

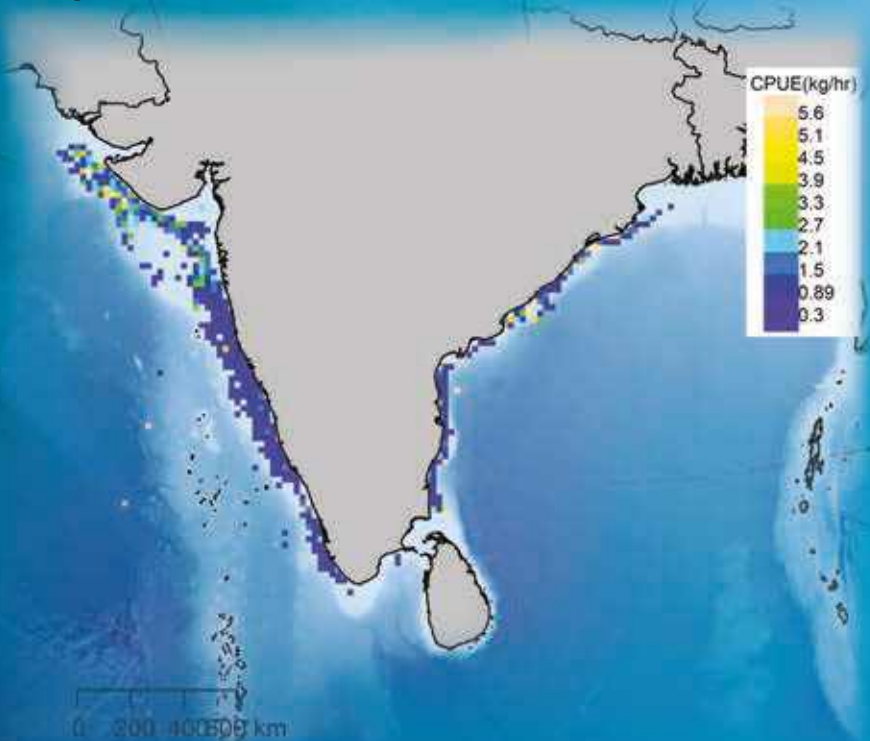


FSI/FC/(FA)/8/2024

# Treasures of the Deep

## An Atlas of India's Demersal Fishery Resources and Fishing Grounds

*Sijo P. Varghese, R. Jeyabaskaran, A. Tiburtius, K. Silambarasan, Nashad M., Solly Solomon, Rajashree U. Pawar, M.K. Sinha and Ansuman Das*



**FISHERY SURVEY OF INDIA**

Department of Fisheries  
Ministry of Fisheries, Animal Husbandry & Dairying  
Government of India

*FSI special publication No. FSI/FC/(FA)/8/2024*

# **Treasures of the deep**

## ***An Atlas of India's Demersal Fishery Resources and Fishing Grounds***

***Abbreviation:*** *Atl. Fish. Surv. India*

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# Preface



**Dr. R Jeyabaskaran**  
Director General  
Fishery Survey of India

It is with great pride that I introduce "Treasures of the Deep: An Atlas on India's Demersal Fishery Resources and Fishing Grounds." This atlas is a result of extensive research and surveys conducted by the Fishery Survey of India (FSI), dedicated to exploring and documenting the marine biodiversity within India's Exclusive Economic Zone (EEZ) and adjacent high seas. The support and encouragement received from the Department of Fisheries, Government of India, especially the Hon'ble Secretary, Joint Secretary and other higher official are thankfully acknowledged at this juncture.

Our primary goal in creating this atlas is to provide a detailed, scientific account of the demersal fishery resources, showcasing their diversity, distribution, and potential. The Fishery Survey of India has consistently aimed to support sustainable management of marine resources, and this publication is a testament to our commitment to this mission.

The FSI's achievements in mapping new fishing grounds and monitoring marine ecosystems are significant. Our integration of advanced technologies in fishery surveys has enhanced the accuracy and reliability of our data. Additionally, our capacity-building initiatives have strengthened the human resource base in the fisheries sector, ensuring that we are well-equipped to address future challenges.

This atlas is designed to serve as a comprehensive resource for policymakers, researchers, and the fishing community. It provides detailed insights into India's demersal fishery resources, and I am confident that it will play a crucial role in supporting informed decision-making and promoting sustainable fisheries management.

I extend my deepest gratitude to the scientists, researchers, and staff of the FSI for their dedication and hard work. Their contributions have been instrumental in making this publication possible. As we navigate the complexities of sustainable fisheries management, I hope that "Treasures of the Deep" will inspire and guide us towards a future where our marine resources are utilized responsibly and conserved for generations to come.

A handwritten signature in black ink, appearing to read 'R. Jeyabaskaran'.

**Dr. R Jeyabaskaran**

# Acknowledgements

We extend our deepest gratitude to the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, for their unwavering support, which was instrumental in carrying out the comprehensive research operations documented in this atlas. Their commitment to advancing our understanding of marine resources has been vital to the success of this project.

We place on record the invaluable contributions of all former Director Generals of the Fishery Survey of India, whose vision and foresight in designing the research operations laid the foundation for this extensive survey program. We express our gratitude to all the present and former Zonal Directors as well, whose leadership and practical implementation of these plans brought the surveys to fruition.

Our heartfelt thanks go to the dedicated scientists who participated in the surveys over the past two decades. Their tireless efforts, meticulous data collection, and insightful analyses have been the cornerstone of this publication. Without their expertise and perseverance, this atlas would not have been possible.

We also express our sincere appreciation to the floating staff, whose hard work and resilience during each voyage ensured the successful execution of the surveys. Their dedication and professionalism in often challenging conditions were crucial to gathering the extensive data presented here.

A special mention goes to the Computer Section, especially Shri. NV Ramanamurthy, Shri. Ch Bhaskar and Shri. Ashish Kumar, whose team of programmers and data specialists played a pivotal role in compiling and processing data from all the survey bases. Their technical acumen and diligent efforts have been instrumental in transforming raw data into the comprehensive and accessible format of this atlas. We also express our sincere gratitude to Shri. Ashok S. Kadam, Sr. Fisheries Scientist for technical advices and logistic support rendered during the drafting.

We are equally grateful to the Engineering Section, Workshop Section, and Establishment Section employees, whose meticulous planning and logistical support ensured the smooth operation of each voyage. Their technical expertise and commitment to excellence facilitated the seamless execution of our research missions.

Lastly, we acknowledge all those who have contributed, directly or indirectly, to this monumental endeavour. Your support, collaboration, and dedication have made this atlas a reality, and we hope it serves as a valuable resource for the sustainable management and conservation of India's demersal fishery resources.

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# 1. Introduction

## 1.1 Genesis and initial missions of Fishery Survey of India

The Fishery Survey of India (FSI) was established in October 1946 as a pilot project known as Deep Sea Fishing Station (DSFS) by the Government of India with the objective of augmenting food supply through development of deep-sea fishing. The institute has started its journey as DSFS and survey activities were initiated in a humble way with one vessel namely S. T. *Meena*, a mine sweeper converted into a trawler. The main objectives of the DSFS were charting of fishing grounds and training of deep-sea fishing personnel. Realizing the gigantic task of DSFS, the Government of India, established several such stations on both east and west coasts of India. Accordingly, the Offshore Fishing Stations (OFS) were established at Cochin in 1957 and two more stations at Tuticorin and Visakhapatnam in 1958.

The OFSs operated wooden fishing vessels and few steel trawlers. The OFSs were initially under the direct administrative control of the then Ministry of Food and Agriculture, Government of India and subsequently were brought under the control of DSFS in 1959. These stations operated 20 fishing vessels, of which, 15 were wooden vessels.

In 1968, an ambitious programme of exploratory survey in offshore waters of the entire Indian coast was undertaken and a fleet of 20 indigenously built steel stern trawlers (*Meena* series) of 17.5m OAL were inducted. In 1969, *Matsya Vigyani*, a 32m stern trawler was acquired from German Democratic Republic under bilateral aid programme. After the induction of *Meena* series vessels, eight OFSs viz., Calcutta (1971), Port Blair (1971), Kandla (1971), Goa (1972), Mangalore (1972), Madras (1972) and Paradeep (1972) were established in addition to the DSFS, Bombay and OFSs, Cochin, Tuticorin and Visakhapatnam.

In 1973, DSFS at Bombay was made an independent Offshore Fishing Station (OFS). In 1974, re-orientation of the activities of OFSs took place and the institute was renamed as Exploratory Fisheries Project (EFP) and the OFSs were named as the Bases of EFP. In 1976-77, Veraval Base was established and thus, the institute had 12 operational Bases with a fleet of 23 survey vessels. In 1976, Exclusive Economic Zone (EEZ) was declared and India has got an area of 2.02 million square kilometre of sea as its sovereign right for exploitation of marine fisheries resources. Realizing this massive need of the nation towards food security, Government of India had started to acquire large survey vessels for the survey of demersal, pelagic and oceanic resources of the EEZ. In 1977, as a first leap to achieve this goal, Government of India had chartered a 69m OAL survey vessel M. T. *Murena* from Poland for a period of one year to carry out the exploratory survey of demersal and pelagic resources of North-West coast of India.



This was followed by acquisition of 9 vessels constructed abroad and in India under various bilateral aid programmes. This fleet included two combination trawlers (*Matsya Nireekshani* and *Matsya Shikari*) from Netherlands in 1979, two combination trawlers-cum-purse seiners (*Matsya Varshini* and *Matsya Darshini*) from Denmark in 1980, a tuna long-liner-cum-squid jigger (*Matsya Sugundhi*) from Japan in 1980 and four indigenously built vessels under Norwegian aid at Goa Shipyard Limited which included a purse-seiner-cum-tuna long liner (*Matsya Harini*) in 1980, a combination trawler-cum-tuna-long liner (*Matsya Jeevan*) in 1982 and two combination trawler-cum-tuna-long liners (*Matsya Shakti* and *Matsya Vishwa*) in 1983. In 1982, a confiscated Taiwanese vessel (*Matsya Mohini*) was added to the fleet by converting it to Stern trawler.

In 1983, with the acquisition of the larger survey fleet, the Government of India decided to reorganize and upgrade the organization by adding more survey vessels, strengthening infrastructure facilities and scientific manpower. As a result, the EFP was renamed as the Fishery Survey of India (FSI) under the aegis of the then Ministry of Agriculture (Department of Animal Husbandry and Dairying). In 1988, the FSI was declared as a Science and Technology Institute.

Consequent to the reorganization, the institute has amplified, enlarged and upgraded. With passing time, the FSI had passed through the administrative control of multiple ministries of Government of India *viz.*, Ministry of Food and Agriculture, Ministry of Agriculture (Department of Agriculture and Cooperation), Ministry of Food Processing Industries, Ministry of Agriculture (Department of Animal Husbandry and Dairying), Ministry of Agriculture and Farmers' Welfare (Department of Animal Husbandry, Dairying and Fisheries). In 2019, Government of India has embarked upon the ambitious programme of “*Neel Kranti*” “Blue Revolution” with the objective of doubling the income of the fisher folks. To achieve this goal Government of India has created the new ministry, the Ministry of Fisheries, Animal Husbandry and Dairying (Department of Fisheries) and thereafter FSI functions under the aegis of this new Ministry.

Presently, the Institute has a research/survey fleet of 11 deep sea vessels of which two are multifilament Tuna longliners, two monofilament Tuna longliners and seven Stern Trawlers equipped with the state-of-the-art technology equipment. These vessels are deployed from seven Bases *viz.*, Mumbai, Mormugao, Cochin and Porbandar on the west coast and Chennai, Visakhapatnam and Port Blair on the east coast in order to accomplish the mandate of the Institute.

The Institute has thus, emerged as the nodal Fishery Institute in India with the primary responsibility of marine fisheries resources survey, assessment and monitoring in the Indian Exclusive Economic Zone (EEZ) for promoting sustainable exploitation and management of the fish stocks. The Institute has been generating real time geo-tagged data of marine fishery resources from shallow to deep and oceanic waters for more than 7 decades. In addition to the regular survey projects, research is also carried out to find out the diversified fishing methods and gear development for sustainable fishing by reducing by-catch and discards.



The FSI, from its inception, conducts exploratory surveys, charting of fishing grounds, assessment of fish stocks in the Indian EEZ and adjoining high seas and research thereof. Additionally, the Institute conducts specific surveys on request from the States and the Union Territories. The Institute, thereby collects time series geo-referred data through the exploratory surveys by the survey fleet and disseminates these survey findings/ data to the end users, including fishers, fishing industries, researchers, managers and policy makers.

In order to disseminate the information on the survey findings to the stakeholders, various extension activities are being carried out by the FSI in the form of workshops, open-houses, marine fisheries exhibitions, awareness rallies and direct interaction with the fishing industry, fishermen and other end users. Besides these, the information is also being disseminated through various publications such as Resources Information Series, Meena News, Charts, Atlas, Special publications, Occasional papers and Bulletins. Other modes of Information dissemination are through print and visual media including *Akashwani* (AIR), *Doordarshan*, and various social media platforms.

Human resources development through the practical training to the students, fishermen, industry, fisheries officials and managers are regularly conducted. Under the capacity building programmes, the Institute organizes skill development programmes on-board to impart training on latest fishing methods, especially tuna long lining technology, squid jigging etc., to the fishermen of different maritime states and Union Territories.

The Institute imparts training to the students sponsored by the CIFNET on-board survey vessels on tenure basis as part of Human Resource Development programme of the Institute. The FSI has a wide collaboration with several premier national institutes of the country for multiple research & development programmes. The Institute also been recognized by the University of Mumbai, Andhra University, Goa University, Cochin University of Science & Technology, University of Madras for research leading to Ph.D., and Master's Degree in Science. Scientists of FSI were also recognized by these universities as the research guides for Ph.D., and M.Sc., degree courses.

The FSI also has a dedicated Marine Engineering Division (FSI-MED), which can undertake maintenance works including dry-docking / underwater repairs of the fishing vessels. Other fisheries engineering works including fabrication/repairs of otter boards, winches, dredgers, squid jigging machines, refrigeration systems etc. are also being undertaken. The FSI-MED has an ILR Servicing Centre approved by the DG Shipping. It has a grab dredger with a capacity of 40 cubic meter per hour for dredging fishing jetties, harbours etc. The division undertakes the repair and maintenance of electronic equipments like echo-sounders, auto pilot, RADAR, GPS, VHF, compass, AIS etc.





## 1.2 Mandate of the institute

The mandate of FSI is tuned from time to time to match the developmental activities of the fisheries sector as well as to meet the national and global requirements.

- Exploratory surveys, charting of fishing grounds, assessment of fish stocks in the Indian EEZ and adjoining high seas and research thereof, besides the specific surveys on request from the States and the Union Territories.
- Data collection and periodic re-validation of potential of fishery resources to provide advice on fishery management issues enshrined in the national, regional and global conventions and agreements and other associated activities.
- Monitoring survey of fishery resources in the exploited areas including coral reefs, application of Monitoring, Control and Surveillance (MCS) for regulating fishing activities and promoting Code of Conduct for Responsible Fisheries (CCRF) in the Indian EEZ.
- Maintain Data Bank and disseminate information on fishery resources to the end - users and act as an interface between the State/UTs and the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India for Marine and Inland fish production and related aspects.
- Assessment of suitability of fishing gear, accessories and equipment with special reference to the preservation of environment and ecology of marine habitat.
- Fish stock identification and biodiversity studies including application of genetic tools and techniques.
- Marine fisheries forecasting including application of Remote Sensing for the benefit of Artisanal, Mechanized and Industrial sectors.
- Human Resources Development through the practical training of fishing operatives, fishermen, fisheries officials and students.



### 1.3 The need for a comprehensive demersal fishery atlas

Demersal or the bottom dwelling fishes, which inhabit and feed near the seabed, are essential for maintaining marine biodiversity and to support the fisheries-dependent communities. Sustainable exploitation of these resources is crucial to ensure their continued contribution to marine ecosystems and human livelihoods.

India's rich marine resources have been exploited for thousands of years, with traditional fishing practices evolving significantly in time with modern technologies and management strategies. With a vast coastline spanning over 8,114 kilometres and an exclusive economic zone (EEZ) of 2.02 million square kilometres, India is endowed with diverse marine resources. Demersal fisheries play a vital role, contributing significantly to the nation's economy, food security, and the livelihoods of millions of coastal inhabitants. This sector, further generates substantial revenue through domestic sales and exports, contributing to the country's GDP and foreign exchange earnings. Post-independence, the Indian government initiated several programs to enhance fish production, including the mechanization of fishing vessels and the establishment of fishery research institutions. The transition to modern fishing methods, marked by the introduction of mechanized trawlers, advanced gear technologies, and improved processing and storage facilities, has significantly increased the efficiency and reach of the fishing industry.

Despite these advancements, the sustainable management of demersal fisheries faces numerous challenges. Current fishing practices often result in high fishing mortality rates and inadequate selectivity patterns, negatively impacting stock productivity and fleet profitability. Habitat destruction, caused by destructive fishing practices, coastal development, and pollution, undermines the productivity and resilience of marine ecosystems. The monitoring of demersal fish diversity patterns helps assess the impact of fishing activities, which is crucial for ensuring sustainability of these resources.

FSI's surveys monitor the status of marine fishery resources, offering insights into species composition, biomass estimates, and spatial distribution patterns. This information is crucial for understanding fisheries' dynamics, identifying overexploitation risks, and formulating effective management strategies. Additionally, evaluating the ecological effects of fishing activities, including bycatch and habitat degradation, are crucial for developing ecosystem-based fisheries management approaches. Therefore, the FSI's exploratory assessments and data-driven management contributions are vital for the conservation and responsible utilization of demersal resources along the Indian seas.



This atlas provides a comprehensive overview of the demersal fishery resources in India, highlighting their distribution, abundance and dynamics. Understanding the dynamics of demersal fish populations is crucial for maintaining the biodiversity and functioning of these habitats.

This atlas delves into demersal fishery resources across India's different coastal states and presents species distribution, abundance, and potential fishing grounds based on extensive surveys conducted by the Fishery Survey of India from 2000 to 2020. By integrating scientific research and innovative technologies, the atlas proposes effective management strategies to ensure the long-term viability of demersal fisheries, safeguarding marine resources for future generations.



## 2. Materials and Methods

### 2.1 Data collection and survey methods

The FSI's exploratory fishery surveys were meticulously planned to cover wide range of habitats and depth zones along all the maritime states and island groups of India. The survey vessels of FSI undertake 20 days survey cruises every month.

The survey area was divided into different strata based on depth zones and ecological characteristics. Random sampling was conducted within each stratum to ensure representative data collection. Surveys were carried out round the year to obtain an account of seasonal variations in fish abundance and distribution.

Data collection involved the use of research vessels equipped with modern fishing gear and scientific instruments. The primary methods and equipment used were, Demersal Trawl- used to target fish species dwelling near the sea floor; Shrimp Trawl- Specifically designed to catch shrimp and other crustaceans and Cephalopod Trawl - used to capture cephalopods such as squids, cuttlefishes and octopuses.

Primary analysis of the catches were done onboard the vessels. Fish species were identified, and their weights and lengths were recorded. Biological samples were collected for further laboratory analysis.

### 2.2 Geographic coverage

The exploratory fishery survey conducted by the Fishery Survey of India (FSI) covered the entire exclusive economic zone (EEZ) of India, including the waters off the coasts of the Arabian Sea, Bay of Bengal, and the Indian Ocean. The survey was designed to encompass various latitudinal and longitudinal ranges, providing a comprehensive understanding of fishery resources across different maritime state. The depth range of the demersal survey operations was between 20 to 500 meters. The distribution and abundance of these resources are cartographically presented, segregated into maritime states. We had taken utmost care to define the boundaries of maritime states. However, the seaward boundaries of the states in the maps presented may differ from the actuals.



## 2.3 Analytical techniques

### 2.3.1 Data collection

The data for this study were obtained from exploratory surveys conducted by the Fishery Survey of India (FSI). These surveys collected species-wise catch data across the geographical extends mentioned in the section 2.2. The catch per unit effort (CPUE) was calculated based on the species-wise catch data to assess the efficiency of the fishing operations and the abundance of different species.

### 2.3.2 Calculation of catch per unit effort (CPUE)

The CPUE was calculated using the formula :  $CPUE = \frac{Total\ Catch}{Fishing\ effort}$

where the total catch represents the weight of the fish caught, and the fishing effort is the measure of time of actual fishing duration. This metric allows for the standardization of catch data, making it possible to compare the abundance of different species across various regions and time.

### 2.3.3 Spatial analysis

To visualize the spatial distribution of fish species and identify major fishing grounds, the CPUE data were mapped using R package and ArcGIS. These tools were chosen for their robust analytical capabilities and their ability to handle large geospatial datasets.

### 2.3.4 Mapping with R

R, a powerful statistical computing language (<https://cran.r-project.org/bin/windows/base/>), was employed for initial data cleaning, processing, and subsequent analysis. Packages such as `tidyverse` for data manipulation and `ggplot2` for data visualization were utilized. The spatial analysis in R involved:

- Data Import and Cleaning: Importing raw survey data and cleaning it to remove any inconsistencies or missing values.
- CPUE Calculation: Calculating the CPUE for each species at different survey locations.
- Spatial Visualization: Creating preliminary maps to visualize the distribution patterns of CPUE using `ggplot2` and `sf` (simple features) packages.



### 2.3.5 Mapping with ArcGIS

ArcGIS was used for advanced spatial analysis and creating high-quality maps. The steps involved in ArcGIS included:

- Data import : Importing the processed data into ArcGIS.
- Spatial analysis: Using spatial analysis tools in ArcGIS to identify patterns, trends, and hotspots of fish abundance.
- Mapping: Creating detailed maps that show the spatial distribution of CPUE across different regions. Layers representing different species and their abundance were added to the maps.
- Identification of Major Fishing Grounds: Analyzing the spatial data to identify and delineate major fishing grounds based on the highest CPUE values.

In the present study, we employed the Inverse Distance Weighting (IDW) interpolation technique using ArcGIS software to create fishing maps that represent the spatial distribution of fishery resources. Fishery survey data, collected from various demersal fishing operations conducted by the Fishery Survey of India (FSI) along the Indian coast over 20 years (2000-2020), was used. This dataset included the locations of fishing grounds, species abundance, and catch per unit effort (CPUE) values. The data was preprocessed to ensure accuracy and consistency, and the IDW method was applied to interpolate CPUE values across the study area. The IDW tool within the ArcGIS Spatial Analyst extension was utilized, with input parameters optimized based on preliminary analysis. A variable search radius was used to account for varying data point densities, and the resulting raster was visualized using appropriate symbology and overlaid with additional contextual layers.

The accuracy of the IDW interpolation was validated using cross-validation techniques, with mean absolute error (MAE) and root mean square error (RMSE) calculated to assess the model's performance. The interpolated fishing maps provide a detailed and accurate representation of the spatial distribution of demersal fishery resources along the Indian coast. These maps serve as essential tools for policymakers, researchers, and the fishing community to make informed decisions regarding sustainable fisheries management.

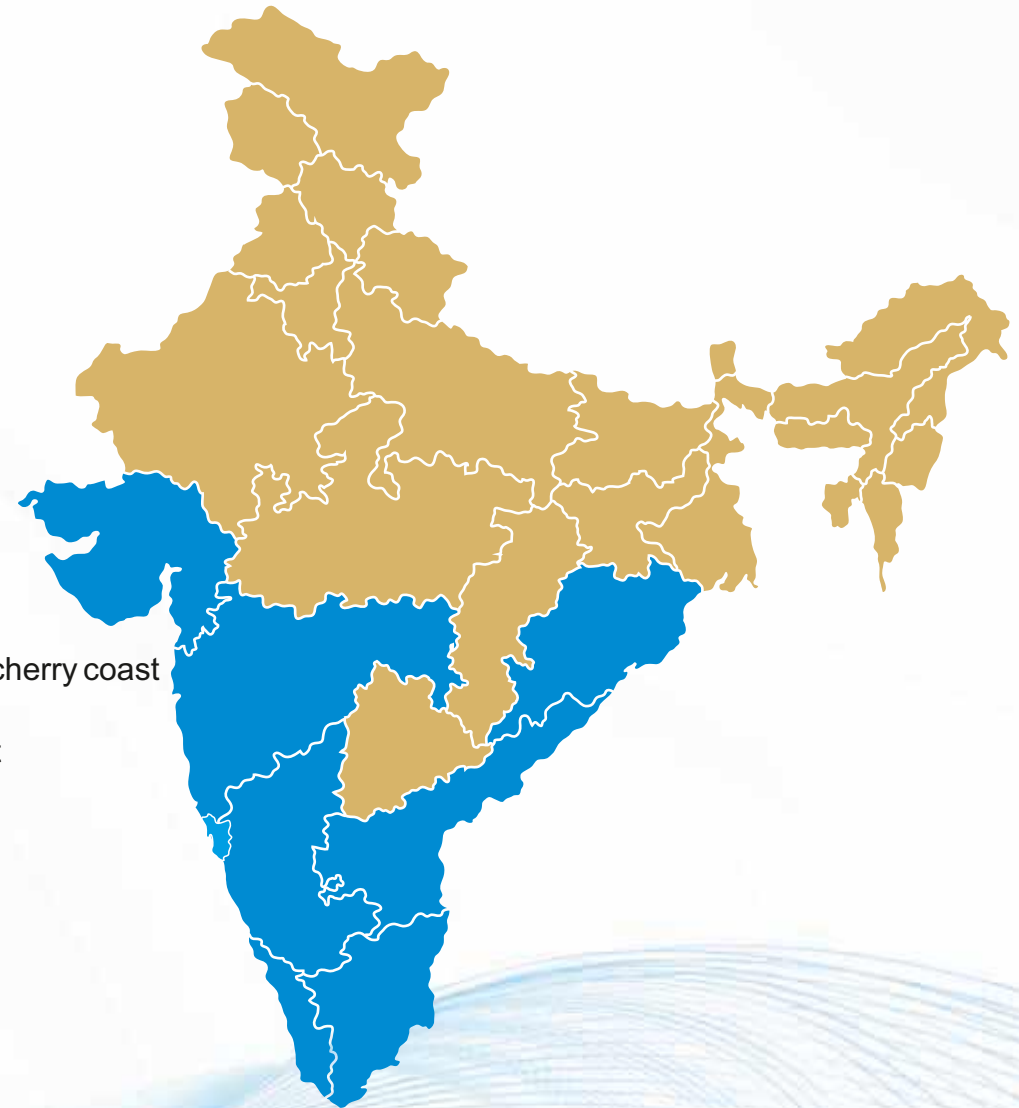
### 2.3.6 Interpretation of the data

The maps generated from R and ArcGIS were analysed to provide a comprehensive view of the spatial abundance of the selected fish species. The combination of CPUE calculation and R package for preliminary data analysis, and ArcGIS for detailed spatial mapping provided a robust framework for analyzing the spatial abundance of fishery resources. This approach enabled the identification of major fishing grounds, contributed valuable insights into the spatial dynamics of fish populations in the surveyed regions and facilitates the development of targeted management strategies for sustainable fisheries.



### 3. Distribution of Demersal Fishery Resources

- 3.1 Spatial distribution and abundance along Gujarat coast
- 3.2 Spatial distribution and abundance along Maharashtra coast
- 3.3 Spatial distribution and abundance along Goa coast
- 3.4 Spatial distribution and abundance along Karnataka coast
- 3.5 Spatial distribution and abundance along Kerala coast
- 3.6 Spatial distribution and abundance along Tamil Nadu and Puducherry coast
- 3.7 Spatial distribution and abundance along Andhra Pradesh coast
- 3.8 Spatial distribution and abundance along Odisha coast





## Vernacular names of the species mapped

| Sl. No. | Name of the Fish              | Gujarat                 | Maharashtra                      | Karnataka                      | Goa                                  | Kerala                                      | Tamil Nadu   | Andhra Pradesh               | West Bengal                        | Odisha   |
|---------|-------------------------------|-------------------------|----------------------------------|--------------------------------|--------------------------------------|---|--|------------------------------|------------------------------------|--|
| 1       | Threadfin Breams (Nemipterus) | Rani, Rata, Lalmachala  | Rani / Bamni                     | Mudumagalu, Madmal, Madumagala | Rano, Rane                           | Kilimeen, Kelli Meen, Chengalava            | Navara, Rani Meenu, Sennagarai, Thullu Kendai, Kandal Meen | Chalaneera Kanti, Selleganti | Rani mach, Ruppan                  | Nalliborai, Nallisankara                                   |
| 2       | Mackerel                      | Bangada                 | Bangada                          | Bangude                        | Bangada                              | Aila, Ayala                                 | Kanangeluthi, Kaanakaathai                                 | Kannangadatha                | Kajal Gouri                        | Kanagurda, Marua   |
| 3       | Goatfish (Upenids)            | Chiri                   | Chiri / Rana                     | Kurli, Purli                   | Palu                                 | Manakkam                                    | Nagarai, Navarai   | Rathi Goolivinda             | Borai                              | Gopi rangia, Guli binda                                    |
| 4       | Round Scads (Decapterus)      | Khota bangada           | Shitap / Teli Bangada            | Meenu sonte                    | Haro Bangdo                          | Ayillakanni, Kiriyan                        | Parai / Parai, Kumara Parai / Killichai                    | Pilliodugu                   | Lomba Narkeli Mach, Sada maittya,  | Kanti machha, Kokali                                       |
| 5       | Ribbon Fish                   | Patti / Ribbon          | Wagti / Bala/ Baga               | Kittale                        | Balle                                | Vaala, Thalayan, Pambada                    | Vaalai   | Savallu                      | Patia, Phitha,                     | Rupapatia, Savala, Langi                                   |
| 6       | Groupers (Kalava)             | Vekhali / Vekhlu        | Gobra / Hekaru                   | Guri, Gopra, Muri Meenu        | Gobro, Wekhanu, Bile Korai           | Kalava, Murumeen                            | Kalavan, Panni Meen, Komeri, Kelavan                       | Bontha, Bontoo               | Kun kuni, Katkoi                   | Bhala, Kai Balay   |
| 7       | Silverbellies                 | Katti                   | Katli / Kappi Surgutta, Titaka   | kittale                        | Khampi                               | Thaali Mullen, Karal, Nalla Mullen          | Kaara Podi, Kara Podi                                      | Kaara                        | Gang Chanda, Tikati, Plastic match | Tanka Cahandi  |
| 8       | Lizardfish                    | Chor Bumla              | Chor Bombil                      | Aranai meenu                   | Narle, Konkaro                       | Aranameen                                   | Thumbil, Thanni Panna                                      | Code Mottah                  | Kauda mach                         | Budimottah, Andolla, Balia girrida                         |
| 9       | Catfish                       | Khagadi / Khaga, Khago  | Teesrya, Shimpliya, Nal Shingala | Thede, Walshingala, Walshingti | Mogamshede, Sangot, Sangtam, Shyade, | Valia Etta, Etta, Kaari, Mushi, Thendu Kadu | Kelluthi, Mandai, Kaleru, Irung Keletee, Kellettee, Keliru | Jelalu, Walaga, Tedi Jella   | Muchal Kanta, Kan Magur            | Kantia (white), Mangura (Black), Thella jella, Nella jella |
| 10      | Squids                        | Narsinga / Ranga, Dodka | Makul / Nala                     | Koppe Dondas                   | Mankli                               | Koonthal                                    | Kanawai, Thotti Kanavai, Ottu Kanava, Muttai, Kadamba      | Charala Kalivinda, Kandavai  | Samudra shasha, Bed                | Kumuti muna, Kalirinda, Batua macha                        |

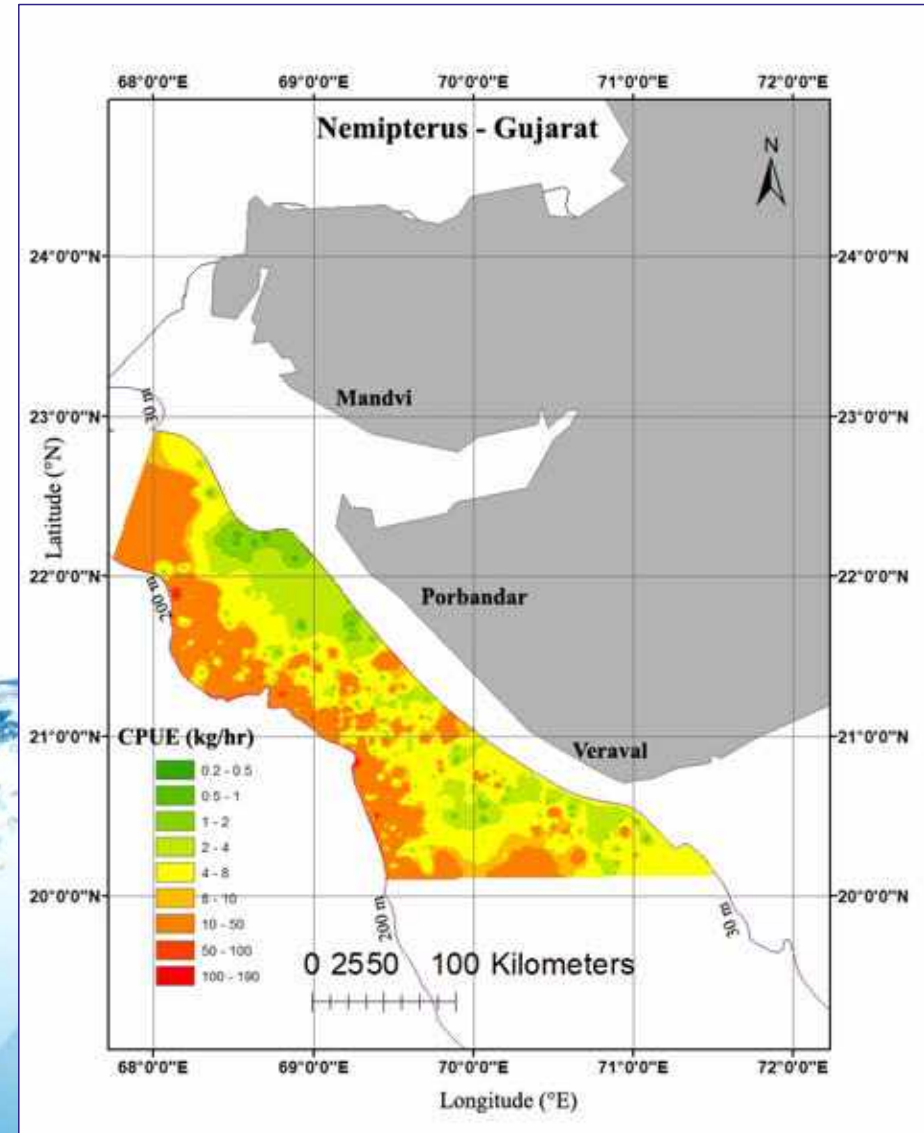


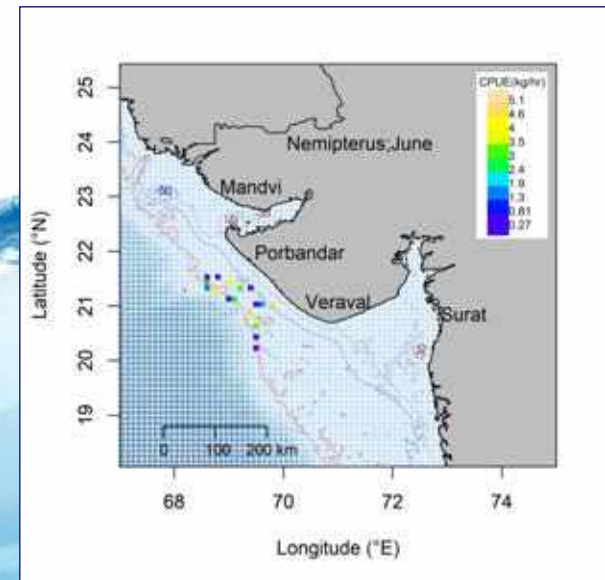
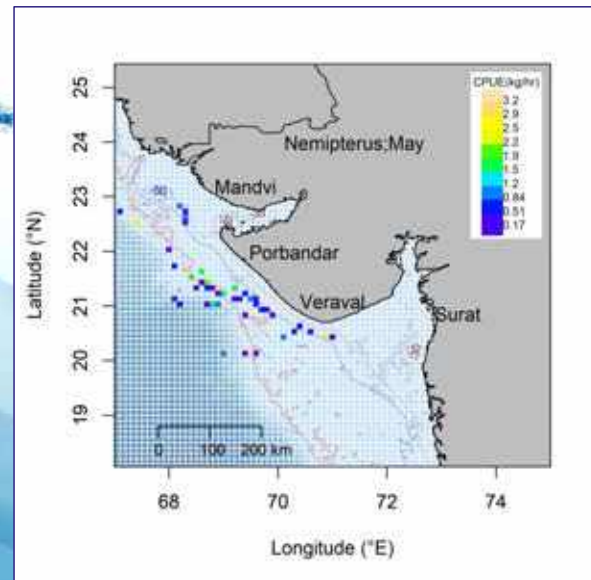
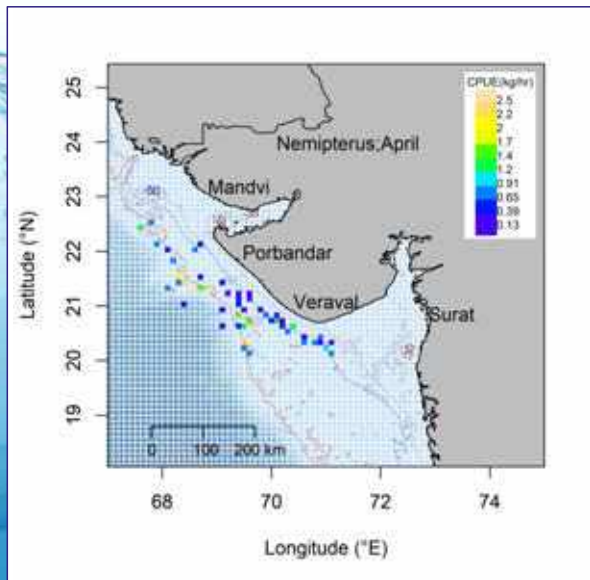
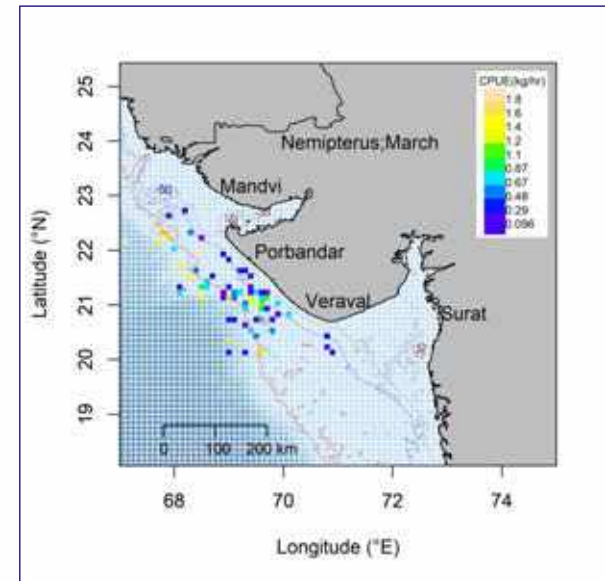
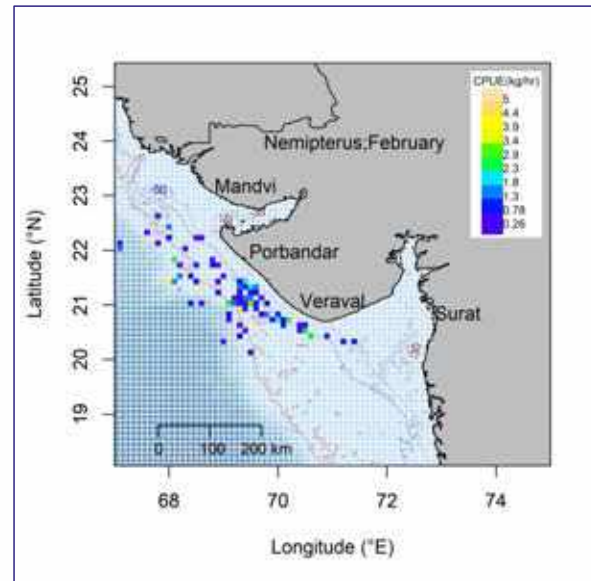
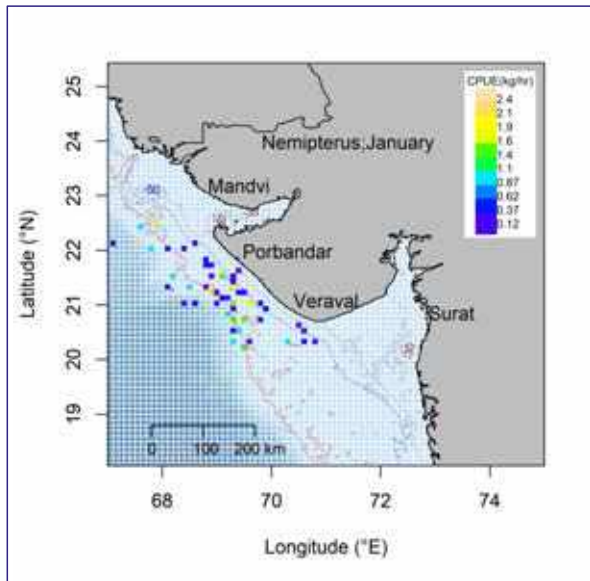
# 3.1 Spatial distribution and abundance along Gujarat coast

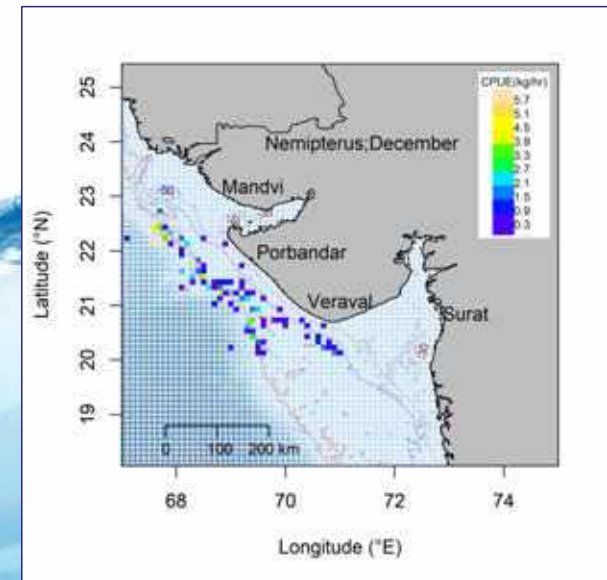
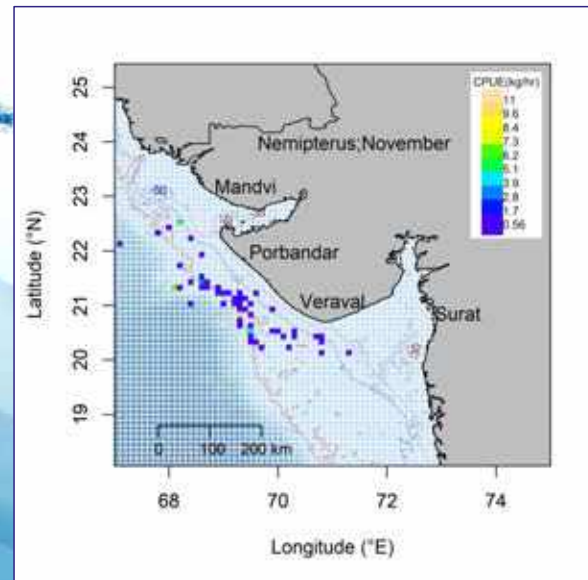
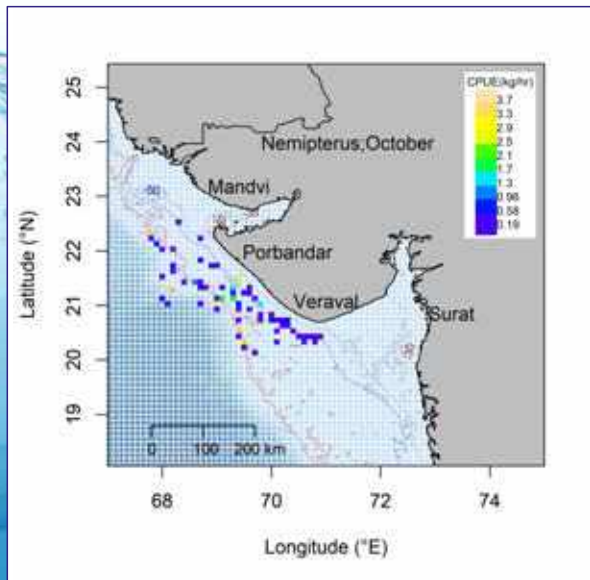
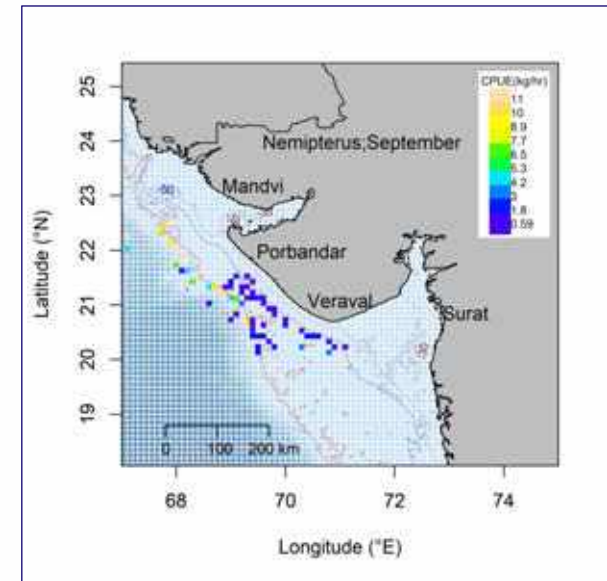
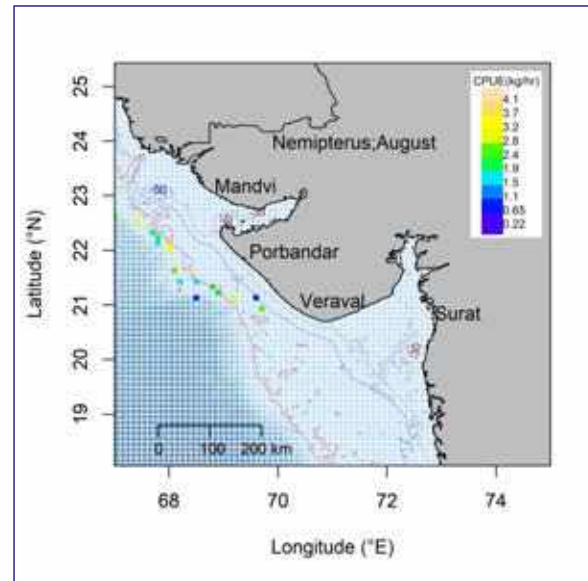
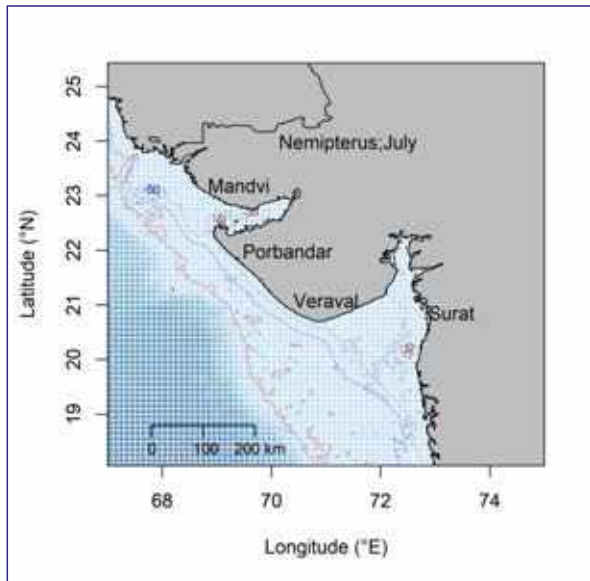




# Threadfin Breams (Nemipterus)

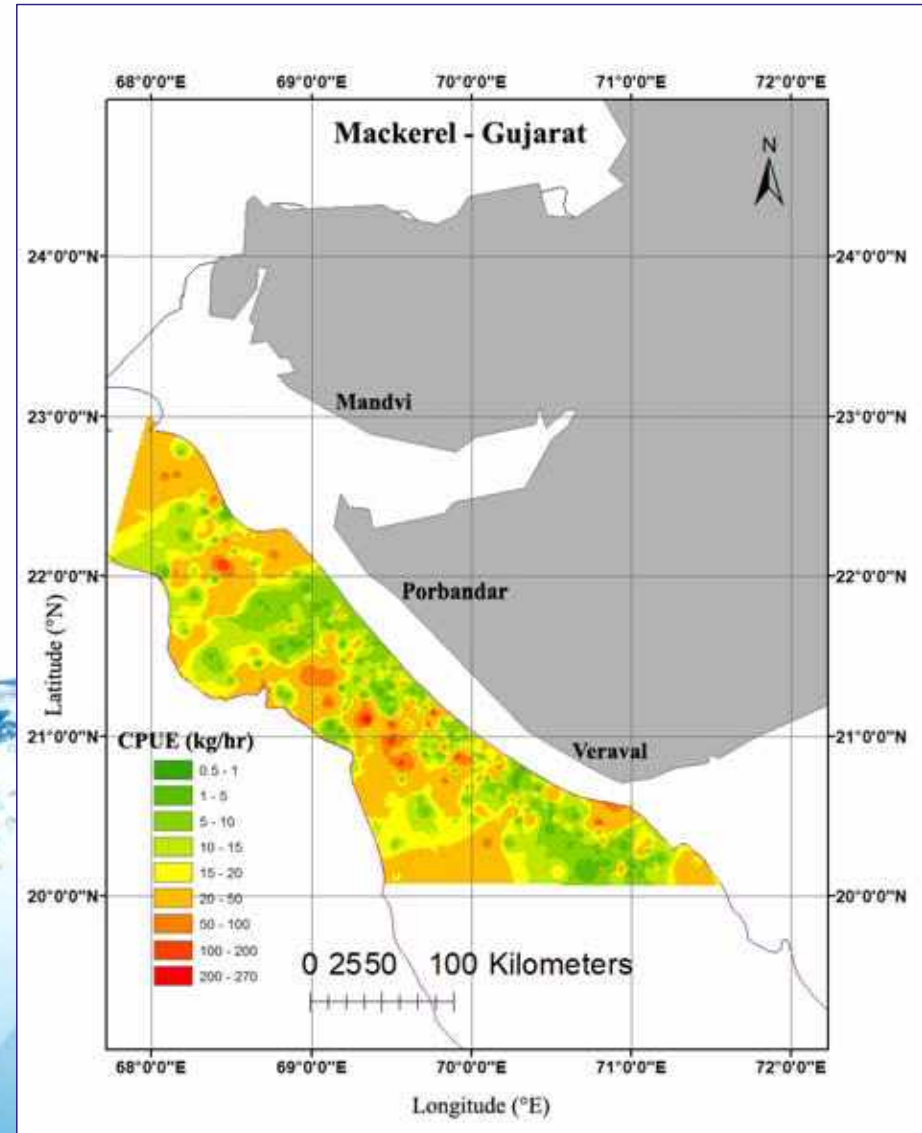


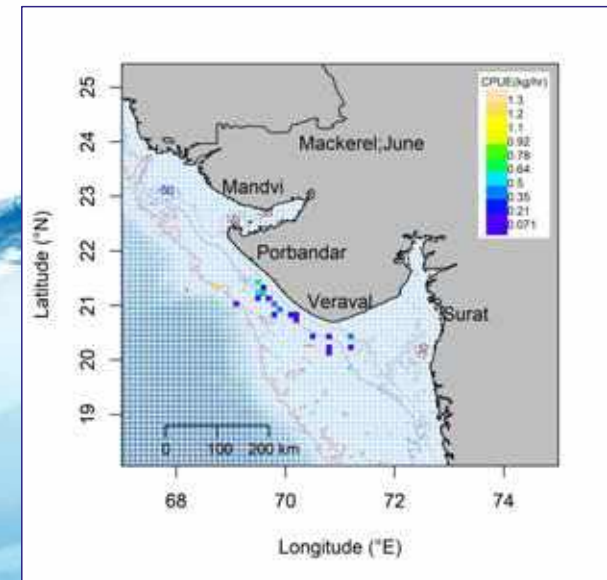
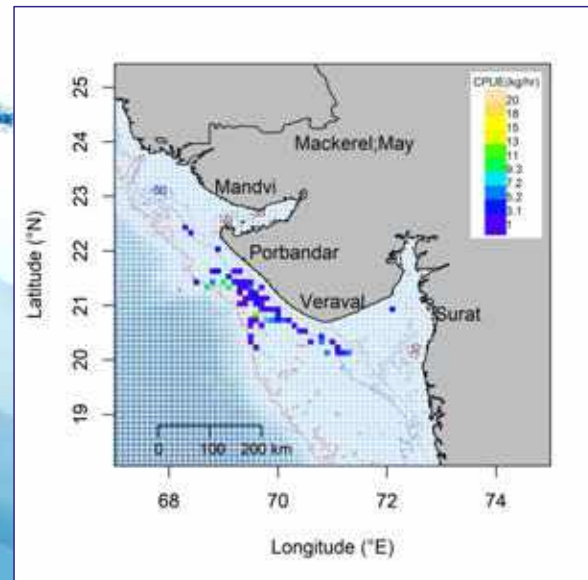
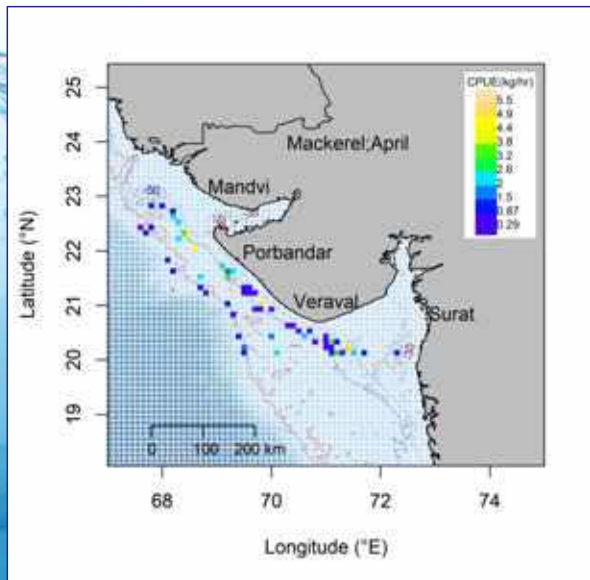
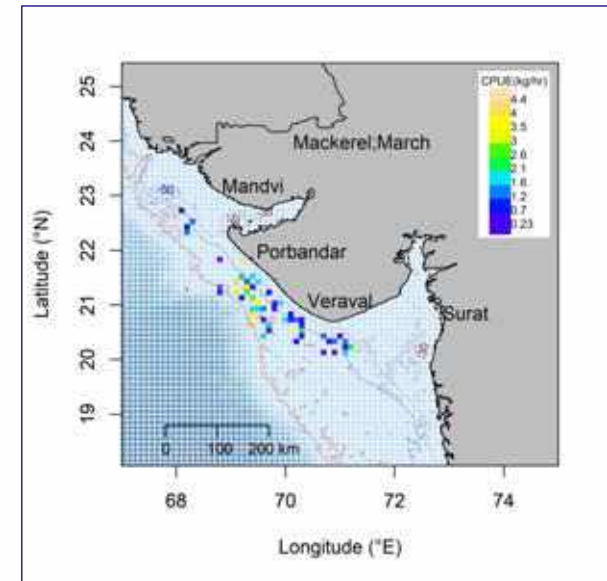
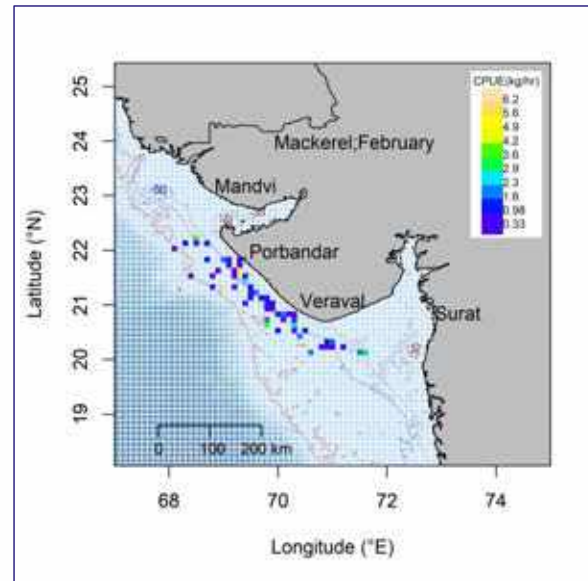
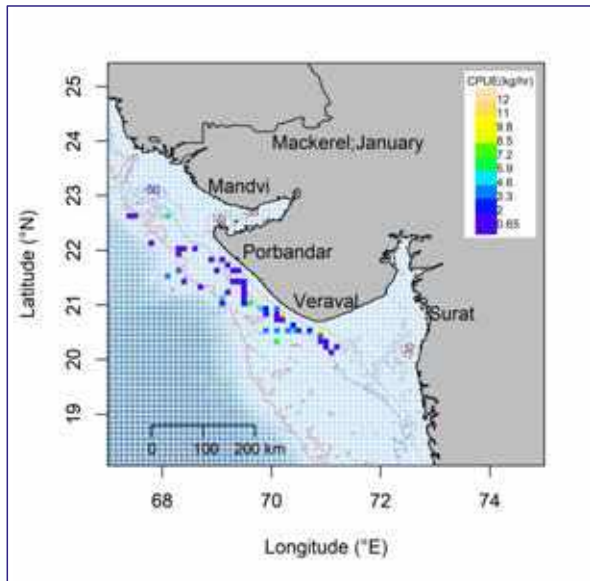


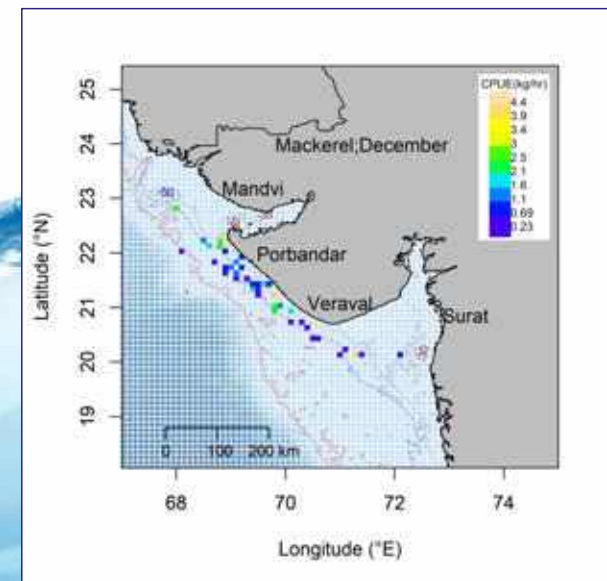
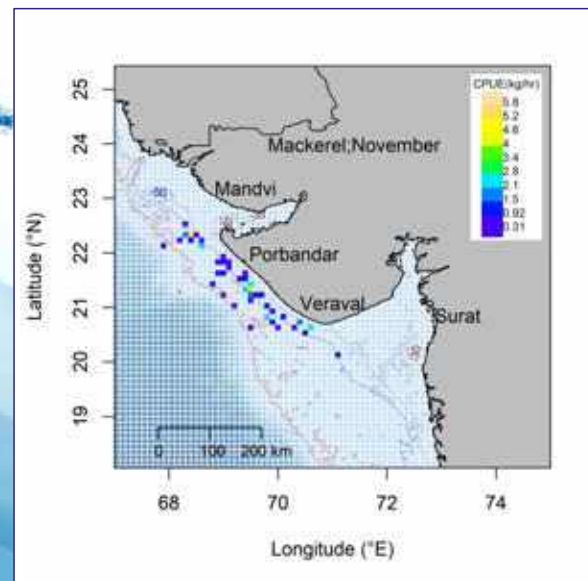
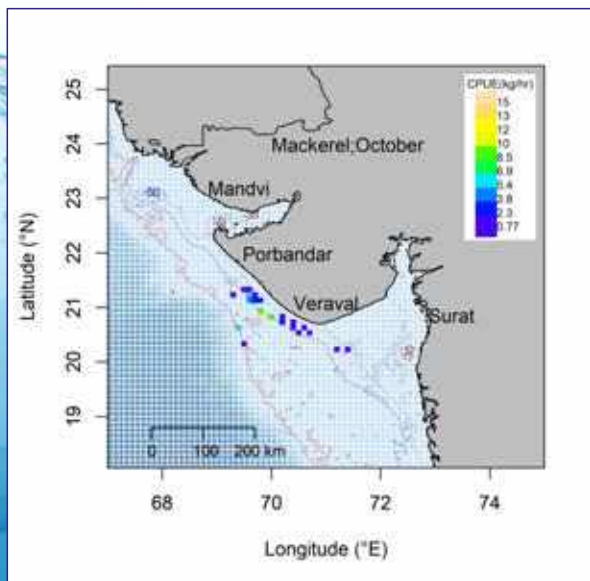
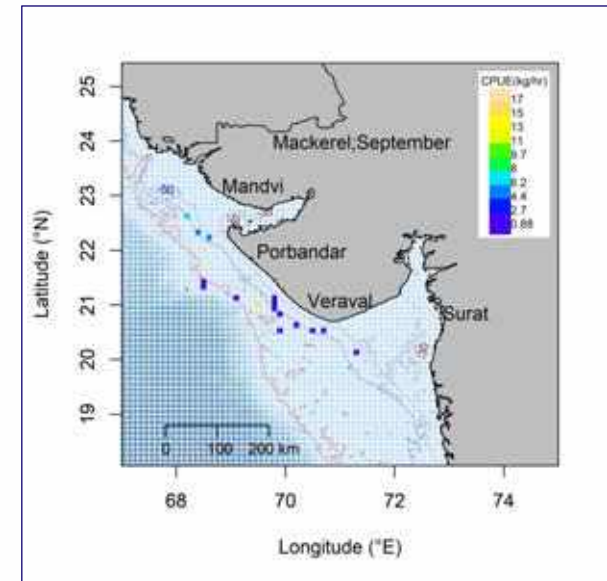
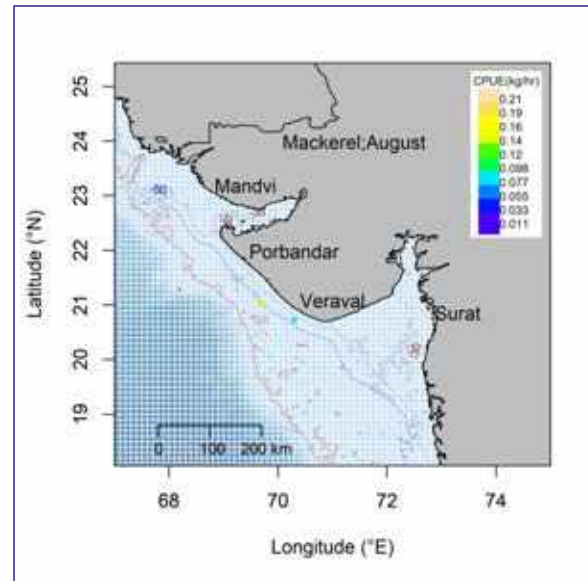
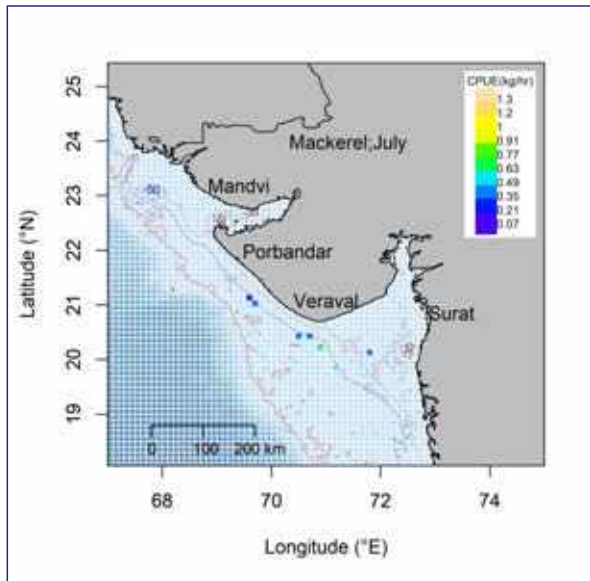




# Mackerel

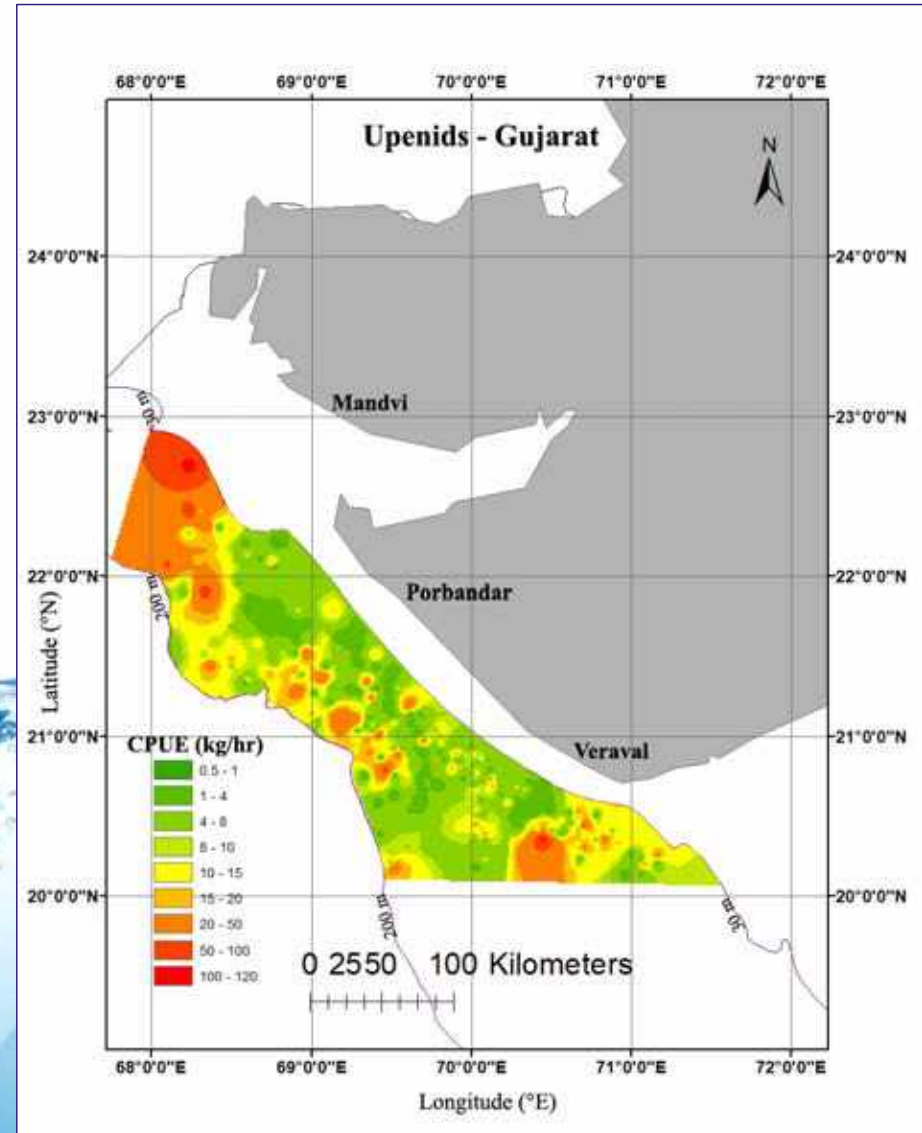




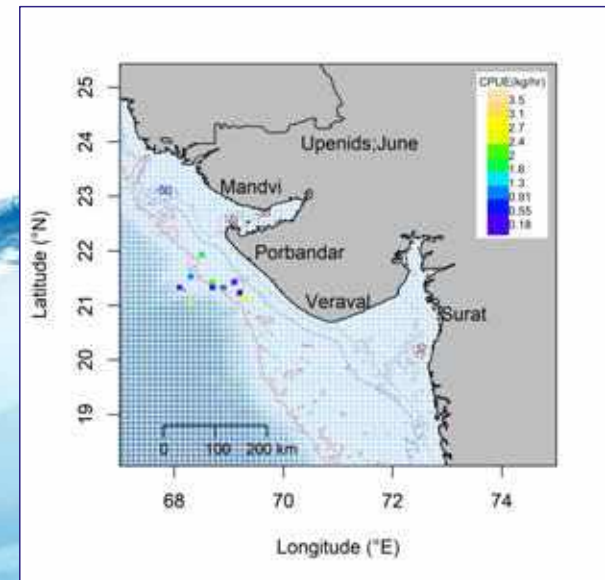
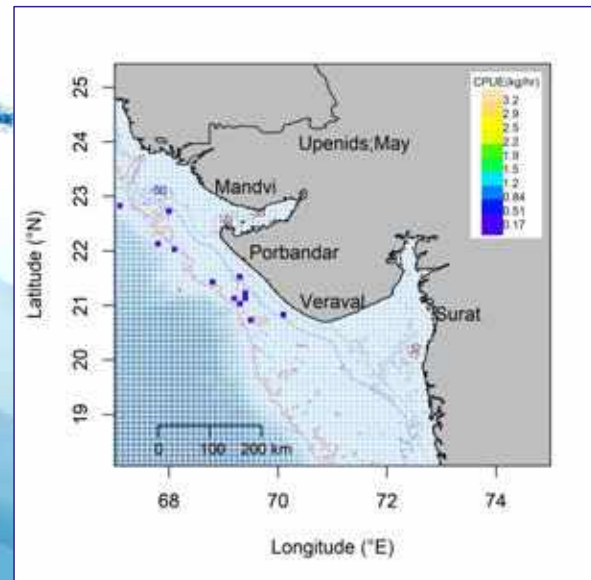
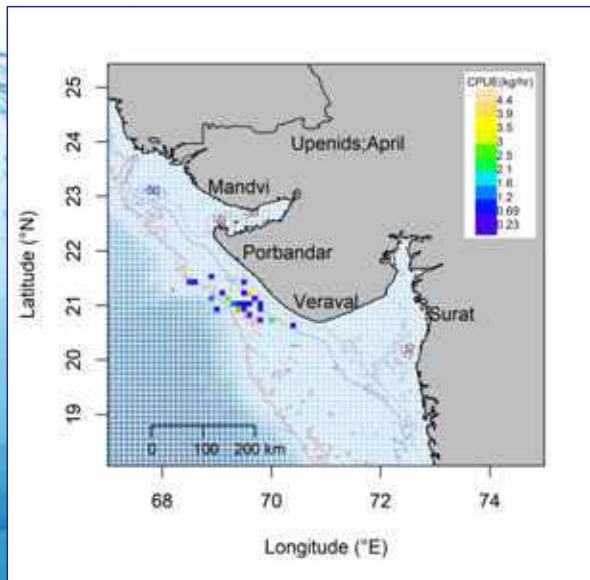
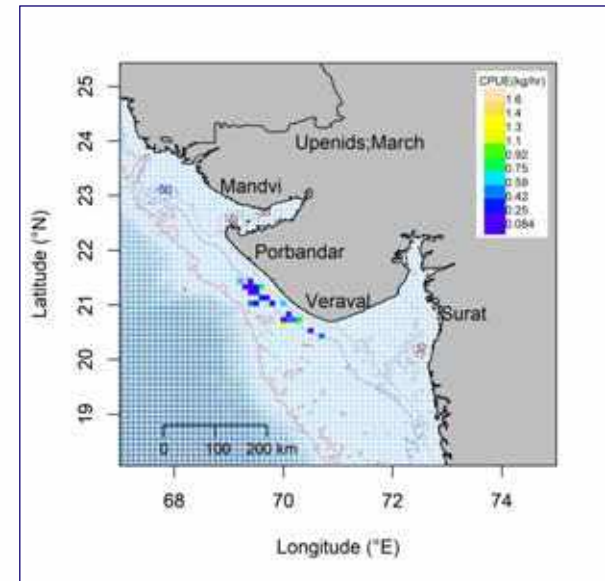
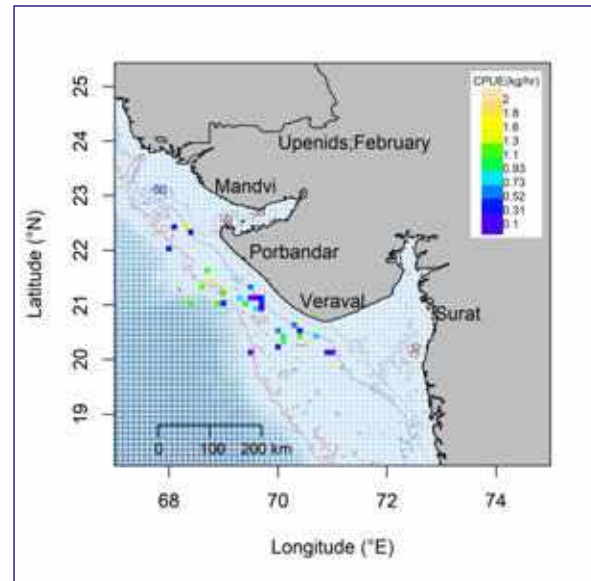
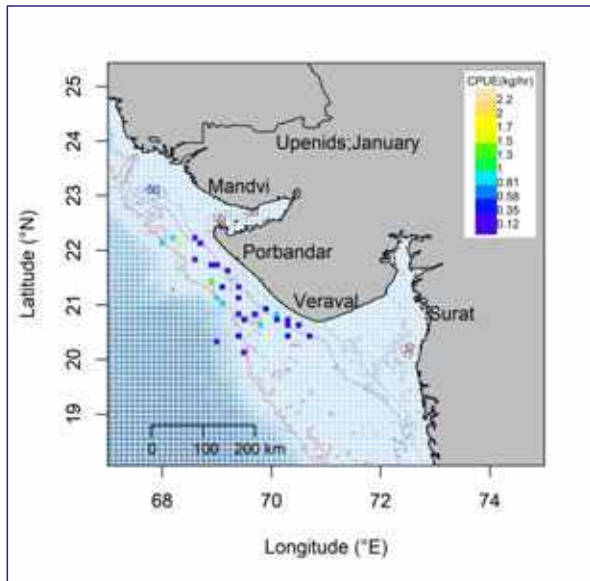


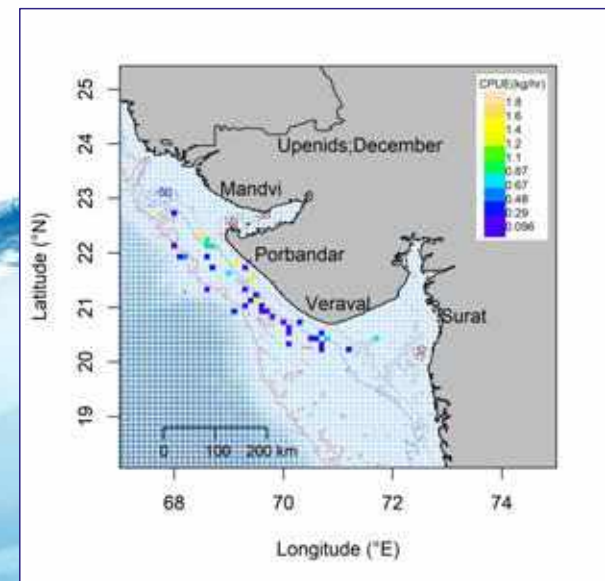
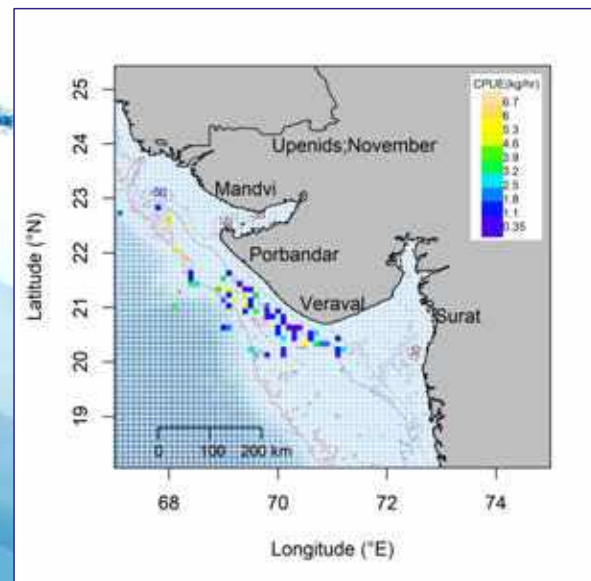
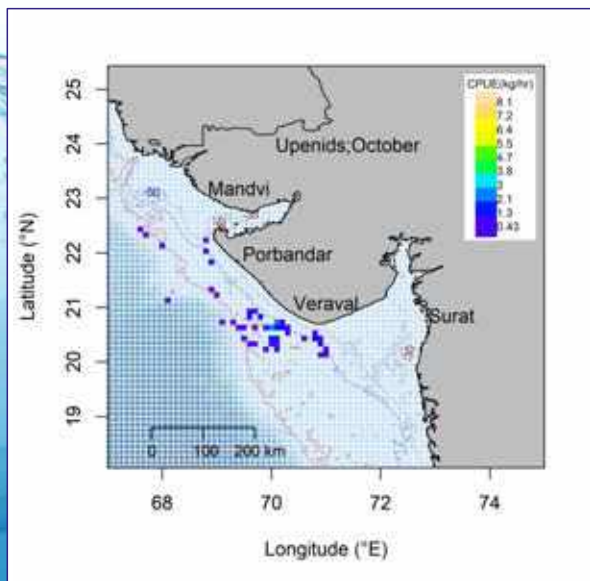
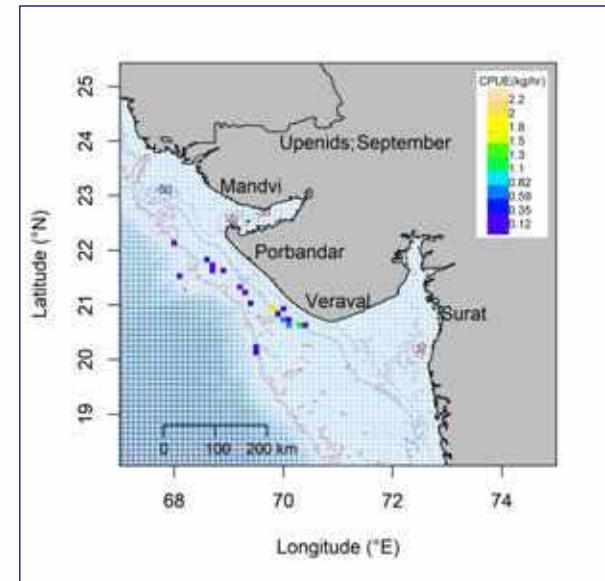
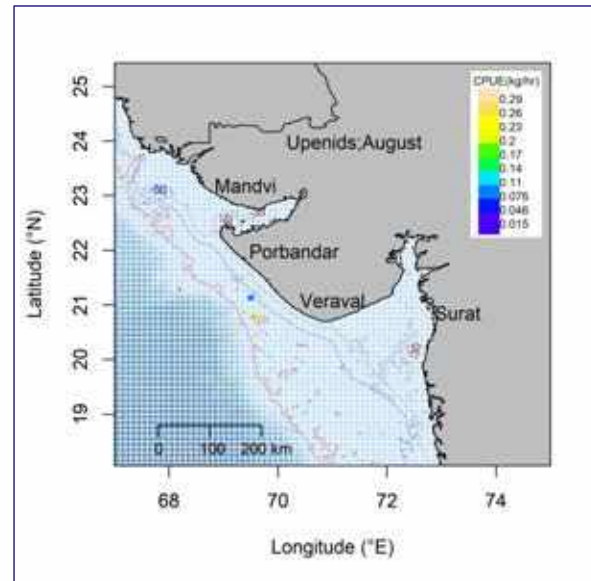
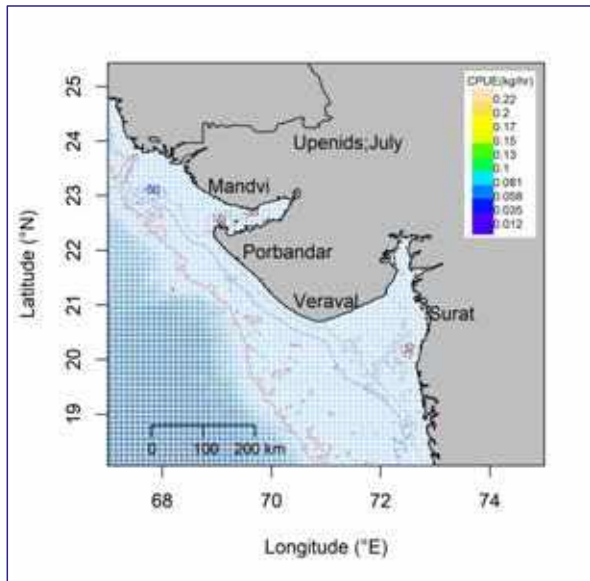


# Goatfish (Upenids)



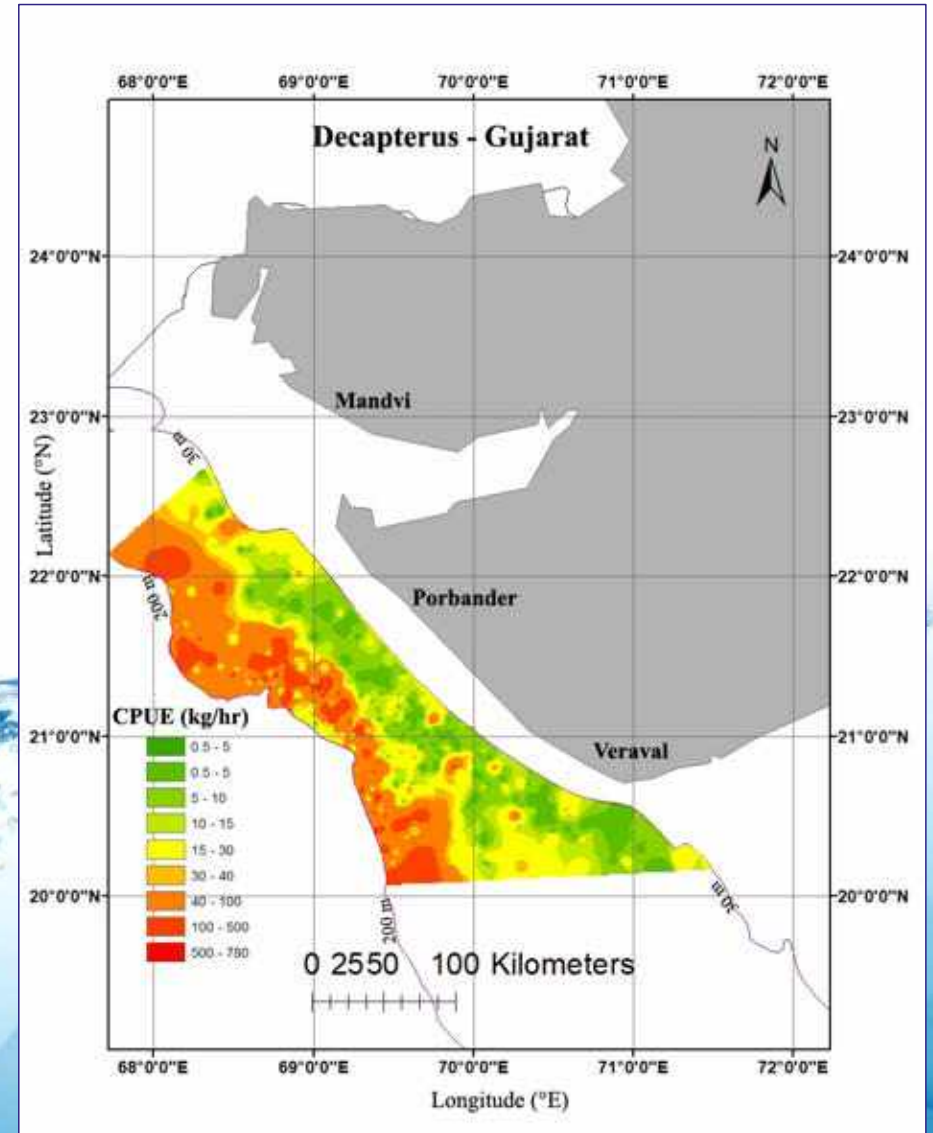


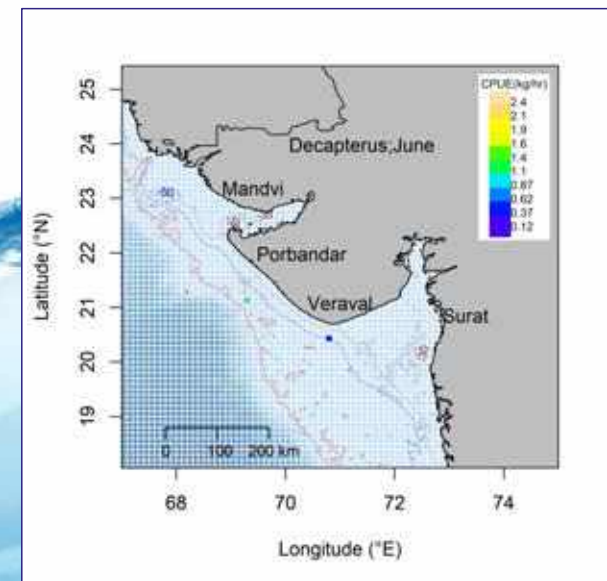
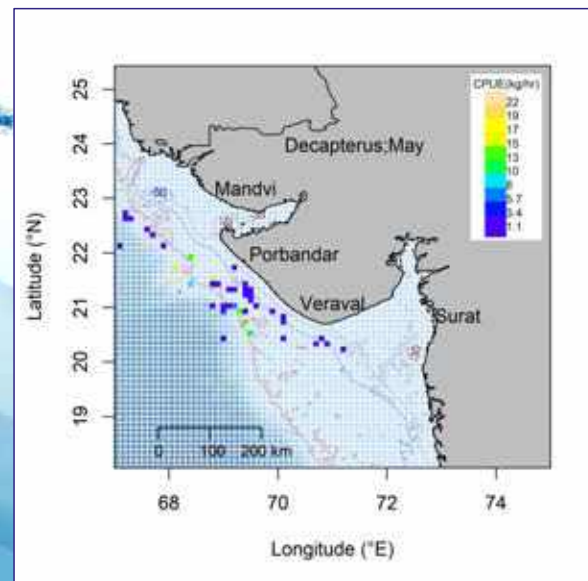
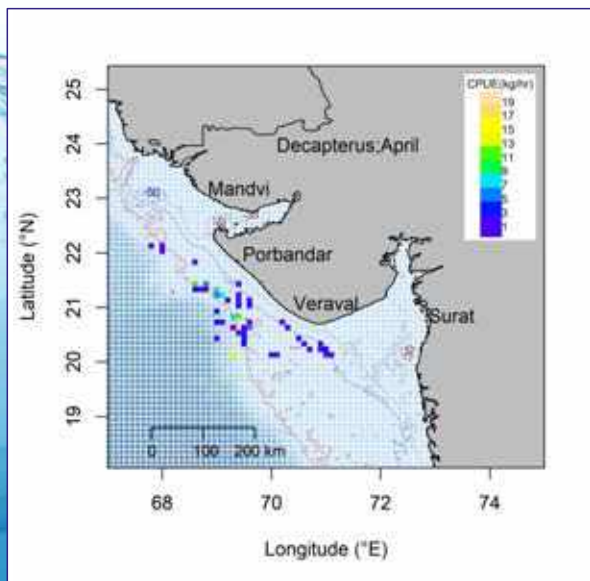
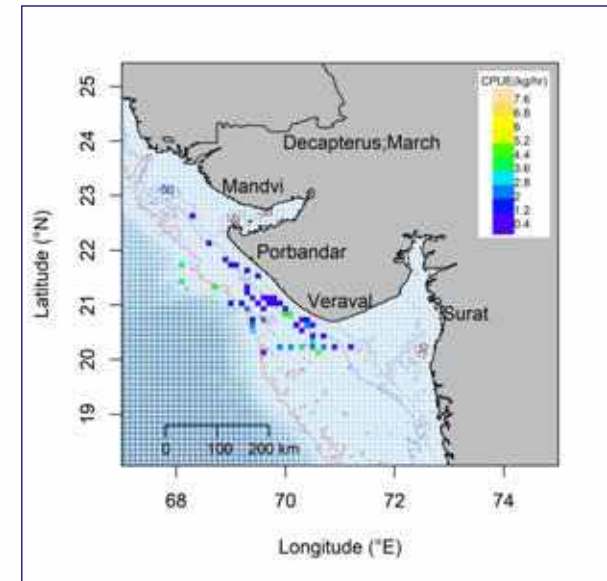
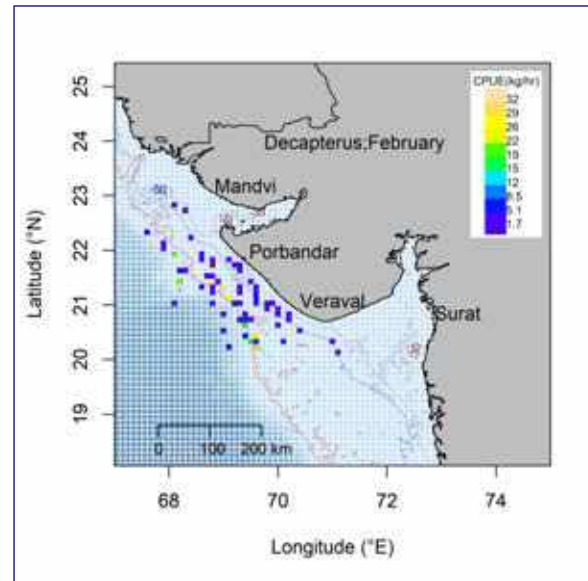
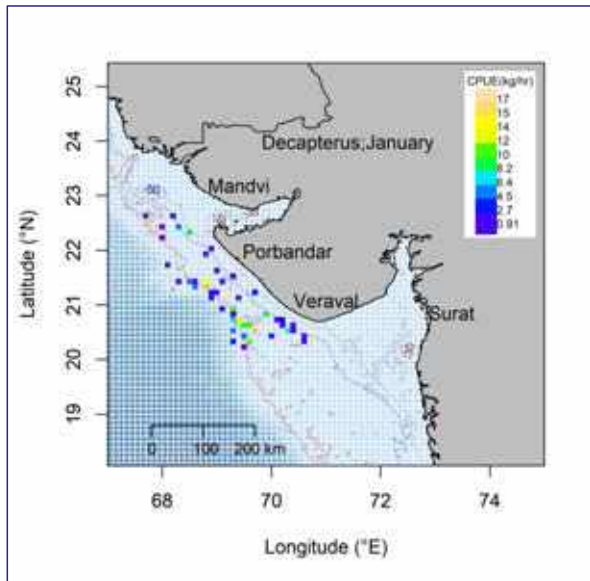


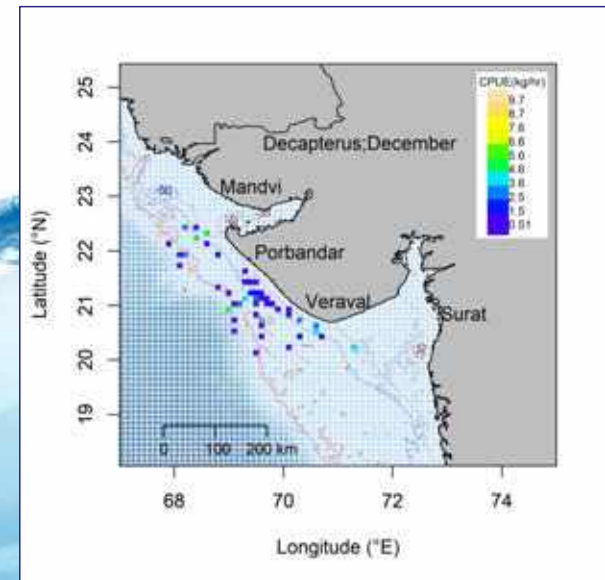
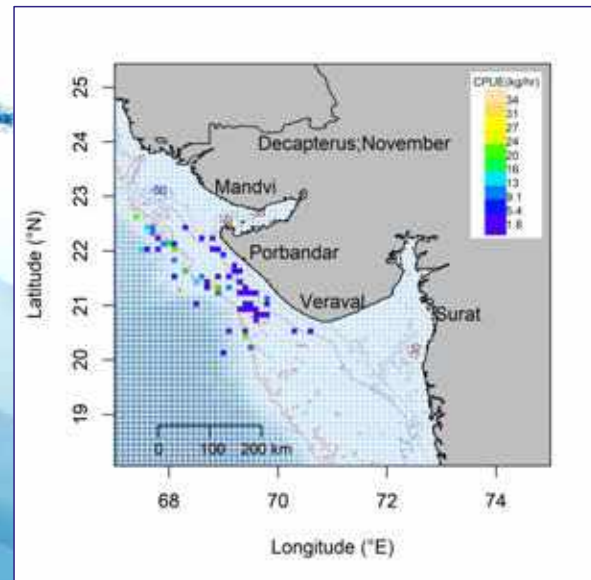
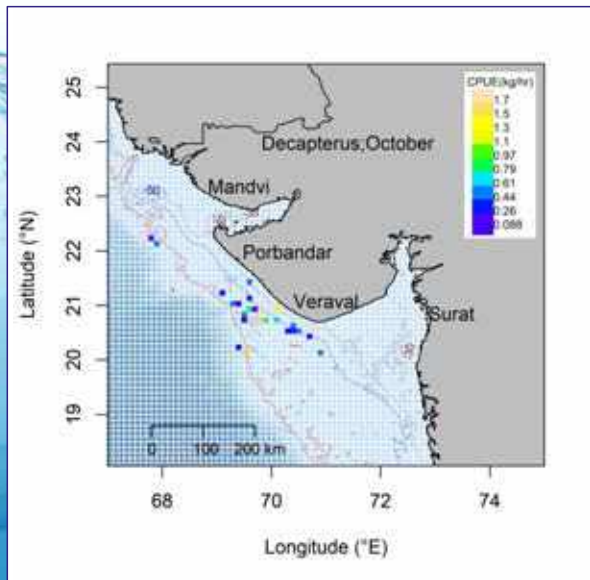
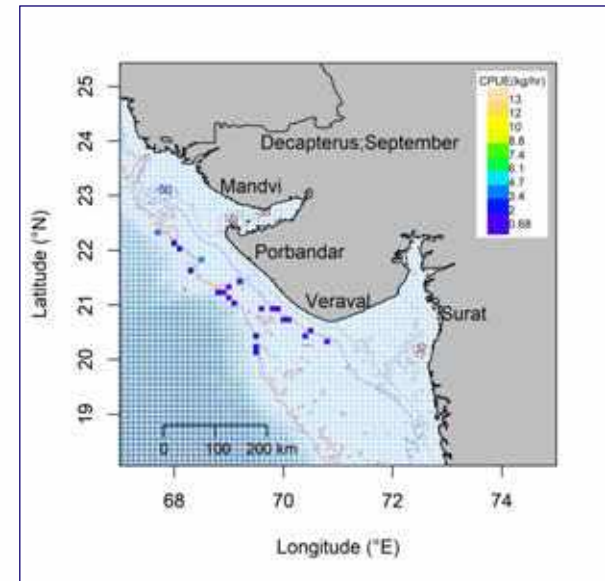
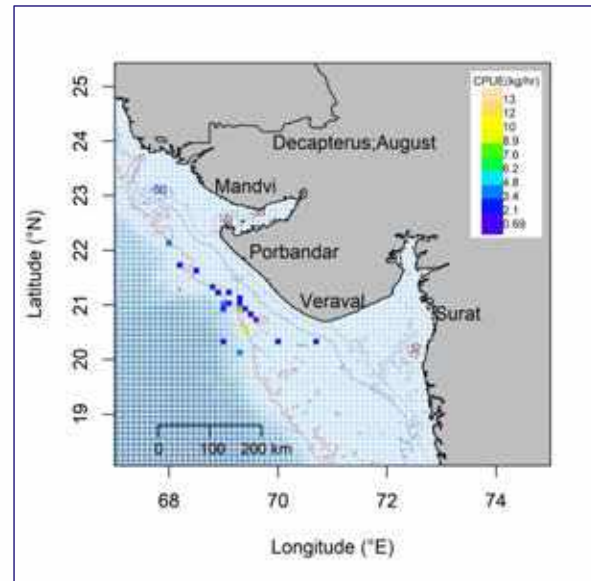
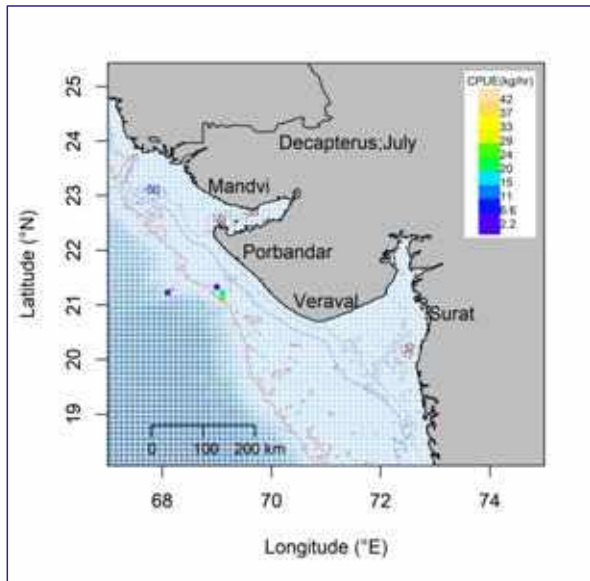




## Round Scads (Decapterus)

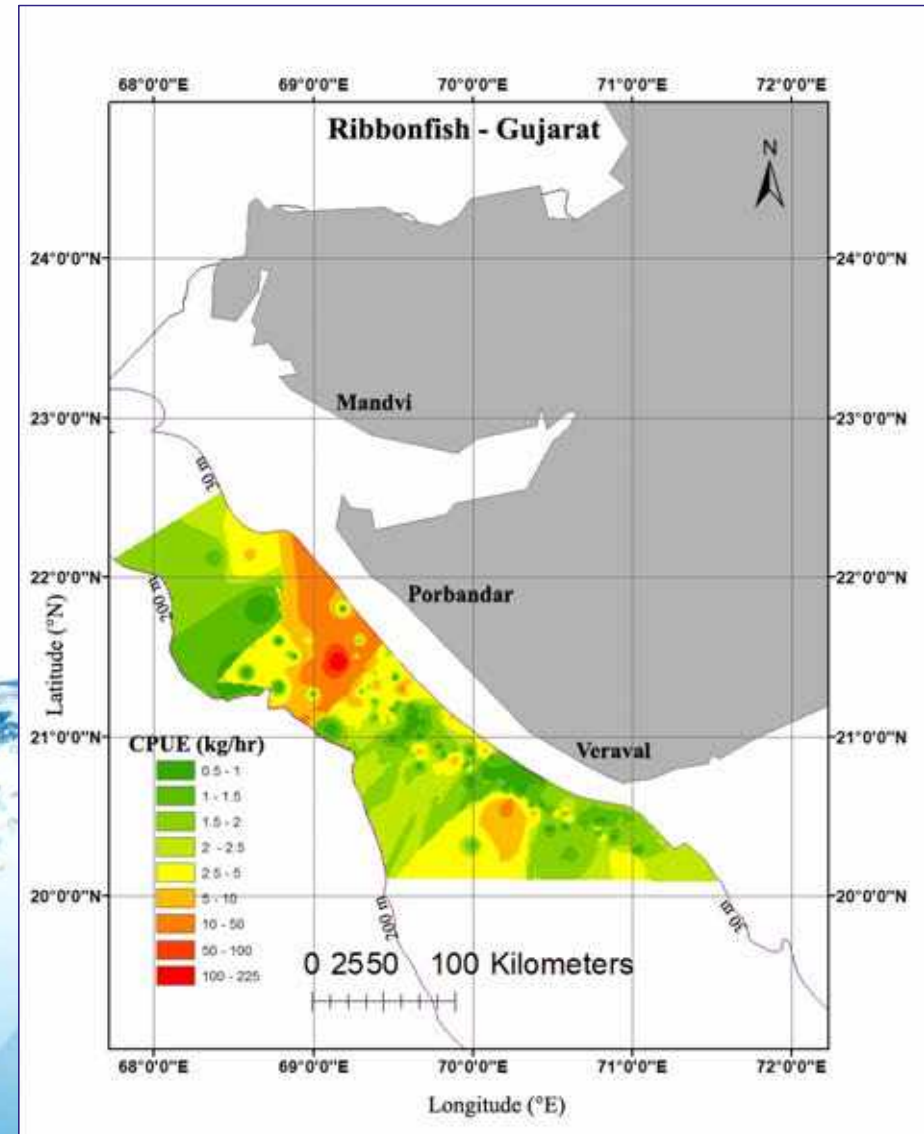


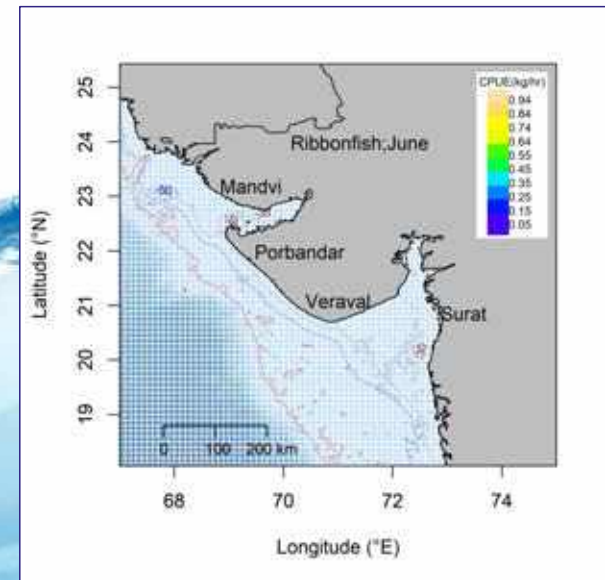
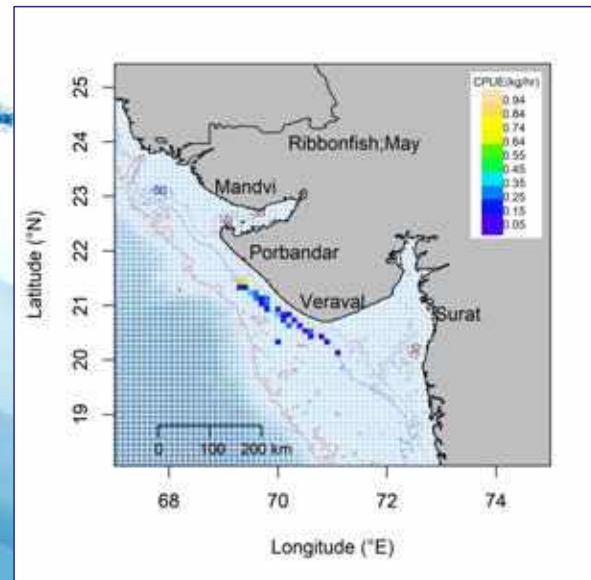
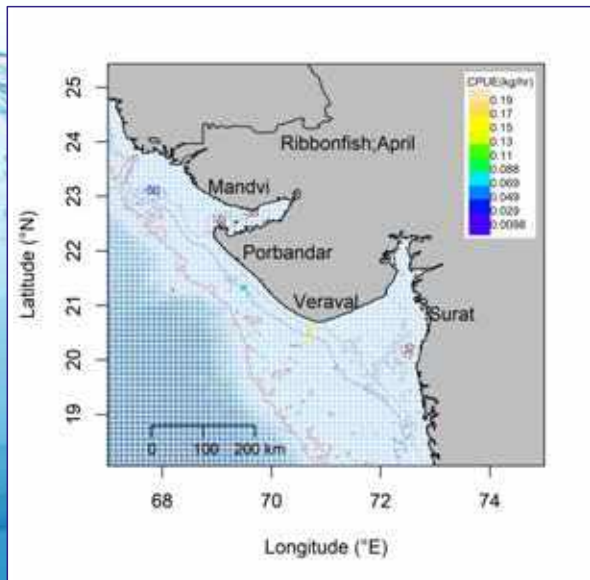
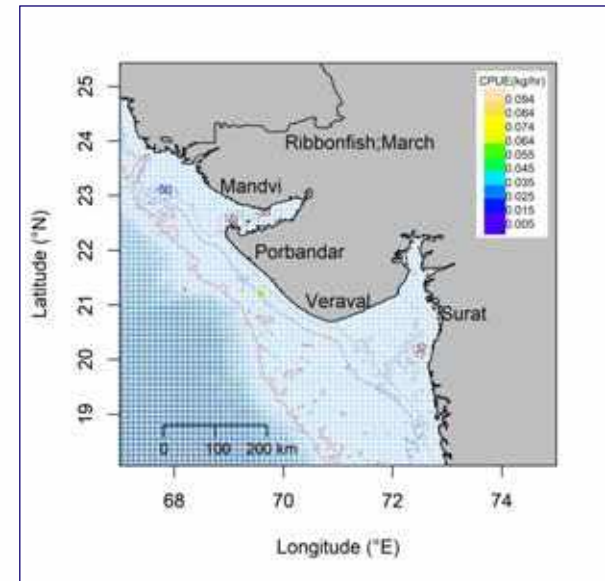
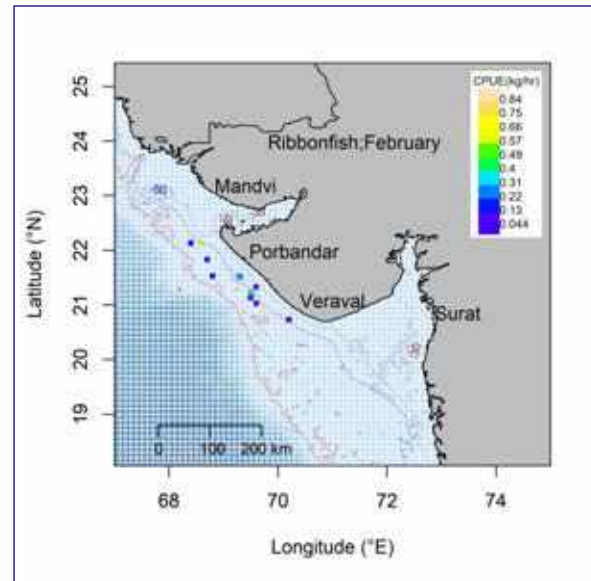
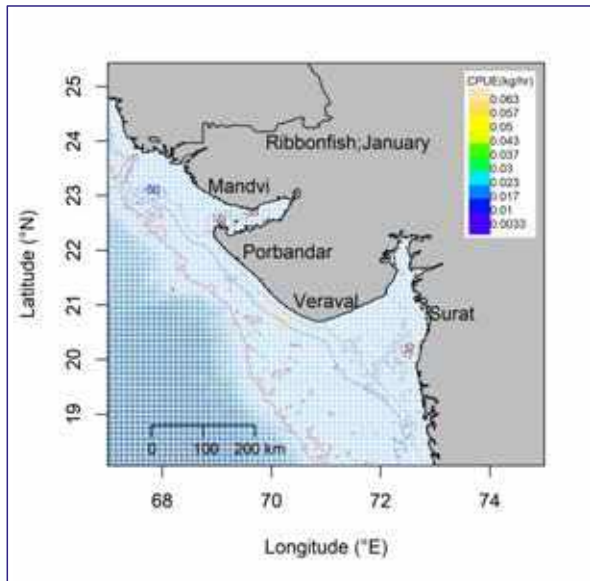


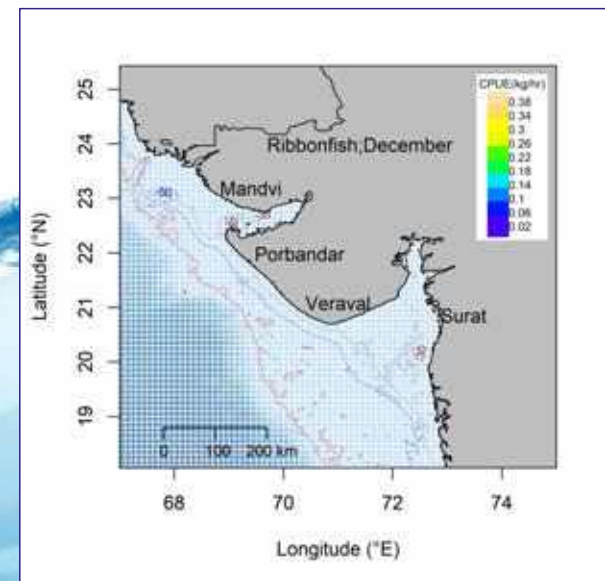
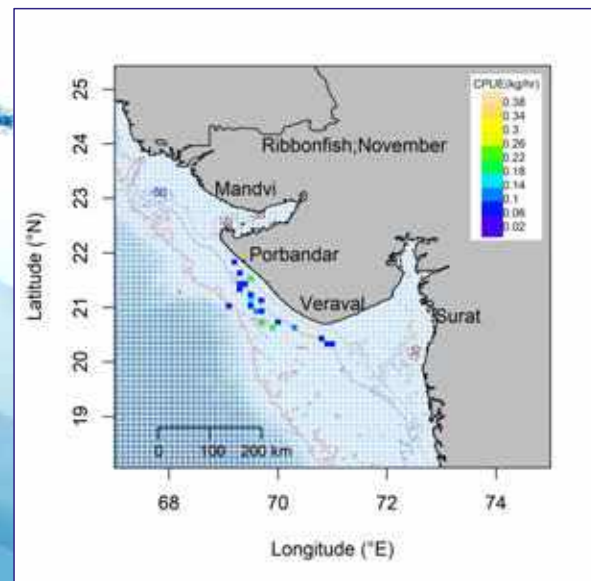
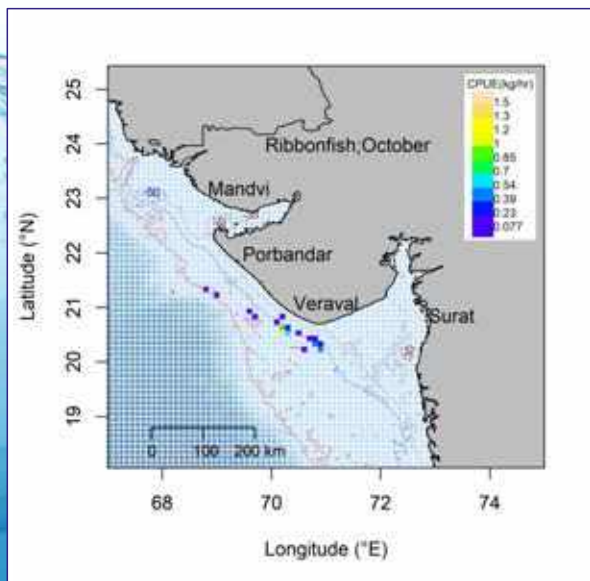
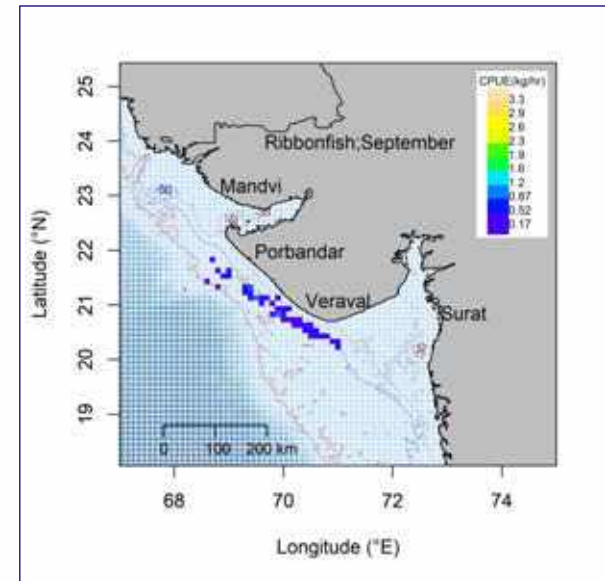
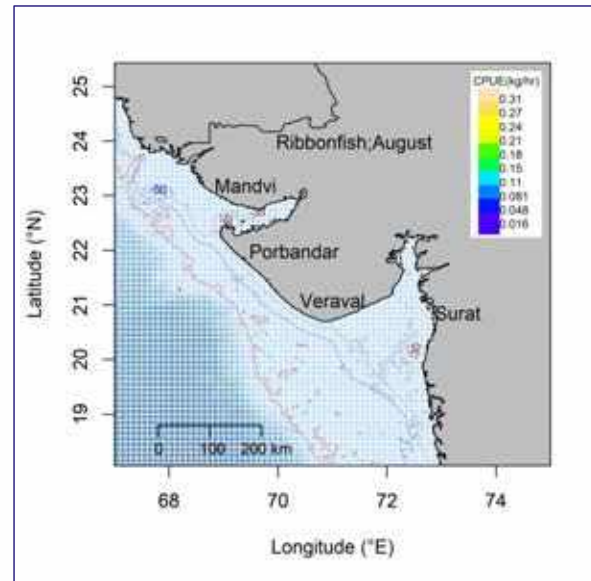
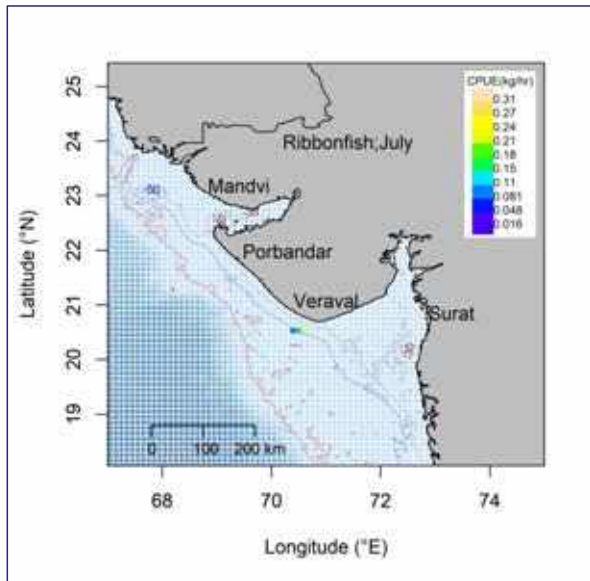




**Ribbonfish**



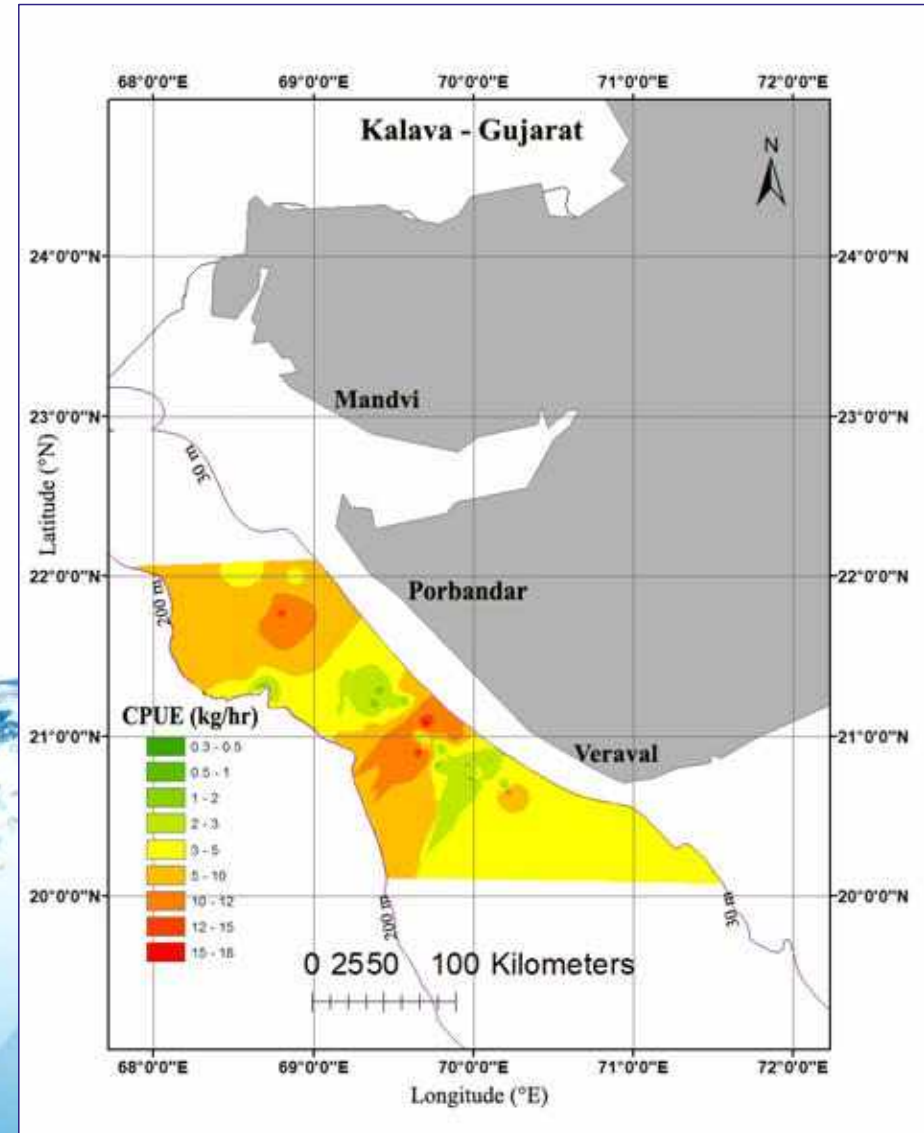


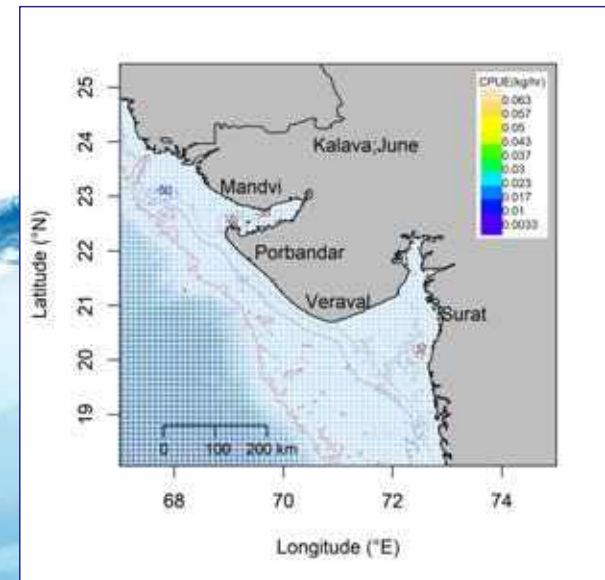
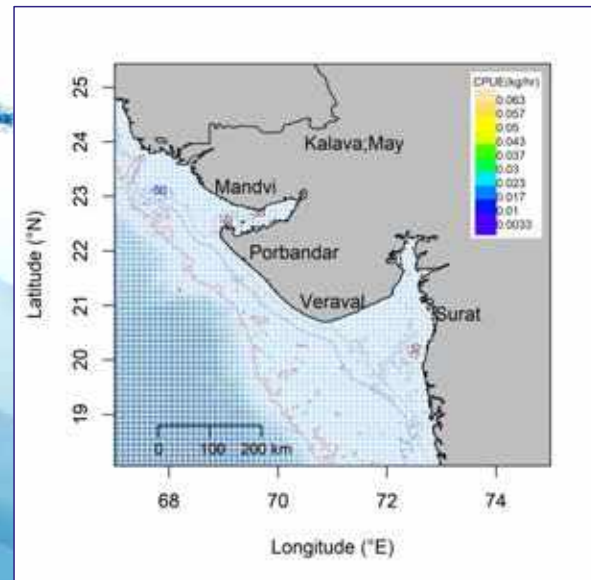
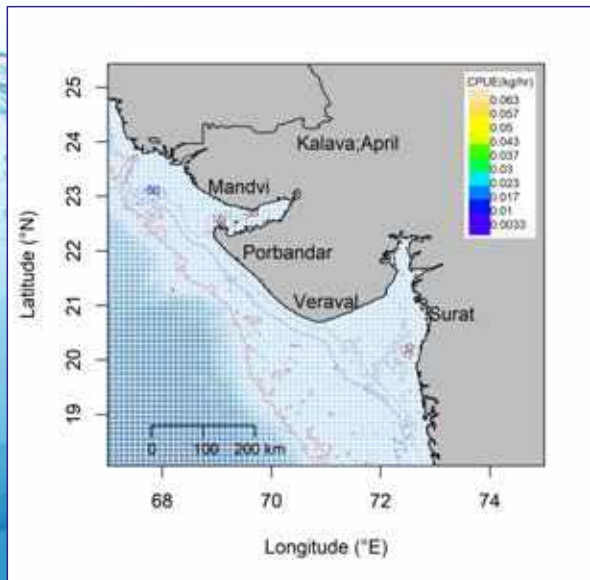
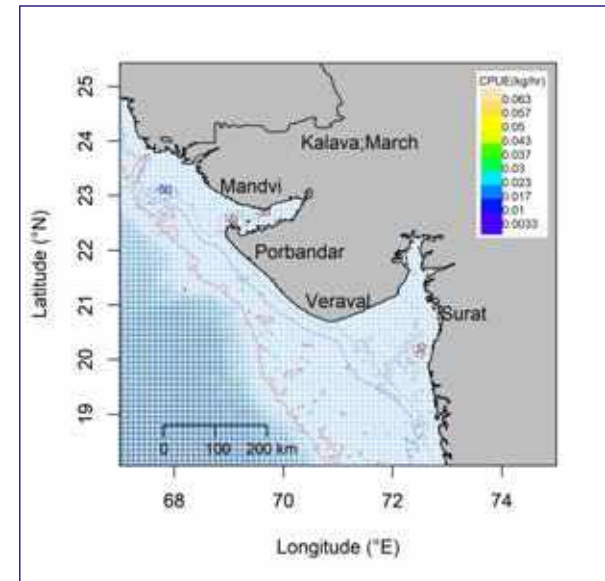
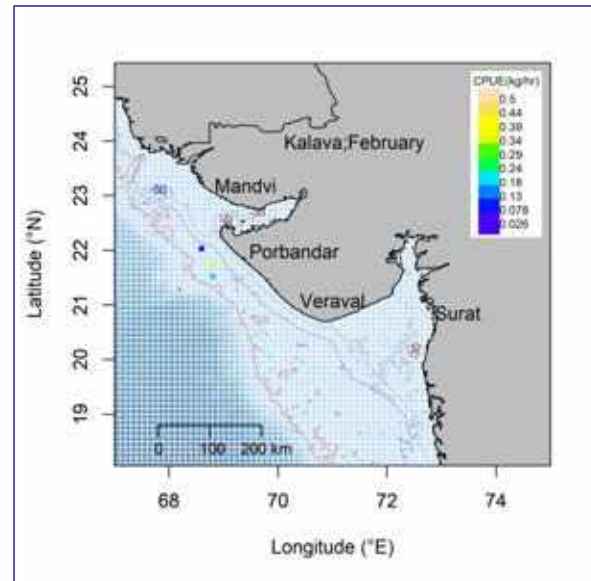
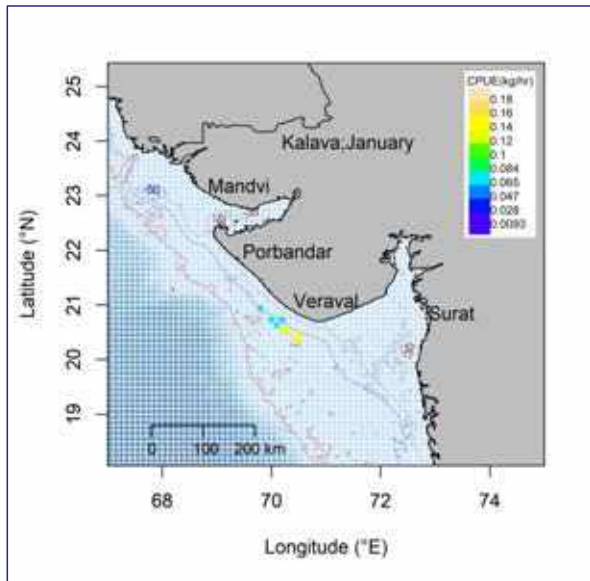


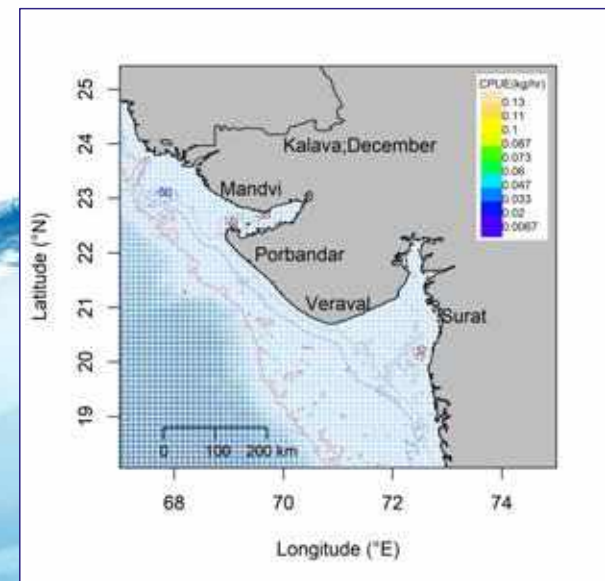
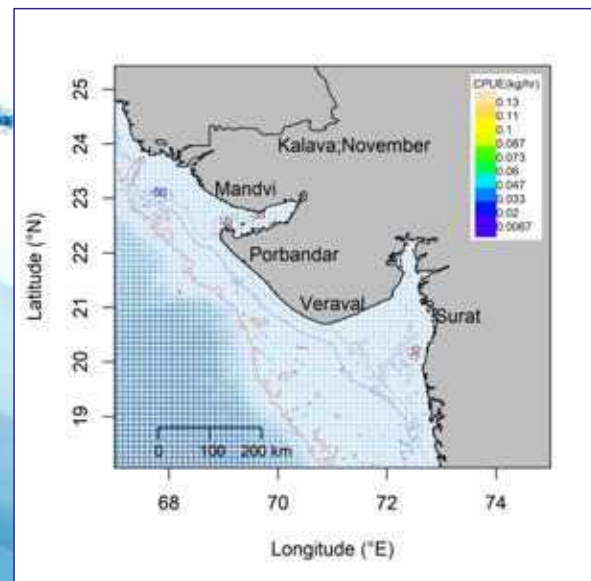
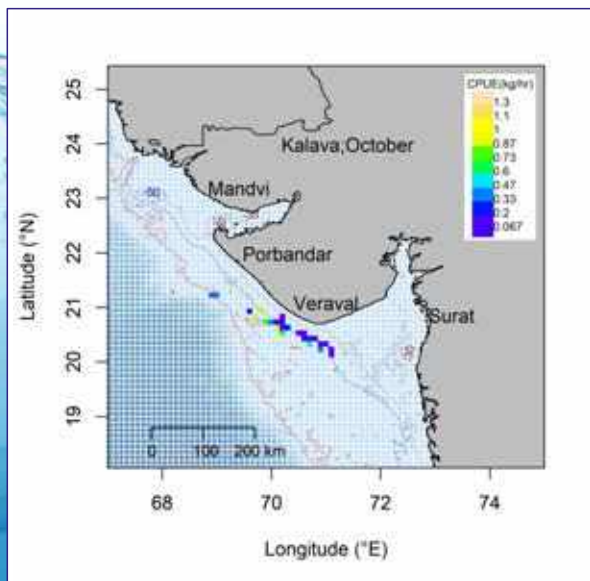
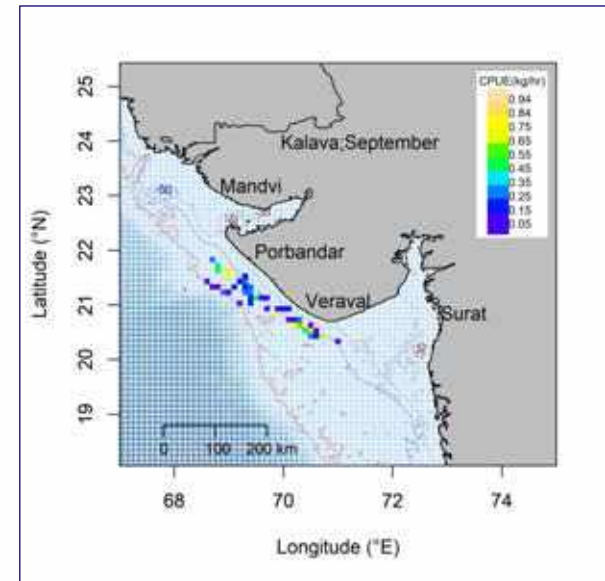
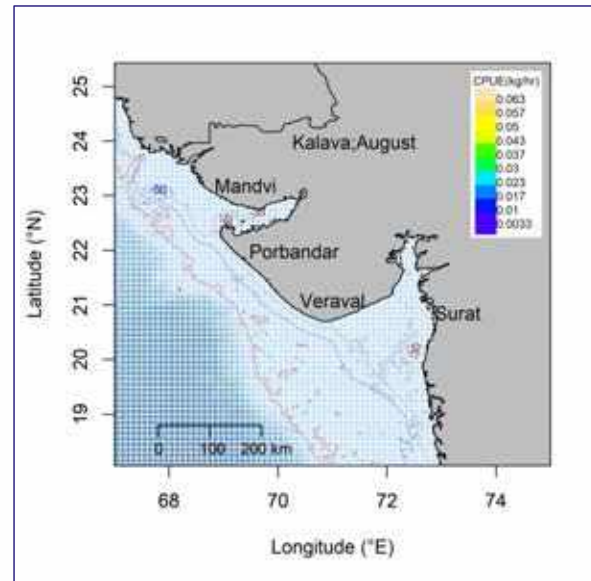
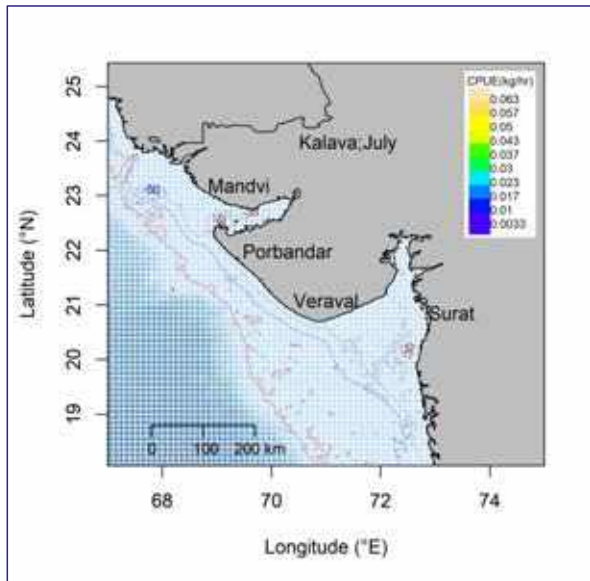




## Groupers (Kalava)

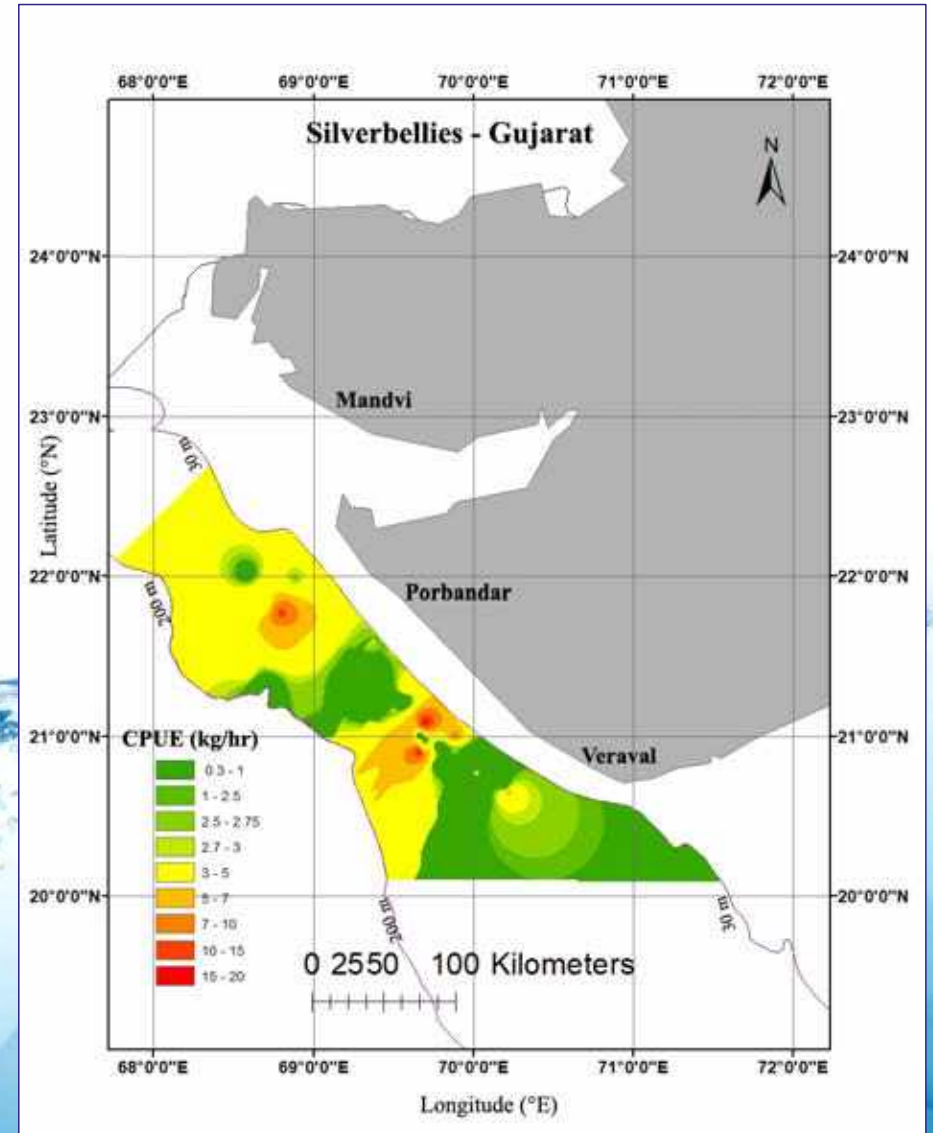


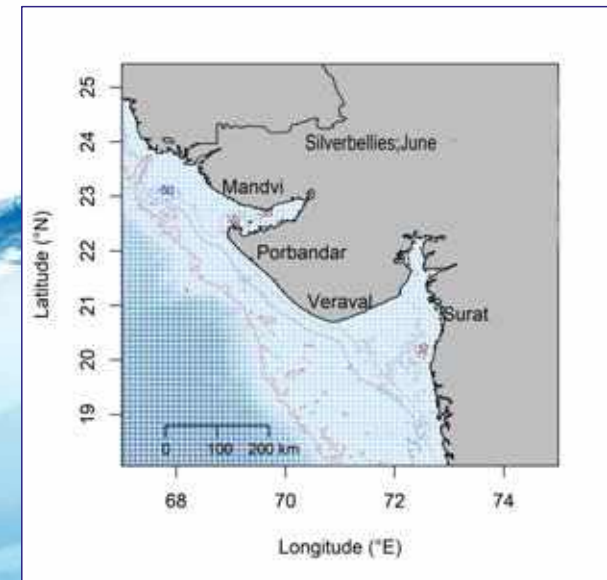
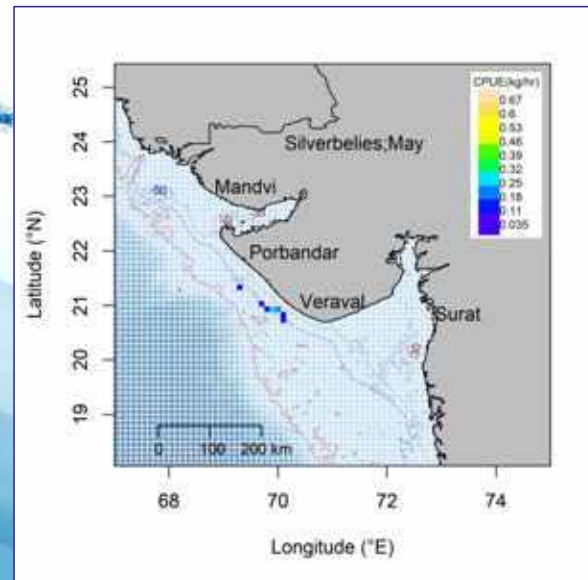
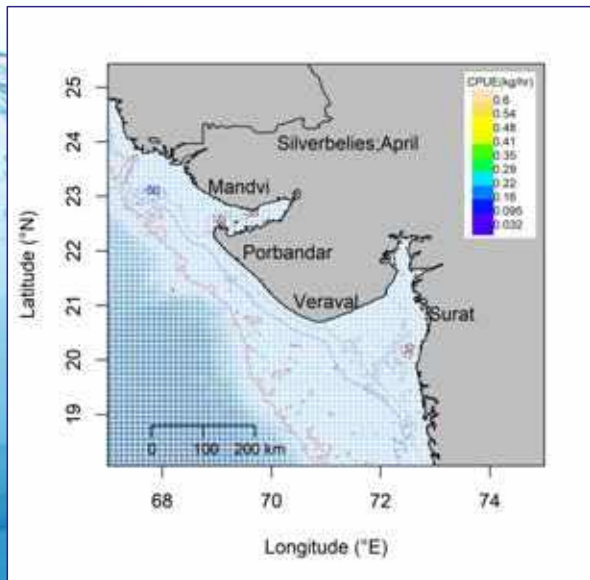
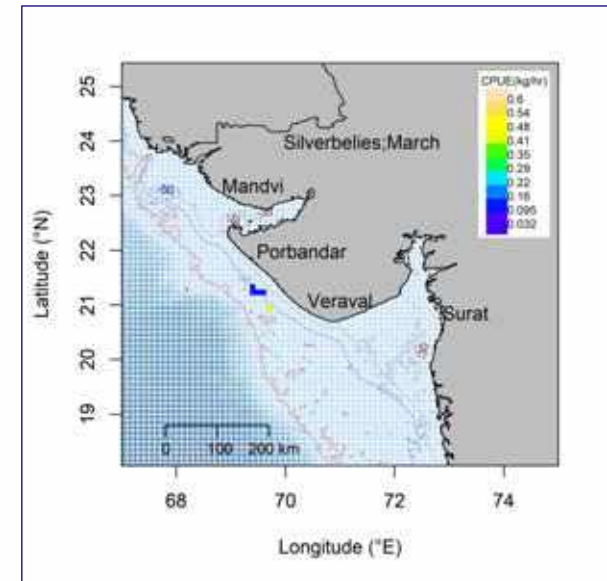
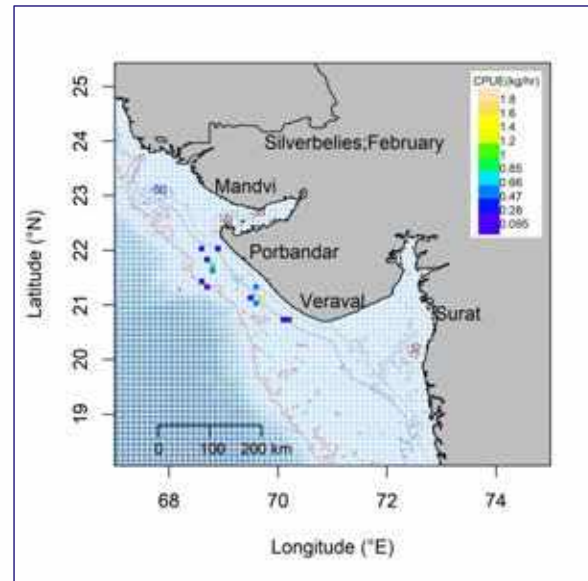
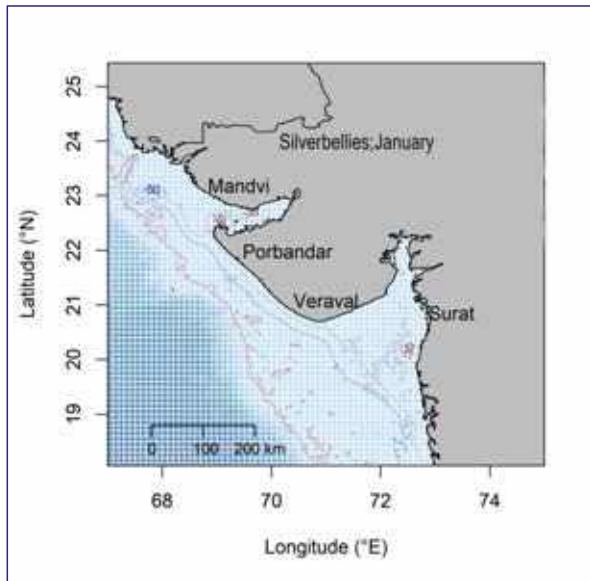


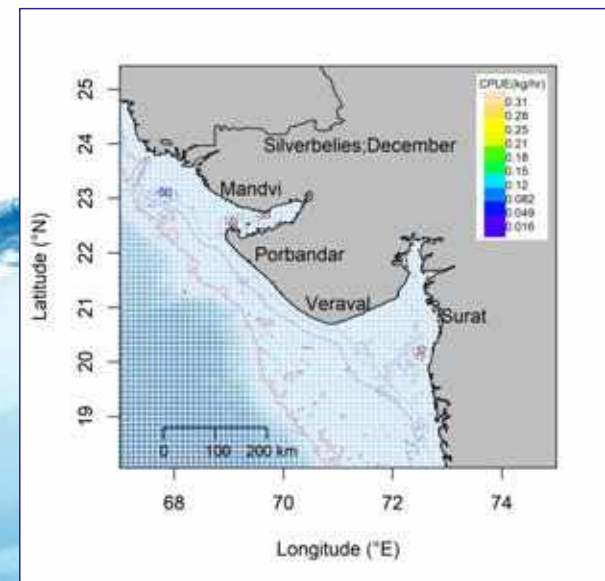
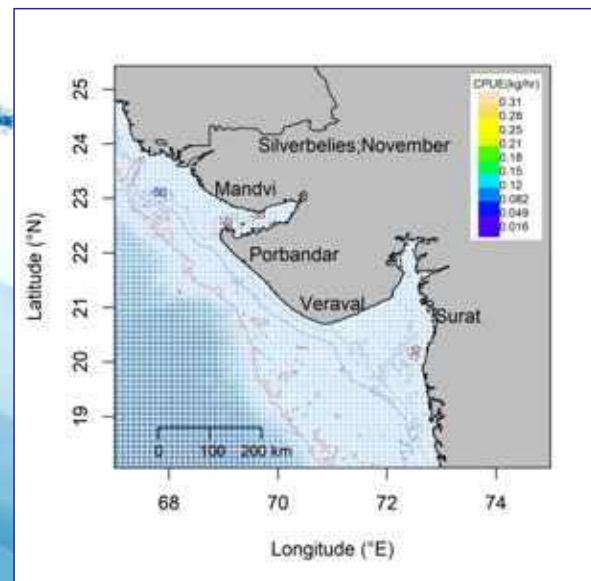
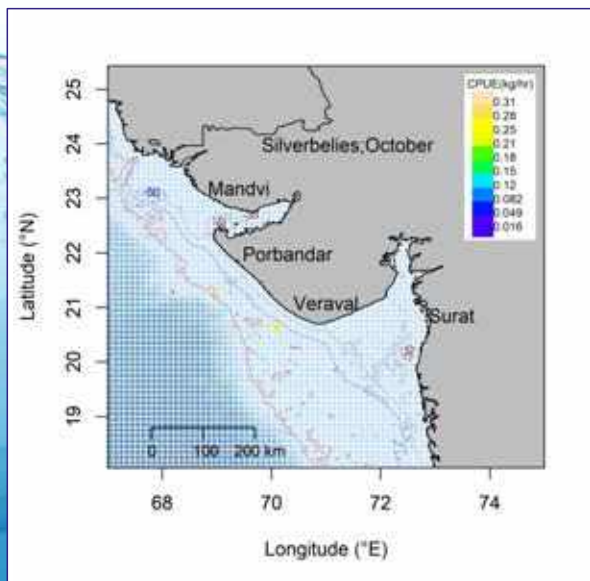
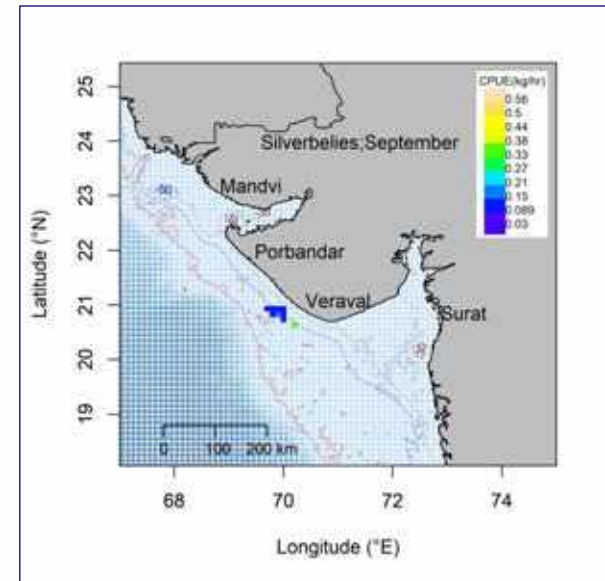
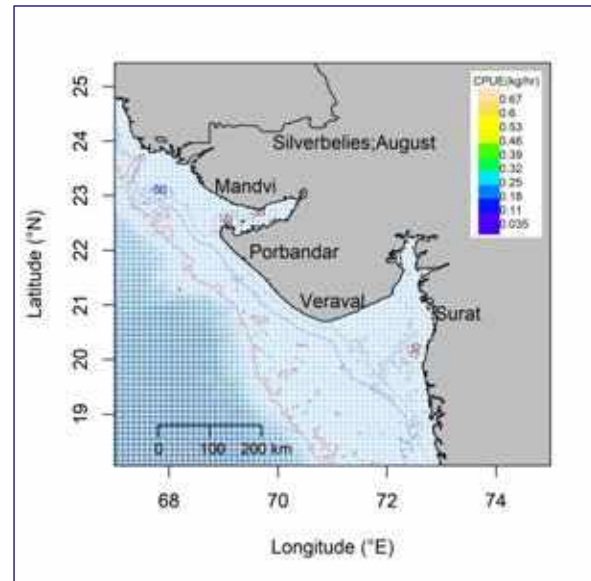
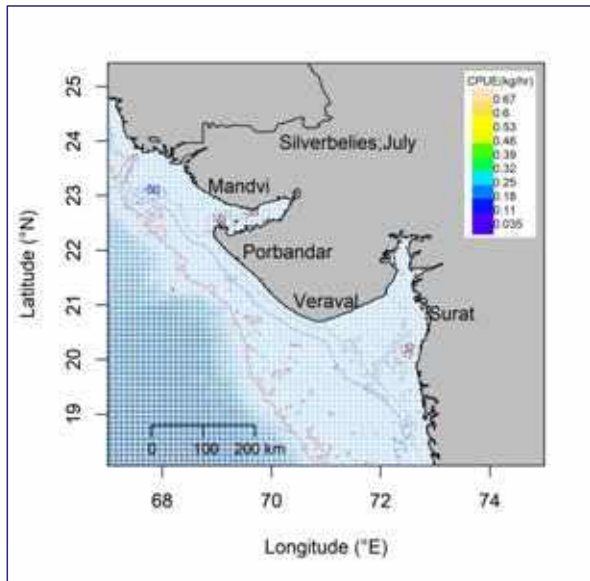


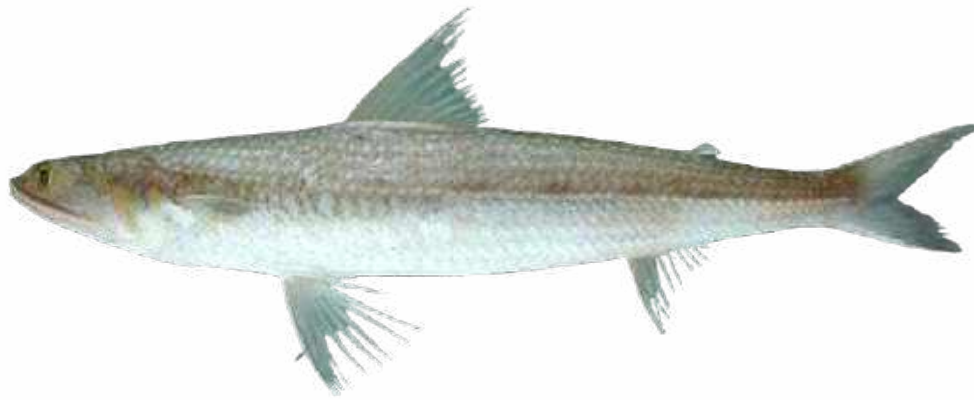


# Silverbellies

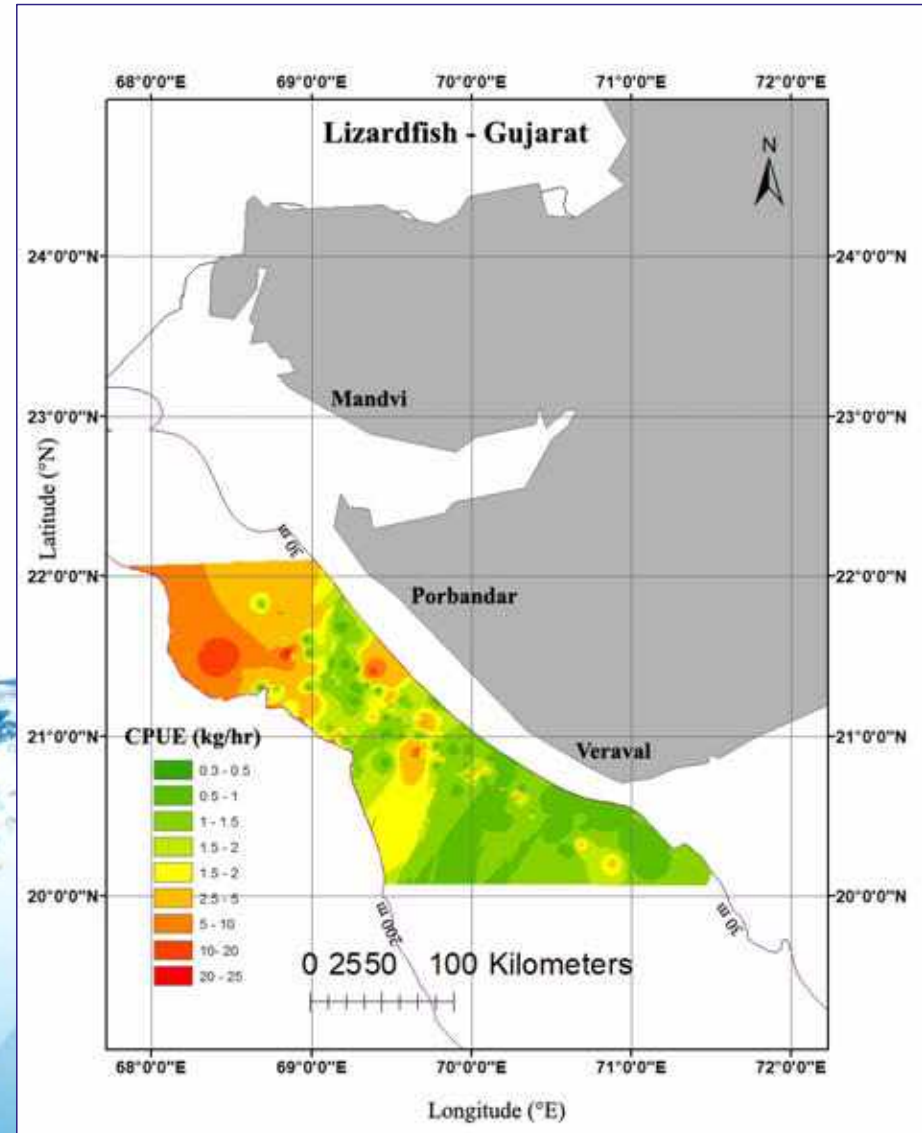


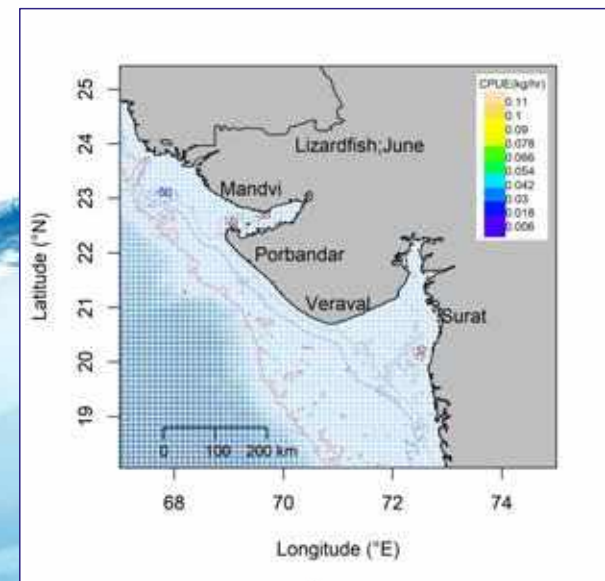
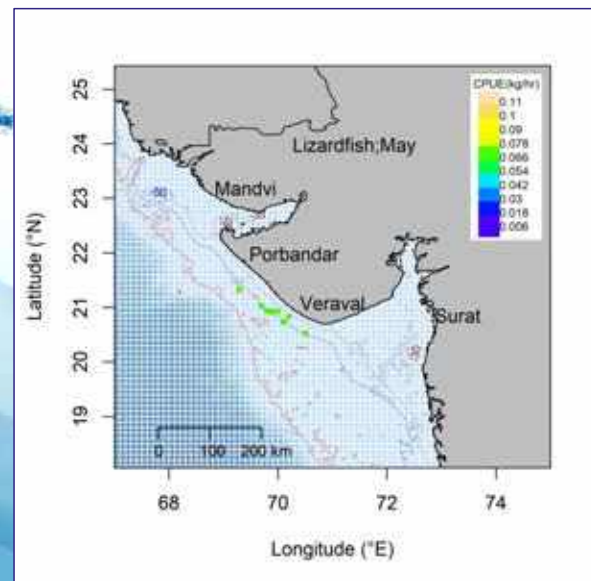
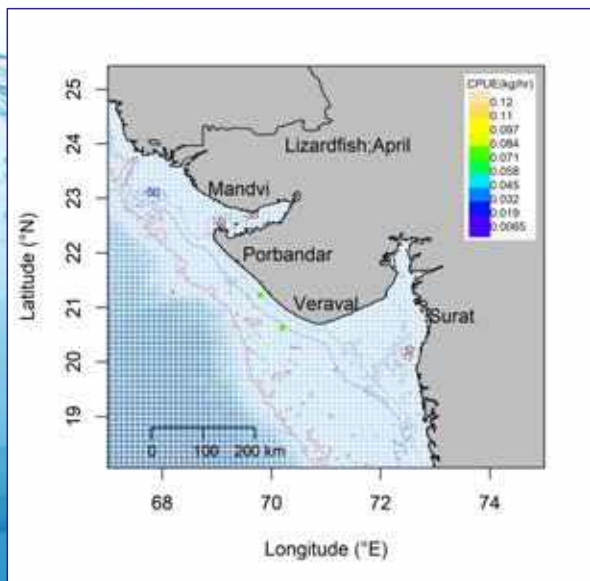
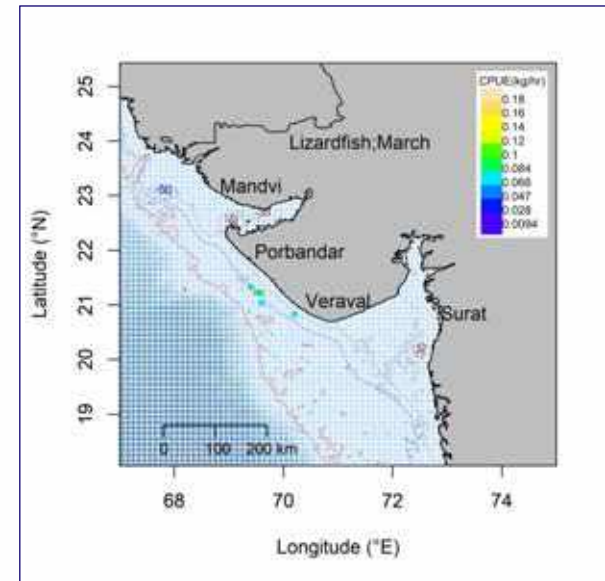
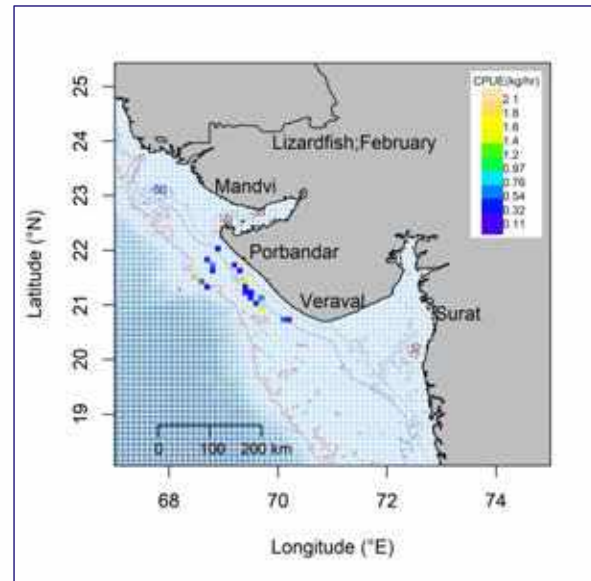
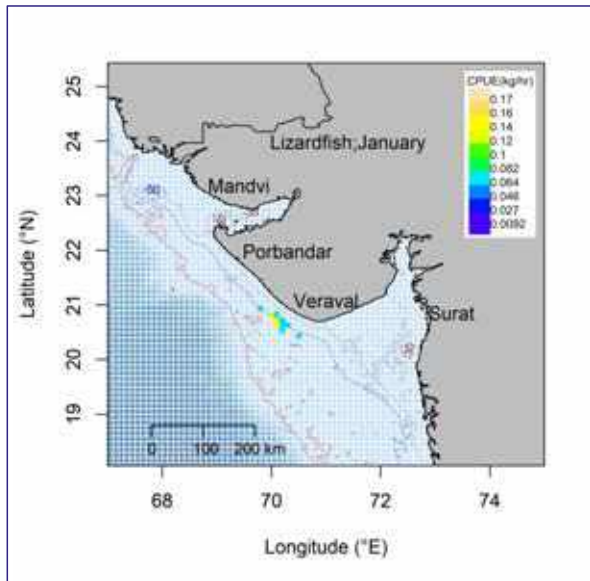




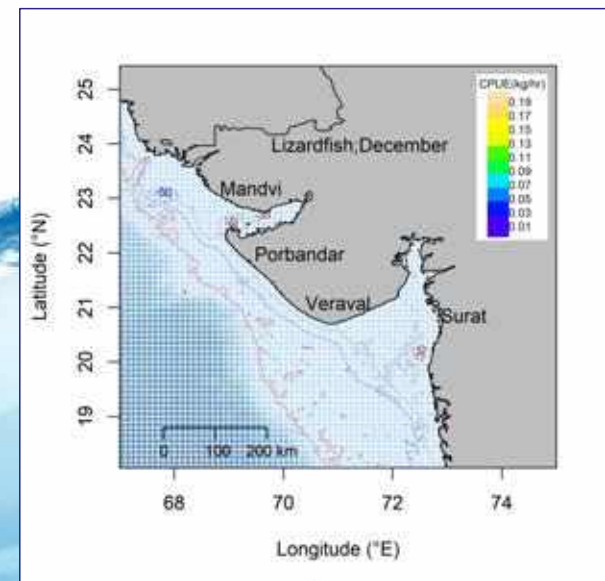
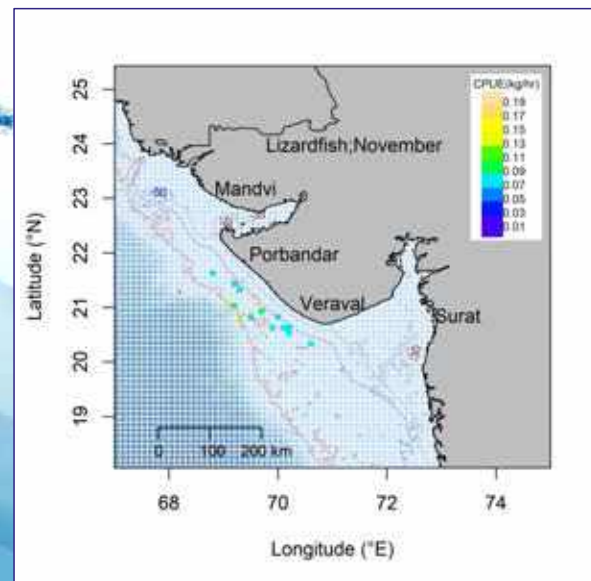
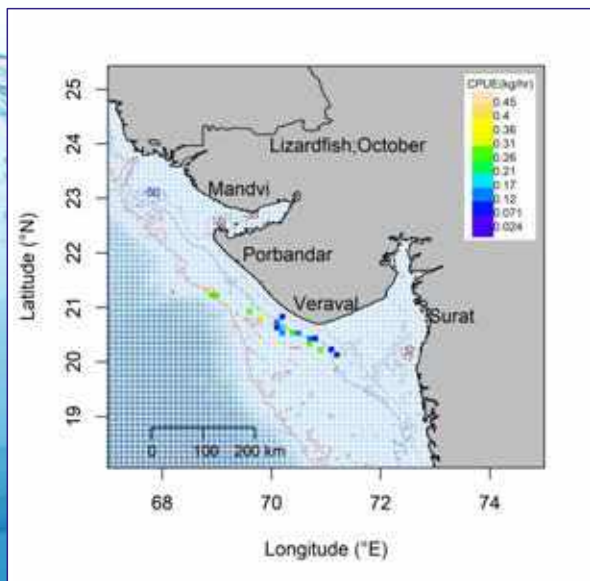
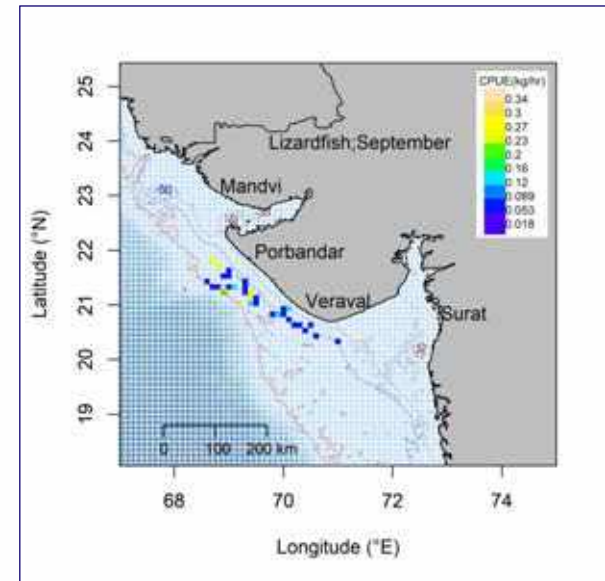
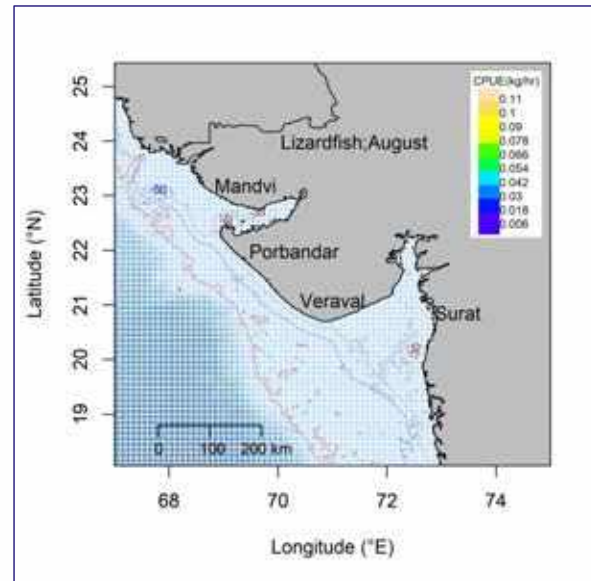
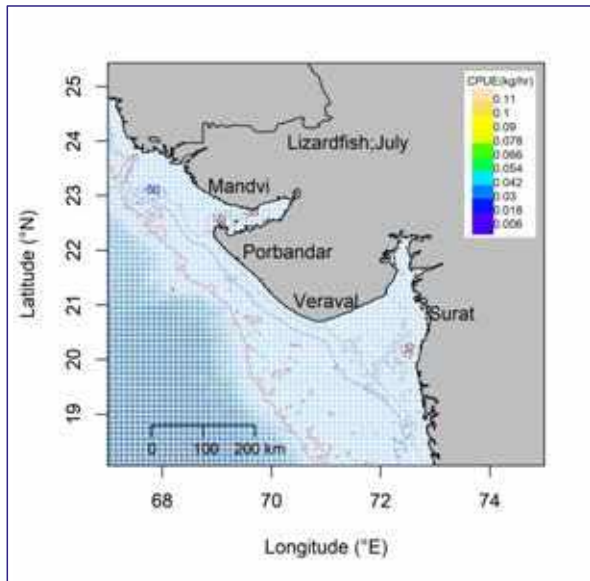


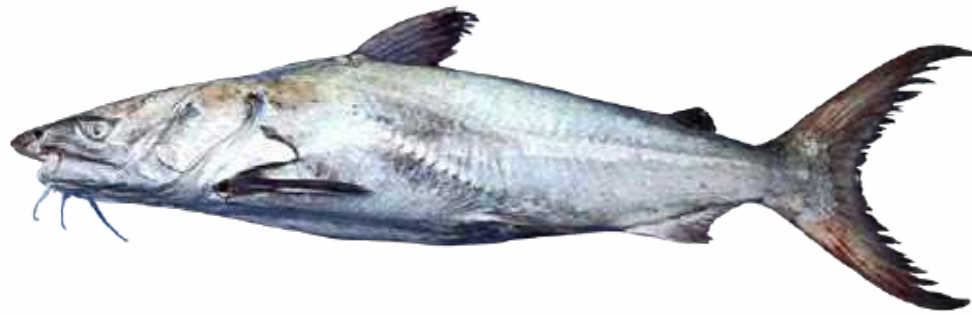
**Lizard Fish**



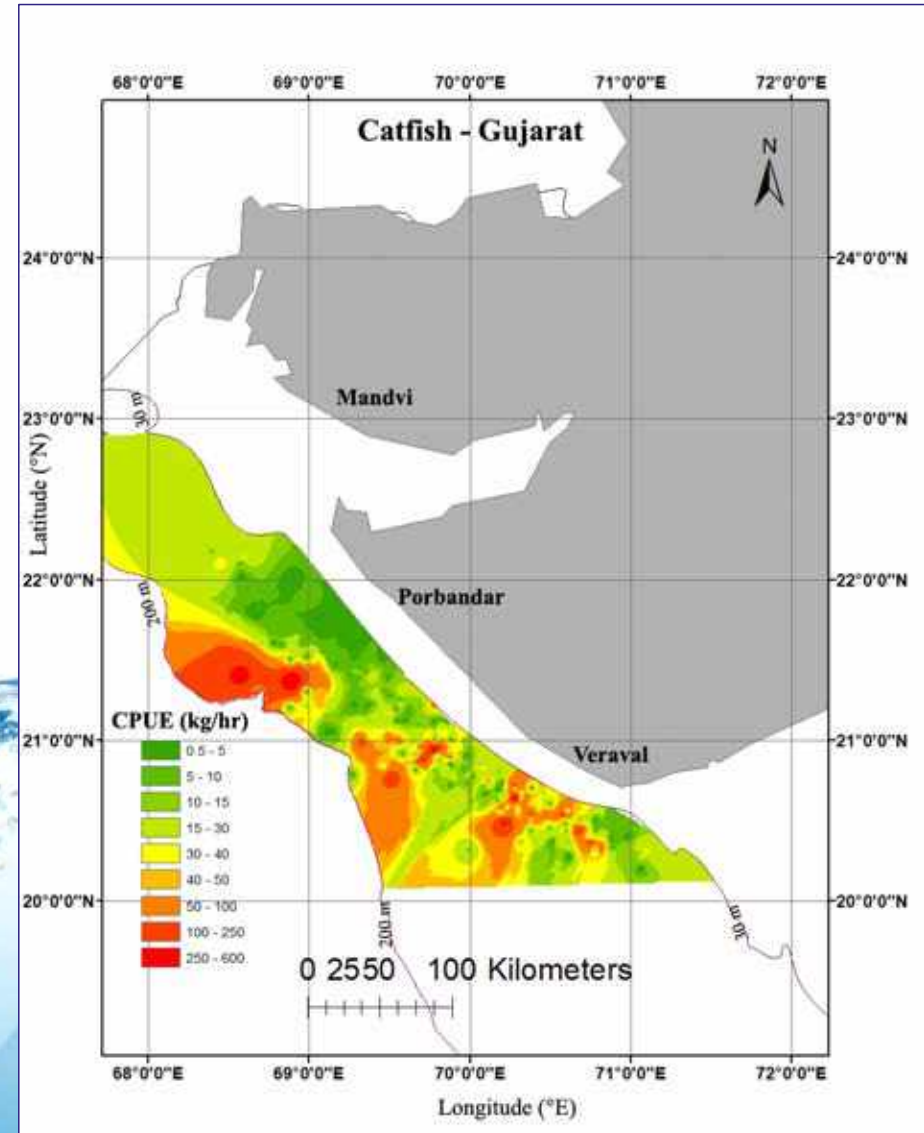


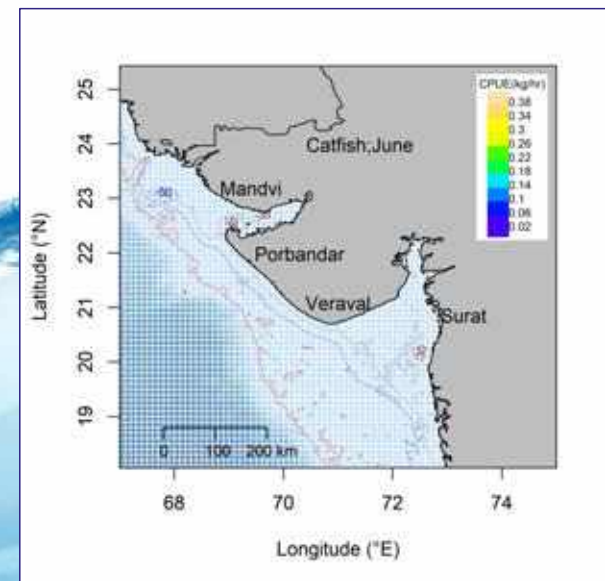
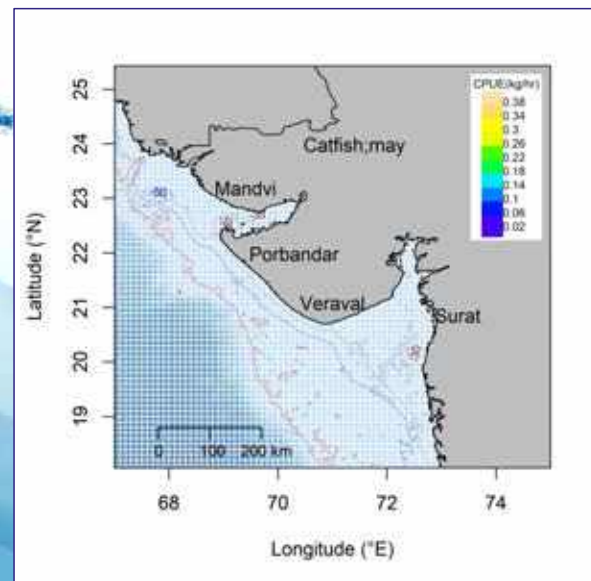
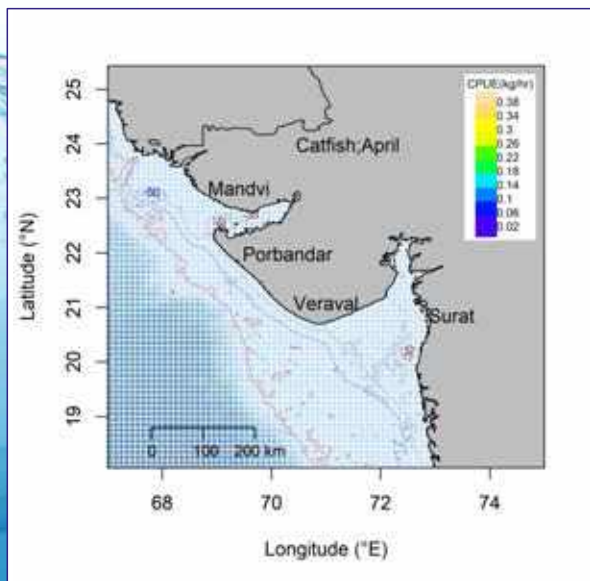
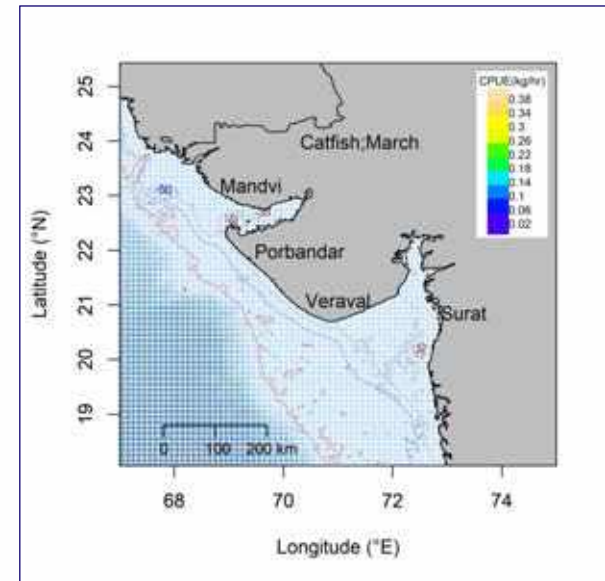
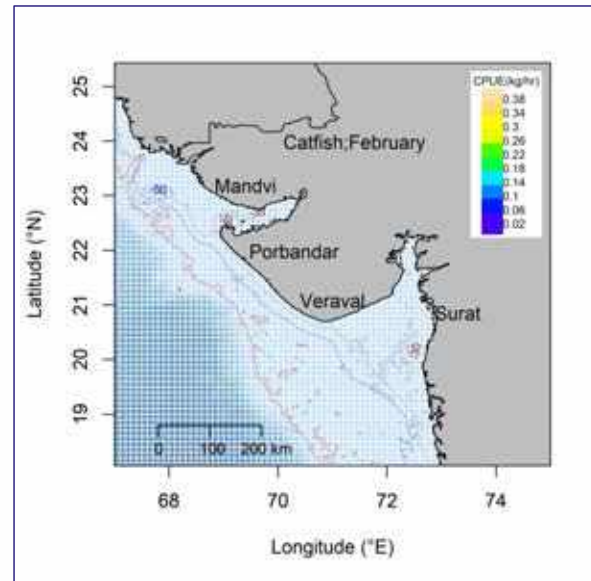
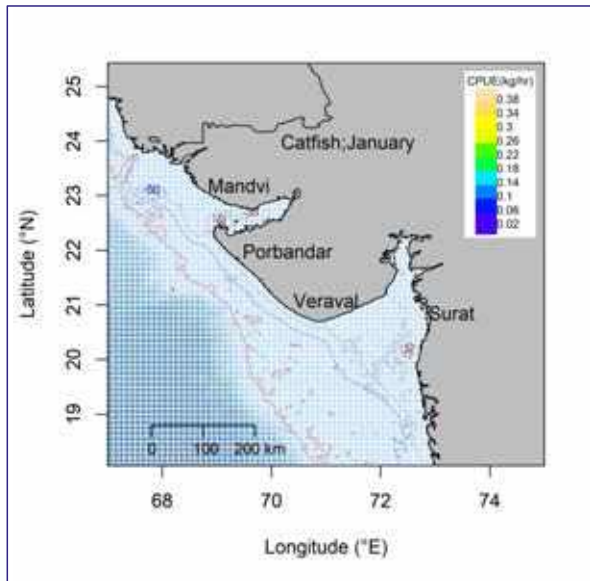


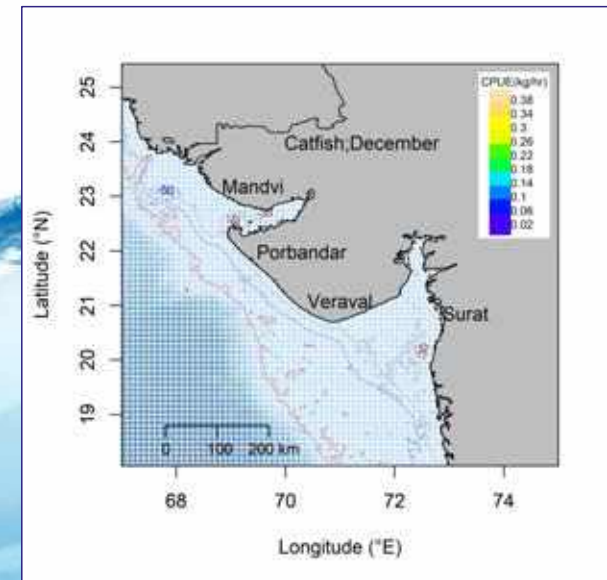
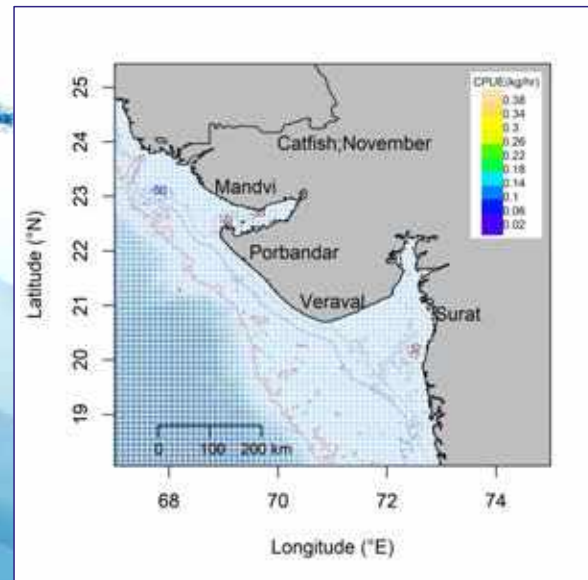
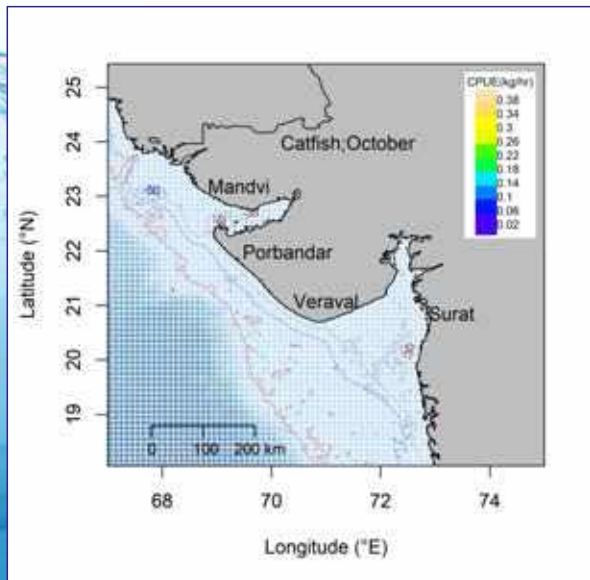
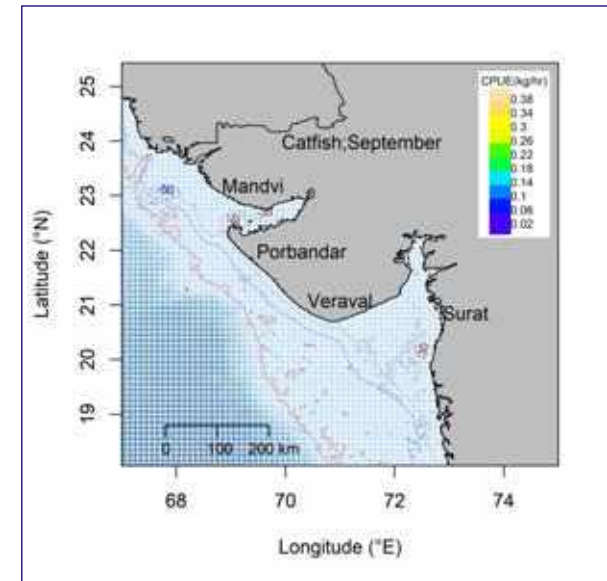
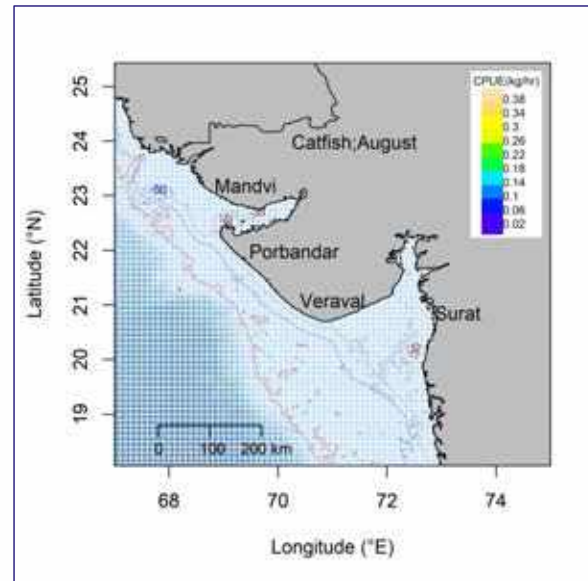
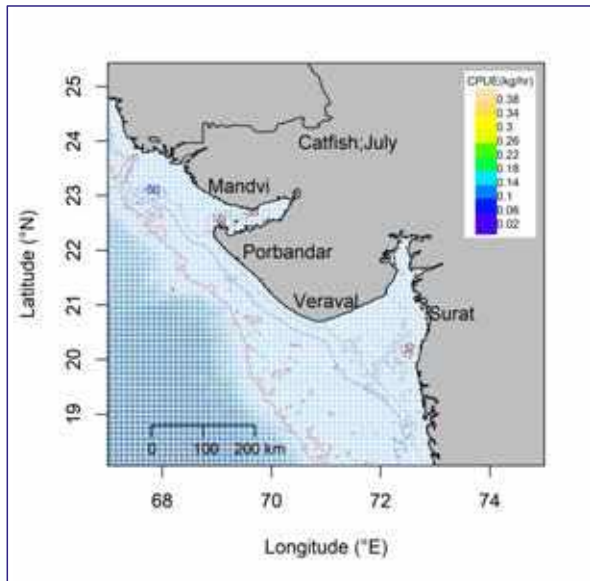


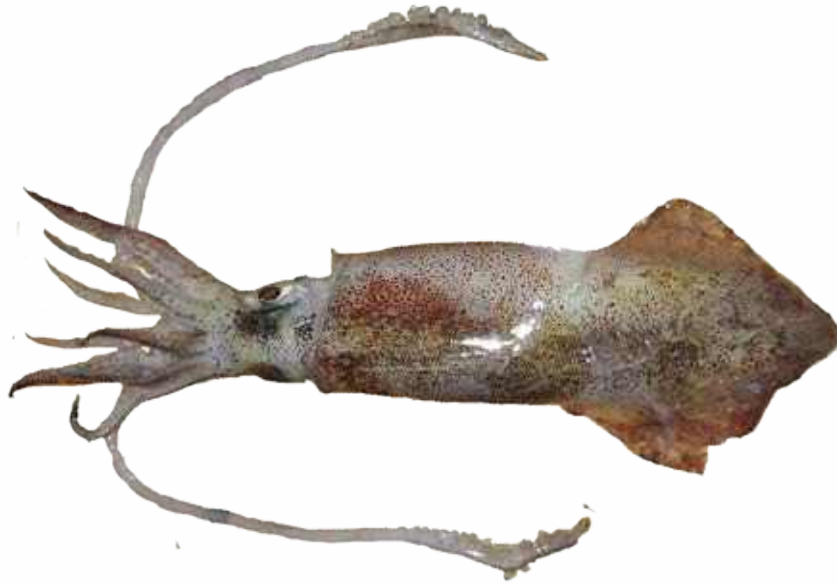


Cat Fish

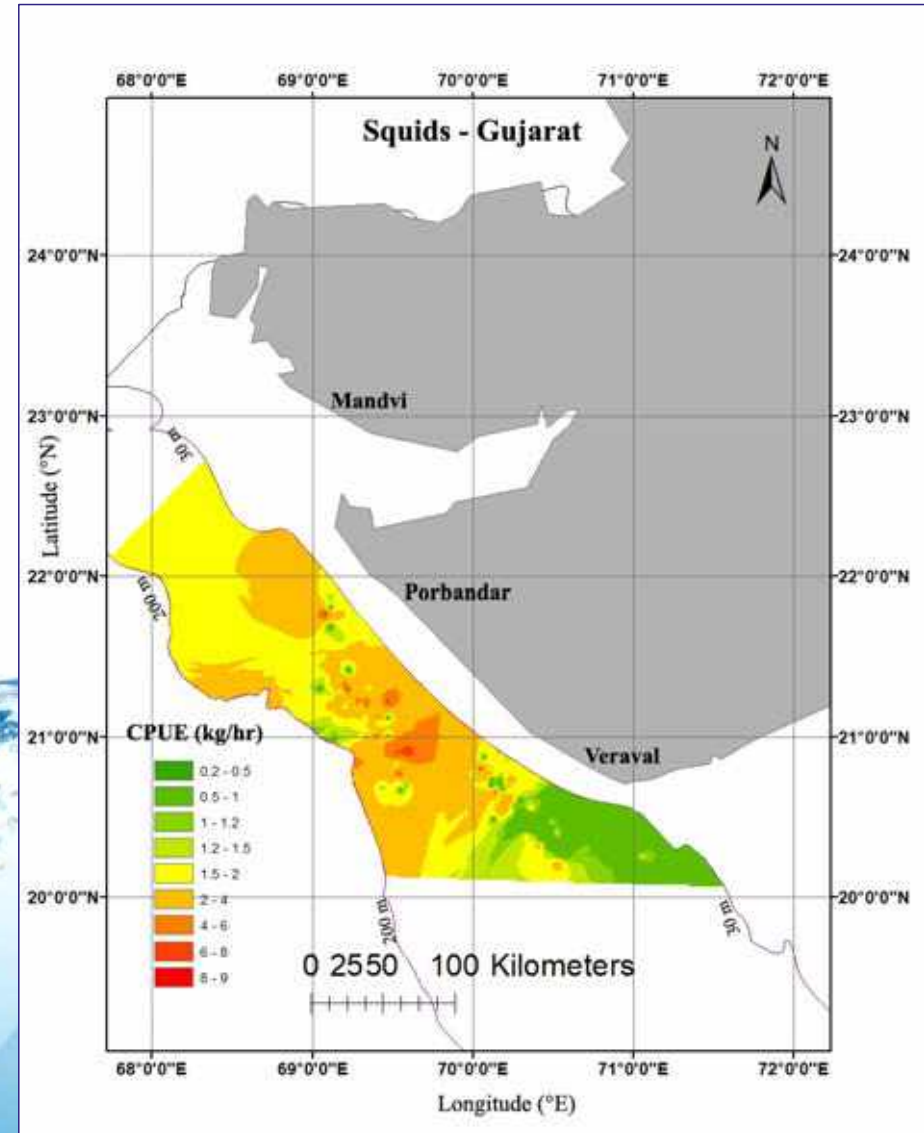


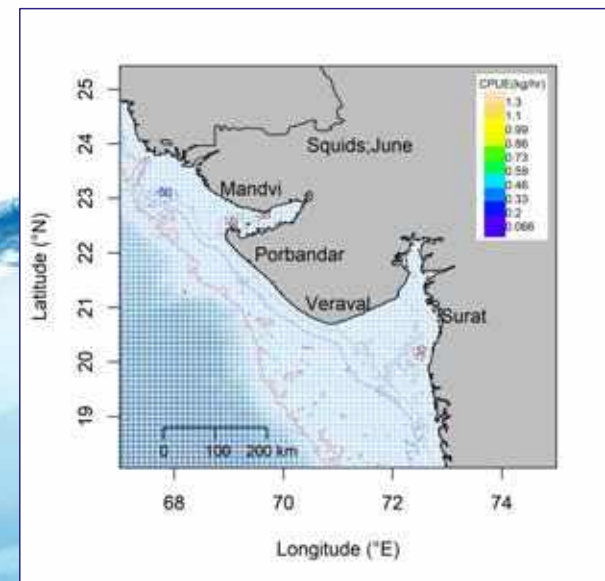
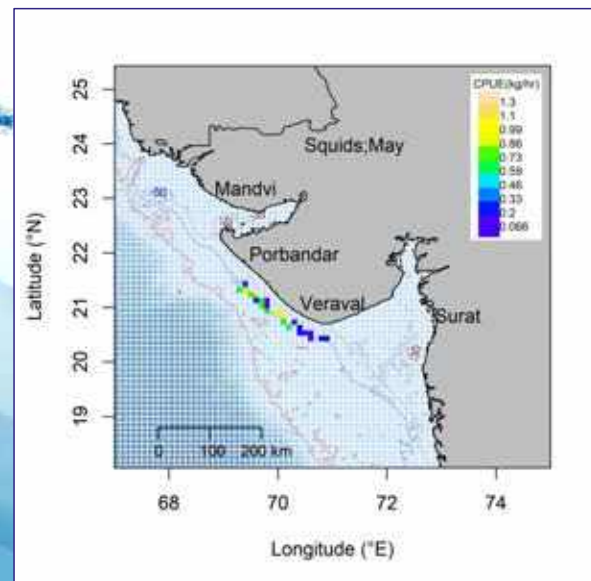
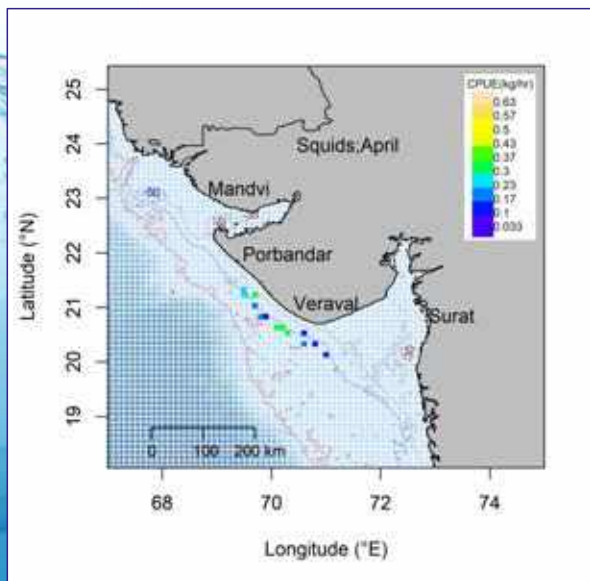
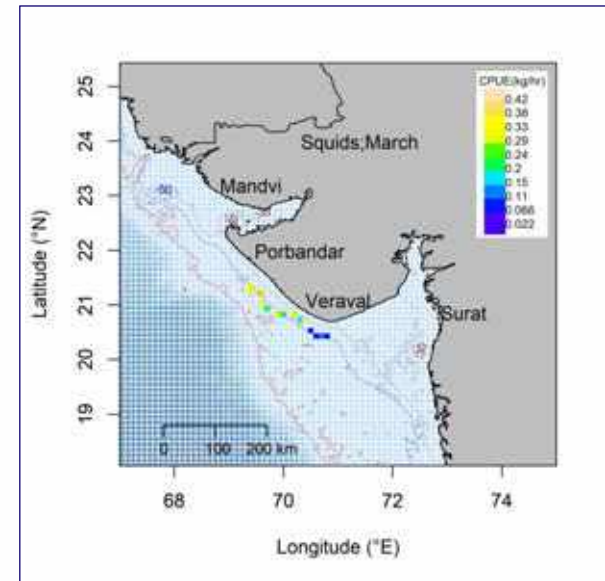
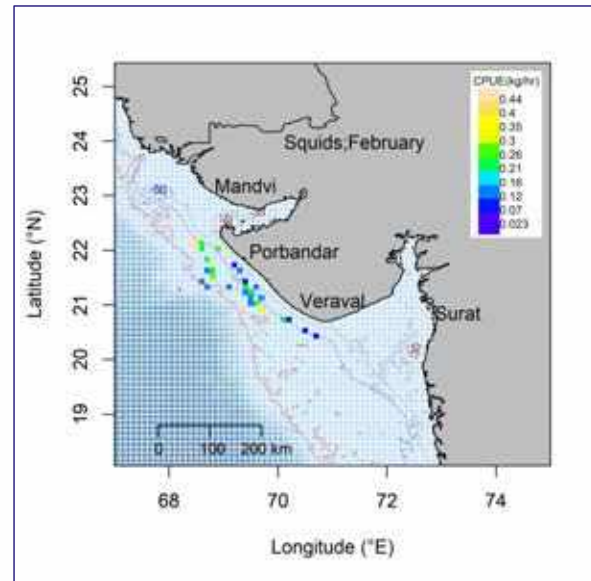
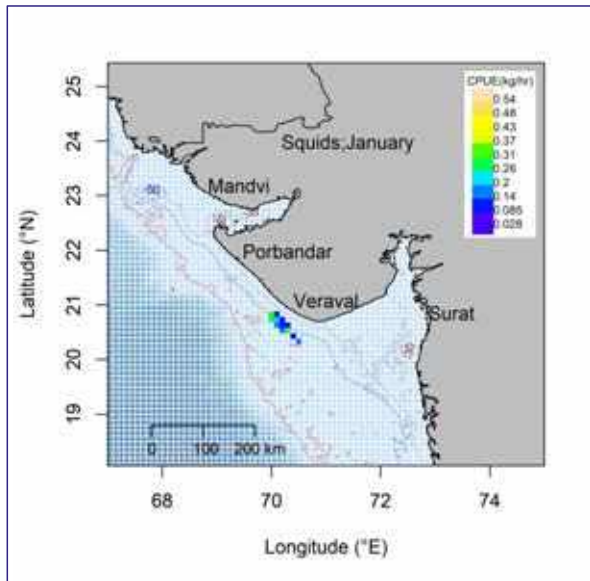


