from urban (mainly domestic) origin, marine debris and solid wastes, are the discharges from functioning industries, such as petroleum extraction in Soyo and Malongo, cement factories and soap, edible oil and breweries manufacturers in Luanda, in addition to port installations in Lobito. Besides, physical modification, coastal erosion of the littoral, particularly in Porto Amboim, Sumbe, is also of great concern.

In São Tomé and Príncipe, an archipelagic nation which has its EEZ partially surrounded by the proposed Sanctuary, considering the heavy rain in the country and the fragile coastal ecosystems, the most serious problems related to marine and coastal environment are due to huge quantities of sediments carried by rivers, which contribute to the disturbance of the aquatic environment.

Brazil, with the largest coastline and EEZ of the South Atlantic, has proportionately larger challenges regarding marine contamination, its mitigation and prevention. Today, more than a quarter of the Brazilian population is concentrated along the coast, with a population density of around 87 inhab/km^2, much higher than the national average of 20 inhab/km^2, and whose way of life has a direct impact on the coastal ecosystems.

Península Valdés in Argentina is the main calving ground for southern right whales in South America. In the same region, sources of metals include mining, storage and transport of petroleum, harbour activities and cities that have settled in the area and are under expansion. The biggest aluminum factory in the country is located on Golfo Nuevo, the southern gulf of the Peninsula. Moreover, sea currents moving in north-south direction bring waters from the Plata river basin, particularly from Buenos Aires and Montevideo, which are the most populated and industrialized areas of both countries with numerous metallurgical, petrochemical, textile and pharmacological industries. Levels of nonessential and essential metals and elements in skin biopsies from living female southern right whales were measured at *Península Valdés*. The levels in the skin of these animals were on the low end of the spectrum of measured concentrations when compared to other studies, with Aluminum having the highest value.

Acoustic and Noise Pollution

The relation between cetaceans and anthropogenic noise, including noise from shipping, seismic surveys and sonar has been extensively discussed by the IWC in recent meetings. The South Atlantic is exposed to the effects of increasing international shipping, localized seismic exploration activities, and military operations. The effects of noise pollution are not as easy to detect as are other more

obvious and visible pollutants like oil spills and marine debris. To what extent these manmade sounds are negatively impacting the oceans is not fully known, as well as their long-term effects. Currently seismic survey activities are potentially the greatest concern for the region since they may interfere with still unknown whales migratory paths and their known and unknown breeding grounds.

The International Maritime Organization (IMO) has recognized the need to take action to reduce underwater noise from ships and through efforts towards developing quieting technologies for commercial vessels. This led to recommendations that countries identify their noisiest ships that could most benefit from quieting technologies, and the establishment of design standards for reduced noise alongside energy efficiency. However, progress to implement these recommendations remains slow.

Hydrocarbon Exploration and Exploitation

Oil and gas exploration and exploitation occur in several areas of the proposed Sanctuary and tends to progress farther in offshore areas. Concerns regarding the relationship between cetacean strandings and seismic surveys have led Brazil to apply the Precautionary Principle, prohibiting such activities during the whale reproduction season to avoid risks to humpback whales in their breeding ground. Brazil is also implementing domestic measures to study, monitor and mitigate the negative impacts of offshore oil exploration on marine ecosystems, and these initiatives may be of benefit to all countries in the South Atlantic region in the context of cooperation at the ocean basin level.

In Gabon, there are also concerns regarding short and long-term effects of the current exploitation of hydrocarbon resources by a range of industries, with the perspective of expanding efforts in the next few years, and the need for management measures to minimize negative impacts on humpbacks and the overall ecosystem.

Significant sources of marine pollution have been detected around coastal petroleum extraction and processing, releasing quantities of oil, grease and other hydrocarbon compounds into the coastal waters of the Niger delta and off Angola, Cameroon, Congo and Gabon.

Climate Change

The possible effects of climate change also need to be considered when assessing future threats to cetaceans. There is a significant relationship between global climatological effects and the oceanographic parameters of the South Atlantic, which are closely linked with those of the Southern Ocean. When considered together along with other human activities that alter the marine environment, such as cities, river dams and soil erosion, relatively minor changes in global circulation patterns could cause significant alterations in South Atlantic ecosystems.

Climate change is expected to affect cetaceans mainly through the loss of habitat, given the distinct temperature-linked ranges of most species, changes in prey availability and potential increased competition from range expansions of other species. The potential impacts include changes in abundance, distribution, timing and range of migration, prey abundance and distribution, and reproductive success and ultimately survival.

It is unclear to what extent cetaceans will be able to adapt to the rate of climate change, but it is predicted that some species will not support large range shifts. Warming is predicted to impact first at the southern limits of species range, forcing shifts in species distribution towards north. However,

the ability of the majority of species adapted to cooler waters to move northwards is constrained as waters warm.

With respect to ocean impacts the Intergovernmental Panel on Climate Change Final Draft (IPCC WGII, AR5, Chapter 6), released in March 2014, reasserts that community re-assembly under climate change involves a change in species composition and strongly alters food web structure, *e.g.*, causing shifts in trophic pathways, some of which are irreversible.

On this subject, research has shown that right whales off *Península Valdés*, Argentina, have fewer calves than expected following years of low krill abundance on their feeding ground off *Islas Georgias del Sur*. Krill abundance declines in years when sea surface temperatures are higher than normal, such as in El Nino years. This finding indicates that some Patagonian right whales are krill dependent for successful reproduction and could experience prolonged reproductive failures if krill abundance declines in response to global warming.

Die-offs

Southern right whales are dying in unprecedented numbers on their nursery ground at *Península Valdés*, Argentina, in what is the most extreme mortality event ever observed for the species. Until recently, this was considered a healthy and robust population. However, at least 626 whales died between 2003 and 2014. The majority of the dead whales were calves less than three months old. Possible causes for these high mortalities include biotoxins, infectious diseases and reduced availability of food for females. The Southern Right Whale Health Monitoring Program, a consortium of Universities and NGOs (University of California – Davis, Whale Conservation Institute, Instituto de Conservación de Ballenas, Wildlife Conservation Society and Fundación Patagonia Natural) has performed post-mortem examinations of hundreds of whales found dead on the shores of *Península Valdés* between 2003 and 2013. Hundreds of biological samples have been collected and analyzed since 2003. However, a common cause of the high mortality rates in this southern right whale population remains to be found. In view of these deaths, it seems that this whale population and its ecosystem may be less healthy and robust than previously stated. This reinforces the importance of continuing research and monitoring efforts to help understanding population trends and their causes.

Kelp gulls feed on the skin and blubber of live southern right whales at *Península Valdés*. The gulls open large wounds on the whales' backs and affect whale behavior by interrupting nursing and resting bouts and increasing travel speed. The percentage of living mothers and calves with gull lesions increased from an average of 2% in the 1970s to 99% in the 2000s. Hence, kelp gull attacks have been considered as a potential cause of right whale calf mortality at *Península Valdés*.

NATIONAL AND REGIONAL MEASURES FOR WHALE CONSERVATION IN THE SOUTH ATLANTIC

Regional Perspective

A South Atlantic Whale Sanctuary is not intended to replace or supersede national efforts for cetacean conservation. Rather, it shall serve as an umbrella under which adequate coordination, cooperation and synergy can be promoted towards achieving common goals. This is of particular importance for the many species which migrate among coastal States´ jurisdictional waters and between these and the high seas, as well as for those species whose offshore habitat use patterns

that are yet to be properly understood.

An IWC Whale Sanctuary is not a Marine Protected Area (MPA) in the generally accepted interpretation of these, since under the IWC it would only prevent commercial direct takes from impacting cetacean populations. The proposed SAWS, therefore, is intended to promote cooperation well beyond this restricted interpretation, including support for the coordination among MPAs established at national levels or under other relevant international initiatives, such as the World Heritage Convention and UNESCO Man and the Biosphere programme. This objective was actively promoted during discussions at the V IUCN World Parks Congress (WPC-5), and will be again brought up to the forefront at the VI WPC (Sydney/Australia 2014) as a cross- cutting theme, and is of paramount importance for future management initiatives in the SAWS. It has recently been noted that novel designs of MPAs guided by a consideration of marine mammal distribution and life history may greatly enhance the effectiveness of existing protective measures. A Sanctuary may help provide the cooperation framework for such innovative planning.

The notion of encompassing high seas areas in a Whale Sanctuary as proposed is fully consistent with Article 194 of UNCLOS which stipulates measures to protect 'rare and fragile ecosystems **as well as the habitat of depleted, threatened or endangered species** and other forms of marine life' (emphasis added).

Marine Protected Areas within the SAWS

Four countries, representing the vast majority of national marine jurisdictions in the South Atlantic encompassed by the SAWS, have established marine protected areas which, under different categories, provide for the protection of cetaceans and critical habitats. A recent survey indicated that more than 30 MPAs relevant for cetaceans have already been taken into account in the SAWS proposal, which harbour at least 19 whale and dolphin species.

National Legislations

Apart from the designation of specially protected areas, cetaceans are fully protected in most jurisdictional waters of the South Atlantic. In South Africa, the Marine Living Resources Act of 1998 has established strict conservation rules for cetaceans and laid the foundations for whale watching regulations, which nowadays include a refined operator permit system. In Brazil, the killing, capture or intentional harassment of cetaceans was banned permanently in 1987 through federal law. There is a compendium of Federal, State and Local laws intended to protect cetaceans. Federal Law n^{o} 7.643/1987 prohibits *"fishing, or any form of intentional harassment of all cetacean species in Brazilian waters"*. Federal Decree n^{o} 6.514/2008 prohibits anyone from *"willfully molest any species of cetacean, pinniped or sirenian in Brazilian territorial waters"*. As for the whale watching tour, Ordinance IBAMA n^{o}. 117/1996, amended by n^{o} 24/2002, deals with the procedures to be adopted especially in relation to whales, and IBAMA Ordinance n^{o} 05/1995 is specific to spinner dolphins (*Stenella longirostris*) of Fernando de Noronha.

In Argentina, a country that has prohibited whaling activities since the early 1950's in its jurisdictional waters, all cetaceans are protected federally and Provinces regulate its non-lethal use. In Chubut Province, provincial laws and regulations are particularly aimed at the regulation of whale watching.

In Uruguay since 2002 federal regulations have been in place to prevent harassment of cetaceans and establish appropriate whale watching norms. Species such as the Southern right whale, because

of their outstanding cultural and economic value for whale watching and the development of coastal communities, have also been given special protection under different legal measures (e.g. National Natural Monument in Argentina, State Natural Monument in Santa Catarina, Brazil, etc.). In September 2013 Uruguay adopted Law nº 19.128, which designates the country's territorial waters as a *"sanctuary for whales and dolphins"*. The Law applies not just to the territorial sea but also to the EEZ and prohibits the chasing, hunting, catching, fishing, or subjecting of cetaceans to any process by which they are transformed. It also includes a prohibition against the transportation and unloading of live whales and dolphins, irrespective of whether vessels sail under Uruguayan or foreign flags. The law envisages penalties for those who do not comply. Exceptions will be made for scientific and medical cases, providing they are approved by state authorities. The law also takes into account cases of harassment, aggression, or any other mistreatment that could lead to the death of cetaceans.

The Gabonese Government has publicly committed to the expansion of marine protected areas through the creation of a Presidential Coastal Task Force, and has requested a clear proposal highlighting how to create no-take reserves in existing protected areas and establish new protected areas.

Individually, other South Atlantic coastal States are developing flexible regulatory frameworks for boat-based whale watching, with a view of adapting legal norms to the rapidly increasing wealth of knowledge about potential impacts of the activity on cetaceans.

APPROPRIATENESS OF THE PROPOSED SANCTUARY AND ITS BOUNDARIES FOR WHALE CONSERVATION

In accordance with Article V(1)(c) of the ICRW, it is proposed that the area of the Atlantic Ocean described below be designated as the SOUTH ATLANTIC WHALE SANCTUARY (SAWS). Its endorsement by the IWC will require an amendment in the Schedule through the inclusion of a new paragraph in Chapter III that should read as follows:

"In accordance with Article V(1)(c) of the Convention, whaling activities of any kind*, whether by pelagic operations or from land stations, is prohibited in a region designated as the South Atlantic Whale Sanctuary. This Sanctuary comprises the waters of the South Atlantic Ocean 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, where it reaches the boundary of the Southern Ocean Sanctuary; thence due east following the boundaries of this Sanctuary to the point where it reaches the boundary of the Indian Ocean Sanctuary at 40°S; thence due north following the boundary of this Sanctuary 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. This prohibition shall be reviewed twenty years after its initial adoption and at succeeding ten-year intervals, and could be revised at such times by the Commission. Nothing in this sub-paragraph shall prejudice the current or future sovereign rights of coastal states according to, inter alia, the United Nations Convention on the Law of the Sea. With the exception of* Argentina, Brazil, Gabon, South Africa, and Uruguay*, this provision does not apply to waters under the national jurisdiction, according to its current delimitation or another that may be established in the future, of coastal States within the area described above, unless those States notify the Secretariat to the contrary and this information is transmitted to the Contracting*

Governments."

