

South West to Eastern Sri Lanka IMMA

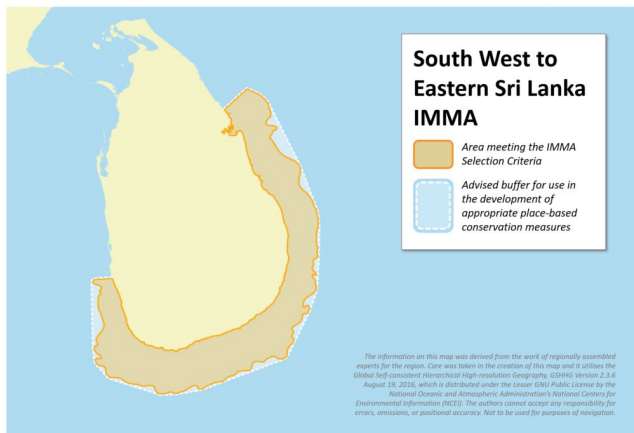
Summary, continued.

and includes the deep Trincomalee canyon, several smaller canyons, and the river outfalls and affected by both northeast and southwest monsoons.

Bathymetric and oceanographic features drive primary productivity and create nearshore habitats for a diversity of cetacean species. At least 18 species of cetaceans occur, including the Northern Indian Ocean blue whale (*Balaenoptera musculus indica*) and the Vulnerable, sperm whale (*Physeter macrocephalus*) are among the most commonly occurring species. The IMMA provides important feeding and breeding areas for several of the species including spinner dolphins (*Stenella longirostris*).

Description

Sri Lanka, has a relatively narrow continental shelf except in the north and northwest, where the shelf merges with that of India (Wijeyananda, 1997). The IMMA covers the continental shelf waters and extends at its outer boundary into deeper waters just beyond the shelf edge throughout most of its range. The landward boundary of the IMMA starts just south of Sri Lanka's capital city of Colombo on the west coast, continues down the southwest coast to the southern tip of the island at Dondra Head and then continues up the east coast and ends north of Trincomalee. A narrow shelf characterizes the IMMA, with deep waters close to shore, and several river outfalls and related submarine canyons dotting the shoreline. The largest of these river outfalls is that of the Mahaweli, Sri Lanka's largest river, that flows out at Thampalagam bay in Trincomalee on the east coast. Here too is found the deep Trincomalee canyon that plunges down to 2000 metres just off



Area Size

28 699 km²

Qualifying Species and Criteria

Sperm whale – *Physeter macrocephalus*

Criterion A; B (2); C (1, 2)

Blue whale – *Balaenoptera musculus*

Criterion A; B (2); C (1, 2)

Spinner dolphin – *Stenella longirostris*

Criterion B (2); C (1, 2)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera edeni, *Balaenoptera omurai*,
Balaenoptera musculus, *Stenella attenuata*,
Stenella coeruleoalba, *Tursiops truncatus*,
Steno bredanensis, *Lagenodelphis hosei*,
Grampus griseus, *Globicephala macrorhynchus*,
Peponocephala electra, *Physeter macrocephalus*,
Pseudorca crassidens, *Feresa attenuata*,
Orcinus orca, *Kogia sima*, *Kogia breviceps*,
Stenella longirostris

Summary

This IMMA encompasses the narrow continental shelf waters off southwest Sri Lanka, extending down, past the southern tip of the island at Dondra Head and up along the east coast just north of Trincomalee. The area primarily extends from the coast out to just beyond the shelf-break,

the coast within Trincomalee bay. Primary productivity in the waters around Sri Lanka including those within the IMMA, is driven mainly by monsoon-related upwelling as in other parts of the Northern Indian Ocean (Vinayachandran and Mathew; Vinayachandran et al., 2003, 2004) and is enhanced through nutrient enrichment from river outfalls in nearshore waters.

