SIOFA Sharks

Annex 2: Summary of IEO Data

DELEGATION OF THE EUROPEAN UNION

04 March, 2024

Introduction

This document provides a summary of the shark dataset, which includes information on shark captures such as species, length, weight, sex, maturity, and other relevant data. The aim is to understand the diversity of species, the types of data collected, and assess the quality and coverage of the dataset.

Data Preparation

This section is dedicated to preparing the shark datasets for analysis. It includes loading the datasets, standardizing the variables, and ensuring the data is in a format suitable for analysis.

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7848 6495 2873 1211  386   80  140  123   27  559    3  303    1  326    1  911
 E/5  F/6   F1   F2   F3   F4   F5   F6   F7   F8    G  G/7   M1   M2   M3   M4
  70   40  605  392  175   25   16   16    7  111    1    3  220  346  325   71
  N1 <NA>
   1  608
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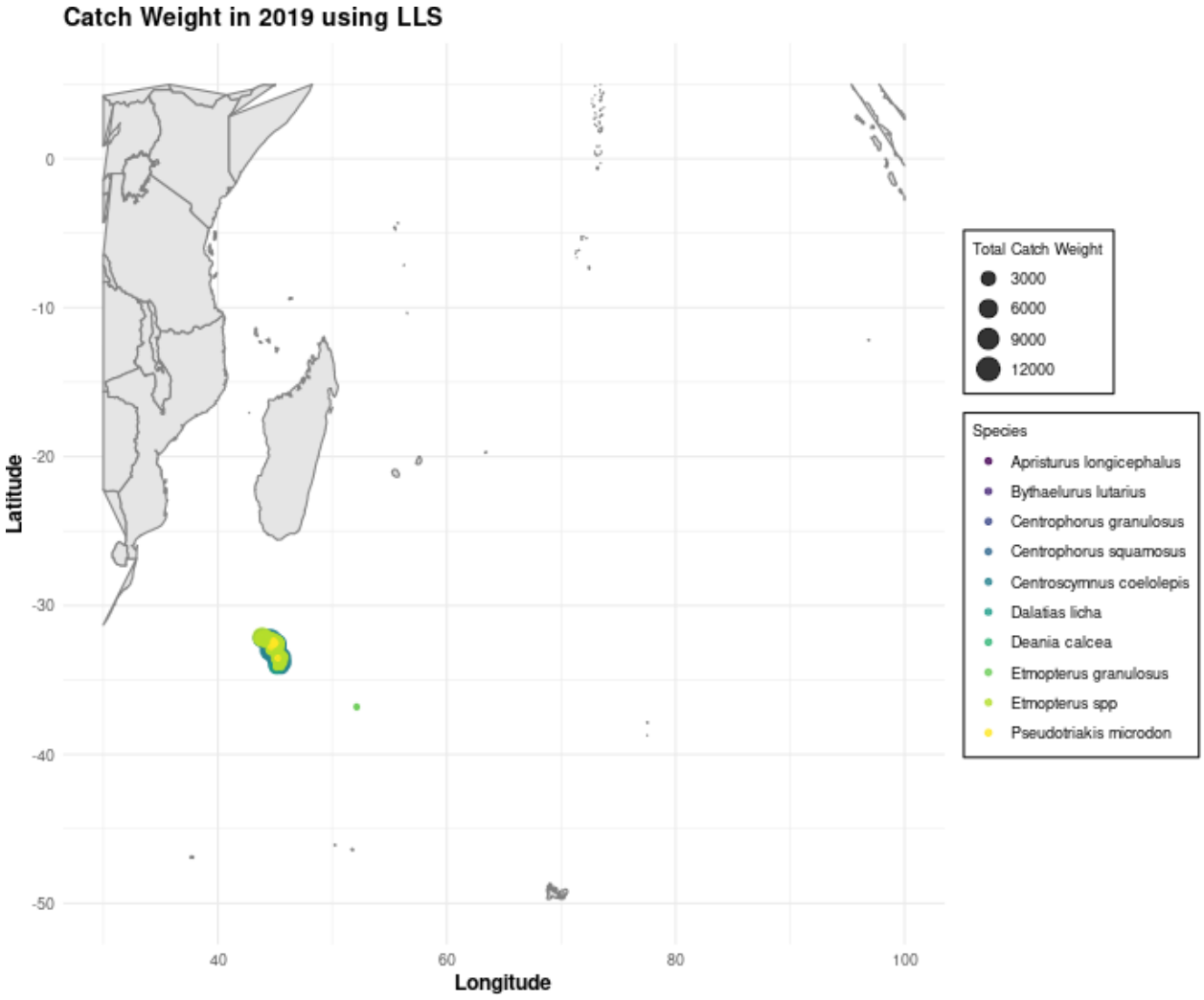
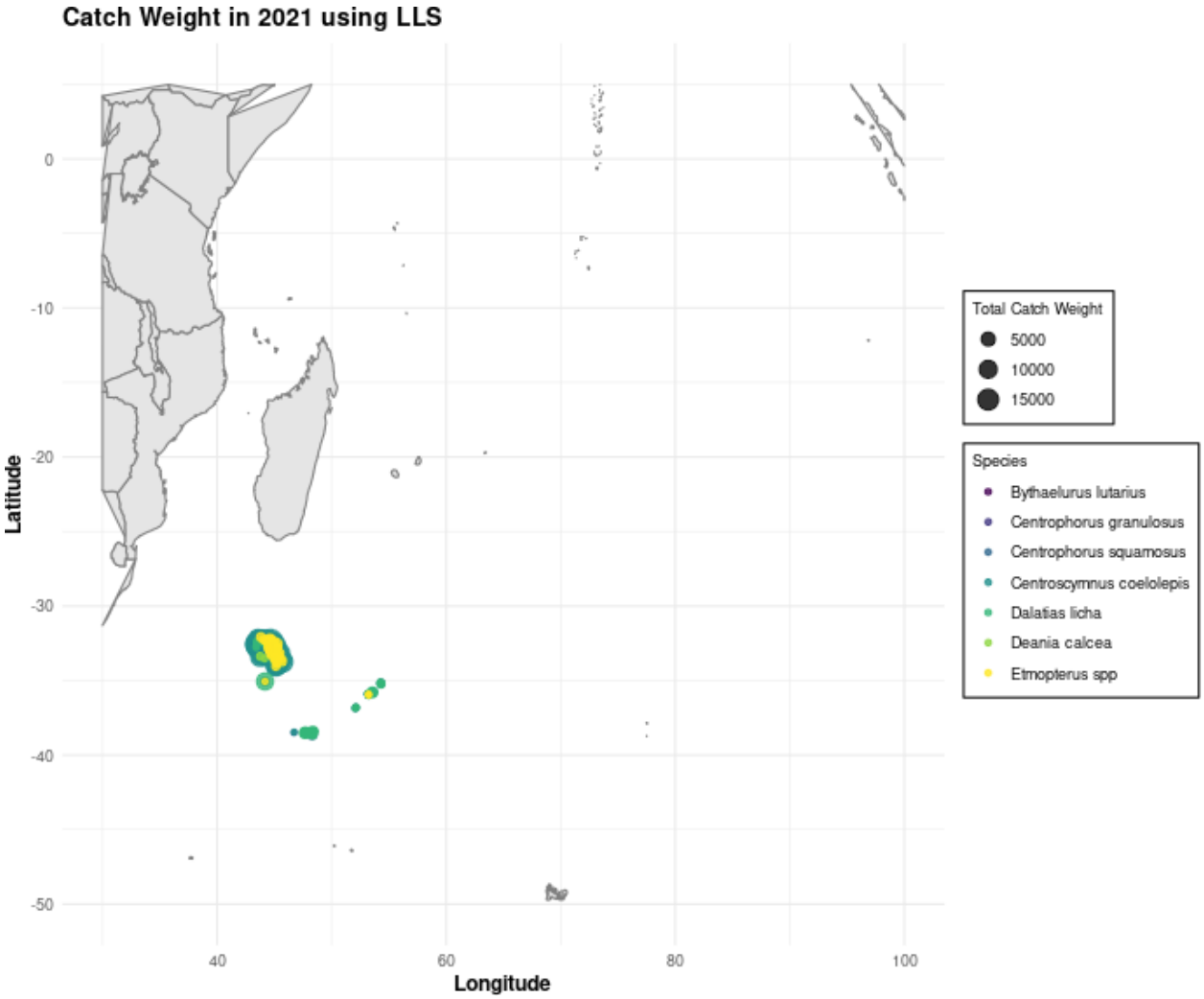
Maps of Catch Locations