The IWC Technical Committee Working Group on Whale Sanctuaries (TCWGWS) recommended that "*information should be provided on the area proposed for designation as a sanctuary. Specific*

information should be given in support of the boundaries proposed and the degree to which the proposed boundaries relate to existing IWC stock management areas. Information should be given on the degree to which the proposed sanctuary would offer protection to the primary species in terms of ranges and critical areas such as breeding or feeding grounds and migratory pathway or any other ecological consideration". In addition, the instructions for the review of sanctuaries require the IWC Scientific Committee to provide advice on whether the boundaries are ecologically appropriate.

Boundaries of the SAWS were defined (Figure 1 and 2) taking into account discussions and recommendations held over the years at the IWC. The northern limit, the Equator, is approximately the northern range of some Southern populations of migratory whales. It has been widely accepted that populations of Southern Hemisphere species (except probably the Bryde's whale) usually do not cross the Equator and therefore do not mix with Northern Hemisphere populations. Studies conducted in South America suggest that minke and humpback whales migrate as far north as 5ºS and 3ºS, respectively. Information on the northern range of other migratory rorquals is proportionally limited but it is unlikely that these species mix with North Atlantic populations as well. In addition, although breeding herds of sperm whales are continuously distributed between approximately 40ºS and 45ºN, marking experiments have not identified any sperm whales that have crossed the Equator and therefore it is likely that northern and southern stocks remain separate. Also, differences in breeding season possibly warrant genetic isolation between the two populations. In addition to this, the warm west-east flowing Equatorial Current is located near the Equator. This current coincides with the northern limit of the SAWS and may serve as an oceanographic boundary to several physical and biological processes that occur in the North and South Atlantic Oceans.

The eastern boundary of the SAWS is established in the western African coast and the 20ºE meridian, which corresponds to the western limit of the Indian Ocean Sanctuary. The southern boundary of the SAWS is set in the northern limit of the Southern Ocean Sanctuary, which is nearly equivalent to the Subtropical Convergence. The western boundary is the eastern coastline of the South American continent and the approximate limit of the Atlantic and Pacific Oceans**.**

Within these boundaries specific measures to improve whale conservation have been implemented in a smaller scale, in the form of zonation specific to whales. As already mentioned above, the South Atlantic Whale Sanctuary could assist in the development of a network of such appropriate localized measures. These could address the issue of protection of critical habitat for whales within a coordinated framework.

From the biological and ecological points of view, the proposed Sanctuary encompasses known breeding grounds for all large whale species in the South Atlantic Ocean. It also takes into account the yet undetailed migratory paths that baleen and toothed whales may use in their way to and from their feeding grounds. For instance, the Southern right whales that calve off *Península Valdés* are now known to move as far north as southern Brazil, east as Tristan da Cunha and southeast as near *Islas Georgias del Sur*. Recent research combining genetic and stable isotope analyses made clear that the whales from *Península Valdés* show site fidelity to their feeding grounds and that calves inherit their foraging locations from their mothers. This "conservatism" in use of feeding grounds could limit the exploration of new areas and could explain why this population has fewer calves than expected in years following sea surface temperature anomalies such as El Niño events that raise water temperatures off *Islas Georgias del Sur* and reduces krill abundance. Four right whales previously identified at *Península Valdés* have been resighted feeding off the Island of *Islas Georgias del Sur*, the area in the western South Atlantic with the highest abundance of krill in the

Southern Ocean and one of the major feeding grounds for all whales in the South Atlantic. An individual southern right whale first identified in *Península Valdés* was seen later in Tristan da Cunha, at 4,424 km from its first sighting in the South Atlantic.

Recent studies have shown that humpback whales wintering off Brazil travel a relatively direct, linear path from wintering to feeding grounds near *Islas Georgias del Sur* and the *Islas Sandwich del Sur*. The information available demonstrates that large whales do utilize a significant portion of the proposed SAWS as their home range and migratory routes. In addition, the proposed sanctuary, in conjunct with the current geographical area covered by the boundaries of SOS and IOS, would constitute a mosaic of non-intentional catch zones, complementing and reinforcing other international initiatives for the conservation of whales. The SAWS would grant full protection to several depleted whale stocks in the Southern Ocean, since it would include all critical ecological areas for their life cicle (i.e. areas of feeding and breeding grounds and areas used for seasonal movements).

OBJECTIVES FOR RESEARCH AND MANAGEMENT

The preamble to the ICRW recognizes as a common interest the achieving of the optimal level of whale stocks as rapidly as possible without causing widespread economic and nutritional distress. Since the coming into effect of the commercial whaling moratorium by the IWC in 1986, utilization of whales by South Atlantic nations has been exclusively non-extractive and non-lethal. For the purpose of non-extractive and non-lethal uses (including, but not limited to, tourism and research), the optimal level of whale populations is equivalent to the recovered level since this provides for the highest sustainable abundance of whales. Objectives for the SAWS are set, therefore, taking into account the reality of the region in terms of the non-extractive and non-lethal use options. These are entirely consistent with Article V of the ICRW as it specifies that closed areas may be designated with respect to the conservation and utilization of whale resources.

Primary Sanctuary Objectives

The primary goal of the SAWS is to promote the biodiversity, conservation and non-lethal utilization of whale resources in the South Atlantic Ocean. To achieve this goal, its primary objectives are:

1. To maintain or increase current whale stocks levels, by mitigating identified threats to whale stocks, as well as to identify and quantify other potential threats;

2. In conjunction with the Southern Ocean Sanctuary, promote the long-term conservation of large whales south of the Equator, embracing the entire range of numerous stocks (i.e. ecologically meaningful boundaries), including breeding and feeding grounds, and migratory routes;

3. To stimulate coordinated non-lethal and non-extracive research in the region, especially by developing countries, and through international cooperation with the active participation of the IWC.

4. To develop the sustainable, non-extractive and non-lethal economic use of whales for the benefit of coastal communities in the region (e.g. whale watching and educational activities).

5. To integrate national research, management efforts and conservation strategies in a cooperative framework, maximizing the effectiveness of management actions, taking

into full account the rights and responsibilities of coastal States under UNCLOS.

6. To provide an overall framework for the development of localized measures, in order to maximize conservation benefits at an ocean basin level.

Development of a Sanctuary Management Plan

To date, no Whale Sanctuary established under the ICRW has implemented a management plan. The lack of such plans has however not prevented these sanctuaries from being useful for whale conservation as originally proposed. While it is obviously impossible to draft specific management measures before any area is defined and agreed as a Sanctuary, there are nevertheless many benefits in preparing an adequate management plan proposal which can take into account national and regional whale conservation measures, as well as integrate efforts at the ocean basin level once the South Atlantic Whale Sanctuary is adopted.

The establishment of the proposed Sanctuary would, therefore, be followed by the implementation of a management plan (please see Annex I of this document for suggestions as to possible content) to address protection during vulnerable phases of the whales' life cycles and important habitats. The eventual management plan must be informed by contributions from coastal States bordering the Sanctuary and relevant national, regional or international bodies, including, as appropriate, the development of proposals for the zoning of the Sanctuary into areas with differing levels of protection for whales. These could take into account factors such as:

- A scientific evaluation of the conservation needs of whale species/populations in each area, including the level of known or potential threats;
- The status of whale populations (e.g. depleted with little recovery; depleted with rapid recovery; not thought to be depleted, or unknown);
- The habitat usage of species, including feeding, breeding and migration, and the identification of critical habitats;
- Existing research programs and opportunities for future research and cooperation;
- Existing areas of whale habitat protection already established by coastal States in the Sanctuary and its current or potential exchanges and synergies;
- Existing coastal State policies in regards to the management of marine resources in waters under their national jurisdiction and the potential for synergy, resource pooling and cooperative exchange, and their sovereign rights as asserted by the United Nations Convention on the Law of the Sea.

It is noteworthy that some of the intended cooperative synergies already occur at the level of jurisdictional waters of some coastal States in the region; for instance, in Uruguay an internationally recognized UNESCO Biosphere Reserve in Rocha and Maldonado States encompasses Southern Right Whale habitats, to which several whale researchers from countries in the region are actively contributing. In September 2004, a network was created to promote regional cooperation on marine protected areas which include relevant cetacean habitats. The SAWS proposal aims to extend such active cooperation to scopes beyond national jurisdictions and to reinforce existing links among scientists, managers and other stakeholders.

While the proposed Sanctuary encompasses both coastal and high seas areas, international cooperation is needed to monitor some offshore regions, coastal monitoring of cetaceans provides invaluable data for research and should be included in any management plan initiative. The integration of geographically- based research cooperation networks is an essential tool for the achievement of the Sanctuary's objectives. In this regard, stranding networks, such as those already

established in Brazil and which cover more than 4,500 Km of coastline through the work of 23 governmental and non-governmental institutions, can be integrated in a Sanctuary monitoring program in a cost-effective manner.

It is understood that, in accordance with the provisions of the proposed Sanctuary, its management 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.

Other Research and Management Aspects and Opportunities relevant to the SAWS

The South Atlantic Ocean is bordered exclusively by developing nations, who have historically faced difficulties for the development of marine research given the limited financial resources normally available for both public and private scientific endeavors.

Notwithstanding, South Atlantic nations have made enormous progress in the past few decades towards a better understanding and proper conservation and utilization, through non-lethal means, of the whale resources present in the region. Local scientists and institutions have advanced significantly towards a comprehensive understanding of cetaceans both large and small that inhabit the region.

In particular, endangered and threatened species such as Southern right whales and humpback whales have been the subject of long-term studies in their calving grounds. Breakthrough achievements in the region are well known and it is noteworthy that the South Atlantic, in particular its western margins, Gabon and Southern Africa, is a region where non-lethal research on whales has been greatly developed by cooperative research efforts since the early 1970's.

Along with the growing interest in whale watching in the region there came an interest of native researchers in studying its effects and potential impacts on whale populations subject to this important economic use of whale resources. Ensuring the long-term sustainability of whale watching is an essential part of its development. Thus, research on the operation and effects of whale watching has been under way in Argentina, Brazil and South Africa, which are three countries where this activity is already economically important and growing.

Stock identity, population size, ecology and behavior of large whales in the South Atlantic are all research aspects which have greatly progressed in the region through the use of non-lethal techniques. A brief look at the leading international scientific journals in the field, and the growing participation of scientists from the region in relevant international scientific meetings, shows abundant evidence of efforts conducted by Range States of the South Atlantic. As for the national budgets currently available in the region for marine mammal research, they continue to represent a unique achievement as far as cost-benefit ratios are considered.

However, much remains to be addressed in the region concerning scientific research, especially on pelagic species. For instance, Balaenopteriids stocks must be better assessed, and for blue, fin, sei, Bryde's and minke whales there are enormous uncertainties regarding population size and/or populations trends, stock structure, calving ground boundaries and migratory routes. Progress on these topics can be achieved through the implementation of a well-designed scientific plan, respecting the Range States' sovereign decision to pursue scientific research through non-lethal means, if only more international cooperation could be organized and implemented. Such research

would include, among other topics:

- Analysis of genetic diversity and population connectivity;
- Monitoring the recovery of depleted stocks;
- Surveys of historical open-ocean whaling grounds;
- Development of projects and initiatives to better understand migratory routes and movement patterns;
- Analysis of threats and potential mitigation measures to those threats across a range of spatial scales;

  Monitoring changes in distribution due to: shifts in prey density; temperature changes due to weather patterns and/or possible links to global warming; anthropogenic factors including vessel traffic, seismic activities, etc.;
- Analysis of pollutant load in cetaceans and their environment and potential threats for recovery of depleted whale stocks; and
- Development of non-lethal techniques, testing and application of methodologies with possible comparison with other regions.

Encompassing the breeding grounds for all large whale species in the South Atlantic, plus feeding areas for at least two or three such species (Bryde's and sperm whales, and maybe common minke whales), and migratory corridors yet to be properly surveyed, the SAWS offers a unique opportunity for international cooperation in obtaining vital information concerning these species' life cycles: for instance, open ocean surveys of the 'Brazilian Banks' which concentrated historic catches of foreign whaling fleets in the region; satellite tracking of migrating individuals; further interaction between research in breeding grounds which, if conducted inside the Southern Ocean Sanctuary, are all windows of opportunity that could benefit immensely from the establishment of an IWC Sanctuary in the region. The cooperation thus fostered would benefit primarily its developing country members in the region by enlisting local and foreign scientists and institutions alike in a cooperative manner.

Issues Arising from Discussions on Sanctuaries at the IWC and its Scientific Committee

Stemming from the prohibition of commercial whaling, the IWC now aims at developing a coherent scheme for scientific research and habitat preservation considerations in the overall objective of protecting whale species. This is consistent with the notion of evolving interpretation of its founding treaty and decidedly highlights the importance of sanctuaries in a global whale conservation framework.

