

Skipping the Important Details -- What About Mormugao's Marine Mammals?

Goa is a land of pristine beaches, dense mangrove forests, expansive estuaries, islands with their fringing reefs and perennial rivers. This coastal landscape is one of the reasons this place is among India's premier tourism destinations, attracting close to 60 lakh tourists every year (source: Tourism Department of Goa) and contributing hugely to the state's economy. This perfect piece of paradise is on the verge of destruction with the latest developmental project proposed by the Mormugao Port Trust in association with Jindal SWPL, Adani and Vedanta (Smita Nair, *Indian Express*, 2017).

The expansion of the Mormugao Port in Goa, to incorporate a coal hub, has raised concern and alarm among people both in the immediate region of Vasco, as well as from those across Goa. The proposed project's Public Hearing of three days was extended to a total of eight days wherein concerned citizens from the fishing community, business community, local residents, students, politicians, lawyers and scientists spoke against the proposed project, which intends to bring in as much as 50 million tonnes of coal through this port in the coming decade (Smita Nair, *Indian Express*, 2017).

Among the many concerns which the project proponents haven't addressed at all (and wish to proceed without addressing), are a number of ecological threats which will most likely affect the presence of marine mammal species which are often seen in areas well within the impact range of the proposed project. These particular issues appear to have either received little or no attention, or have been considered and immediately dismissed based on flawed and incomplete information. As independent researchers who have on multiple occasions studied the marine mammals inhabiting this region, we proceed to point out the potential impacts the project's EIA report appears to have overlooked, and also point out some omitted/overlooked facts.

Dredging to deepen the approach channel to the port is one of the activities of the proposed project. When the present EIA considers the effects of dredgers on marine mammals ("especially dolphins", as it says), it considers factors such as "collision, propeller action and underwater rope, wires and anchorage material" – all of which are only **very direct and short terms** threats – threats that could cause **casualties** to dolphins." What it completely ignores is the set of potential long-term threats that could be very much more detrimental to the dolphins that occupy and utilise the area.

Displacement of dolphins from an area as a direct result of dredging, even if the area is an already urbanised and heavily modified one, is a phenomenon that has been observed very clearly. In a study at Aberdeen Harbour (Scotland), Pirotta et al (2013) observed a clear drop in the usage of the area by bottlenose dolphins as a result of high-intensity dredging. Although Goa's humpback dolphins are a different species from the bottlenose, both species are similar. Both cases – the cited one from Scotland, and the one of Mormugao harbour – involve habitats that already had/have been urbanised and human-modified. Both cases deal with foraging areas in such habitats. The Scotland case showed clear disturbance to dolphins as already stated. For the Mormugao case, it would be wise to learn from the former very similar case study, especially considering we are here dealing with an animal that is a Protected Species under the Wildlife (Protection) Act, 1972. Furthermore, the Indian humpback dolphin is a strictly near-shore species. It is dependent on river mouths as foraging areas. Contrary to a lot of popular belief, it CANNOT simply move out to sea and occupy any available undisturbed habitat, so continuing with ecologically unsound development under the assumption that they will do so is not only baseless, but also goes against the legal protection this species is awarded by central law.

The EIA does in fact make a mention of underwater noise caused by dredging – something that could have serious effects on local marine life, considering that its impact could reach well beyond the port area itself. Surprisingly, the fact that Schedule I protected species may be implicated in this problem

(for example the Indian humpback dolphin, as per this very EIA) does not seem to be of the slightest concern to the project's proponents. The EIA states that three types of dredger will be employed – Trailer Suction Hopper Dredger (TSHD), Cutter Suction Dredger (CSD), and Backhoe Dredger (BD). TSDHs have sound source levels as high as 186 dB underwater at 1m distance (DOSITS website). CSDs can potentially be even louder, depending on the substrate they are being used on (DOSITS website). To put noise levels like those into perspective – human exposure to noise beyond 115dB is considered safe for only 30 seconds at a time. 186dB (equivalent to about 160dB in air) is a lot louder at the source than fireworks. It is even louder than a jet take-off, and almost as loud as a space shuttle launch. Imagine that noise underwater, present constantly.