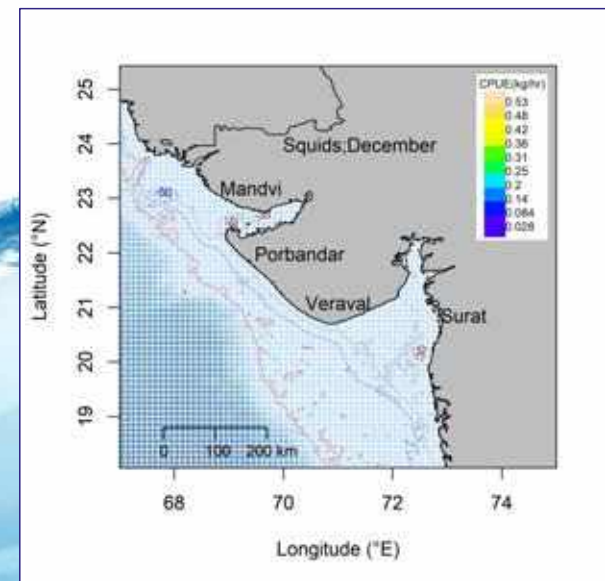
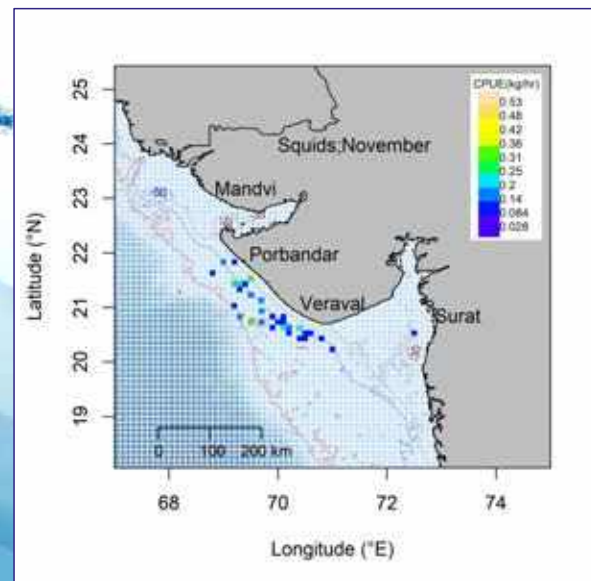
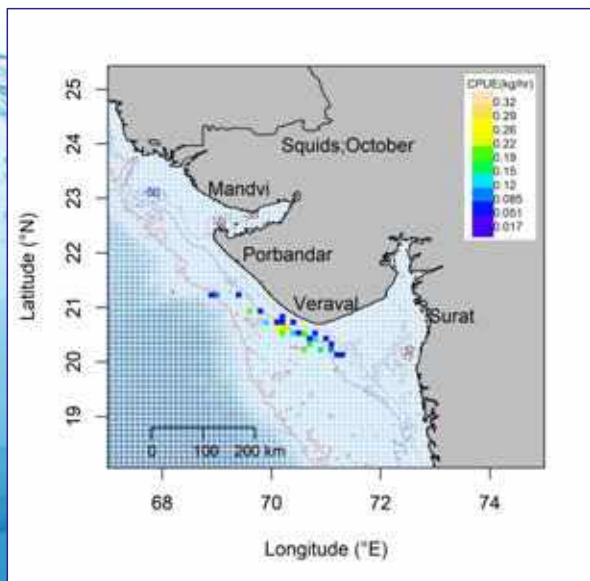
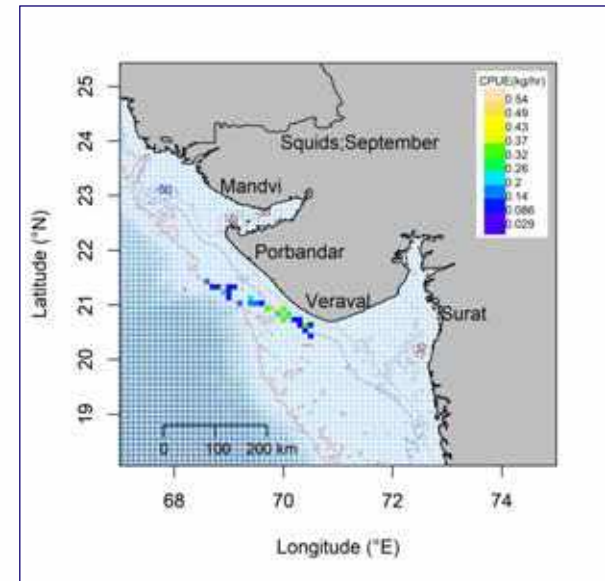
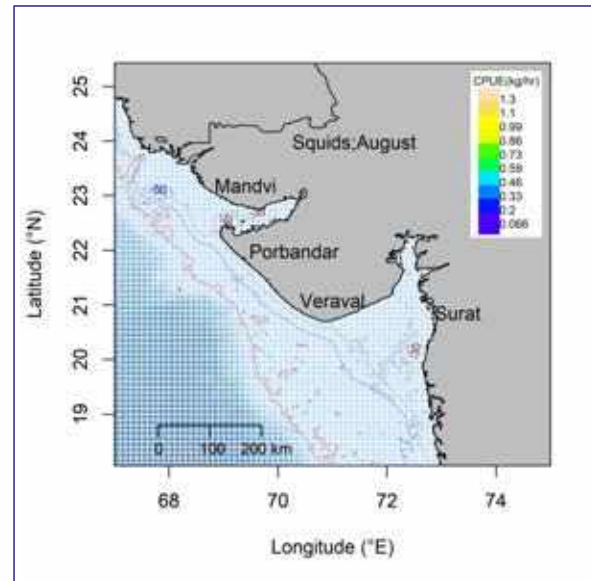
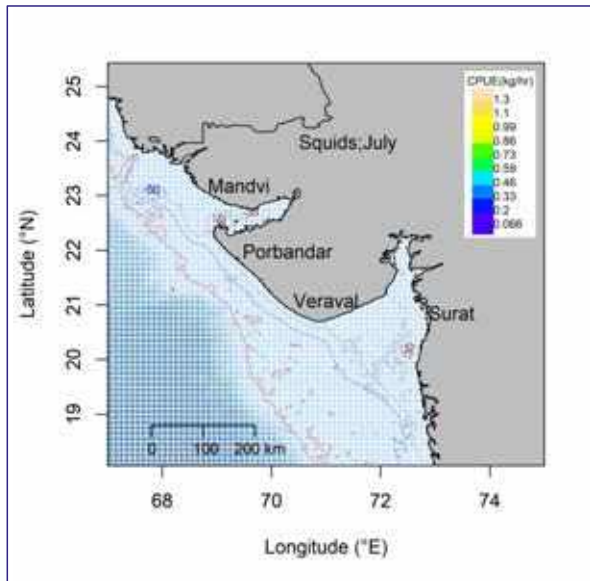




# Squids







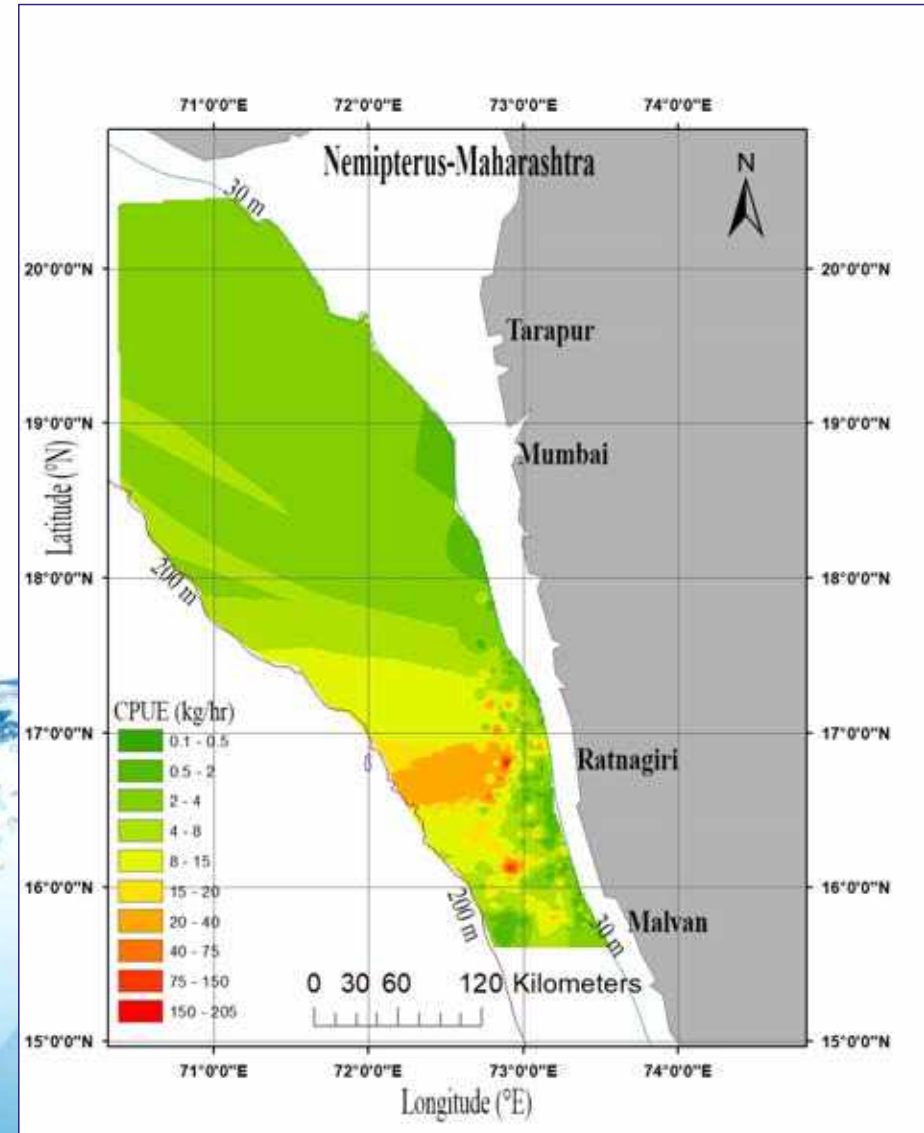
## **3.2** Spatial distribution and abundance along Maharashtra coast

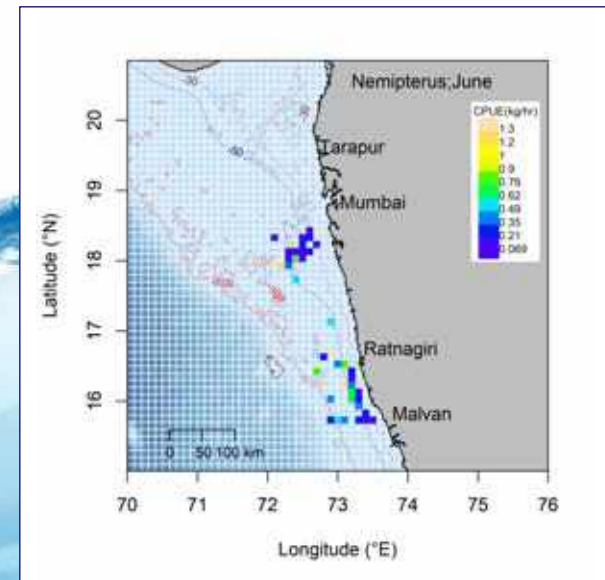
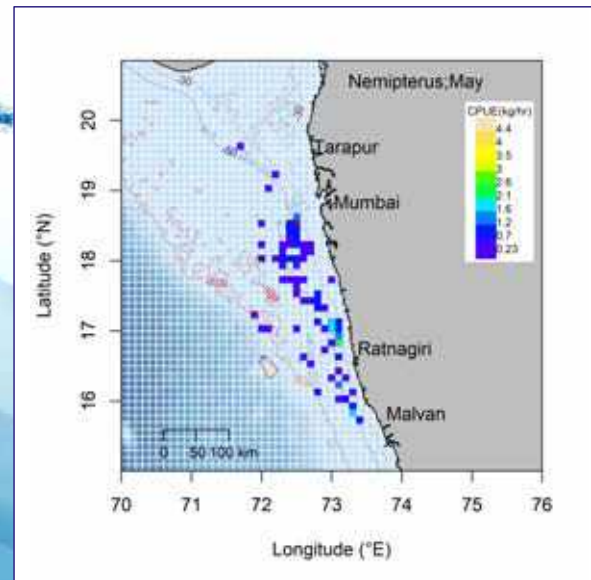
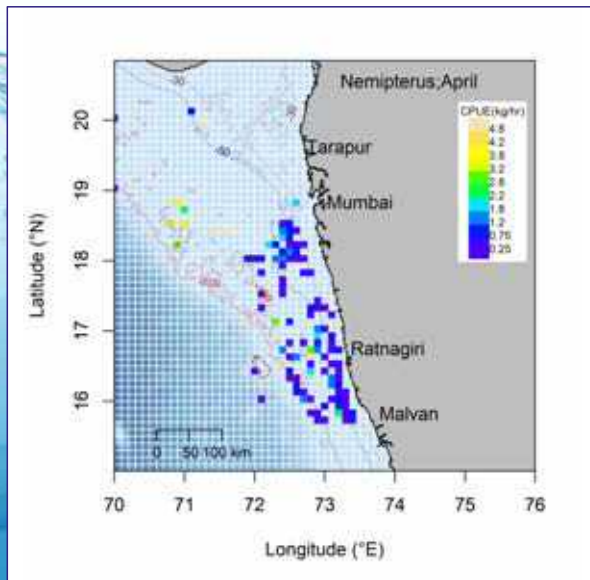
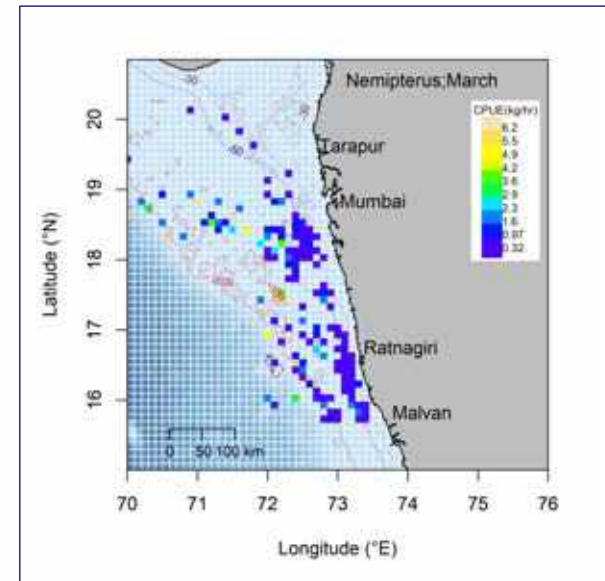
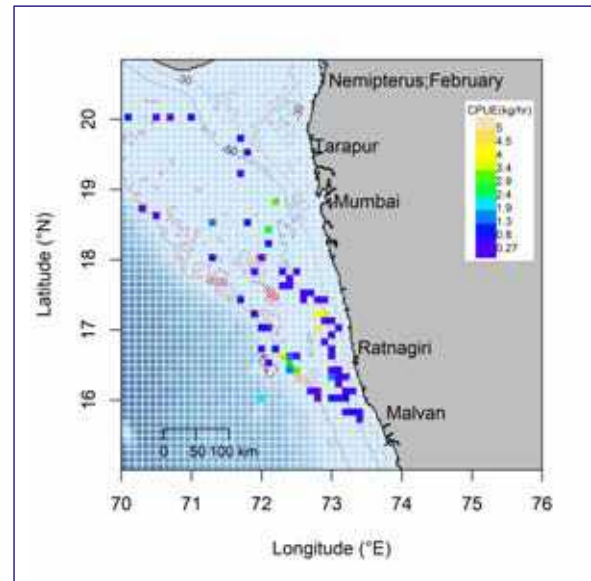
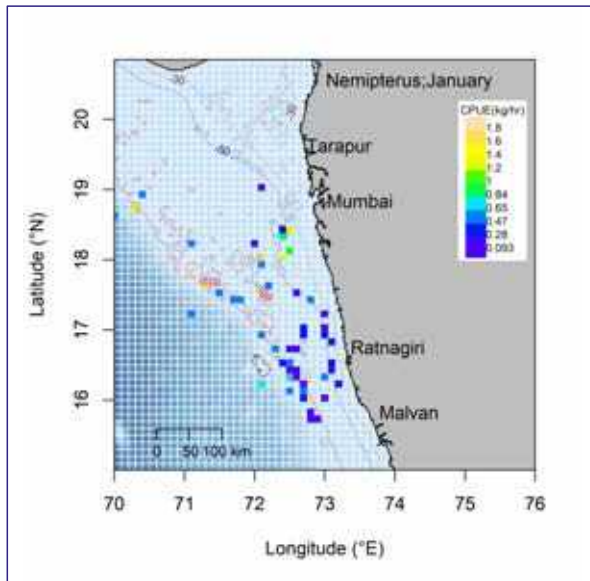


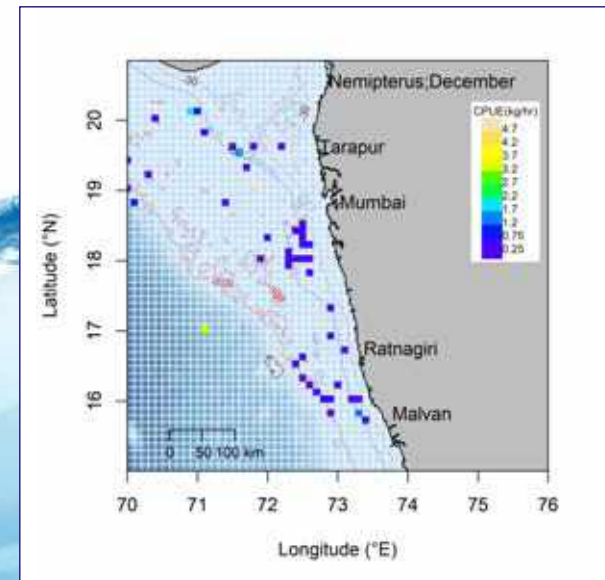
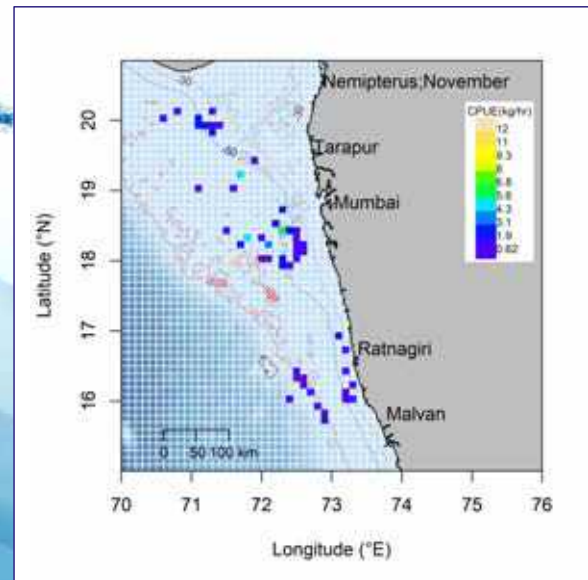
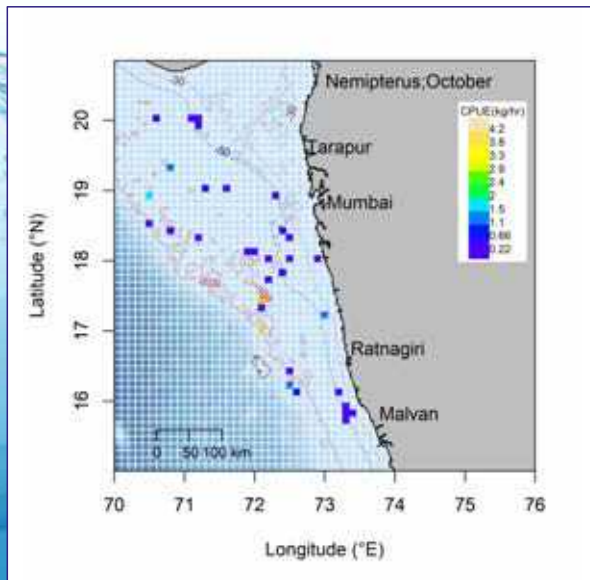
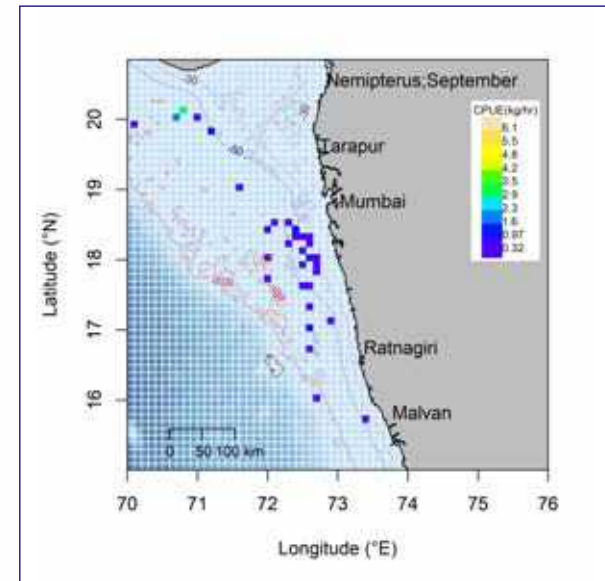
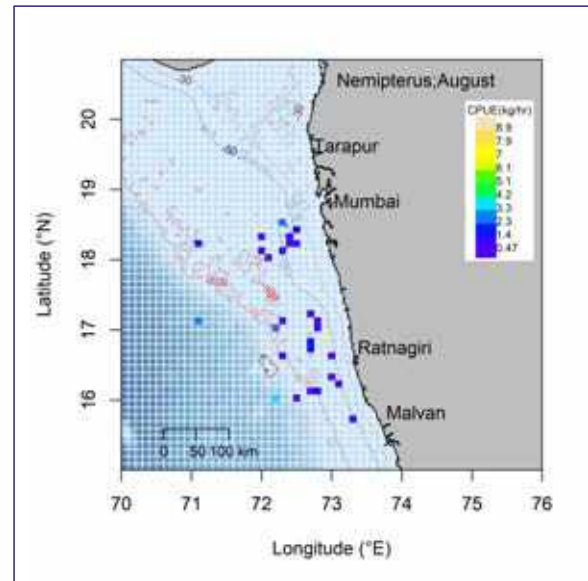
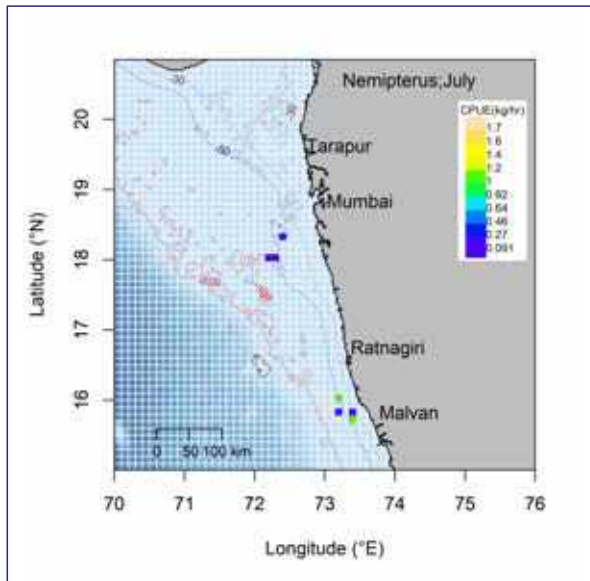




# Threadfin Breams (Nemipterus)

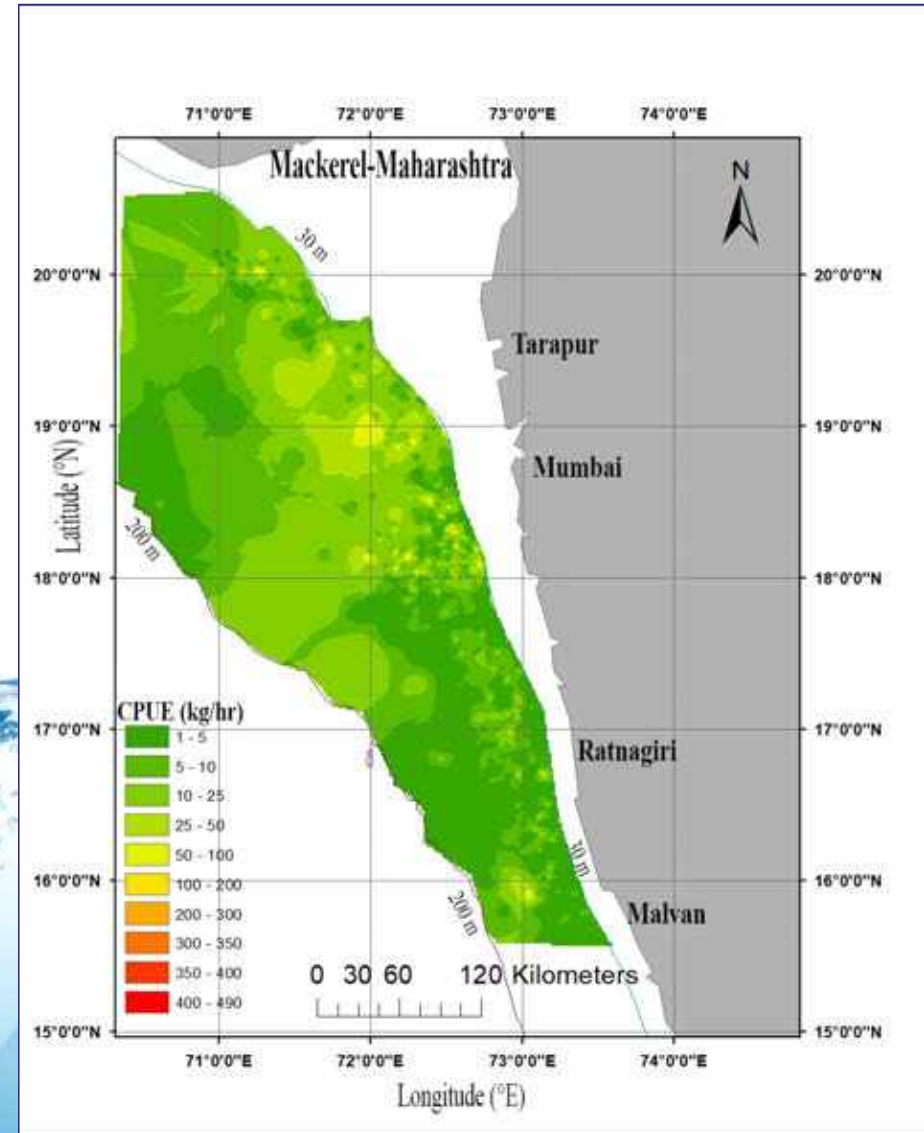


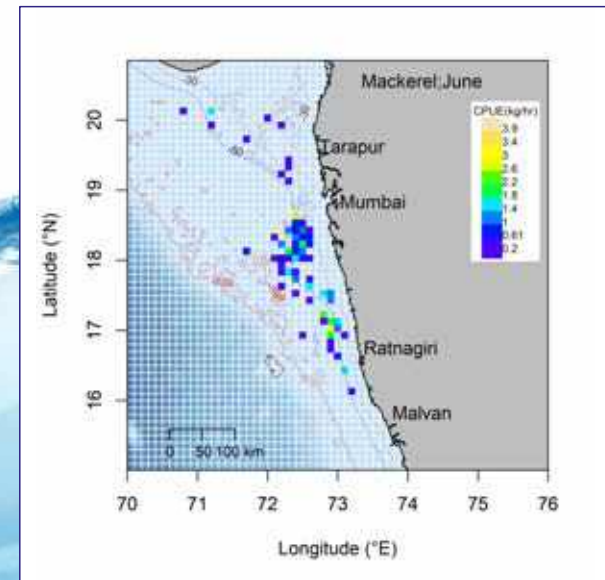
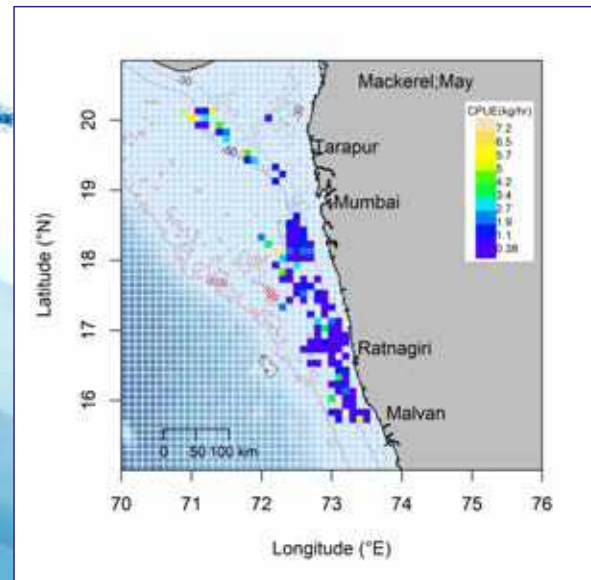
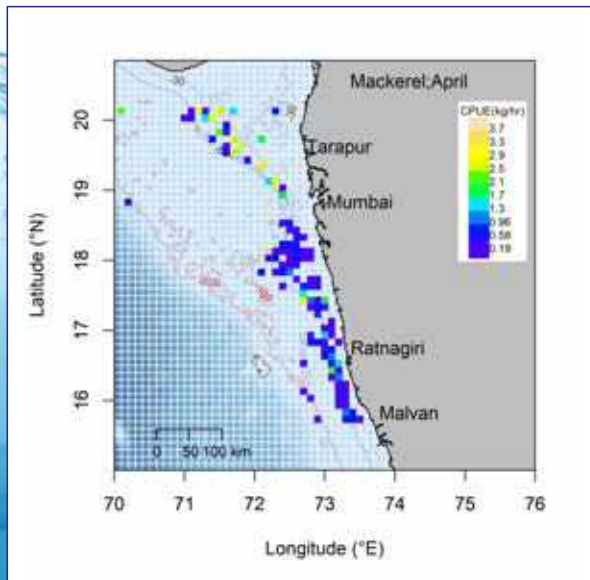
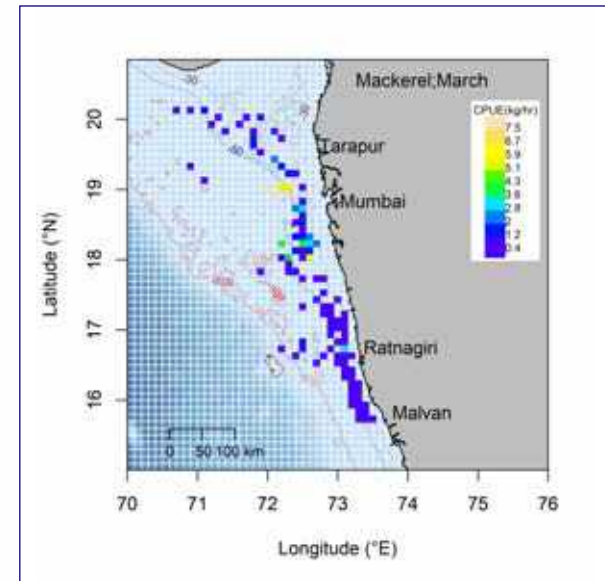
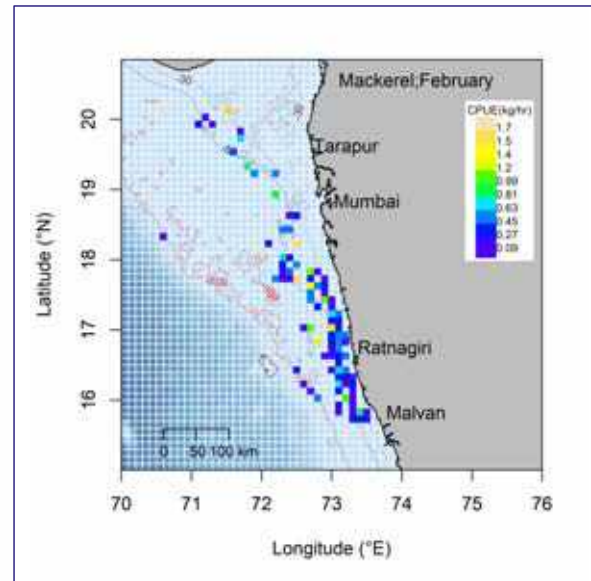
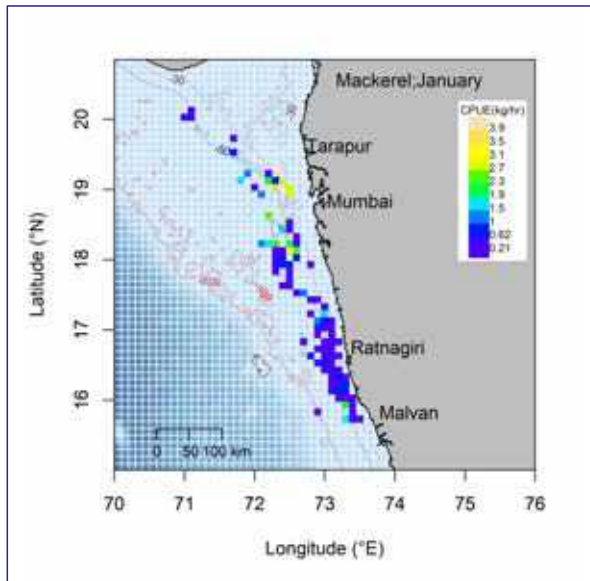


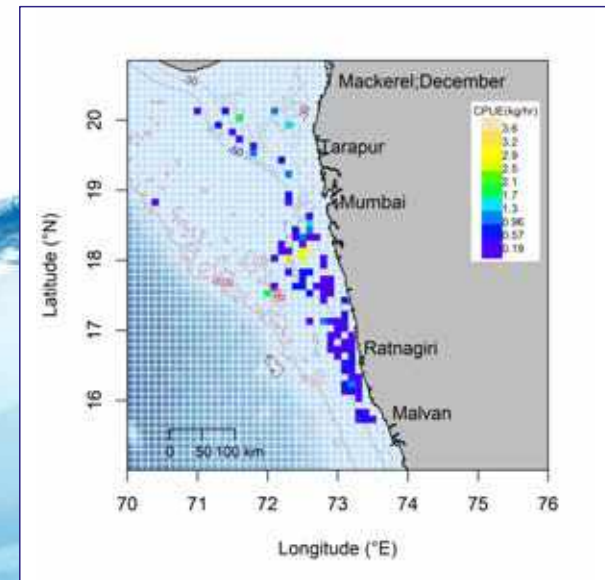
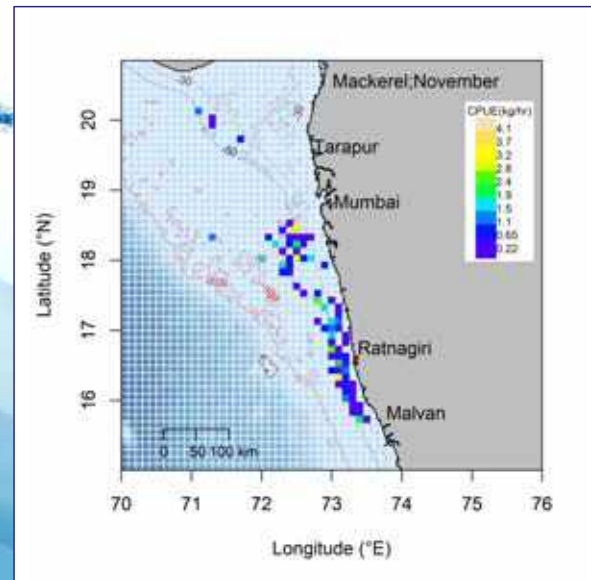
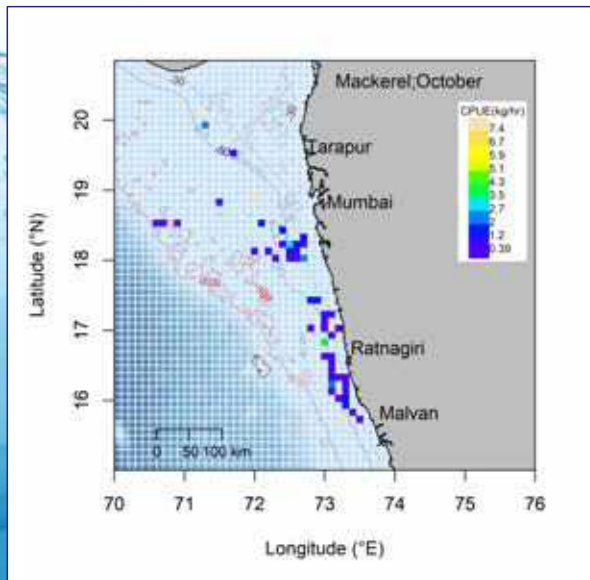
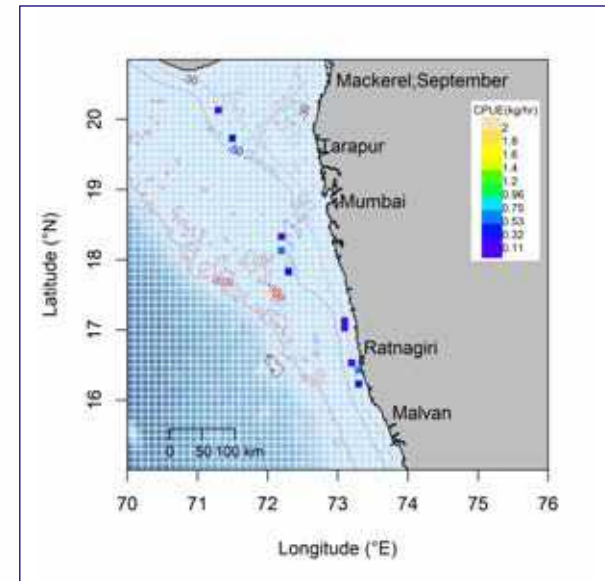
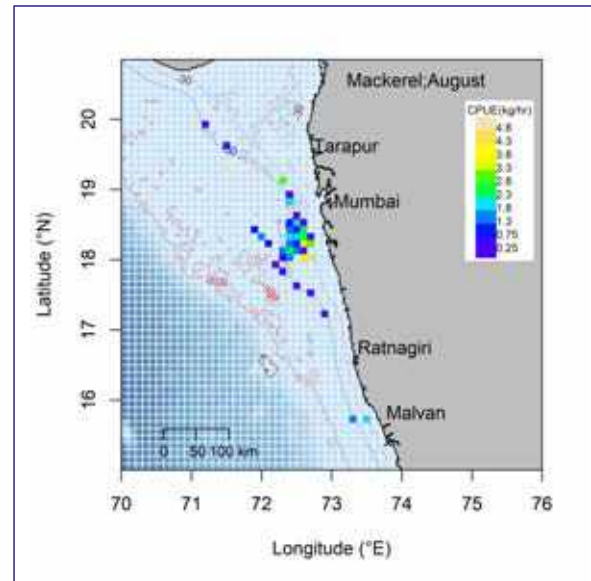
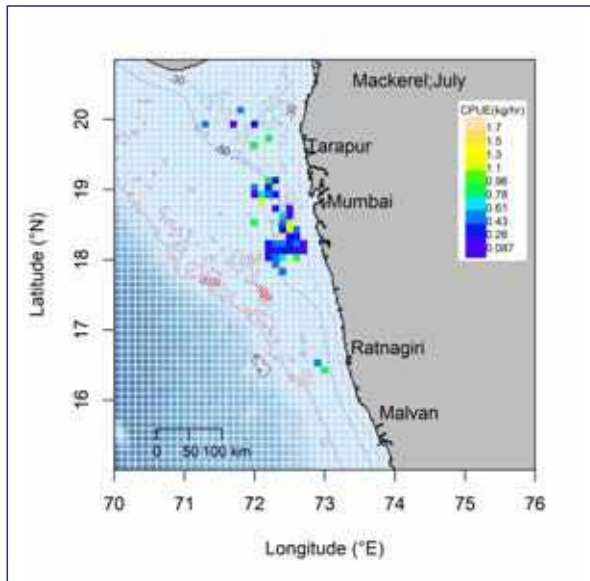




# Mackerel

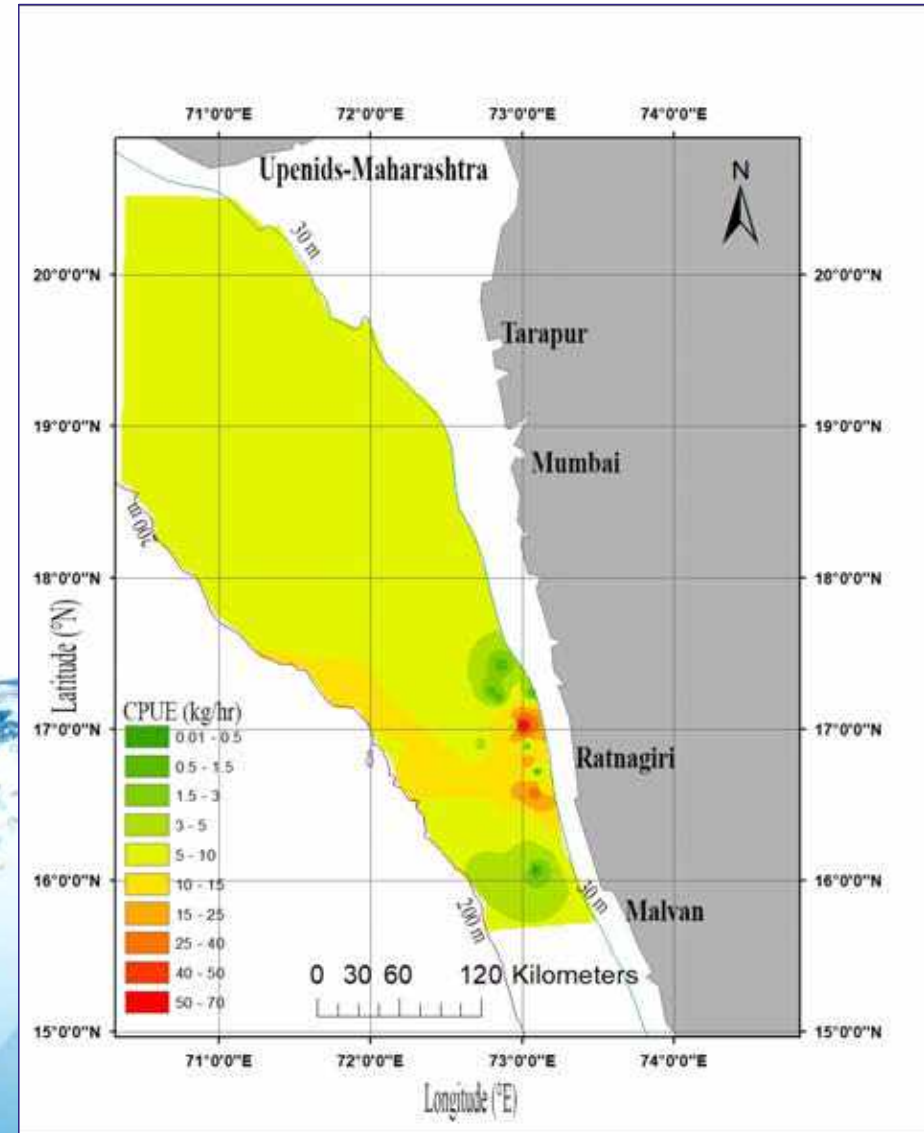


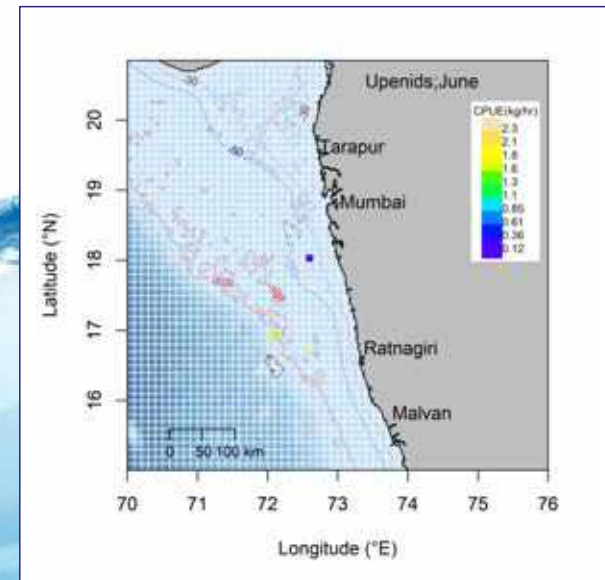
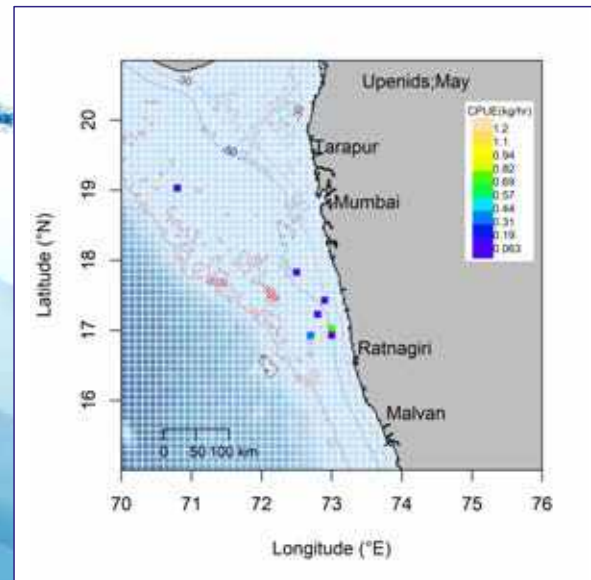
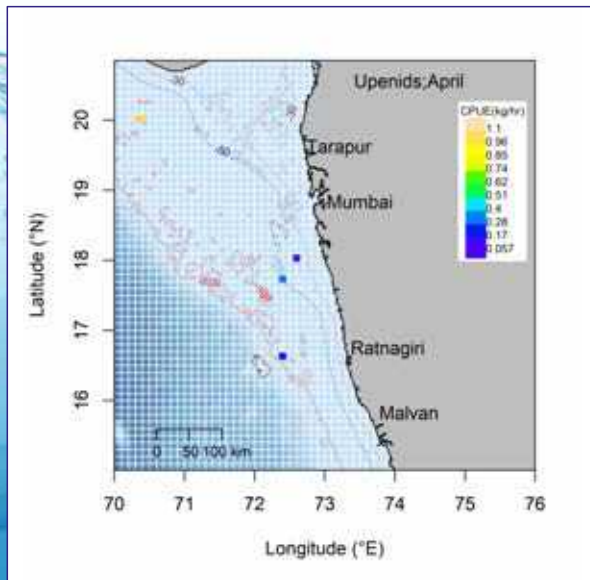
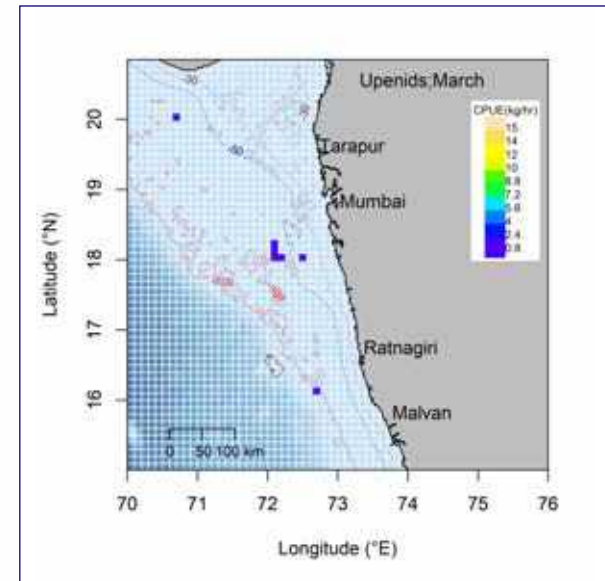
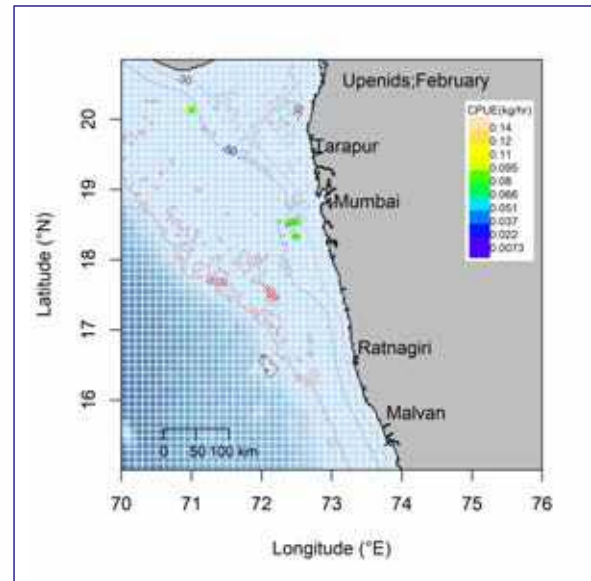
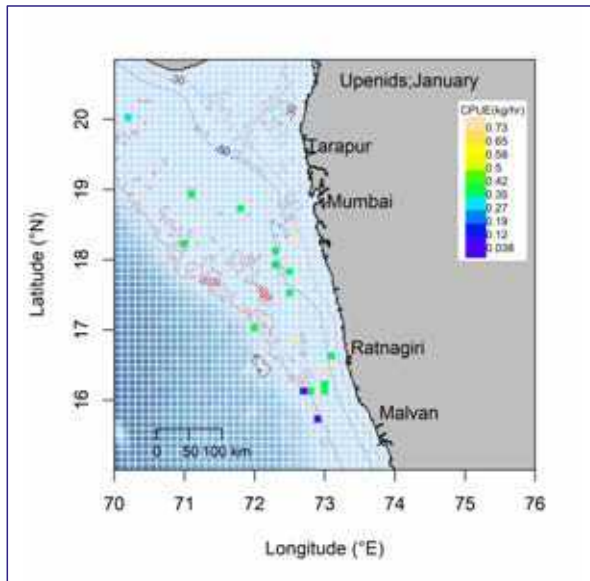




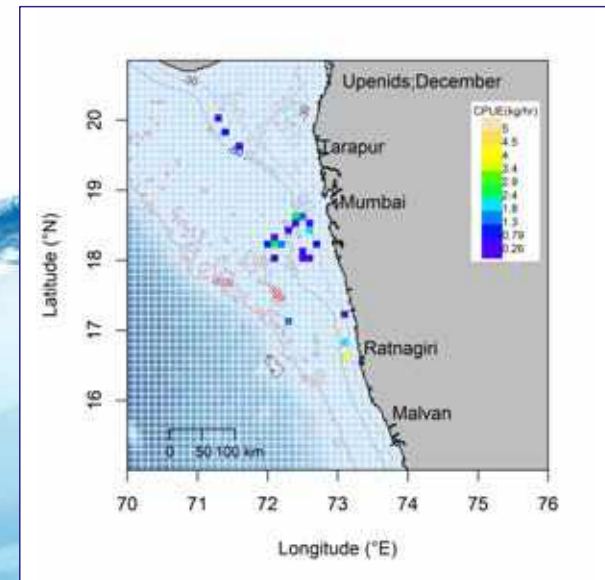
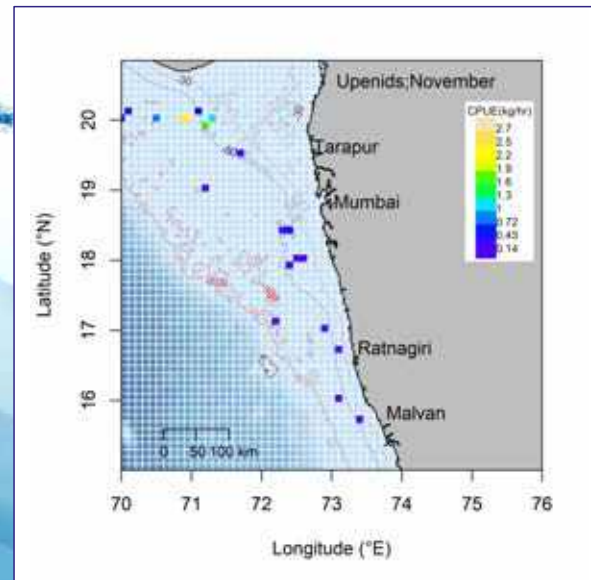
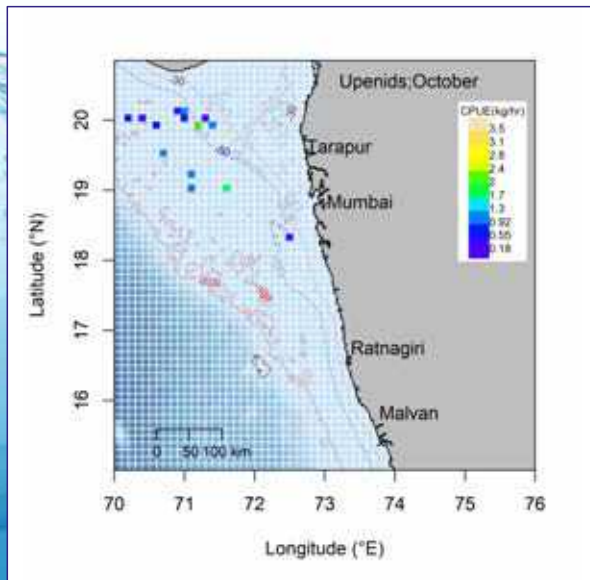
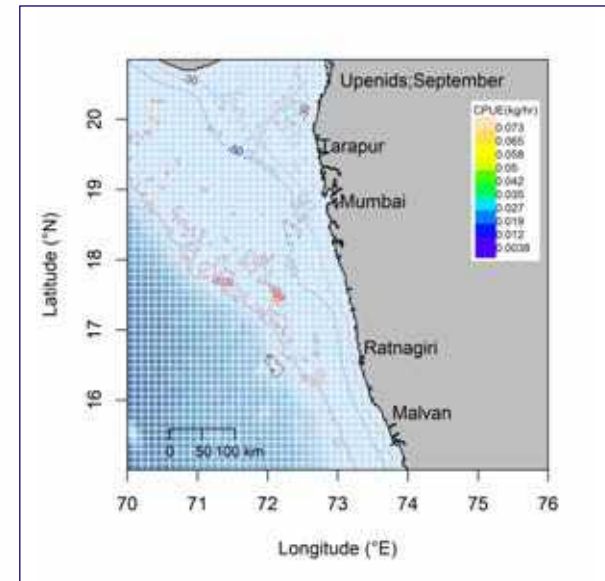
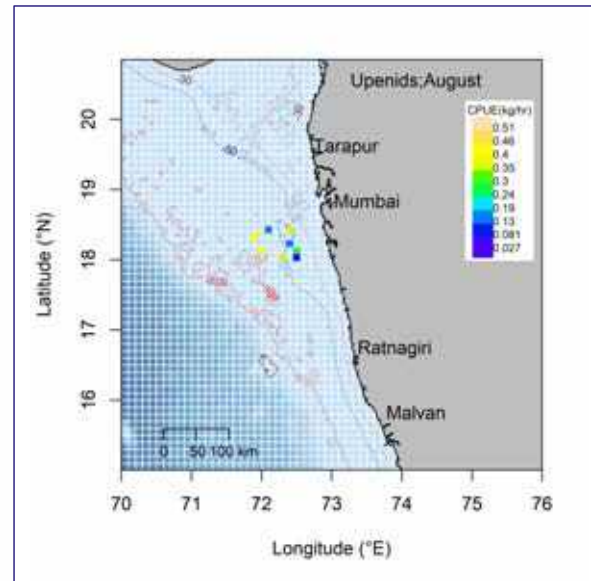
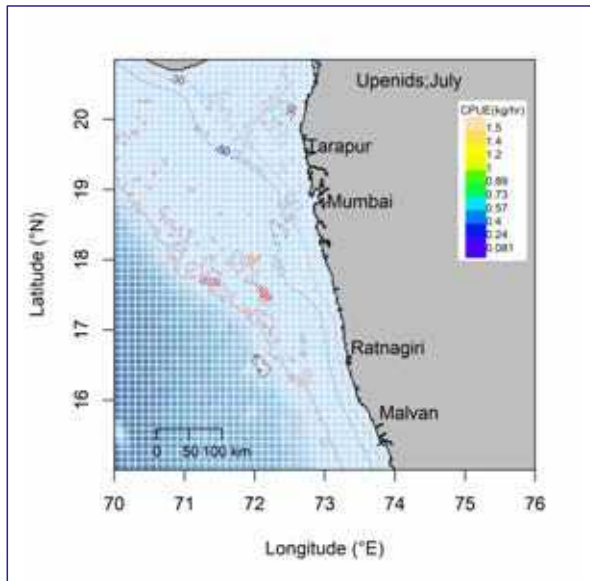


## Goatfish (Upenids)



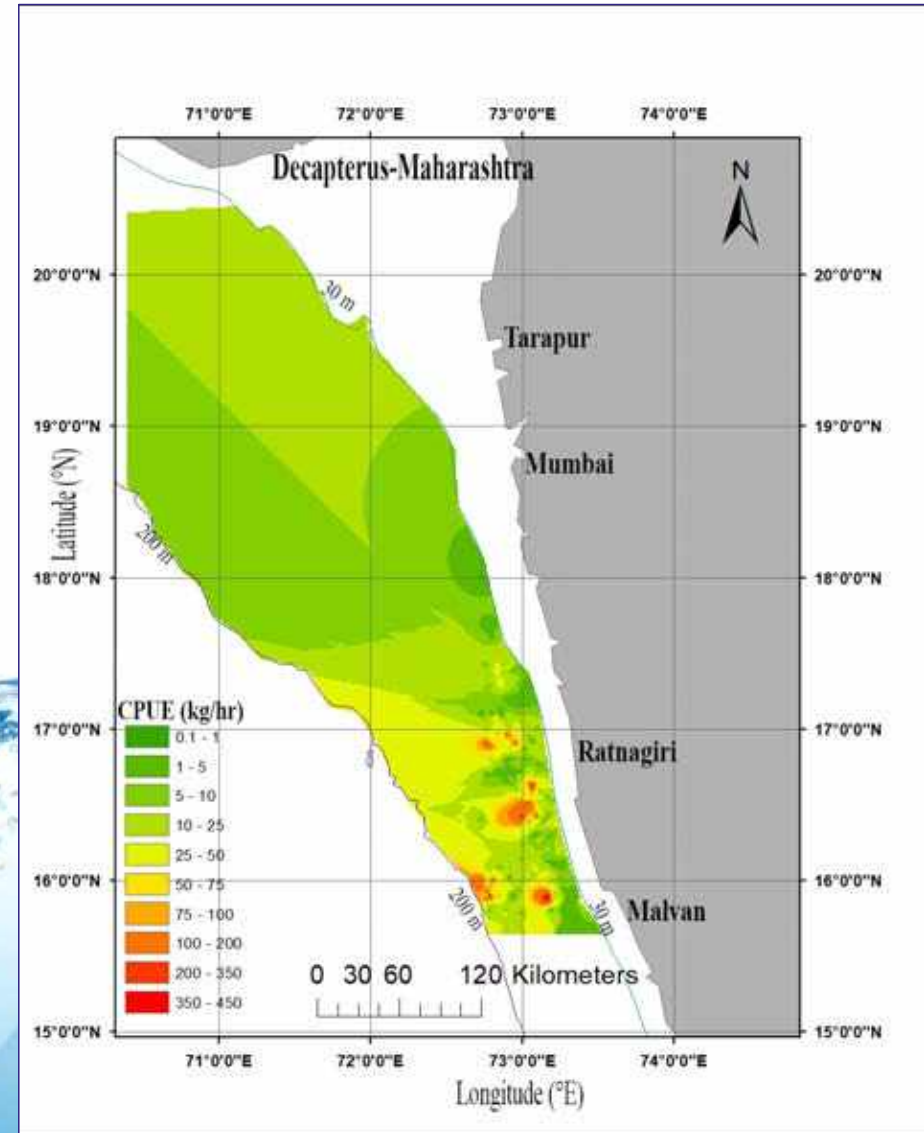


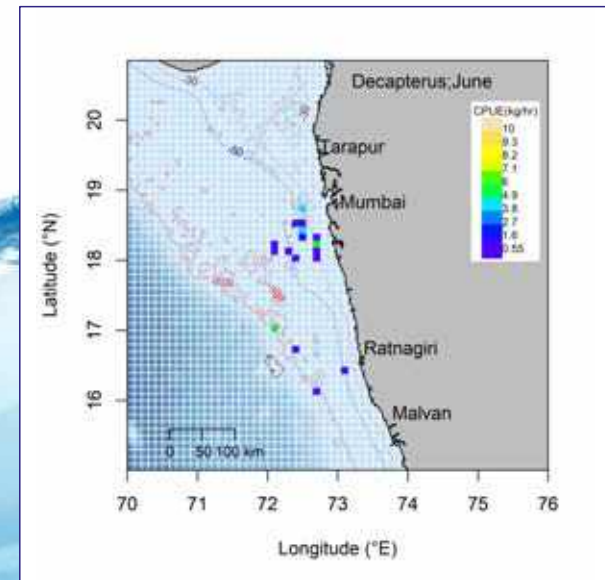
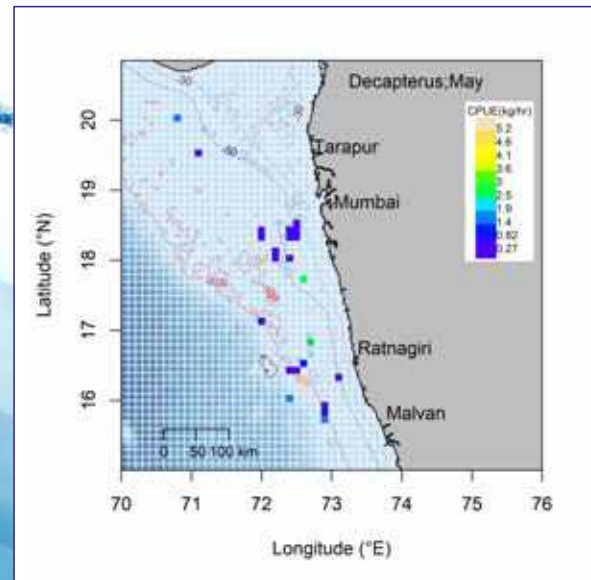
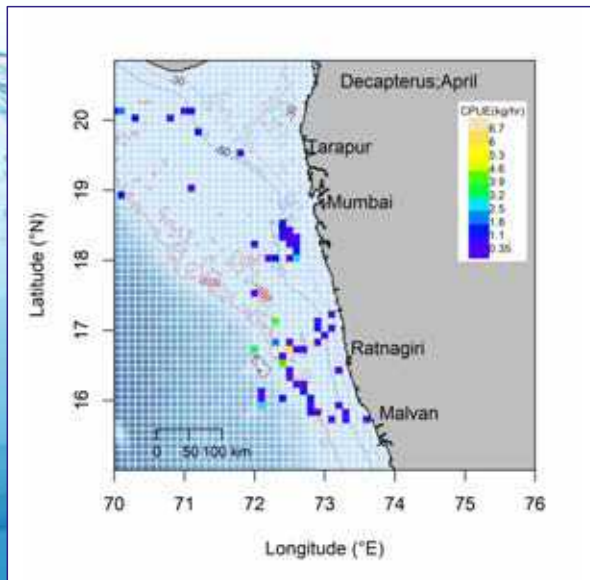
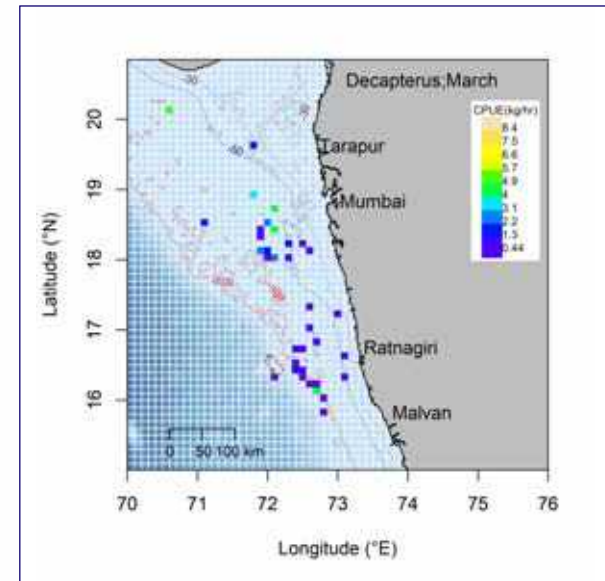
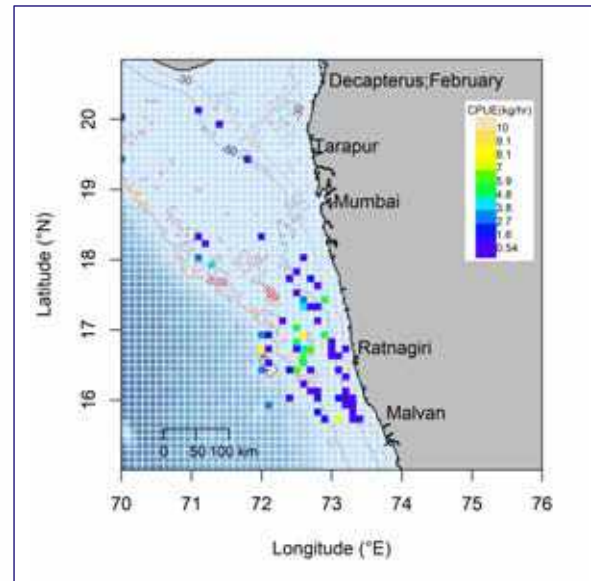
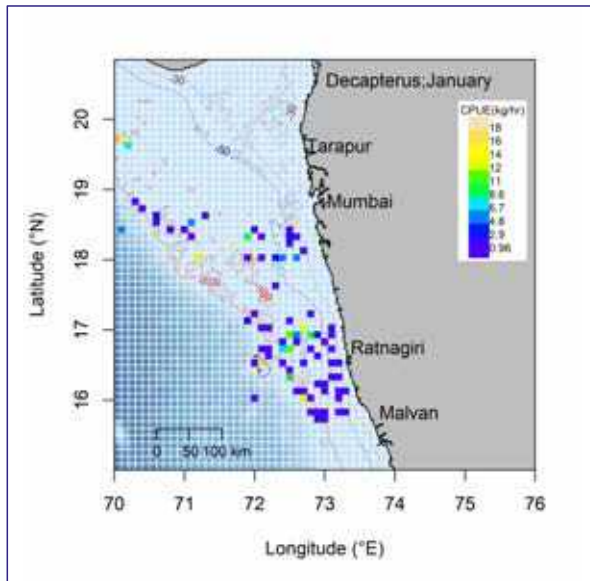


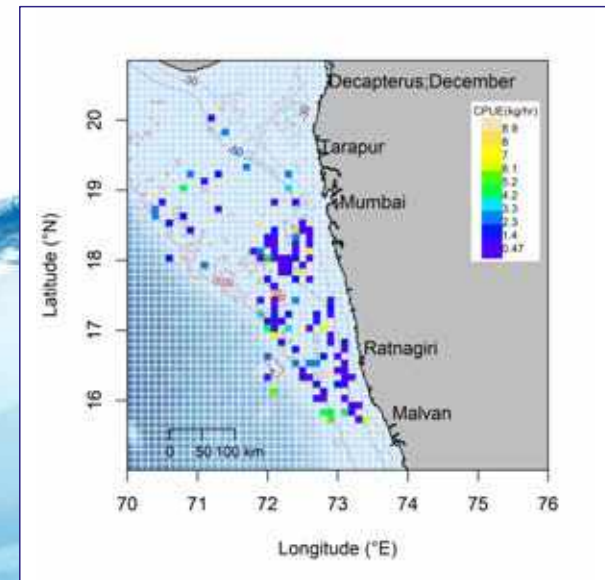
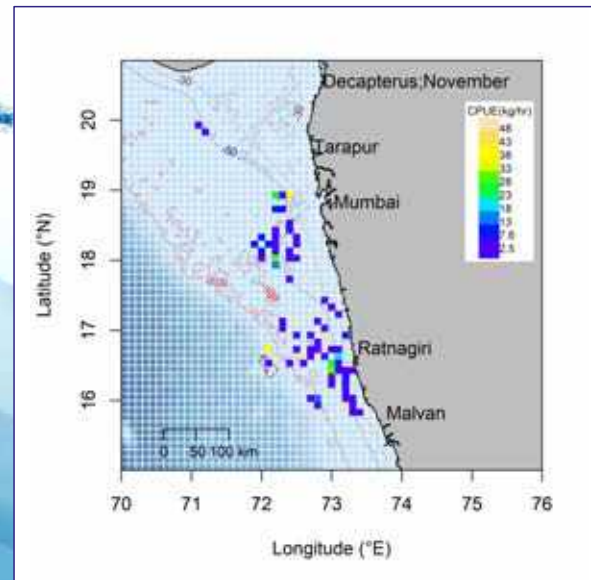
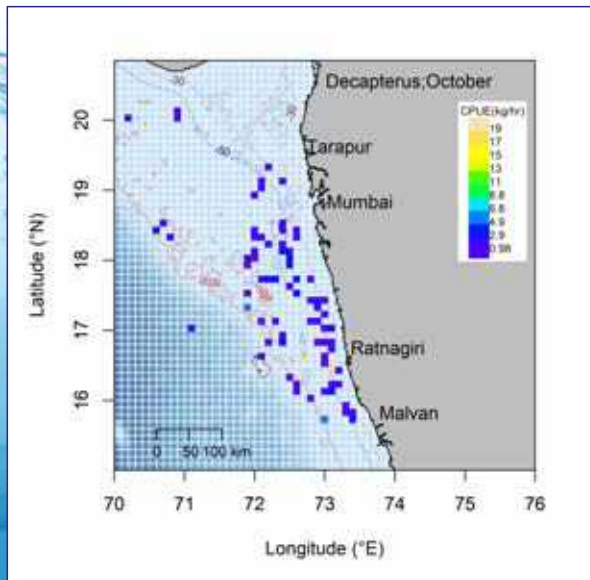
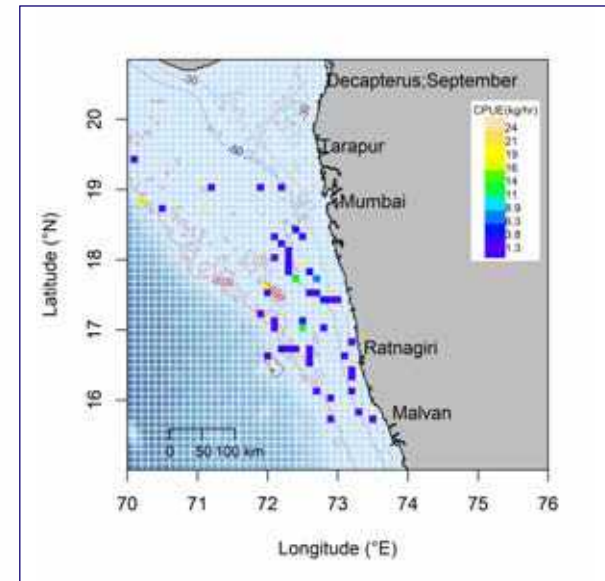
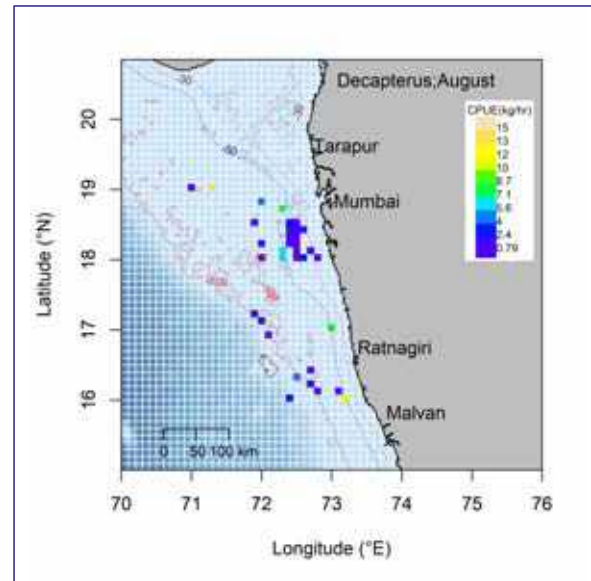
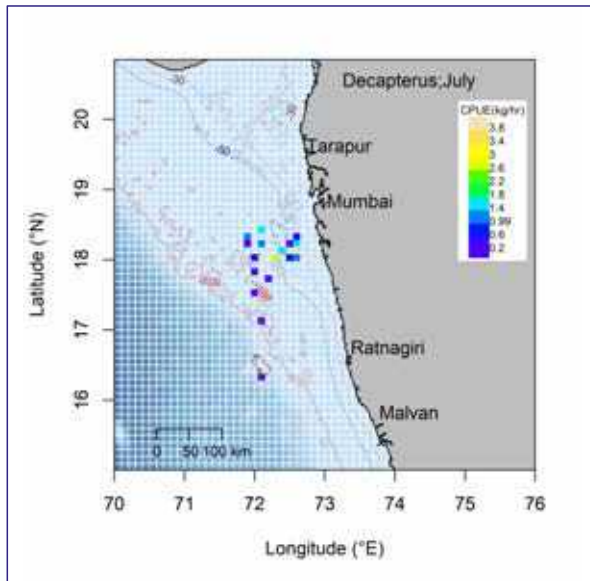




## Round Scads (Decapterus)

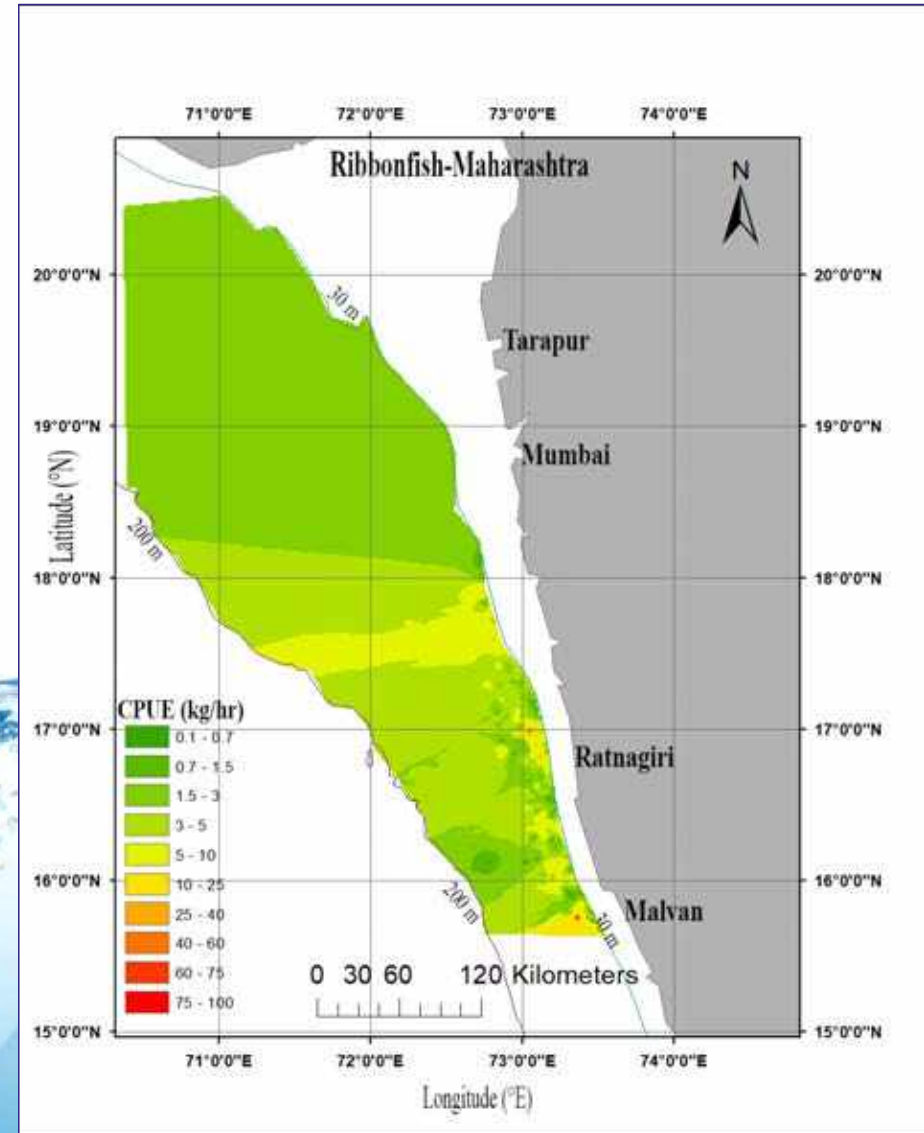


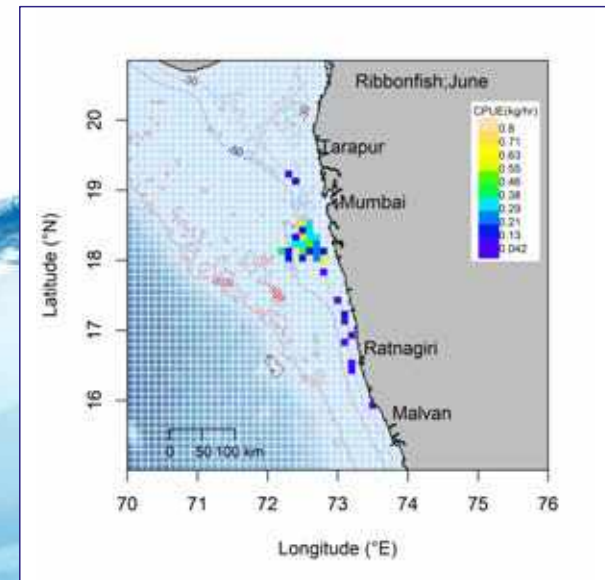
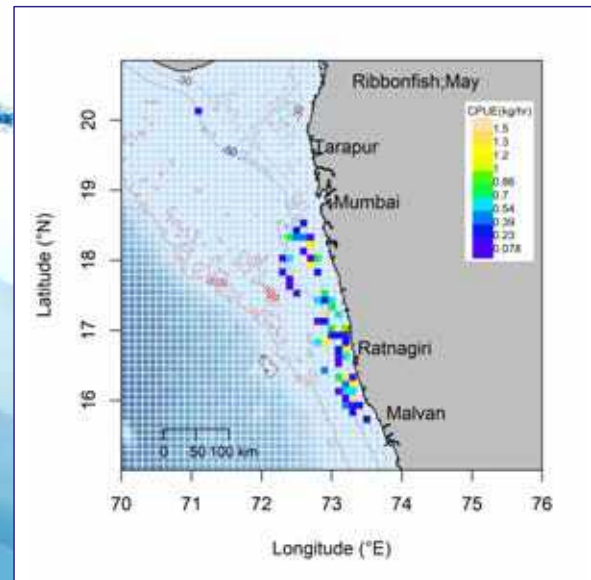
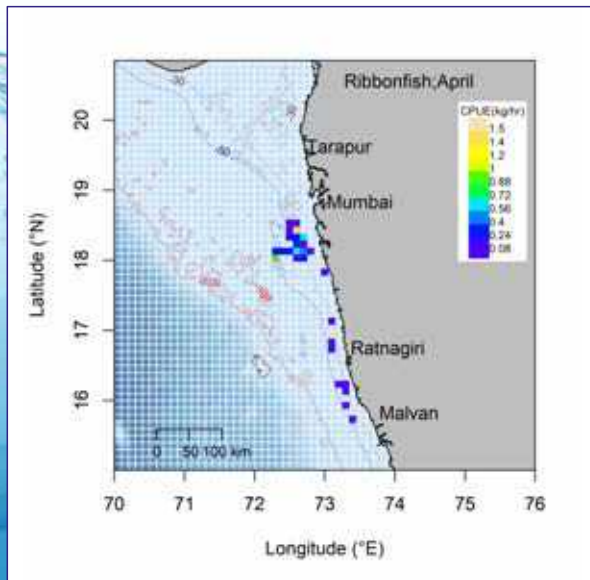
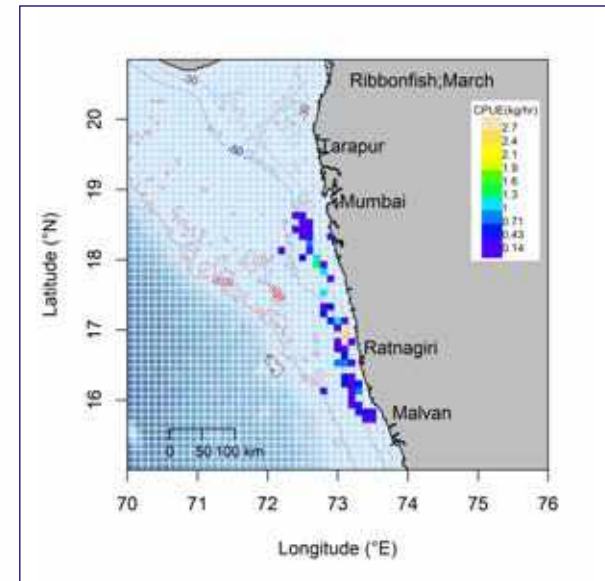
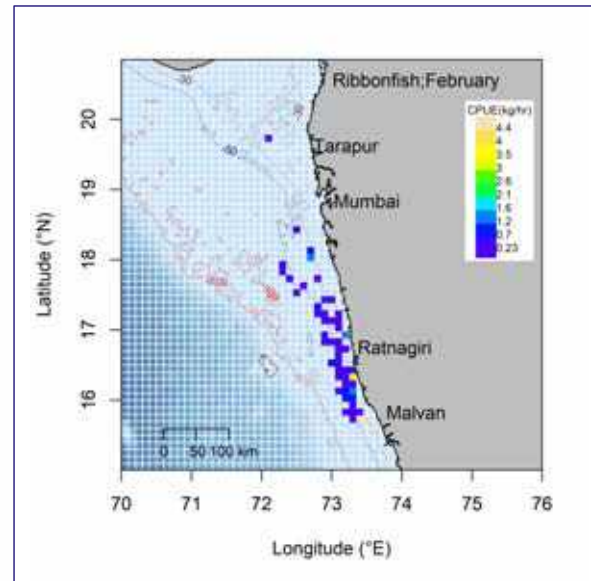
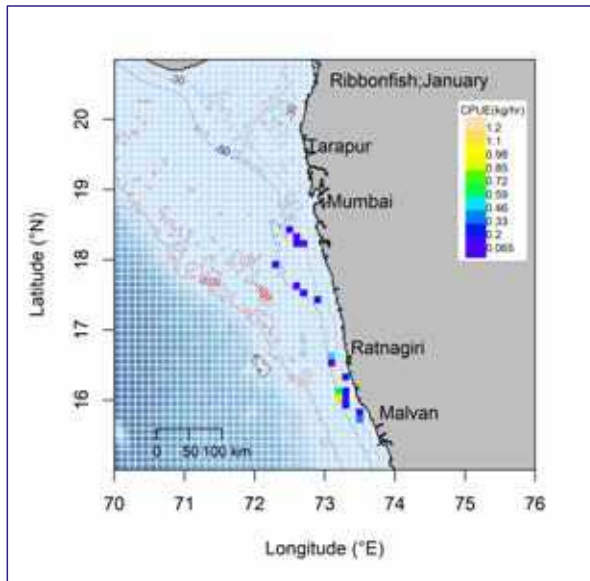


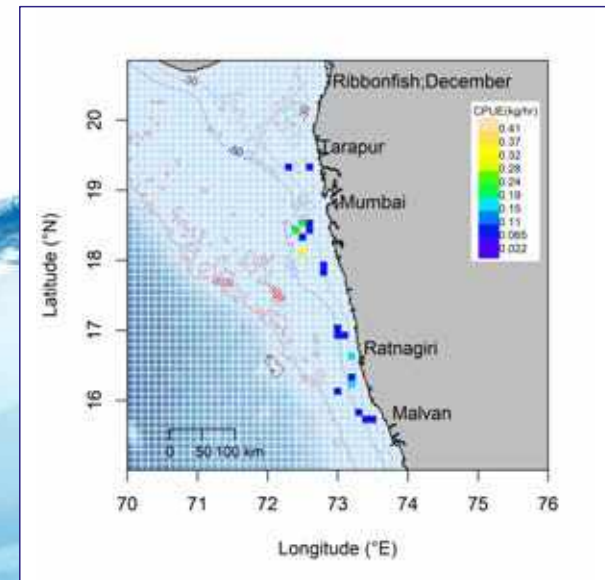
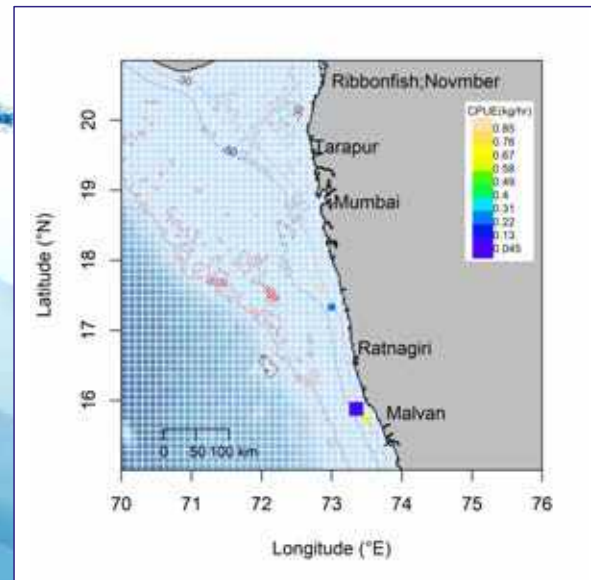
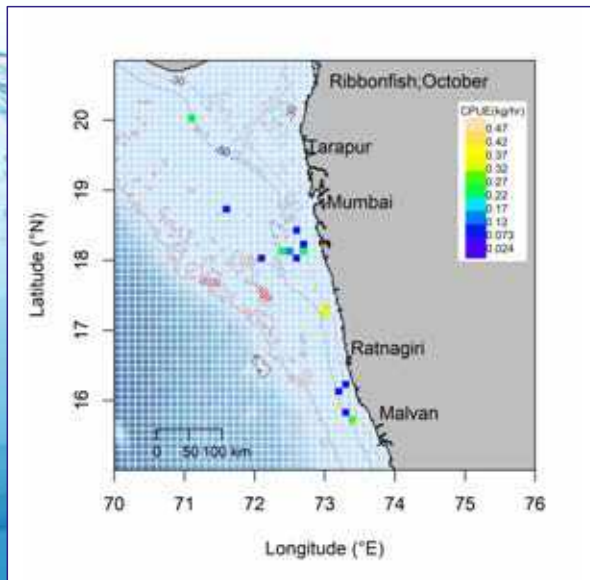
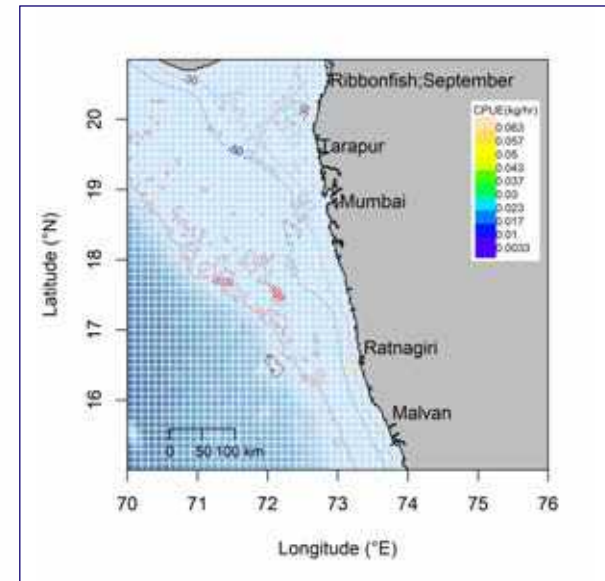
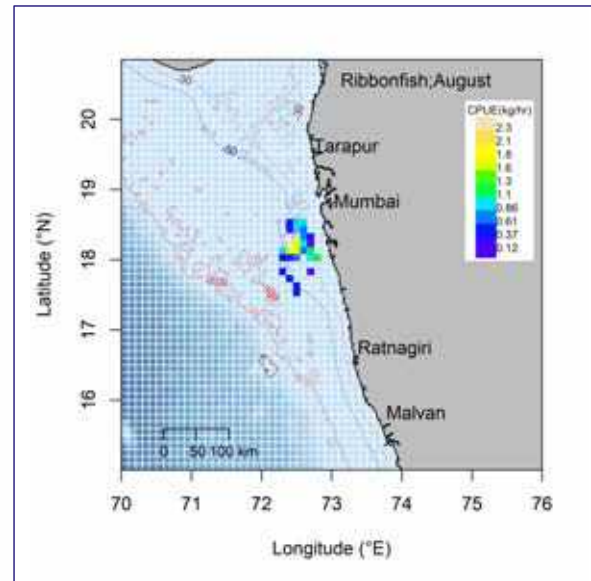
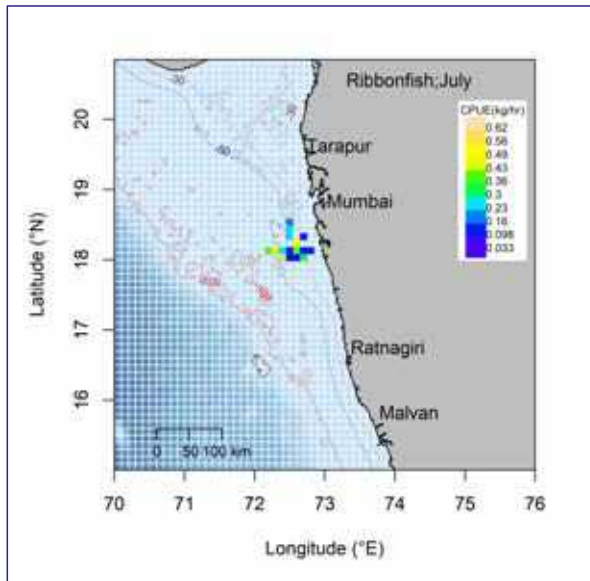




**Ribbonfish**

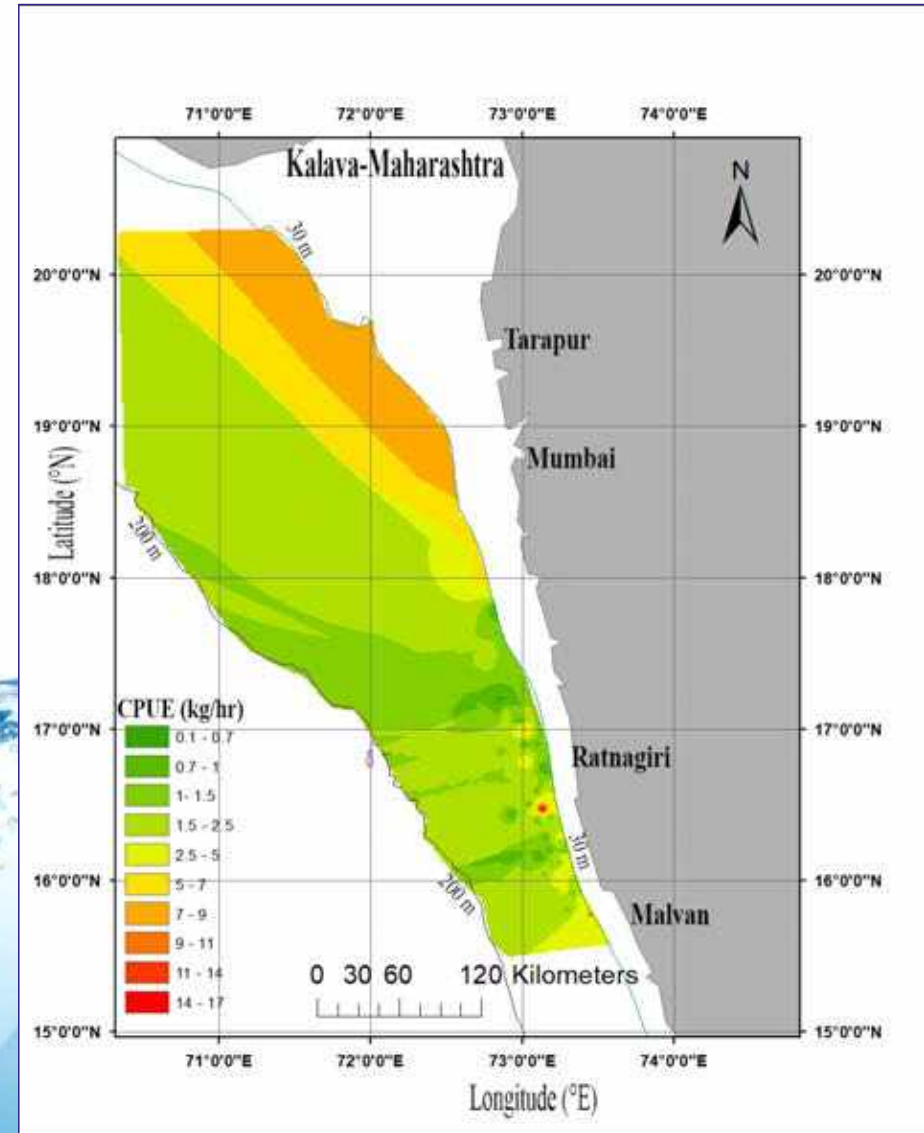




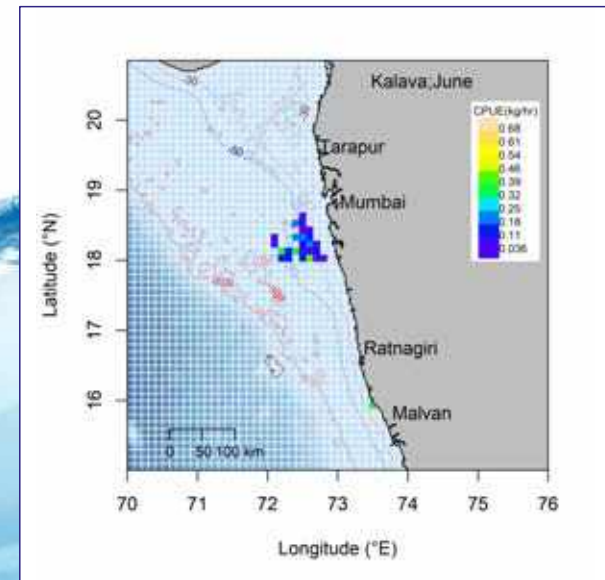
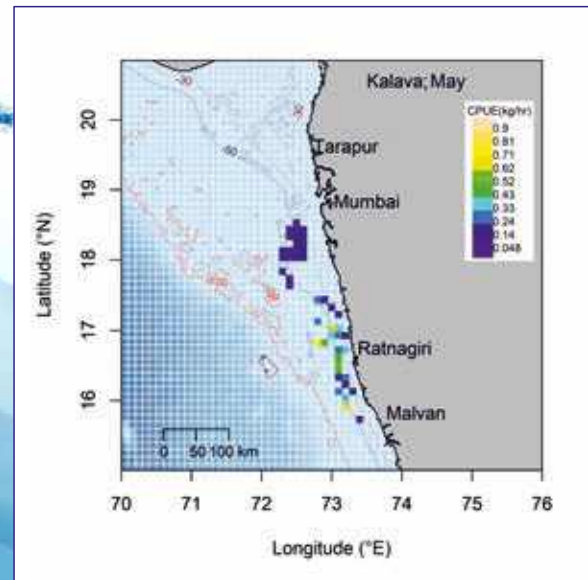
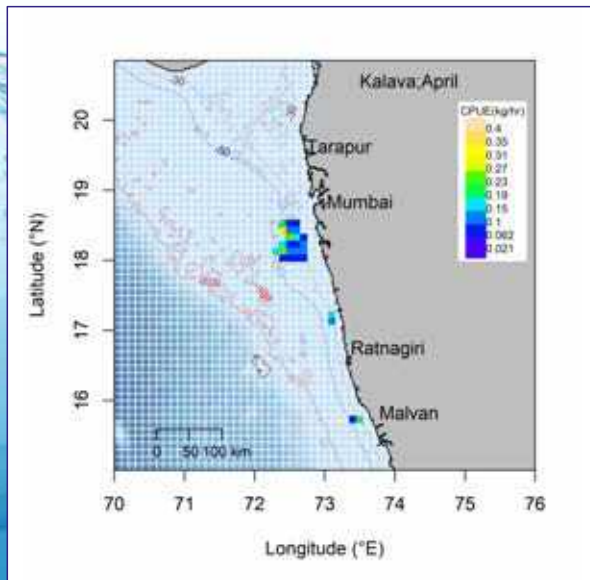
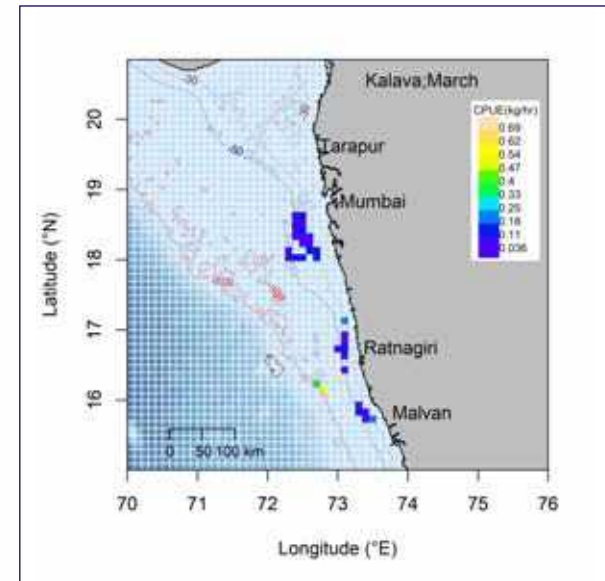
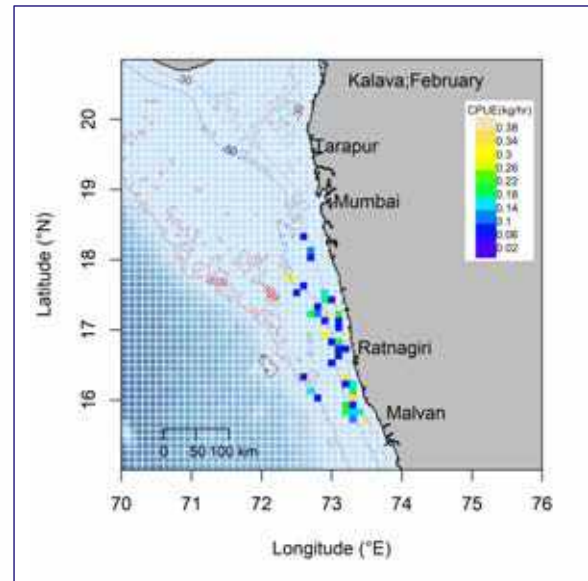
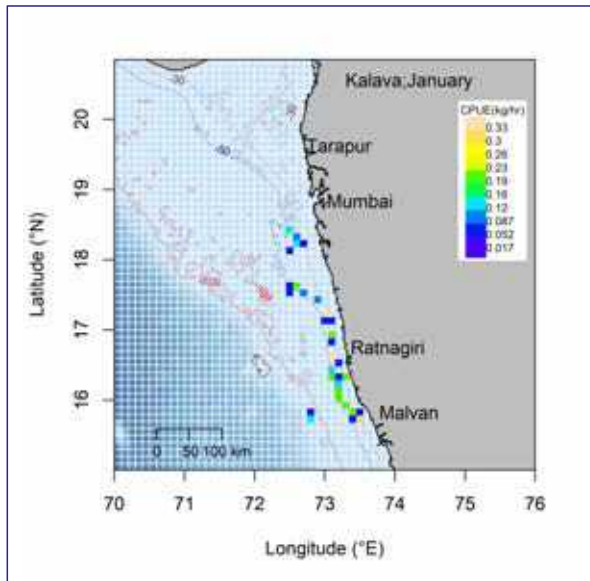


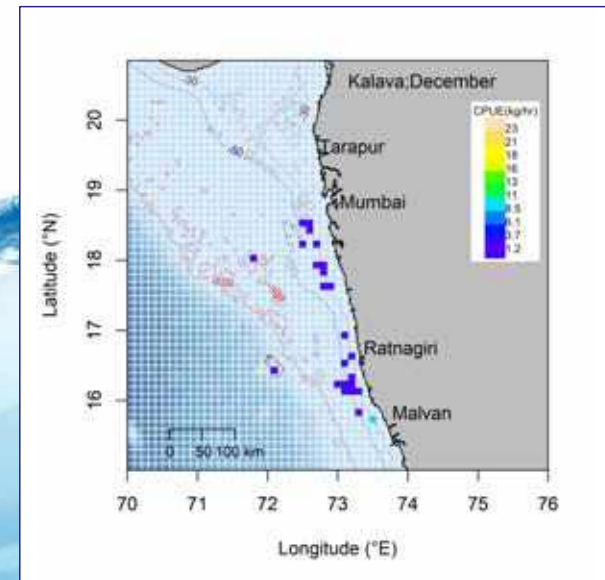
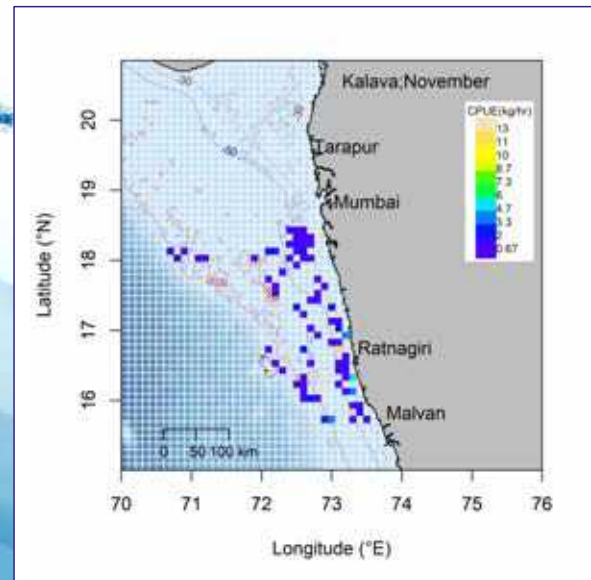
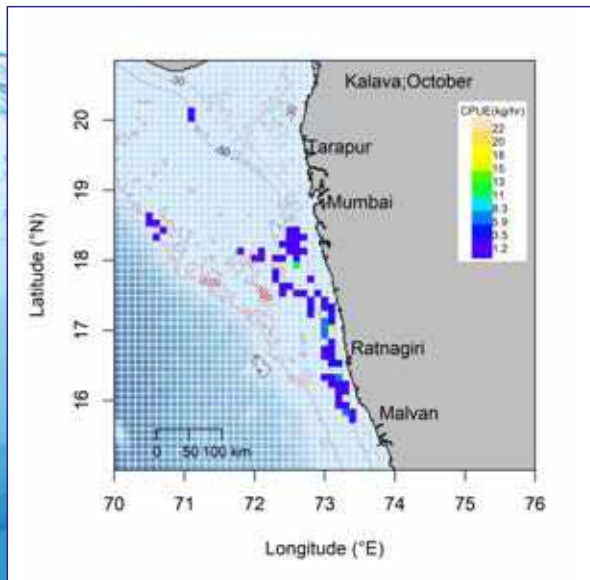
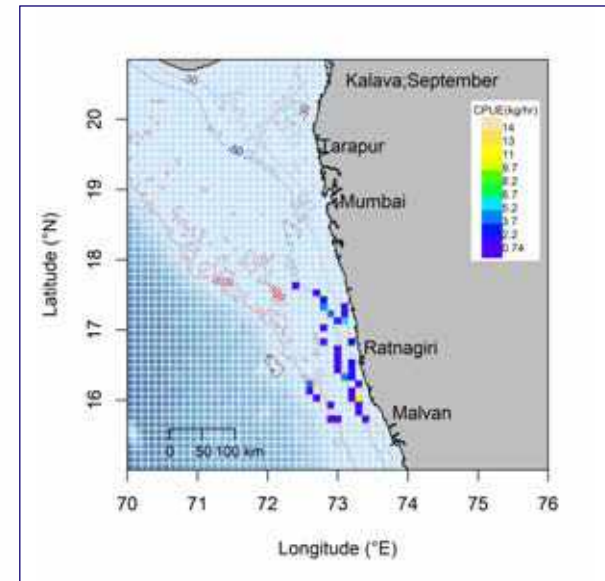
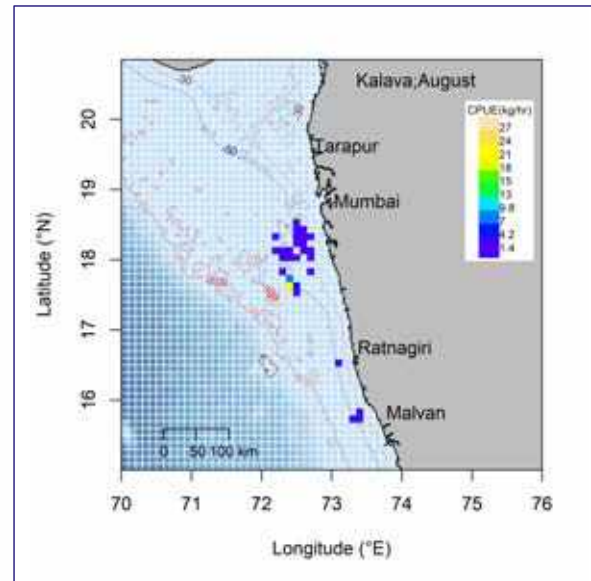
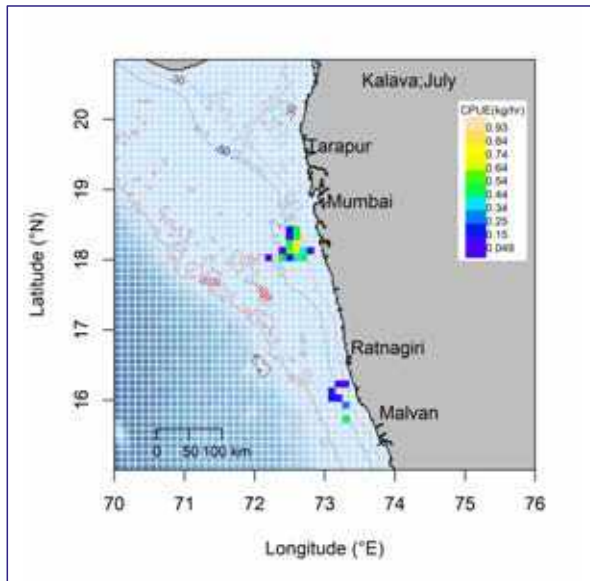


## Groupers (Kalava)



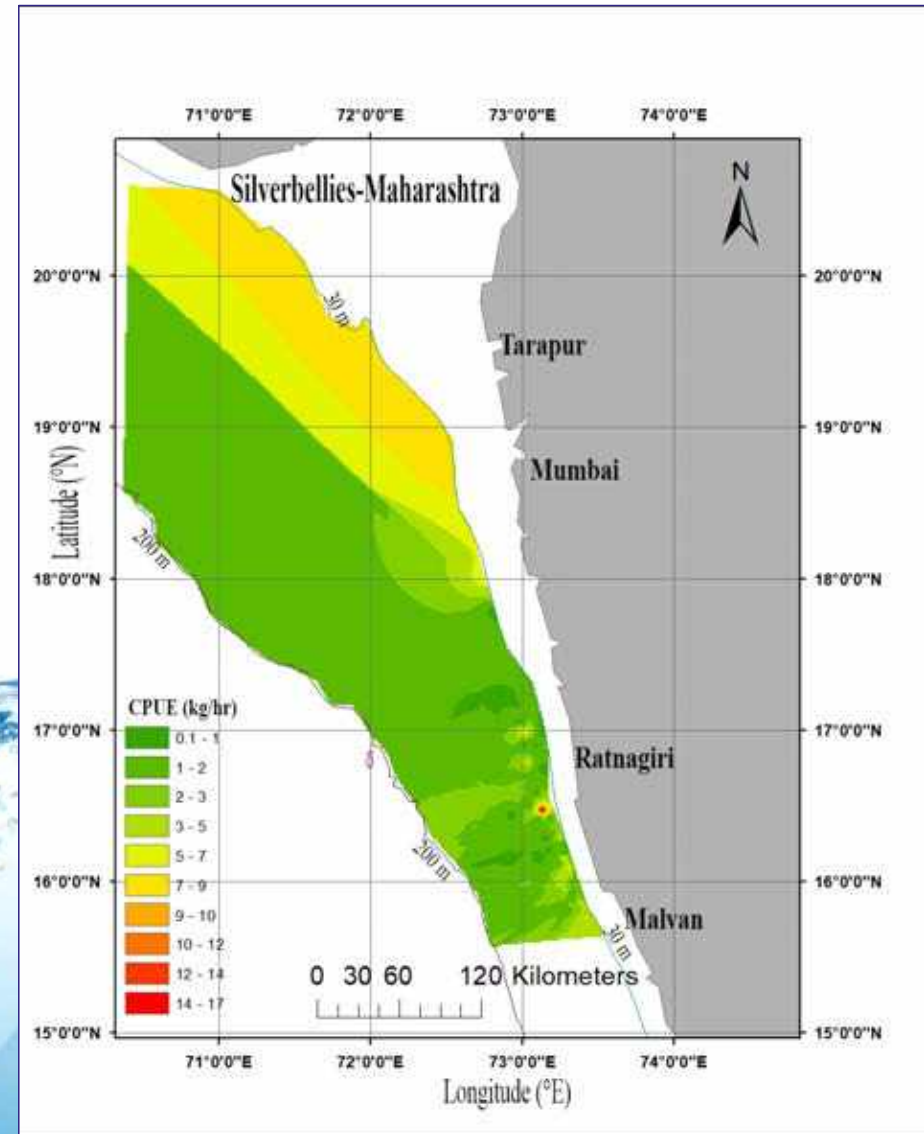


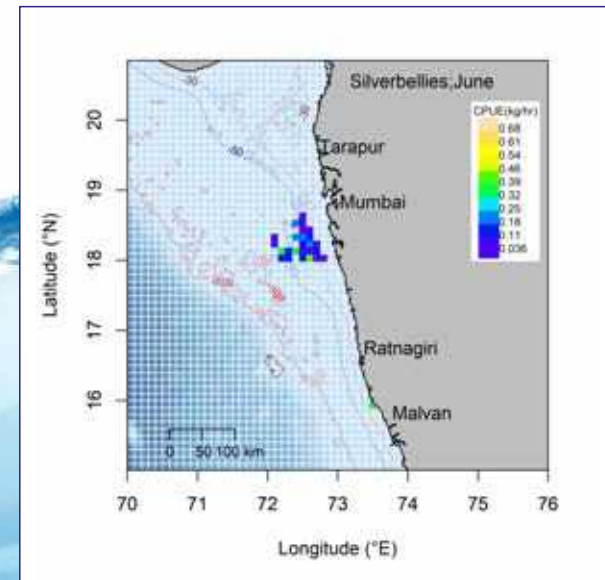
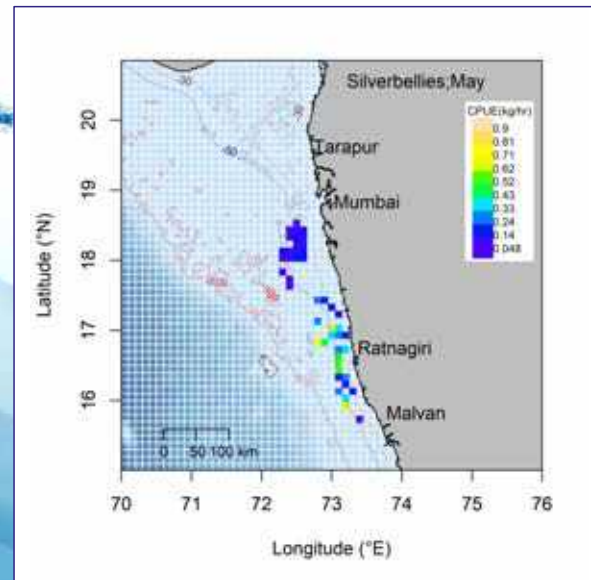
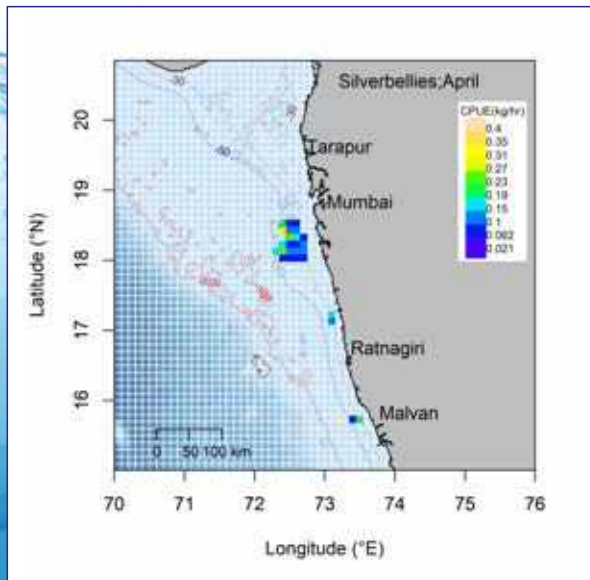
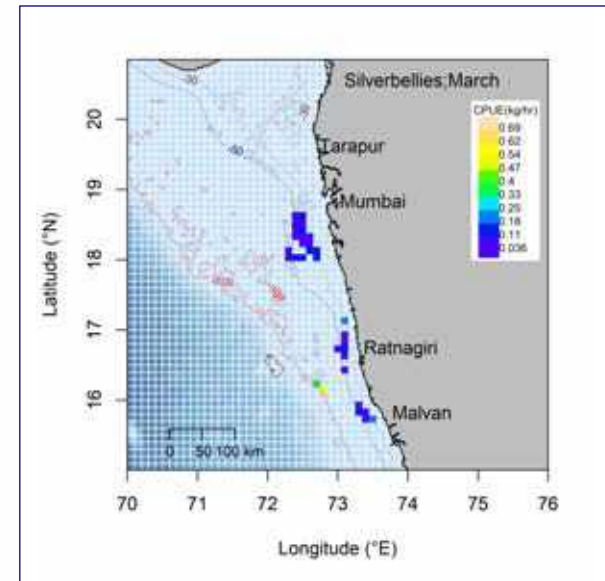
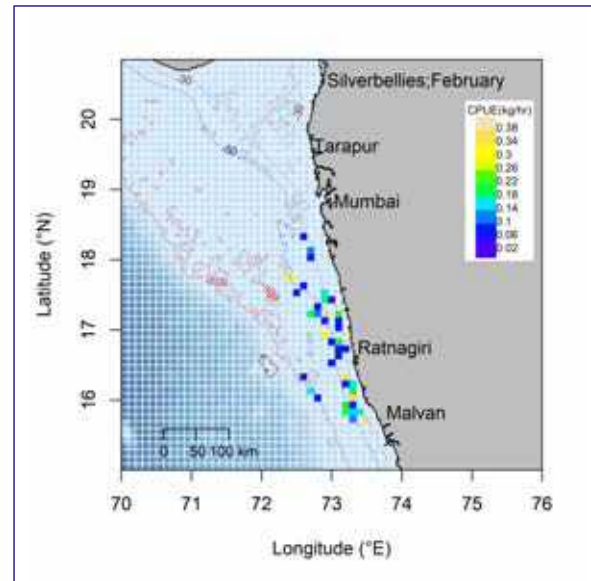
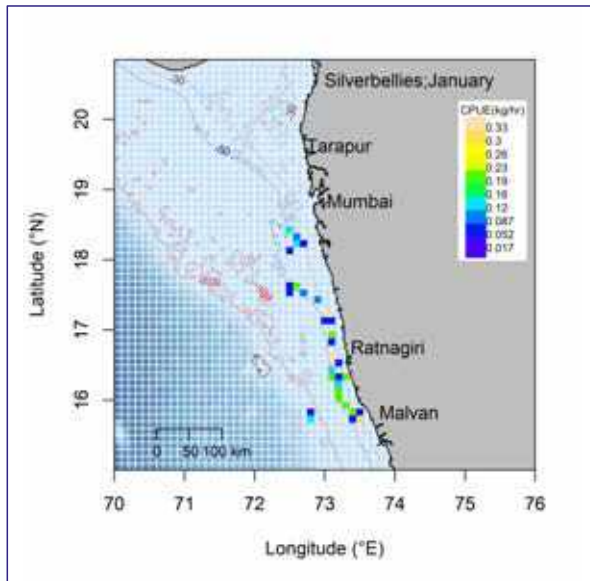


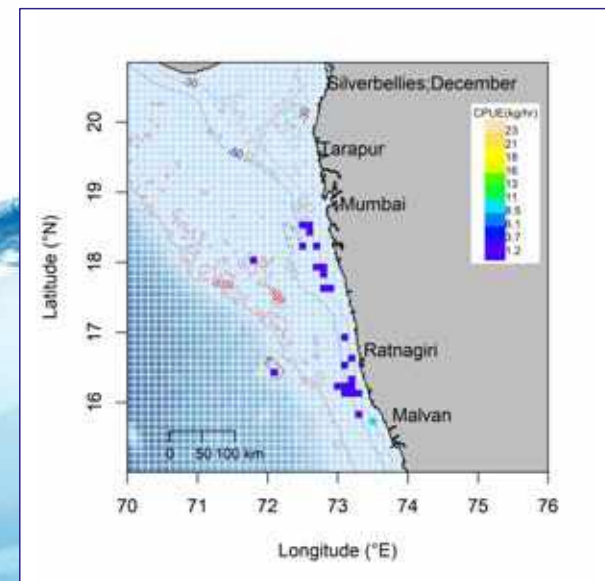
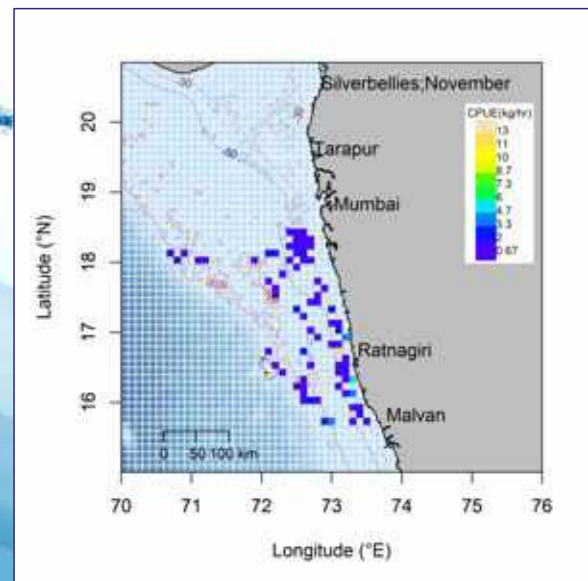
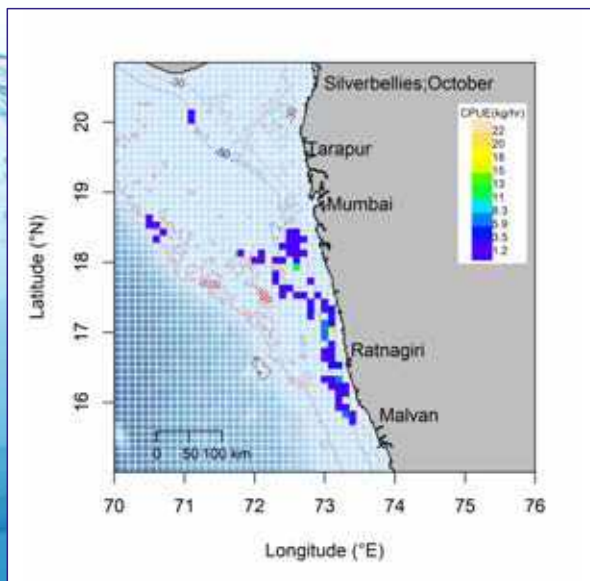
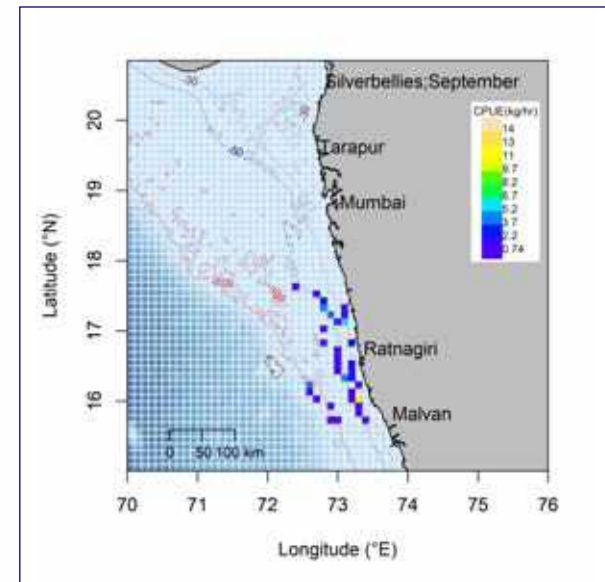
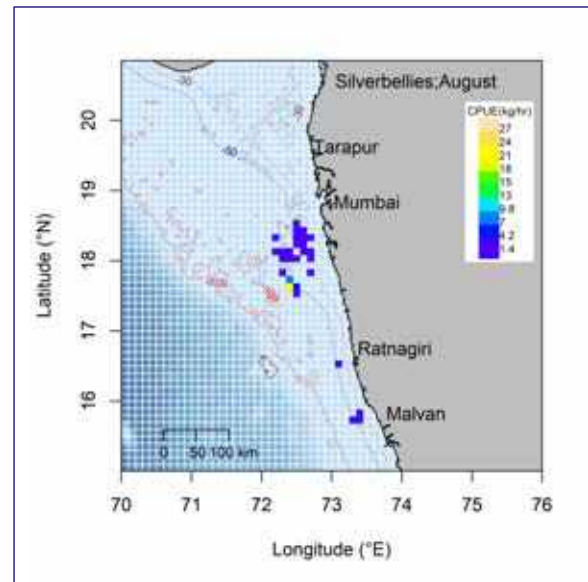
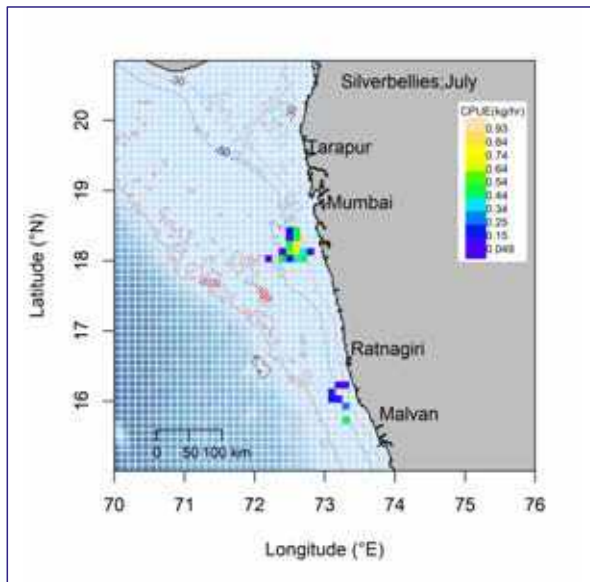


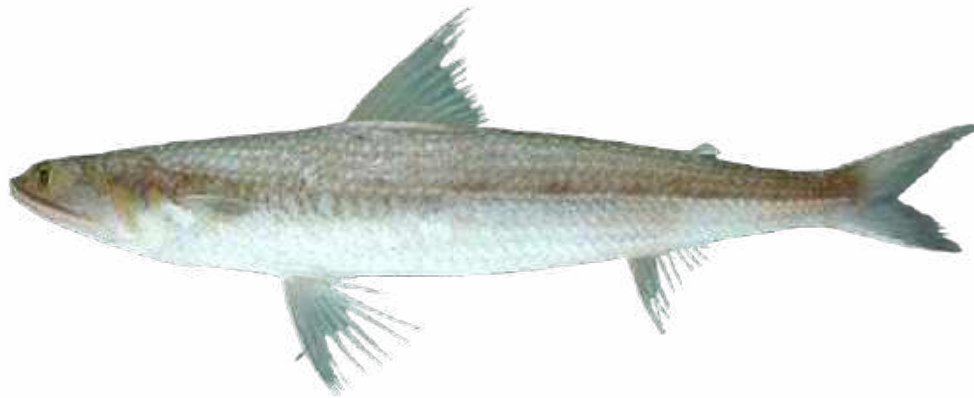


# Silverbellies

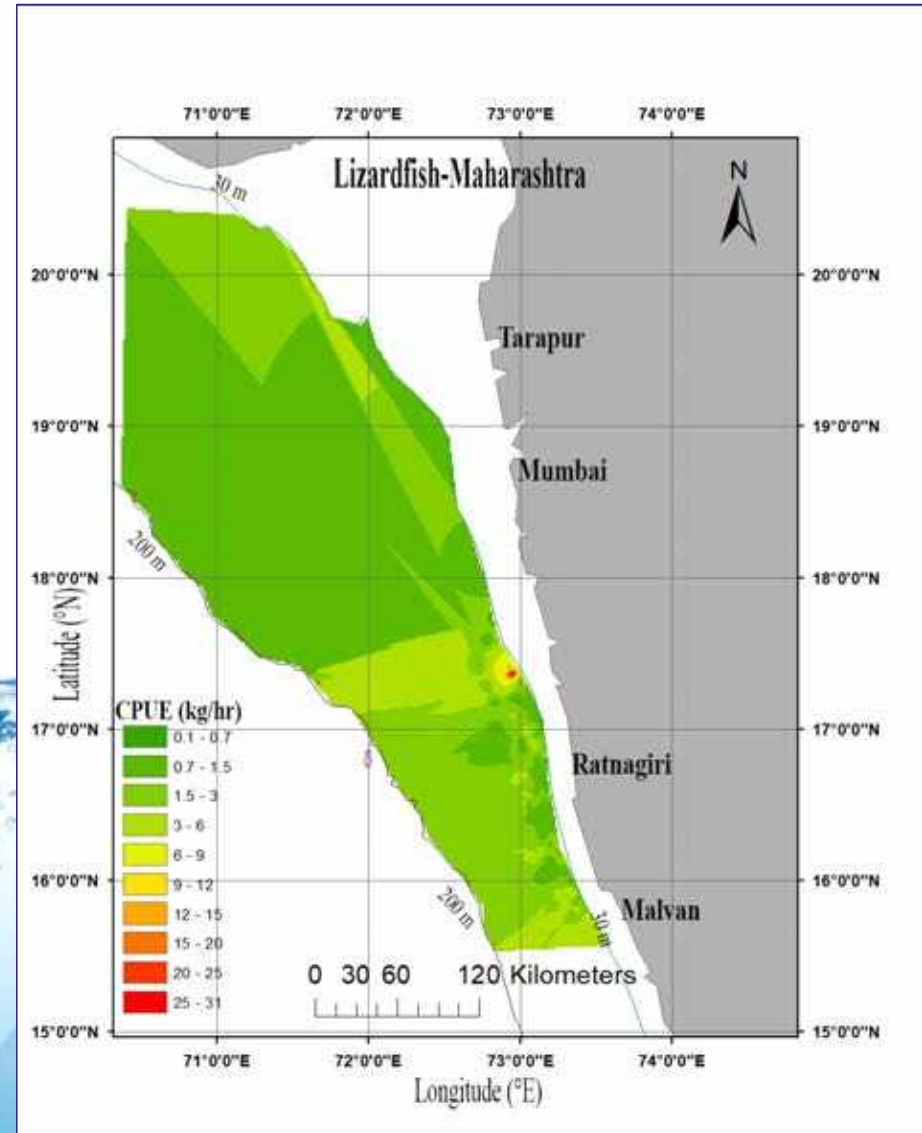


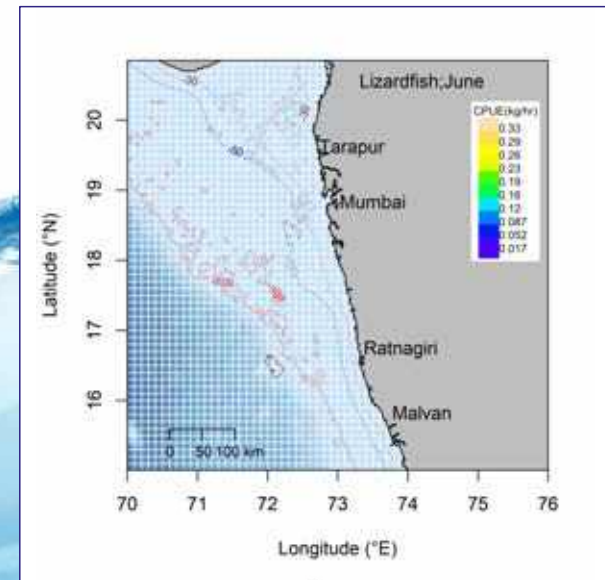
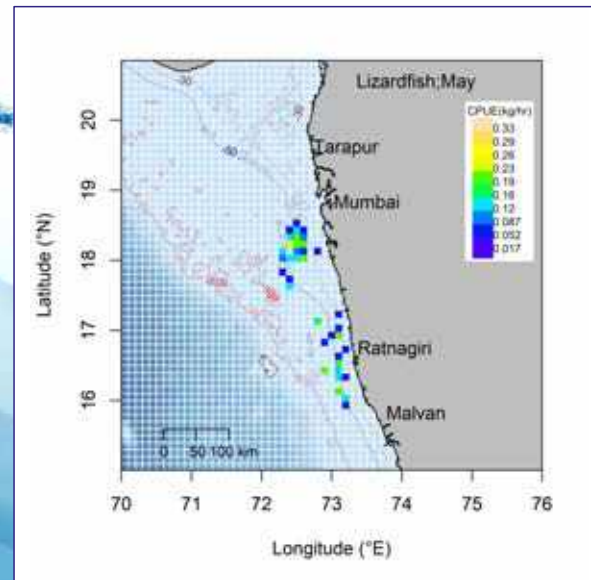
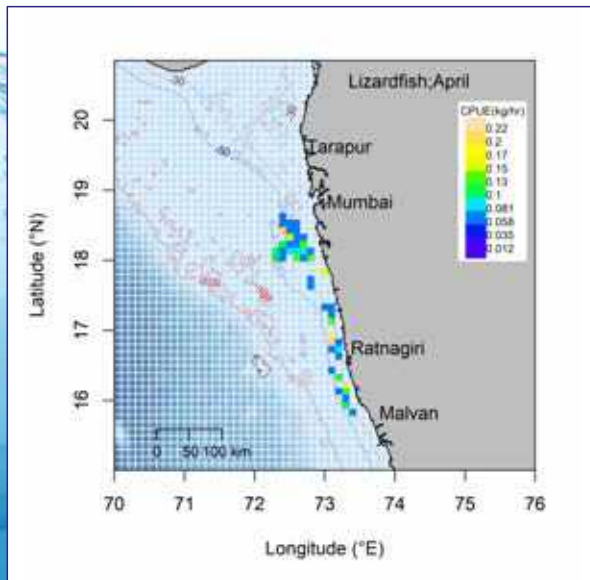
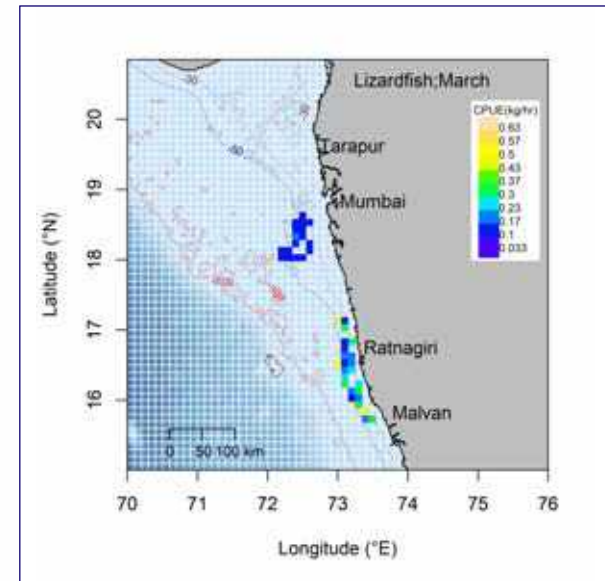
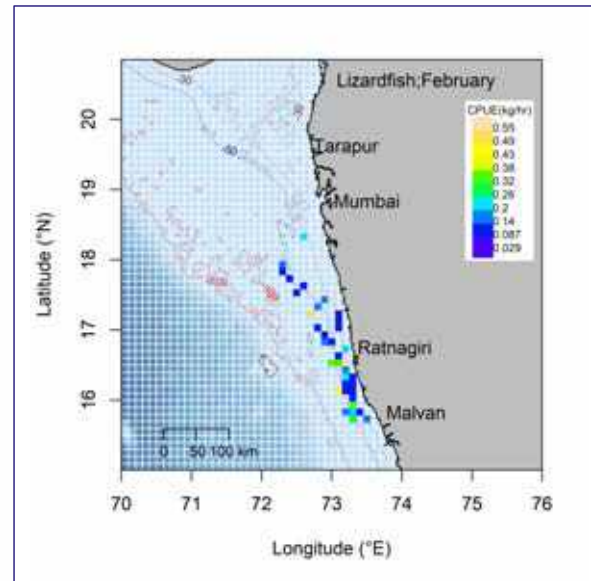
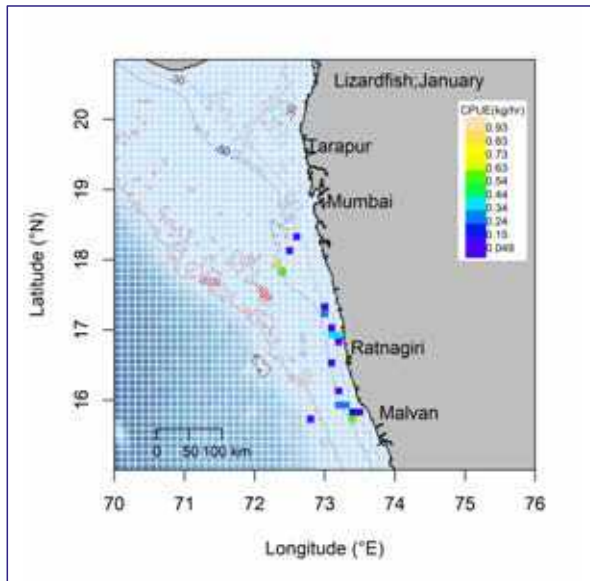


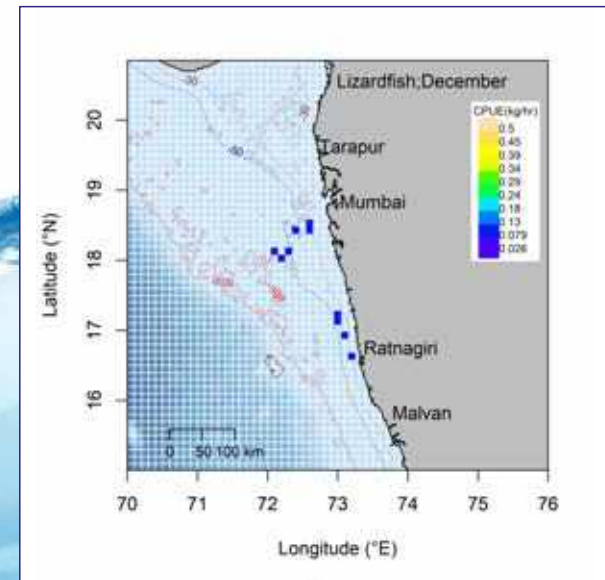
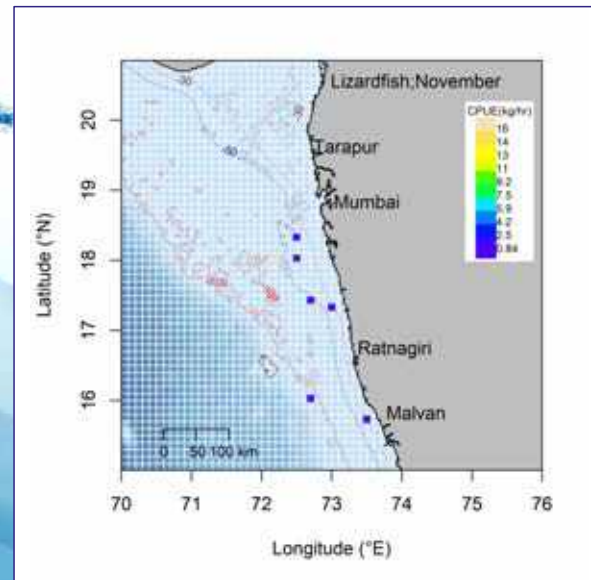
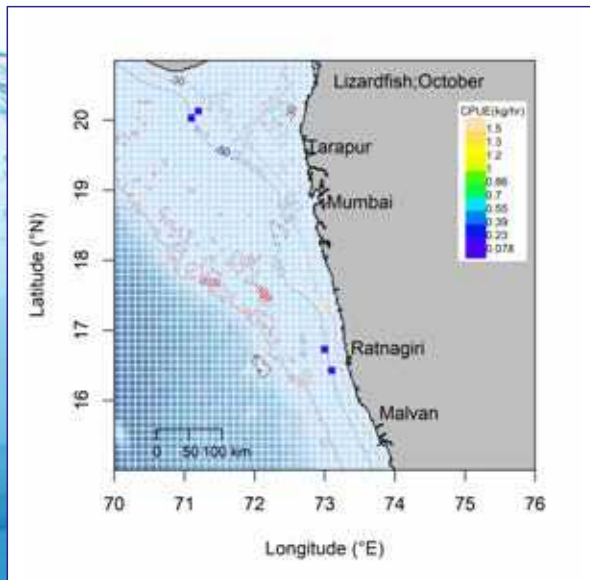
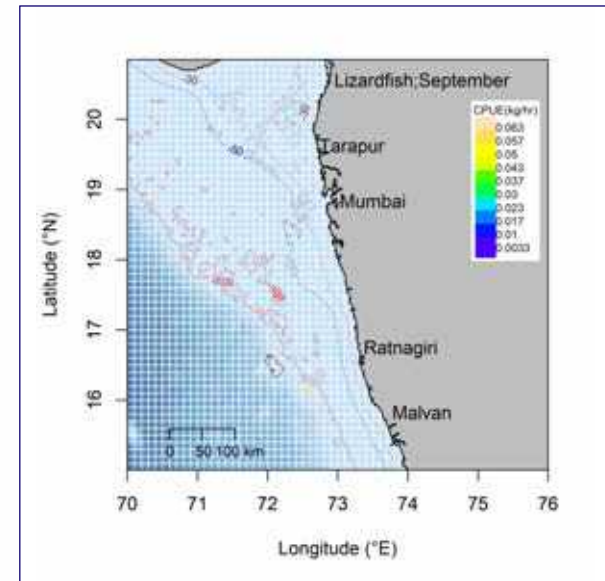
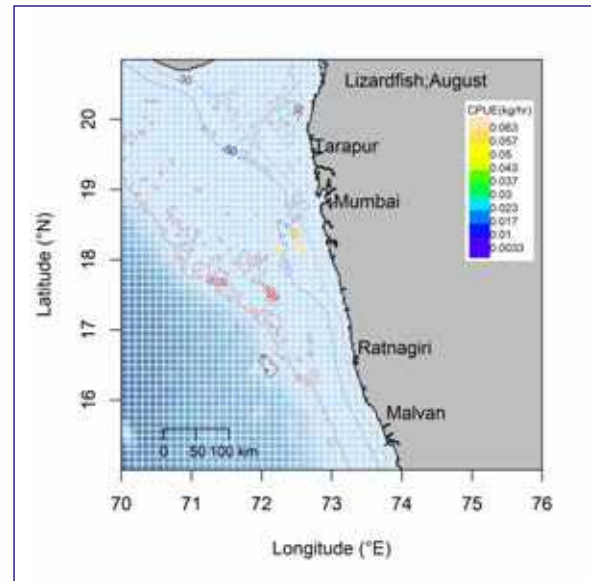
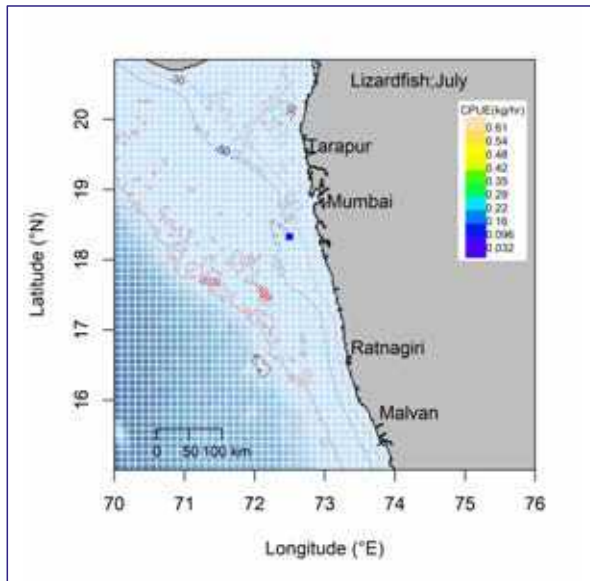




**Lizard Fish**



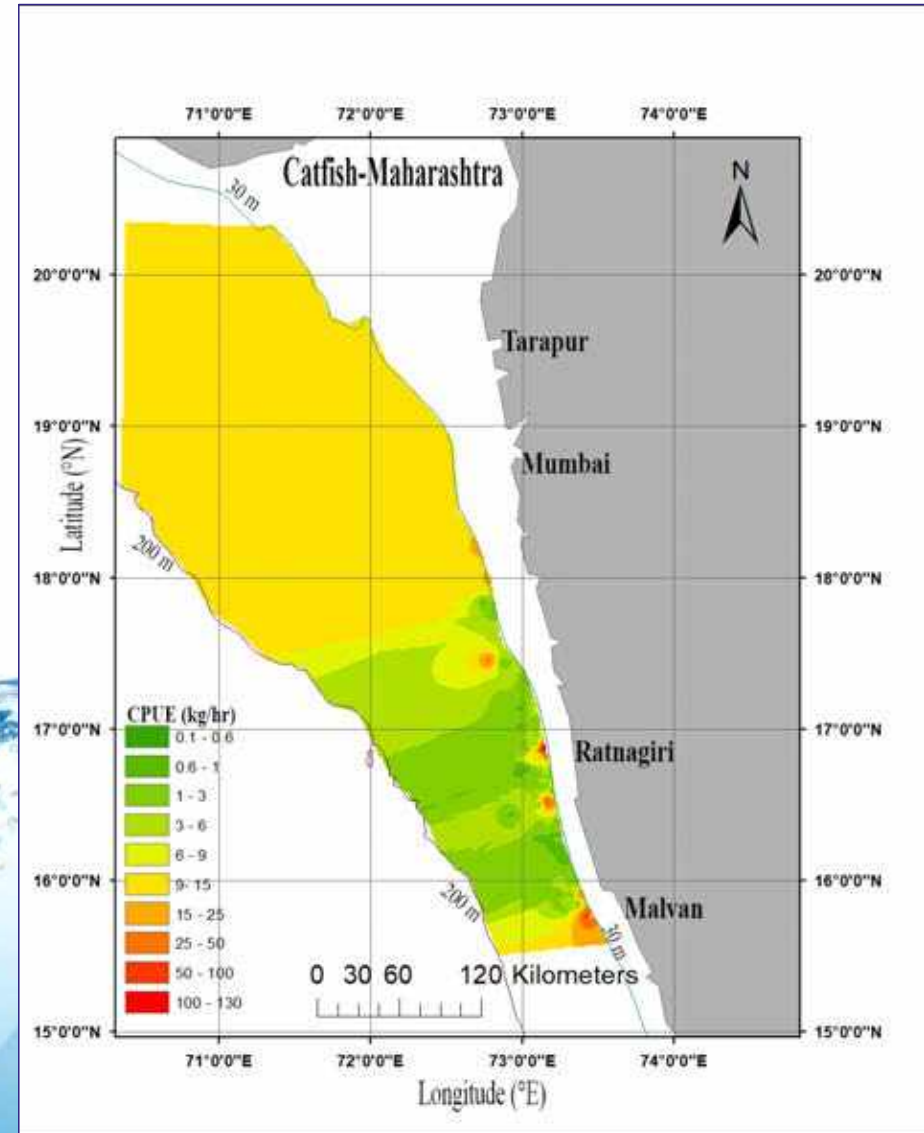


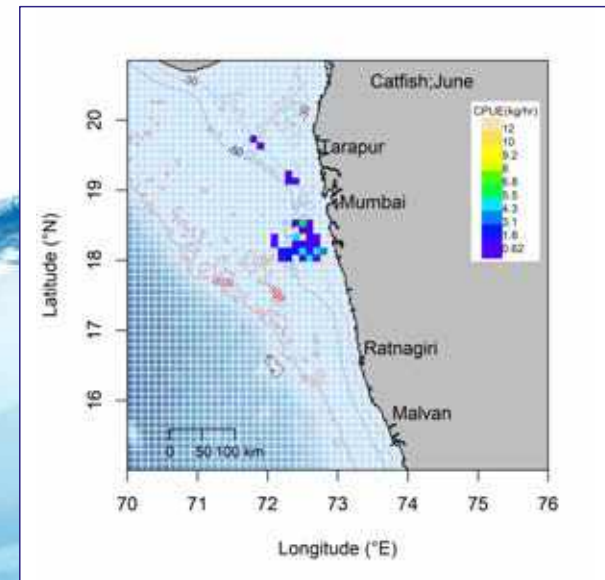
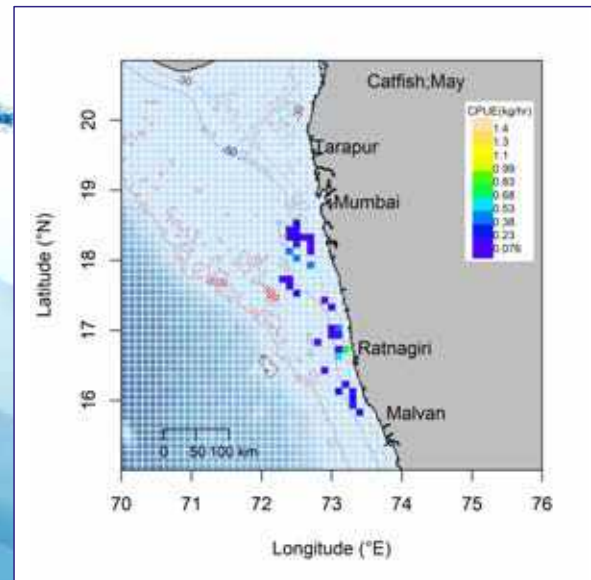
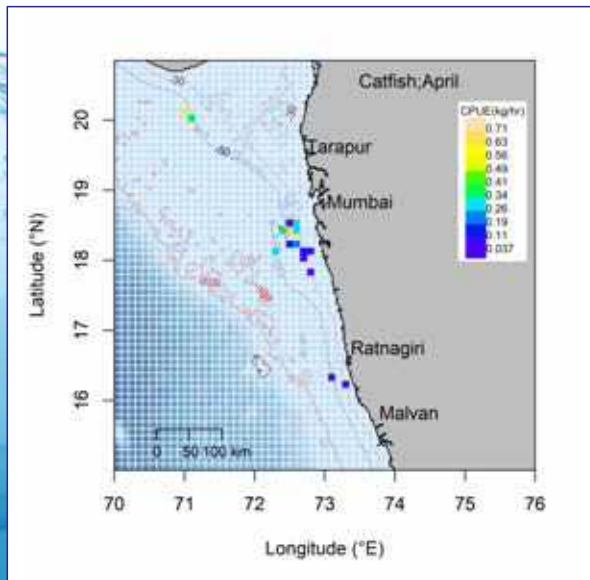
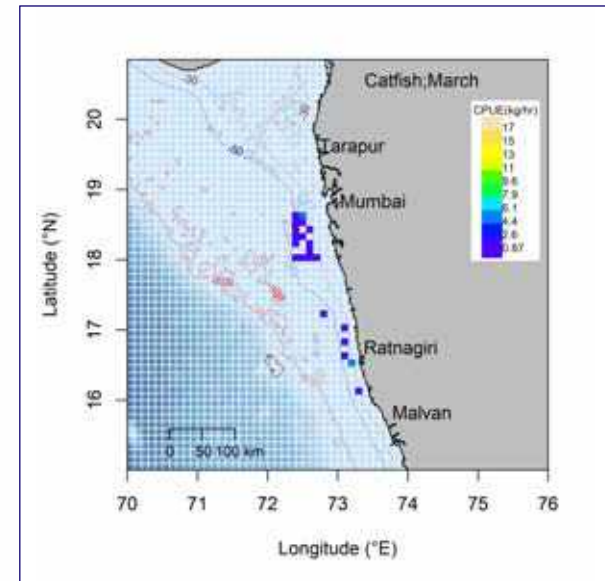
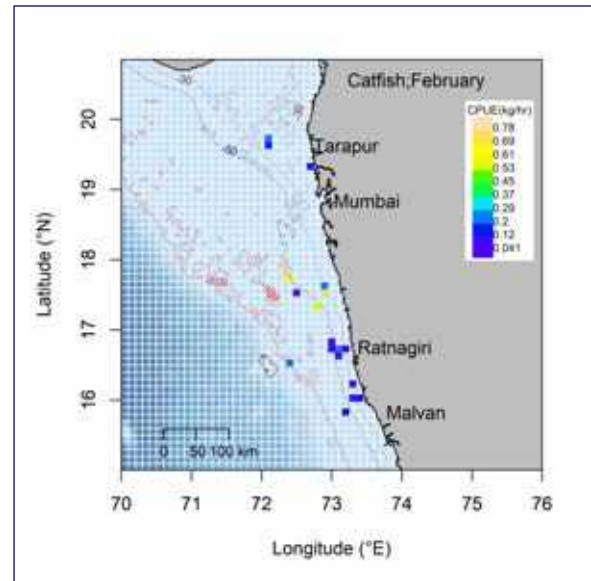
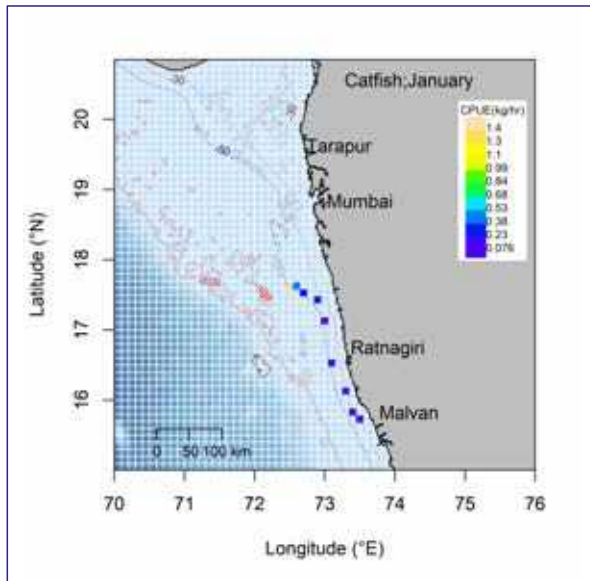


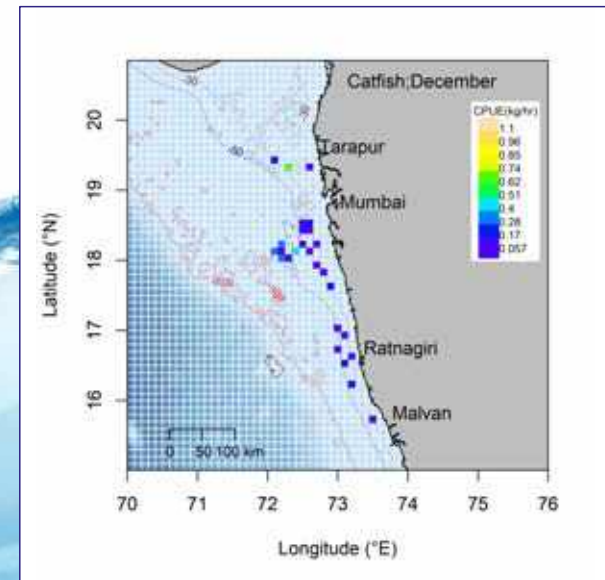
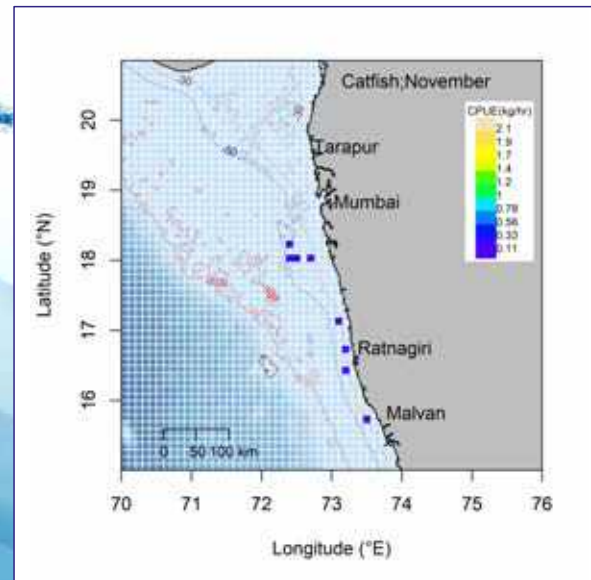
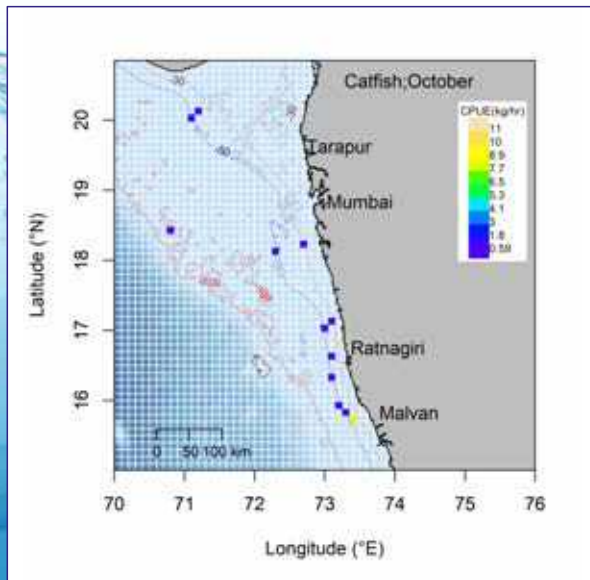
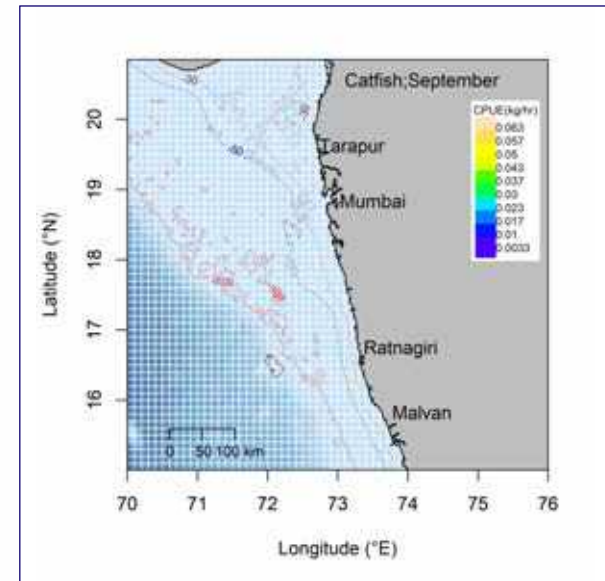
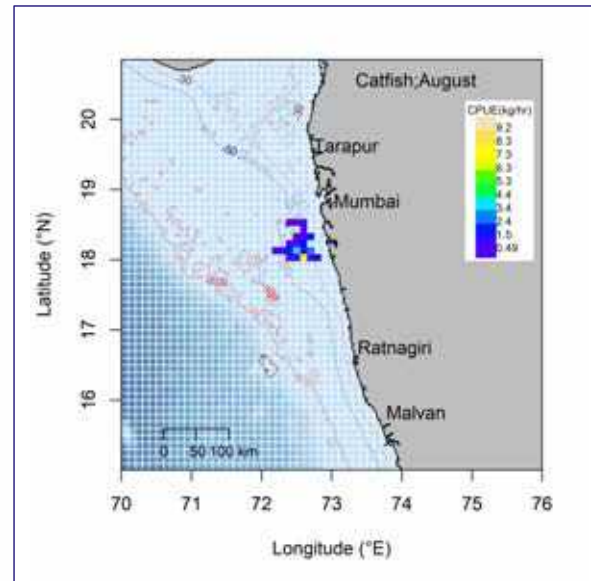
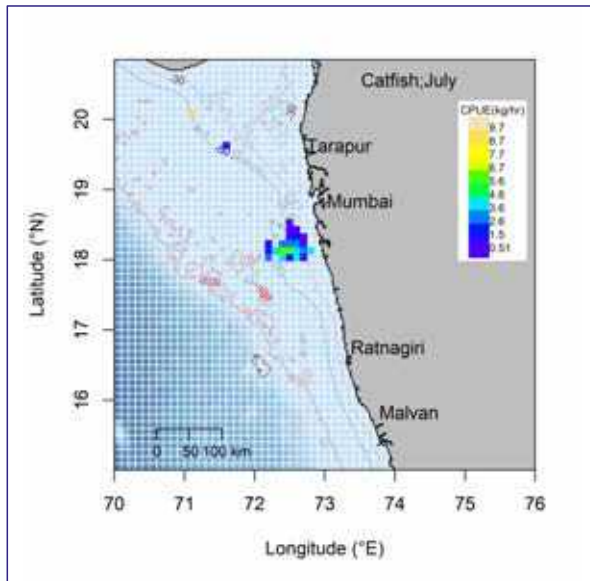


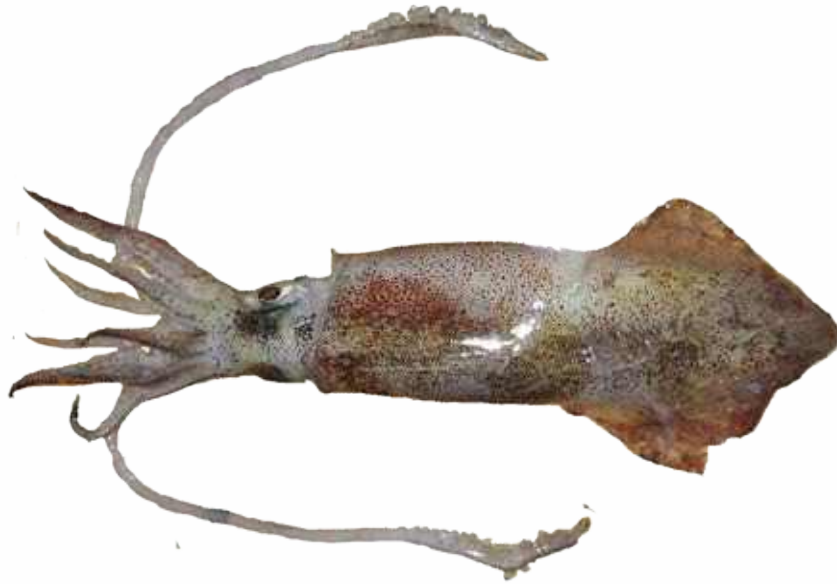


Cat Fish

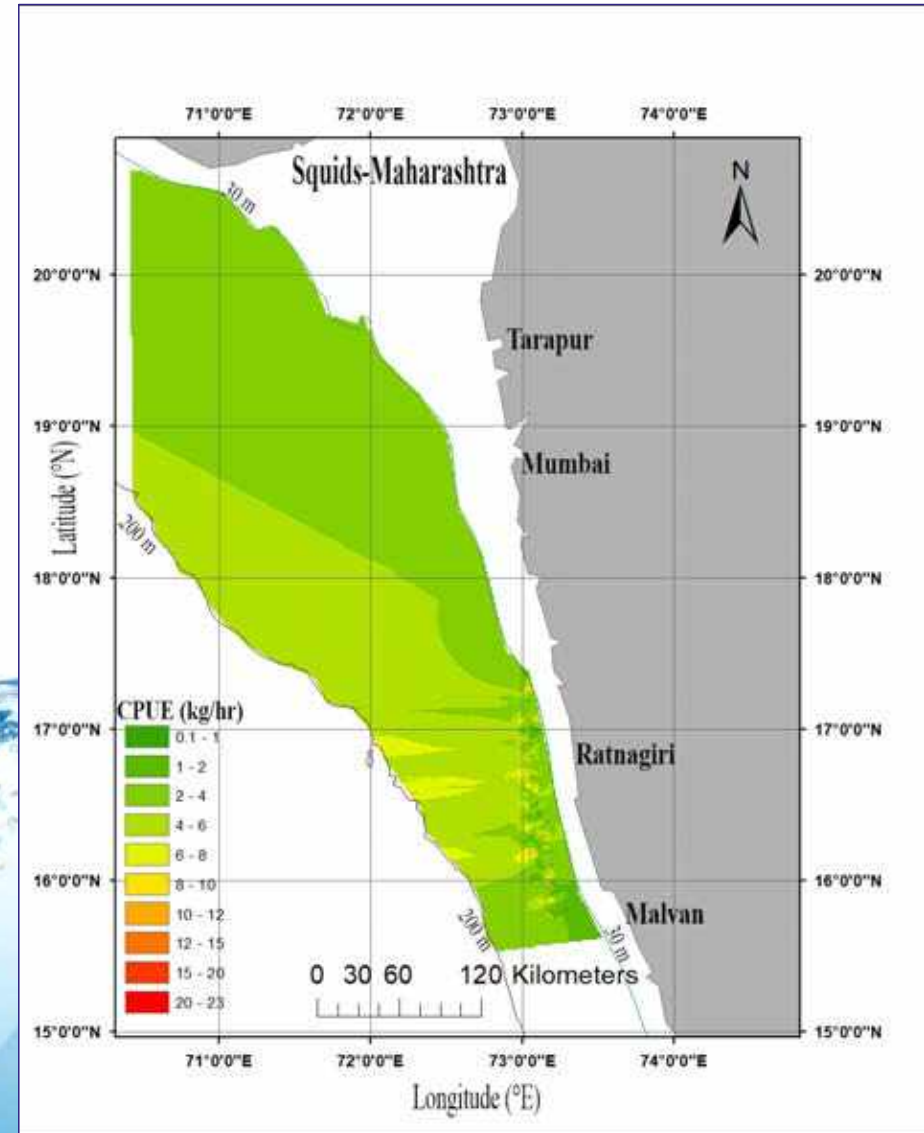


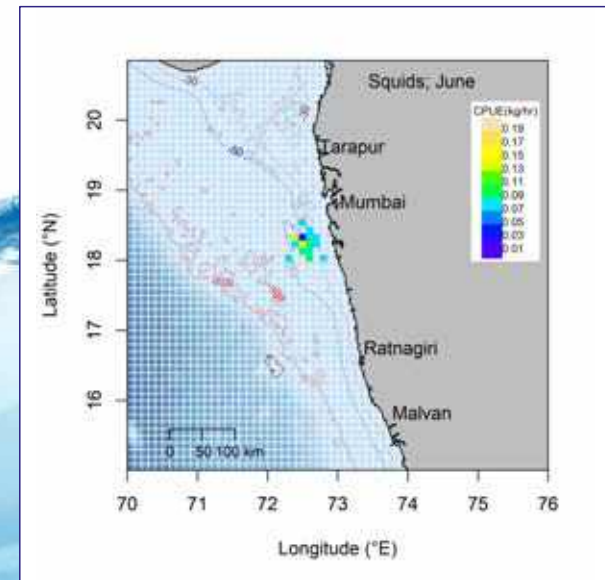
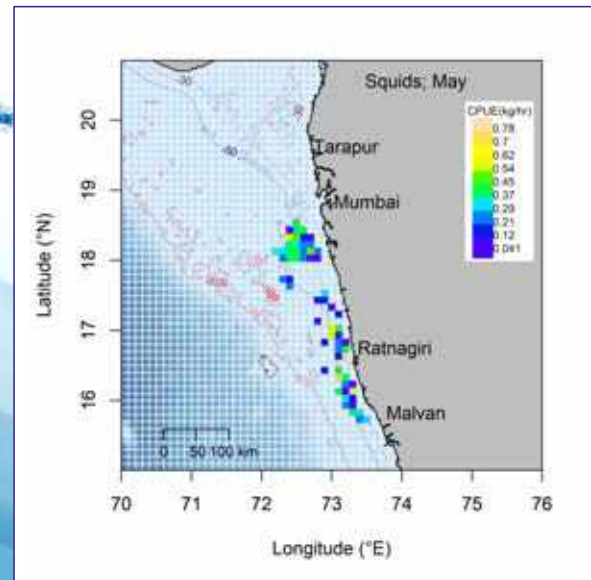
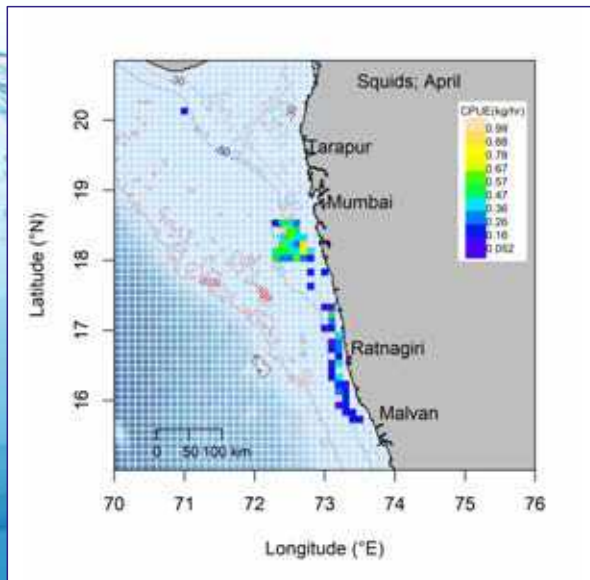
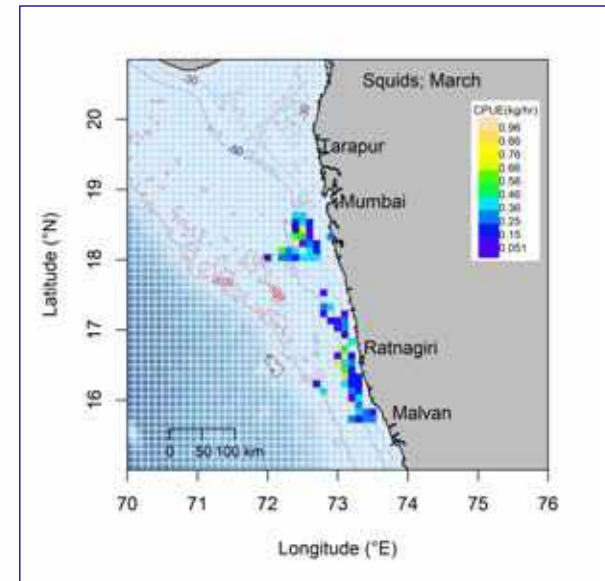
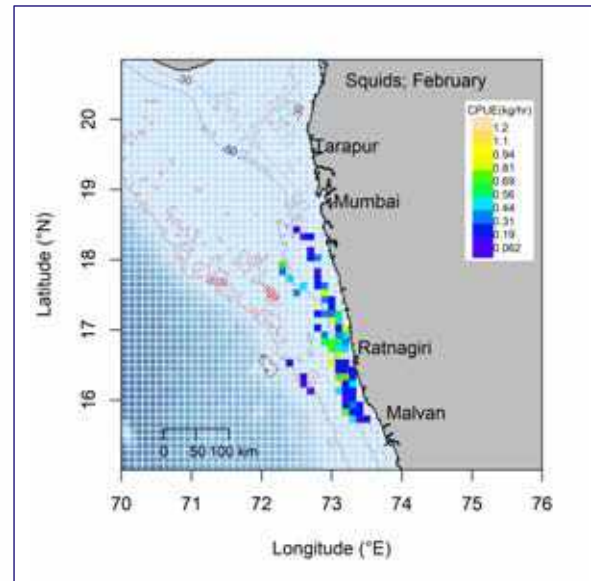
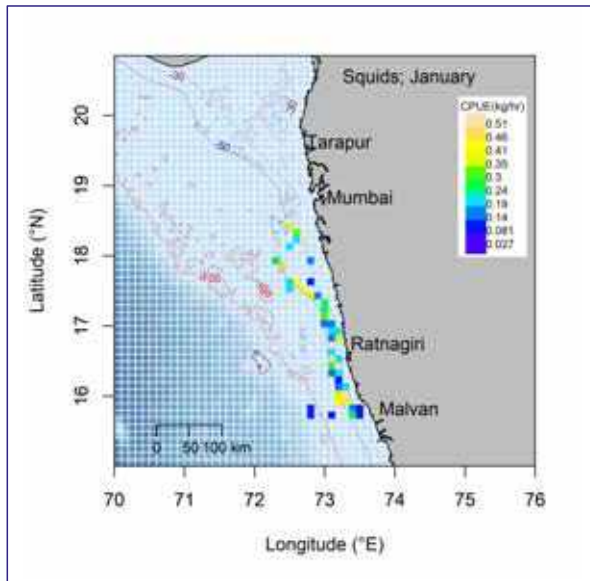


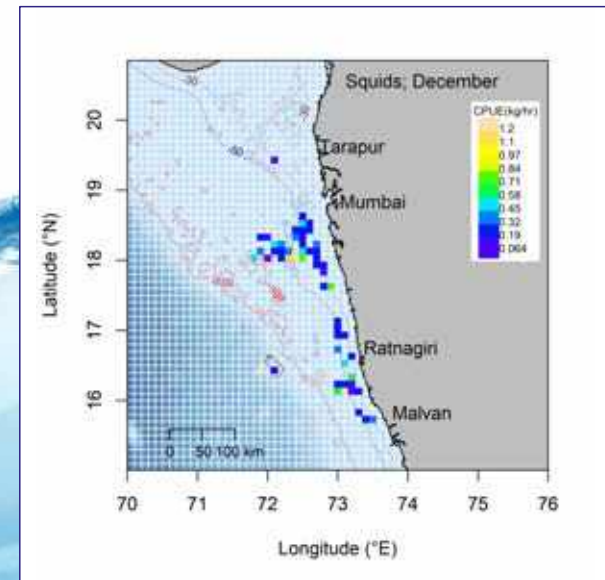
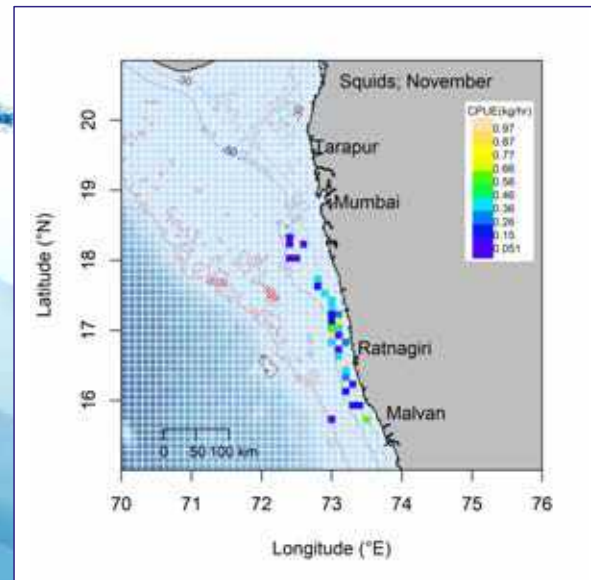
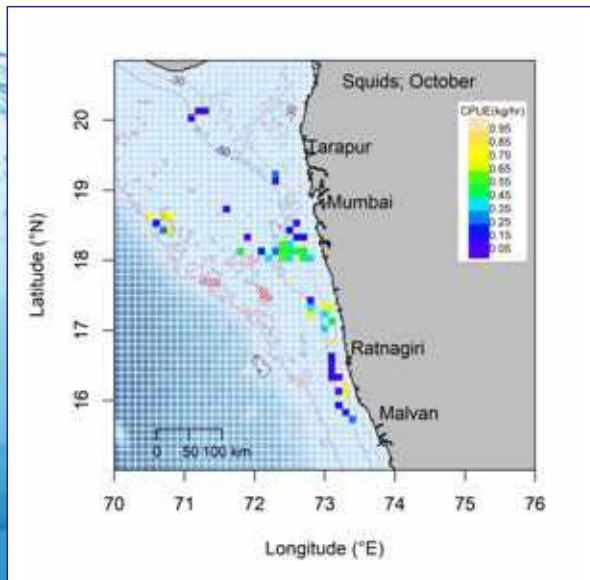
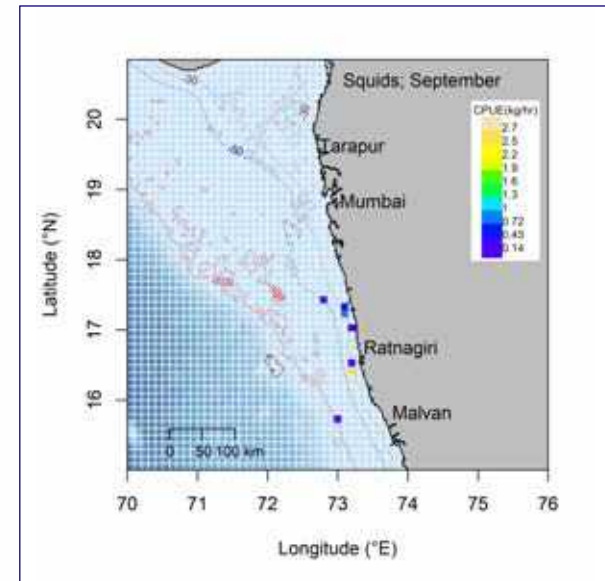
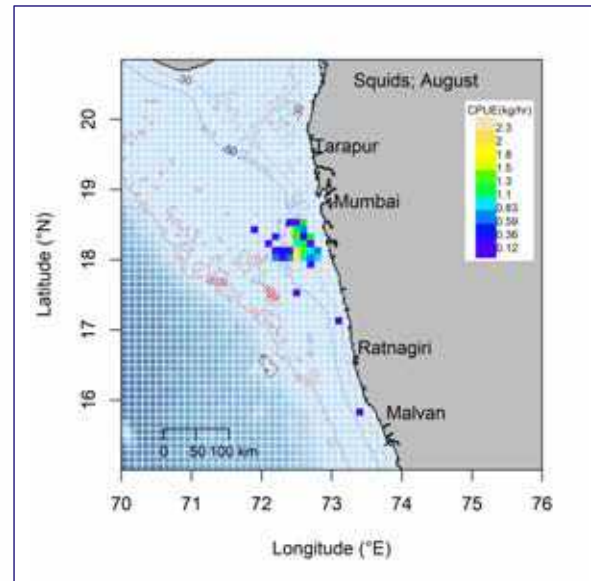
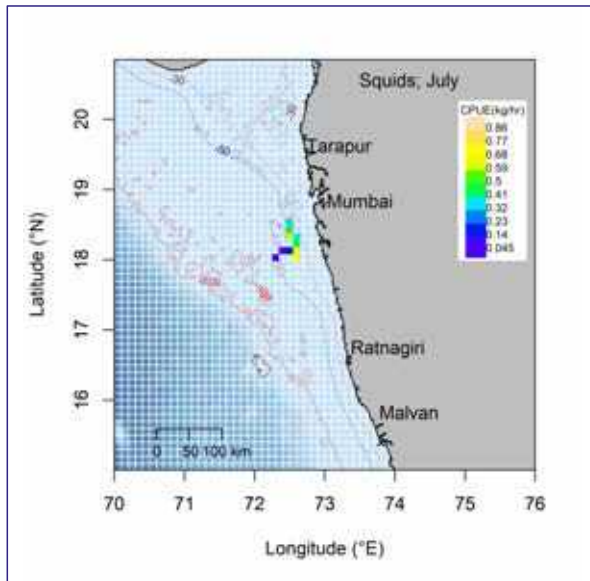




# Squids





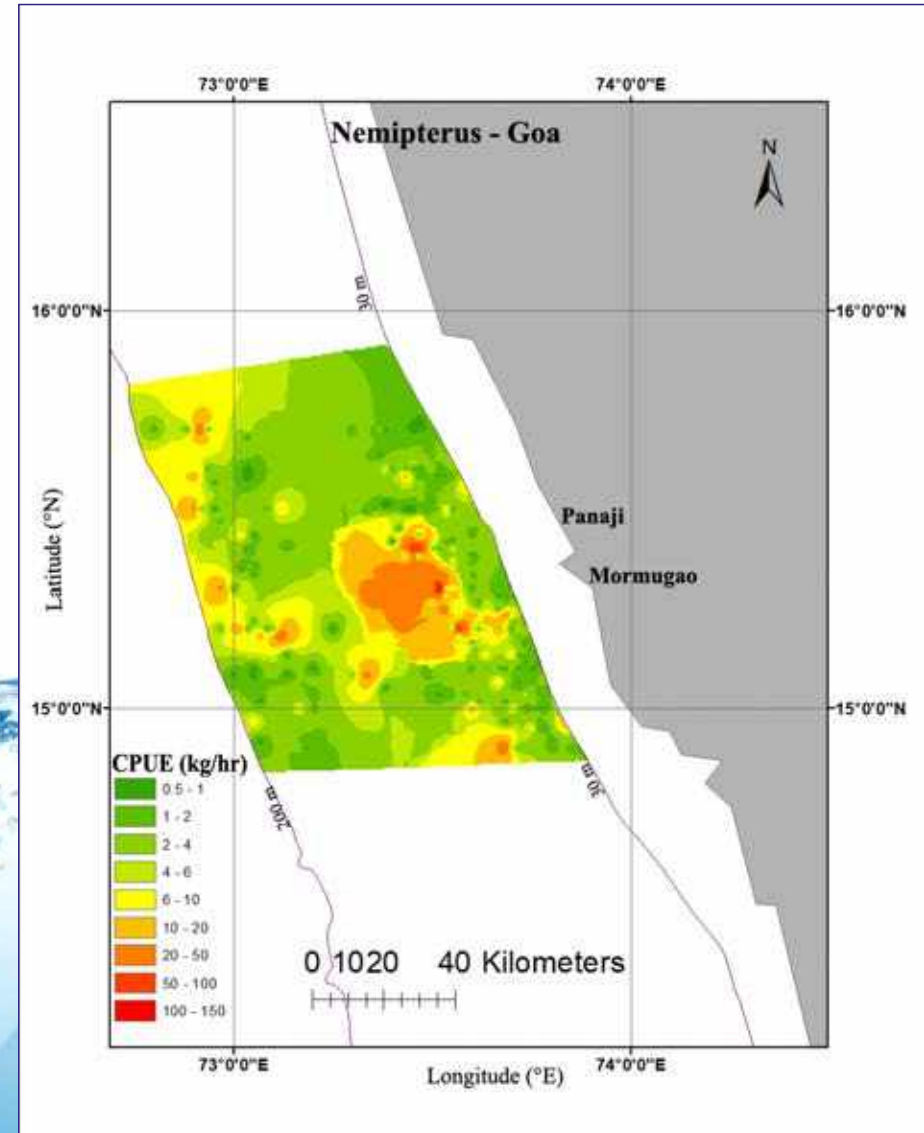


## **3.3** Spatial distribution and abundance along Goa coast

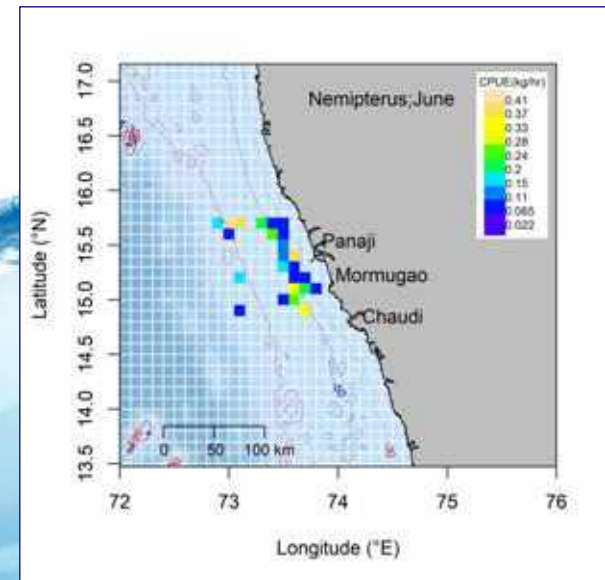
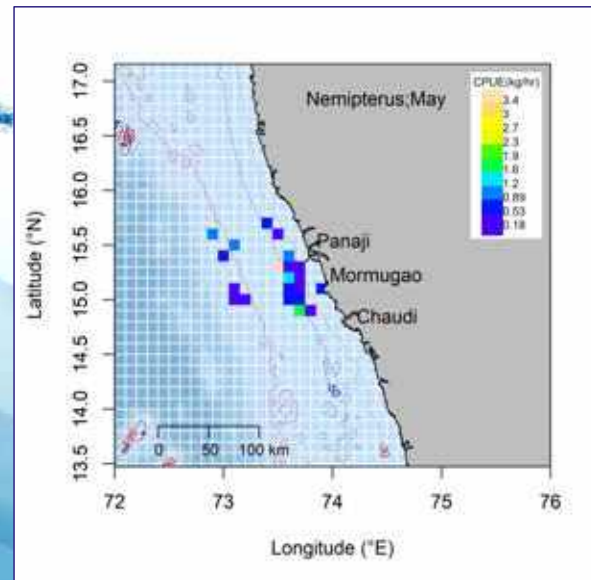
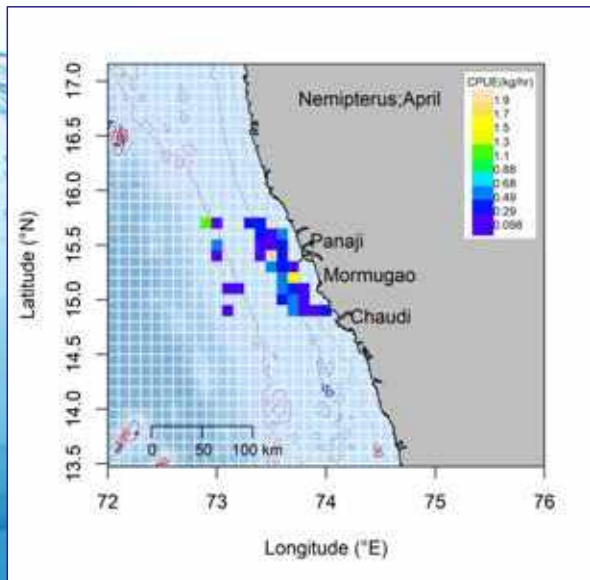
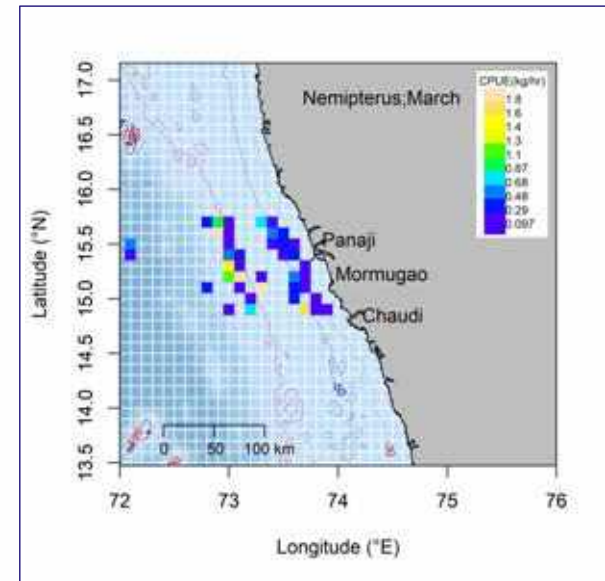
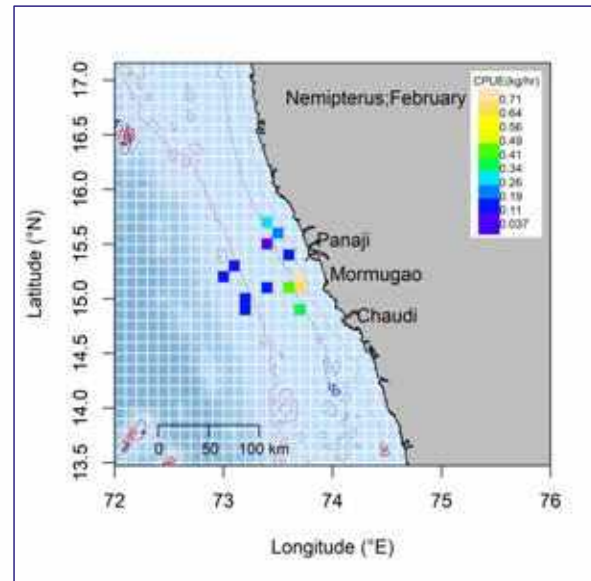
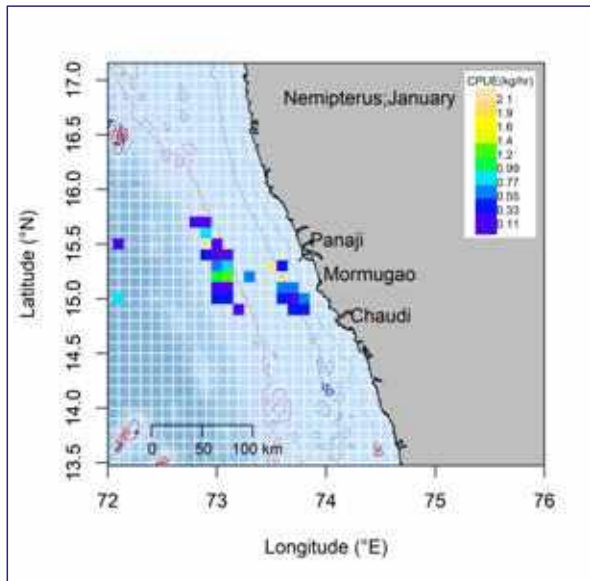


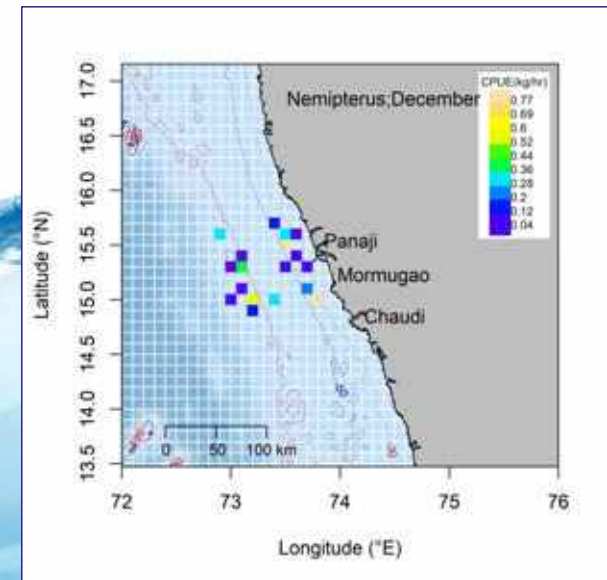
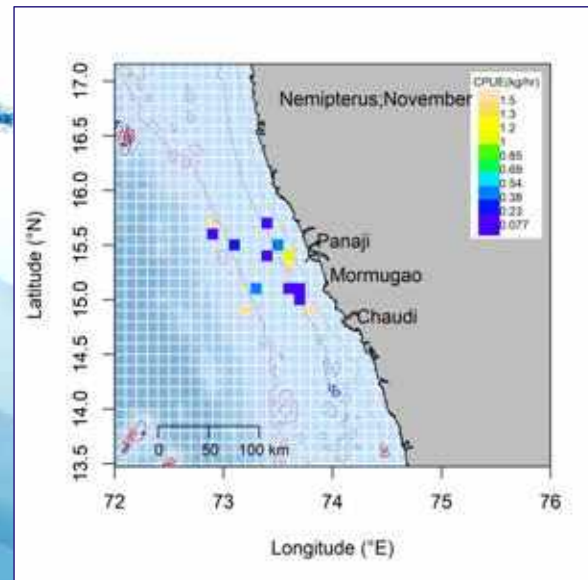
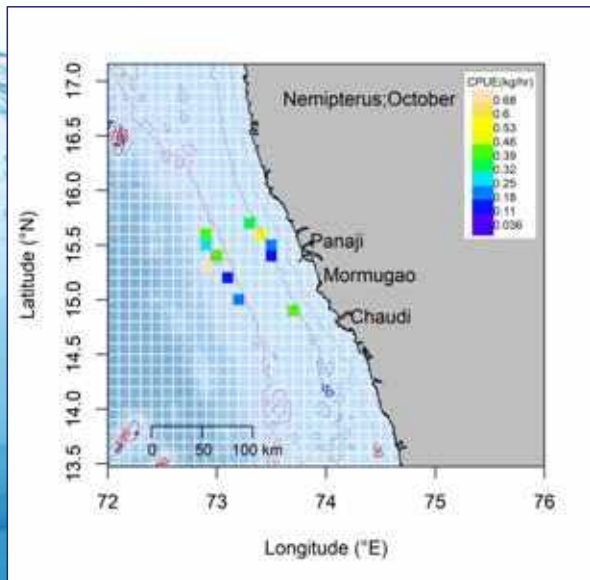
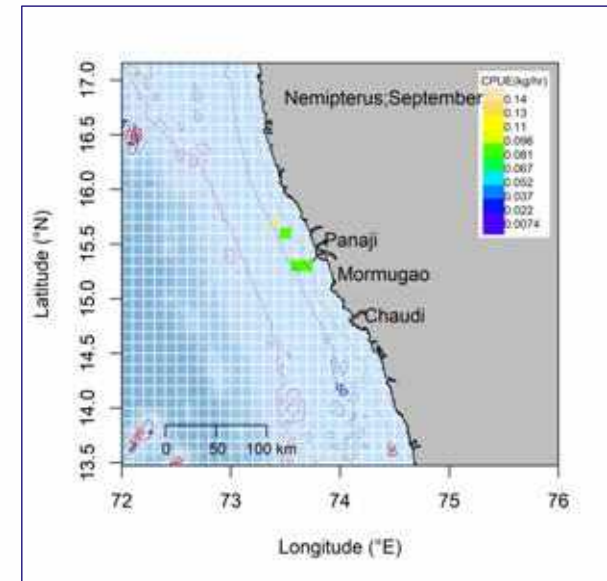
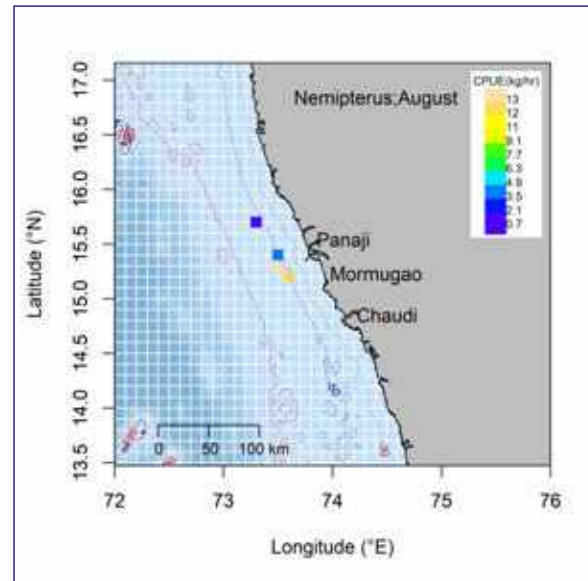
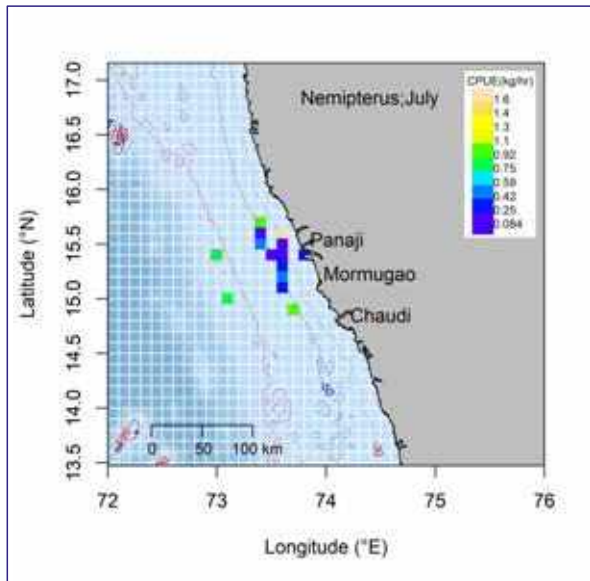


# Threadfin Breams (Nemipterus)



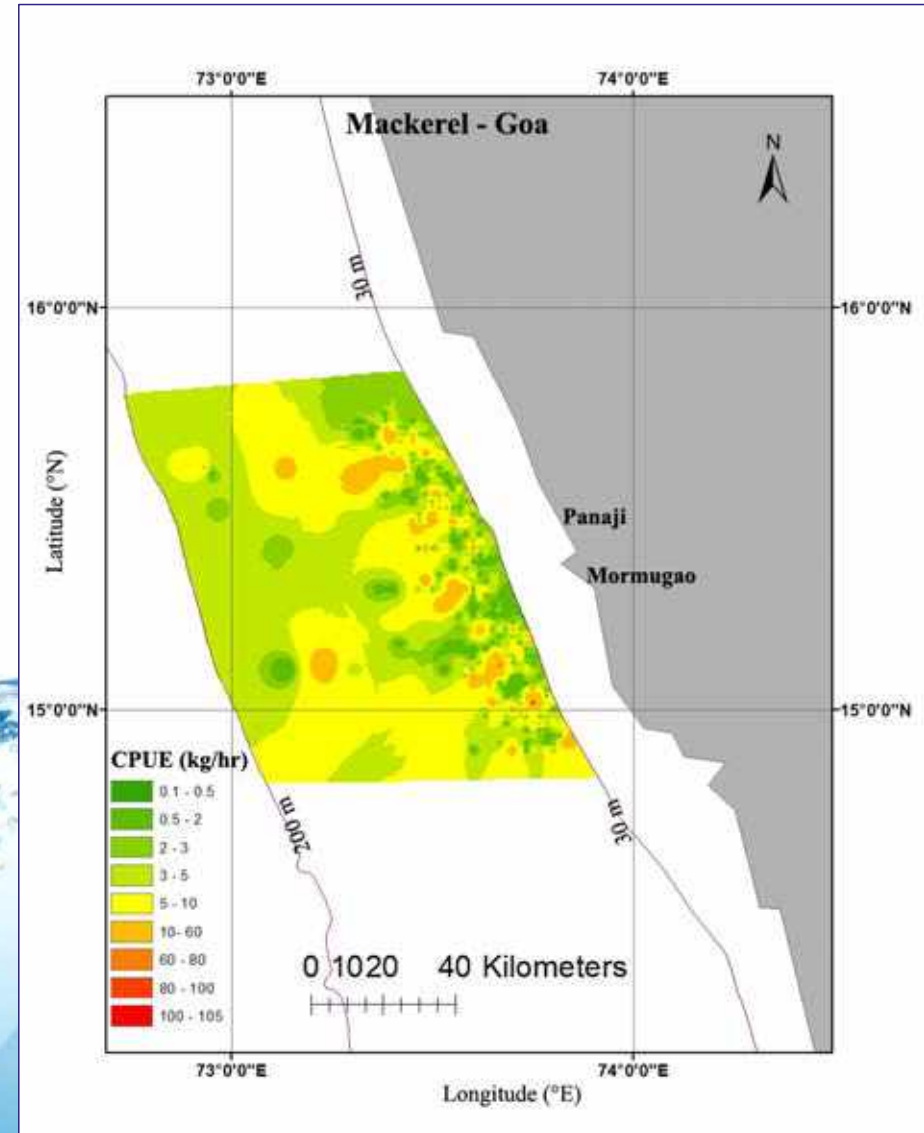


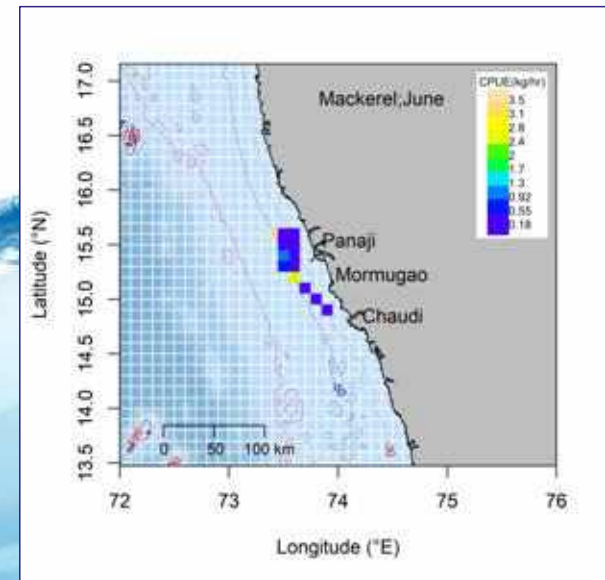
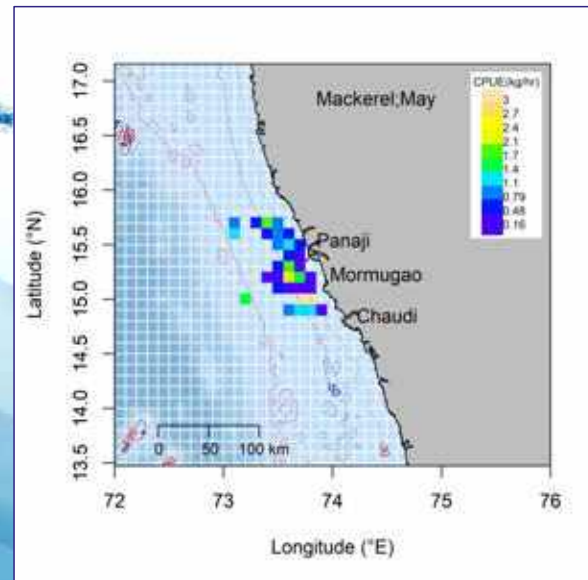
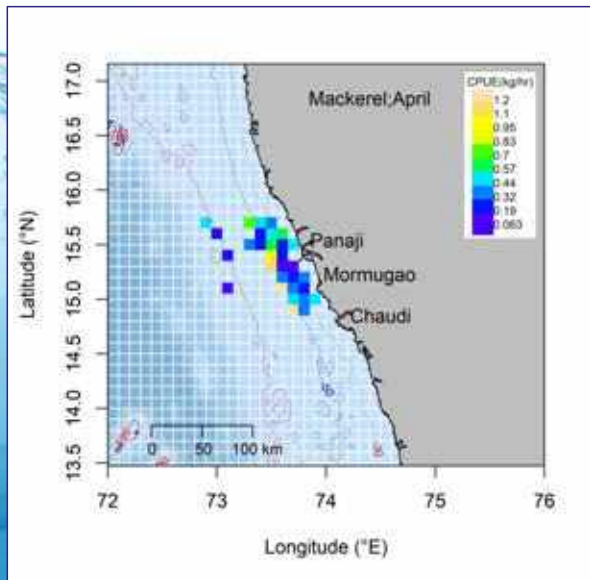
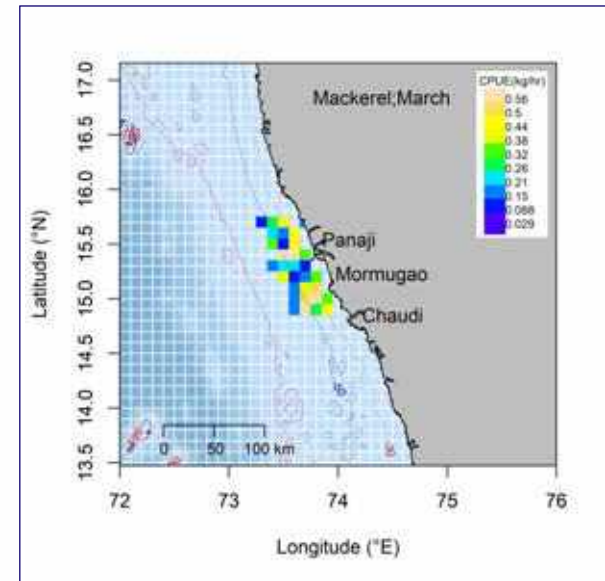
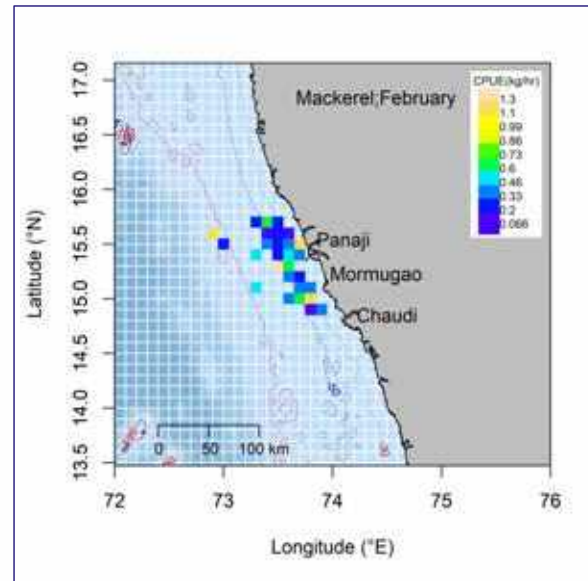
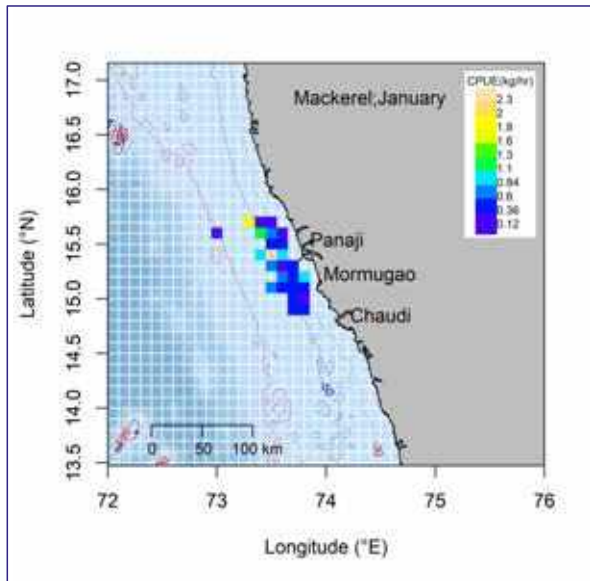