Scientific uncertainty is deeply imbedded in international environmental law, and the Precautionary Principle became recognized in modern legal instruments in order to tackle this reality. This is especially true in relation to whale management, given the migration patterns of whales throughout the world's oceans, low rates of reproduction, late onset of sexual maturity and the potential for small populations in relation to the extension of habitat for several species, especially after the depletion brought by decades of commercial whaling. Accordingly, previous methods for ascertaining whale populations have been proven dangerously inaccurate because data are subject to several biases and methodological flaws, and in many cases an absolute lack of definitive data on species' stock divisions and actual distribution.

While the 1946 Convention requires that management measures including the establishment of sanctuaries be based on scientific findings it does not provide a precise definition of the scientific basis for the establishment of a closed area, thus leaving undetermined the kind of evidence that

needs to be brought forth by proposing member States. Although there have been differences of opinion within the Scientific Committee over the merits of sanctuaries, productive discussions can be held within the framework of the Committee, which may help the Commission as a whole to decide on the merits of proposed new sanctuaries. It must also be noted that while scientific findings are relevant, they by no means exhaust the reasons why sanctuaries are important as management tools.

During the review of the Southern Ocean Sanctuary in its 2004 meeting, the Scientific Committee developed a series of recommendations to facilitate evaluation in future reviews (items 1-7 below).It was also recognized at that time that many of these recommendations were relevant to the review of proposals for new sanctuaries:

"(1) The purpose(s) of the SOS (and other IWC Sanctuaries) should be better articulated through a set of refined overall objectives (e.g. preserving species biodiversity; promoting recovery of depleted stocks; increasing whaling yield). In particular, the relationships between the RMP and the Sanctuary programme should be articulated.

(2) Appropriate performance measures both for Sanctuaries in general, and the SOS in particular, should be developed. These performance measures should link the refined objectives of the SOS with monitoring programmes in the field.

(3) Systematic inventory and research programmes should be established or further developed so as to build the required information base for a Sanctuary management plan and subsequent monitoring programmes.

(4) A Sanctuary management plan should clearly outline the broad strategies and specific actions needed to achieve Sanctuary objectives (e.g. how to protect *x*% of a given feeding area for stock *y*).

(5) A monitoring strategy that measures progress toward achieving the Sanctuary objectives should be developed and subsequently implemented. A key component of this monitoring strategy would be the development of tangible indicators to monitor progress.

(6) Review criteria that reflect the goals and objectives of the Sanctuary (as described above) should be established.

(7) The Sanctuary management plan should be refined periodically to account for ecological, oceanographic and possible other changes in an adaptive fashion."

The objectives of the proposed SAWS are listed in the beginning of this section. These include both research and management objectives. Some of the research objectives are already being addressed to some extent and the role of the SAWS would be to stimulate coordinated research at a regional level through international co-operation with the active participation of the IWC. Co-ordinated, multi-disciplinary research is widely recognized as being essential for management but it is difficult to identify performance measures for quantifying the role of SAWS in this context. In previous reviews of IWC sanctuaries the Scientific Committee has not been able to agree on ways to measure research effort undertaken in response to the Sanctuary designation, compared to what might have been undertaken without the existence of a Sanctuary. Nevertheless, the proposed management plan would be a new initiative whose success could be evaluated. One of the objectives of the SAWS is to provide an overall framework for the development of localized measures to maximize the

conservation benefits at an ocean basin level. The necessary steps to achieve this objective will involve quantifying the combined contribution of localized management initiatives to overall conservation objectives. Although strictly not a performance measure of the SAWS itself, this objective could provide a framework to measure the combined performance of the network of measures within the SAWS.

Aspects of whale population management objectives in the SAWS

In the case where cetacean utilization is exclusively non-lethal, strategies aiming at maintaining or increasing the current level of whale stocks (as is one of the objectives of the current proposal) is advantageus over reducing stocks below this level, because it:

(i) Maximizes the encounter rate of whales, by research and whale watching vessels, in areas where whales already occur;
(ii) Maximizes the likelihood of whales expanding their range and re-colonizing habitats occupied historically in pre-whaling times;
(iii) Provides the greatest margin of safety, and time for remedial action, in the event of possible unexpected detrimental factors that may impact whales in the future.

To this end, avoidable takes of whales are to be minimized.

The RMP and the SAWS

In 1994 the IWC accepted the Revised Management Procedure (RMP) model as a component of the yet to be adopted Revised Management Scheme (RMS). Previous debates about the scientific justification for whale sanctuaries have polarised on the degree of protection an accepted RMP and RMS would afford whale stocks. The RMP requires estimates of current whale abundance, and while the conservative nature of this model intends to incorporate the uncertainty around such estimates, the experience of the past decades has been that abundance estimates are extremely difficult to derive and agree upon. Furthermore, problems associated with the back-extrapolation of abundance estimates to calculate pre-exploitation whale numbers have been identified. Difficulties with the use of traditional generalised logistic models of population dynamics for such purposes, as well as the current uncertainty (and order of magnitude differences in estimates) of genetic approaches, have been recently pointed out. The associated problems of determining current and historic whale abundance mean it may not be possible to place the current population status of Southern Ocean whale stocks in the context of recovery from over-harvest. The RMP also relies on determining stocks and stock boundaries such that any take can be attributed to each putative stock. The understanding of the stock structure of Southern Hemisphere whales (except perhaps Humpback and Southern Right Whales) remains rudimentary.

The management objectives of the South Atlantic Whale Sanctuary differ significantly from those of the RMP. While both share the objective of conserving whale stocks and avoiding their extinction, a further objective of the RMP is to make possible the highest continuing lethal yield from whale stocks. The objectives of the Sanctuary involve exclusively non-lethal uses, for which different target levels for whale stocks would apply than for lethal uses. It would, therefore, not be appropriate to apply the RMP target levels or catch limit formulae to whales within the Sanctuary.

This does not imply a rejection *per se* of the scientific validity of the RMP as a means to achieve the management objectives for which it was designed, but merely that the management objectives

of the Sanctuary are different from those that the RMP was developed to meet.

It is important to note that the RMP cannot be legitimately applied in practice before the IWC agrees on a new international whaling management system (so-called the Revised Management Scheme, RMS) which encompasses many vital aspects of the activity, such as inspection and observation, compliance, and costs, besides the setting of catch quotas. Protracted negotiations on an RMS have been under way for a long time, and the discussion and establishment of whale sanctuaries must not be stalled in the meantime, given the patently diverse nature of management options for lethal and non-lethal uses of whale resources.

There is considerably more positive overlap between the objectives of the proposed South Atlantic Whale Sanctuary and the existing Southern Ocean Sanctuary. In view of the regular migration of many whale stocks between the area of the proposed SAWS and parts of the SOS, co-ordination of research and management activities developed in the two sanctuaries will be very important.

Performance measures for the SAWS

Worldwide experience with the recovery of depleted whale stocks is still fairly limited. Hence specific performance measures, in terms of how quickly depleted stocks may be expected to recover, both in terms of numbers of whales and in terms of occupied habitat, are hard to specify. It is more important to ensure that whale stock trends are monitored, so that their population dynamics and interaction with their environment become better understood over time.

Ideally, the residual human impacts on whales in the SAWS should be such that the population levels attained are not substantially less than the levels they would reach in the absence of any disturbance, say within 10%. However, our understanding of the relationship between whale population dynamics and impacts on habitat needs to improve before we can quantify the relationship and determine what additional protective measures are required to achieve a given target.

Data from existing and expanding long-term whale monitoring programmes in the South Atlantic can be used to assess whether the goals of SAWS related to the recovery of whale populations are being achieved. For humpback and Southern right whales, such programmes have already been in place for decades using a variety of efficient non-lethal research methodologies, such as line-transect and photo-identification surveys, biopsy sampling and, more recently, satellite telemetry and passive acoustic monitoring. The SAWS can have a crucial role in helping national programs in the region to build upon existing co-operative efforts.

Some milestones could therefore be established to help achieve SAWS objectives, including *inter alia*, estimate the abundance, trends and stock structure of coastal breeding whales along the east coast of South America and west coasts of Africa, through sighting and biopsy surveys. Emphasis would be given on humpback and southern right whales, as an index of stock status of species that feed in the Southern Ocean such that estimates could be used to determine when, and at what level, stocks reach their carrying capacity, and how this varies in time and space. On the other hand, continue to support IWC efforts to estimate the abundance and trends of Southern Ocean pelagic whales on their feeding grounds through non-lethal sightings and biopsy sampling surveys such that from these estimates can be determined when, and at what level, stocks reach their carrying capacity, and how this varies in time and space.

It would be crucial to ensure that data derived from these milestones are made available to relevant bodies of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

for its effort to construct meaningful models of Southern Ocean ecosystems.

NON-EXTRACTIVE AND NON-LETHAL USAGE OF WHALE RESOURCES IN THE SOUTH ATLANTIC: A LEGITIMATE MANAGEMENT OPTION OF COASTAL STATES

The issue of conservation, development, and optimum utilization of whale resources in accordance with Article V of the International Convention for the Regulation of Whaling must be interpreted, as already discussed in the Introduction to this document, in light of recent international practice and the rights of coastal States. Such utilization is no longer exclusively related to harvesting whales, but also encompasses whale watching activities, non-lethal scientific research, and sociocultural values of these animals. Therefore, with respect to the "optimum utilization of whale stocks," the sovereign interests of non-whaling countries of the Southern Hemisphere, whose tourism activities depend on whale watching, are better protected by conservation measures such as sanctuaries.

The establishment of a Sanctuary in the South Atlantic to provide for the conservation and optimum non- extractive and non-lethal utilization of whale resources is entirely in line with the application of the Precautionary Principle as commonly accepted in international fora. Principle 15 of the 1992 UNCED Rio Declaration states:

> ***"In order to protect the environment the Precautionary Approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".***

In this context, and in light of the history of commercial whaling, which has brought serious, if not yet irreversible, damage to most exploited whale species, the establishment of a Sanctuary as proposed:

- Averts the risk of scientific uncertainty brought about by the application of quota calculations and their potential effects, cumulative with other impacts, on the recovery and stability of whale populations;
- Is clearly a low-risk management strategy;
- Is clearly a cost-effective management strategy; and
- Takes fully into account the needs and values of coastal communities currently using whale resources in the region.

The establishment of the SAWS will not bring any economic hardship on Range States, as no State in the South Atlantic currently practices whale killing as an economic activity or for aboriginal/subsistence purposes. The SAWS is intended not only to enhance scientific cooperation activities but also to protect and foster the economic benefits that many local communities in the region are obtaining from the sustainable utilization of whale resources through responsible whale watching as a key catalyst to regional ecotourism.

The Commission, through its Resolutions and proceedings, has already asserted the benefits of whale watching in the economic and social contexts, and has taken responsibility for supporting member States in devising appropriate means to ensure

the sustainability of this practice. Such assertion was confirmed when, according to the Chairman's Report of the 50th IWC Annual Meeting, delegations identified the following as among the reasons for promoting whale watching around the world:

- It offers new opportunities for developing for coastal communities;
- It can represent substantial economic benefits;
- It is sustainable, non-consumptive use of cetaceans offering opportunities for non-lethal research;
- It offers opportunities for education and development of research methodologies.

IWC member States of the South Atlantic have established whale watching operations, whose economic importance is recognized, and which have great potential for increase. In Argentina, for instance, whale watching in *Península Valdés* generated revenues of at least U$D 16 million for the local tourist industry in 1997. The number of tourists going on whale watch tours to see southern right whales on this nursery ground increased dramatically, from 17,446 in 1991 to 113,148 in 2007 (548%). In Brazil, Southern right whales are the basis for a fast-growing boat- and shore-based ecotourism industry along the States of Santa Catarina and Rio Grande do Sul, and humpback whales off the State of Bahia are utilized for tourism in at least seven communities. Uruguay has already established government-sponsored land-based platforms for whale watching along the shores of Punta del Este and surroundings with increasing public interest. Argentina, Brazil and Uruguay whale watching activities generated total expenditures for US$93,197,692 in 2006, when the last socioeconomic study on this activity was carried out. In South Africa, 20 communities benefiting from whale watching have been identified. Collectively, South Atlantic States account for more than 750,000 'consumers of whale products', that is, people directly enjoying whale watching and benefiting at least 43 coastal communities. These activities are interwoven with both research and public education development, and are in many cases fundamental for these. Namibia, Angola, São Tomé and Príncipe and Gabon are all countries with a growing potential for the development of similar non-lethal uses and which could benefit from further international co-operation and capacity building in this field.