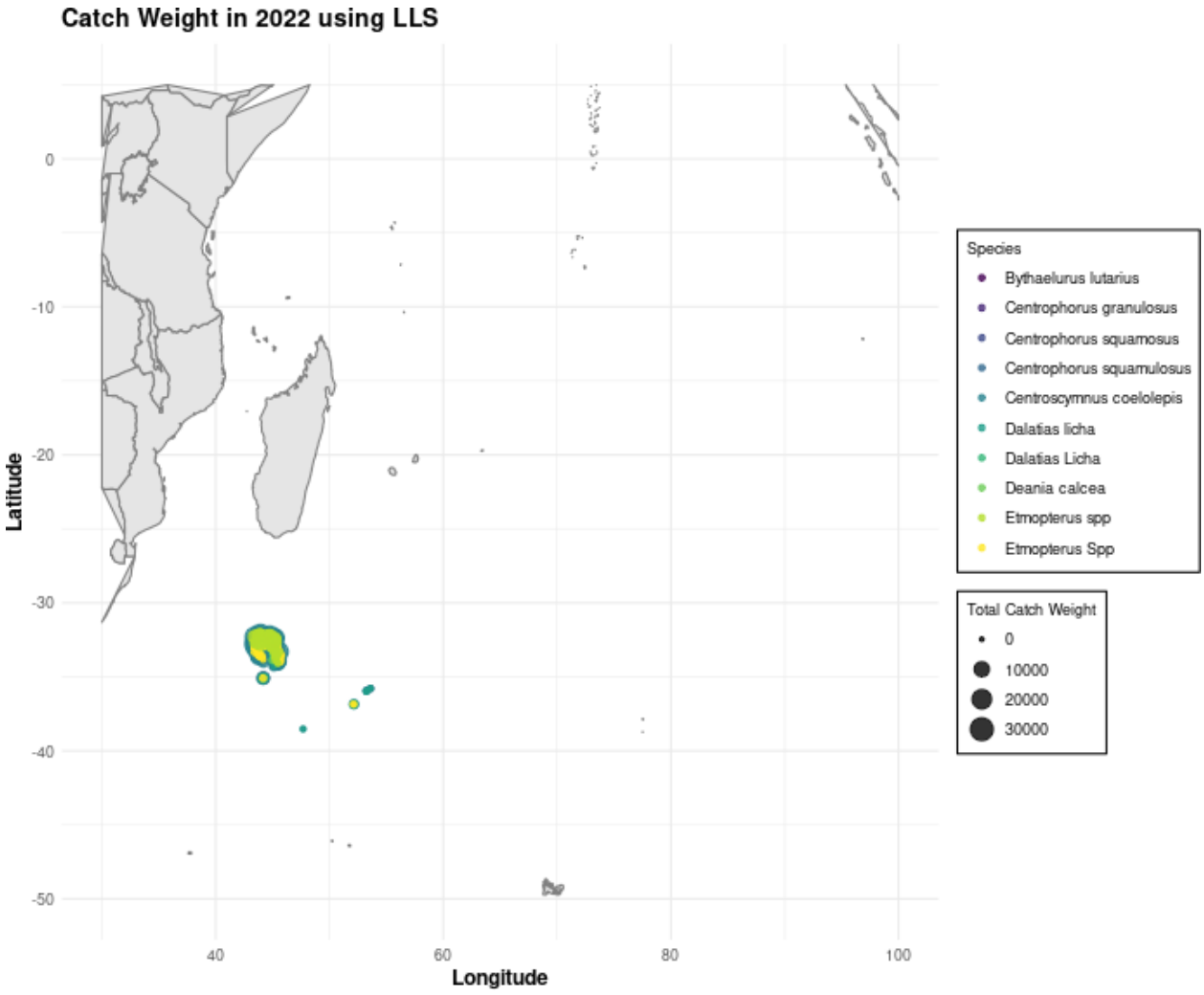
This section focuses on visualizing and analyzing the geographical distribution of shark catches. Using maps, it aims to show where different shark species have been caught, the quantity of catches, and how these patterns vary based on the fishing gear used and over different years. This spatial analysis is crucial for understanding fishing hotspots, species distribution, and the impact of various fishing gears on different shark species.