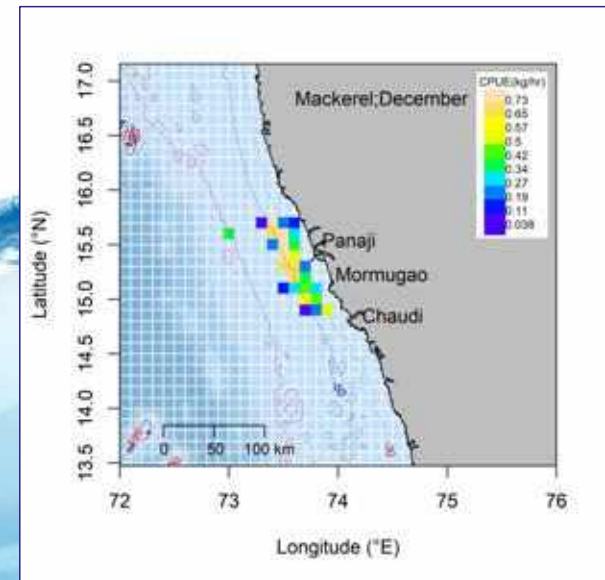
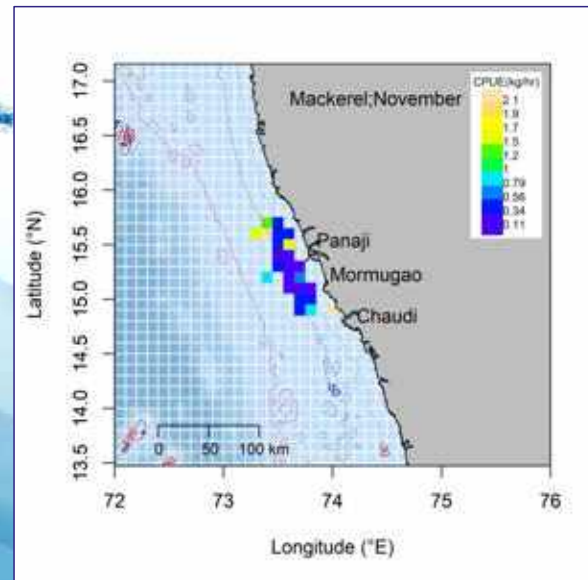
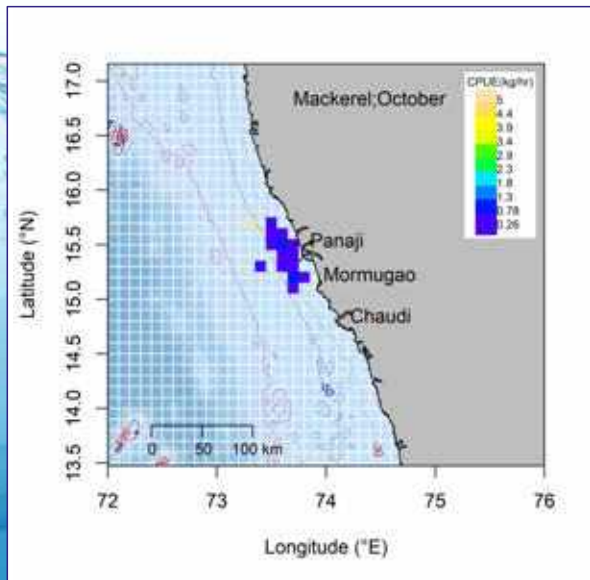
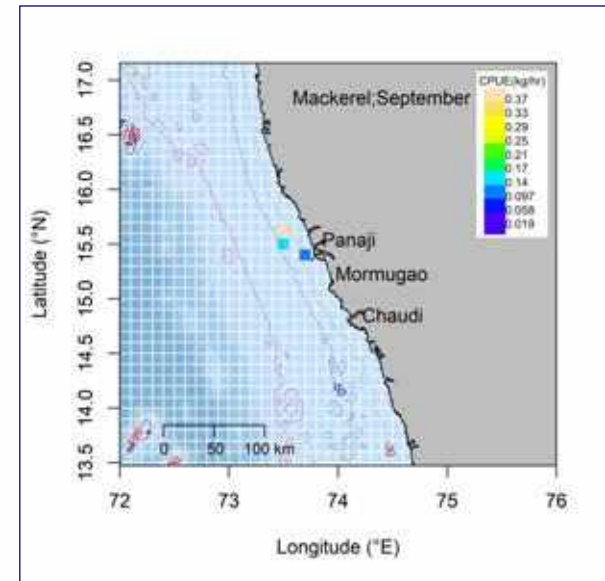
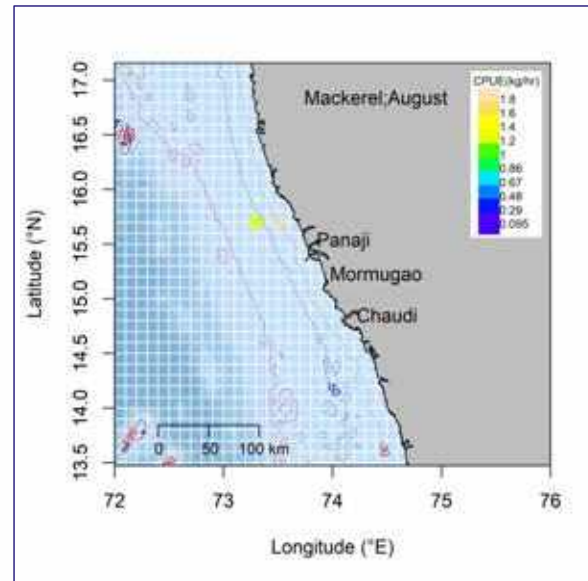
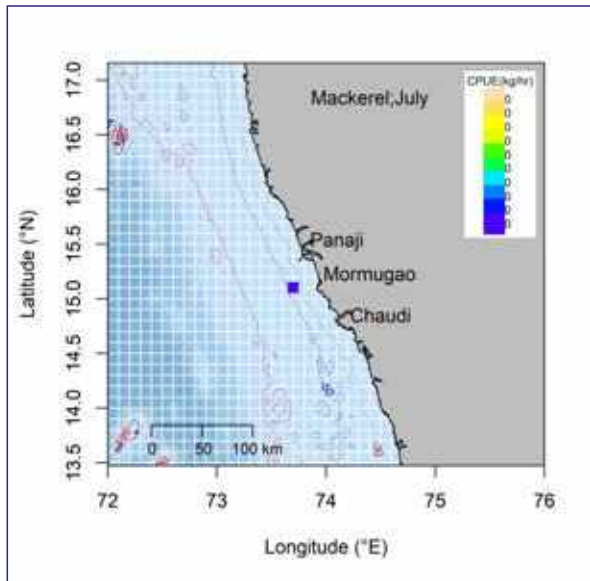




# Mackerel

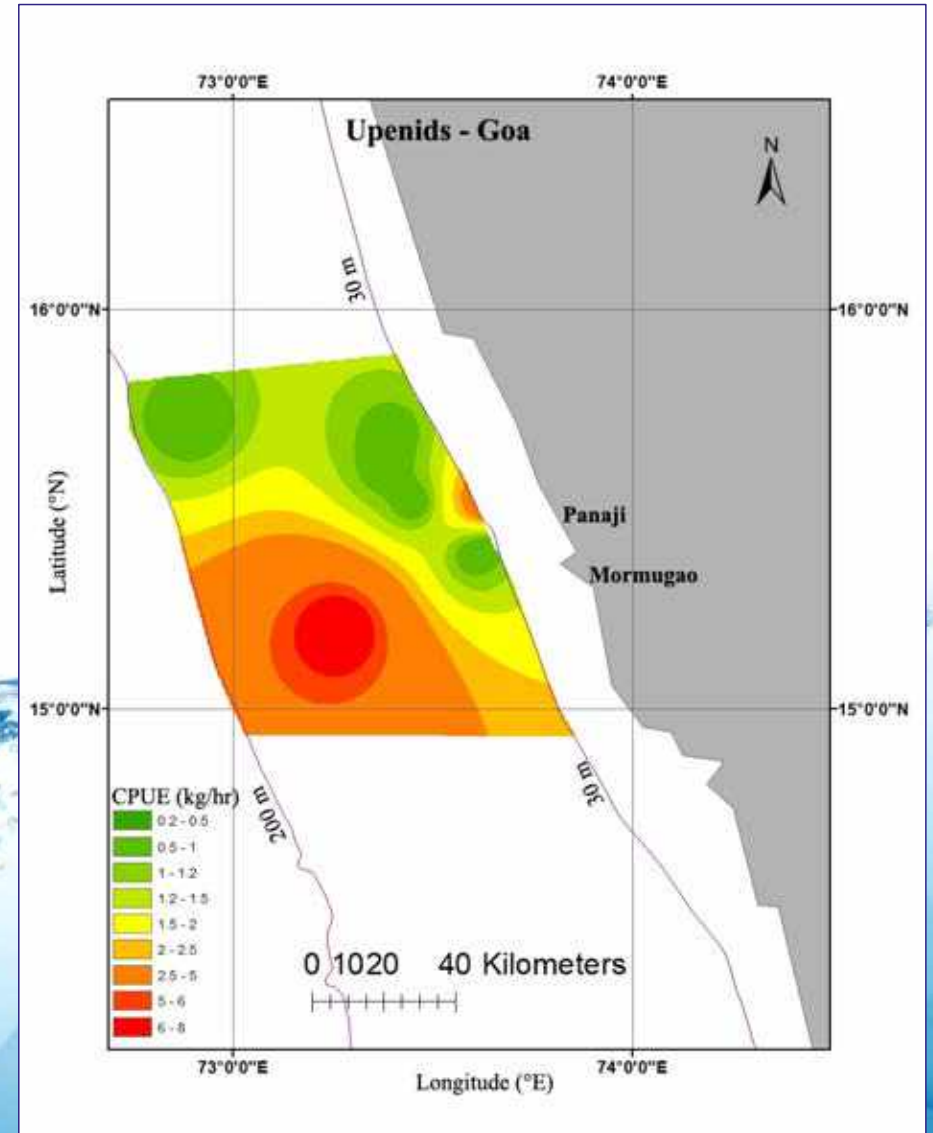


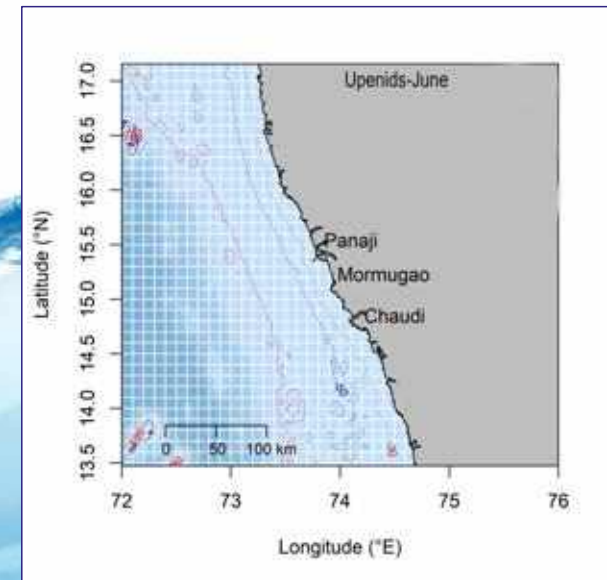
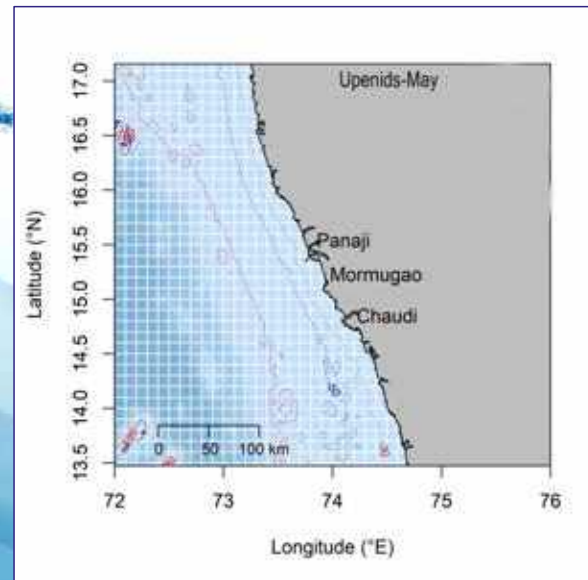
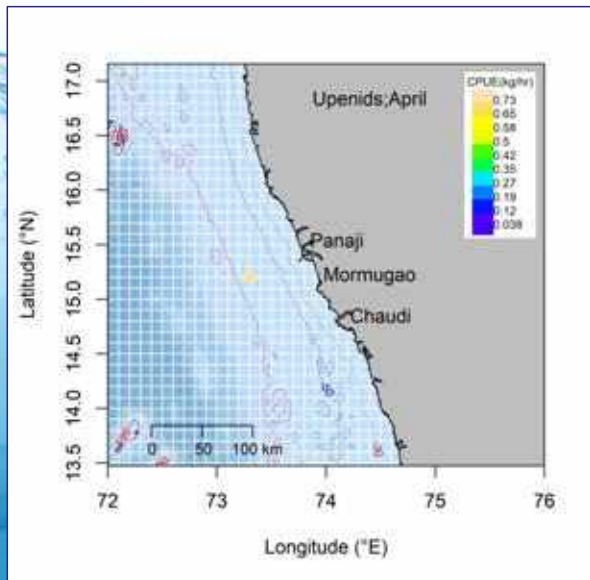
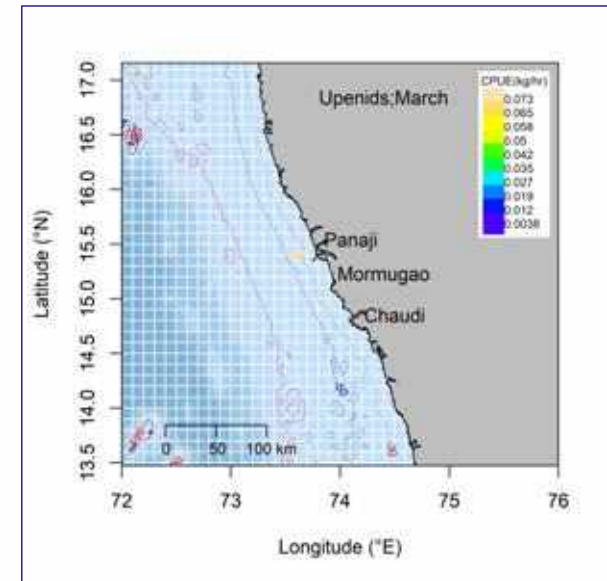
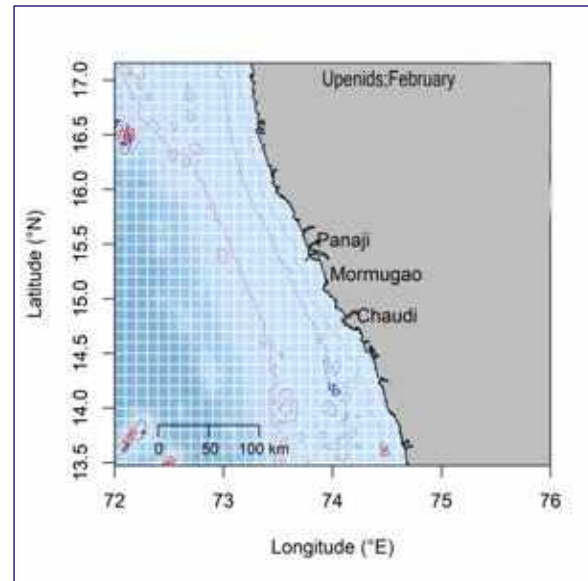
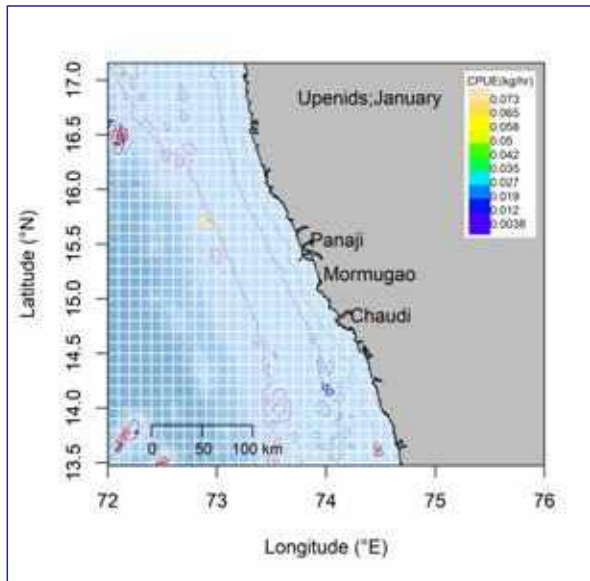


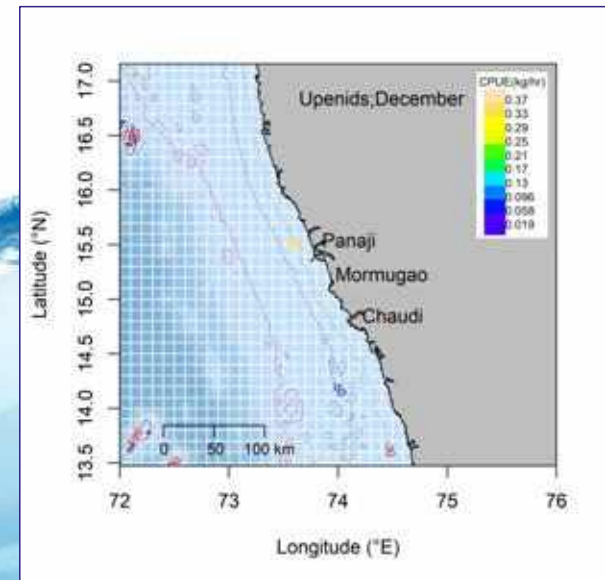
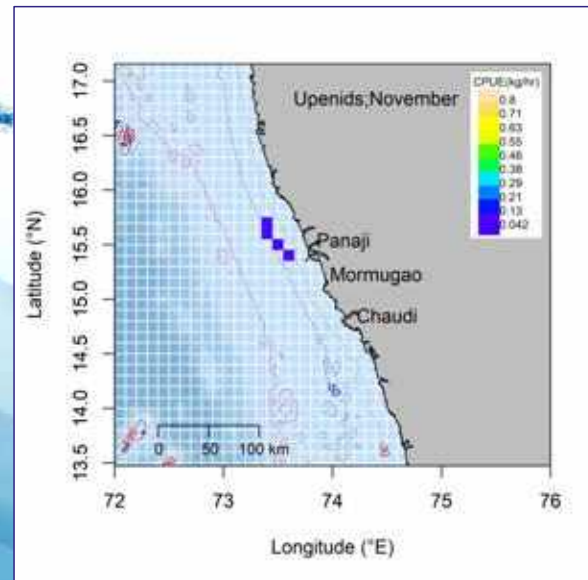
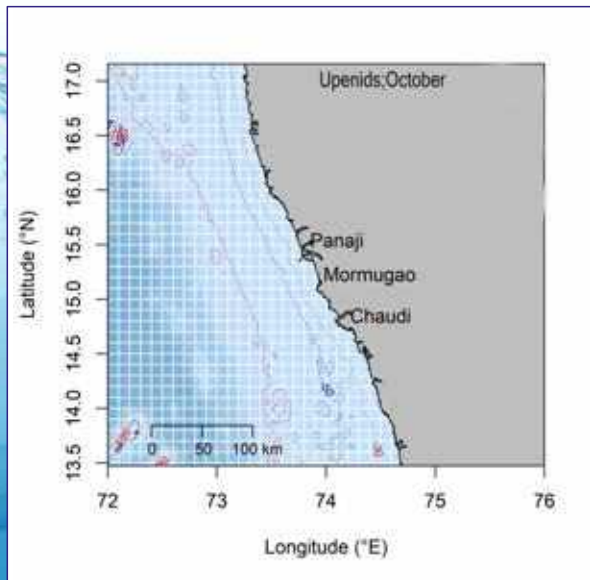
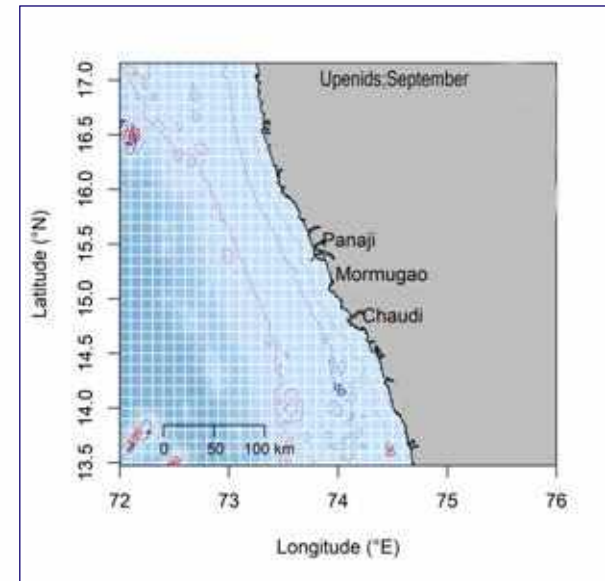
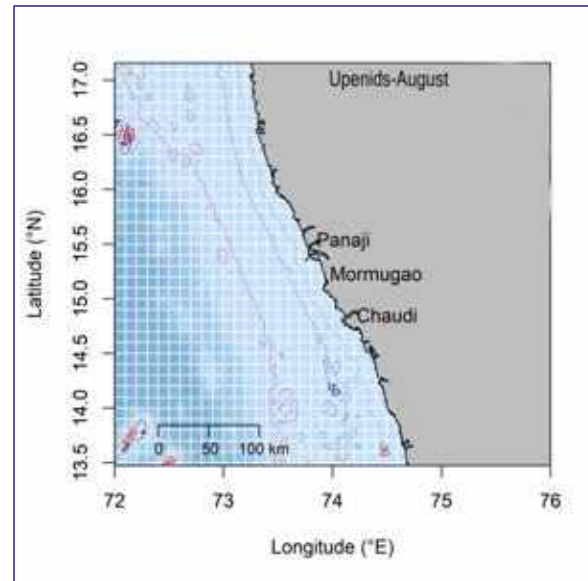
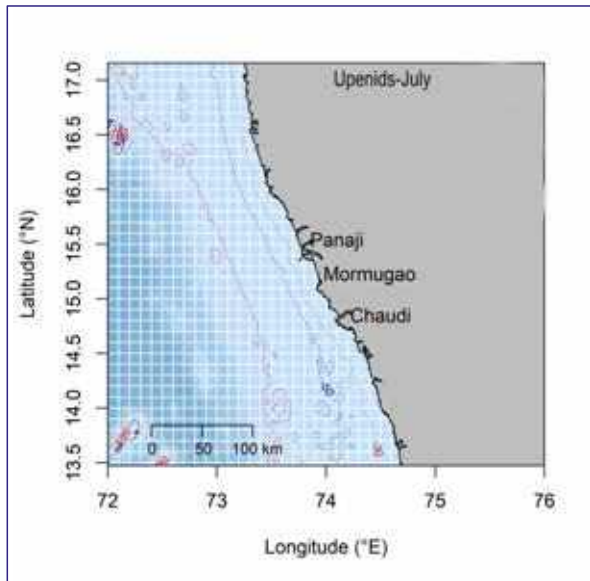




## Goatfish (Upenids)



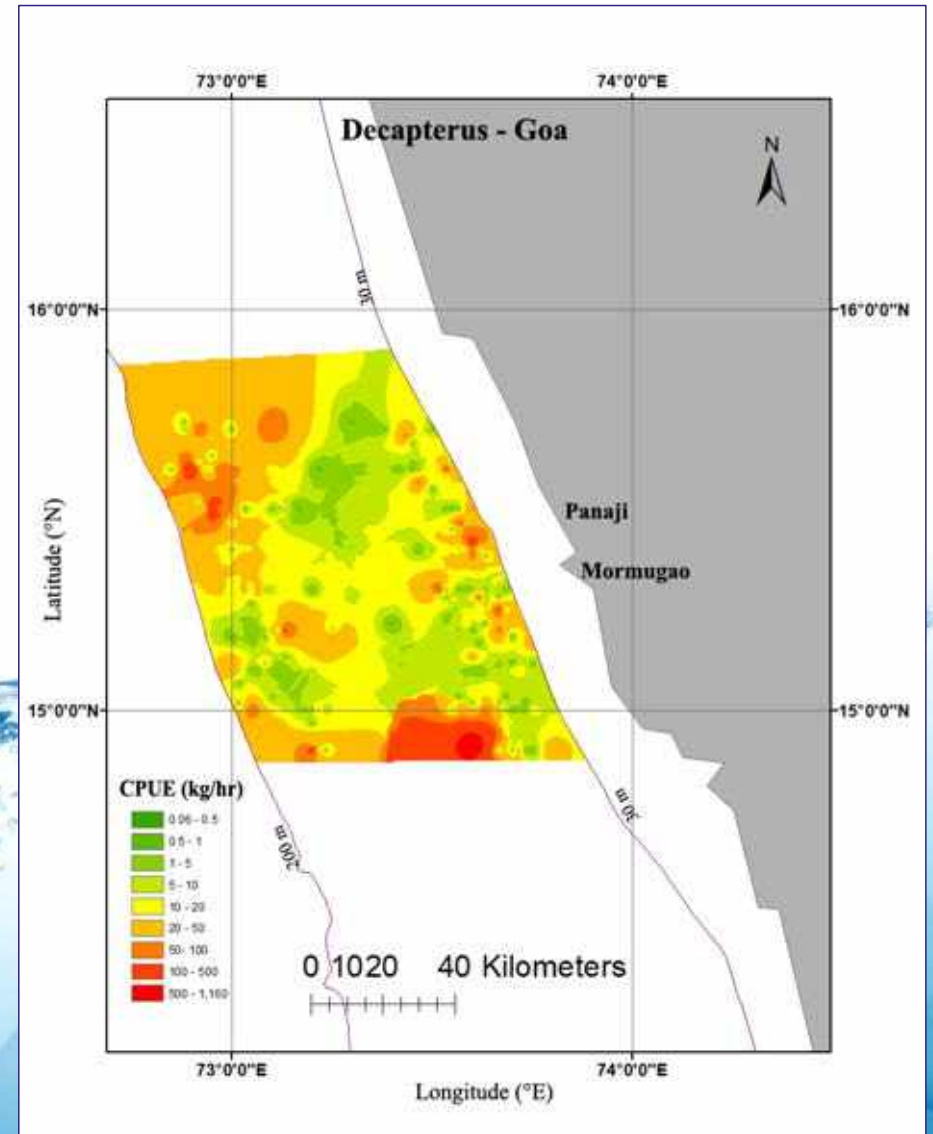


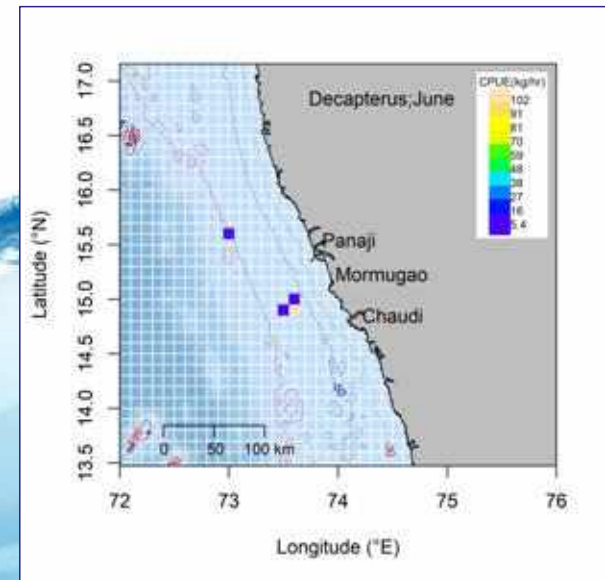
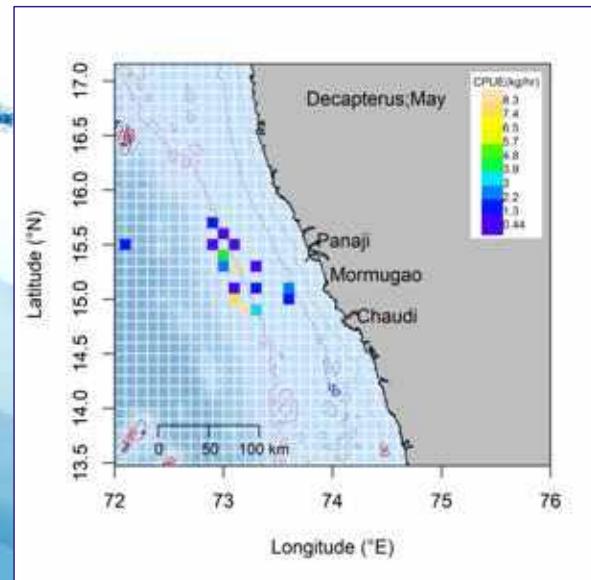
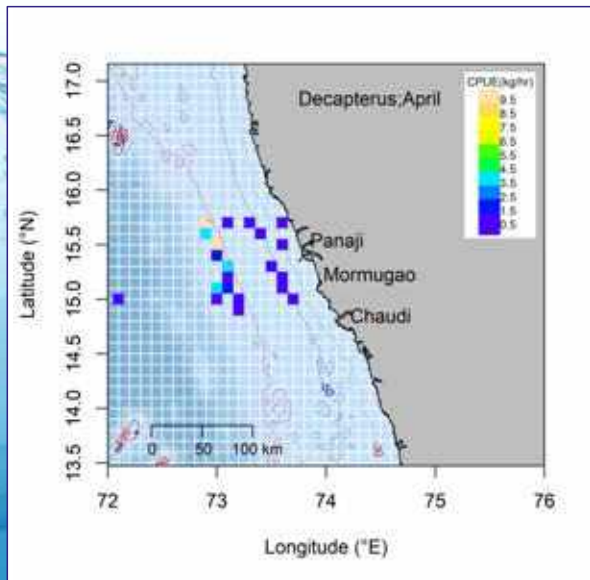
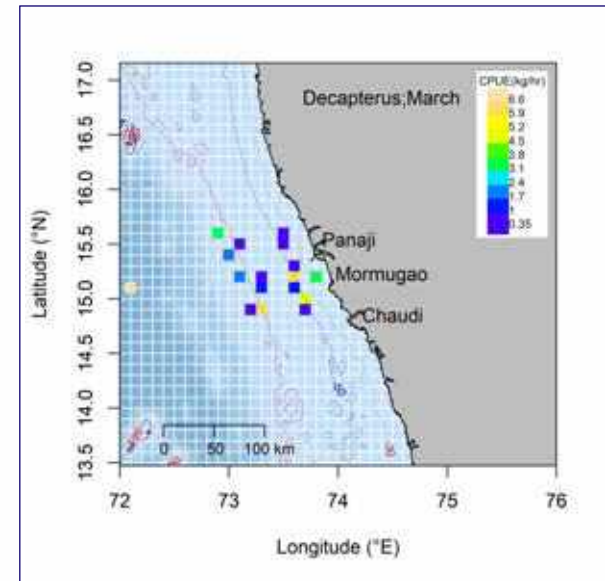
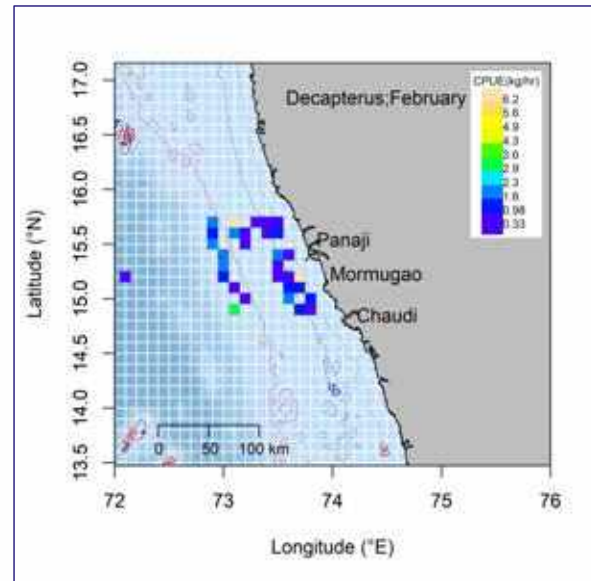
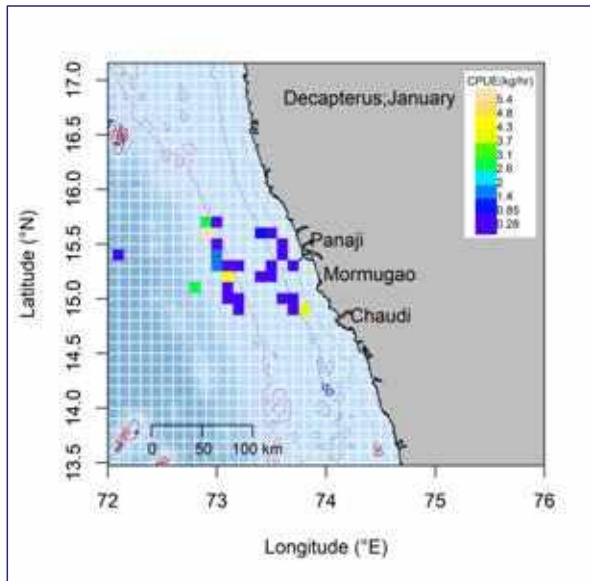


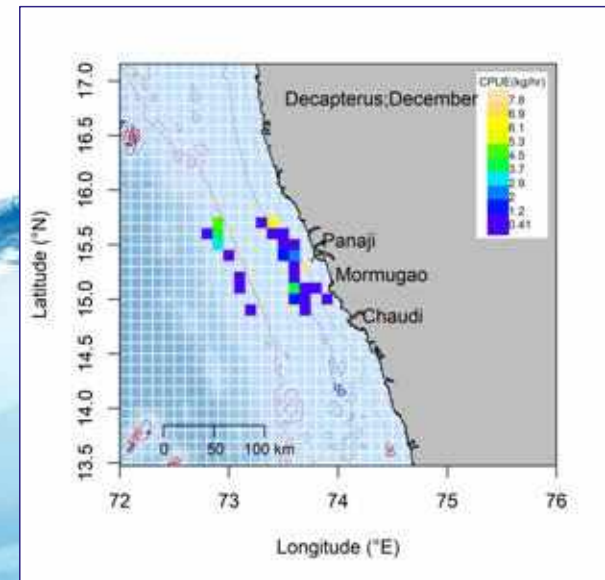
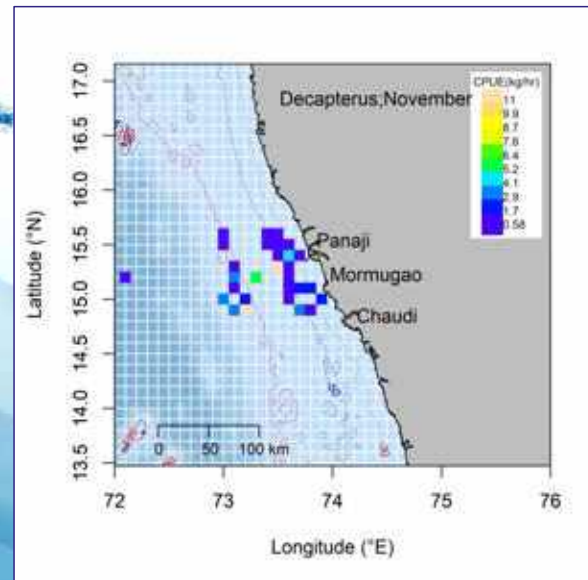
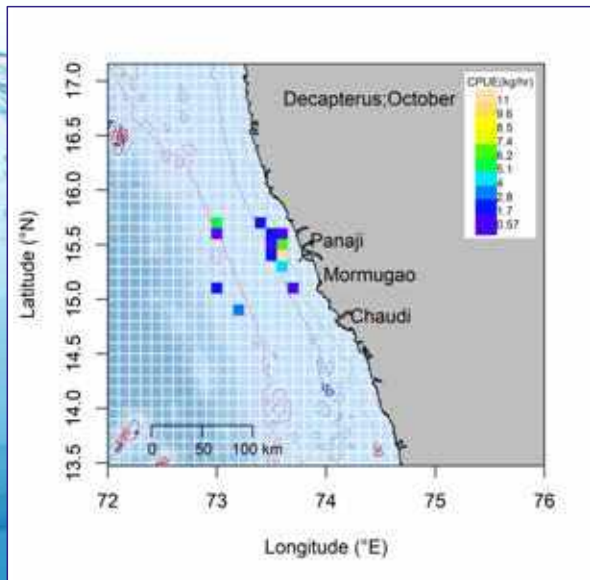
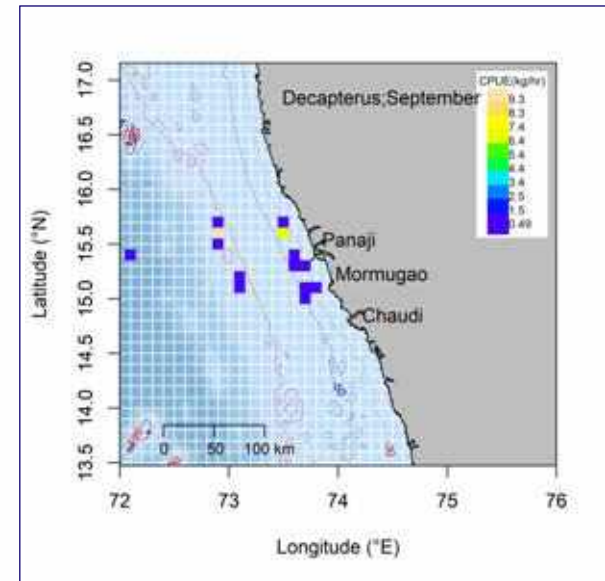
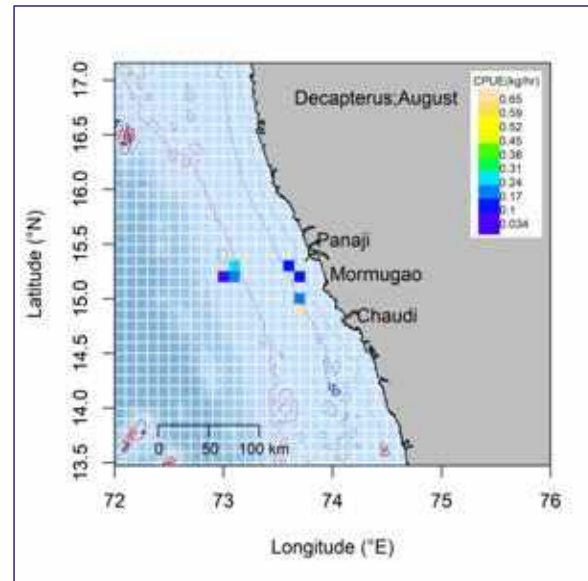
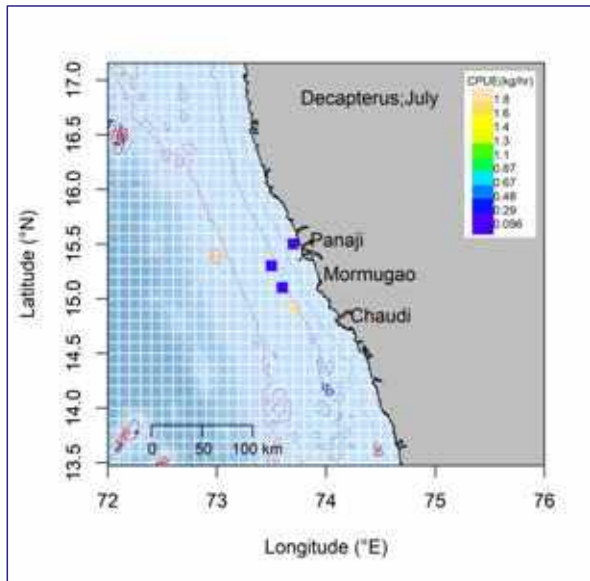




## Round Scads (Decapterus)

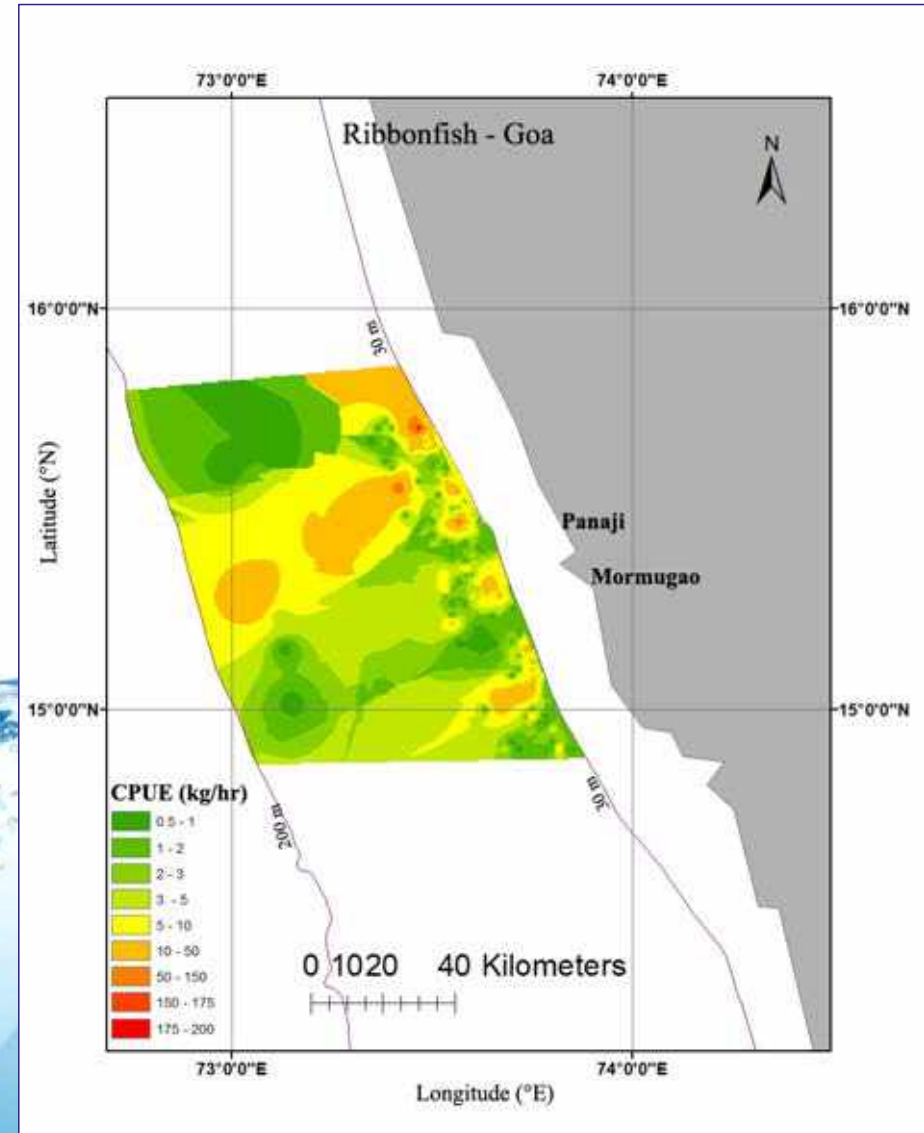


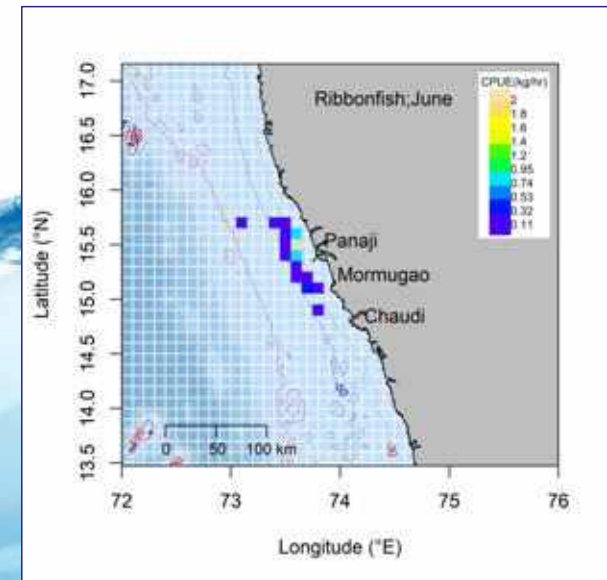
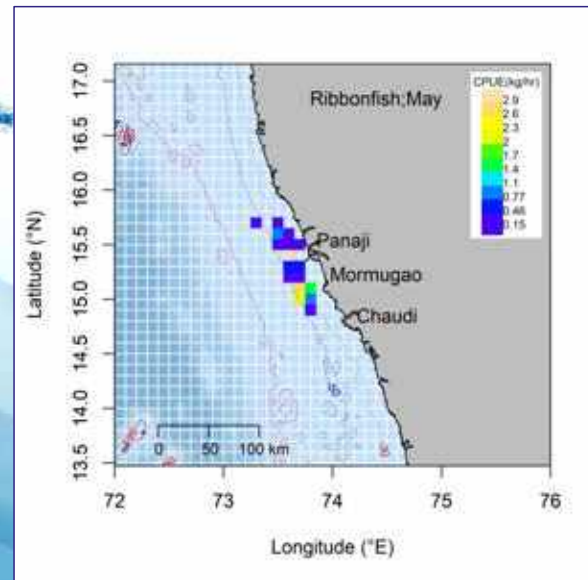
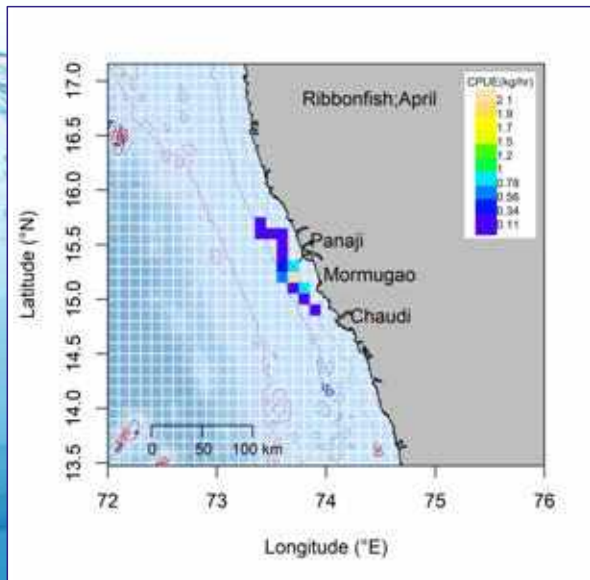
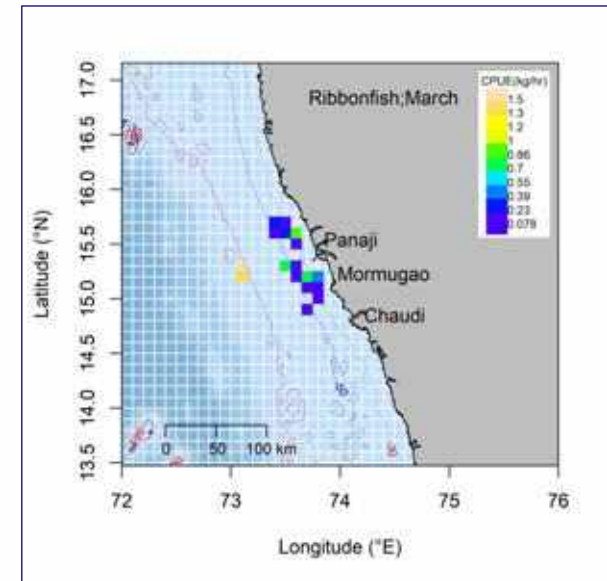
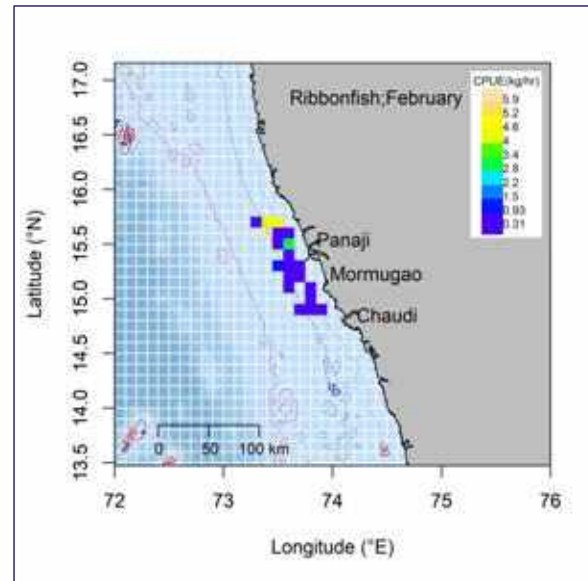
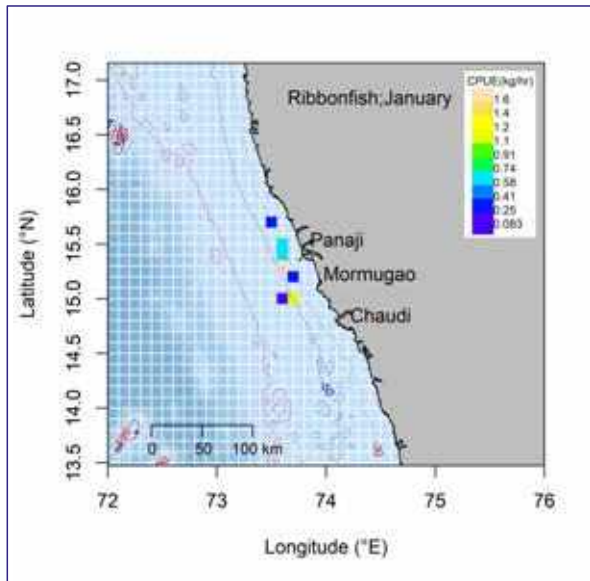


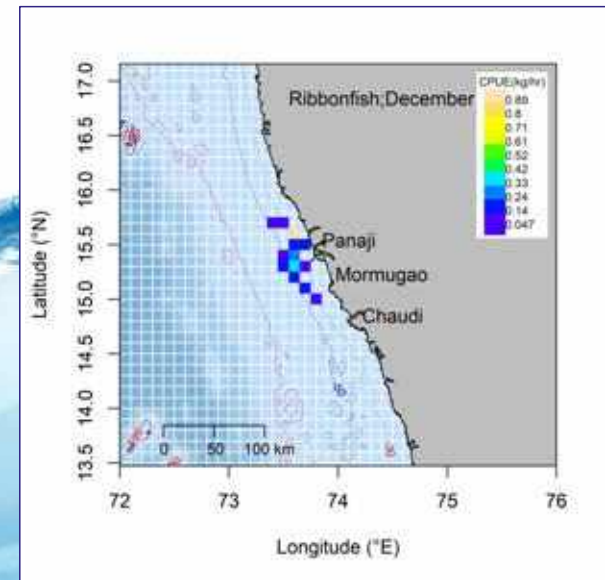
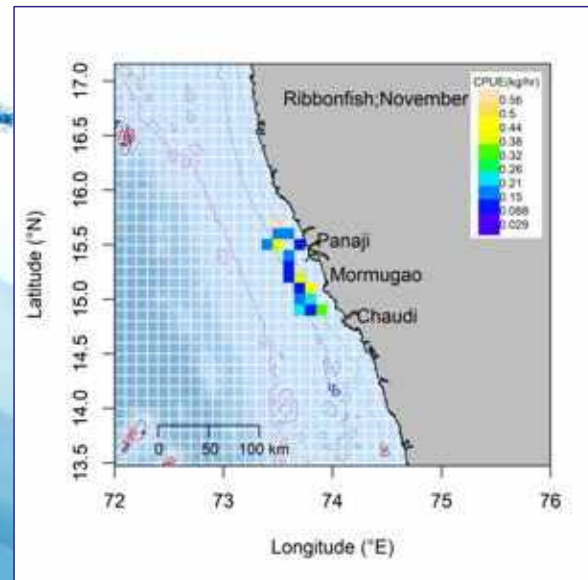
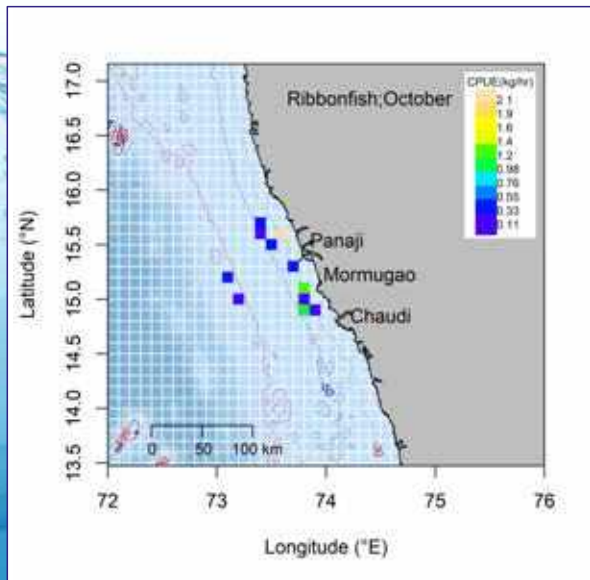
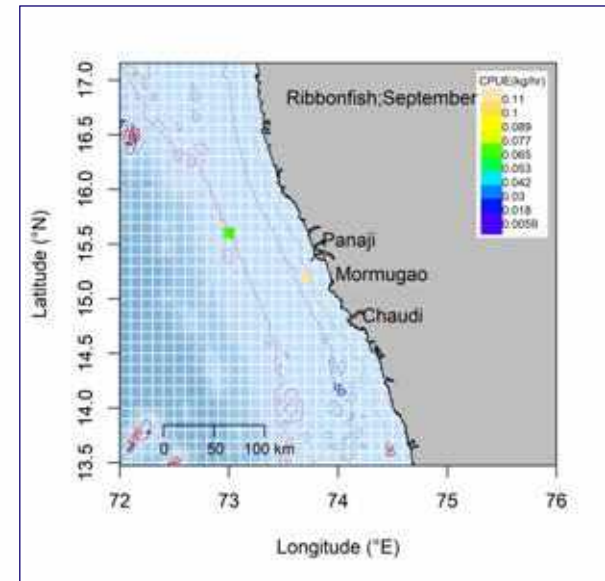
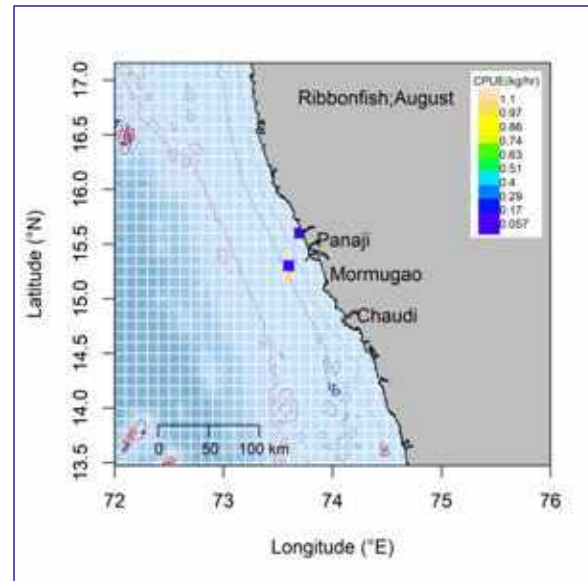
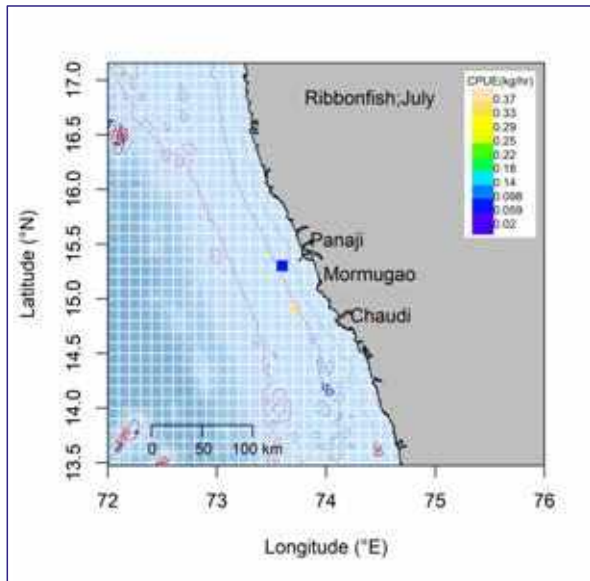




**Ribbonfish**

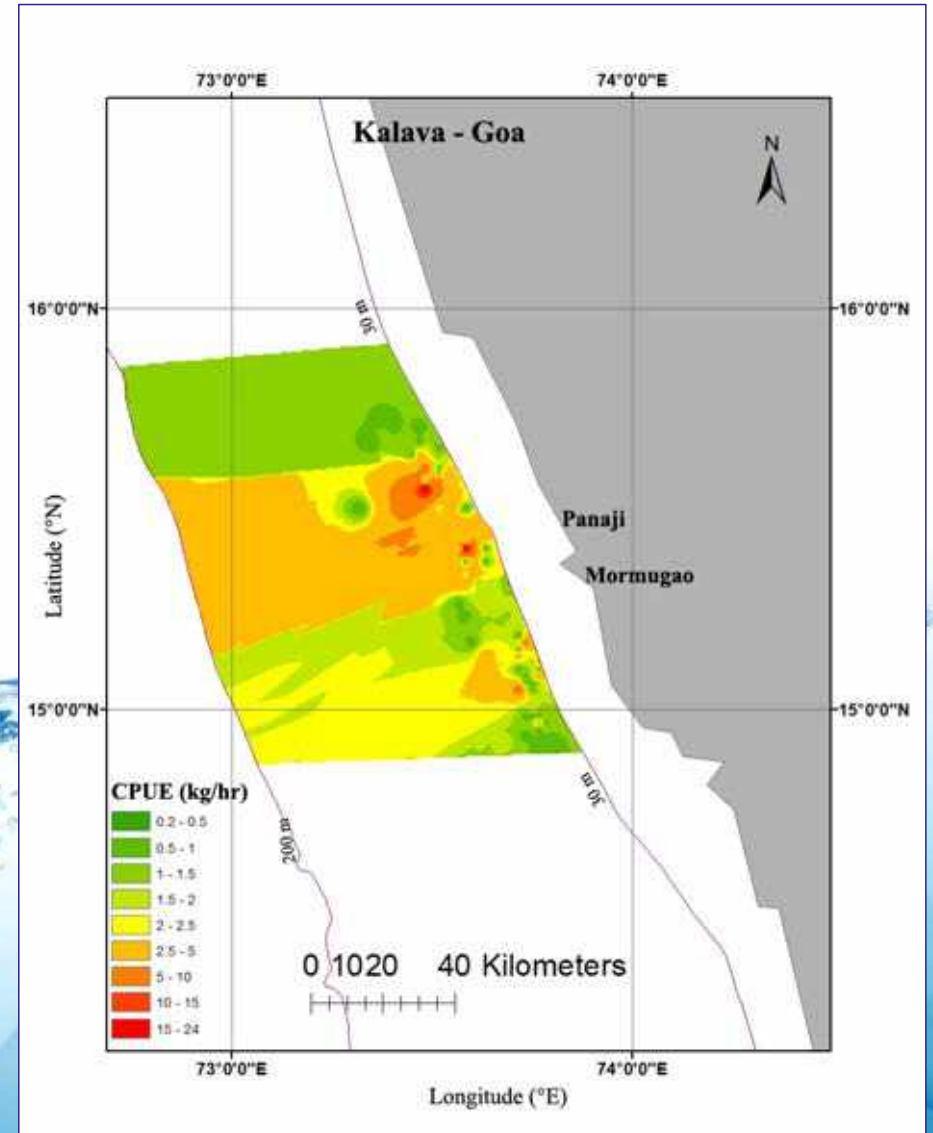


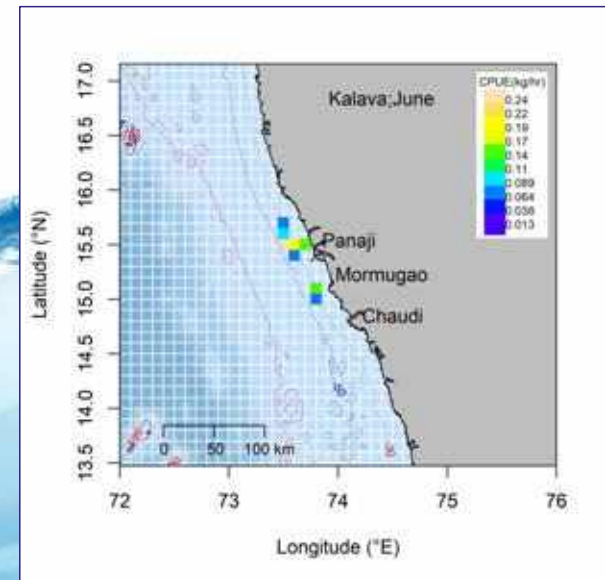
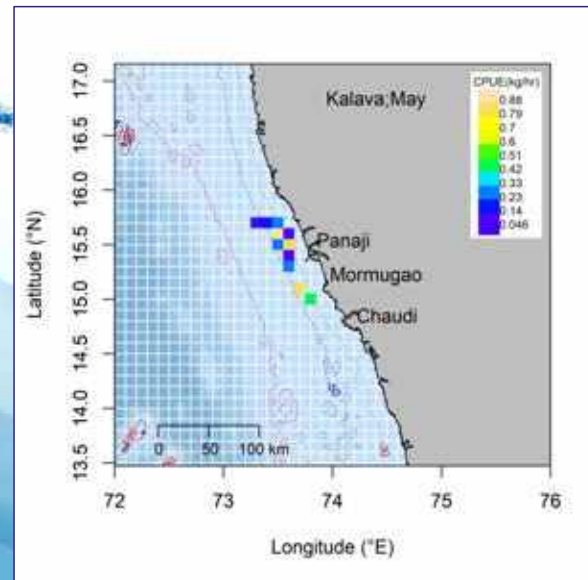
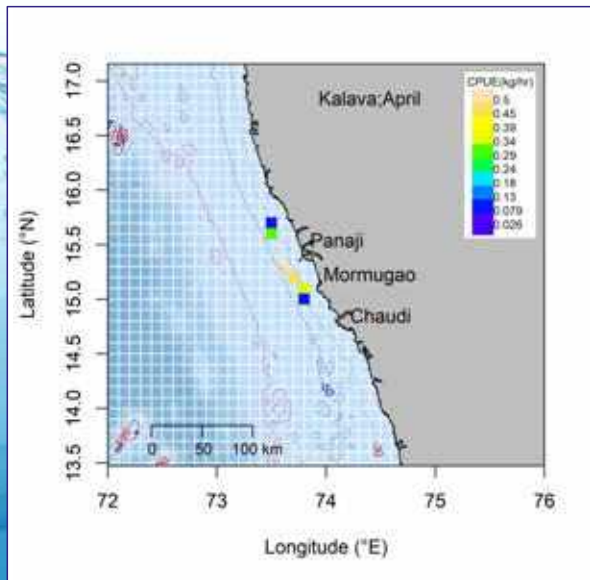
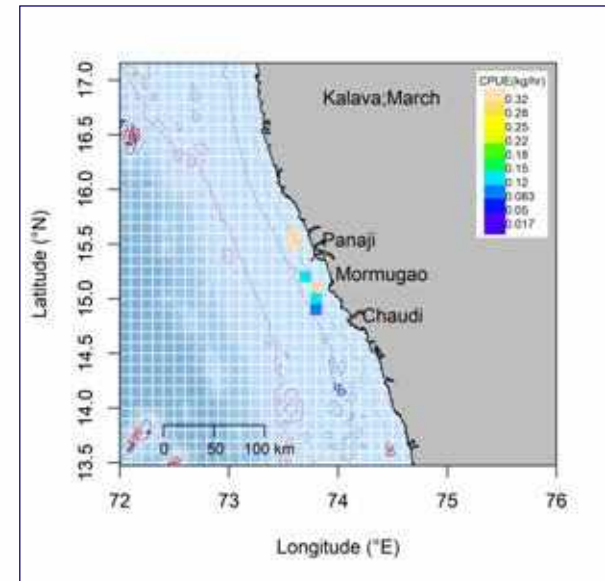
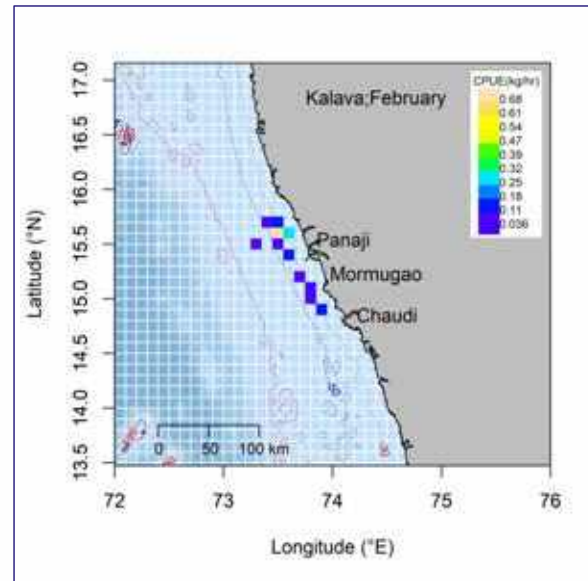
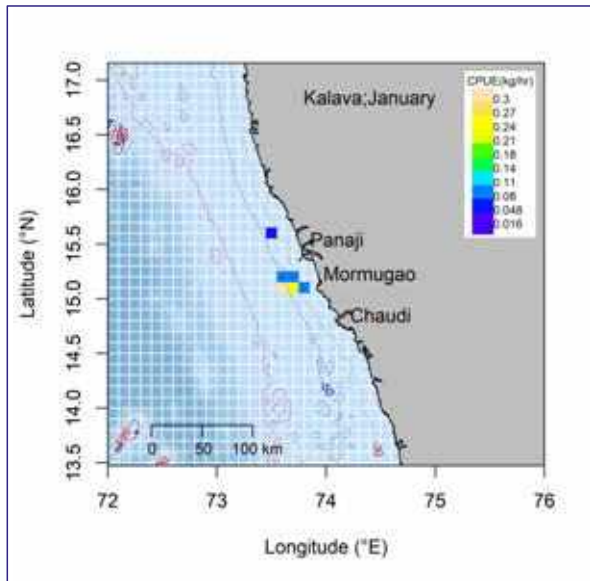




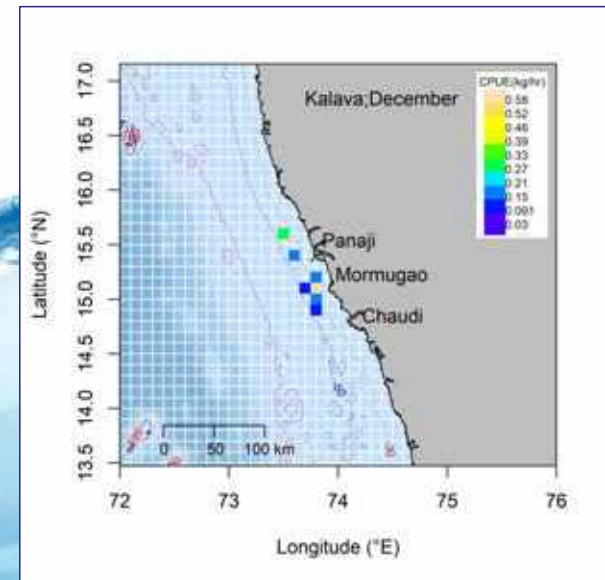
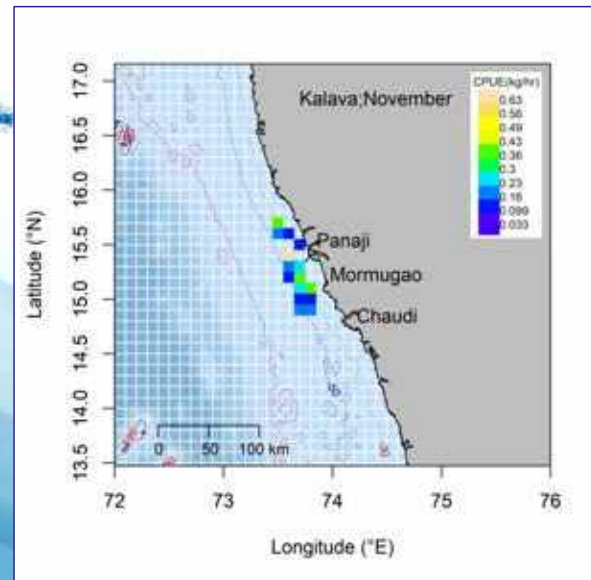
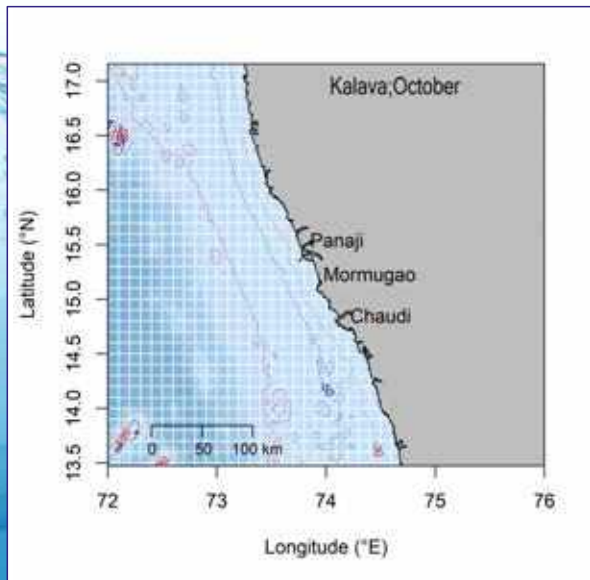
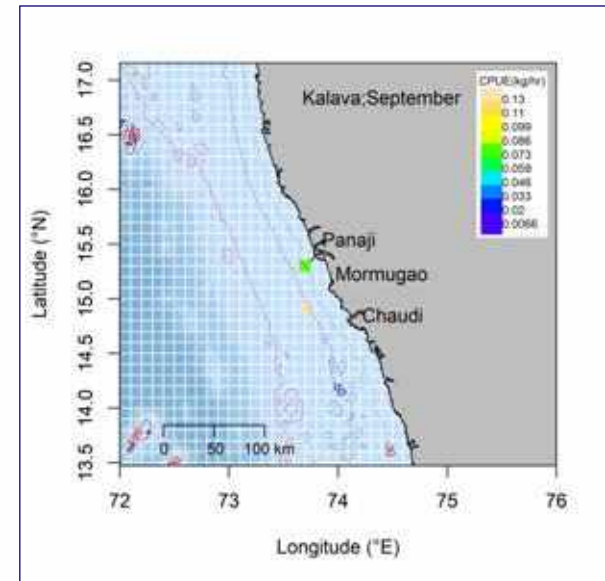
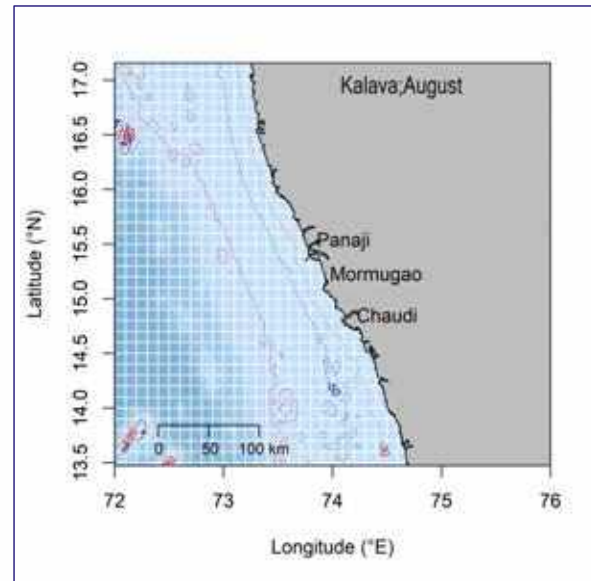
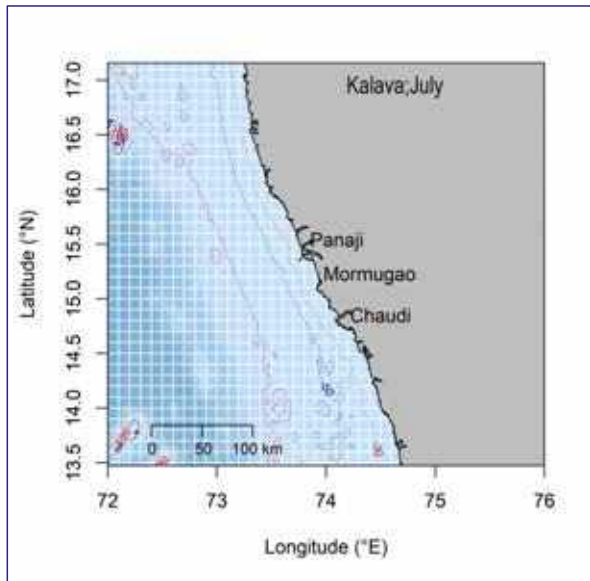


## Groupers (Kalava)



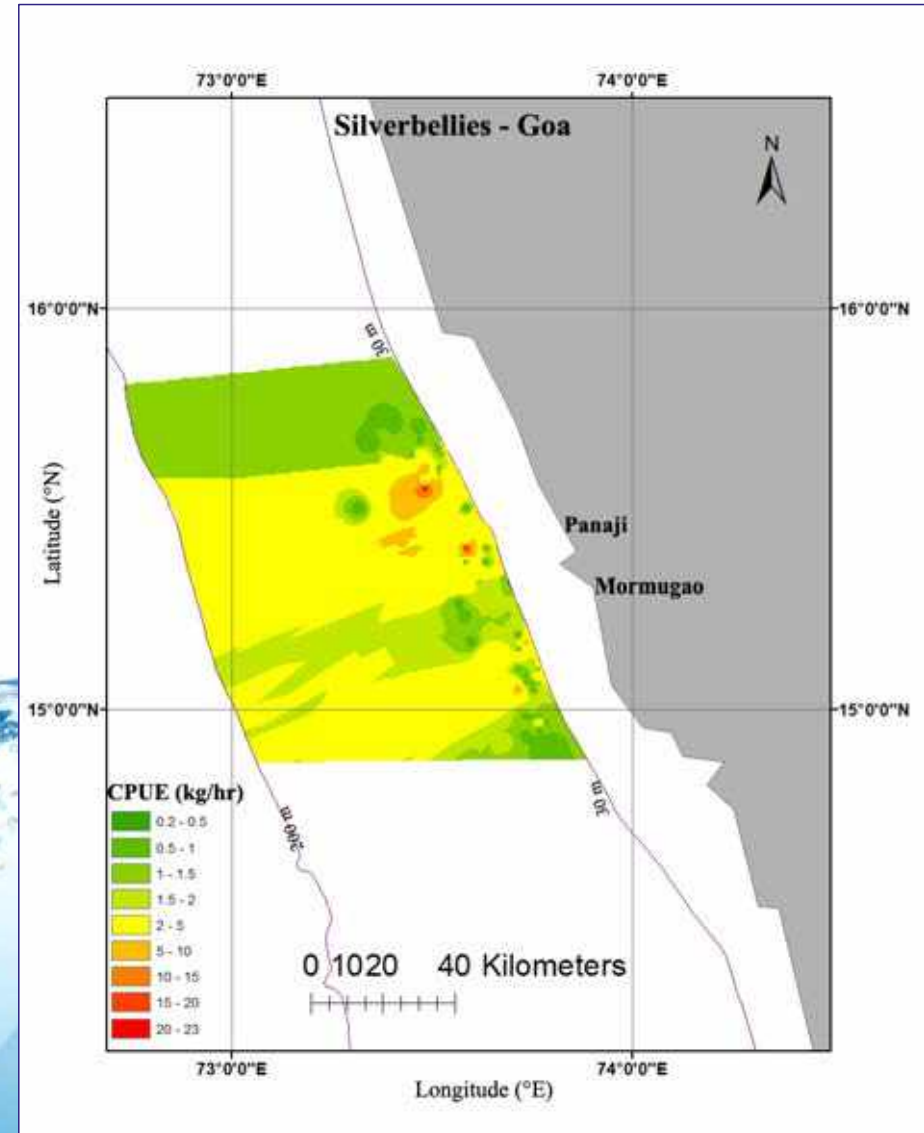


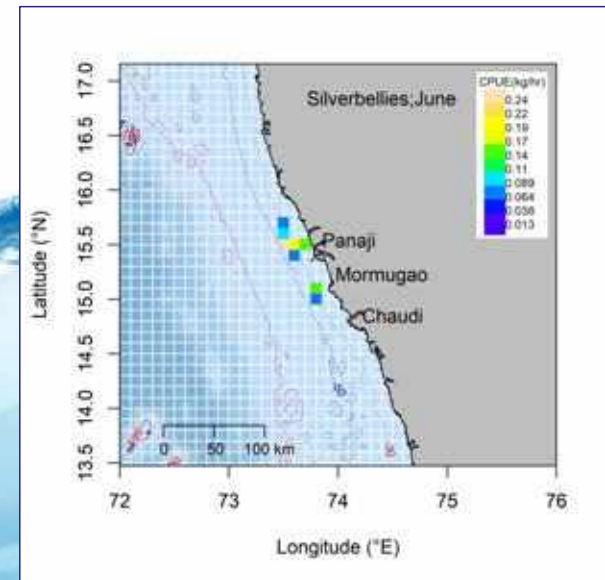
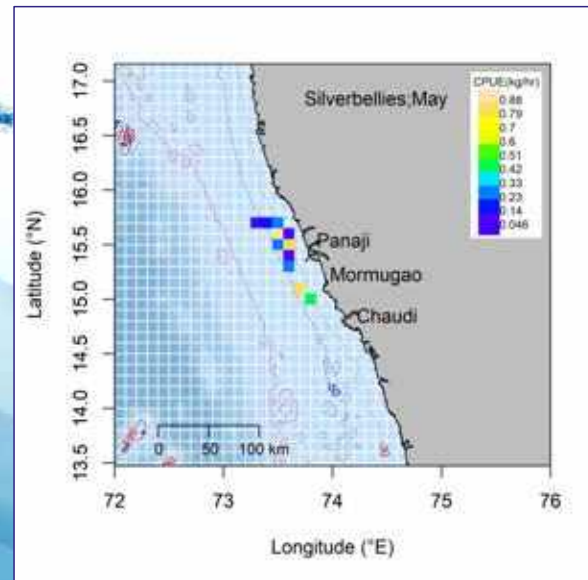
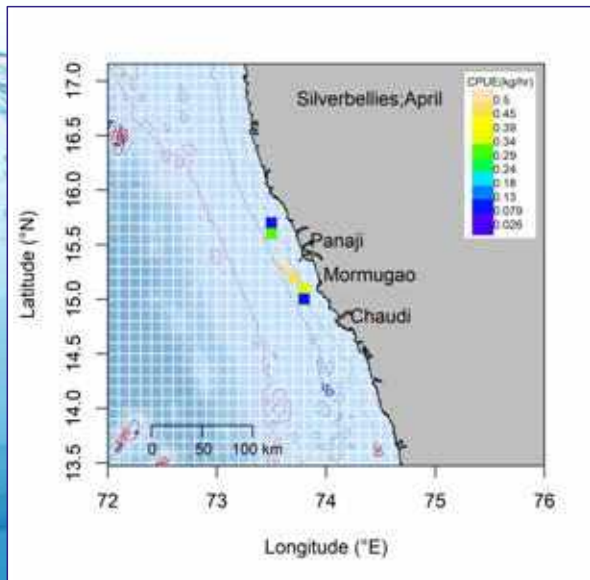
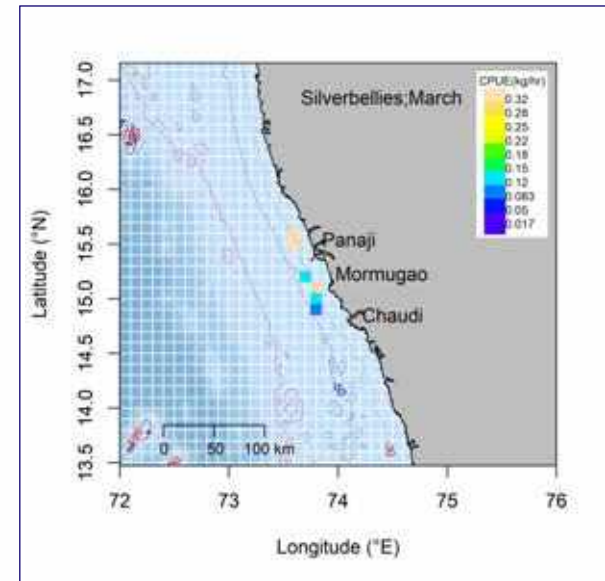
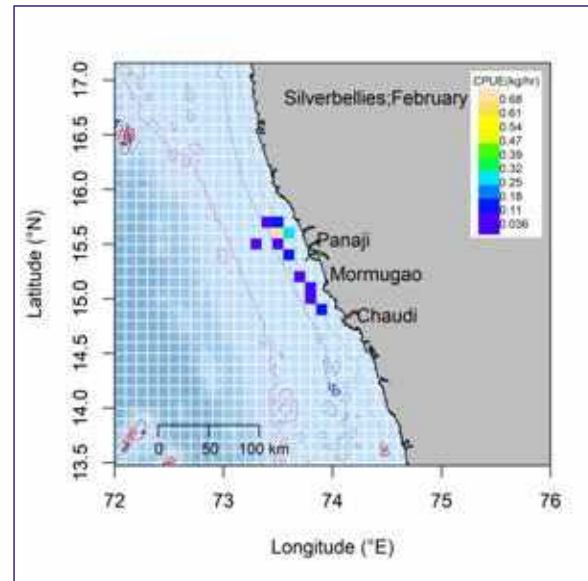
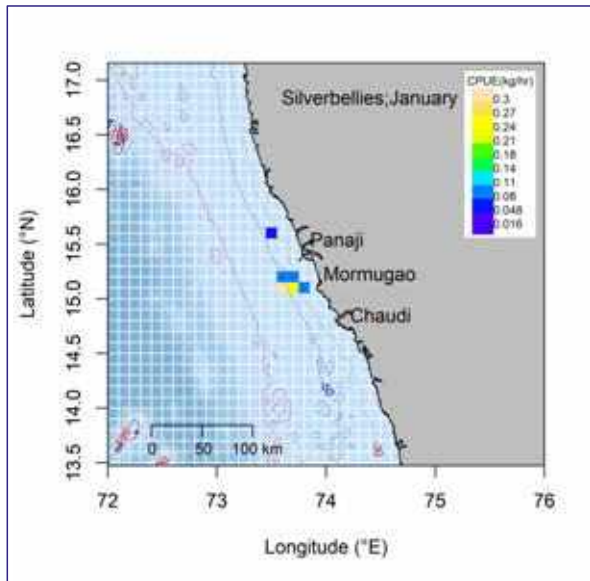


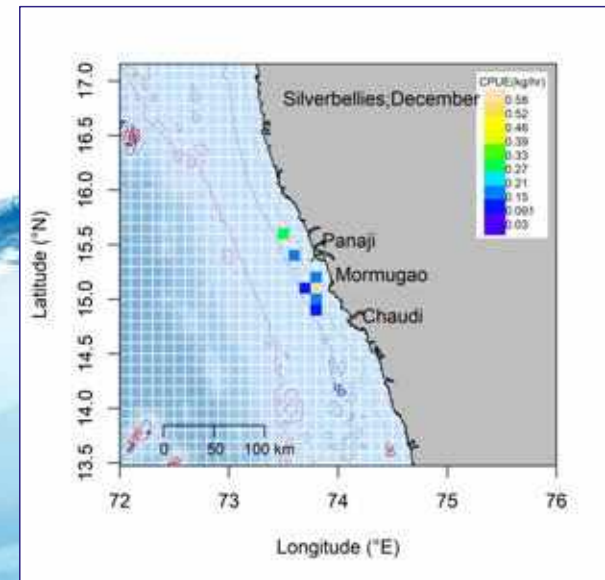
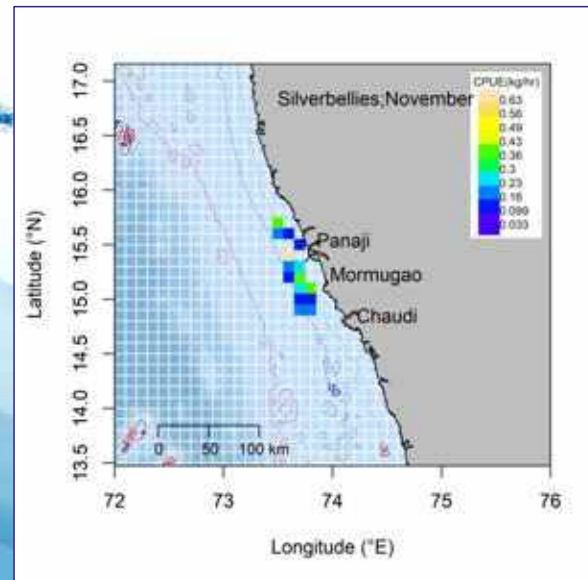
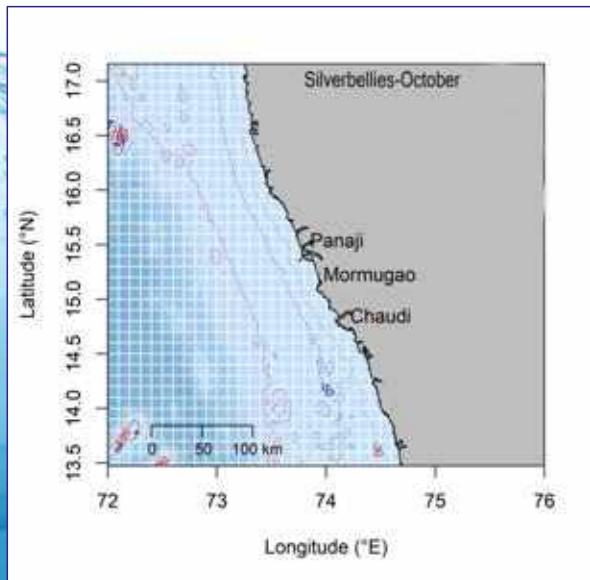
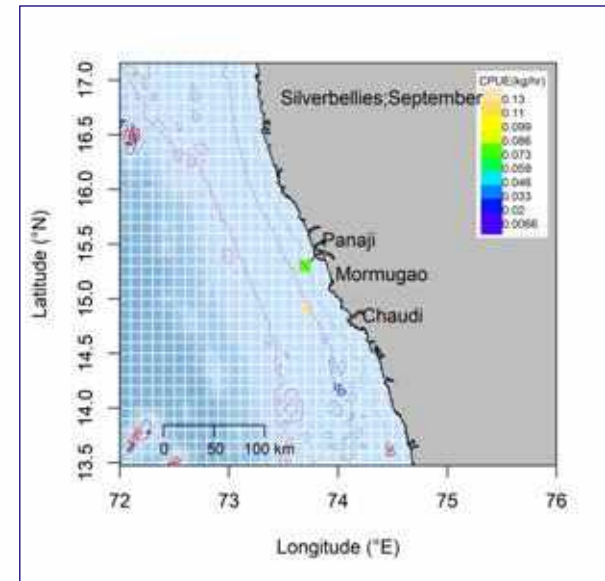
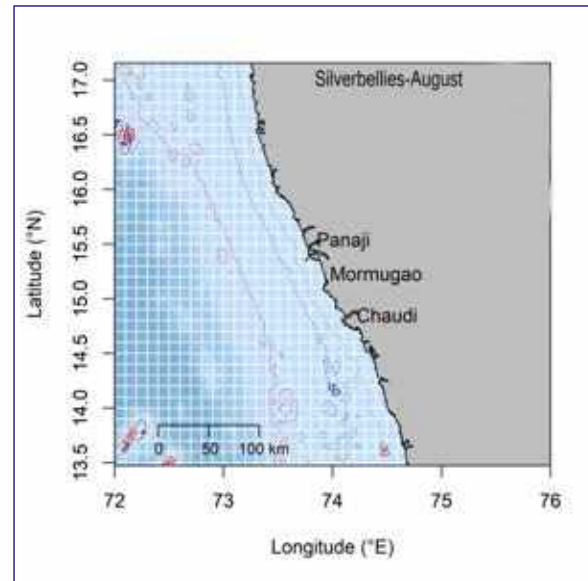
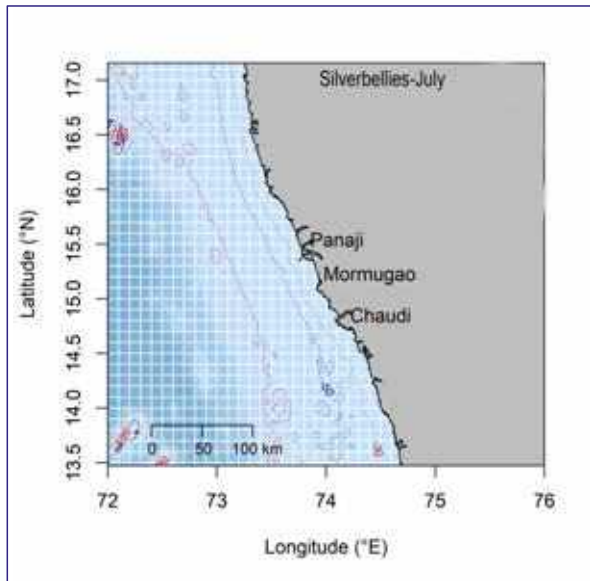


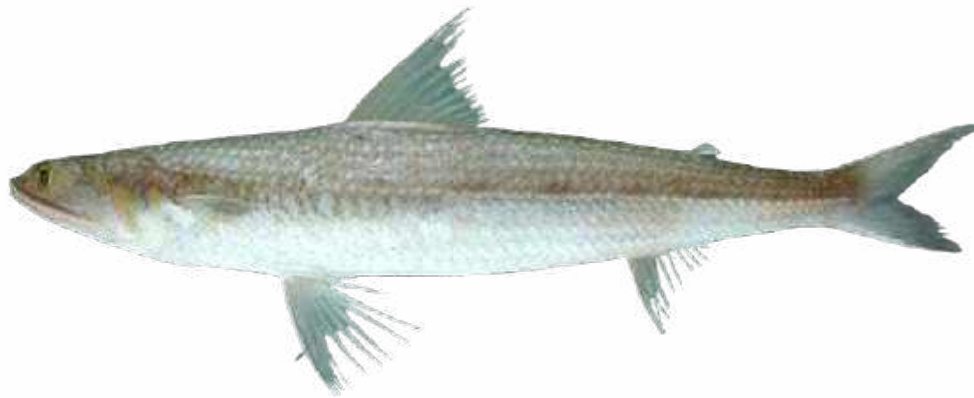


# Silverbellies

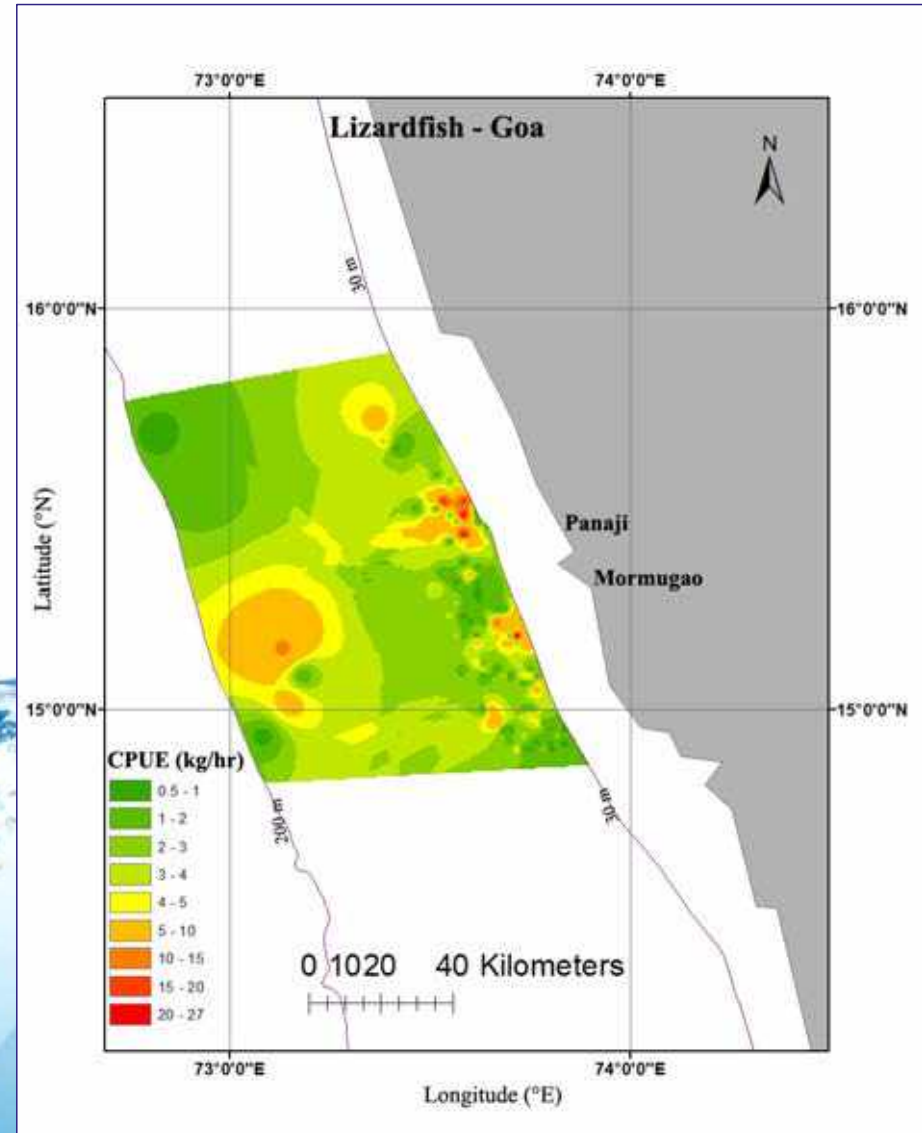


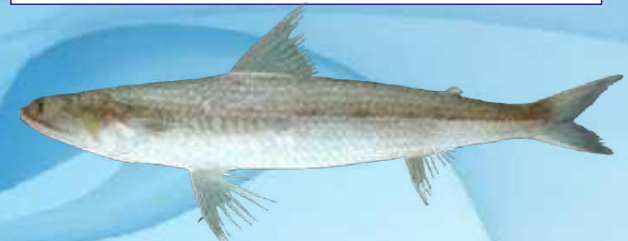
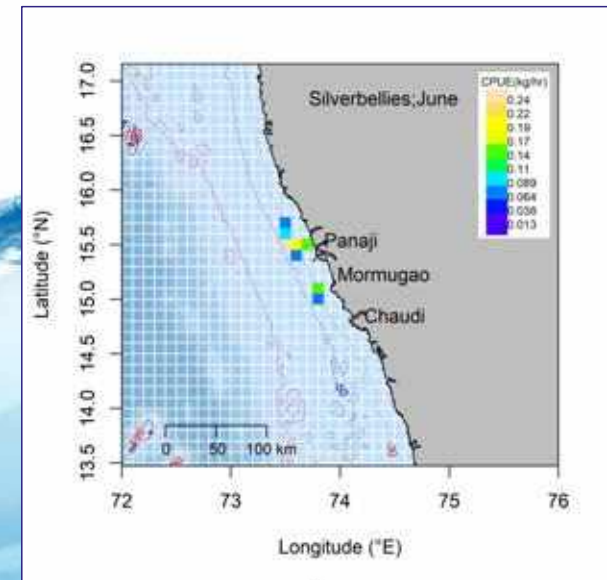
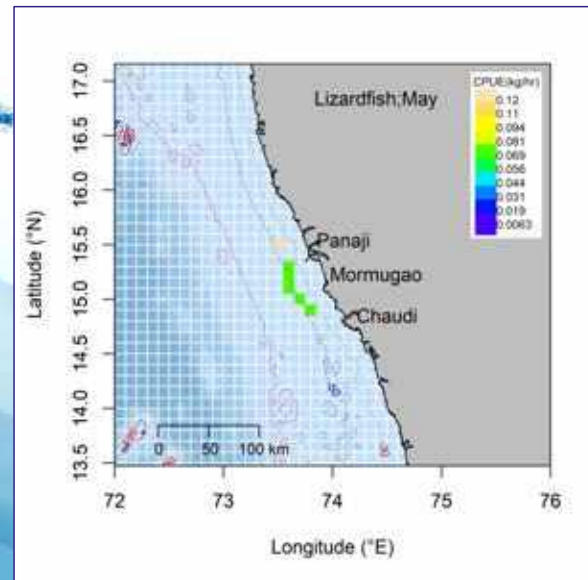
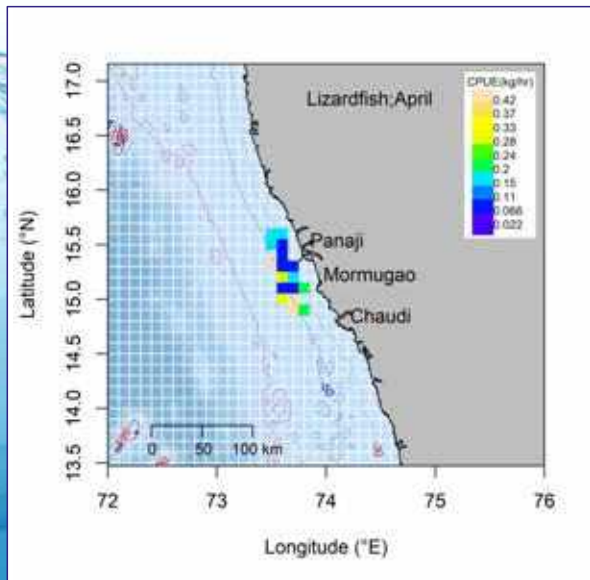
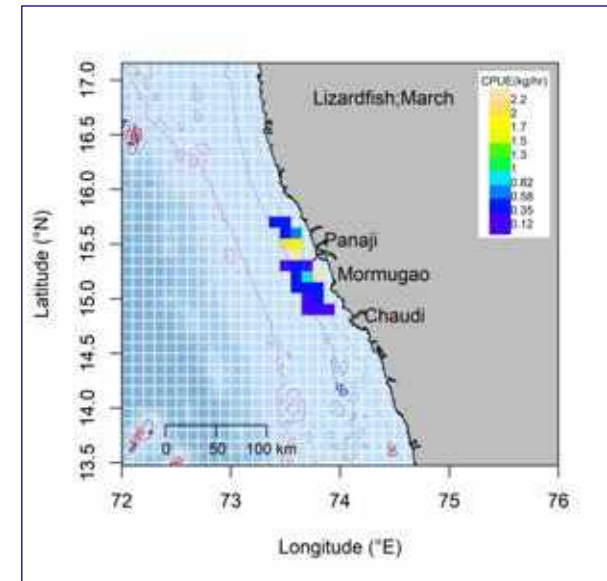
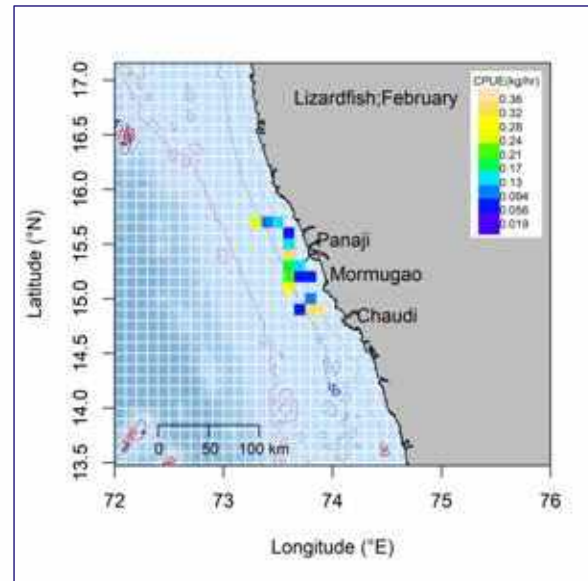
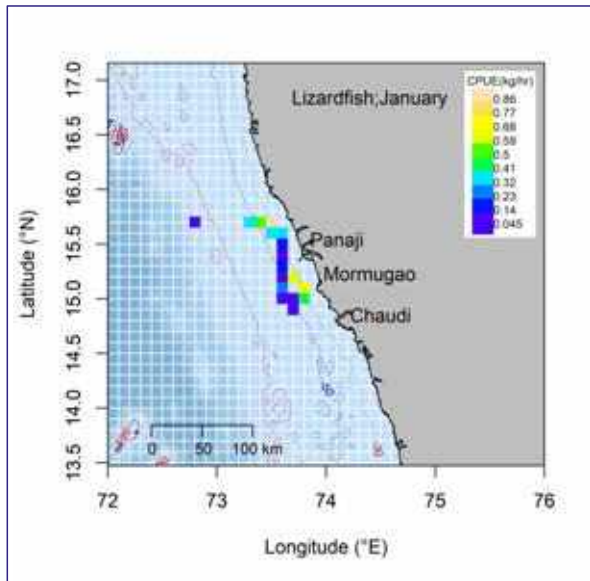


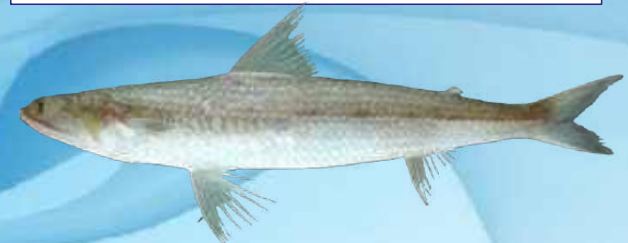
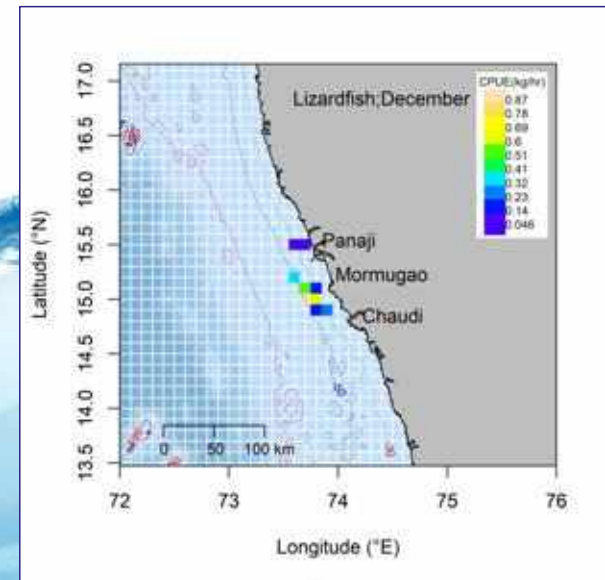
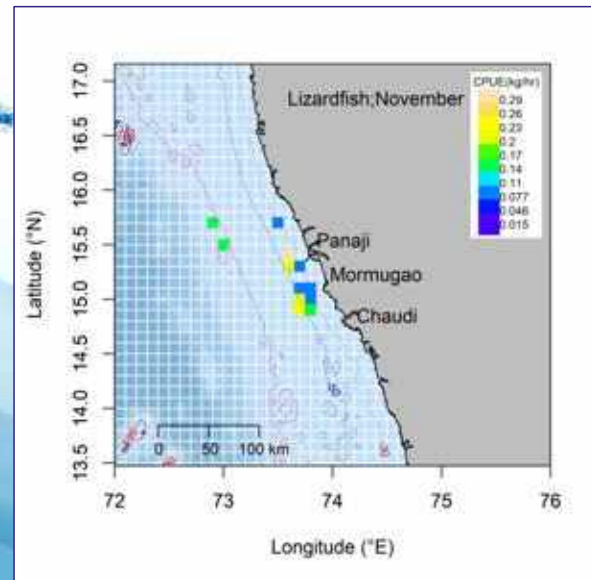
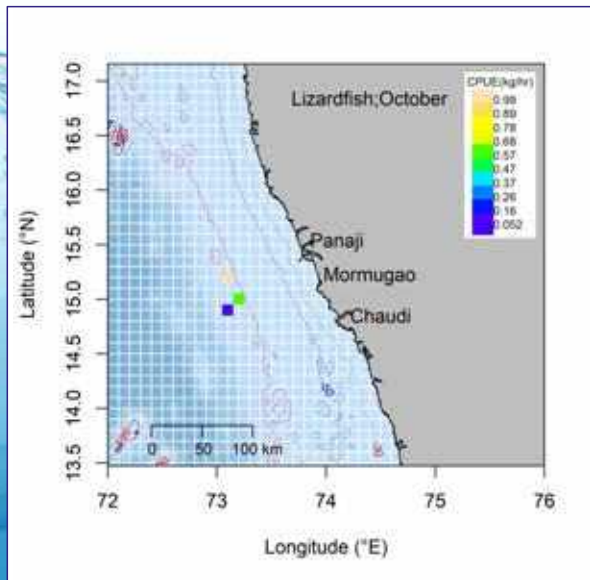
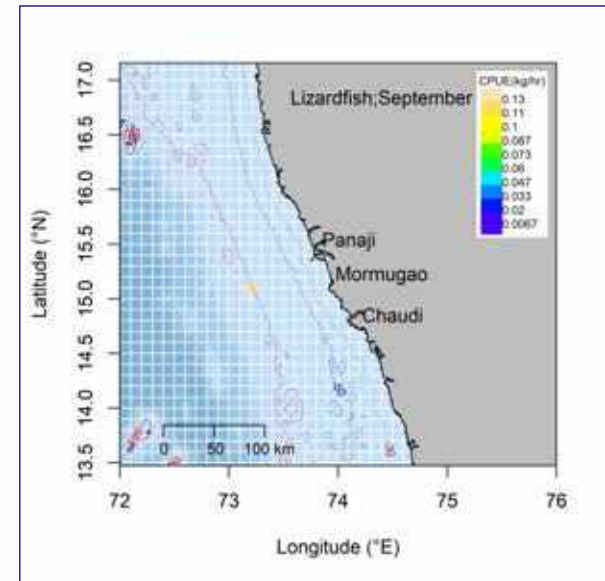
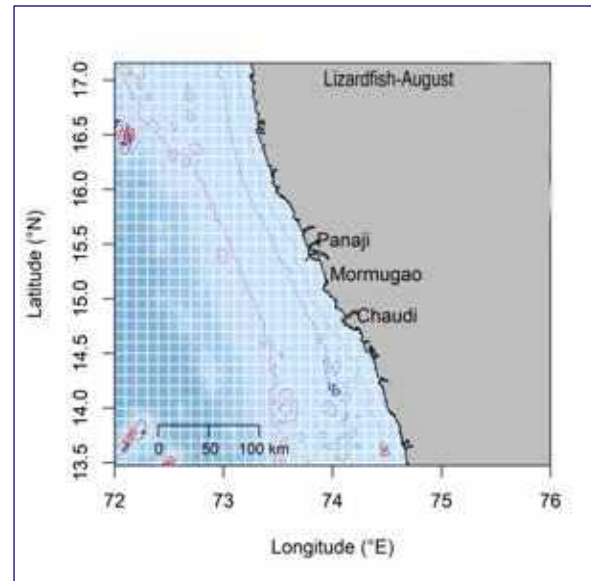
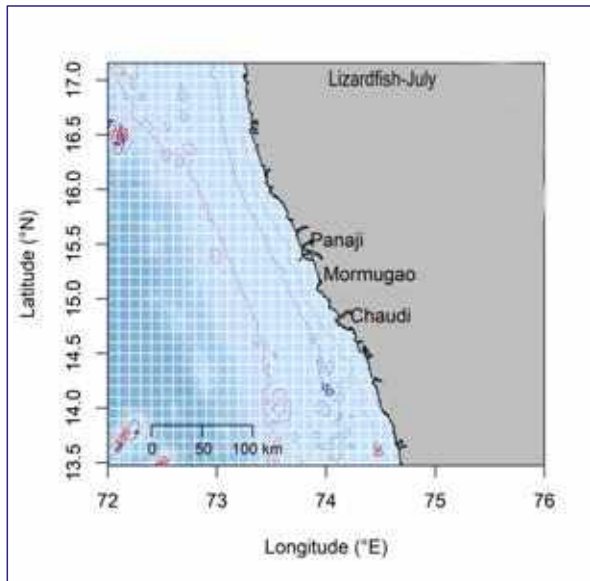


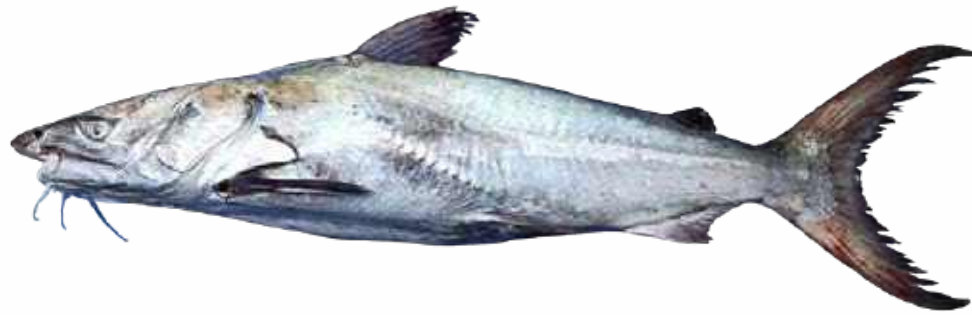


**Lizard Fish**

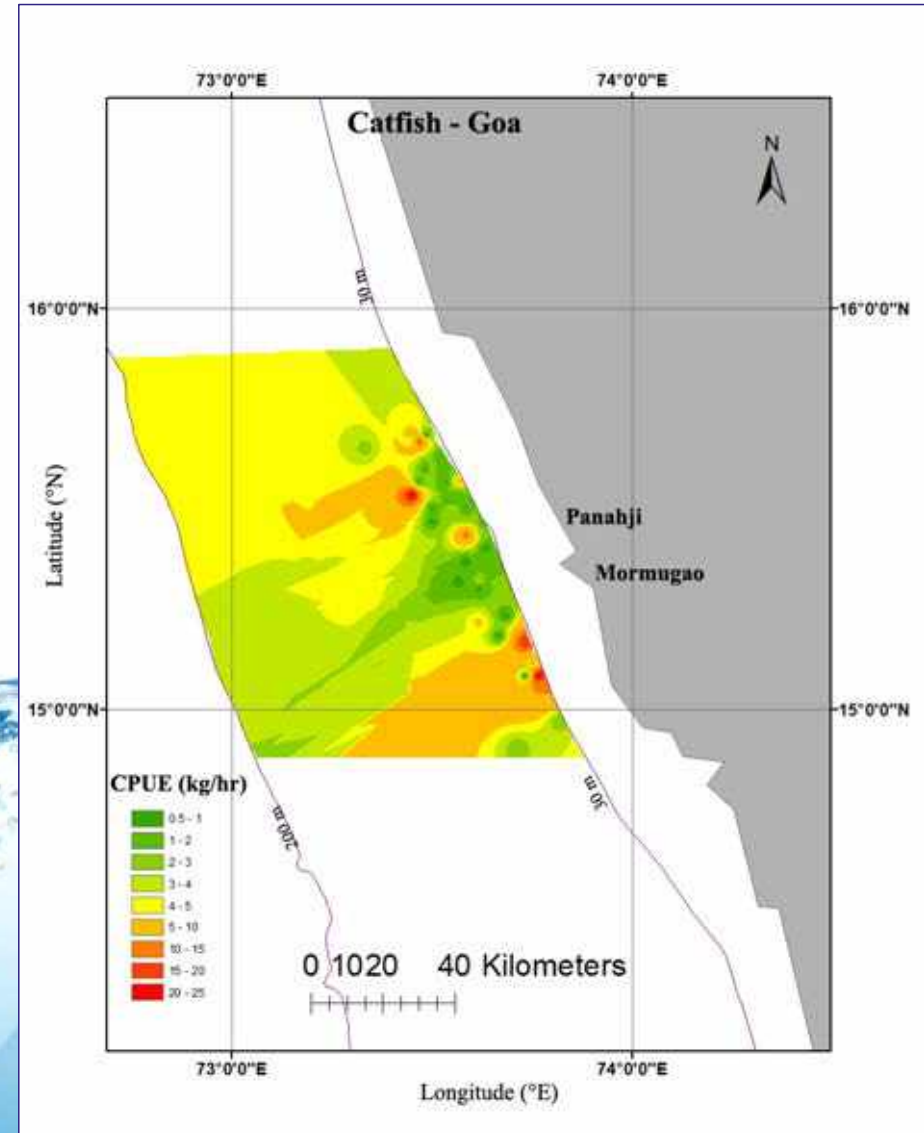




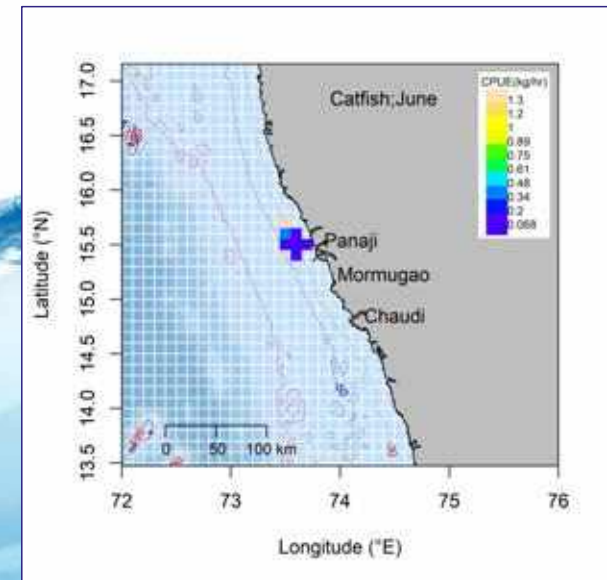
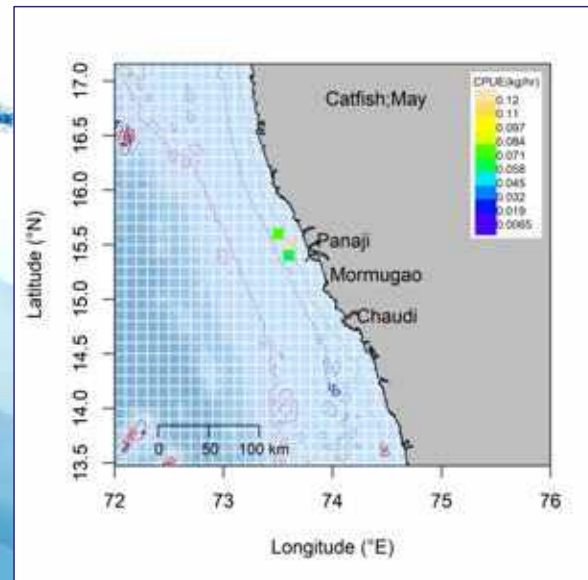
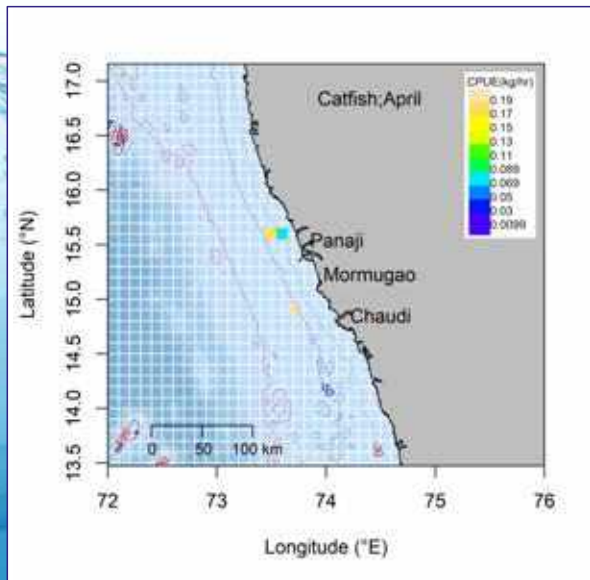
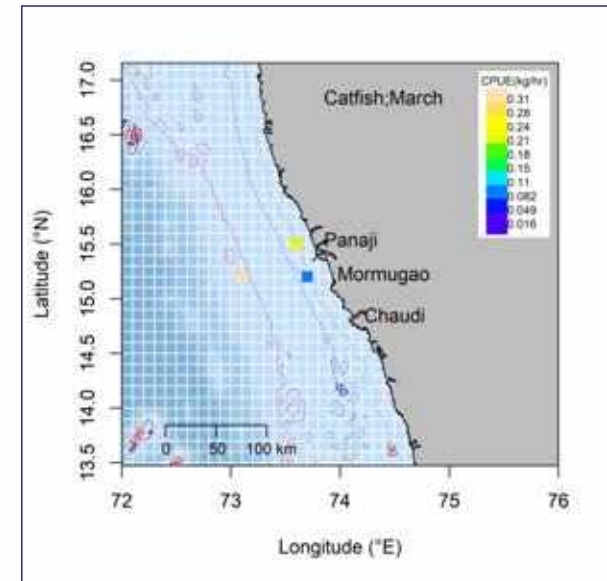
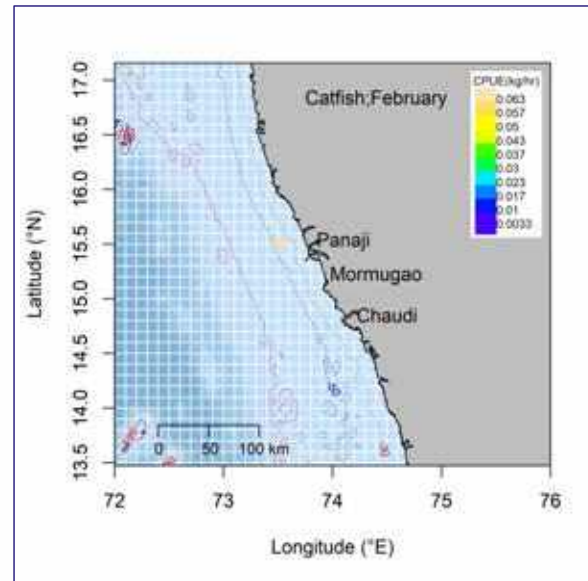
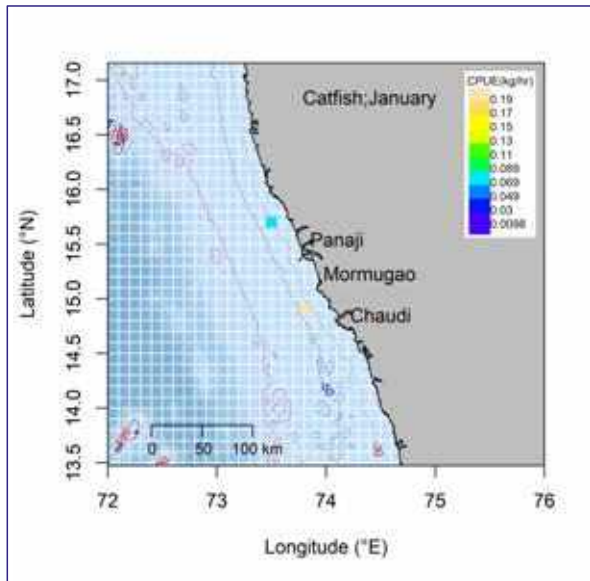


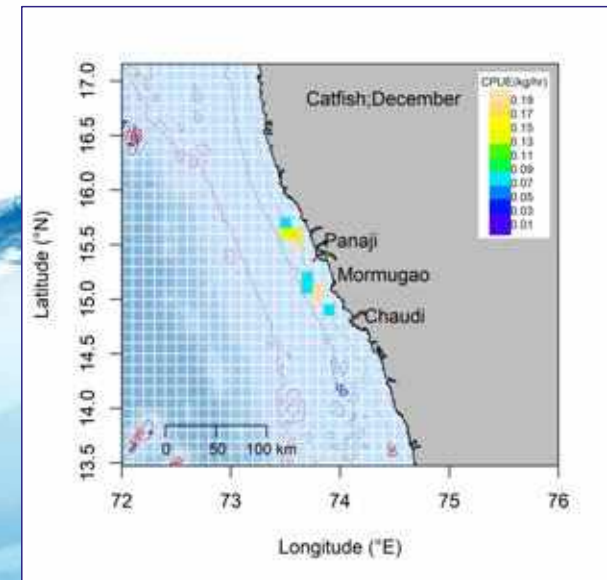
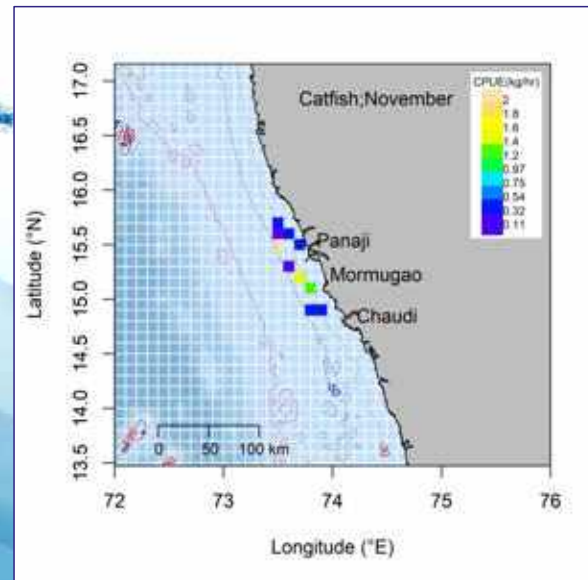
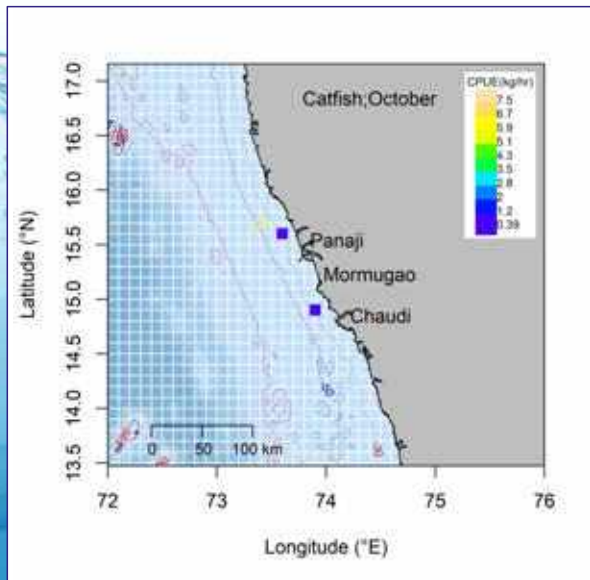
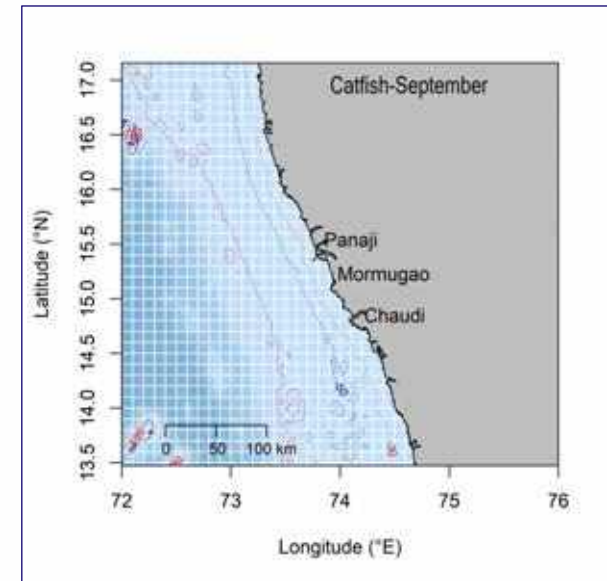
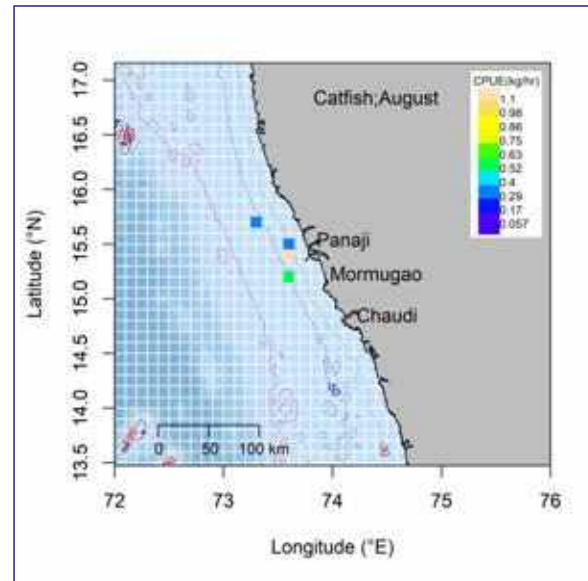
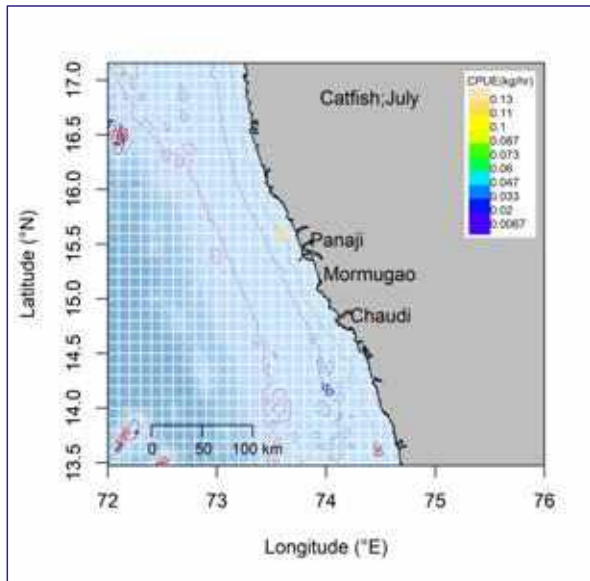


Cat Fish



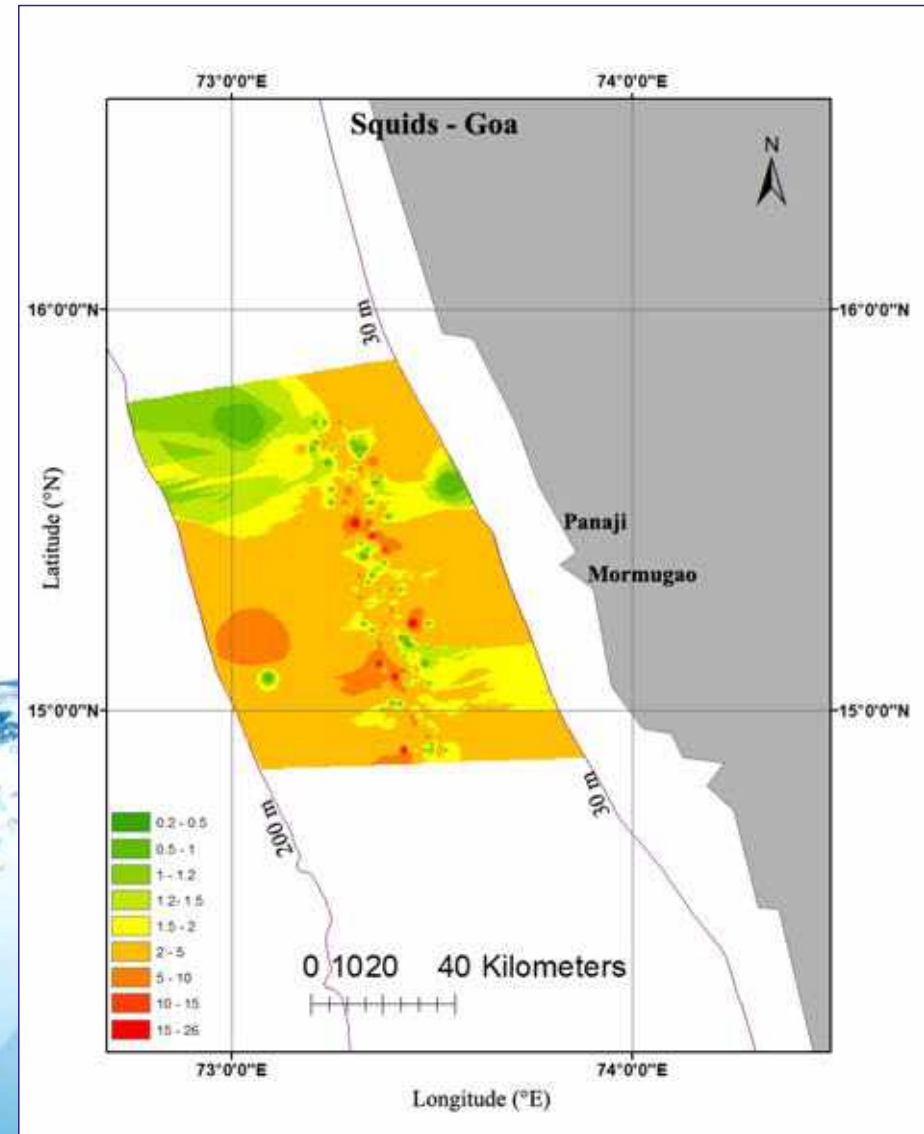


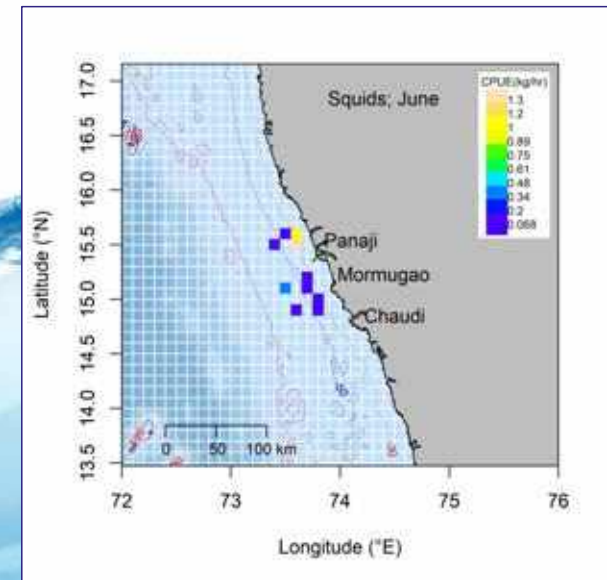
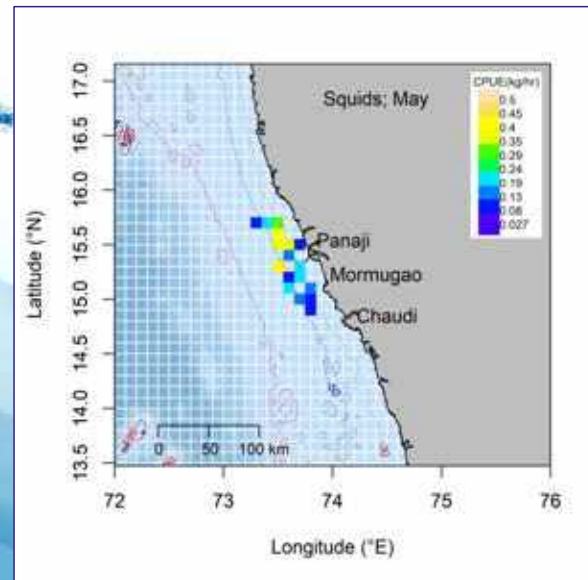
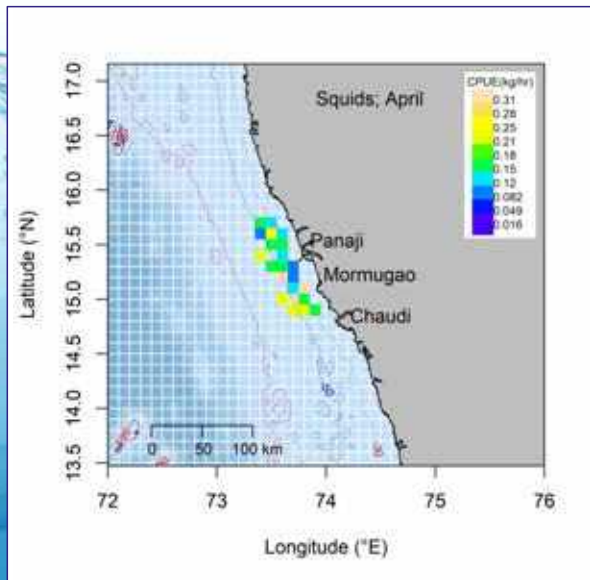
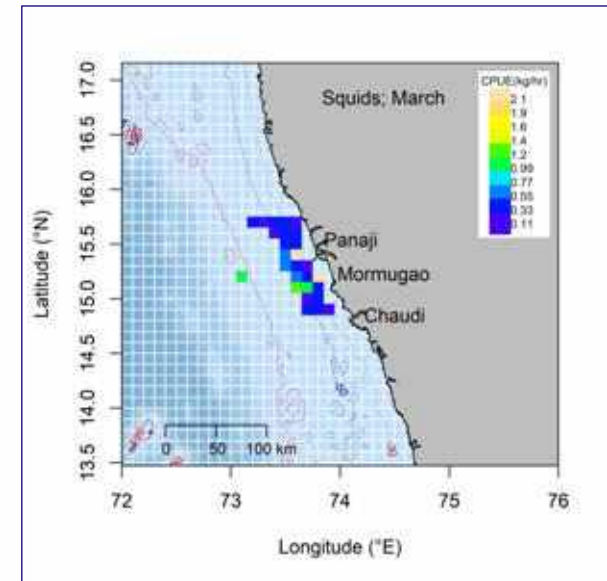
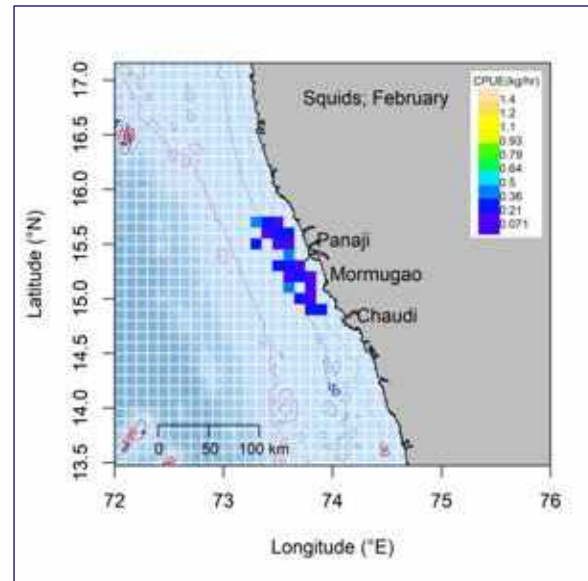
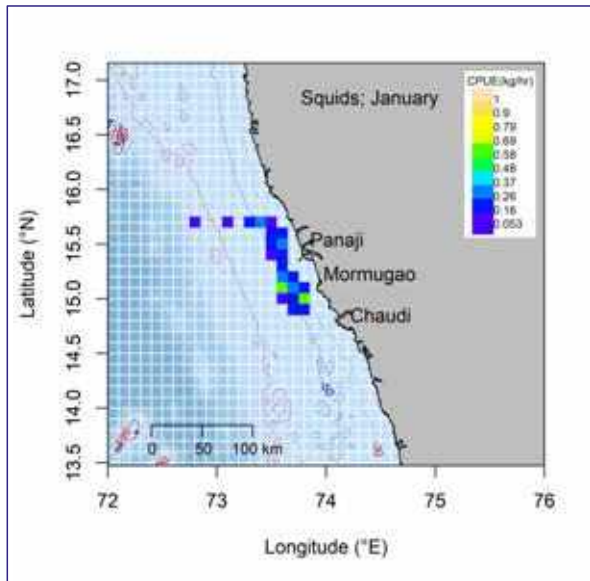


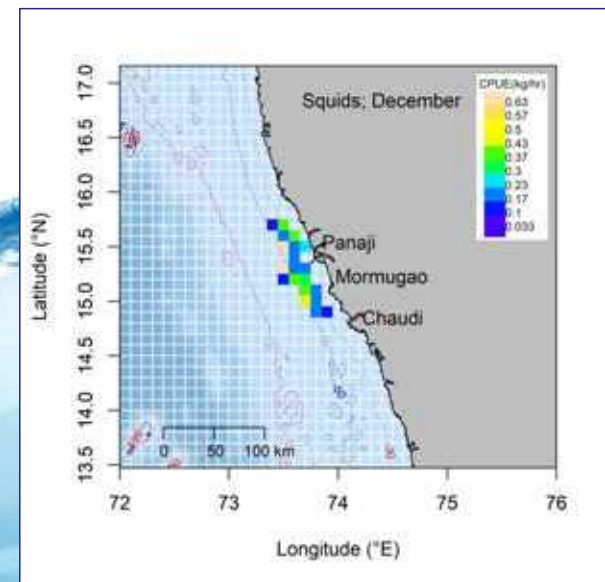
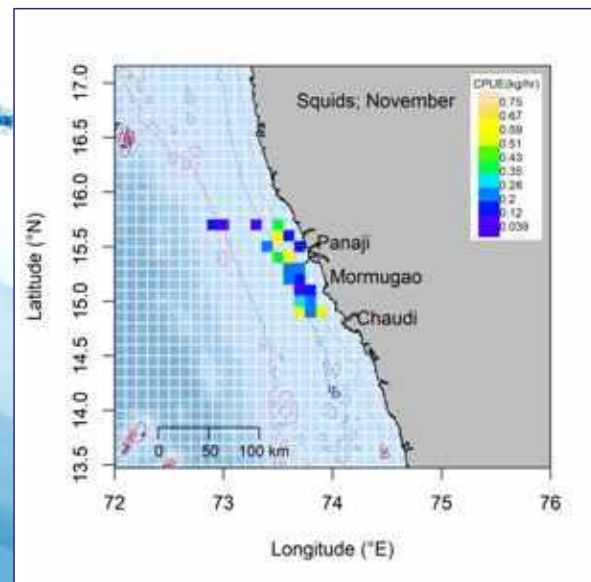
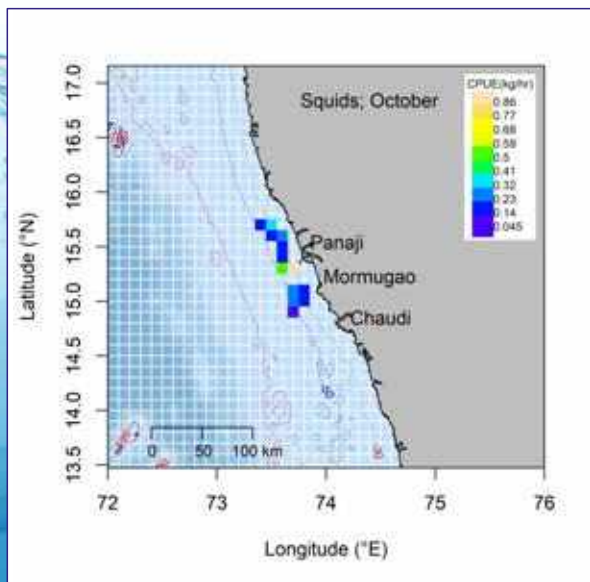
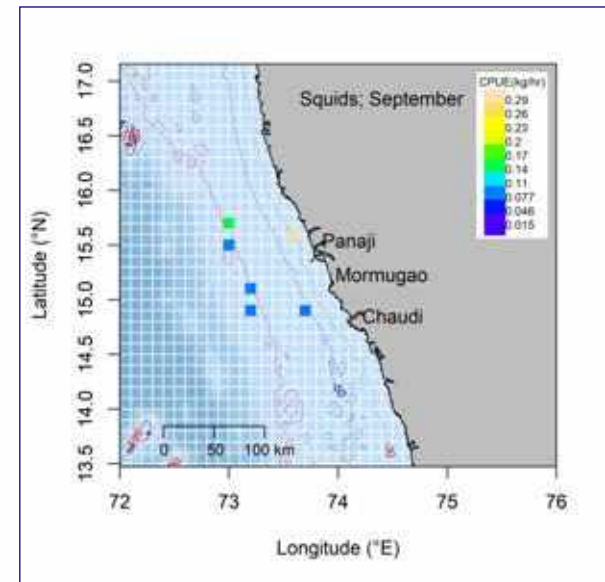
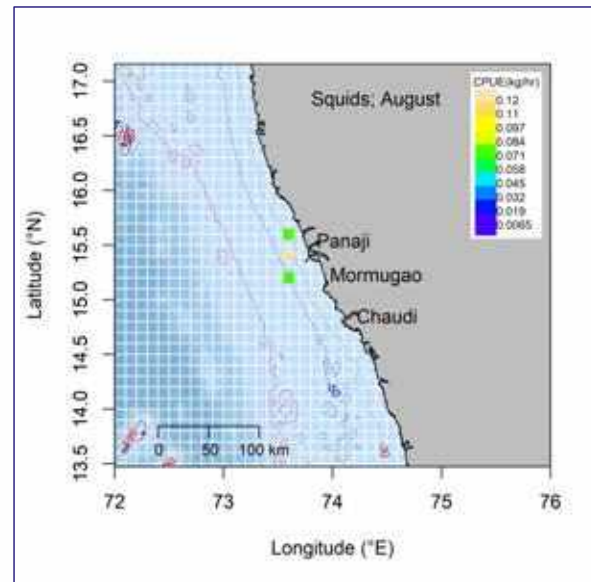
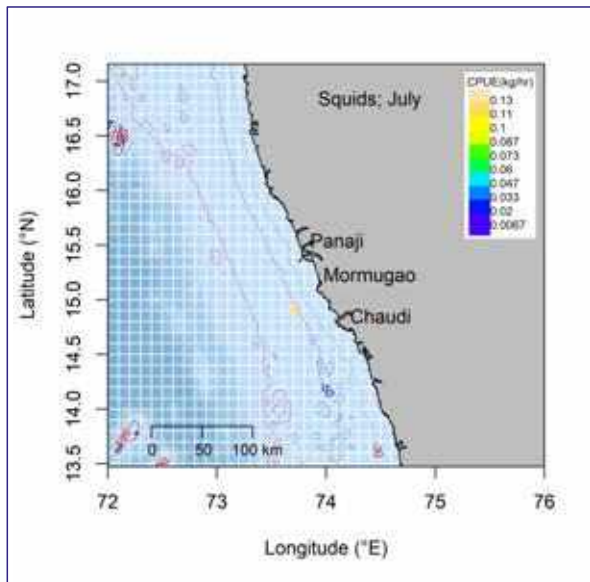




# Squids





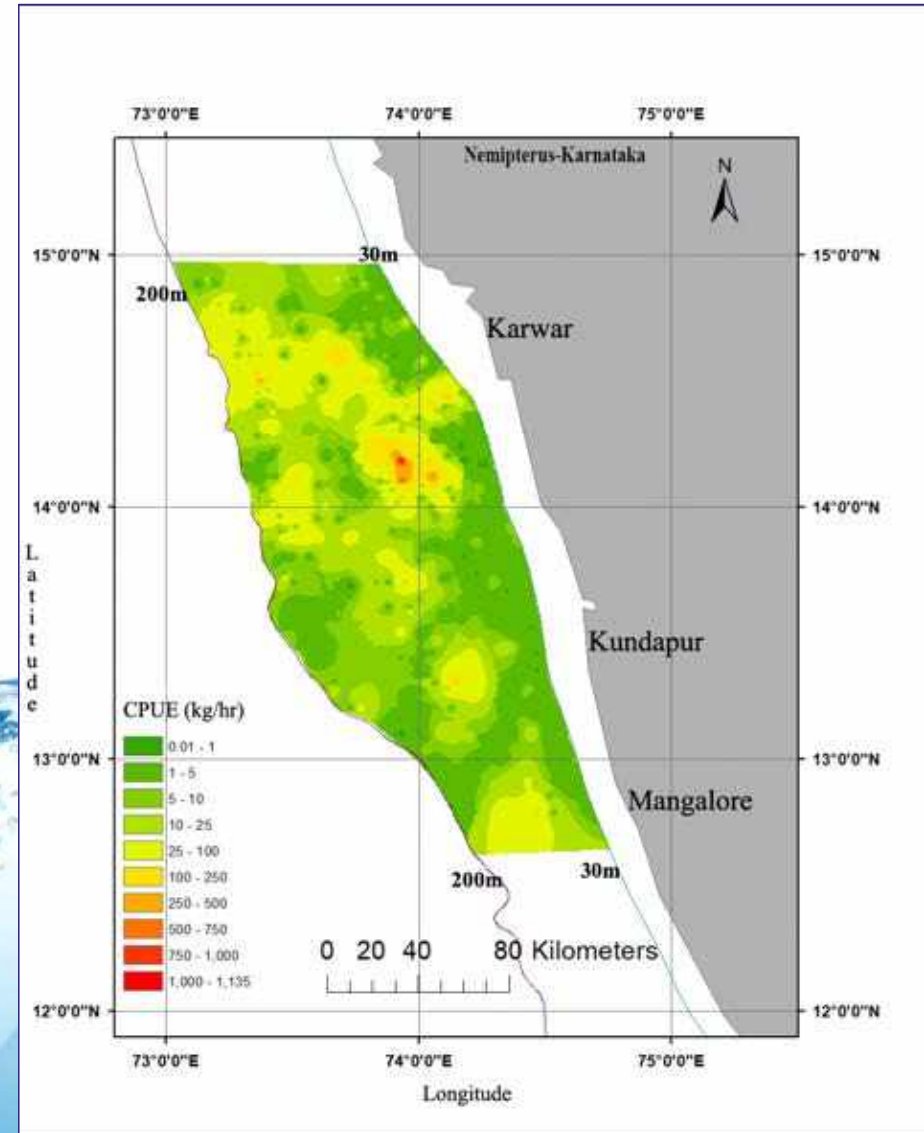


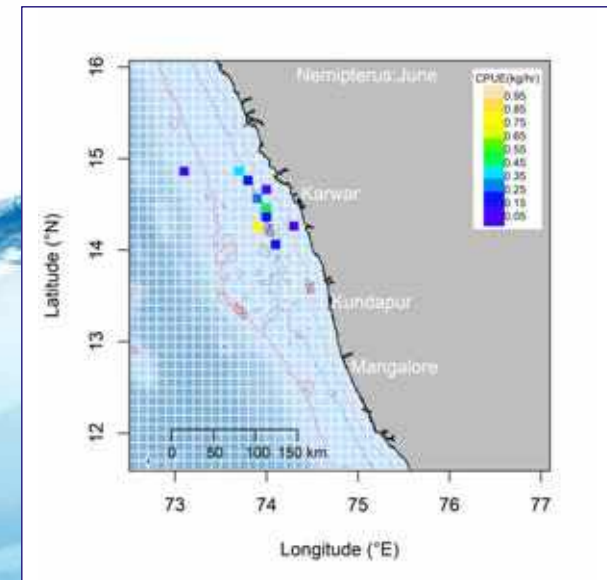
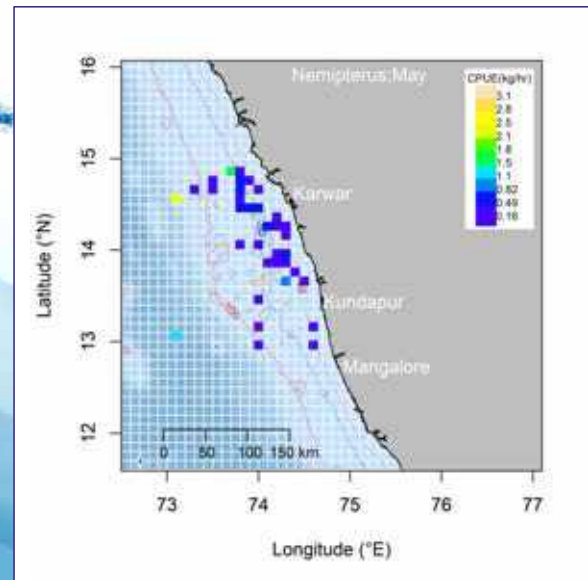
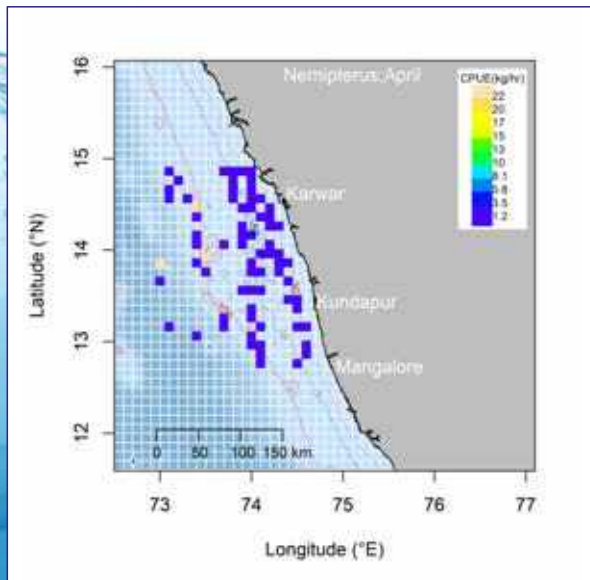
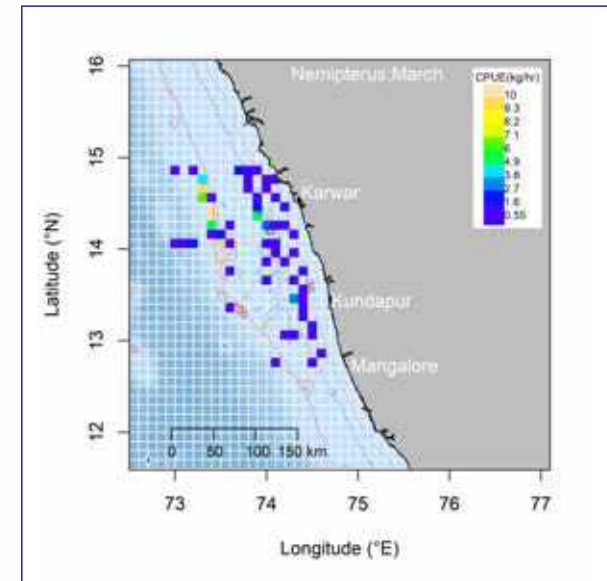
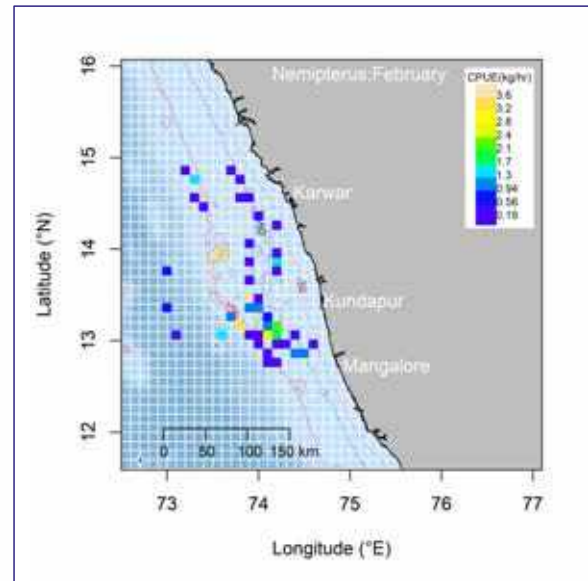
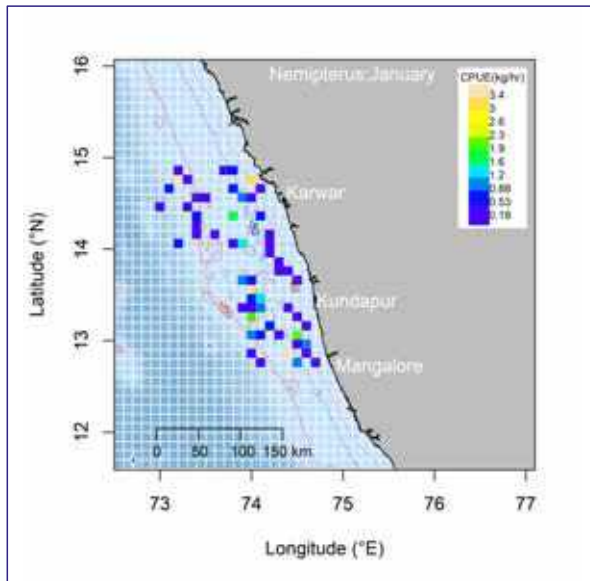
## **3.4** Spatial distribution and abundance along Karnataka coast



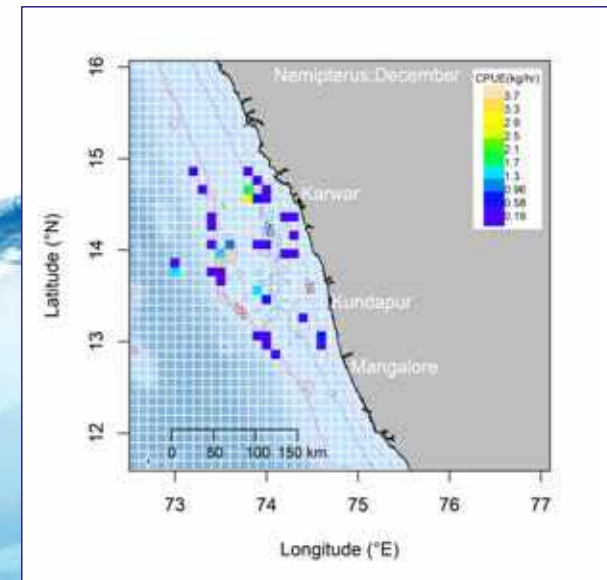
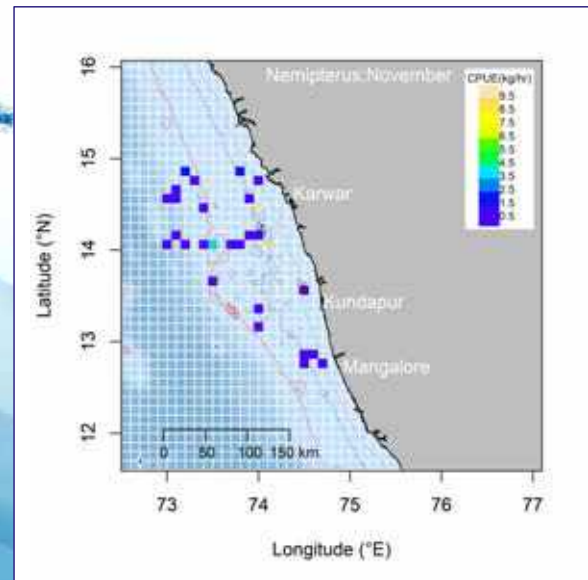
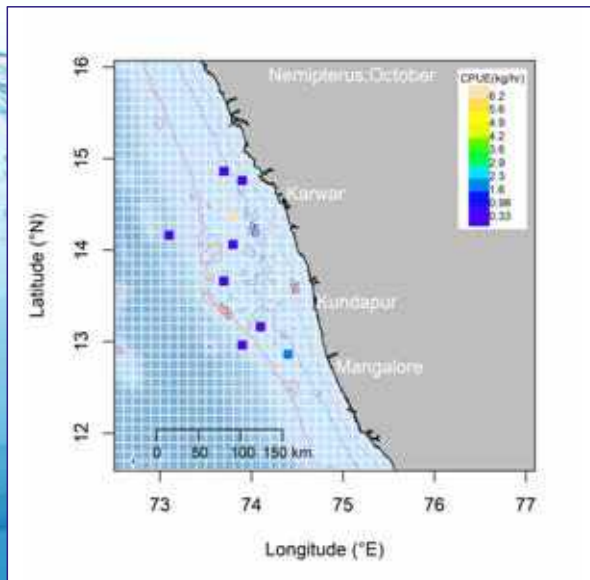
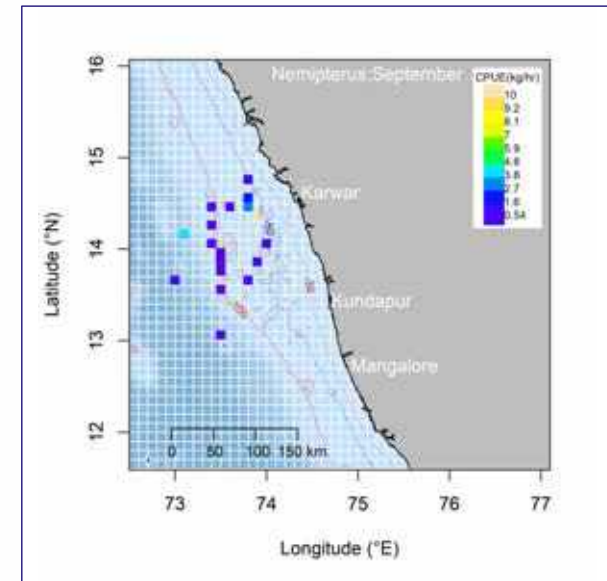
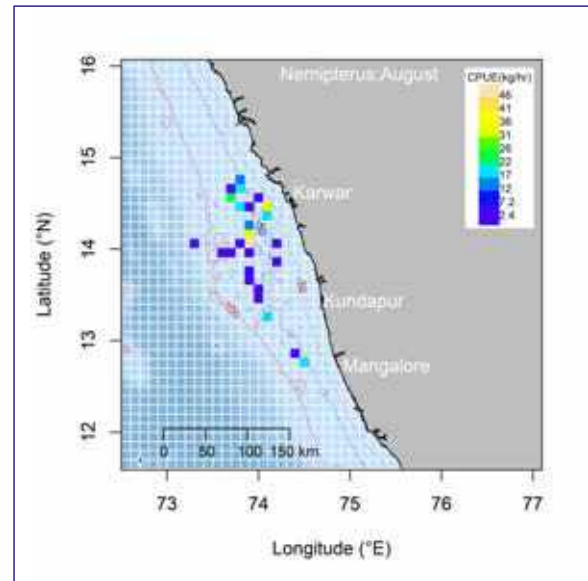
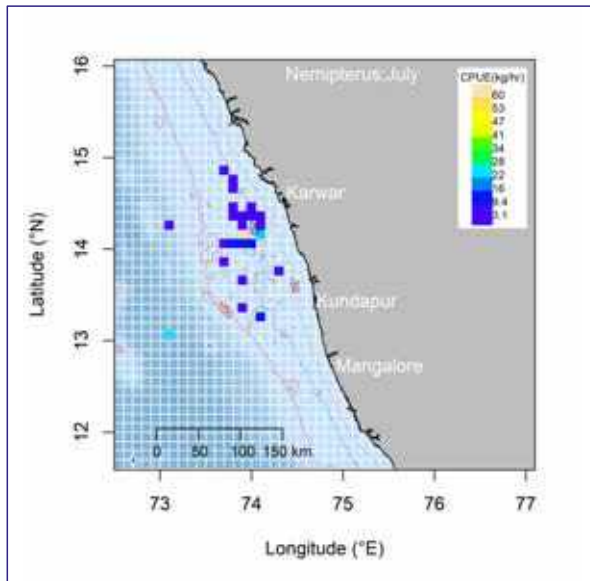


# Threadfin Breams (Nemipterus)



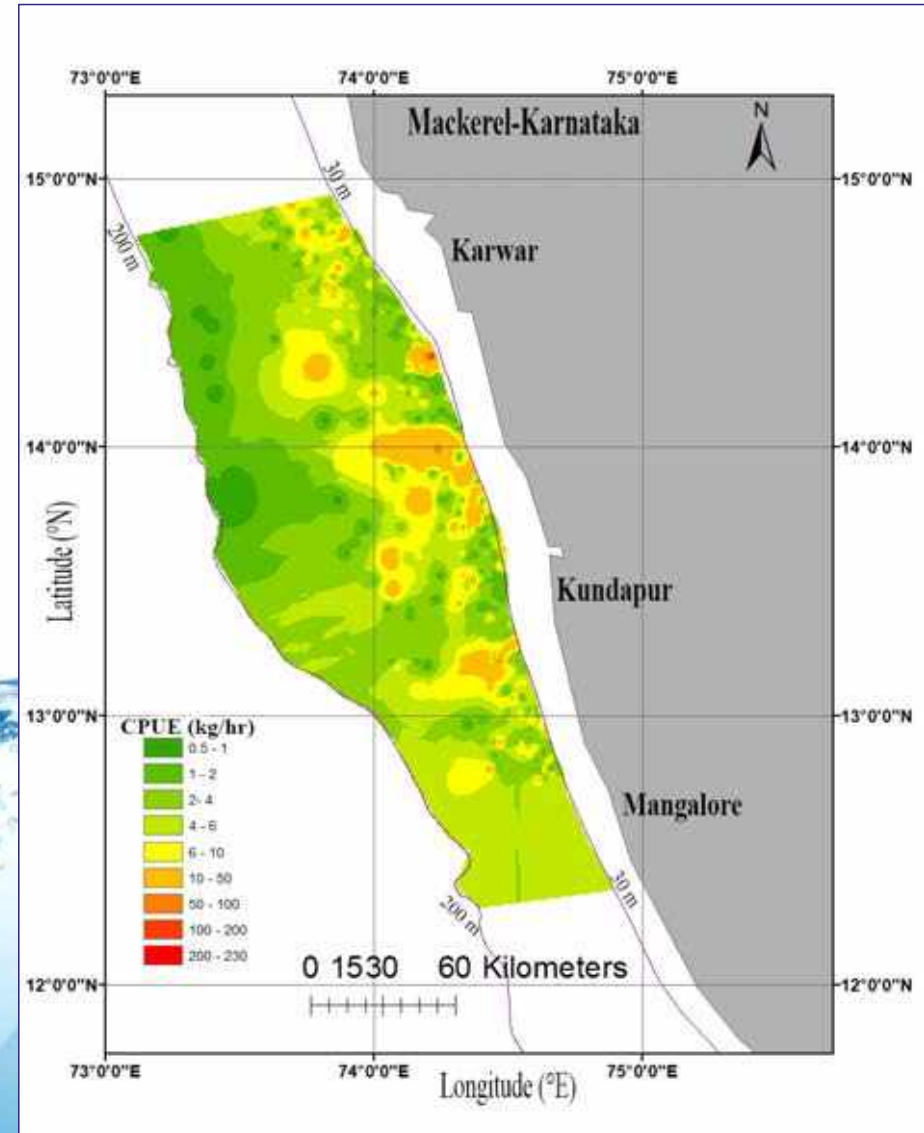


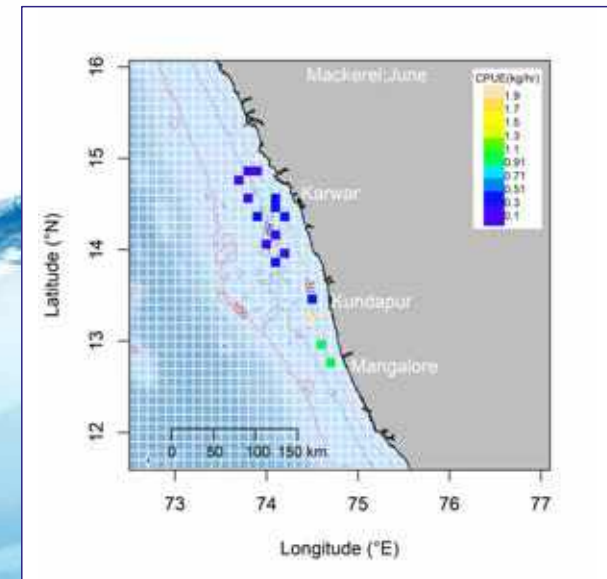
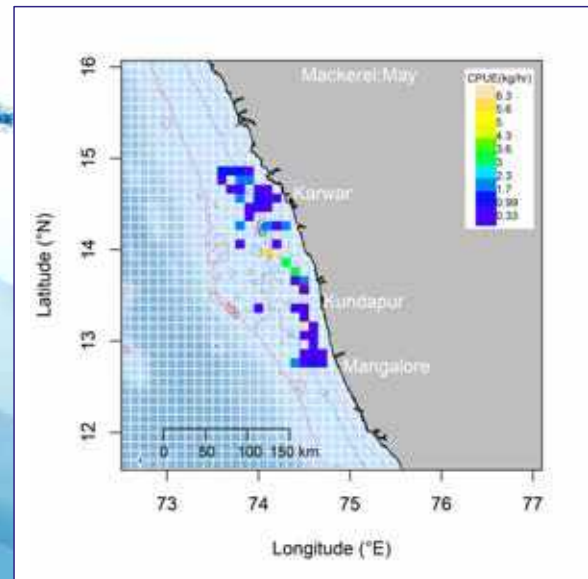
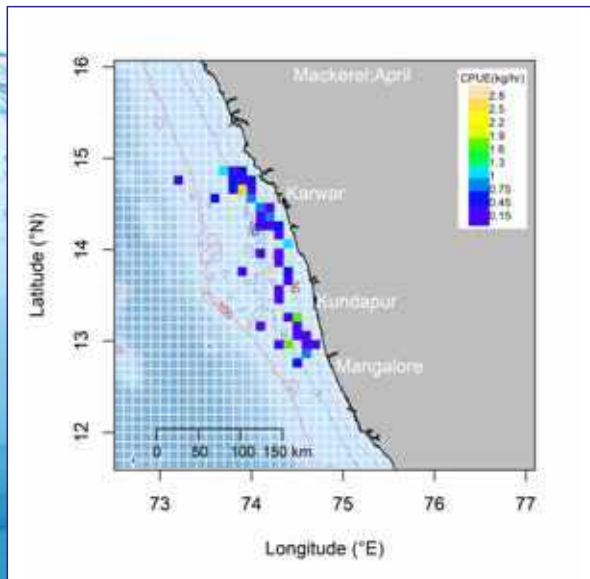
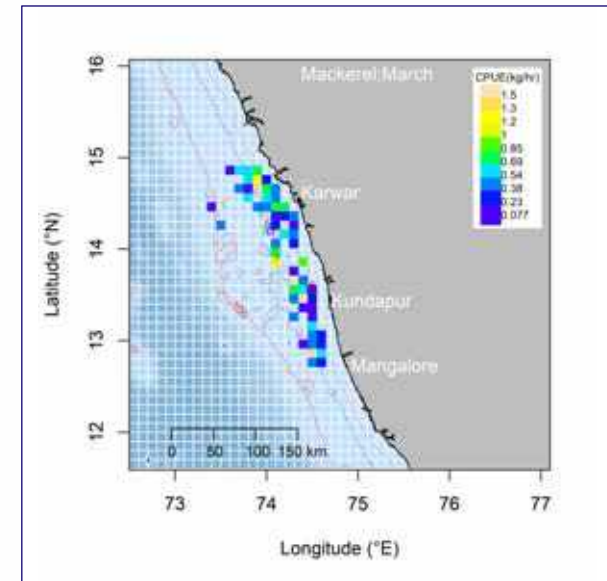
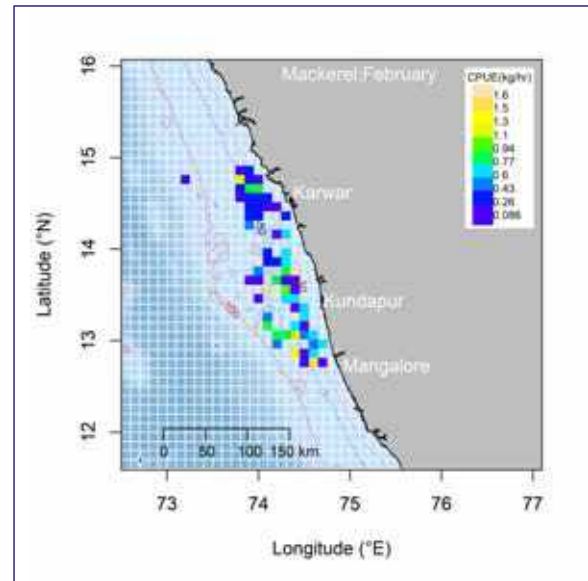
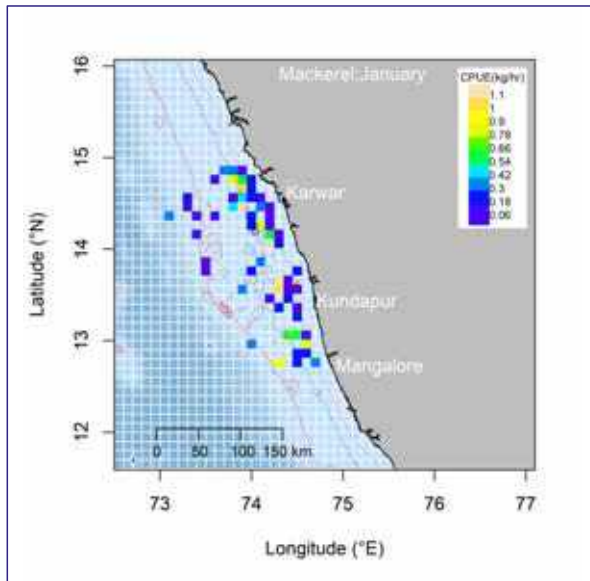


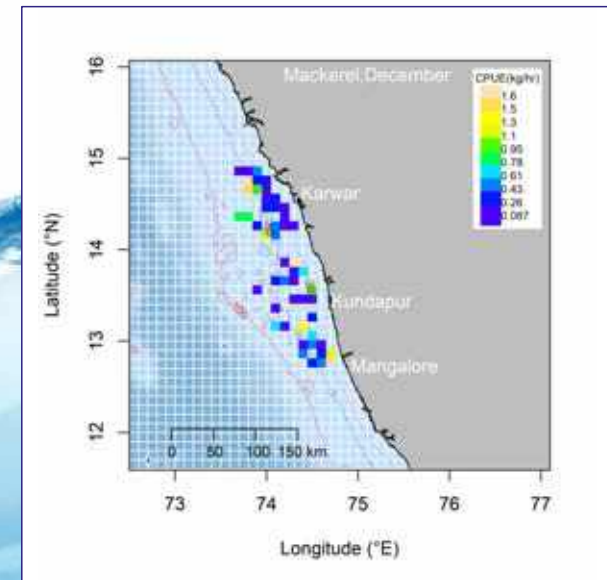
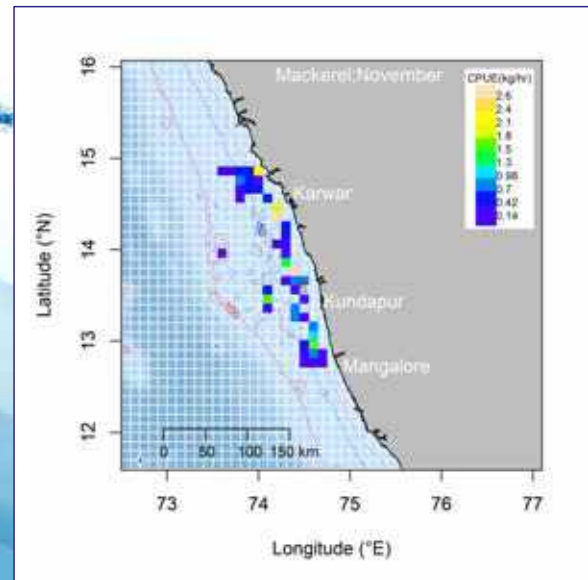
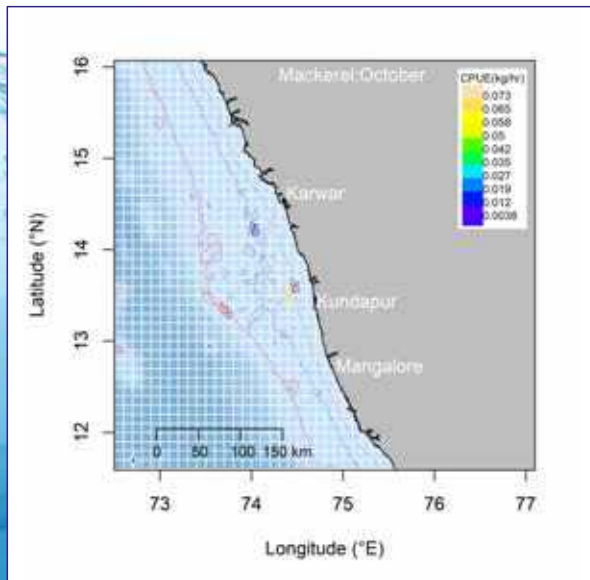
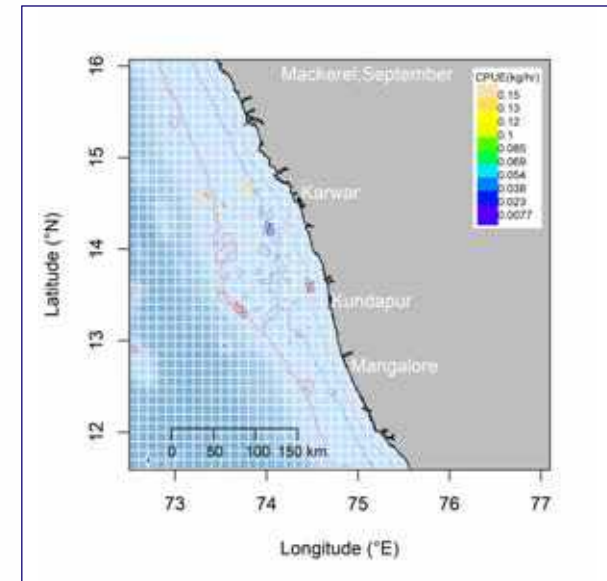
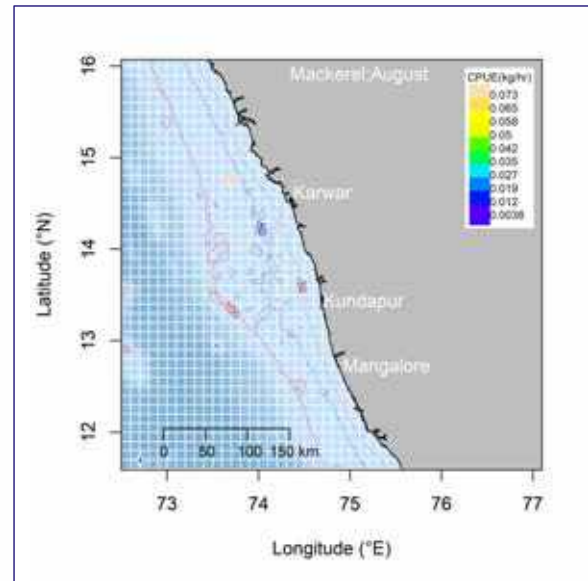
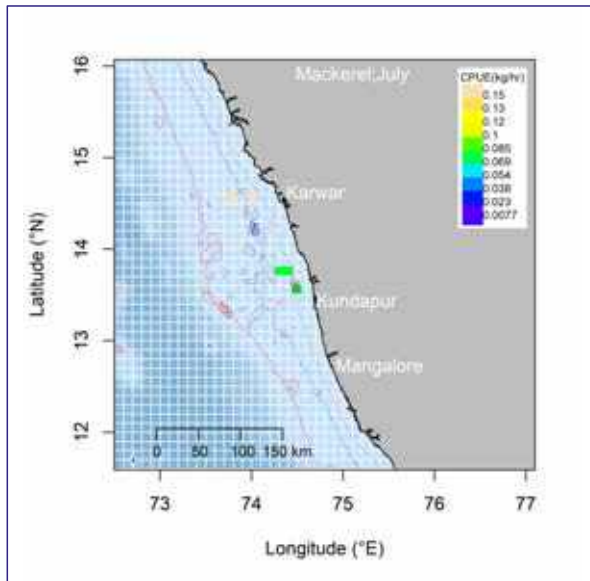




# Mackerel

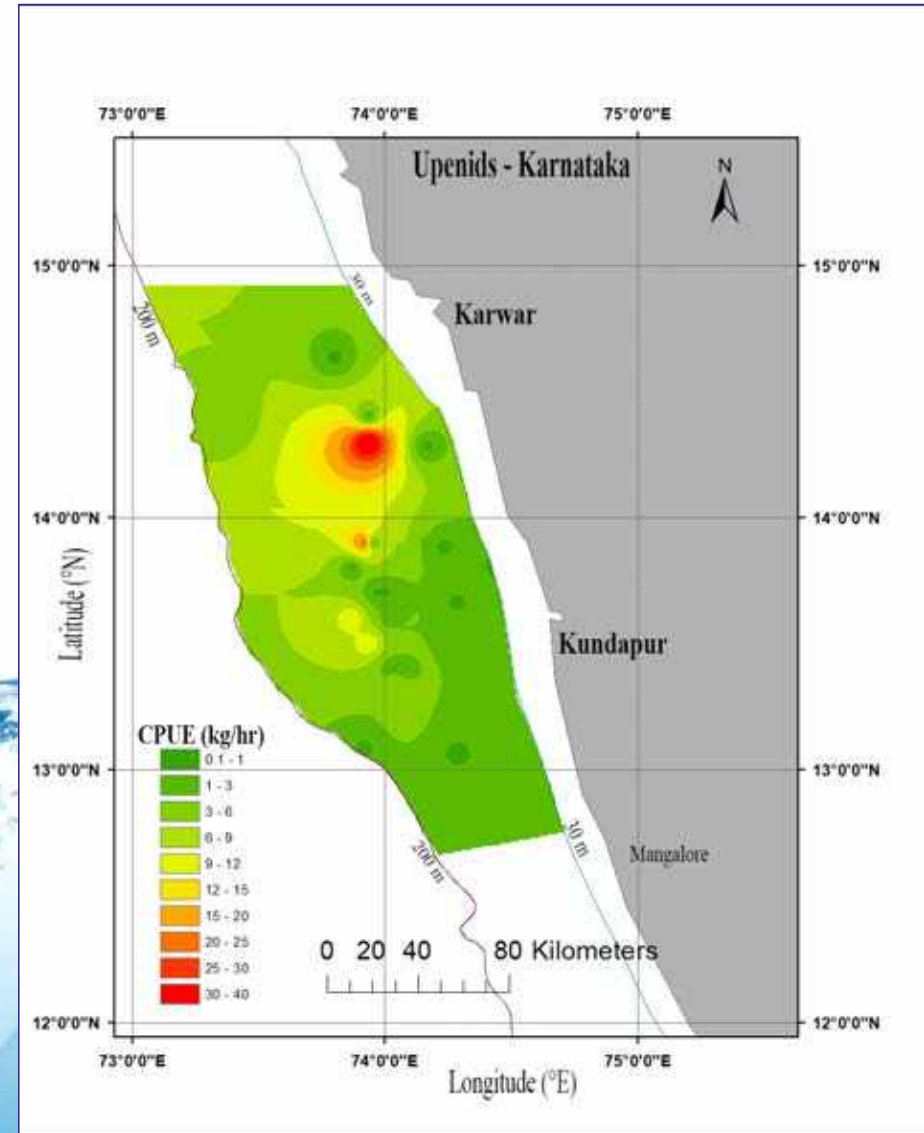


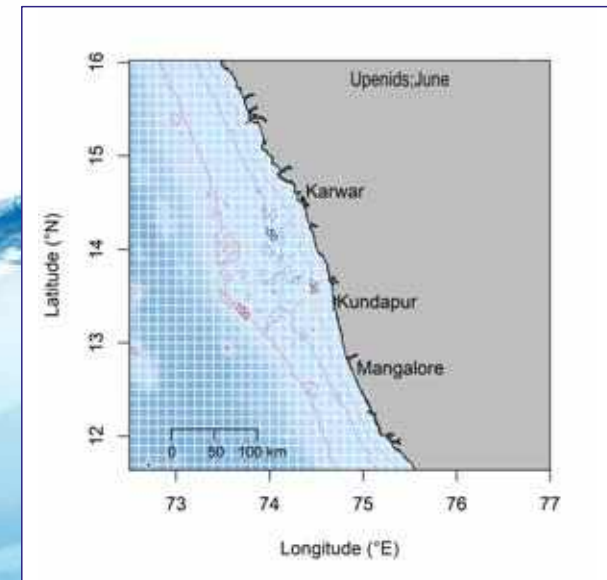
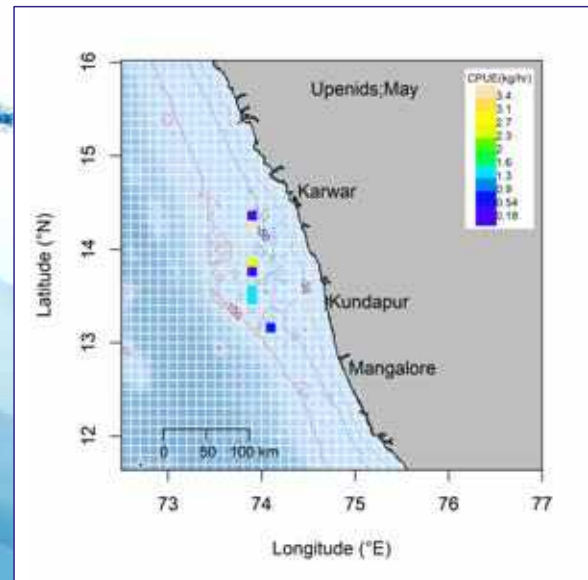
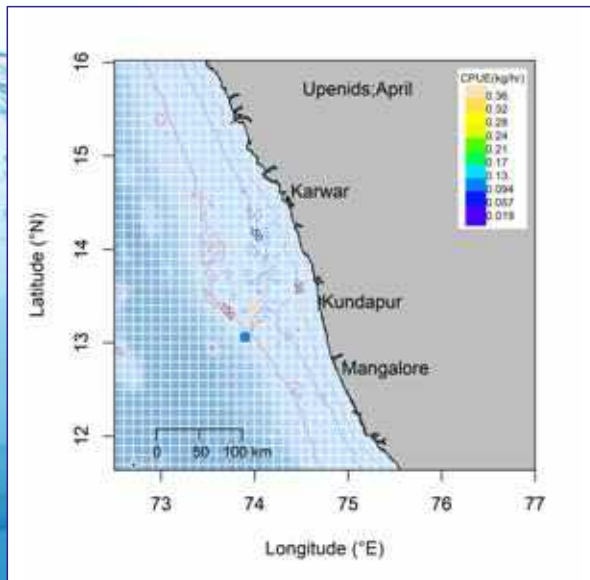
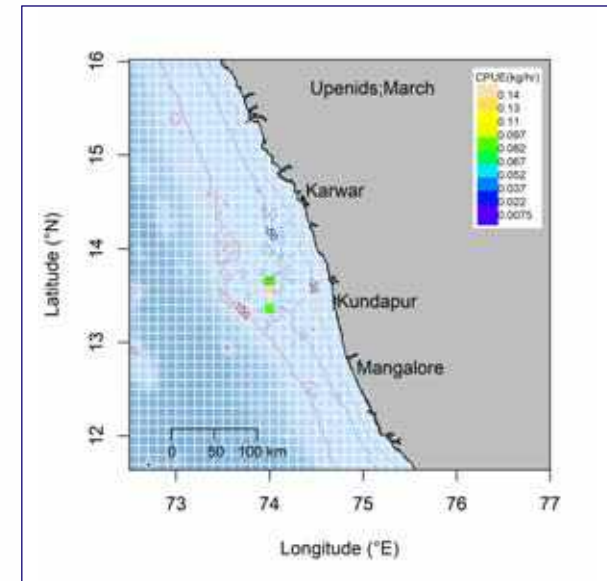
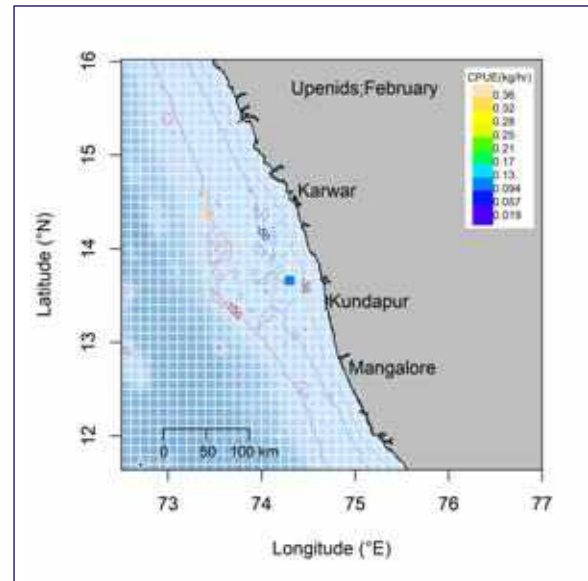
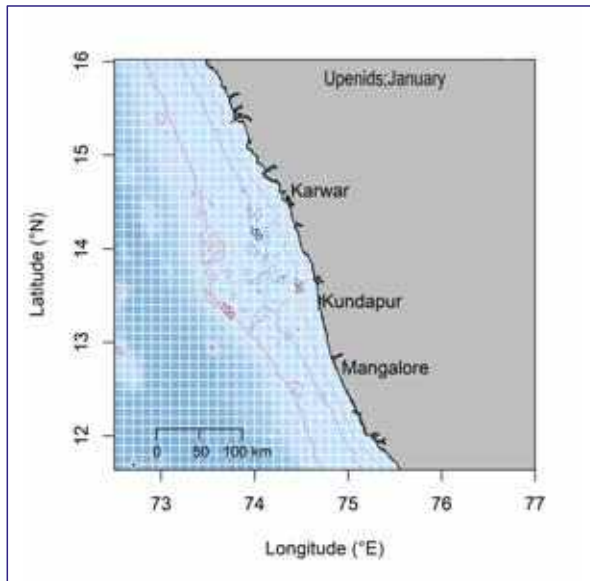


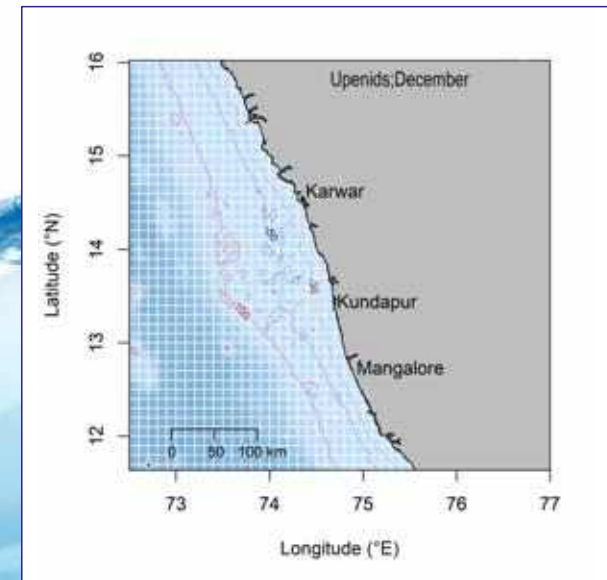
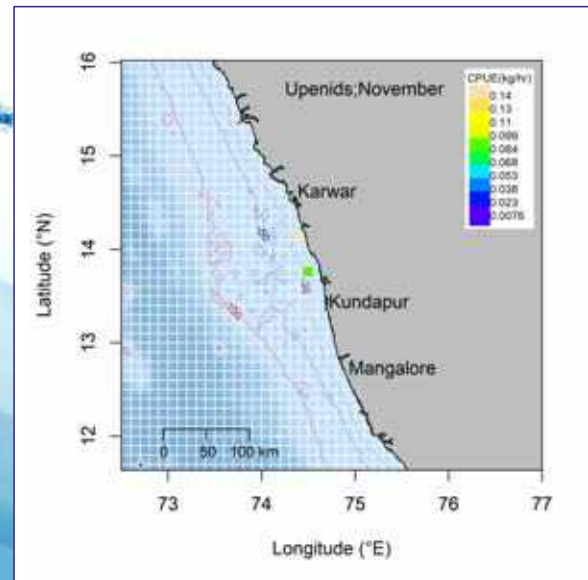
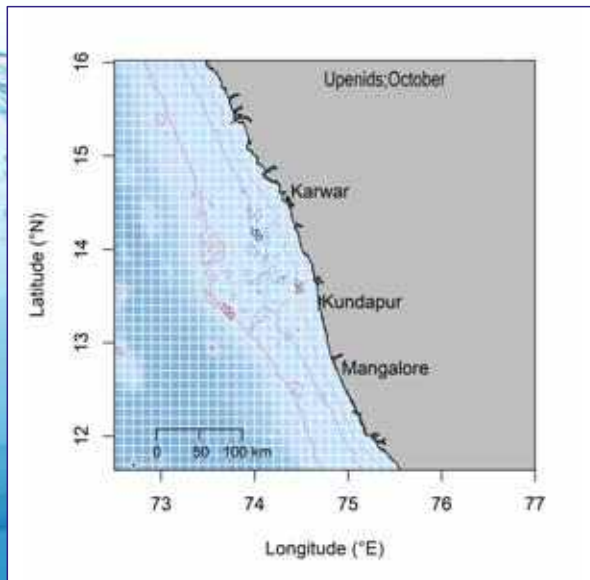
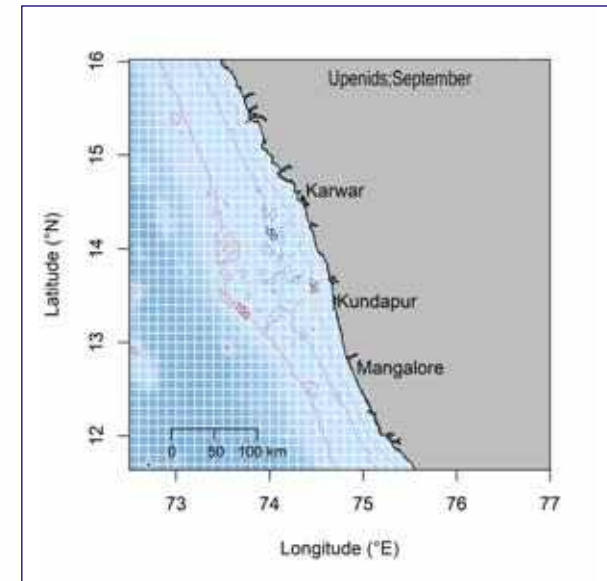
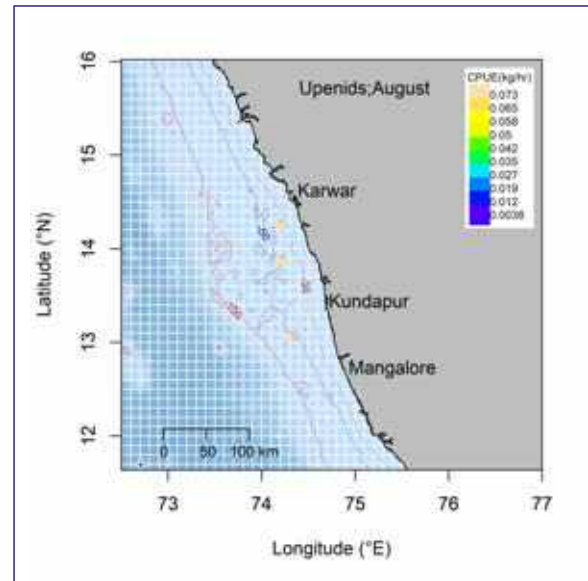
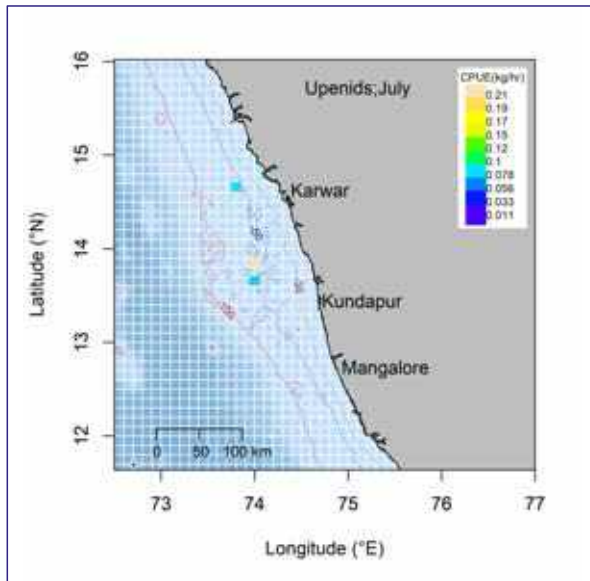