Cetaceans are distributed throughout the IMMA due to the bathymetric and oceanographic conditions outlined above. The species recorded from within the area include *Balaenoptera musculus indica*, *Balaenoptera brydeii*, *Balaenoptera omurai*, *Physeter macrocephalus*, *Kogia sima*, *Kogia breviceps*, *Tursiops truncatus*, *Grampus griseus*, *Stenella longirostris*, *Stenella attenuata*, *Stenella coeruleoalba*, *Steno bredanensis*, *Lagenodelphis hosei*, *Globicephala macrorhynchus*, *Orcinus orca*, *Pseudorca crassidens*, *Feresa attenuata* and *Peponocephala electra* (Alling, 1986; Leatherwood and Reeves, 1989; Ilangakoon, 1989, 1997, 2002, 2012; Ilangakoon et al., 2000; Ilangakoon and Perera, 2009; Ocean Alliance, 2003). The most common species in the area are *B. m. indica*, *P. macrocephalus* and *S. longirostris* and for this reason the above three species are the primary species in this IMMA. The two large whales are listed under IUCN Red List threat categories of Endangered and Vulnerable while the delphinid is Data Deficient but soon to be changed to Least Concern. All three species are dependent on this area to fulfill several important life history characteristics.

Although no abundance estimate has been made for the blue whale in these waters survey data indicates that these waters have one of the highest encounter rates for the species in a worldwide context (Branch et al., 2007). Based on sighting surveys and stranding records, at least part of the blue whale population around Sri Lanka are also known to be non-migratory, inhabiting these waters year-round (Ilangakoon and

Sathasivam, 2012). Likewise, of the three distinct blue whale call types (Alling et al., 1991; Ljungblad et al., 1998; McCauley et al., 2001) attributed to pygmy blue whales in the Indian Ocean one type was first recorded in 1984 off northeast Sri Lanka (Alling et al., 1991) and subsequently the same type of call was recorded near Diego Garcia, south of the equator (McDonald et al., 2006; Stafford et al., 2005). However, these calls are distinct from pygmy blue whale calls recorded off Madagascar and Australia (Branch et al., 2007) indicating this population does not mix with others nearby and could possibly be isolated in the northern Indian Ocean which could have long term survival implications. Meanwhile, blue whales are known to feed and engage in reproductive behavior within this IMMA (Alling, 1991; Ilangakoon and Sathasivam, 2012). The constant presence of mother-calf pairs is a further indication of the area being important as a breeding site. Therefore the waters of this IMMA are important habitat in all aspects of the life history of this blue whale population.



Figure 1: A sperm whale diving off eastern Sri Lanka. Photo: Anouk Ilangakoon

Physeter macrocephalus is one of the most commonly encountered and widely distributed large cetaceans in Sri Lankan waters and particularly throughout the waters of this IMMA. They are however, concentrated and abundant in the waters off the northeast coast, especially in association with the Trincomalee canyon, where very deep water occurs close to the coast (Gordon, 1991; Leatherwood

et al., 1984; Whitehead et al., 1983). Surveys within the rest of the IMMA too have regularly sighted this species (Ilankoon, 2002, 2006a, 2009; Ilankoon et al., 2000b; Leatherwood and Reeves, 1989; Ocean Alliance, 2003) and super-pods numbering in the hundreds of animals are sometimes encountered moving past the south coast and up the west coast towards the Gulf of Mannar.

Studies indicate that *Stenella longirostris* is by far the most common species of small cetacean in this IMMA and the species appears to be evenly distributed throughout both coastal and offshore waters (Alling, 1986; Ilankoon, 1989, 1997, 2002, 2012; Leatherwood and Reeves, 1989; Dayaratne and Joseph, 1993). Cetacean catch studies show that spinner dolphins comprise more than 50% of all recorded cetacean catches in Sri Lanka (Dayaratne and Joseph, 1993; Ilankoon, 1989, 1997, 2007; Ilankoon et al., 2000b). This is possibly a result of the association of this species with the tuna that are targeted by fishermen (Ilankoon, 2006a). The spinner dolphin's natural behaviour of frequent bow-riding with boats also makes it an easy target for direct take using hand-harpoons in some areas where this is practiced (Ilankoon, 1989, 2002; Ilankoon et al., 2000). Spinner dolphins are therefore at particular risk in Sri Lanka's waters, but no population estimates are available making it difficult to assess the impact of catches.