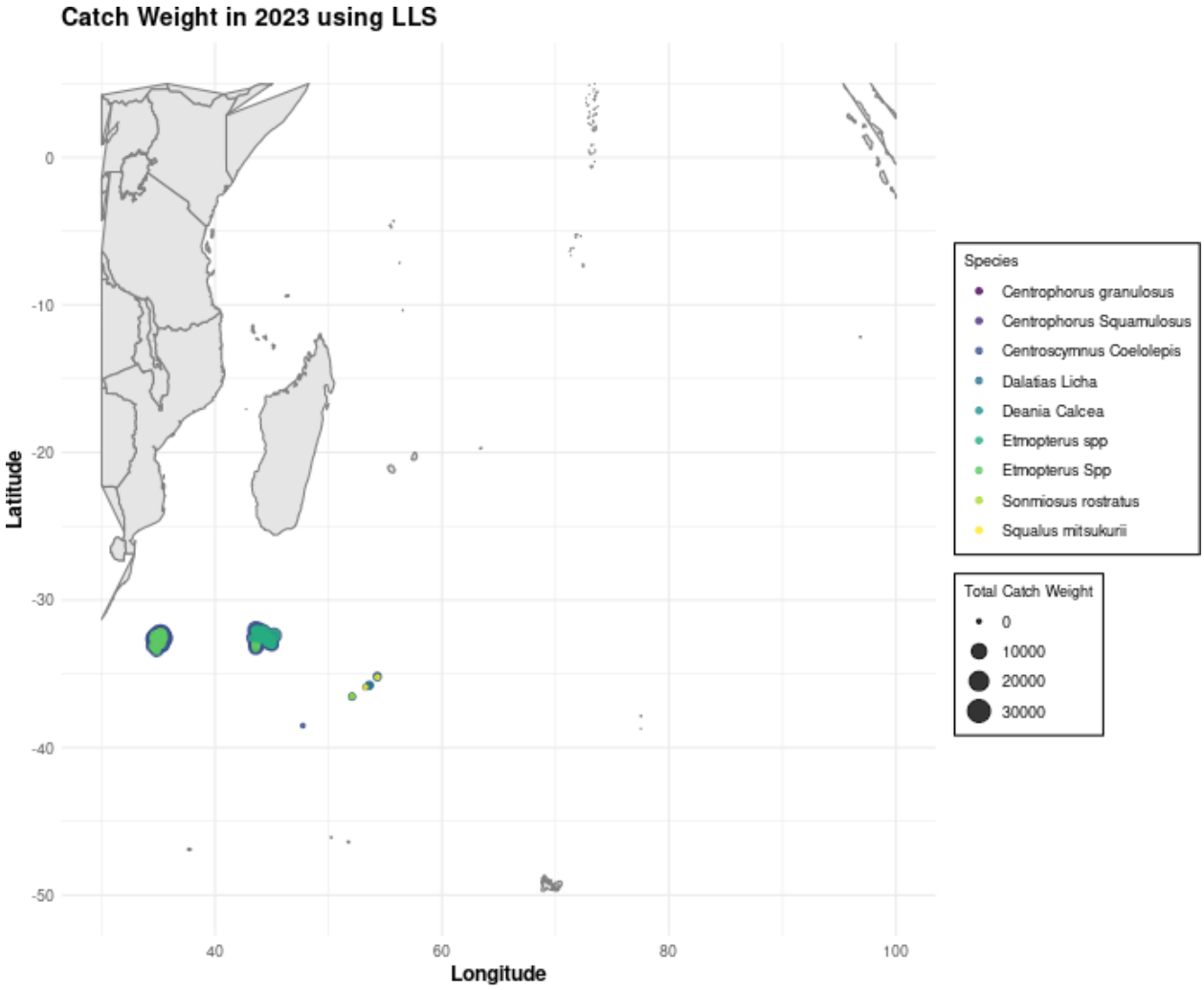
Catch weight per year and gear

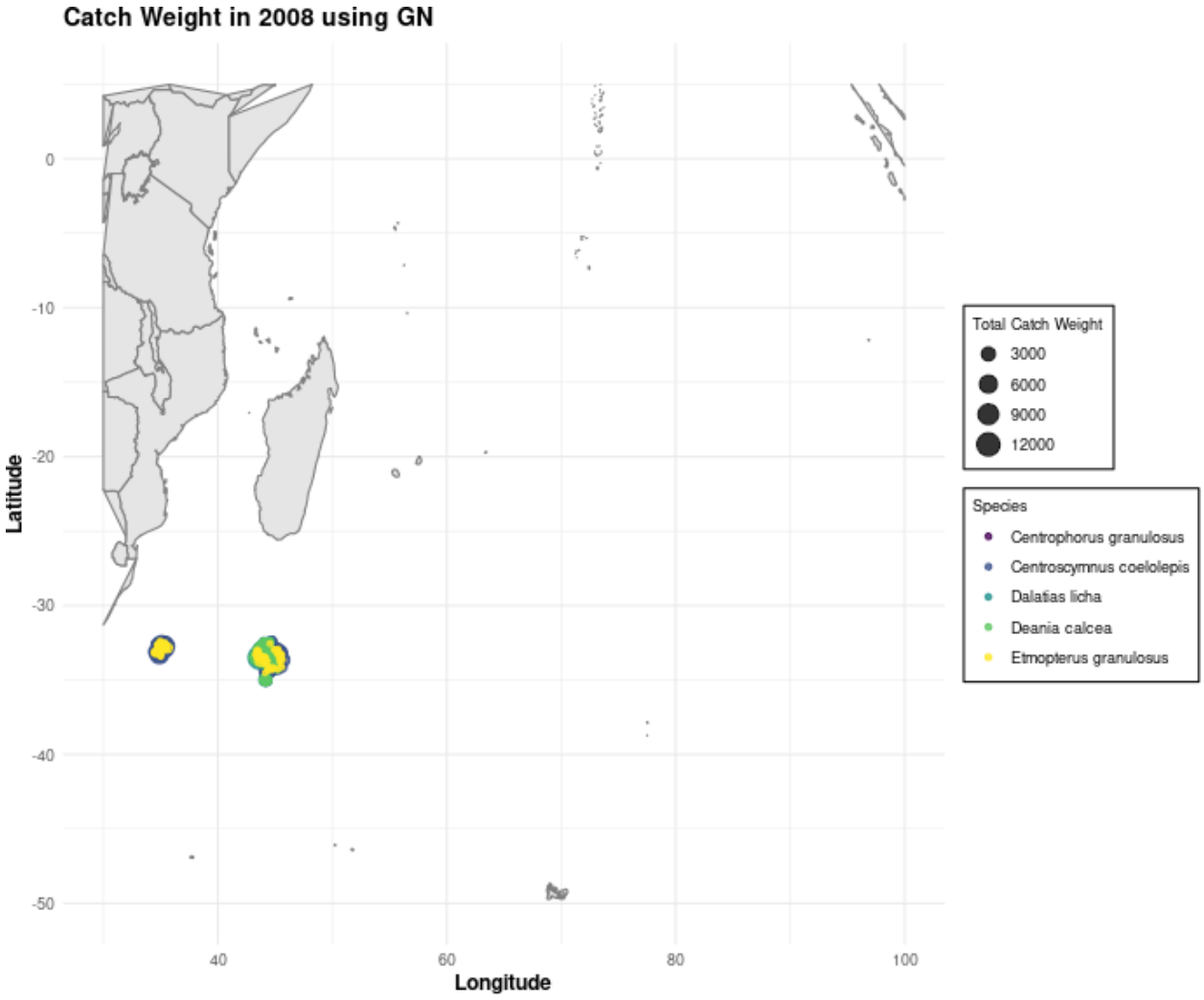
We create map-based plots that combine geographic coordinates with catch data. These visualizations serve as a tool for understanding fishing patterns and their impact on shark populations, highlighting areas of intense fishing activity and shifts in fishing practices over time.