## Goatfish (Upeneids)

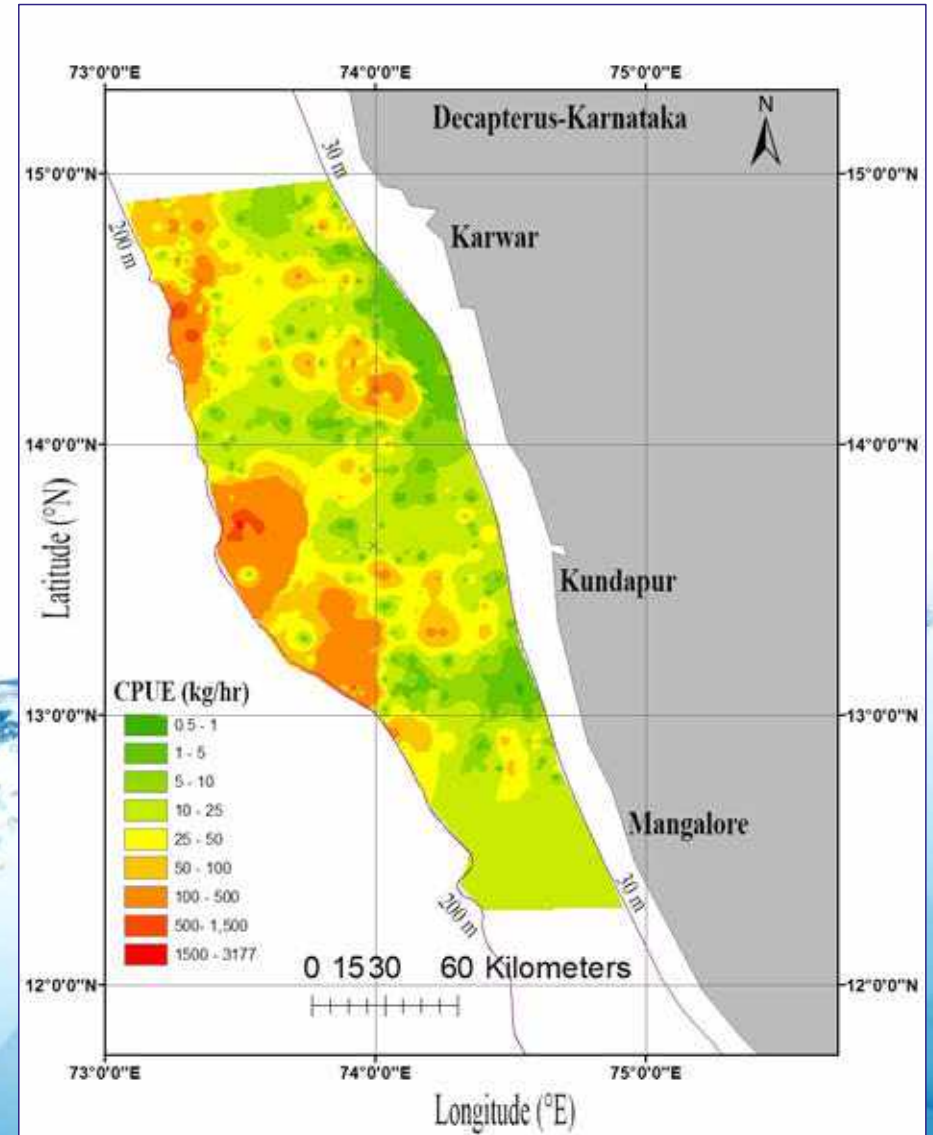




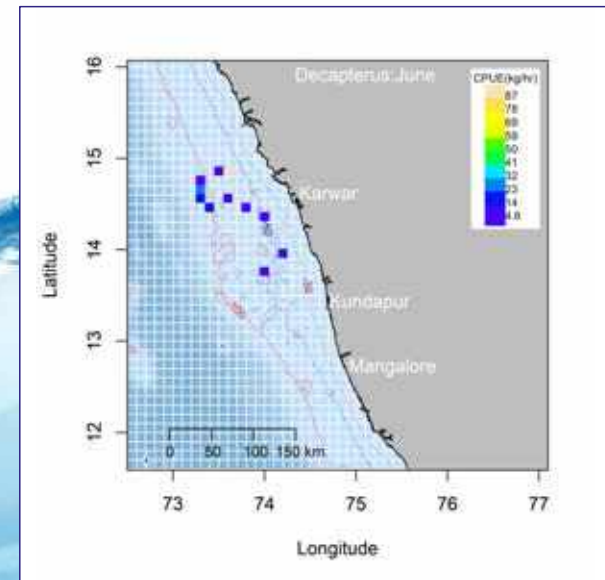
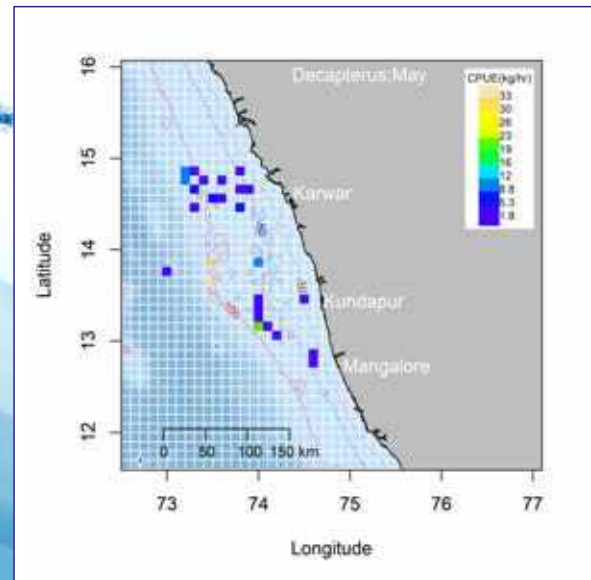
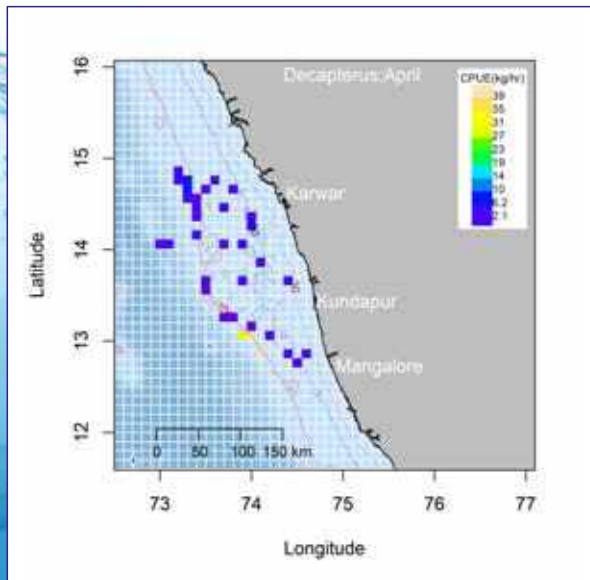
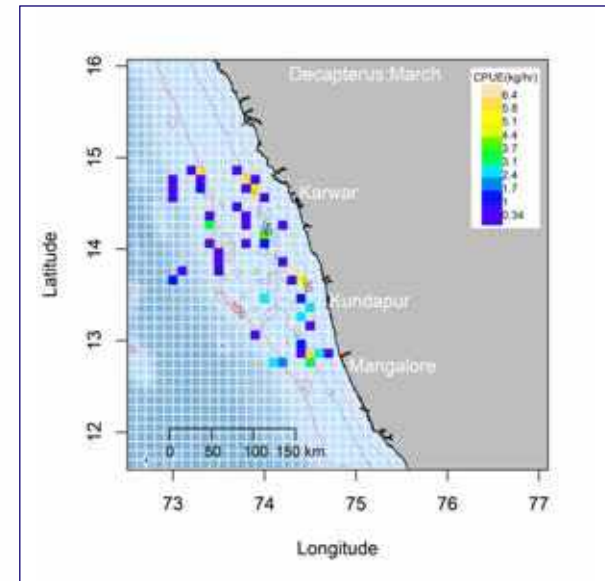
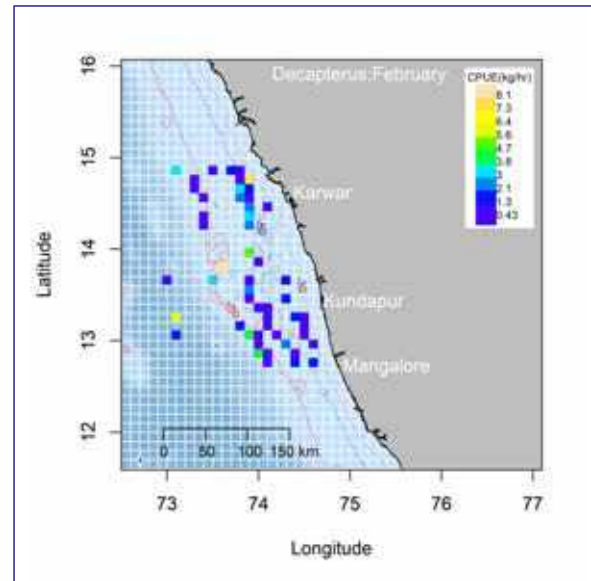
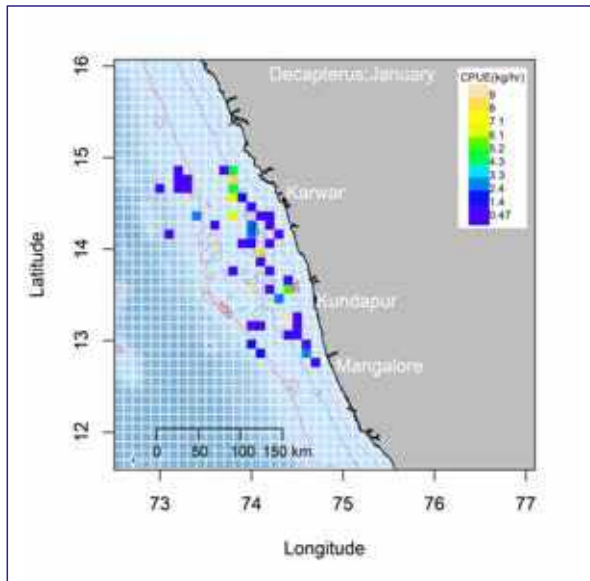


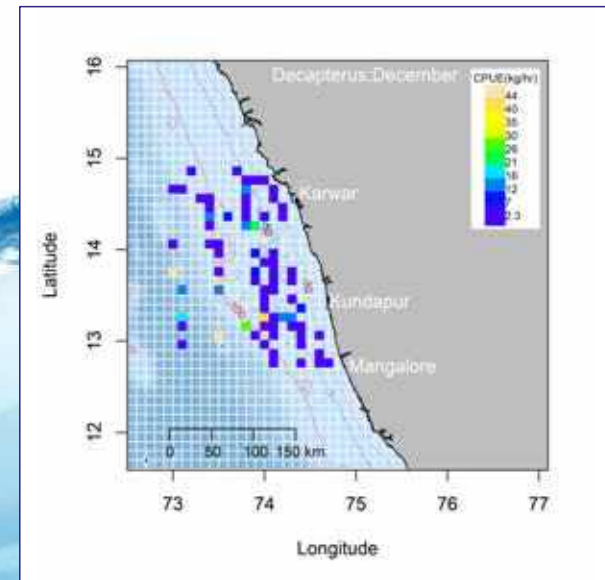
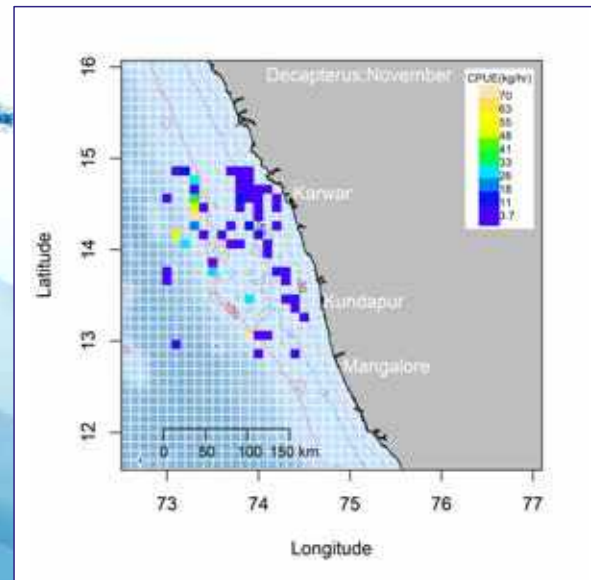
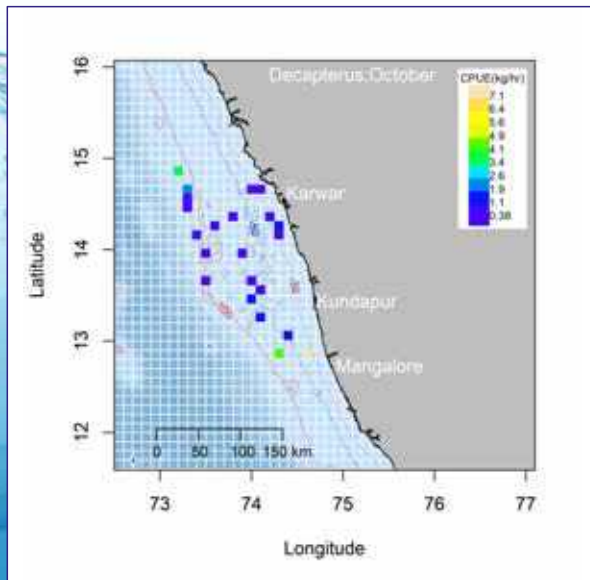
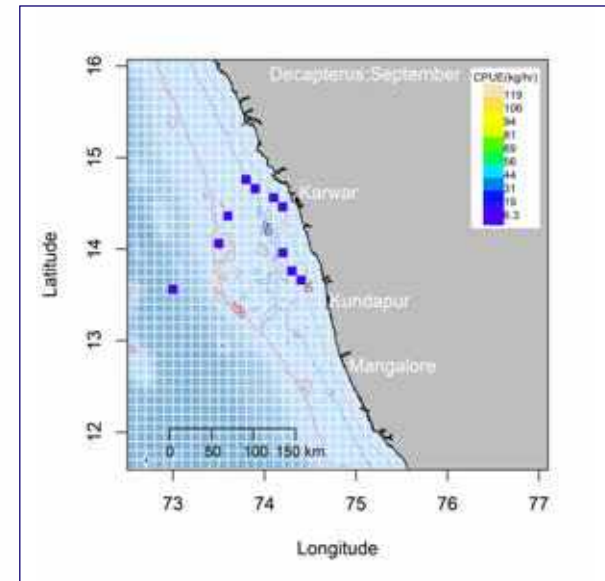
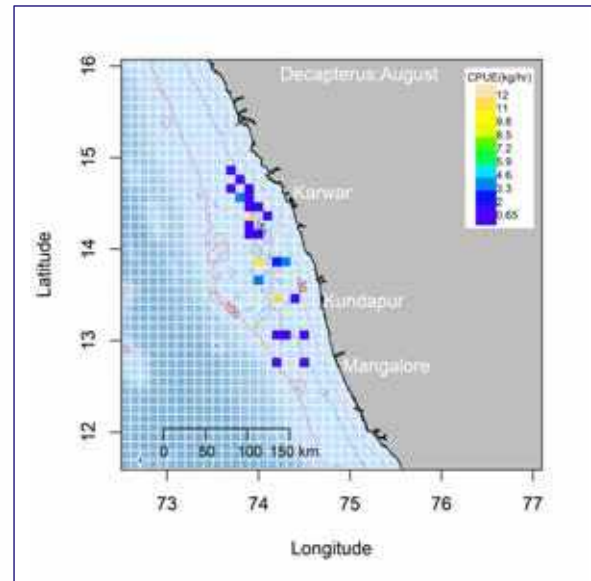
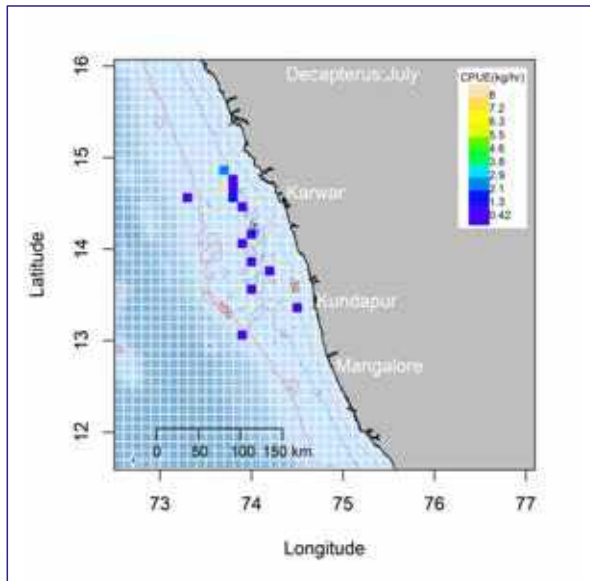


## Round Scads (Decapterus)



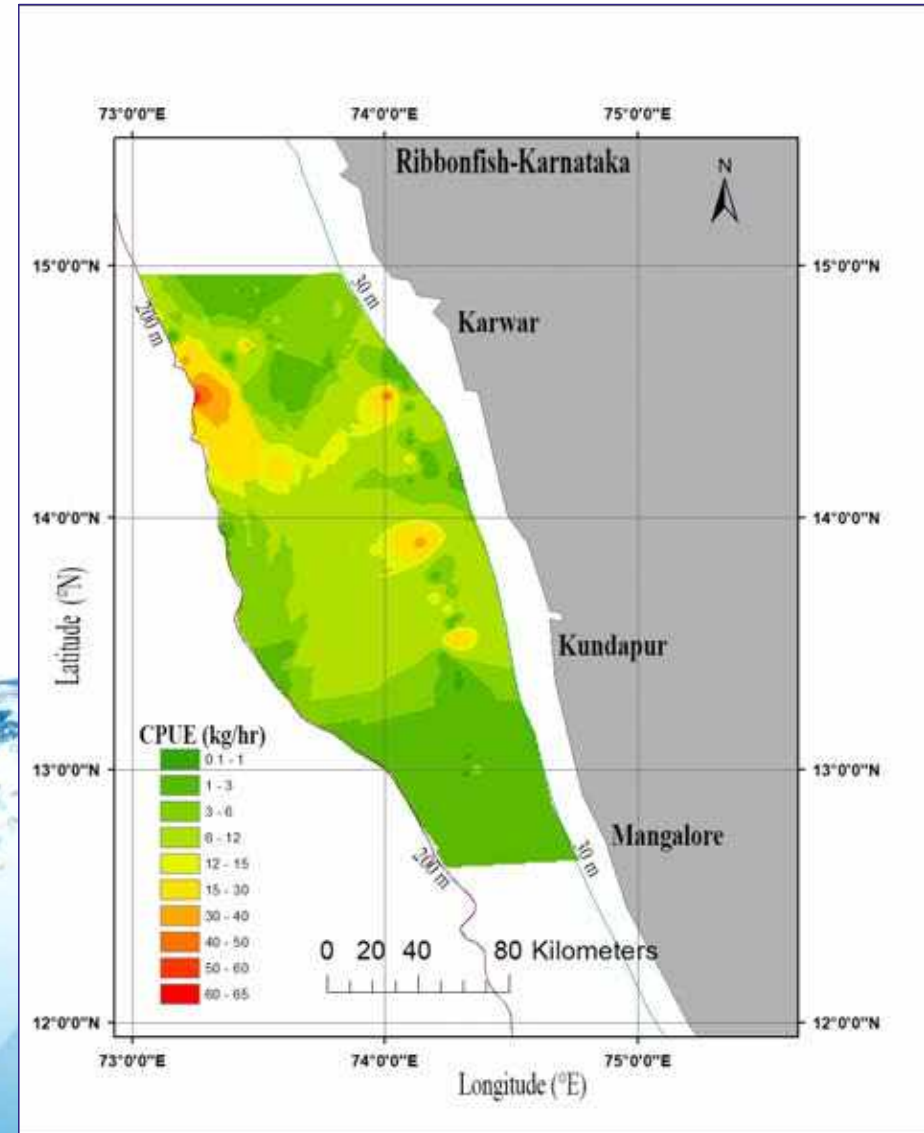


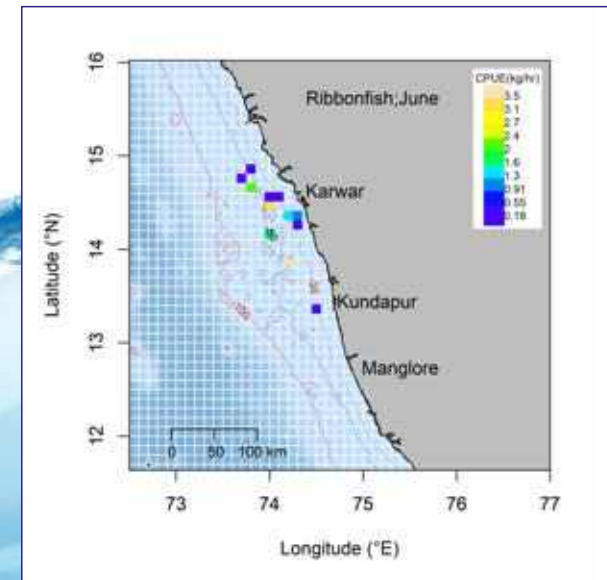
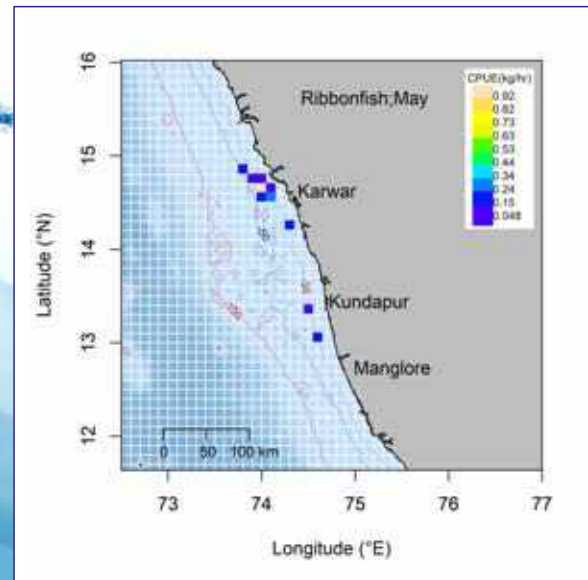
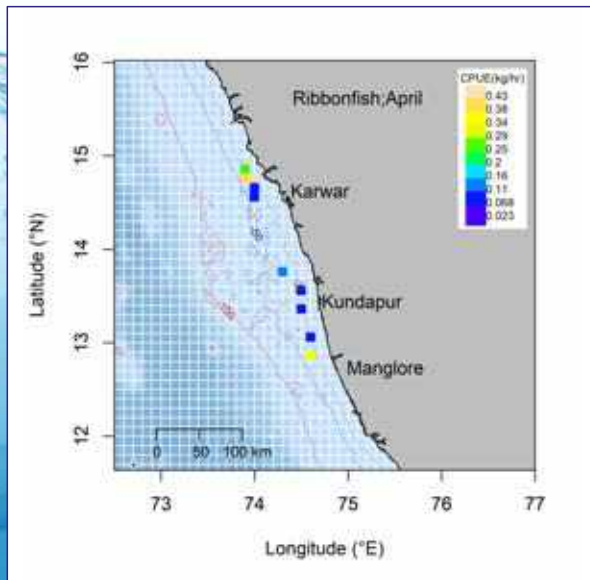
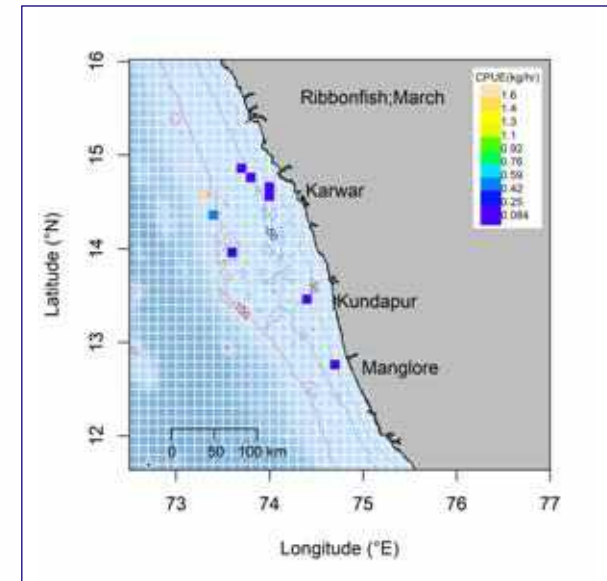
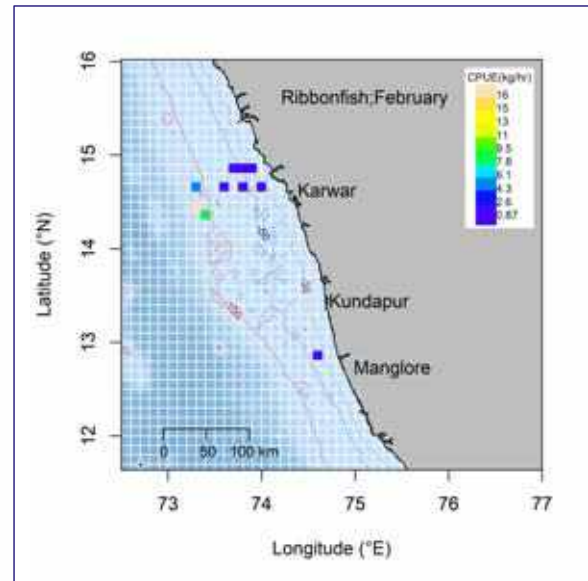
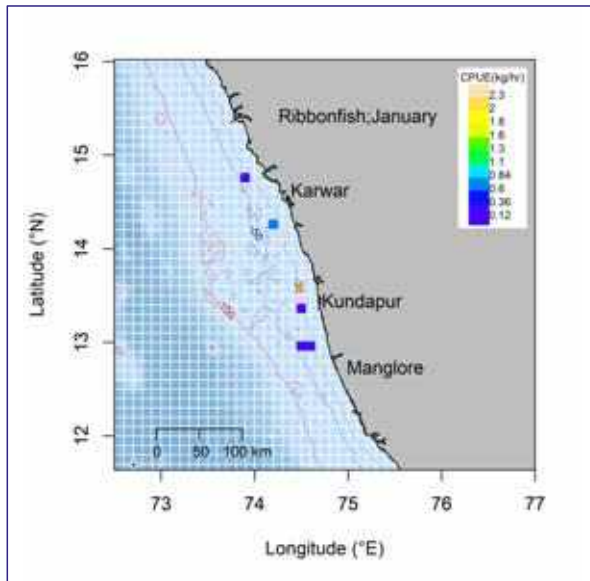


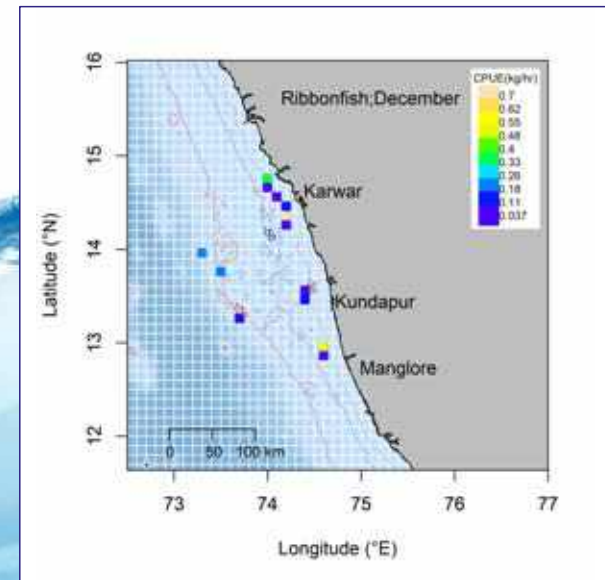
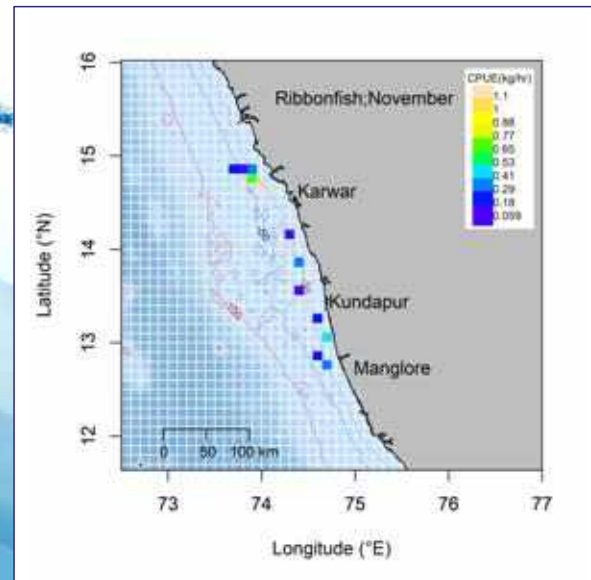
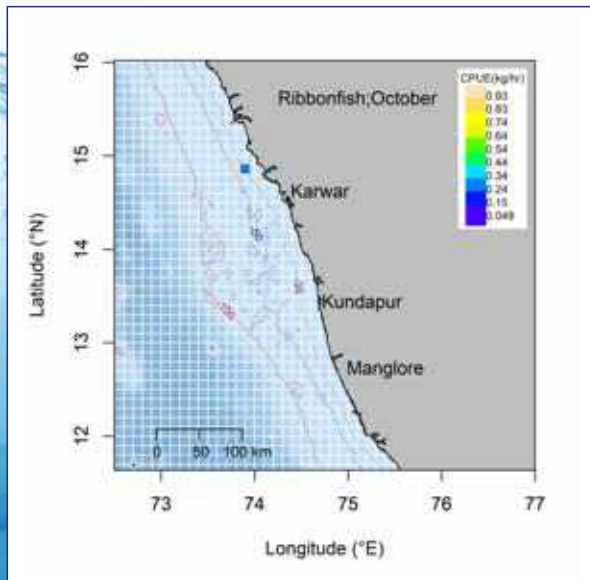
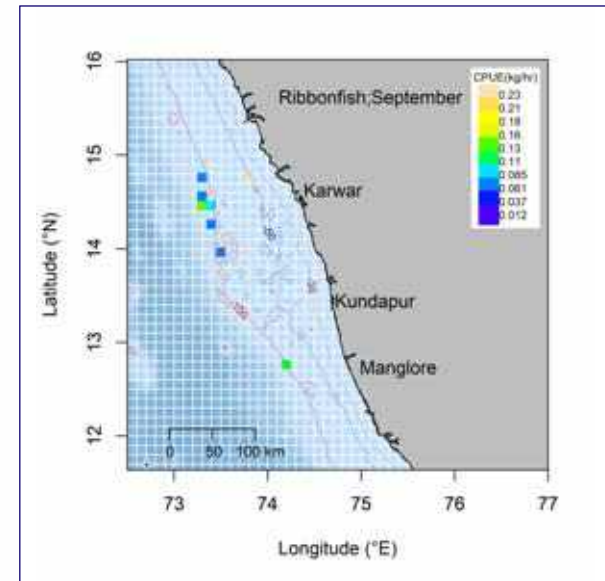
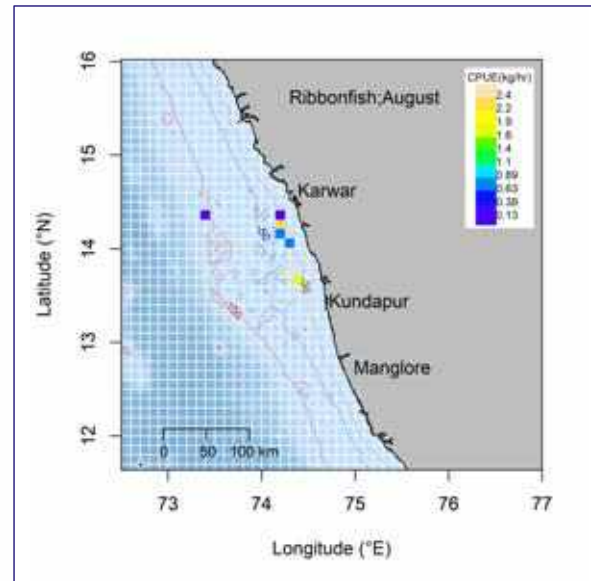
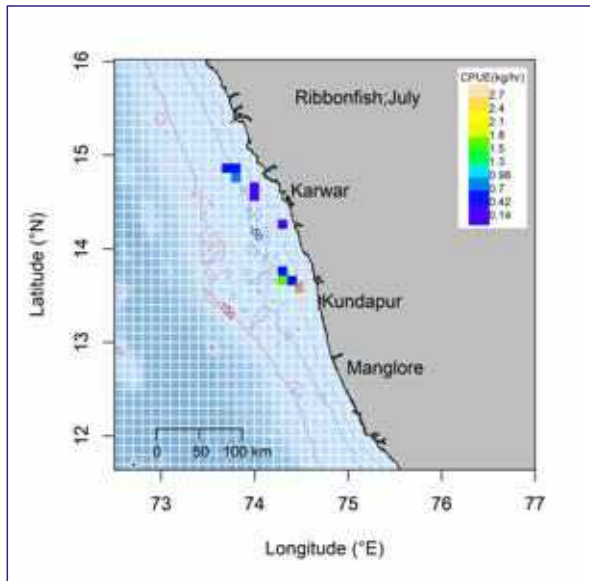




**Ribbonfish**

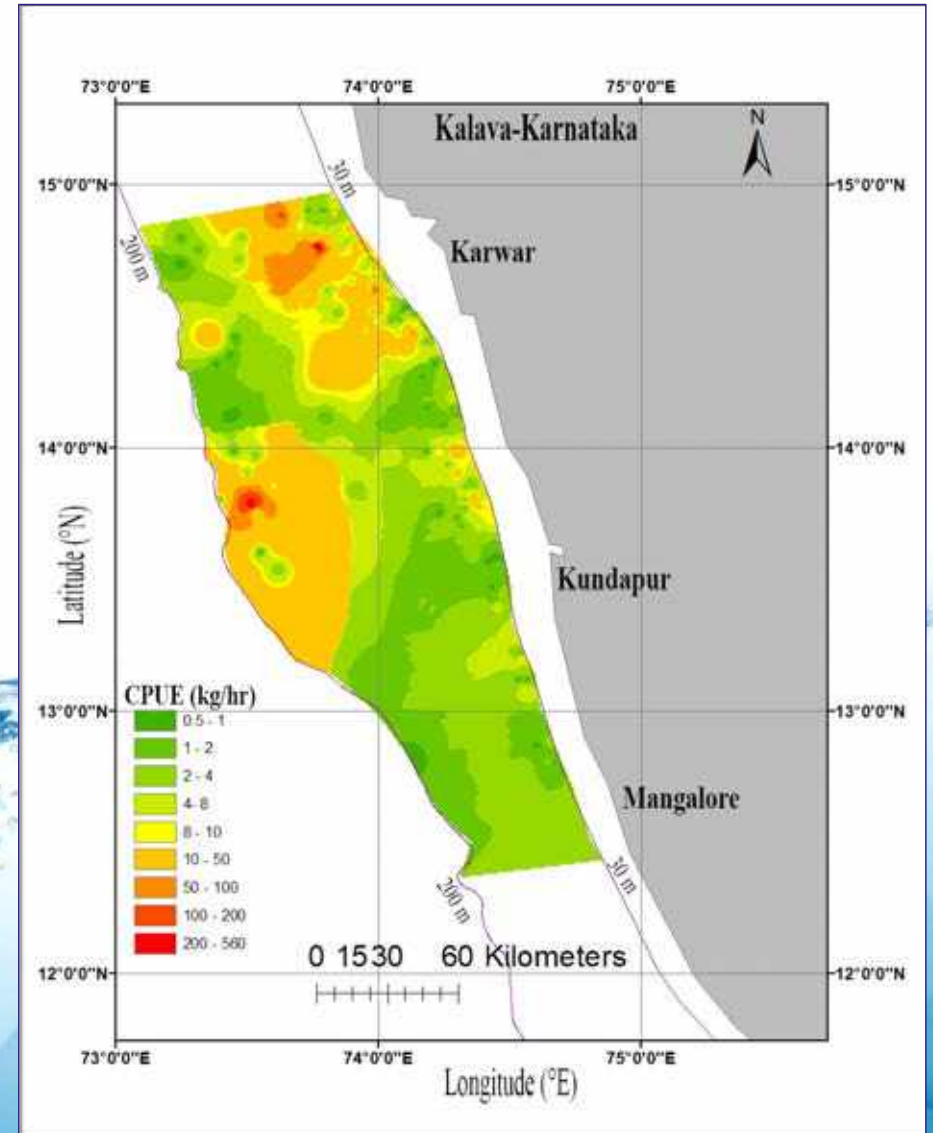


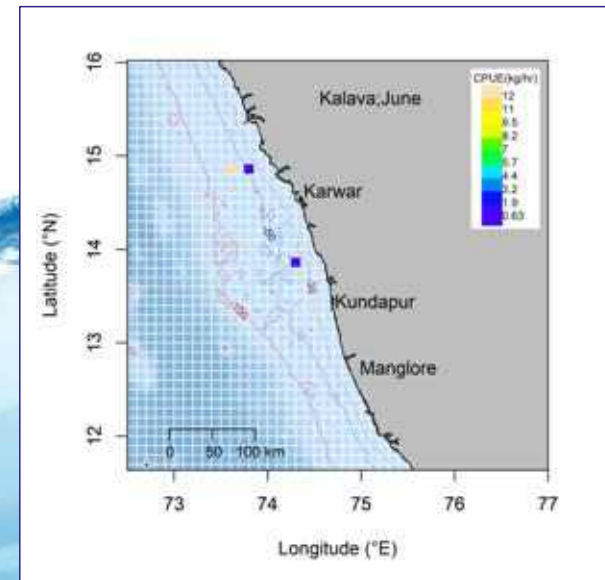
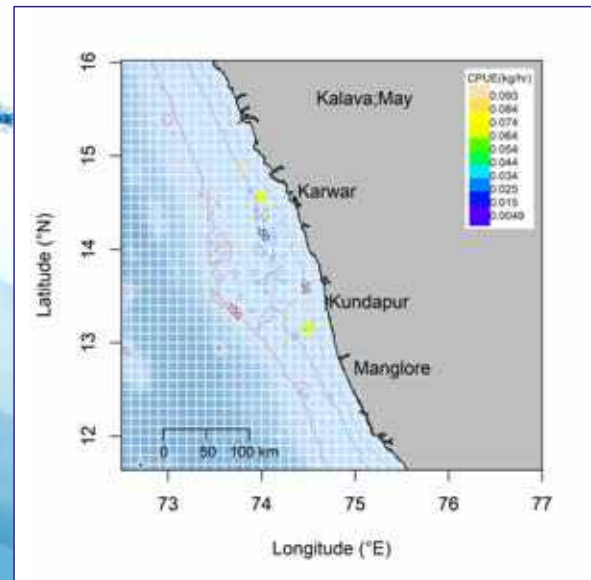
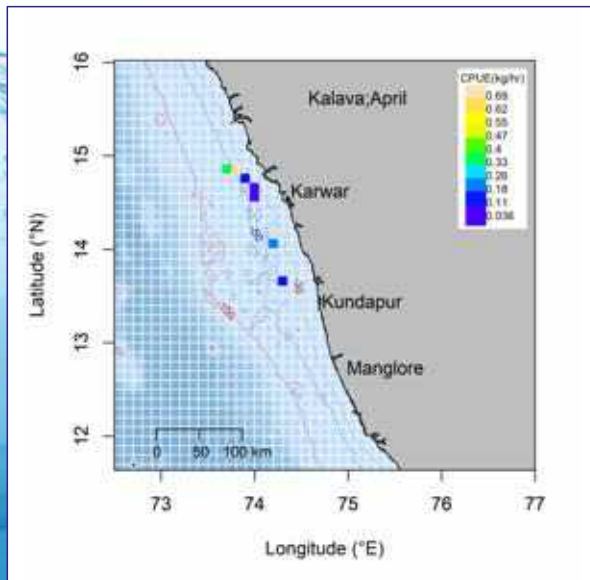
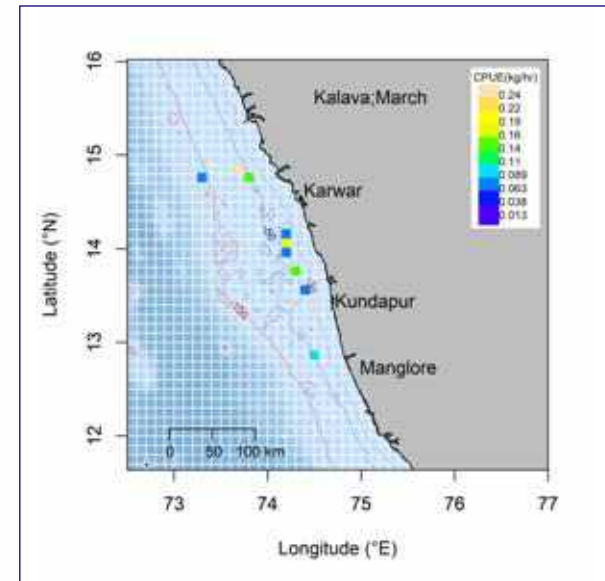
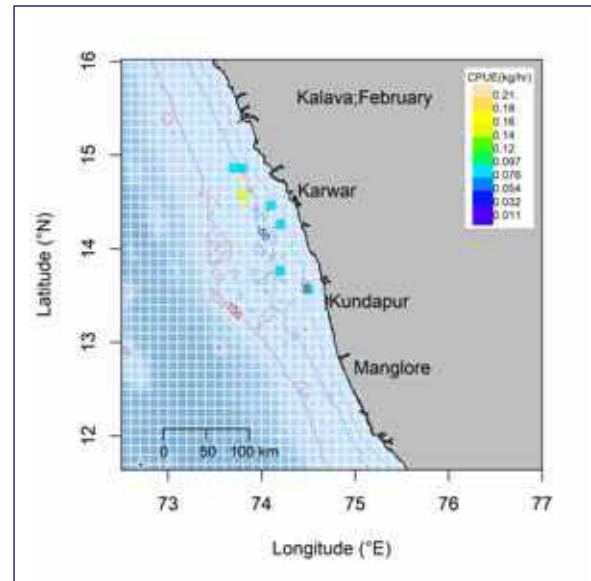
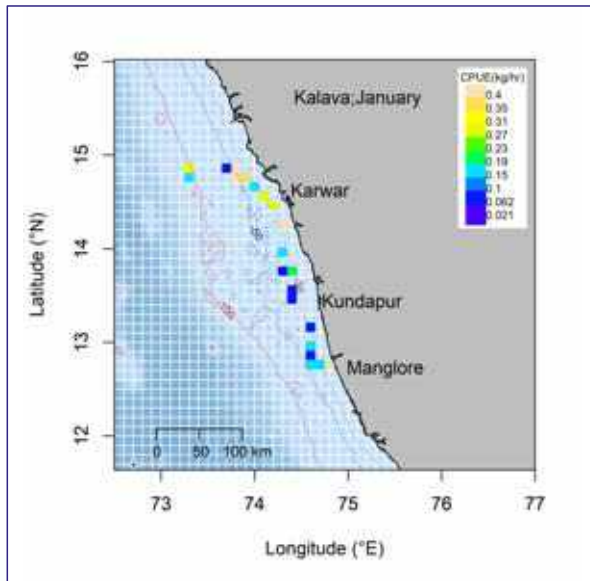


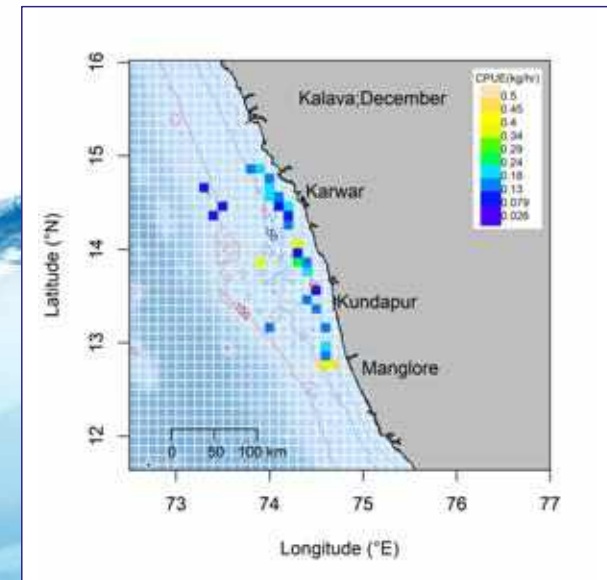
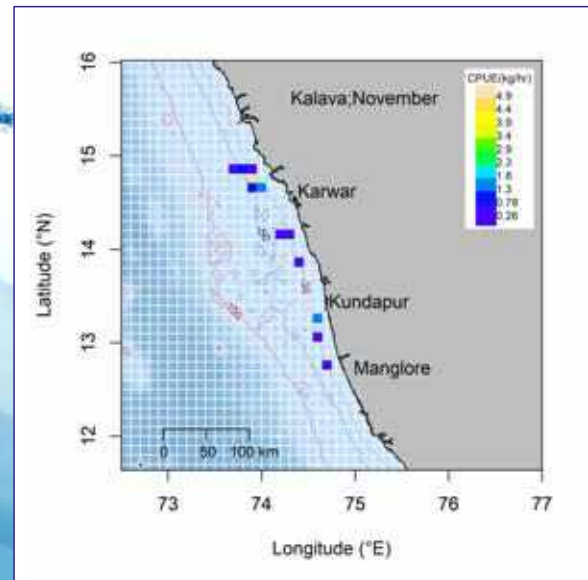
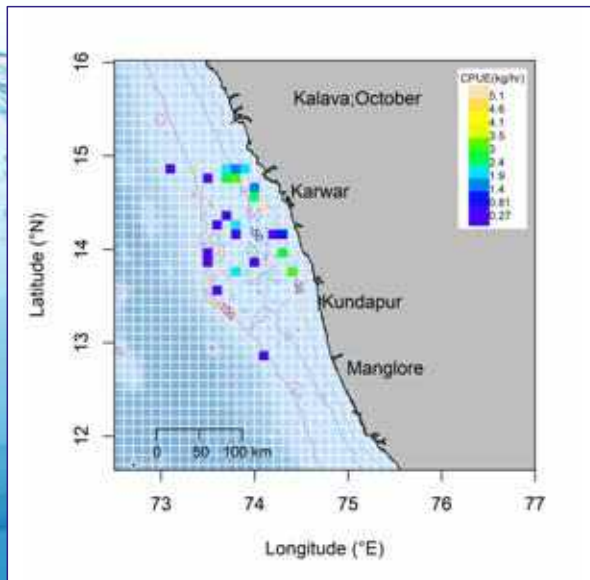
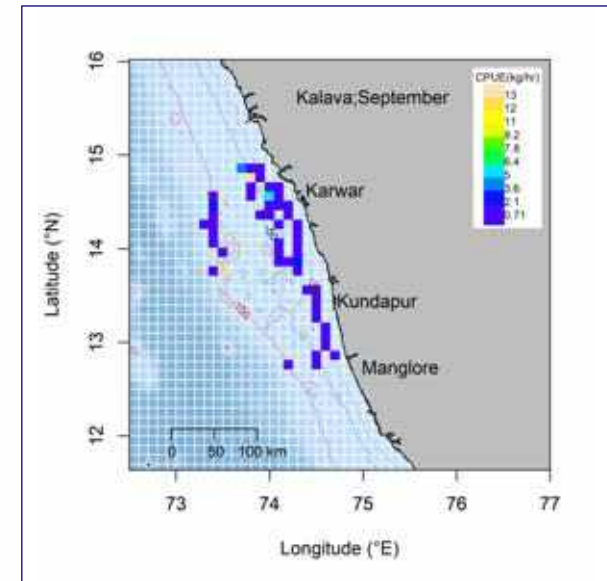
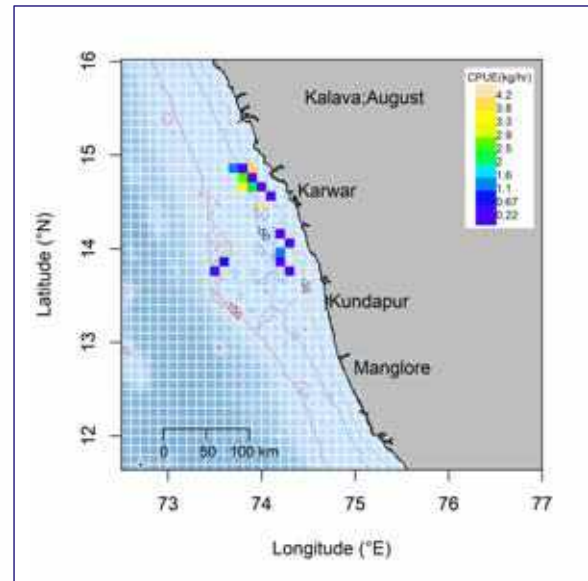
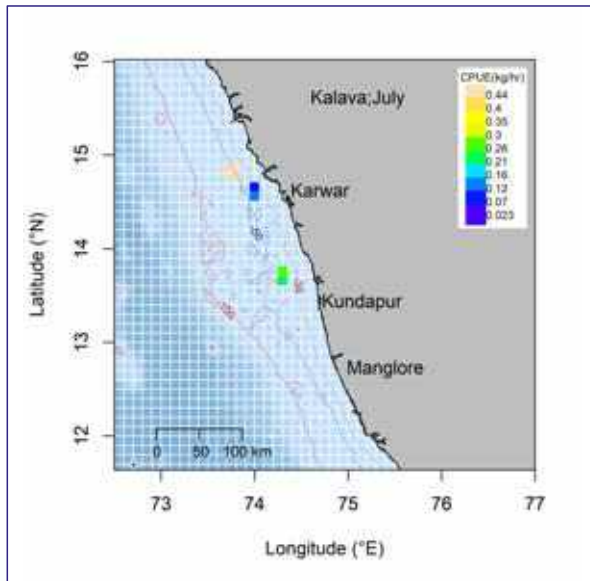




## Groupers (Kalava)



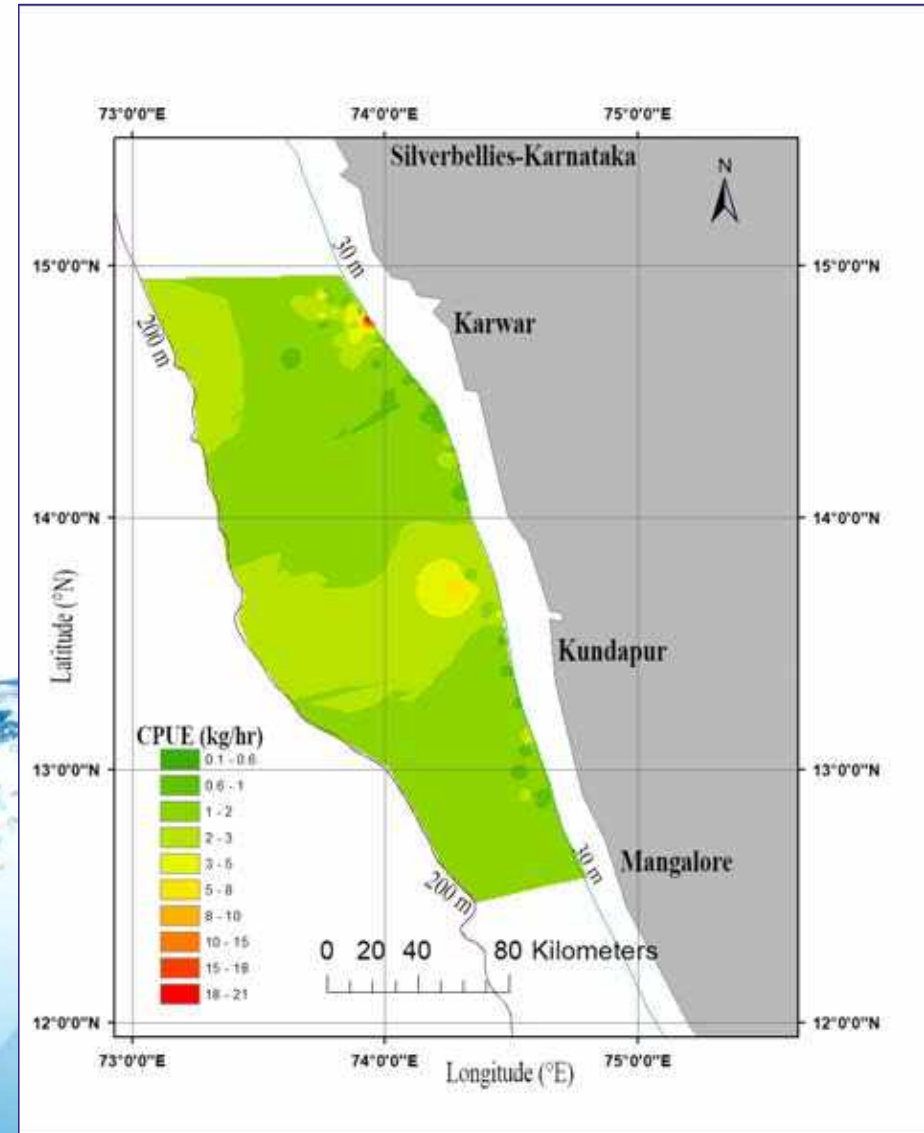


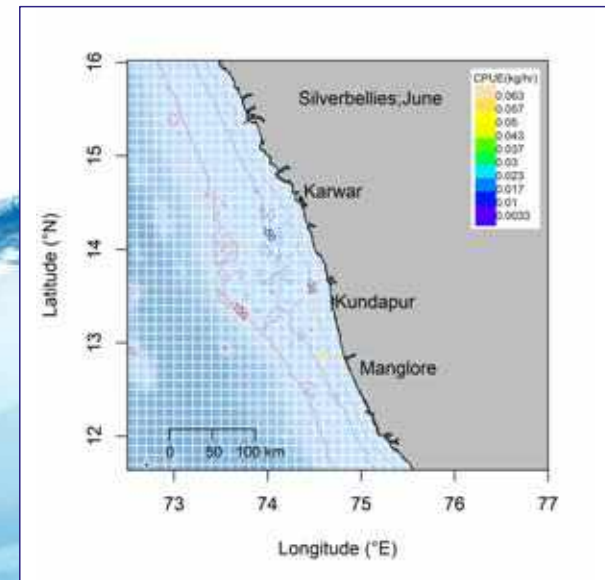
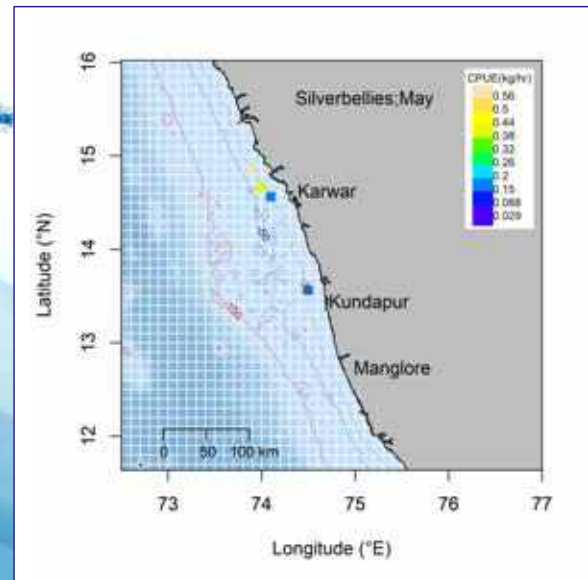
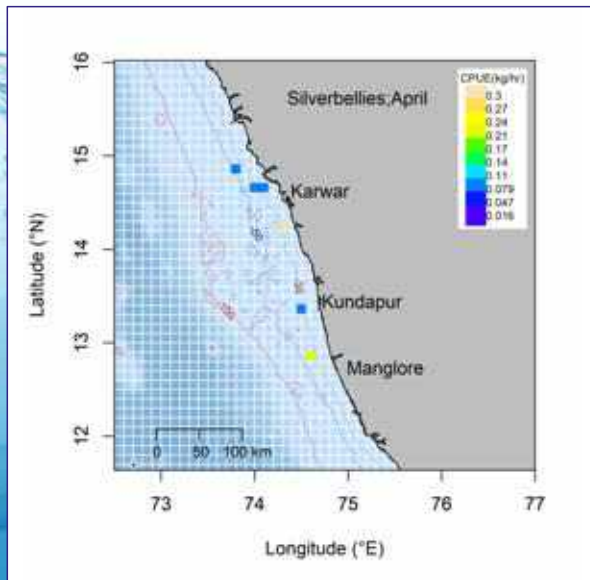
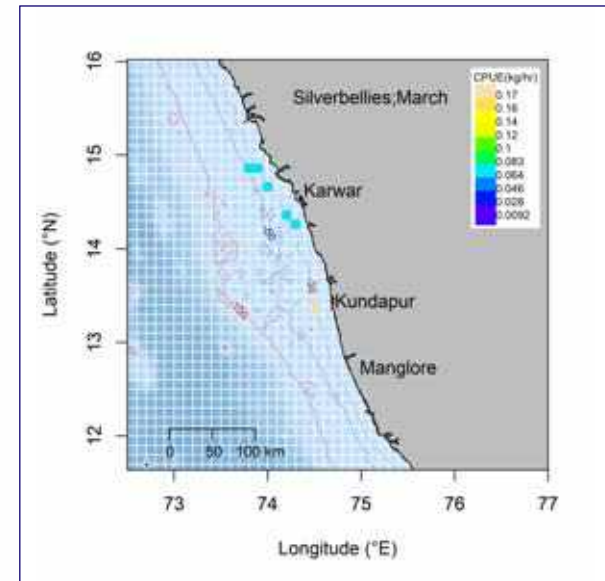
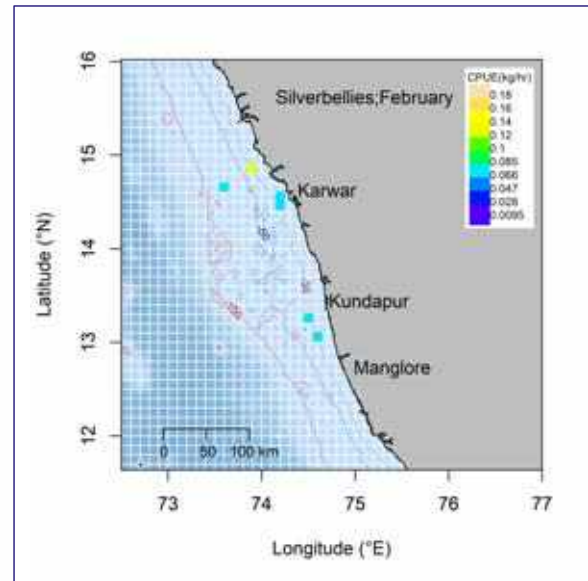
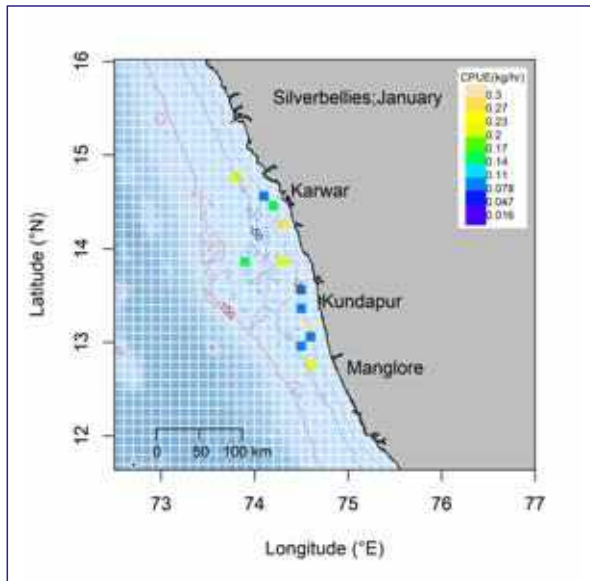


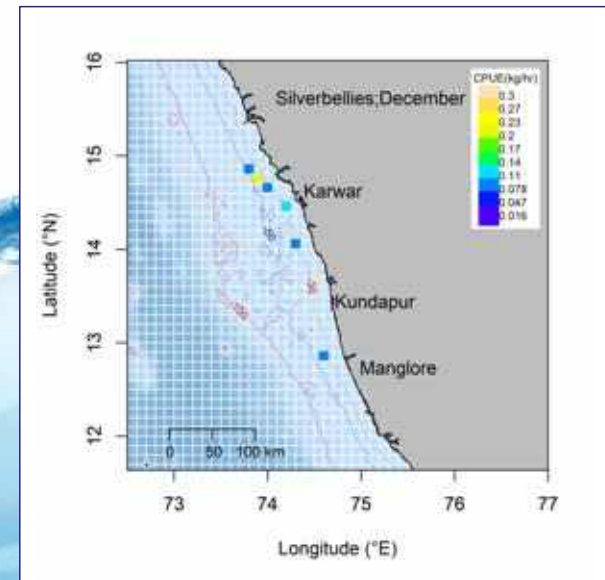
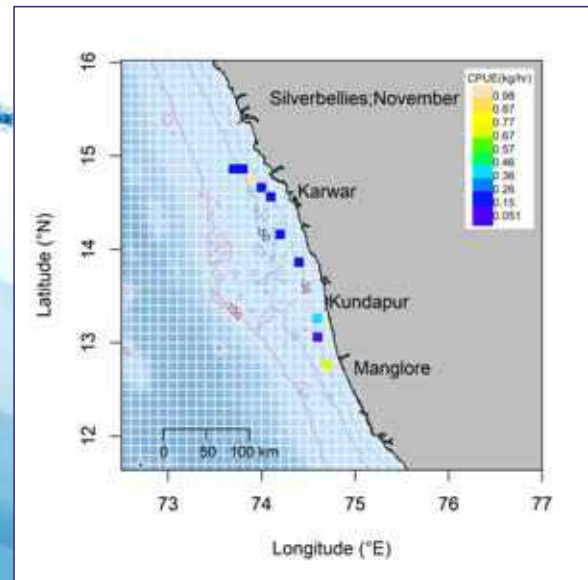
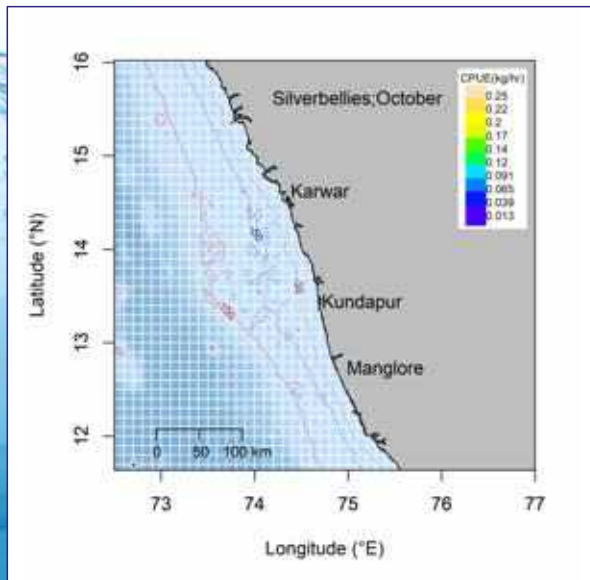
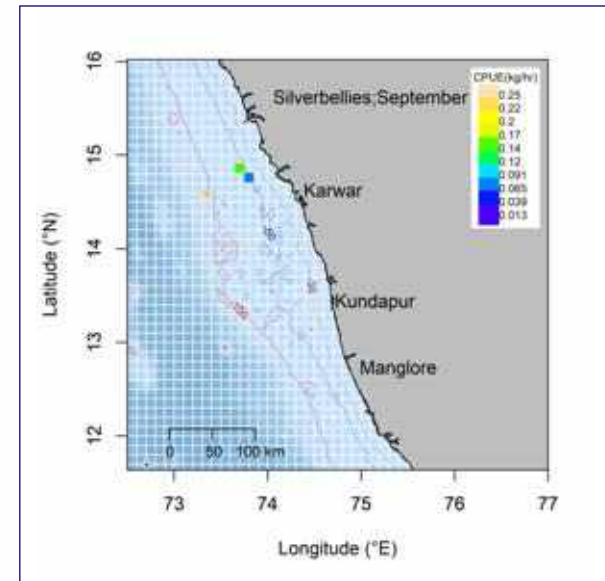
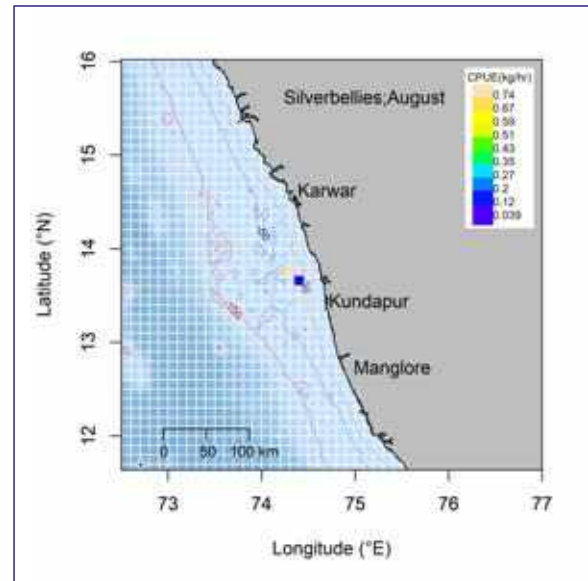
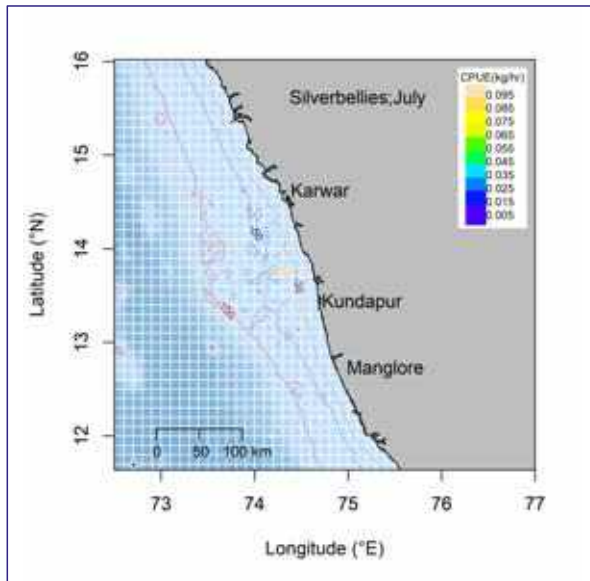


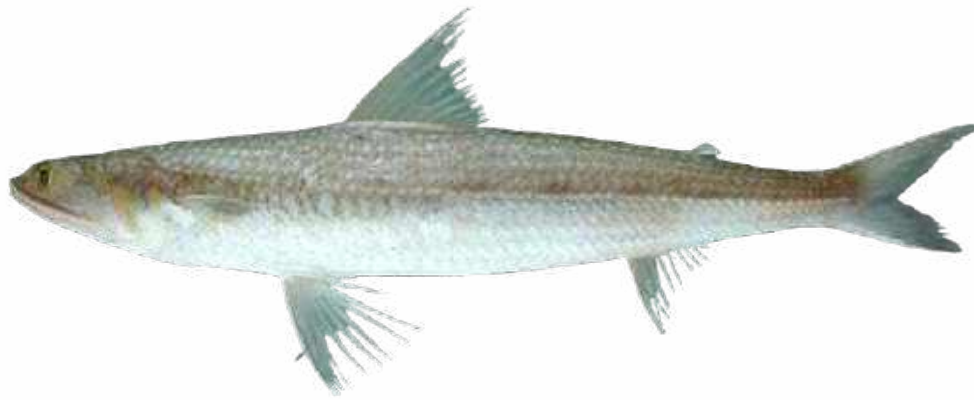


# Silverbellies

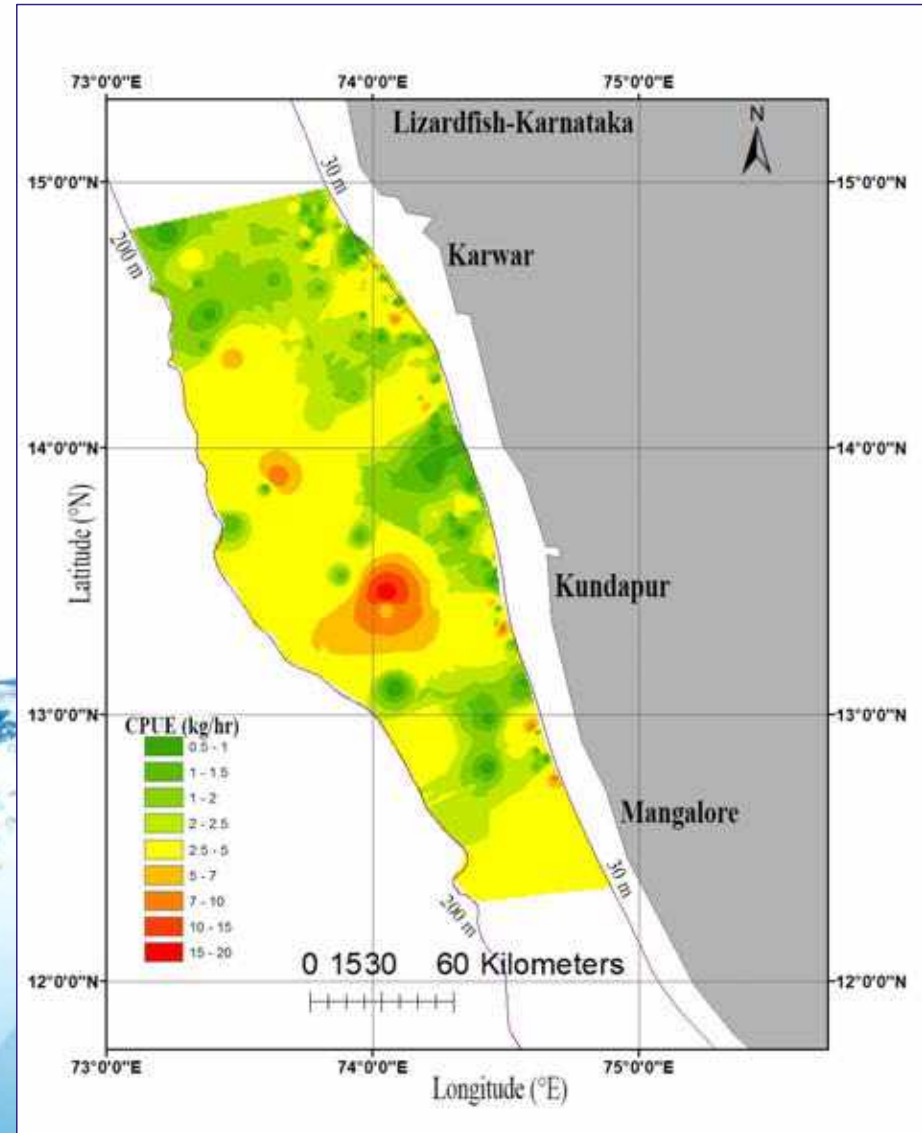


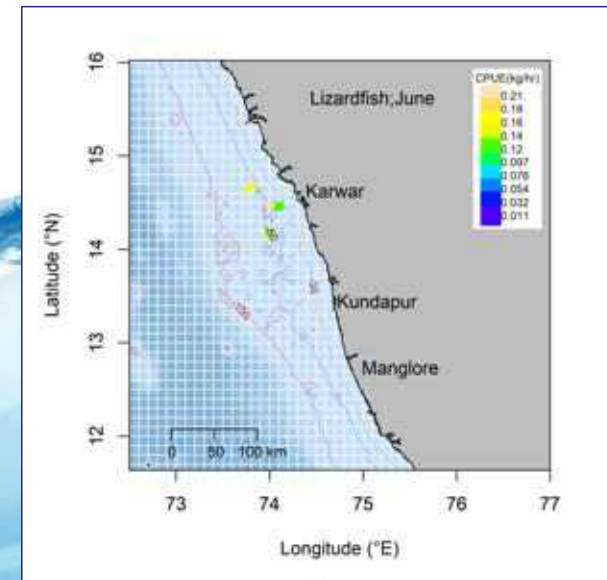
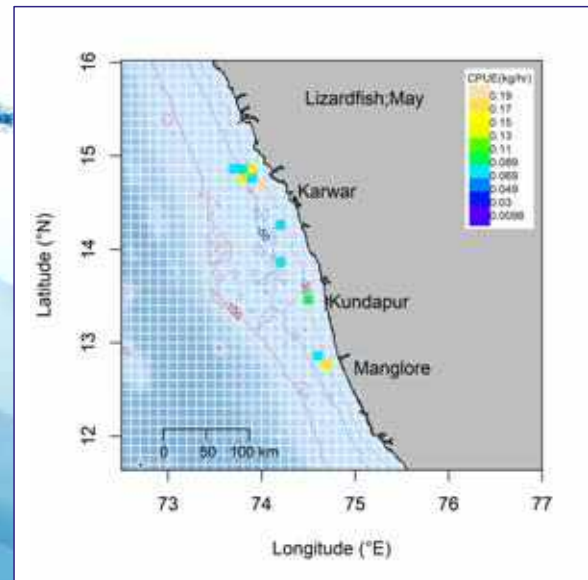
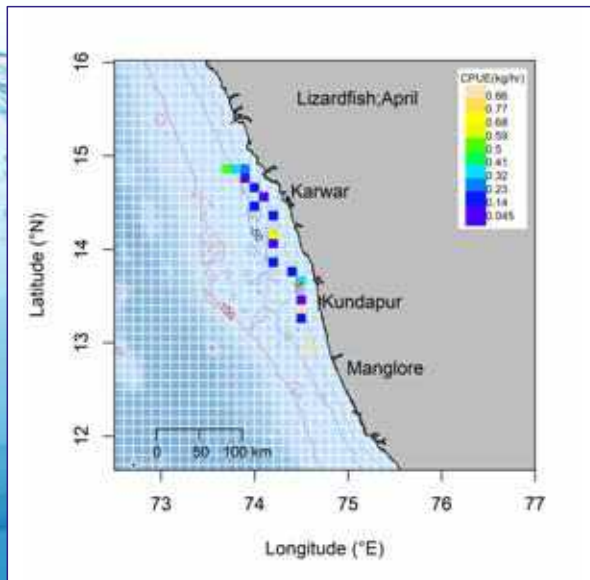
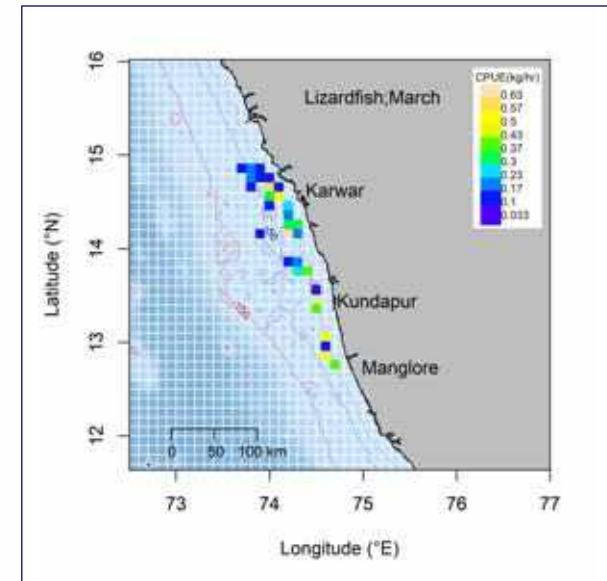
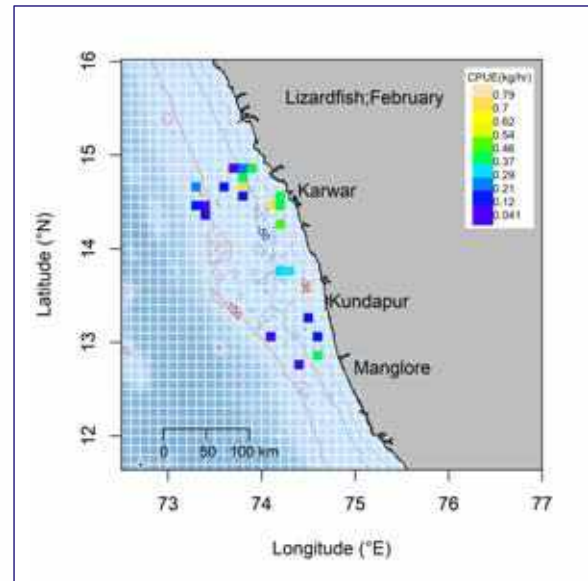
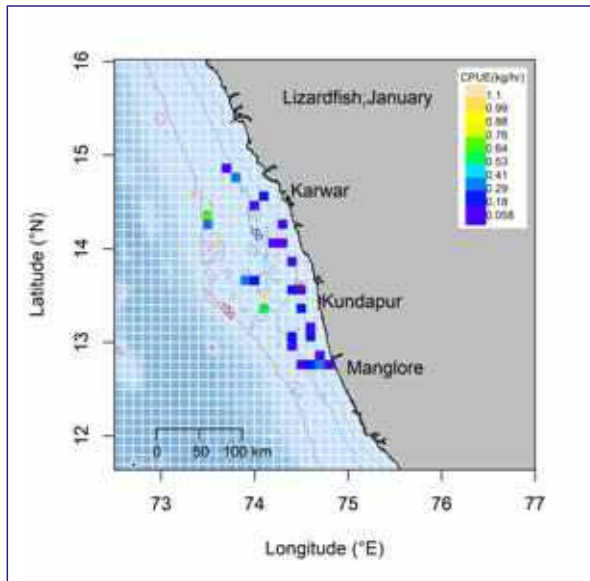


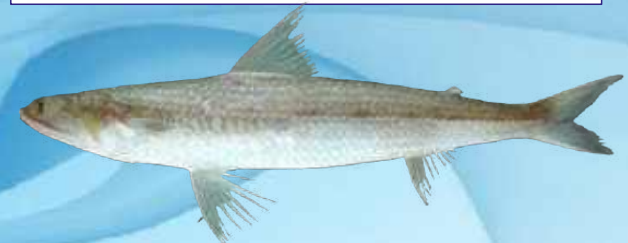
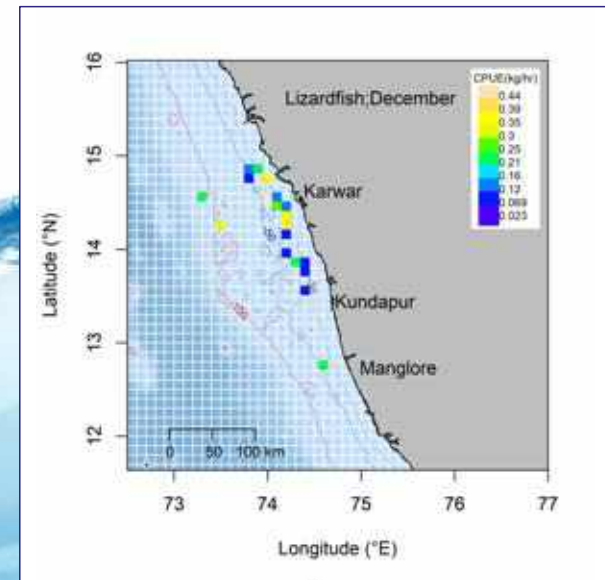
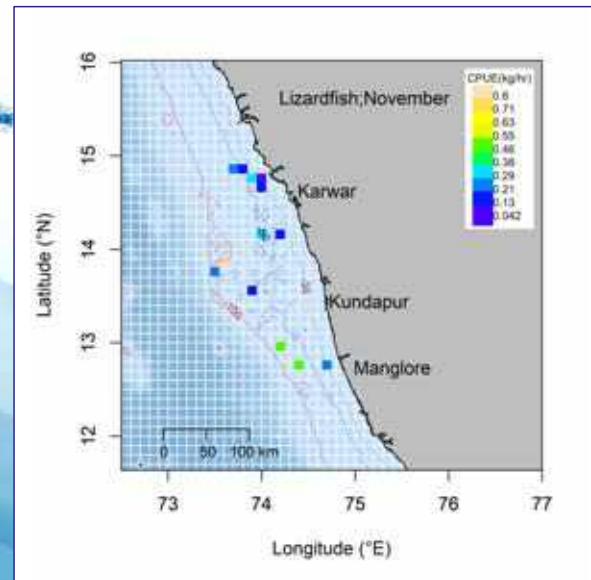
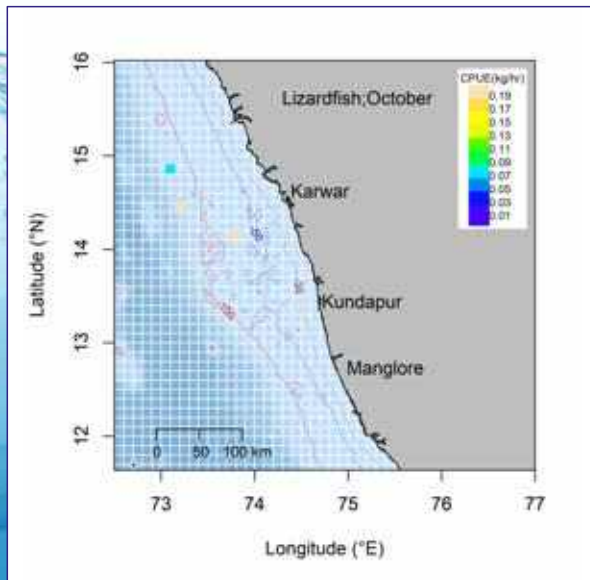
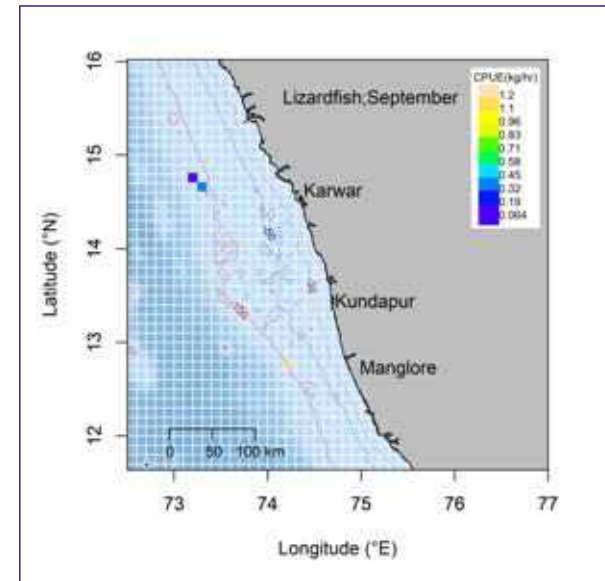
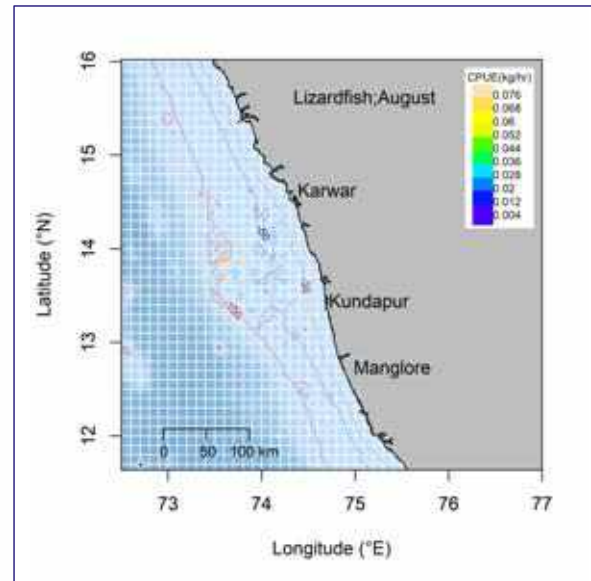
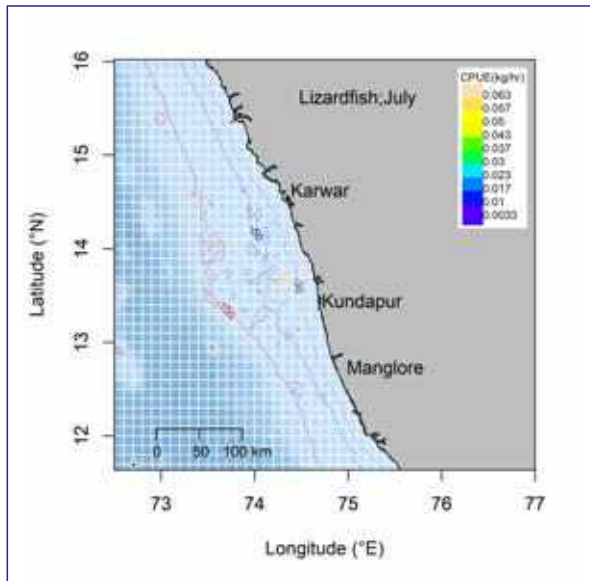


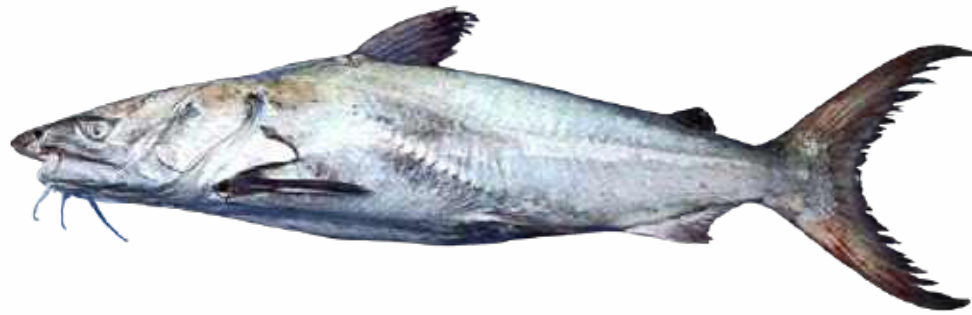


**Lizard Fish**

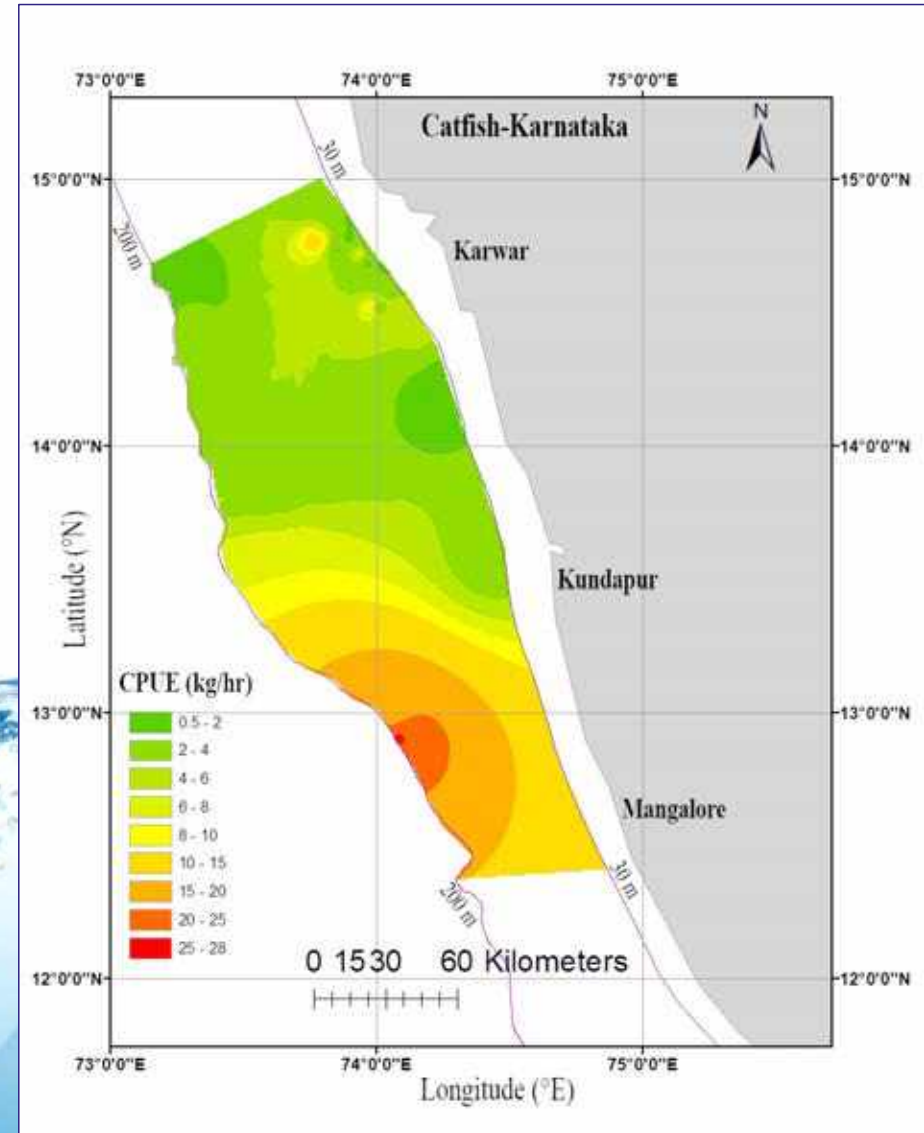


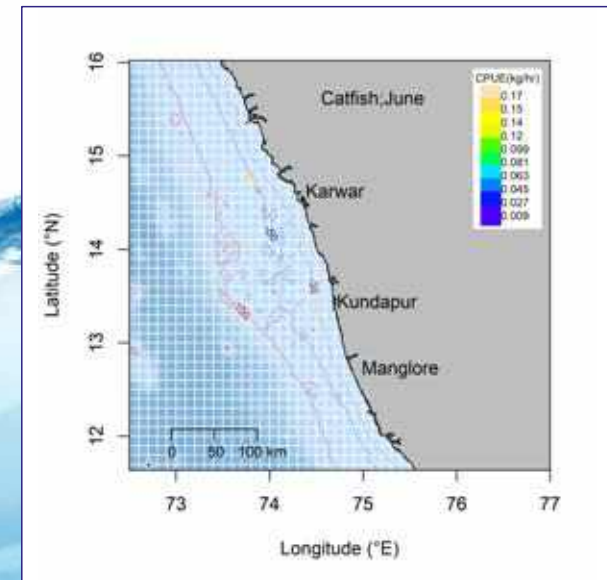
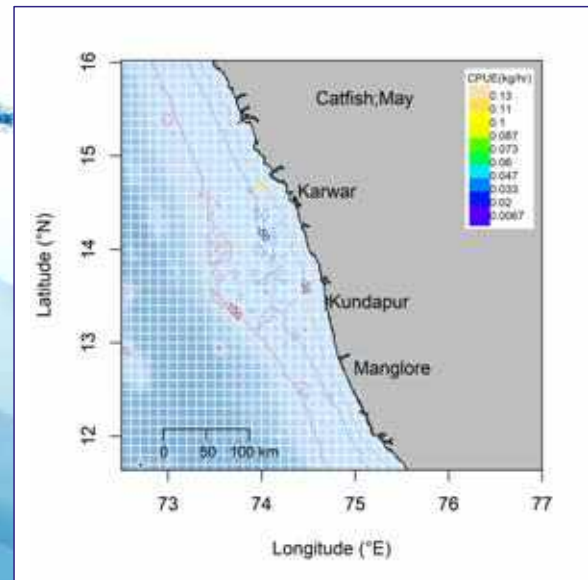
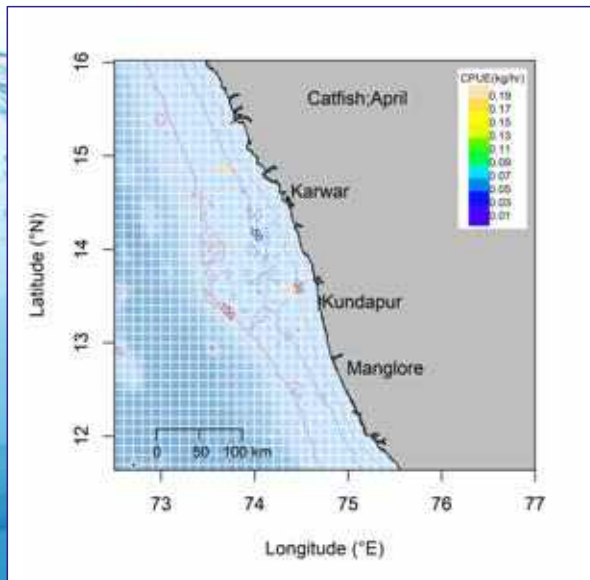
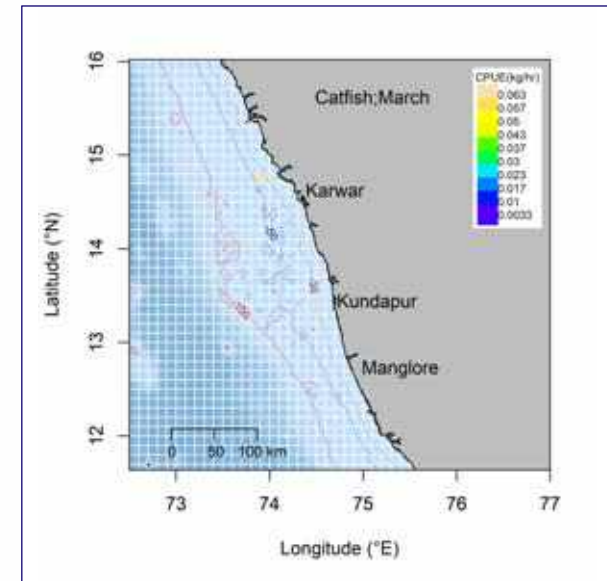
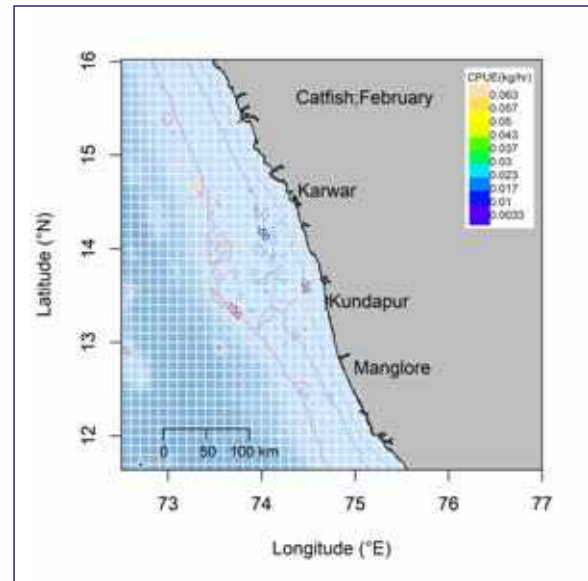
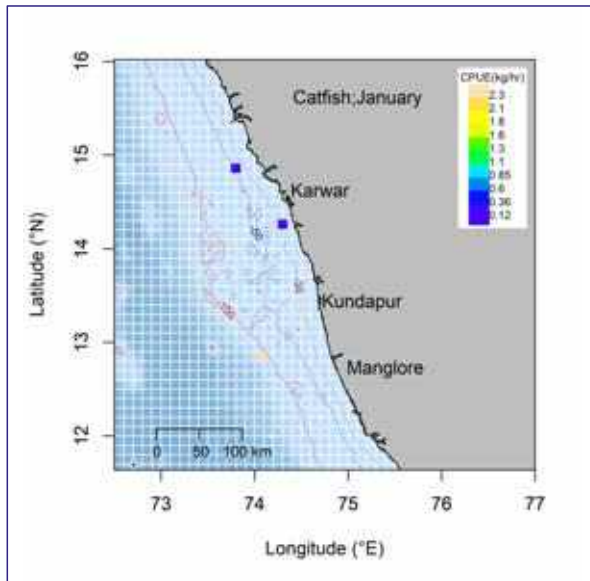




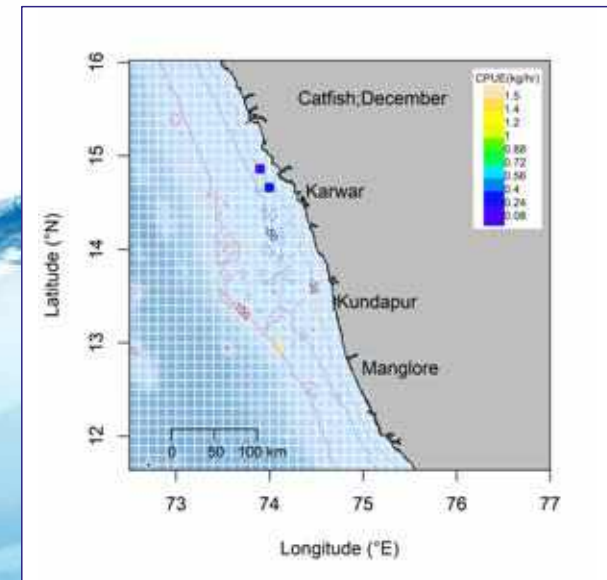
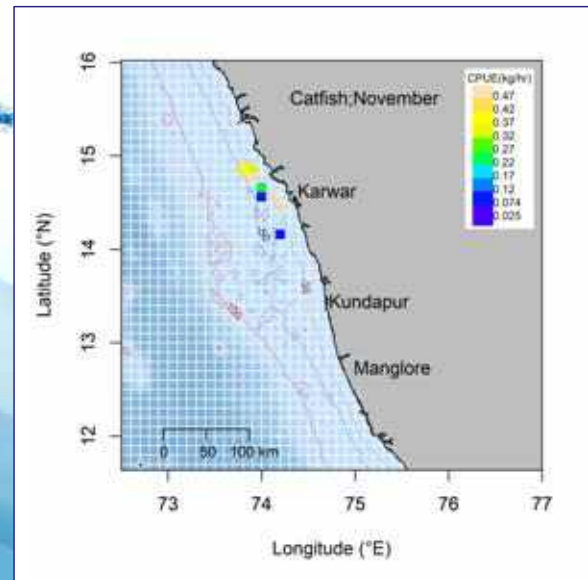
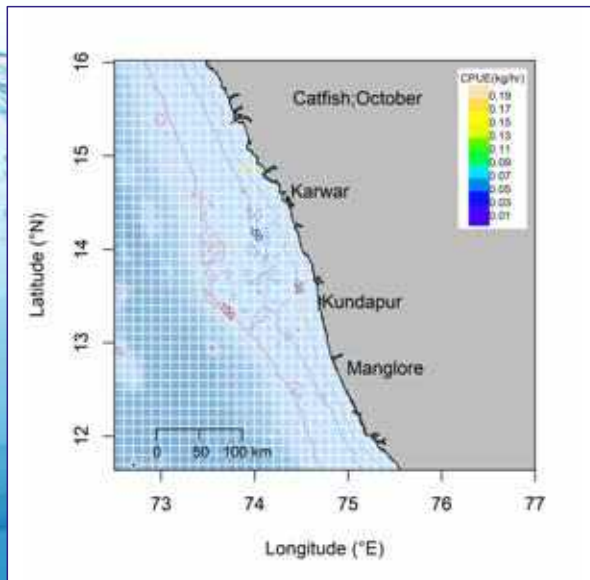
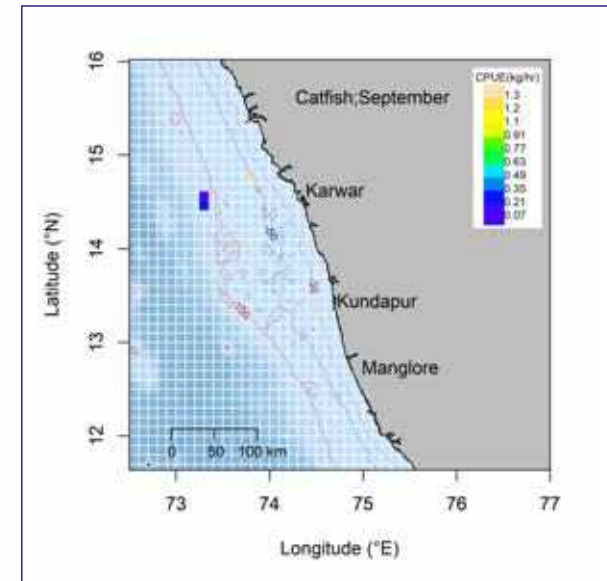
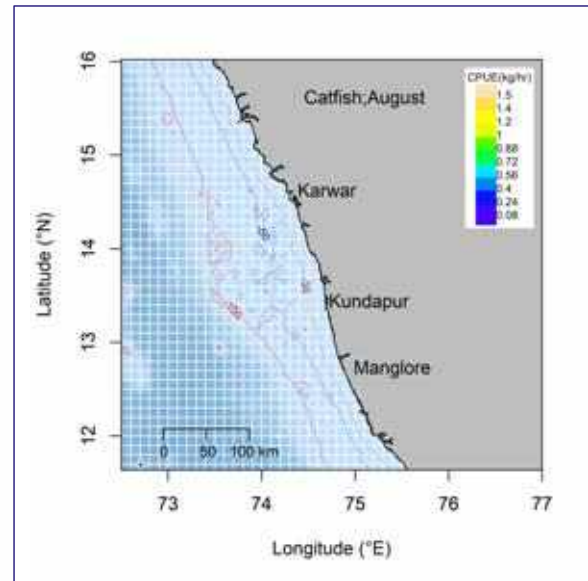
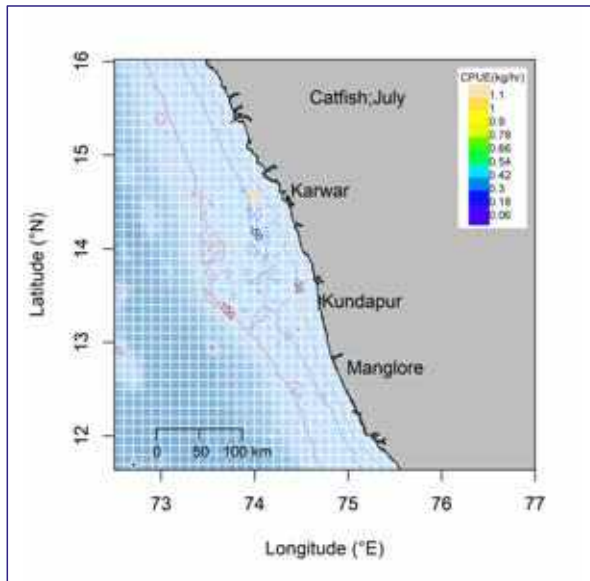


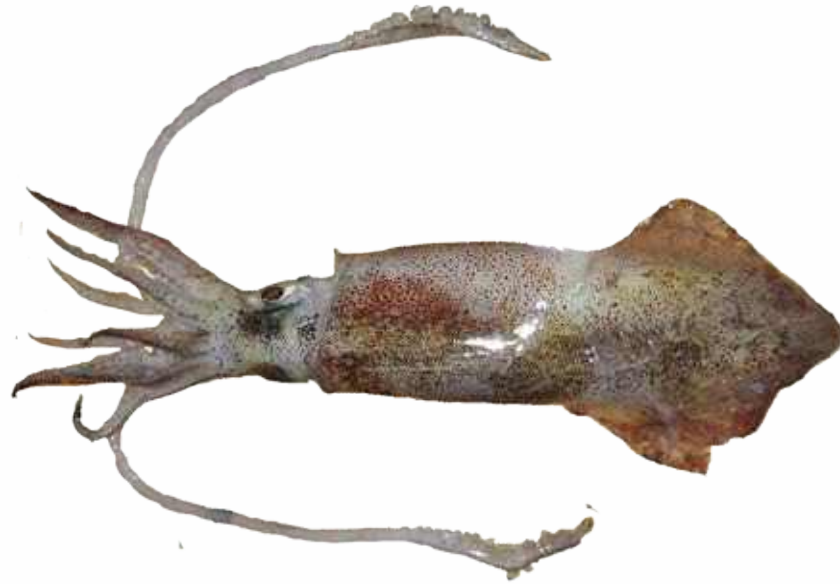
**Cat Fish**



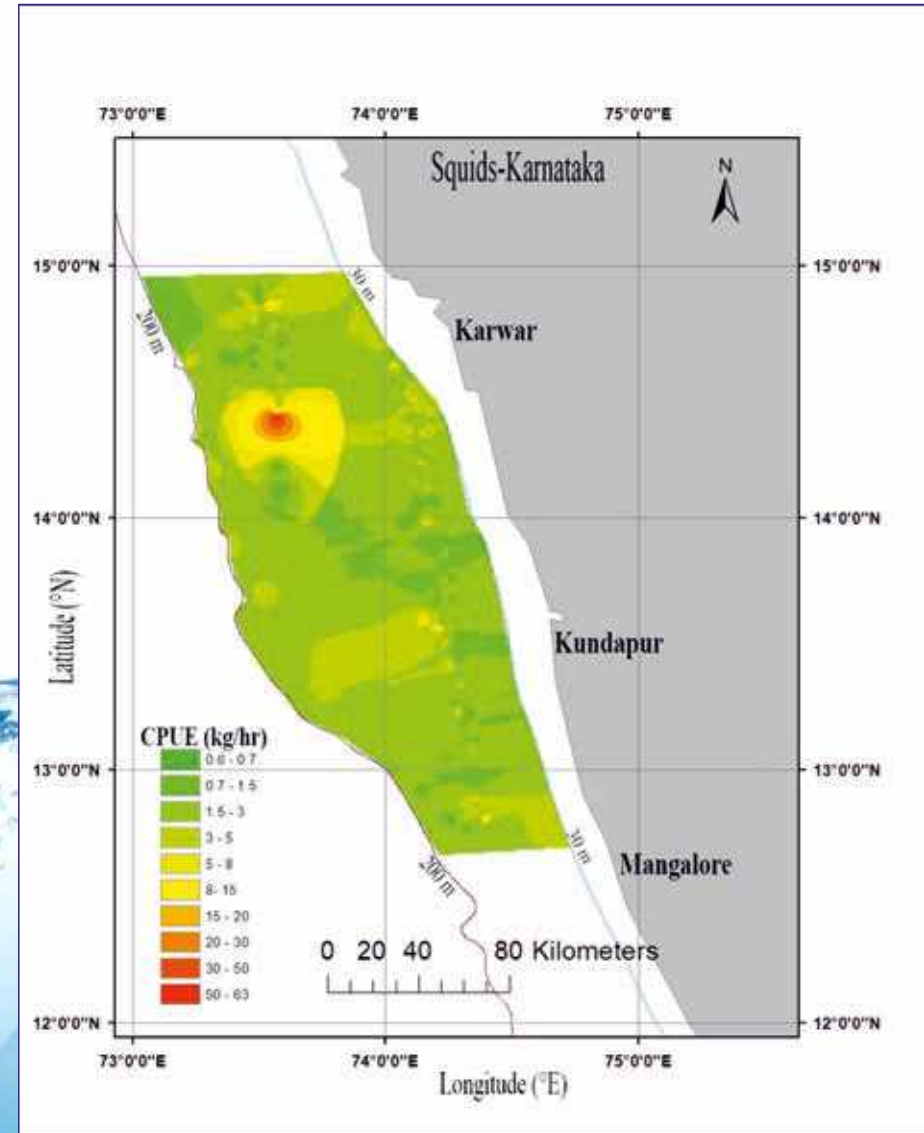


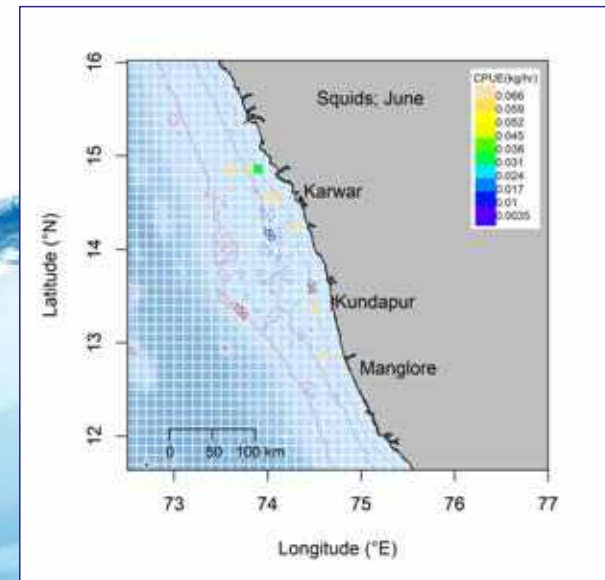
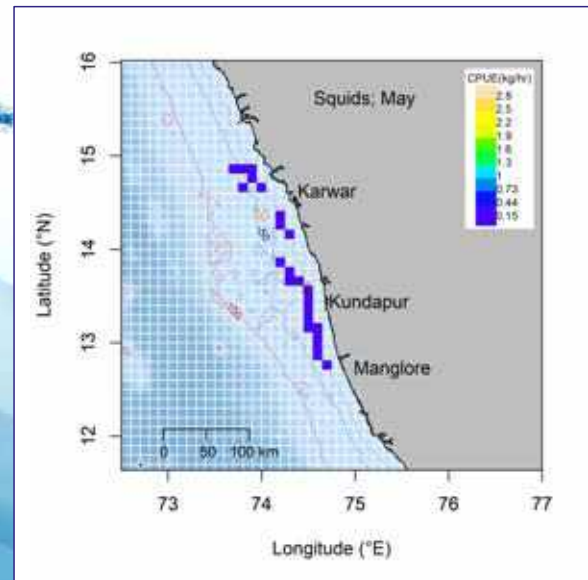
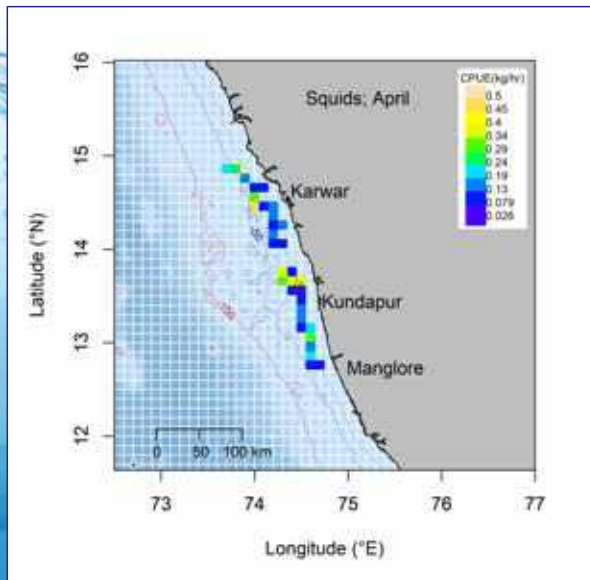
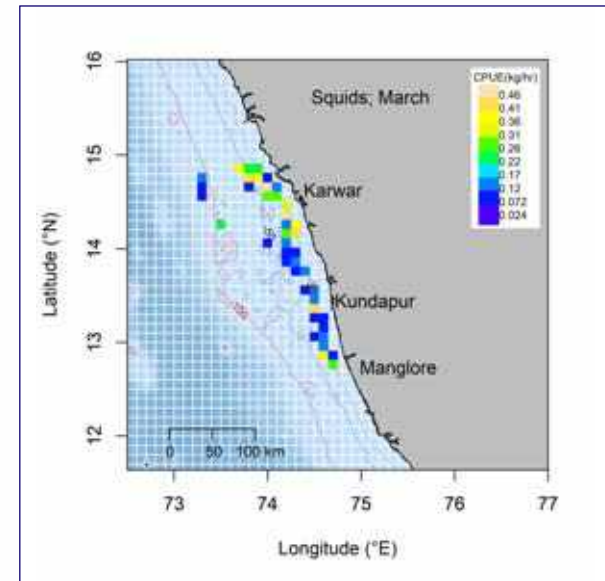
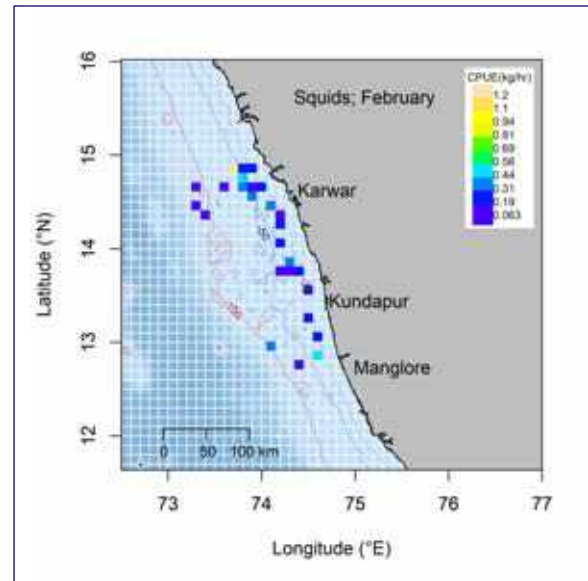
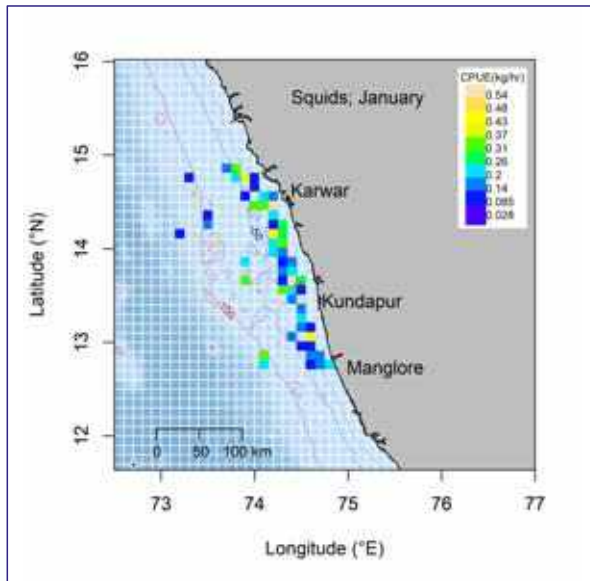


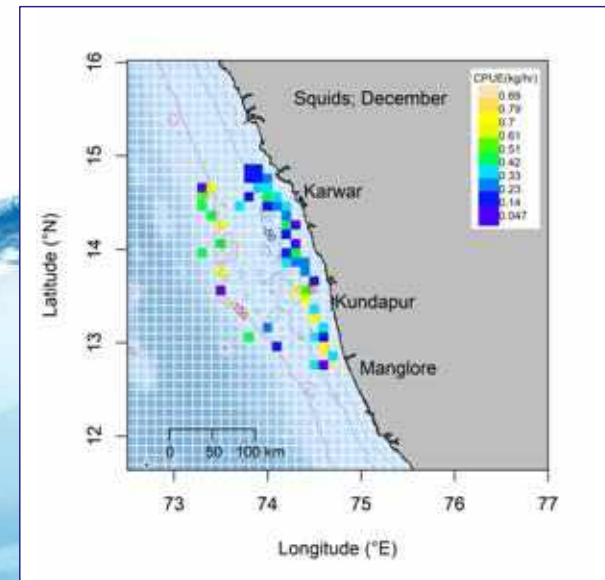
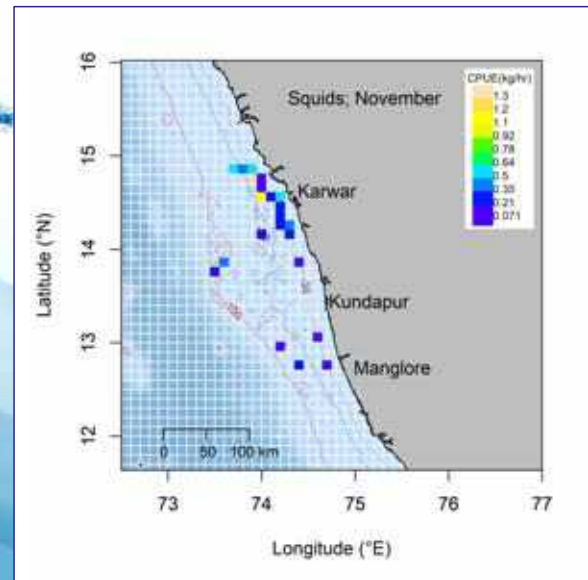
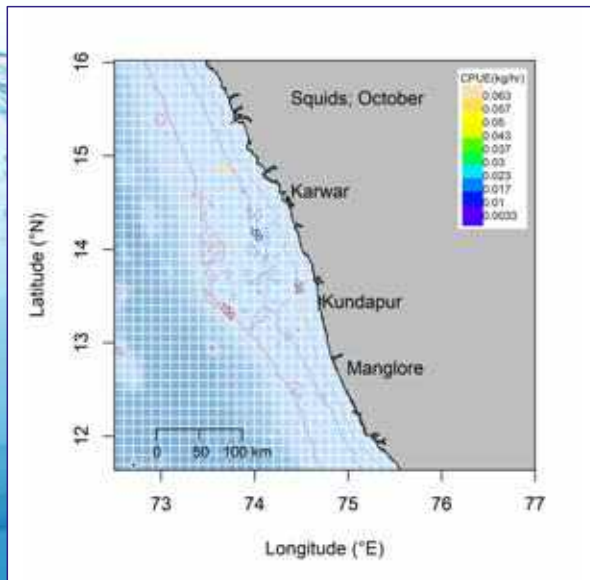
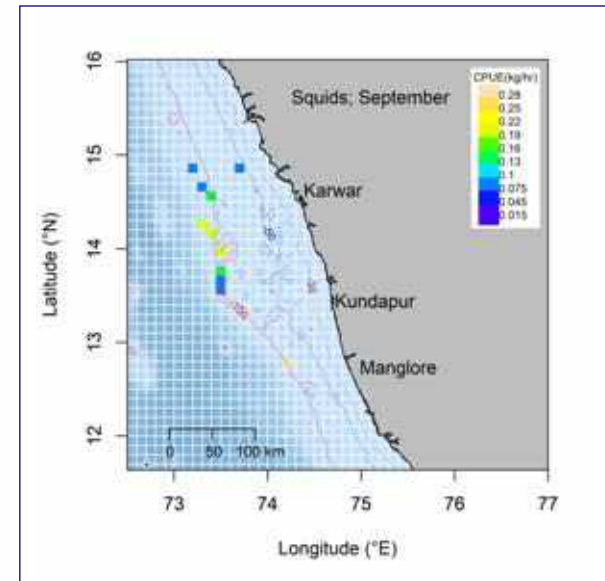
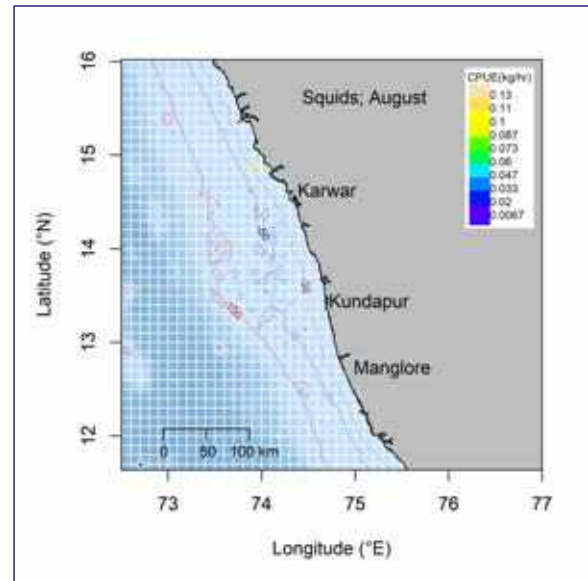
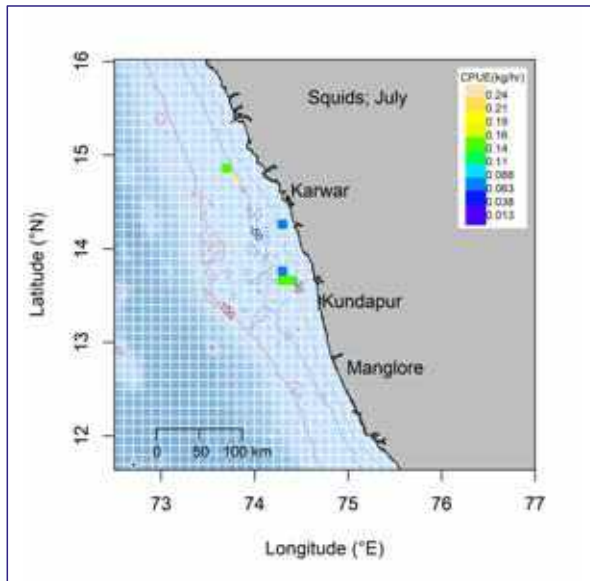




# Squids





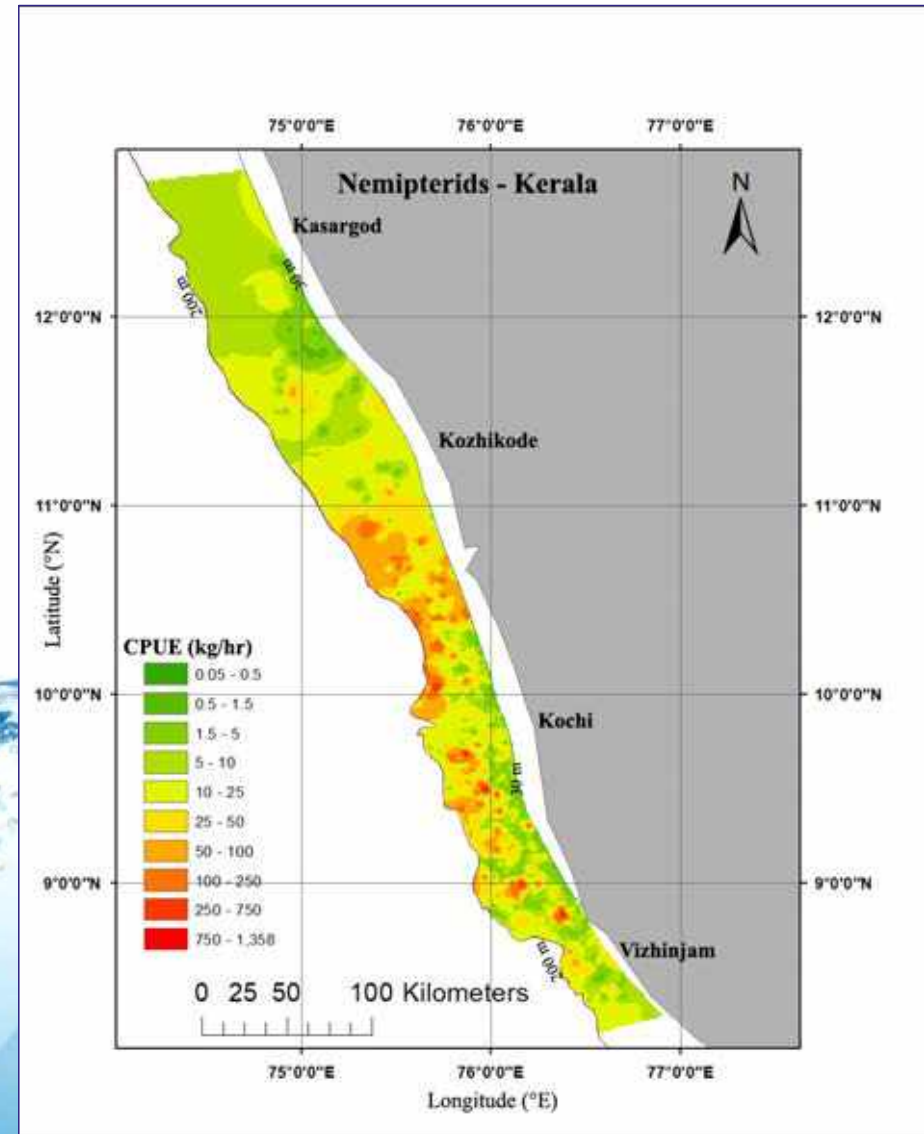


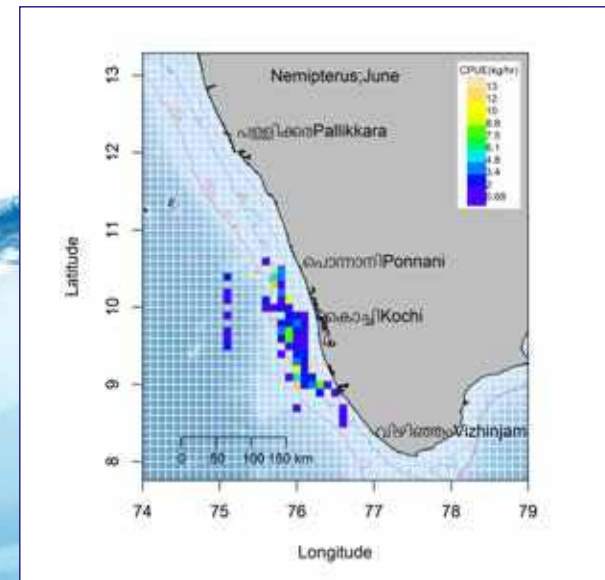
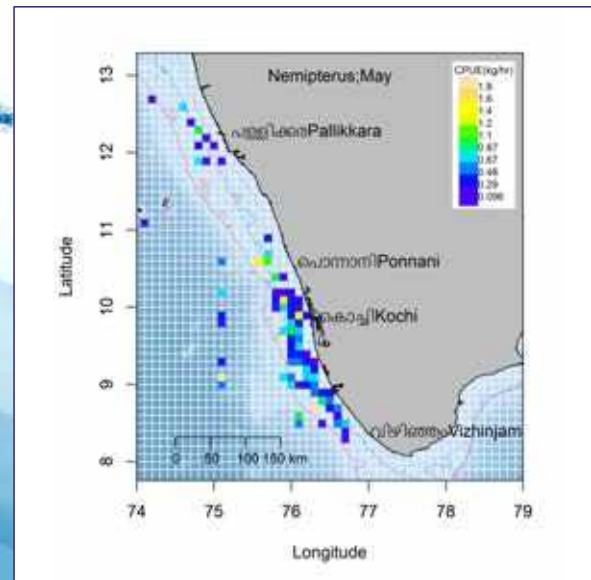
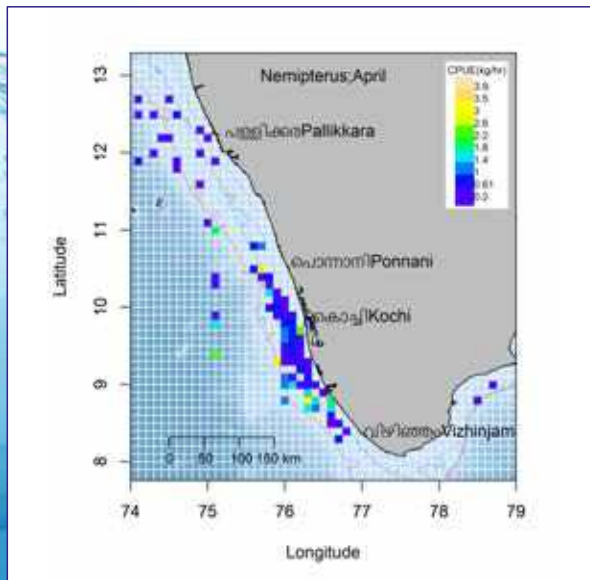
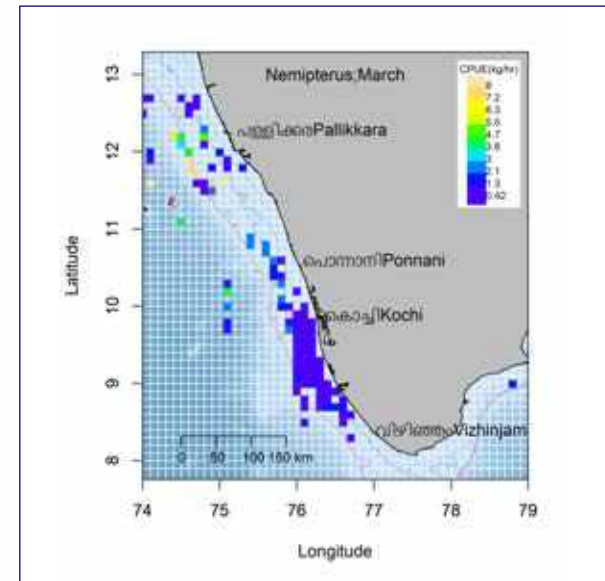
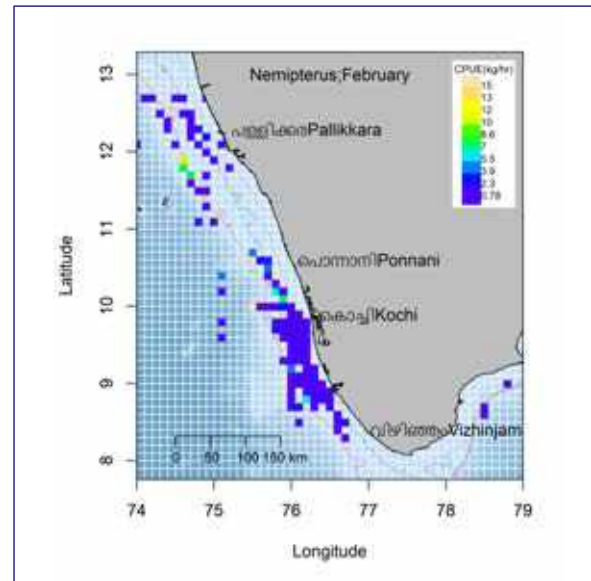
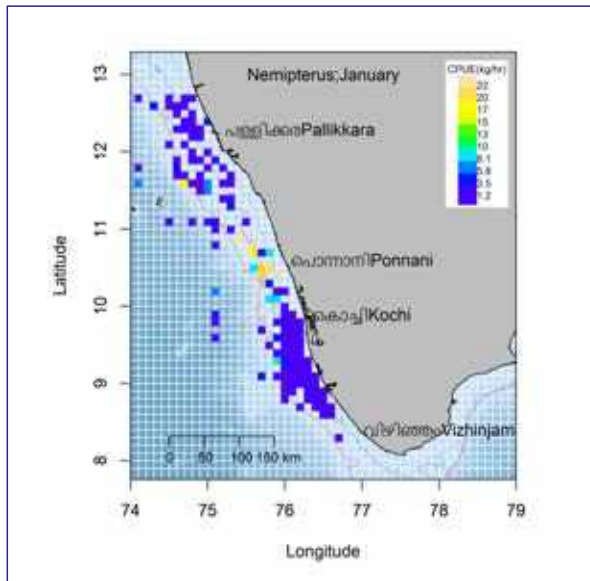
## **3.5** Spatial distribution and abundance along Kerala coast

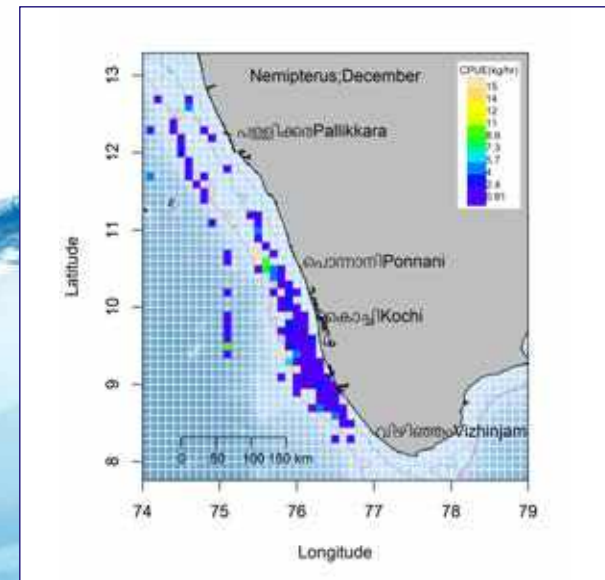
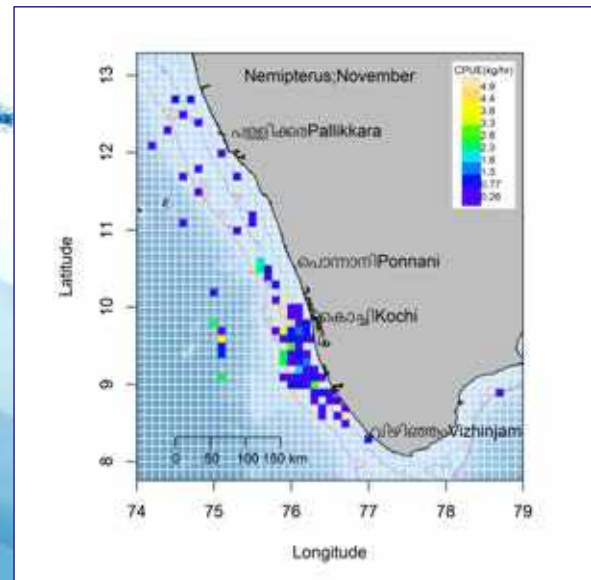
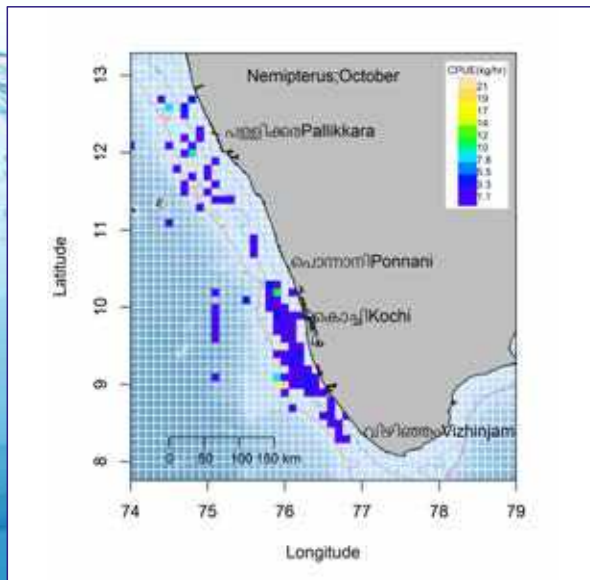
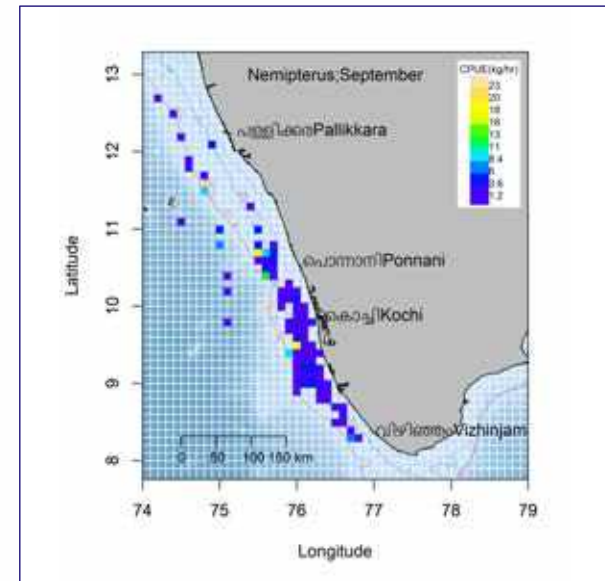
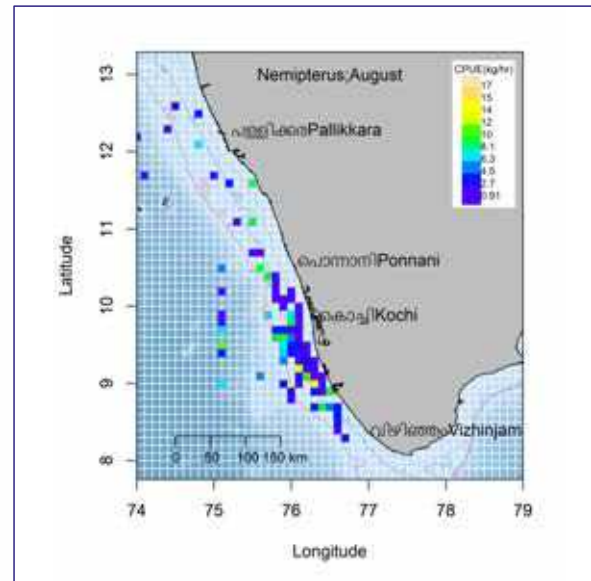
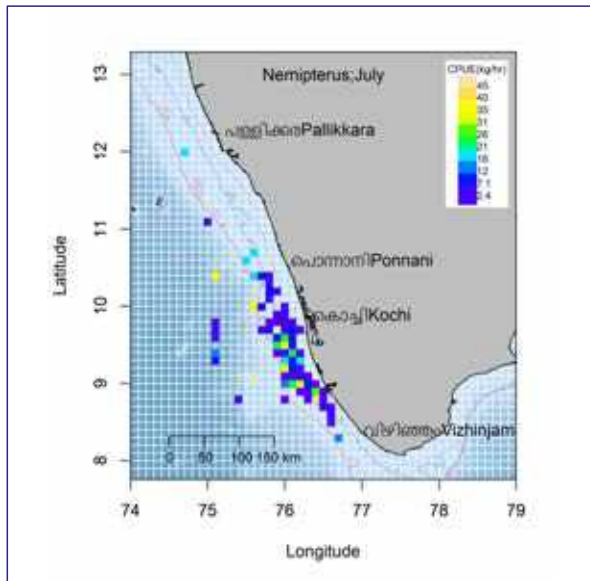




# Threadfin Breams (Nemipterus)



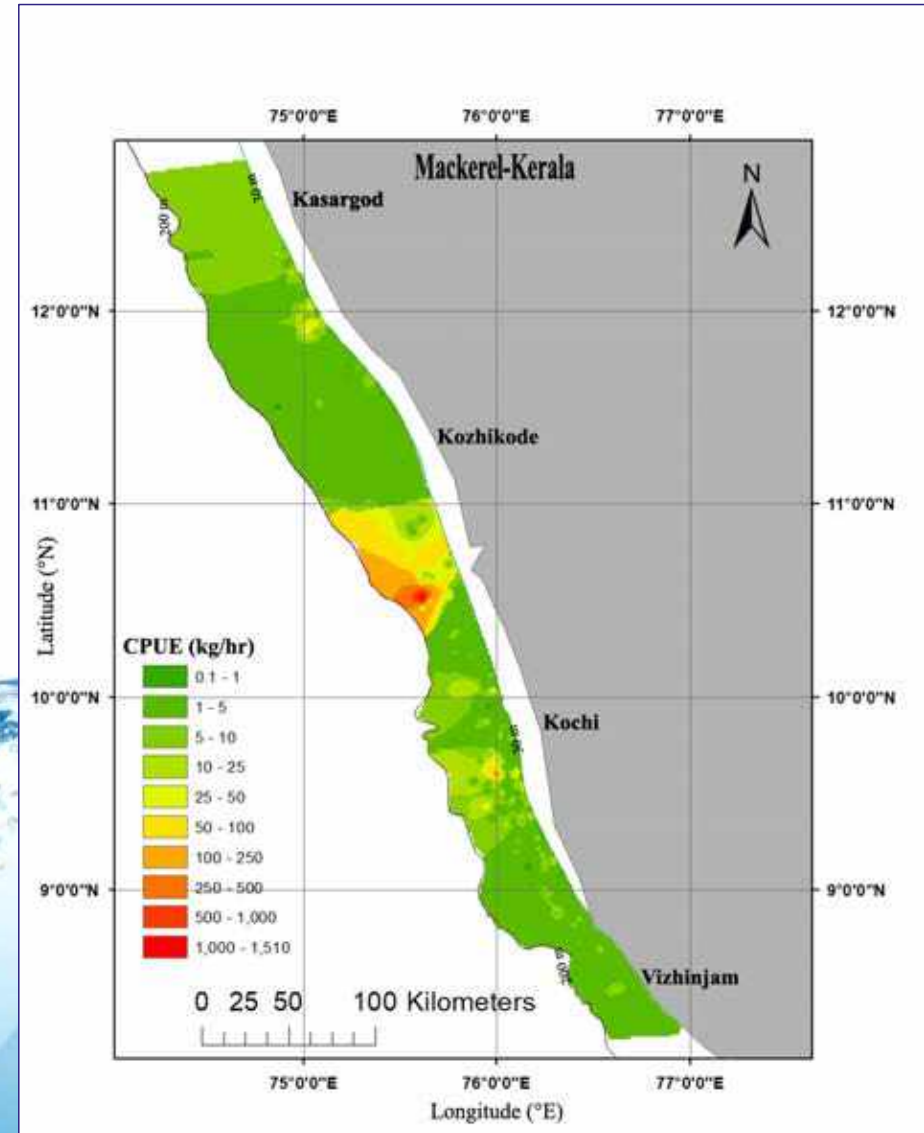


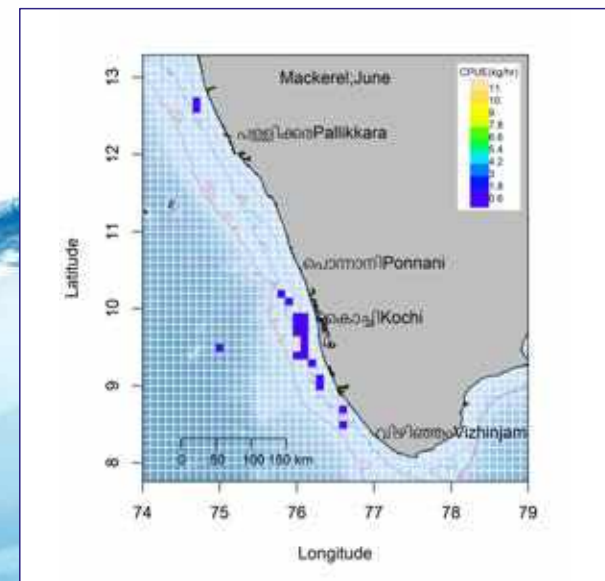
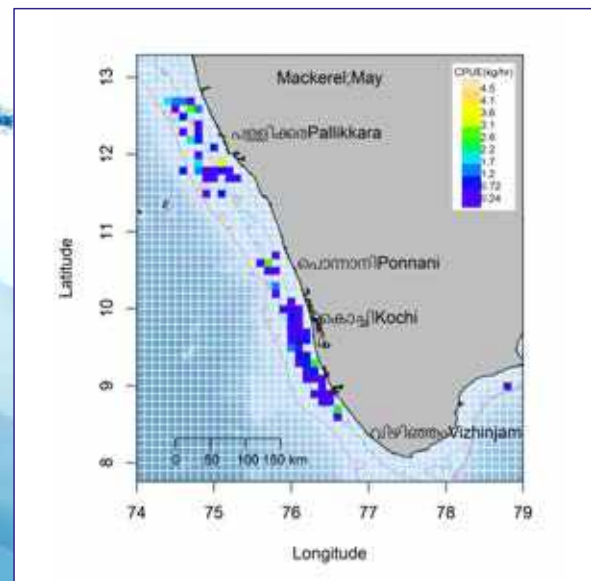
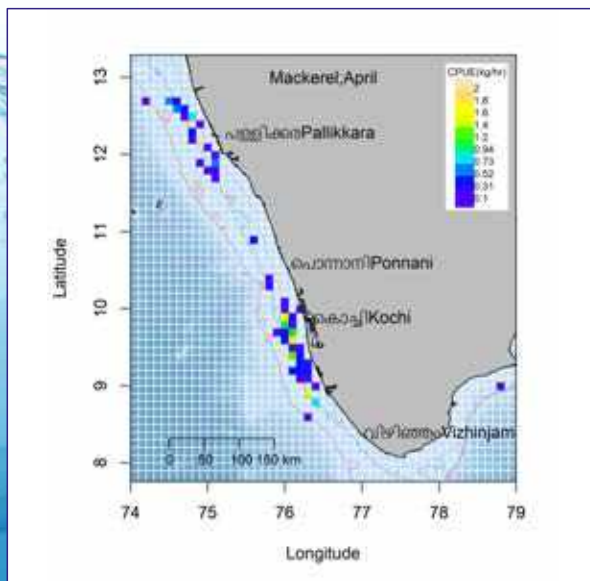
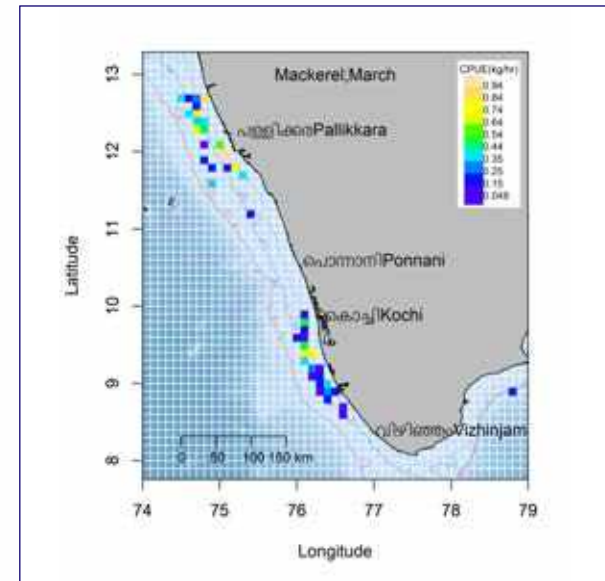
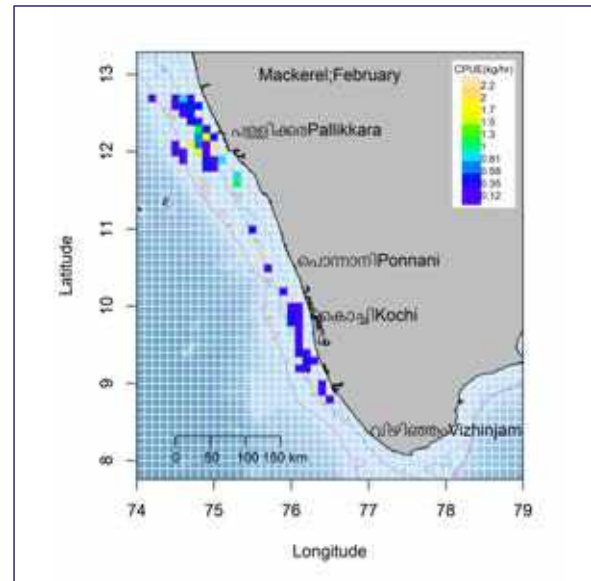
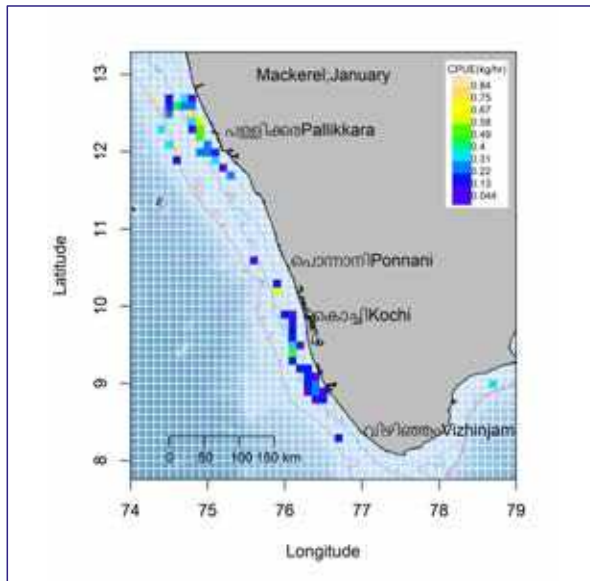


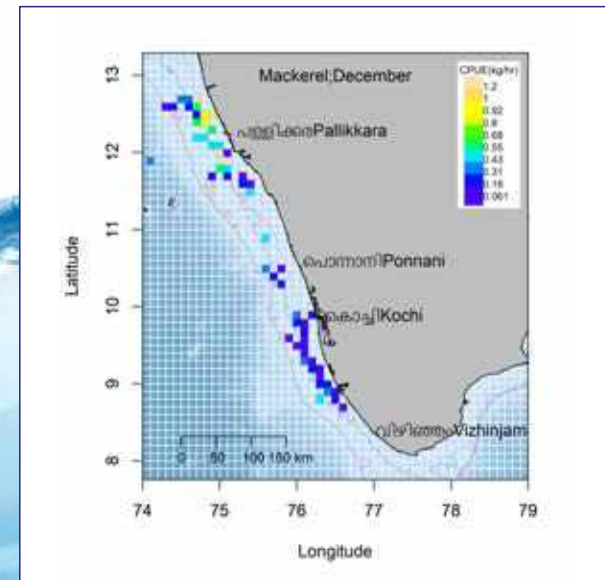
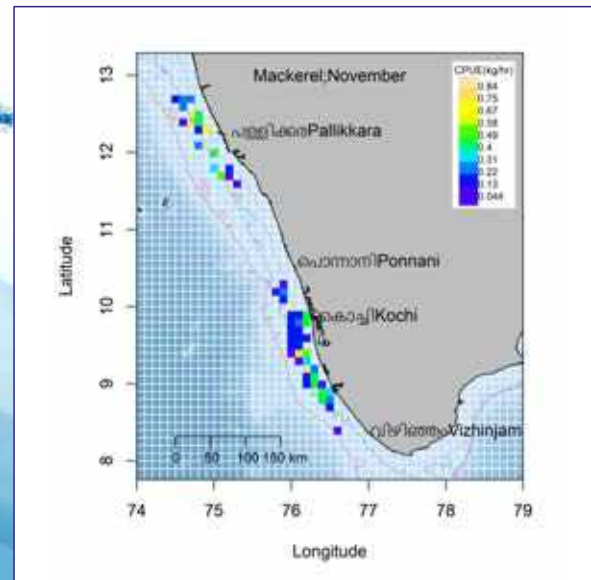
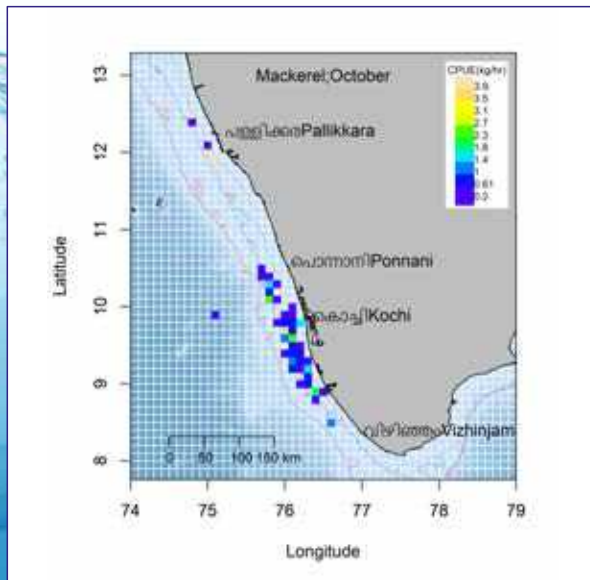
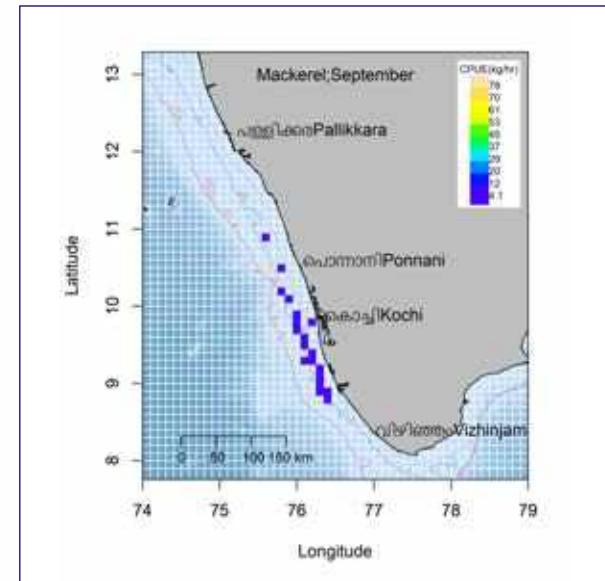
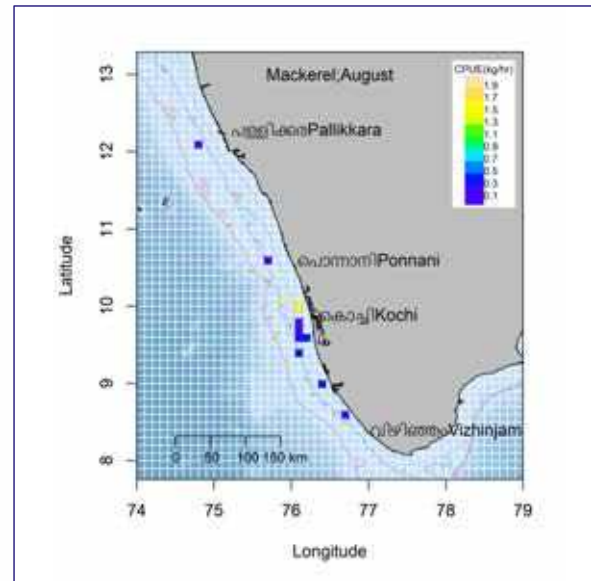
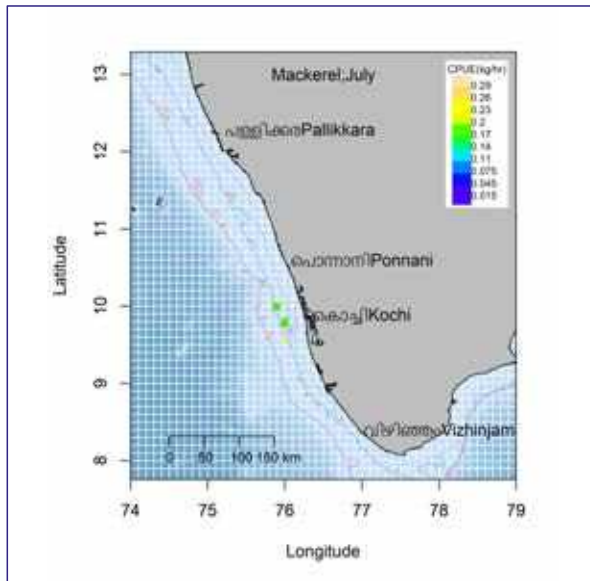




# Mackerel

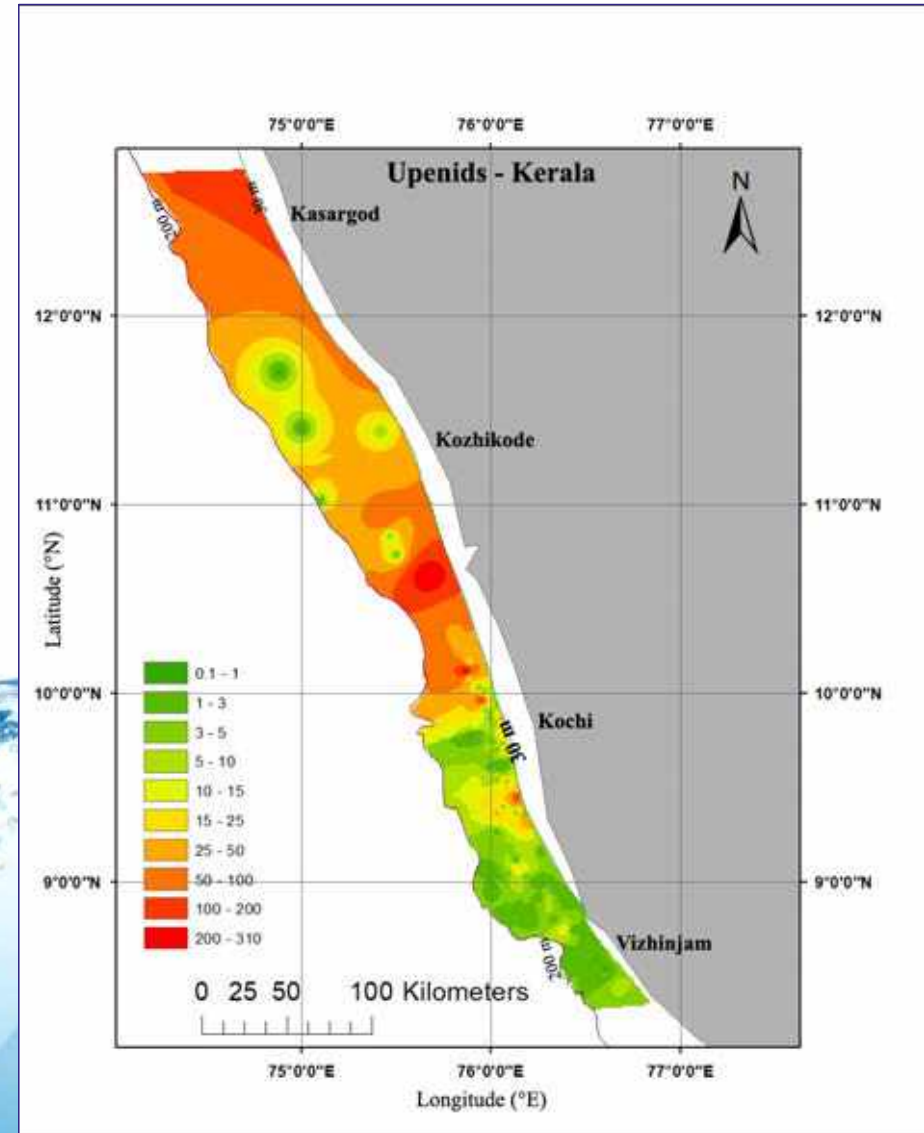


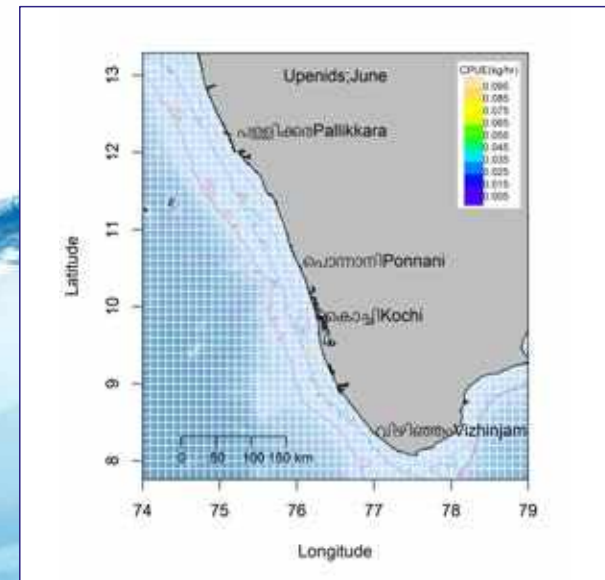
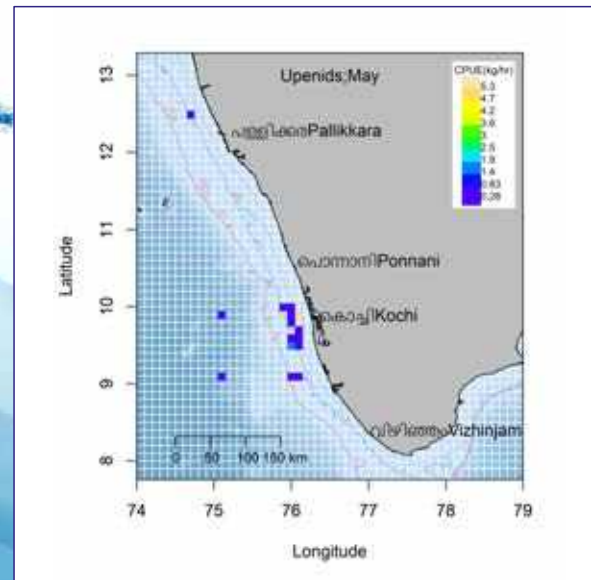
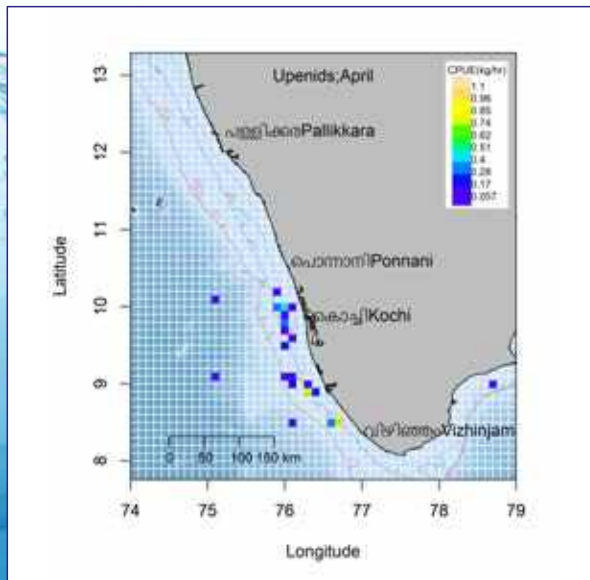
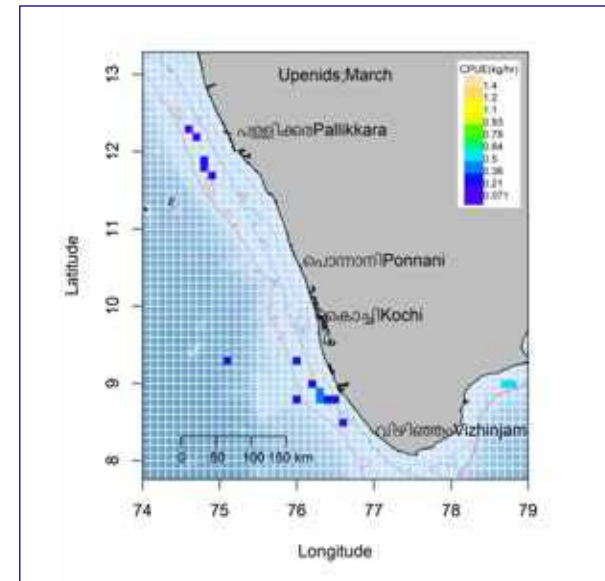
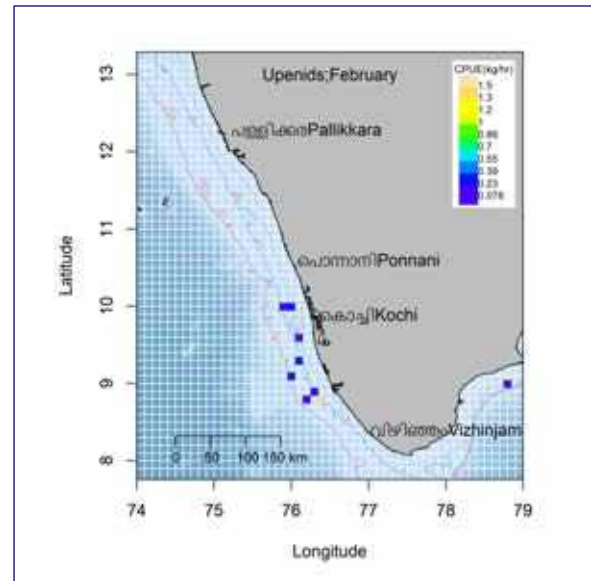
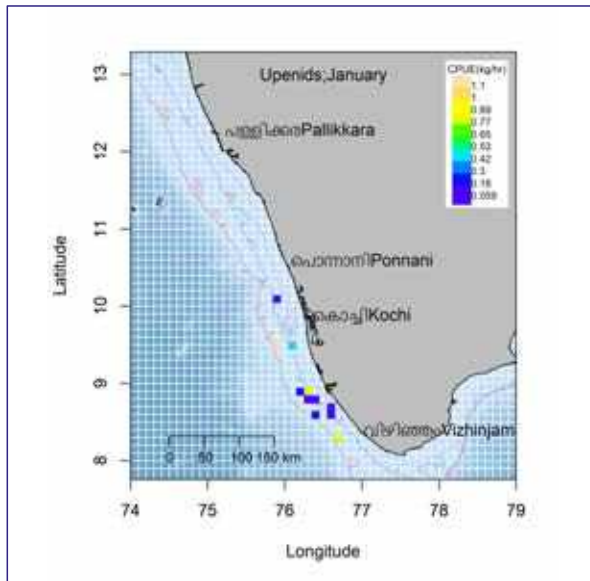


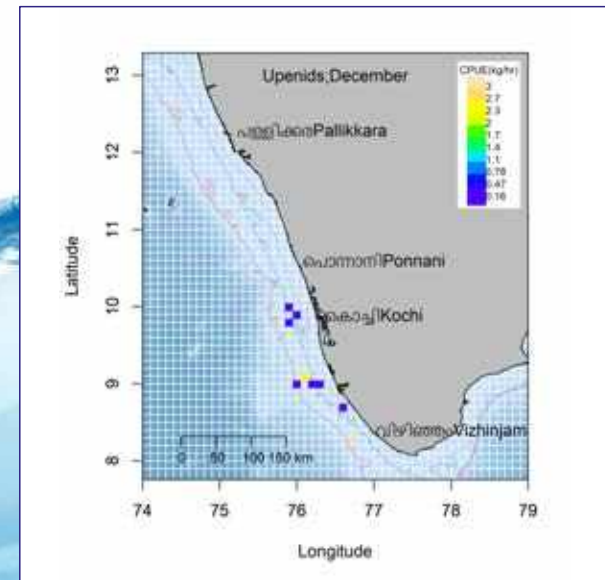
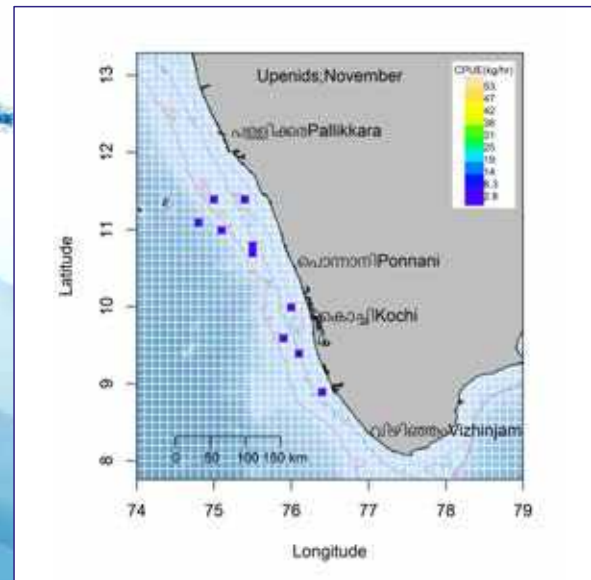
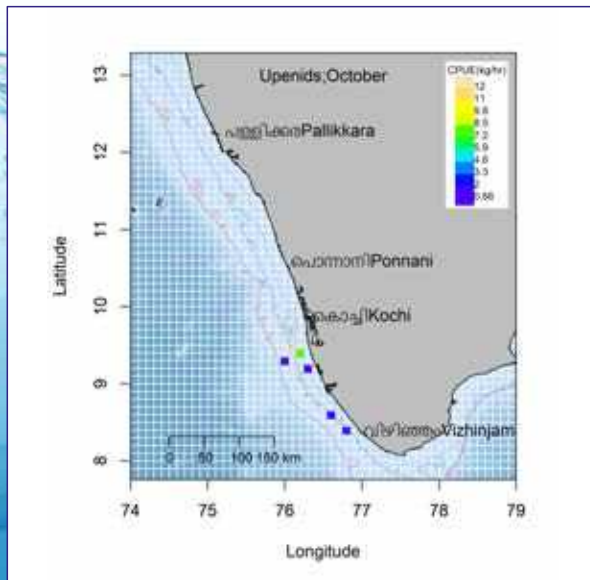
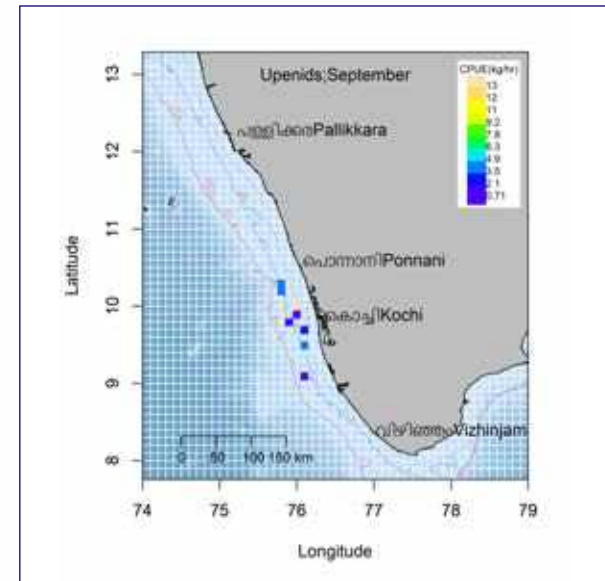
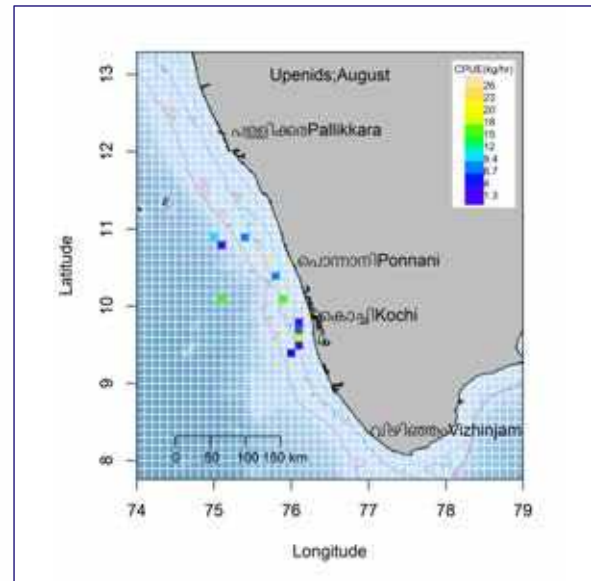
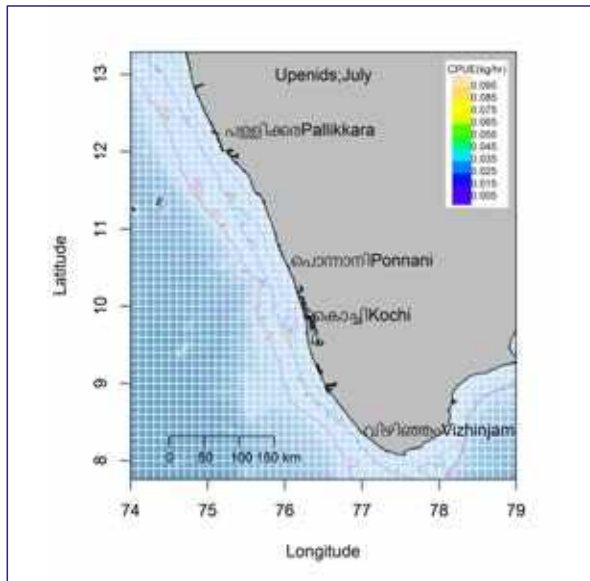




## Goatfish (Upenids)

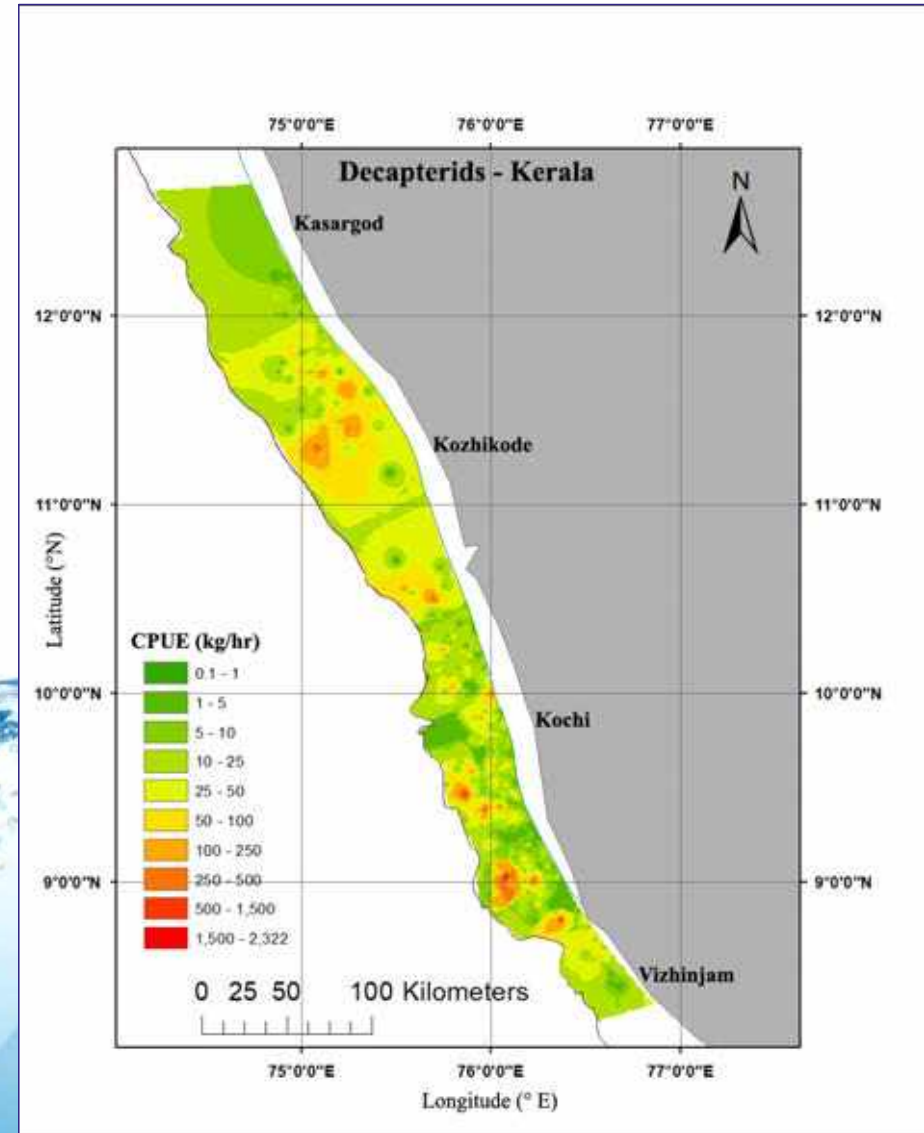


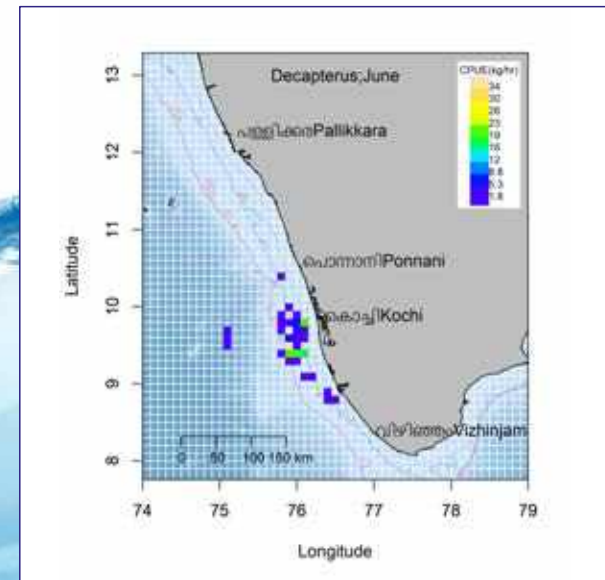
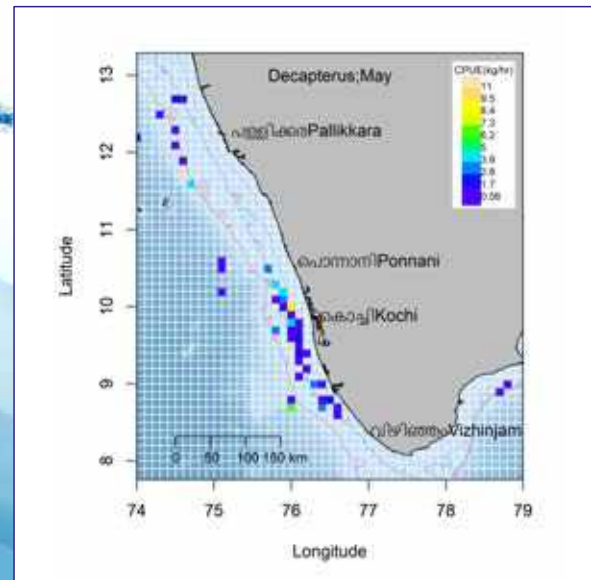
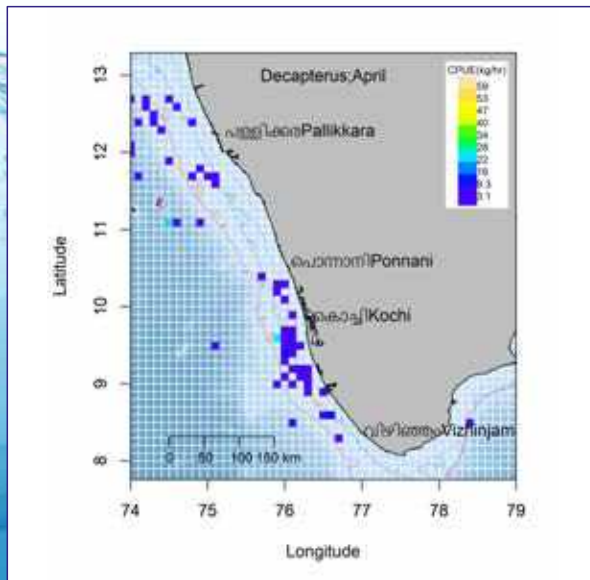
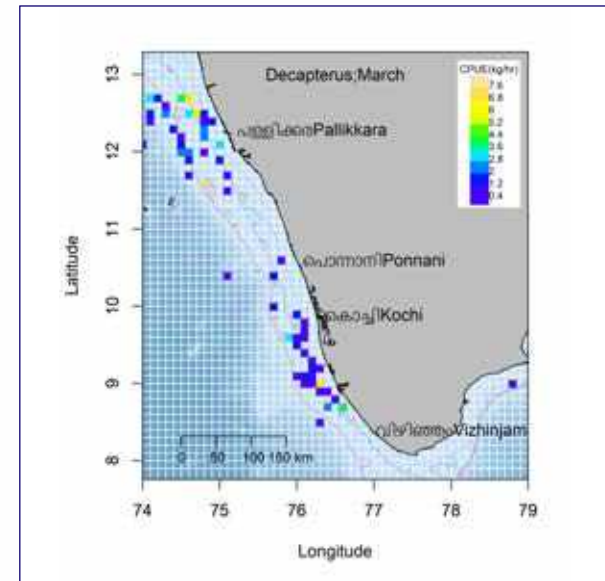
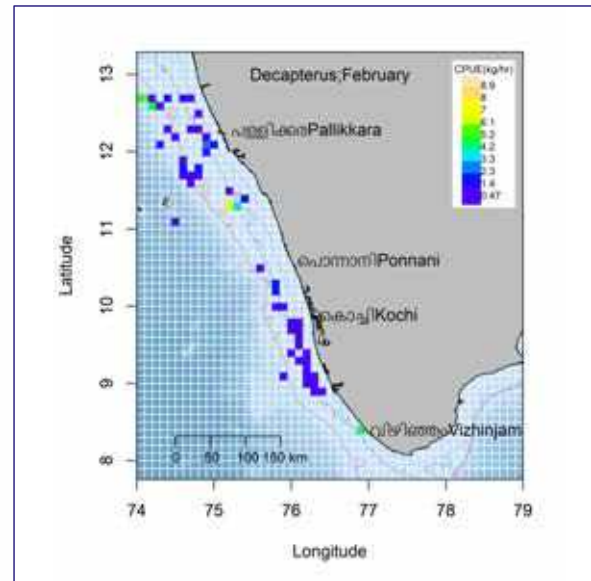
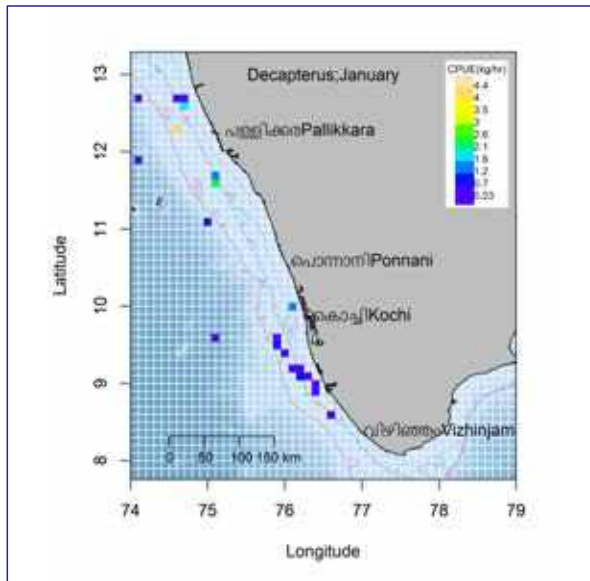




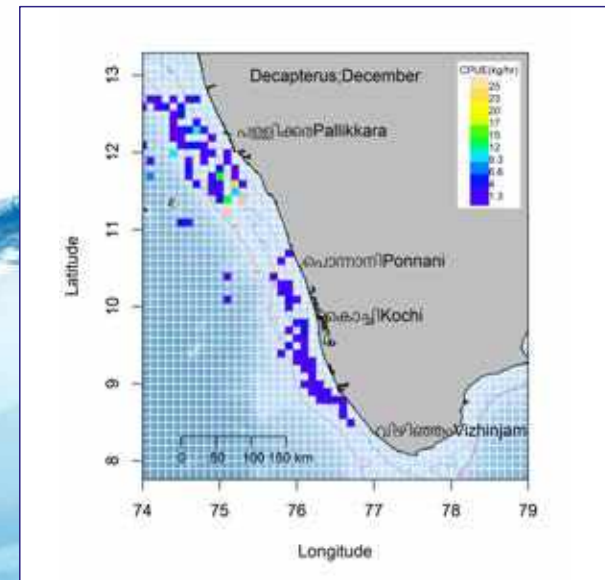
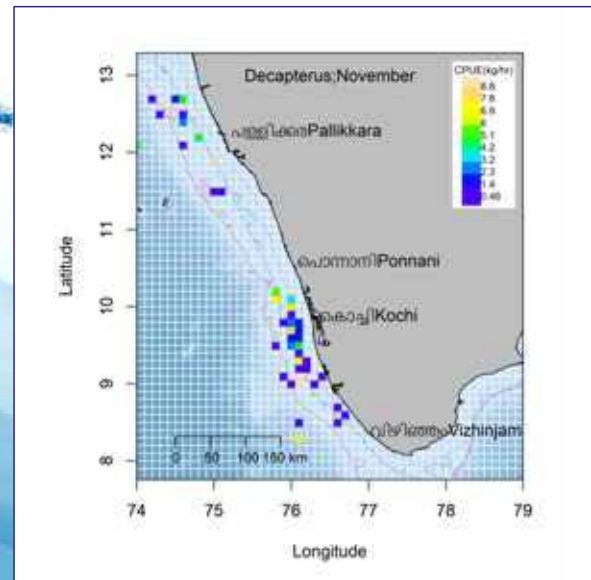
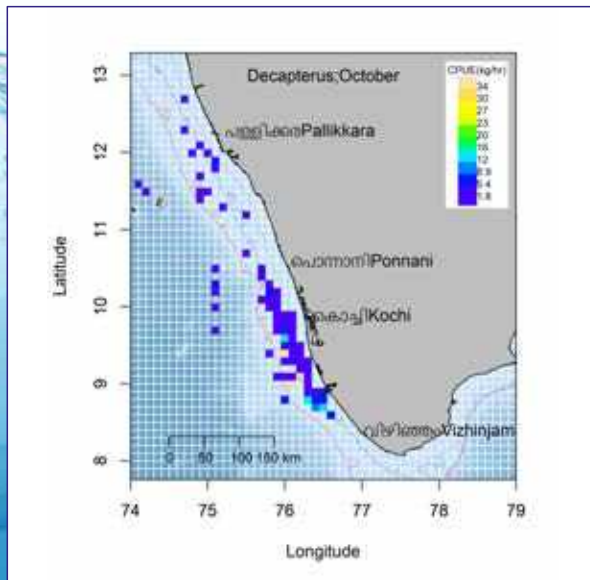
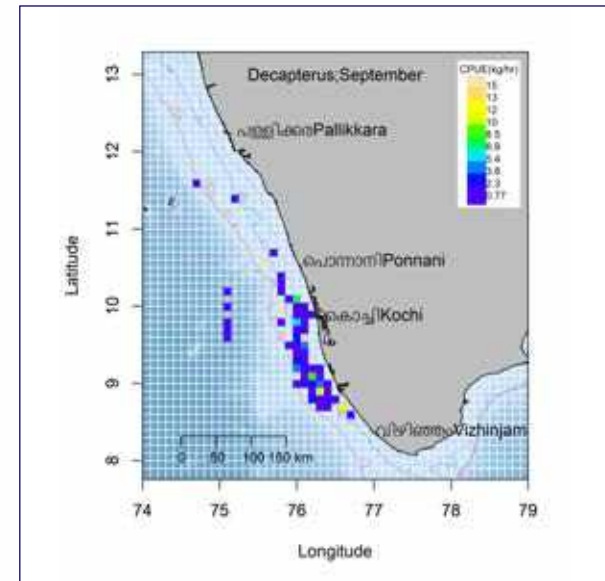
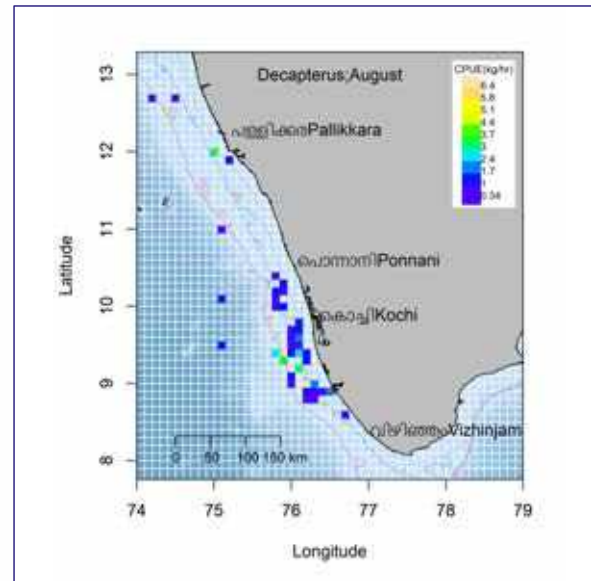
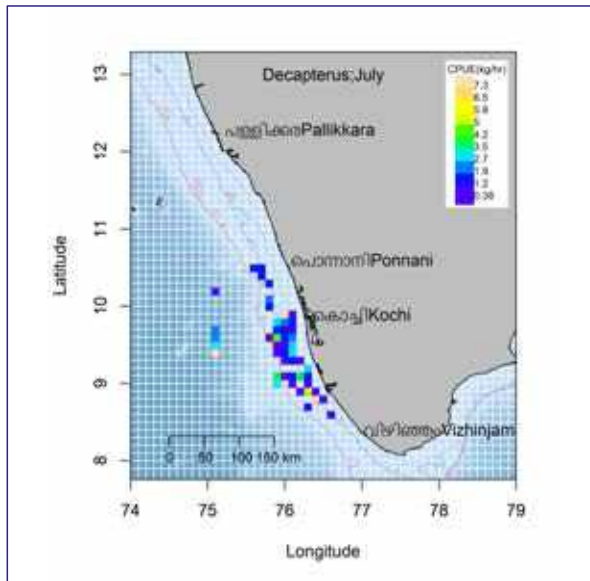


## Round Scads (Decapterus)



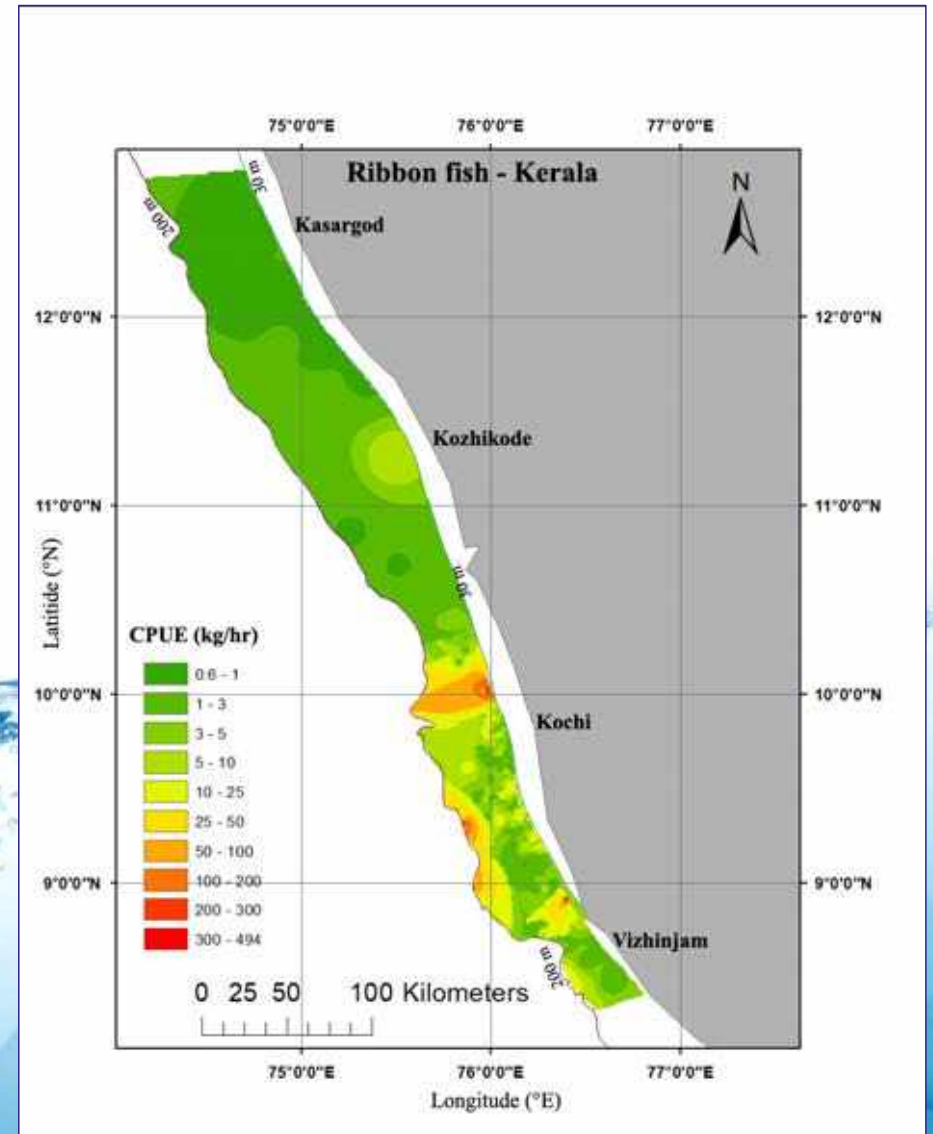


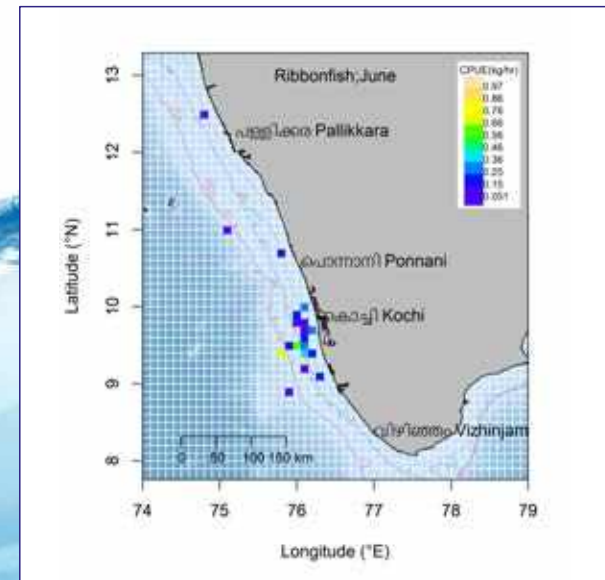
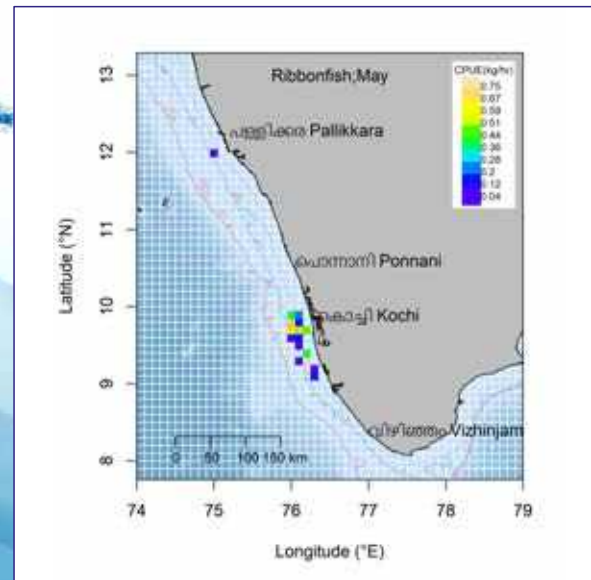
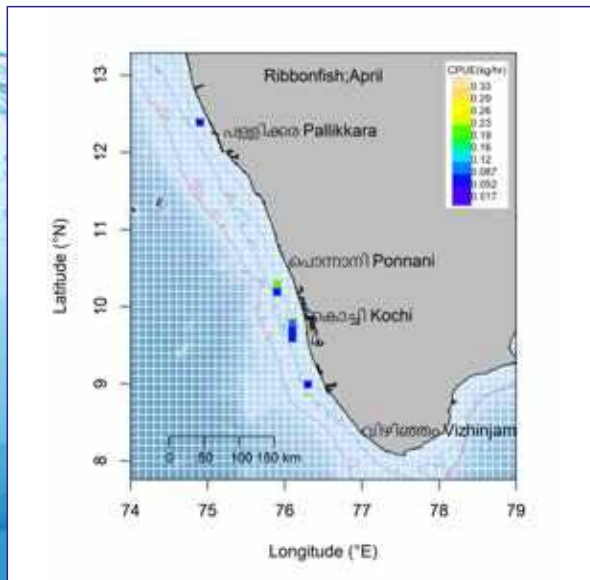
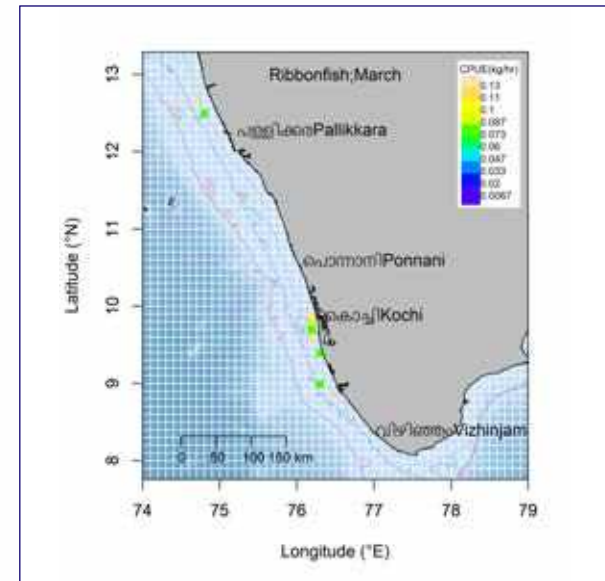
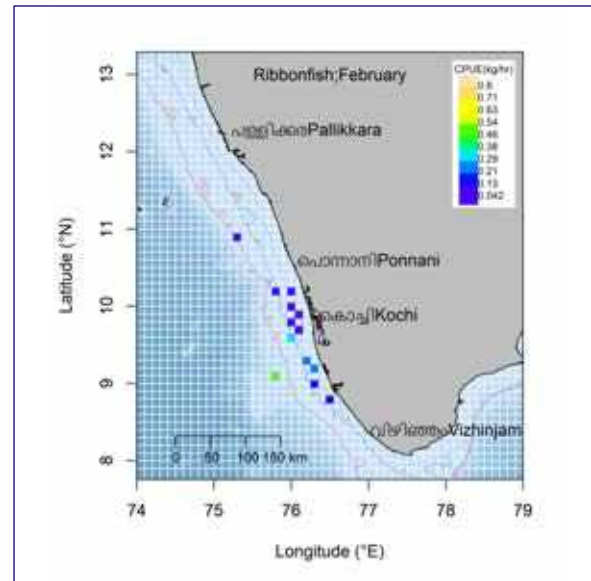
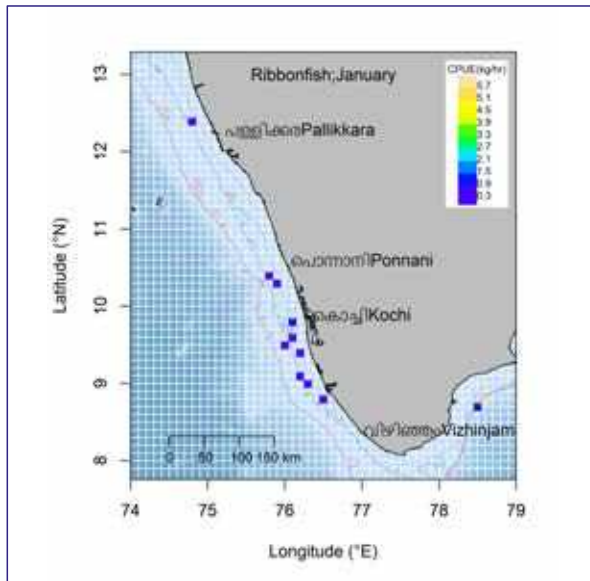