What makes it all the more serious is that the sound frequency of most dredging machines is concentrated at or below 1kHz, which overlaps with the frequencies used by migrating whales, and even by fish for communication. It is therefore very likely that the intensive dredging planned for this project will interfere with these species, either affecting their activities in the area or possibly displacing them altogether. Considering most dredging noise will be in this low frequency band, there are chances this sound will travel over longer distances, only widening its impact on aquatic fauna far beyond the project site.

Although porpoises do not use the low- to mid-frequency range of sounds used by dolphins and whales, harbour porpoises have still been found to avoid TSDHs from as far as 600 m (Diederichs et al, 2010). The finless porpoise found in our waters is a species that is vulnerable to most coastal anthropogenic activities, being relatively less tolerant of human interference than other marine mammals. Although preferring near-shore and estuarine habitats, they are elusive creatures, are hard to detect, and their presence is often mistakenly overlooked. Finless porpoises have been found around the Mormugao Port waters in November 2016 during surveys supported by the State Forest Department, and they are very likely to be at risk from intensive dredging in and around their habitat. This is another animal that is protected by the Wildlife (Protection) Act, 1972.

As mentioned before, most species of fish are also sensitive to low frequency sounds (Popper et al., 2003; Popper and Fay, 2011), within the range of those produced by dredgers. This is of special concern, since the EIA does not consider the impacts of dredging noise on fish. Fisheries operate around this area, and are a major livelihood in the region, contributing to the economy of the state. Dredging has been known to reduce feeding efficiency (Voellmy et al., 2014), and interfere with communication signals (Codarin et al., 2009) in fish. The EIA does not describe the fish life in the area at all – it states only that the increased sediment load can clog the gills of fish, and goes on to negate even this point by saying that fish could simply move out of these waters.

On 3rd May 2017, at the public hearing for the project, in response to a question raised by Mr. Sanjay Redkar, representatives of the Mormugao Port Trust claimed that “no dolphins had ever been sighted in the port area”. This flawed response comes as a surprise. The area of the proposed port expansion and redevelopment, and the surrounding 10km radius (which the EIA report defines as its study area), have witnessed several species of marine mammals like Indian humpback dolphins, finless porpoises, orcas (killer whales) and a humpback whale – all of which are protected species under central law. Biologists have recorded a number of Indian humpback dolphin and finless porpoise sightings in and around this area as recently as November 2016 (see maps below). Sutaria & Jefferson (2004) surveyed the Goa coast for the presence of marine mammals, and found a number of finless porpoise group very close to Mormugao, and 135 Indian humpback dolphin groups, 100 of which were found on the coastline of North Goa, clustered near river mouths – including that of the Zuari, which is within the impact range of the project. The EIA itself mentions that dolphins are regularly sighted at Dona Paula, 4.5km away from the project site, and that these are likely to be affected by the proposed project. Photo-documented sightings of humpback dolphins have even happened within the docking area of the

port in February 2013, on the departure of a research cruise from this port – these were not just glimpses, but prolonged sightings of entire bouts of foraging, with pods of these dolphins hunting mullet fish right beside ships berthed at the port (the photographs from these sightings, taken from a ship’s deck, are included below). Intense social activity among these dolphins was also observed during this sighting. Moreover, a pod of three killer whales was sighted just outside the port in 2011, and they were even observed swimming into the Zuari river mouth towards the port; this is a verified record available on a public database (<http://www.marinemammals.in/index.php/database/sightings-strandings>). Also of particularly special interest was the sighting and audio-recording of a humpback whale – a very rare species to find in Indian waters – at Grande Island, which lies very close to the project site, in March 2017 (Dipani Sutaria, *Livemint*, 2017). Lastly, in addition to these marine mammals, a whale shark – yet another species protected under the WPA – was sighted and filmed in April 2017 at Grande Island.

The easy dismissal of the presence of marine mammals and other protected species here, within the port’s waters as well as within the EIA’s study radius of 10km, shows disregard and ignorance on the part of the project’s proponents.

