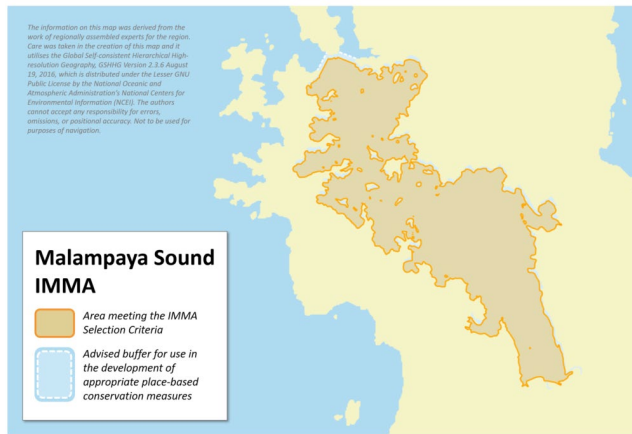


# Malampaya Sound IMMA

## Description

Malampaya Sound is a brackish inlet in the municipality of Taytay, Palawan province, Philippines. It is known as the "Fish Bowl of the Philippines" due to its productive fishing grounds, though fish stocks are declining. The flagship species of this site is the Irrawaddy dolphin, the first known population of the species in the country – and one of only three currently known populations. As documented in multiple studies, bycatch in local fisheries is the major threat to this population (Dolar et al., 2002; Smith et al., 2004; Gonzales and Matillano, 2008; Whitty, 2016).

The area of the Sound is approximately 230 km<sup>2</sup> and is divided by rocky islands into an inner and outer portion; Irrawaddy dolphins are found only in the Inner Sound, while there have been some sightings of *Tursiops truncatus* in the Outer Sound (Smith et al., 2004). The maximum depth of the Inner Sound is about 16 m while the Outer Sound is 46 m. The surrounding landscape is characterised by high hills, with altitudes ranging from 100-500 m, and dominated by the 1,013 m tall Mt. Capoas on the western side. Steep topography and a highly indented shoreline, with many small and large bays, coves and inlets create complex wind patterns that vary greatly according to area, season and time of day (due to convection forces). The seasonal climate is largely determined by the monsoon seasons, with the wettest months in July-September during the southwest monsoon, and prolonged winds during the northeast monsoon (roughly December-March). Freshwater inflows come from numerous rivers draining into the inner Sound, and extensive mangroves dominate the shore in this area. Fishing is the principal source of income and employment, with



## Area Size

197 km<sup>2</sup>

## Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*  
Criterion A; B (1); D (1)

## Other Marine Mammal Species

### Documented

*Tursiops truncatus*

## Summary

Malampaya Sound, Palawan, Philippines, is home to a small subpopulation of Irrawaddy dolphins (*Orcaella brevirostris*). The most recent population estimate is 35 individuals (CV = 22.9%), with bycatch rates greatly exceeding the potential biological removal rate. This subpopulation is restricted to the inner part of the sound and is listed as Critically Endangered on the IUCN Red List. Though Malampaya Sound has been designated a Protected Landscape and Seascape since 2000, fishing effort continues to increase without effective enforcement of regulations, in a context of local communities that are highly dependent on fisheries for their livelihoods.



Figure 1: Irrawaddy dolphins breaching in Malampaya Sound. Photo: Mavic Matillano

at least 5,000 fishermen in seven villages dependent on at least 60 commercially valuable fish species.

Although Irrawaddy dolphins were first reported as occurring in Malampaya Sound in 1986 (Kataoka et al., 1995), it was not until 1999 that the first dedicated cetacean survey was conducted in the area and recorded 17 sightings with a mean encounter rate of 7.4 dolphins/100 km (SE=2.9) and mean group size of 5.3 dolphins (SE=1.1) (Dolar et al., 2002; Smith et al., 2004). All sightings were made in shallow waters (76% less than 6 m deep) of the Inner Sound. Surveys were conducted in the area up until 2009 and again in 2011-2012. This latter survey yielded a population estimate of 35 individuals (CV = 22.9%), and an estimate of bycatch rates that exceed the PBR (Whitty, 2016).

Due to its rich waters, and important terrestrial habitat surrounding it, Malampaya Sound was proclaimed as a protected area (Protected Landscape and Seascape) under the National Integrated Protected Areas System (NIPAS) in 2000, and a general management plan for the area was issued (NIPAP,

2000). However, implementation of management measures has been challenging, with limited personnel and funding dedicated to enforcement, and as a result there has been a continued increase in fishing effort due in part to in-migration of fishers from other parts of the country (Whitty 2015). The Malampaya Sound Ecological Studies Project reported an 'uphill struggle to implement the policies being set by the Protected Area Management Board (PAMB)', noting that 'protected seascape' is the 'lowest possible prioritization' given to a protected area. Enhanced protection is needed. As of 2011, this area is listed as one of 17 PAs outlined for fast-tracking habitat bills (description from <http://www.cetaceanhabitat.org>).

