

ANNEX 15

Potential interactions between purse seine operations and critical habitats off the coasts of Goa and Maharashtra

April 2026

Background

Fishing gear and habitat interactions

Some types of benthic habitats such as seagrass beds and coral/sponge communities are important for those fish and invertebrates that are dependent on habitat structure for some part of their lifecycle. Whilst the loss of some habitat may not be a significant issue for maintaining populations of species of economic importance there may be effects on overall biodiversity and sustainable yields if losses are too great.

Some types of fishing gears such as demersal trawl and dredges are well known for their ability to remove habitat structure (Kaiser et al 2002 - [10.1046/j.1467-2979.2002.00079.x](#), Grabowski et al 2014 - [10.1080/10641262.2013.846292](#)). The degree of impact depends on the nature of the gear used (i.e. whether it is designed to sit hard on the seabed or even dig in as is the case for some types of scallop dredges), the types of habitats involved (some soft bottom communities are less susceptible to benthic impacts and recover quite quickly), the percentage of the habitat affected and the number of times per year that the habitat is affected, amongst other factors.

Purse seines are not generally associated with habitat impacts. The nets are generally not designed to touch the seabed due to concerns about damage such as tearing, that may be driven by sharp rocks and fauna such as corals. The nets are not designed to be dragged great distances by the fishing vessel and operate by forming a curtain around schools of fish swimming above the seabed. However, there are places where purse seining on seagrass beds has proven problematic (Tosunoğlu, Z. and Ulaş, A 2025) due to the weight of the gear. Depth of water and the hanging depth of the net are both factors in evaluating the potential for impacts on habitats such as seagrasses.

Requirements of Marin Trust Version 3.0

The purse seine fisheries of Maharashtra and Goa passed the requirements of the Marin Trust Standard Version 2.0 receiving a passing grade for all three components of Clause F2. The fishery assessor determined that on the basis of available knowledge about purse seines and habitat interactions that it was unlikely for habitat interactions to take place.

However, Version 3.0 of the standard contained requirements for further details to be provided, namely;

E2.1.1 Habitats which may be directly affected by the fishery have been identified, including any habitats which may be particularly vulnerable.
E2.1.2 Information on the scale, location and intensity of fishing activity relative to habitats is collected.
E2.1.3 Collection and analysis of habitat information is adequate to provide a reliable indication of the impact the fishery has on marine habitats.

There is mention of ‘vulnerable’ marine habitats but these are not defined. For the case of E2.1.1 there is specific mention of mangroves, corals and seagrasses. The FAO defines the term ‘Vulnerable Marine Ecosystems’ ([Criteria | Vulnerable Marine Ecosystems | Food and Agriculture Organization of the United Nations](#)) but these are generally deep water coral and sponge beds. For the purposes of this evaluation we shall consider mangroves, seagrasses and corals as per the fishery assessment conducted under V3.0.

Fishery Assessment Determination for the Indian Oil Sardine FIP – Maharashtra and Goa

There were gaps identified for sub clauses E2.1.2 and E2.1.3. The main source of the gap was a lack of information, not evidence of impact.

The fishery assessment noted that the fishery was legally mandated to operate in areas where these habitats did not occur. However, it also stated, with no supporting evidence, that the fishery sometimes operated inshore and thus ‘could’ have an impact. Assuming that ‘inshore’ refers to areas that are closed to commercial purse seining then we would view any habitat interactions arising from illegal fishing as an enforcement issue and not something that should be used to characterise the whole fishery.

In addition, given that mangroves occur in intertidal habitats which are physically impossible to access via vessels and purse seine gear the fact that these areas are also closed to purse seining means that mangroves are not considered any further.

Method

Given the views expressed to us by gear technologists and scientists we did not see the value in conducting studies of seabed interactions between purse seining and habitats due to costs. Therefore we:

1. Sought maps of the distribution of seagrasses and corals. The mangroves are totally inaccessible by the vessels and gear.
2. Determined which areas are open to fishing by purse seines from published information and/or applicable regulations

3. Sought information on where fishermen fish and overlaid this on the bathymetry.

Results

The area of interest covers the waters adjacent to the states of Maharashtra and Goa. The northern border of Maharashtra is about 20 degrees north and the southern border of Goa is about 15 degrees south (Figure 1).