While species are indeed protected by national legislation of the South Atlantic Range States and at their feeding ground in the Southern Ocean Sanctuary, they remain highly vulnerable during their migration to and permanence in waters beyond national jurisdiction. Closing this gap is essential to ensure that the Commission upholds the conservation and sustainable use policies of IWC member States in the region properly.

Whale watching is an economic option, which presents a series of immediate social benefits for the people of developing countries, especially coastal communities, often in areas where other economic options are scarce. The fact that no whales are being killed for the fruition of these gains cannot be argued in an attempt to deny, undermine or otherwise diminish the sovereign rights of States to assert and maintain said non- lethal, actually sustainable uses. Rather, using cetaceans non-lethally during part or the entirety of their natural life cycle is a management option that not only promotes sustainability, but also allows for their expanded fruition in the same manner by other nations and peoples. By benefiting from the "interests gained" (i.e., the revenue generated by observing living whales) and not from the "capital" (i.e.,

the revenue generated by killing whales), whale watching makes sustainable use of this natural resource. Contrary to the whaling industry (which has historically been shown to deplete its own resource base, having under several management regimes been unsuccessful in ensuring sustainability), whale watching and non-lethal scientific research can potentially profit from this resource indefinitely over time.

It is also important to note that whale watching in South Atlantic coastal States is not limited to those who participate in whale watching tours. Enjoyment and appreciation of whales is brought to millions through the media of television, magazines and books; efforts under way to rescue historical aspects of whales in the settlement of coastal areas and economic development; and socio-cultural events and opportunities.

In Brazil both humpback and southern right whales are at the very center of historical research and education linked to the early settlement of the nation, and cultural events linked to the seasonal presence of these whales in breeding grounds have become a landmark for coastal communities in the States of Bahia and Santa Catarina. The Touristic Department of Bahia State separates the coast of Bahia in areas according their characteristics. The south of Bahia State is designated Costa das Baleias (Whale's Coast) because of the importance of the whales as attractive to the tourism in this region.

Similar developments took place in Uruguay, with the rescue of whaling history in Isla Gorriti, Punta del Este, and its integration into the interpretation programs of the whale watching industry.

Argentina celebrates its right whales both as a National Monument and under special legal protection in provincial regulations that recognize its social importance. Moreover, September 25th is "National Whale Day" in Argentina, with celebrations including performing arts, sports events, art exhibits and educational activities with school children in Puerto Pirámides, the hub of the whale watching industry in *Península Valdés*. Also, Argentina is home to the longest scientific study in the world based on following the lives of photographically identified southern right whale individuals, began in 1970.

In South Africa, the Hermanus Whale Festival is one of the most relevant cultural events of the Cape Province thanks to the seasonal presence of right whales.

Ex situ whale watching and appropriation of whales as cultural resources, therefore, is an important social component both in terms of the economic turnover and also as part of the cultural identification of South Atlantic States as they cherish their marine natural heritage.

The Non-lethal Use of Whale Resources:

- **Is a sovereign right of coastal developing States which must be protected;**
- **Allows for economic growth in coastal communities through means that promote locally distributed revenues;**
- **Stimulates scientific activity through modern research methodology with negligible impact on target animals and populations;**
- **Represents the actual sustainable use of the resource and its continuation in a long-term basis;**
- **Provides for the distribution of benefits from biodiversity as prescribed in the Convention on Biological Diversity;**
- **Allows for the shared resource use by many communities in different nations by preventing the resource consumption by a single user group.**

Apart from whale watching, non-lethal scientific research centered at, or related to, living cetaceans, is another form of sovereign appropriation of whale resources that is promoted in the SAWS context. In 2004 alone, for instance, through their Progress Reports, Argentine, Brazilian and South African scientists reported 91 scientific peer-reviewed published papers and 25 communications in scientific fora on cetaceans to the IWC, prepared by scientists from 35 institutions and encompassing data on 43 of the 53 cetacean species occurring in the SAWS – a wealth of data produced using exclusively non-lethal research methodologies. Information on recent non-lethal research on humpback whales off Gabon has also become available through scientific journals and meetings, and there has been recent research cooperation among African scientists to promote surveys off Namibia and Angola.

WHALE SANCTUARIES AND THE FUTURE OF GLOBAL WHALE MANAGEMENT

The regulation of commercial whaling prior to the commencement of the Moratorium is widely recognized to have been ineffective, and the target species of great whales in the Southern Hemisphere were dramatically depleted. The recovery of many of these long-living, heavily depleted species could take from decades to centuries.

Conservation has become a core issue on the Agenda of the IWC. This was evidenced by, *inter alia*, the adoption of the moratorium on commercial whaling; the establishment of the Scientific Committee´s standing working group on environmental concerns and working group on whale watching; the organization of the 1996 workshop on climate change and cetaceans; and the establishment of a Conservation Committee to develop a conservation agenda for the Commission. It was recognized that the IWC was one of the competent international organizations for the conservation, management, and study of cetaceans, addressed by Article 65 of the United Nations Convention on the Law of the Sea, with reference to the duty to cooperate to conserve marine mammals.

The extension of cetacean protection afforded by coastal South Atlantic States in most of the ocean basin´s recognized EEZs is timely and legitimate. Today, the time-honoured concept of freedom of the sea is to be understood in the context of the present range of marine activities and in relation to all their potentially conflicting uses and interests, such as the protection of the marine environment and the sound exploitation of marine living resources. In the South Atlantic exploitation of the shared resource represented by cetaceans is only sound and acceptable if it respects the non-lethal management options currently implemented.

In spite of its expansive goals and sound framework, the IWC has not been able to create a successful protocol for the regulation of commercial whaling. While the Commission has played a significant role in bringing the world's attention to the plight of the whales, many provisions have left it unable to enforce its own regulations.

Although South Atlantic members of the IWC have to date generally supported the development of the RMP and later the RMS, the Commission has still not adopted it, despite over 10 years of protracted negotiations, in particular because of a consistent refusal of whaling countries to abide by international inspection and observation standards and to agree upon measures to protect the interests of non- whaling countries and uphold their rights to the non-lethal appropriation of whale resources. The Commission’s failure to conclude the RMS should not become a reason for failing to move forward with alternative management systems, such as the SAWS, in cases where these are more appropriate to the needs and objectives of most countries in the region.

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Annex I

South Atlantic Whale Sanctuary Management Plan

Introduction and Background

The proposal for the creation of the South Atlantic Whale Sanctuary (SAWS) is co-sponsored by the Governments of Argentina, Brazil, Gabon, South Africa and Uruguay, with the support of other International Whaling Commission (IWC) members, viewing to reassert 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.

The prospect of a South Atlantic Whale Sanctuary began at the 50th Meeting of the IWC (IWC-50), held in the Sultanate of Oman in 1998, when Brazil first stated its intention to create it. Since that meeting, many consultations have been held in order to ensure that the proposed Sanctuary would be socially, economically and scientifically useful for the peoples of the South Atlantic coastal States, and would contemplate the widest possible array of regional interests. The proposal was first evaluated at the IWC 53, in 2001, in the United Kingdom. Later, Argentina, South Africa, Gabon and Uruguay joined Brazil as co-sponsors of the Proposal.

At IWC 64, held in Panama, in 2012, Argentina, Brazil, South Africa and Uruguay requested a new evaluation of the proposal. The amendment to the International Convention for the Regulation of Whaling (ICRW) Schedule did not achieve the necessary three-quarters of Member-States votes. The proposal, however, was supported by a clear majority of Member States, reaching 64% of the required votes.

The absence of a Management Plan has been pointed out by some members of the IWC as a shortcoming in the SAWS proposal. In order to address this concern of the Commission, a plan to manage the SAWS was developed and is presented below. The SAWS is the first Sanctuary proposed in the context of the IWC which has presented a Management Plan Proposal to the IWC Scientific Committee even before its creation.

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

As requested by the Scientific Committee at the last meeting, the IWC Scientific Committee, as stated in its Report, agreed that the Management Plan proposal as it stands “should be seen as a proposal of intent”, and also agreed that upon approval of the Sanctuary by the Commission, “a more detailed process to implement the management plan would need to be established”.

This is in line with the co-proponents view of the Management Plan as a living document, which will require, for its adequate implementation, to take on board the SC and the Commission’s comments and contributions and also adapt to the coastal States own constitutional and legal requirements and management strategies, including wide

consultation with stakeholders, validation and approval by national decision-making processes, taking into account that, as stated in page 21 of the SAWS proposal, a South Atlantic Whale Sanctuary is not intended to replace or supersede national efforts for cetacean conservation.

Once the sanctuary is approved, therefore, its Management Plan will require, as advised by the Scientific Committee, adequate revision to make it a workable tool for cooperation in whale conservation while fully respecting national capacities, processes and sovereign rights of the participating coastal States.

Species and stocks account

This Management Plan Proposal focuses on all great whale species (all baleen whales, including the pigmy right whale, plus the sperm whale) that occur in the SAWS area. Table 1 presents a list of the species and their currently accepted stocks delination (when known), abundance and trends estimates and known threats to conservation.

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	Stock	Abundance (year)	Abundance CV or 95% CI	Trends	Threats
Eubalaena australis	South Western Atlantic	4,030 [1]	Unknown	6.2% year [1]	Vessel collision, fishery entanglement, coastal development, die-offs.
Eubalaena australis	South Central Atlantic	80 [1]	Unknown	Unknown	Unknown
Eubalaena australis	Southern Africa	4,410 [1]	Unknown	6.8% year [1]	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas exploration
Megaptera novaeangliae	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
Megaptera novaeangliae	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
Megaptera novaeangliae	Breeding Stock B2	510 [4]	95% CI: 230-790 [4]	Unknown	Vessel collision, fishery entanglement
Balaenoptera acutorostrasta	South Atlantic	Unknown	---	---	Vessel collision, fishery entanglement, coastal development, chemical and noise pollution, oil and gas explorattion

Species	Stock	Abundance (year)	Abundance CV or 95% CI	Trends	Threats
Balaenoptera bonaerensis	Areas II and III [1]	Unknown	---	---	Vessel collision, fishery entanglement
Balaenoptera musculus	Areas II and III [1]	Unknown	---	---	Unknown
Balaenoptera physalus	Areas II and III [1]	Unknown	---	---	Unknown
Balaenoptera edeni	South Atlantic	Unknown	---	---	Vessel collision, fishery entanglement
Balaenoptera borealis	Areas II and III [1]	Unknown	---	---	Unknown
Caperea marginata		Unknown	---	---	Unknown
Physeter macrocephalus	Divisions 1 and 2 [5]	Unknown	---	---	Vessel collision, fishery entanglement

[1] IWC (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 (Donovan, 1991).

South Atlantic Whales Sanctuary Management Plan

Governance

Coordination of the management plan

Key stakeholders who may be involved in the development, implementation and review of the South Atlantic Ocean Management Plan include the Government and non-governmental agencies of Brazil, Argentina, Uruguay, South Africa and Gabon.

Duration of the Management Plan

The Sanctuary management plan should be reviewed and refined every ten years to account for ecological, oceanographic and other possible changes in an adaptive fashion.

ACTION PLANS

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

Outline of the Action Plans

Goals. The goal states *what* is the desired future situation of the South Atlantic Ocean Sanctuary concerning the conservation and management of whale species, and makes a broad statement about a long-term desired outcome.

Objectives. The objectives are *measurable outcomes* for evaluating progress and success in moving towards the future desired condition.

Strategies. The strategies section is an account of *how* the objectives will be achieved. Activities are developed and implemented to achieve the desired goals and objectives.

Performance measure. The performance measure is a direct index of the success or failure of each action.

Implementation of the Action Plan

This Plan is designed to guide the management of threats faced by whales and the monitoring of their recovery for the next 10 years in the South Atlantic Ocean. The implementation of this management plan will require cooperation and coordination among federal government agencies, as well as private organizations and individuals. Information exchange, sharing facilities and staff, and the coordination of policies and procedures within an ecosystem context are also features of this management plan.

Limitations

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

PERFORMANCE OF THE MANAGEMENT PLAN AND PRIORITIZATION OF ACTIONS

A fundamental aspect of the SAWS Management Plan is the requirement of continuous performance evaluations regarding its implementation and development. The progress of SAWS must be evaluated in order to understand which aspects need to be improved or given more attention/effort. 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 in the SAWS Workshops and in the International Whaling Commission meetings. This is important as a means to keeping the public, researchers, and other interested parties apprised of the Sanctuary'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 short and long term. The measures proposed to evaluate the performance of the SAWS Management Plan are linked to field monitoring, and are presented in the table of sanctuary project goals that specifies the actions needed to assess threats and monitor population abundance and trends.

A list of priority for actions was elected and is presented in the table of the MP goals.