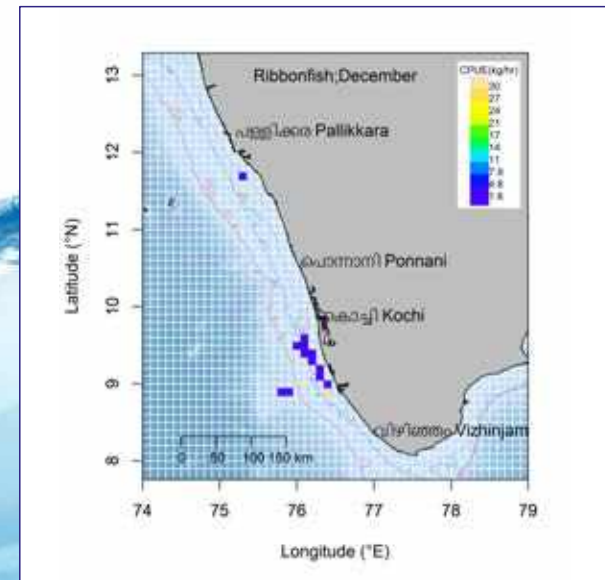
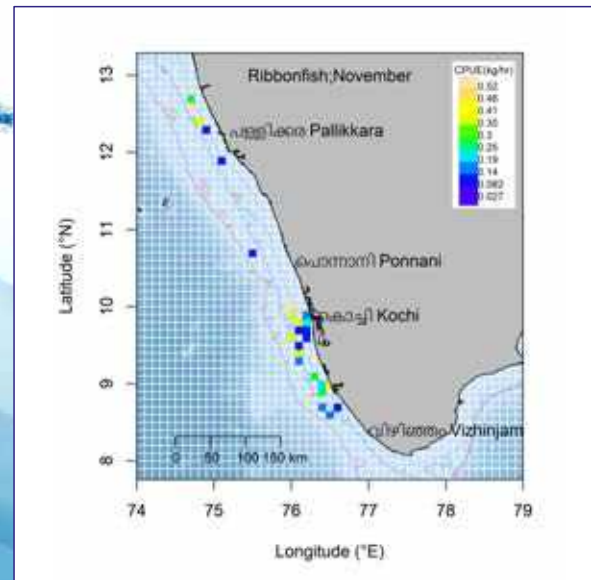
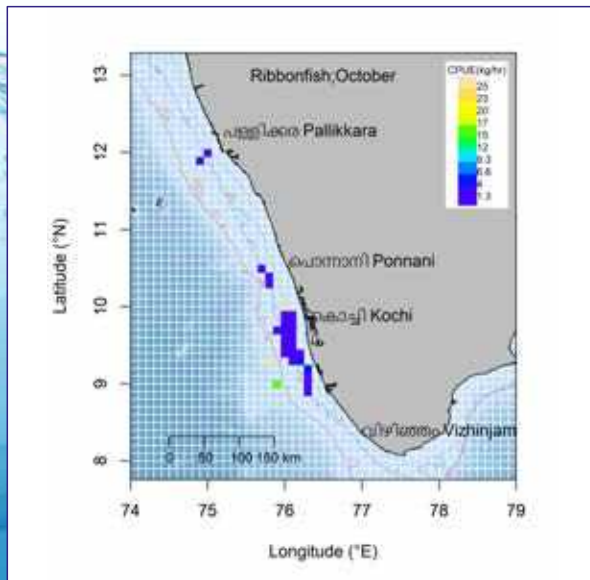
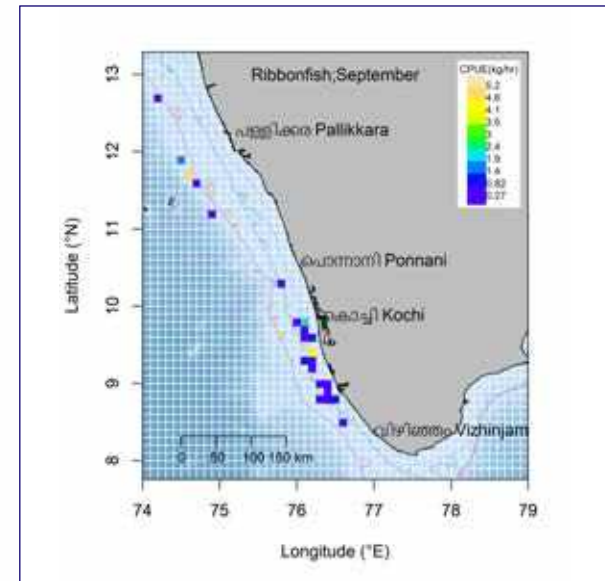
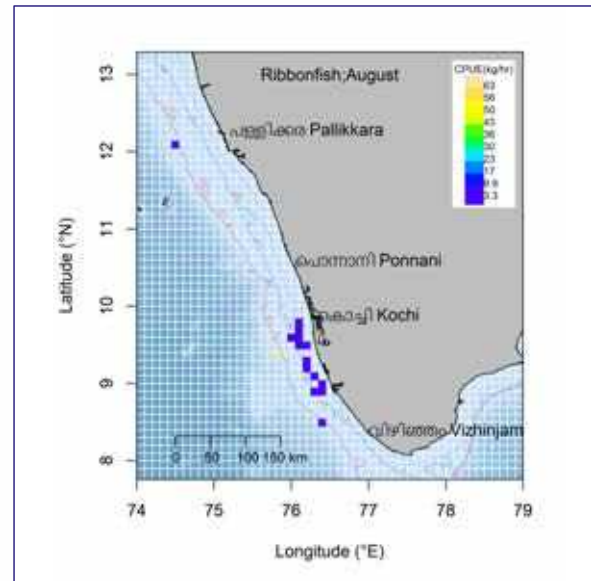
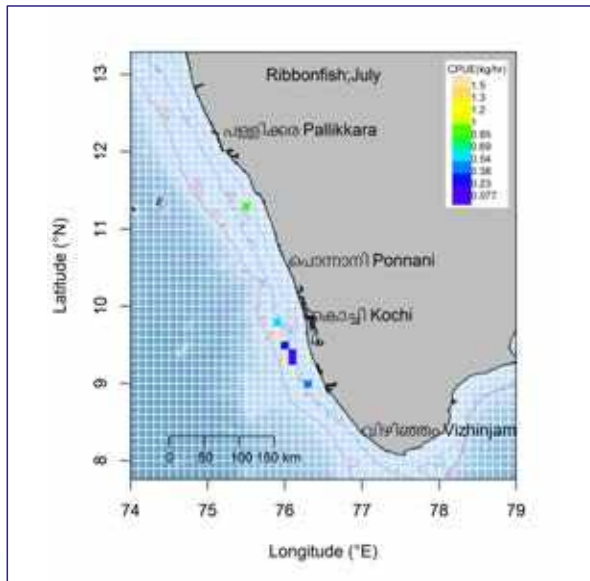




**Ribbonfish**

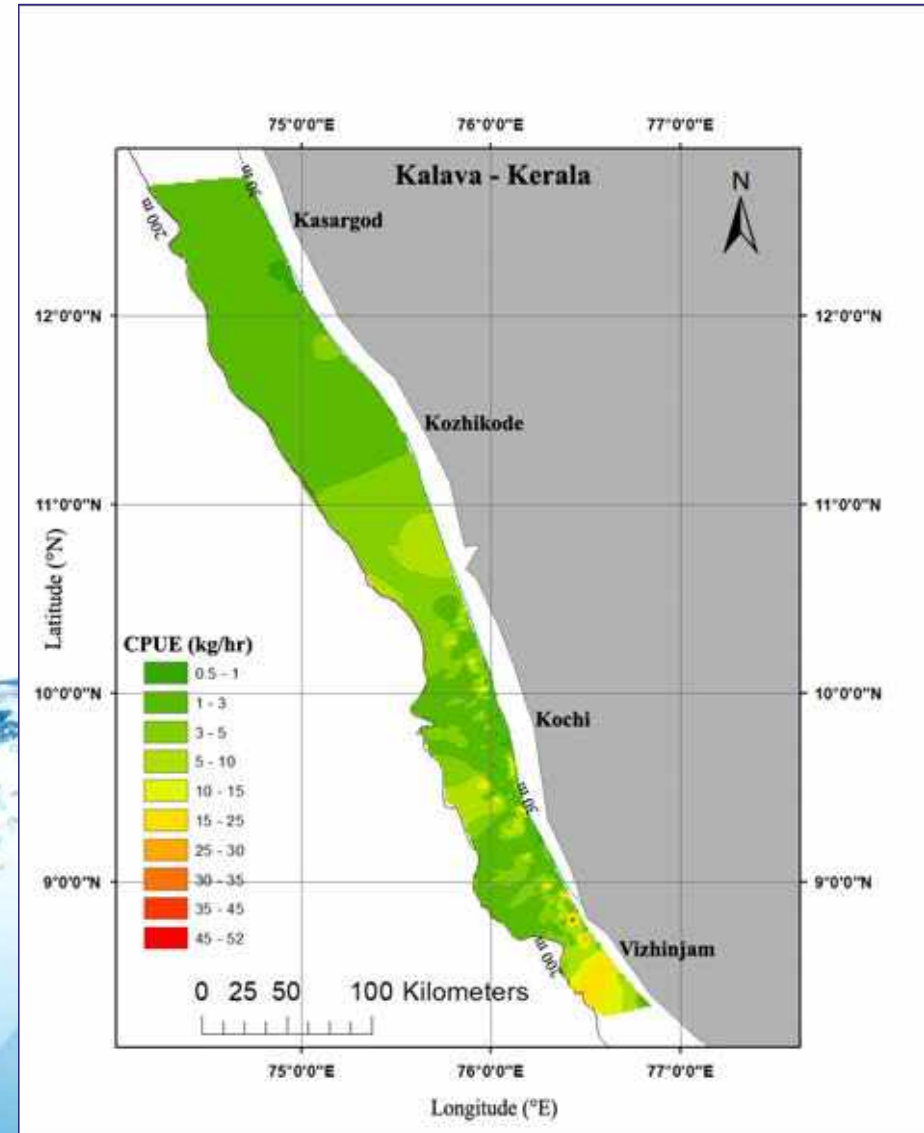


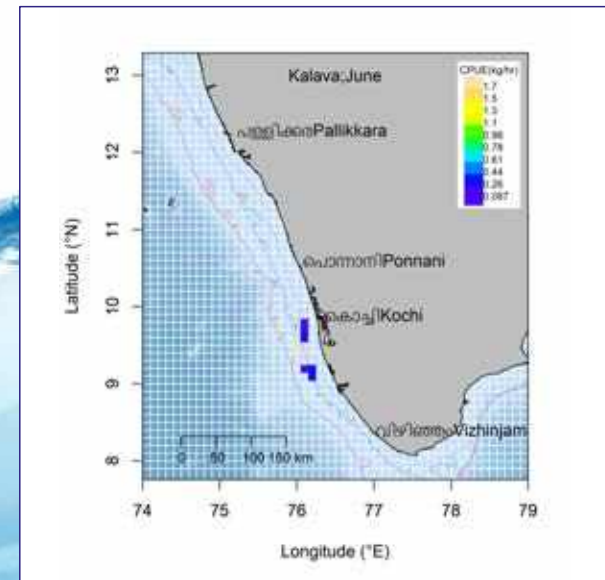
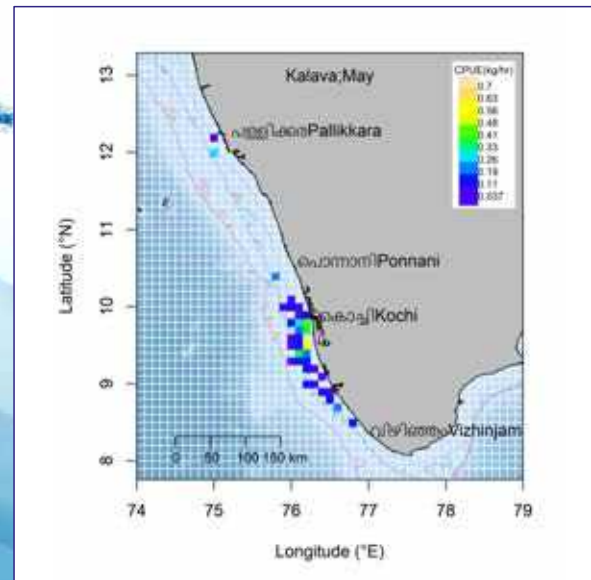
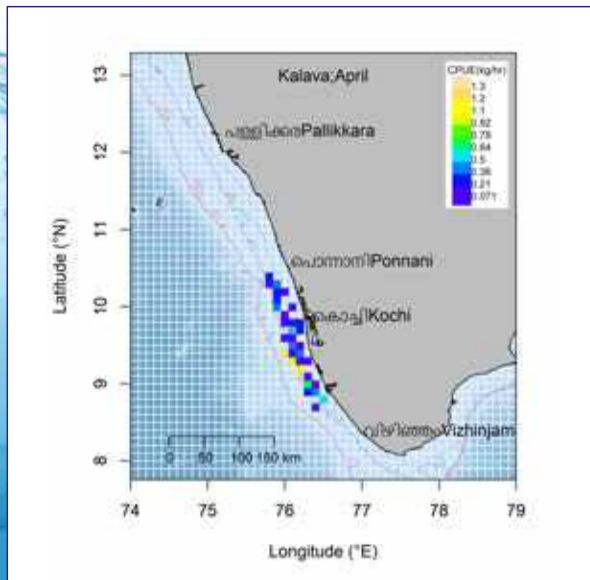
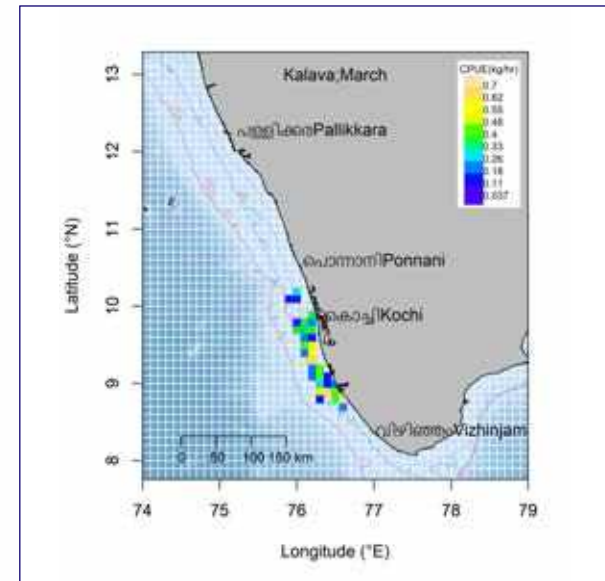
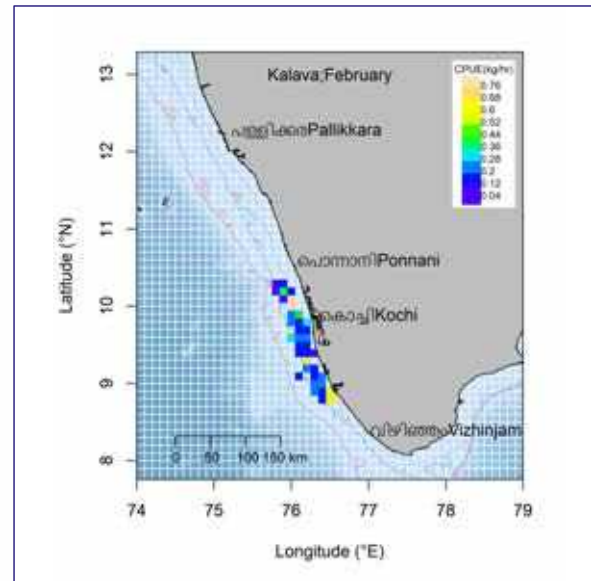
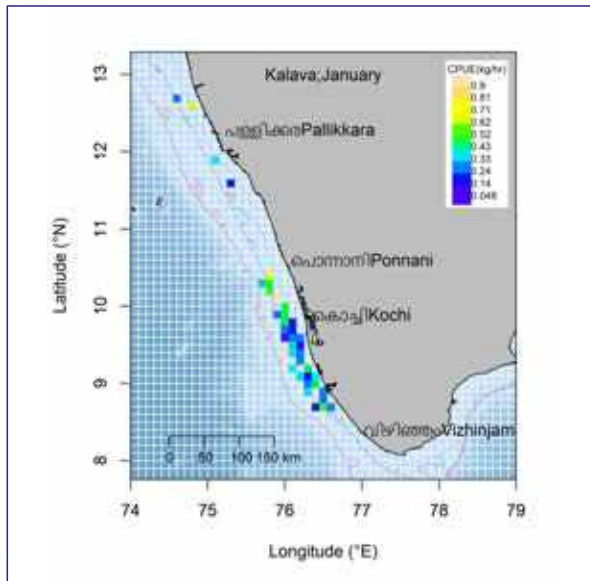


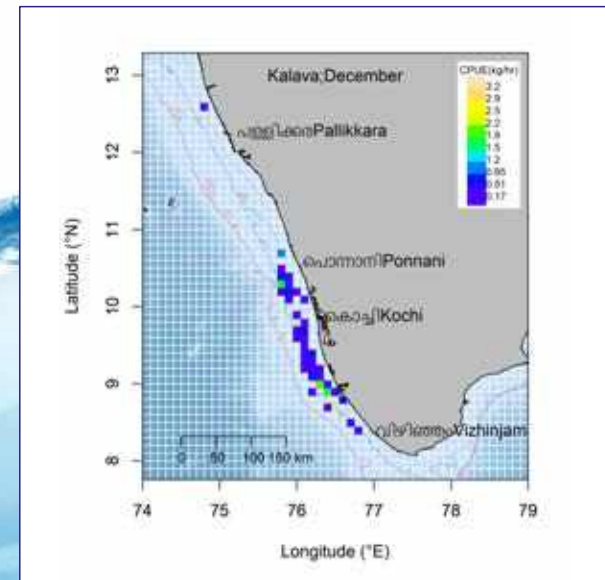
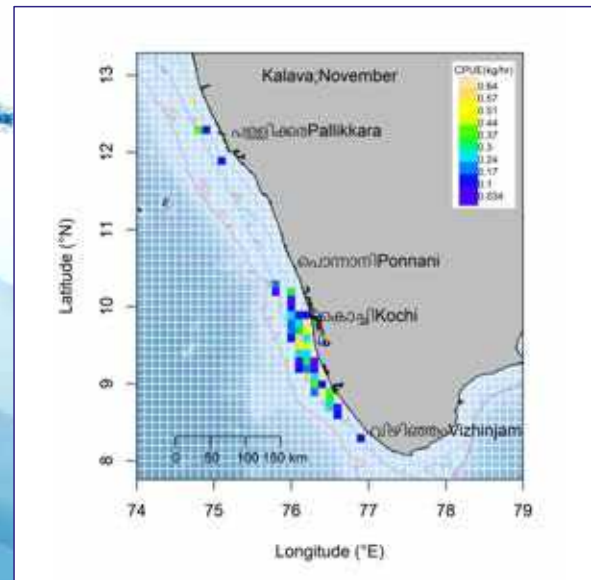
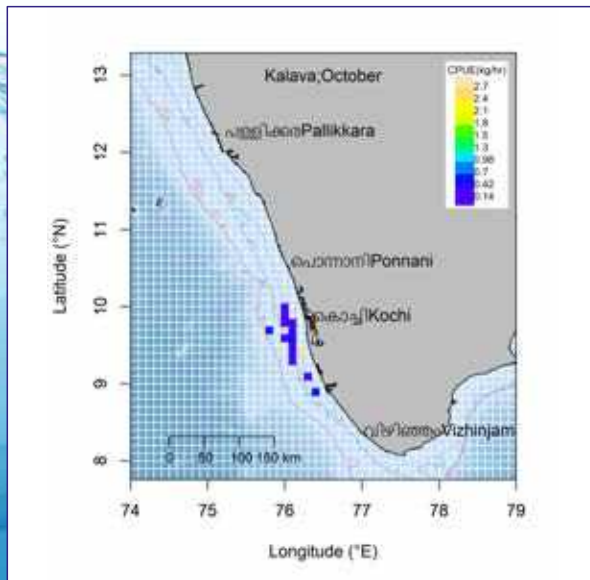
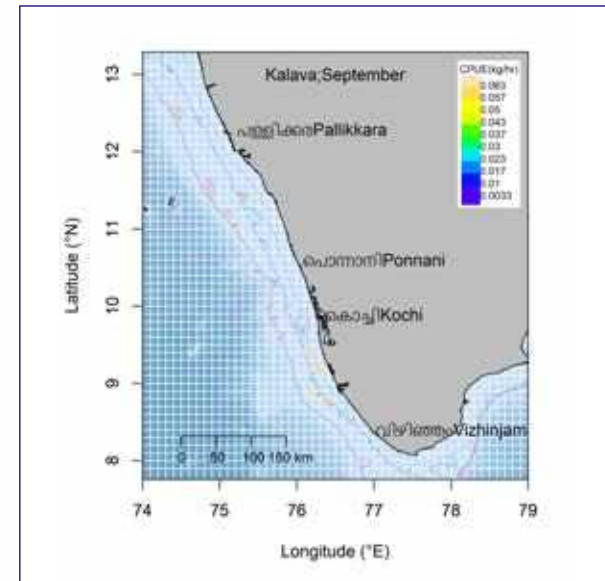
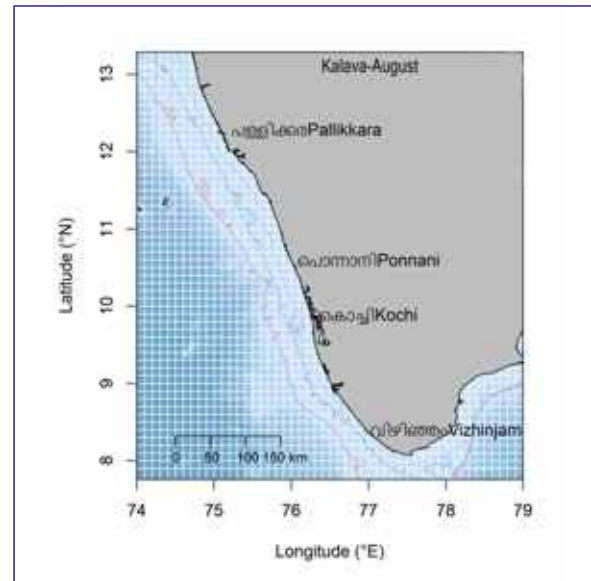
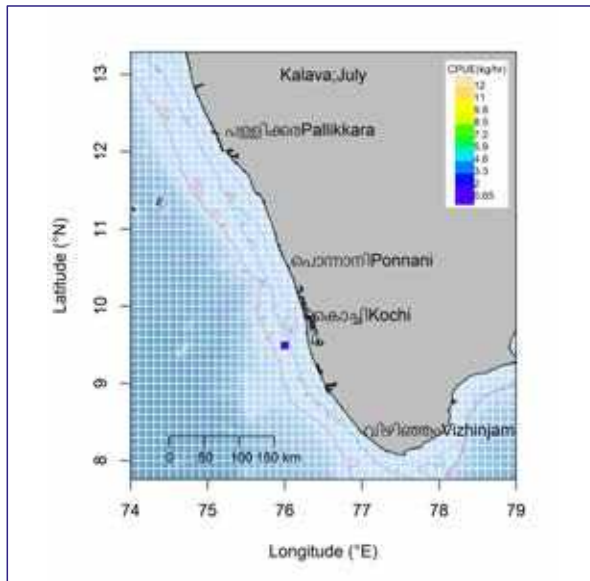




## Groupers (Kalava)

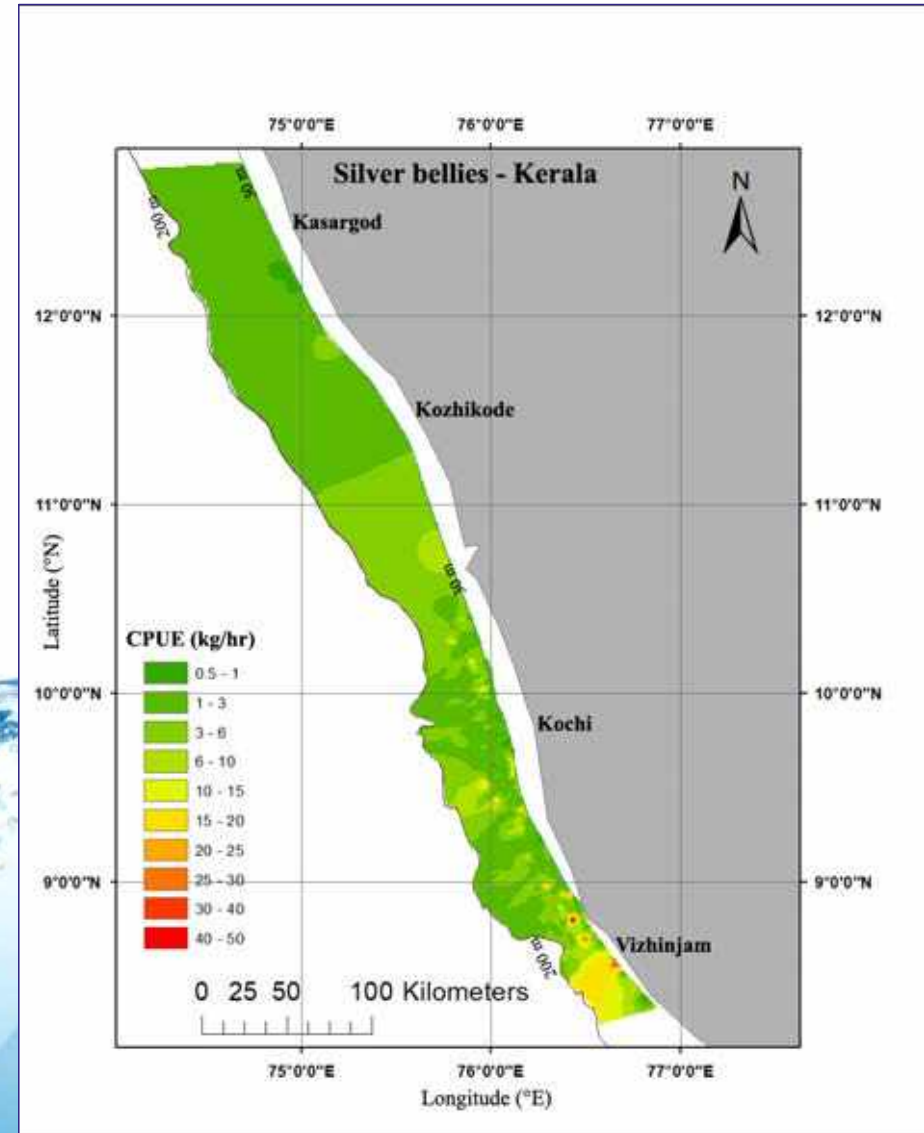




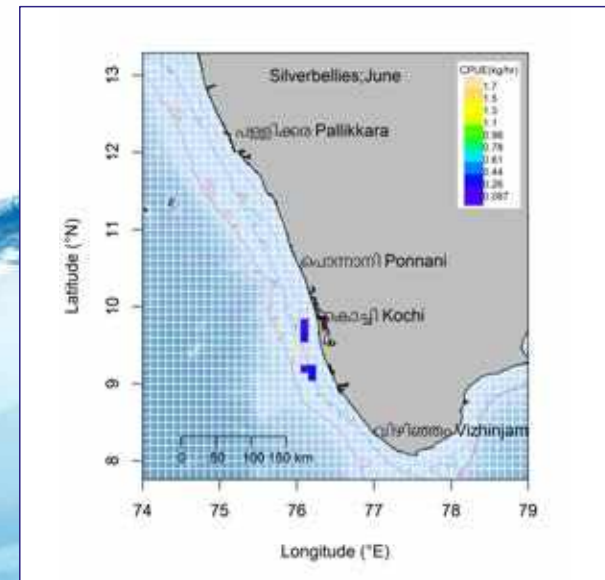
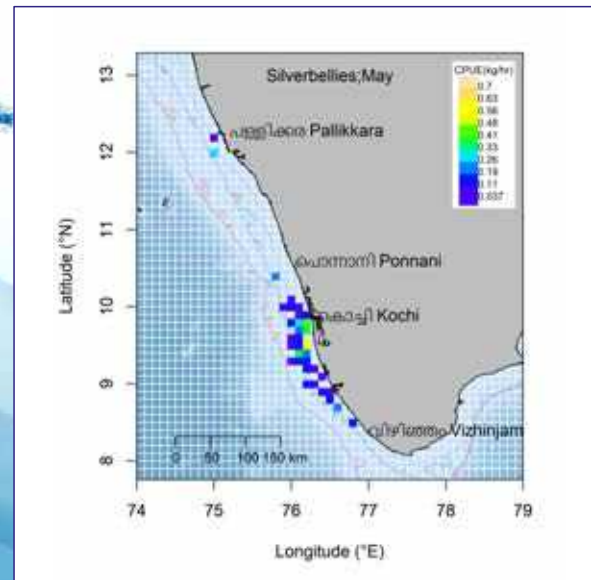
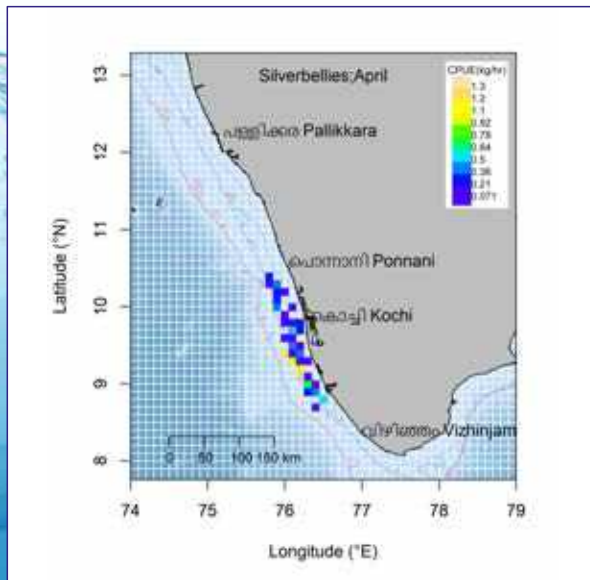
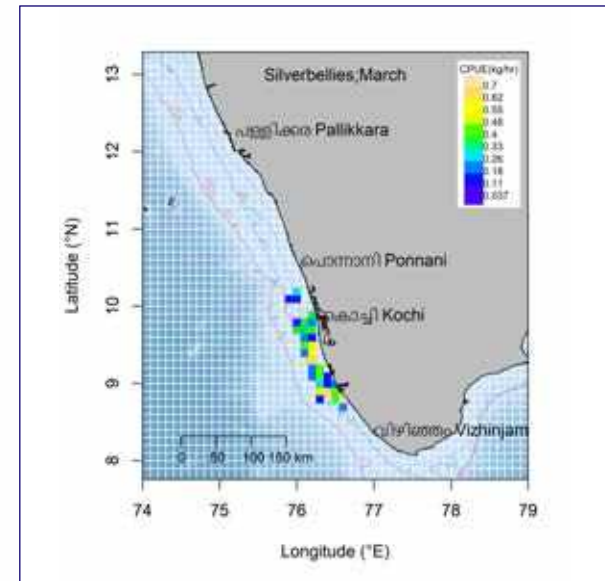
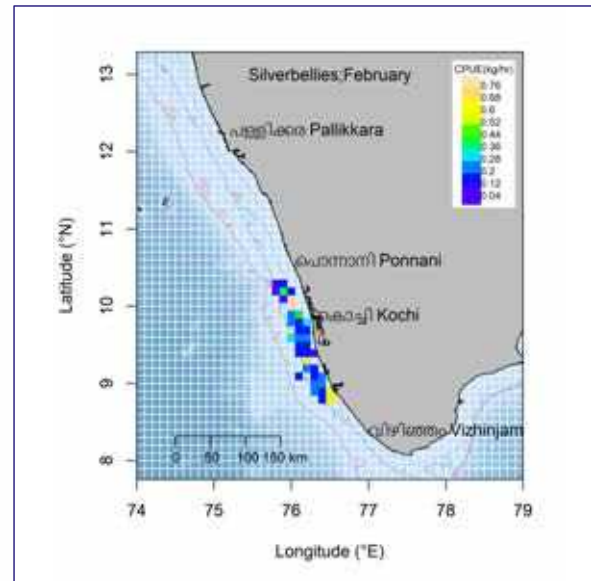
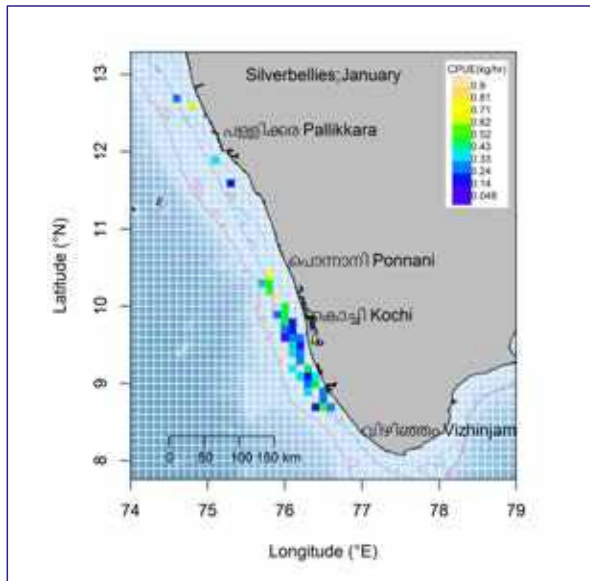


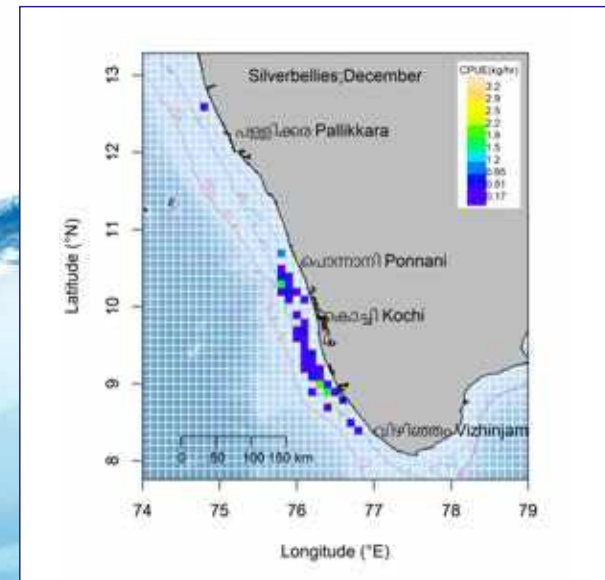
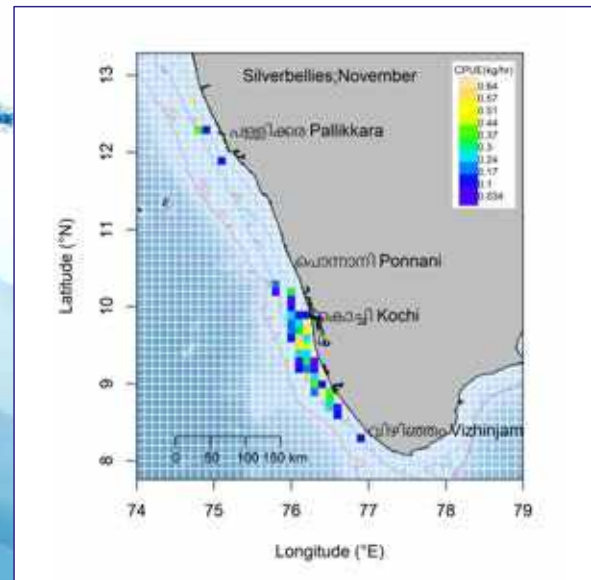
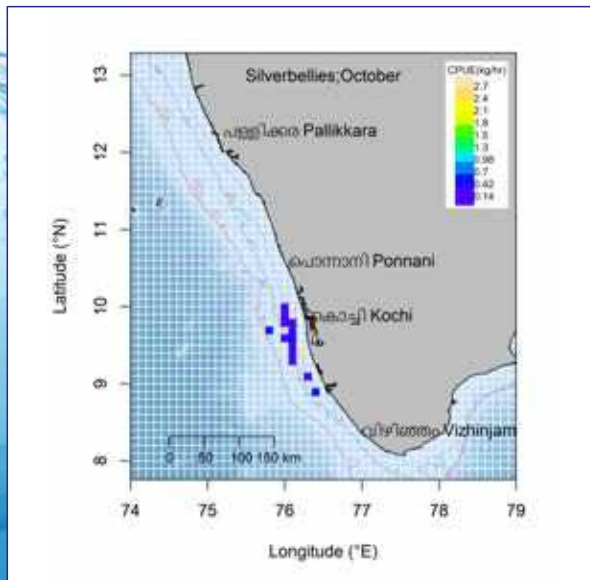
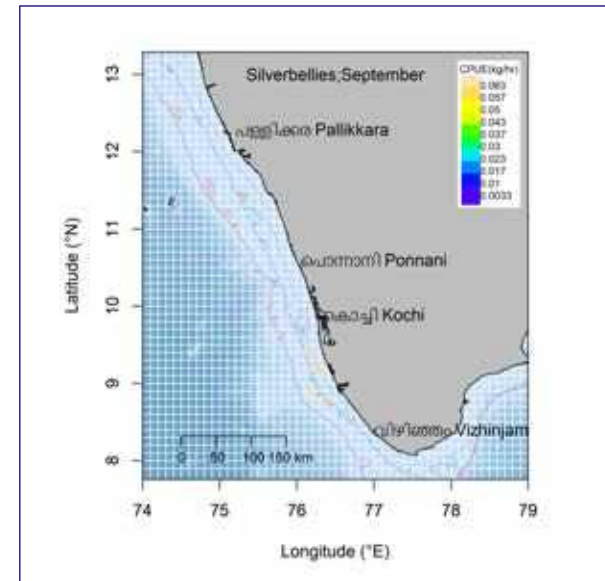
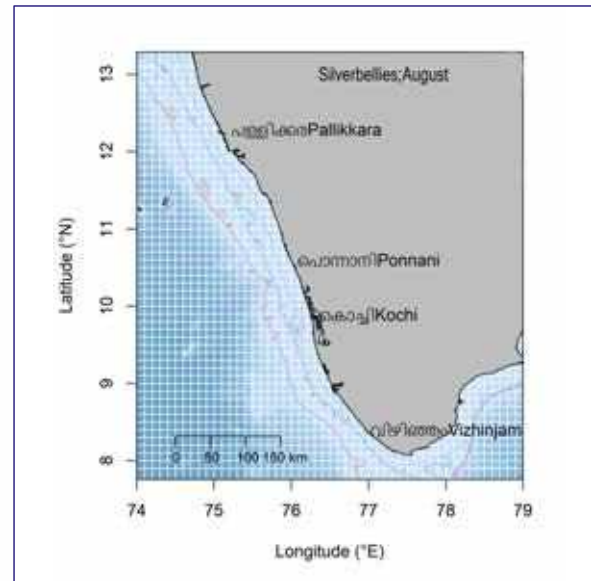
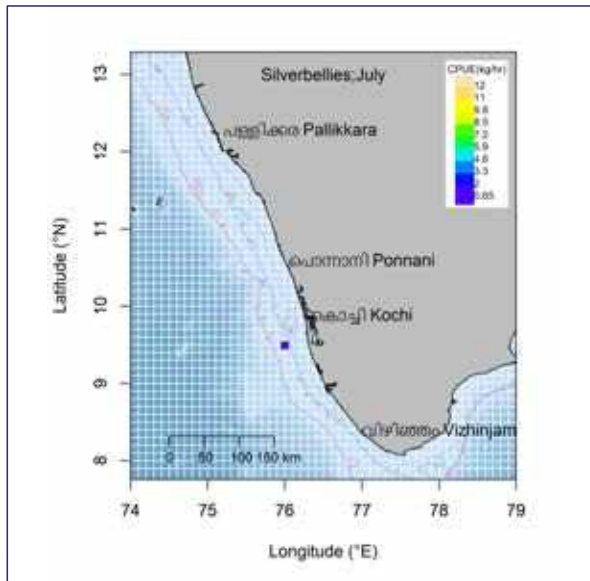


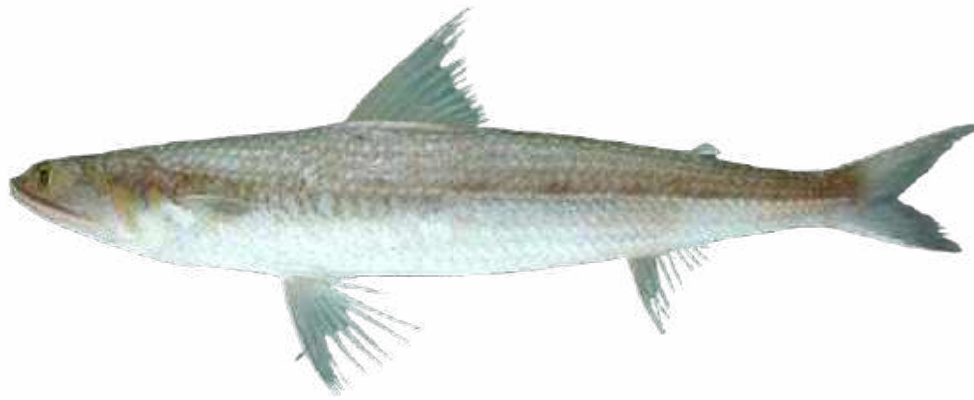
# Silverbellies



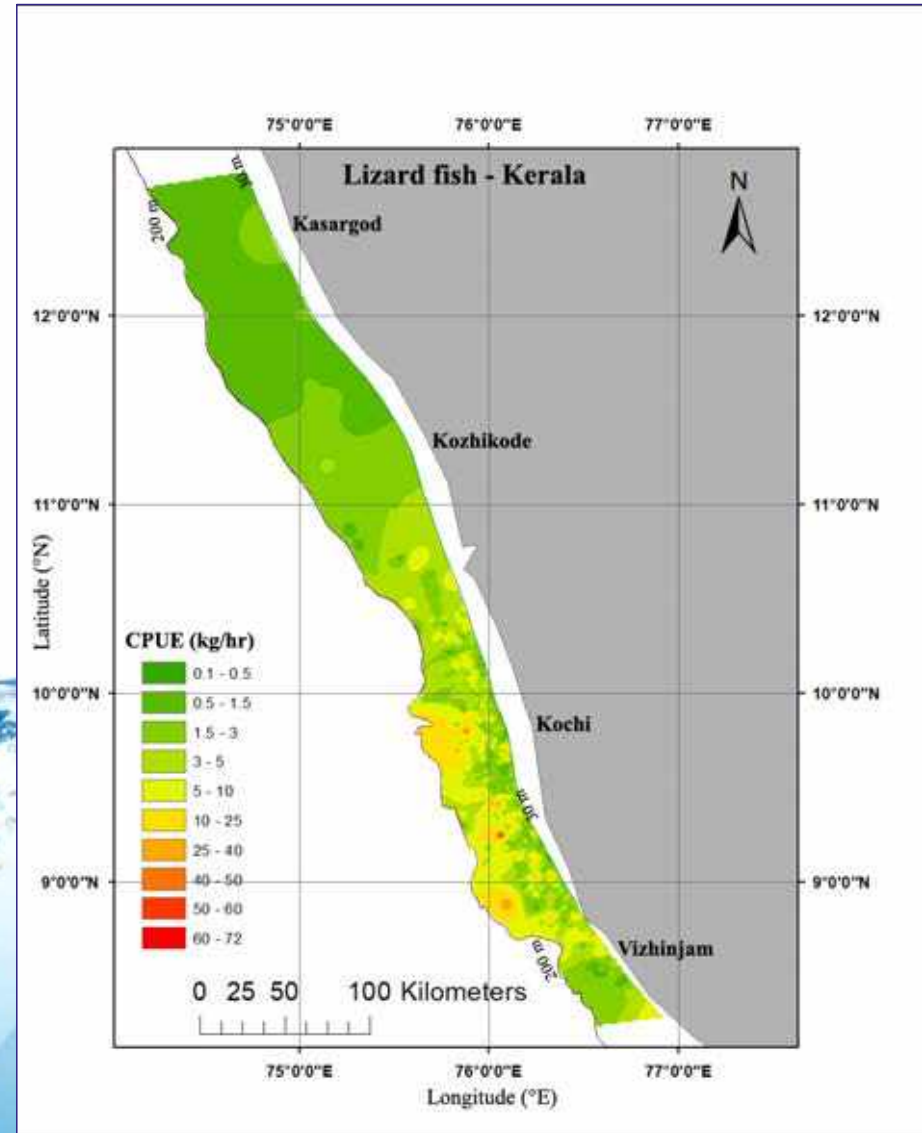


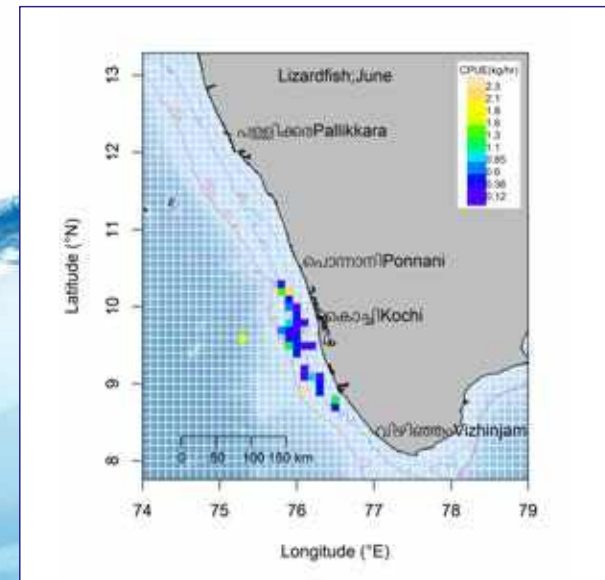
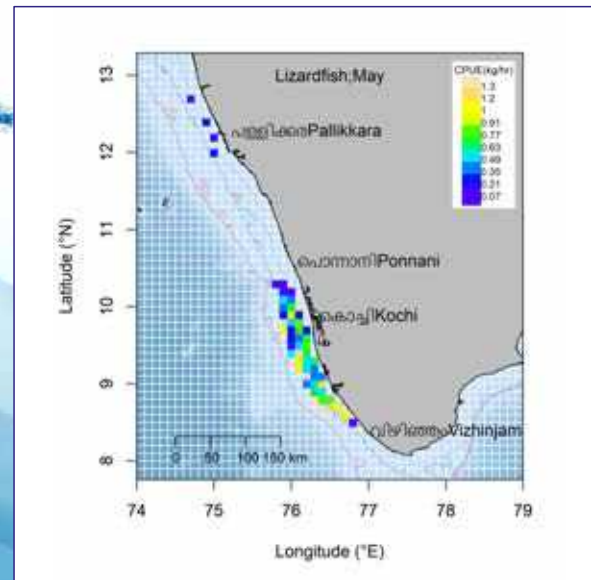
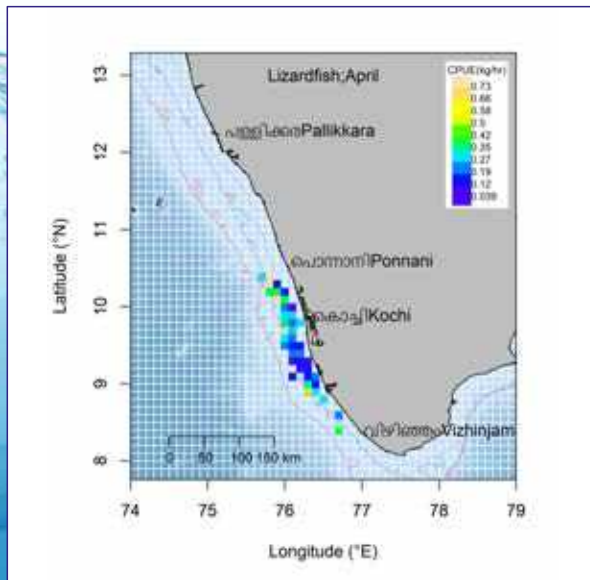
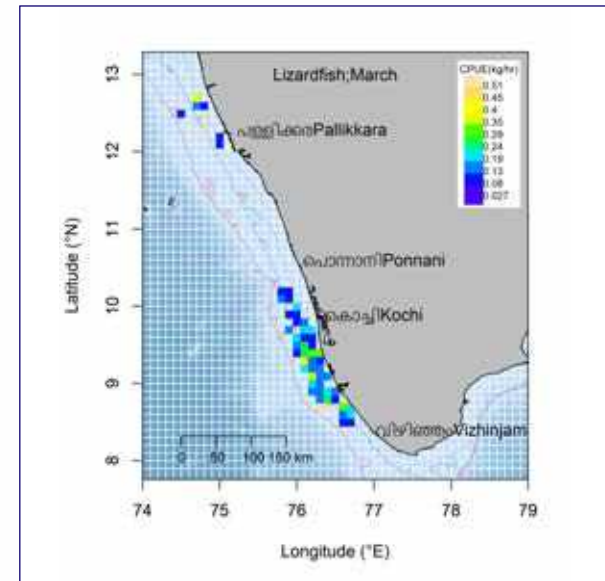
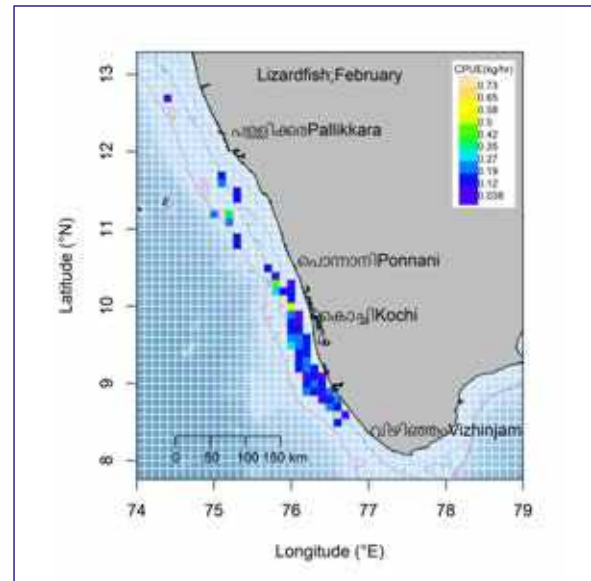
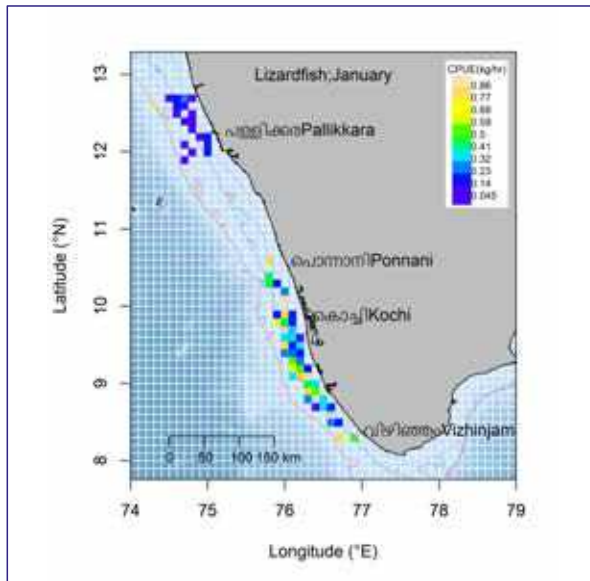


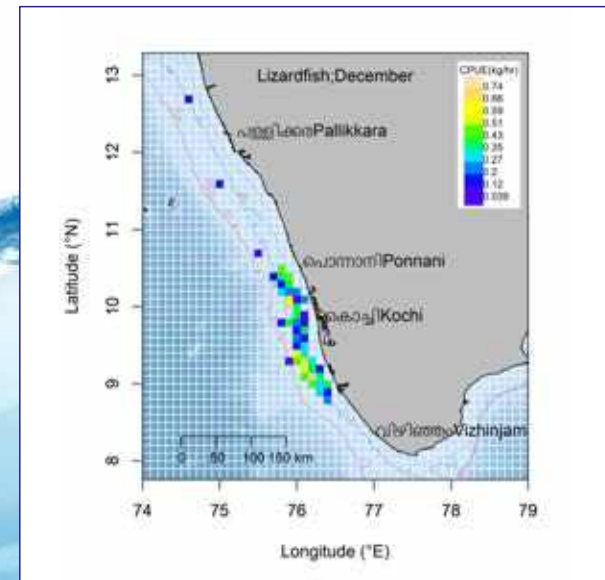
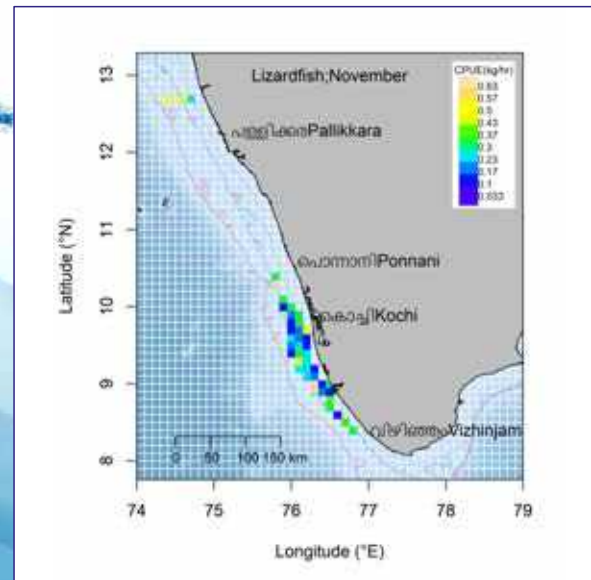
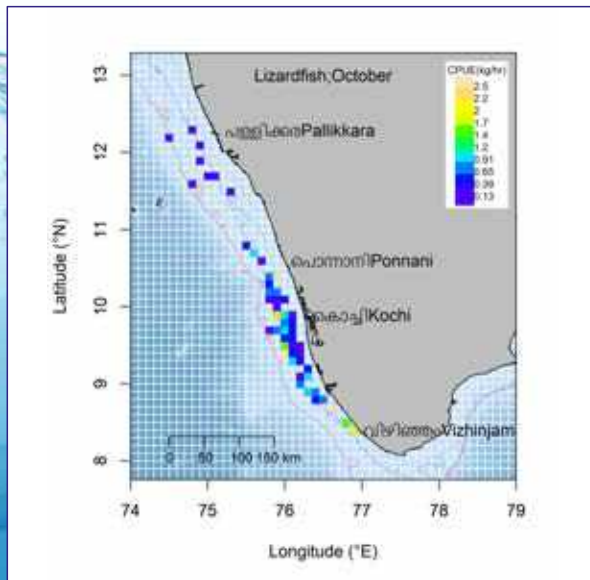
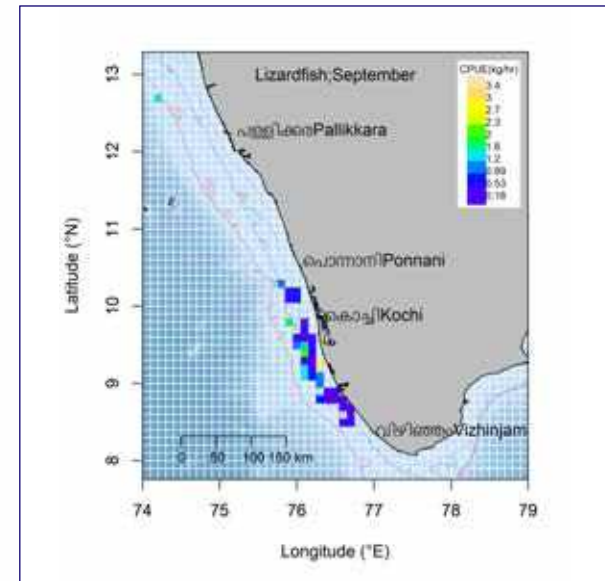
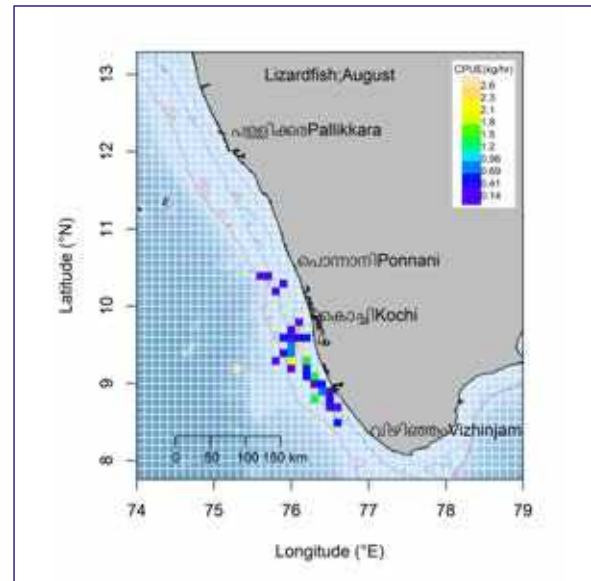
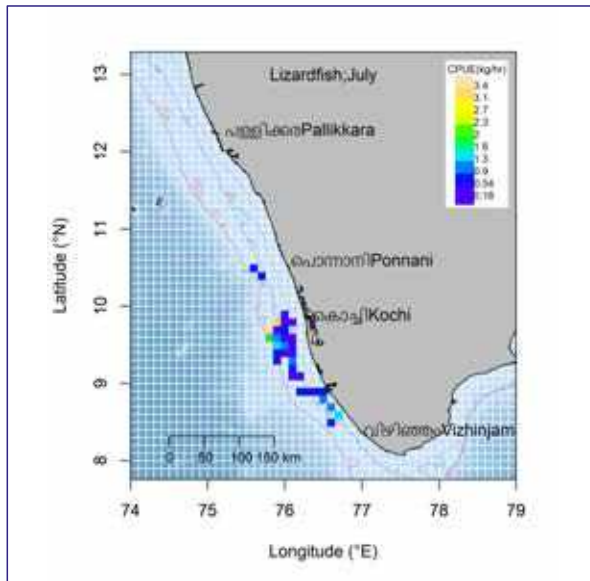


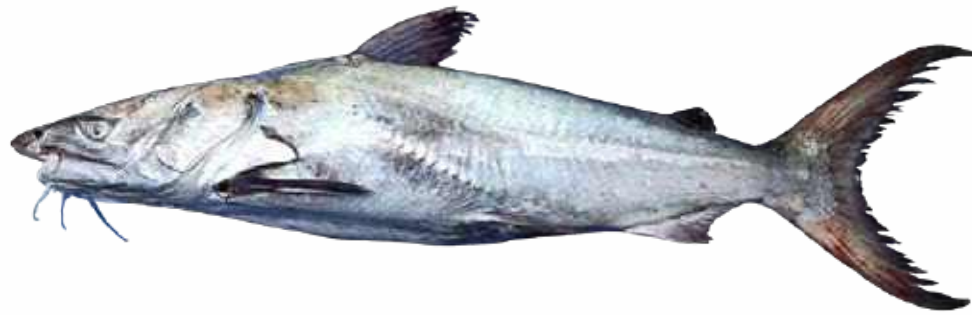


**Lizard Fish**

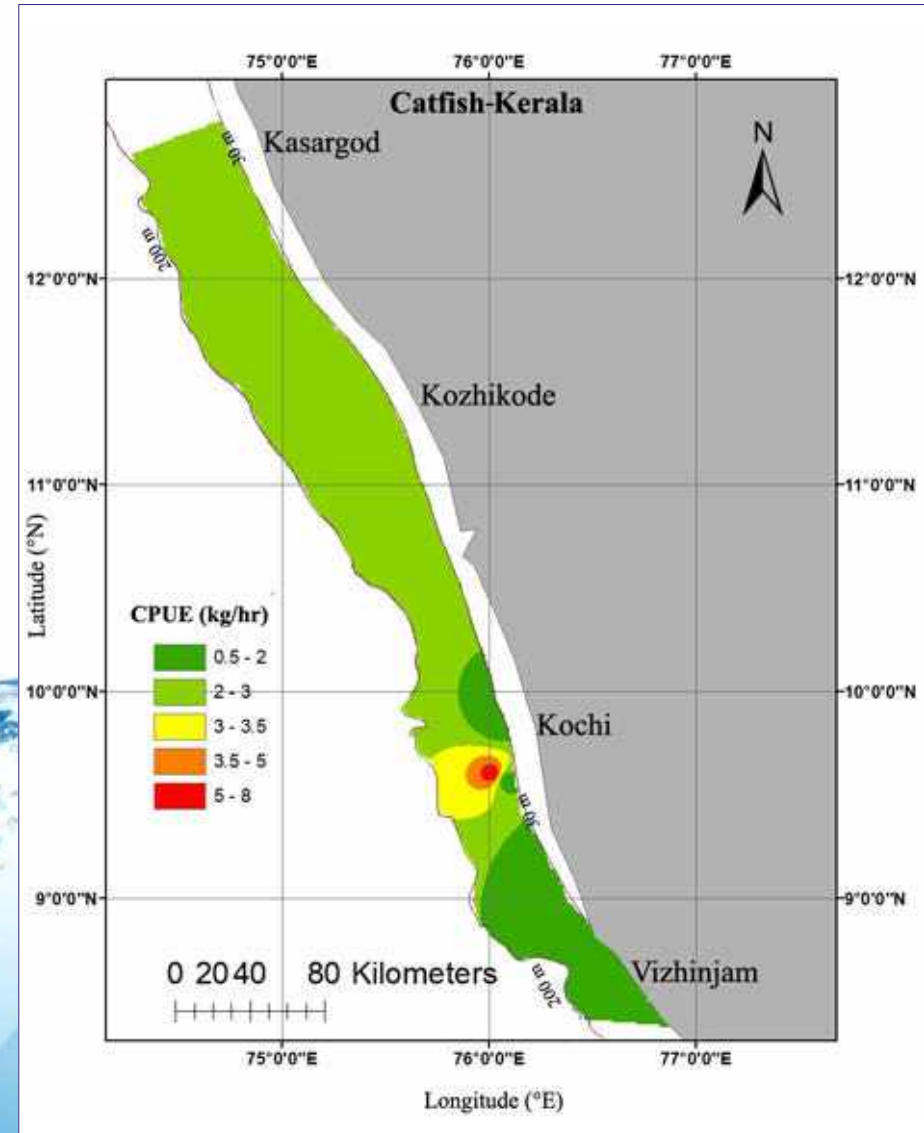


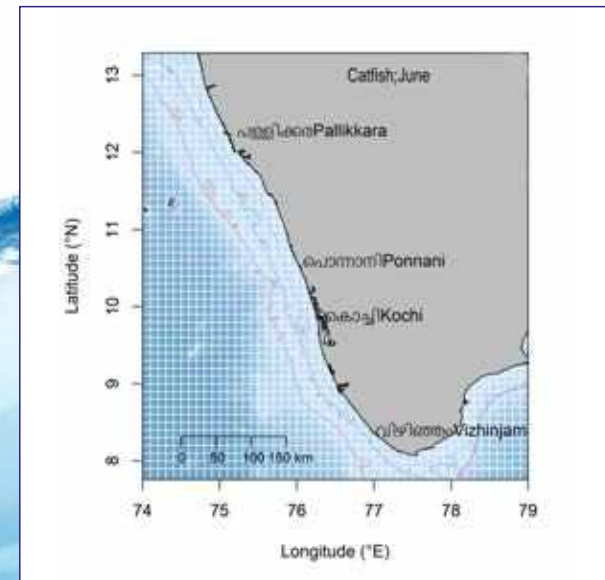
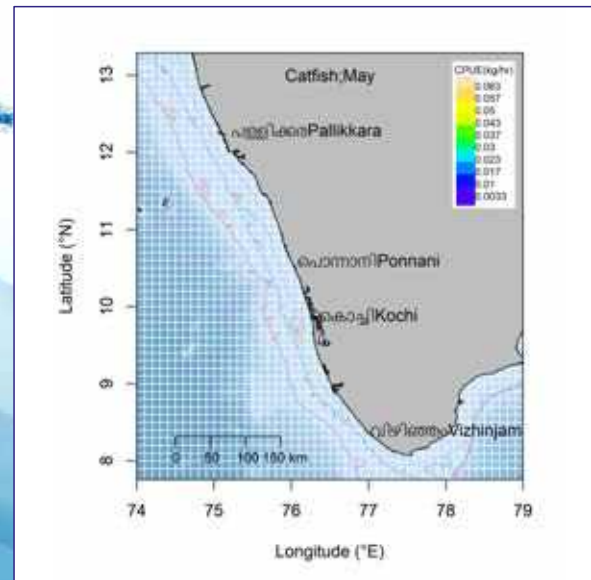
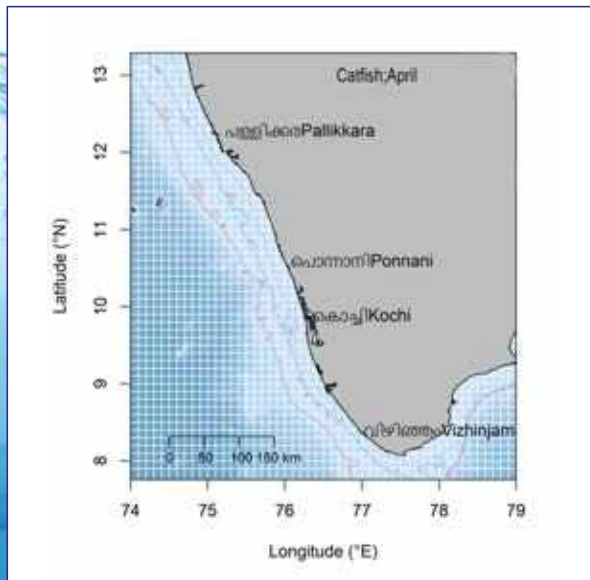
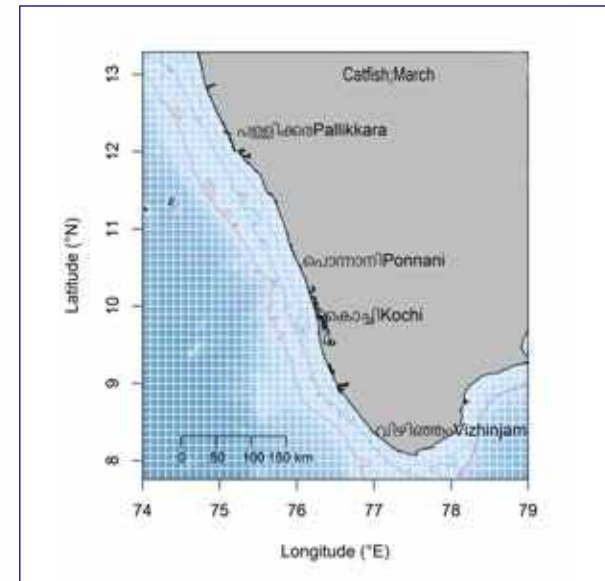
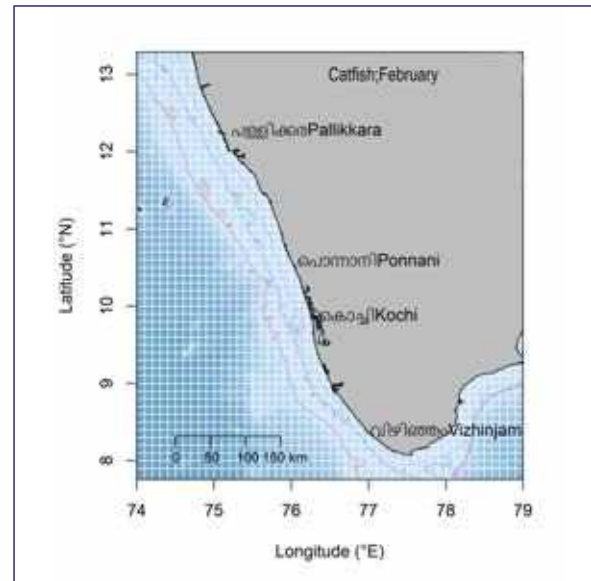
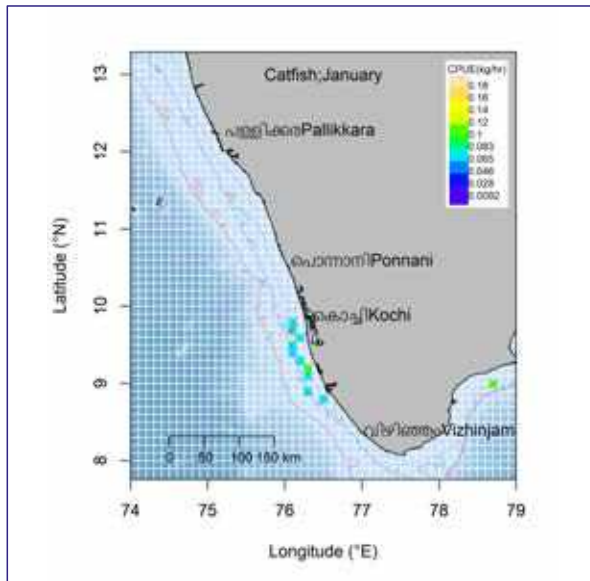


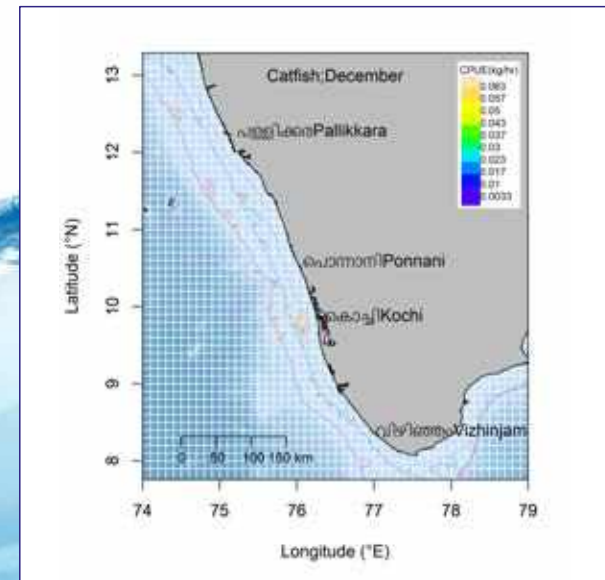
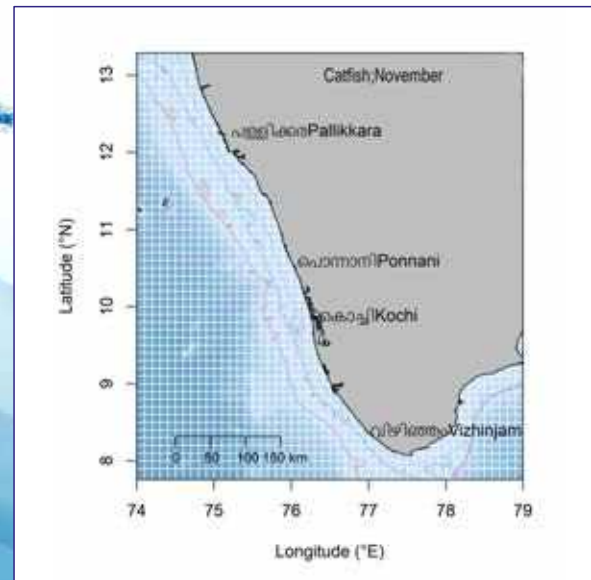
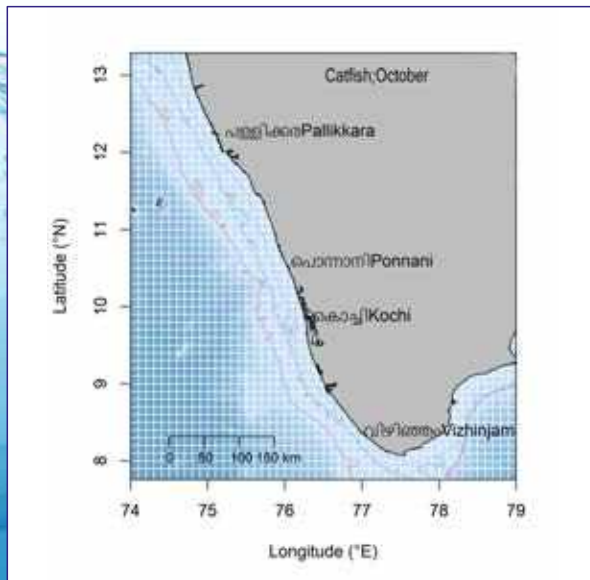
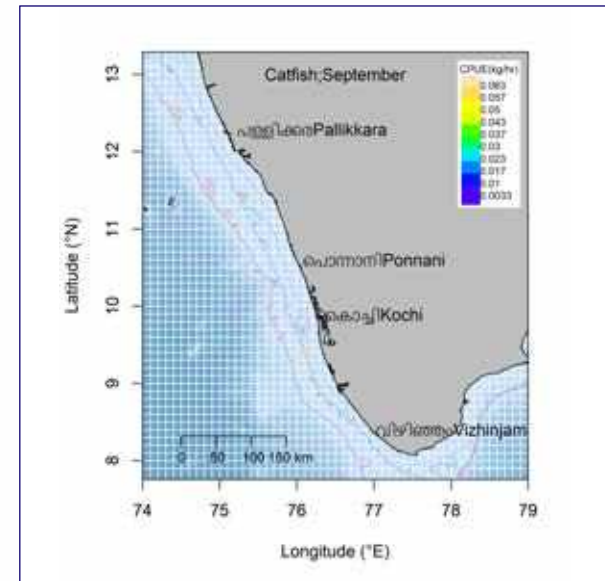
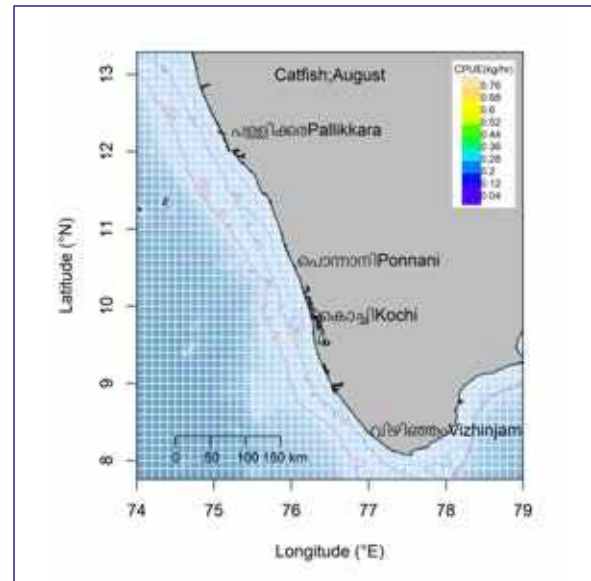
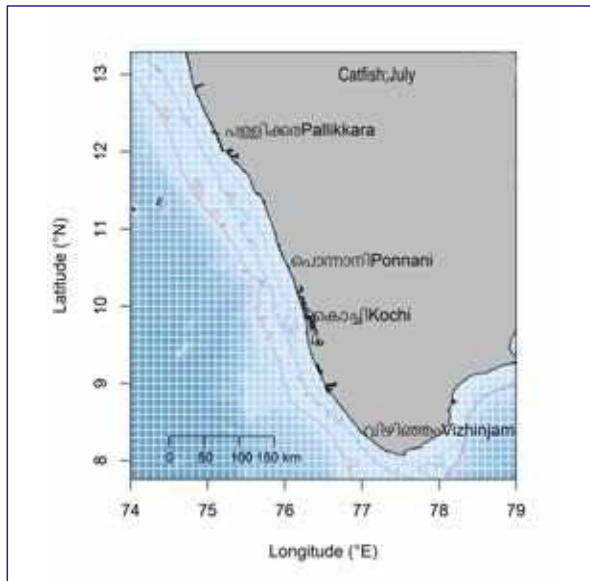




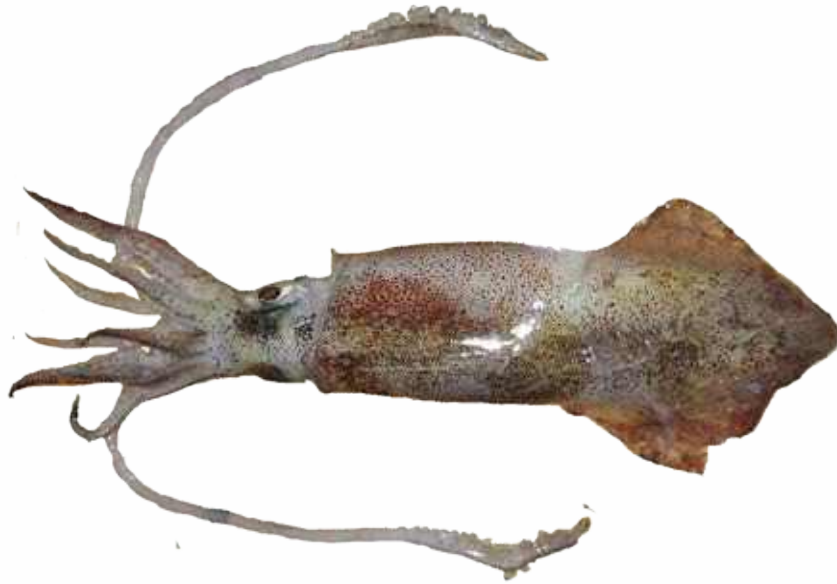
Cat Fish



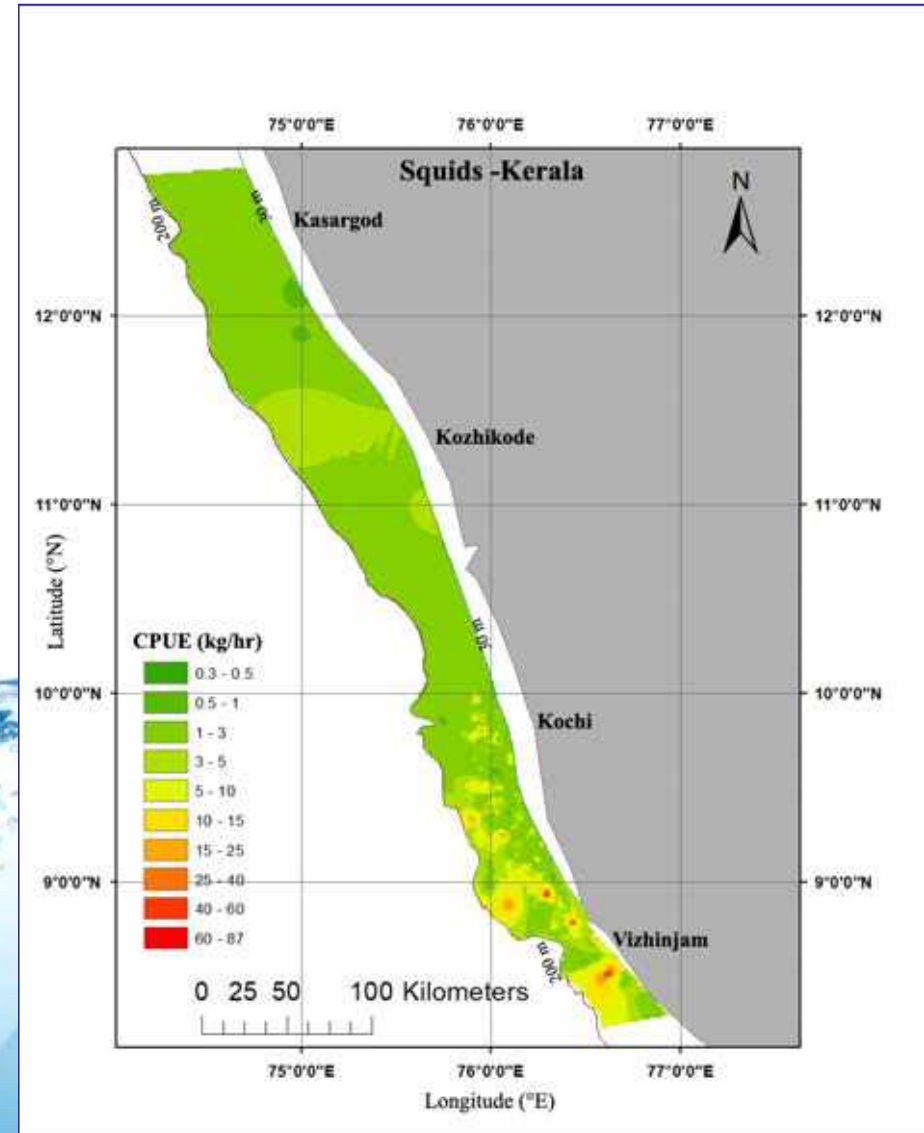


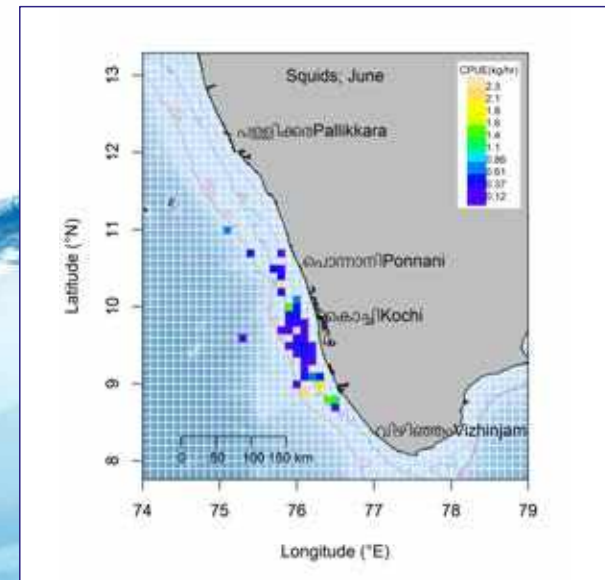
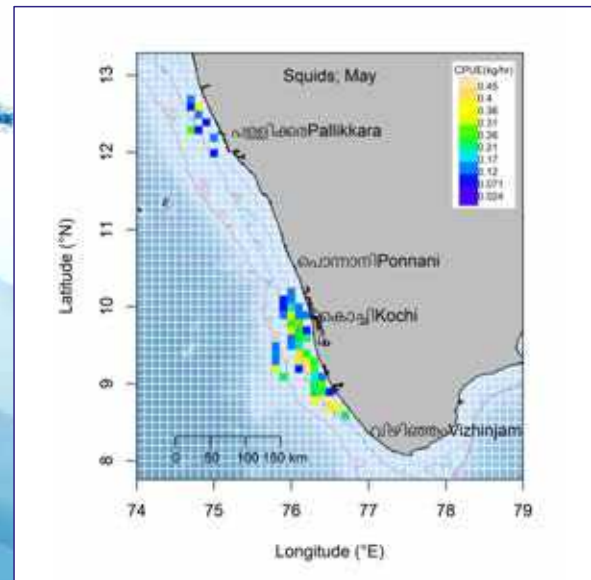
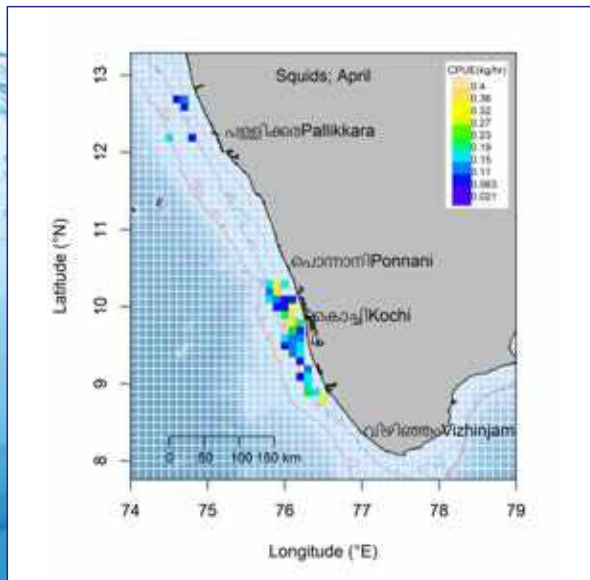
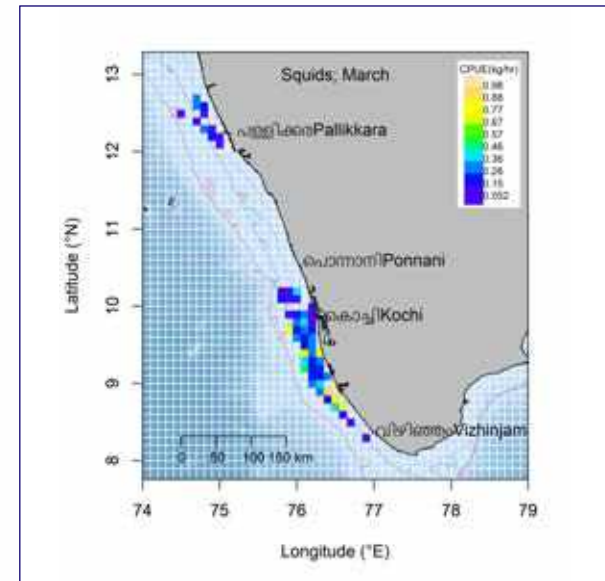
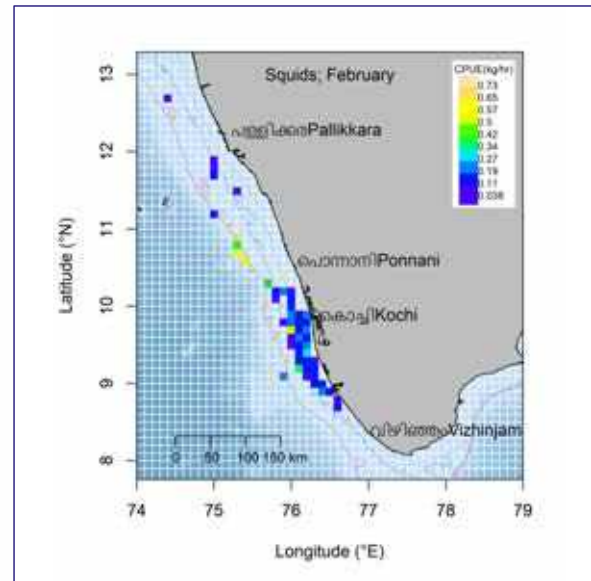
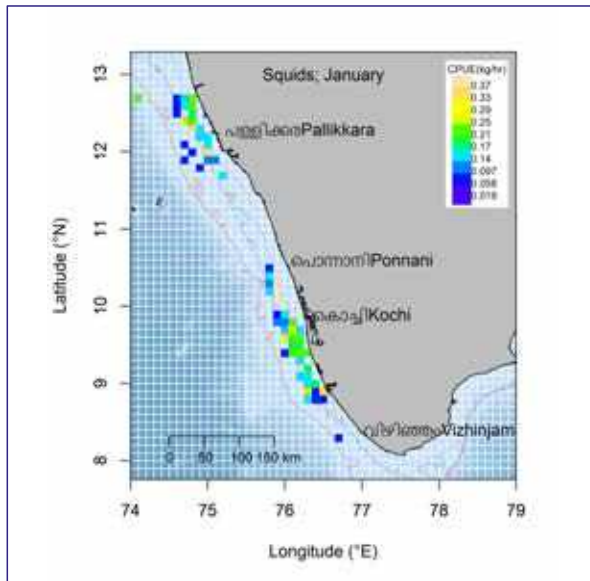


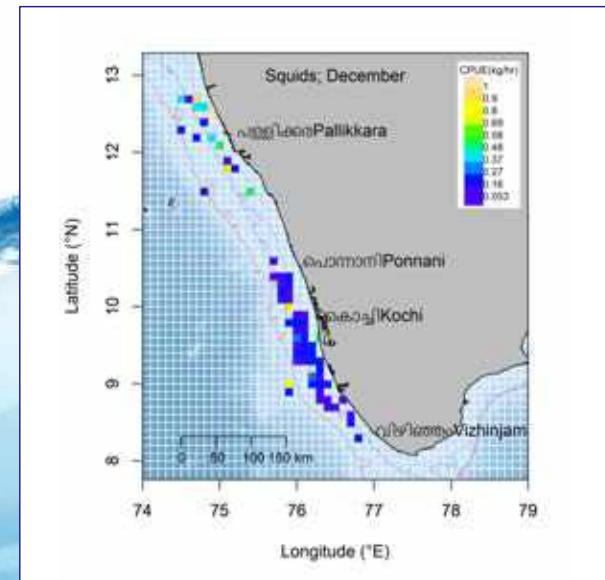
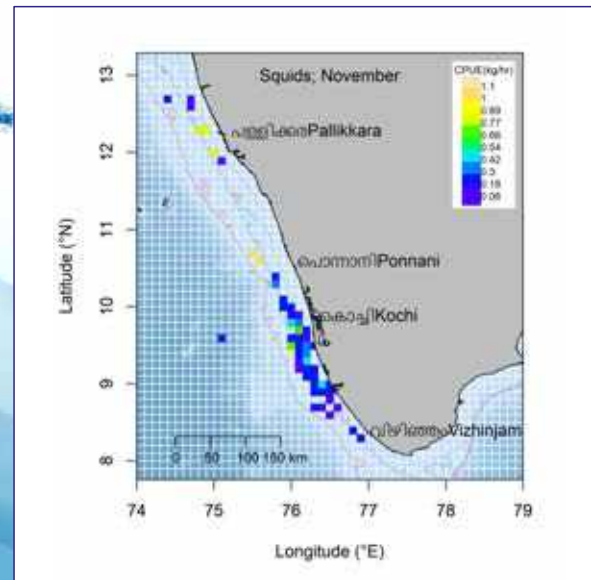
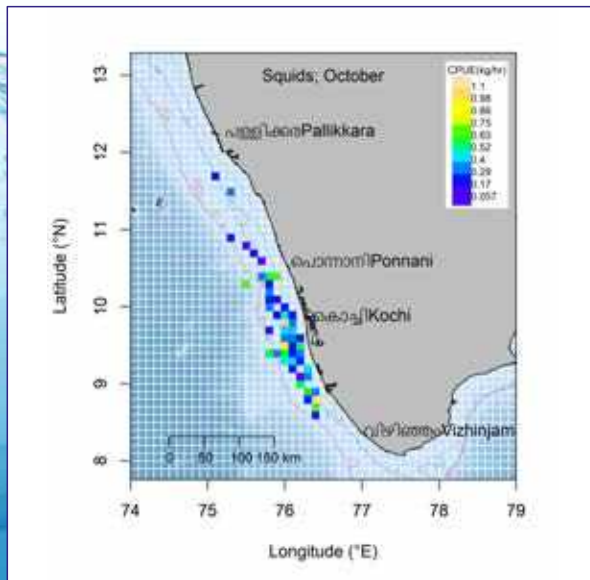
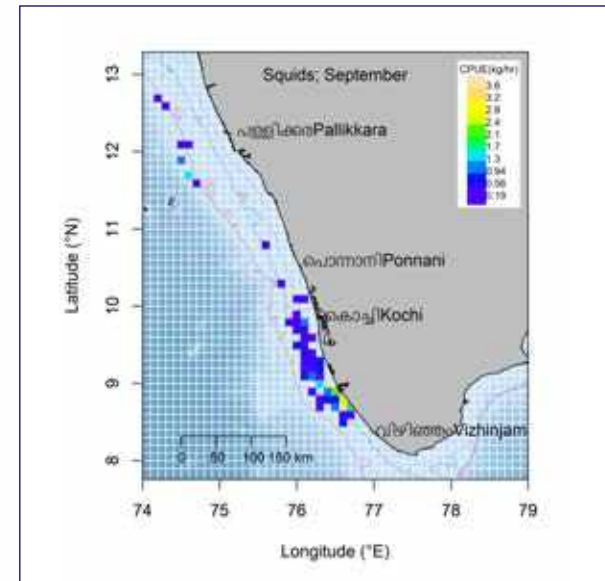
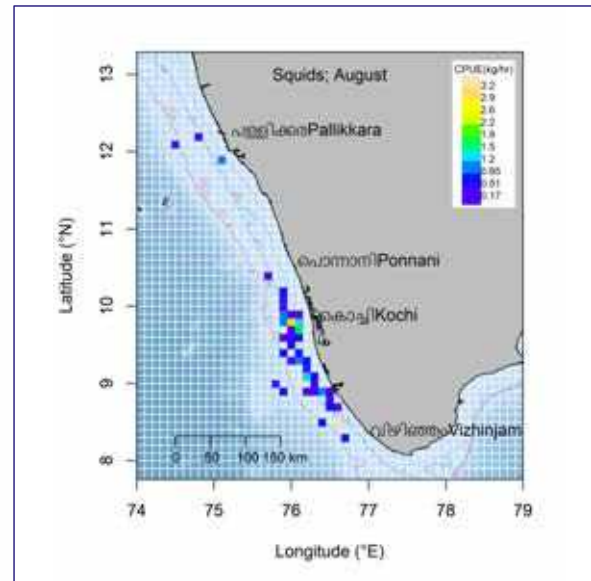
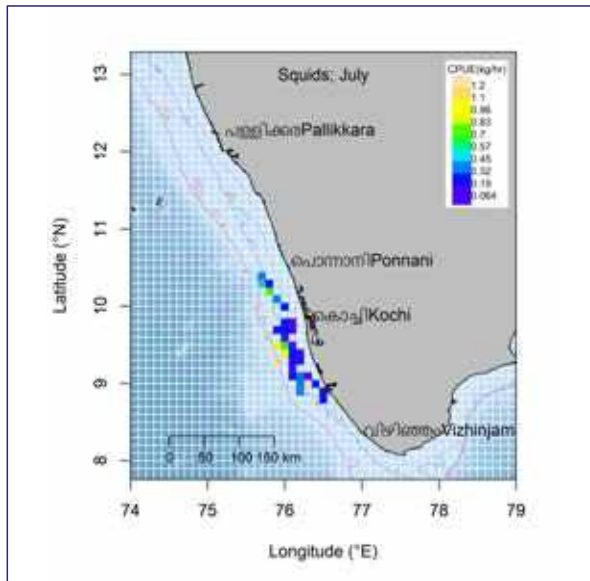




# Squids

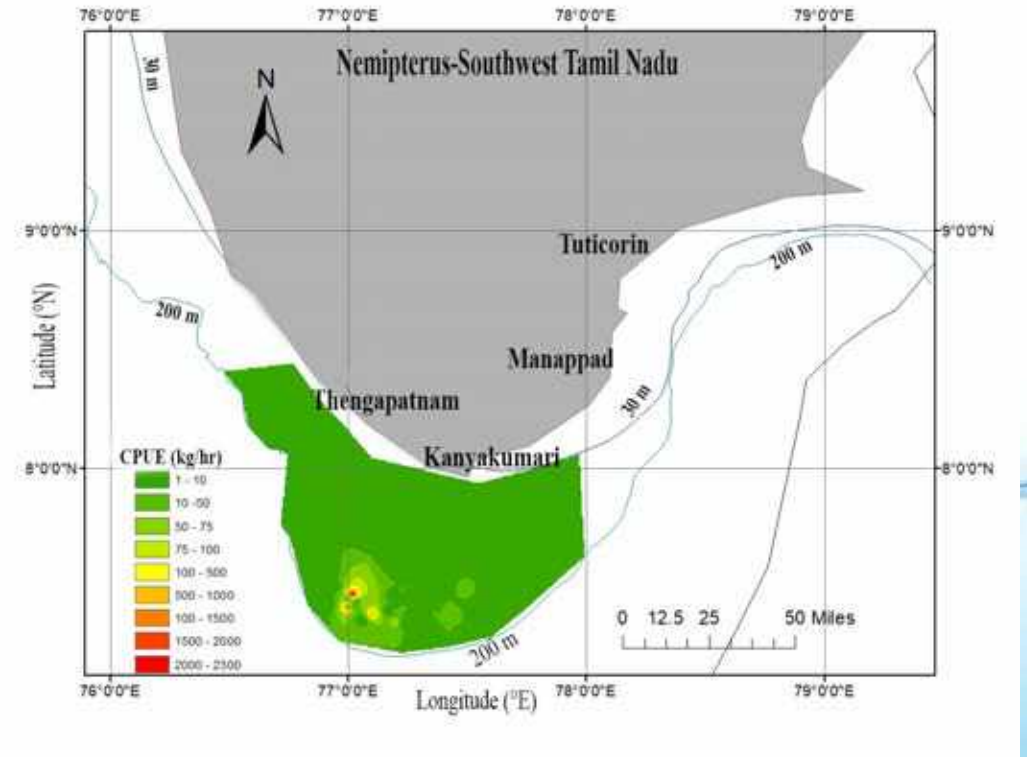




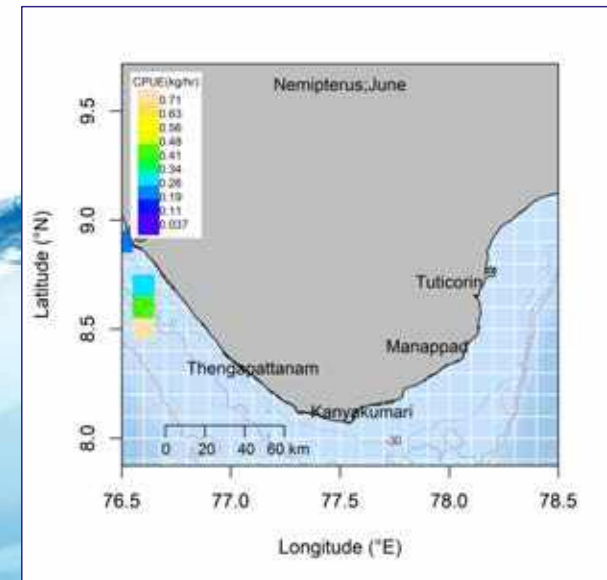
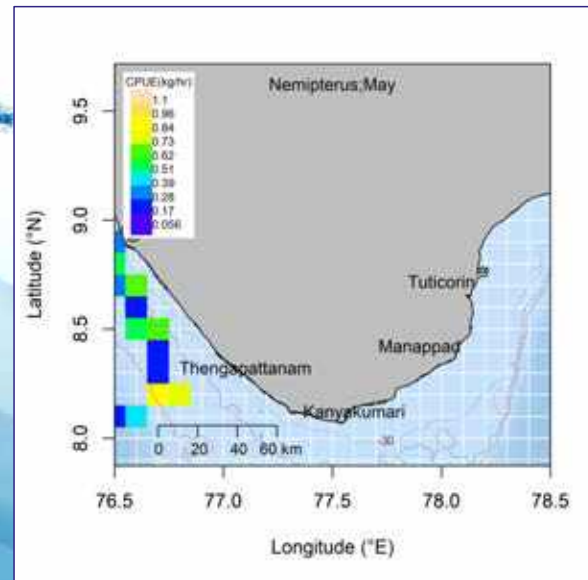
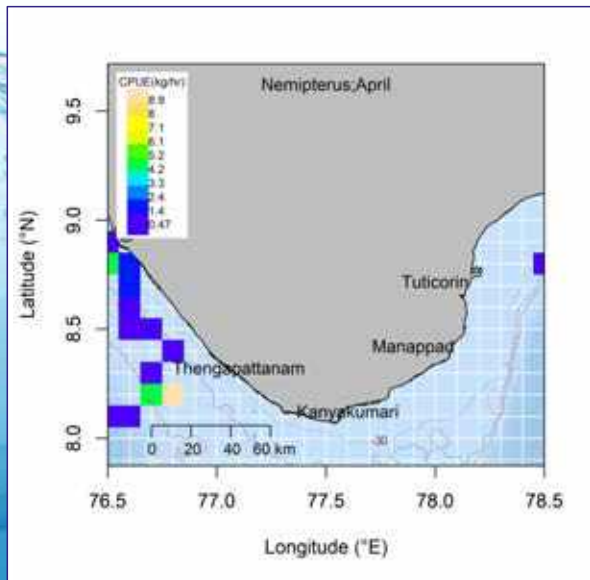
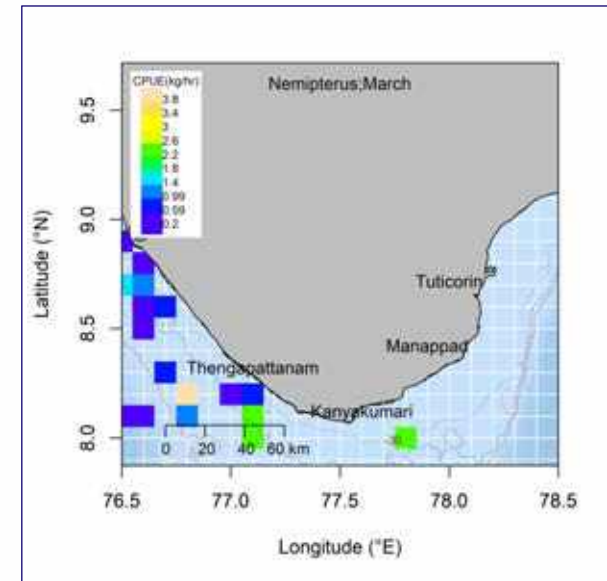
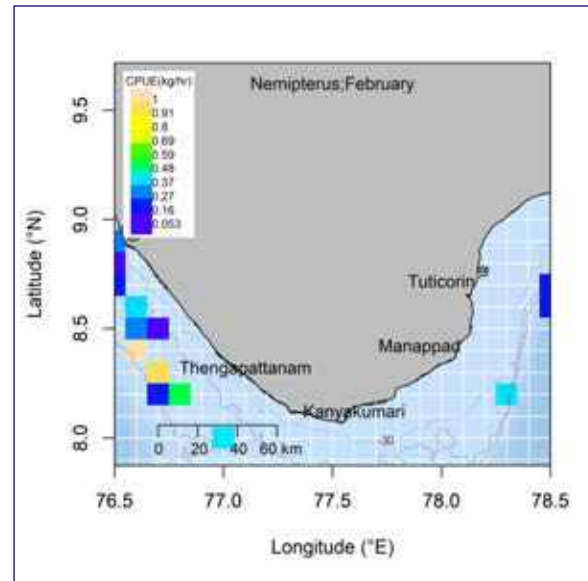
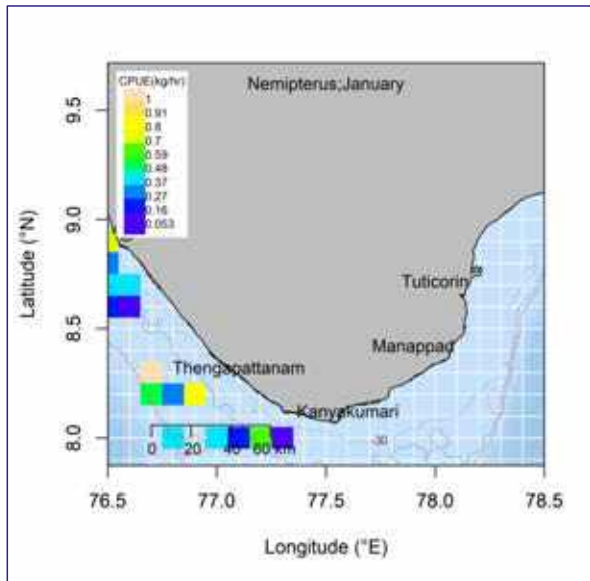


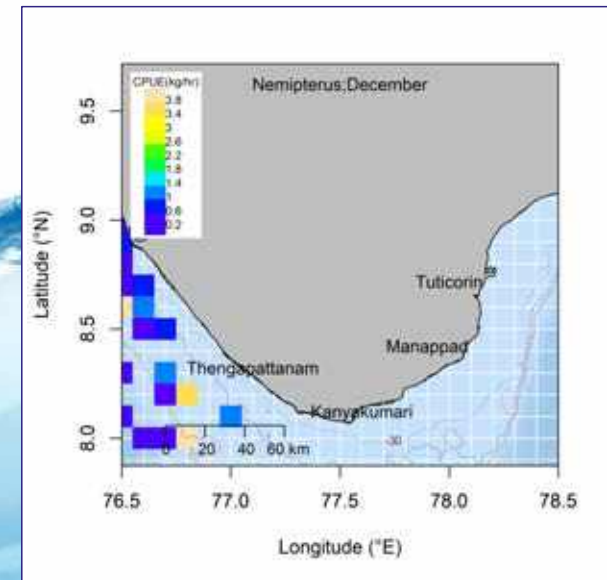
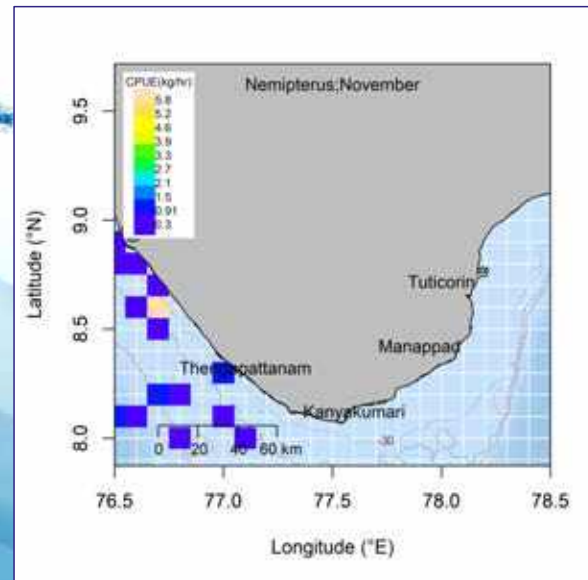
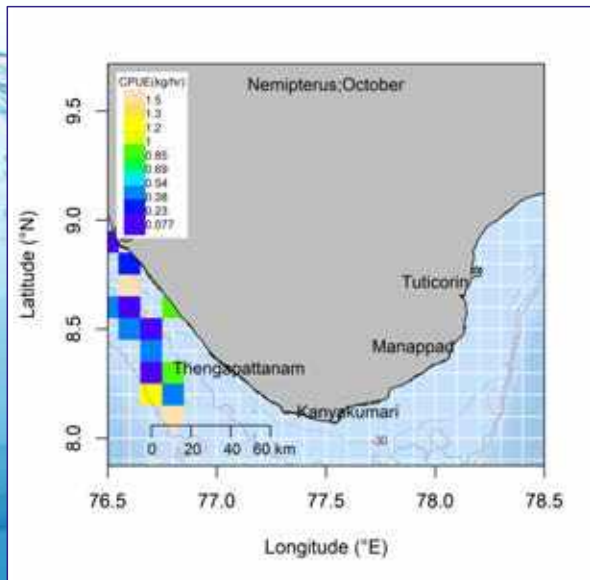
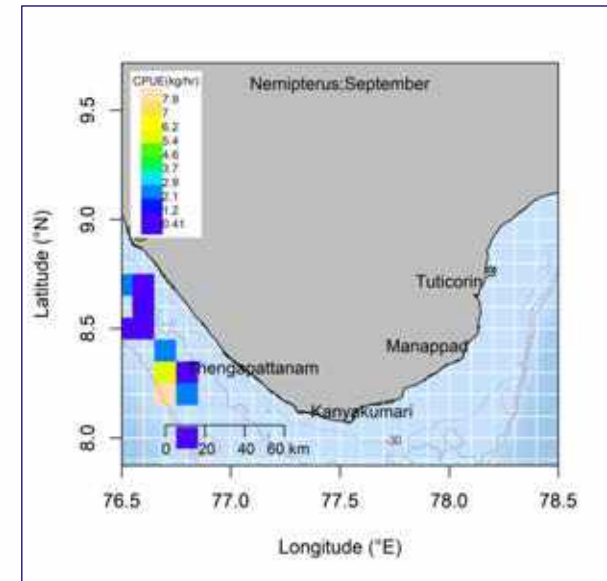
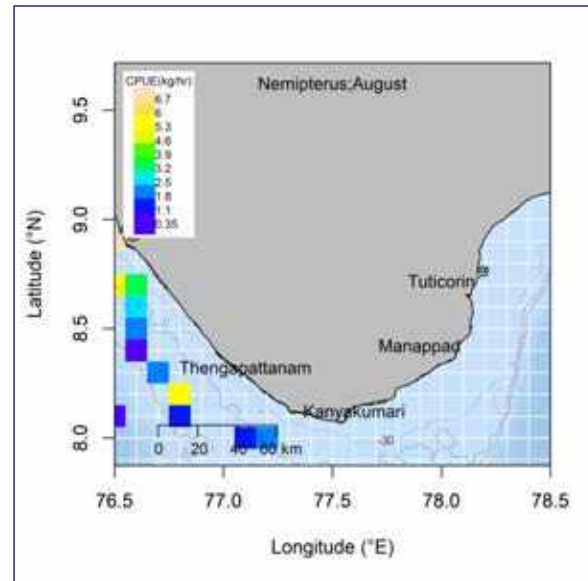
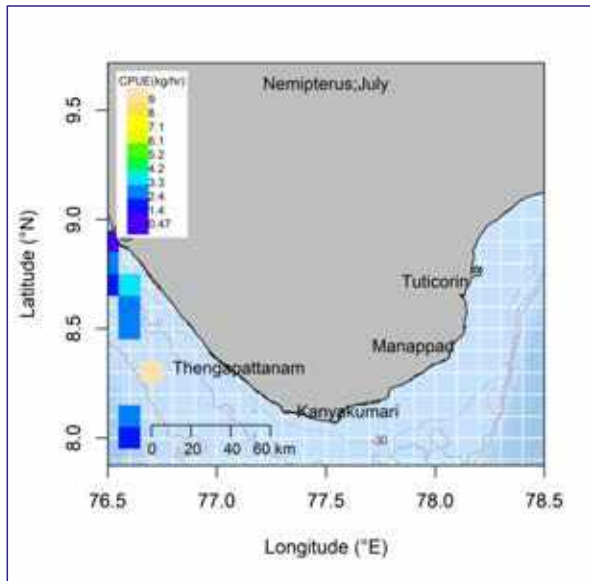
## **3.6** Spatial distribution and abundance along Tamil Nadu coast





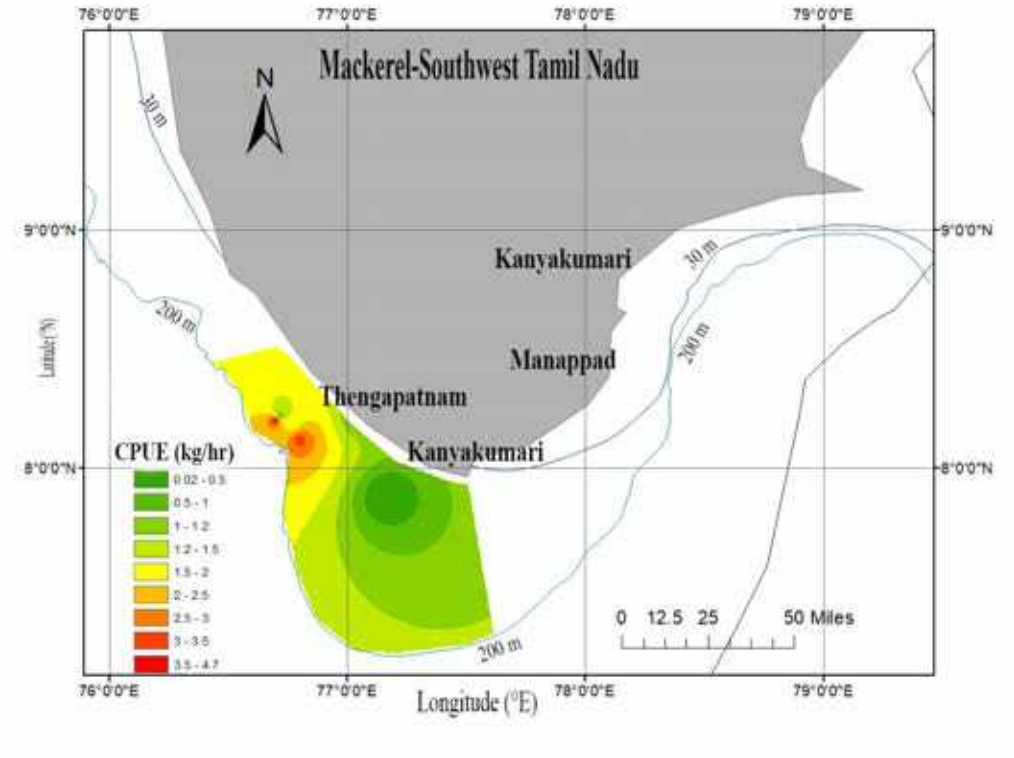
## Threadfin Breams (Nemipterus)



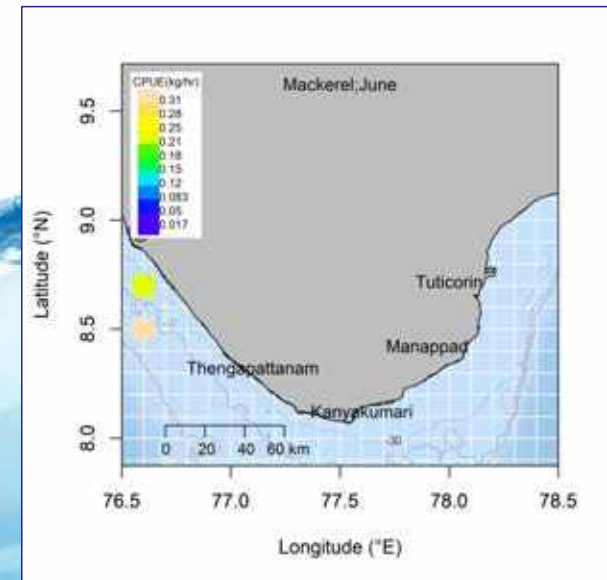
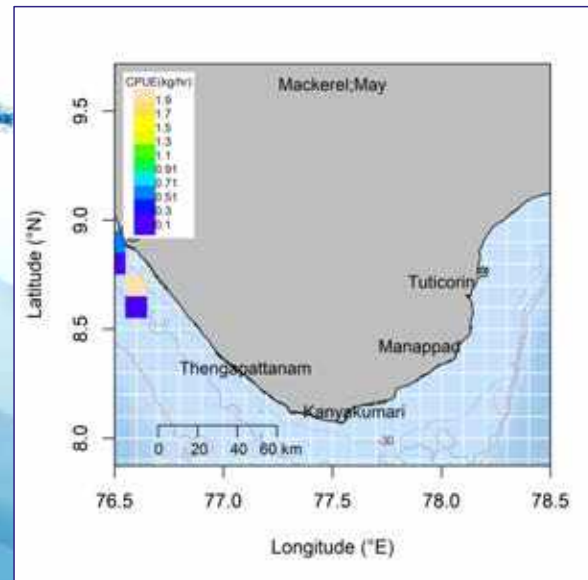
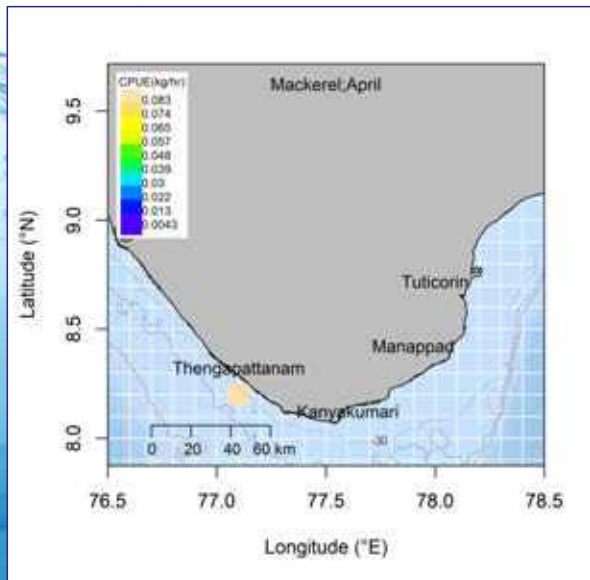
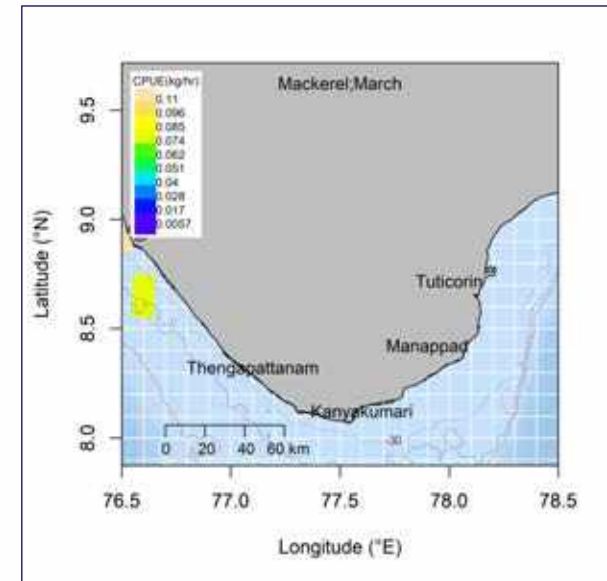
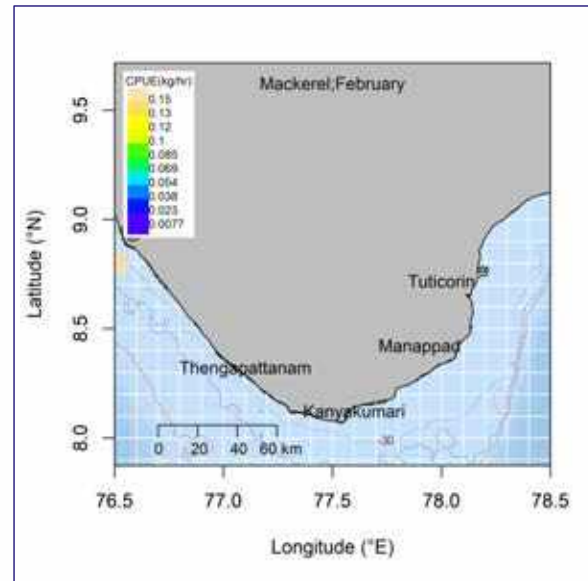
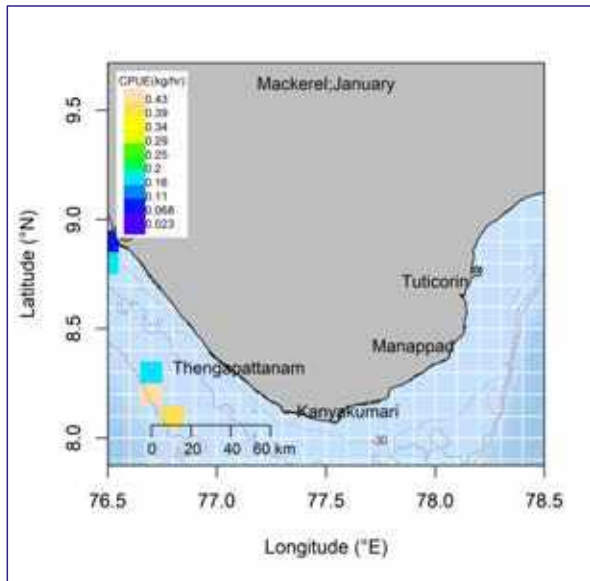


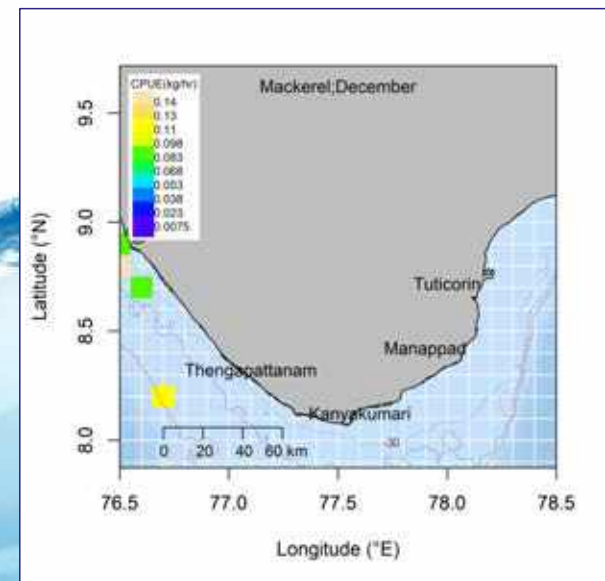
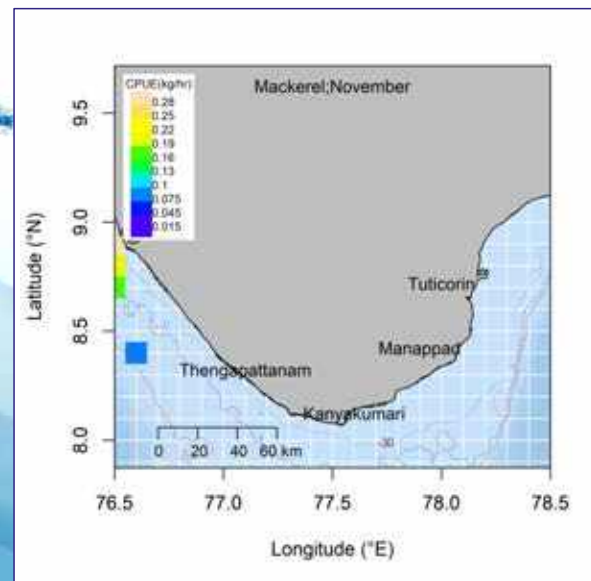
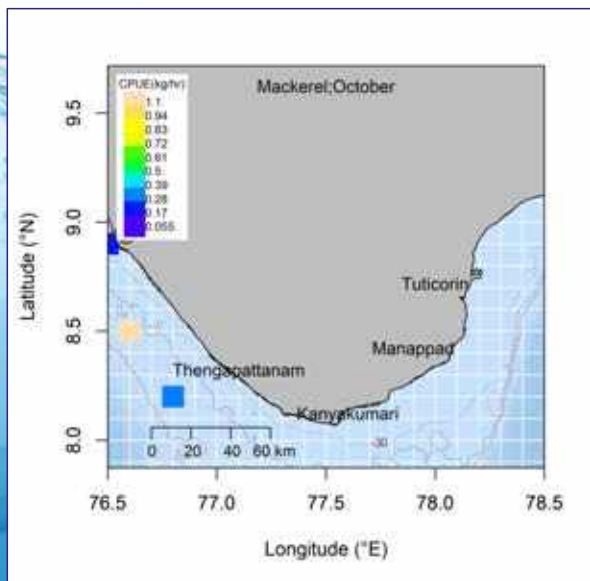
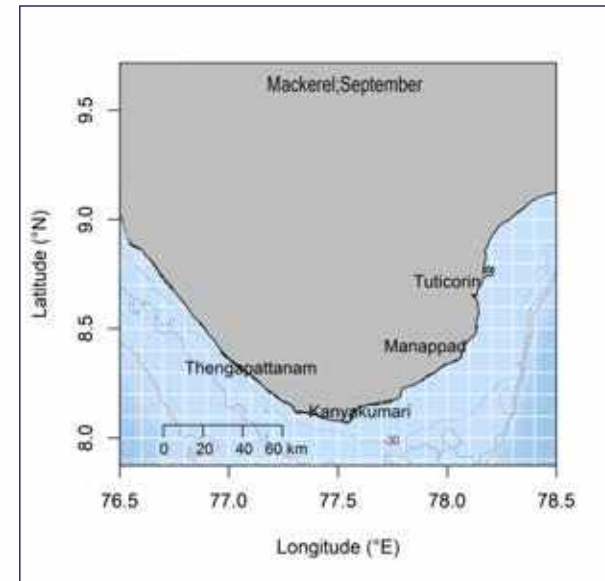
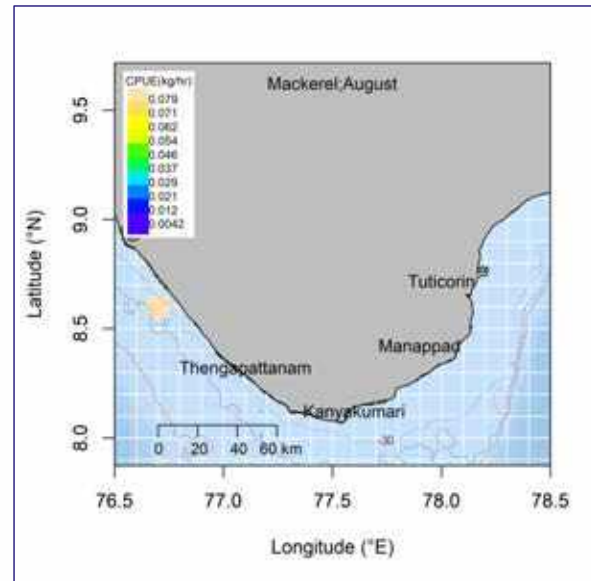
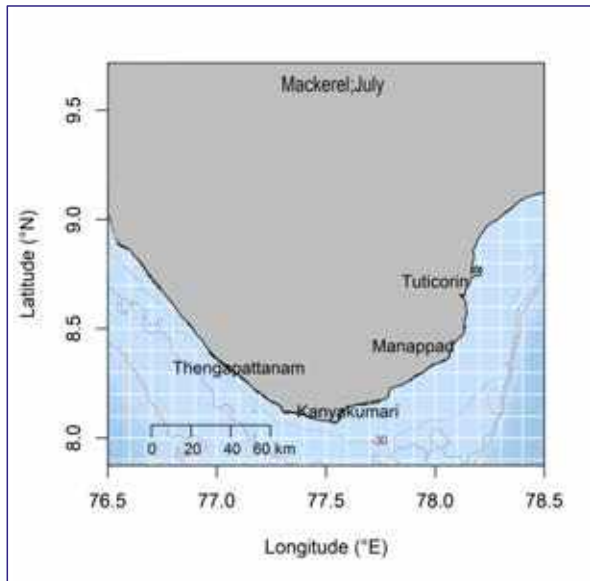


# Mackerel



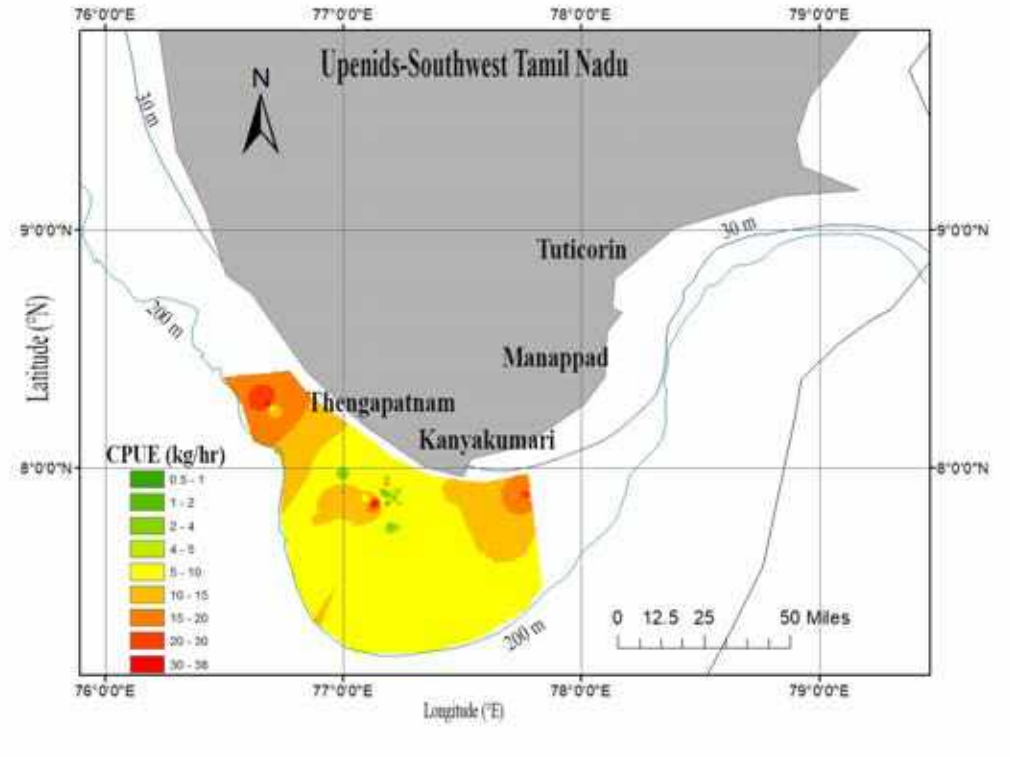


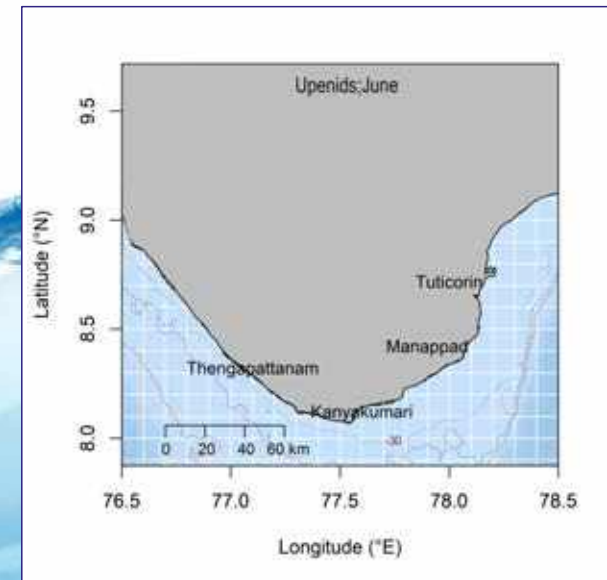
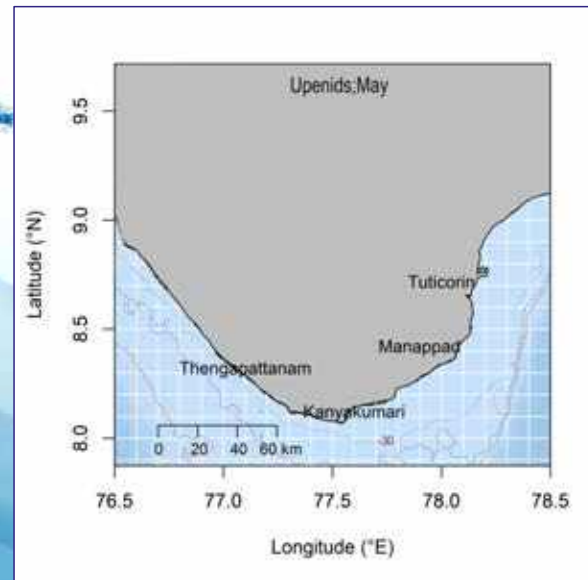
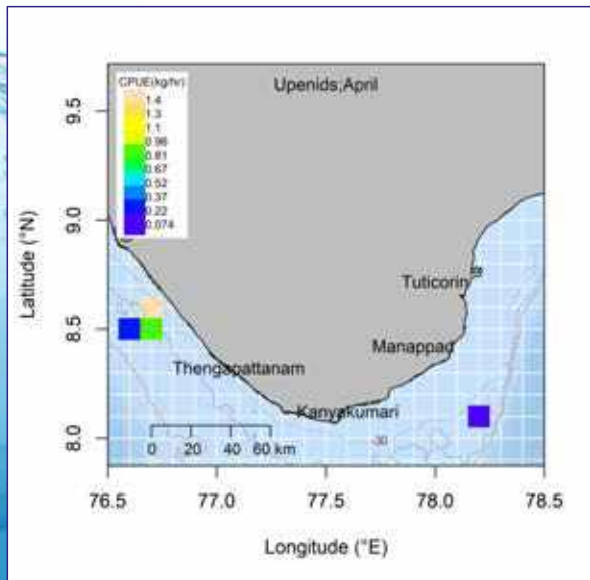
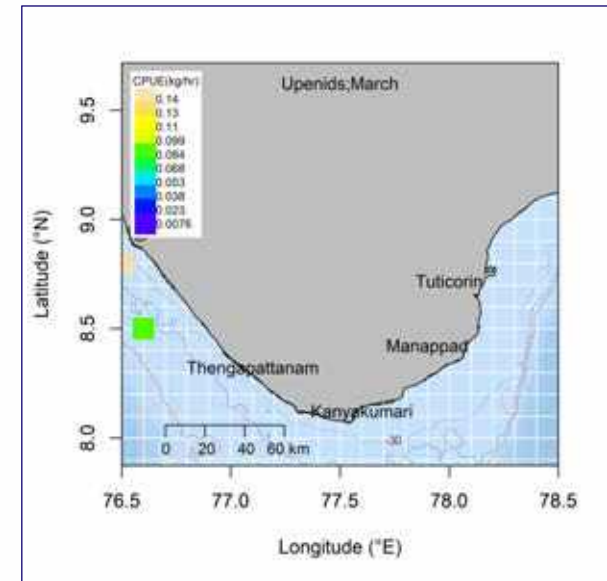
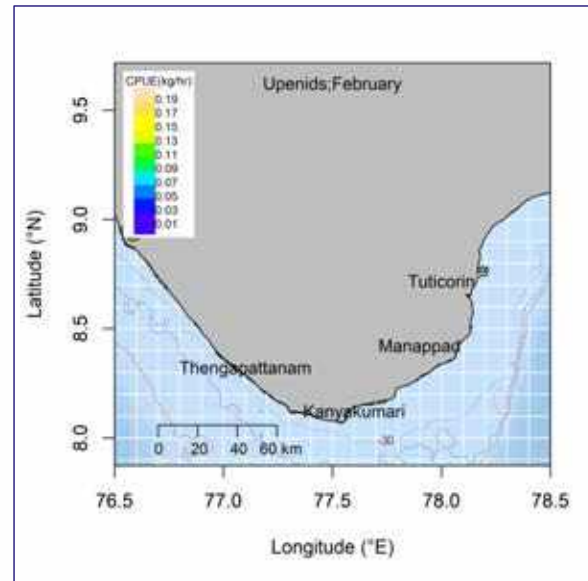
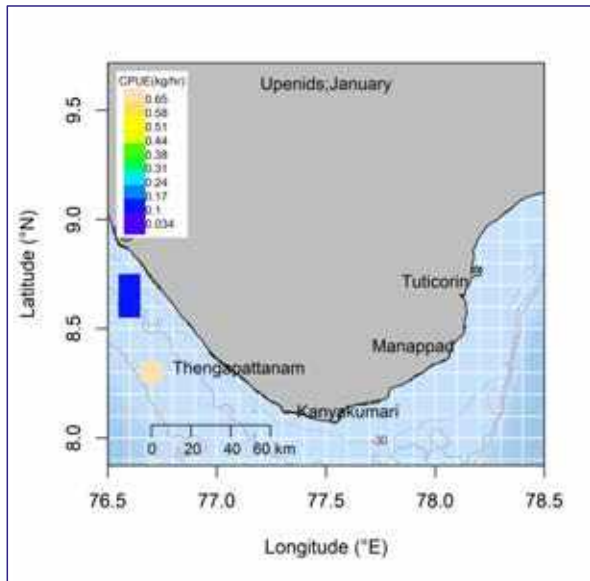


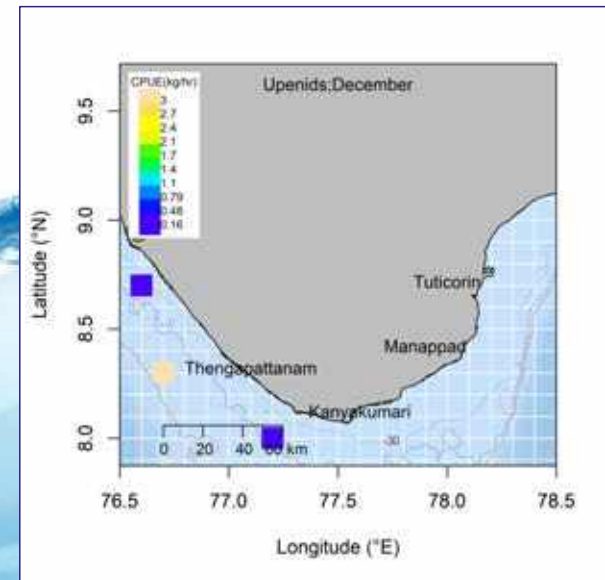
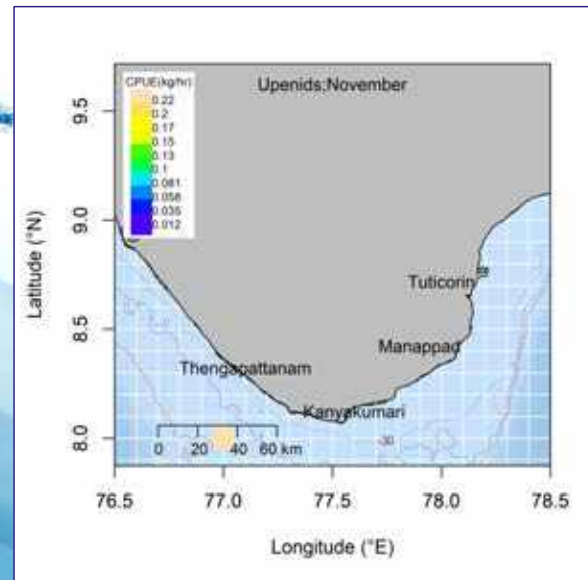
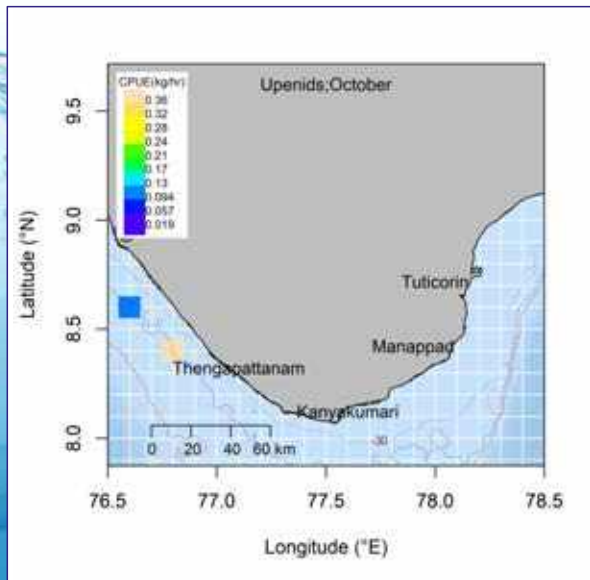
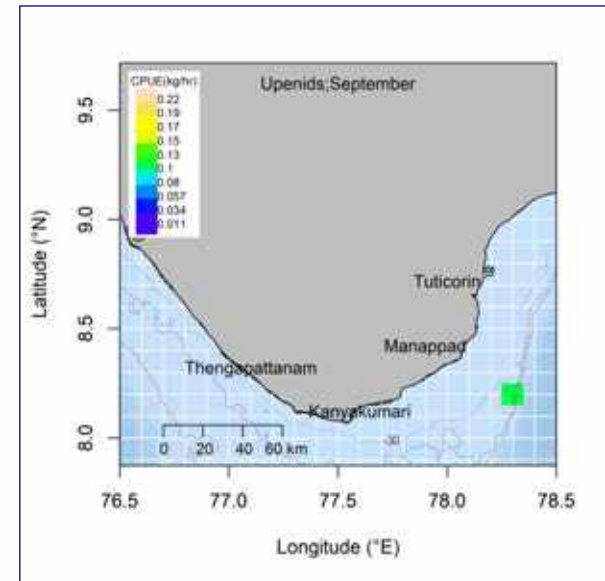
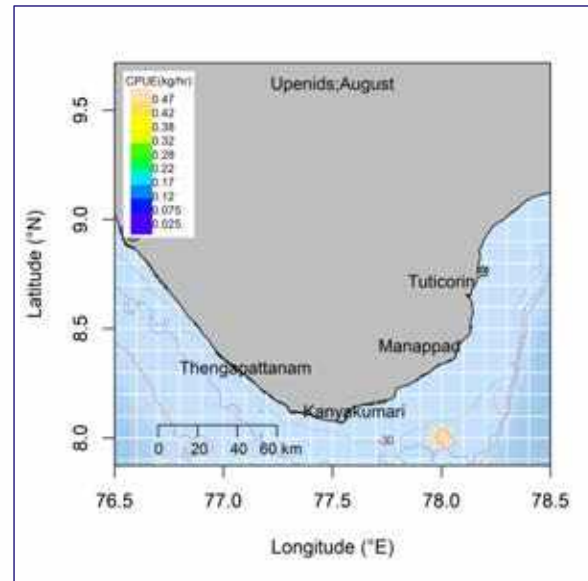
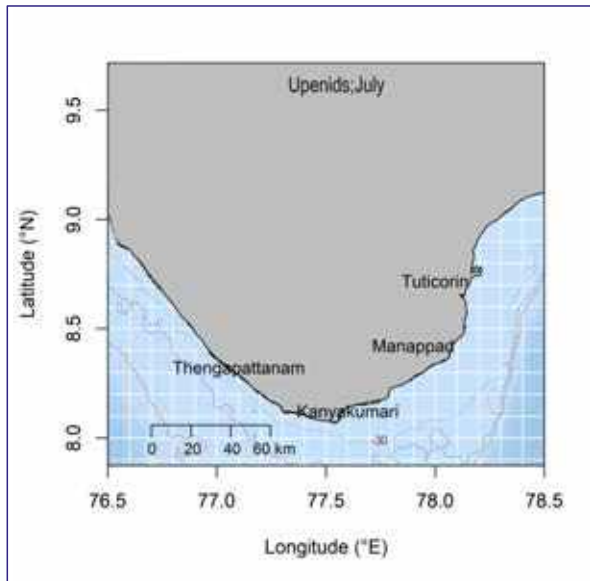


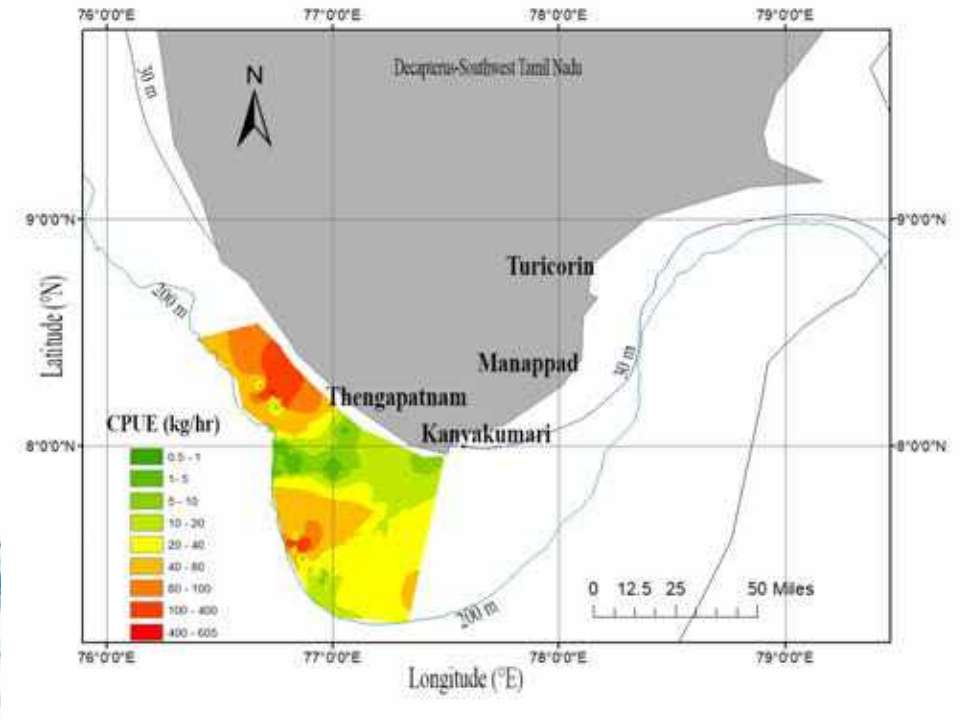


**Goatfish (Upenids)**

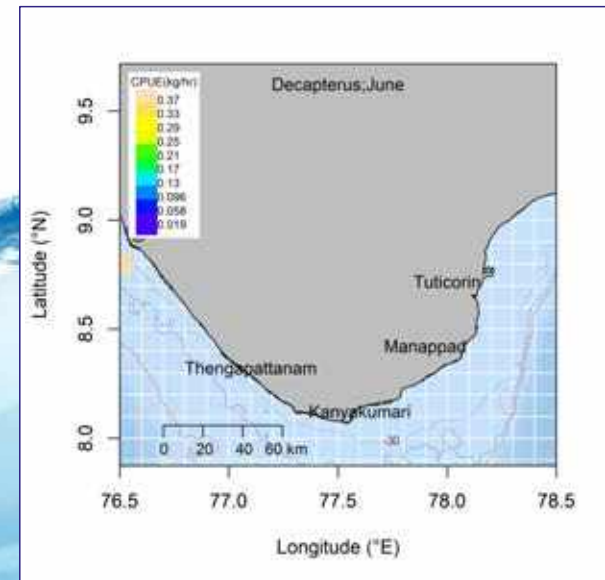
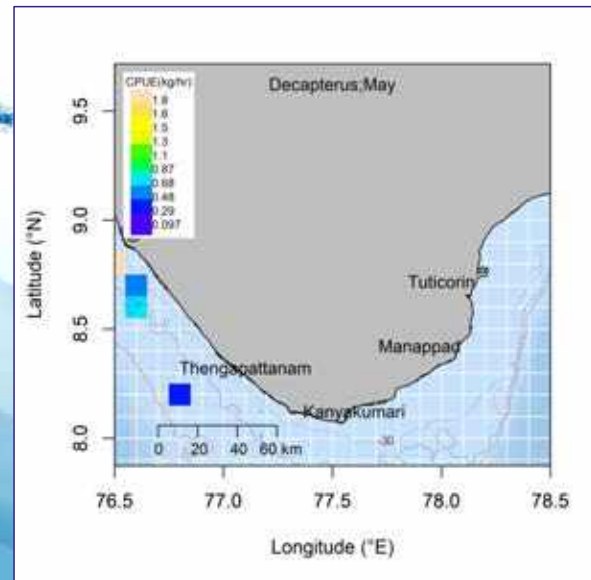
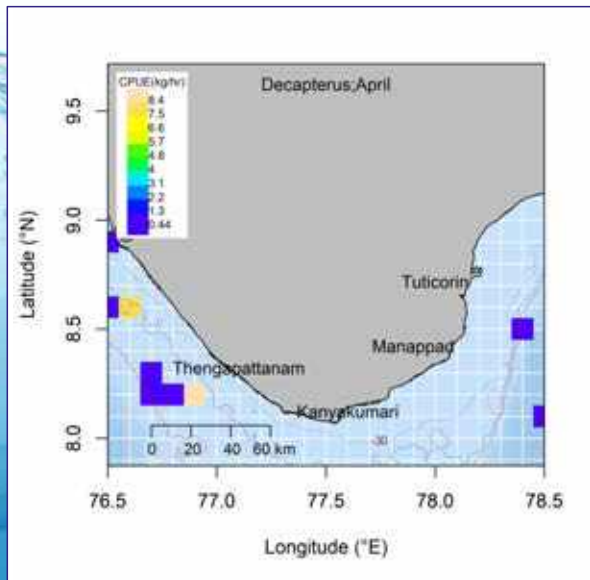
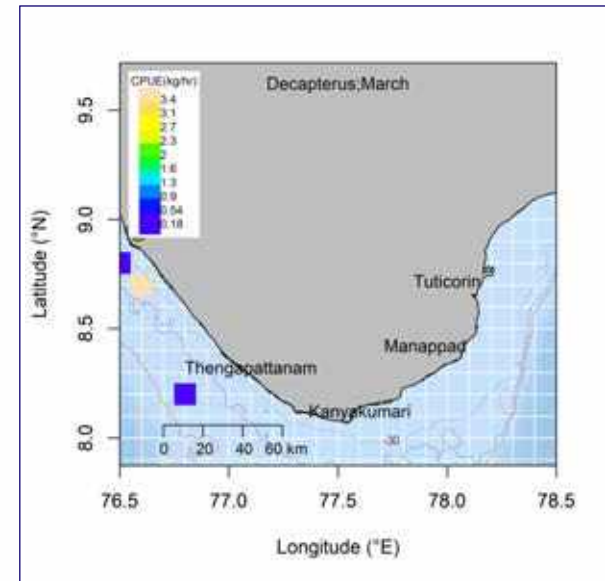
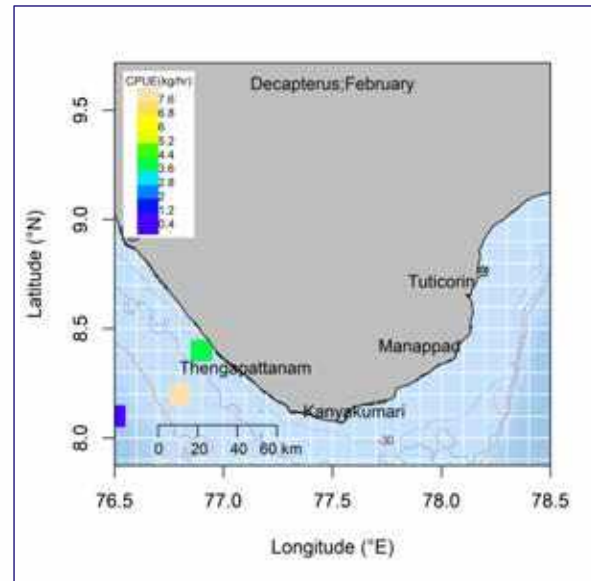
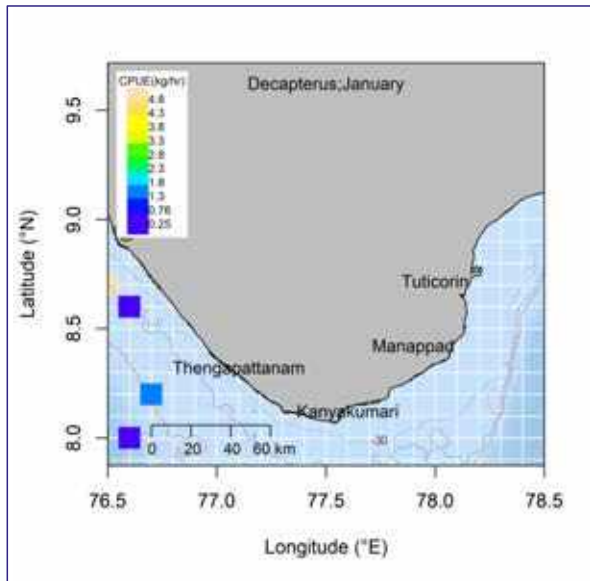


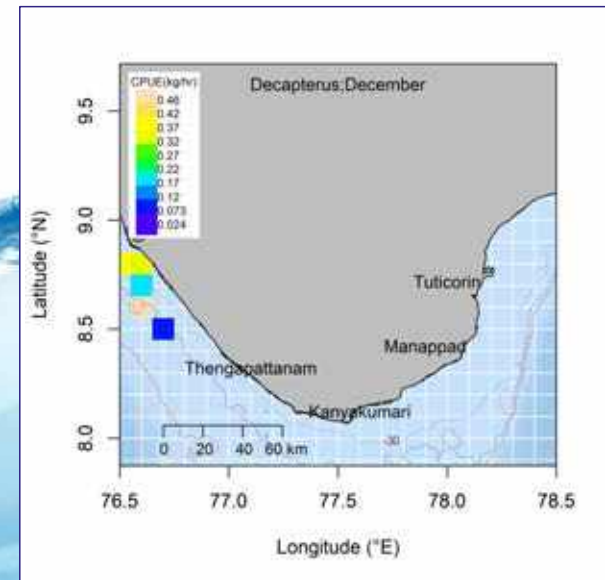
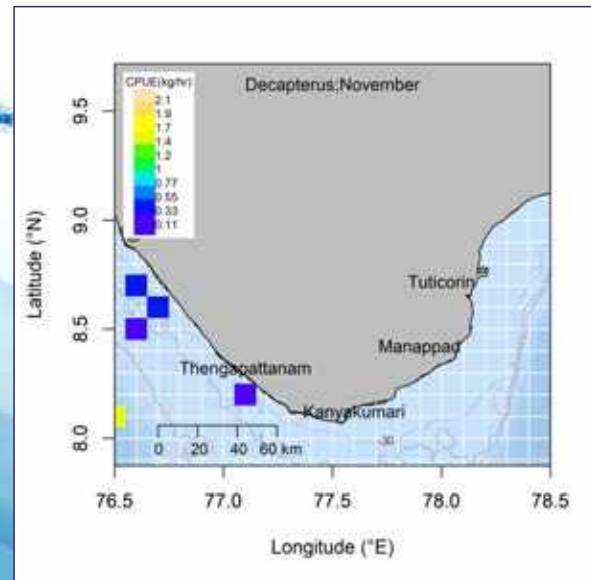
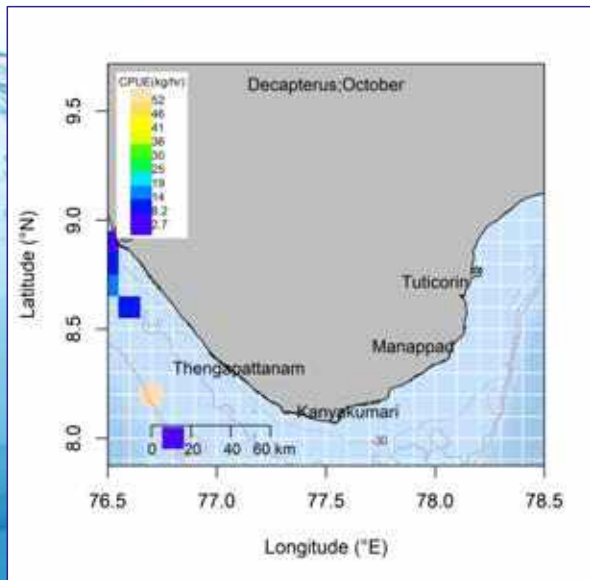
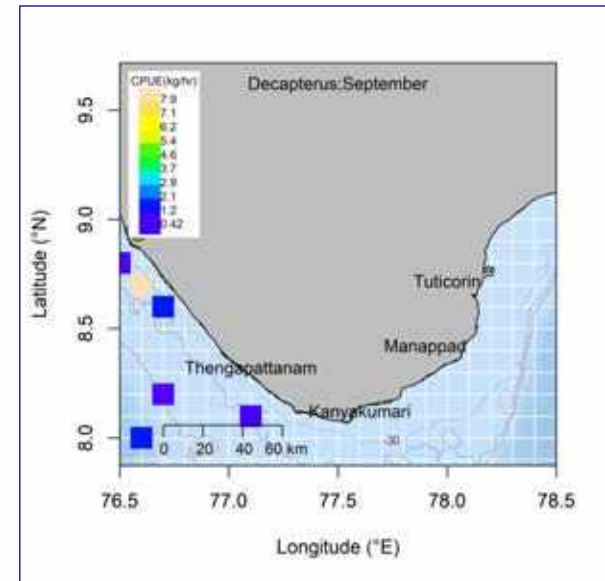
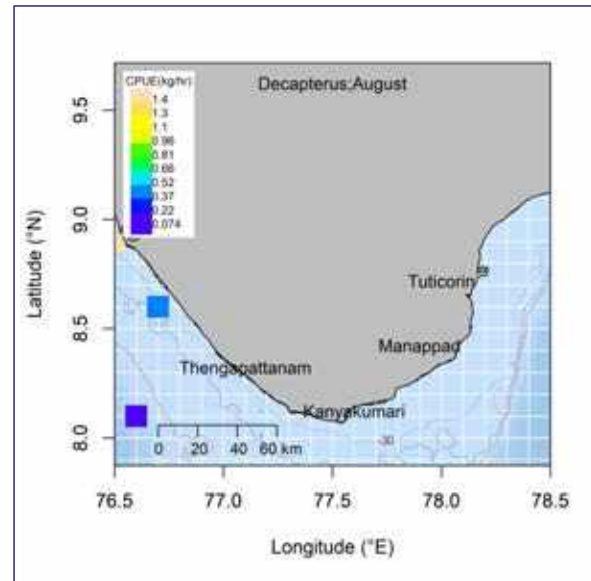
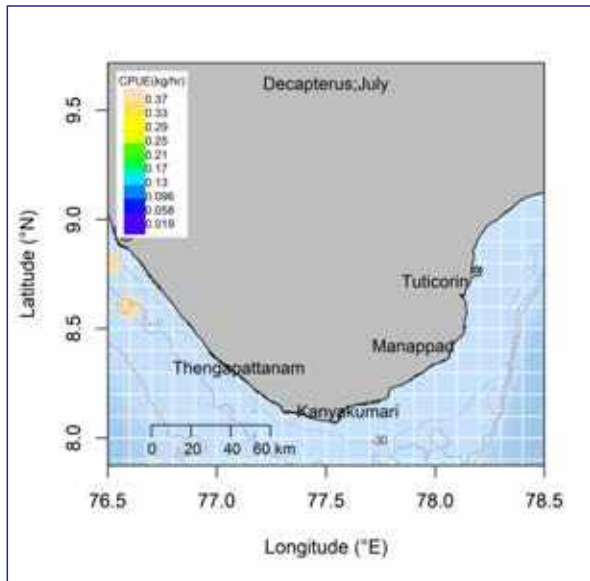






## Round Scads (Decapterus)

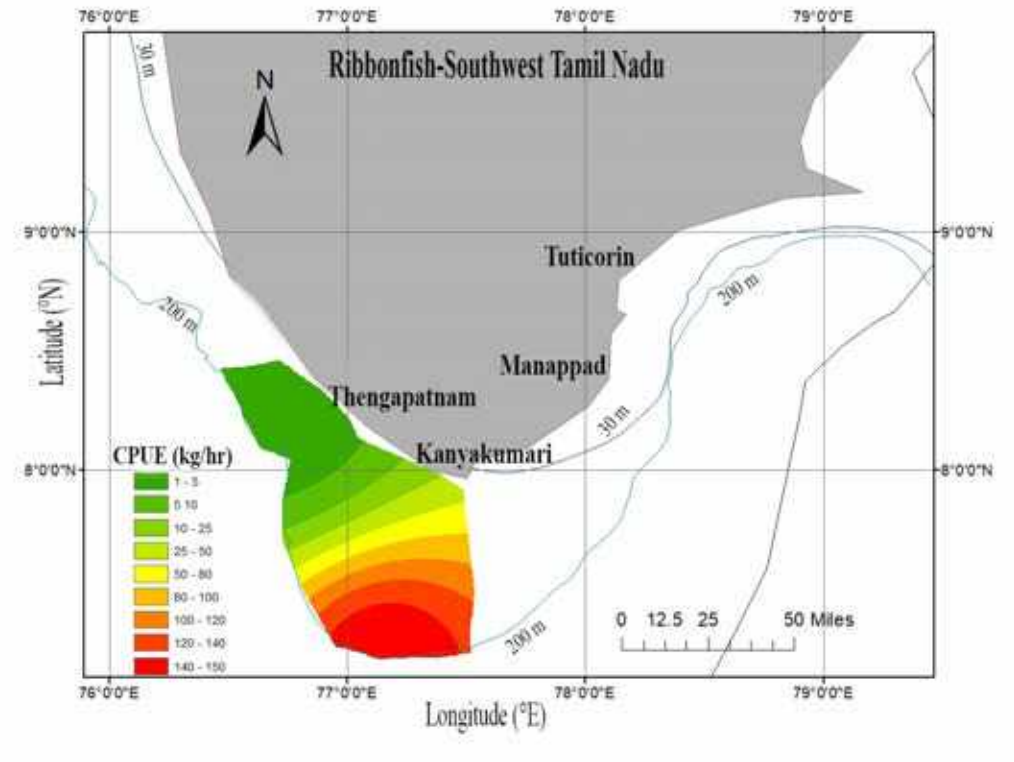


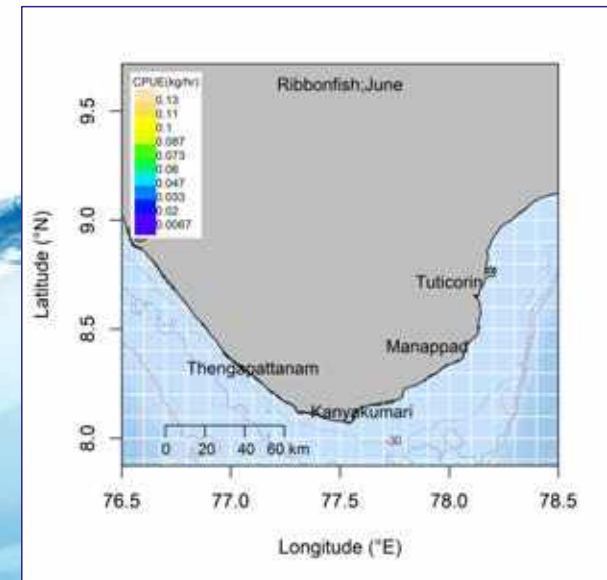
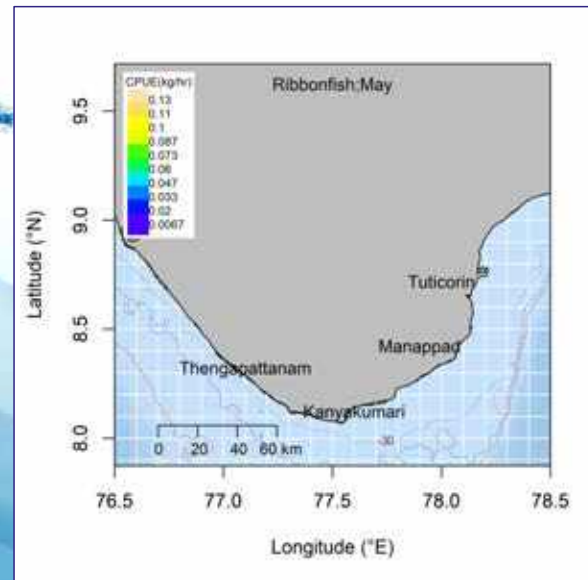
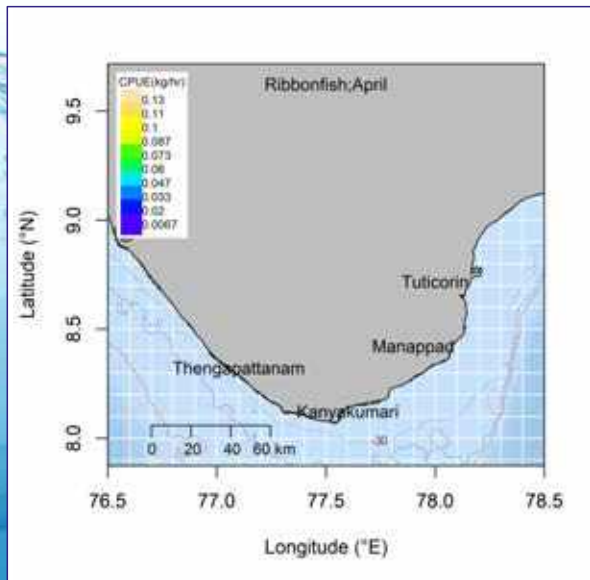
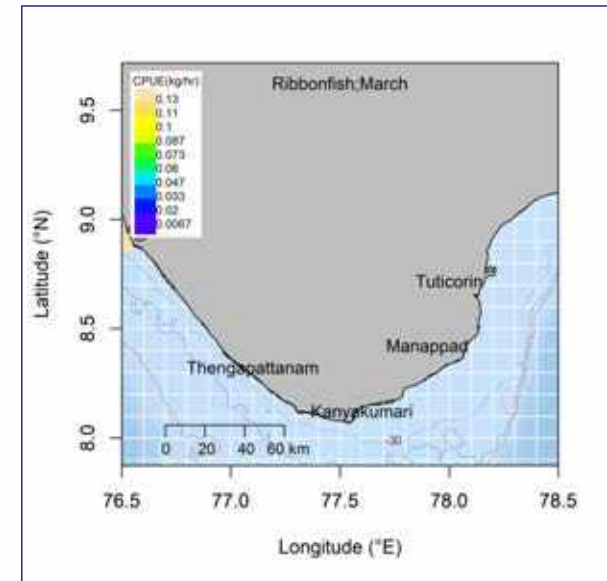
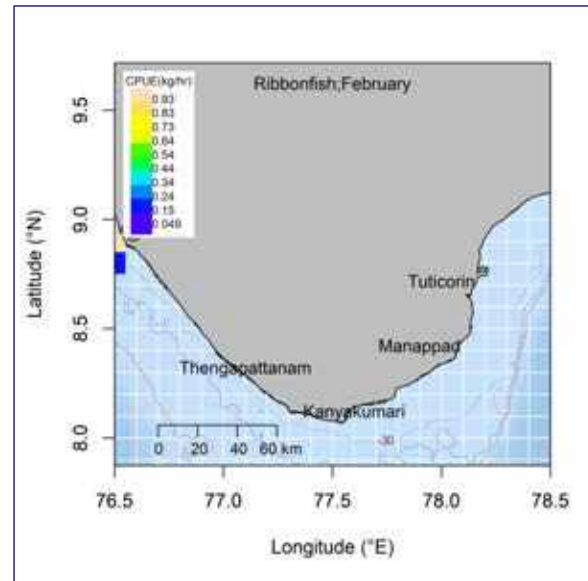
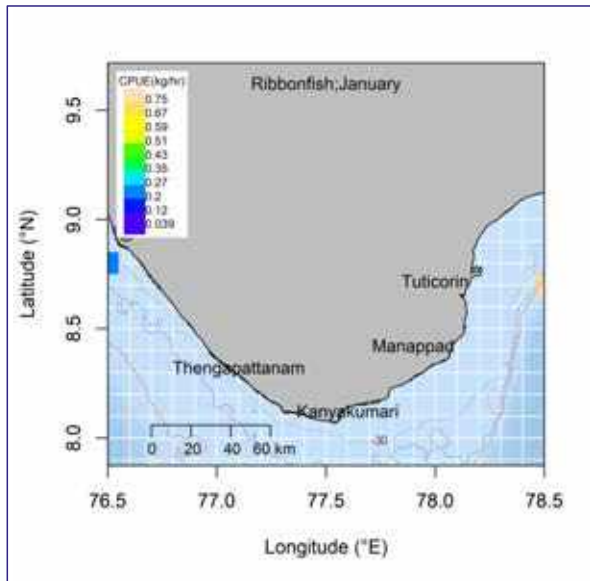


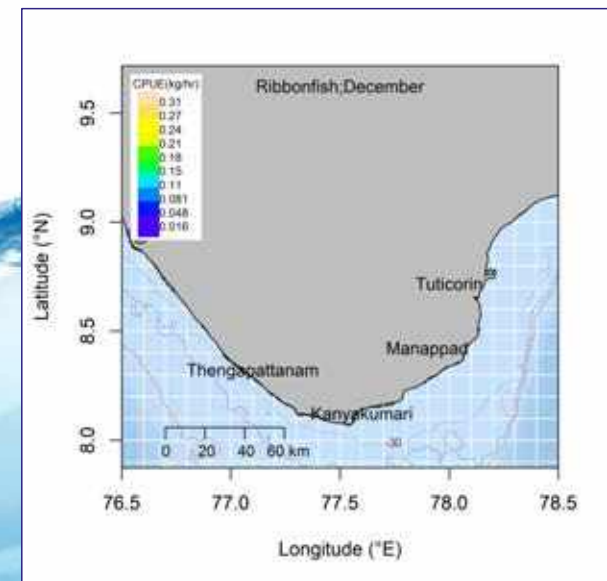
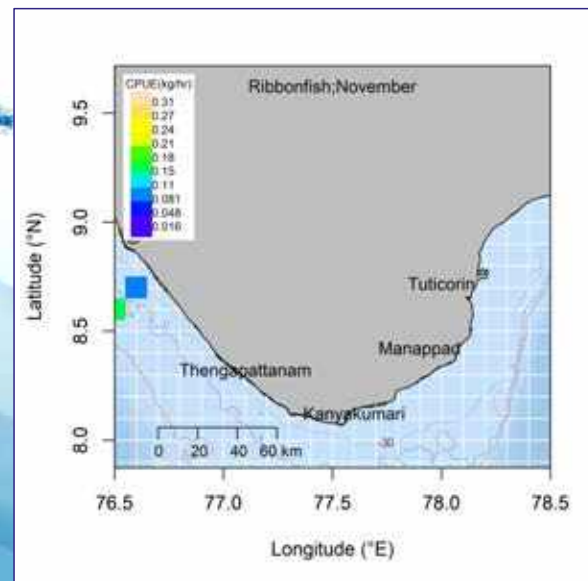
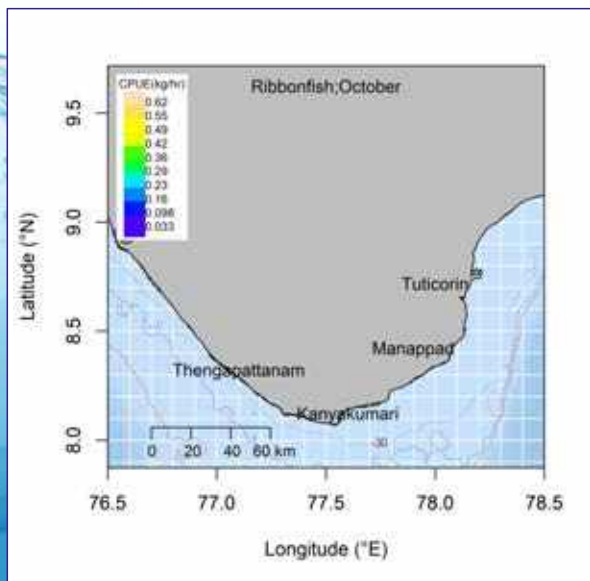
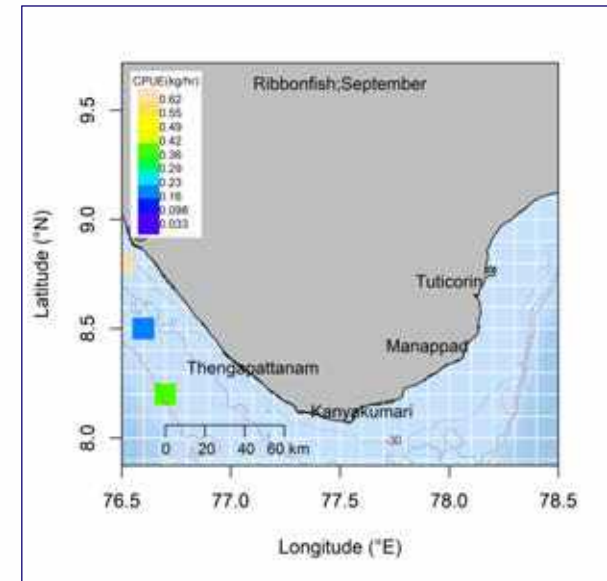
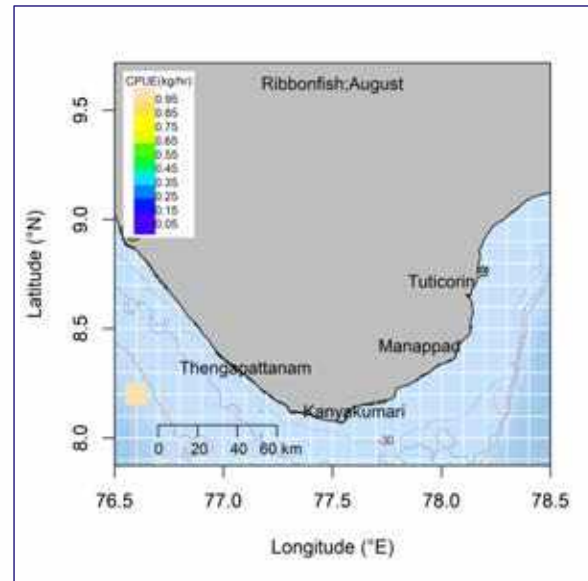
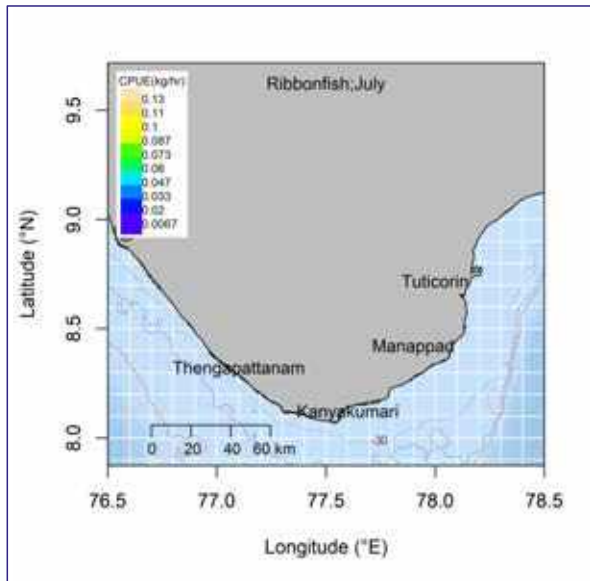




**Ribbonfish**

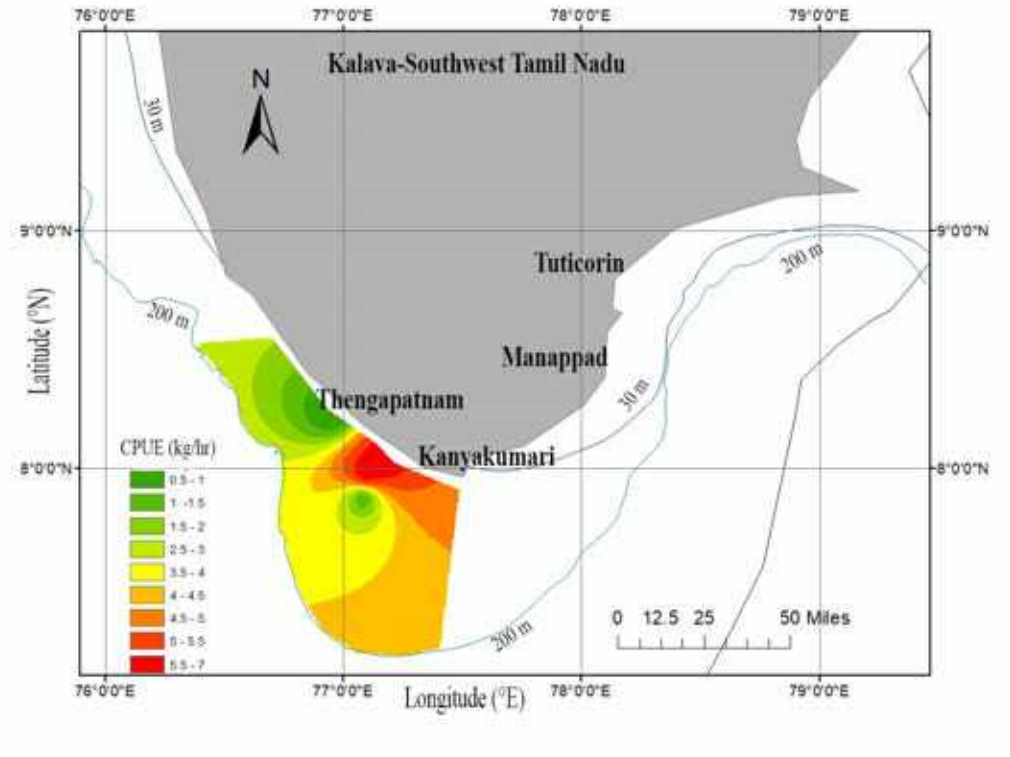


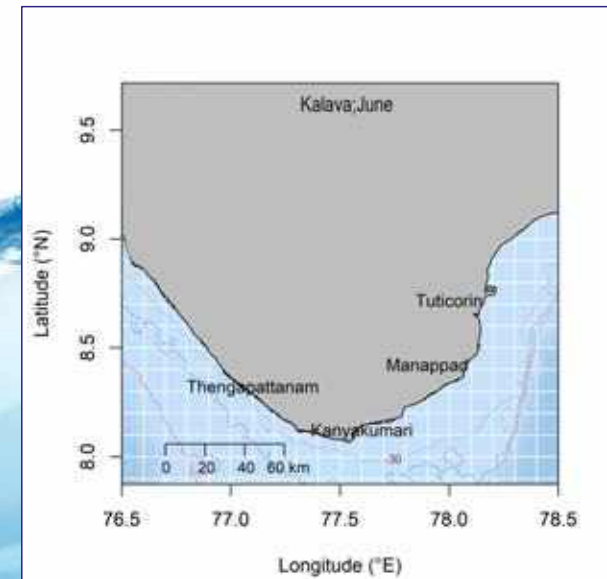
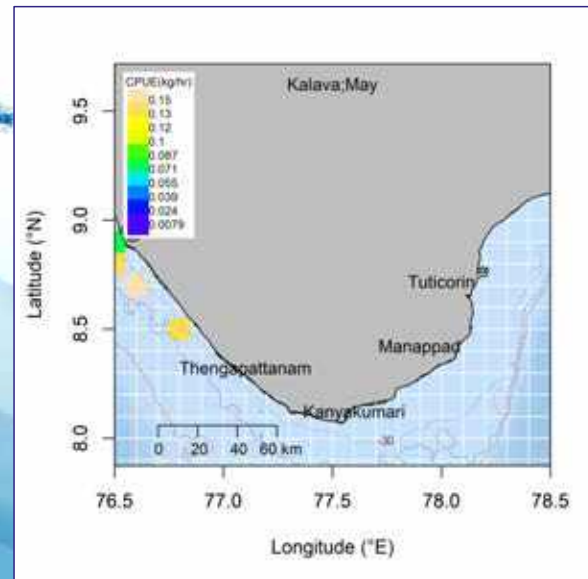
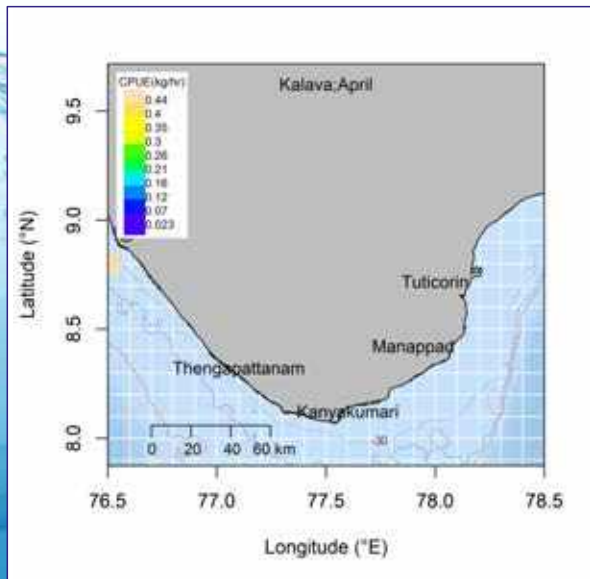
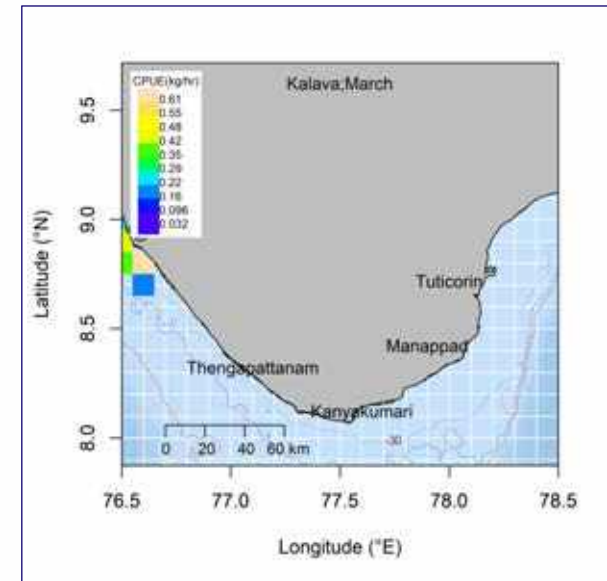
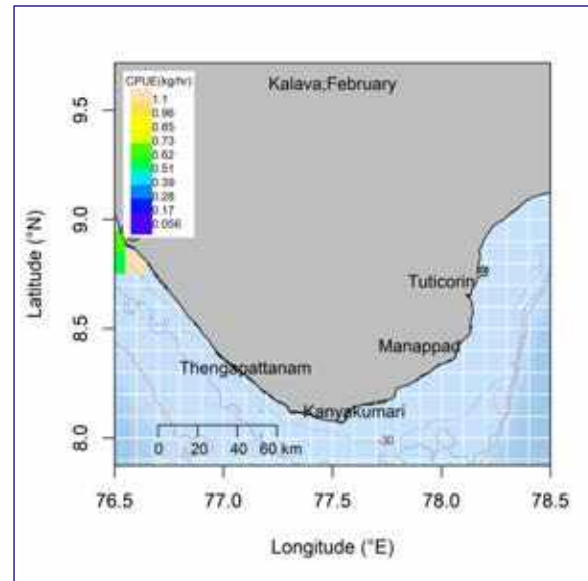
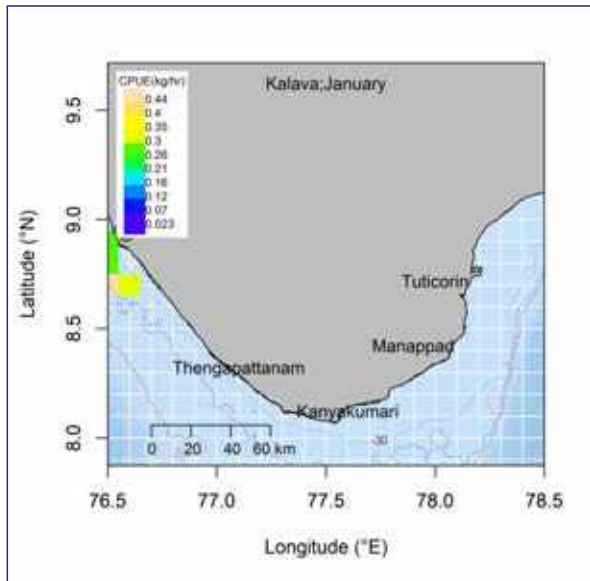


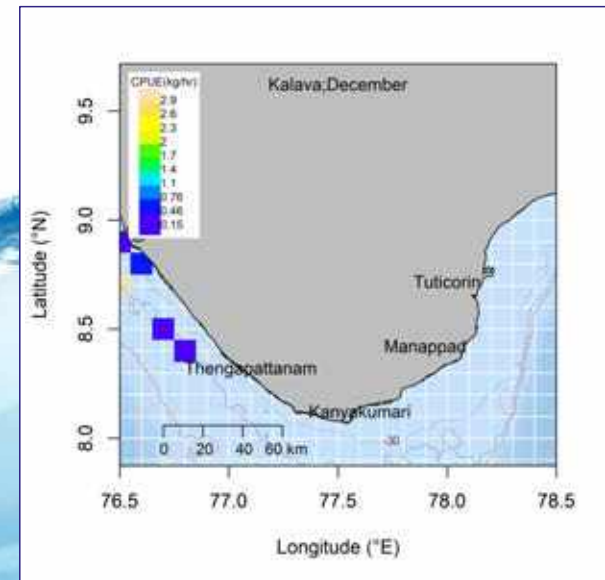
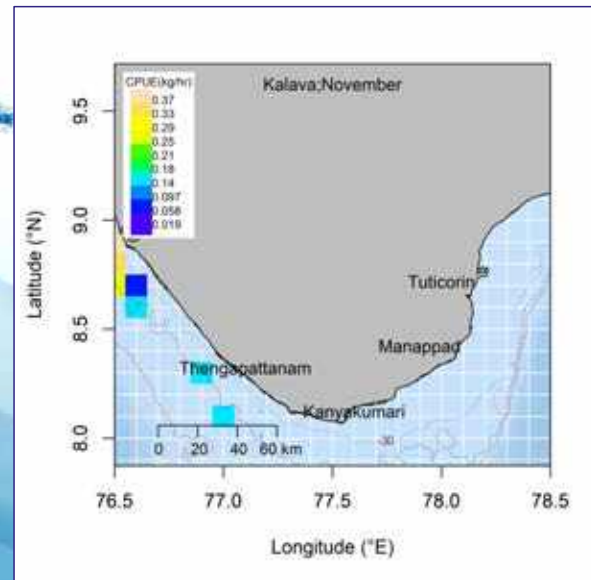
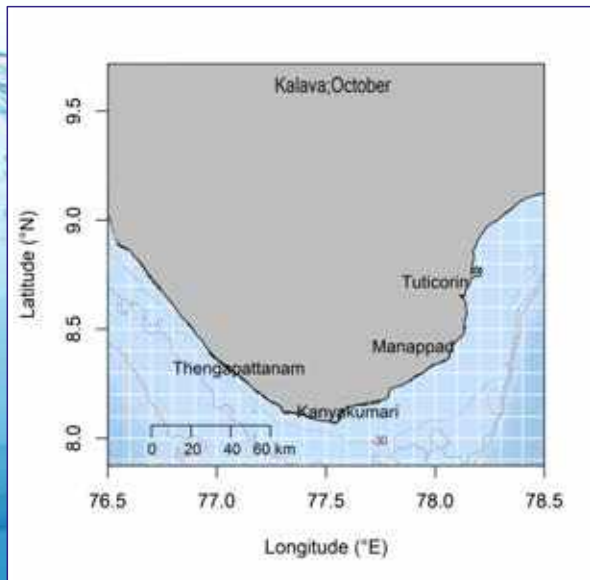
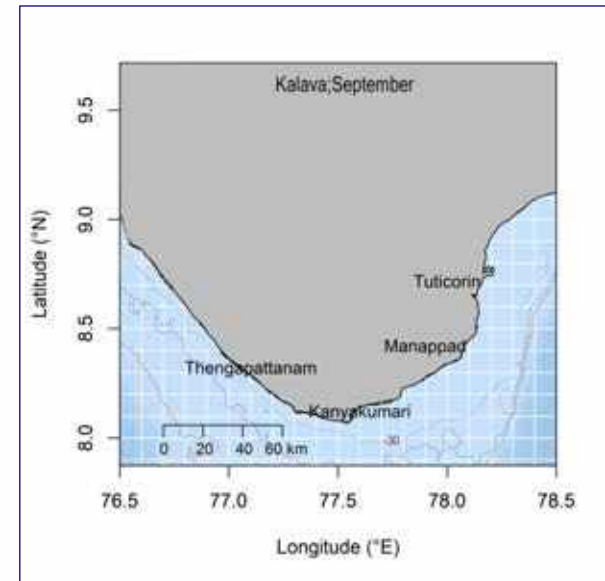
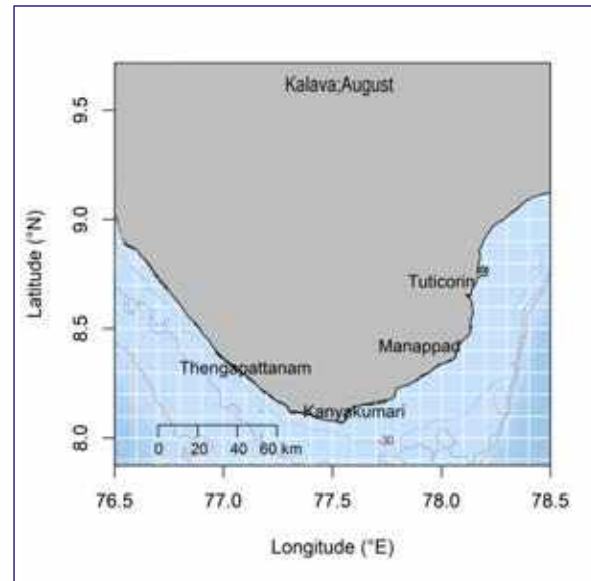
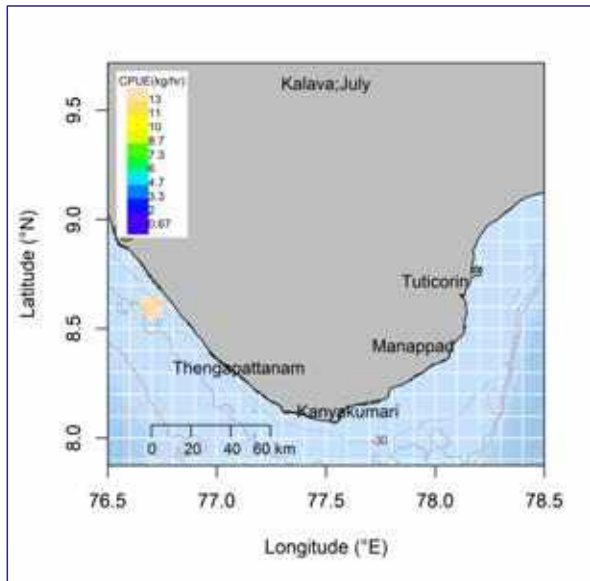


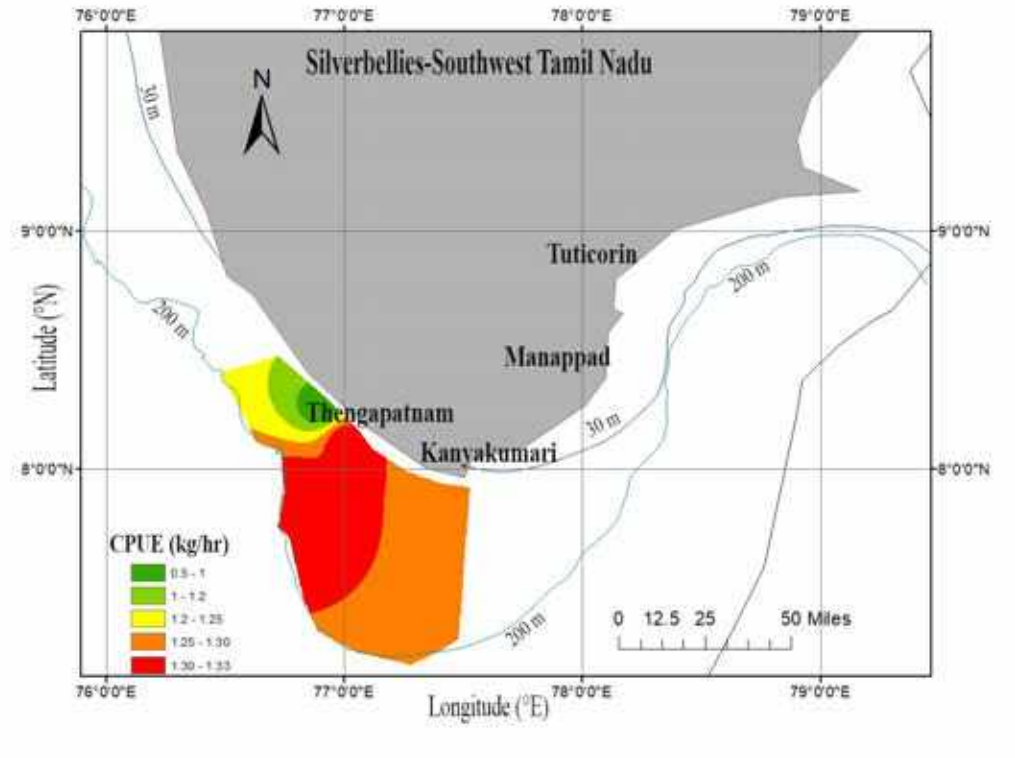


## Groupers (Kalava)

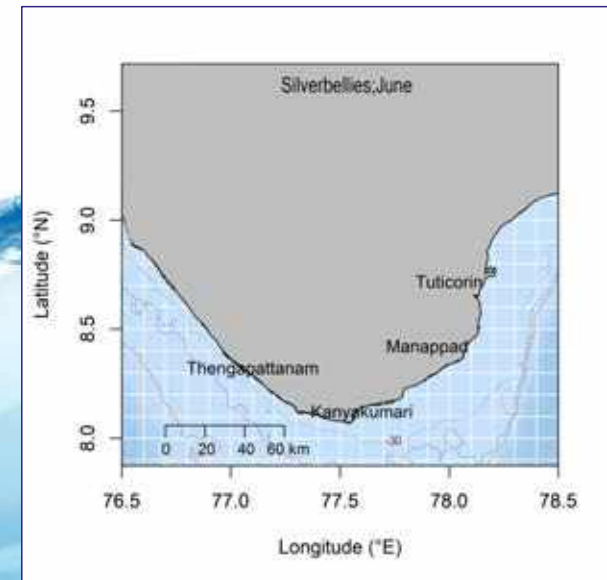
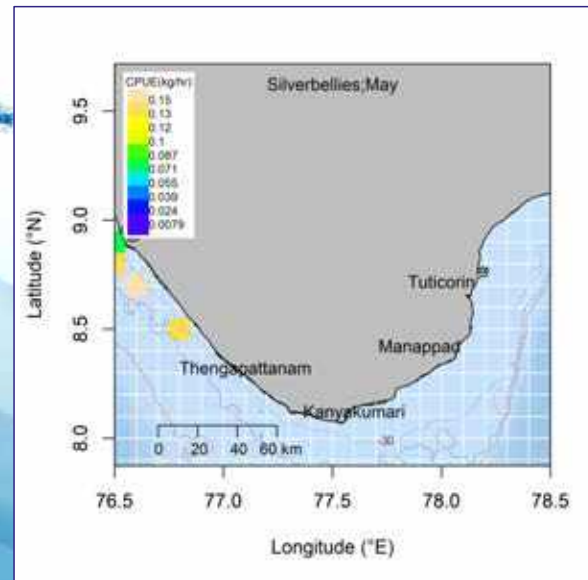
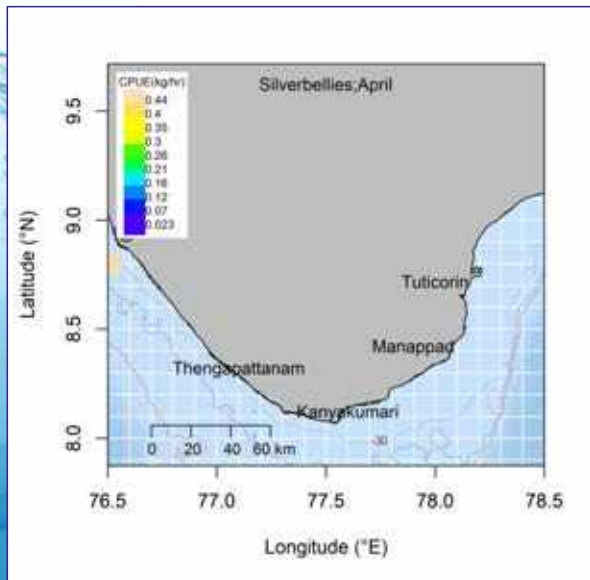
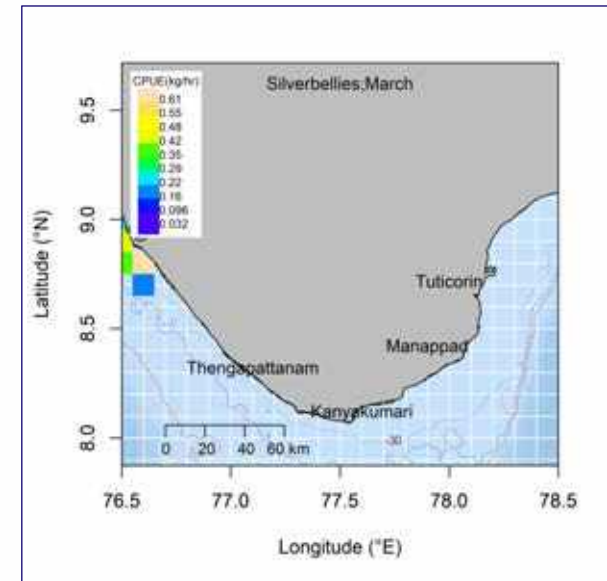
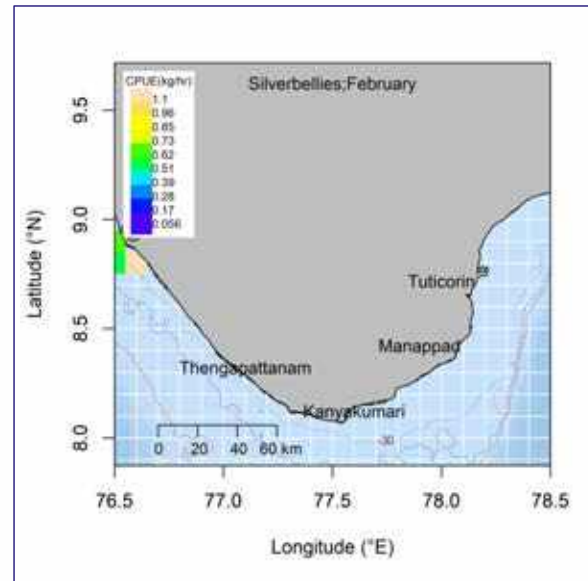
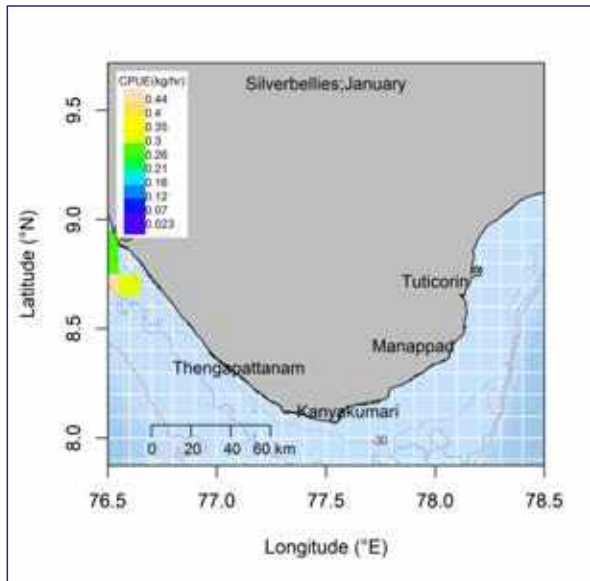