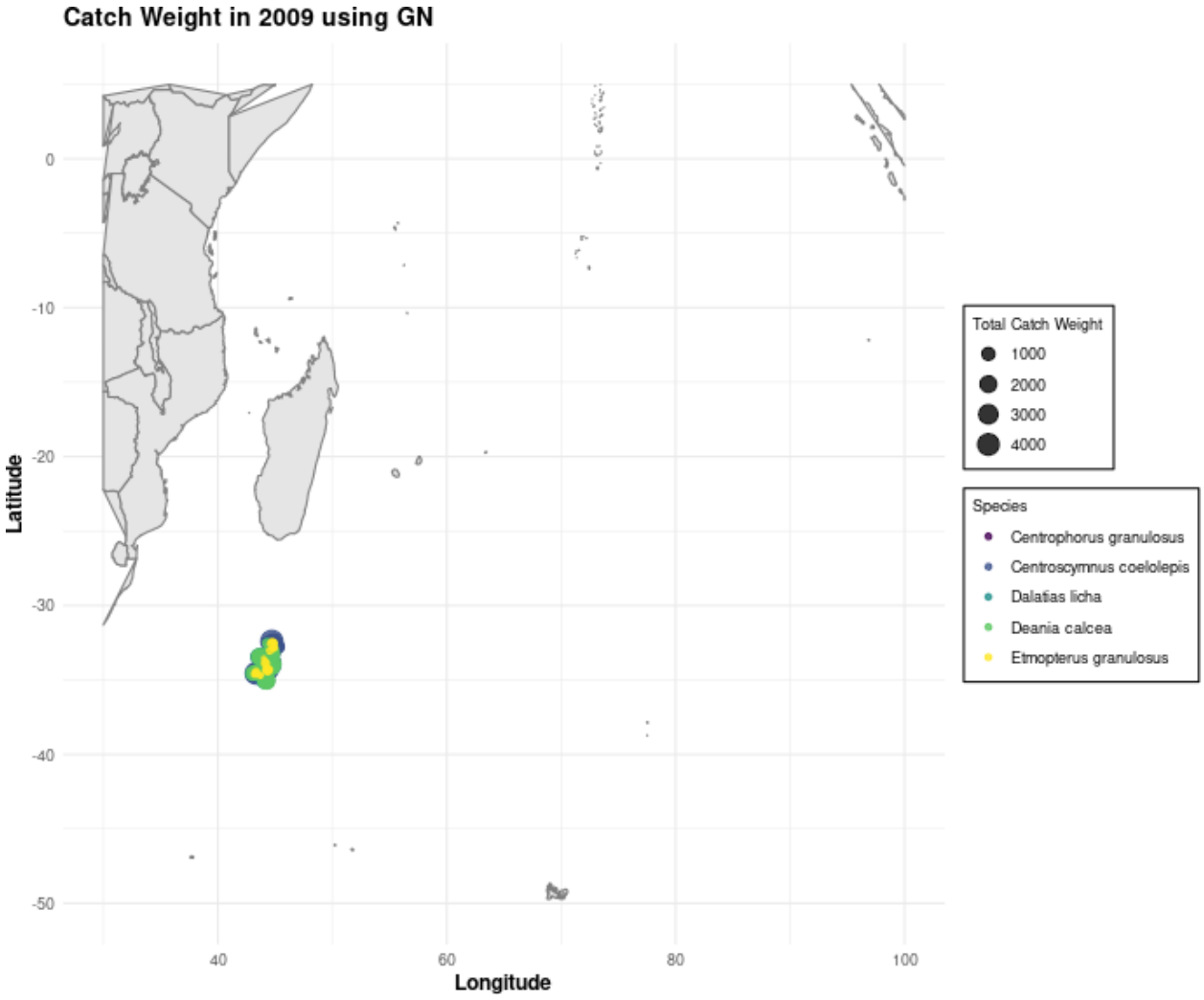

Catch Weight in 2019 using LLS
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Total Catch Weight
3000
6000
9000
12000
Species
Apristurus longicephalus
Bythaelurus lutarius
Centrophorus granulosus
Centrophorus squamosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Etmopterus spp
Pseudotriakis microdon