Criterion A: Species or Population Vulnerability

The Northern Indian Ocean blue whale *Balaenoptera musculus indica*, occurring within the IMMA, is a currently recognised subspecies of *Balaenoptera musculus*, and is listed as Endangered in the IUCN Red List of Threatened Species. Therefore, without additional descriptions of the subspecies status specifically within the Northern Indian Ocean, it is

assumed that this subspecies meets IMMA Criterion A on Species or Population Vulnerability. In addition the sperm whale *Physeter macrocephalus* is listed in the IUCN Red List as a Vulnerable species and therefore meeting Criterion A of the IMMA selection criterion.

Criterion B: Distribution and Abundance **Sub-criterion B2: Aggregations**

Primary productivity is high within the area of the IMMA, with monsoon related continental shelf-edge upwelling and nutrients brought in from numerous river outfalls creating ideal conditions for cetacean aggregations. Blue whales that are normally solitary are seen feeding in loose aggregations along the shelf edge off the south and east coast and in the Trincomalee canyon (Alling et al., 1986; Ilankoon 2009, 2012a; Ilankoon and Sathasivam, 2012). Large numbers of sperm whales also aggregate around Trincomalee canyon and sometimes super pods numbering in the hundreds are known to move along the deeper waters just off the continental shelf edge in southern Sri Lanka and up the western coast towards the Gulf of Mannar. Meanwhile, smaller cetaceans such as the long snouted spinner dolphin form large schools numbering between 500-1000 individuals especially off the south coast. Mixed-species feeding aggregations of smaller cetaceans are also frequent off the south-southwest coast (Ilankoon, 2012b). These aggregations may sometimes involve *Stenella* spp., *Tursiops truncatus* and some species of "black fish" and some large whales. Such mixed aggregations usually occur in shelf edge upwelling zones within the IMMA.

Criterion C: Key Life Cycle Activities **Sub-Criterion C1: Reproductive Areas**

Adult blue whales accompanied by young calves are frequently recorded both off the east coast in the



Figure 2: A northern Indian Ocean blue whale surfacing off southern Sri Lanka. Photo: Anouk Ilangakoon

vicinity of the Trincomalee canyon and off the south coast (Alling et al., 1991; Ilangakoon and Sathasivam, 2012) within this IMMA. Adult blue whales have also been observed engaging in breeding related behavioural activities such as high-speed chasing, breaching and synchronized diving and surfacing (Ilangakoon and Sathasivam, 2012). All this indicates that this habitat is important not only as a feeding area but also in relation to the breeding cycle of these Endangered northern Indian Ocean blue whales. Likewise, the area around Trincomalee canyon is inhabited throughout the year by groups of female sperm whales with young calves and even newborn animals with foetal folds have been observed within the last three decades (Whitehead et al., 1983; Ilangakoon, 2012). The more common species of small cetaceans such as the spinner dolphin, bottlenose dolphin, spotted dolphin and Risso's dolphin that appear to have resident schools in the area are also frequently accompanied by calves when observed during sighting surveys and calves of these species are also frequently recorded in gillnet bycatch of the coastal fisheries in the

southwest, south and east of Sri Lanka (Leatherwood and Reeves, 1989; Ilangakoon, 1997).

