

to regulate the fishery from these waters. Unless the spatial analysis is brought into study, these expansions cannot be incorporated in fishery policies and present developments demands formation of regional bodies to regulate the fishing grounds beyond territorial waters of different States. The paper projects the mapping of fishing operation and fishery resource distribution as handy tool for empowering the authorities engaged in fishery management with sea truth information. Paper evaluates that the improvements brought in by introducing engines of higher power have increased fish production, but these innovations lead to irrational high speed operation of mid water/pelagic trawling. Recently bull trawls operated along west coast of India landed huge quantities of juveniles, which raised concerns over the sustainability of most of the commercially important species. With the illustrative mapping of changing scenario in light of all innovations, the paper reveals that conventional natural marine protected areas are being exposed to fishing pressure and this exposure may affect the resilience capacity of the ecosystem

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Variability in thermal front formation and its impacts on fisheries of the eastern Arabian Sea

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In the marine ecosystem, distribution of fish, as well as abundance, is determined by the

presence of conditions favourable for their existence. Among various oceanic features, frontal zones are important sites promoting fish aggregation and these zones are found to be ideal habitats for fish. Therefore, areas with higher incidence of fronts are likely to be associated with higher fish production, than those with lower frontal incidence. An evaluation of this concept based on total thermal frontal area of the eastern Arabian Sea (50-80°E; 0-30°N), is performed for the period July 2002 to December 2016. This work utilizes eight day averaged satellite Sea Surface Temperature observations (SST) from MODIS/AQUA sensor. Frontal identification is based on Cayula-Cornillon (1992) single-image edge detection algorithm on the satellite SST image. Seasonal variation of thermal fronts showed maximum frontal coverage (0.5–0.6 million km²) during the winter period. Thermal fronts have their lowest incidence (0.2–0.3 million km²) during post and pre-monsoon period, and moderate existence during the summer monsoon (0.3–0.4 million km²). Possible physical reasons for the seasonal variation in thermal front incidence are discussed. Time series analysis of frontal formation indicated an increasing trend during 2015 and 2016. During this period, the usual seasonal variation in thermal fronts is not observed. The mechanism responsible for this unusual behavior is also analyzed. Chl-a enhancement is seen in the thermal frontal zones. The impact of thermal frontal areas on fisheries during the intra and inter-annual cycles is also discussed.

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Study on the deep sea bottom trawl resources from the exclusive economic zone of India



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A study conducted by trawling in the deeper waters of Exclusive Economic Zone of India using FORV Sagar Sampada to understand the bottom fishery resources and the trawlable grounds from 2012 to 2017. Expo and HSDT trawls were deployed for the exploration in the present study. An inventory of deep-sea fishery resources from the Indian EEZ is presented based on the specimens collected between the depths from 100 to 1000m. In the present investigation a total of 94 species belonging to 60 families and 22 orders are identified from the depths ranging from 100–1000m. The elasmobranchs were few in number; they consisted of 13 species belonging to 10 families and 6 orders. Teleosts were represented by 81 species belonging to 50 families and 16 orders. The distributions as per the groups are listed in the present study.

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Genetic structure of a small brood-stock population of cobia through pedigree analyses

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The genetic structure of a small brood-stock population of the marine food fish, the cobia maintained at Mandapam Regional Centre of Central Marine Fisheries Research

Institute, India was evaluated through pedigree analyses. Data on pedigree information (n=238) for 6 years (2010-2016) were utilized for the study. Molecular marker (microsatellites) based software program FAP (Family Assignment Program, version 3.6) was used for parentage assignment. Pedigree analysis and the estimates of population genetic parameters based on the gene origin probabilities were performed using the software program ENDOG (version 4.8). The number of founders and ancestors for the whole population were 76 and 17, respectively. The effective number of founders and effective number of ancestors for the whole and reference population were 11 and 6, respectively. The analysis revealed that the mean values of generation interval, inbreeding coefficient and average relatedness were 3.08 years, 2.85% and 5.5%, respectively. The proportion of population inbred was 71.43% after third generation. About 16% of total matings were highly inbred in which full-sib and half-sib matings were 2.5 and 13.5%, respectively. The per cent increase in inbreeding over generations was 3.99, 4.20 and 4.37 estimated through maximum generations, equivalent generations and complete generations, respectively. The number of ancestors contributing the most of 50% genes (f_{a50}) to the gene pool of whole population as reference was only 5 which might have led to reduction in the genetic variability. The extent of genetic bottleneck assessed by calculating the f_e/f_a ratio was 1.0 which is indicative of the absence of stringent bottlenecks. The realized effective population size was 7.70 which is very small and with the increasing trend of inbreeding the situation has been assessed to be critical. The proportion of animals with the genetic conservation index (GCI) greater than 4 was 10.5 per cent which can be used as a scale to use such animals with higher GCI to