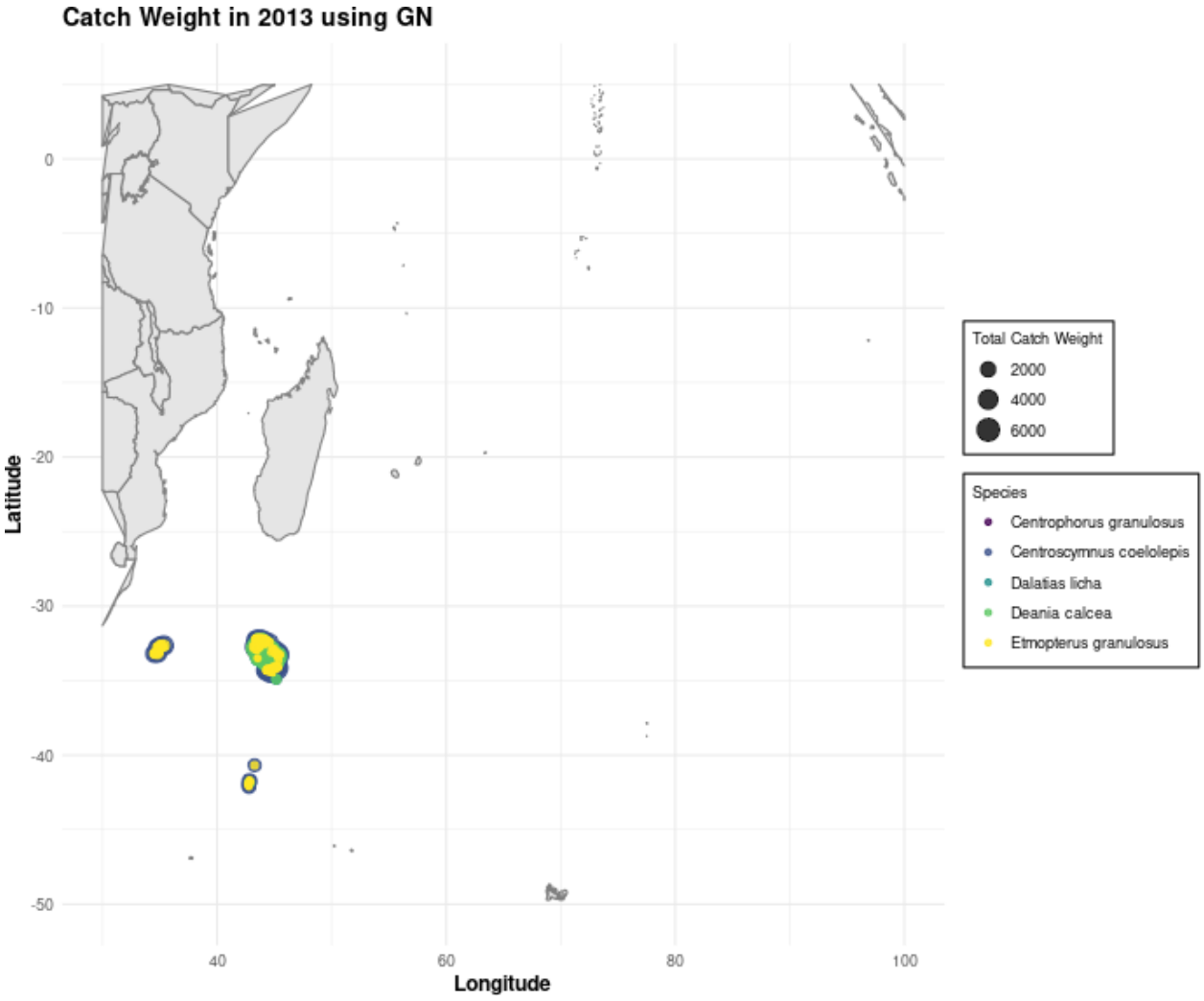

Catch Weight in 2021 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
5000
10000
15000
Species
Bythaelurus lutarius
Centrophorus granulosus
Centrophorus squamosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus spp

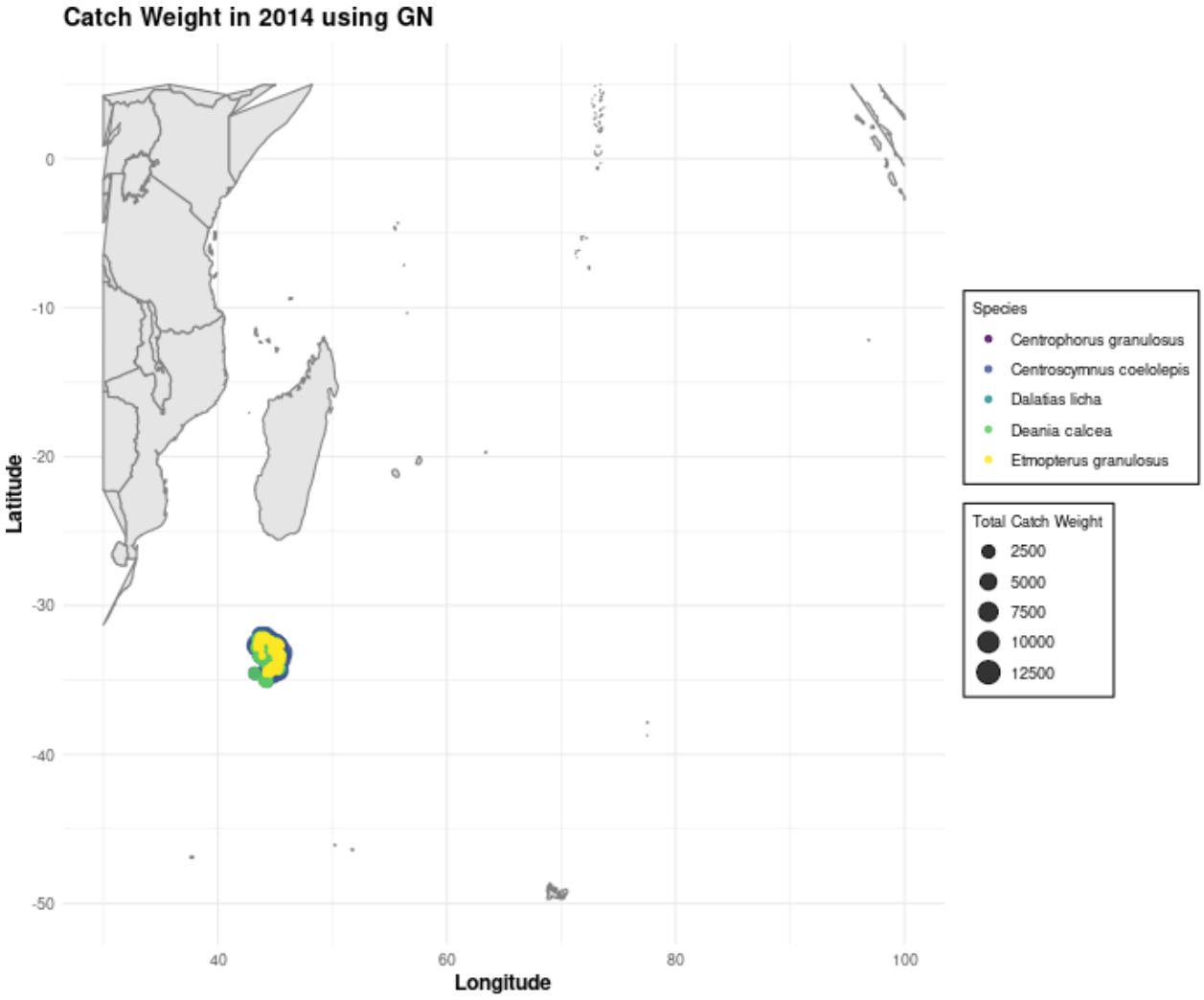

Catch Weight in 2022 using LLS
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Species
Bythaelurus lutarius
Centrophorus granulosus
Centrophorus squamosus
Centrophorus squamulosus
Centroscymnus coelolepis
Dalatias licha
Dalatias Licha
Deania calcea
Etmopterus spp
Etmopterus Spp
Total Catch Weight
0
10000
20000
30000