All of the above – including gaps in the existing EIA, and the dismissal of questions raised during public hearings – demonstrate the apathetic approach of the project’s proponents towards matters of serious ecological concern. We strongly believe that given these issues, along with concerns over countless other ecological, environmental, economic, and livelihood impacts (all of which have been rightly raised by individuals and local communities), the project has no basis on which to receive clearance to proceed in this region.

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A humpback dolphin photographed at the mouth of the Zuari river, with Mormugao Port in the background (2016).



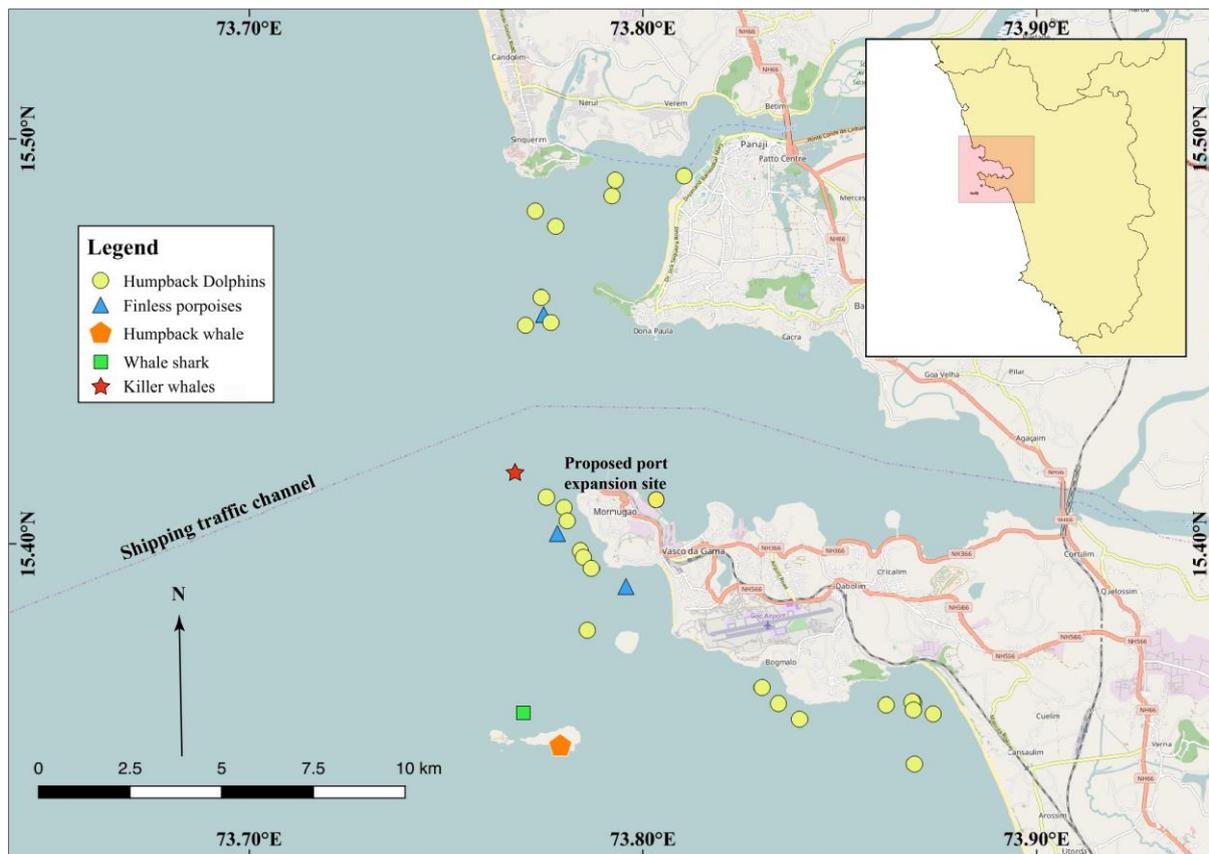
Indian humpback dolphins foraging in the docking area of Mormugao Port (2013).