Sub-criterion C2: Feeding Areas

The waters around Sri Lanka are among the few feeding areas for blue whales that have been identified in the Indian Ocean (Alling et al., 1991; Gill, 2002; Ilangakoon, 2009; Ilangakoon and Sathasivam, 2012). Blue whales are observed feeding (sub-surface skimming as well as feeding dives) along the continental shelf edge and in shelf waters along the entire continental shelf within this IMMA, as well as within the Trincomalee canyon in the north eastern extremity of the IMMA (Alling et al., 1991; Ilangakoon and Sathasivam, 2012). The blue whales undertake extremely localized movements within a small but highly productive, monsoon-driven feeding area (Ilangakoon and Sathasivam, 2012). The northeast monsoon affects the northeast coast of Sri Lanka and adjacent waters from November to March, the time when blue whales are abundant in the waters around Trincomalee, as reported by Alling et al. (1991), who

suggested that these waters are an important feeding ground. The outfall of Sri Lanka's largest river, the Mahaweli, is located in Trincomalee and deposits the largest volume of nutrient-rich waters at this time of the year, enhancing productivity in the area.

Re-sightings of individually identified animals in consecutive years also indicate site fidelity to these productive feeding grounds. Meanwhile, the southwest monsoon creates upwelling and nutrient enrichment through river outfalls off the south and west coasts from May to September and localized upwelling occurs between the southern tip of India and Sri Lanka (Rao et al., 2006). Both sightings and strandings of blue whales have been recorded from the area during this period of the year (Ilangakoon, 2002, 2006a, 2006b, 2009; Ilangakoon and Perera, 2009; Ocean Alliance, 2003) and again re-sighting of identified individuals in multiple years indicates site fidelity. However, sightings of feeding off the south coast are not limited to this monsoon period but have also been recorded during the north-east monsoon (Ilangakoon, 2009; Ilangakoon and Perera, 2009; Ilangakoon and Sathasivam, 2012), indicating that feeding opportunities are not limited to monsoon-related upwelling and that blue whales in these waters exploit seasonal upwelling-related food sources and at least a part of the population is able to find enough sustenance here throughout the year. This species, which is normally migratory, remain in these waters year-round, indicating the importance of the area as a feeding ground.

Sperm whales feed primarily in and around the Trincomalee canyon (Whitehead, 1983) but regularly move along the shelf edge of the south/southwest coast too. Some of these movements include super-pods numbering in the hundreds of animals and it is not well documented if these are movements between food patches or for other reasons. Spinner dolphins while being the most common species of small cetacean in the IMMA, are seen feeding in

waters of the continental shelf throughout the day but most often from mid-morning to early afternoon. Large aggregations of feeding spinner dolphins can be observed during the tuna fishing seasons and in fact fishers usually follow these dolphins in order to find the tuna.

Criterion D: Special Attributes

Sub-criterion D2: Diversity

Diversity is one of the primary criteria for this IMMA. While endangered *B. m. indica* is a primary species in the area throughout the year other baleen whale such as Bryde's whales (*Balaenoptera brydei*) and more recently the Omura's whale (*Balaenoptera omurai*) have been recorded in the area (Leatherwood and Reeves, 1989; Ilangakoon, 2012; de Vos et al., 2016). Likewise *P. macrocephalus* and *S. longirostris* are primary species in this IMMA. Additionally small cetaceans ranging from four species of blackfish (*G. macrorhynchus*, *O. orca*, *P. crassidens*, *P. electra*, *F. attenuata*), two more *Stenella* species (*S. attenuata*, *S. ceoruleoalba*), *T. truncatus*, *G. griseus*, *L. hosei*, *S. bredanensis*, *K. sima*, *K. breviceps* are known to use these IMMA waters as habitat. Such a diversity of species concentrated in an area that is relatively small makes this IMMA somewhat unique in terms of species richness alone.

Supporting Information

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**MARINE MAMMAL
PROTECTED AREAS
TASK FORCE**



IMMA

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WHALE AND
DOLPHIN
CONSERVATION

WDC

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