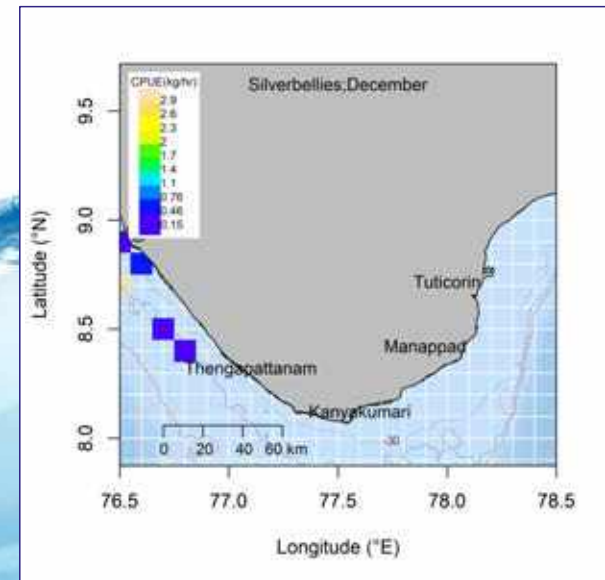
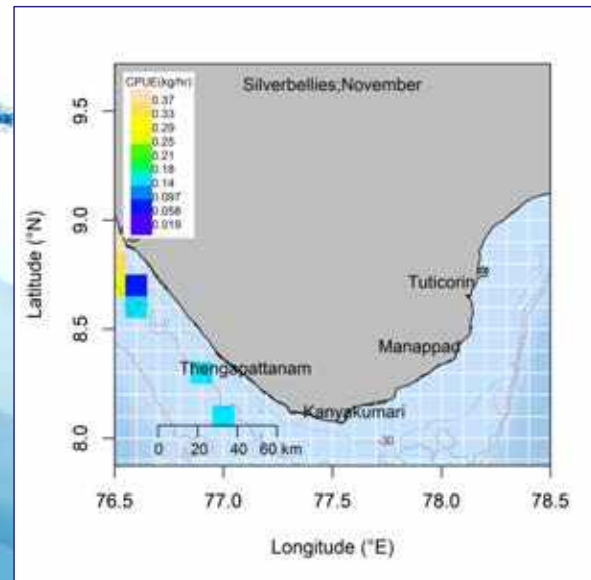
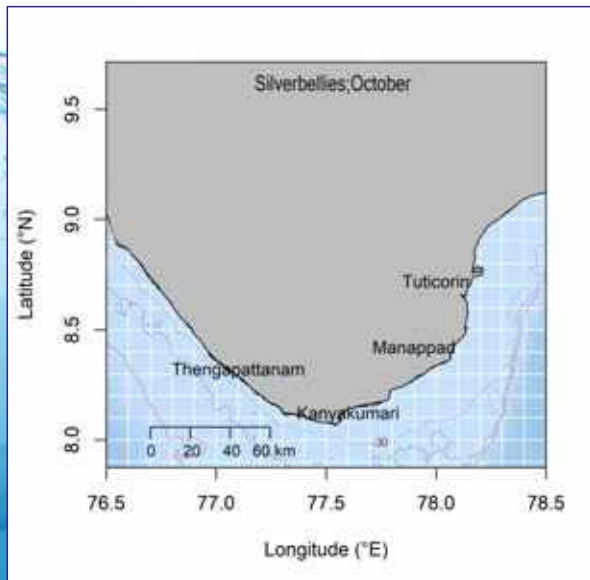
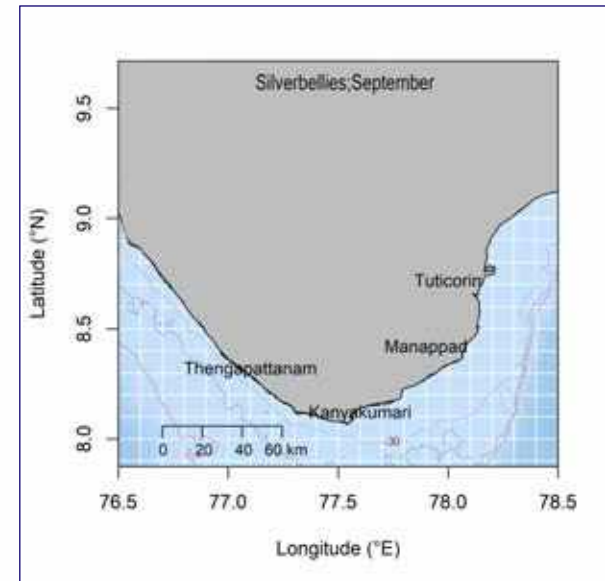
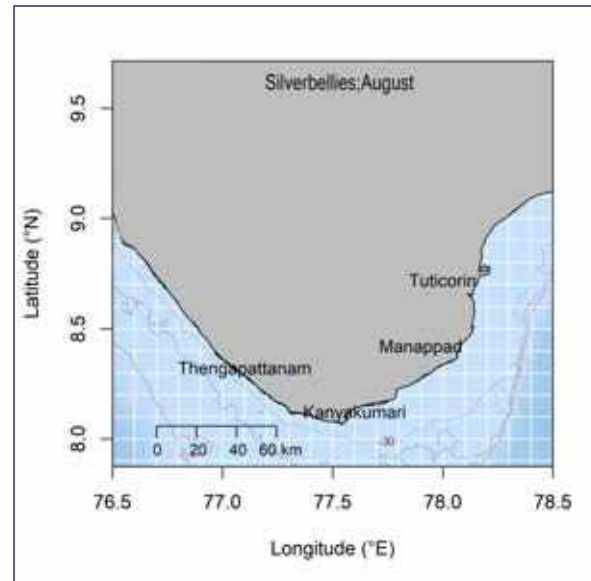
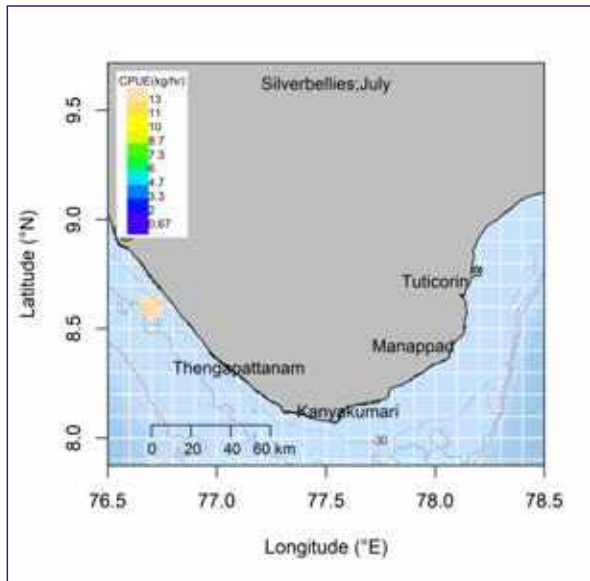


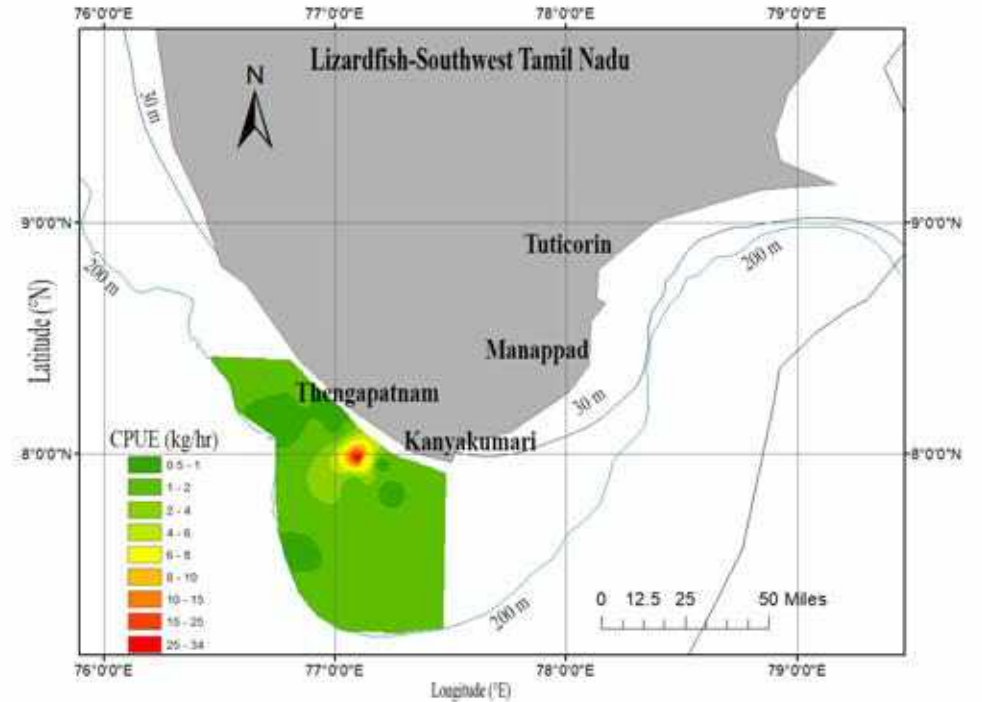
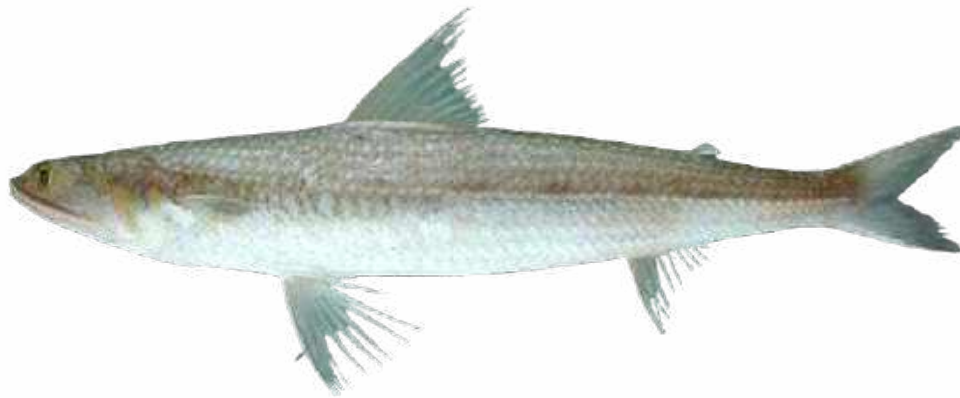


# Silverbellies

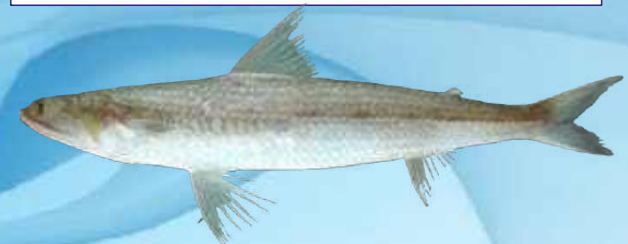
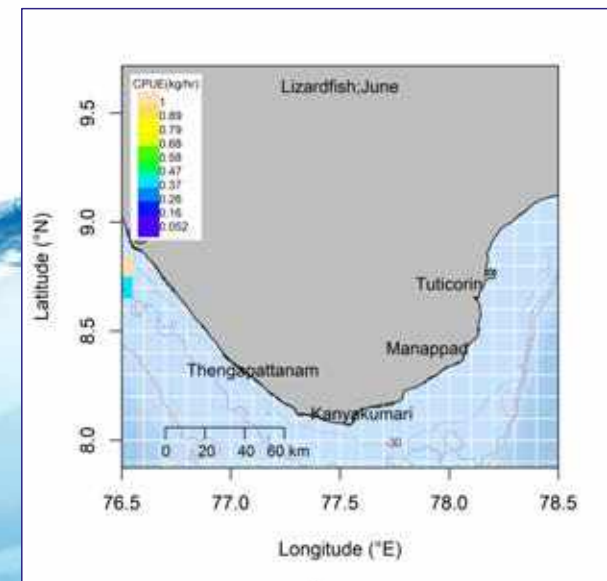
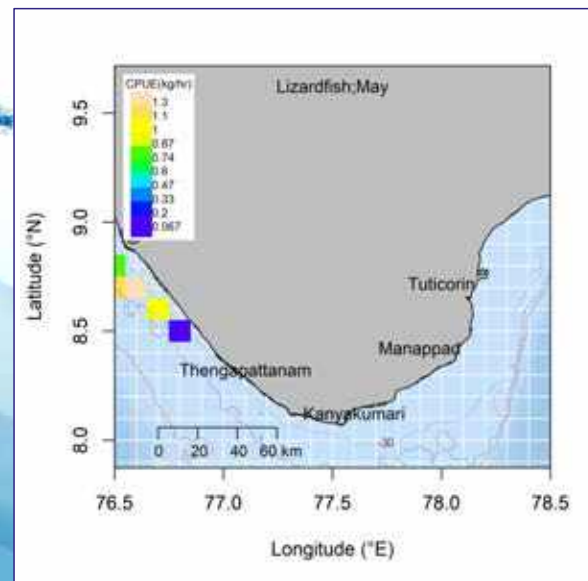
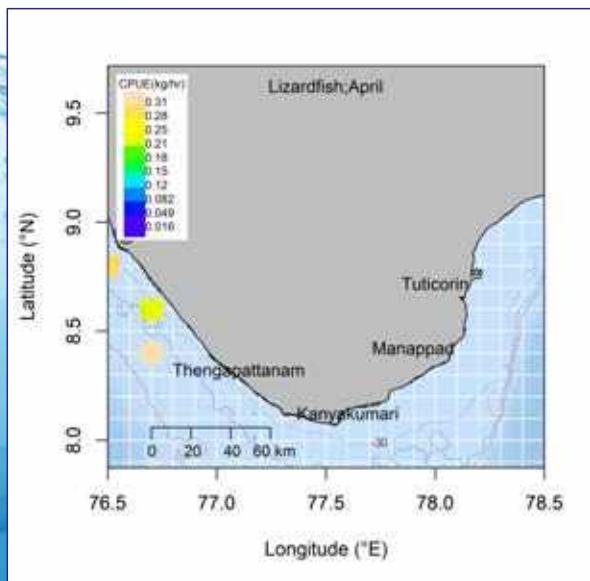
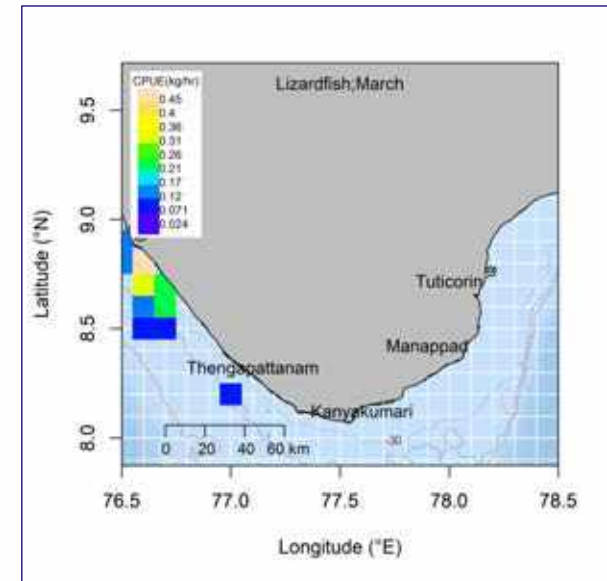
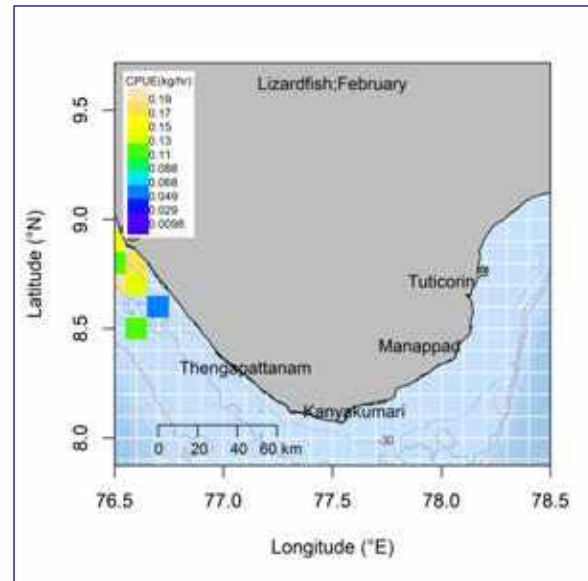
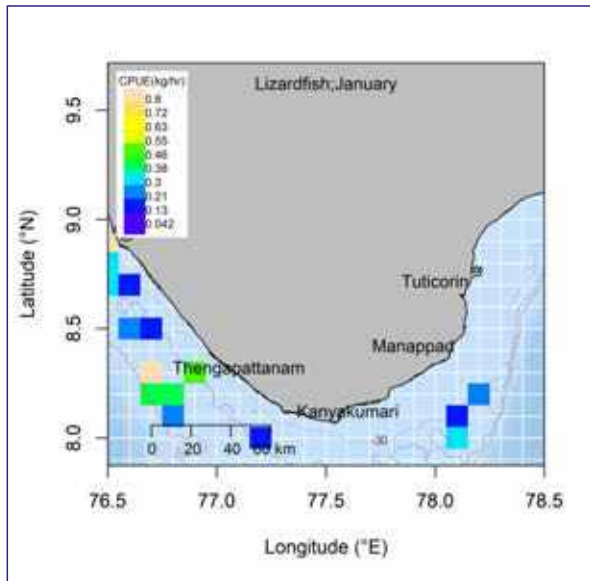


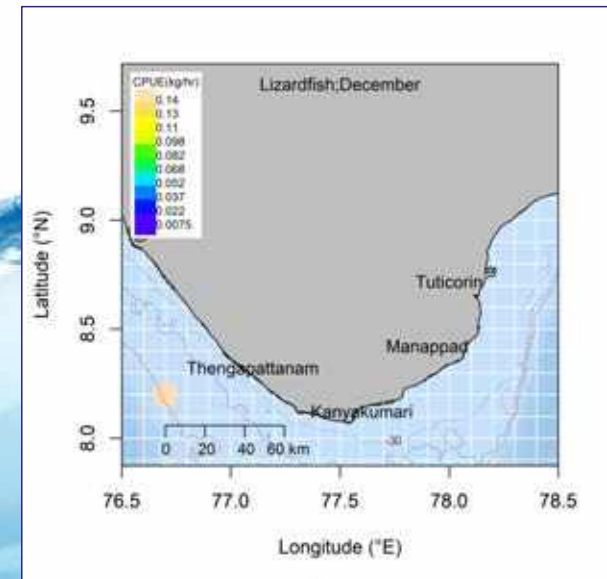
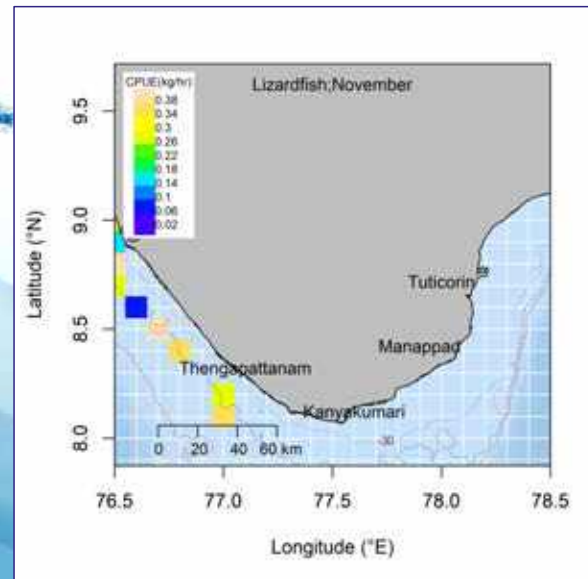
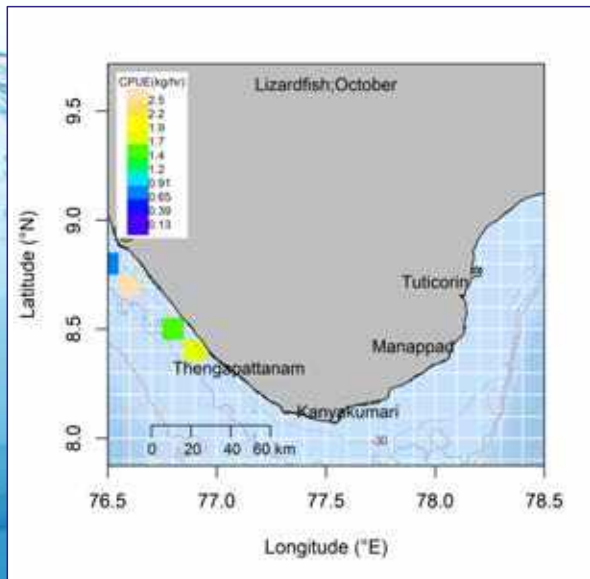
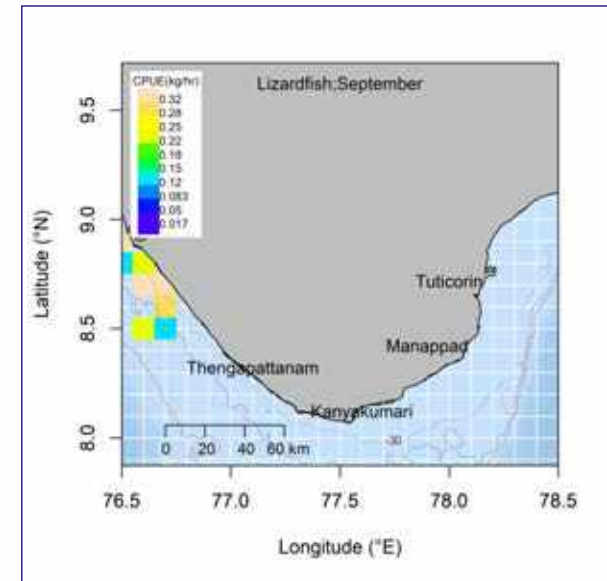
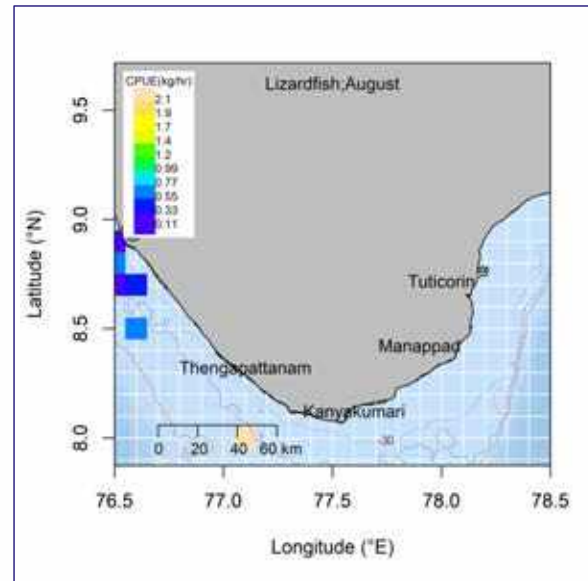
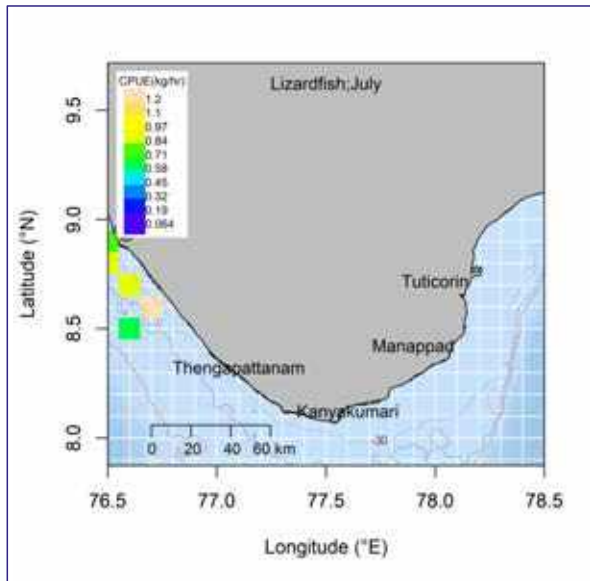


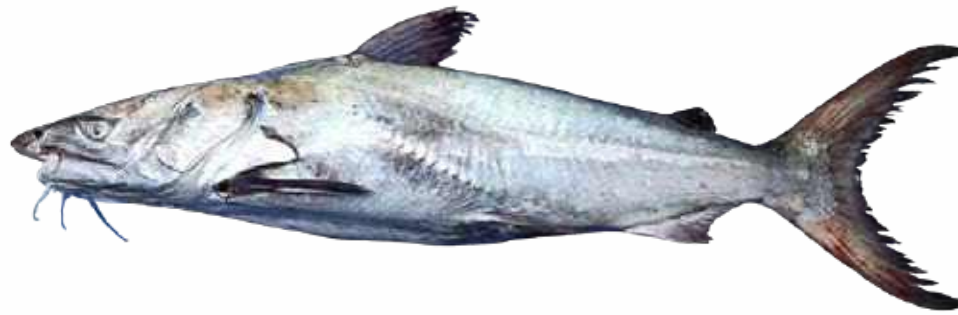




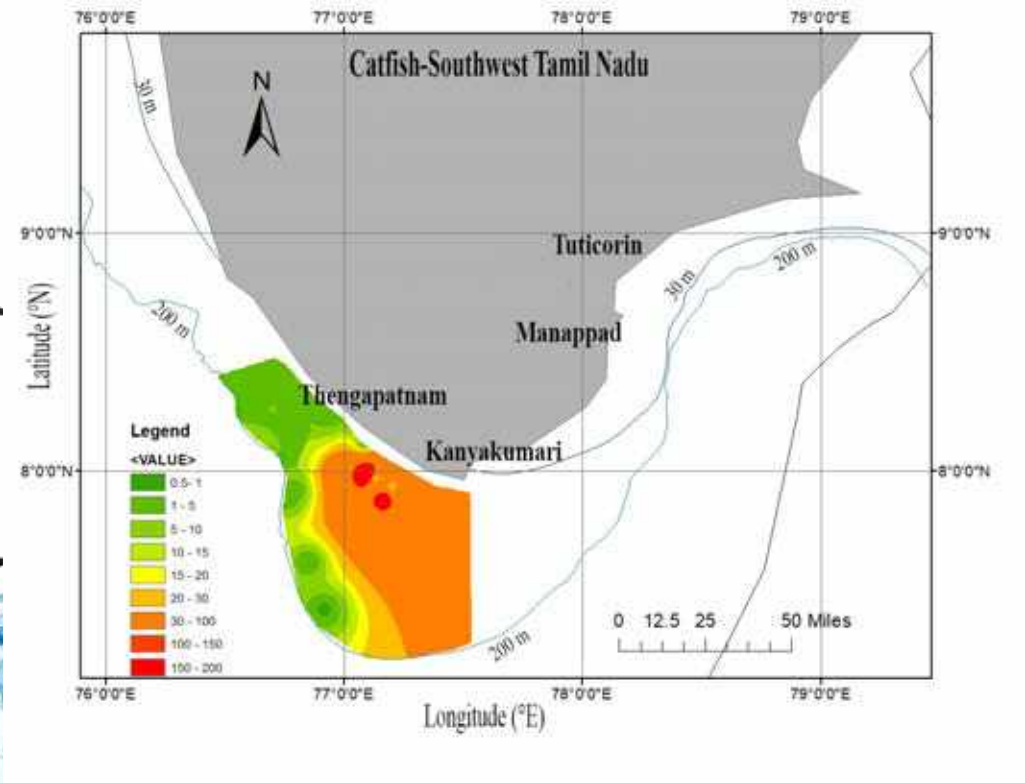
## Lizard Fish

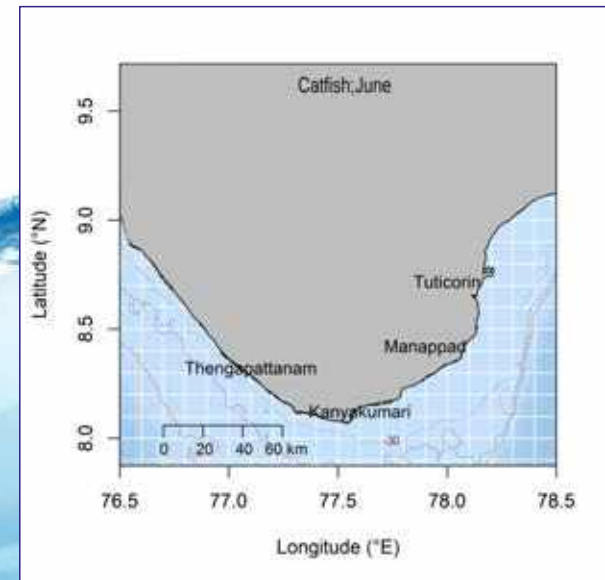
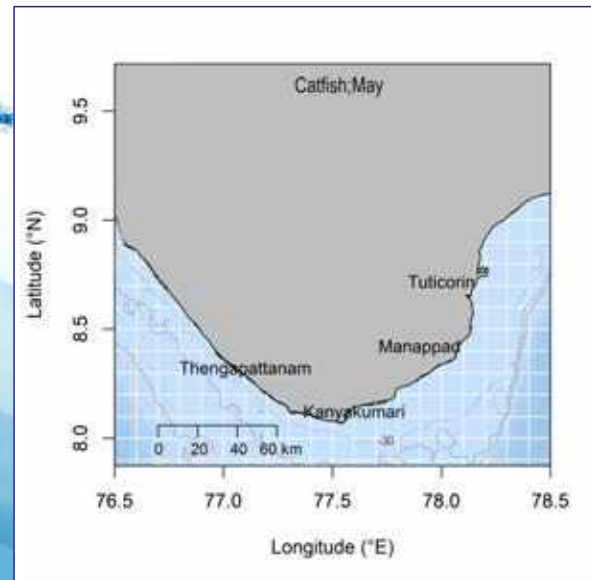
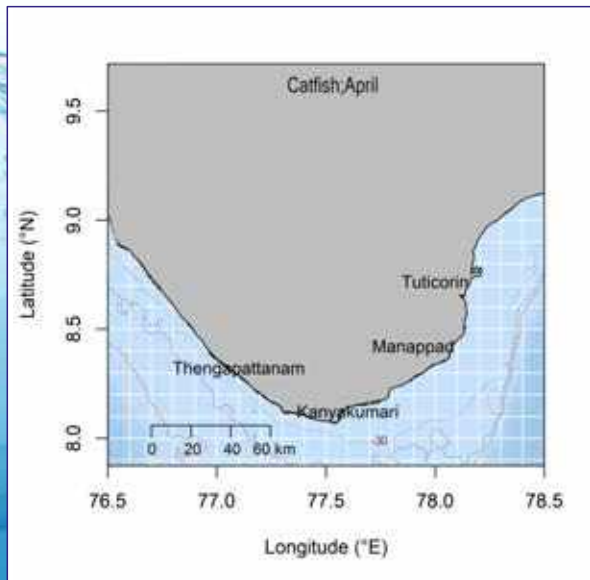
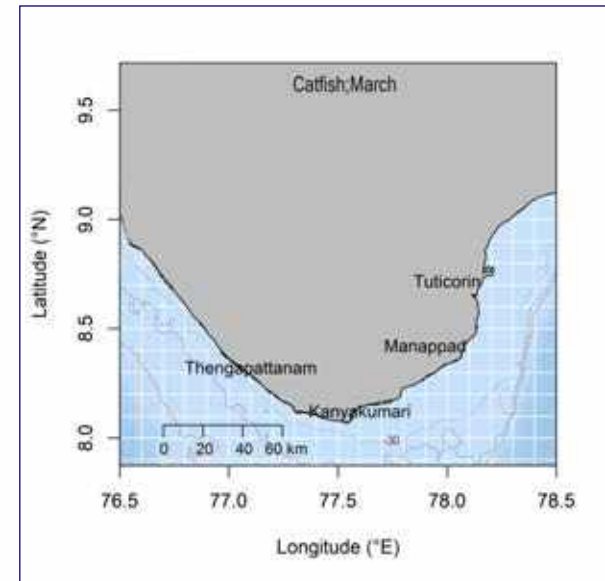
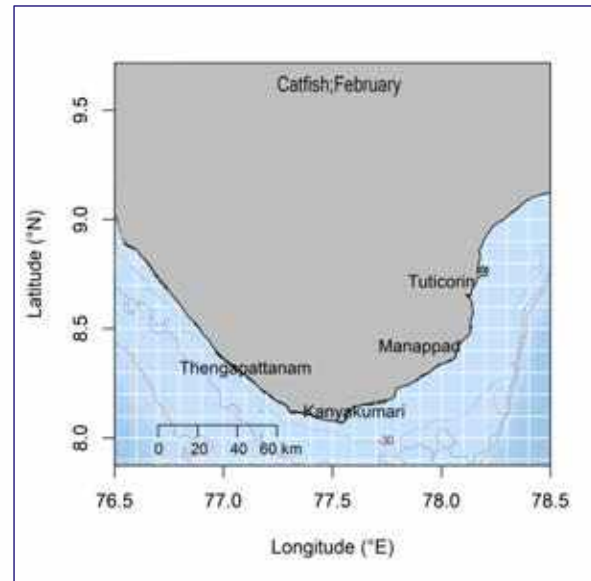
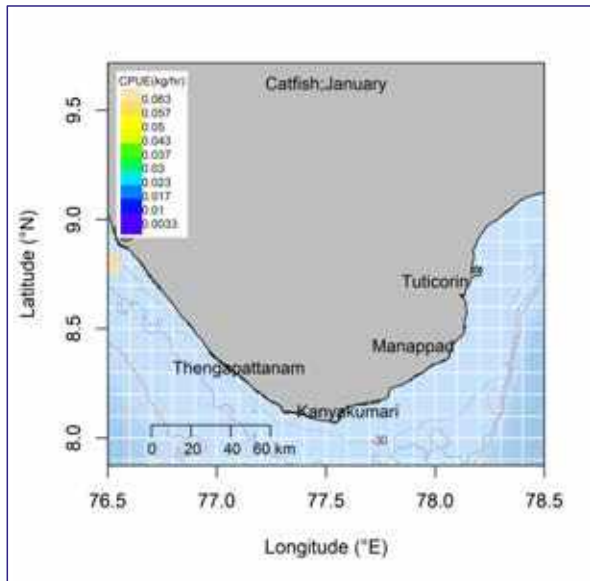


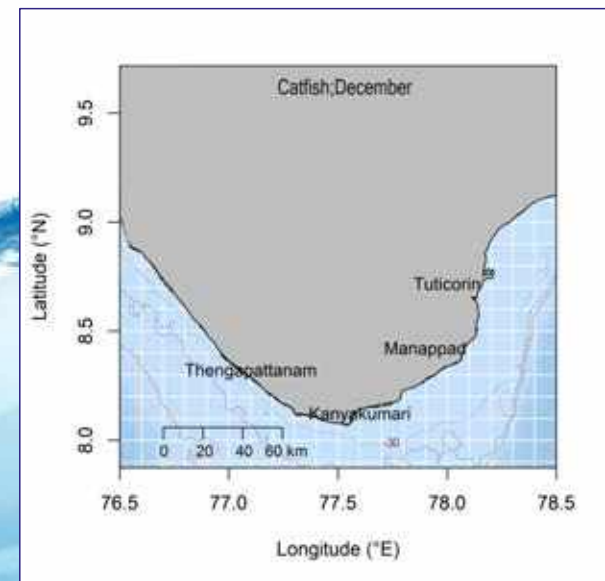
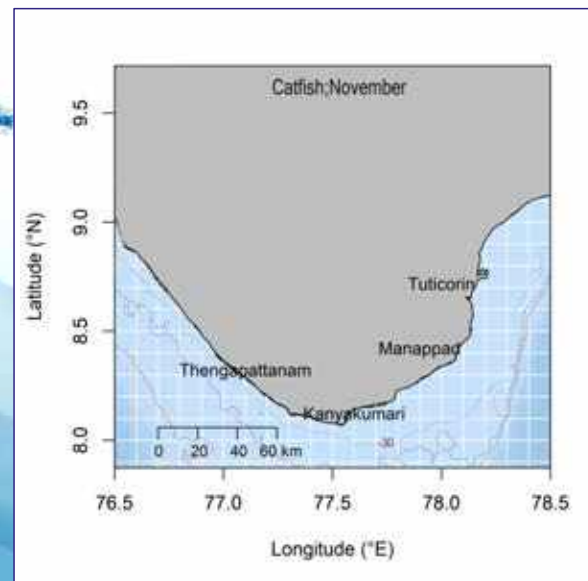
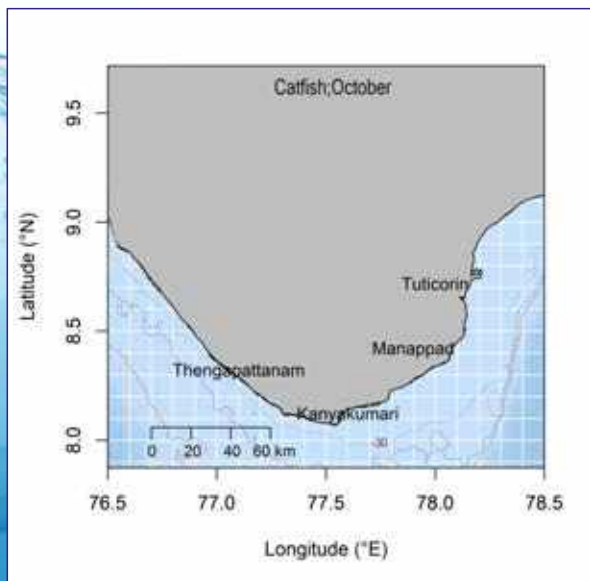
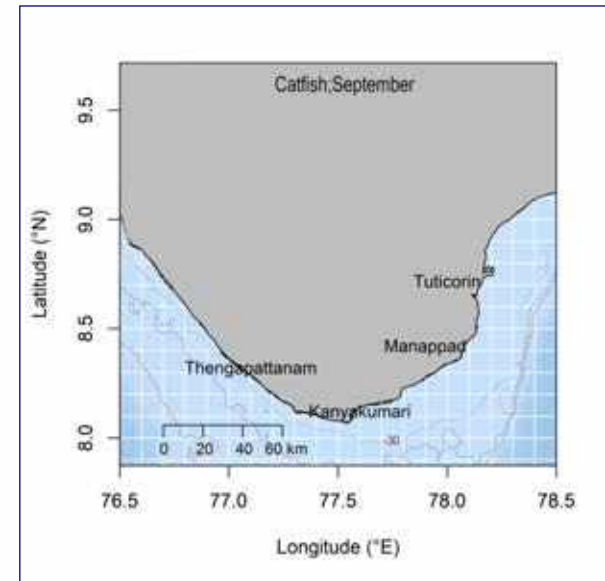
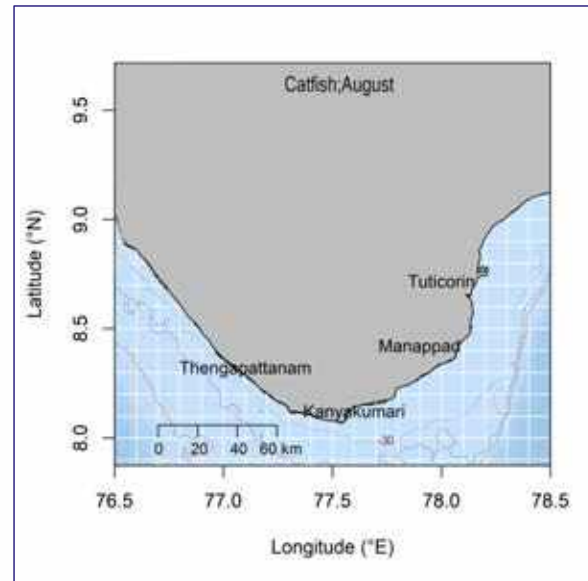
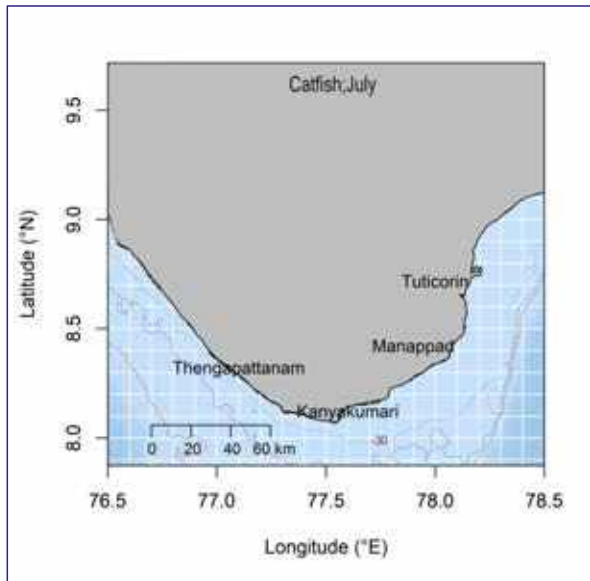


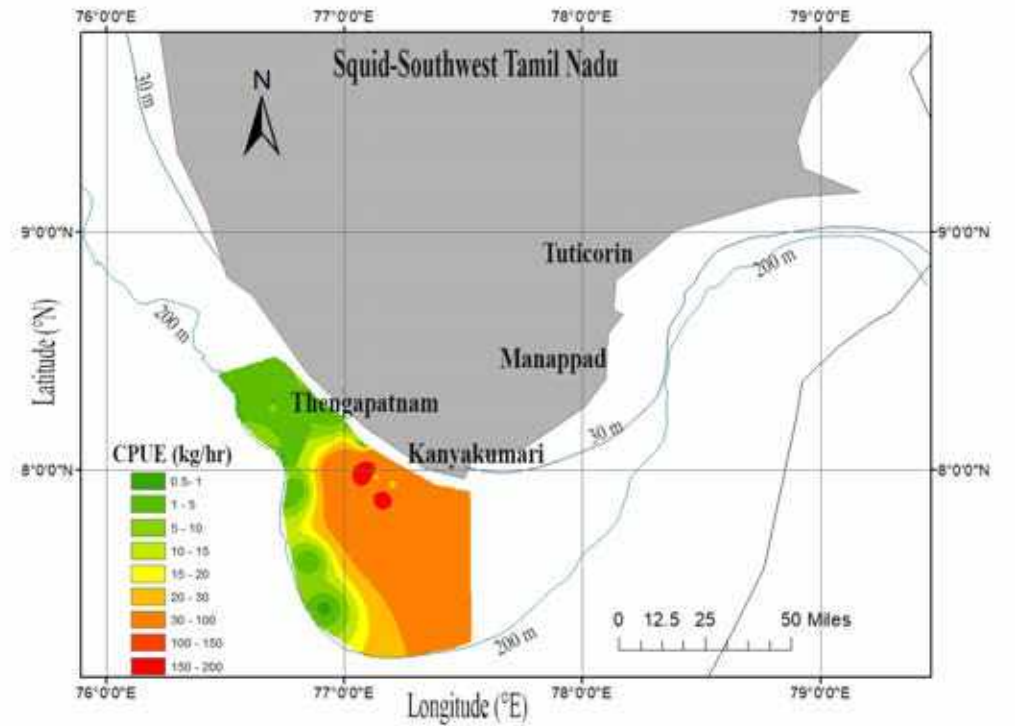


Cat Fish



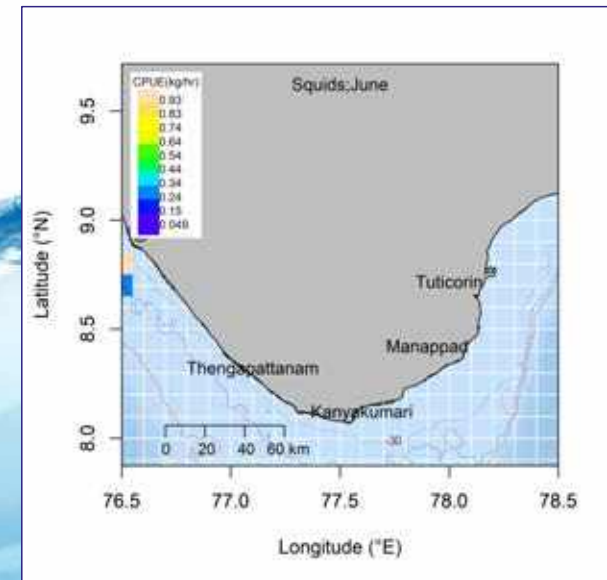
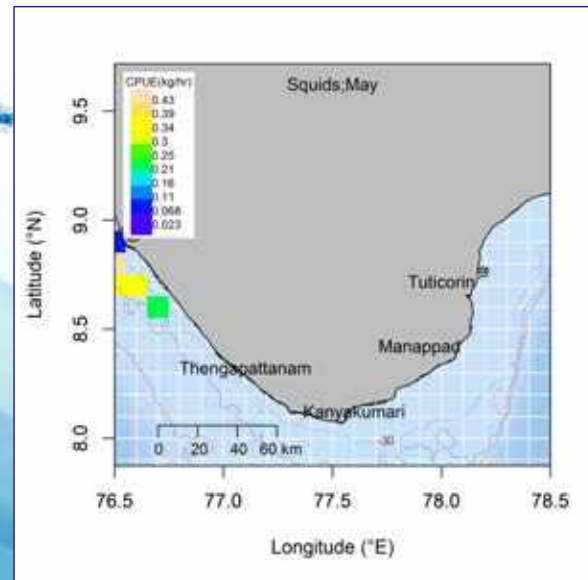
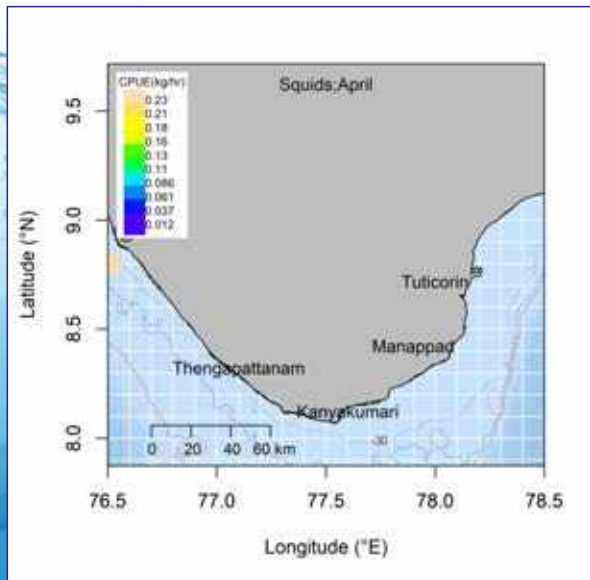
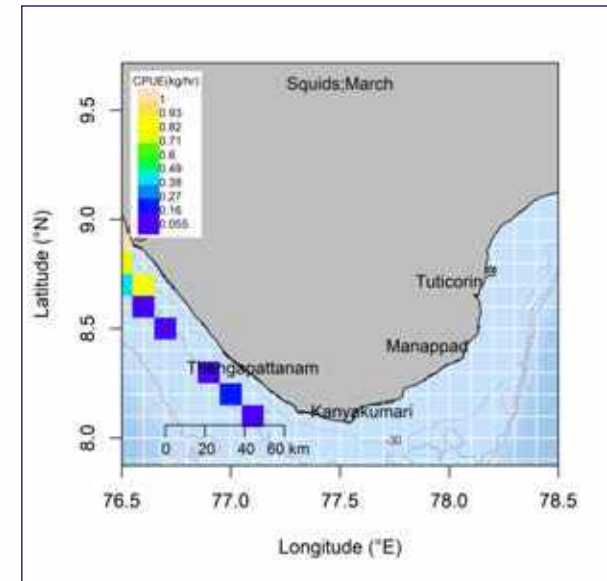
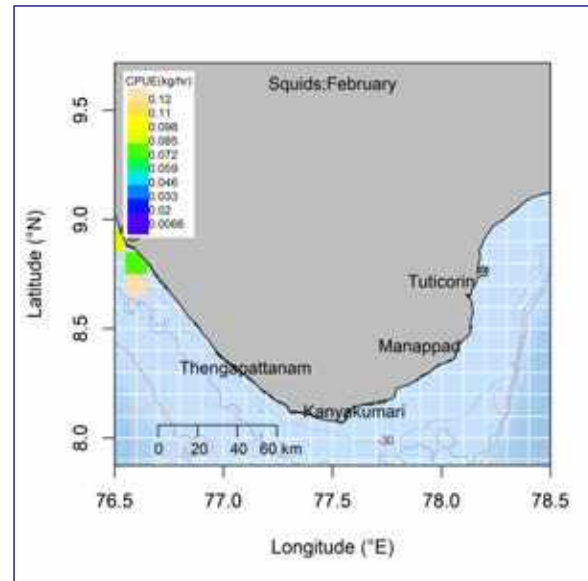
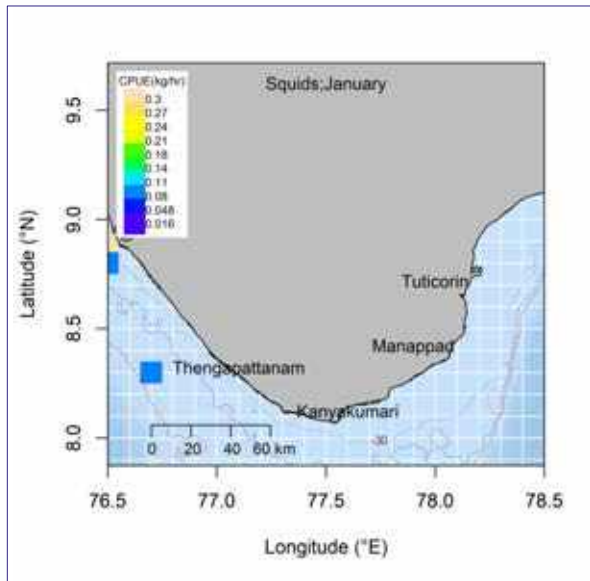


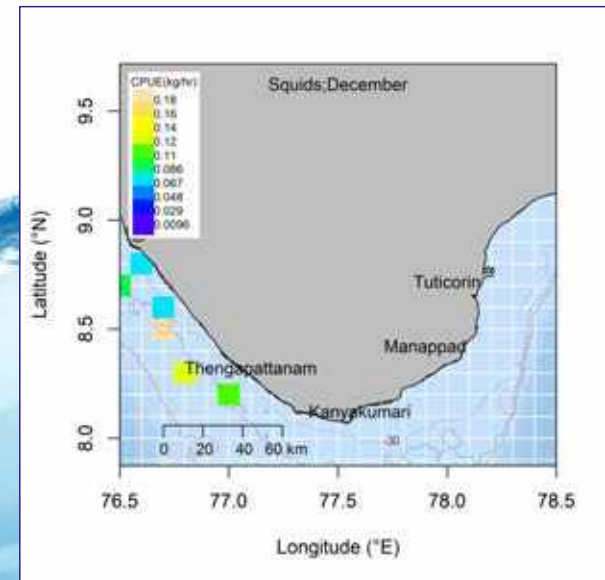
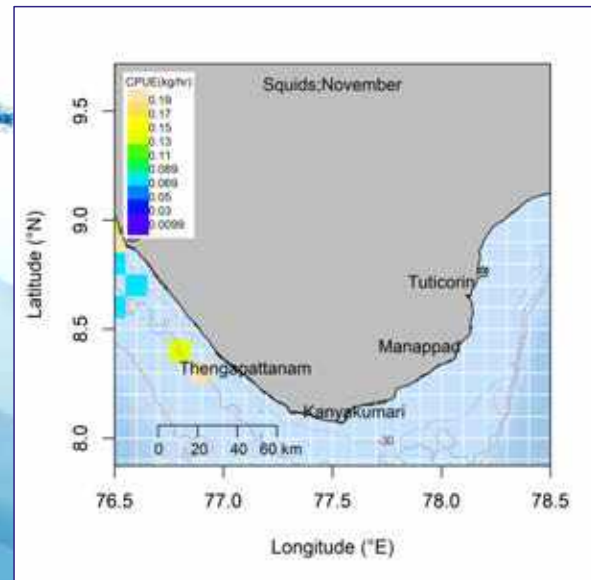
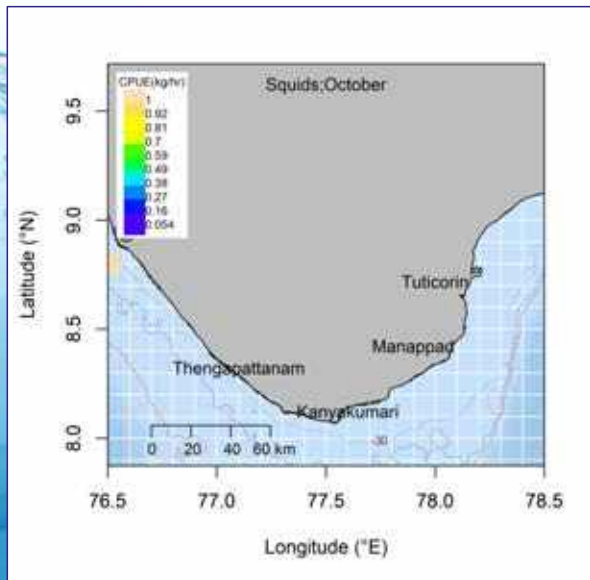
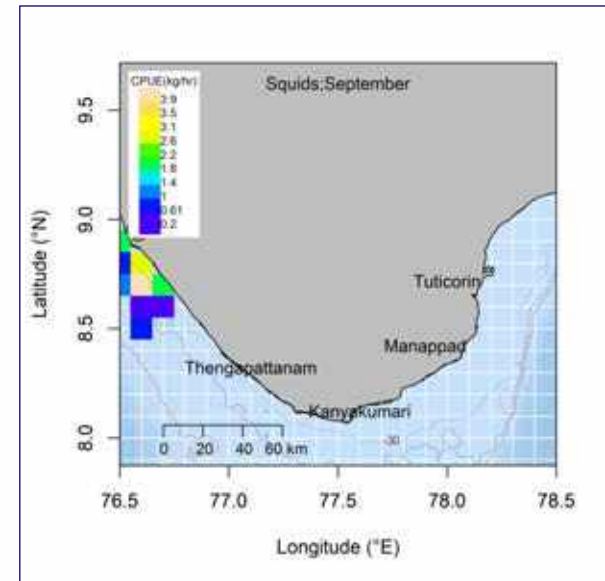
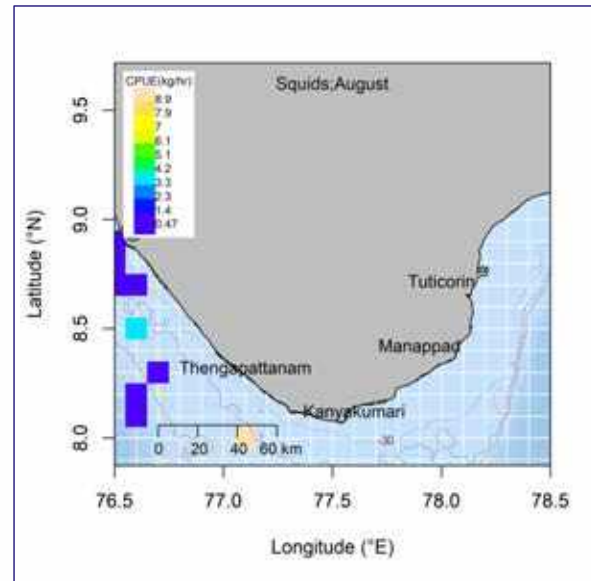
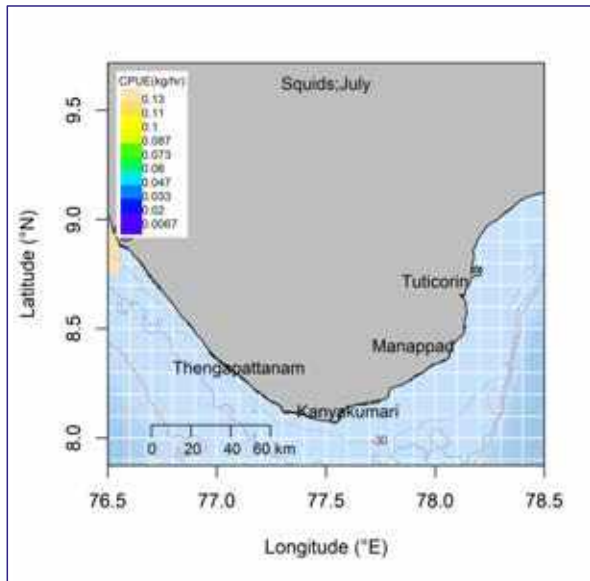




## Squids

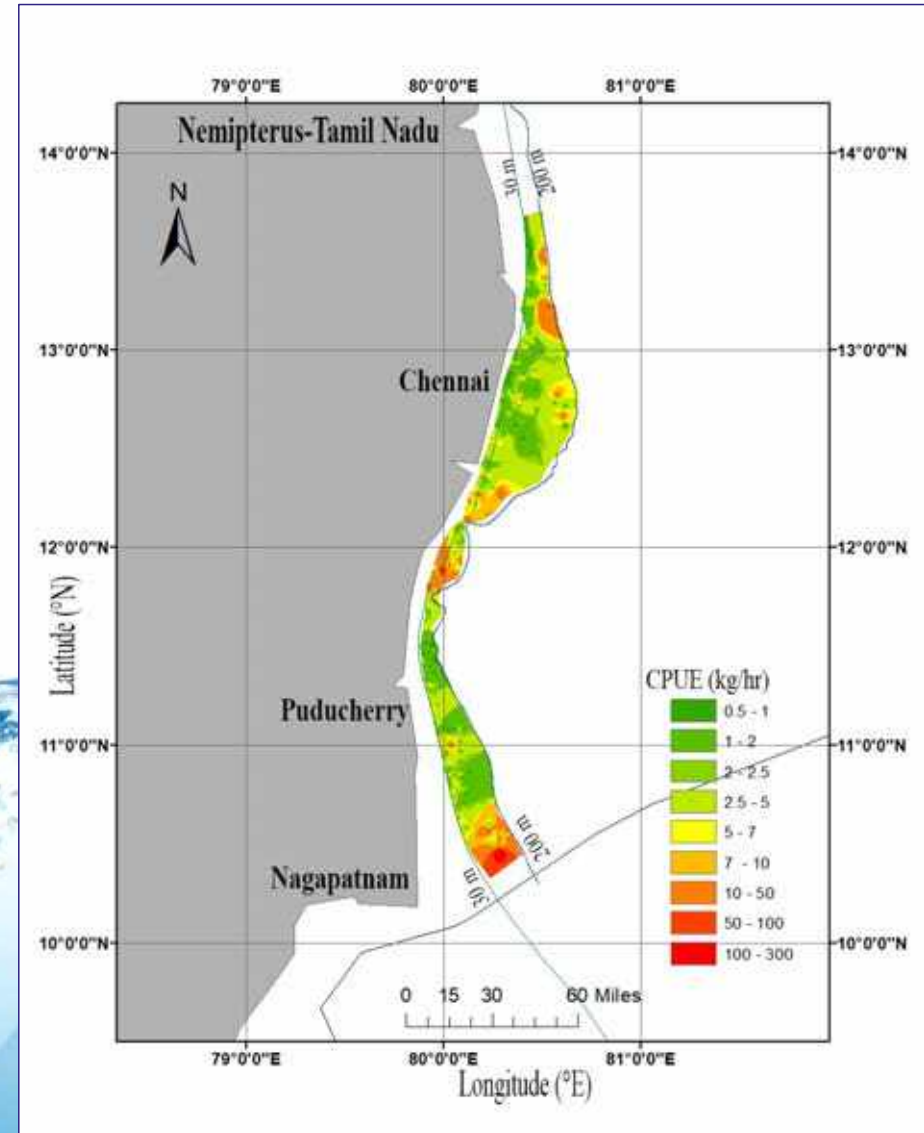




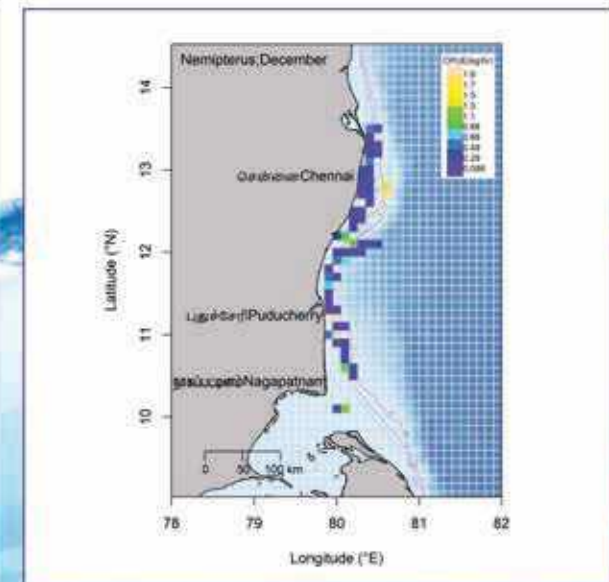
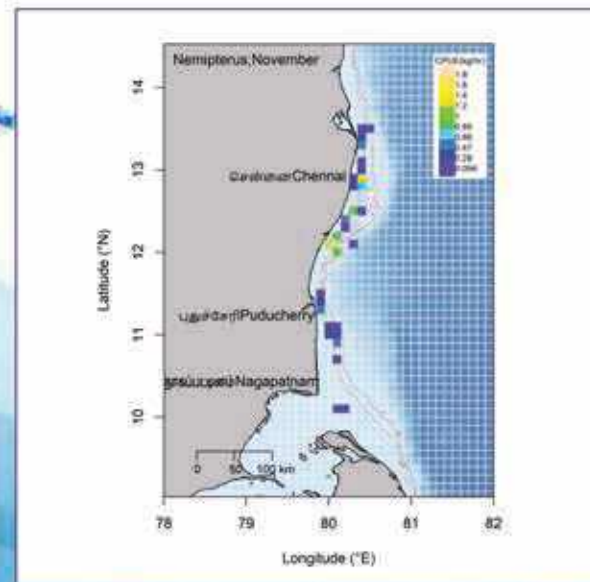
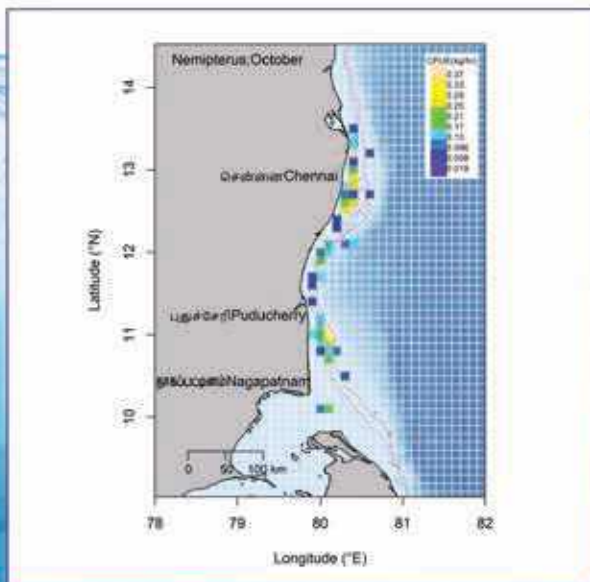
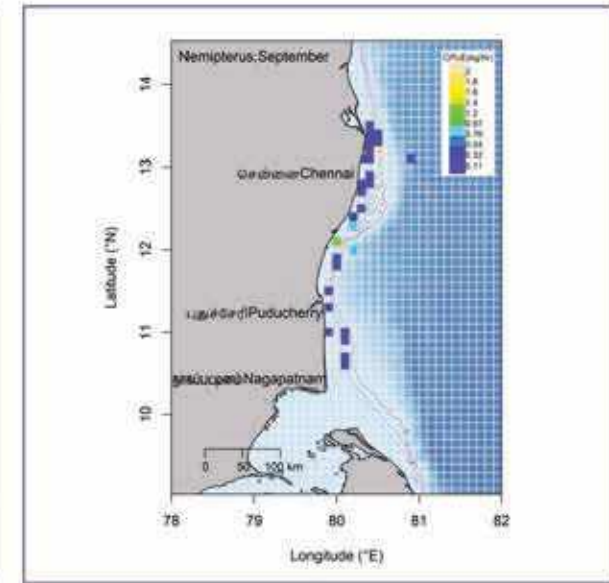
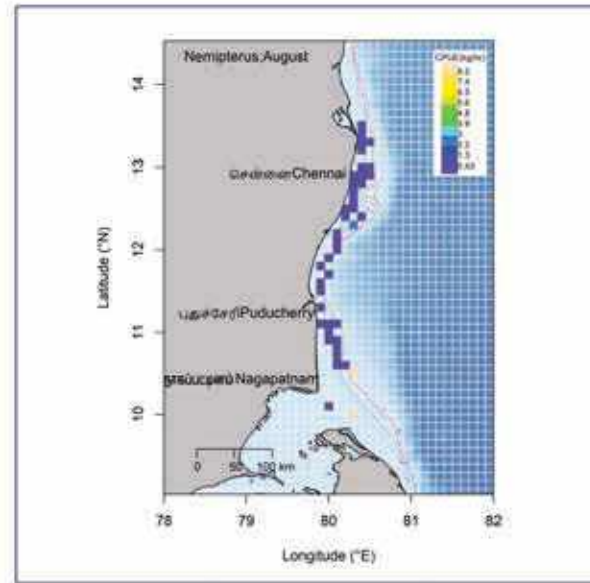
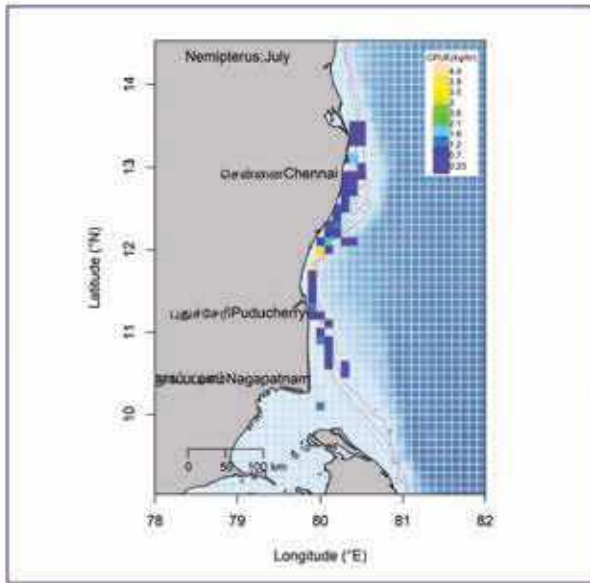




# Threadfin Breams (Nemipterus)

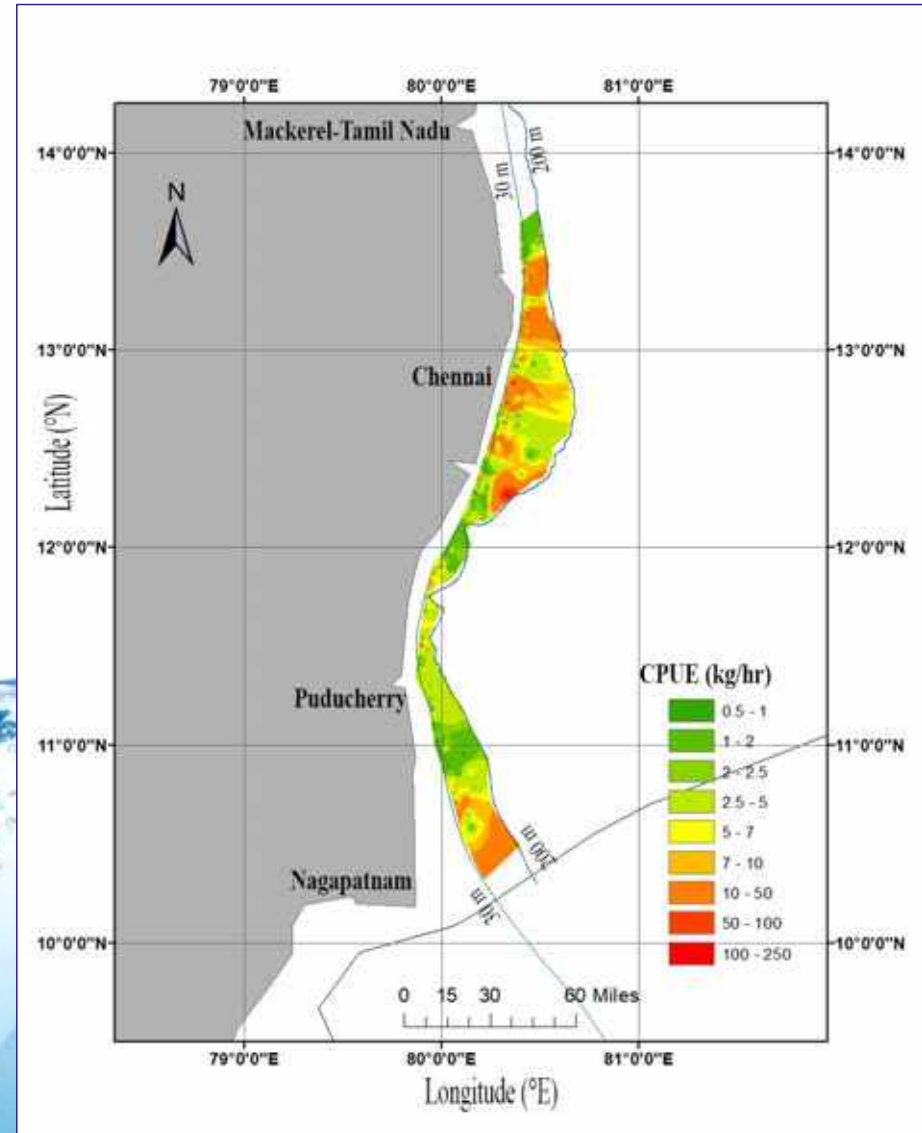


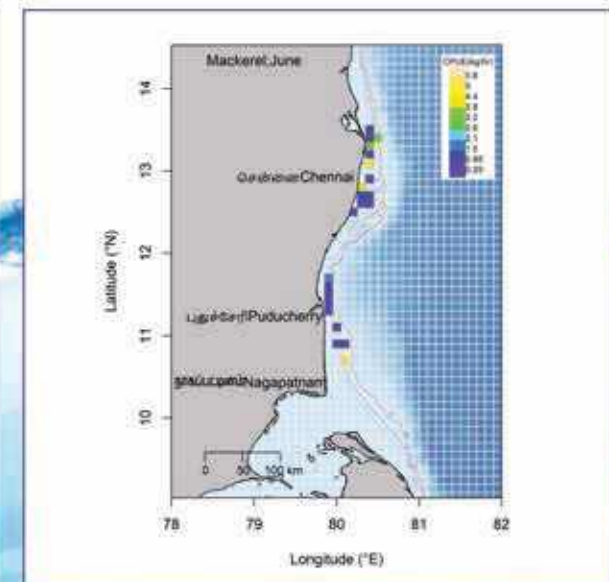
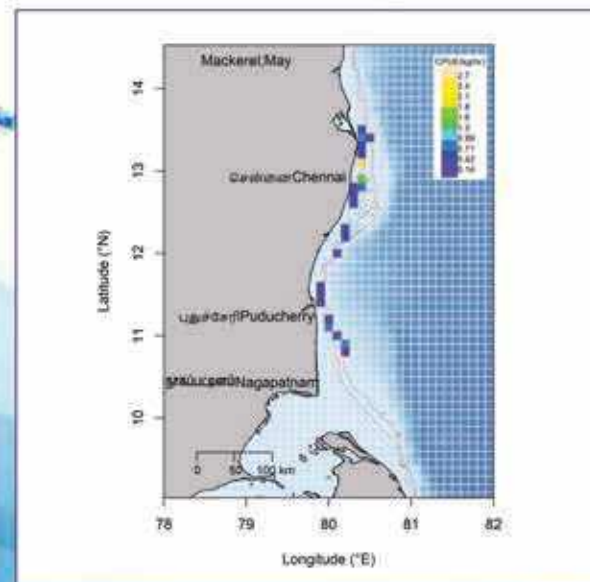
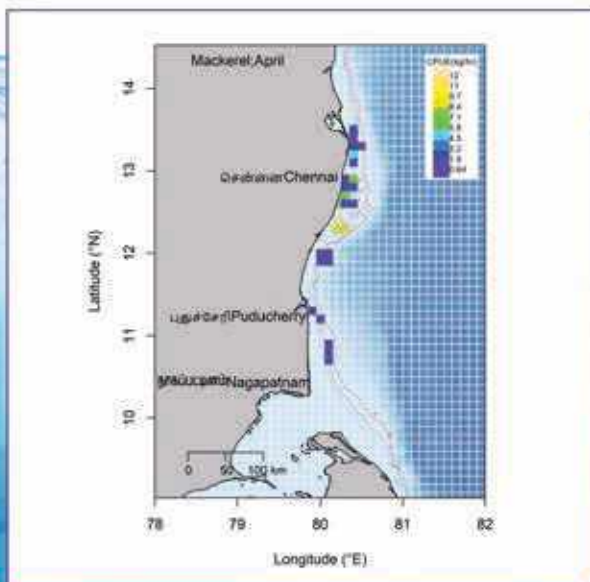
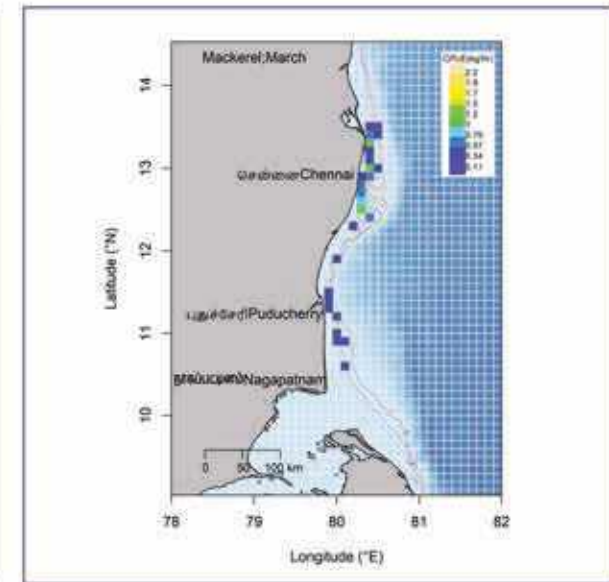
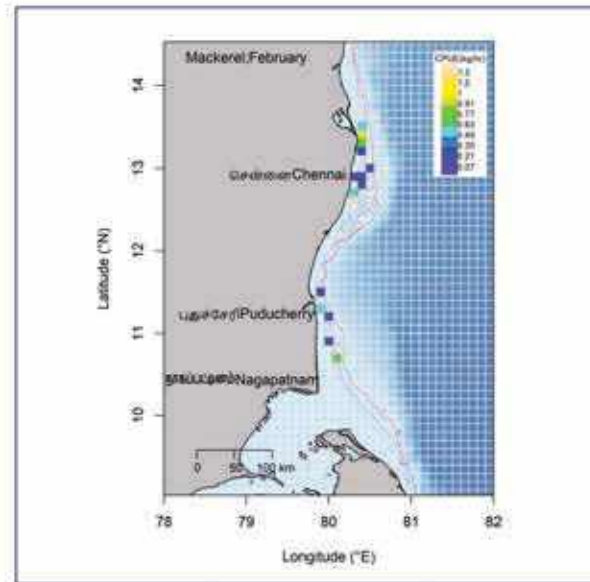
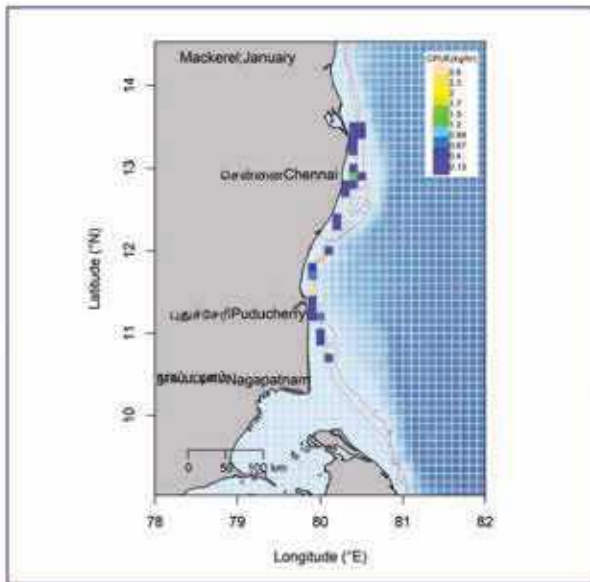


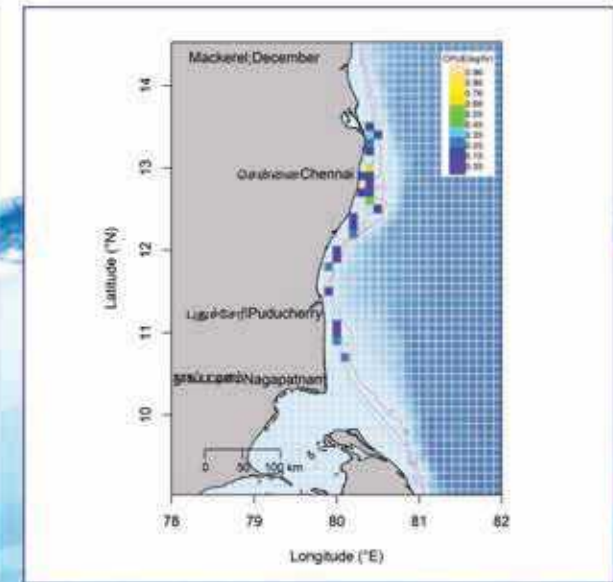
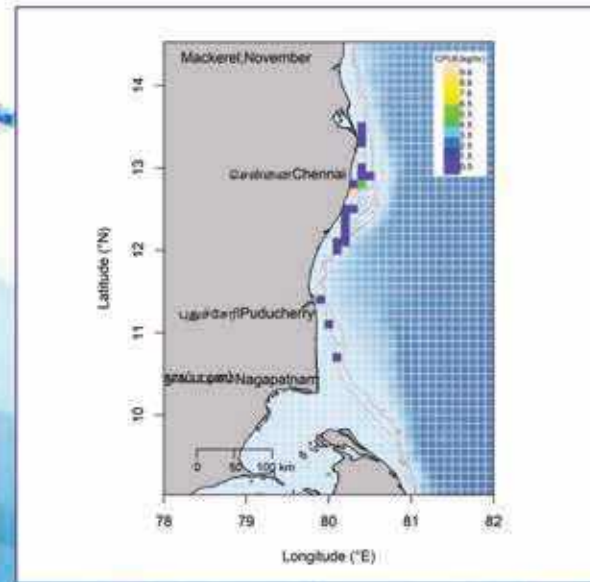
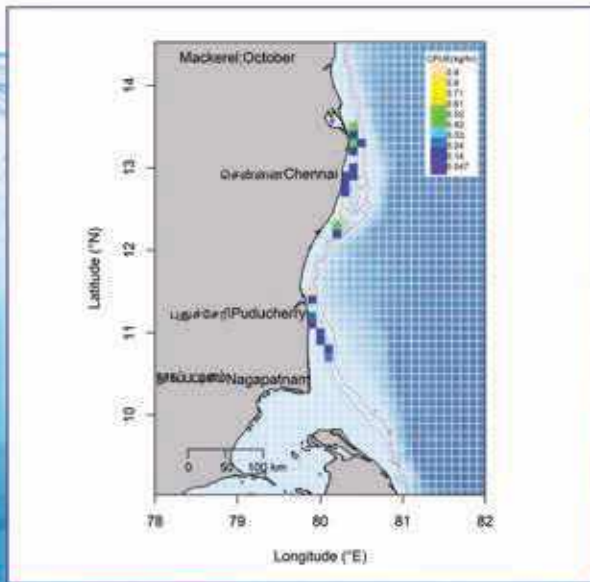
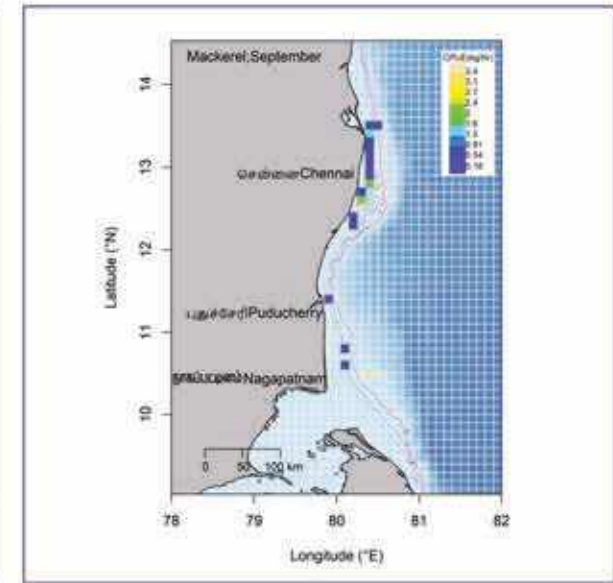
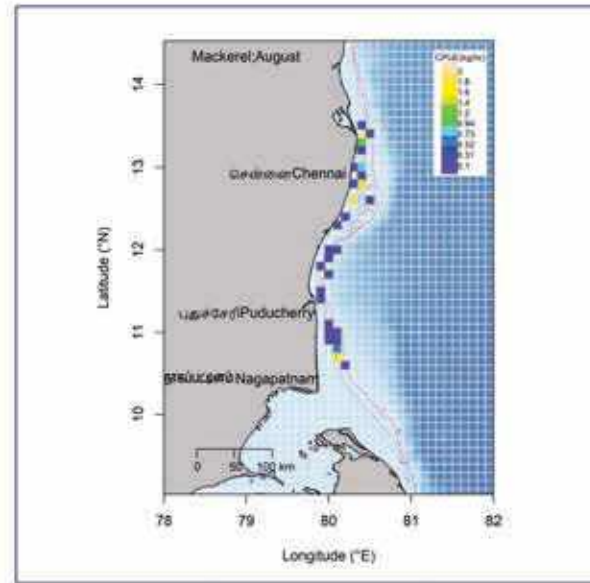
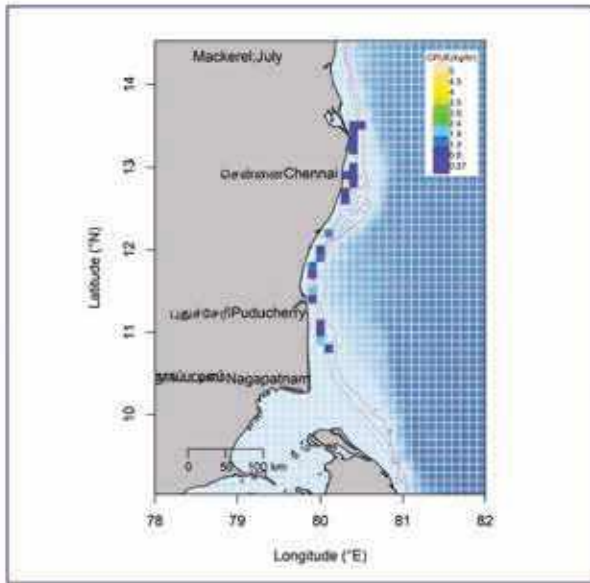




# Mackerel



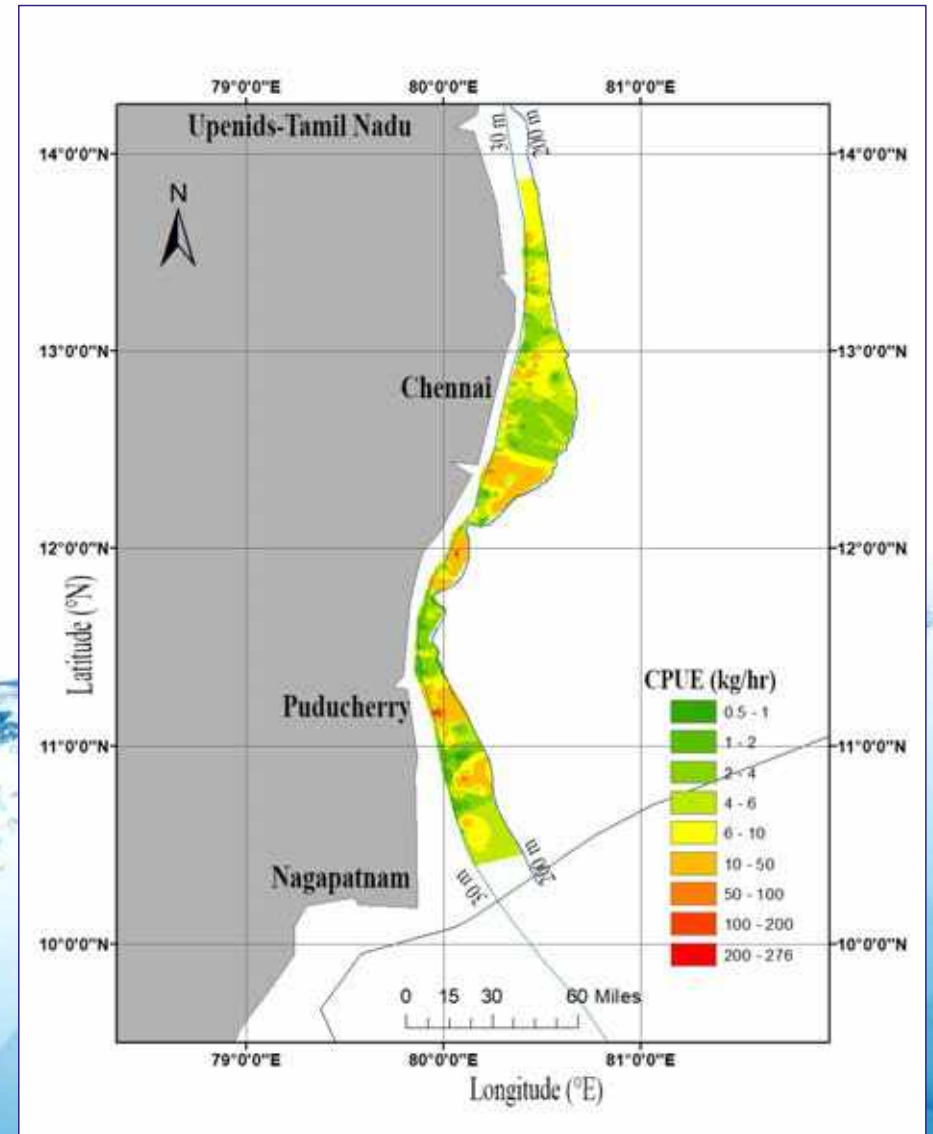


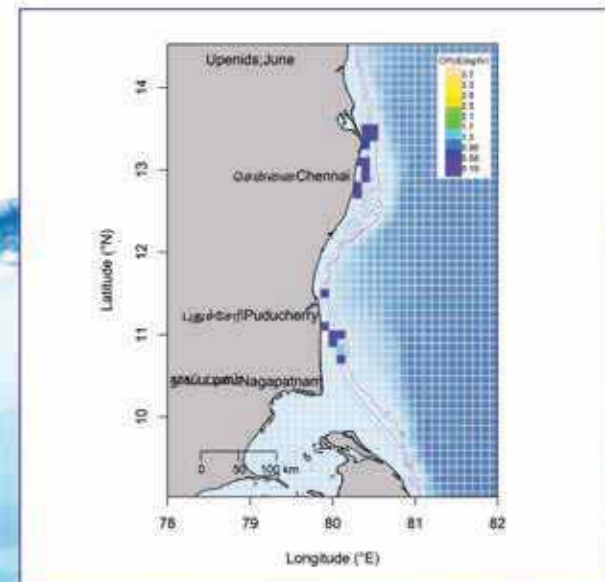
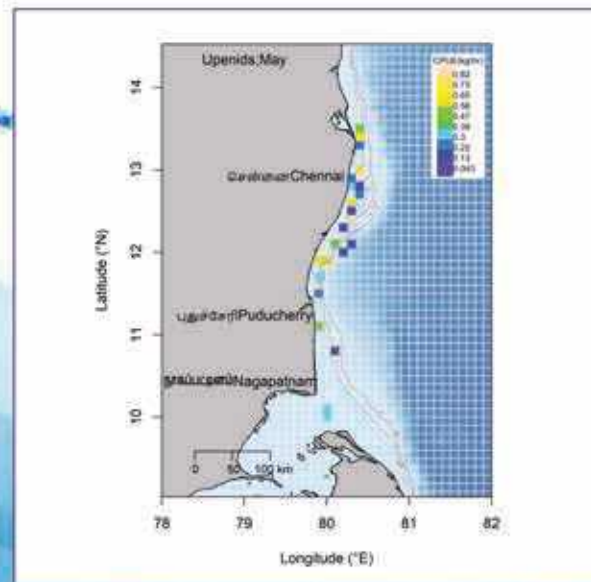
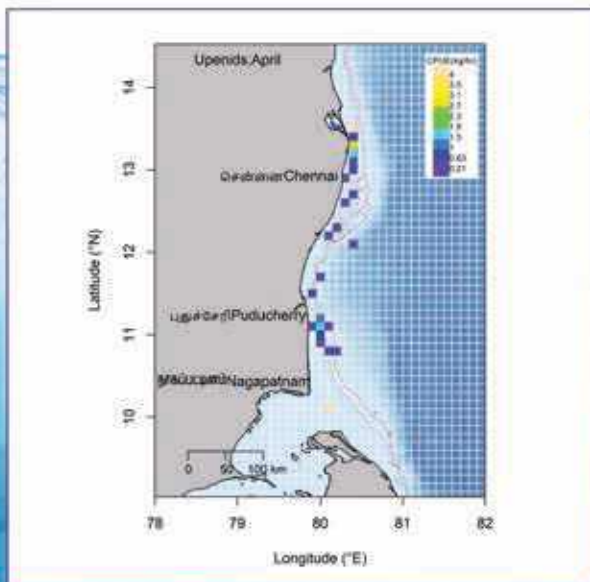
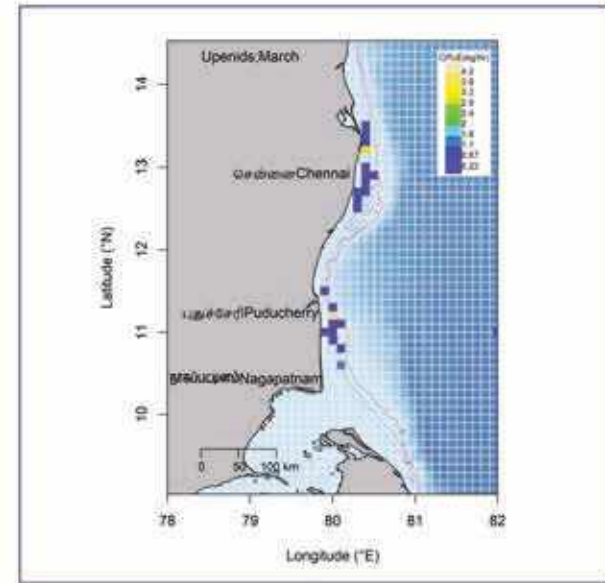
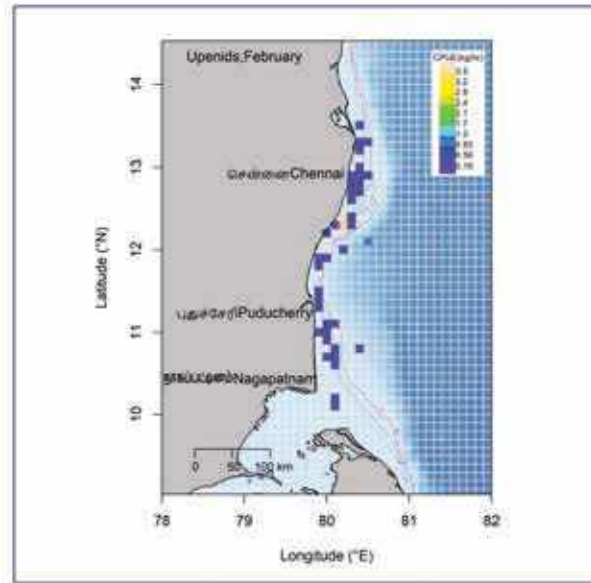
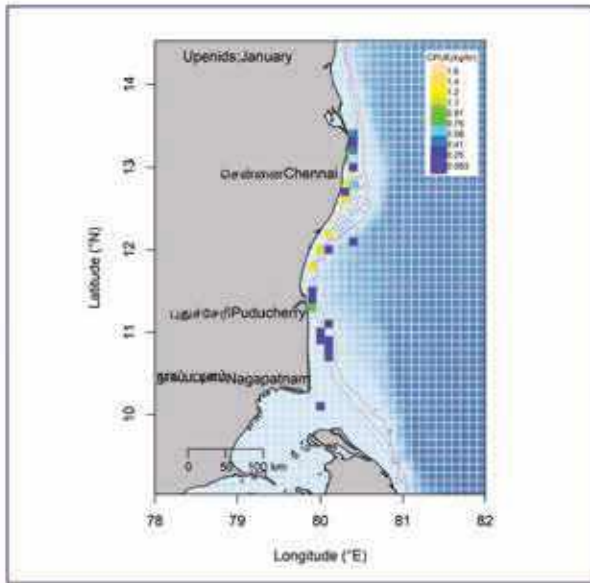


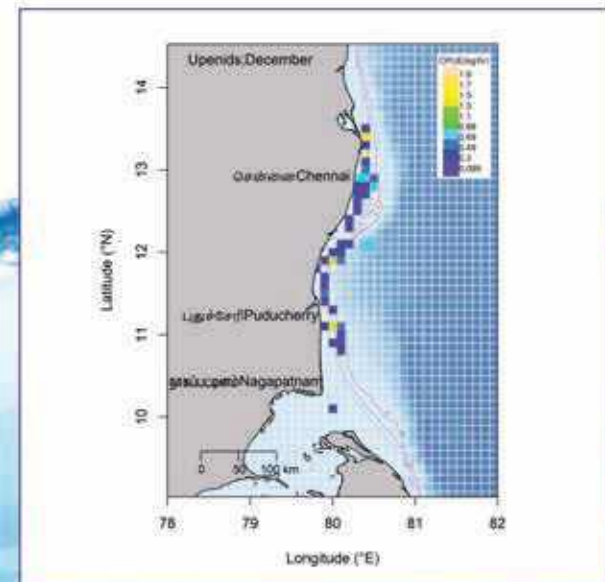
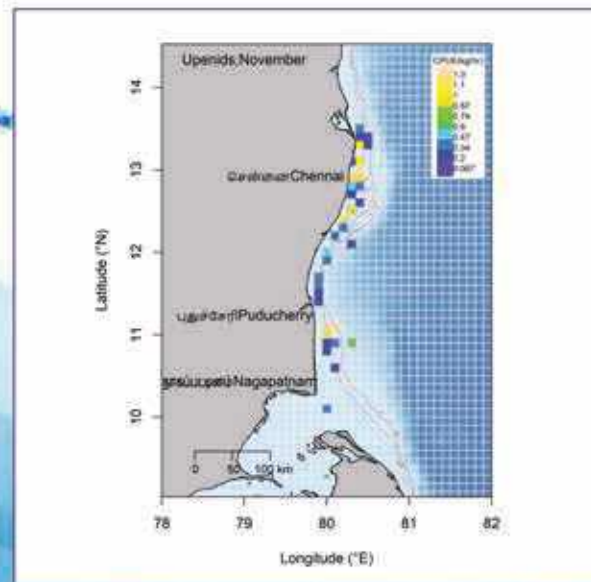
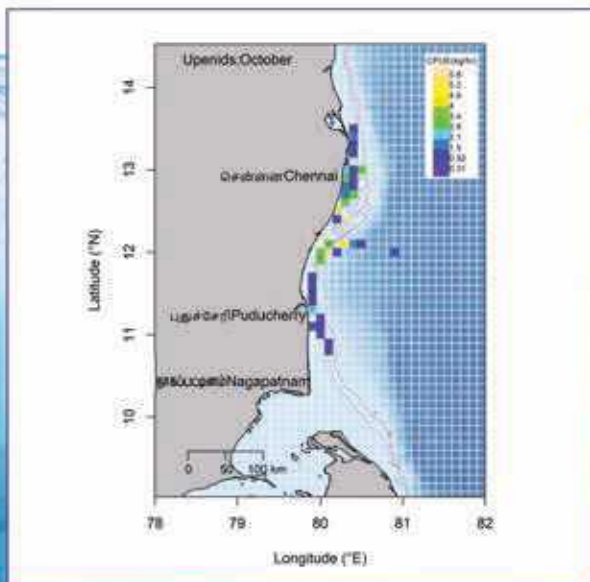
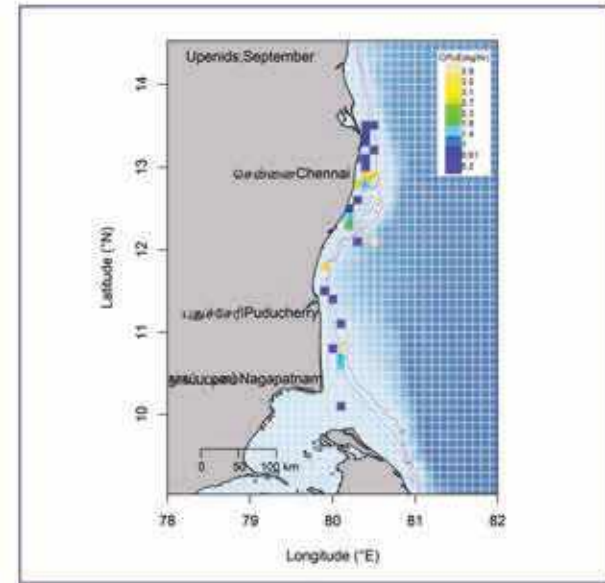
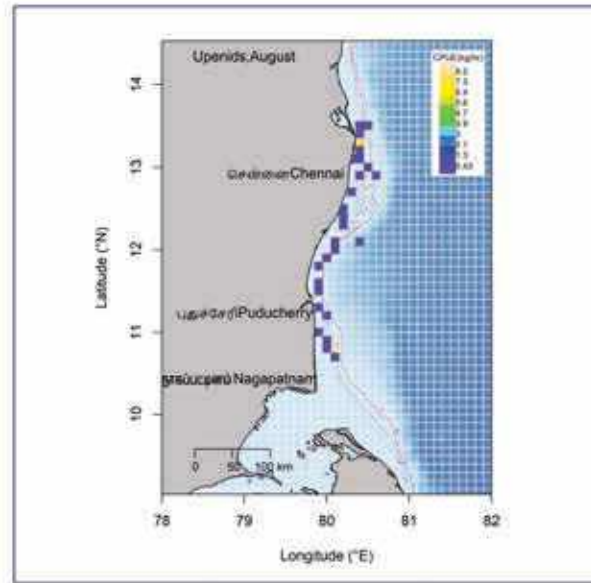
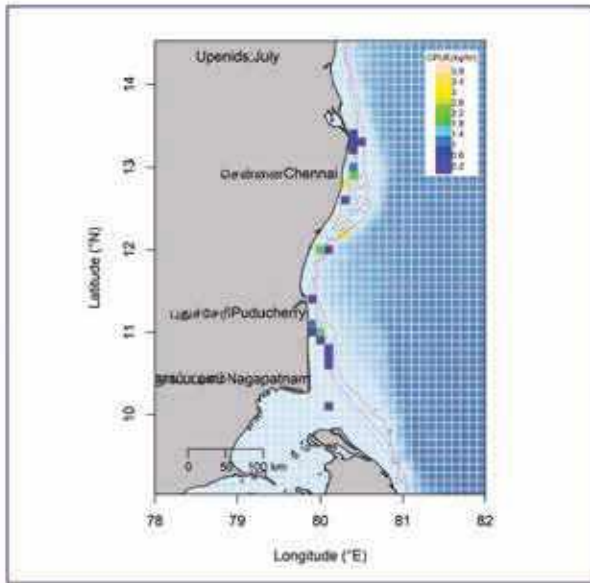




## Goatfish (Upenids)

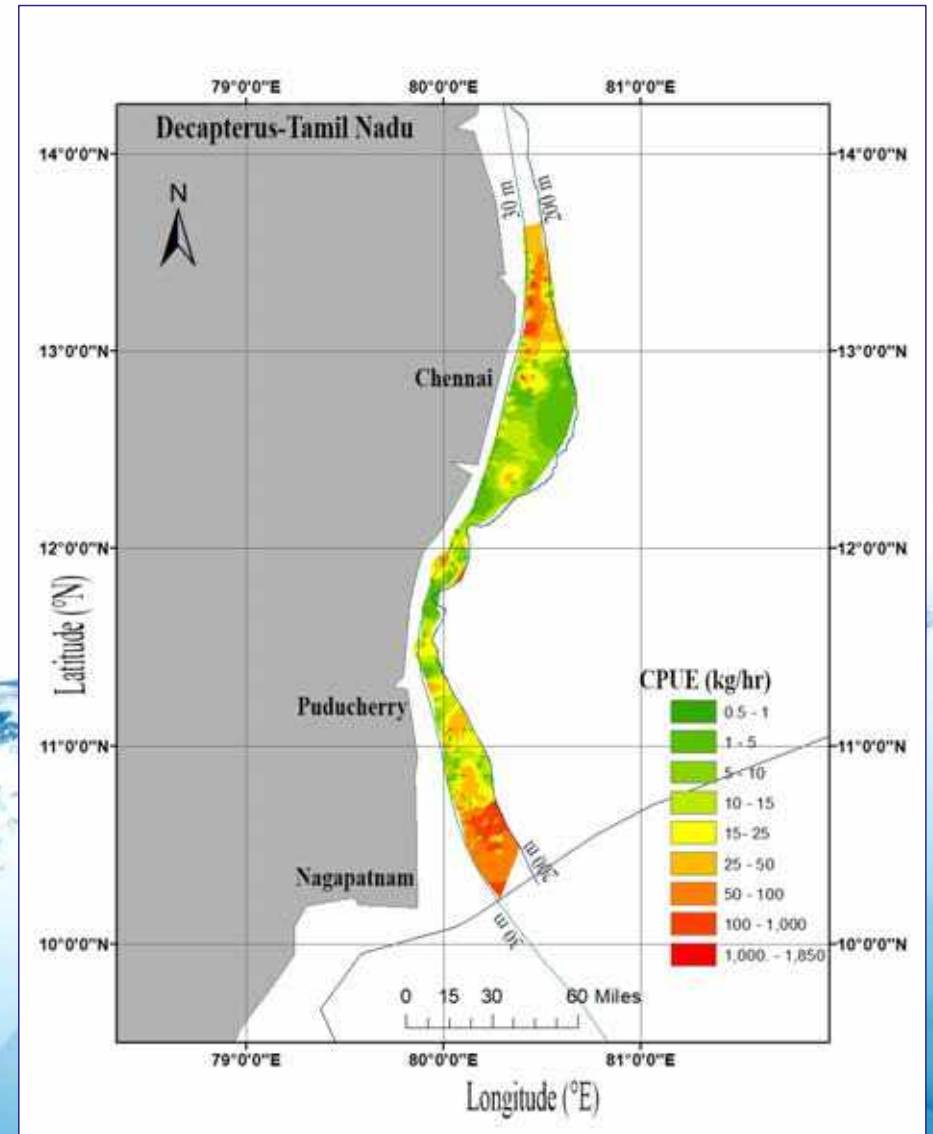


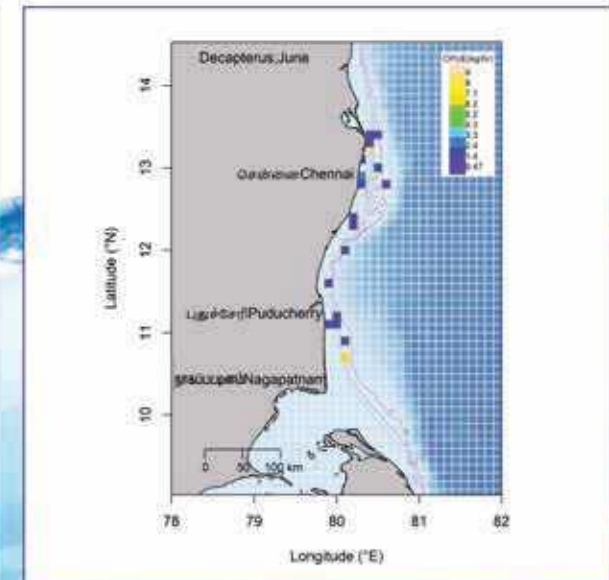
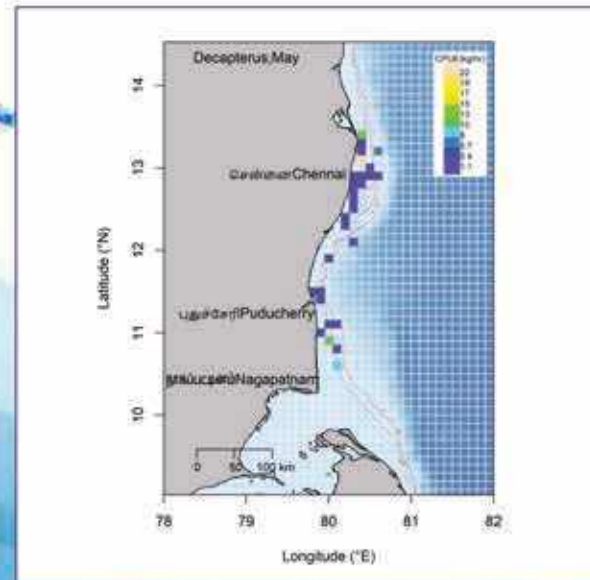
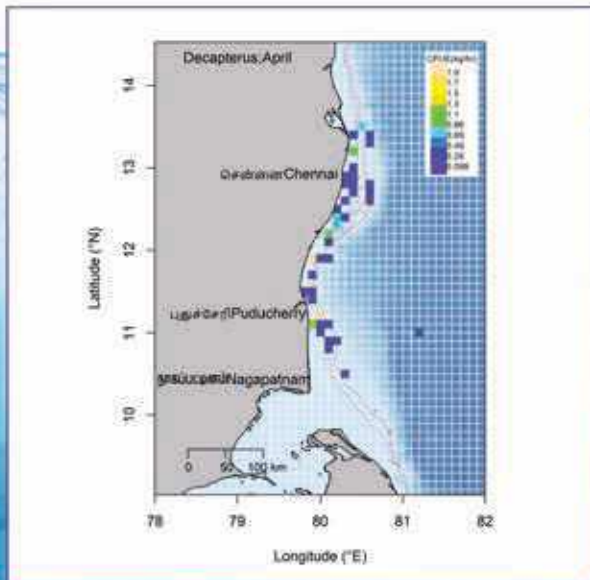
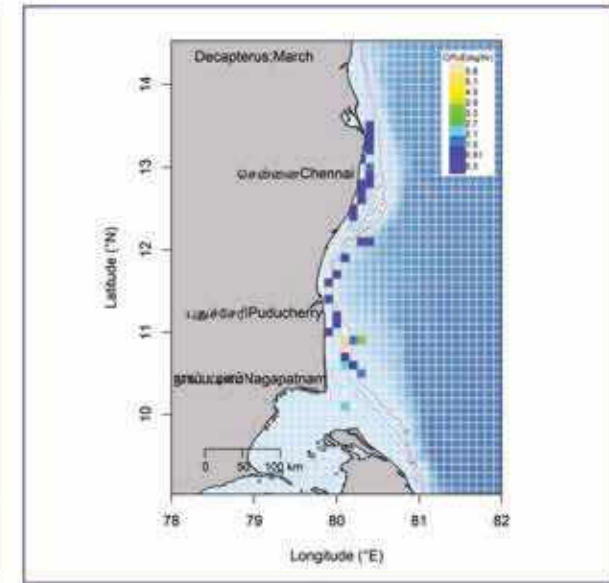
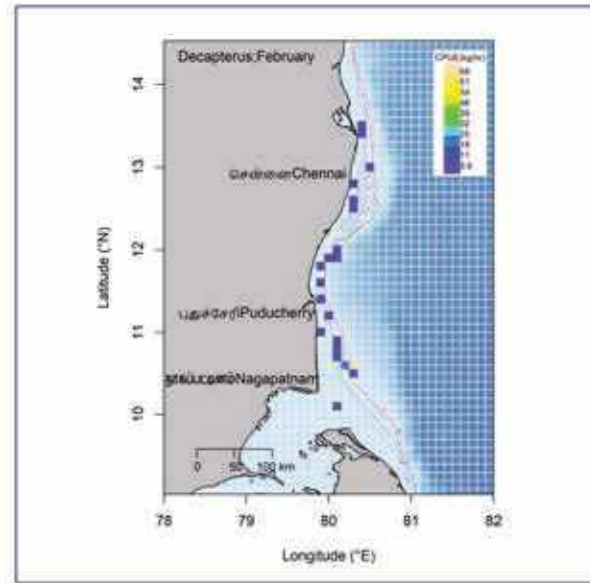
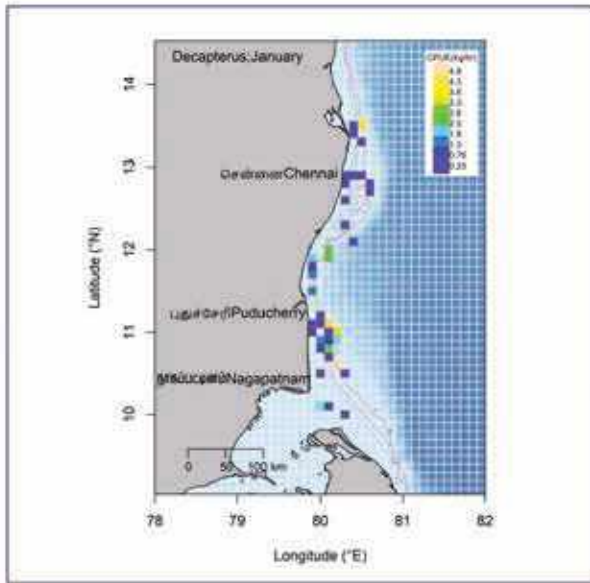


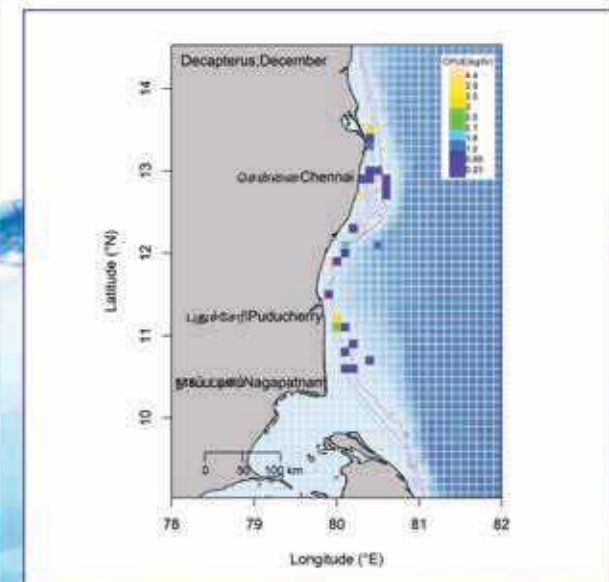
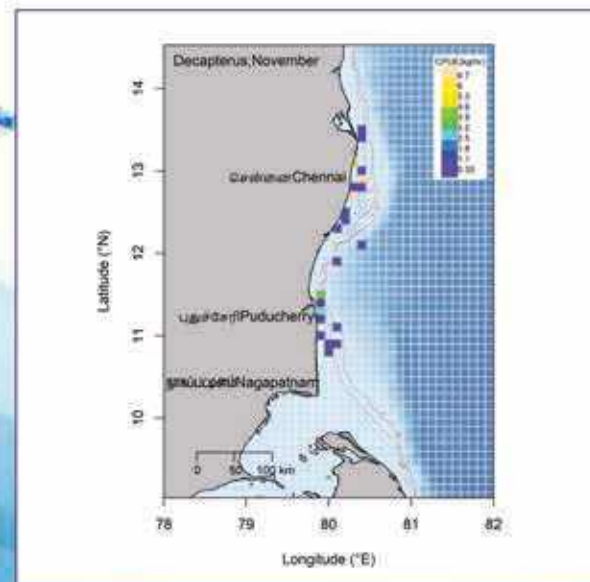
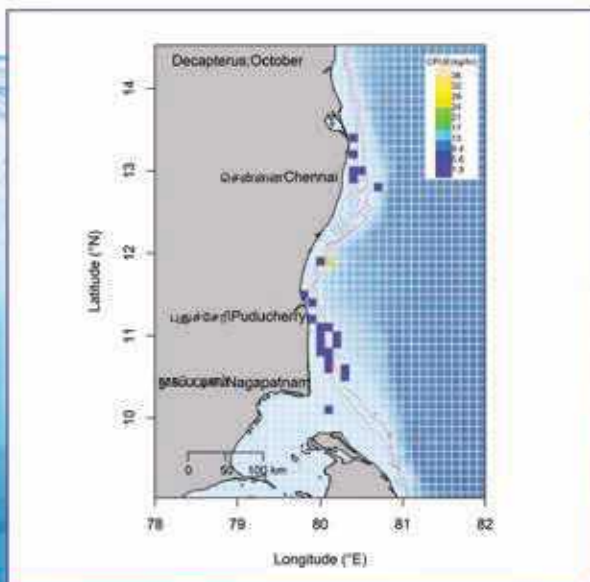
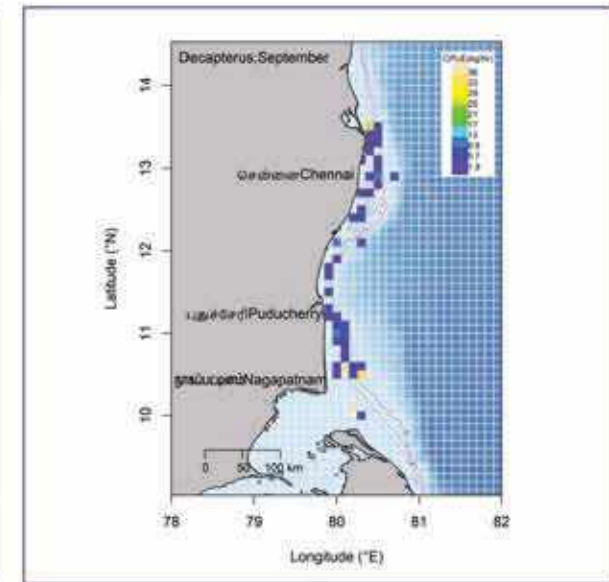
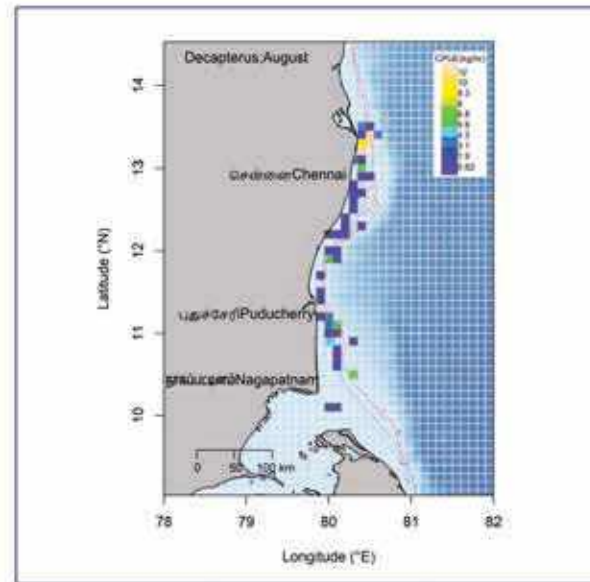
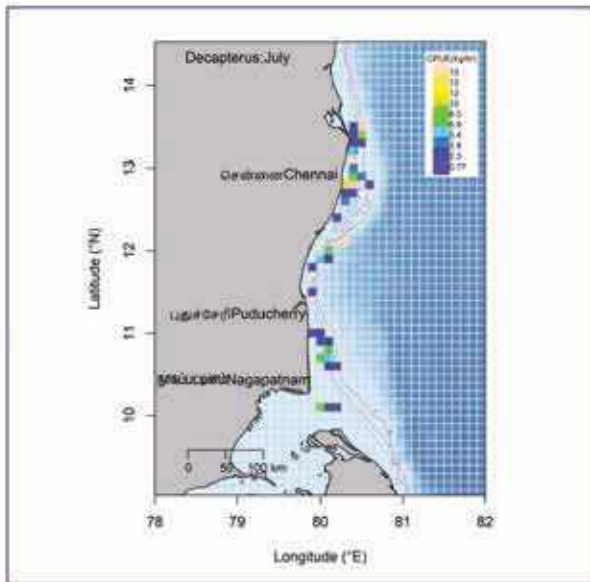




## Round Scads (Decapterus)

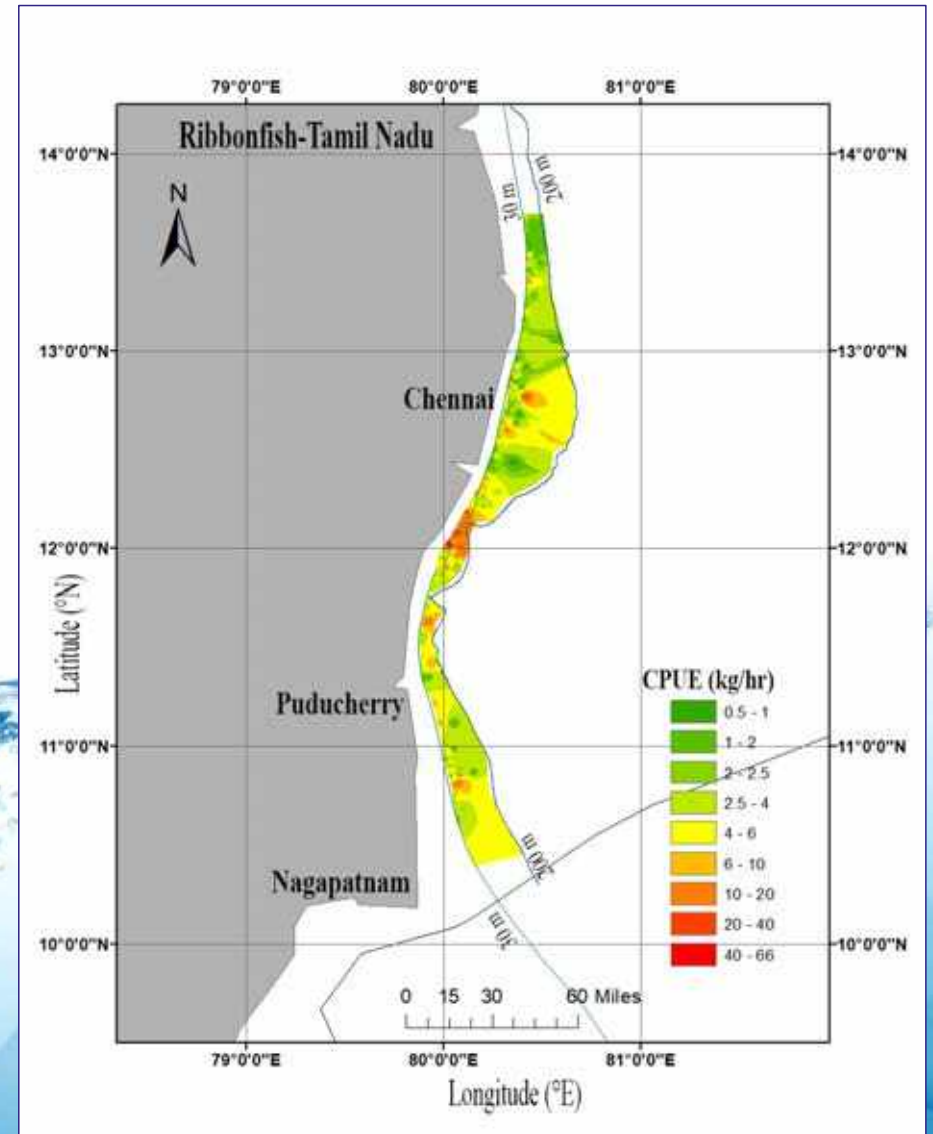


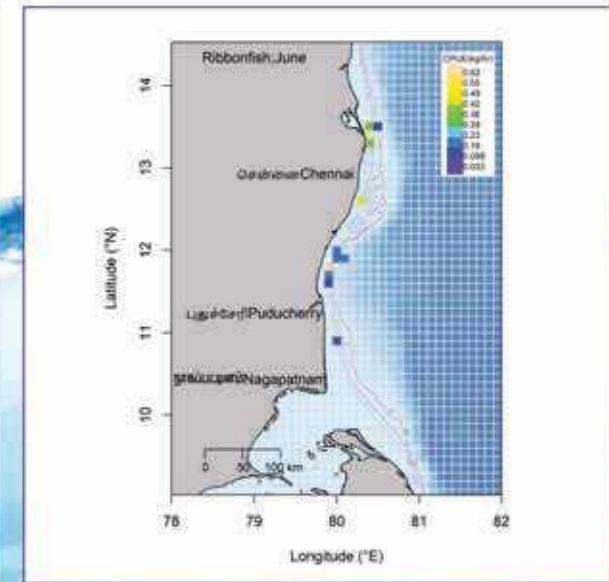
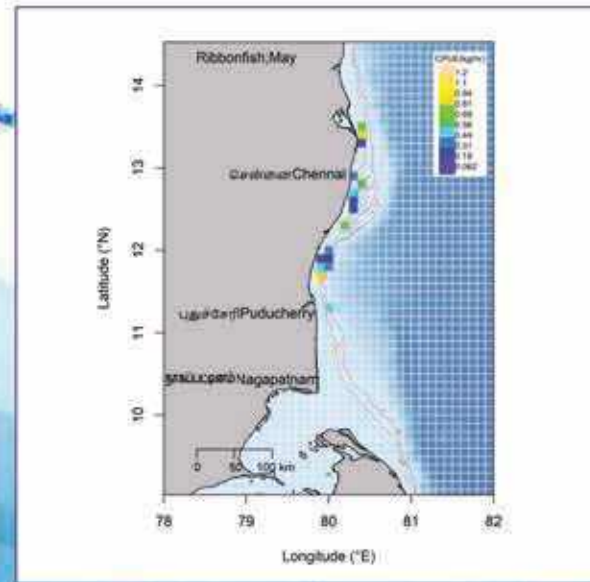
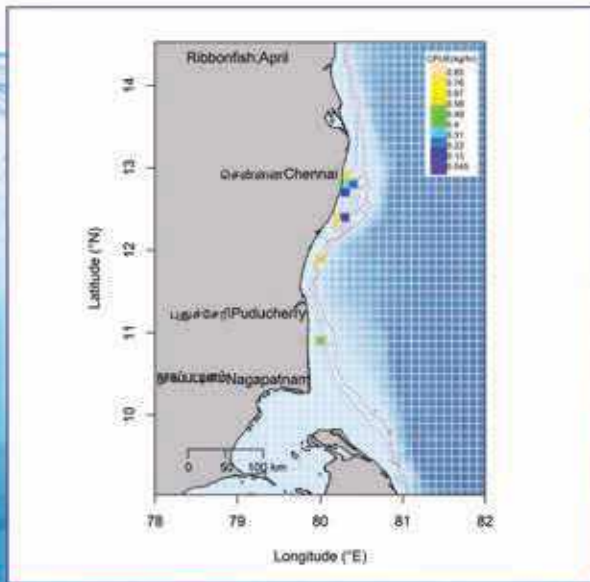
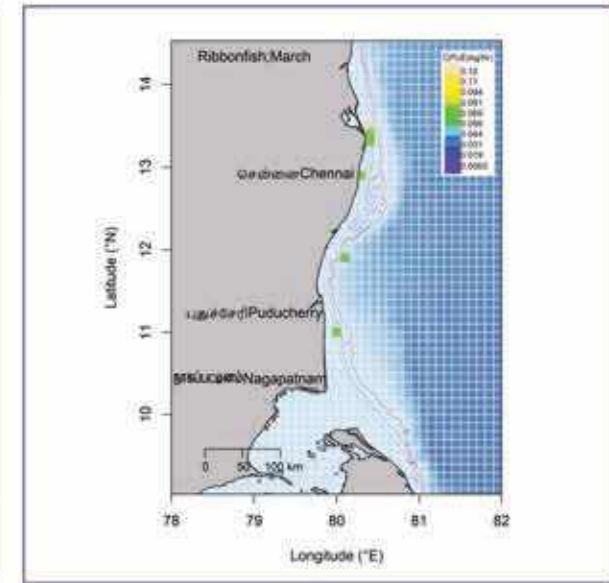
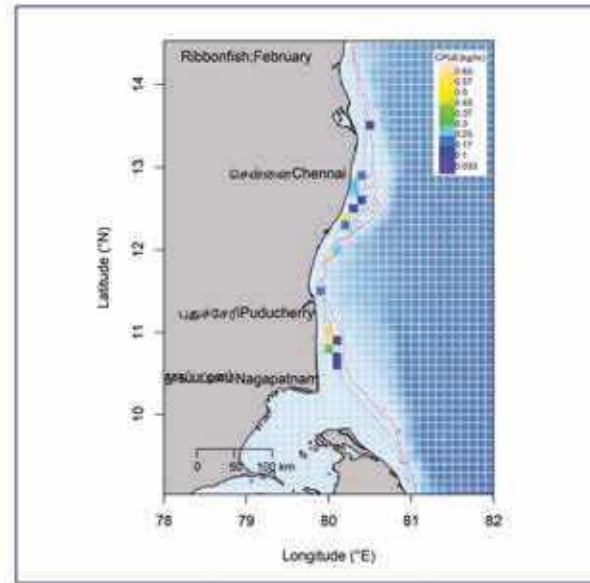
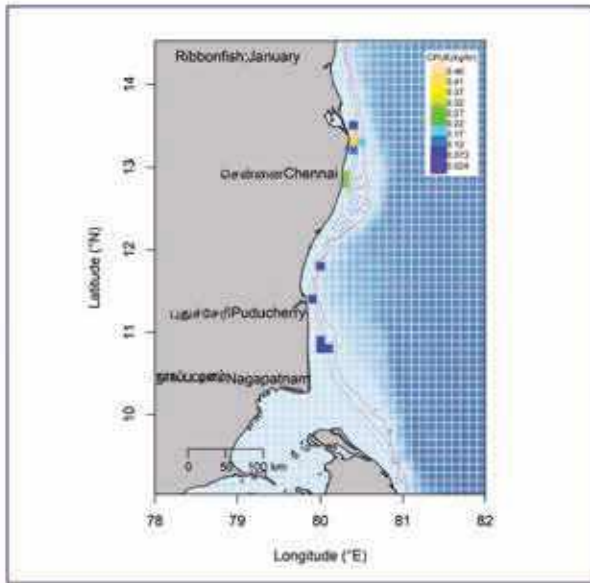




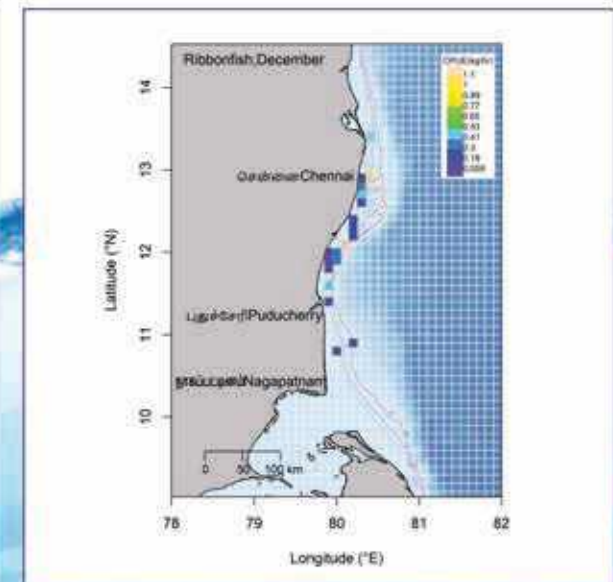
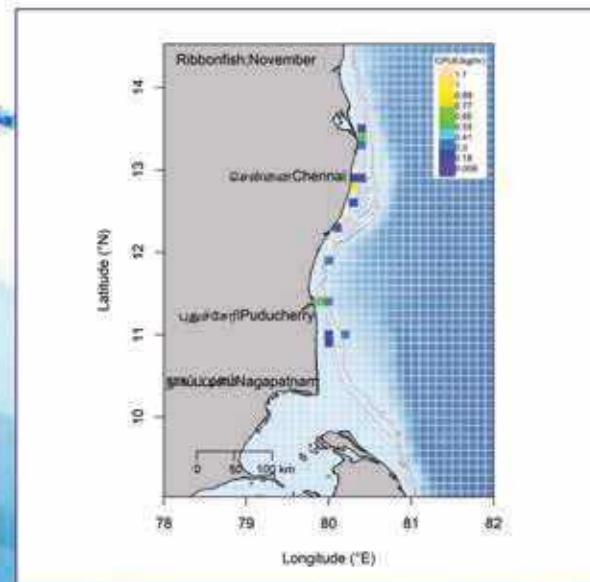
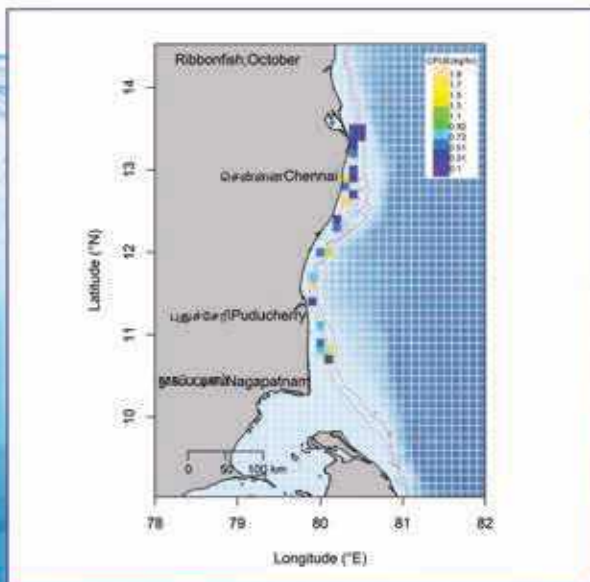
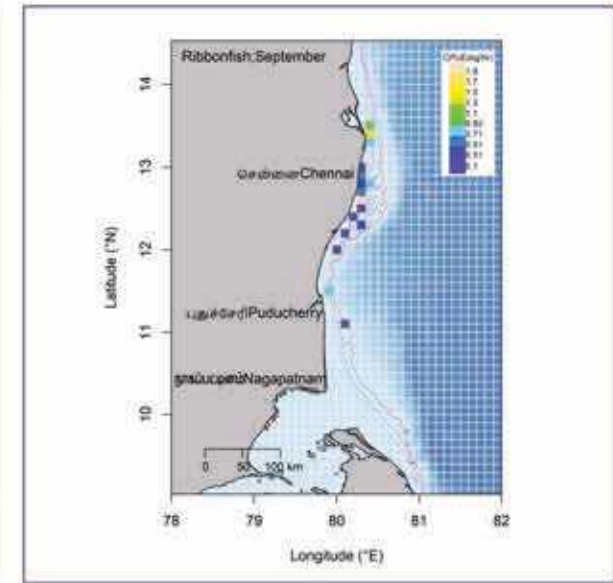
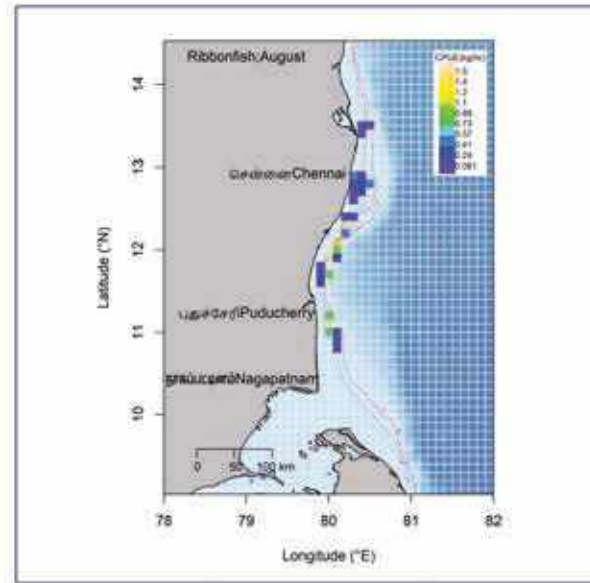
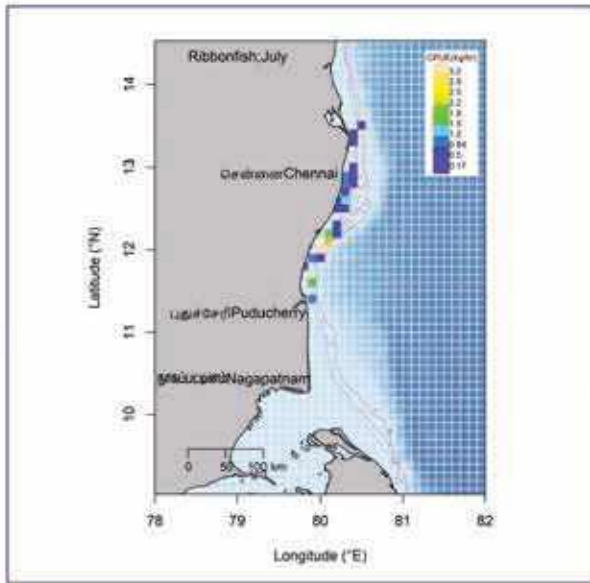


**Ribbonfish**



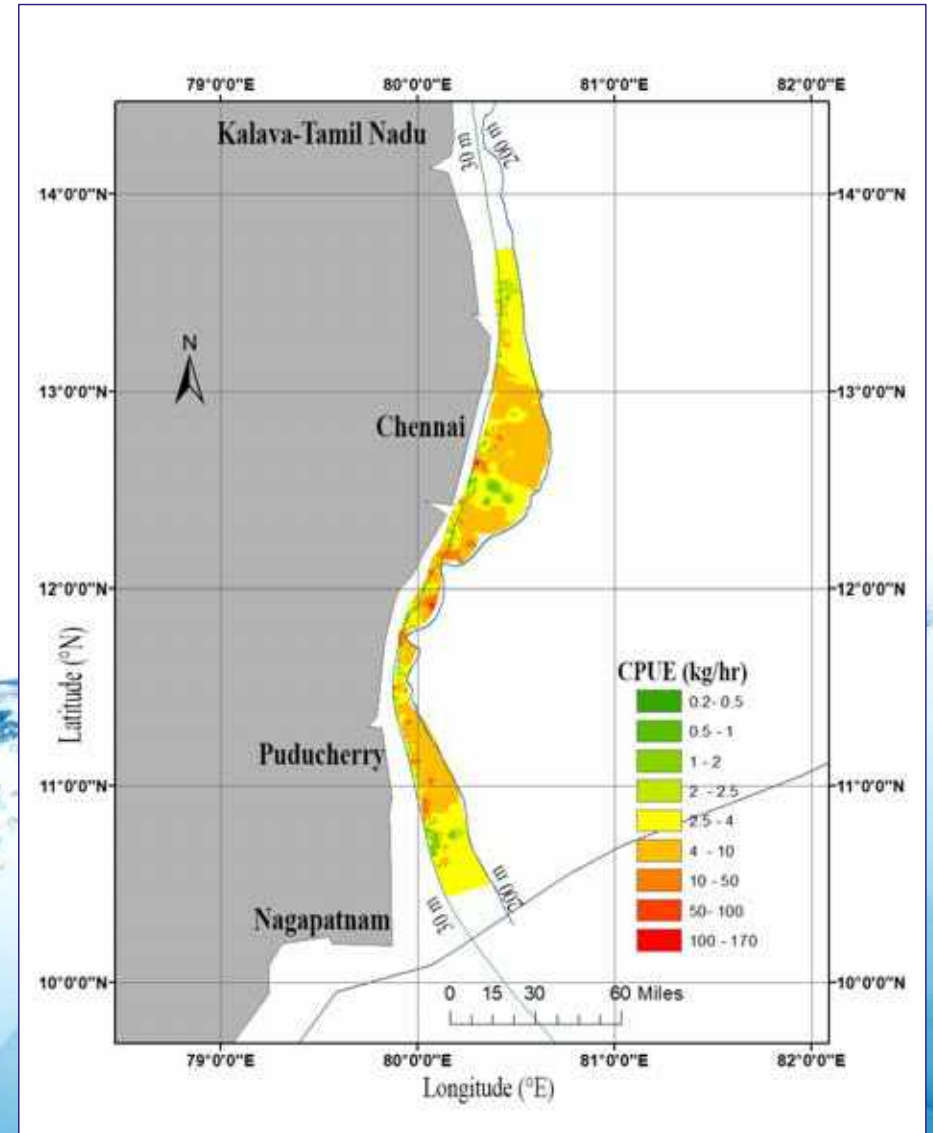


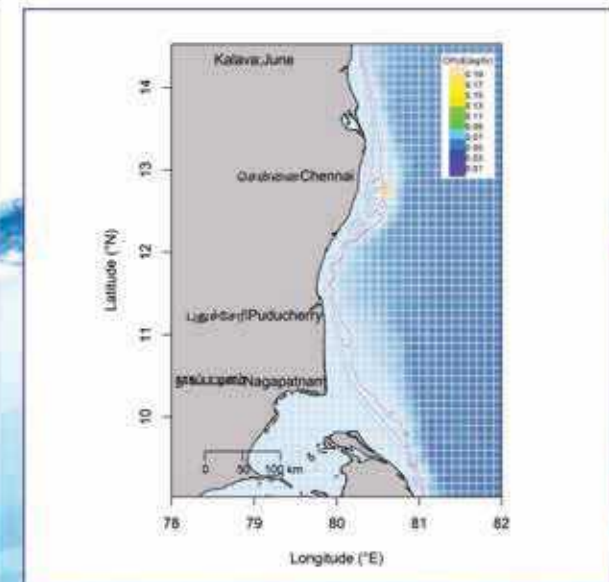
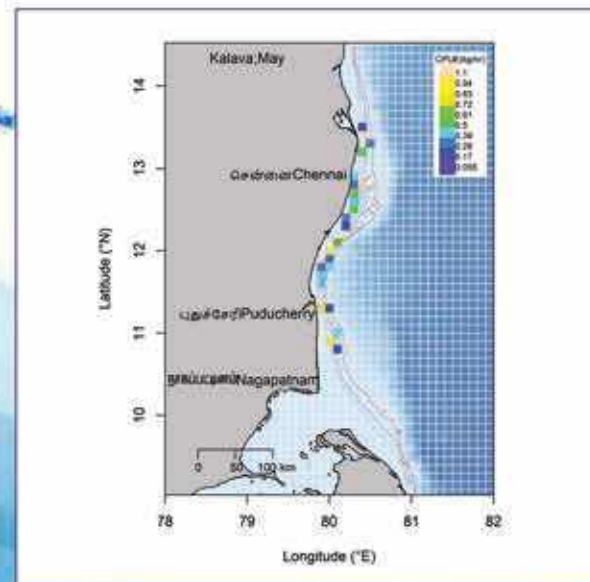
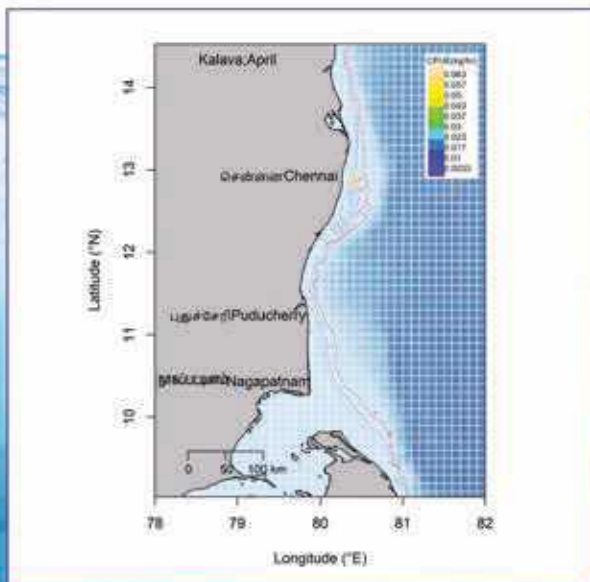
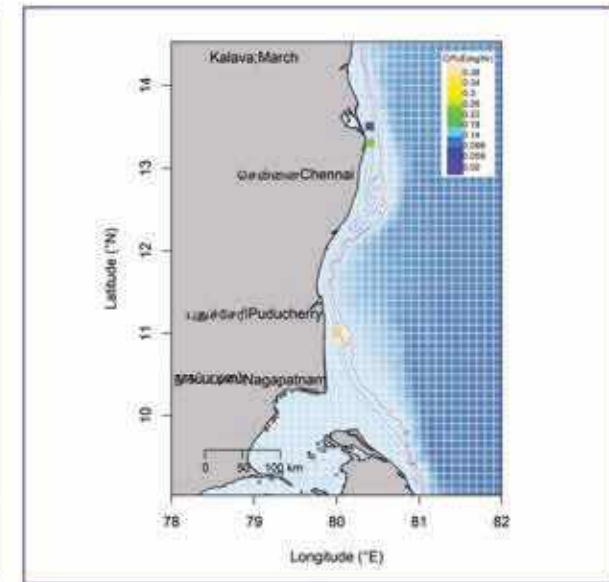
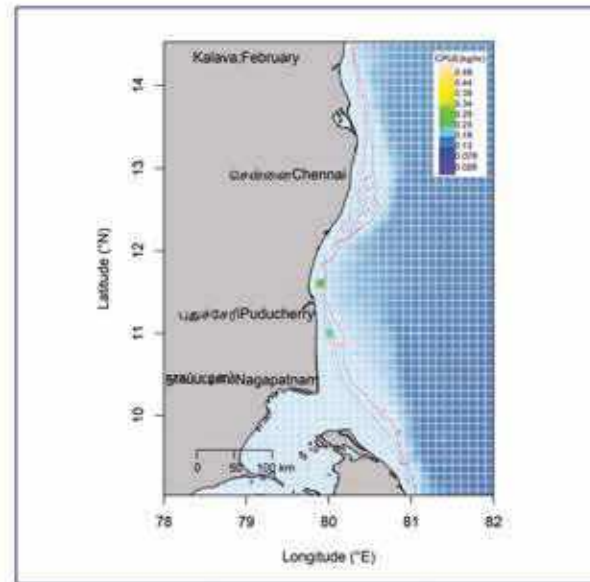
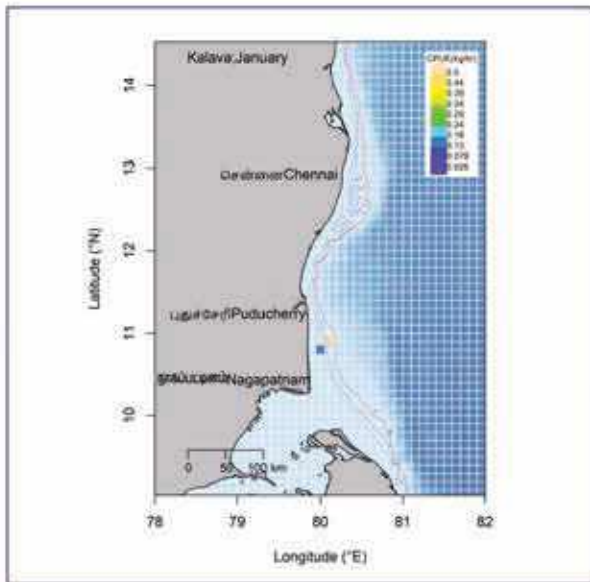


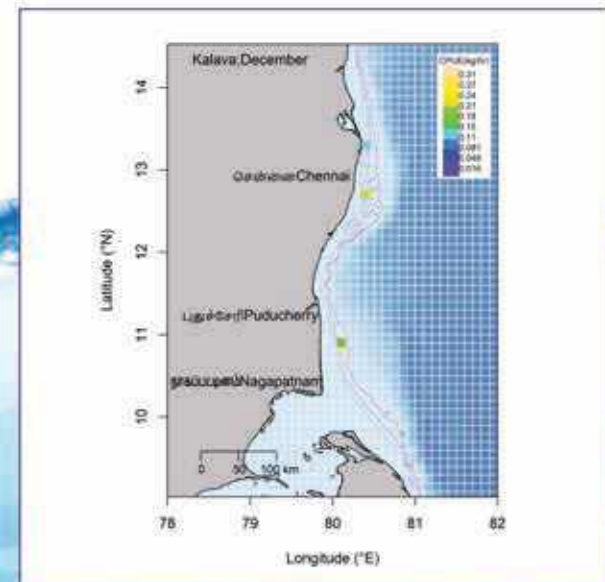
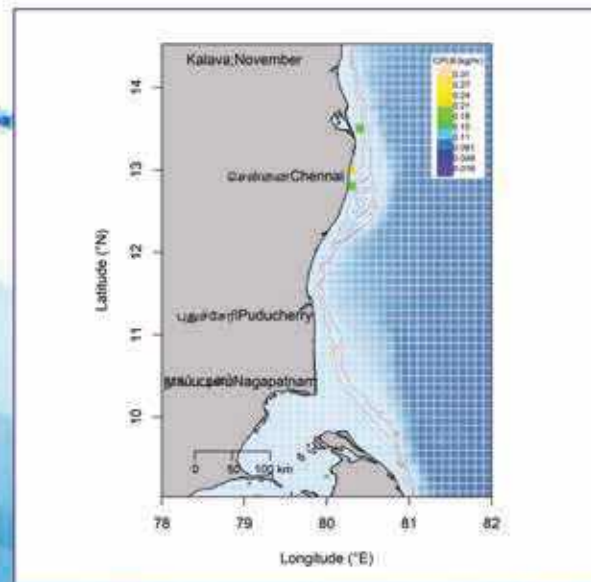
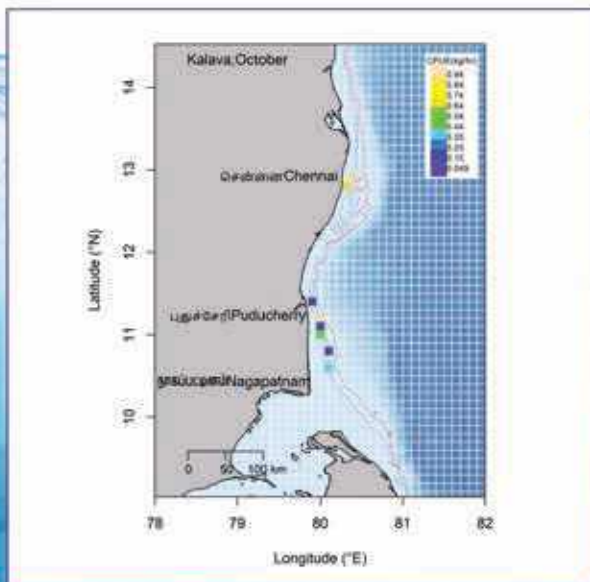
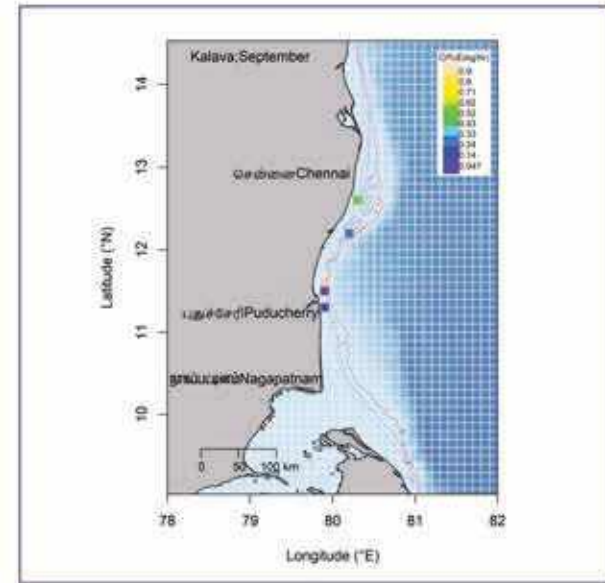
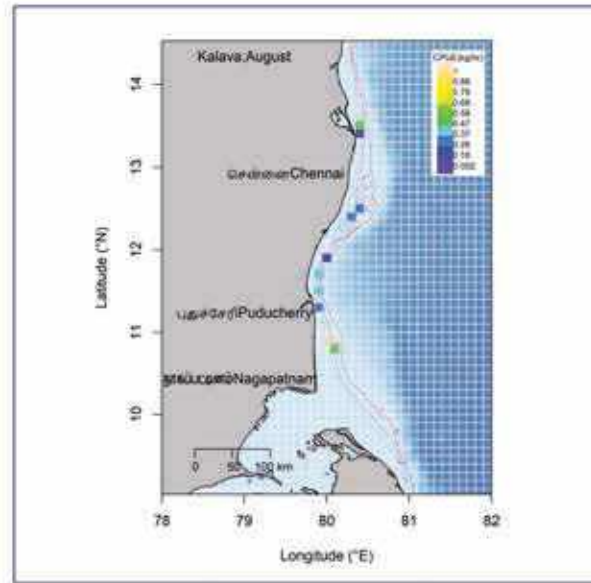
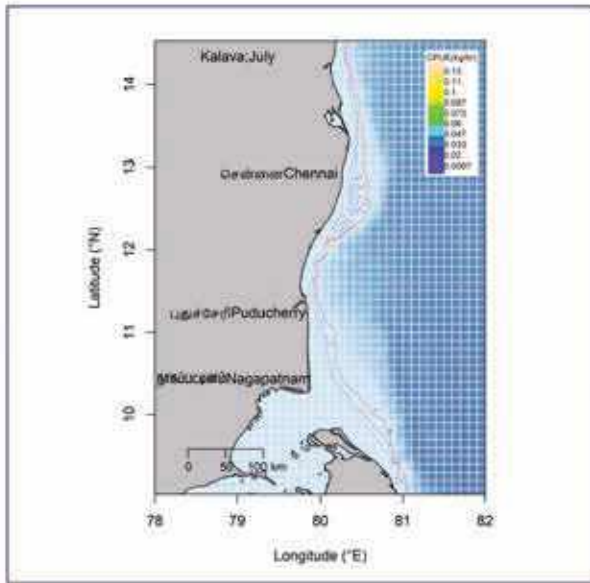




## Groupers (Kalava)

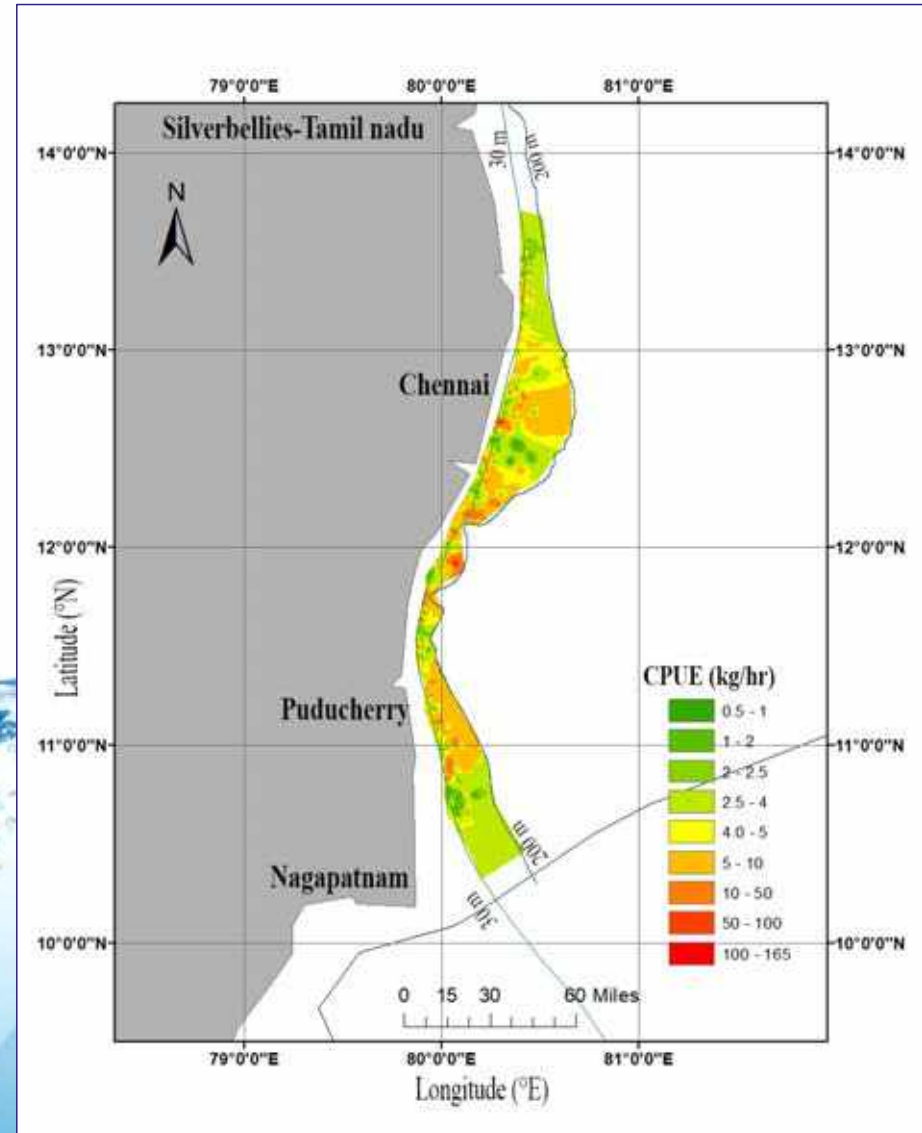


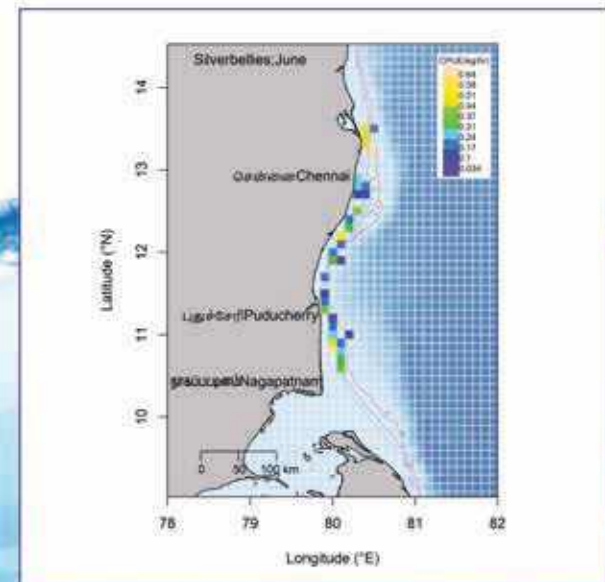
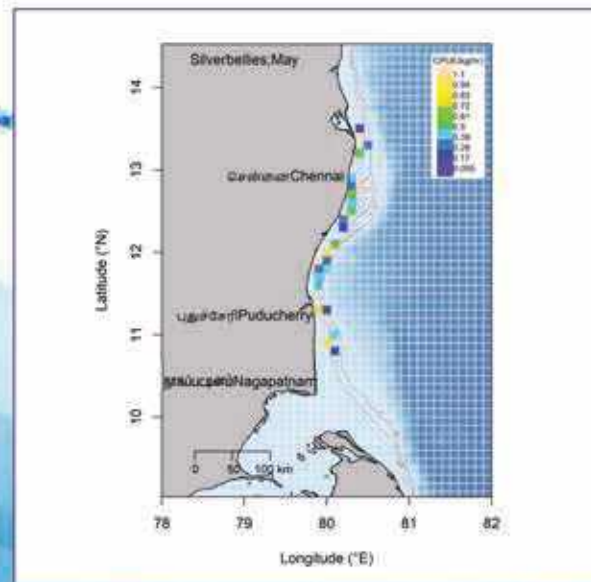
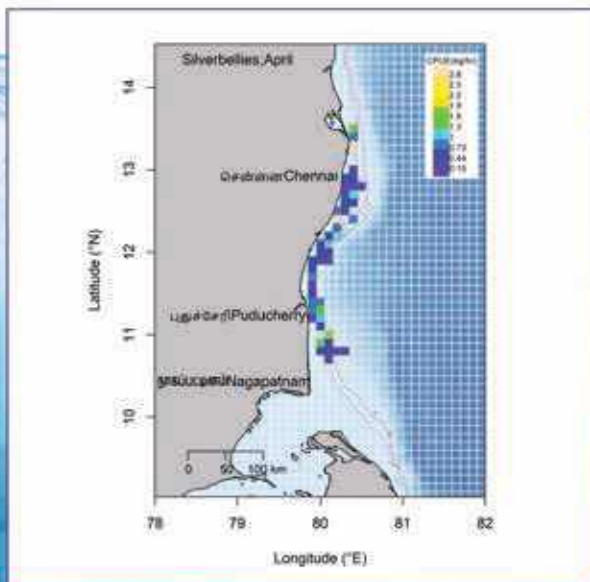
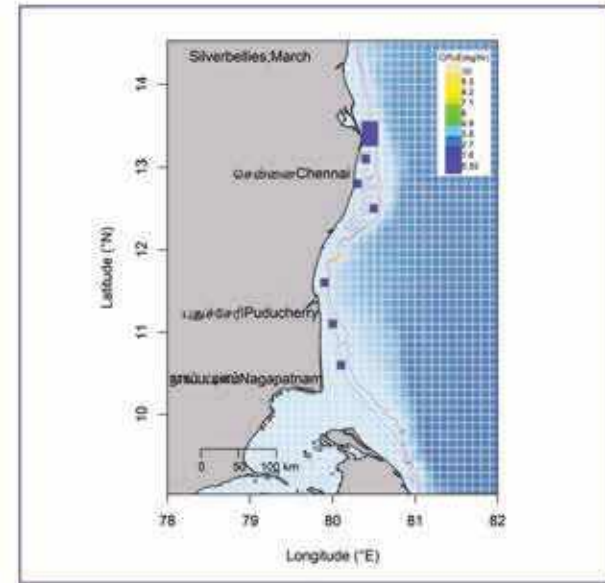
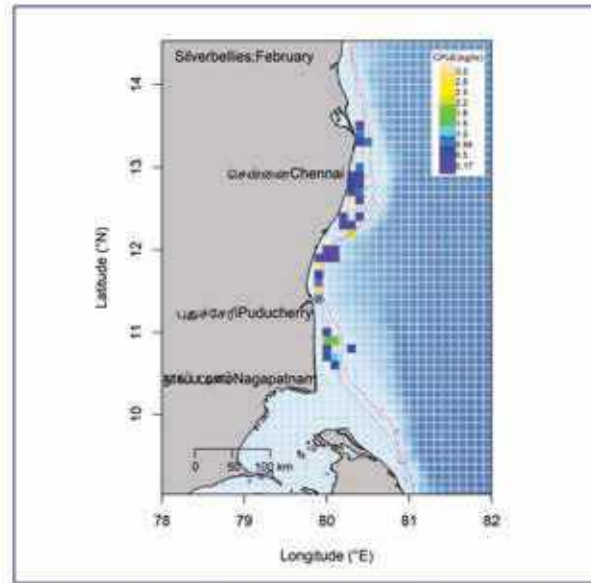
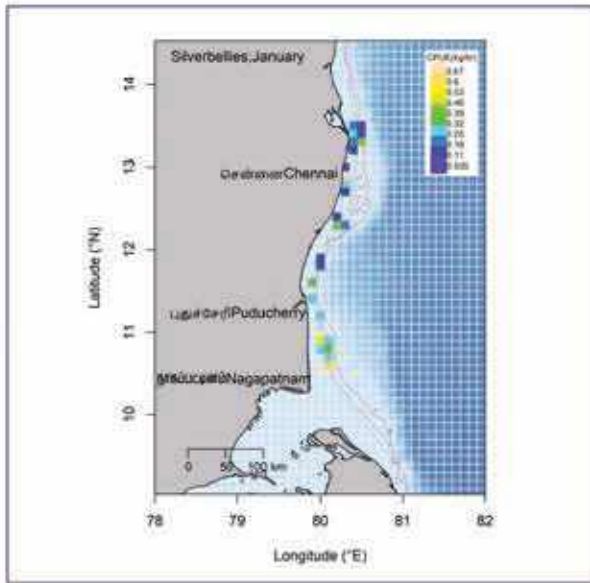


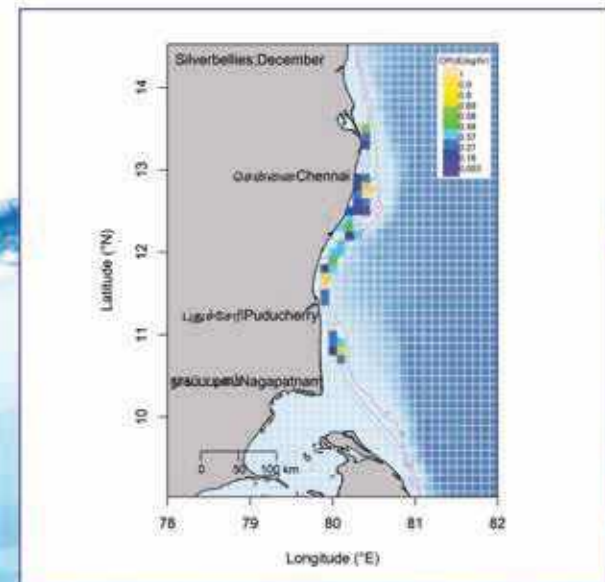
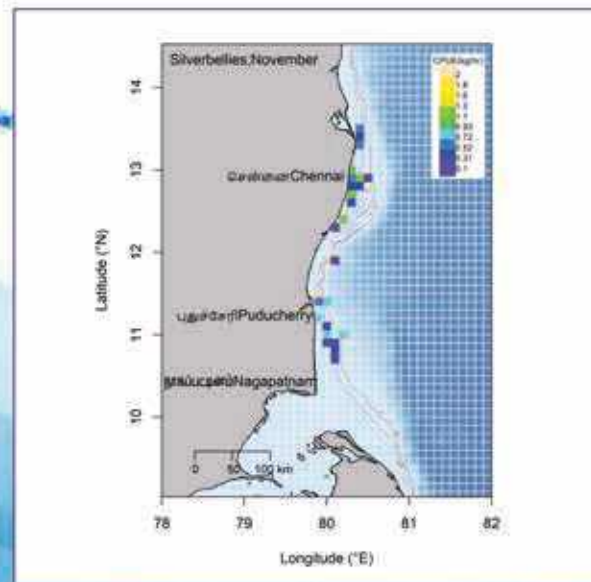
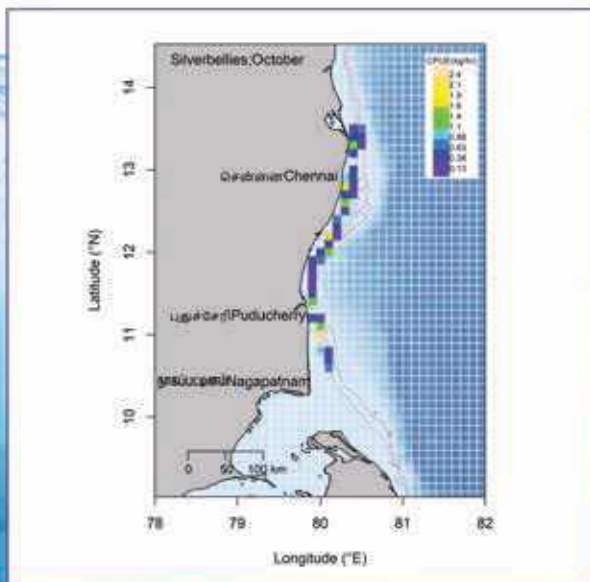
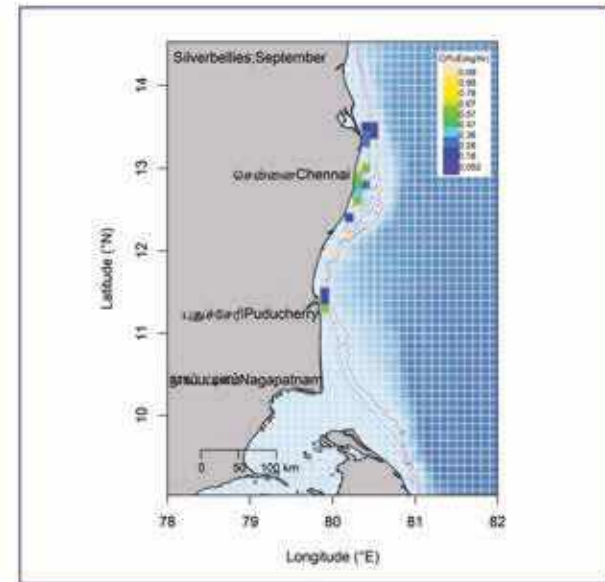
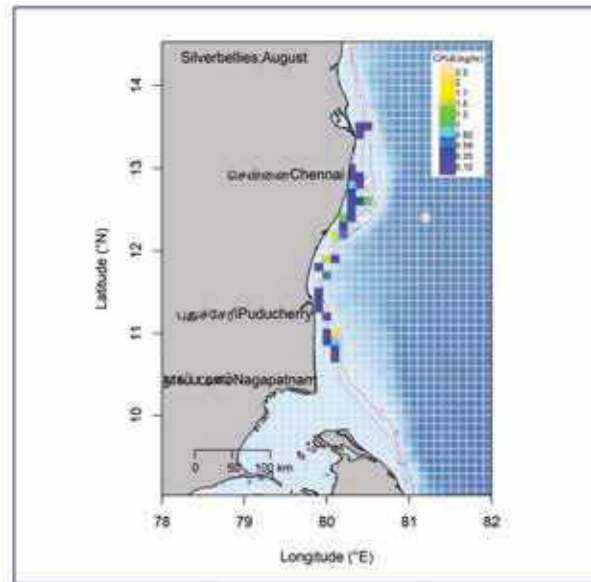
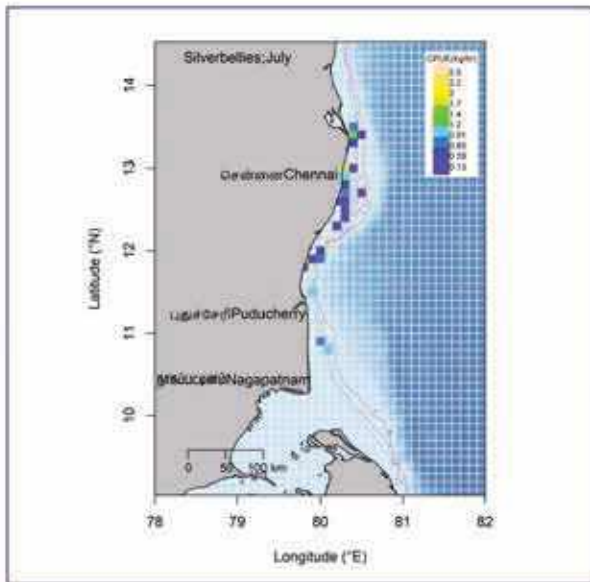


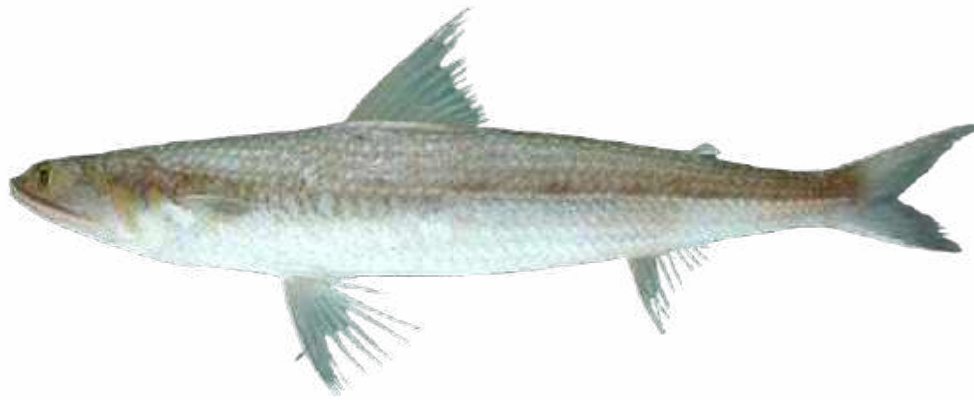


# Silverbellies

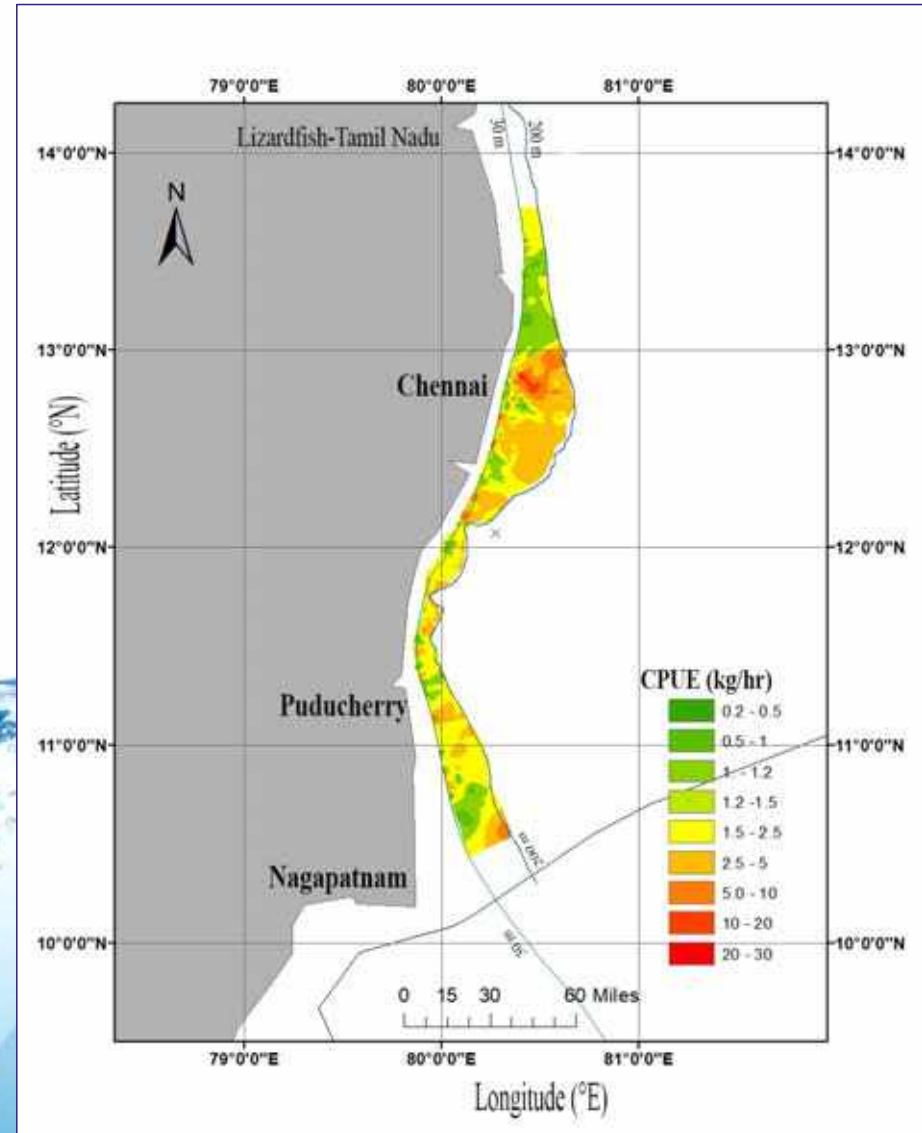




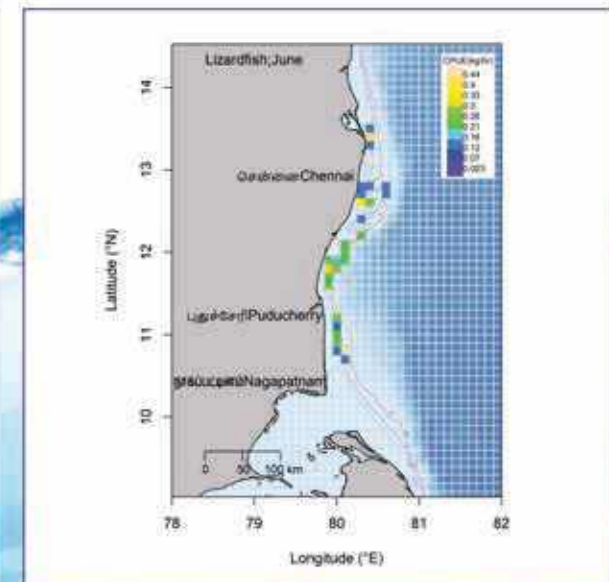
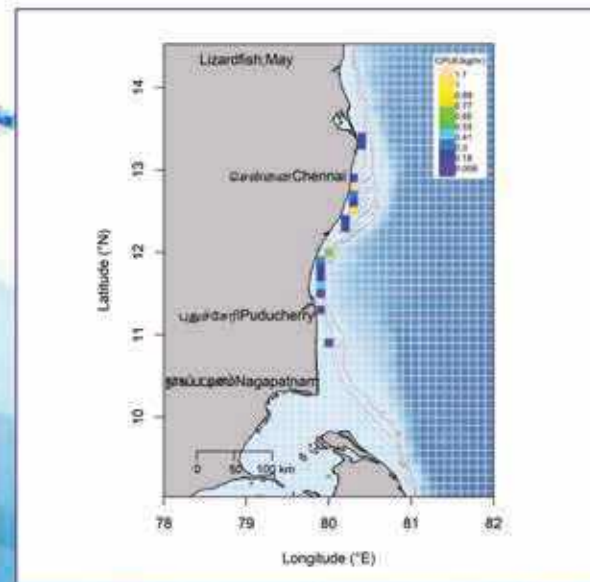
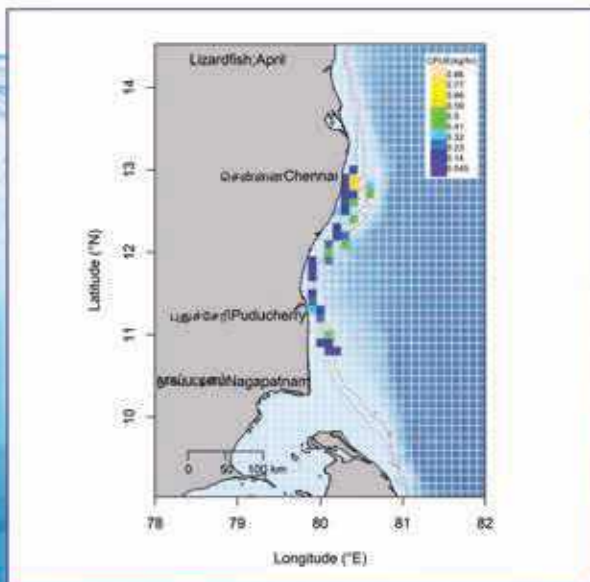
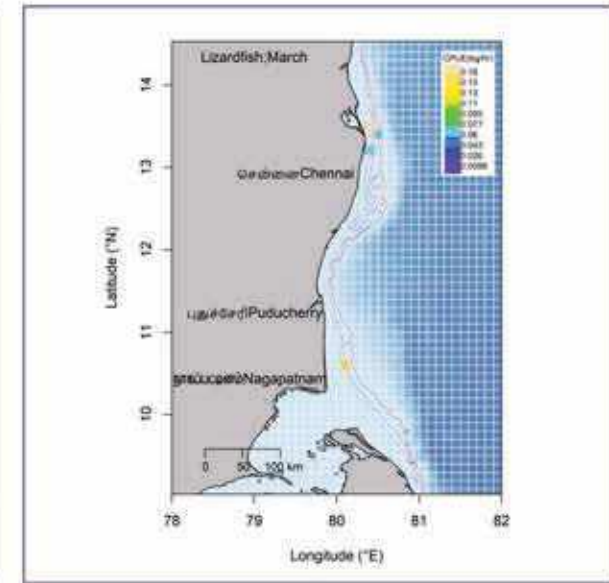
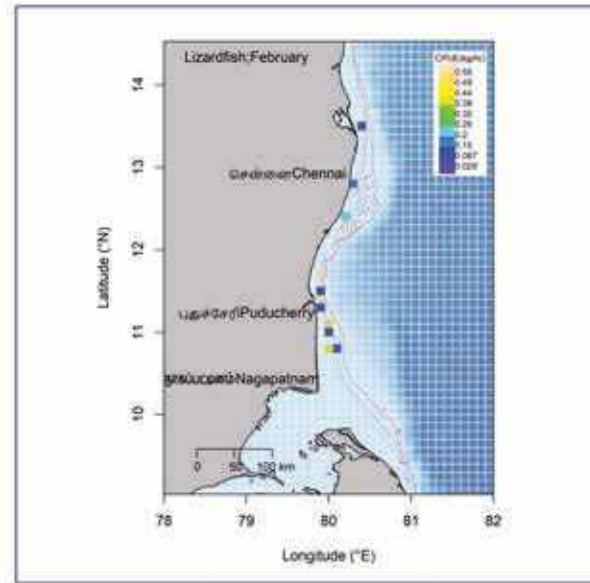
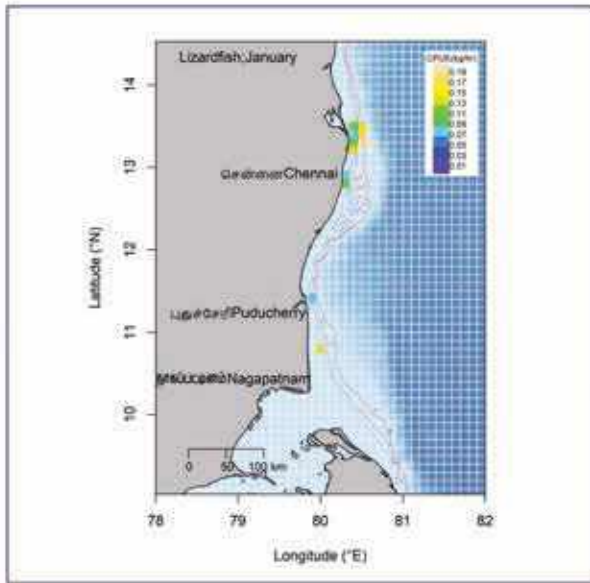


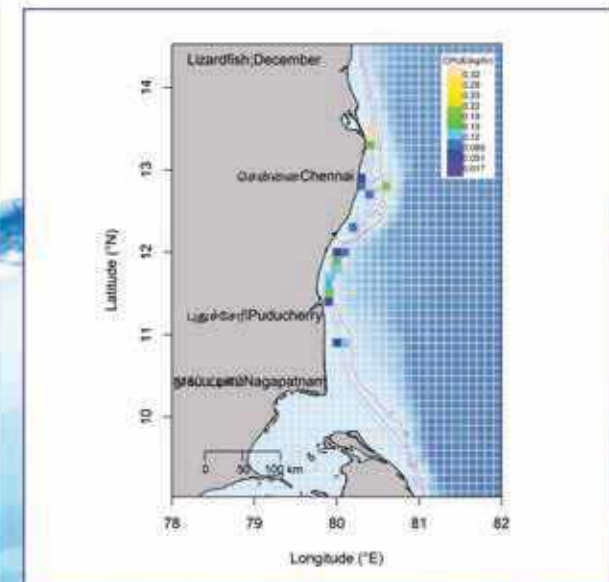
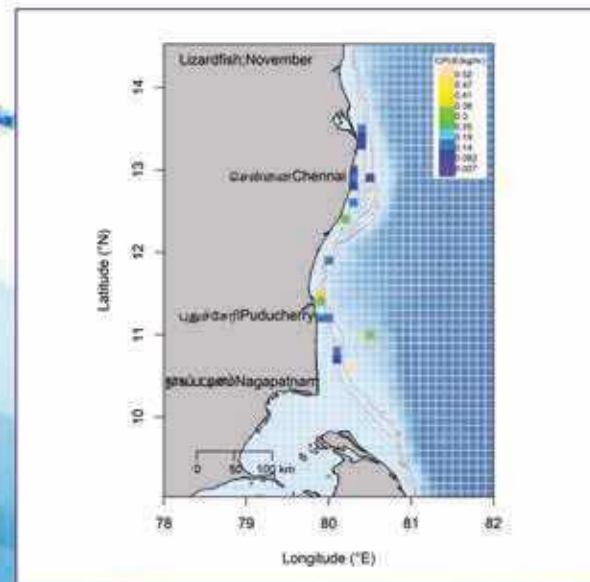
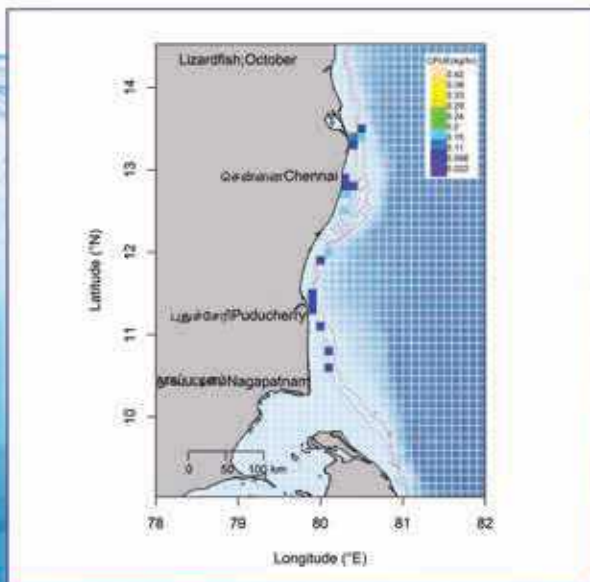
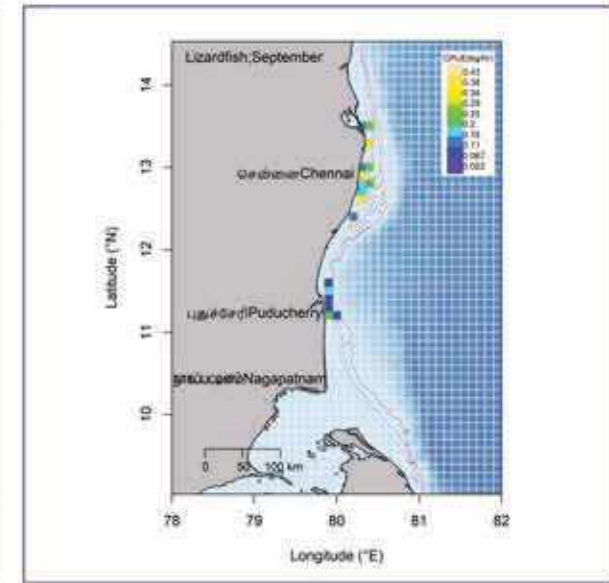
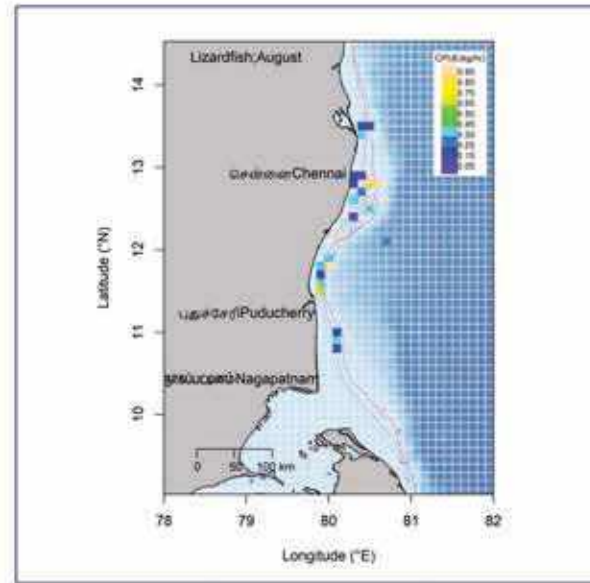
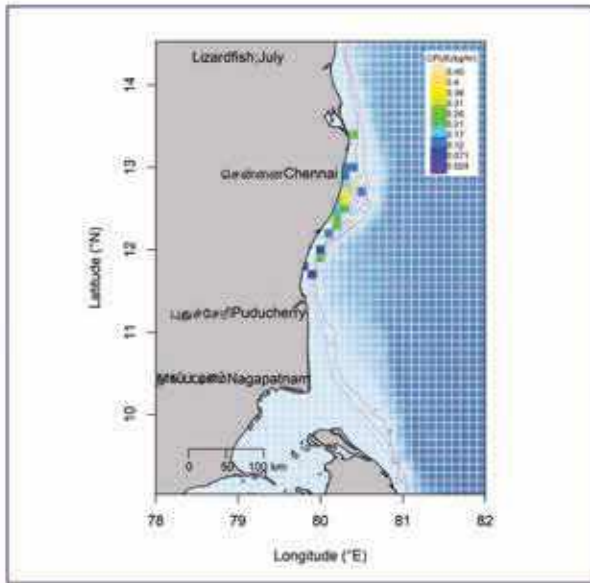


**Lizard Fish**



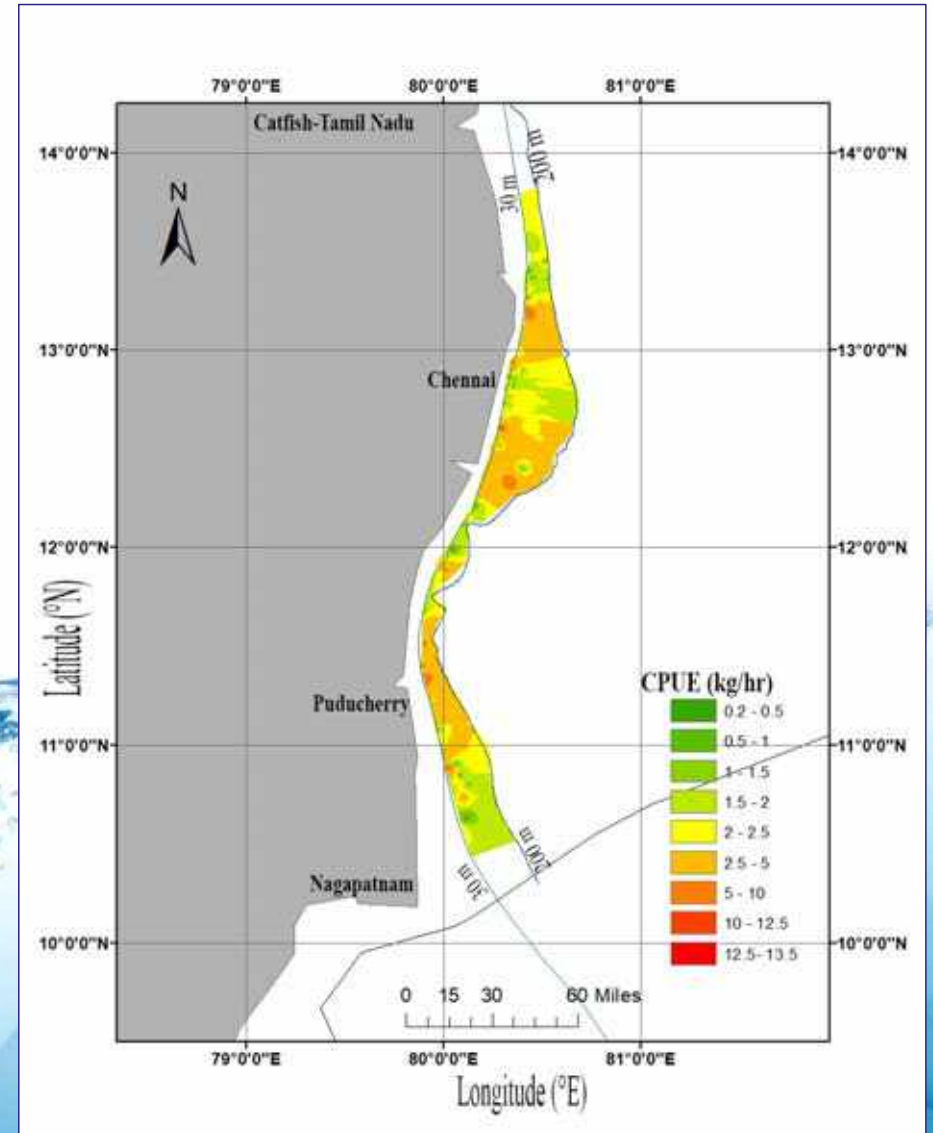


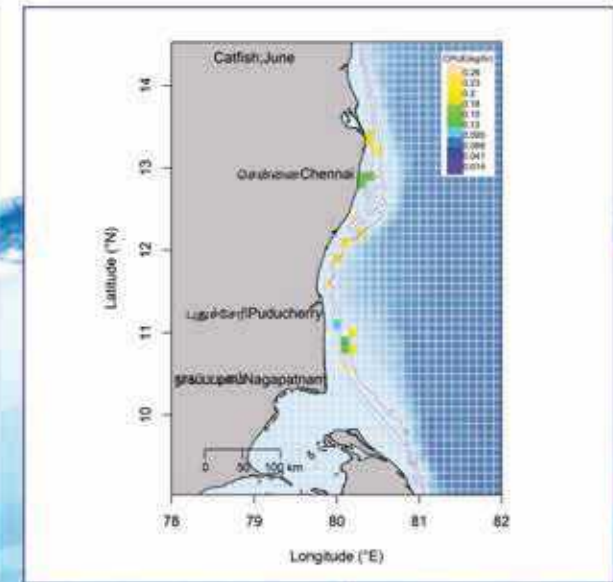
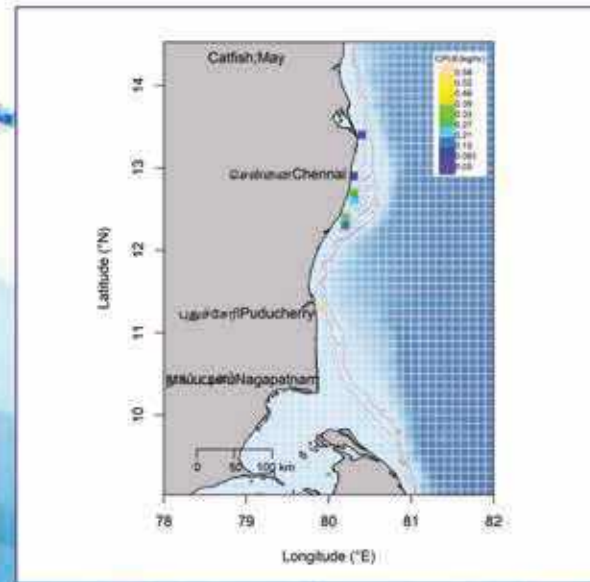
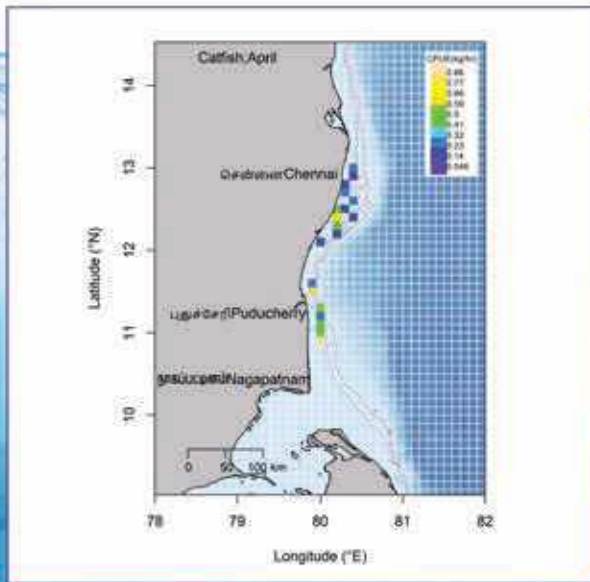
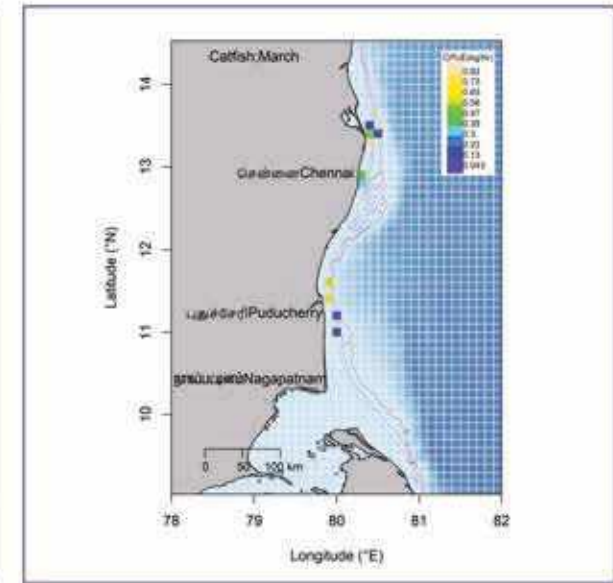
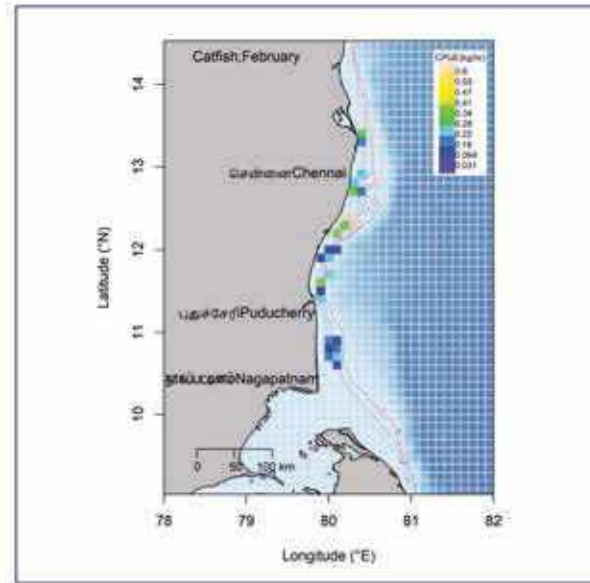
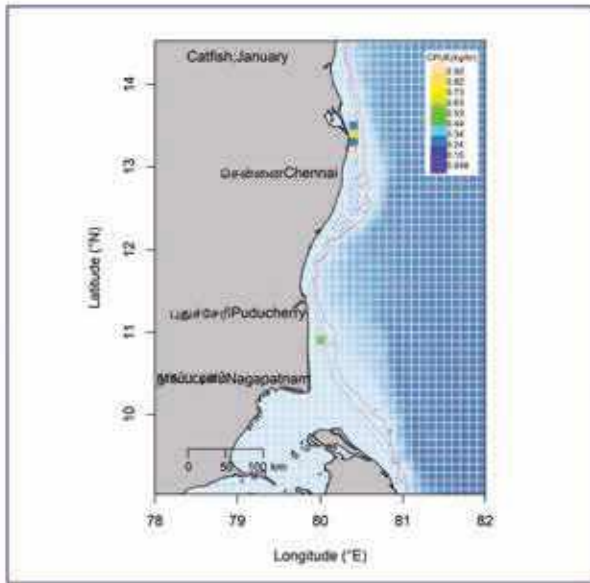