Currently, there are reinvigorated, serious efforts to establish eco-tourism in Malampaya Sound, led by the Tourism Officer of the Municipality of Taytay. This represents an opportunity to link Irrawaddy dolphin conservation to a broader program that could include mountain hiking, bird watching, and livelihood tourism.

## Criterion A: Species or Population Vulnerability

The Irrawaddy dolphin, *Orcaella brevirostris*, recently declared Endangered on the IUCN Red List (Minton et al., 2017), is found only in the Indo-Pacific region. It tends to occur in small, patchy populations concentrated in and near estuaries and in semi-enclosed, protected bodies of water with freshwater inputs, such as bays, lagoons, and river systems (Stacey and Leatherwood, 1997; Stacey and Arnold, 1999). Five discrete subpopulations of Irrawaddy dolphins, including the Malampaya Sound subpopulation, have been assessed on the IUCN Red List separate from the species' main assessment. All of these are designated as Critically Endangered. Several other subpopulations, which have not been assessed, have populations in the tens or hundreds of individuals. Several of these subpopulations occur in "ecological cul-de-sacs" – such as rivers or inlets –

meaning that they do not have the option to move to more suitable, less impacted habitats in contiguous areas.

Until recently, the Critically Endangered Malampaya Sound subpopulation of Irrawaddy dolphins in Palawan was the only subpopulation known in Philippine waters (Dolar et al., 2009, Matillano pers. comm). Surveys in 2001 yielded a population estimate of 77, CV = 0.27 (lower 95% CI = 45, upper 95% CI = 130) (Smith et al., 2004); most recent population estimate from research in 2011-2012 is 35 individuals (CV = 22.9%, 95% CI = 22 to 55) (Whitty, 2016). Based on extensive interviews with fishers, cross-checked with limited official records, bycatch estimates for 2009 ranged from 2 to 6 dolphins; 2010, 6 to 11; 2011, 0 to 3 – though the study might not have captured entanglement events that occurred in the latter part of 2011, when the study was conducted (Whitty, 2016). These are minimum estimates, and



T.S. Whitty

Figure 2: Irrawaddy dolphin surfacing near fishermen boats. Photo: Tara Sayuri Whitty



indicate bycatch rates that far exceed the Potential Biological Removal threshold (Whitty, 2016). Surveys indicate extensive overlap in fishing grounds and dolphin habitat throughout the Inner Sound (Whitty, 2016).



Figure 3: Irrawaddy dolphin found near fishing net in Malampaya Sound IMMA. Photo: Mavic Matillano

Meaningful efforts to reduce bycatch are hampered by ineffective fisheries management, high dependence of local communities on fisheries as a livelihood, and lack of strong community-based groups working on environmental resources, in addition to continued influx of fishers and ever-increasing fishing effort. The main fishing gears responsible for Irrawaddy dolphin bycatch – crab gillnets and crab pots – are also among the most widely used gears. This renders this population extremely vulnerable.

Two more locally occurring Irrawaddy dolphin populations have been recently identified, one in southern Palawan and another in Iloilo-Guimaras Straits. The Iloilo-Guimaras Straits population has been assessed three times, resulting in the following: 2009-2012 with 23 dolphins (CV 23.6%, 95% CI 15-36 dolphins); 2013-2014 with 21 dolphins (CV 25.5%, 95% CI 10-31 dolphins) and 2015-2016 with 13 dolphins (CV 20.9%; 95% CI 9-19 dolphins) (Dolar et al., 2018).

## Criterion B: Distribution and Abundance

### Sub-criterion B1: Small and Resident Populations

As described under Criterion A, the Malampaya Sound subpopulation of Irrawaddy dolphins is small and under threat. A further consideration is that this subpopulation is resident to the Inner Sound, with no corridors to other suitable habitats nearby. Additionally, the southernmost portion of the Inner Sound is decreasing in depth due to sedimentation from rivers (Aquino et al., 2006), possibly decreasing accessible habitat.



Figure 4: Malampaya Sound subpopulation of Irrawaddy dolphins. Photo: Mavic Matillano



Figure 5: Malampaya Sound Irrawaddy dolphins. Photo: Tara Sayuri Whitty

## Criterion D: Special Attributes

### Sub-criterion D1: Distinctiveness

Given its geographic location, this population is most likely distinct from the other population of Irrawaddy dolphins in the Philippines, which are found in the Iloilo and Guimaras Straits, although genetic studies have not been conducted. So far, comparison of photo-identified individuals between the two localities yielded no similarities (Dolar et al., 2018).



Figure 6: *Orcaella brevirostris*. Photo: Mavic Matillano

## Supporting Information

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