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# Note

# Trends of Potential Fishing Zones (PFZs) along the Mumbai coast, Maharashtra

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## ABSTRACT

The Potential Fishing Zones (PFZs) advisory from INCOIS, Hyderabad for Mumbai coast was analysed to study the trend of PFZ locations. The PFZ trends for landing centers of Versova, Mahim and Colaba were studied during the period 2010-2011. The average depth and distance were 55.2 m and 100 km respectively from the coast in 2010. In the year 2011, the average depth and distance were calculated at 37.8 m and 59 km respectively. The PFZ areas located ranged from 5-229 km in distance and 12-97 m in depth during 2010 and 22-1000 km in distance and 17-500 m in depth in 2011.

Keywords: CPUE, Depth, Distance, Potential Fishing Zone

The technique of predicting Potential Fishing Zone (PFZ) using satellite derived data is becoming an important aspect for the fishermen. The validation of PFZ forecasts plays a vital role in the environmental indication of fish stocks. Many species of oceanic fish aggregate into large schools of fish which offers survival advantages such as enhanced spawning, predator avoidance, and feeding improvement (Makris *et al*., 2009). The validation of PFZ helps in finding fish schools and productive fishing areas that can minimise the fuel consumption and time expended in commercial fisheries. In order to lower the cost of fishing operations, there is a need to accurately predict and detect economically fishable aggregations of fish in space and time (Victor, 2012). Remote sensing, like a two-edged sword, can be used not only to help manage fisheries at sustainable levels, but also guide fishing fleets to increase their catch. Earlier studies showed that satellite derived fishery-aid charts can reduce 25-50% in US commercial fisheries search time (Laurs *et.al*., 1984). Satellite remote sensing has been an important technique in fishery research, management and harvesting, because it provides synoptic ocean measurements for evaluating environmental influences on the abundance and distribution of fish populations and allows ecological analyses at community and ecosystem scales (Chassot *et al*., 2011; Stuart *et. al.*, 2011). Satellites can be used to locate and predict potentially favourable areas of fish aggregation based on remotely detectable environmental indicators. These indicators may include ocean fronts, separating waters of different temperature or colour; upwelling areas, which are cooler and more productive (greener) than background waters; specific temperature ranges preferred by certain fish.

In the present study, an attempt was made to compare and determine the trend of PFZ advisories disseminated by Indian National Center for Ocean Information Services (INCOIS), Hyderabad to study the depth and distance of marine fish distributions in 2010-2011 along north-west coast of India. Prediction of depth and distance variations will be essential for modeling of fish location, distribution and abundance of commercial and non-commercial marine fish stocks. The PFZ advisories disseminated by INCOIS, Hyderabad to selected fish landing centers such as Versova, Mahim and Colaba were studied (Table 1).

Table 1. Trend of PFZ locations along Mumbai coast during 2010 and 2011

| 2010 | | | | 2011 | | | |
|---|---|---|---|---|---|---|---|
| Depth (m) | Distance (km) | Average depth (m) | Average distance (km) | Depth (m) | Distance (km) | Average depth (m) | Average distance (km) |
| 12-97 | 5-229 | 55.2 | 100 | 17-500 | 22-1000 | 37.8 | 59 |

The analysis of PFZ 2010 shows that the average depth and distance were far away from the shore line comparing to 2011. The analysis of PFZ showed that it will be economically beneficial to fishermen for both single day and multiday fishing. Many authors who studied the catch per unit effort, chlorophyll and also employing experimental fishing found 2-3 fold increase in fish catch when fishing is done in the PFZ areas (Gower, 1986; Carr and Broad, 2000; Solanki *et al*., 2001 FAO, 2003; Chassot *et al*., 2011). The Fishery Survey of India, Central Institute of Fisheries Technology and Gujarat State Fisheries Department carried out validation and observed that 70-80% forecast yielded 70-100% increase in catch (Nayak and Solanki, 2003). The validation result of Solanki *et al*. (2001) indicated an average increase in catch of pelagic resources by 200% and 80% in gillnet and trawl net respectively. There is a positive relationship between PFZ and the abundance of commercially important pelagic fishes thereby improving the economics of fishing operations by artisanal, motorised and mechanised sectors, obtaining higher catch per unit effort (Pillai and Nair, 2010).

A study carried out by Despande *et al.* (2011) revealed mean CPUE difference of 17.70 kg between PFZ and non-PFZ with difference of 58 kg, by trawling along Uttara Kannada coast of Karnataka. The cost benefit analysis for the satellite fishery forecasts observed increased from 1.27-2.12 for bottom trawling and 1.3-2.14 for gillnet fishing, with the use of satellite forecasts by adopting an integrated approach to generate nation-wide fishery forecasts (Dwivedi *et al*., 2005). Major constraints were faced in the collection of feedback data from fishermen as majority of the crew members are illiterate that leads to communication gap between researcher and fisher. The greater distance of the PFZ from shore and short period of validity of advisory is another constraint, as preparation for fishing trip takes time. It is imperative to overcome the above constraint by dissemination of the advisories through latest communication techniques like shortwave radio bulletins. The study on the trend of distance and depth of PFZ advisories for NW coast indicated that most of them were located at greater distance from the shore compared to other locations in Maharashtra; particularly southern Maharashtra (Ratnagiri and Sindhudurg). This may be due to unique topographical features of the selected location.

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