Research and Monitoring Action Plan

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

Goal 1. Assessment of 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
A3	All species/ stocks	Produce abundance estimates and trend estimates	Conduct comprehensive field surveys for abundance estimation. Conduct long-term studies to detect temporal trends of whale populations.	Abundance estimates for all species/stocks Trends estimated for all species/stocks	Abundance estimates for most of species/stocks Trends estimated for most of species/stocks	Abundance estimates for some species/stocks Trends estimated for some species/stocks	Abundance estimates for few species/stocks Trends estimated for few species/stocks	High	Long-term

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

Goal 2. Maintain or increase current whale population sizes.

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

A5	All species/stocks	Reduce mortality due to entanglemets in fishing gear.	a)Evaluate the dregree 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 under the IWC disentanglement program.	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

A6	All species/ stocks	Reduce whale-vessel collision rates in breeding grounds. abundance estimates and trend estimates.	a)Initiate a broad and long-term program to evaluate the degree of overlapping between vessel routes and distribution of whales 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 vessel-strike database.	Pronounced negative trend in estimated rates of whale-vessel strikes.	Moderately Negative trend in estimated rates of whale-vessel strikes.	Moderately positive trend in estimated rates of whale-vessel strikes.	Pronounced positive trend in estimated rates of whale-vessel strikes.	Low	Medium-term

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

Goal 3. Stimulation of 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 SAWS	a) Organize periodic workshops for the coordination of whale research in the SAWS. 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 High	Medium-term Medium-term

A8	All species/stocks	Promote data sharing.	a)Create unified databases. b)Integrate information with other existing programs and databases (e.g. IWC Southern Ocean Research Program (SORP)), IWC photo identification catalogs 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

[1]Time 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 SAWS	a) Disseminate and share information about SAWS (e.g. social media, press releases). b) Develop a webpage within the IWC portal to spotlight the initiatives and results of the SAWS actions.	High number of reports, conferences, press release, and media campaigns, etc. Internet metrics on the SAWS webpage.	Moderate number of reports, conferences, press release, and media campaigns, etc. Internet metrics on the SAWS webpage.	Few number of reports, conferences, press release, and media campaigns, etc. Internet metrics on the SAWS webpage.	No relevant reports, conferences, press release, and media campaigns, etc. Internet metrics on the SAWS webpage.	High	Medium-term

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

Goal 5. Development of the 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 SAWS´ 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 region of the SAWS 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 region of the SAWS 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 region of the SAWS 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 region of the SAWS 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 SAWS.	Identity opportunities in educational policies to include information about the SAWS. Produce content for educational activities.	Educational policies and activities developed in most countries in the region of the SAWS.	Educational policies and activities developed in some countries in the region of the SAWS.	Educational policies and activities developed in a few countries in the region of the SAWS.	No Educational policies and activities developed in countries in the region of the SAWS.	Low	Medium - term

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

GOALS AND ACTIONS

In this section the Management 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. Assessment of 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 SAWS 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 towards a baseline.

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

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.

This Action aims to define the stock identity of whales in the SAWS, 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 programs 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 SAWS during the Management Plan 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 the SAWS Management Plan.

This Action aims to determine the habitat use patterns and critical areas for the whale species in the SAWS.

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, especially in regards 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 SAWS during the Management Plan 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 SAWS context, 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, the SAWS Management Plan stimulates systematic research in order to produce abundance estimates for whales and compute population trends for the whale species in the SAWS.

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 SAWS 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 remainder 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 SAWS during the Management Plan period.

Goal 2. Maintain or increase current whale population sizes.

One of the main objectives of the SAWS is to maintain or increase current whale stocks 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 within the proposed Sanctuary include contaminants, acoustic and noise pollution, hydrocarbon exploration and exploitation, interaction with fisheries, collision with ships, climate change and die-offs. However, in the SAWS 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 Management Plan proposes three Actions aiming to maintain or increase current whale stock size in the Sanctuary: zero deliberate whale catches, to reduce mortality by the fishery and reduce whale-vessel collision rates.

Action 4. Zero deliberate whale catches in the Sanctuary

The SAWS area must be regarded as a non-take zone for all whales´ stocks. No animal could be deliberately caught for commercial, scientific or aboriginal subsistence purposes.

Strategy

In order to assure the SAWS 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 to the IWC.

Performance measure

Action A4 will be considered fully successful if no whale catch is reported in the SAWS 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 the fisheries may potentially compromise the recovery of whales' stocks it is important to develop management strategies aimed to prevent this. Action 6 aims to evaluate, monitor and reduce the magnitude of this anthropogenic impact on whales' stocks in SAWS.

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 SAWS 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.

Finally, promoting capacity building in all countries in the SAWS area under the IWC disentanglement program is recommended.

Performance measure

Action 5 will be considered successful if the indexes of whales killed due to entanglements show negative trends during the Management Plan 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 onboard 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 SAWS.

Strategy

A broad and long-term program to evaluate the degree of overlapping 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.

Finally, this Action must contribute with data to the IWC vessel-strike database. In this sense, every case should be informed to the IWC ship strikes database (*http://www.iwcoffice.org*).

Performance measure

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

Goal 3. Stimulation of coordinated research in the region.

Action 7. Coordinate whale research in the SAWS

The central spirit of the SAWS 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 SAWS is considerably beneficial to the achievement of several objectives of this Management Plan and may be done in several ways. Action 8 proposes strategies to stimulate the coordinated research in the SAWS.

Strategy

Workshops for the coordination of whale research in the SAWS should be organized periodically during the Management Plan 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 management plan.

The standardization of research methodologies is of paramount importance to the achievement of the SAWS Management Plan objectives. Several actions of the SAWS Management 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 SAWS workshop.

Building local human capacity through training and collaborations is also a strategy to be followed. The training of researchers is considered an important component of the SAWS MP, 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 MP period. This must be a continuous strategy during the lifetime of the SAWS.

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 SAWS. Making data available to other investigators is essential to put SAWS 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 SAWS scientists.

Strategy

To encourage data sharing, the creation of unified databases to store collected and analyzed research data is advised. Online unified databases should include research guidelines and protocols, taxonomic and distribution maps, and biological and ecological datasets. Those datasets should be continuously updated during the MP lifetime. Intellectual property policies should be established.
Besides that, information collected and generated during the SAWS Management Plan lifetime should be integrated with other existing programs and databases, such as the IWC SORP, IWC photo-identification catalogs 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 the MP period. This must be a continuous strategy during the lifetime of the SAWS.

Goal 4. Raise awareness and engagement.

Action 9. Increase awareness about the SAWS

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

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

Even though other actions will raise important scientific information about whale species and stocks in SAWS, 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 SAWS. 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 the SAWS, there is no specific metric to be achieved. This must be a continuous strategy during the lifetime of the SAWS.

Strategy: Develop a webpage within the IWC portal to spotlight the initiatives and results of the SAWS actions.

Even though social media is important to disseminate information, a stable node must be created in the internet to hold information permanently available about SAWS. As it is an IWC initiative, the most logical place to hold this node is the IWC's website.

The webpages dedicated to the SAWS will contain links to reports, scientific articles, infographics, and any other media that will be produced about the SAWS. These can be used as anchor points for information disseminated through other channels.

Performance measure: Internet metrics on the the SAWS webpage.

Since the goal is to share information about the SAWS, 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. Development of the 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 SAWS countries.

Strategy

The development of international workshops on responsible whale watching considering best practices is highly recommended by the countries in the SAWS area. Those meetings would be important to systematically evaluate the status and development of this activity in different regions of the SAWS. 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 SAWS 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 Management Plan stimulates research on the short and long-term effects of the presence of tourism platforms on the behavior, 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 Plan on Whale Watching planned and implemented in countries in the region of the SAWS 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 SAWS countries. At least one comprehensive assessment is expected to be published in each country where whale watching occurs during the MP lifetime.

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

Contributing to spread knowledge throughout all sectors of society is an important role of scientists and educators. The SAWS 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 the SAWS 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 the SAWS. 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 programs.

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 SAWS countries.

Performance measure

The performance of Action 11 will be measured by the number of educational policies and activites developed in countries in the region of the SAWS. There is no specific metric to be achieved. However, it is expected that all SAWS countries initiate educational programs to disseminate information about the Sanctuary.

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ANNEX II
GLOSSARY

> **Cetacean:** refers to any extant species of whales and dolphins recognized by the Committee on Taxonomy of the Society for Marine Mammalogy.

> **Conservation:** is the management of human actions designed to maximize the chances of long-term persistence of whales and dolphins, yielding the greatest sustainable (i.e. non-extractive and non-lethal) economic use of whales for the benefit of coastal communities.

> **Constituents:** refers to all coastal States embraced by the geographical boundaries established in the South Atlantic Whale Sanctuary proposal.

> **Critical area:** is an area of high relative use by individual whales (e.g. breeding or feeding grounds and migratory pathway or areas with any other ecological consideration) within a stock range that should be considered of fundamental importance when planning conservation management strategies.

> **Endangered:** refers to the classification of a given species in the Endangered category on the IUCN Red List.

> **Long-term:** refers to a temporal scale that will last for generations. Under SAWS conservation perspective, long-term is defined as a period of time greater than 102 (approximately three or more generation times estimated for extant baleen whale species).

> **Performance measure:** is a quantitative approach used to keeping track on the progress of the actions proposed in the SAWS Management Plan towards achieve its objectives. The performance measure generates data on the effectiveness of the Management Plan (i.e. can be used as a direct index of the success or failure of each action).

> **Recovery:** refers to the recuperation (i.e. increasing trends in abundance and expansion in habitat occupancy) of whale stocks overexploited by the whaling industry.

> **Status:** indicates the extinction likelihood of a species or other taxonomic group (e.g. whale stocks or sub-species). The expression “conservation status” is tied to the official classification rank used by the IUCN Red List Categories and Criteria.

> **Stock:** group of individuals of a particular cetacean specie sharing similar geographical

range, behaviour and genetic profile, for which the population changes are mainly driven by their intrinsic parameters.

> **Threat:** human actions affecting or likely to affect cetaceans in an adverse manner.

> **Threatened:** the term "threatened" refers to: 1) those species classified under IUCN Red List categories of Vulnerable, Endangered, or Critically Endangered or 2) species that are or have been severely affected by human activities in an adverse manner.

> **Zone/zonation:** a defined geographical area.

ANNEX III
CETACEAN SPECIES OF THE SOUTH ATLANTIC WHALE SANCTUARY

MYSTICETES

Southern Right Whale, *Eubalaena australis*

Southern right whales migrate from feeding areas in subantarctic regions and concentrate near the coast along the South American and African coasts. The species has been observed in its major wintering grounds off the coast of Argentina (*Península Valdés*), Brazil (Southeastern and Southern Brazil, with recent and increasing sightings at Abrolhos Bank in the Northeast), Uruguay and Western South Africa. Genetic studies suggests that right whales from the southwestern Atlantic Ocean and Western South Africa are different populations, with gene flow occurring primarily between adjacent calving grounds and mixing of lineages from different calving grounds occurring on feeding grounds.

Right whales were hunted for centuries and are now the most endangered of all baleen whales. It is estimated that around 4,400 whales were killed from 1900 to 1980 in the southern Ocean, reducing the Southern right whale population from an estimated 55,000-70,000 animals before commercial whaling to nearly 12,000 at present. The annual growth rates of these right whale populations range between 7 to 8% per year but a recent study found that right whales off Brazil have been increasing at a rate of 14% per year. A possible explanation for the increase is immigration from other wintering grounds such as Peninsula Valdés, Argentina, where a reduction from 6.9% to 5.1% in the annual rate of population increase has been reported.

Resightings of females photographed in Brazil that were also photographed in other years with calves on the wintering ground off *Península Valdés* indicate that some females are using different calving grounds in different years. The preliminary comparison of catalogues from these two wintering grounds resulted that 11% of right whales identified off Brazil have been resighted off *Península Valdés*, in different years. Resightings have also been observed between Argentina and Tristan da Cunha as well as South Africa and Gough Island, indicating that right whales can also make eastward movements in the South Atlantic. Changes in the spatial distribution of right whales around *Península Valdés* and South Africa have been observed, indicating that right whales can be flexible in several aspects of their habitat use. With the increasing number of right whales along the Southern hemisphere, we can expect the whales to expand their range as they have off Argentina and South Africa.

Since 1994, new sightings of Southern Right Whales were recorded at the province of Santa Cruz (Patagonia, Argentina) approximately 500km south of *Península Valdés* wintering grounds and the species seems to be recovering in the area.

Southern right whales have been dying in unprecedented numbers at *Península Valdés*, Argentina since 2005. The Southern Right Whale Health Monitoring Program (a consortium of local NGOs and Universities), recorded 672 right whale deaths from 2003-2013, with a peak of 116 dead whales in 2012. Most of the dead animals were first-year calves. Despite intensive studies of tissue samples collected during necropsies, no common cause of death has been identified. Three possible

causes that require further study include: decreased food availability, exposure to biotoxins, and infectious disease. Kelp gulls have learned to feed on the skin and blubber of southern right whales at *Península Valdés*. The attacks may affect the health and survival of newborn calves in this right whale population.