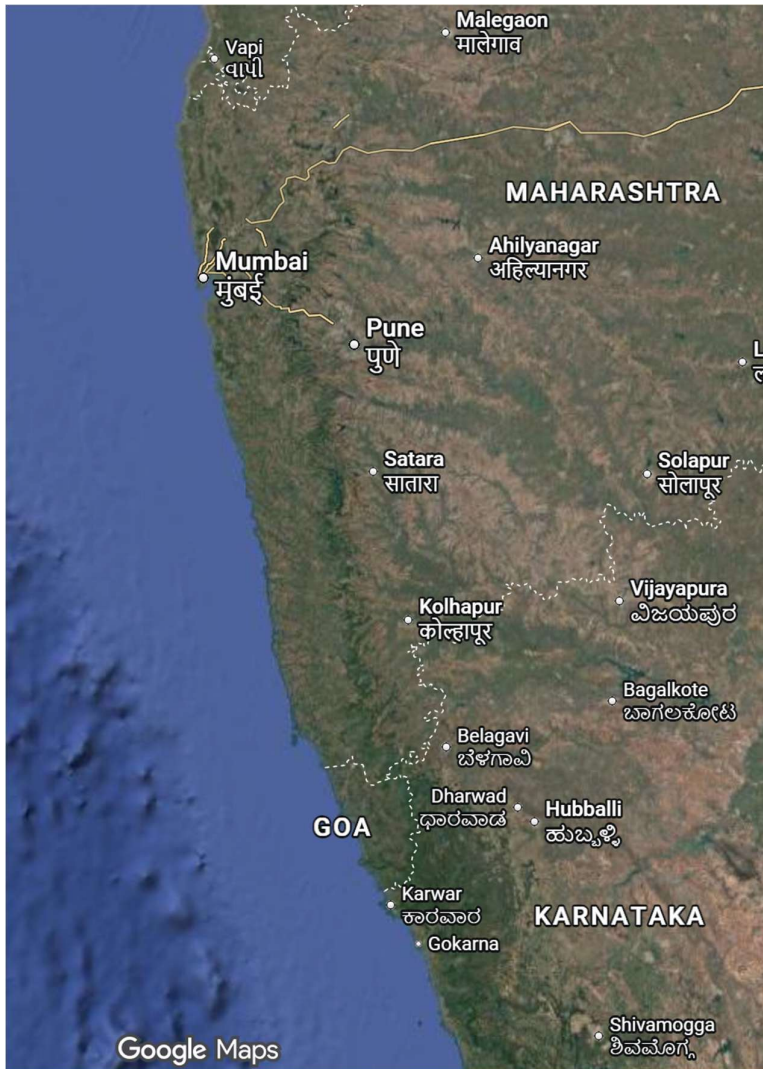


Figure 1 – coastal area from the northern border of Maharashtra to southern border of Goa. Source: Google maps.

Distribution of corals and seagrasses has been sourced from two areas as set out in Figures 2 and 3. Both habitats are very coastally tied, likely due to the turbidity of the water and the depths offshore. There is likely to be corals located on the Angria Bank off the coast of Maharashtra [Angria Bank - Wikipedia](#) and the Adas Bank located off the

coast of Goa [Adas Bank - Wikipedia](#). The Angria Bank is about 105km off the coast and the Adas Bank about 180km off the coast. Both of which are outside of the areas generally fished by purse seiners, about 60km for the case of Maharashtra (Fig 5).

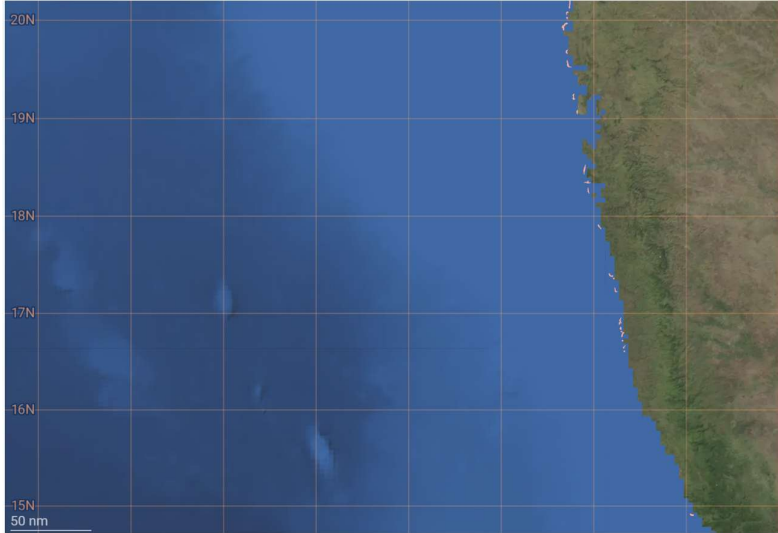


Figure 2. Location of mapped coral reef areas – Latitude 15N to 20N. Source: Global Fish Watch - [GFW | Marine manager](#) - based on doi.org/10.34892/t2wk-5t34