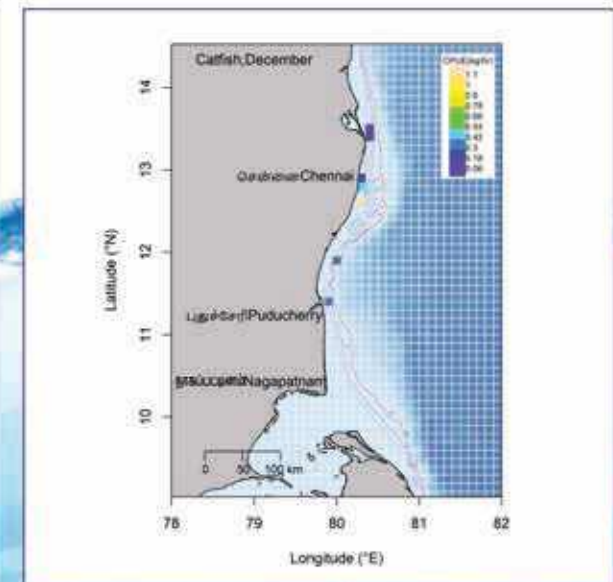
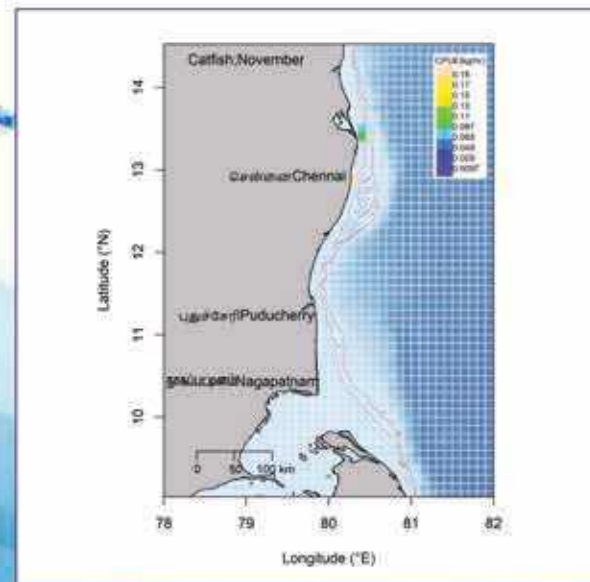
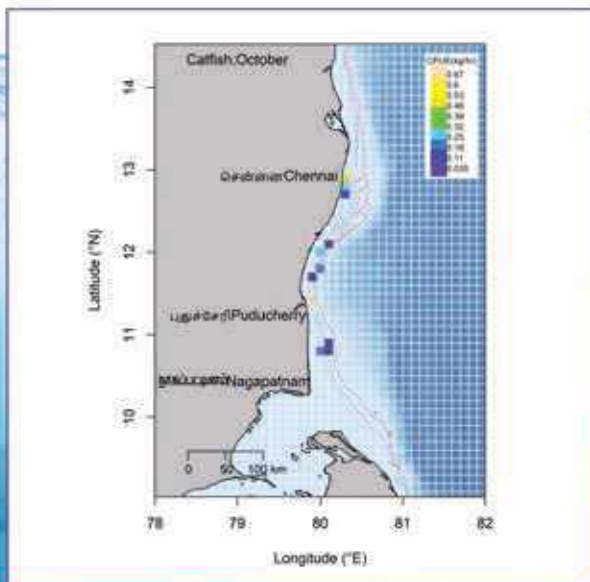
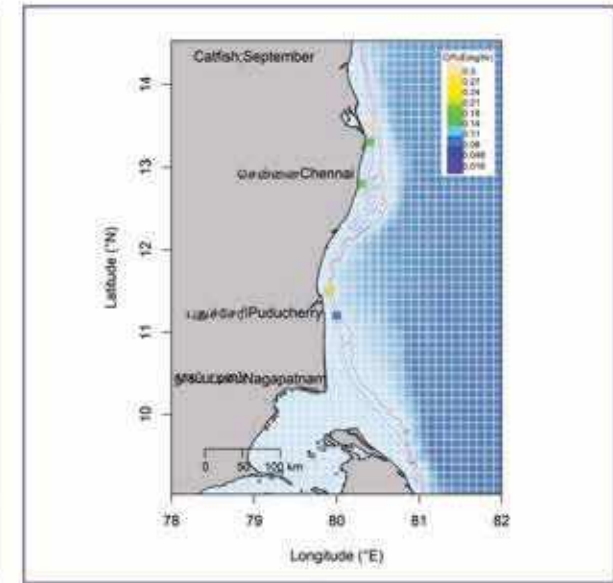
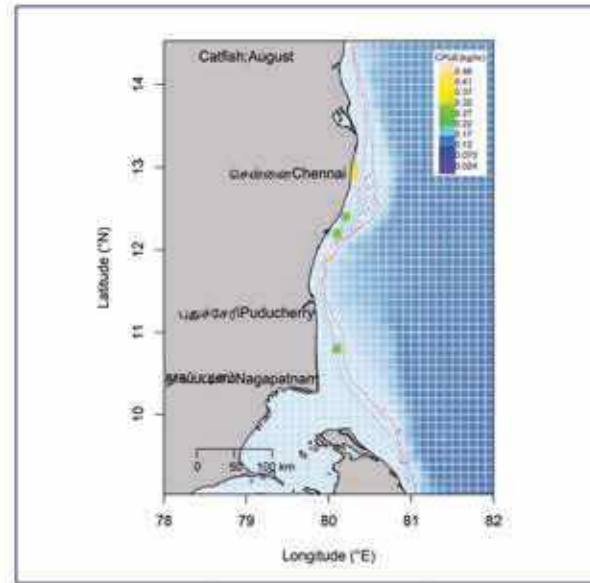
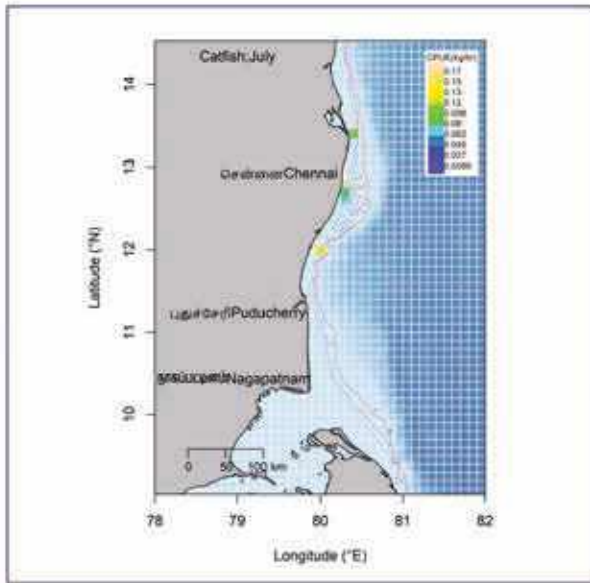


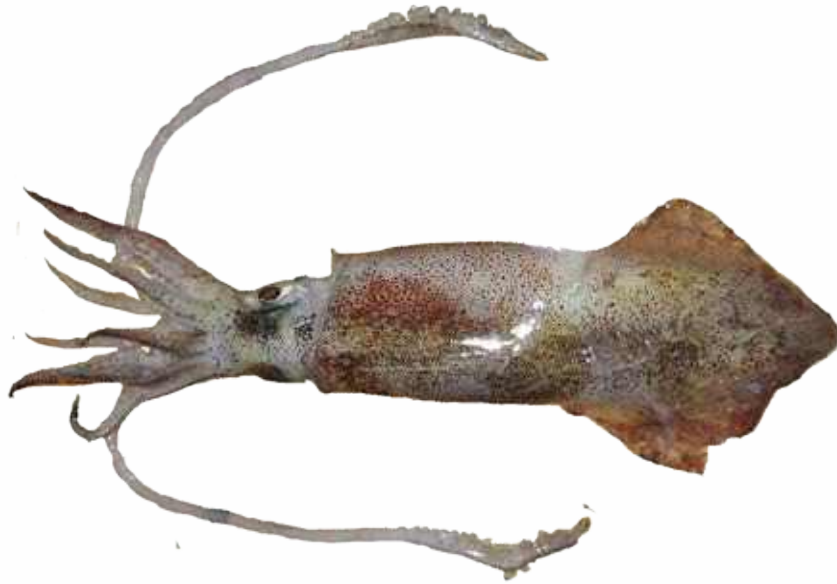


Cat Fish

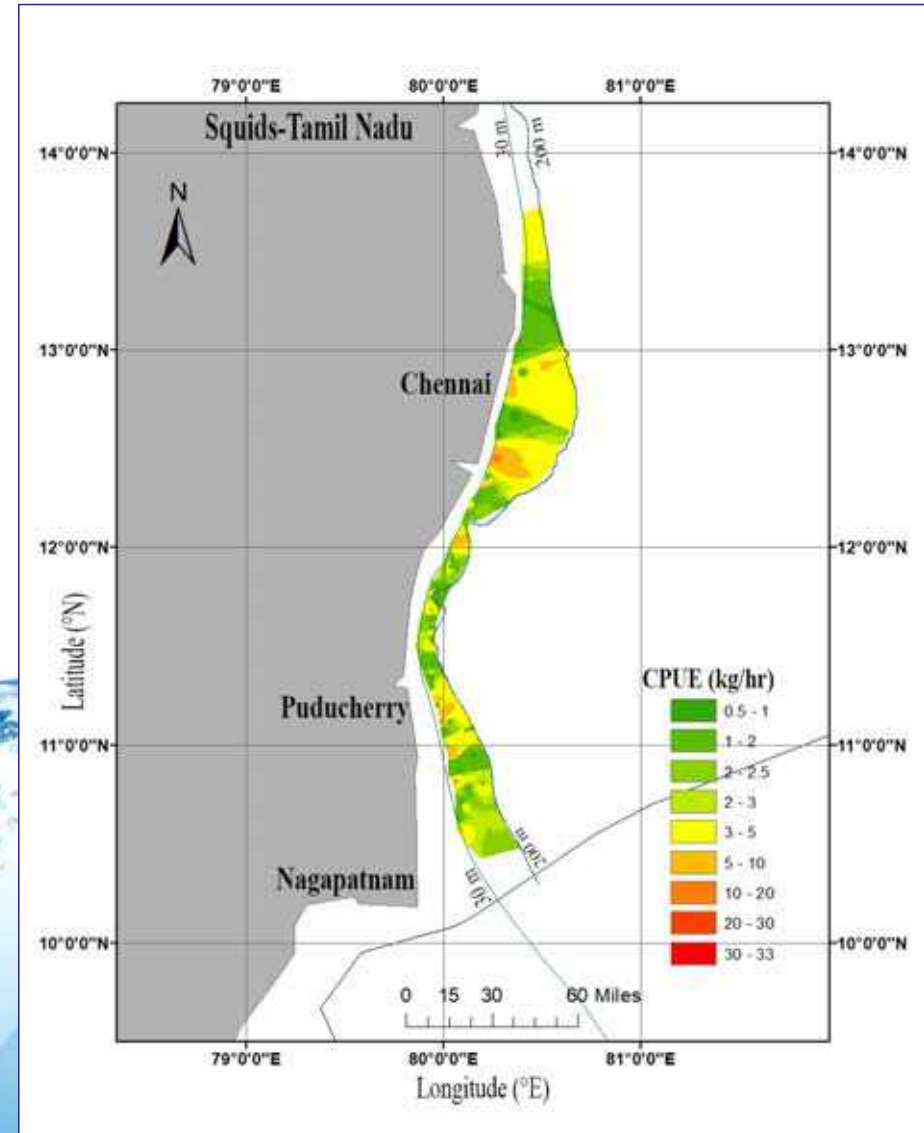






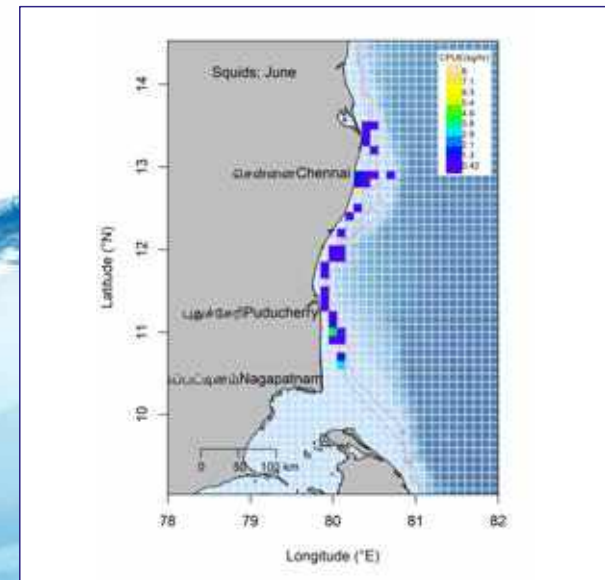
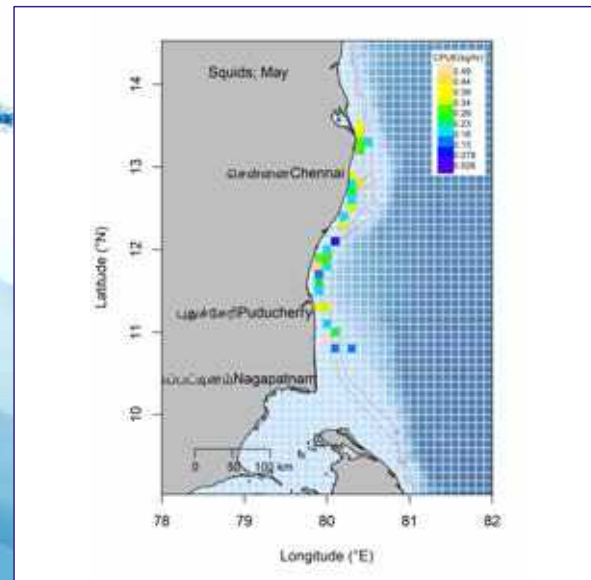
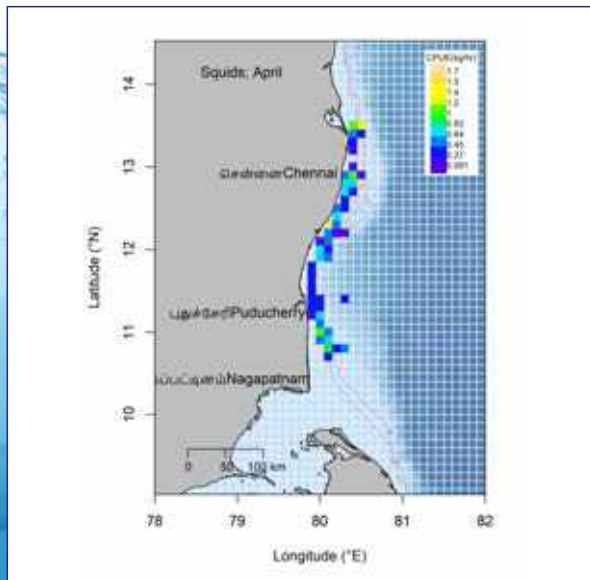
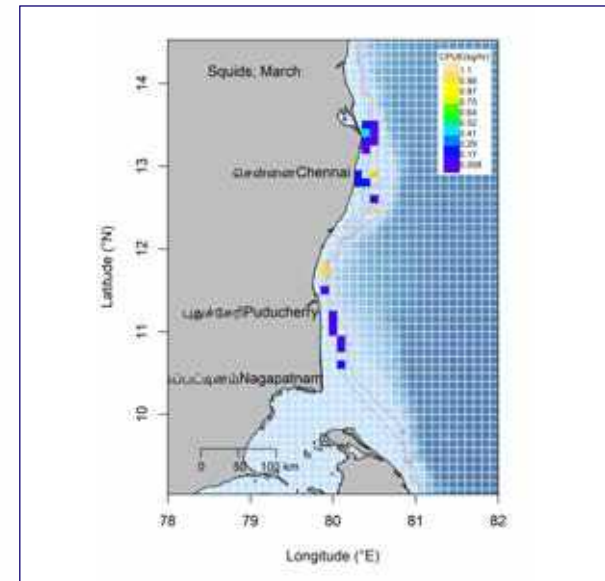
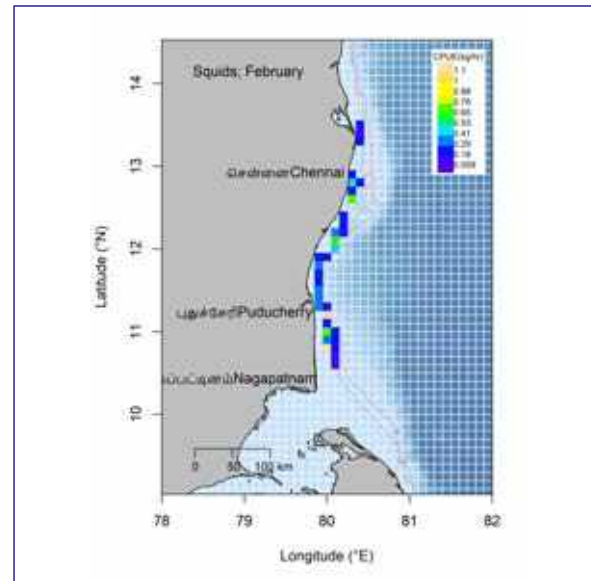
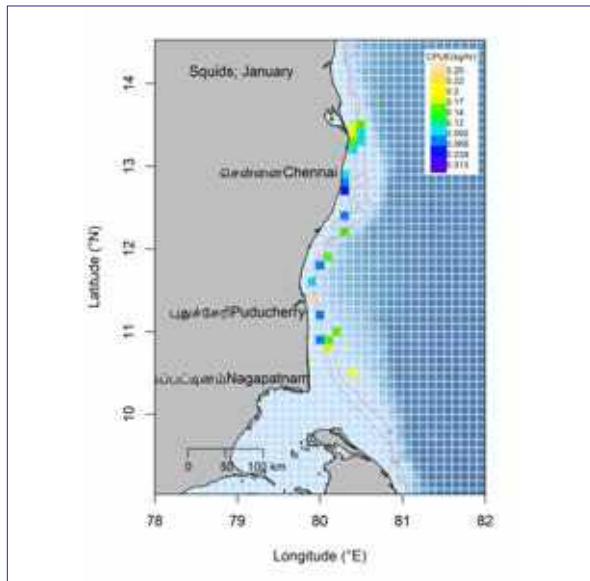


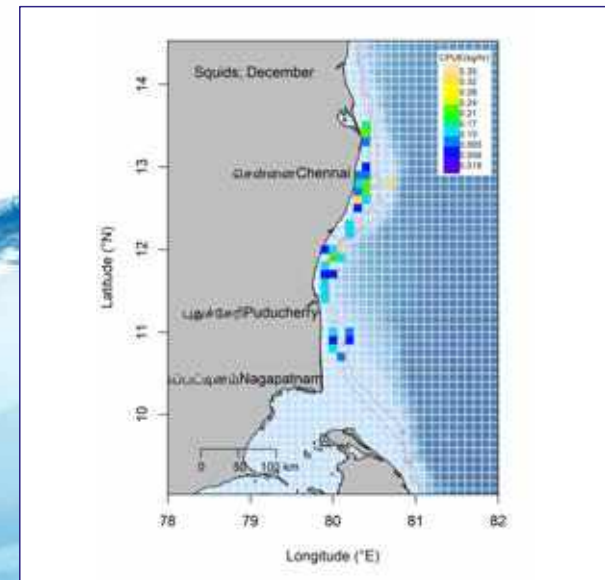
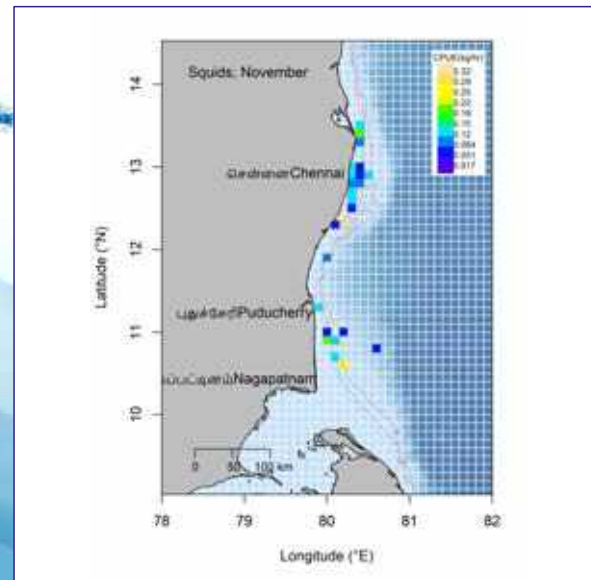
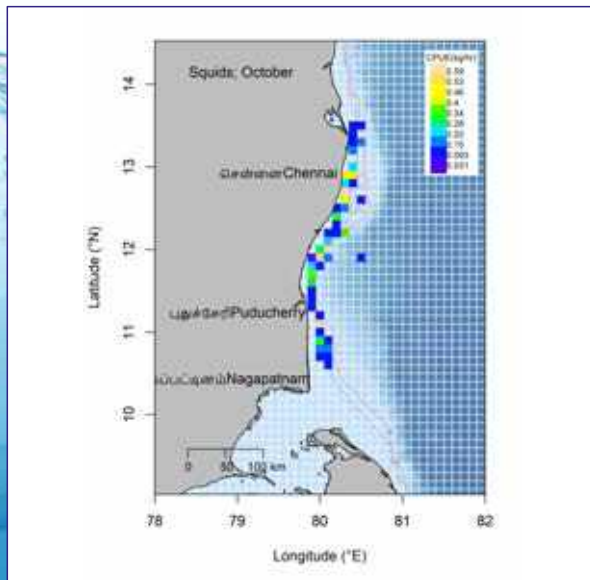
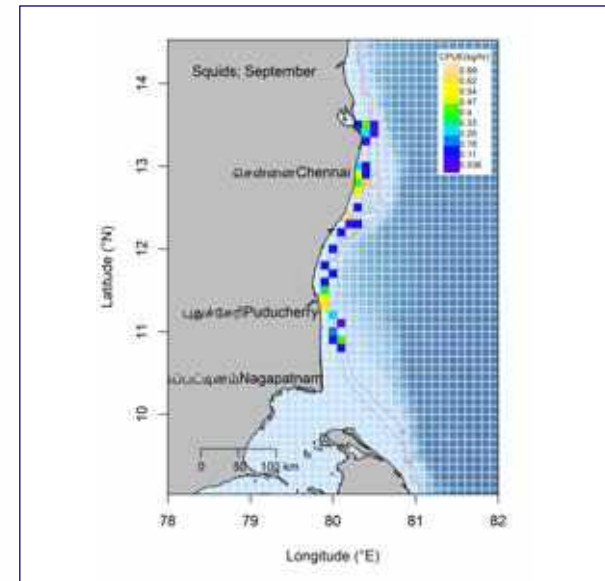
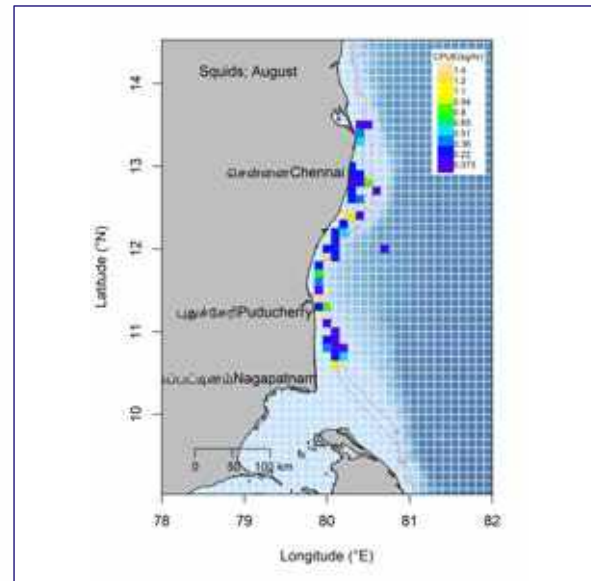
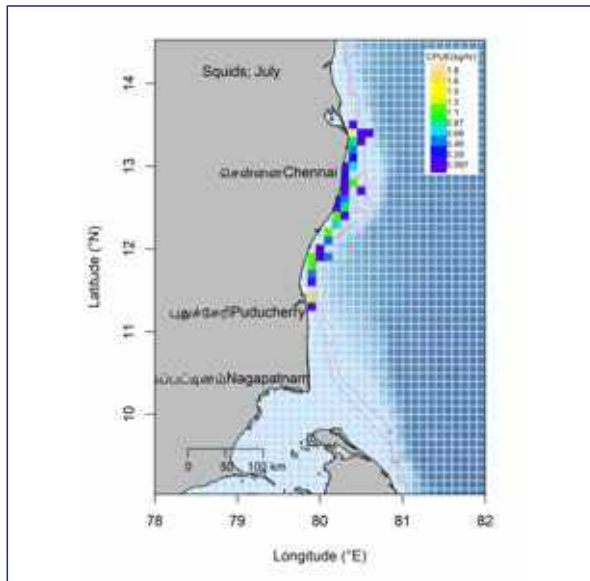
# Squids





# Treasures of the Deep - An Atlas of India's Demersal Fishery Resources and Fishing Grounds





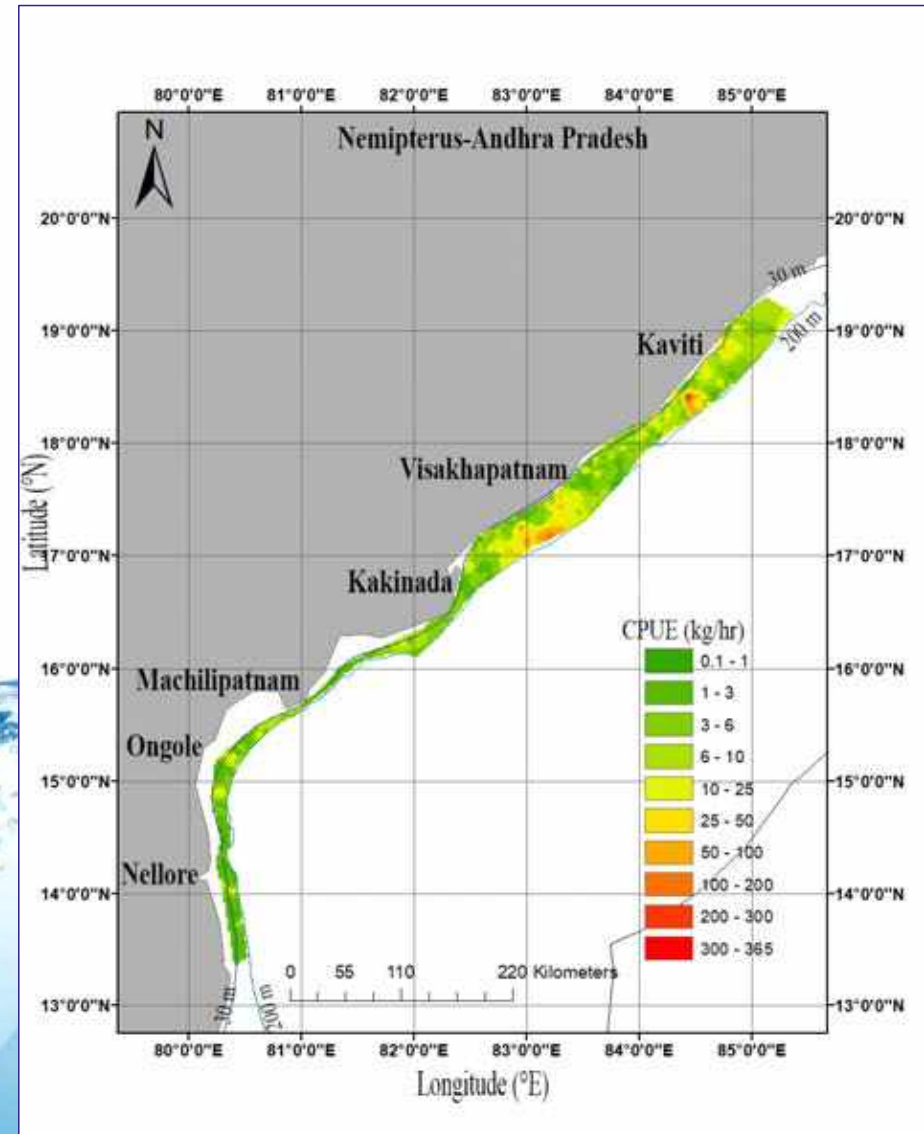


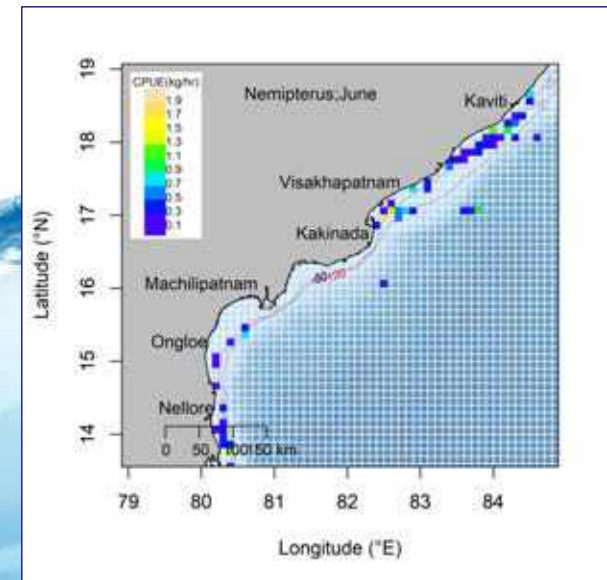
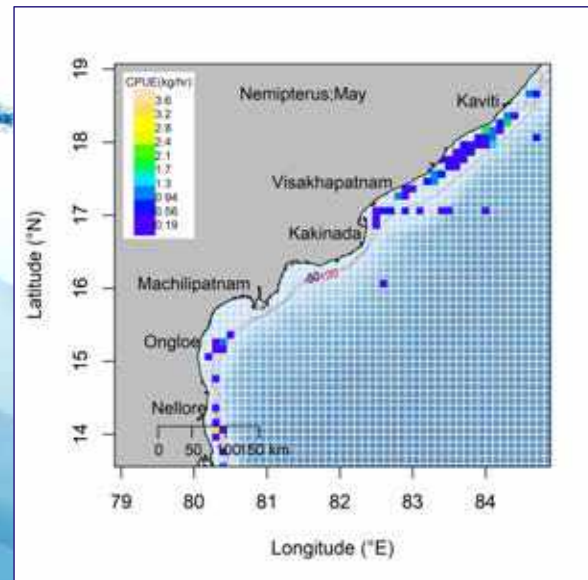
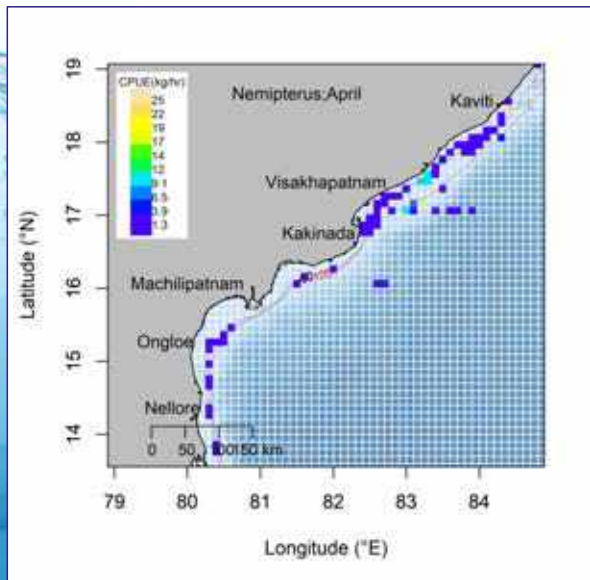
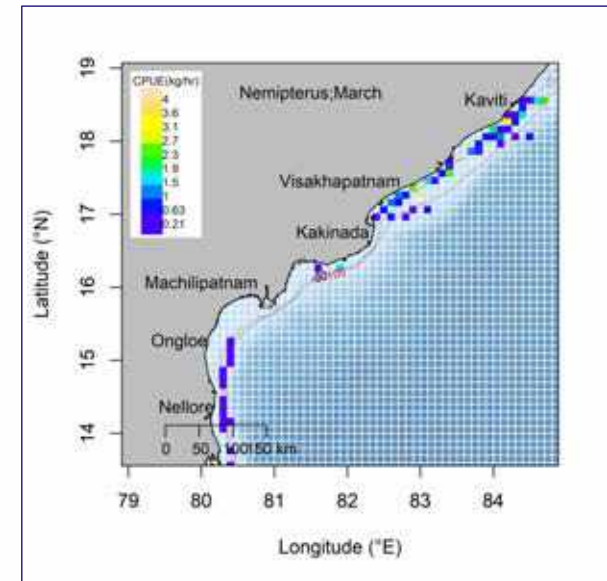
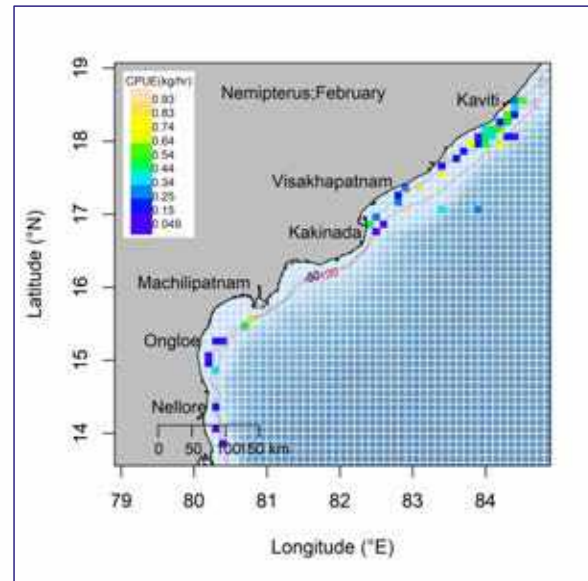
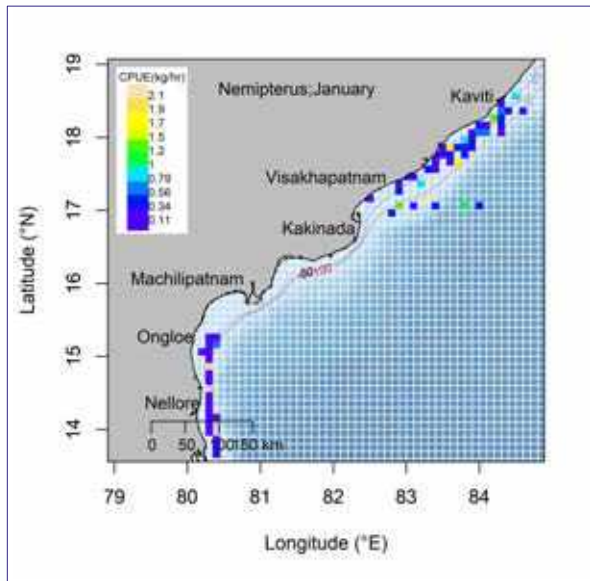
## **3.7** Spatial distribution and abundance along Andhra Pradesh coast

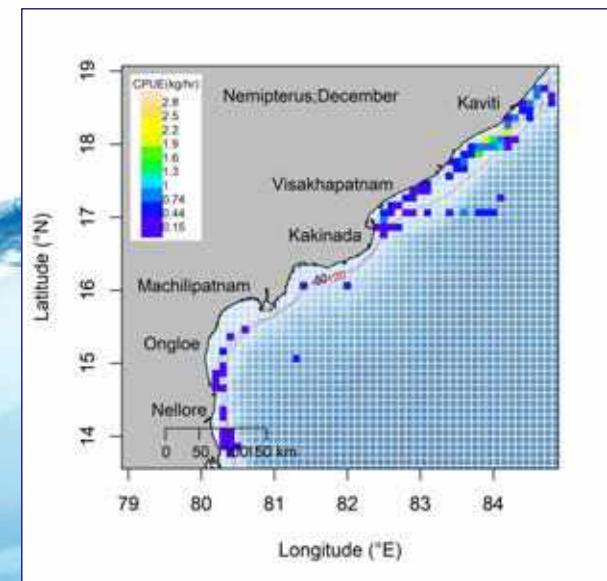
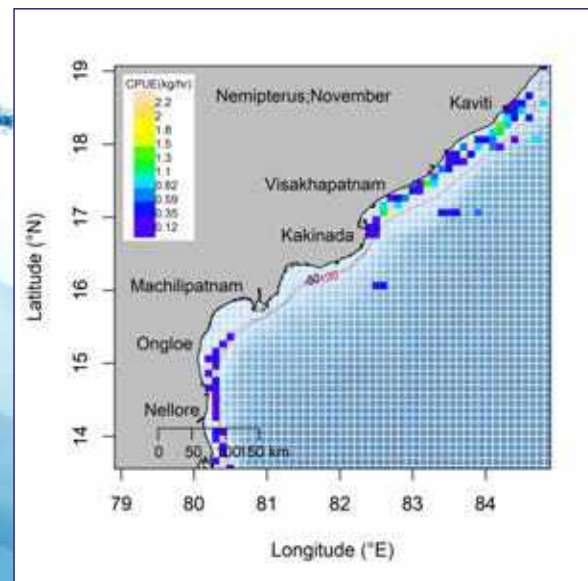
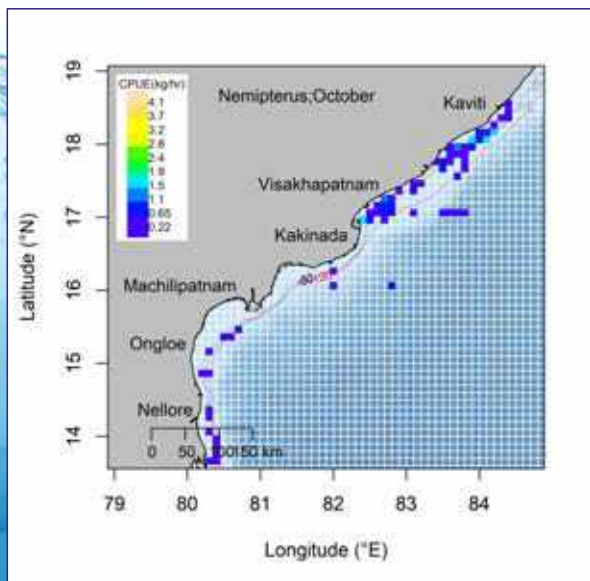
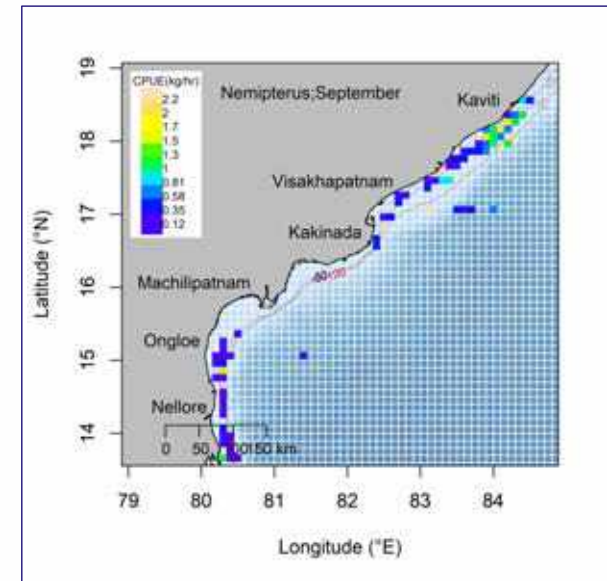
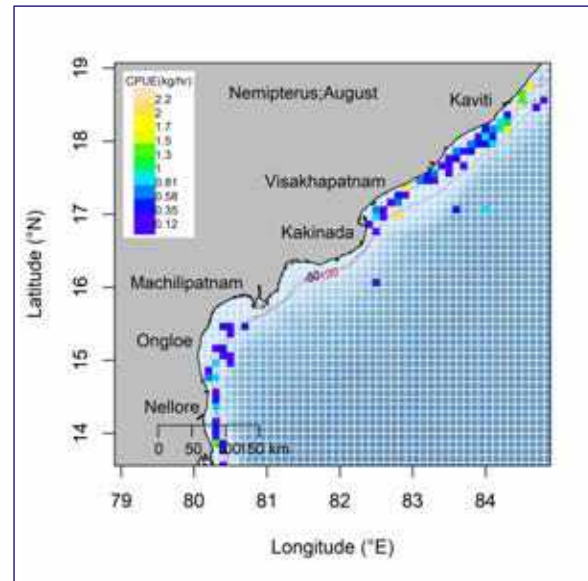
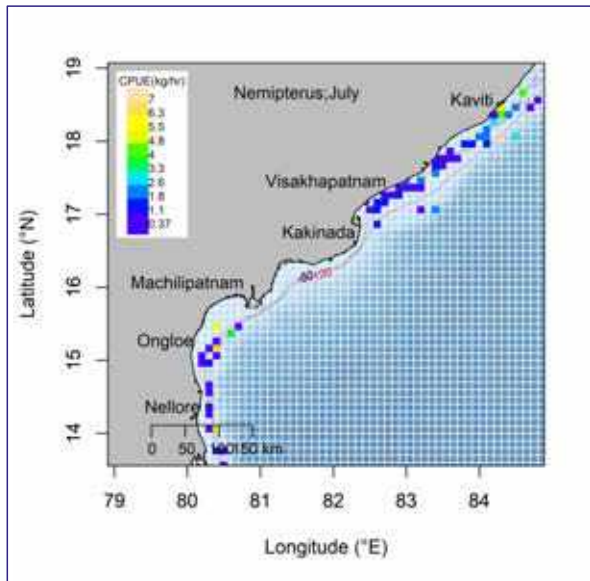




# Threadfin Breams (Nemipterus)

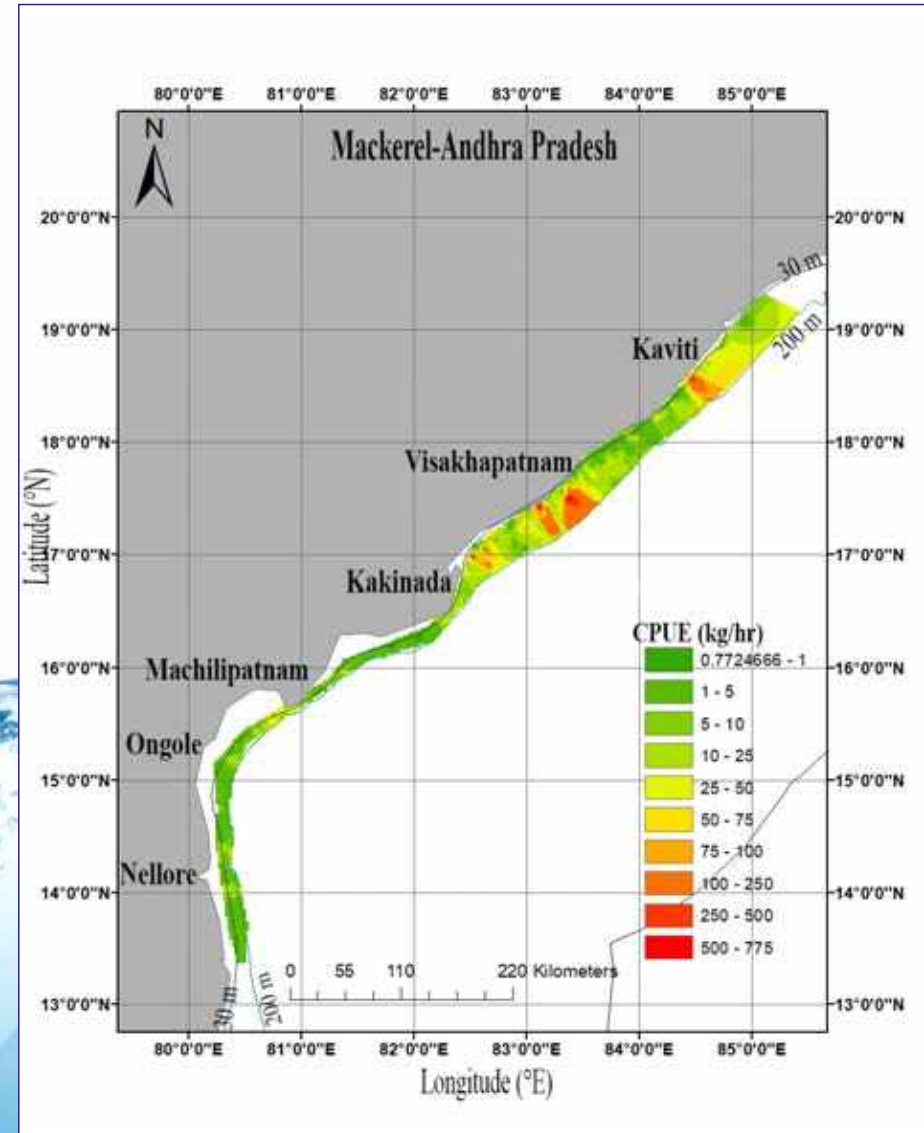


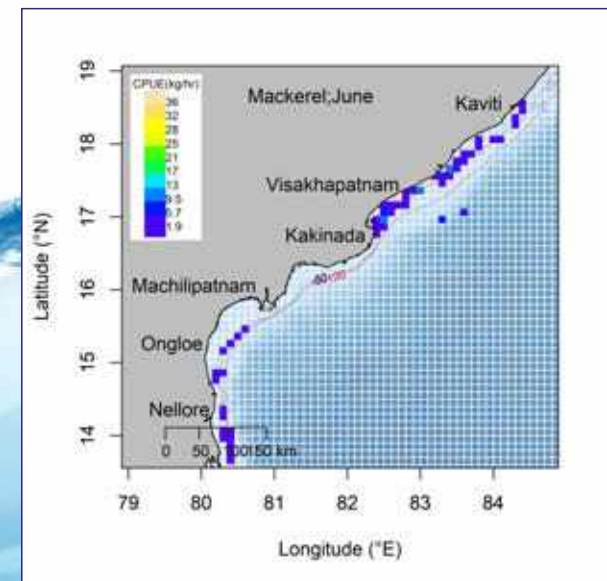
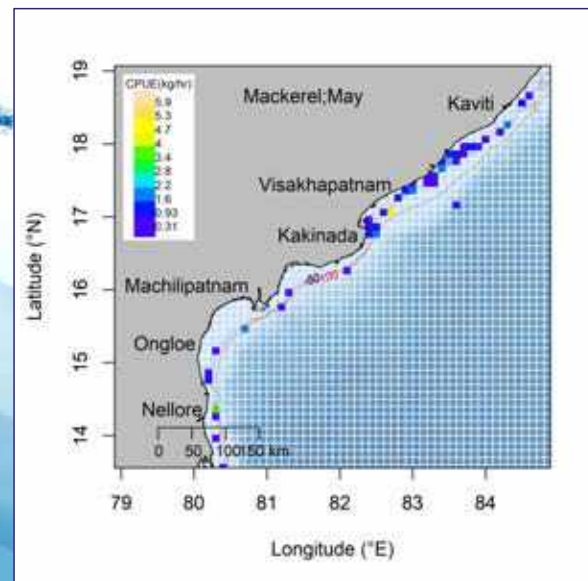
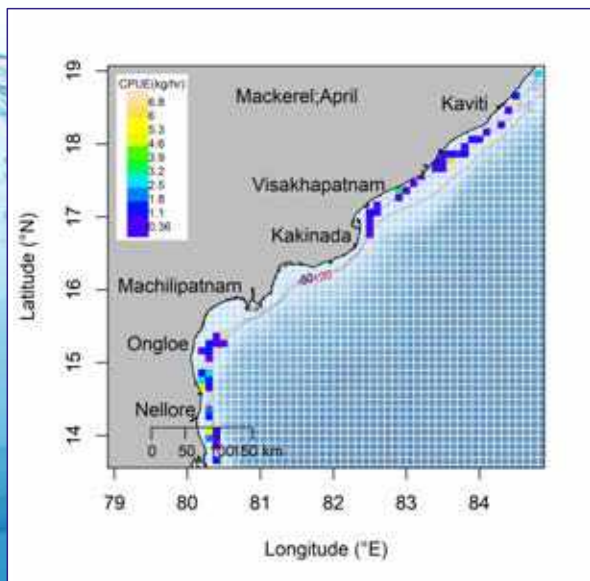
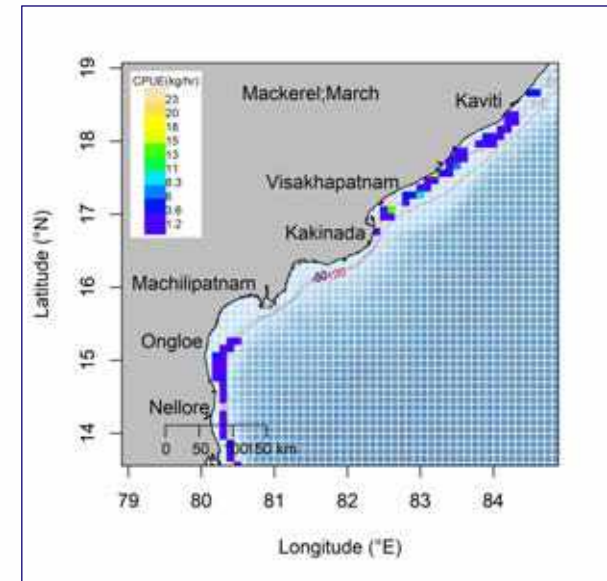
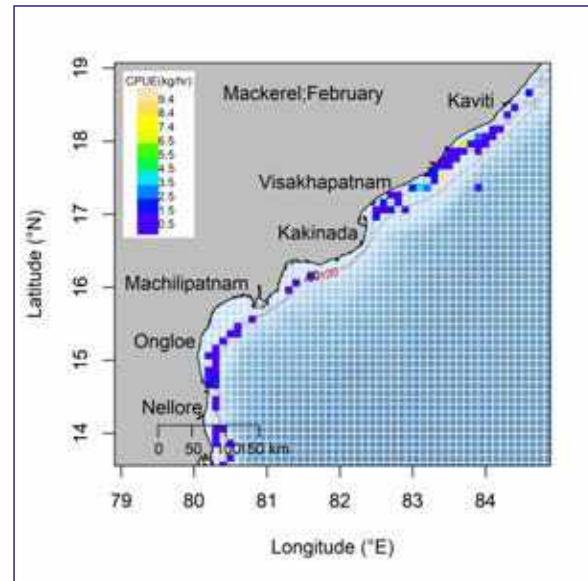
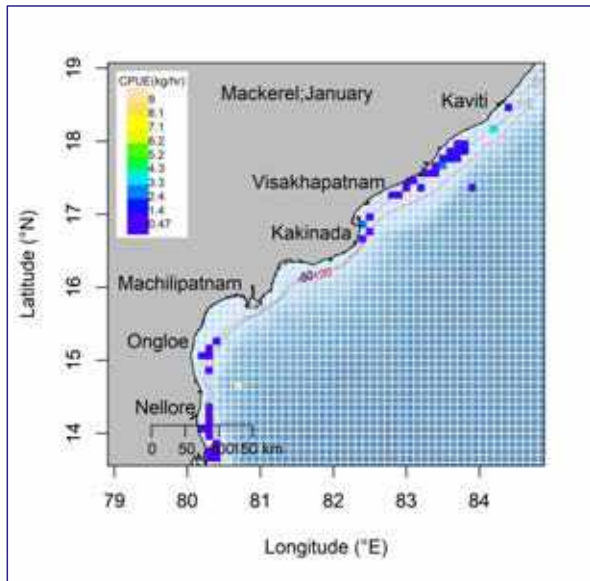


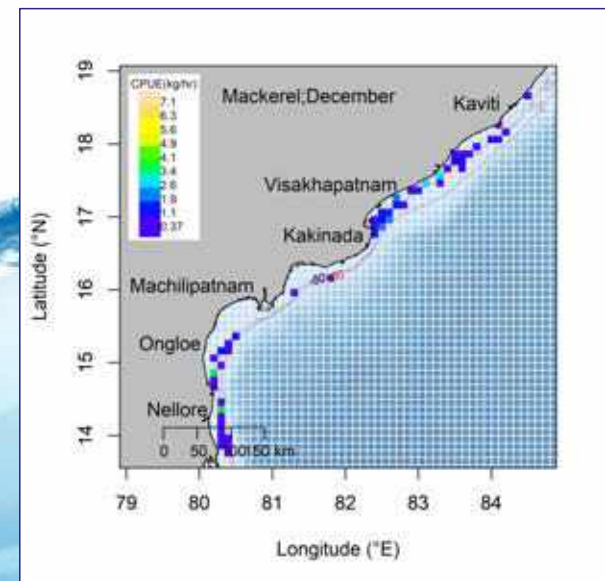
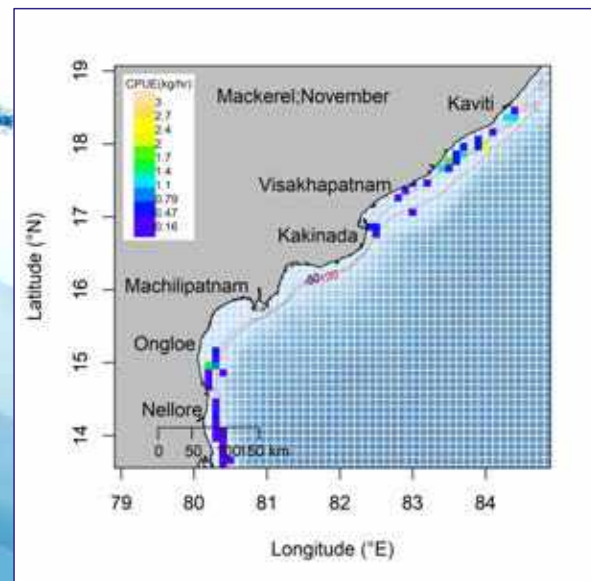
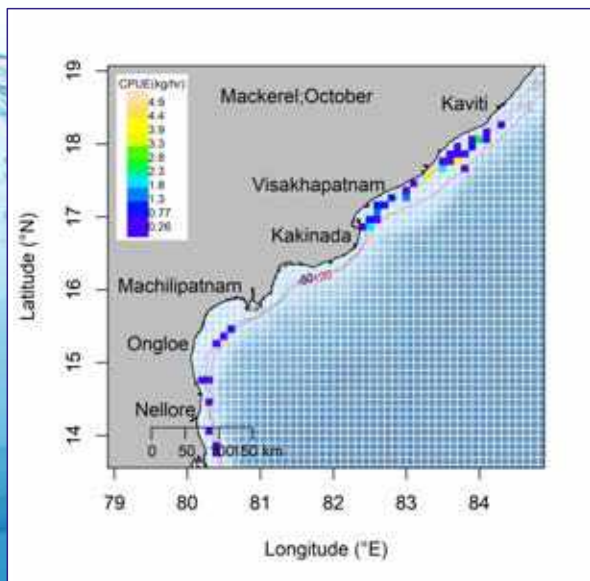
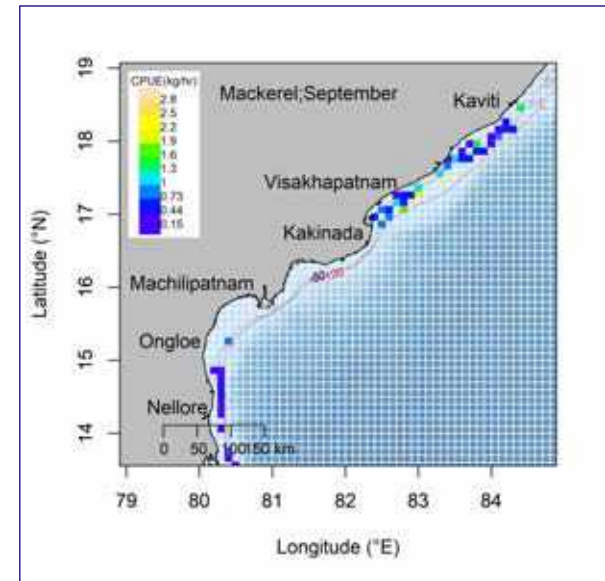
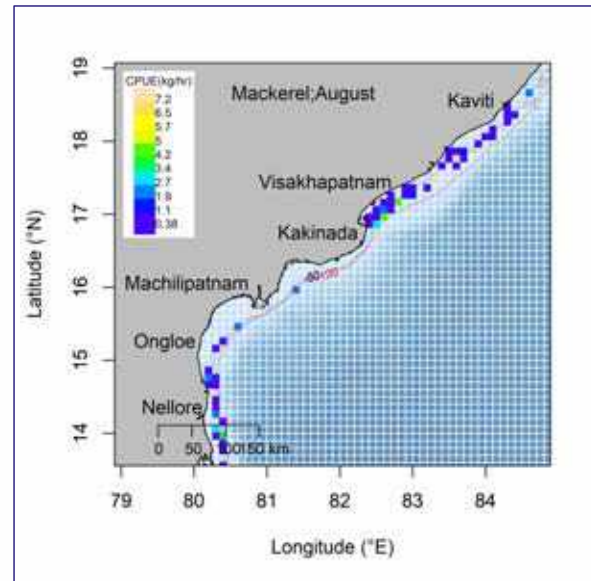
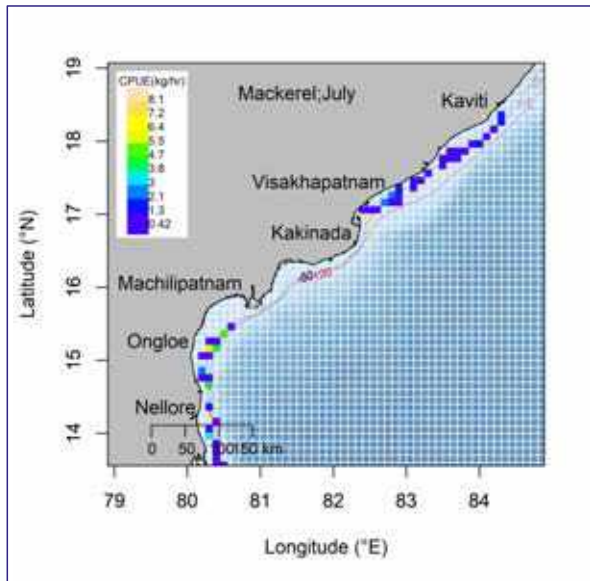




# Mackerel

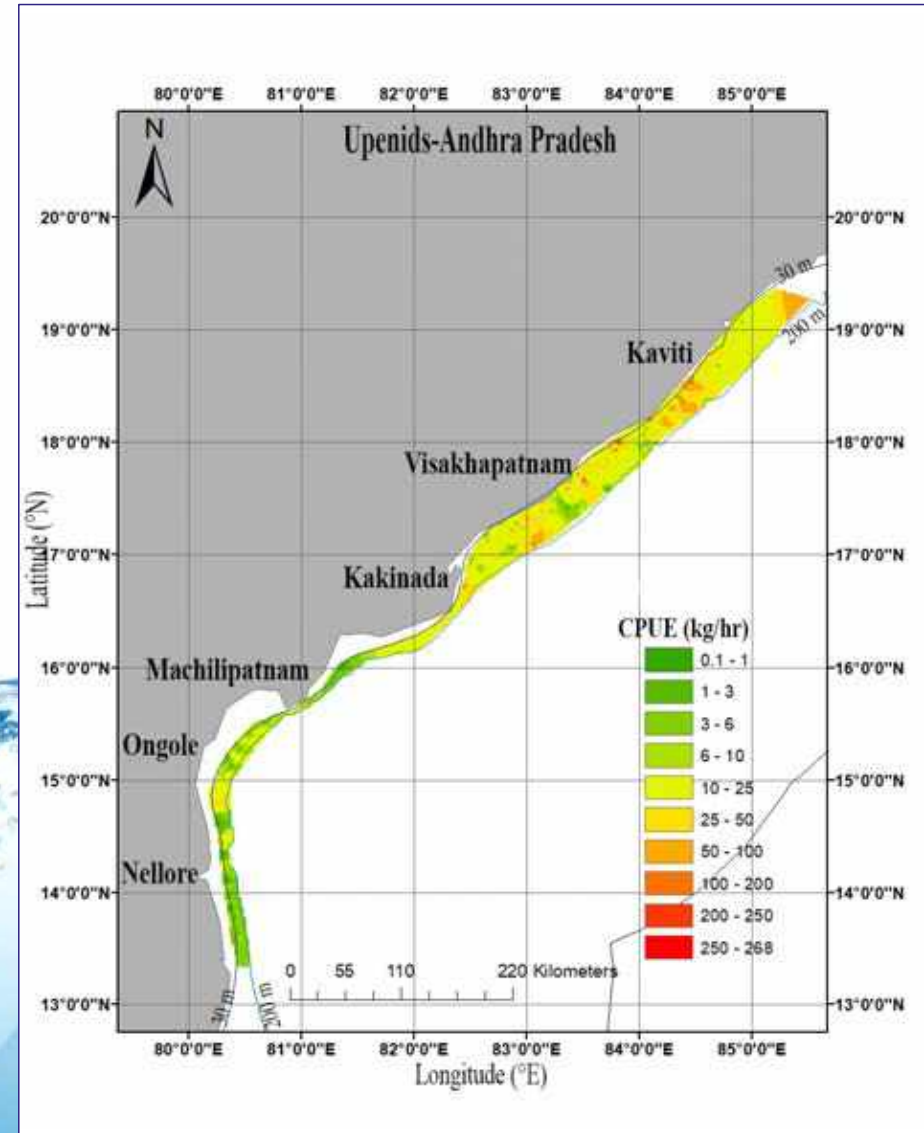




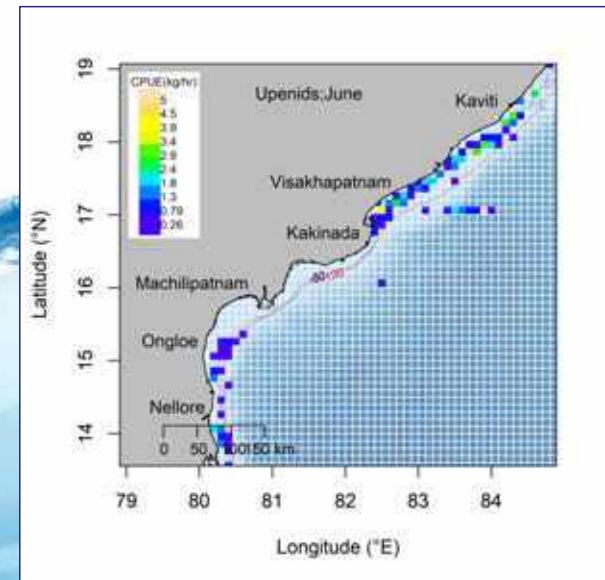
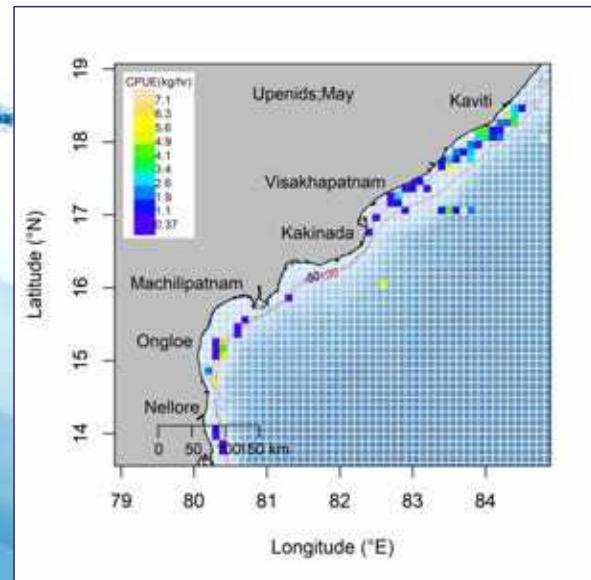
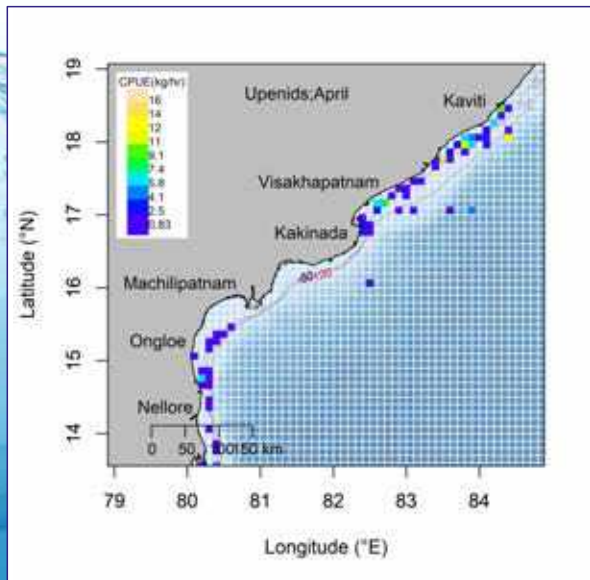
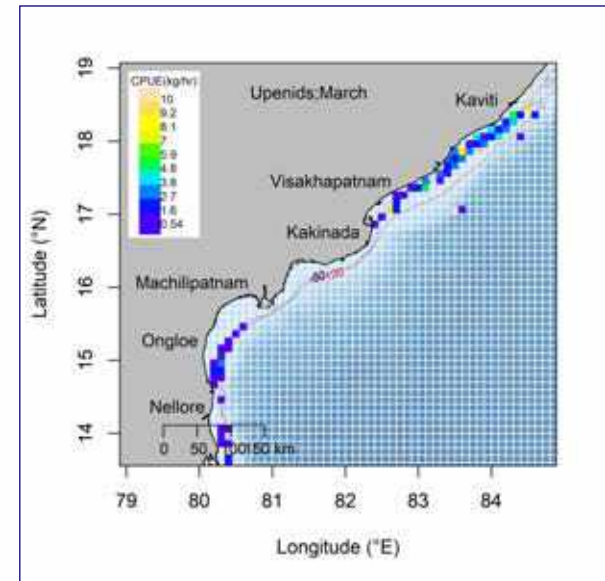
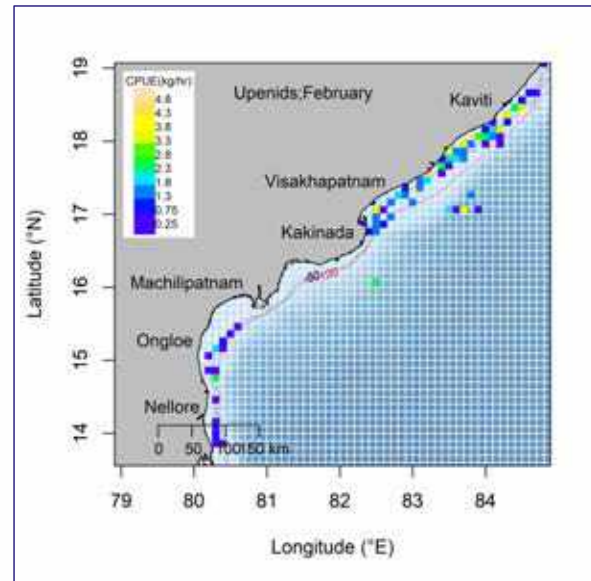
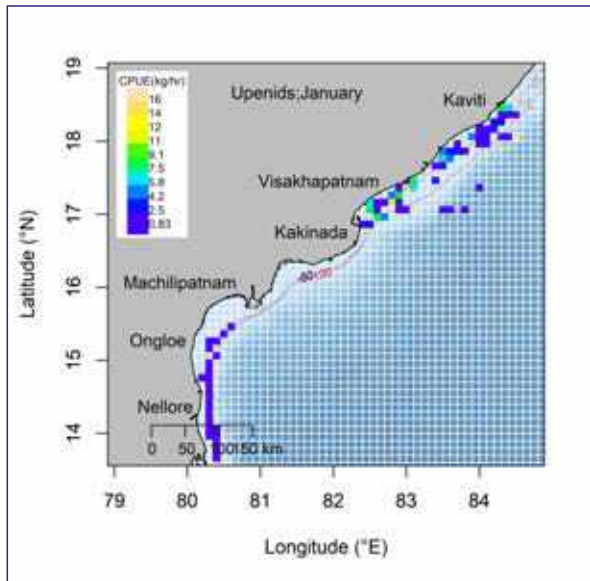


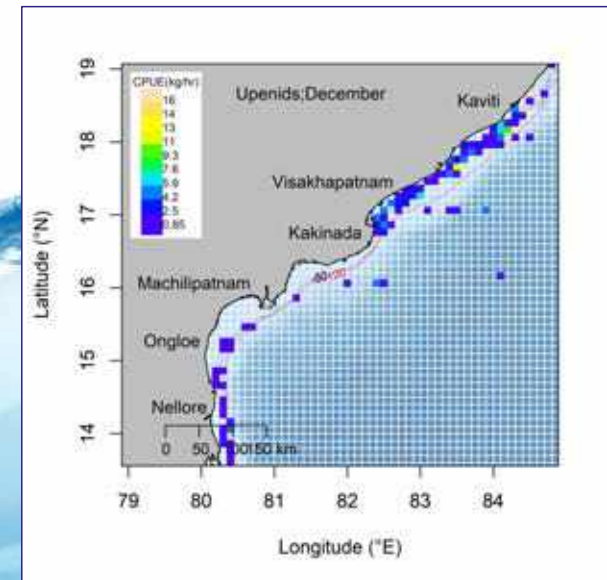
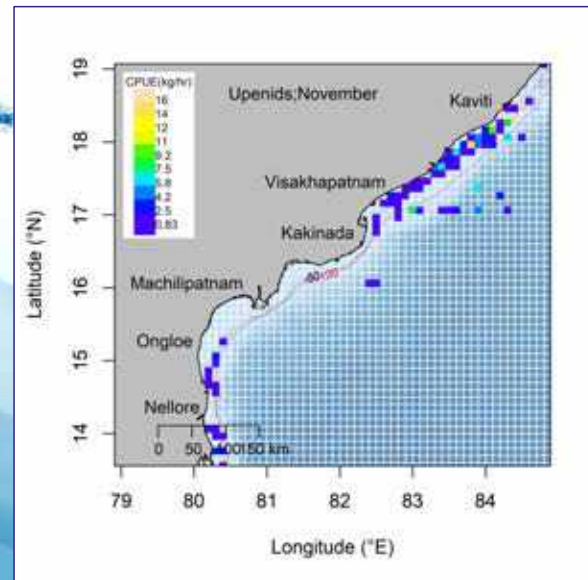
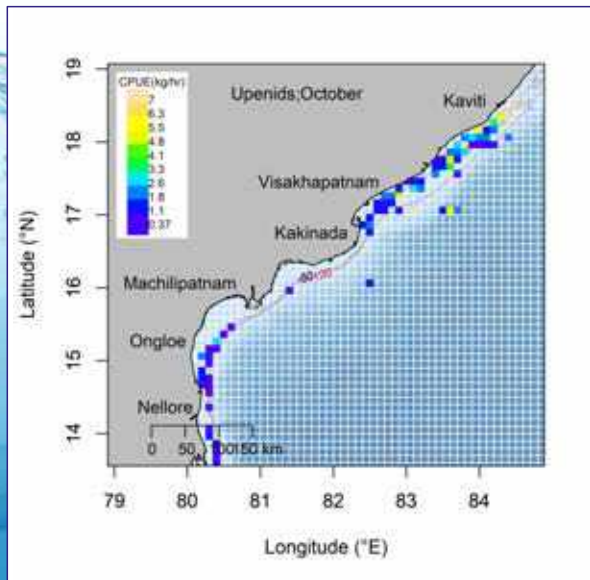
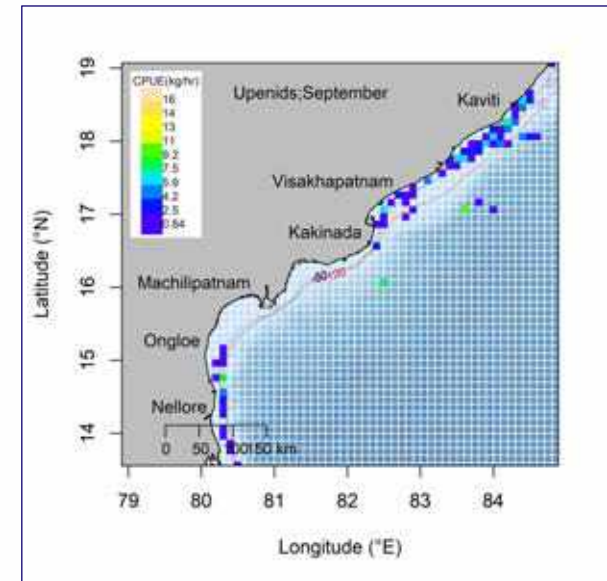
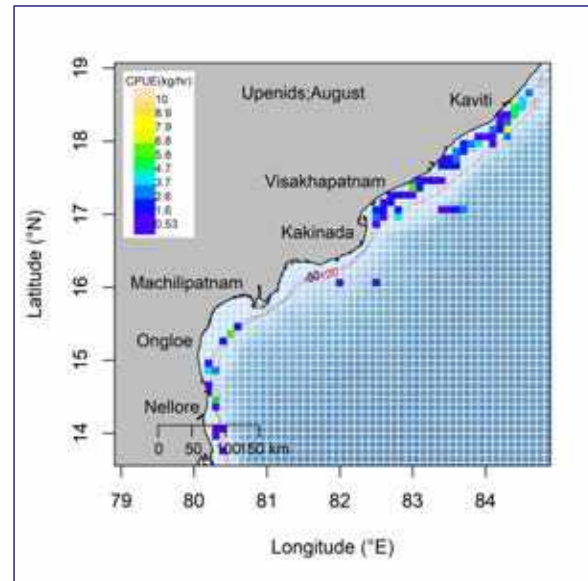
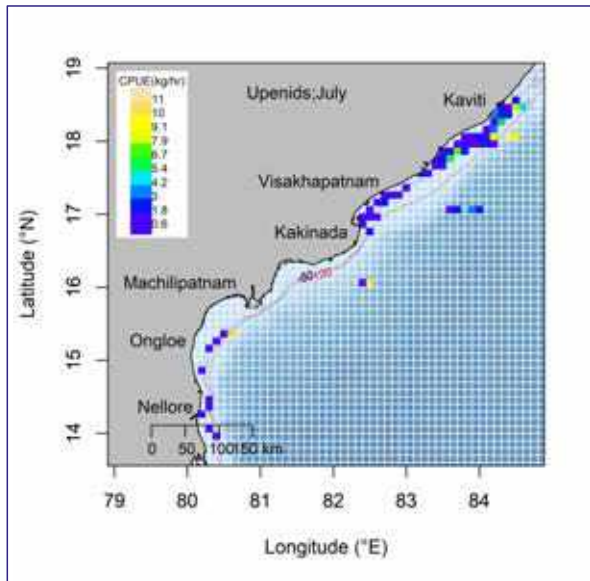


**Goatfish (Upeneids)**



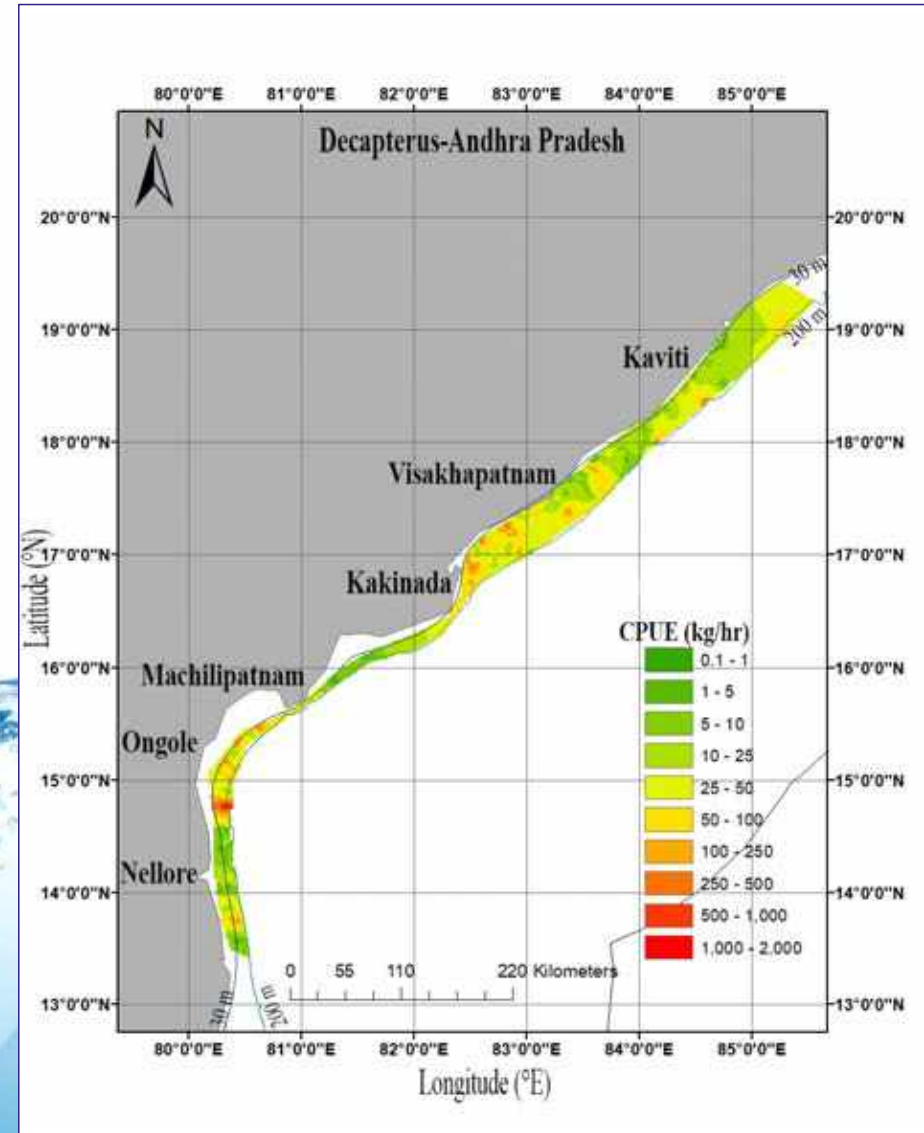


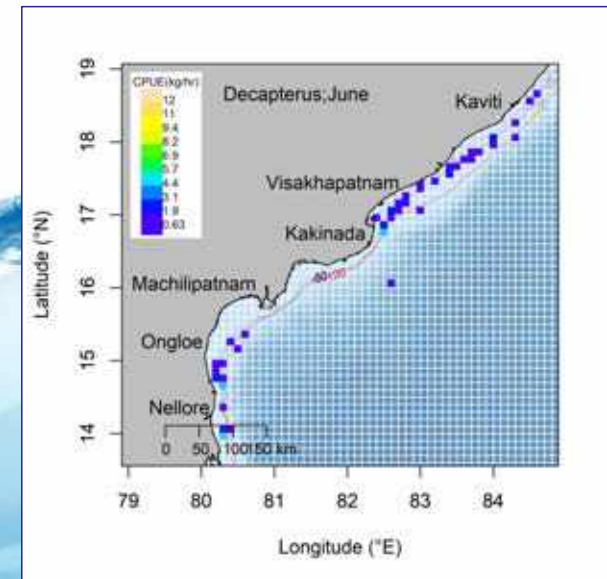
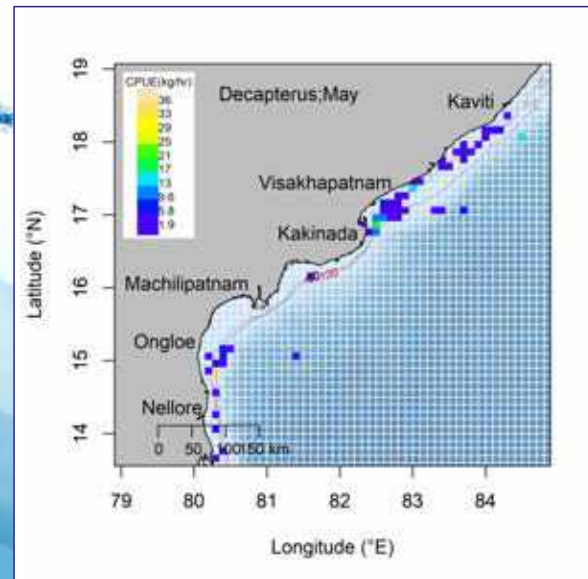
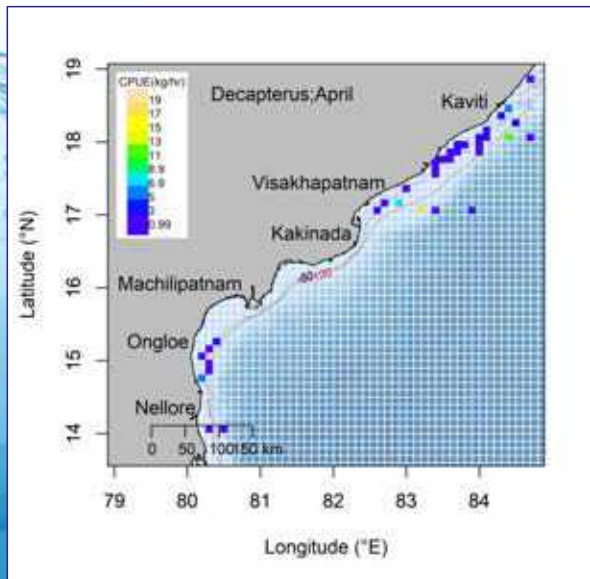
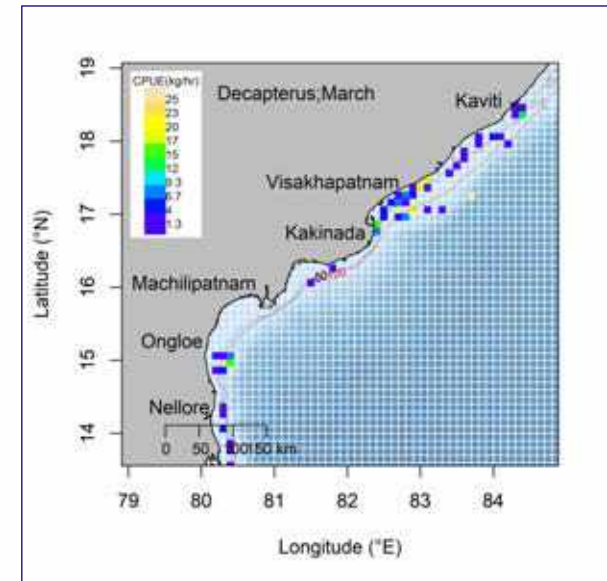
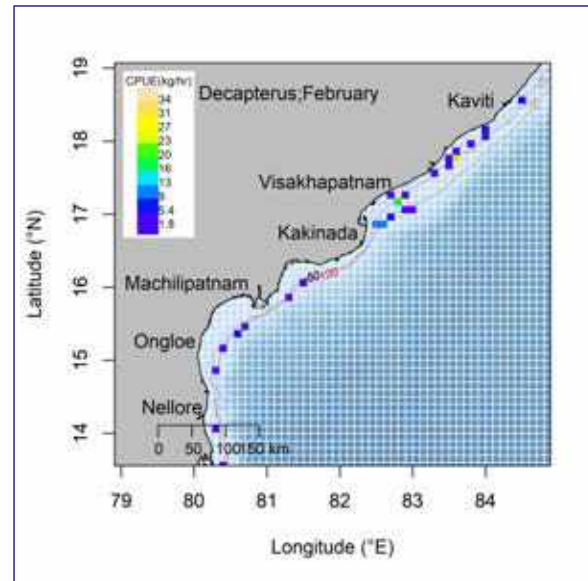
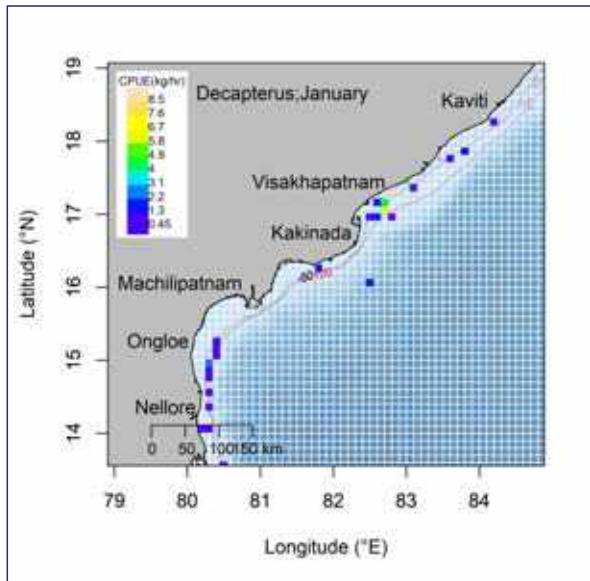


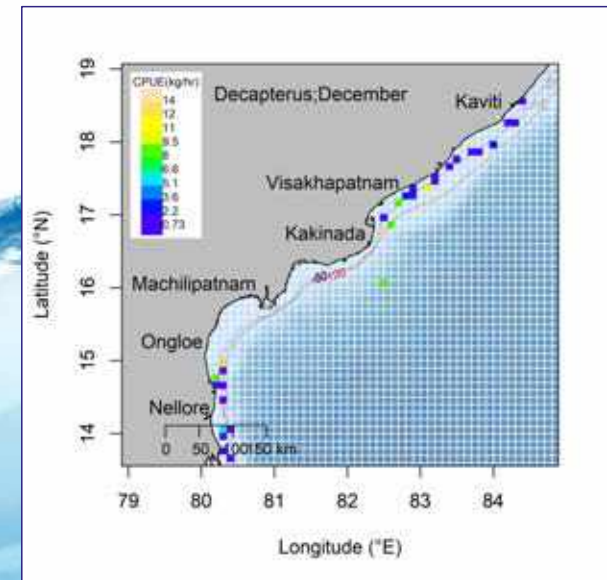
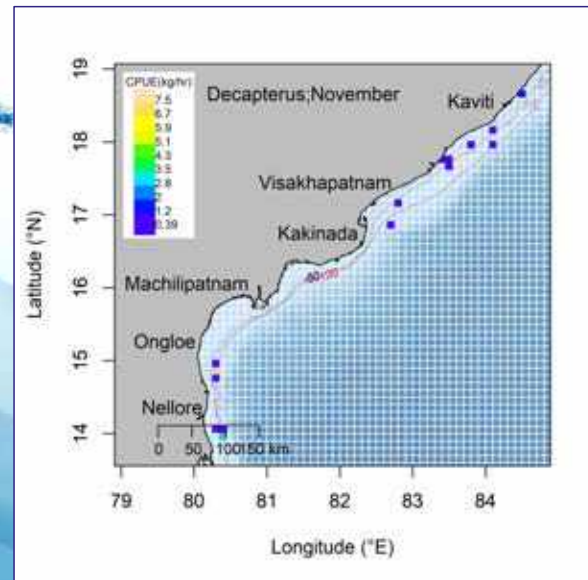
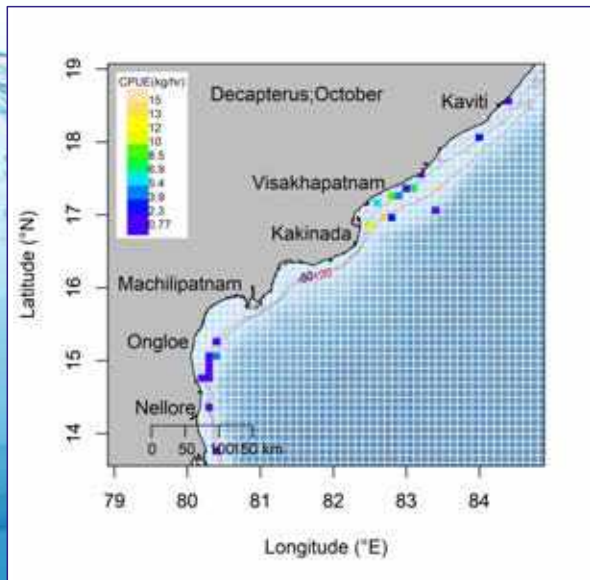
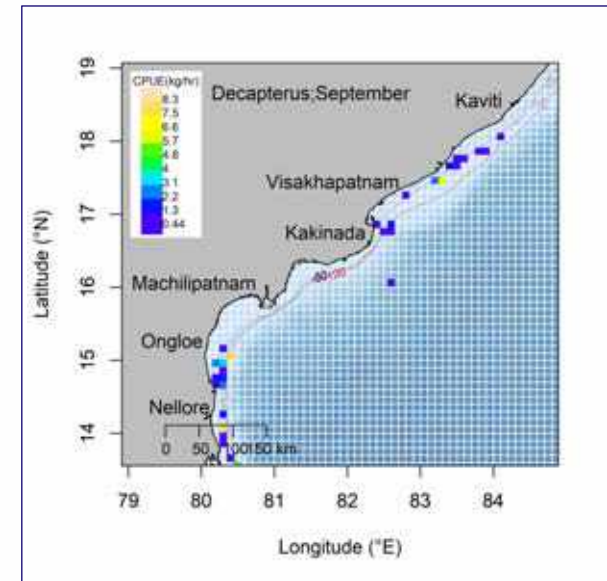
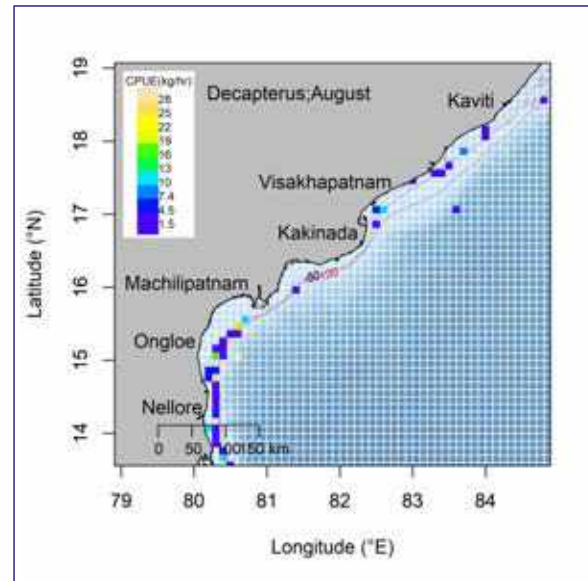
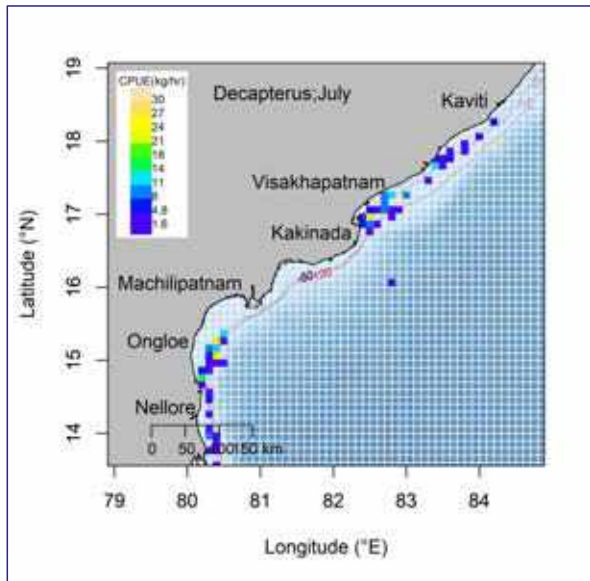




## Round Scads (Decapterus)

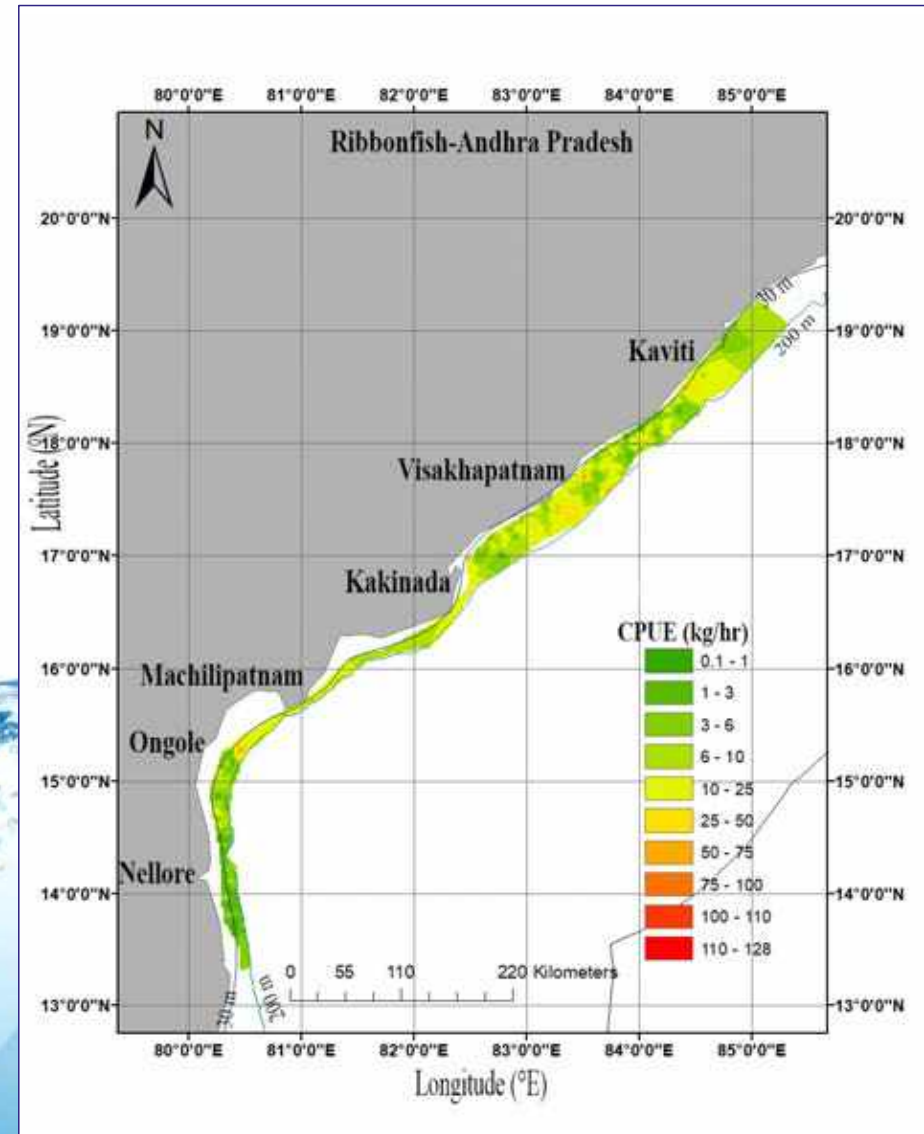


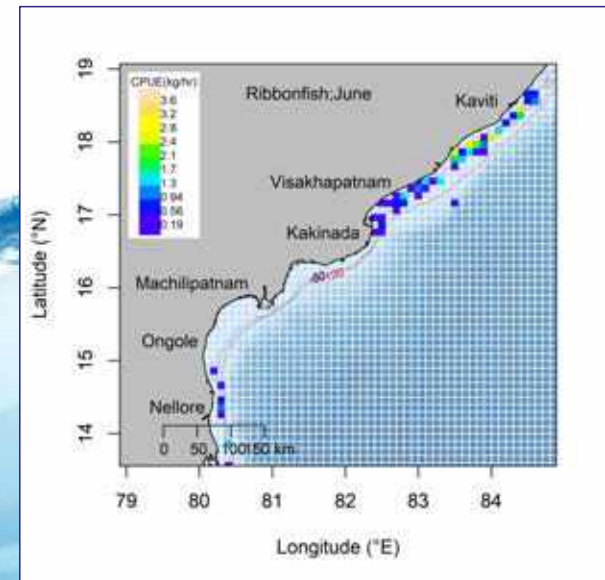
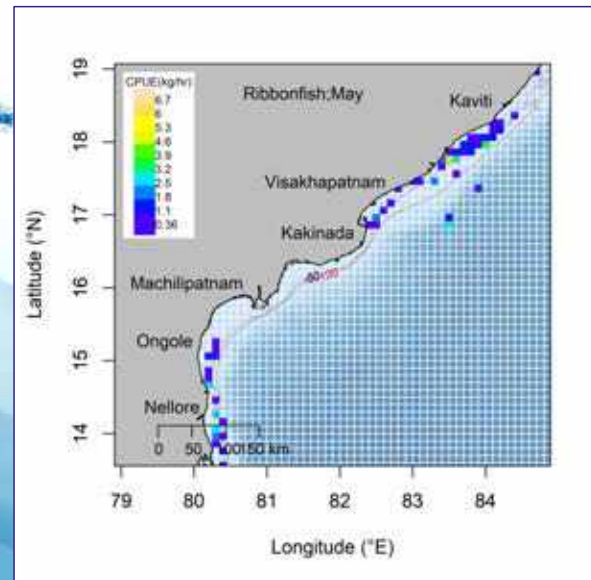
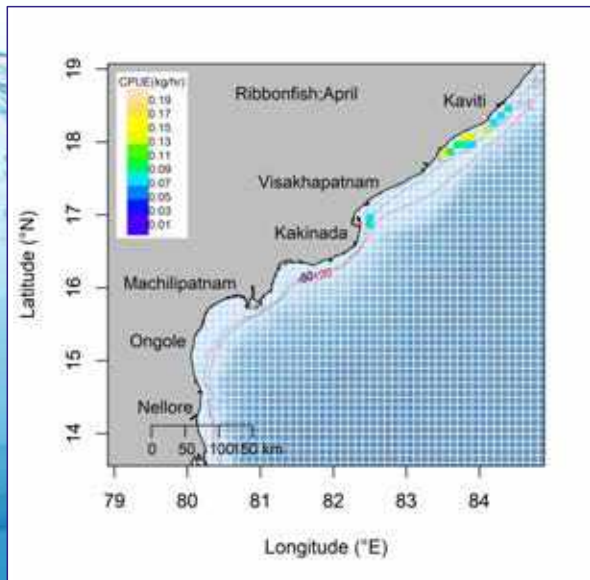
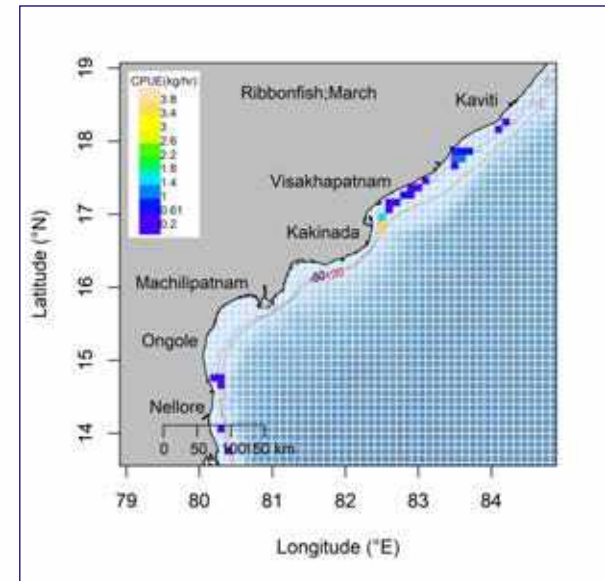
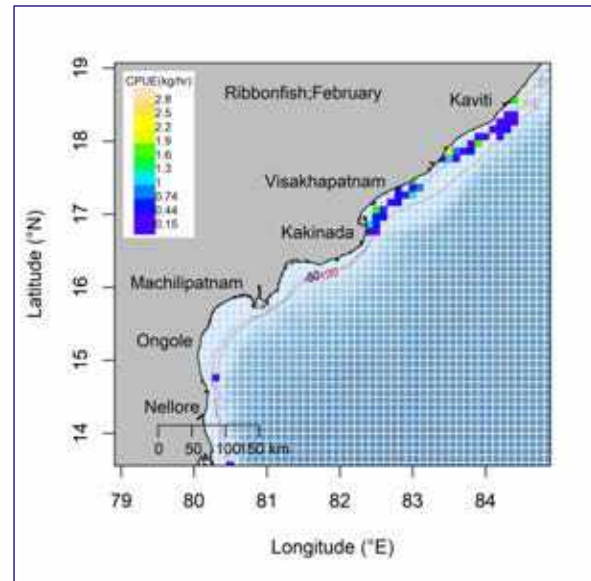
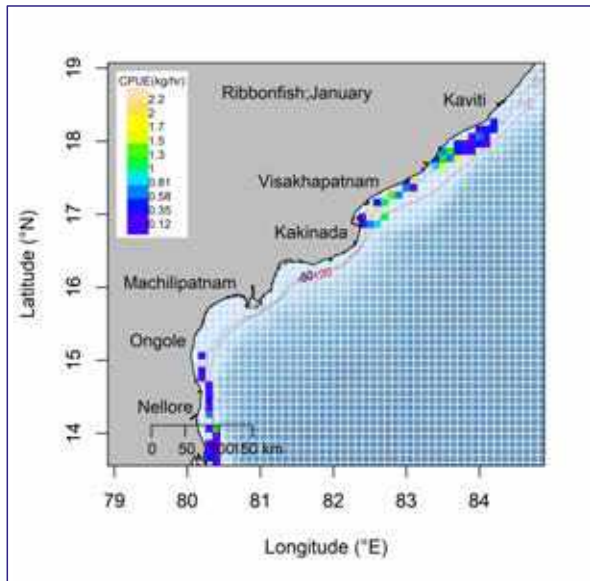


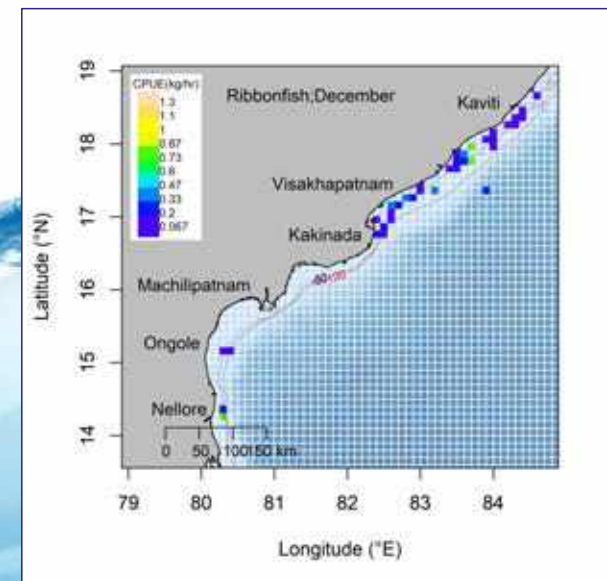
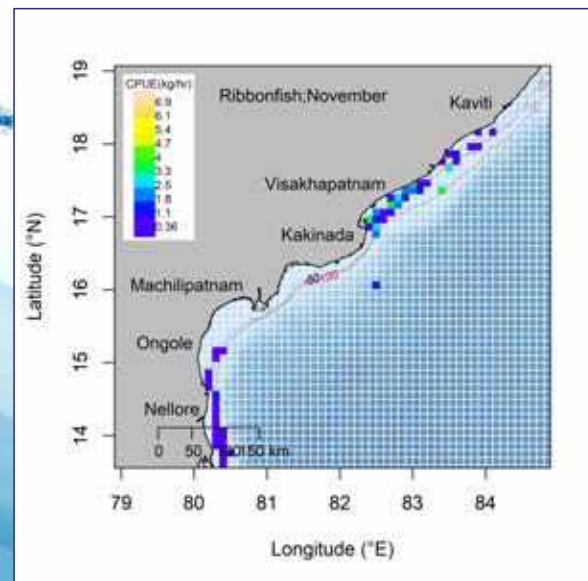
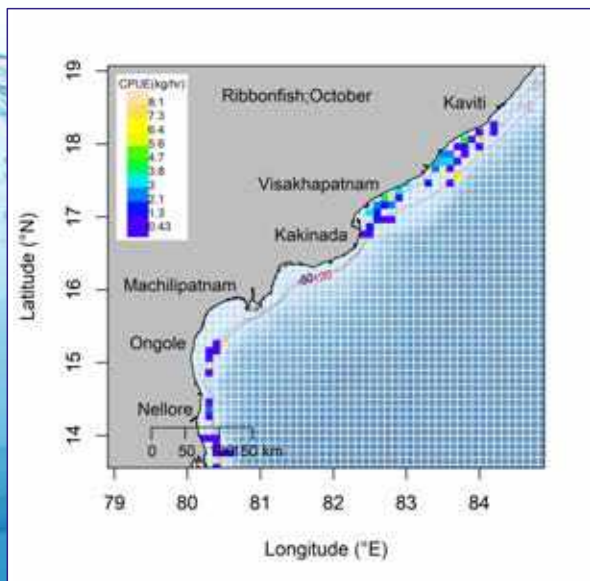
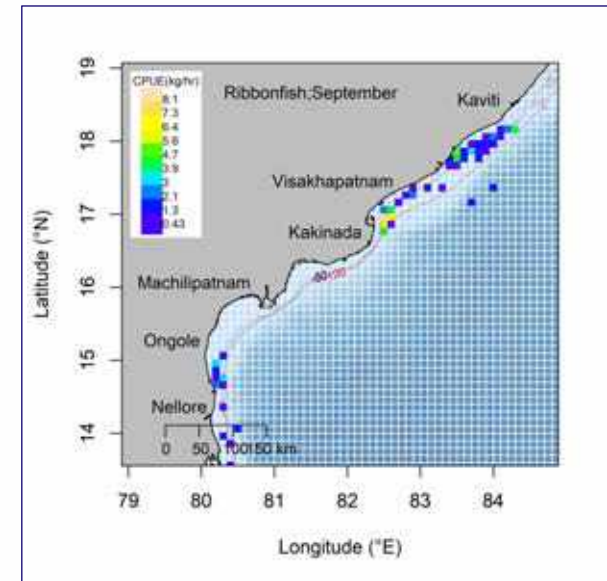
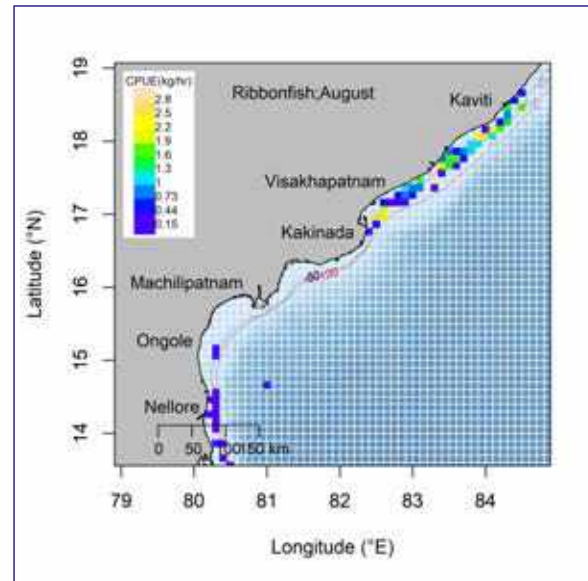
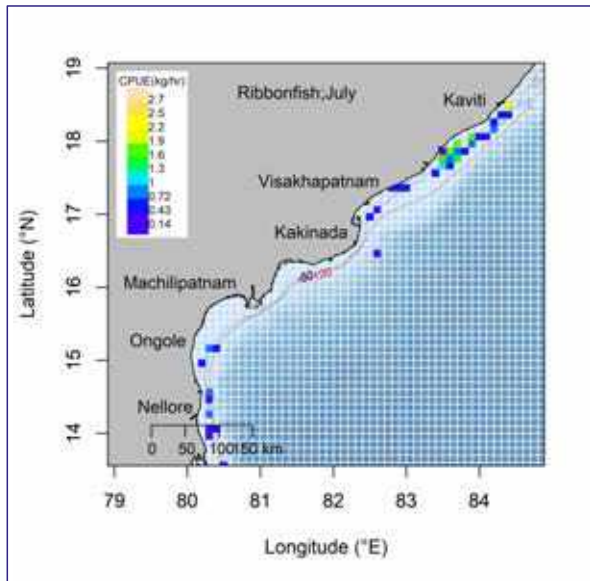




**Ribbonfish**



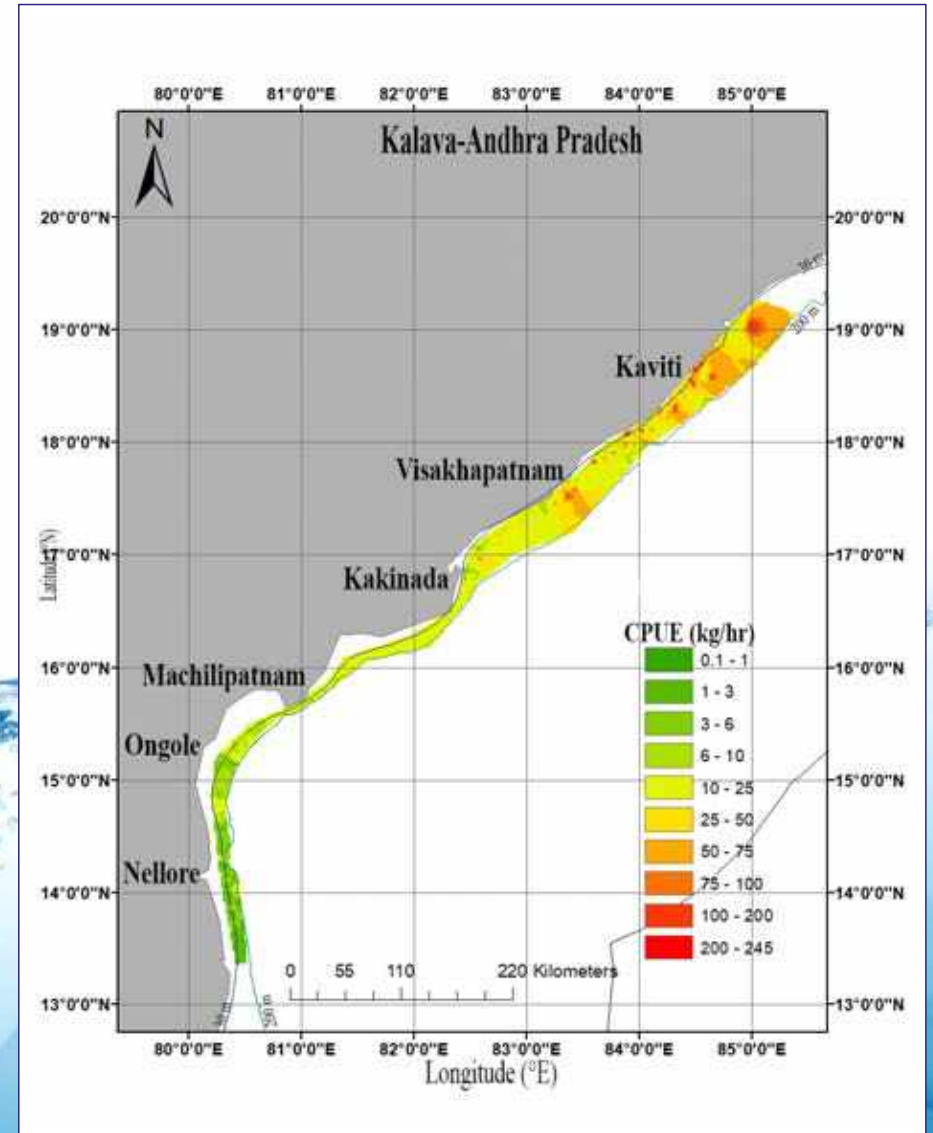


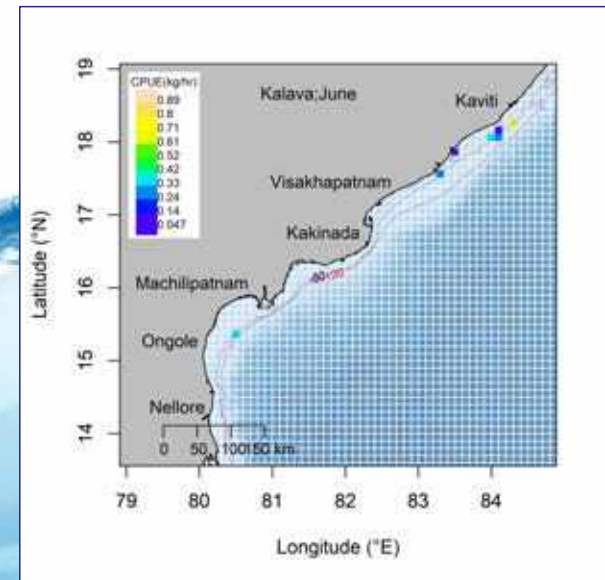
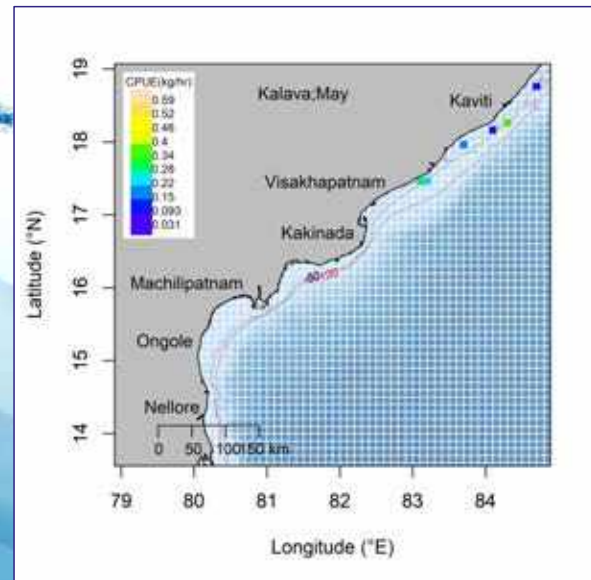
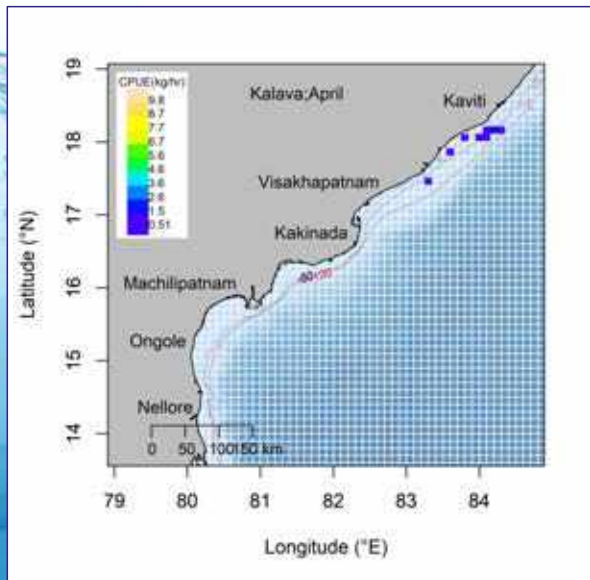
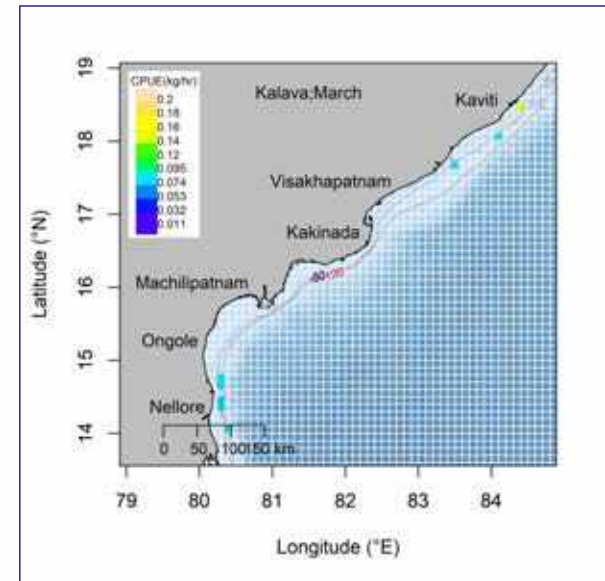
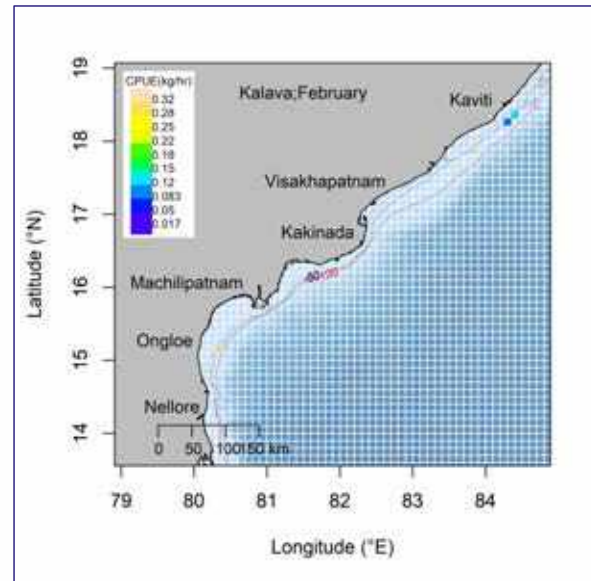
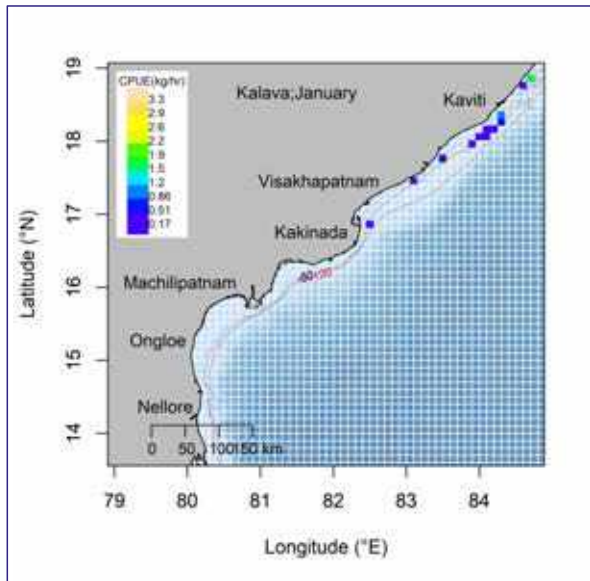


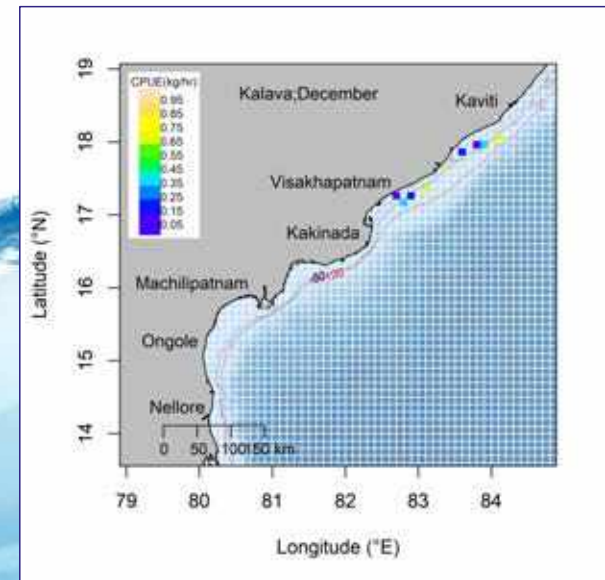
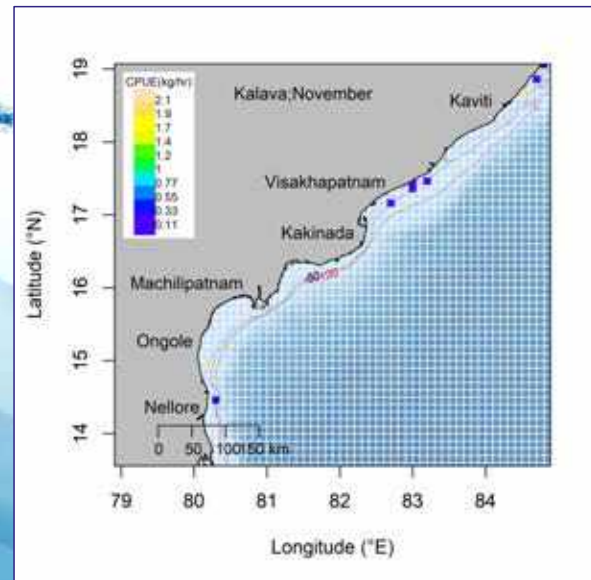
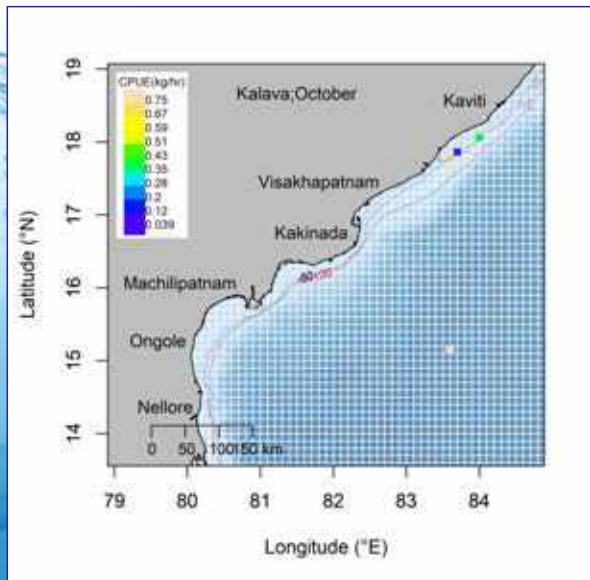
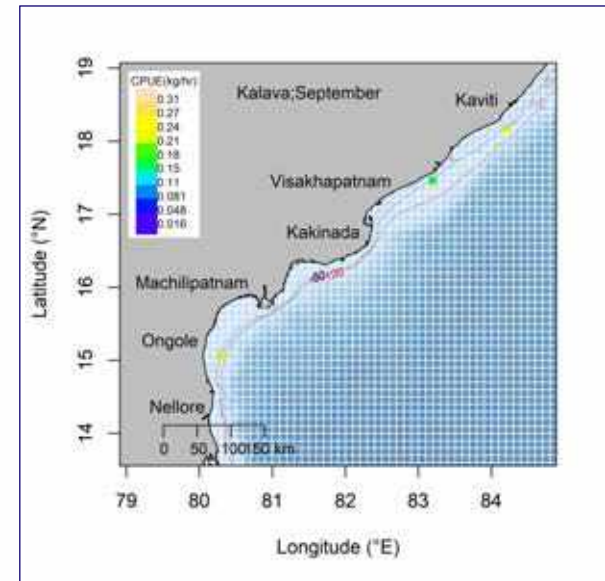
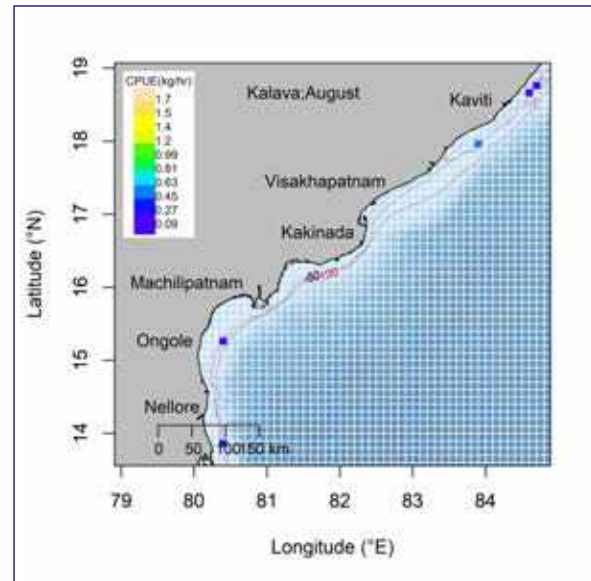
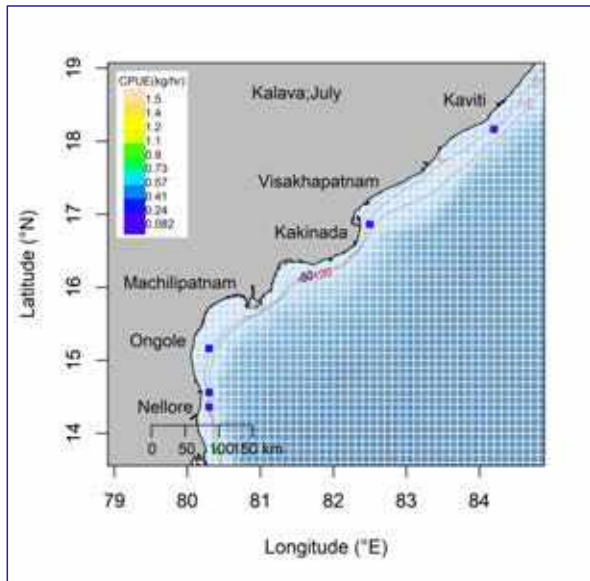




## Groupers (Kalava)

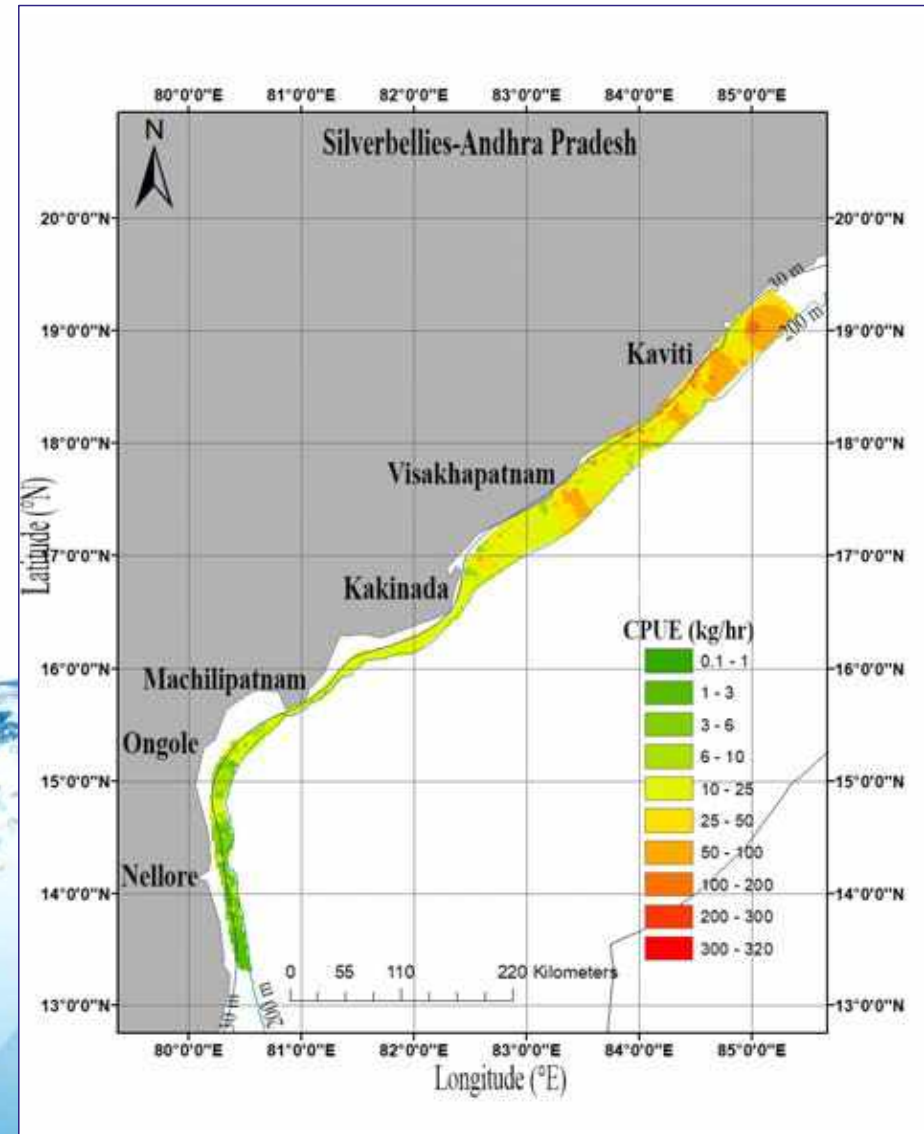


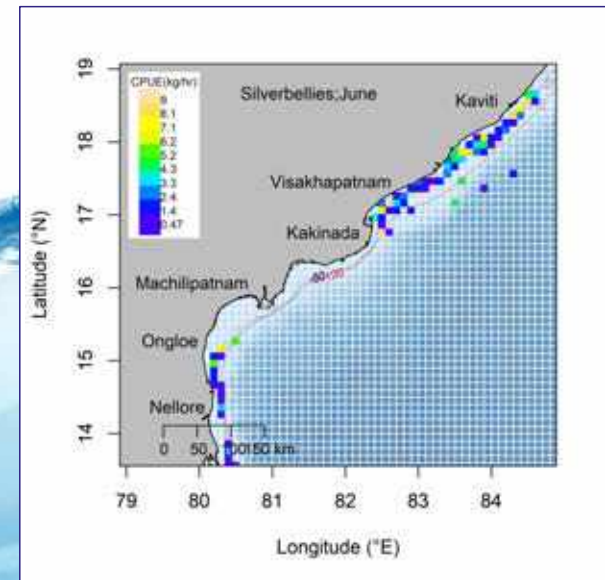
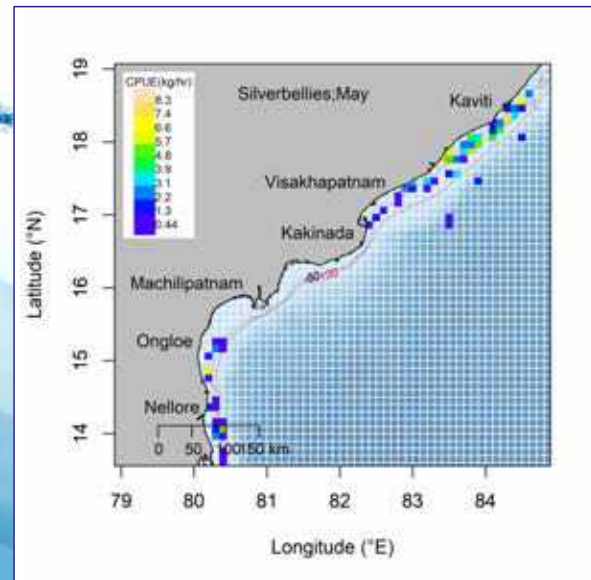
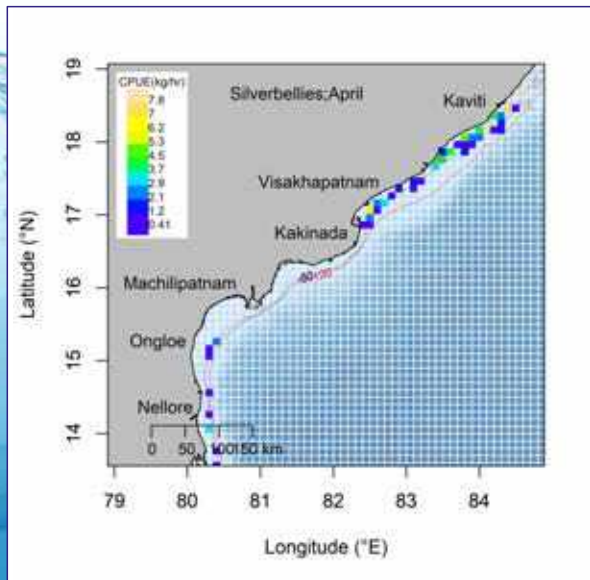
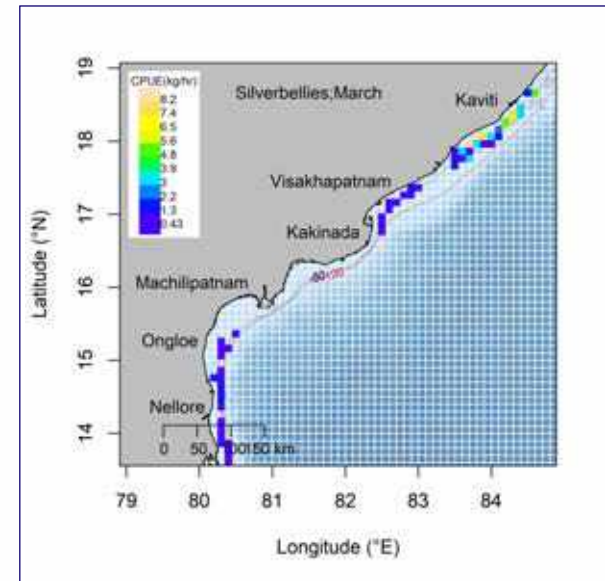
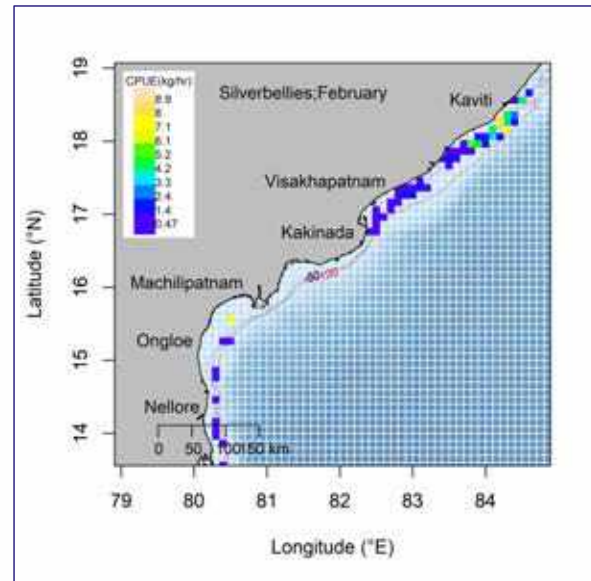
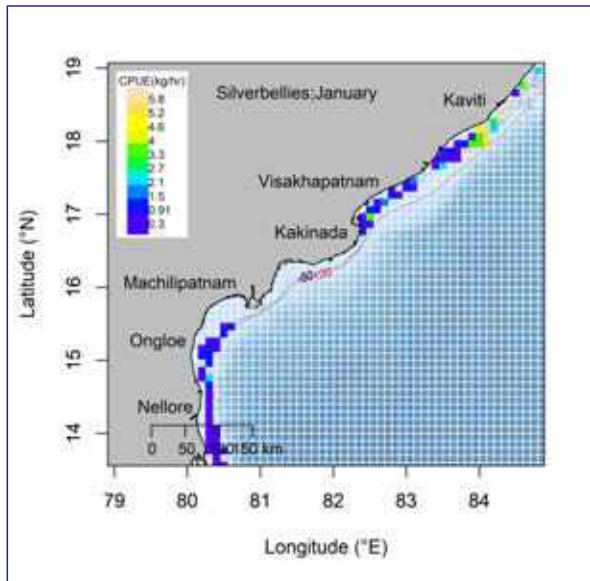


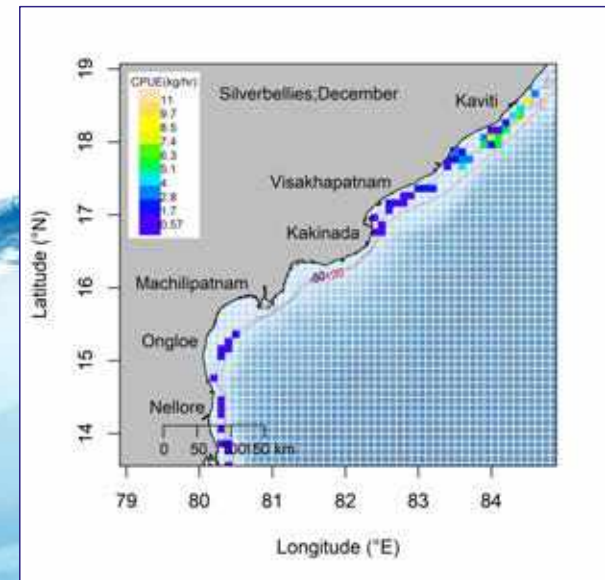
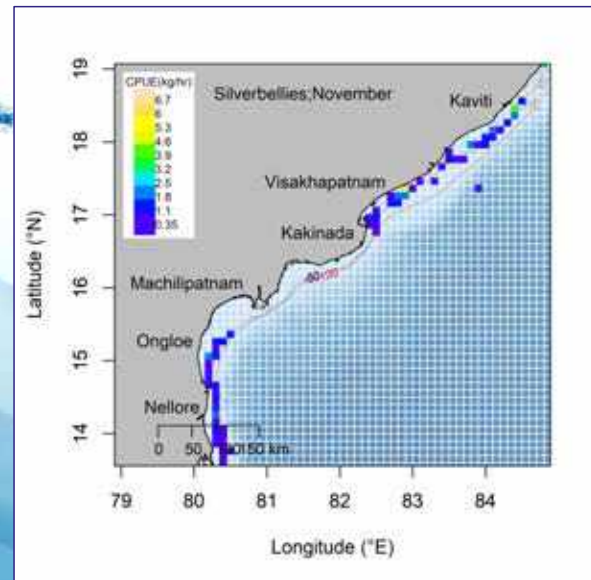
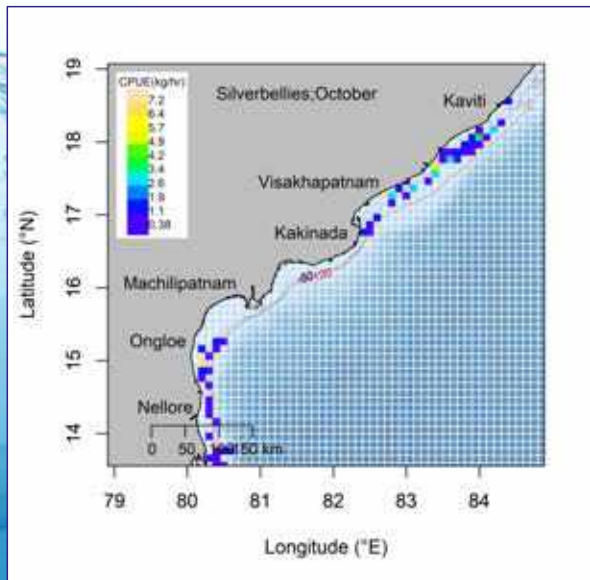
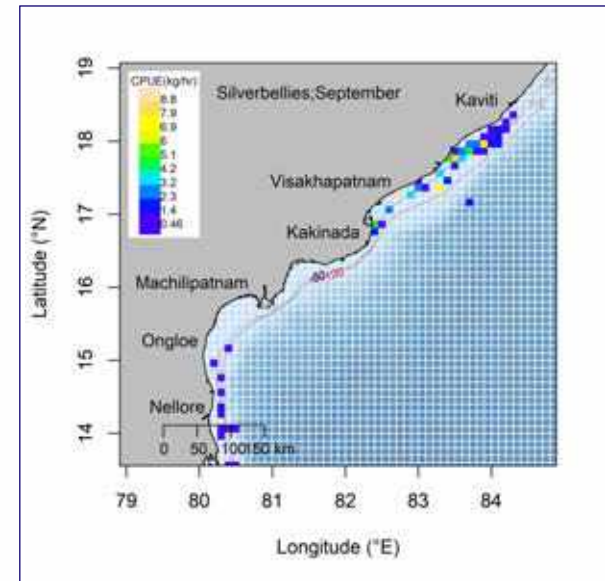
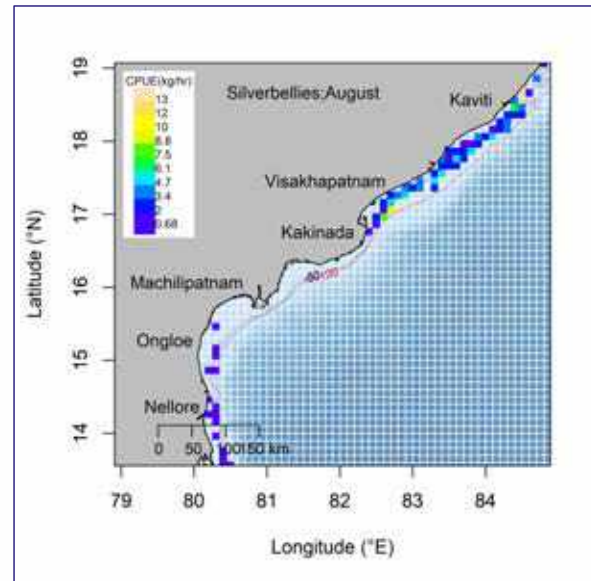
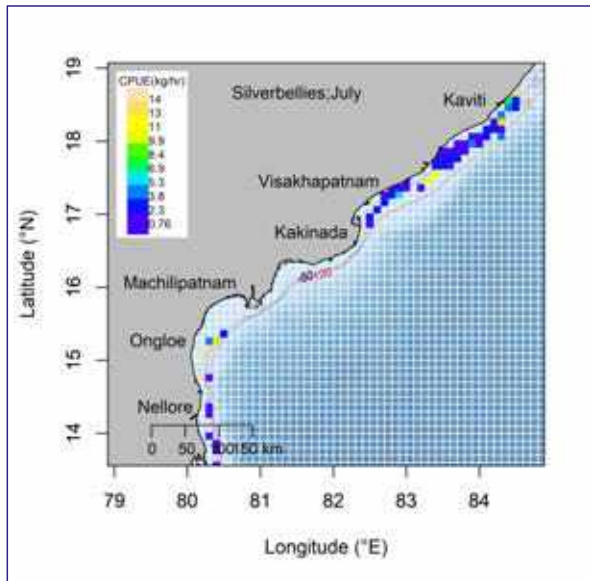


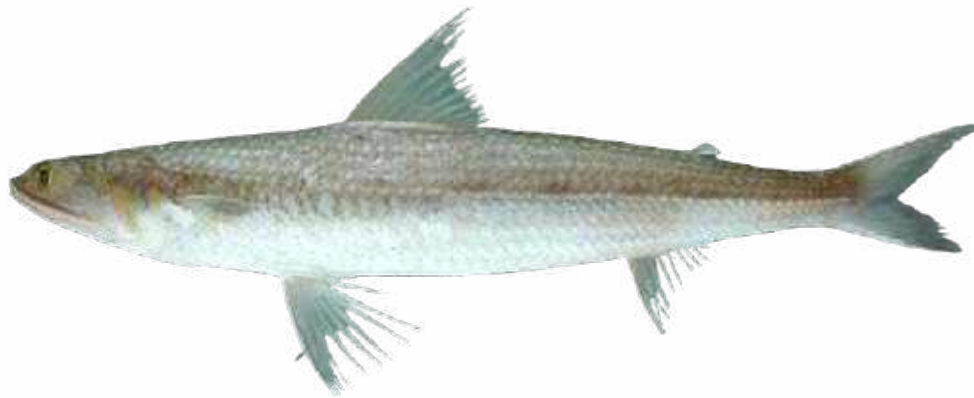


# Silverbellies

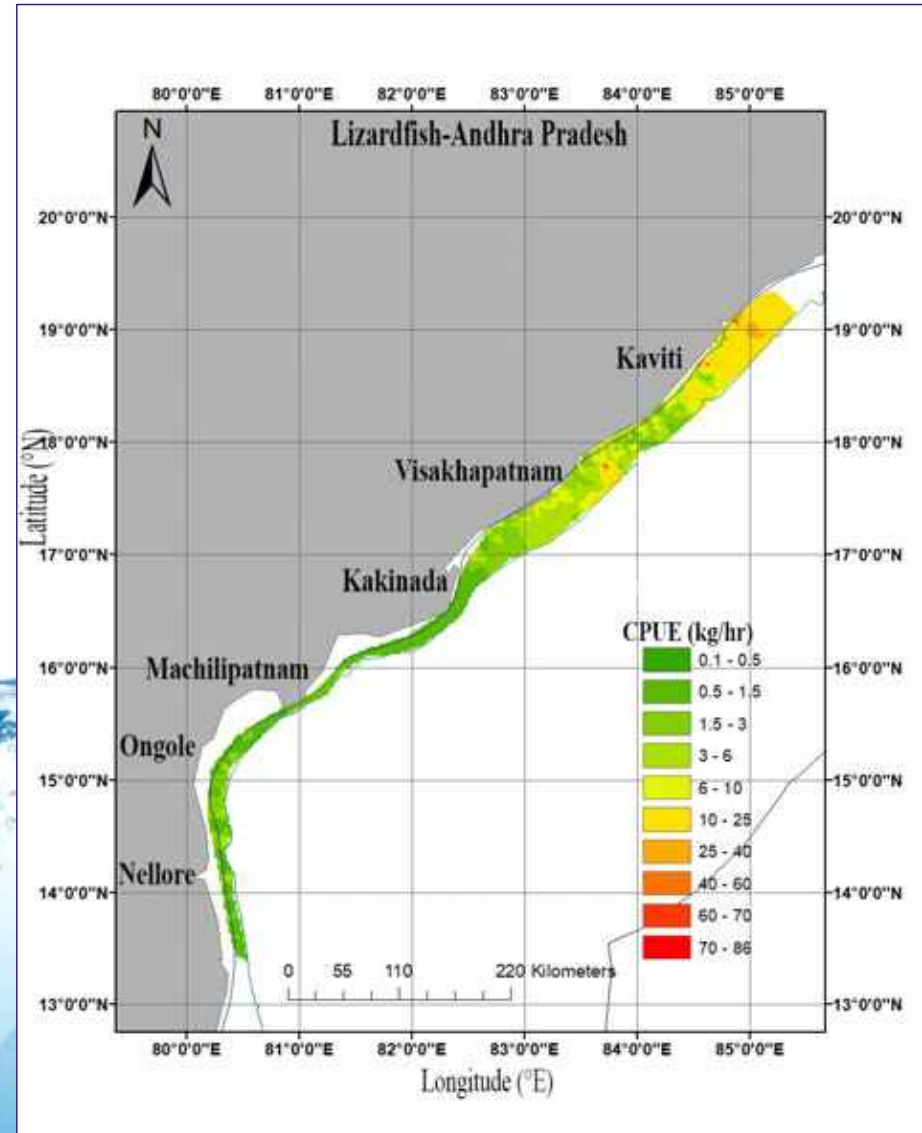


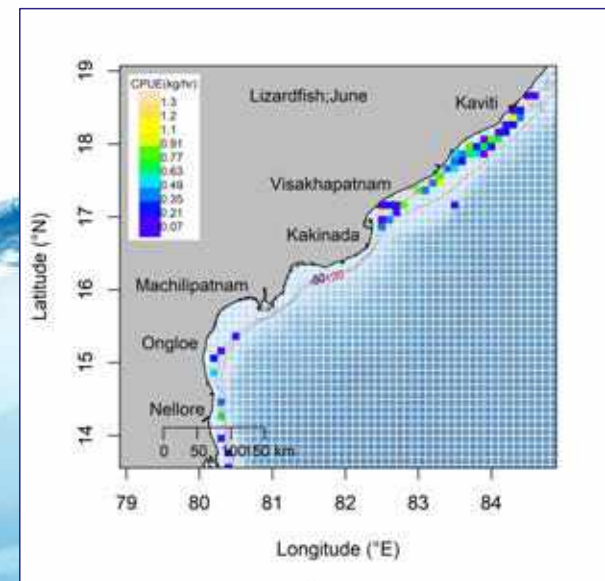
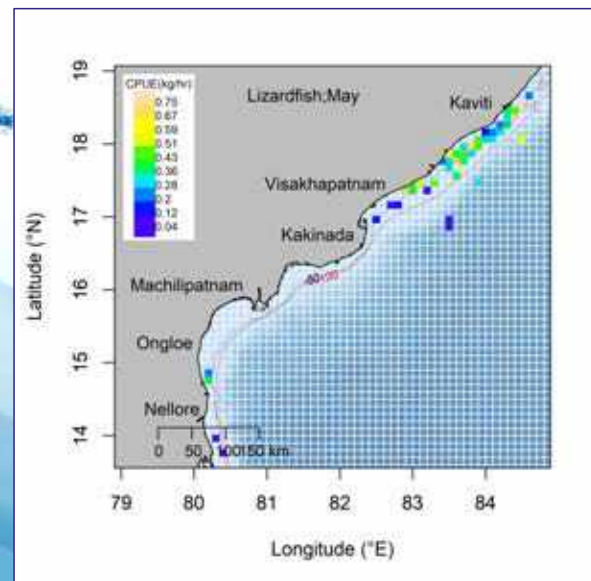
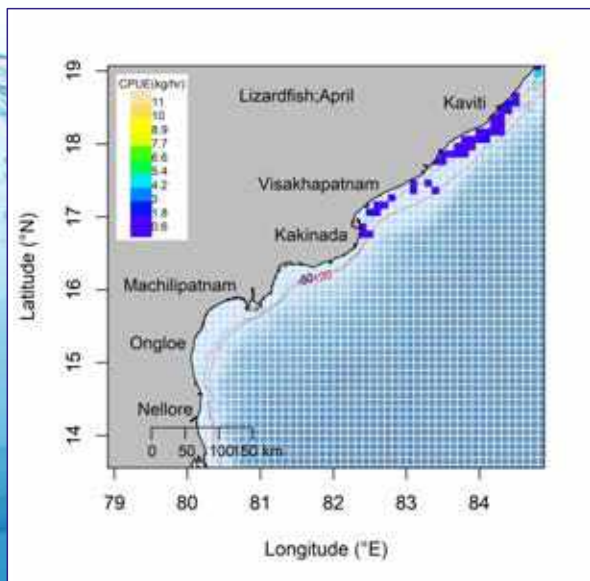
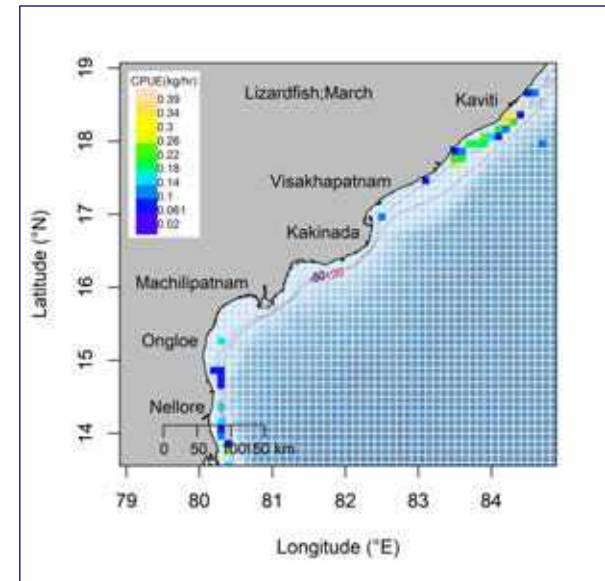
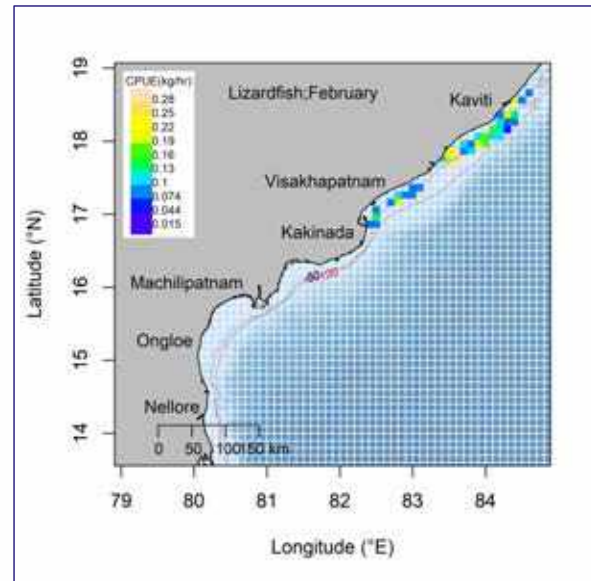
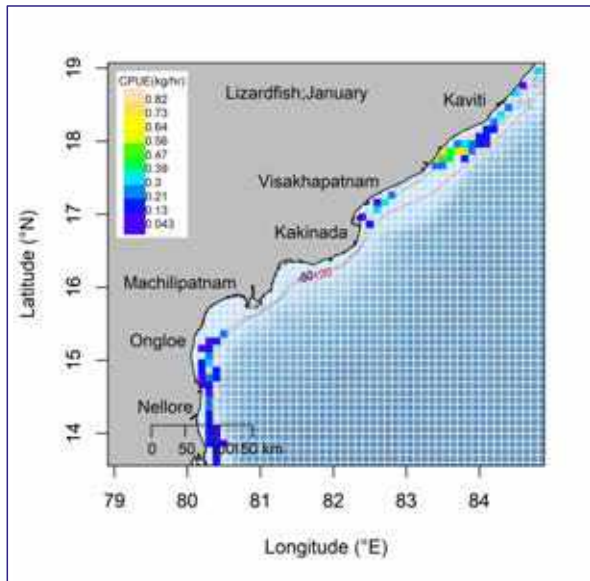




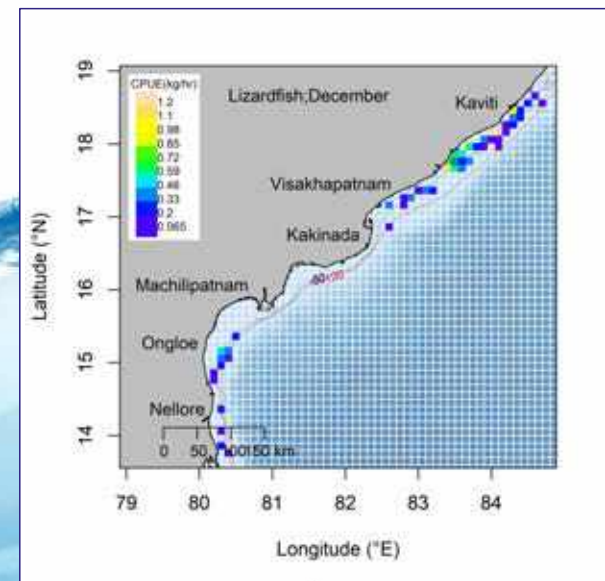
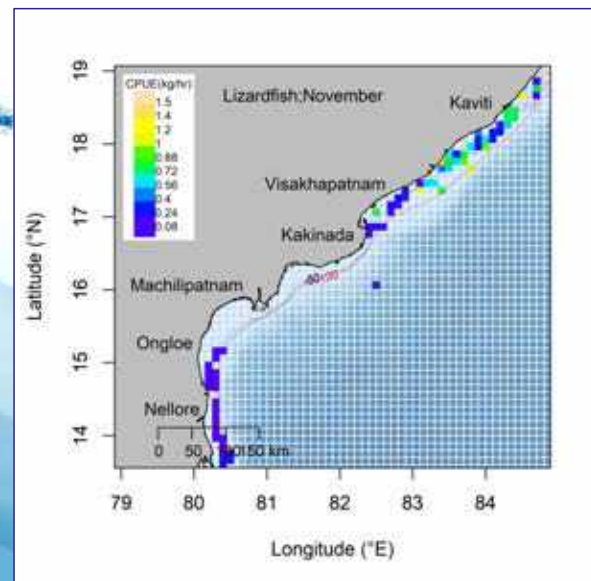
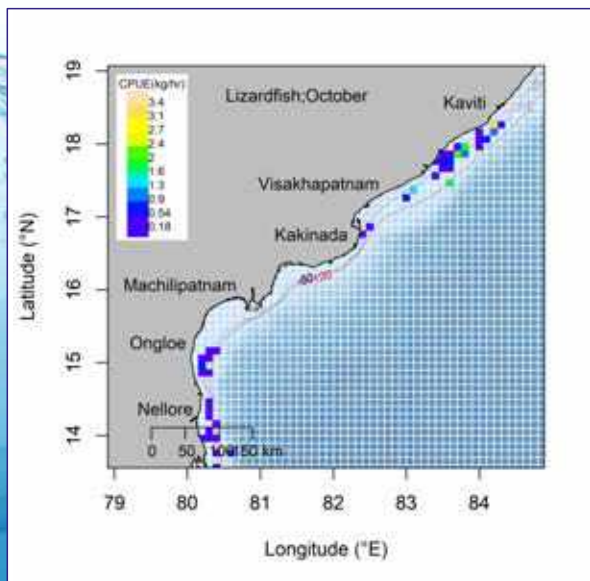
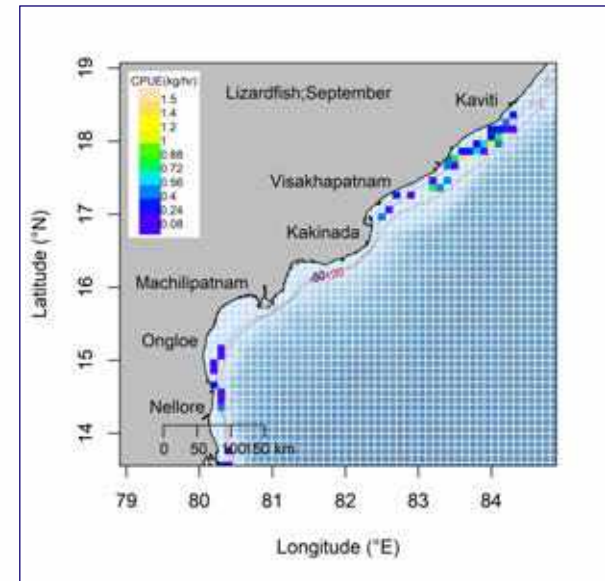
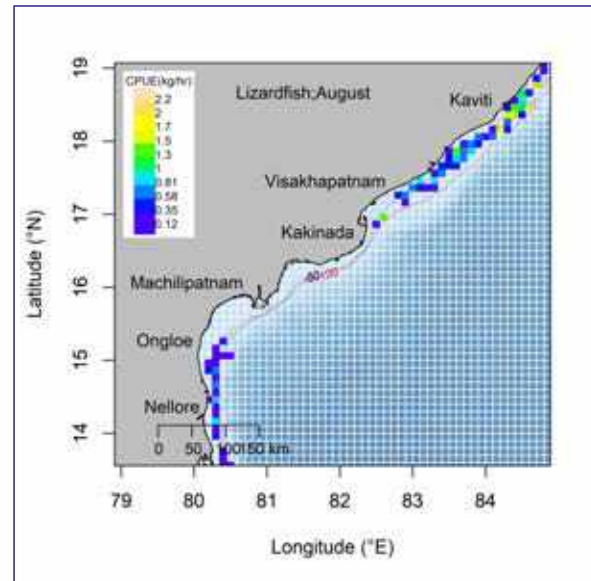
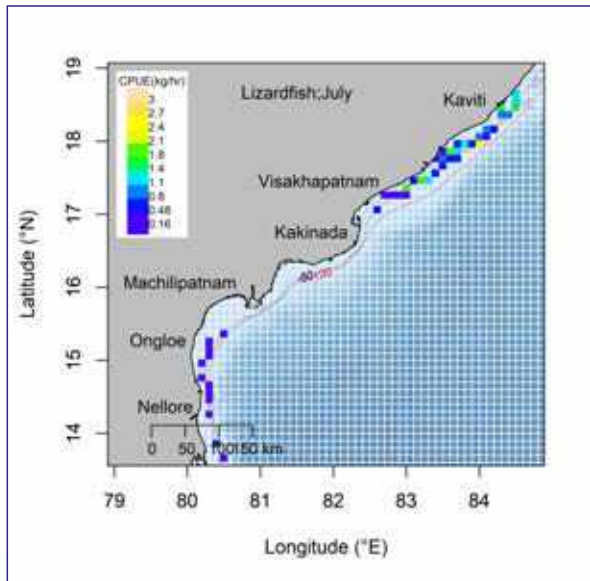


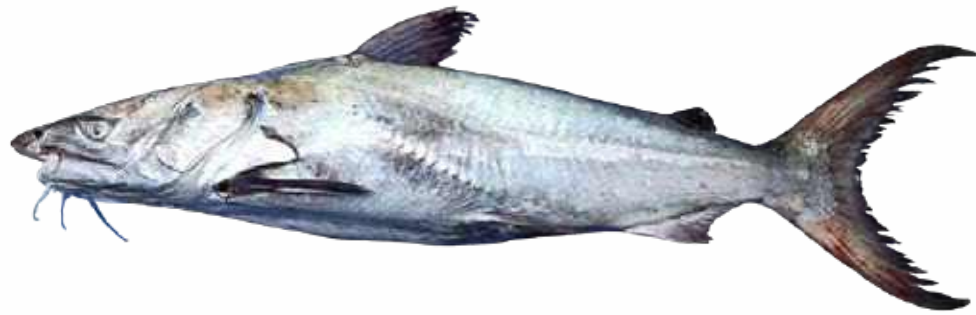
**Lizard Fish**



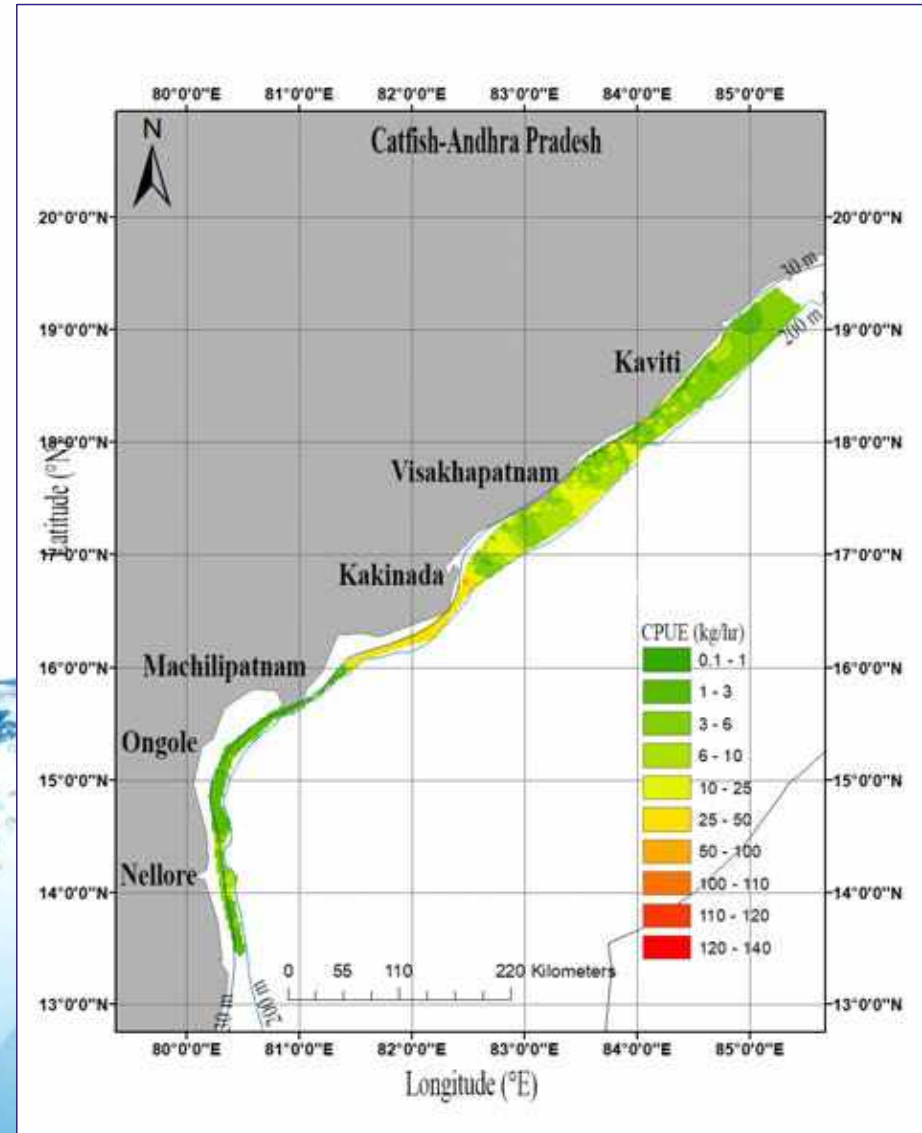


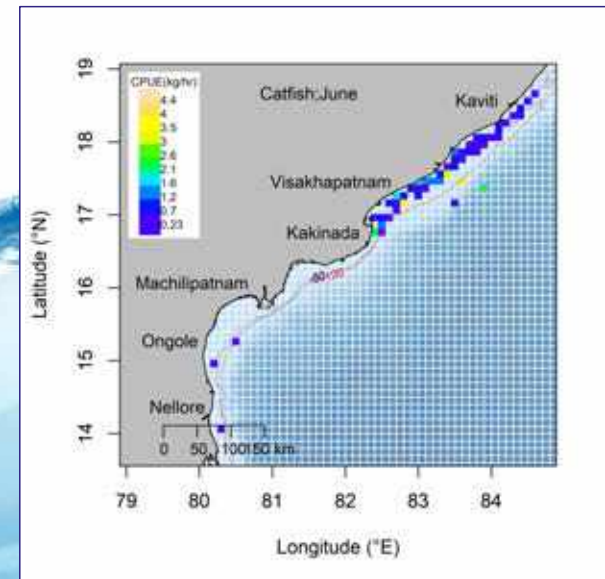
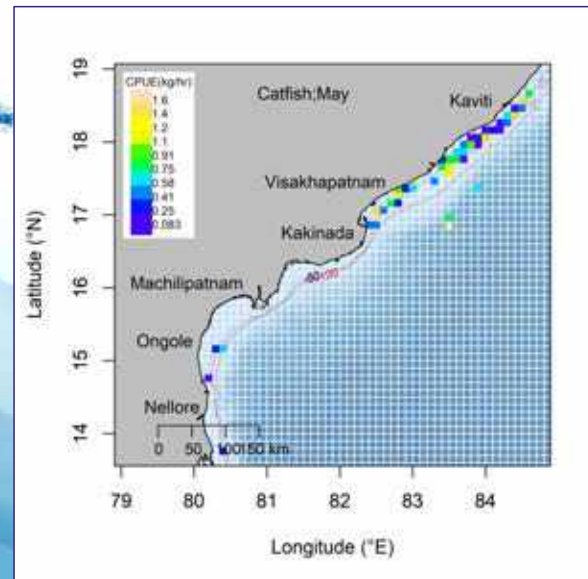
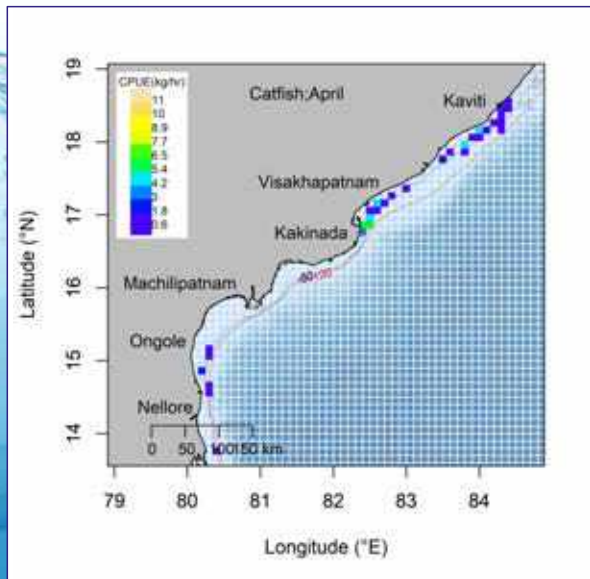
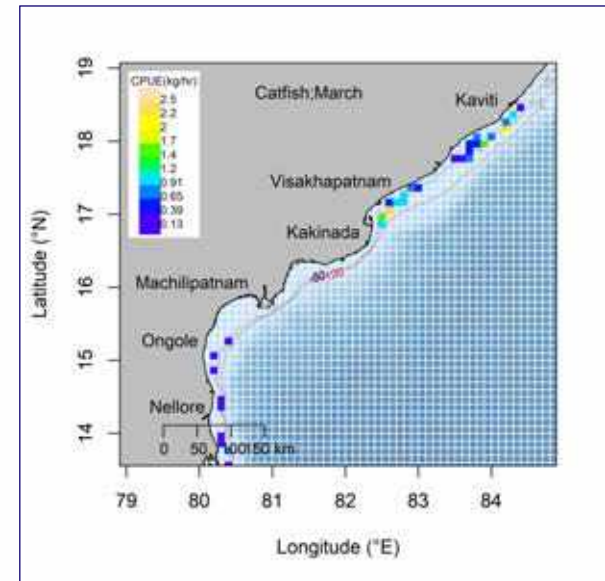
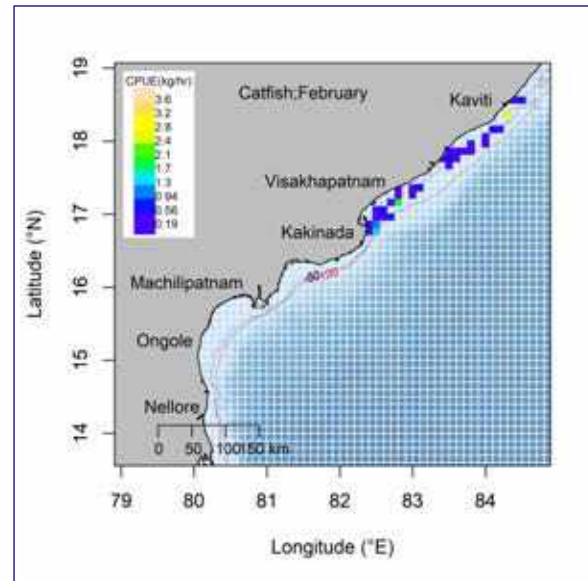
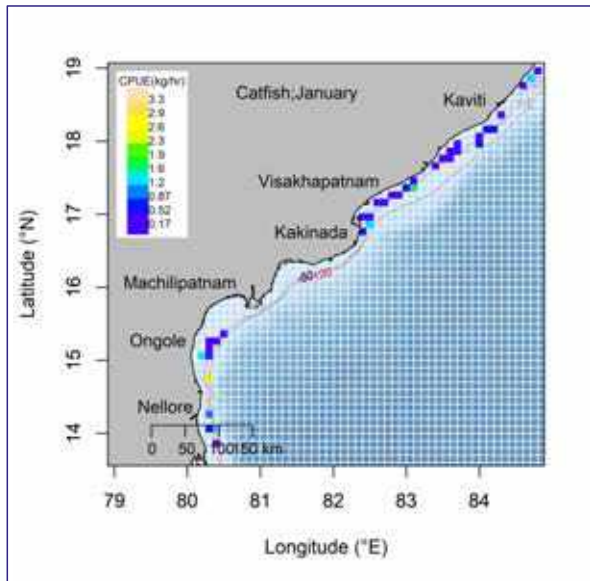


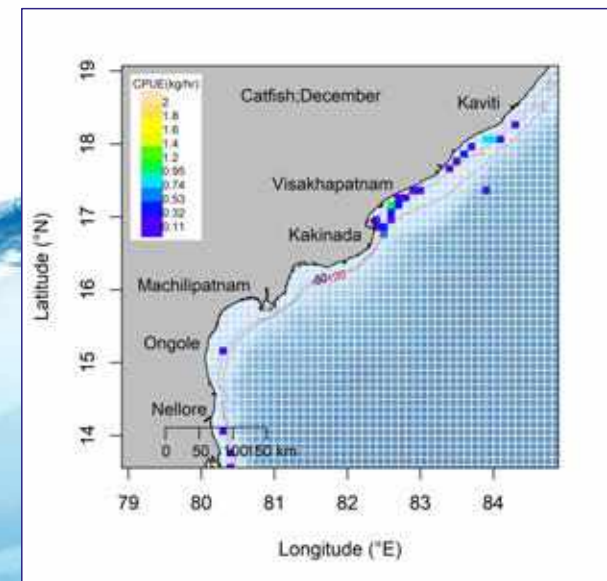
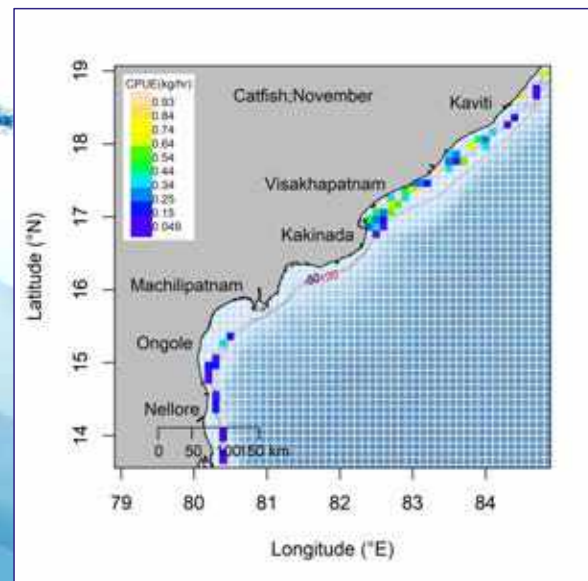
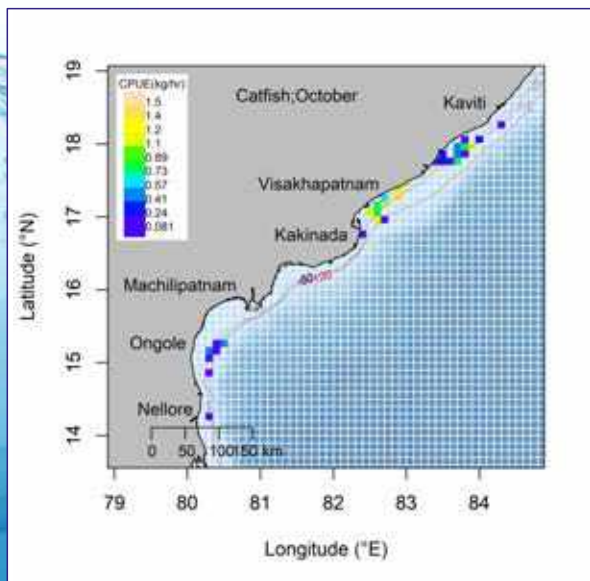
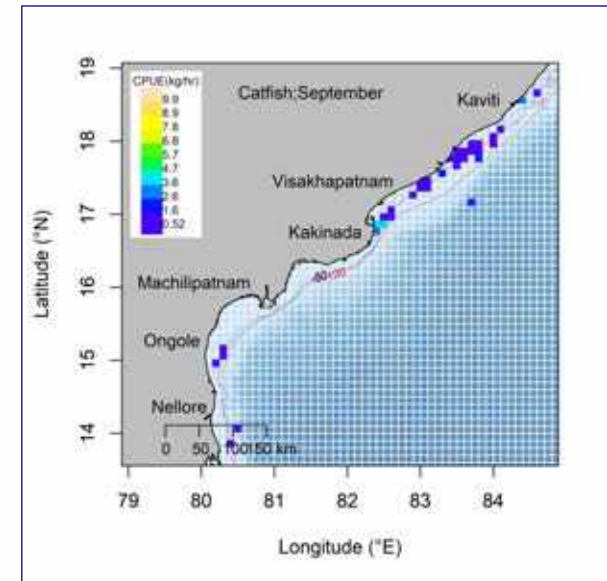
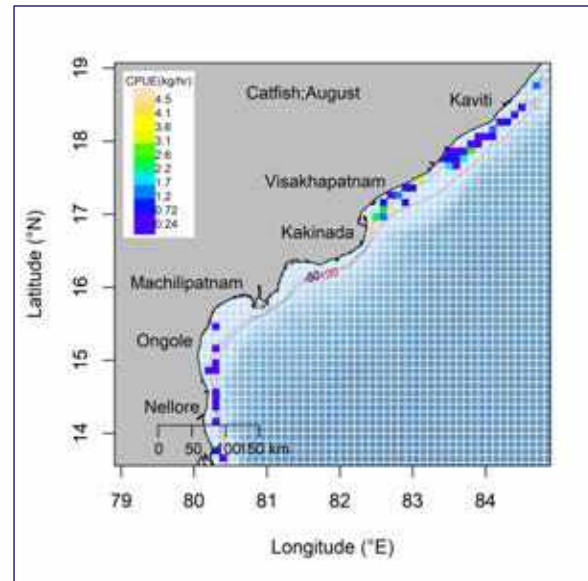
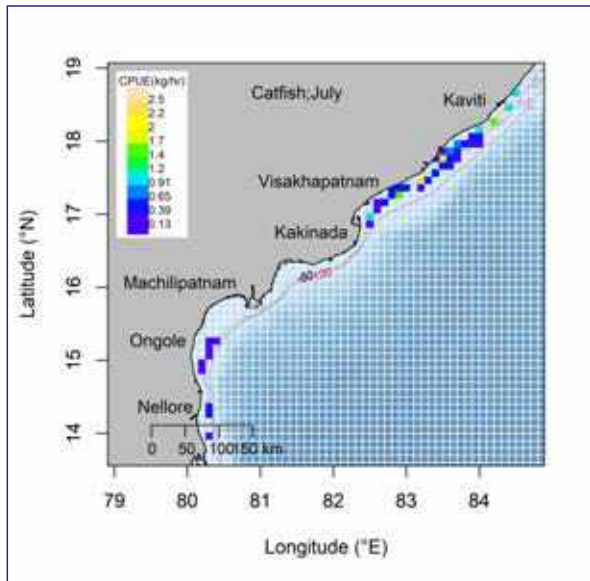


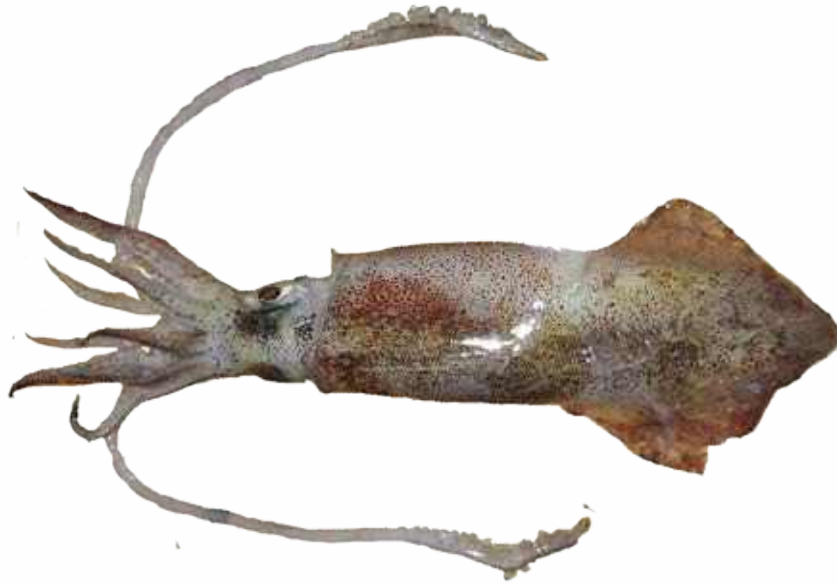


Cat Fish

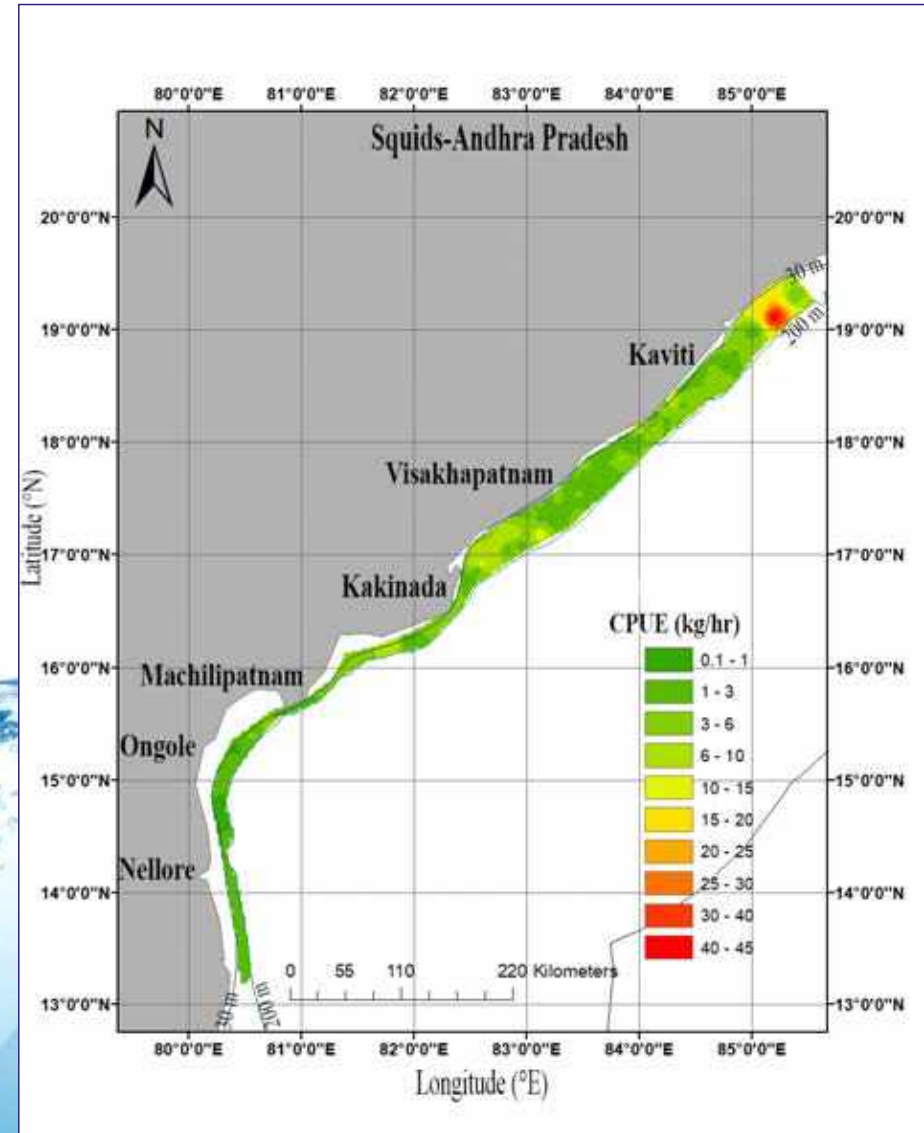


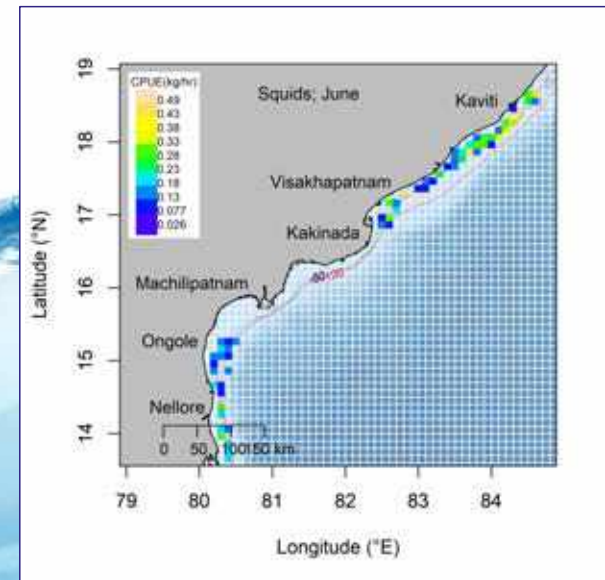
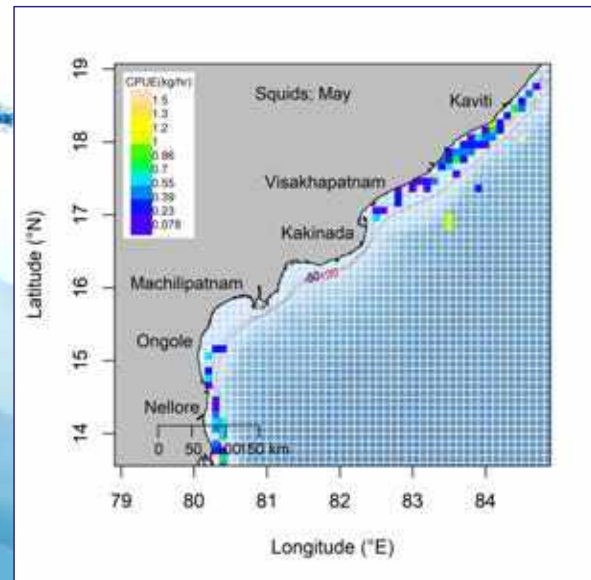
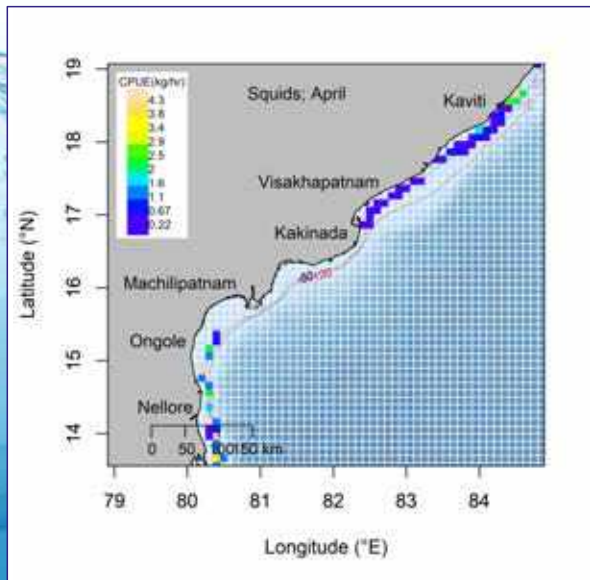
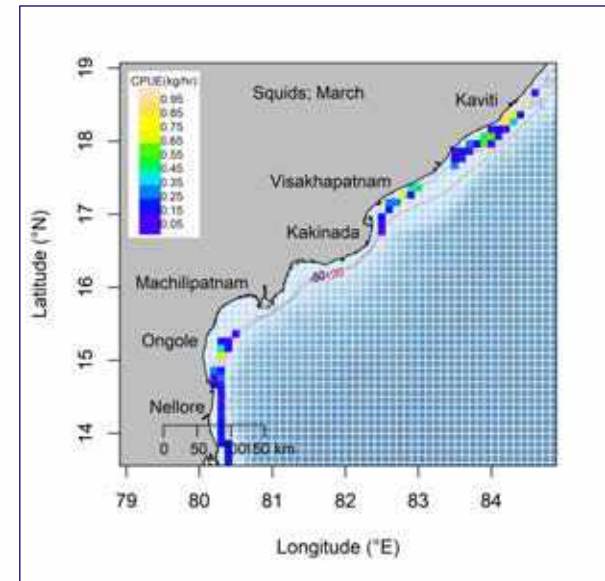
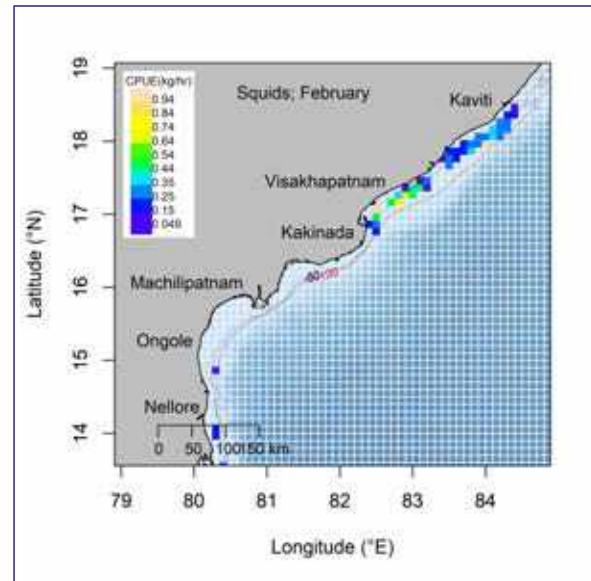
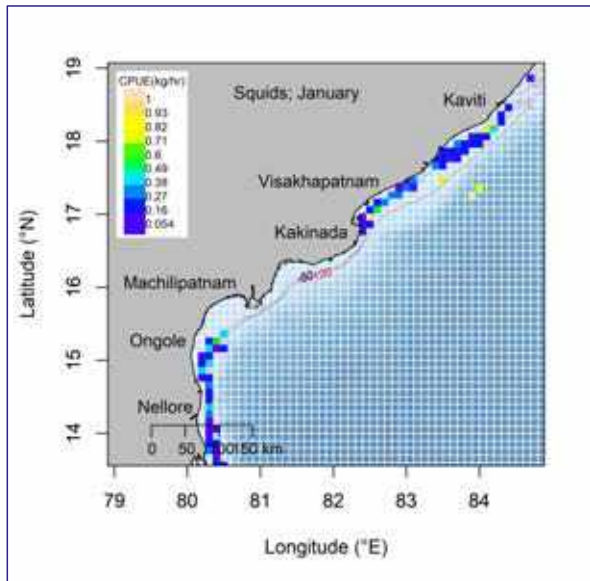


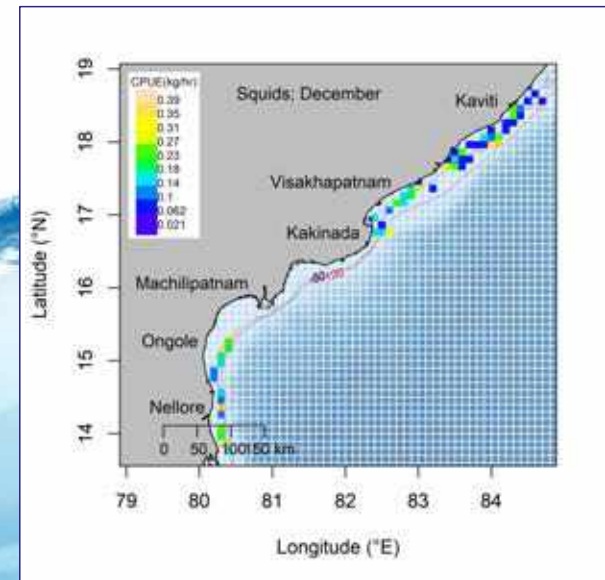
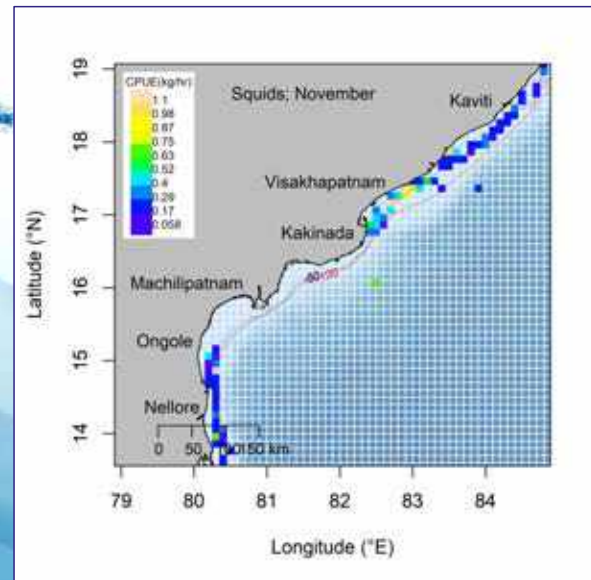
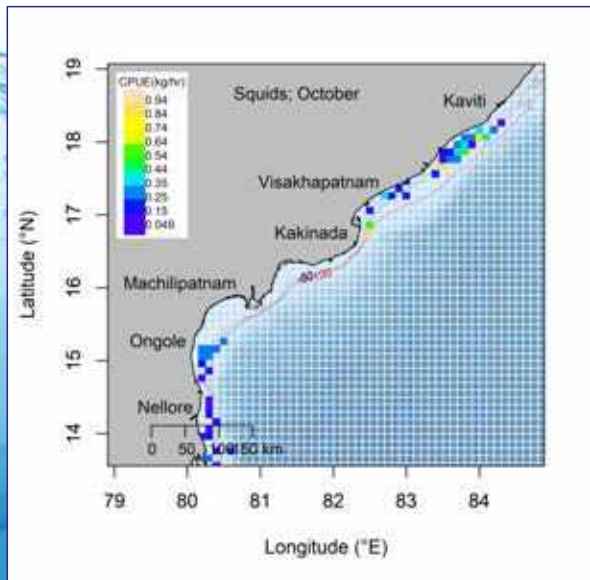
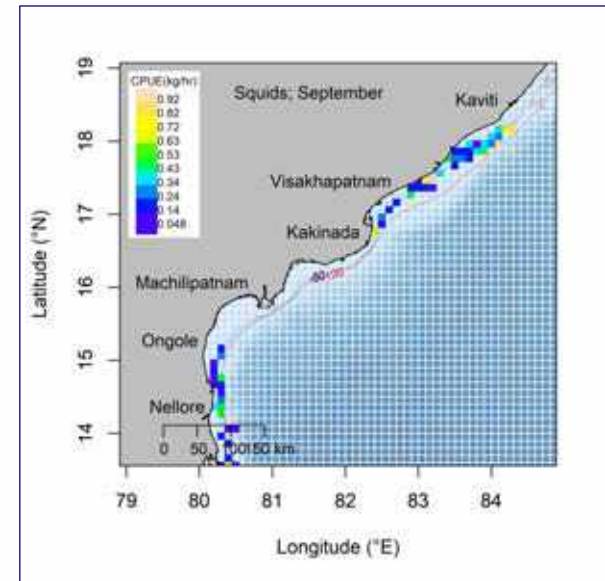
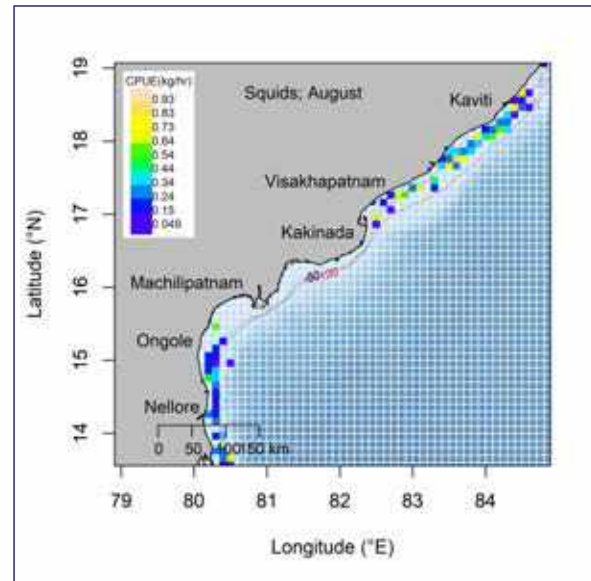
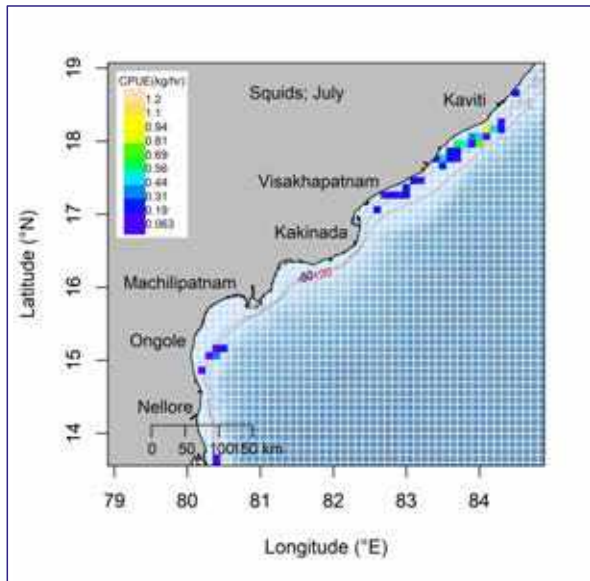