Locations of primary feeding grounds for most southern hemisphere right whale populations are not well understood. Only recently it has been established that at least some of the Southern right whales breeding off South Africa remain alongshore towards the Northwest, where they spend summer feeding on copepods, a previously undescribed phenomenon for coastal waters of the Southern Hemisphere. Recent research combining genetic and stable isotope analyses has shown that the whales from *Península Valdés* feed on at least four different areas in the South Atlantic.

There were open-ocean seasonal concentrations as recorded in Yankee whaling logbooks and charts, but these areas, in particular those in the vicinity of the Rio Grande Rise and southwards, have not been properly surveyed mainly due to lack of material means. This is a very illustrative example of how much needs to be done in scientific research in international waters to better understand and manage whale species in the South Atlantic – something that will rely heavily on international cooperation that the SAWS can promote.

Pygmy Right Whale, *Caperea marginata*

The pygmy right whale remains to date one of the least known cetaceans. Being the smallest of the baleen whales, it is found exclusively in the Southern Hemisphere and it probably has a circumpolar distribution, with South Atlantic records mostly based on strandings from South Africa and several parts of Eastern South America. It is probably restricted to temperate and subtropical waters, but migration patterns – if any – or seasonal movements are unknown. There is no information at all on its population sizes or conservation status.

Humpback Whale, *Megaptera novaeangliae*

The South Atlantic hosts two of the humpback whale stocks currently recognized by the IWC: stock breeding A, in the southwestern Atlantic, coast of Brazil, occurring mainly from the northeastern down to Rio de Janeiro (from ~5^{o}S to ~21^{o}S) and stock breeding B, in the Southeastern Atlantic, encompassing the coast of West Africa, from the Gulf of Guinea down to South Africa. Recent genetic studies have provided current information on stock structure for humpback whales in the South Atlantic Ocean, fully supporting the current IWC designation of Breeding Stocks. Additionally to reinforcing genetic differences between humpback whales from southwestern and southeastern South Atlantic, these studies identified further sub-structuring between individuals from West South Africa and Gabon, and presented evidences of possibly geneflow between Brazil and Gabon. Similarities in song production between humpback whales from Brazil and Gabon also suggests that these populations could experience some degree of mixing; possibilities include a significant overlap in feeding grounds leading to regular interchange between the two breeding areas, or Gabon and Brazil being way- points on the same migratory route.

The Abrolhos Bank (Lat. 19^{o} 30’S to Lat. 16^{o} 40’S) constitutes one of the most important breeding grounds for the species in the Western South Atlantic. Mitochondrial DNA analyses, photoidentification and telemetry data indicate that the

correspondent feeding area of the Brazilian humpback whales is near *Islas Georgias del Sur y Sandwich del Sur*. An increasing number of whales, including mother-calf pairs, has been observed southward and northward of Abrolhos Bank, suggesting that the recovering population may be moving again to areas previously used for breeding and calving prior to the species' exploitation. Recent aerial surveys estimated population size in 9,330 whales (95%CI=7,185-13,214; %CV=16.13) from 5°S to 24°S in 2008. This population was estimated to be at about 30-37% of its pre-exploitation population size, suggesting that conservation measures are still required to ensure its recovery.

Humpback whales are seasonally observed in South Africa and the west coast of the African continent, in Angola and Gabon. The coastal waters of Gabon are the most important wintering area off equatorial West Africa for humpback whale breeding, calving and nursing. Current status and population trends are unknown for humpback whales in these areas.

At the Republic of São Tomé and Príncipe, an archipelagic State, preliminary research indicates that humpback whales are present in austral winter and spring. Plans are being made to study these whales genetically and acoustically to determine stock affiliation.

Photo-identification data obtained from humpback whales in Brazil is held in the Antarctic Humpback Whale Catalog to facilitate comparison with other regions of the Southern Hemisphere and promote cooperative research. This led to identify a migration from one humpback whale from Brazil to Madagascar, in a transoceanic migration. These data are being compared with those obtained from Gabon, as part of the Indo-South-Atlantic Humpback Whale Consortium/ISACH.

Common Minke Whale, *Balaenoptera acutorostrata*

The common minke whales (recognized as "dwarf minke whales" in the Southern Hemisphere - a nomenclature usually accepted to differentiate it from the "form" of common minke whales from North Atlantic), have been reported for western South Atlantic waters off Brazil and Chilean Patagonia, western South Pacific waters off New Zealand and central and northern Great Barrier Reef in Australia, and western Indian Ocean waters off Durban in South Africa. Little is known about the population genetic structure and migratory links for the common minke whale in the Southern Hemisphere. A genetic-based study has recently suggested that minke whales from western South Atlantic and western South Pacific should be considered different Evolutionary Significant Units (ESUs). Within western South Atlantic, frequencies in sighting data from Brazil, Uruguay and Argentina indicate a possible north-south seasonal movement of this species. Results from another recent genetic study is consistent with this hypothesis, reinforcing the possibility of migratory connection between dwarf mink whales at low-latitude waters off Brazil and Chilean Patagonia and whales in high-latitude feeding grounds on the western side of the Antarctic Peninsula.

Stranding records indicate the species may not be rare in Brazil, where it is commonly found in the winter and spring. During austral summer few sightings were made at headlands near Cabo Frio in southeastern Brazil, where apparent feeding behavior has been observed in conjunction with aggregations of sardines and squid. This may indicate the importance of the region´s upwelling for feeding baleen whales along their yet undetermined migratory pathways along the western South Atlantic.

Interactions with humpback whales and humans were recorded in this region.

In medium and low latitudes, common minke whales seem to inhabit coastal waters, usually over the continental shelf. Their ecology is poorly known. There is no current information on population size and trends in the wintering grounds off eastern South America. The species feeds on small crustaceans and small pelagic schooling fishes.

Antarctic Minke Whale, *Balaenoptera bonaerensis*

The Antarctic minke whale spends much of the year in waters around the Antarctic, migrating to lower latitudes in winter. This species is larger and presents different colour patterns than common minke whales. Antarctic minke whales occur off the eastern coast of South America, being usually found in oceanic waters between 200 and 1,000 m depth and in greater numbers between August and October. The northeastern coast of Brazil is considered a putative breeding ground for the species. From 1966 to 1985 nearly 15,000 whales were taken off NE Brazil from a coastal whaling station located in Costinha (~7^{O}S), Paraíba State. This station was closed after the moratorium on whaling. Recent surveys have shown that the species is relatively common in this area, where breeding behaviour has been observed.

Little is known about the social structure or behavior of *B. bonaerensis*, however this species frequently travels alone or in small groups, but also sometimes gathers in large feeding aggregations. Evidence suggests that the populations are segregated by age, sex, or reproductive condition, even during migrations. Antarctic minke whale migrations between the eastern coast of South America and the IWC management Areas II and III have been confirmed by marking experiments, showing that this population feeds in the Antarctic Sector of the South Atlantic. The stock size and population identity of whales wintering off Brazil is poorly known, and population status, after predation of both minke species by commercial whaling in the late 20th century, is currently unknown. However, Antarctic minke whales are abundant. Present estimates of total Antarctic abundance based on multi-year circumpolar surveys range from around 460,000 – 690,000 whales.

Sei Whale, *Balaenoptera borealis*

This species occurs in all nonpolar waters both in coastal and oceanic areas. Sei whales were heavily exploted in Southern Ocean after the declining of catches of blue and fin whales. It is estimated that about 204,589 sei whales were hunted by industrial whaling. This number is likely underestimated because of the known unreliability of whalers to correctly distinguish sei whales from other rorquals. There are insufficient data to undertake an assessment of their status in any area of the Southern Ocean.

Sei whale distribution along its breeding grounds is broadly similar to blue and fin whales. Off Western South Africa the species was found most frequently off the continental shelf, and its South Atlantic populations were heavily affected during

whaling operations along both continental coasts. Recent sightings of the species are rare and some were recently recorded in Southern Patagonia, where it was also hunted and severely depleted.

Sei whales are the main target of whalers operating at Costinha whaling station in NE Brazil. From at least 1947 to 1965 nearly 3600 whales were taken. Data collected from catcher boats in later years of whaling operations (1981-1985) and, more recently, during sighting surveys conducted from 1998 to 2001 have shown that sei whales are still very rare in their former whaling grounds off NE Brazil and suggest that this population has not shown any recovery. The species was also taken further south, at a whaling station operating in Cabo Frio, where the current occurrence of sei whales is not known.

The species preys mainly on krill and copepods, with small fish occasionally being part of its diet. Unlike other species, sei whales apparently change their concentration areas over time, thought it is generally believed that they make seasonal movements between high and low latitudes as do other large whales. Research on this species is scarce in the South Atlantic and very little has been done in recent years to elucidate its conservation status.

Bryde´s Whale, *Balaenoptera edeni*

Although Bryde's whales may present latitudinal movements, they do not migrate to Antarctic waters and therefore feed and reproduce in tropical to warm temperate waters. At least two different stocks – onshore and offshore – are found off western Africa and, possibly, eastern South America. Both populations differ from another group in Eastern South Africa, which possibly constitute a third (pelagic) stock.

Bryde's whales were taken by the whaling stations operation in Costinha and Cabo Frio, Brazil. The total number of whales taken for this region is unknown because this species was recorded together with the sei whale, but estimates for the Southern Ocean suggests at least 7,913 whales removed by commercial whaling.
Bryde's whales are regularly found off the coast of Brazil, with the majority of the sightings in southern and southeastern coasts, where cetacean survey efforts concentrate. In this region, seasonal abundance seems to be higher in the summer and fall and seems to be correlated with the spawning season of schooling fishes such as sardines.

Recent regular sightings of Bryde´s whales off southeastern Brazil indicate the occurrence of a resident population around some oceanic islands, especially in the vicinity of the Laje de Santos (Santos Rocks) Marine State Park (25 nautical miles off the Southeastern Brazilian coast), possibly extending its longitudinal movements towards the east. Recent sightings have been recorded in the region at the 3000m isobath and breaching behavior was observed for the first time near the 1200m isobath. Population structure and current stock size of these whales off Brazil is unknown and a detailed regional survey project is under way aiming to assess the actual status and distribution of this population.

Blue Whale, *Balaenoptera musculus*

One of the icons of the greed and irresponsibility of the whaling industry, the largest mammal species on Earth was almost entirely wiped out. It was originally a wide-ranging species occurring from polar to tropical waters. Krill is its primary food source, though blue whales can also prey upon copepods and amphipods. Its taxonomy remains subject to debate, but it is generally accepted that the so-called pygmy blue whale (*Balaenoptera musculus brevicauda*) is significantly different from the "true" blue whales to warrant separate taxonomic status.

It is shocking that, like in so many other cases where the whaling industry has so heavily pursued whale species and pretended to know enough to "sustainably exploit" them, very little is known about the social structure of blue whales (and, to be sure, of most other cetaceans). There is insufficient information on the areas of concentration for breeding populations of blue, fin and sei whales. Nevertheless, it has been accepted that blue and fin whales disperse in open tropical waters of the Southern Hemisphere, generally around 20ºS. Both species were relatively common along the western African coast but seemed to be proportionally rare off the South American coast, where blue whales were exterminated by commercial whaling up until the 1960´s. No sightings of live blue whales have been confirmed in Brazil over the last four decades. There is not a proper estimate of surviving blue whales in the South Atlantic, and numbers could be as low as a few hundreds.

Fin Whale, *Balaenoptera physalus*

The second largest species of cetacean, the fin whale originally had a wide distribution much like that of the blue whale, encompassing all waters from the polar regions to the Equator. Just like the blue whale, however, the species was recklessly slaughtered by industrial whaling, with more than 700,000 animals killed in the Southern Hemisphere alone, and its current numbers are unknown. Its breeding and feeding areas are also not known. The species feeds on krill and Clupeidae fish. 84 whales were taken in Costinha and Cabo Frio respectively, suggesting that the species is rare off Brazil. Strandings have occurred widely along the eastern seaboard of South America, but in relatively small numbers. Occasionally they are seen associated with blue whales, and interspecific mating has been recorded. The extent to which this may be due to the drastic reduction in numbers of both species by commercial whaling, which makes it harder to find intraspecific mates, is open to discussion.

ODONTOCETES

Sperm Whale, *Physeter macrocephalus*

The sperm whale, *Physeter macrocephalus*, is relatively well known in comparison with other large cetaceans, and has been studied in many parts of the world. Breeding and rising of young spermwhales take place in warm waters in harem groups, while old males and groups of young males migrate toward cooler waters in summer. In the Southern Hemisphere, old males reach Antarctic waters, but it is believed that bachelor herds seldom reach 50° S. In the South Atlantic Ocean, female and young male sperm whales are only found up to the Subtropical Convergence (approximately 40ºS). In Argentina's southernmost province, systematic beach surveys for stranded animals revealed more than 50 stranded sperm whales in an 11-year period, all of

them males. All were found in or near Bahía San Sebastián (53°S 68°W), which with its imperceptibly sloping beaches and high tides (10.6 m) is a natural trap. Further north, sperm whales have been recorded from strandings all along the Brazilian coast and observed during oceanic surveys from 29^{o}S to 34^{o}S being the most sighted species in the surveyed area. In Southern Brazil, groups of up to 17 individuals have been observed along the fringes of the continental shelf in depths of 850 to 1550m.