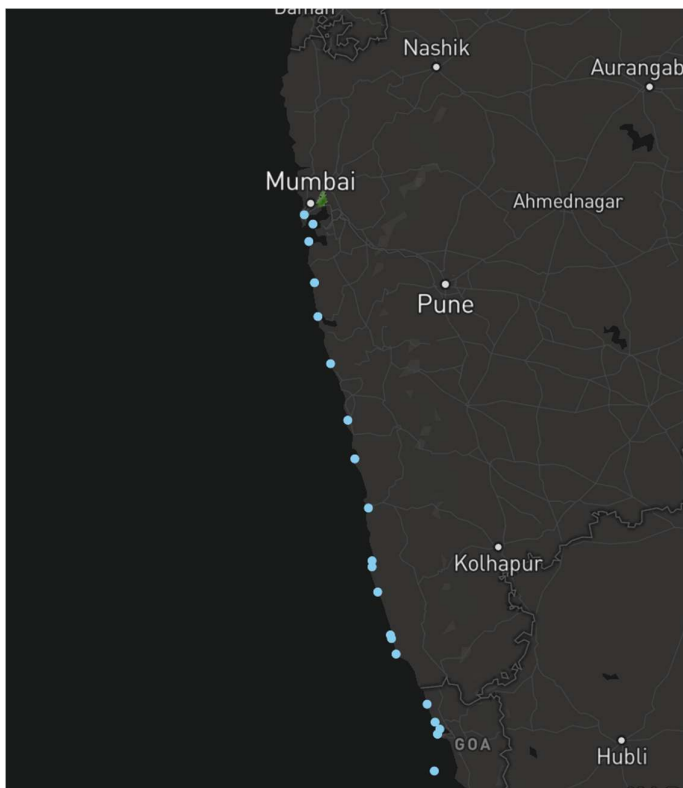


Figure 3. Location of mapped seagrass areas – Latitude 15N to 20N. Source: [Ocean+ Habitats | India](#)

The areas closed to purse seining offshore Maharashtra are shown in Figure 4, below.

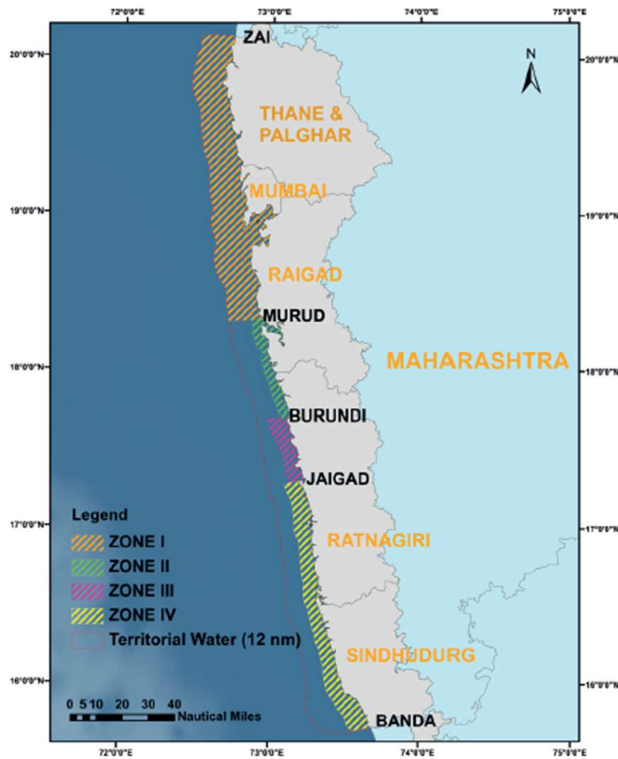


Fig.4. Zonation of the fishing grounds for operation of seines along Maharashtra coast

Figure 4 – areas closed to purse seine fishing off the coast of Maharashtra. Source: Nakhawa, A.D., Chellappan, A., Kumar, R., Bhendekar, S., Pawar, N. and Akhilesh. K.V. (2018). Purse seine fishing in Maharashtra. Marine Fisheries Information Service Technical & Extension Series No. 237, 2018, pp23-25

Details on the zone boundaries are as follows:

- Zone (I)- Zai to Murud: Area from shore to 12 nautical miles (nmi) shall be reserved for traditional fishing. The purse seine, ring seine including mini purse seine fishing shall be prohibited in this Zone
- Zone (II) Murud to Burundi: Area up to 10 m (5 fathom) depth from shore shall be reserved for traditional fishing. The Purse seine, ring seine and mini purse seine fishing shall be permitted beyond the 10 m (5 fathom) depth.