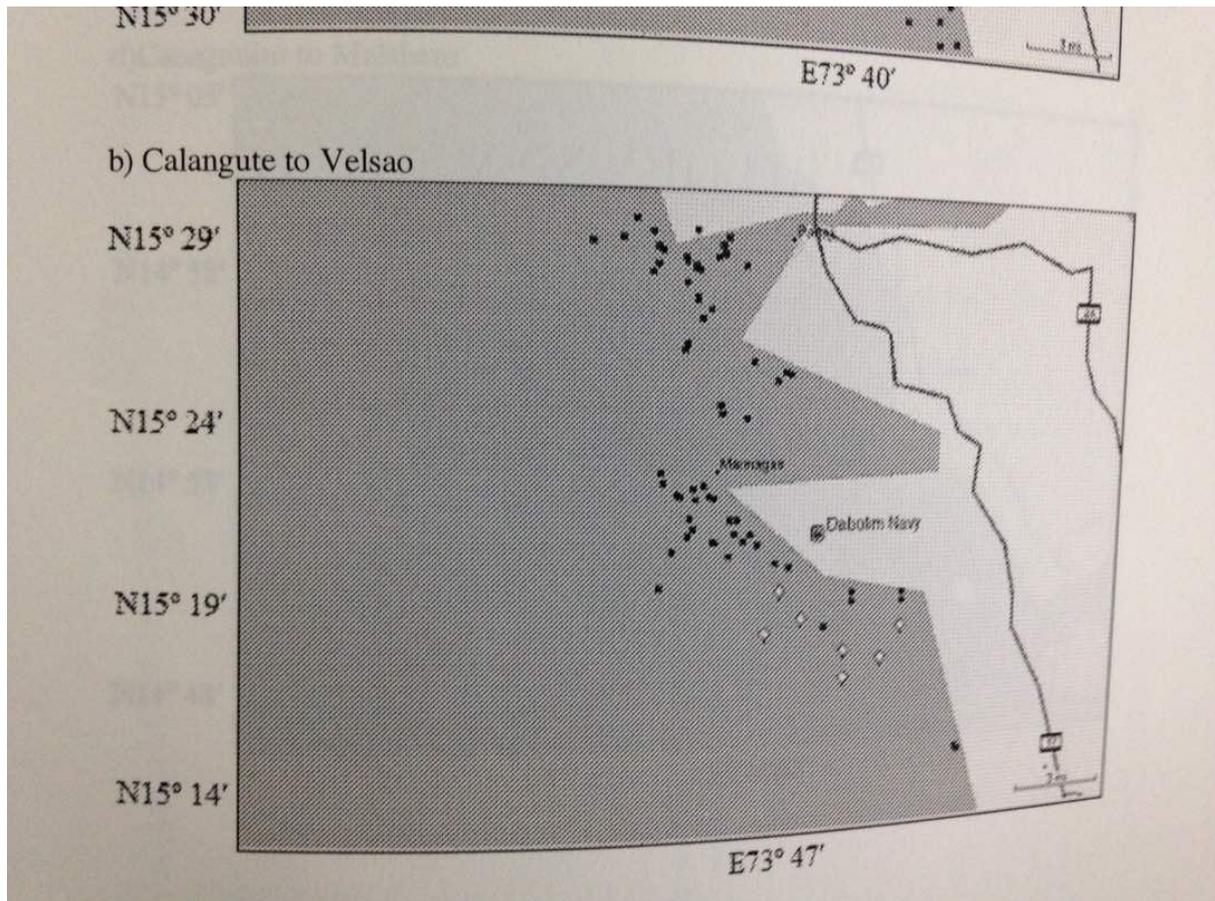
Indian humpback dolphins engaged in intense social activity in the docking area of Mormugao Port (2013).



Orcas (killer whales) sighted near the entrance to Mormugao Port (2011).



A map showing the sighting locations of four marine mammal species and a whale shark, in the vicinity of the proposed project site (November 2016 to April 2017).



Finless porpoise sighting locations (marked in white) and humpback dolphin sighting locations (marked in black) during a 2002 field survey, from Sutaria & Jefferson (2004).

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