Pygmy Sperm Whale, *Kogia breviceps*

The pigmy sperm whale inhabits tropical and temperate seas worldwide. Its habits are markedly oceanic, and the species distribution and abiological aspects have been mainly studies through strandings, of which several have occurred along the Northeastern Brazilian coast and parts of South Africa. Many recorded strandings of the species are from mothers and calves. It exhibits opportunistic feeding behaviour targeting small and medium-sized squid and deep-sea fish and crustaceans, possibly found along the continental shelves beyond 200m deep. The species also shows tolerance towards a larger range of water temperatures than *K. sima,* facilitating long distance movements. Bycatch of the species has been reported off Brazil.

Dwarf Sperm Whale, *Kogia sima*

Dwarf sperm whales, like the pygmy sperm whale, occur worldwide in the tropics and subtropics. They are apparently more coastal than *K. breviceps*, probably inhabiting the edges of continental shelf and slopes, with no evidence for migration, and in African waters the species can be observed year-round. Deep- sea cephalopods, crustacean and fish of several deepwater species are among its food items. Group sizes so far observed are usually small, not surpassing ten animals.

Cuvier´s Beaked Whale, *Ziphius cavirostris*

Cuvier's beaked whale is known to be the most cosmopolitan of the beaked whales, occurring in all oceans and most seas. In the Southwest Atlantic records of at least 37 specimens are known, from Fernando de Noronha, Brazil, to Argentina's southernmost province. Although most of these records occurred in Argentina, 12 have been reported for Brazilian waters, widely distributed along the Brazilian coastline. The species is little known in terms of its biology, but data from strandings indicate that if feeds on deep-sea squid, crustaceans and echinoderms. The species appears to be particularly vulnerable to acoustic trauma and there have been several mass strandings of Cuvier's Beaked Whales coincident with military exercises involving the use of very loud, low-frequency sonar.

Arnoux´s Beaked Whale, *Berardius arnuxii*

This species has a circumpolar distribution and, reaching up to 10m in length, is the largest of the Ziphiidae together with *B. bairdii* from the Northern Hemisphere. It is one of the least known cetacean species in terms of its biology and ecology; other than feeding on squid and appearing to gather in groups of up to ten animals, almost nothing else is known. The species has a circumpolar distribution from the ice edge to approximately 35^{o} S, though a lower latitude stranding was recorded in Southeastern Brazil. Stranding records of Arnoux's beaked whales were common in

late spring or early summer in higher latitudes. There is evidence that the species could move onshore during summer months.

Shepherd´s Beaked Whale*, Tasmacetus shepherdi*

This is an extremely rare species, known only from a little more than twenty stranded specimens and virtually no information about its behavior and actual distribution. Strandings records indicate that the species may be circumpolar distribution. Five strandings were recorded from Argentina. Putative sightings of live individuals were reported from the western South Atlantic (53°45'S, 42°30'W) and off New Zealand.

Southern Bottlenose Whale*, Hyperoodon planifrons*

The Southern Bottlenose whale is distributed throughout the Southern Hemisphere from the floating ice limits in Antartica to approximately 30^{o} S. Its habits are mainly oceanic, and it is most common beyond the continental shelf and over submarine canyons, in water deeper than 1,000m. It is rarely found in water less than 200m deep. During summer, this species is most frequently seen within about 100km of the Antarctic ice edge, where it appears to be relatively common. Its presence in the South Atlantic is evidenced by strandings from both the South American and African coasts. Large cephalopods constitute its dietary item. There are no population estimates for the species.

Andrew´s Beaked Whale, *Mesoplodon bowdoini*

Andrew´s beaked whales are only known from fewer than 40 strandings in the Southern Hemisphere, most of which have occurred in Southern Australia and New Zealand. Nevertheless, the species has been recorded in the southern South Atlantic as well, between 1988 and 2002. A stranding has also been recorded in the archipelago of Tristan da Cunha.

Blainville´s Beaked Whale, *Mesoplodon densirostris*

This species is probably the most common beaked whale and the one with the widest distribution, reaching from both subtropical areas in the northern and southern hemispheres into the tropics, and is also the only *Mesoplodon*, which has been regularly observed at sea, both in the North Pacific and the Caribbean. The species seems to avoid coastal areas and stay in offshore areas where depths are over 500m. No reliable population estimates exist. As with other cetacean species, beaked whales also suffer from contamination in the oceans, as evidenced by the ingestion of plastic debris found in a stranded specimen of *M. densirostris* in Brazil.

Gervais´ Beaked Whale, *Mesoplodon europaeus*

Gervais´ beaked whales inhabit warm temperate and tropical waters of the North and South Atlantic oceans, with most confirmed records being from strandings, with very few live animal sightings. The southernmost confirmed record of the species in the South Atlantic is from Southeastern Brazil. Three other confirmed records in the South Atlantic are from Ascension Island, and on the northeastern coast of Brazil. There is very little information available on the species, virtually nothing about its

actual behavior and no estimates for population size.

Gray´s Beaked Whale, *Mesoplodon grayi*

Gray's beaked whale occurs mainly in temperate waters of the southern oceans. At least 10 specimens have been reported from the Southwest Atlantic, almost all of them from Argentina. There are also records for the extreme south of Brazil, where its distribution may follow the colder waters of the Malvinas Current. Though there have been live animal sightings, virtually nothing is known about its ecology and behavior.

Hector´s Beaked Whale, *Mesoplodon hectori*

With scarce information available about its actual distribution, strandings indicate that Hector´s beaked whale may have a circumpolar distribution in the Southern Hemisphere, with occurrence confirmed in the South Atlantic through records from Argentina, South Africa, and Southern Brazil, which apparently represents the northernmost limit of the species. It is probably an open sea species and its status remains unknown.

Layard´s Beaked (Strap-toothed) Whale, *Mesoplodon layardii*

Layard´s beaked whales occur in temperate and cold waters. Strandings in the South Atlantic were recorded in Southern continental locations of Argentina, Uruguay, Southern Brazil, Malvinas Islands, Namibia and South Africa. Analyses of stomach contents from several strandings indicate that the species' food preference consists of oceanic squid.

True´s Beaked Whale, *Mesoplodon mirus*

True's beaked whales are rare animals (with only around 20 records worldwide) and their distribution puzzles researchers. Records have been made in the North Pacific and Indian Ocean, and strandings in the Cape Province, South Africa, indicate that the species probably reaches the eastern South Atlantic. Indications are that the species is restricted to latitudes higher than 30^{o} on both hemispheres. They are probably pelagic animals, which feed on squid, but nothing else is known about their habits, nor there are any population estimates.

Franciscana, *Pontoporia blainvillei*

Despite research and monitoring efforts over many years, the species is still largely unknown in regard to its actual population sizes, status and rates of decrease due to incidental catch, and recent initiatives to provide international coordination for research and management initiatives must be encouraged and supported. Total abundance has been estimated as nearly 20,000 franciscanas for the whole Rio Grande do Sul, Brazil and Uruguay coastal waters, considering the 30m isobath as the offshore border, and about 2.1 - 10.8% of the population may be removed each year by fisheries in the region.

An apparently resident inshore population of franciscanas was discovered at Babitonga Bay, Southern Brazil, where it coexists with *Sotalia fluviatilis*, an unique

phenomenon for this otherwise open-water species.

Offshore distribution of the species in Southern Brazil seems to be limited by the 35m isobath. Other factors affecting distribution can be related to limiting habitat characteristics such as river discharge, which offers food resources, protection against predators and maintenance of the water temperature; ocean floor morphology, especially depth; presence of predators and trophic competitors. These factors may account for the observed discontinuity in the population along southern and southeastern Brazil.

Guiana Dolphin, *Sotalia guianensis*

Guiana Dolphin is a species restricted to eastern South America and the Caribbean coasts of Central America extending into the South Atlantic always inshore and south to Florianópolis, Brazil at 27^{o} 35´S, where the southernmost resident population of the species is located. Pelagic clupeids, demersal sciaenids and cephalopods account for most of its diet.

Abundance estimates of Guiana dolphins only exist for localized, resident populations in several estuaries, bays and embayments along the Brazilian coast in which groups range from some dozens to several hundreds, indicating that its total numbers for the marine form are probably not beyond a few thousands. Therefore, though the species is widespread along eastern South America, it is highly vulnerable, especially due to its inshore habits and constant exposure to habitat degradation, contaminants and anthropogenic disturbances such as bycatch in artisanal fisheries.

Commerson´s Dolphin, *Cephalorhynchuscommersonii*

The Commerson's dolphin is distributed south of 41ºS in the coastal waters of southern South America, though stranding records have been made in Southern Brazil. It is also found off Malvinas and the Kerguelen islands. The species apparently favors inshore waters and feeds on a wide variety of shrimp, fish and squid. No overall population estimates exist.

There have been many reports of incidental capture of Commerson's dolphins in gillnets, trammel nets and mid-water trawls in Argentine waters.

In Santa Cruz Province, Argentina, Provincial Law 2,582 declared the Commerson's dolphin to be a Provincial Natural Monument in July 2001 to protect the local resident populations.

Heaviside´s Dolphin, *Cephalorhynchus heavisidii*

Heaviside's dolphins occur only in the west coast of southern Africa, between Table Bay in South Africa and Northem Namibia, with nearshore coastal distribution. Very little is known about their ecological context and anthropogenic impacts that may threaten their survival in the region, eg. fisheries by-catch and contamination from land-based mining. Though it is currently considered common, and possibly the most

common dolphin species seen in Namibia, no reliable population estimates exist and its restricted distribution alone makes the species vulnerable.

Rough-toothed Dolphin, *Steno bredanensis*

The rough-toothed dolphin is commonly thought to be a tropical to subtropical species which inhabits deep oceanic waters, rarely ranging north of 40ºN or south of 35ºS and away from continental coasts. However, in Brazil, it has also been regularly observed close to shore, both in the northeast and in the southeastern coasts. It has also been observed at the Abrolhos Bank, off Bahia, and along the coastal archipelago of Arvoredo Biological Reserve in Santa Catarina State. Its diet is composed of a wide variety of fish and squid. Rough-toothed dolphins are rather difficult to study at sea due to schools staying submerged often for long periods of time (sometimes up to 15 minutes). Groups observed usually vary from 10 to 50 animals. Global population is unknown but probably in the hundreds of thousands.

Hump-backed Dolphin, *Sousa teuszii*

Taxonomy of the genus *Sousa* remains under controversy, and the hump-backed dolphins can belong to anything from three to a single species. Atlantic Humpback dolphin or *S. teuszii strictu senso* known distribution limits are, in the north, Dahkla Bay (23º 50'N), Western Sahara, and in the south, Tombua (15º 47'S), southern Angola, while *S. plumbea*, the Indian Ocean species, occurs from the Cape Province of South Africa east along the African coast towards Arabia and the Indian sub-continent. Its habitat is predominantly inshore coastal and estuarine, over soft-sediment bottoms, in areas less than 20m deep and in the surf zone on more open coasts. There are no reports of its presence in offshore waters. The preferred habitat is near sandbanks and mangrove areas, in turbid waters with temperatures ranging between 17°C and 28°C. The main threats for this species may be the mortality by fisheries activities and habitat encroachment, even though further studies are needed to confirm that. There are no global population estimates but the South Atlantic *Sousa* probably numbers in the few thousands.

Bottlenose Dolphins, *Tursiops truncatus*

The common bottlenose dolphin, *T. truncatus*, is practically a cosmopolitan species. The species tends to explore a wide variety of habitats from inshore to pelagic, and offshore sightings in the Western South Atlantic are common. Its diet varies with local availability of prey species; in Southern Brazil, resident groups of bottlenose dolphins cooperate with artisanal fishermen in capturing mullet in river and lagoon mouths. Coastal home ranges may comprise extensive areas and long-range movements have been recorded for individuals in Argentina and between south Brazil and Uruguay. There are no global population estimates for bottlenose dolphins, but the combined result of some surveys indicate it may be in the hundreds of thousands.

A recent study reported unprecedent low genetic variation in coastal bottlenose dolphins from Southwestern Atlantic. It was proposed that coastal bottlenose dolphins from Southern Brazil - Uruguay (SB-U) and those from Argentina represent two distinct evolutionarily significant units, and that dolphin communities from SB–

U comprise five distinct Management Units (MUs). Genetic data indicate very low population sizes for coastal bottlenose dolphins in Southwester Atlantic. Mark-recapture abundance estimates available for some of these coastal communities in Brazil, Uruguay and Argentina confirmed the genetic data, indicating very low population sizes (not exceeding 90 dolphins). Bycatch in gillnets is the main threat to coastal bottlenose dolphins. Bycatch is higher in southern Brazil than in other areas, but resident communities seem to be stable in the last years.