- Zone (III) Burundi to Jaigad: Area up to 20 m (10 fathom) depth from shore shall be reserved for the traditional fishing. The purse seine, ring seine and mini purse seine fishing shall be permitted beyond the 20 m (10 fathom) depth.
- Zone IV Jaigad to Banda: Area up to 25m (12.5 fathom) depth from shore shall be reserved for traditional fishing. The purse seine, ring seine and mini purse seine fishing shall be permitted beyond the 25-meter (12.5 fathom) depth.

For the state of Goa, commercial purse seine vessels are not permitted to fish within 5klm of the coast.

Fishing along the coast of Maharashtra is extensive but, according to fishermen is largely undertaken in depths greater than 25m. Its highly unlikely that there are any seagrasses present at all and any corals would be restricted to small areas of reef. As mentioned before, the incentive for fishermen to set nets over such areas is very low due to the risk of net damage. Conversations with fishermen have confirmed that they keep the risk of benthic interaction at zero by making sure that the net is 10m or more above the seabed.

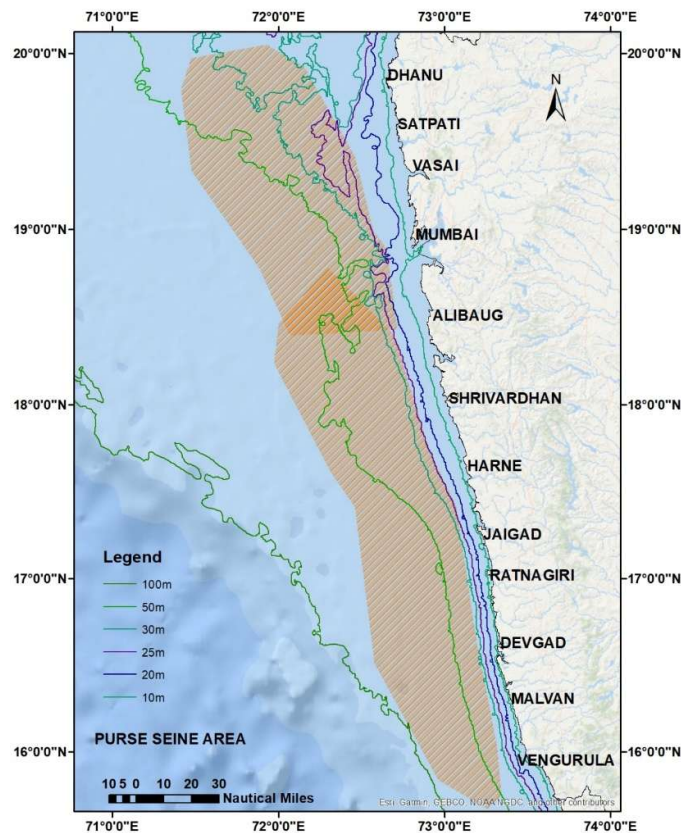


Figure 5. Areas fished by commercial purse seiners. Source: Commercial fishermen stakeholders.

Conclusions

We have provided information on the scale and location of fishing activities off the coast of Maharashtra and the distribution of corals and seagrasses along the coasts of both states. We have also provided information on where commercial purse seining (the subject of the FIP) is prohibited. There seems to be very little overlap between the known distribution of vulnerable habitats and the areas open to purse seining. From an operational perspective, fishermen minimize the risk of having the net damaged by seabed structures by having about 10m between the seabed and the bottom of the net.

Based on the information provided above we believe that legally operated purse seines do not overlap with the habitats mentioned by the fishery assessment team. Therefore, the fishery meets the requirements of E2.1 of Version 3.0.

Additional References

Tosunođlu, Z. and Ulař, A (2025) How Bottom Trawling and Purse Seining Threaten *Posidonia oceanica* Meadows? Chapter 5 in Beyond Sustainable Fisheries Conservation and Sustainability, Small-Scale Fisheries and Creating Value Chains. © Duvar Yayınları