# Squids



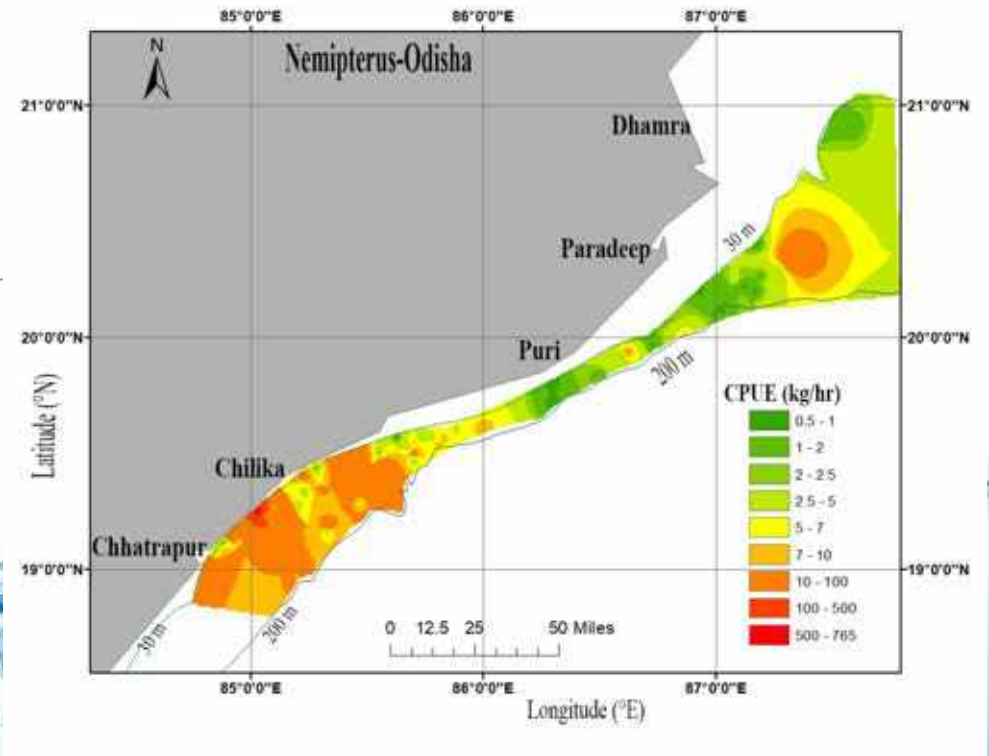




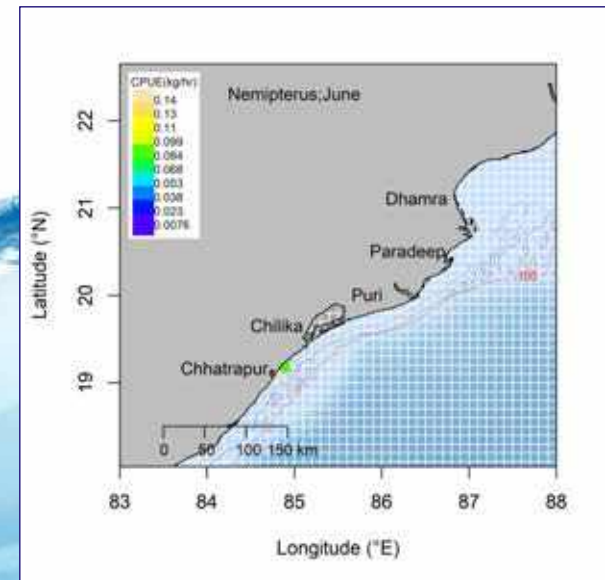
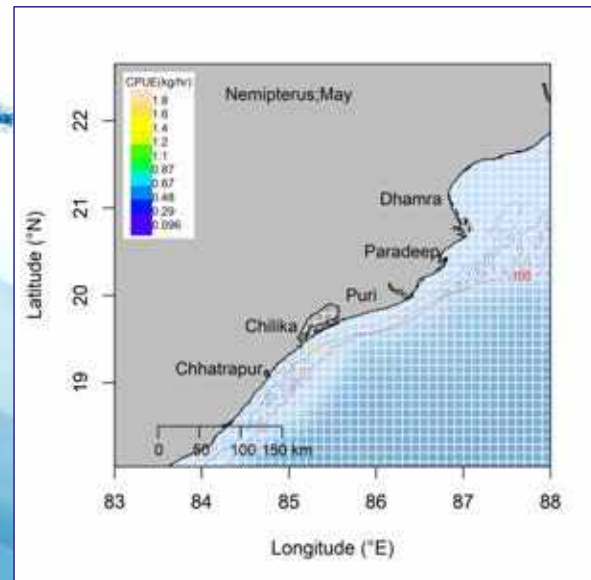
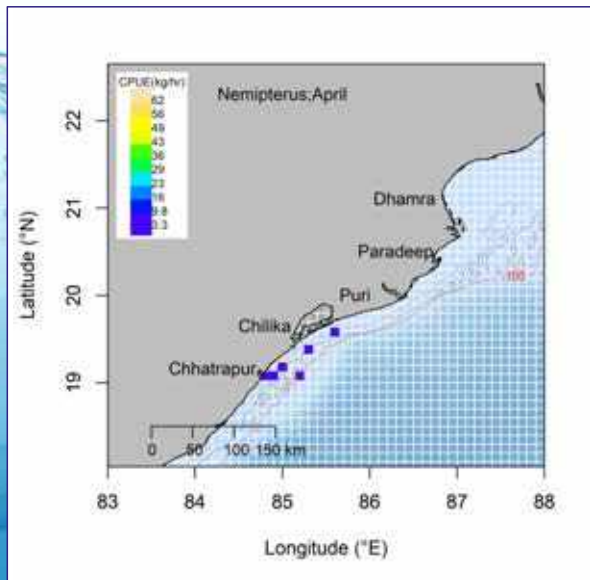
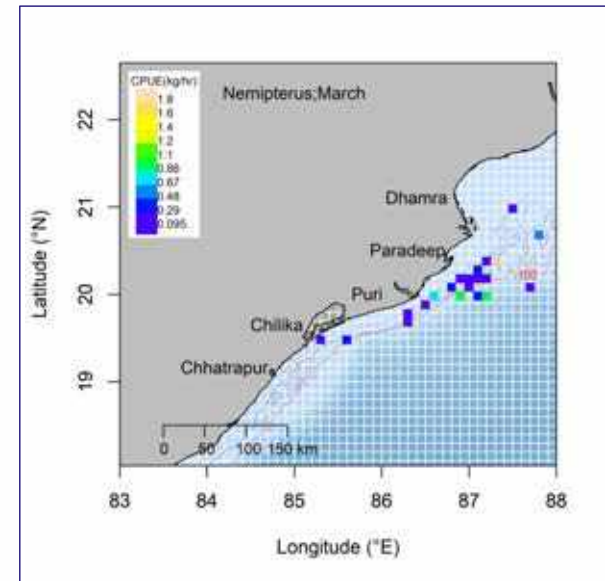
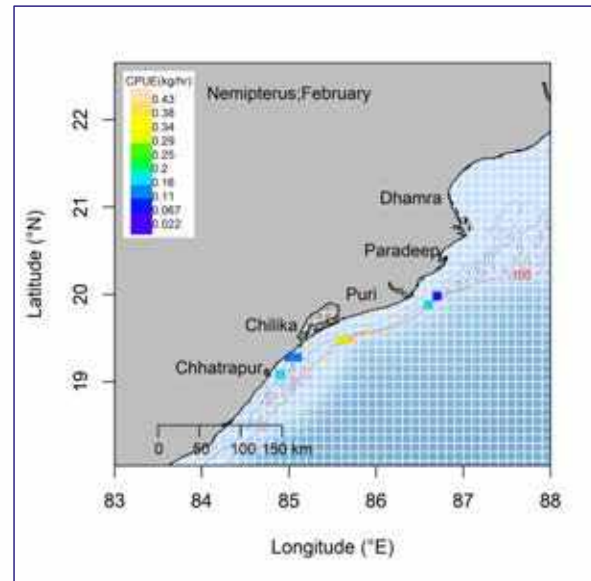
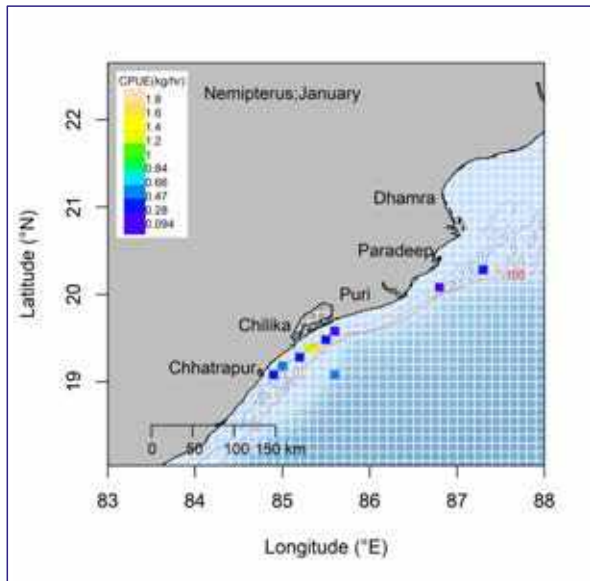
# 3.8 Spatial distribution and abundance along Odisha coast

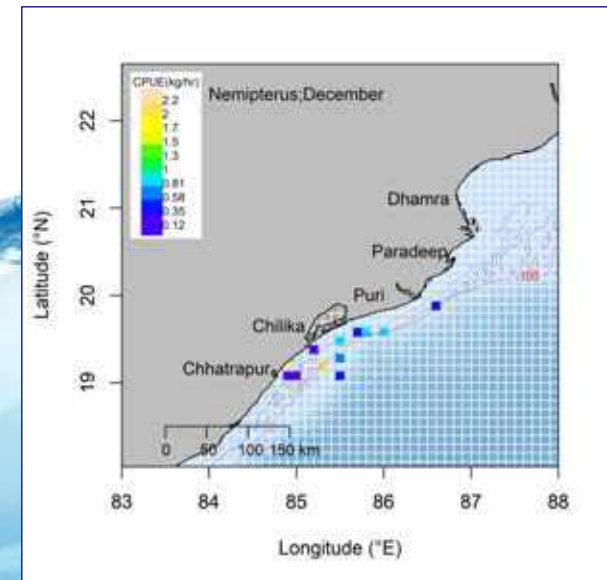
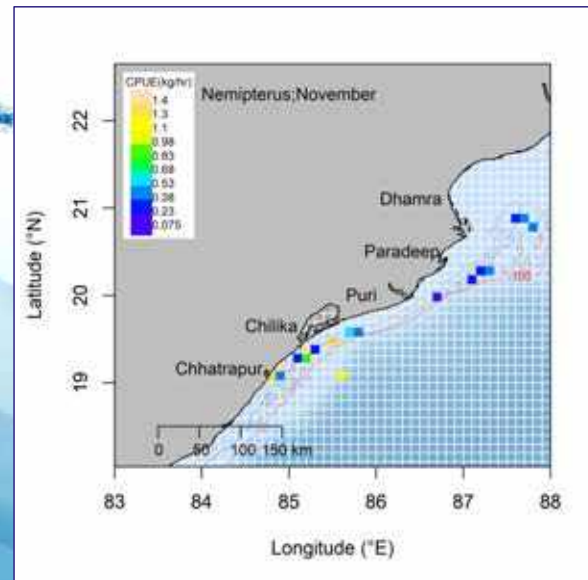
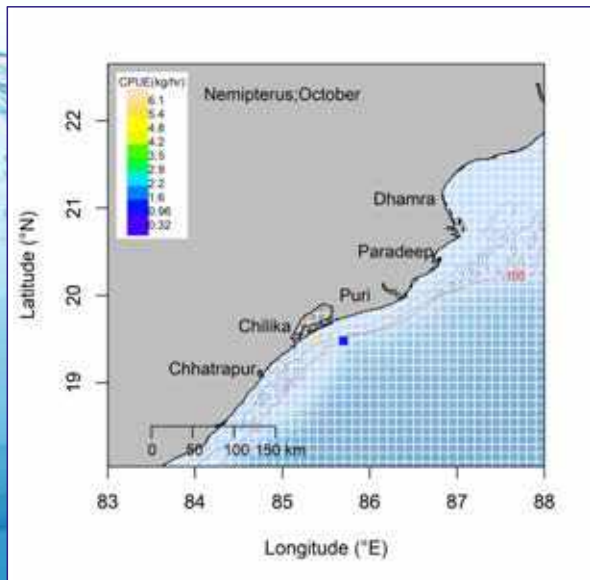
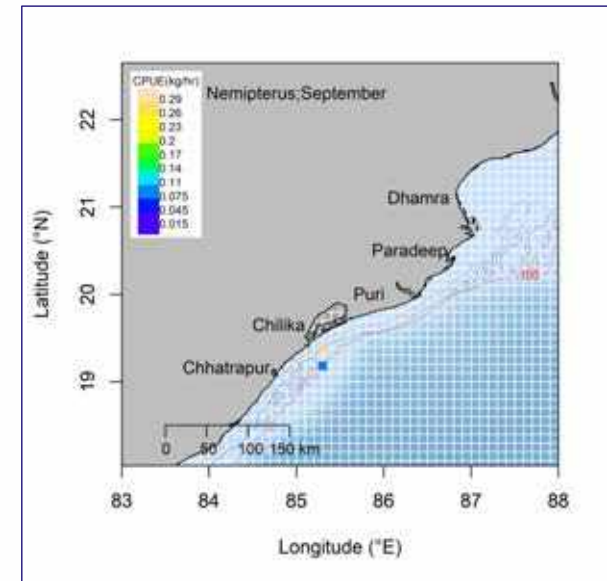
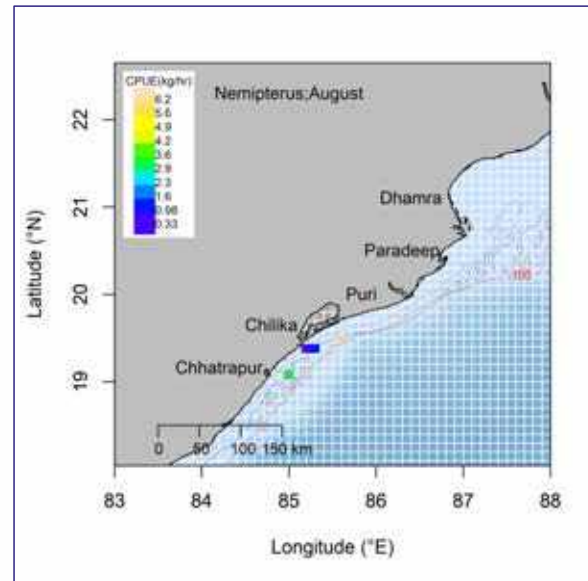
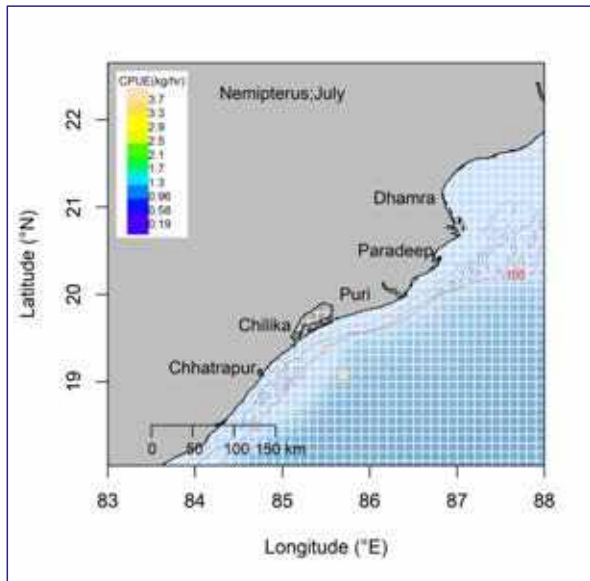






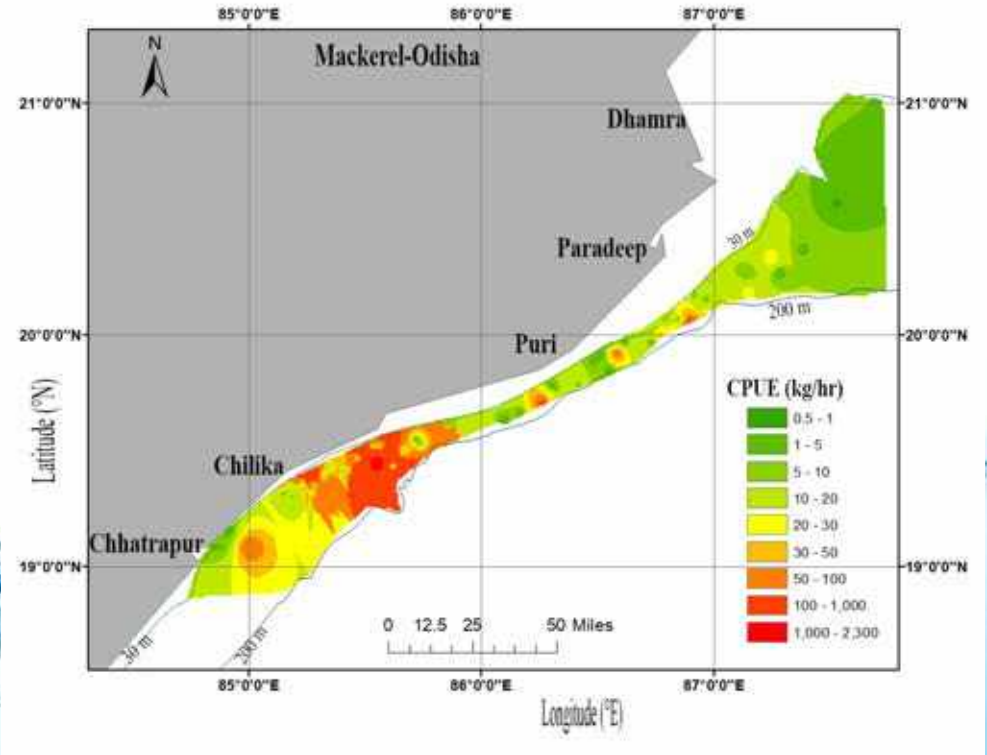
## Threadfin Breams (Nemipterus)

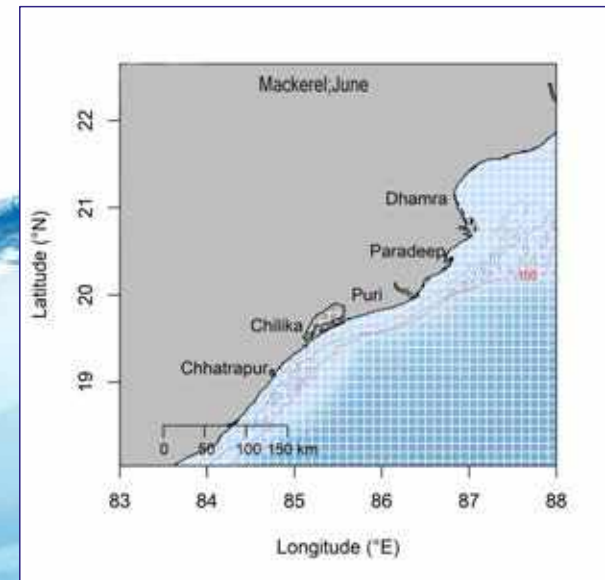
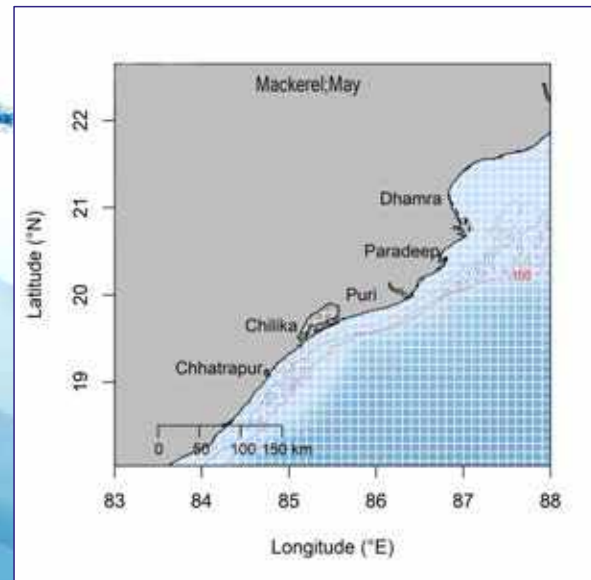
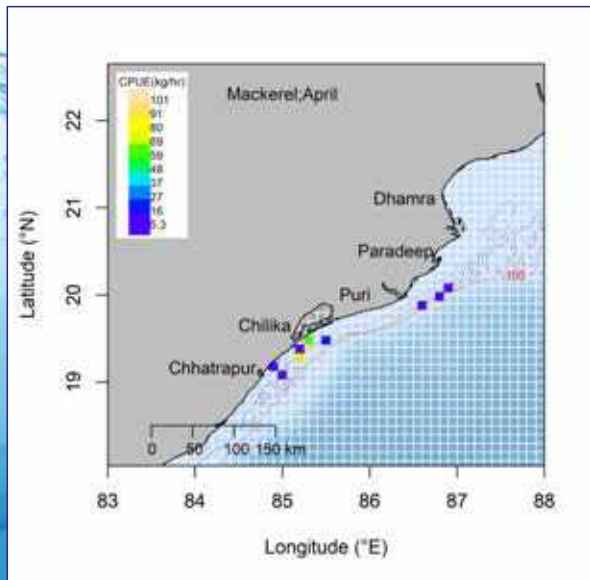
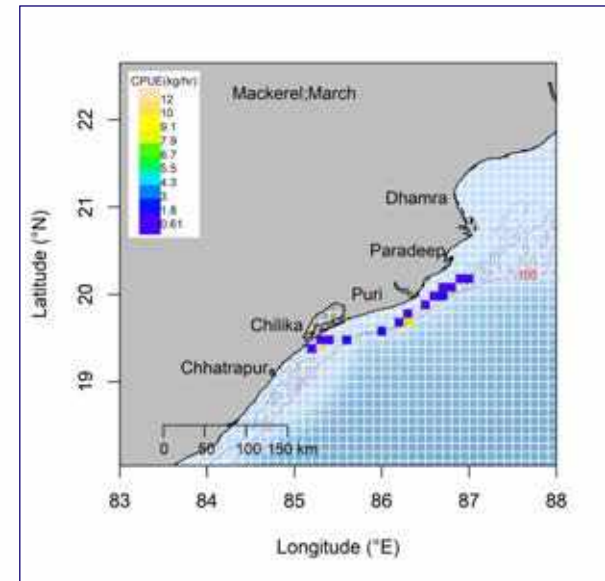
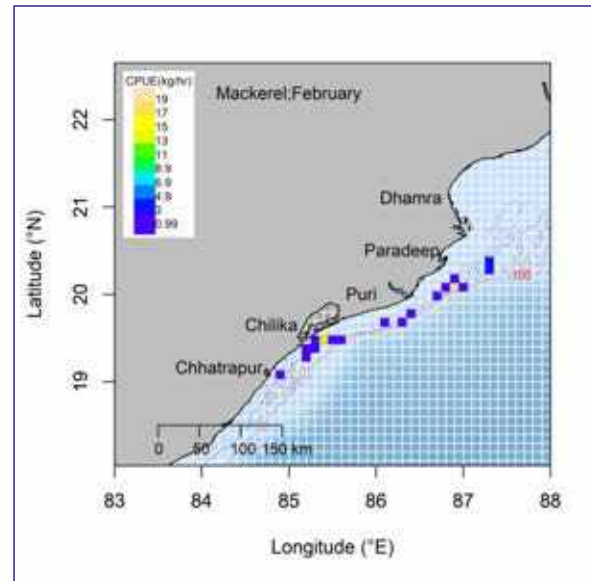
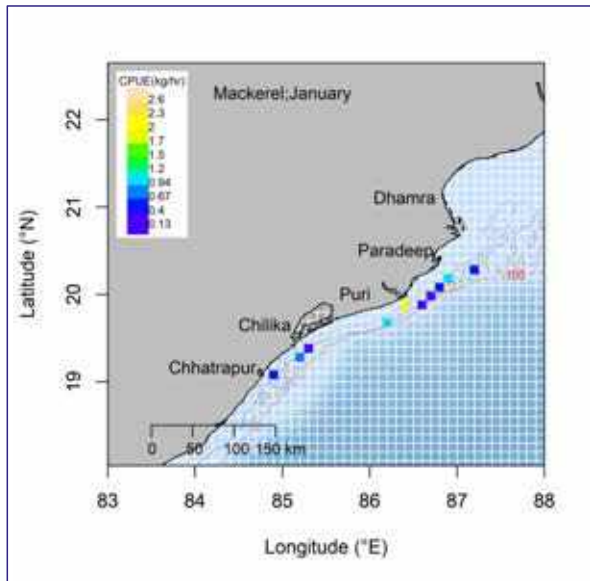


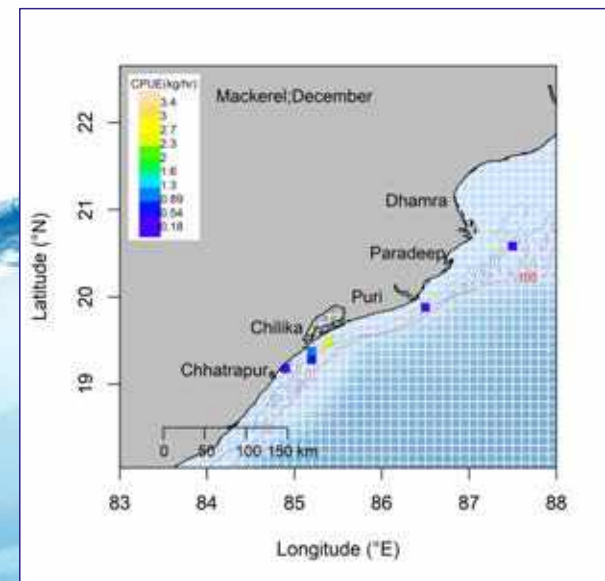
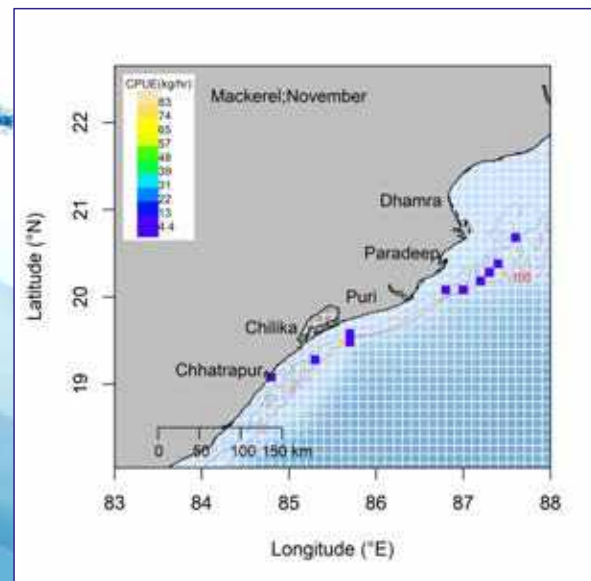
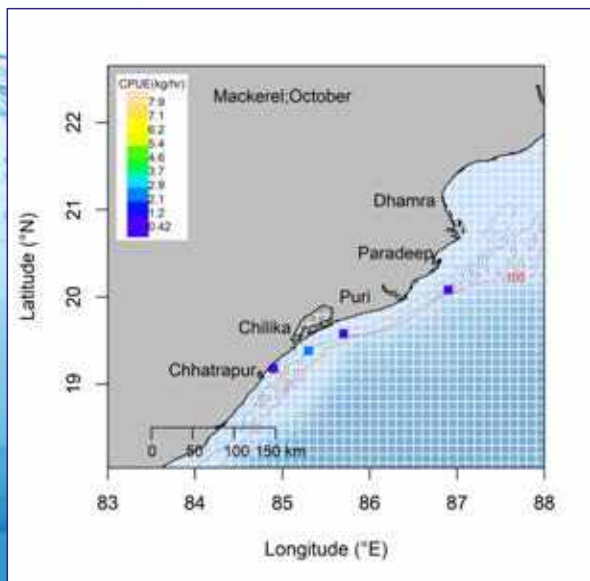
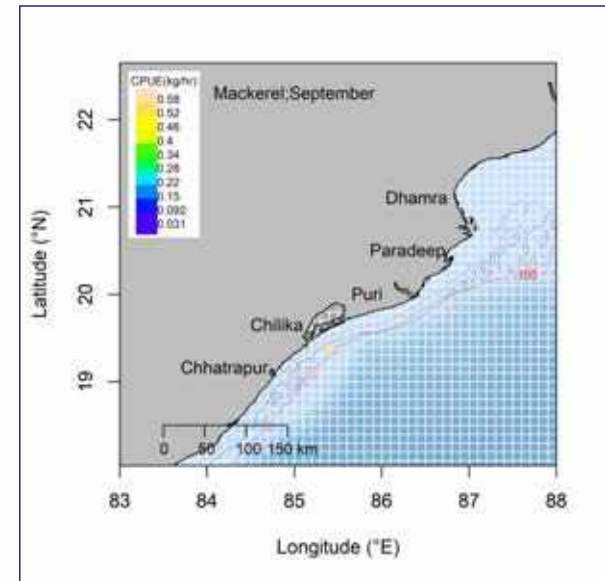
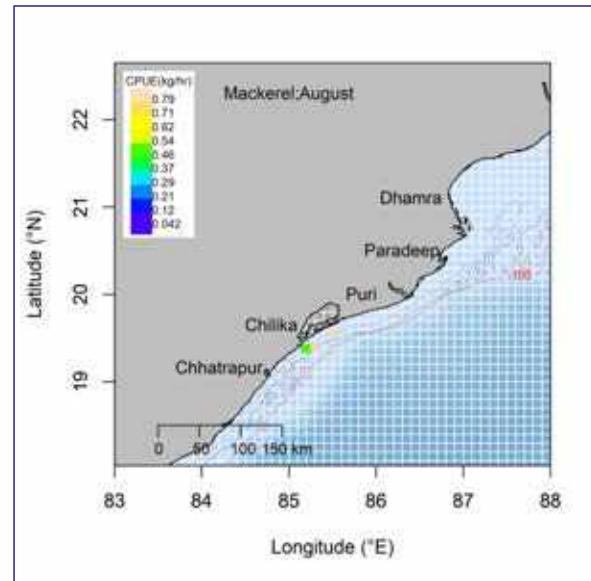
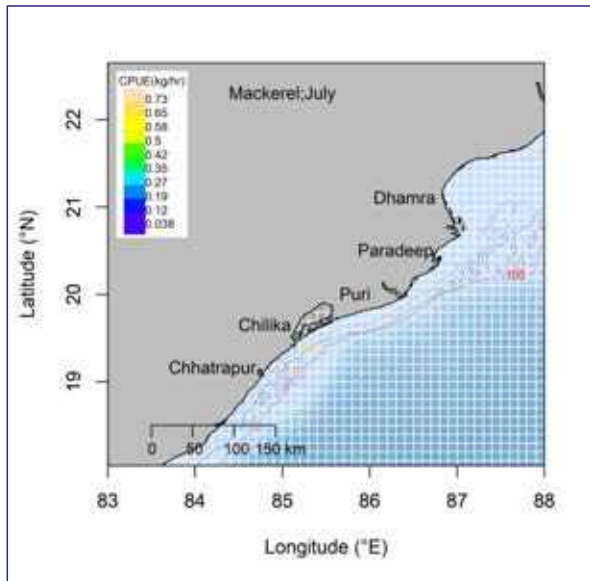




# Mackerel

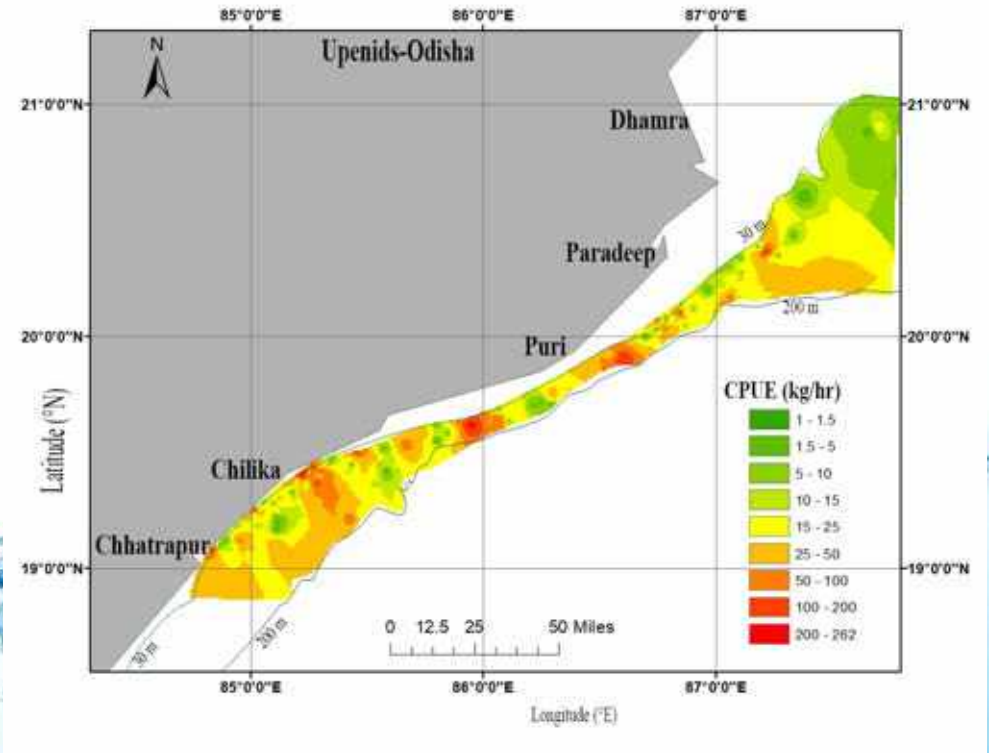


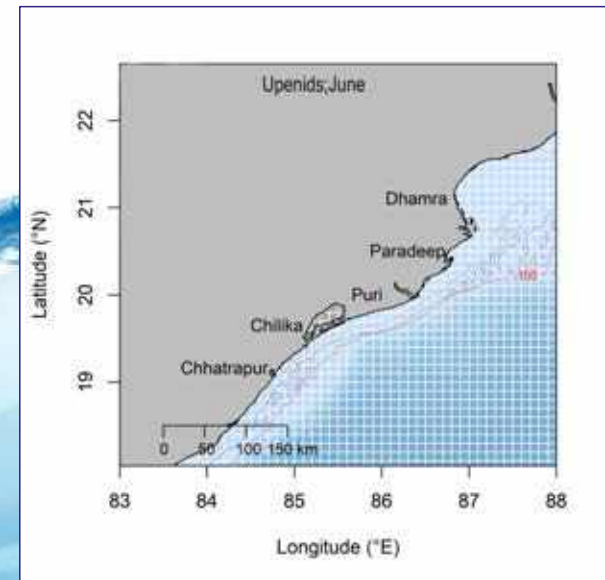
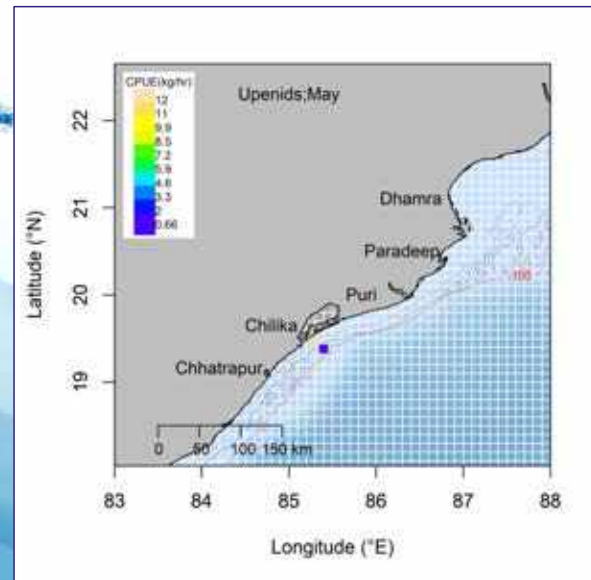
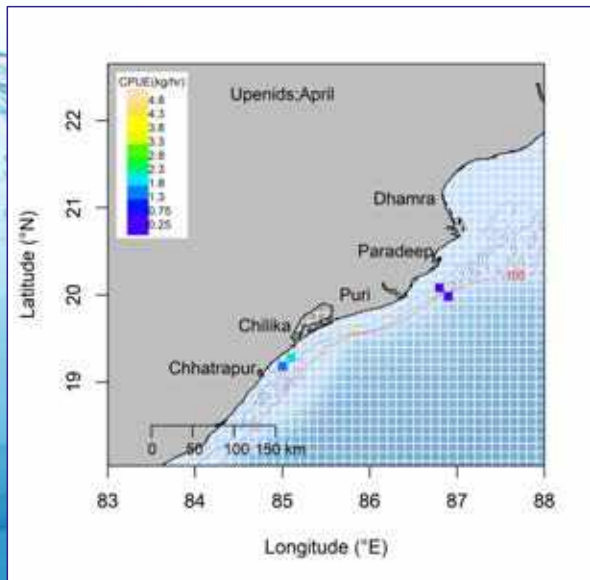
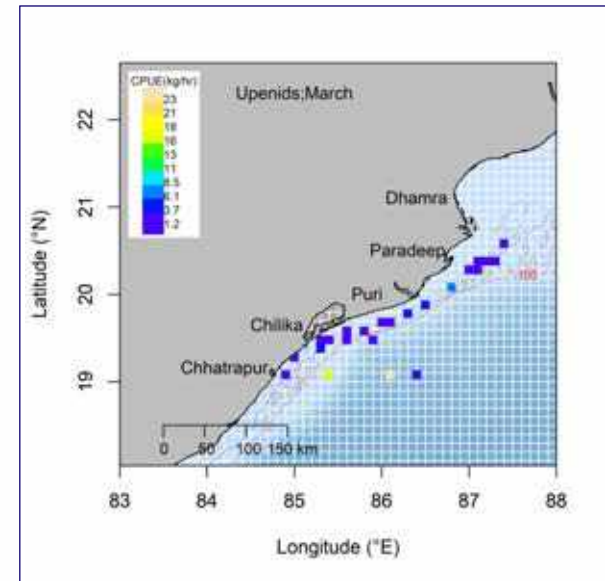
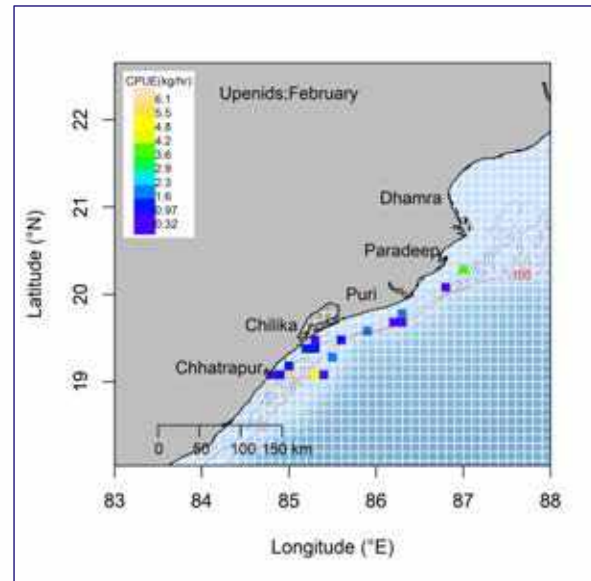
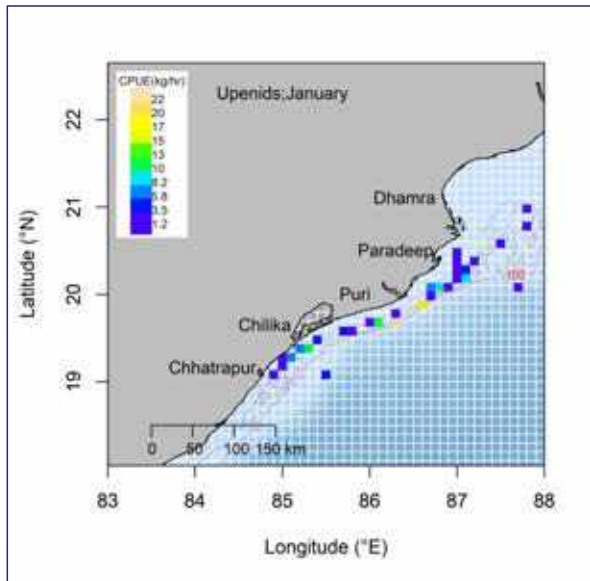




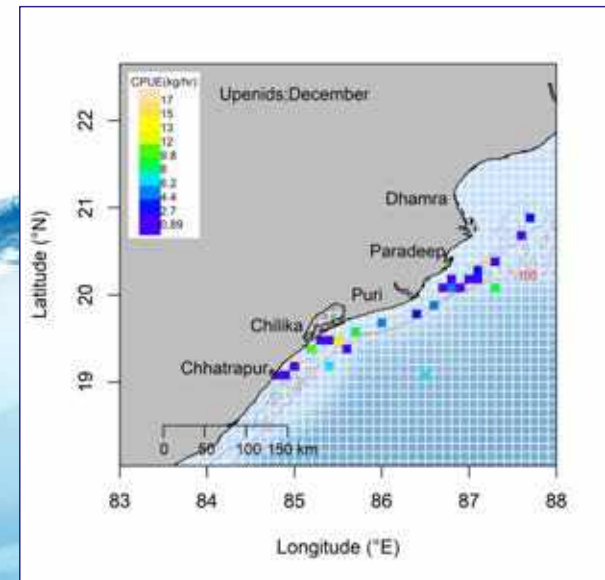
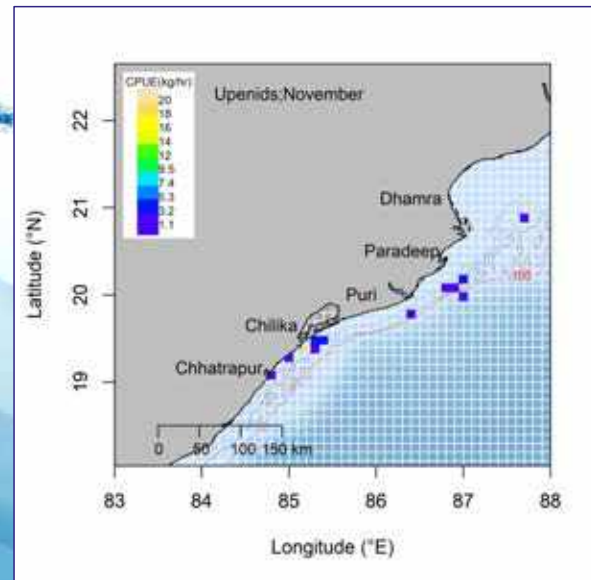
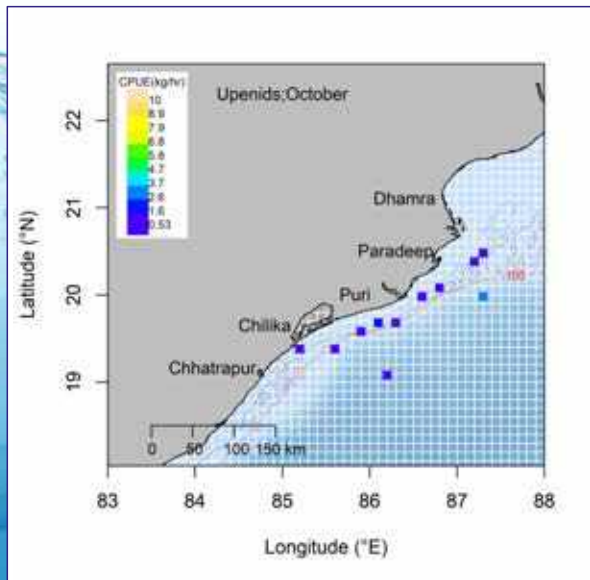
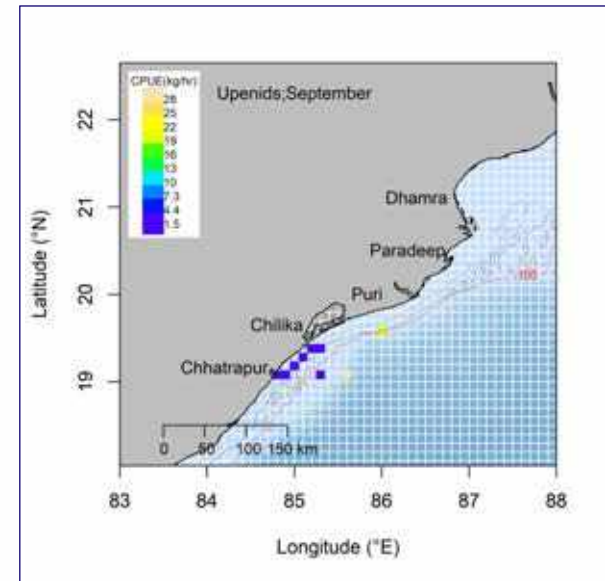
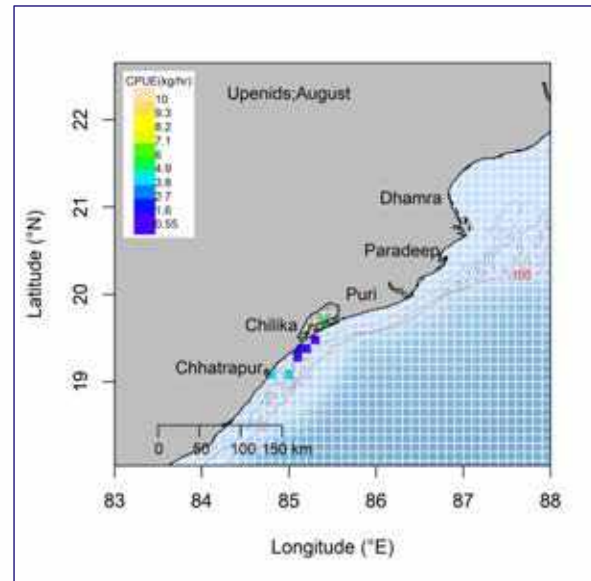
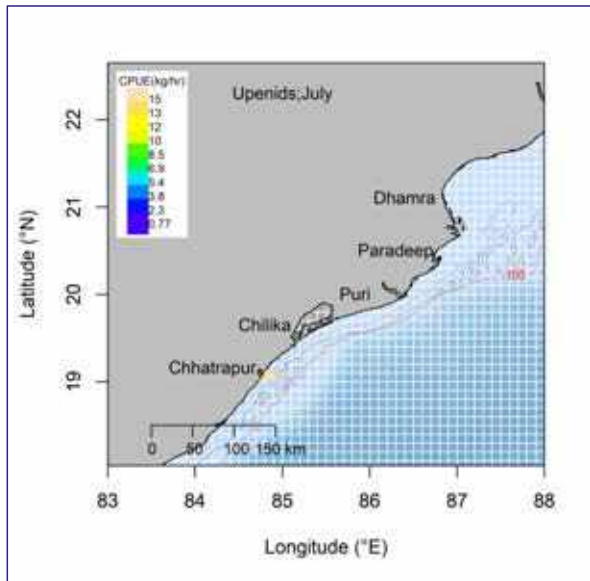


## Goatfish (Upenids)



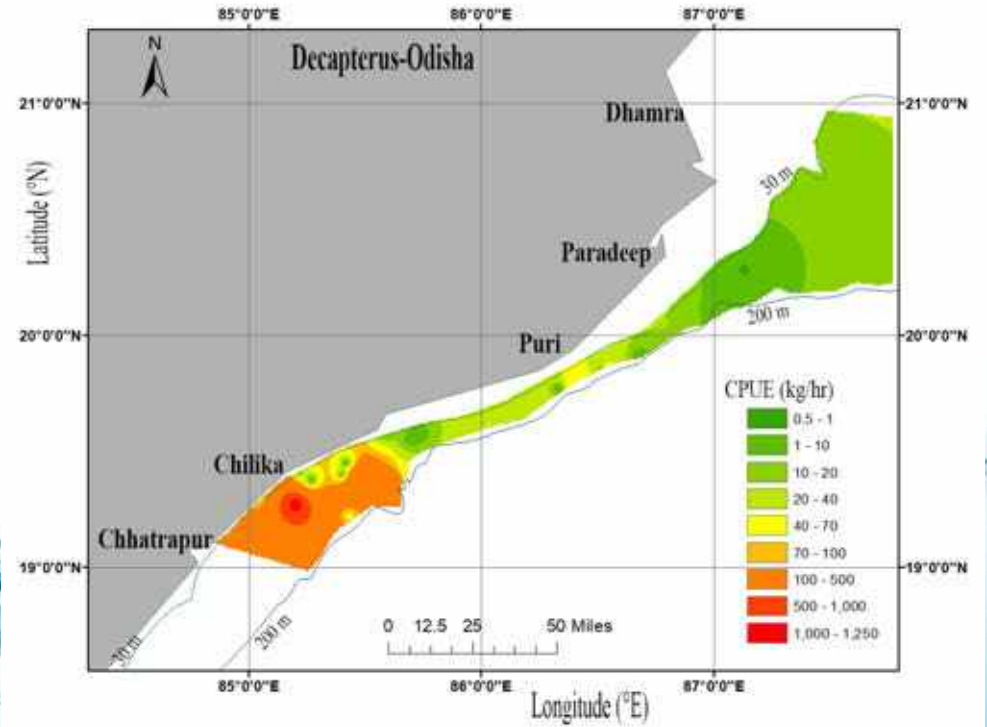


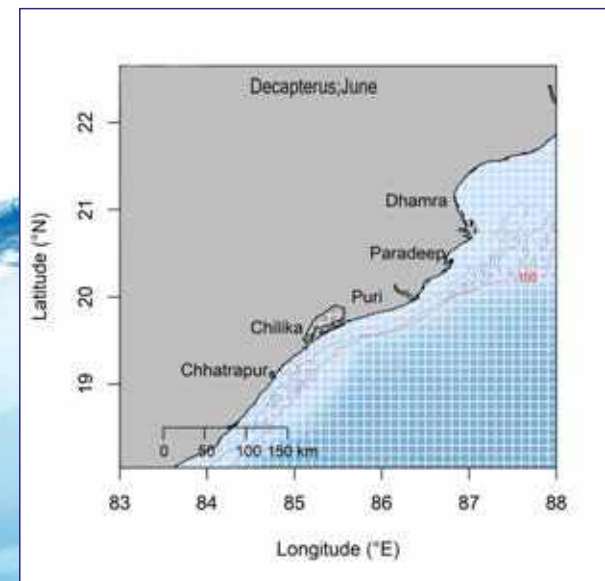
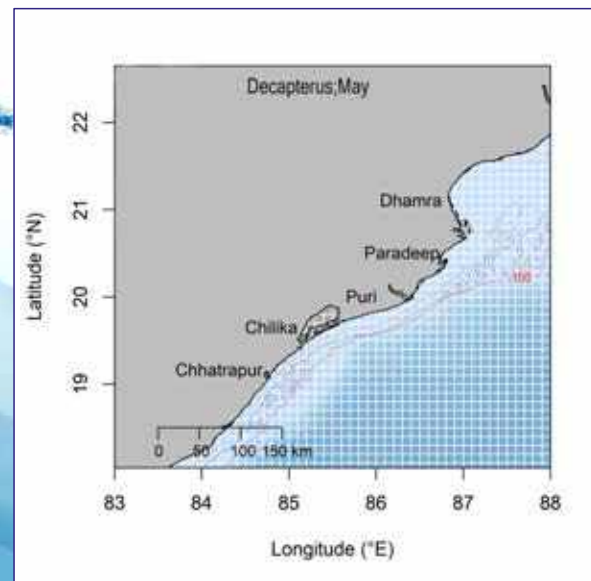
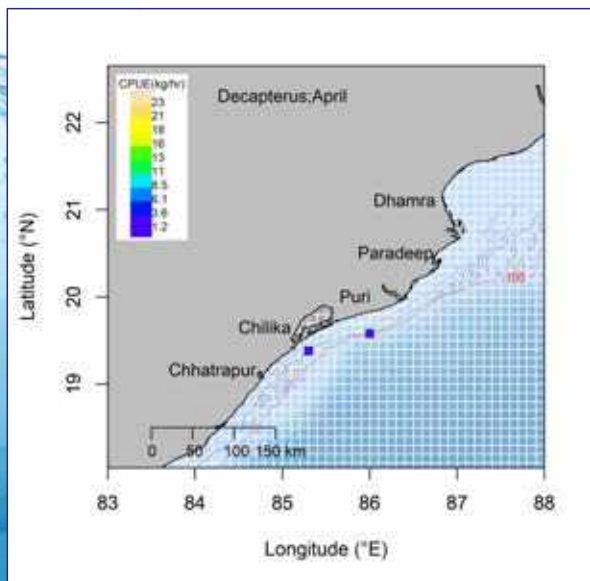
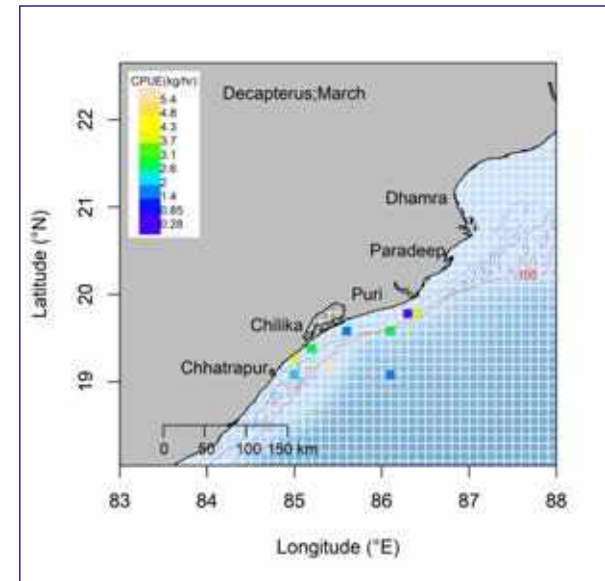
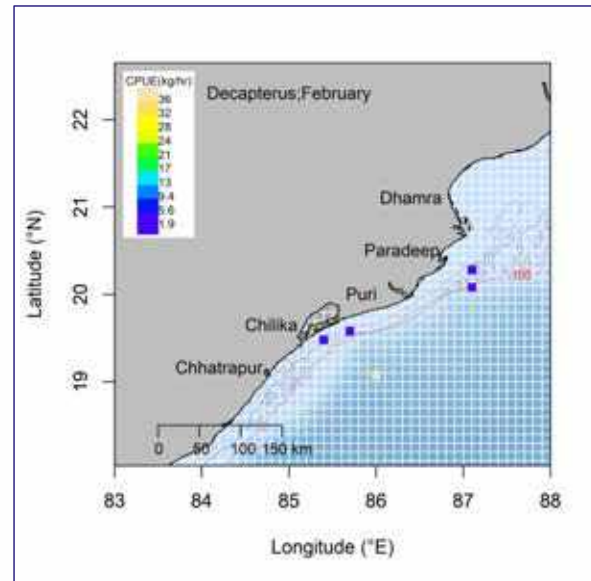
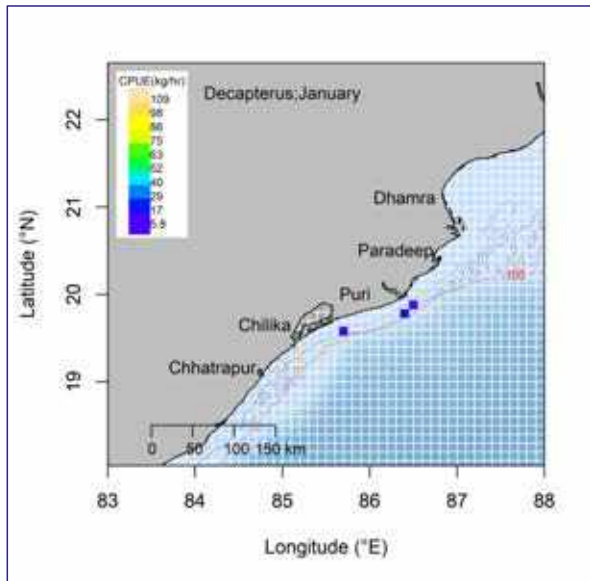


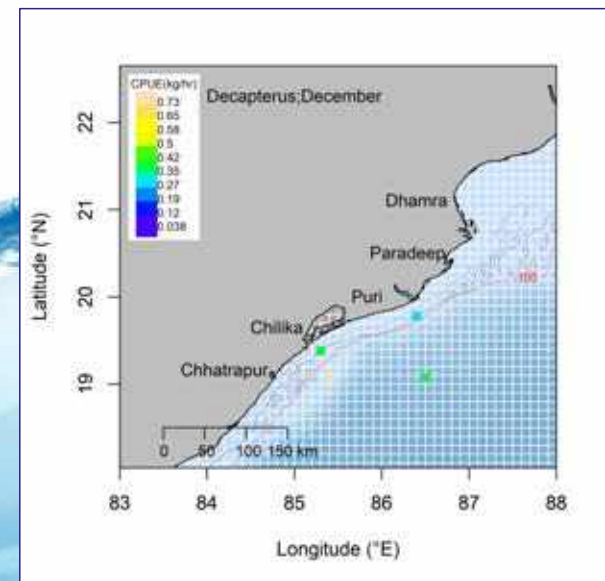
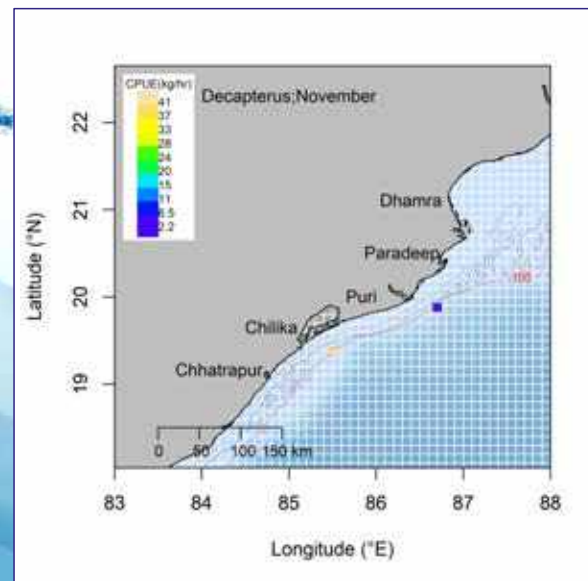
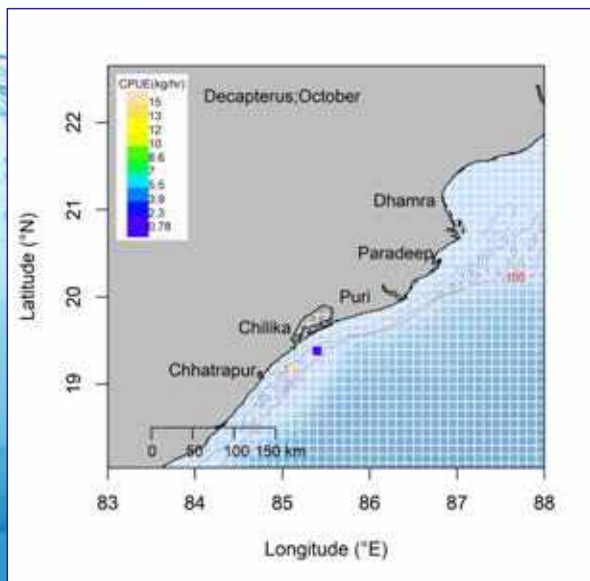
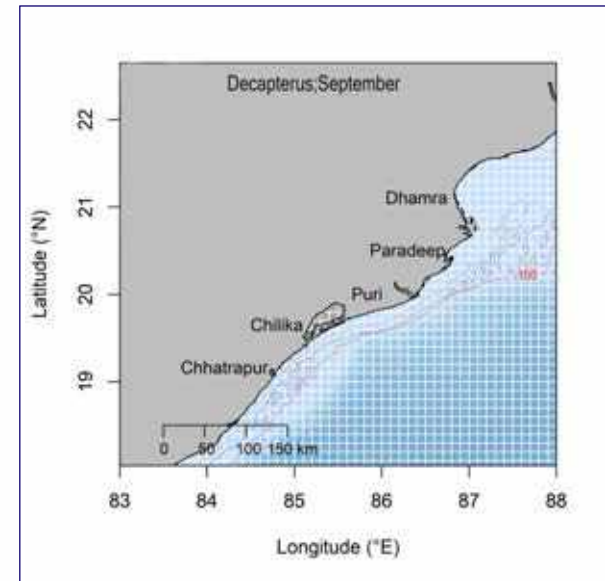
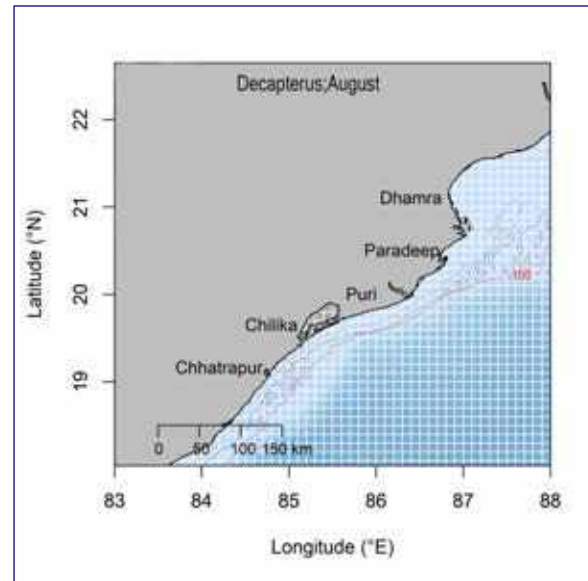
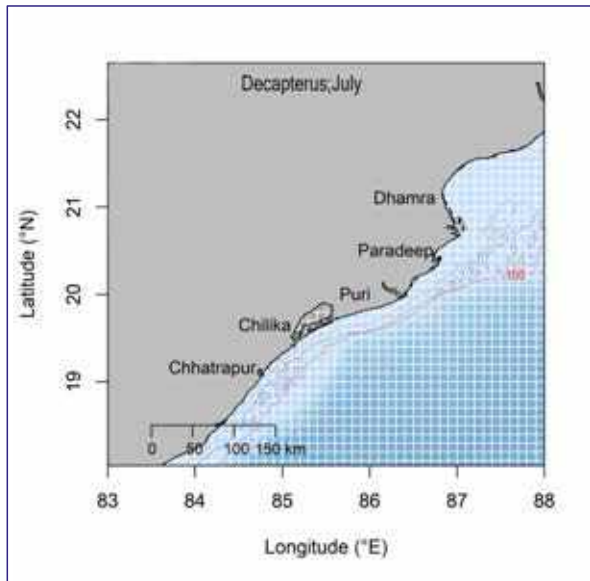




## Round Scads (Decapterus)

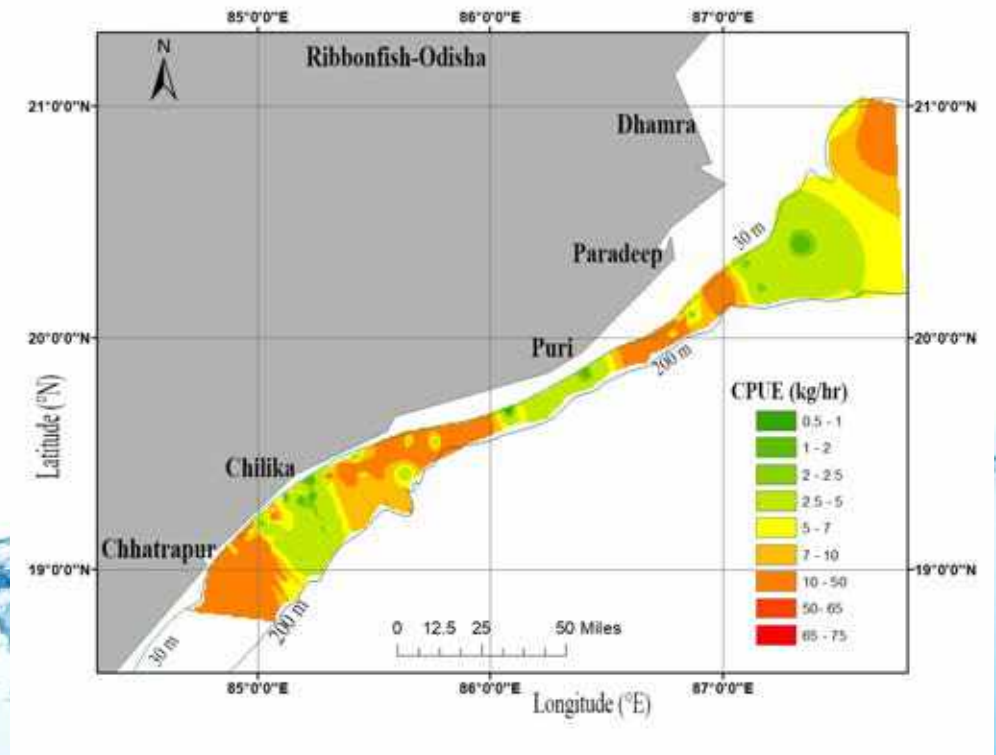


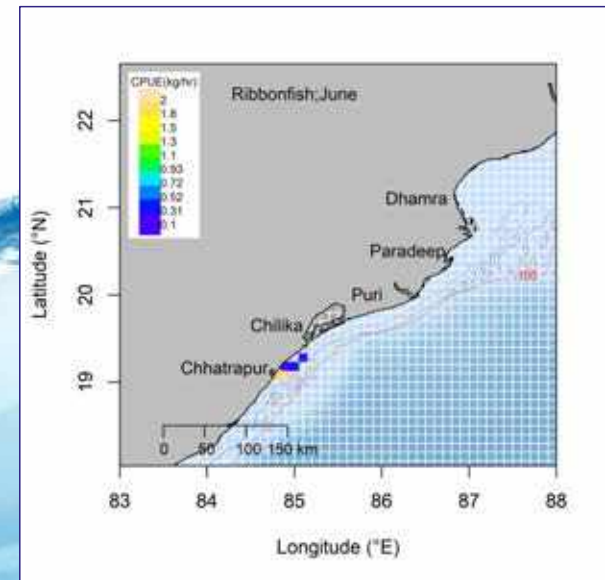
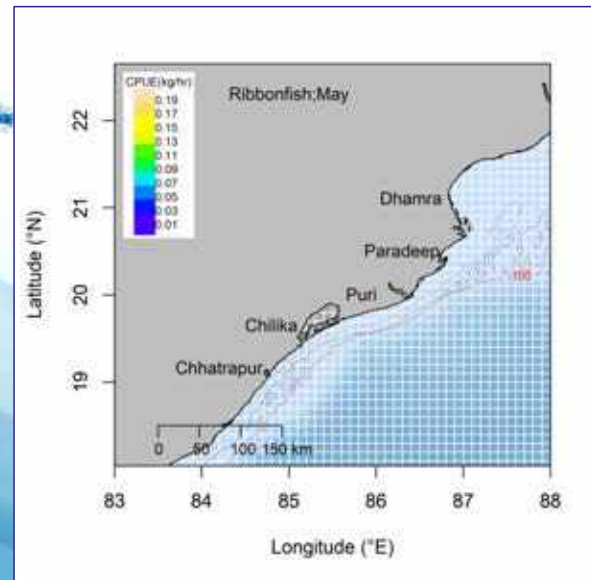
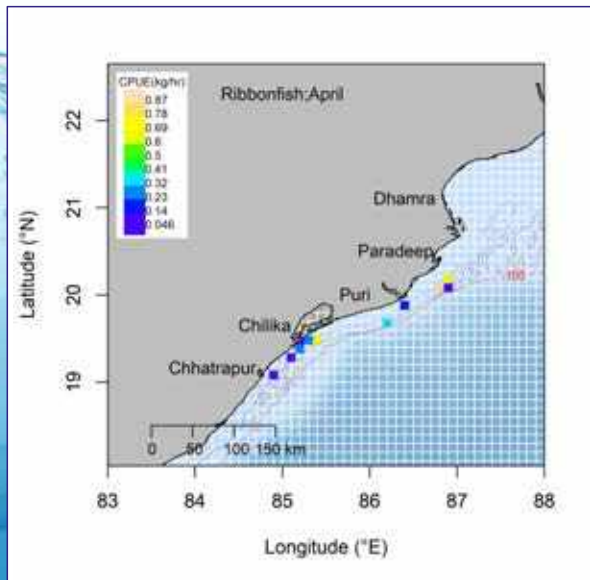
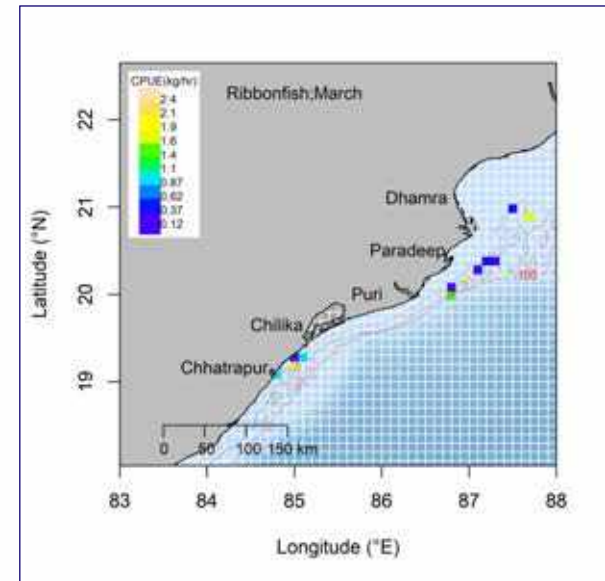
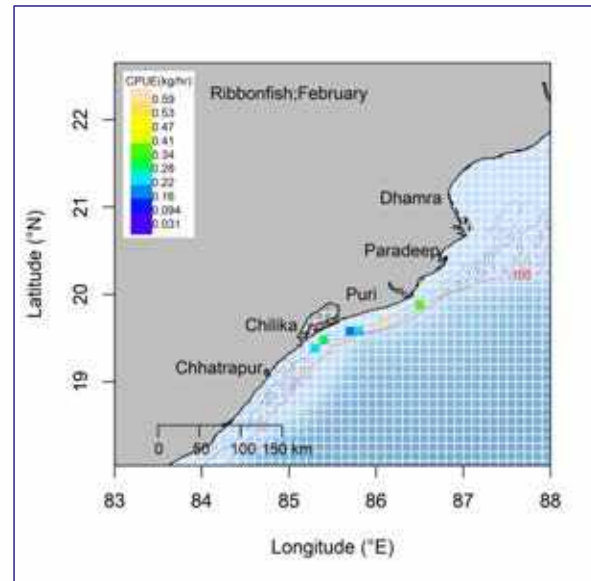
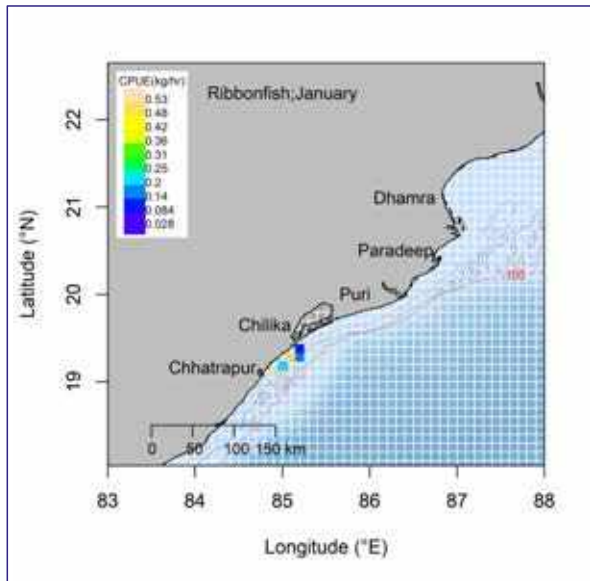


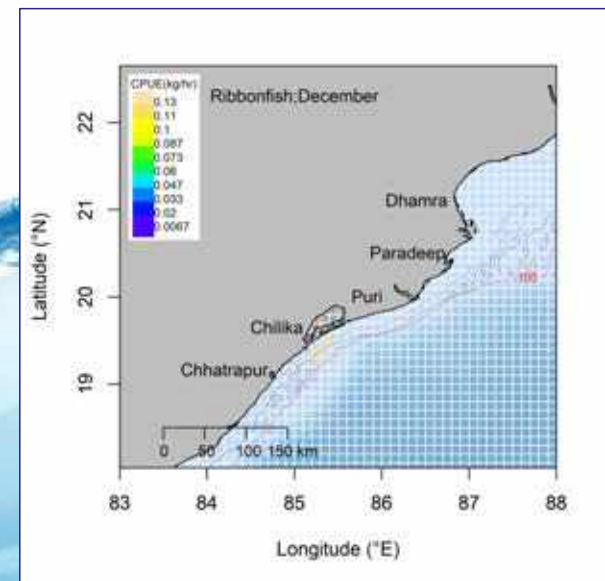
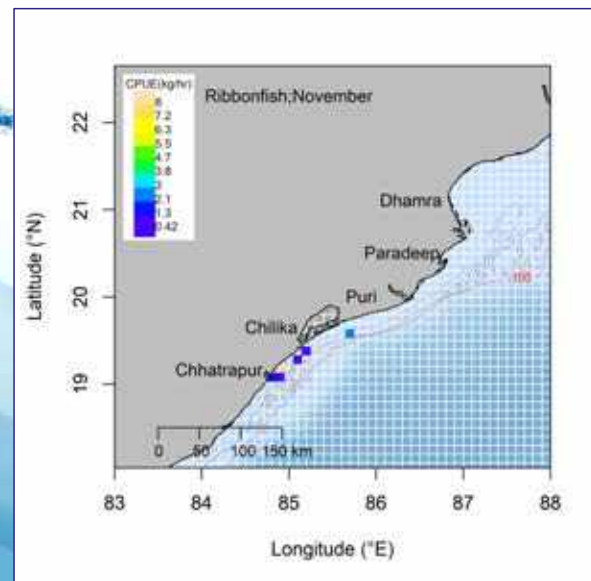
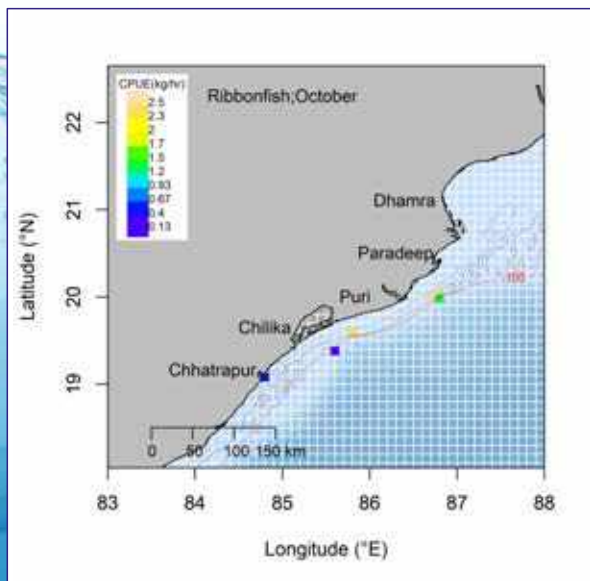
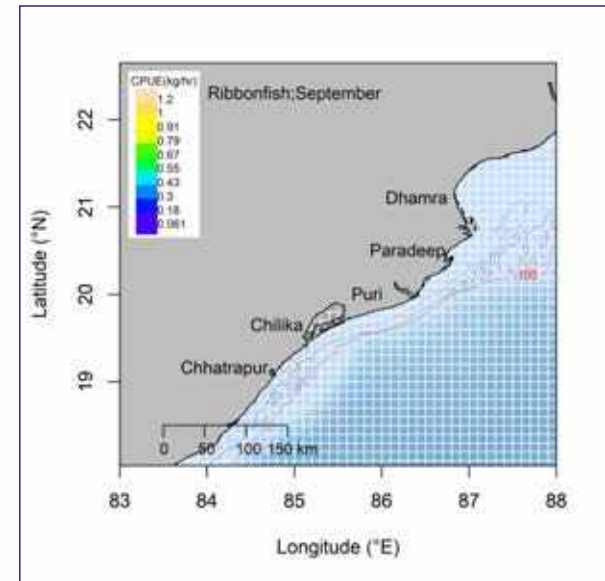
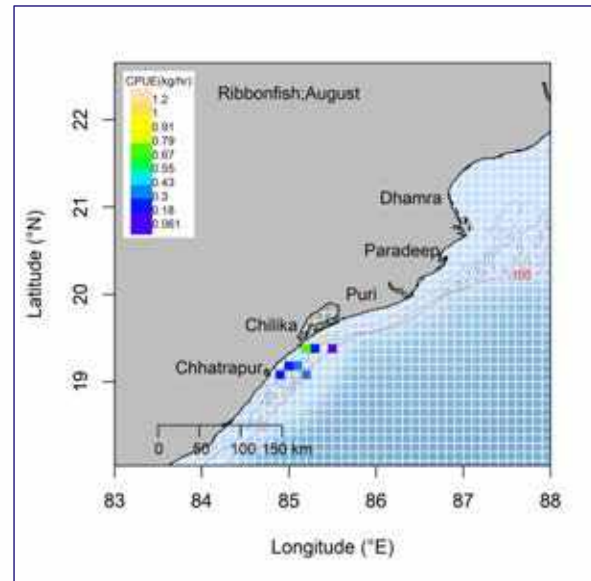
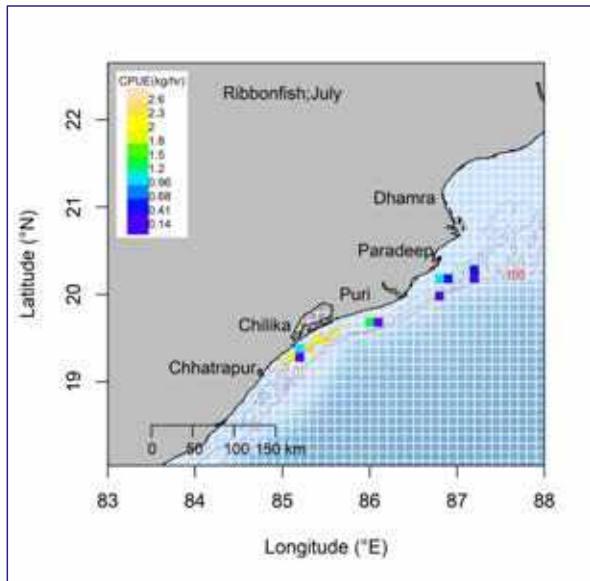




**Ribbonfish**

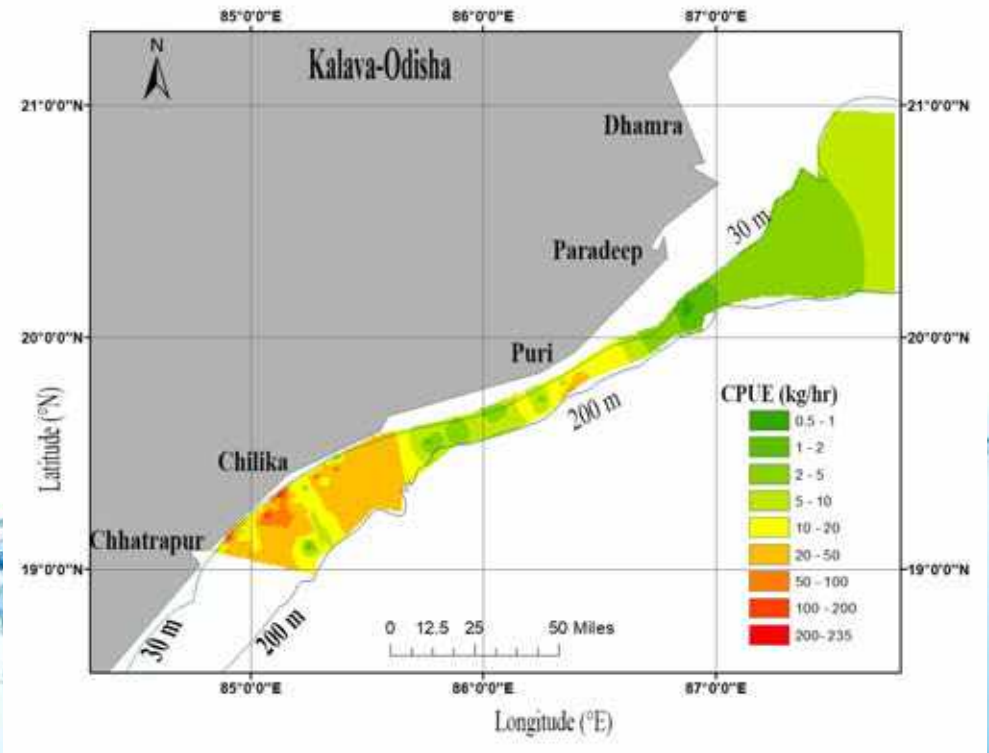




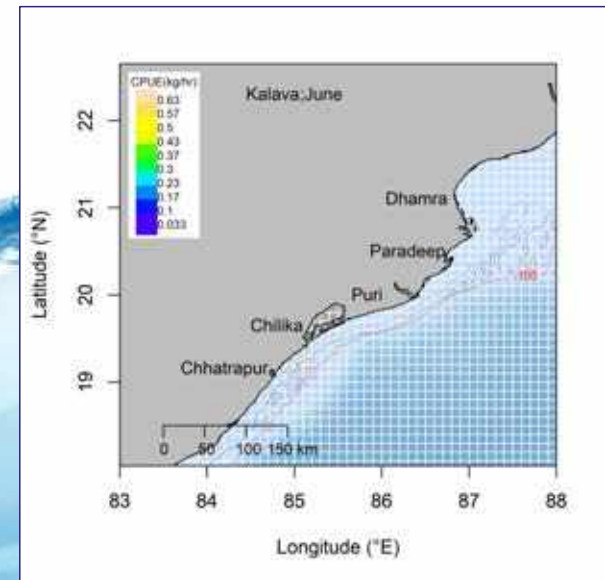
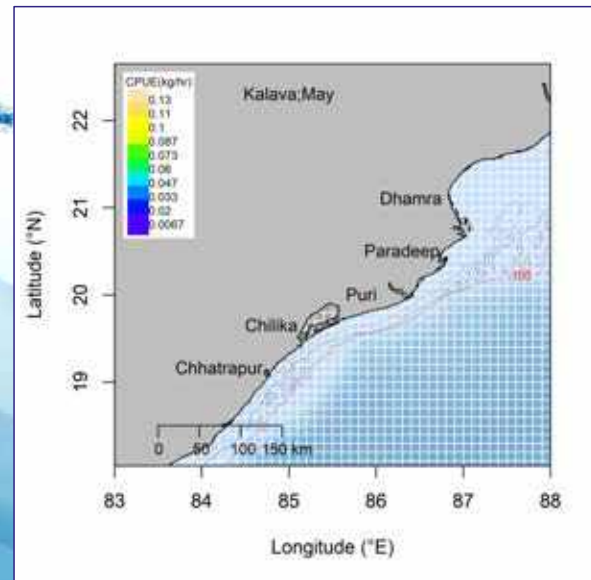
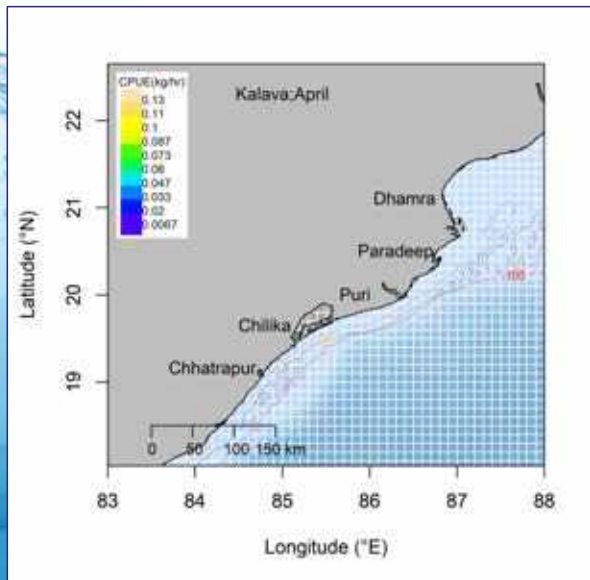
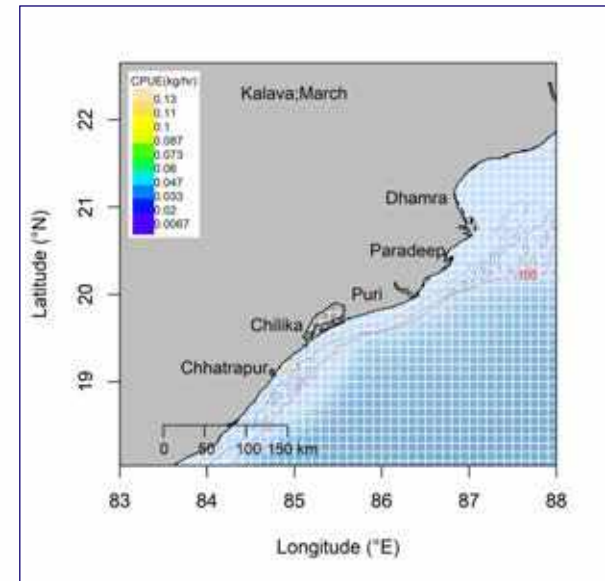
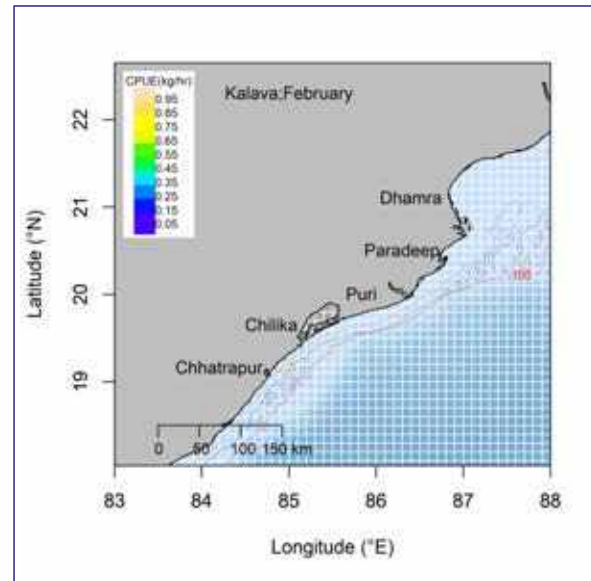
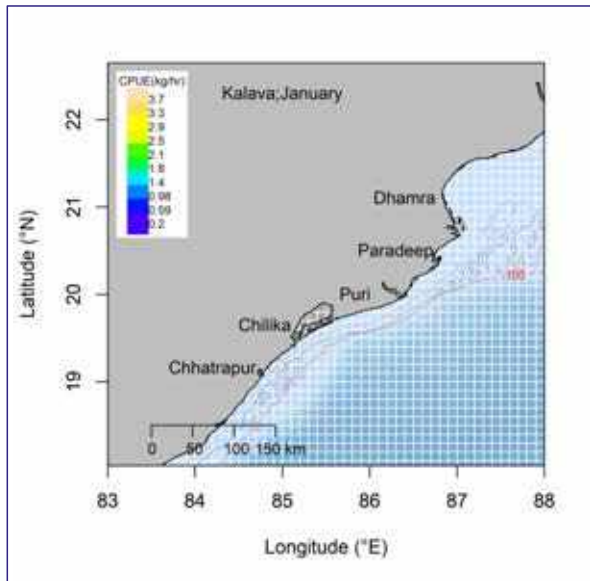


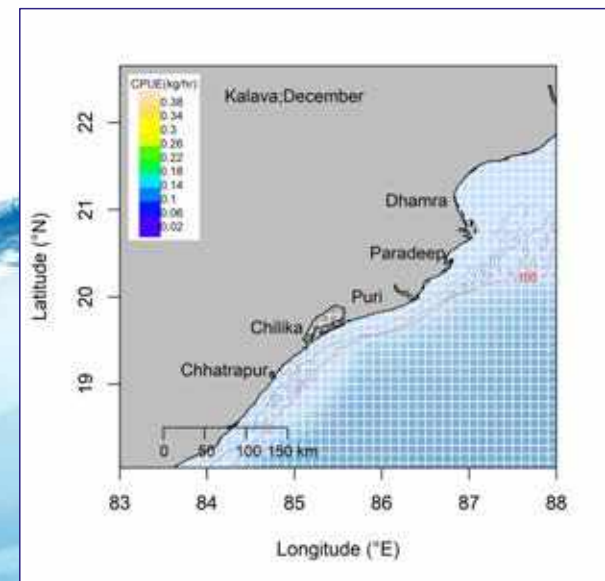
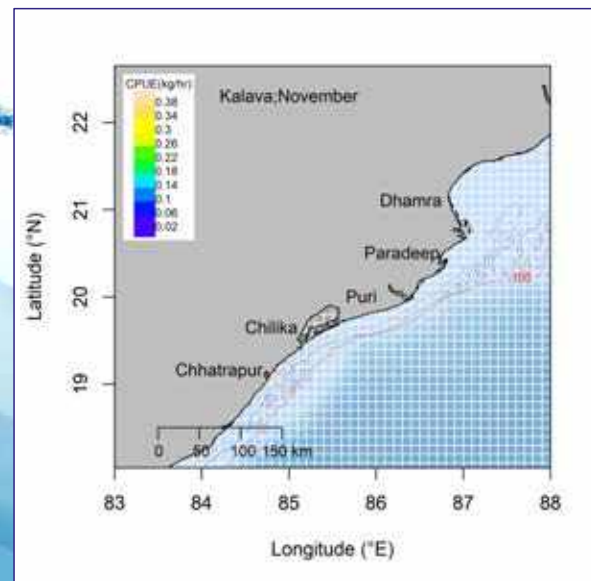
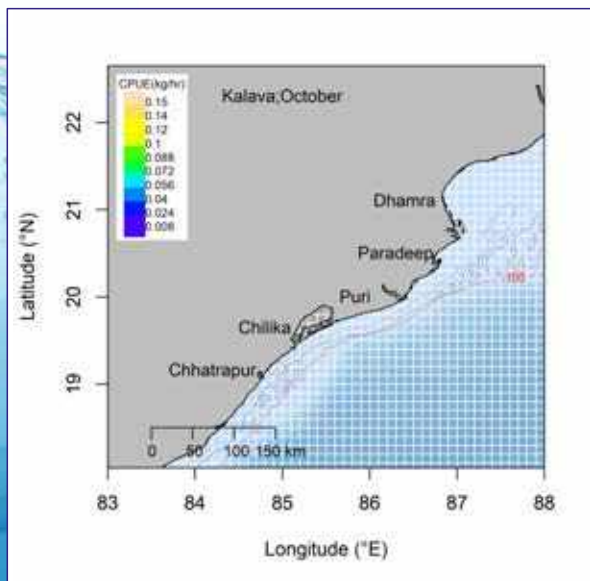
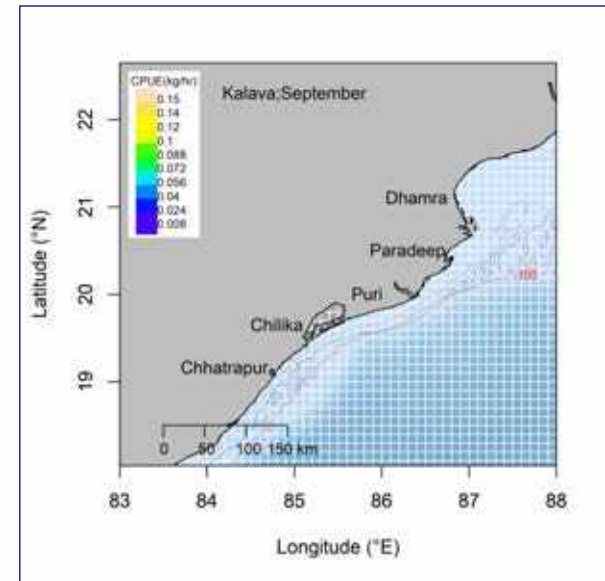
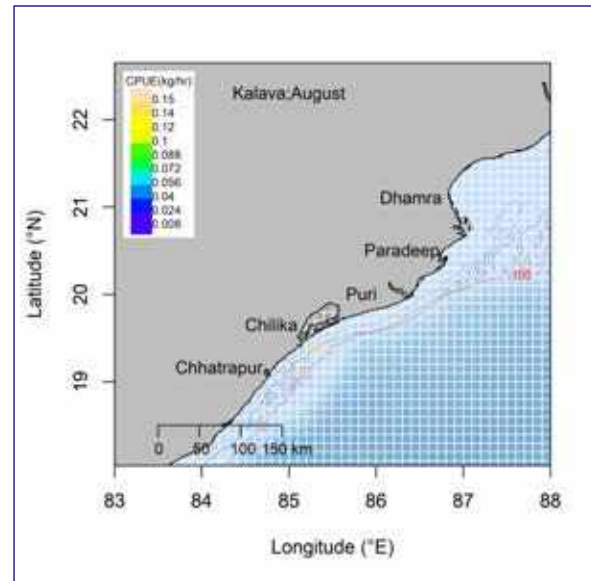
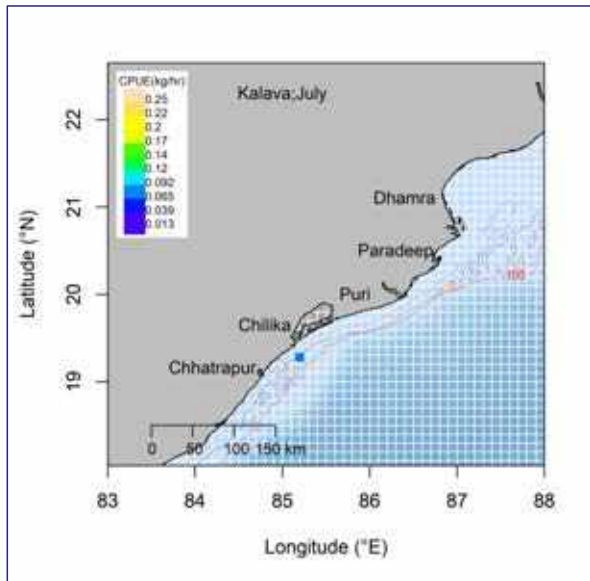


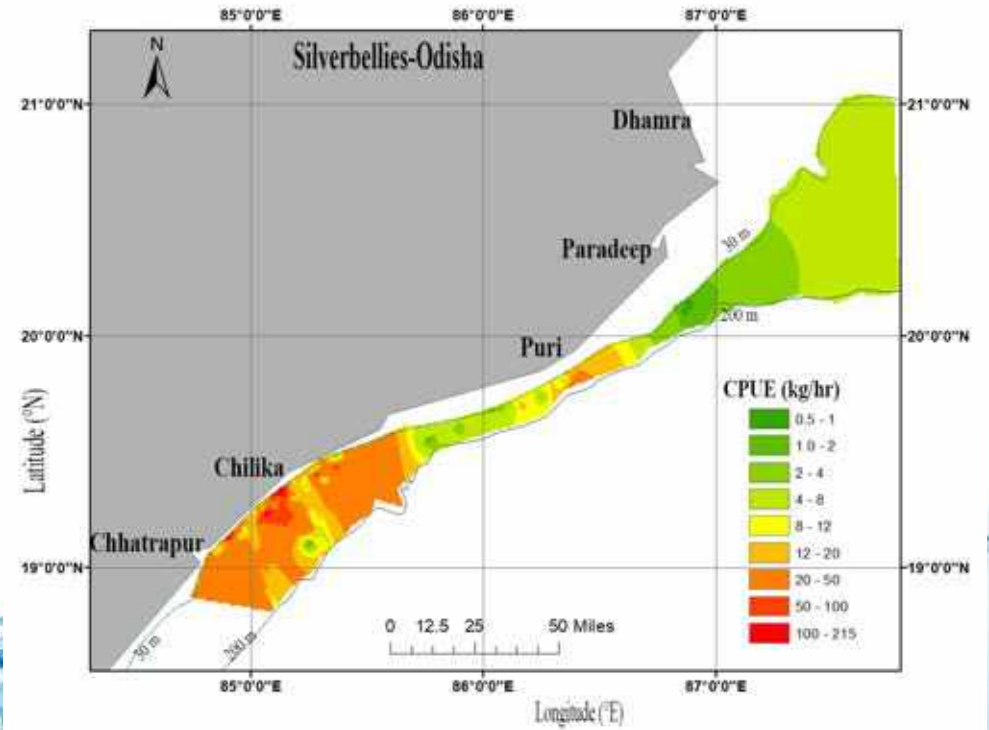
## Groupers (Kalava)



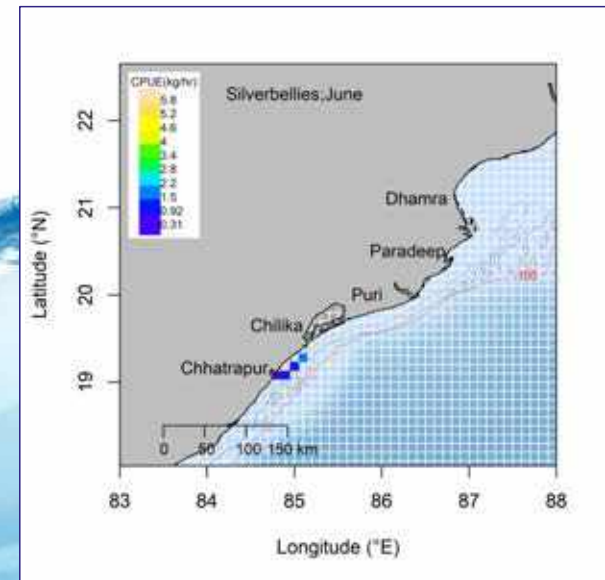
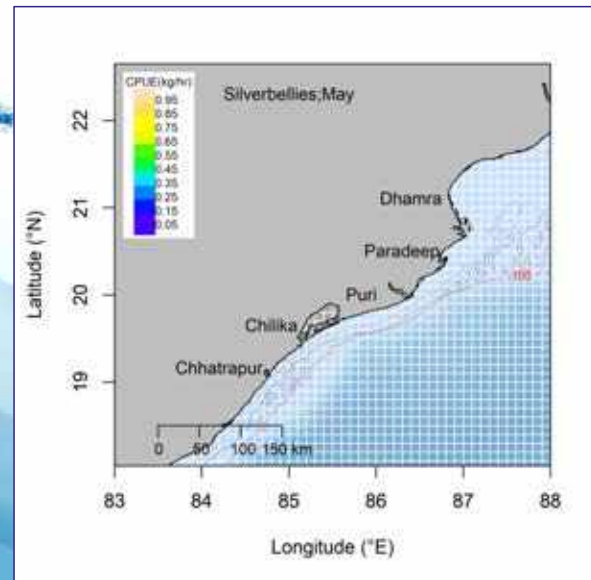
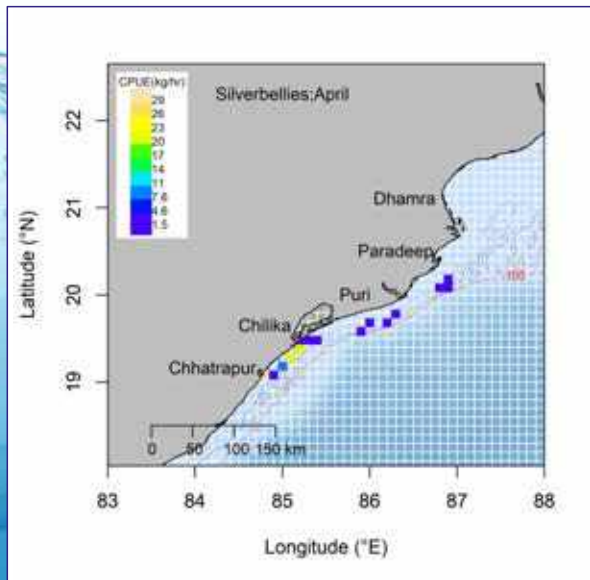
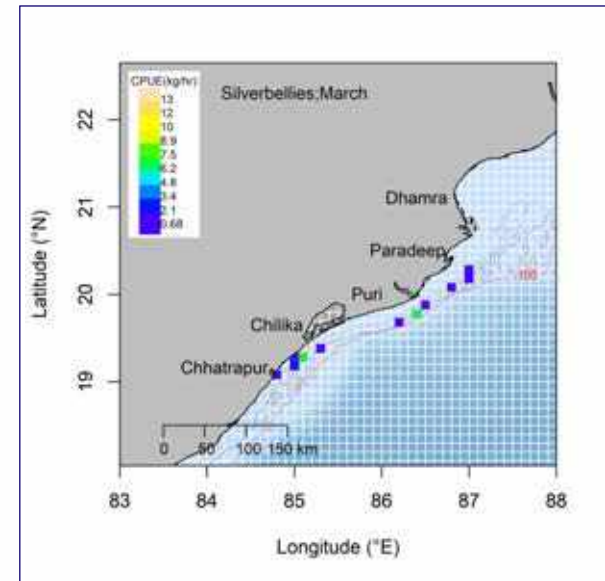
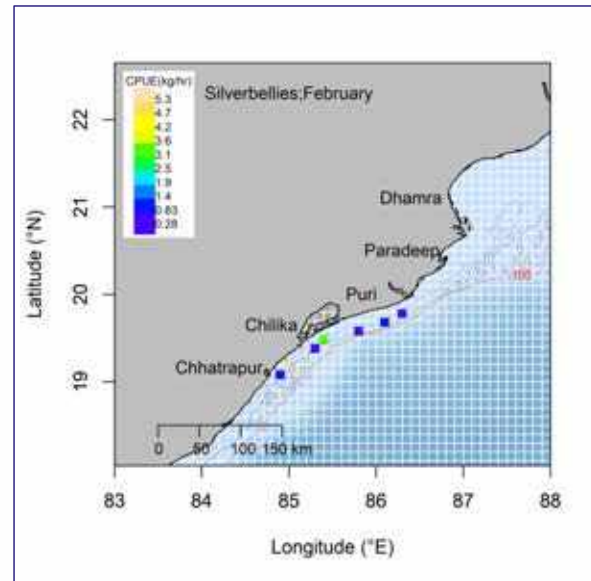
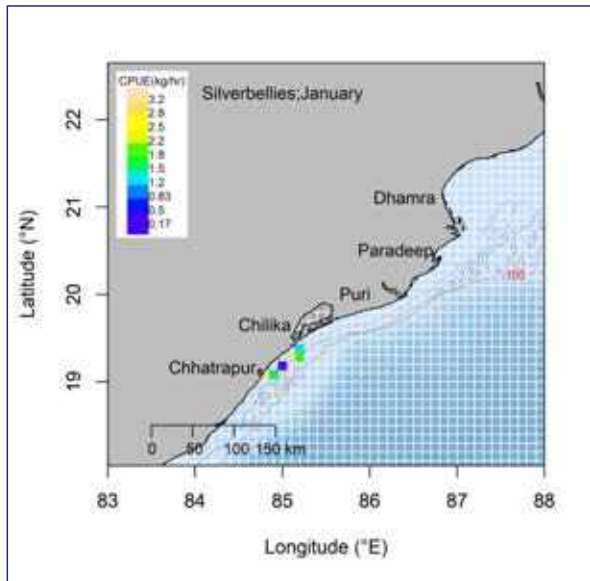


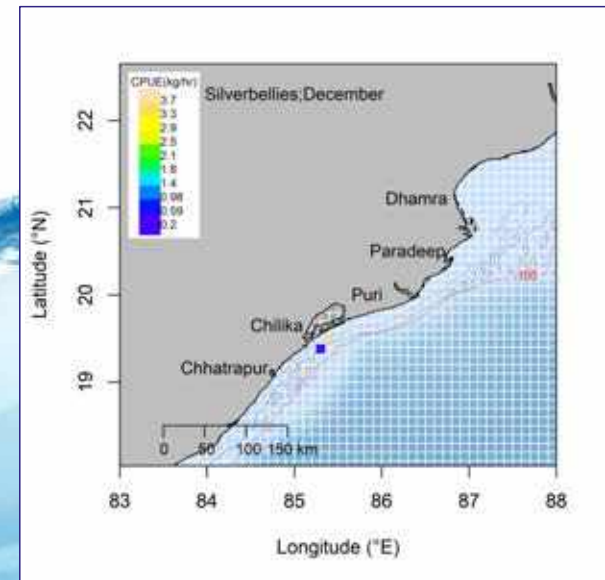
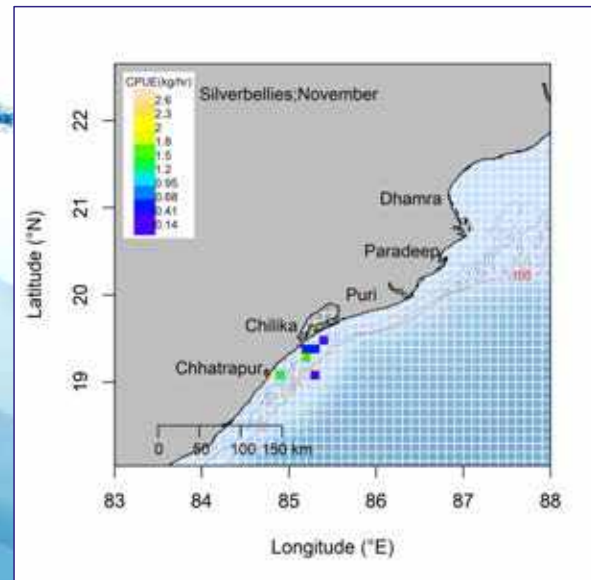
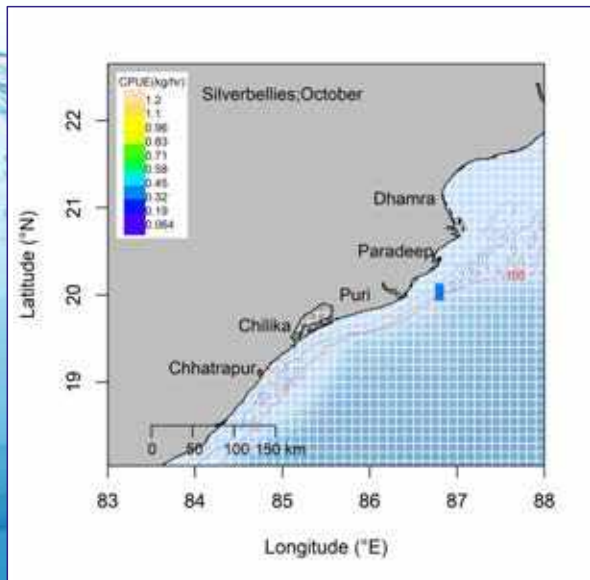
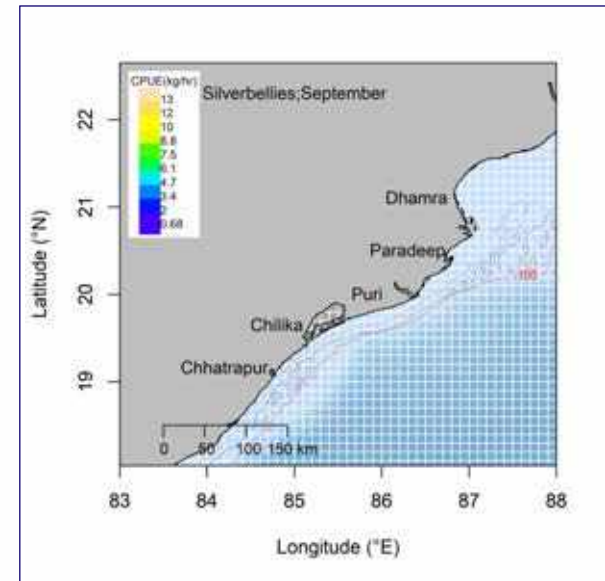
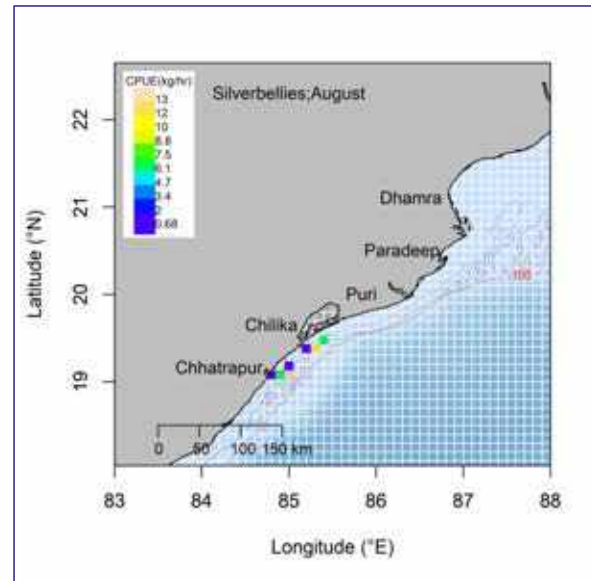
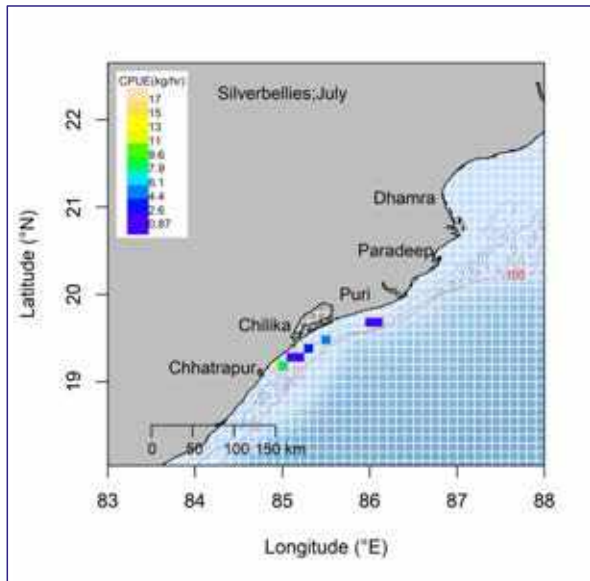


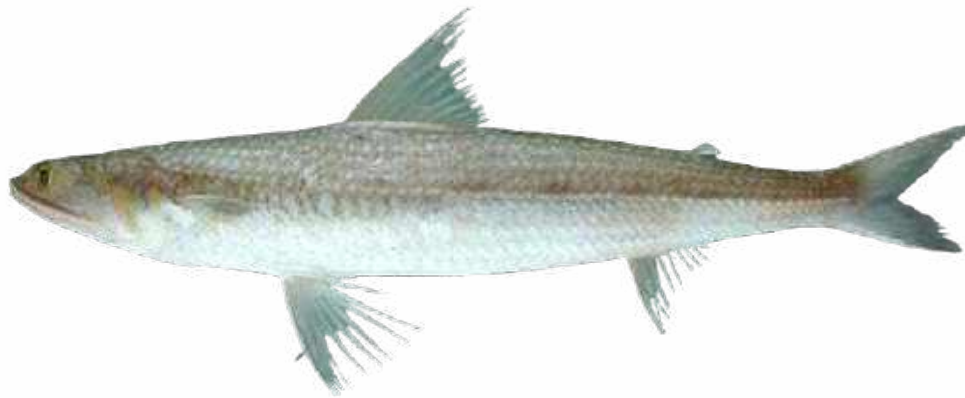




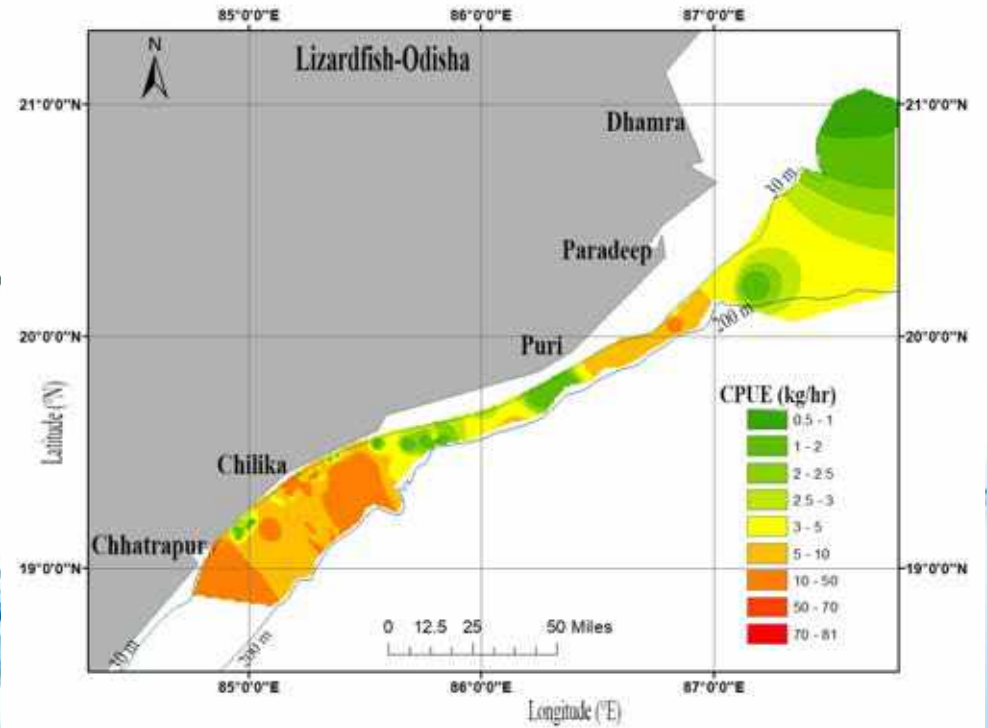
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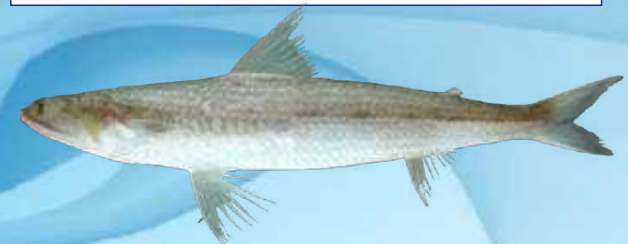
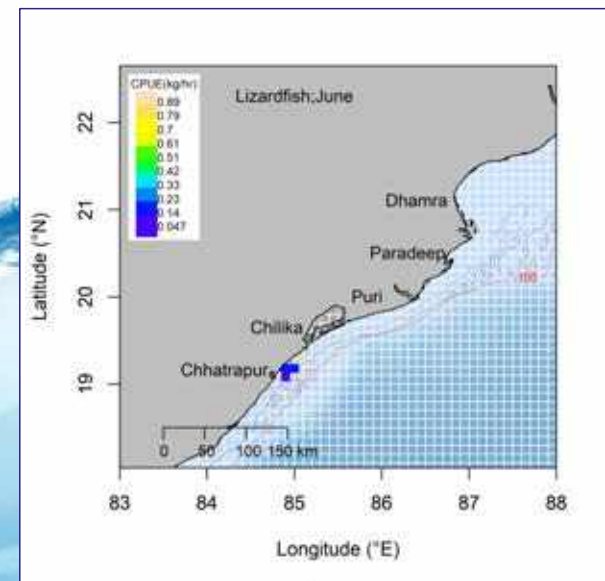
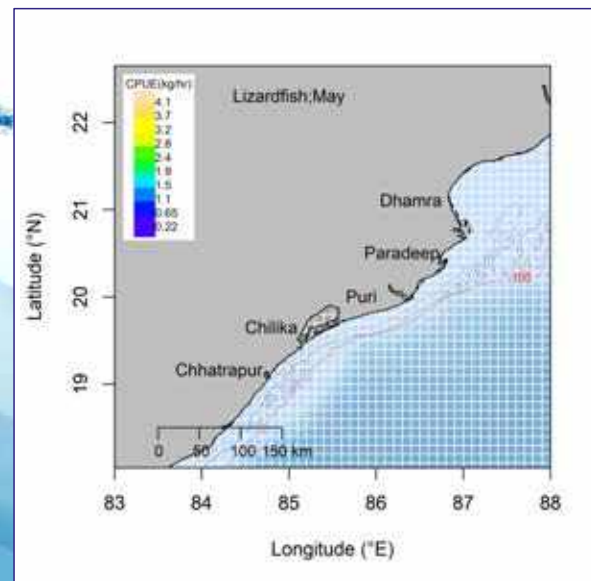
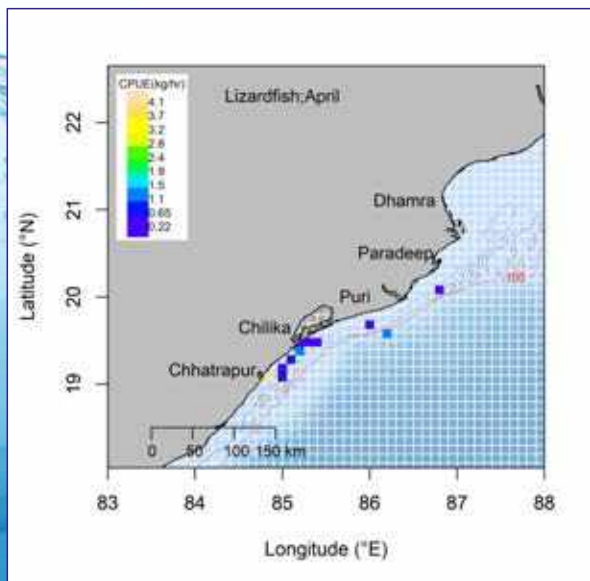
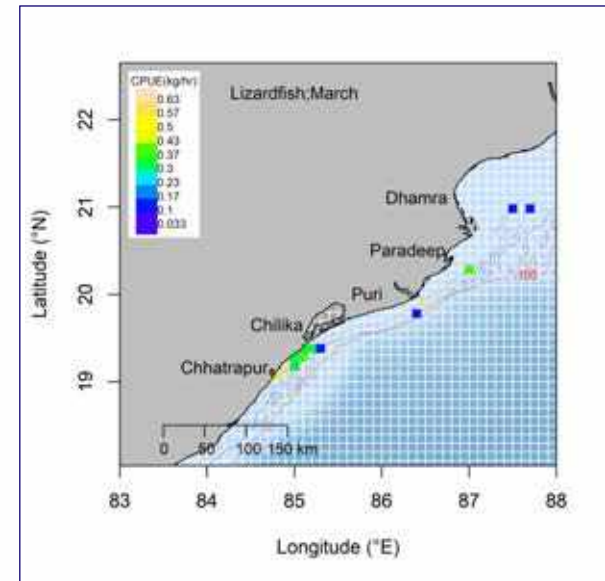
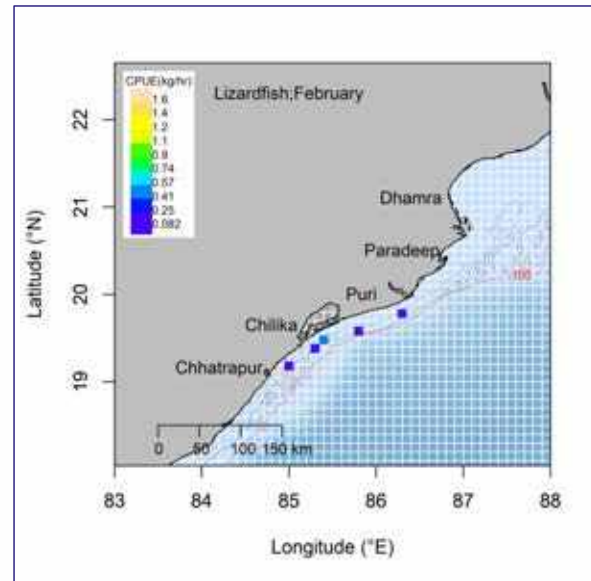
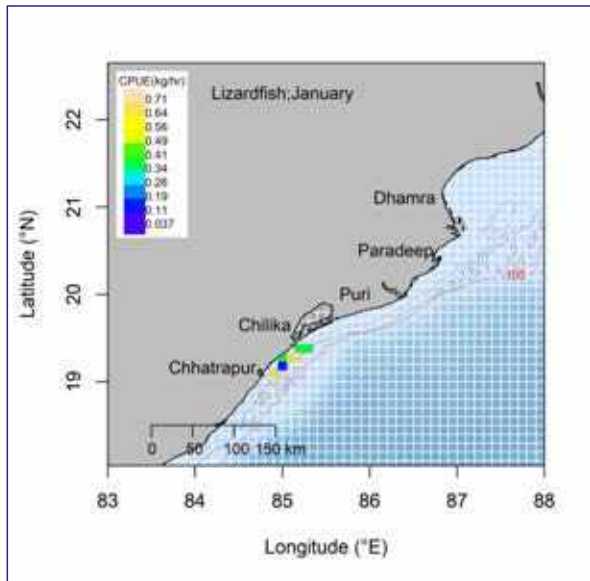


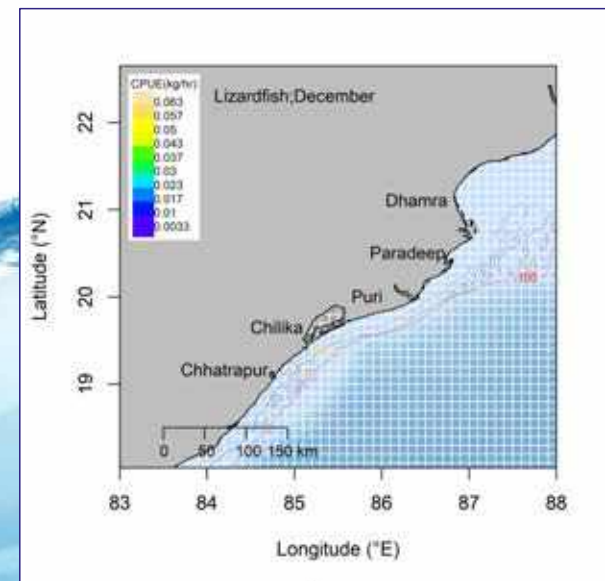
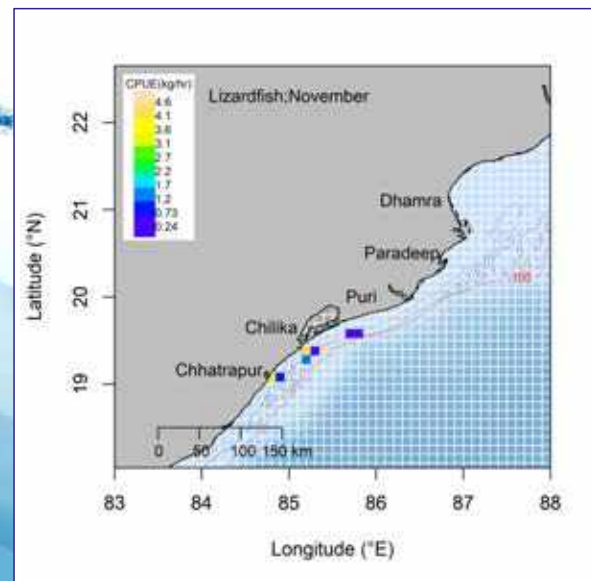
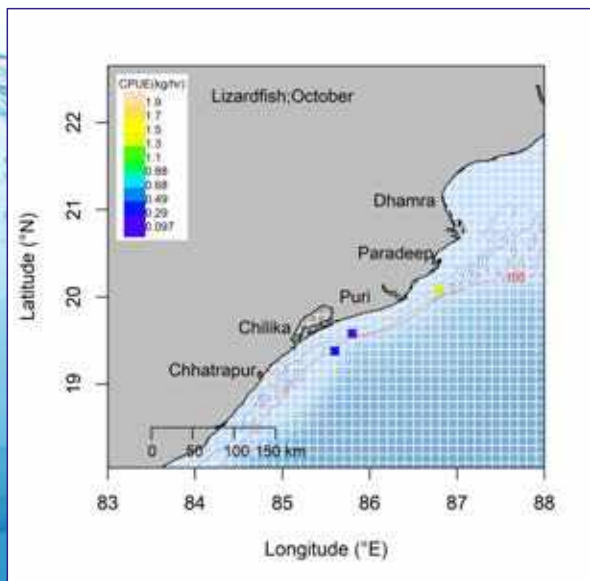
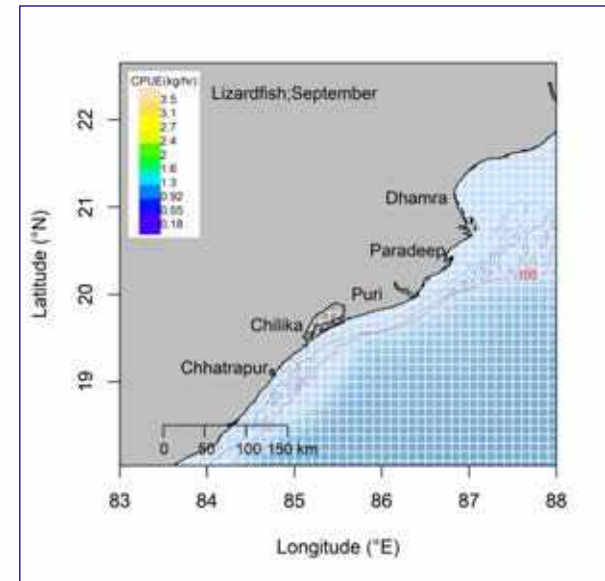
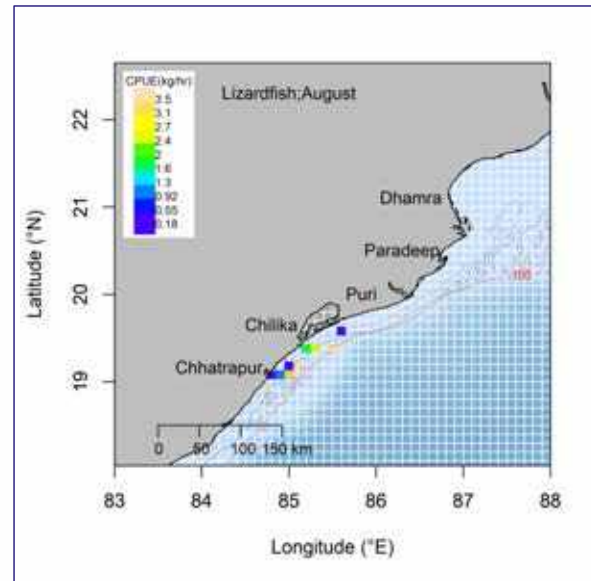
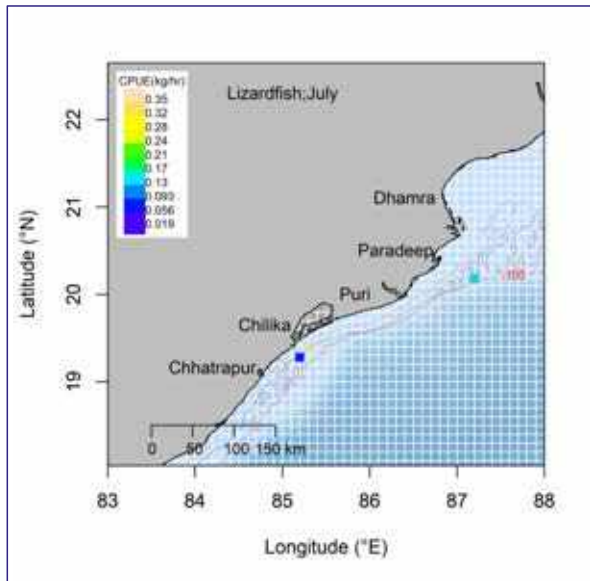




**Lizard Fish**



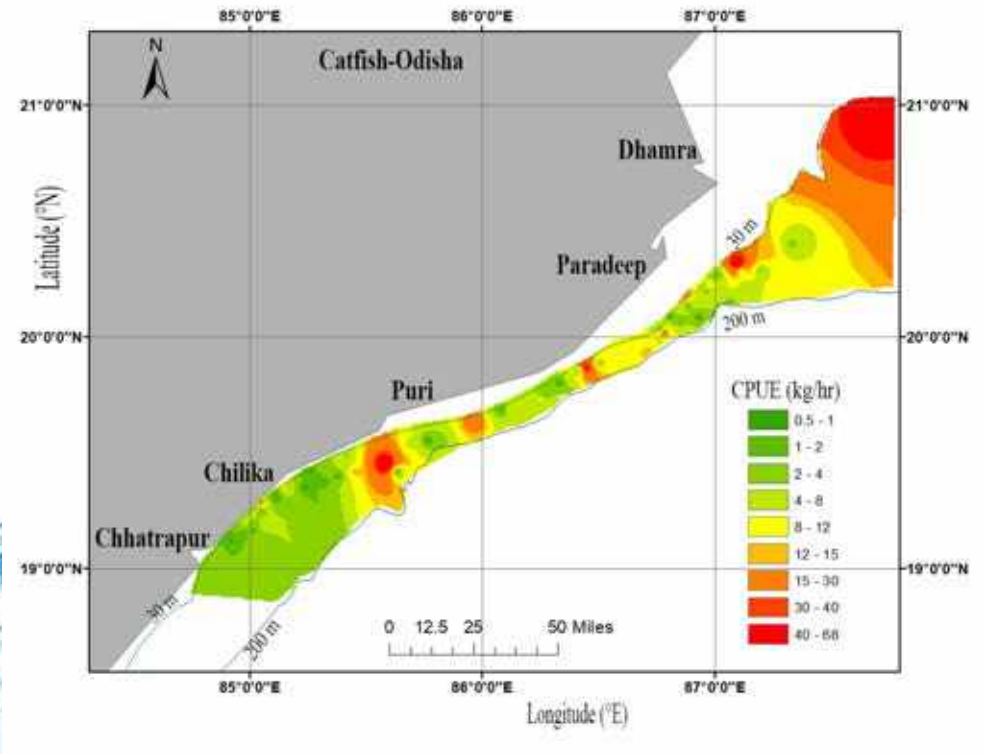


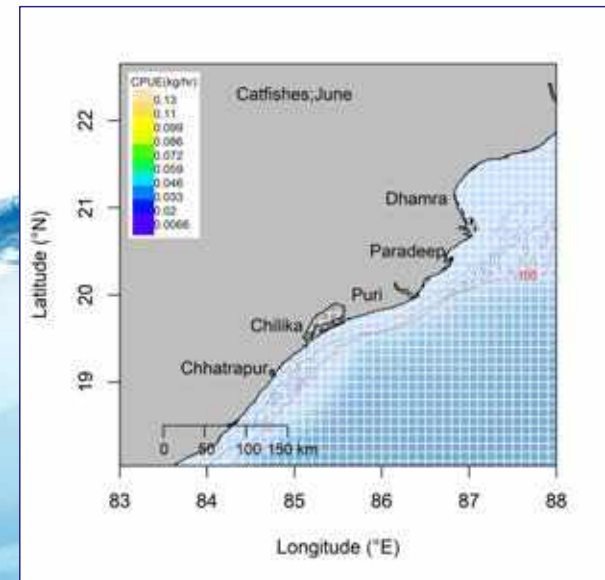
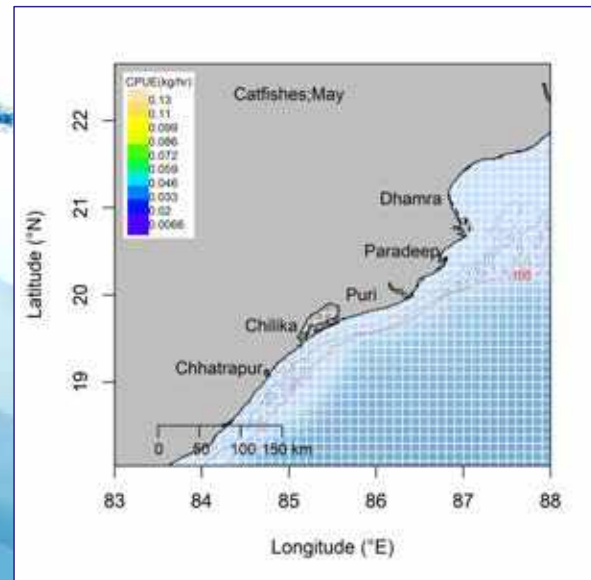
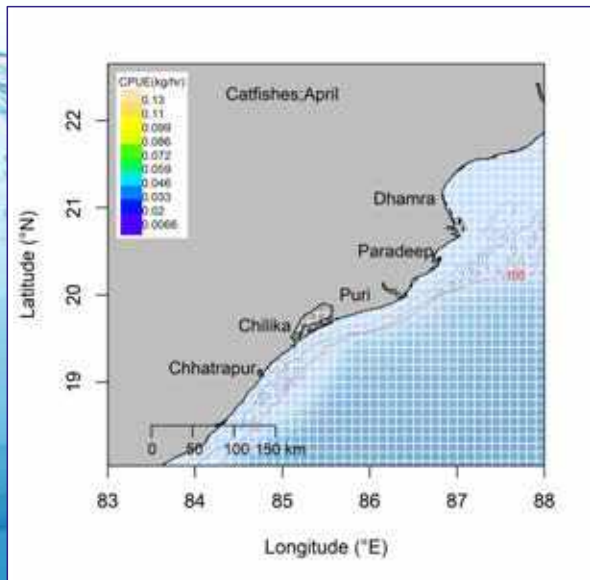
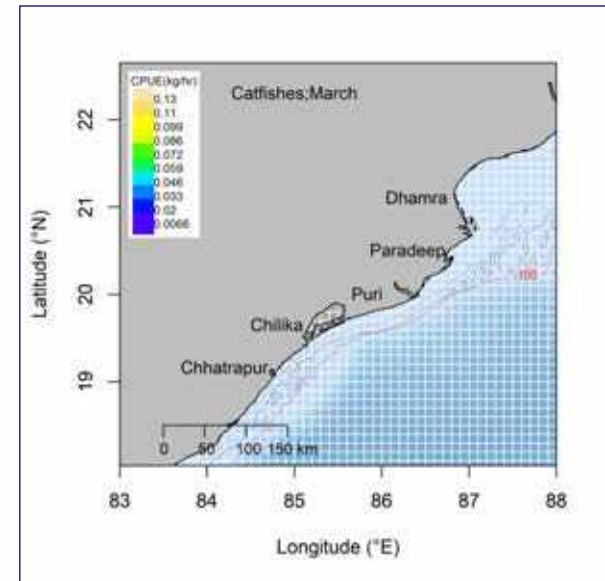
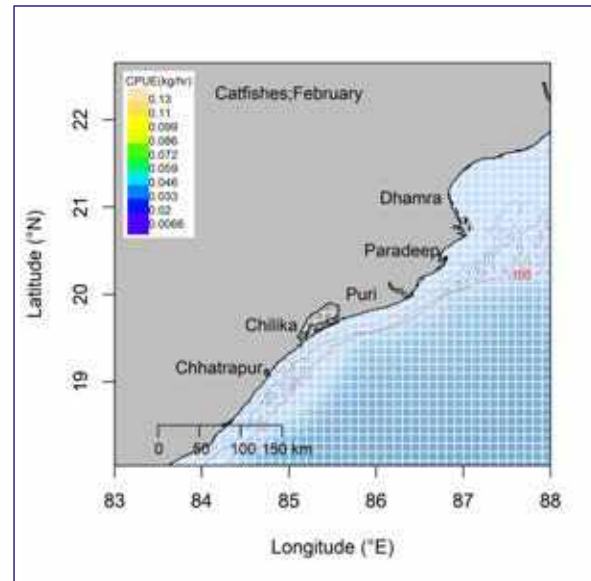
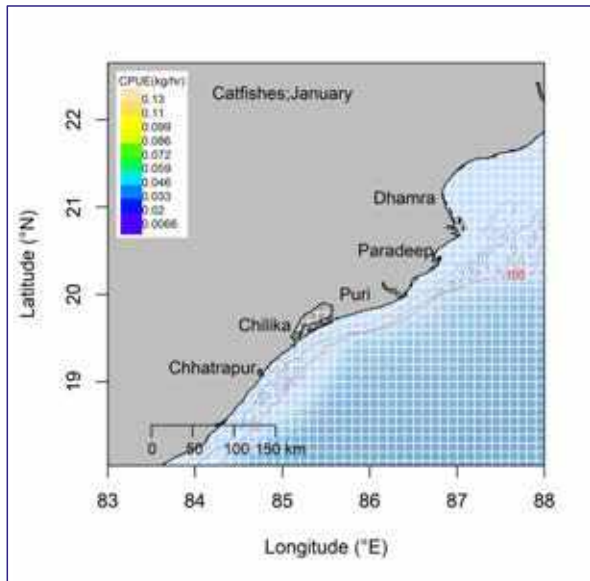


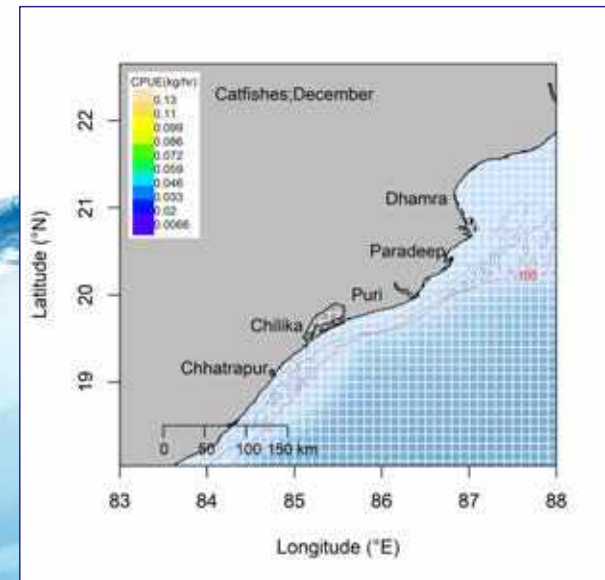
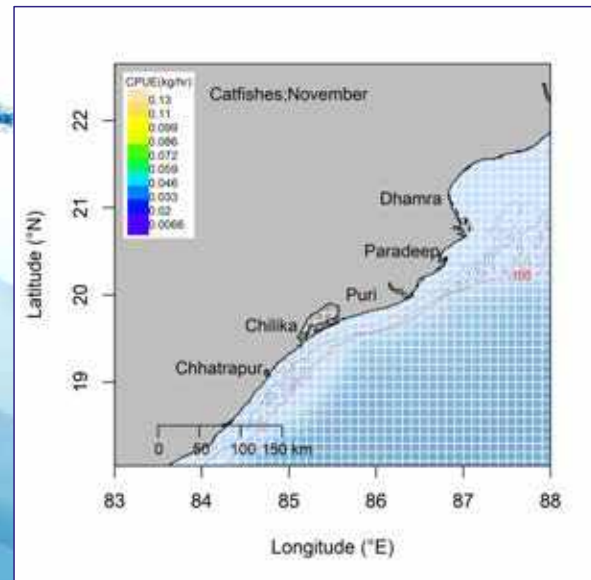
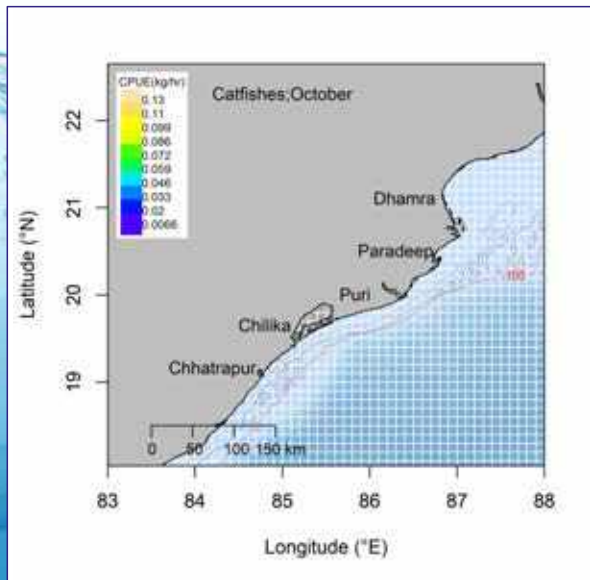
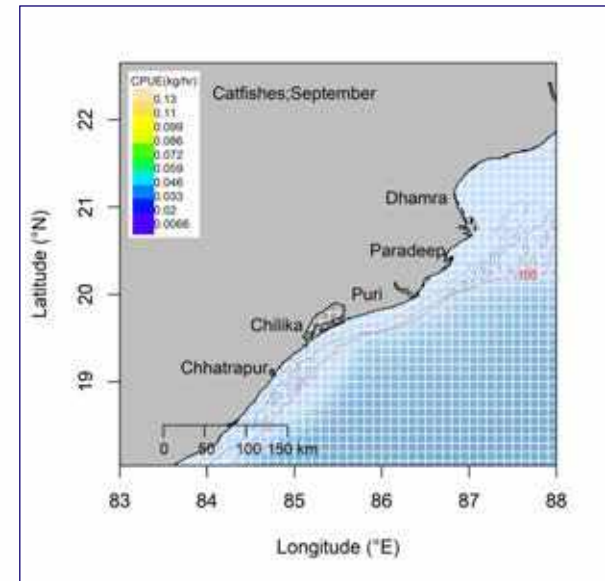
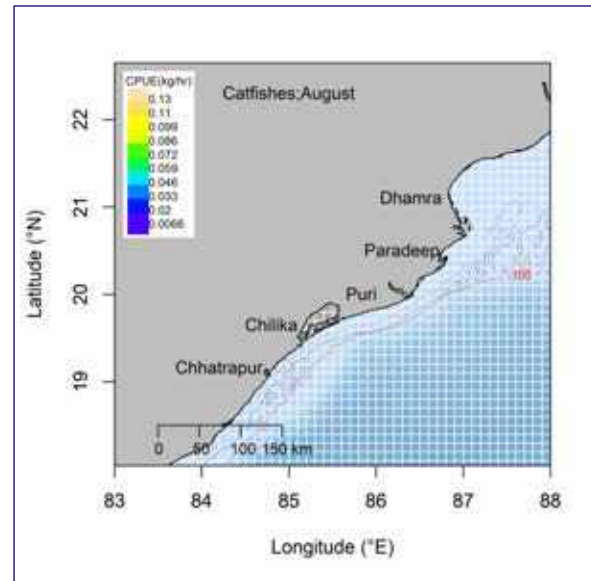
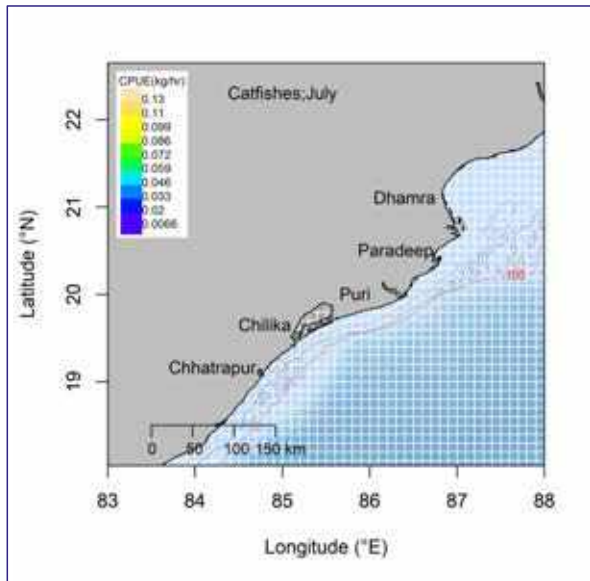


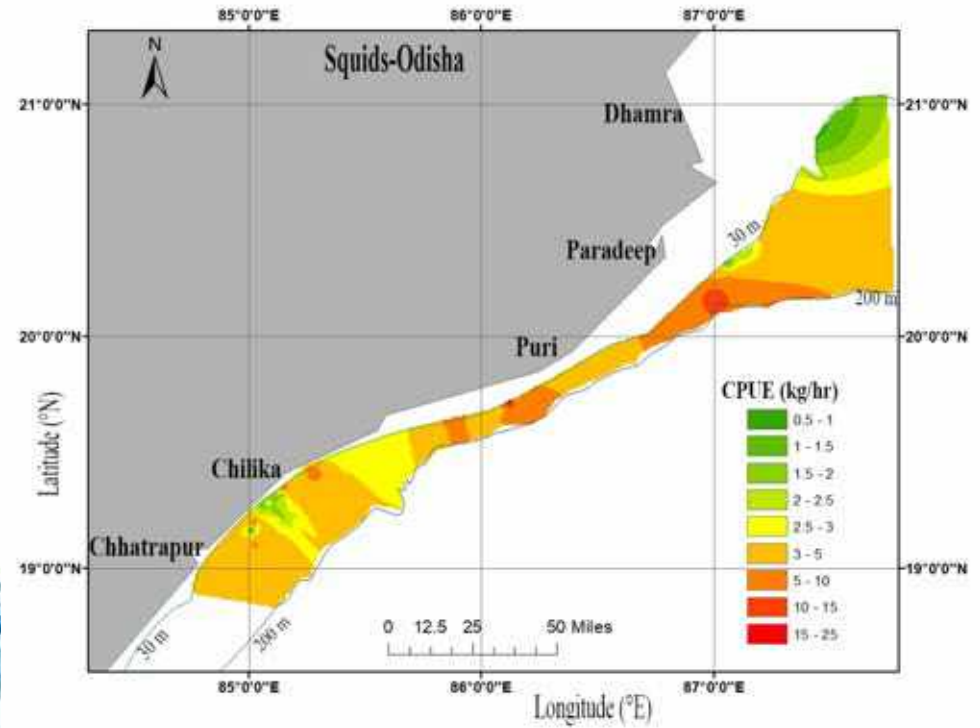
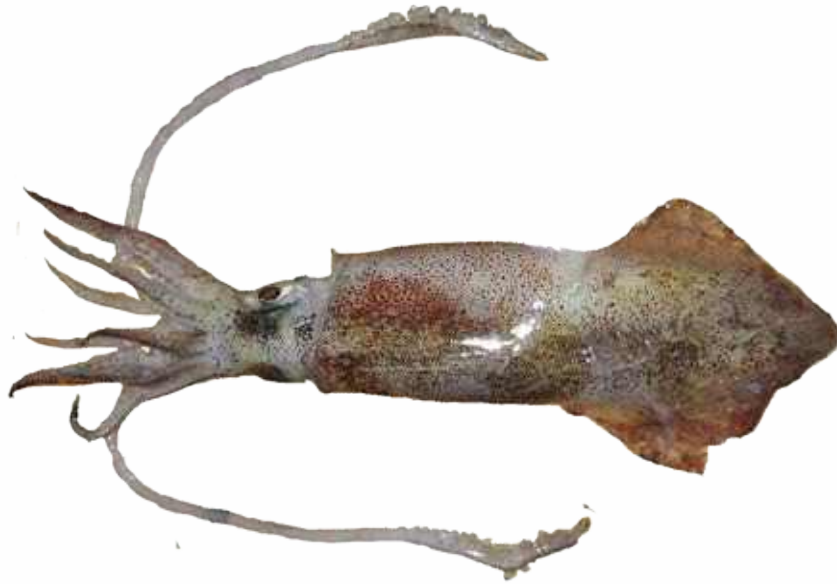


**Cat Fish**

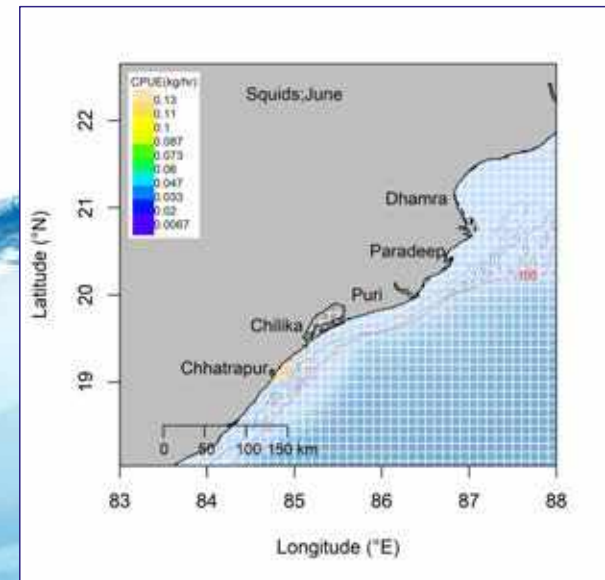
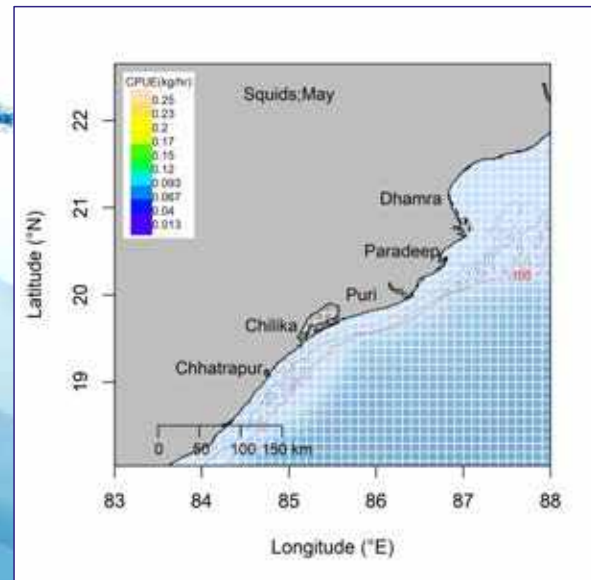
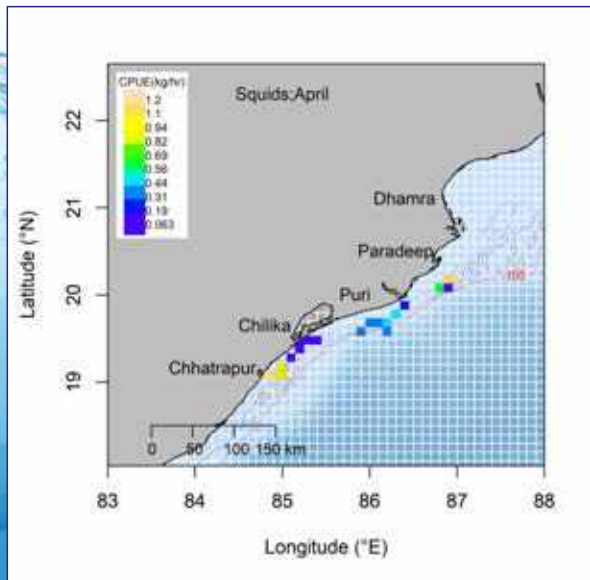
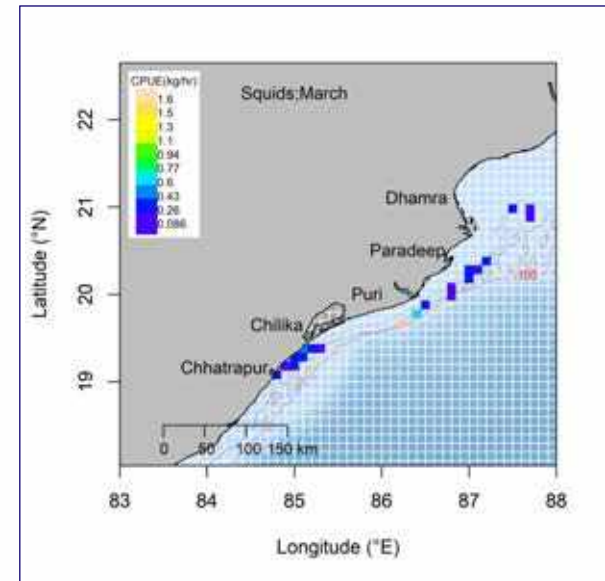
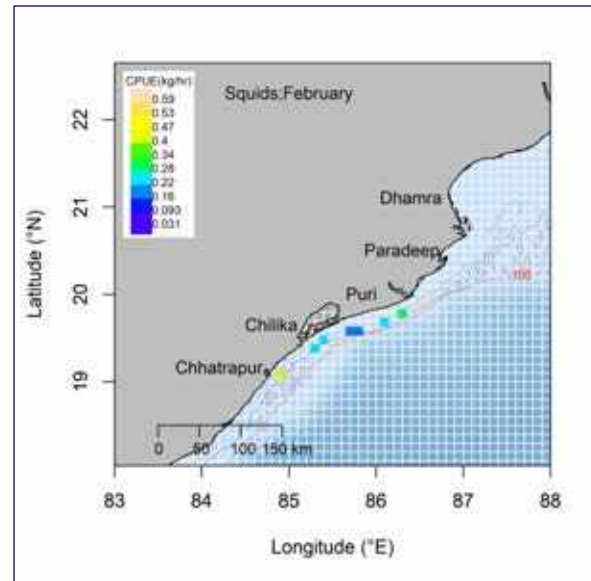
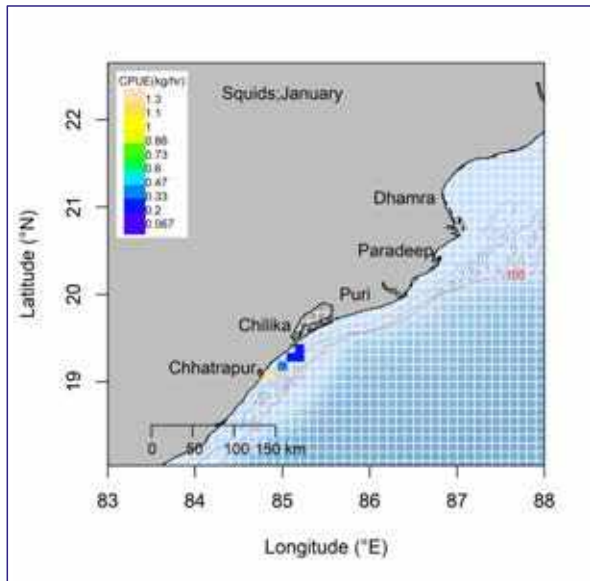


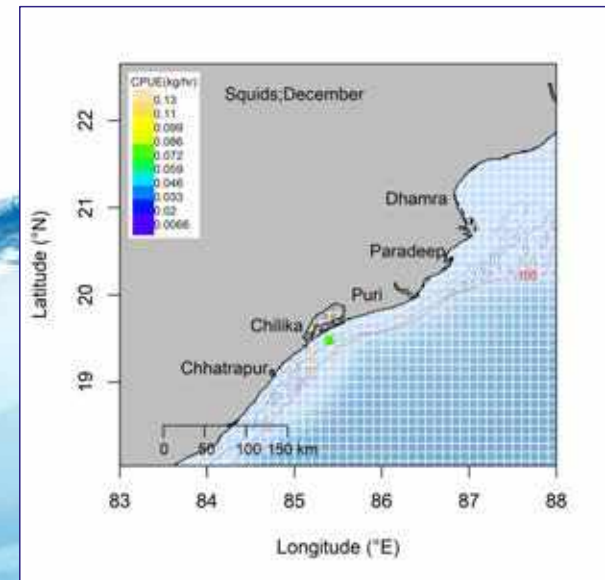
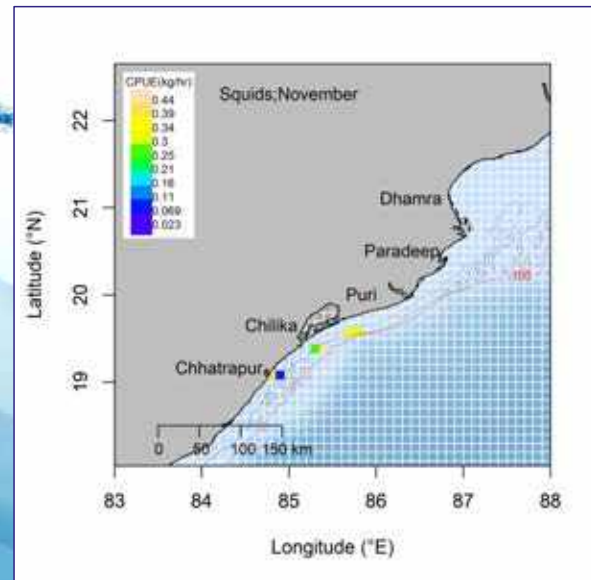
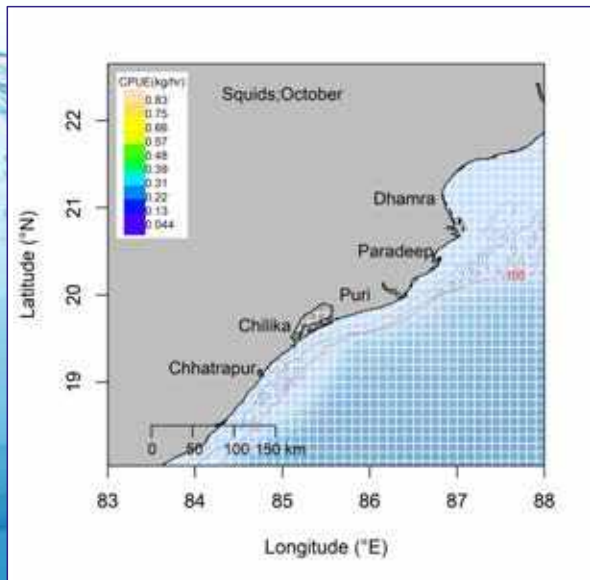
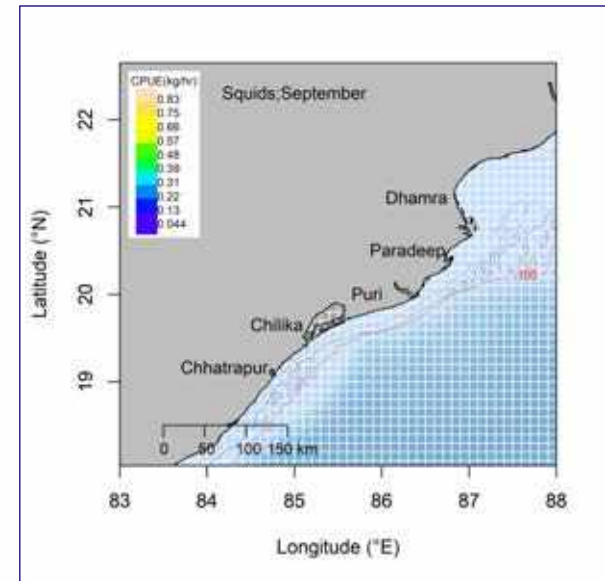
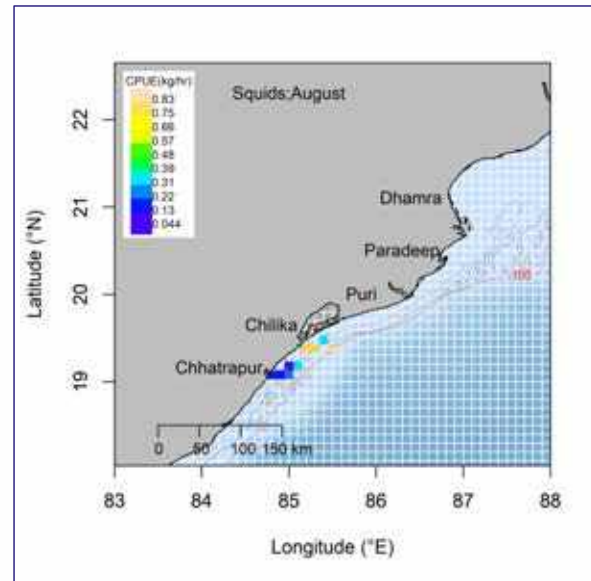
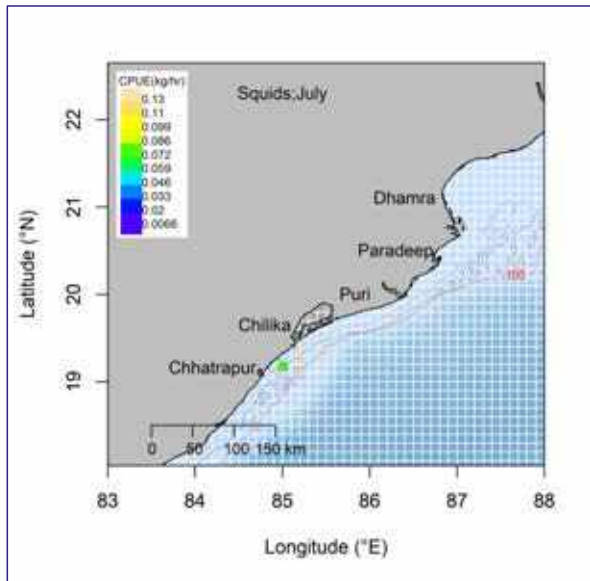






# Squids







## 4. Limitations and Challenges

### 4.1 Environmental and seasonal factors

Changes in environmental conditions (e.g., water temperature, salinity, or ocean currents) can influence fish distribution and abundance, which might not be fully captured by the survey data. Seasonal variations in fish behaviour can affect catch rates, making it challenging to compare CPUE across different months.

### 4.2 Sampling limitations

FSI carries out only experimental fishery survey operations and not any targeted fishing, therefore the observed CPUE rates would be much lower than those recorded by the fishers. Pelagic species like Mackerel and Decapterids are also reported along with other demersal catches in good quantity, but their estimation based on this survey alone may not deliver a real life status on the resource.

### 4.3 Restricted survey area

In the EEZ around Andaman and Nicobar Islands the distribution of efforts was comparatively less, as the vessel at Port Blair Base is a longliner which is concentrating on the survey of oceanic fishery resources. Further, considering the fragile coral ecosystem in the islands, It was decided not to conduct extensive demersal trawl survey in the archipelago. However, for monitoring the status of demersal fishery in Andaman, survey vessels from Visakhapatnam Base of FSI was deployed on special cruises where in they collected data through their intermittent survey cruises. Similarly, effort distribution along West Bengal and northern Gujarat are also limited due to the distant geographical positioning from the corresponding Bases.

### 4.4 Statistical and analytical limitations

The CPUE method assumes a proportional relationship between catch and effort, which may not always hold true, particularly in cases of overfishing or when fish populations are not uniformly distributed.

### 4.5 Spatial resolution

The spatial resolution of the data is limited to (0.1x0.1 nm), potentially overlooking fine-scale patterns in fish distribution and abundance. The boundaries of maritime states were chosen as per the Government of India records. However, the seaward boundaries of the states in the maps presented may differ from the actuals and therefore, the results need to be interpreted with caution.



## Appendix

### (i) Contact Information for Regional Offices

#### Porbandar Base of FSI

Sitala Chowk, K G Road

Porbandar - 360575,

Gujarat

#### Mumbai Base of FSI

1st Floor, Plot No.2A, Unit No.12,

New Fishing Harbour, Sassoon Dock,

Colaba, Mumbai - 400 005, Maharashtra

#### Mormugao Base of FSI

Post Box No: 5

Opp. Microwave Towers, Bogda

Mormugao - 403803, Goa

#### Cochin Base of FSI

Post Box 853, Kochangady

Cochin - 682005, Kerala

#### Chennai Base of FSI

Fishery Harbour Complex

Royapuram, Chennai - 600013,

Tamil Nadu

#### Visakhapatnam Base of FSI

Fishing Harbour, Beach road

Visakhapatnam - 530001

Andhra Pradesh

#### Port Blair Base of FSI

Post Box No: 46

Port Blair - 744101

Andaman & Nicobar Islands





## (ii) Geocoordinates of prominent fishing areas along the maritime states

| Andhra Pradesh   |               |                |       |         |
|------------------|---------------|----------------|-------|---------|
| Resource         | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish          | 16.800        | 82.450         | 4     | 333.33  |
| Catfish          | 16.900        | 82.450         | 8     | 300.00  |
| Catfish          | 16.900        | 82.500         | 4     | 200.00  |
| Catfish          | 17.933        | 83.800         | 4     | 166.67  |
| Catfish          | 16.867        | 82.450         | 9     | 160.00  |
| Round scads      | 14.750        | 80.330         | 5     | 2307.69 |
| Round scads      | 17.100        | 82.680         | 3     | 1769.23 |
| Round scads      | 17.117        | 82.600         | 7     | 923.08  |
| Round scads      | 15.167        | 80.330         | 7     | 769.23  |
| Round scads      | 14.883        | 80.330         | 5     | 769.23  |
| Groupers         | 18.017        | 83.867         | 4     | 123.33  |
| Groupers         | 18.450        | 84.383         | 1     | 34.67   |
| Groupers         | 17.750        | 83.567         | 1     | 33.33   |
| Groupers         | 18.617        | 84.500         | 11    | 22.67   |
| Groupers         | 14.967        | 80.200         | 11    | 20.00   |
| Lizardfish       | 18.400        | 84.417         | 4     | 233.33  |
| Lizardfish       | 18.683        | 84.550         | 4     | 160.00  |
| Lizardfish       | 17.800        | 83.717         | 9     | 120.00  |
| Lizardfish       | 19.067        | 84.883         | 4     | 106.67  |
| Lizardfish       | 18.700        | 84.633         | 4     | 86.67   |
| Mackerel         | 17.420        | 83.120         | 6     | 1500.00 |
| Mackerel         | 17.220        | 82.680         | 6     | 1038.46 |
| Mackerel         | 17.500        | 83.380         | 2     | 1000.00 |
| Mackerel         | 16.980        | 82.530         | 7     | 1000.00 |
| Mackerel         | 16.850        | 82.420         | 3     | 800.00  |
| Threadfin breams | 18.417        | 84.433         | 4     | 769.23  |
| Threadfin breams | 17.883        | 83.667         | 4     | 576.92  |
| Threadfin breams | 17.833        | 83.700         | 11    | 400.00  |
| Threadfin breams | 17.900        | 83.683         | 11    | 384.62  |
| Threadfin breams | 17.417        | 83.233         | 4     | 384.62  |
| Ribbonfish       | 17.767        | 83.467         | 11    | 333.33  |
| Ribbonfish       | 17.700        | 83.517         | 5     | 320.00  |
| Ribbonfish       | 16.983        | 82.483         | 9     | 253.33  |
| Ribbonfish       | 17.650        | 83.500         | 10    | 200.00  |
| Ribbonfish       | 17.767        | 83.533         | 5     | 186.67  |
| Silverbellies    | 18.100        | 84.033         | 5     | 633.33  |
| Silverbellies    | 18.650        | 84.517         | 8     | 420.00  |
| Silverbellies    | 17.783        | 83.500         | 6     | 400.00  |
| Silverbellies    | 17.700        | 83.517         | 5     | 400.00  |
| Silverbellies    | 18.150        | 84.150         | 2     | 340.00  |
| Squids           | 18.683        | 84.533         | 4     | 133.33  |
| Squids           | 18.417        | 84.367         | 3     | 73.33   |
| Squids           | 17.800        | 83.567         | 8     | 72.00   |
| Squids           | 15.167        | 80.267         | 4     | 60.00   |
| Squids           | 14.883        | 80.217         | 4     | 53.33   |
| Goatfish         | 18.033        | 84.400         | 7     | 769.23  |
| Goatfish         | 18.400        | 84.350         | 11    | 653.85  |
| Goatfish         | 18.400        | 84.367         | 9     | 538.46  |
| Goatfish         | 14.083        | 80.200         | 8     | 530.77  |
| Goatfish         | 18.533        | 84.033         | 9     | 500.00  |

| Gujarat          |               |                |       |        |
|------------------|---------------|----------------|-------|--------|
| Resource         | Latitude (°N) | Longitude (°E) | Month | CPUE   |
| Catfish          | 20.633        | 70.283         | 9     | 606.67 |
| Catfish          | 21.367        | 68.900         | 2     | 600.00 |
| Catfish          | 20.933        | 69.783         | 5     | 600.00 |
| Catfish          | 21.400        | 68.583         | 2     | 333.33 |
| Catfish          | 20.483        | 70.217         | 11    | 313.33 |
| Round scads      | 21.300        | 69.030         | 2     | 830.77 |
| Round scads      | 21.033        | 69.280         | 7     | 461.54 |
| Round scads      | 20.133        | 69.530         | 11    | 461.54 |
| Round scads      | 21.250        | 68.830         | 11    | 423.08 |
| Round scads      | 21.383        | 68.850         | 2     | 384.62 |
| Groupers         | 22.917        | 69.717         | 10    | 24.00  |
| Groupers         | 20.850        | 69.883         | 9     | 18.00  |
| Groupers         | 21.383        | 69.500         | 10    | 13.33  |
| Groupers         | 21.200        | 69.367         | 10    | 13.33  |
| Groupers         | 20.633        | 70.183         | 9     | 13.33  |
| Lizardfish       | 21.517        | 68.850         | 2     | 24.00  |
| Lizardfish       | 21.483        | 68.467         | 2     | 19.20  |
| Lizardfish       | 21.400        | 69.383         | 2     | 13.33  |
| Lizardfish       | 20.900        | 69.667         | 2     | 13.33  |
| Lizardfish       | 21.750        | 69.700         | 2     | 8.00   |
| Mackerel         | 21.100        | 69.350         | 5     | 269.23 |
| Mackerel         | 21.170        | 69.220         | 5     | 233.08 |
| Mackerel         | 22.070        | 68.450         | 9     | 192.31 |
| Mackerel         | 21.150        | 69.770         | 1     | 192.31 |
| Mackerel         | 20.980        | 69.500         | 5     | 192.31 |
| Threadfin breams | 20.500        | 69.400         | 11    | 230.77 |
| Threadfin breams | 22.033        | 67.967         | 9     | 138.46 |
| Threadfin breams | 21.883        | 68.133         | 9     | 123.08 |
| Threadfin breams | 21.300        | 68.050         | 11    | 123.08 |
| Threadfin breams | 22.183        | 67.067         | 9     | 115.38 |
| Ribbonfish       | 21.467        | 69.167         | 9     | 222.86 |
| Ribbonfish       | 21.417        | 69.283         | 9     | 36.67  |
| Ribbonfish       | 20.550        | 70.217         | 10    | 20.00  |
| Ribbonfish       | 21.300        | 69.567         | 5     | 16.67  |
| Ribbonfish       | 20.583        | 70.233         | 10    | 16.67  |
| Silverbellies    | 20.900        | 69.667         | 2     | 20.00  |
| Silverbellies    | 21.083        | 69.700         | 2     | 16.67  |
| Silverbellies    | 21.767        | 68.800         | 2     | 10.67  |
| Silverbellies    | 21.000        | 69.883         | 5     | 8.00   |
| Silverbellies    | 21.000        | 69.567         | 3     | 6.67   |
| Squids           | 20.900        | 69.883         | 5     | 16.67  |
| Squids           | 21.200        | 69.550         | 5     | 10.67  |
| Squids           | 21.300        | 69.367         | 5     | 8.00   |
| Squids           | 20.900        | 69.983         | 5     | 8.00   |
| Squids           | 20.800        | 70.083         | 5     | 8.00   |
| Goatfish         | 20.350        | 70.450         | 10    | 120.00 |
| Goatfish         | 22.683        | 68.233         | 11    | 107.69 |
| Goatfish         | 20.433        | 70.700         | 10    | 92.31  |
| Goatfish         | 22.400        | 68.250         | 11    | 76.92  |
| Goatfish         | 20.783        | 69.467         | 4     | 69.23  |

| Kerala           |               |                |       |         |
|------------------|---------------|----------------|-------|---------|
| Resource         | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish          | 9.600         | 76.017         | 8     | 8.00    |
| Catfish          | 9.617         | 76.100         | 1     | 6.67    |
| Catfish          | 9.183         | 76.267         | 1     | 1.33    |
| Catfish          | 9.850         | 76.050         | 12    | 0.67    |
| Catfish          | 9.717         | 76.067         | 1     | 0.67    |
| Round scads      | 9.033         | 76.080         | 10    | 3076.92 |
| Round scads      | 9.117         | 76.200         | 10    | 1538.46 |
| Round scads      | 8.800         | 76.370         | 4     | 992.31  |
| Round scads      | 11.783        | 74.550         | 4     | 923.08  |
| Round scads      | 9.033         | 76.120         | 10    | 769.23  |
| Groupers         | 9.583         | 76.000         | 8     | 400     |
| Groupers         | 9.117         | 76.117         | 7     | 336.667 |
| Groupers         | 9.167         | 76.117         | 10    | 333.333 |
| Groupers         | 11.350        | 75.417         | 9     | 280     |
| Groupers         | 9.533         | 76.017         | 7     | 266.667 |
| Lizardfish       | 9.150         | 76.283         | 9     | 233.33  |
| Lizardfish       | 9.217         | 76.283         | 9     | 133.33  |
| Lizardfish       | 9.417         | 76.050         | 9     | 80.00   |
| Lizardfish       | 9.250         | 76.067         | 8     | 80.00   |
| Lizardfish       | 9.350         | 76.100         | 5     | 66.67   |
| Mackerel         | 10.520        | 75.620         | 9     | 1538.46 |
| Mackerel         | 9.530         | 76.150         | 5     | 375.00  |
| Mackerel         | 9.600         | 76.000         | 6     | 230.77  |
| Mackerel         | 9.600         | 76.100         | 10    | 153.85  |
| Mackerel         | 9.680         | 76.000         | 10    | 120.00  |
| Threadfin breams | 9.683         | 75.867         | 7     | 1980.77 |
| Threadfin breams | 8.833         | 76.383         | 7     | 1692.31 |
| Threadfin breams | 9.500         | 75.967         | 7     | 1571.43 |
| Threadfin breams | 9.400         | 76.133         | 7     | 1555.56 |
| Threadfin breams | 9.550         | 75.967         | 7     | 1538.46 |
| Ribbonfish       | 9.350         | 75.850         | 8     | 1000.00 |
| Ribbonfish       | 10.017        | 75.983         | 10    | 500.00  |
| Ribbonfish       | 8.917         | 76.400         | 12    | 450.00  |
| Ribbonfish       | 9.317         | 75.850         | 10    | 250.00  |
| Ribbonfish       | 8.967         | 75.883         | 10    | 150.00  |
| Silverbellies    | 8.617         | 76.667         | 7     | 133.33  |
| Silverbellies    | 9.317         | 76.150         | 2     | 54.00   |
| Silverbellies    | 8.800         | 76.433         | 12    | 53.33   |
| Silverbellies    | 9.633         | 76.133         | 11    | 40.00   |
| Silverbellies    | 9.567         | 76.100         | 11    | 40.00   |
| Squids           | 9.783         | 76.033         | 10    | 100.00  |
| Squids           | 8.933         | 76.300         | 6     | 86.67   |
| Squids           | 9.517         | 76.133         | 8     | 68.57   |
| Squids           | 9.700         | 76.083         | 8     | 66.67   |
| Squids           | 8.783         | 76.433         | 10    | 66.67   |
| Goatfish         | 12.117        | 75.900         | 11    | 738.46  |
| Goatfish         | 10.617        | 75.667         | 8     | 307.69  |
| Goatfish         | 10.117        | 75.867         | 8     | 269.23  |
| Goatfish         | 9.617         | 76.067         | 8     | 169.23  |
| Goatfish         | 9.967         | 75.950         | 9     | 166.67  |



## (ii) Geocoordinates of prominent fishing areas along the maritime states

| Karnataka       |               |                |       |         |
|-----------------|---------------|----------------|-------|---------|
| Resource        | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish         | 13.400        | 73.900         | 1     | 44.00   |
| Catfish         | 12.900        | 74.083         | 1     | 25.33   |
| Catfish         | 13.000        | 74.050         | 12    | 16.67   |
| Catfish         | 14.767        | 73.767         | 9     | 14.67   |
| Catfish         | 14.517        | 73.983         | 7     | 12.00   |
| Round scads     | 13.700        | 73.500         | 9     | 3333.33 |
| Round scads     | 14.400        | 73.330         | 11    | 1153.85 |
| Round scads     | 14.200        | 74.000         | 12    | 1000.00 |
| Round scads     | 14.500        | 73.280         | 11    | 923.08  |
| Round scads     | 13.100        | 73.920         | 11    | 923.08  |
| Groupers        | 14.767        | 73.767         | 9     | 666.67  |
| Groupers        | 13.783        | 73.517         | 9     | 266.67  |
| Groupers        | 14.883        | 73.633         | 6     | 133.33  |
| Groupers        | 14.883        | 73.633         | 6     | 133.33  |
| Groupers        | 14.600        | 73.983         | 9     | 126.67  |
| Lizardfish      | 13.450        | 74.050         | 1     | 20.00   |
| Lizardfish      | 13.883        | 73.633         | 11    | 10.00   |
| Lizardfish      | 13.583        | 74.467         | 2     | 10.00   |
| Lizardfish      | 13.333        | 74.483         | 3     | 10.00   |
| Lizardfish      | 12.767        | 74.683         | 3     | 10.00   |
| Mackerel        | 14.330        | 74.220         | 11    | 250.00  |
| Mackerel        | 14.000        | 74.230         | 5     | 85.38   |
| Mackerel        | 14.450        | 74.180         | 11    | 76.92   |
| Mackerel        | 13.200        | 74.470         | 5     | 69.23   |
| Mackerel        | 13.980        | 74.230         | 5     | 61.54   |
| Threadfin brems | 14.183        | 73.933         | 7     | 1153.85 |
| Threadfin brems | 14.100        | 73.933         | 10    | 769.23  |
| Threadfin brems | 14.117        | 74.050         | 10    | 473.08  |
| Threadfin brems | 14.500        | 73.367         | 10    | 384.62  |
| Threadfin brems | 14.400        | 73.383         | 6     | 333.33  |
| Ribbonfish      | 14.467        | 73.333         | 2     | 200     |
| Ribbonfish      | 14.383        | 73.367         | 2     | 80      |
| Ribbonfish      | 14.483        | 74.017         | 6     | 45      |
| Ribbonfish      | 14.683        | 73.767         | 6     | 40      |
| Ribbonfish      | 14.617        | 73.333         | 2     | 40      |
| Silverbellies   | 14.883        | 73.750         | 11    | 5.33    |
| Silverbellies   | 14.883        | 73.867         | 2     | 1.33    |
| Silverbellies   | 14.883        | 73.750         | 12    | 0.67    |
| Silverbellies   | 14.867        | 73.783         | 11    | 0.67    |
| Silverbellies   | 14.867        | 73.850         | 11    | 0.67    |
| Squids          | 14.400        | 73.950         | 5     | 65.33   |
| Squids          | 14.783        | 73.933         | 11    | 34.00   |
| Squids          | 14.833        | 73.900         | 4     | 22.00   |
| Squids          | 12.800        | 74.650         | 12    | 20.00   |
| Squids          | 14.867        | 74.883         | 1     | 16.67   |
| Goatfish        | 14.300        | 73.933         | 5     | 38.46   |
| Goatfish        | 13.900        | 73.917         | 5     | 23.08   |
| Goatfish        | 13.600        | 73.867         | 5     | 11.54   |
| Goatfish        | 13.500        | 73.933         | 5     | 11.54   |

| Maharashtra     |               |                |       |         |
|-----------------|---------------|----------------|-------|---------|
| Resource        | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Round scads     | 16.667        | 72.600         | 11    | 692.31  |
| Round scads     | 16.900        | 72.880         | 11    | 653.85  |
| Round scads     | 18.233        | 71.080         | 10    | 640.00  |
| Round scads     | 18.683        | 71.130         | 9     | 615.38  |
| Round scads     | 20.033        | 69.400         | 2     | 476.92  |
| Groupers        | 19.517        | 71.700         | 12    | 470.00  |
| Groupers        | 17.933        | 72.283         | 10    | 466.67  |
| Groupers        | 17.500        | 72.433         | 8     | 466.67  |
| Groupers        | 16.967        | 73.050         | 9     | 350.00  |
| Groupers        | 17.067        | 72.900         | 10    | 333.33  |
| Lizardfish      | 18.000        | 72.183         | 11    | 196.67  |
| Lizardfish      | 17.367        | 72.950         | 10    | 33.33   |
| Lizardfish      | 15.767        | 73.450         | 1     | 10.67   |
| Lizardfish      | 17.400        | 72.983         | 2     | 10.00   |
| Lizardfish      | 17.917        | 72.317         | 1     | 8.67    |
| Mackerel        | 18.320        | 72.530         | 1     | 519.23  |
| Mackerel        | 18.130        | 72.250         | 5     | 242.31  |
| Mackerel        | 18.500        | 72.400         | 1     | 230.77  |
| Mackerel        | 18.470        | 72.520         | 12    | 161.54  |
| Mackerel        | 20.020        | 71.270         | 10    | 146.15  |
| Threadfin brems | 16.500        | 72.367         | 4     | 303.85  |
| Threadfin brems | 18.017        | 71.550         | 11    | 233.33  |
| Threadfin brems | 16.800        | 72.900         | 8     | 215.38  |
| Threadfin brems | 19.800        | 69.550         | 5     | 211.54  |
| Threadfin brems | 17.183        | 72.117         | 9     | 193.85  |
| Ribbonfish      | 15.750        | 73.367         | 2     | 120.00  |
| Ribbonfish      | 18.300        | 72.483         | 8     | 100.00  |
| Ribbonfish      | 18.283        | 72.483         | 8     | 100.00  |
| Ribbonfish      | 18.100        | 72.683         | 5     | 100.00  |
| Ribbonfish      | 18.367        | 72.467         | 8     | 66.67   |
| Squids          | 18.167        | 72.483         | 8     | 72.00   |
| Squids          | 18.150        | 72.567         | 8     | 66.67   |
| Squids          | 18.383        | 72.467         | 8     | 53.33   |
| Squids          | 18.050        | 72.533         | 8     | 53.33   |
| Squids          | 18.067        | 72.517         | 8     | 50.00   |
| Goatfish        | 17.900        | 72.283         | 3     | 192.31  |
| Goatfish        | 17.017        | 73.000         | 12    | 69.23   |
| Goatfish        | 19.800        | 71.617         | 10    | 46.15   |
| Goatfish        | 16.583        | 73.100         | 12    | 39.23   |
| Goatfish        | 20.033        | 70.967         | 11    | 34.62   |
| Catfish         | 18.467        | 72.450         | 3     | 1866.67 |
| Catfish         | 18.283        | 72.533         | 6     | 588.00  |
| Catfish         | 18.400        | 72.467         | 8     | 253.33  |
| Catfish         | 18.100        | 72.667         | 6     | 146.67  |
| Catfish         | 16.867        | 73.150         | 10    | 133.33  |
| Silverbellies   | 17.733        | 73.500         | 7     | 53.33   |
| Silverbellies   | 17.850        | 73.683         | 6     | 16.67   |
| Silverbellies   | 16.467        | 73.133         | 5     | 16.67   |
| Silverbellies   | 15.767        | 73.450         | 11    | 16.67   |
| Silverbellies   | 17.800        | 73.633         | 6     | 13.33   |

| Odisha          |               |                |       |         |
|-----------------|---------------|----------------|-------|---------|
| Resource        | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish         | 19.450        | 85.583         | 7     | 66.67   |
| Catfish         | 20.317        | 87.100         | 3     | 66.67   |
| Catfish         | 20.917        | 87.700         | 3     | 53.33   |
| Catfish         | 19.867        | 86.450         | 2     | 46.67   |
| Catfish         | 20.183        | 86.850         | 7     | 40.00   |
| Round scads     | 19.267        | 85.200         | 1     | 1230.77 |
| Round scads     | 19.367        | 85.470         | 11    | 446.15  |
| Round scads     | 19.083        | 82.530         | 3     | 276.92  |
| Round scads     | 19.567        | 85.070         | 4     | 253.85  |
| Round scads     | 19.133        | 85.070         | 10    | 160.00  |
| Groupers        | 19.167        | 84.950         | 2     | 10.00   |
| Groupers        | 19.250        | 85.050         | 6     | 6.67    |
| Groupers        | 20.083        | 86.933         | 7     | 2.67    |
| Groupers        | 19.400        | 85.300         | 8     | 1.60    |
| Groupers        | 19.133        | 84.883         | 3     | 1.33    |
| Lizardfish      | 19.083        | 84.850         | 4     | 83.33   |
| Lizardfish      | 19.400        | 85.383         | 11    | 50.00   |
| Lizardfish      | 19.350        | 85.167         | 11    | 41.05   |
| Lizardfish      | 19.400        | 85.283         | 8     | 40.00   |
| Lizardfish      | 19.417        | 85.450         | 8     | 37.50   |
| Mackerel        | 19.450        | 85.550         | 11    | 2307.69 |
| Mackerel        | 19.400        | 85.270         | 4     | 1153.85 |
| Mackerel        | 19.320        | 85.150         | 4     | 769.23  |
| Mackerel        | 19.430        | 85.350         | 4     | 550.00  |
| Mackerel        | 20.050        | 86.920         | 2     | 246.15  |
| Threadfin brems | 19.250        | 85.033         | 4     | 769.23  |
| Threadfin brems | 19.433        | 85.550         | 8     | 69.23   |
| Threadfin brems | 19.450        | 85.433         | 10    | 65.38   |
| Threadfin brems | 19.133        | 84.917         | 11    | 30.77   |
| Threadfin brems | 19.117        | 85.017         | 8     | 30.77   |
| Ribbonfish      | 19.150        | 84.917         | 11    | 93.33   |
| Ribbonfish      | 19.117        | 84.917         | 6     | 40.00   |
| Ribbonfish      | 19.217        | 84.967         | 7     | 30.00   |
| Ribbonfish      | 20.200        | 86.967         | 3     | 26.67   |
| Ribbonfish      | 20.067        | 86.833         | 10    | 26.67   |
| Silverbellies   | 19.083        | 84.850         | 4     | 342.67  |
| Silverbellies   | 19.367        | 85.183         | 4     | 333.33  |
| Silverbellies   | 19.317        | 85.117         | 4     | 233.33  |
| Silverbellies   | 19.133        | 84.900         | 7     | 200.00  |
| Silverbellies   | 19.233        | 85.067         | 3     | 166.67  |
| Squids          | 19.717        | 86.183         | 3     | 26.67   |
| Squids          | 19.117        | 84.867         | 1     | 23.33   |
| Squids          | 19.083        | 84.850         | 4     | 23.33   |
| Squids          | 20.133        | 86.883         | 4     | 20.00   |
| Squids          | 20.167        | 87.017         | 4     | 13.33   |
| Goatfish        | 19.700        | 86.300         | 1     | 538.46  |
| Goatfish        | 19.400        | 85.217         | 11    | 276.92  |
| Goatfish        | 19.617        | 85.950         | 9     | 230.77  |
| Goatfish        | 19.517        | 85.450         | 12    | 219.23  |
| Goatfish        | 20.367        | 87.217         | 12    | 192.31  |



## (ii) Geocoordinates of prominent fishing areas along the maritime states

| Tamil Nadu, east |               |                |       |         |
|------------------|---------------|----------------|-------|---------|
| Resource         | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish          | 13.267        | 80.417         | 3     | 20.00   |
| Catfish          | 12.600        | 80.283         | 12    | 13.33   |
| Catfish          | 10.883        | 80.033         | 4     | 10.00   |
| Catfish          | 13.200        | 80.433         | 1     | 10.00   |
| Catfish          | 13.333        | 80.400         | 1     | 8.00    |
| Round scads      | 10.580        | 80.250         | 2     | 2461.54 |
| Round scads      | 10.580        | 80.230         | 10    | 1888.46 |
| Round scads      | 10.620        | 80.130         | 9     | 692.31  |
| Round scads      | 10.500        | 80.270         | 9     | 692.31  |
| Round scads      | 10.070        | 80.230         | 9     | 615.38  |
| Groupers         | 10.867        | 79.983         | 8     | 12.00   |
| Groupers         | 11.550        | 79.883         | 9     | 10.00   |
| Groupers         | 12.883        | 80.367         | 10    | 10.00   |
| Groupers         | 11.217        | 79.950         | 10    | 9.33    |
| Groupers         | 12.767        | 80.317         | 10    | 6.67    |
| Lizardfish       | 12.867        | 80.400         | 4     | 30.00   |
| Lizardfish       | 13.433        | 80.417         | 6     | 27.33   |
| Lizardfish       | 12.517        | 80.250         | 5     | 27.33   |
| Lizardfish       | 12.817        | 80.467         | 4     | 19.33   |
| Lizardfish       | 12.667        | 80.300         | 7     | 17.33   |
| Mackerel         | 12.830        | 80.370         | 3     | 269.23  |
| Mackerel         | 12.780        | 80.350         | 7     | 192.31  |
| Mackerel         | 12.330        | 80.170         | 4     | 169.23  |
| Mackerel         | 12.730        | 80.330         | 11    | 153.85  |
| Mackerel         | 12.430        | 80.220         | 4     | 153.85  |
| Threadfin brems  | 11.883        | 80.000         | 7     | 288.46  |
| Threadfin brems  | 10.450        | 80.283         | 8     | 276.92  |
| Threadfin brems  | 11.800        | 79.917         | 7     | 147.69  |
| Threadfin brems  | 10.517        | 80.283         | 3     | 134.62  |
| Threadfin brems  | 10.033        | 80.267         | 8     | 92.31   |
| Ribbonfish       | 12.017        | 80.033         | 7     | 66.67   |
| Ribbonfish       | 12.600        | 80.250         | 7     | 40.00   |
| Ribbonfish       | 13.383        | 80.417         | 9     | 33.33   |
| Ribbonfish       | 12.817        | 80.333         | 7     | 30.00   |
| Ribbonfish       | 12.183        | 80.117         | 7     | 30.00   |
| Silverbellies    | 12.633        | 80.300         | 2     | 167.33  |
| Silverbellies    | 11.917        | 80.067         | 3     | 153.33  |
| Silverbellies    | 12.350        | 80.183         | 4     | 133.33  |
| Silverbellies    | 11.533        | 79.867         | 2     | 100.00  |
| Silverbellies    | 12.750        | 80.333         | 10    | 93.33   |
| Squids           | 12.350        | 80.200         | 8     | 116.67  |
| Squids           | 13.400        | 80.417         | 7     | 100.00  |
| Squids           | 12.700        | 80.317         | 6     | 98.82   |
| Squids           | 10.767        | 80.050         | 6     | 80.00   |
| Squids           | 11.883        | 80.000         | 8     | 50.00   |
| Goatfish         | 12.433        | 80.200         | 2     | 807.69  |
| Goatfish         | 11.967        | 80.067         | 10    | 276.92  |
| Goatfish         | 11.167        | 79.967         | 3     | 230.77  |
| Goatfish         | 11.883        | 80.033         | 10    | 138.46  |
| Goatfish         | 10.833        | 80.100         | 8     | 123.08  |

| Tamil Nadu, west |               |                |       |         |
|------------------|---------------|----------------|-------|---------|
| Resource         | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Round scads      | 7.567         | 76.830         | 3     | 326.92  |
| Round scads      | 7.550         | 76.850         | 10    | 292.31  |
| Round scads      | 7.533         | 76.830         | 3     | 200.00  |
| Round scads      | 8.183         | 76.780         | 2     | 157.69  |
| Round scads      | 8.200         | 76.900         | 4     | 92.31   |
| Groupers         | 8.033         | 77.167         | 11    | 6.95    |
| Groupers         | 7.983         | 77.100         | 8     | 6.67    |
| Groupers         | 7.867         | 77.083         | 1     | 2.00    |
| Groupers         | 8.233         | 76.950         | 12    | 0.57    |
| Lizardfish       | 7.983         | 77.100         | 8     | 33.33   |
| Lizardfish       | 7.967         | 77.133         | 8     | 16.67   |
| Lizardfish       | 7.867         | 77.083         | 1     | 5.00    |
| Lizardfish       | 7.200         | 77.150         | 8     | 5.00    |
| Lizardfish       | 8.117         | 77.000         | 11    | 3.33    |
| Mackerel         | 8.700         | 76.570         | 5     | 21.54   |
| Mackerel         | 9.770         | 77.580         | 10    | 16.67   |
| Mackerel         | 8.820         | 76.400         | 9     | 11.54   |
| Mackerel         | 8.480         | 76.620         | 10    | 11.54   |
| Mackerel         | 8.750         | 76.400         | 4     | 9.00    |
| Threadfin brems  | 7.467         | 77.017         | 11    | 2307.69 |
| Threadfin brems  | 7.417         | 77.000         | 12    | 2157.14 |
| Threadfin brems  | 7.383         | 77.100         | 2     | 1480.00 |
| Threadfin brems  | 7.350         | 77.200         | 2     | 761.54  |
| Threadfin brems  | 7.500         | 77.500         | 11    | 384.62  |
| Ribbonfish       | 7.200         | 77.150         | 8     | 150.00  |
| Ribbonfish       | 8.217         | 76.567         | 8     | 10.00   |
| Ribbonfish       | 5.700         | 76.617         | 5     | 0.75    |
| Silverbellies    | 5.700         | 76.617         | 5     | 3.75    |
| Silverbellies    | 8.117         | 77.000         | 11    | 1.33    |
| Silverbellies    | 7.917         | 76.800         | 11    | 1.33    |
| Silverbellies    | 8.250         | 76.900         | 11    | 1.26    |
| Squids           | 7.983         | 77.100         | 8     | 200.00  |
| Squids           | 7.883         | 77.167         | 8     | 133.33  |
| Squids           | 7.933         | 77.200         | 8     | 20.00   |
| Squids           | 7.967         | 77.133         | 8     | 16.67   |
| Squids           | 8.200         | 77.033         | 3     | 1.33    |
| Goatfish         | 7.083         | 77.217         | 4     | 46.15   |
| Goatfish         | 7.850         | 77.133         | 4     | 38.46   |
| Goatfish         | 8.267         | 76.683         | 12    | 33.33   |
| Goatfish         | 7.883         | 77.767         | 11    | 23.08   |
| Goatfish         | 7.933         | 77.183         | 4     | 19.23   |

| Goa             |               |                |       |         |
|-----------------|---------------|----------------|-------|---------|
| Resource        | Latitude (°N) | Longitude (°E) | Month | CPUE    |
| Catfish         | 15.533        | 73.450         | 11    | 23.33   |
| Catfish         | 15.083        | 73.767         | 11    | 23.33   |
| Catfish         | 15.167        | 73.733         | 11    | 20.00   |
| Catfish         | 15.667        | 73.467         | 6     | 15.53   |
| Catfish         | 15.667        | 73.467         | 6     | 15.53   |
| Round scads     | 14.917        | 73.600         | 6     | 1153.85 |
| Round scads     | 15.500        | 72.950         | 4     | 336.92  |
| Round scads     | 15.600        | 72.900         | 1     | 242.31  |
| Round scads     | 15.700        | 72.900         | 4     | 230.77  |
| Round scads     | 15.417        | 73.600         | 10    | 200.00  |
| Groupers        | 15.667        | 73.467         | 6     | 705.88  |
| Groupers        | 15.083        | 73.183         | 9     | 566.67  |
| Groupers        | 15.583        | 73.400         | 11    | 386.67  |
| Groupers        | 15.617        | 73.517         | 10    | 333.33  |
| Groupers        | 15.583        | 72.900         | 9     | 333.33  |
| Lizardfish      | 15.183        | 73.717         | 3     | 28.00   |
| Lizardfish      | 15.483        | 73.583         | 3     | 23.33   |
| Lizardfish      | 15.433        | 73.583         | 3     | 23.33   |
| Lizardfish      | 15.217        | 73.750         | 3     | 23.33   |
| Lizardfish      | 15.517        | 73.533         | 3     | 20.00   |
| Mackerel        | 15.020        | 73.750         | 5     | 115.38  |
| Mackerel        | 15.000        | 73.670         | 5     | 96.15   |
| Mackerel        | 15.700        | 73.350         | 10    | 76.92   |
| Mackerel        | 14.980        | 73.670         | 5     | 69.23   |
| Mackerel        | 15.400        | 73.620         | 1     | 53.85   |
| Threadfin brems | 15.300        | 73.517         | 10    | 142.31  |
| Threadfin brems | 15.200        | 73.567         | 7     | 115.38  |
| Threadfin brems | 15.400        | 73.450         | 7     | 80.00   |
| Threadfin brems | 15.400        | 73.467         | 7     | 76.92   |
| Threadfin brems | 15.300        | 73.533         | 10    | 76.92   |
| Silverbellies   | 15.550        | 73.483         | 5     | 23.33   |
| Silverbellies   | 15.400        | 73.583         | 11    | 23.33   |
| Silverbellies   | 15.517        | 73.550         | 5     | 10.67   |
| Silverbellies   | 15.567        | 73.517         | 2     | 8.67    |
| Silverbellies   | 15.050        | 73.717         | 5     | 8.00    |
| Squids          | 14.900        | 73.717         | 2     | 26.67   |
| Squids          | 15.467        | 73.517         | 11    | 23.33   |
| Squids          | 15.433        | 73.583         | 3     | 22.00   |
| Squids          | 15.217        | 73.750         | 3     | 22.00   |
| Squids          | 15.083        | 73.683         | 3     | 22.00   |





## Treasures of the Deep: An Atlas on India's Demersal Fishery Resources and Fishing Grounds

This Atlas is a comprehensive documentation of several demersal fishery resources within the Indian Exclusive Economic Zone (EEZ), compiled from results of extensive surveys conducted by the Fishery Survey of India (FSI) over two decades. Covering the period from 2000 to 2020, this work provides an in-depth analysis of the spatial and temporal distribution, abundance, and trends of key demersal species. The surveys spanned in the depths from 30 to 500 meters along the Indian coast. This rigorous data collection and analysis offer invaluable insights into major fishing grounds and catch per unit effort (CPUE) trends, crucial for sustainable fisheries management.



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