The most threatened population of bottlenose dolphins seems to be located in Argentina. Abundance estimates based on mark-recapture data reconfirmed a maximum estimate of 83 individuals (95%CI=45.8- 151.8) in Bahia San Antonio, Rio Negro Province, Argentina. Of this population, it appears only 14 females are successfully reproducing. Data suggests this population of bottlenose dolphins is declining due to birth- and calf recruitment -rate insufficient to compensate the overall mortality in the population. The reported high contamination of the area is believed to be among the causes of this apparent failure in successful reproduction and needs to be investigated further. Measures need to be taken to protect this species and its habitat, including a controlled management of rural, urban and industrial wastes, protective laws to limit harassment, as well as educational projects to increase public awareness. Additionally, a more detailed insight in the fine-scale population structure of bottlenose dolphins in Argentina and local conservation needs are strongly recommended.

Due to the failure to respond to the precipitous decline in Argentina since the 1980s, bottlenose dolphins have been described as nearly vanished from the coasts of the Province of Buenos Aires and Chubut. Nowadays only infrequent and isolated observations are reported in the areas where they were once most common (Bahía Samborombón, Peninsula Valdés, Bahía Engaño), without any information on numbers, morphotype or ecotype observed. Consequently, Bahía San Antonio was recently suggested to be home to one of the last remaining resident communities in that country. However, data strongly indicates this population is highly vulnerable and at risk. Continuous failure in their conservation would therefore have a devastating effect on the presence of coastal bottlenose dolphins in Argentina.

Pantropical Spotted Dolphin, *Stenella attenuata*

The pantropical spotted dolphin is both one of the most abundant dolphin species and one of the most impacted by fisheries by-catch and direct takes, particularly in the North Pacific. The species is found in tropical and subtropical offshore waters between approximately 40^{O}N and 40^{O}S, sometimes in aggregations of hundreds of individuals. Prey items include a wide variety of fish, cephalopods and crustaceans. In the Western South Atlantic it is found mainly in northeastern Brazil beyond the continental slope in depths ranging from 850 to 4900m. Few strandings were recorded there as of yet, probably as a consequence of the species' offshore distribution. The global population of pantropical spotted dolphins is probably in excess of 3 million animals.

Clymene Dolphin, *Stenella clymene*

The Clymene dolphin occurs in the South and North Atlantic ocean basins, in tropical

and subtropical waters, and appears to be one of the rarest oceanic dolphins. In the Western South Atlantic it is distributed from southern to northeastern Brazil, but it is more frequently observed in offshore waters of the northeastern coast between the 1000m and 4500m isobaths. Strandings of this species are common in northeastern Brazil, with many along the State of Bahia, but sporadic in the southern and southeastern regions. One of the least known species of its genus, the Clymene dolphin feeds on small mesopelagic squid and fish. No global population estimates exist.

Striped Dolphin, *Stenella coeruleoalba*

A cosmopolitan species, the striped dolphin occurs in tropical and subtropical seas. In the Western South Atlantic the Striped Dolphin is mostly found from 7 to 42 degrees South, and sightings closer to the continental margin are more frequent from October to February, and it is considered to be one of the least known species off Brazil. Prey species include a wide range of shoaling fish and cephalopods. The species appears to be relatively rare in parts of the South Atlantic, and there are no global population estimates.

Atlantic Spotted Dolphin, *Stenella frontalis*

The Atlantic spotted dolphin occurs in the North and South Atlantic from temperate to tropical waters. Its distribution along the African coast in the South Atlantic is poorly studied, but along South America it is distributed from southern to northeastern Brazil, where the species exhibits the highest preference for nearshore habitats within its genus, being generally found west of the 1000m isobath. Small fish, cephalopods and benthic invertebrates are its main food items. There are no reliable population estimates for the species.

Spinner Dolphin, *Stenella longirostris*

The spinner dolphin is found in tropical and subtropical pelagic waters and around oceanic islands. In the Western South Atlantic, from southern to northeastern Brazil, it inhabits waters over the shelf and slope, in depths ranging from 170 to 2700m. It forages for small mesopelagic fish, squid and shrimp usually in waters between 200 to 300m deep. Though it is a widespread species numbering probably in the few millions, local populations around oceanic islands are very vulnerable to anthropogenic impacts. At the archipelago of Fernando de Noronha, groups of a resident population (which may reach about two thousand individuals) are observed on an almost daily basis at a specific bay, now protected inside a National Marine Park, allowing for the development of long-term studies.

Fraser´s Dolphin, *Lagenodelphis hosei*

Fraser's dolphin is a typically high-seas dolphin of tropical waters, occurring usually beyond the 1000m isobath, and strandings in temperate areas are considered to represent extralimital occurrences related to temporary oceanographic anomalies, such as the *El Niño* phenomenon. In the Southwestern Atlantic the species was first

recorded in Uruguay, where several strandings have been recorded in recent years, as well as in the southern and southeastern Brazilian coast. It feeds basically on mesopelagic fish. No population estimates exist for the species.

Short-beaked Common Dolphin, *Delphinusdelphis*

A recent study showed that all common dolphins in the Atlantic Ocean belong to a single species, *Delphinus delphis*. *D. delphis*, is distributed discontinuously in tropical and subtropical waters both above continental shelves and in pelagic environments. In the eastern South Atlantic it is recorded in Gabon, and recent records indicate that, contrary to earlier assumptions, the species most likely also occurs off Brazil. Its dietary habits are similar to the long-beaked species, and it has been proposed that its foraging is attuned to the nighttime vertical migration of the deep scattering layer. There are no global population estimates for the species.

Peale´s Dolphin, *Lagenorhynchus australis*

Peale´s dolphins are found mainly in the coastal waters of southern South America, normally from 44°S in the Atlantic to 38°S in the southeastern Pacific and exceptionally to 33°S in the southeastern Pacific to 38°in the southwestern Atlantic. The species is confined to near-shore waters and it seems to be closely associated with kelp beds. The dolphins in Beagle Channel, the Magallanes and southern Isla Grande de Tierra del Fuego have been harpooned for crab bait since the 1970's, which cause reduced abundance by the late 1980's. Nevertheless recent evidence suggests that the scale of exploitation has declined and that some recovery may be occurring.

Hourglass Dolphin, *Lagenorhynchus cruciger*

The hourglass dolphin is a cold-water species occurring around Antarctica and in temperate offshore waters at least to 36^{o} S in the South Atlantic. It apparently prefers offshore areas. Its main prey species are myctophiid fish, squid and crustaceans. Population estimates in the Antarctic indicated the existence of at least 140,000 animals.

Dusky Dolphin, *Lagenorhynchusobscurus*

The dusky dolphin is distributed in cool temperate waters of the Southern Hemisphere. Its occurrence is well documented inter alia along the coasts of Southwest Africa and Argentina, associated respectively with the Benguela and Malvinas currents in areas over the continental shelf and slope. The species has been also recorded from the vicinity of many oceanic island groups in the South Atlantic and elsewhere. Off the waters of Angola and Namibia, the species has been observed in September in deep waters, feeding on Cape horse mackerel *Trachurus trachurus capensis* at depths down to approximately 170m. Off South America, southern anchovy *Engraulis anchoita* and several cephalopods compose the species´ diet. Dusky dolphins are caught accidentally in fisheries off Namibia, and their current population is unknown.

Southern Right Whale Dolphin, *Lissodelphisperonii*

Southern right whale dolphins are found mainly in Subantarctic waters, but in the South Atlantic there are records as far as São Paulo State in Brazil at about 25^{O} S, with most records from winter months, and Walvis Bay in Namibia at about 23^{O} S; they most likely follow the colder waters of the Malvinas and Benguela currents. In Namibian waters the species is probably resident. Large schools of these dolphins have been recorded, with hundreds of individuals. A variety of fish and squid comprise its diet, with lanternfish being a common food item. The species is poorly studied and there are no population estimates.

Risso´s Dolphin, *Grampus griseus*

This large delphinid is widely distributed in oceanic and continental shelf margins from tropical to temperate waters worldwide, usually found in waters 400-1000m deep, where it preys on a mix of neritic, oceanic, and occasionally bottom dwelling cephalopods. In Argentina, there have been several coastal sightings, particularly in Patagonia, interacting with dusky dolphin groups. No population estimates exist for the species.

Melon-headed Whale, *Peponocephala electra*

The melon-headed whale is a pantropical species, which reaches into the South Atlantic from the Equator to Southeastern Brazil and South Africa´s Cape Province. They are markedly oceanic but may reach coastal areas following upwellings, and are usually found in large pods. A variety of fish and small squid comprise their diet. There are no reliable population estimates for the species.

Pygmy Killer Whale, *Feresa attenuata*

Pygmy killer whales have been recorded in all major oceans in tropical, subtropical and temperate waters. Very few records exist in the Western South Atlantic, with stranded animals recorded for Argentina and Southeastern Brazil. Fish and squid comprise most of their diet, though there have been records of attacks on smaller cetaceans. Very little else is known about this species, and its population size has not been estimated.

False Killer Whale, *Pseudorca crassidens*

The false killer whale occurs in all tropical, subtropical and warm temperate seas, and its distribution is largely determined from stranding records. The species habitat is considered to be primarily oceanic. Occurrence has been confirmed in the Western South Atlantic from the South and other regions of Argentina, Northeastern to Southern Brazil, including mass strandings. The species is also known from Southern Africa where large mass strandings have been recorded. Epipelagic and oceanic squid species including *Ommastrephes bartramii* apparently are an important food item for false killer whales in the Western South Atlantic, confirming their oceanic distribution.

Orca, *Orcinus orca*

Orca is a cosmopolitan species with a very wide distribution and occurring along most of the South Atlantic with widespread coastal and offshore sightings. In Brazil, sightings off the Southeastern coast appear to have become more frequent in recent years. The species has been studied since 1975 in Northern Patagonia, Argentina. Thirty killer whales have been identified and studied in the region since 1975 and some individuals use a 1,000 km stretch ofNorthern Patagonian coastline.

Prey species for orca include the South American sea lion (*Otaria flavescens*) and Southern elephant seal (*Mirounga leonina*) among many other marine mammals, besides large-sized fish and penguins. Resident orcas from Patagonia exhibit a peculiar intentional stranding behavior to capture pinnipeds. Recently, predation on sevengill sharks (*Notorhynchus cepedianus*) in Patagonia, Argentina was recorded. Interaction with fisheries of *Xiphias gladius, Thunnus* spp. and orcas were registered in Uruguay and Brazil as well as sightings along the coast.

Short-finned Pilot Whale, *Globicephalamacrorhynchus*

Though no comprehensive studies have been conducted on the species, short-finned pilot whales appear to vary on a geographical basis. Present in all tropical and subtropical seas, it occurs in the South Atlantic from the Equator to, in the east, the Cape Province in South Africa, and in the west the vicinities of São Paulo, Brazil (Rice, 1998). There is a marked preference for deep water areas, and though they can also take fish, short-finned pilot whales are especially well-adapted to eat squid (Hacker, 1992), which they hunt down to at least 800m deep. There are no global population estimates for the species.

Long-finned Pilot Whale, *Globicephala melas*

With little range overlap in relation to the former species, *G. melas* occurs in all cold and temperate waters of both hemispheres. In the South Atlantic it can be found north to southeastern Brazil and to Angola, following the colder currents. In Argentina, it is one of the most common cetacean species in strandings records. Though it is probably more common offshore, coastal records do exist. It preys mainly on squid, but small and medium-sized gregarious fish is also preyed upon opportunistically. There are no global population estimates, but it has been estimated that some 200,000 long-finned pilot whales may exist around Antarctica (Bernard et al., 1999).

Spectacled Porpoise, *Phocoena dioptrica*

The spectacled porpoise occurs mostly south of the Antarctic Convergence, but os also recorded northwards following the Malvinas current into the subtropical South Atlantic (Goodall et al., 2002). Strandings records indicate that sexually mature animals can reach Southern Brazil. This species is among the less studied of the small cetaceans and almost nothing is known of its biology, and virtually nothing of its population size or status.

Burmeister´s Porpoise, *Phocoena spinipinnis*

Burmeister´s porpoises are restricted to waters around Southern South America; in the South Atlantic they range from Argentina's southernmost province to the State

of Santa Catarina, Brazil. Its distribution is most likely restricted to the cooler waters carried by the Humboldt (in the Pacific coast) and Malvinas currents (Brownell et al., 1999). The species is very difficult to detect in the field due to its inconspicuous behavior and dark color, and very little is known about its biology. It feeds on demersal and pelagic fish, as well as squid and crustaceans. There are no population estimates for the species.