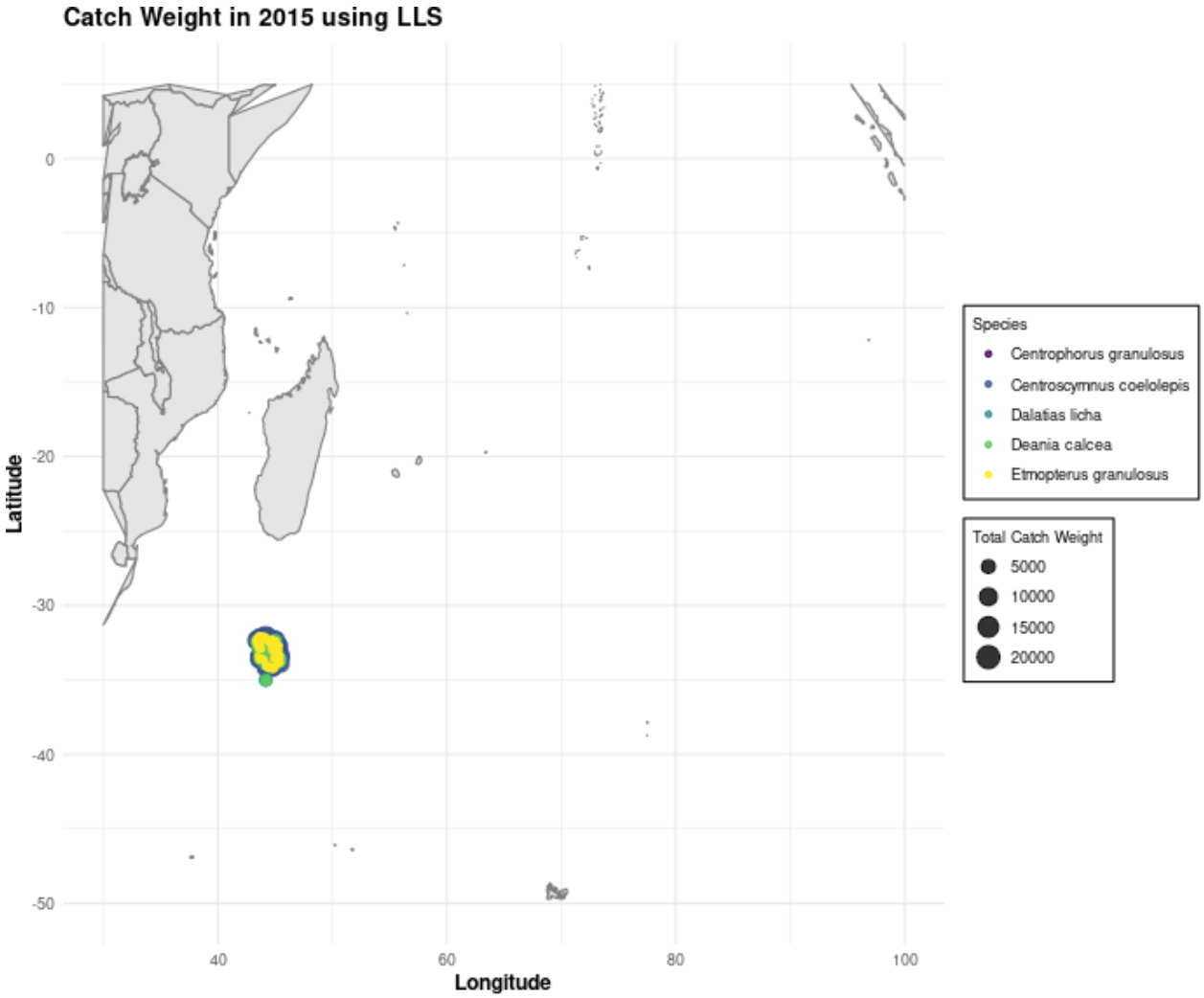

Catch Weight in 2023 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Species
Centrophorus granulosus
Centrophorus Squamulosus
Centroscymnus Coelolepis
Dalatias Licha
Deania Calcea
Etmopterus spp
Etmopterus Spp
Sonmiosus rostratus
Squalus mitsukurii
Total Catch Weight
0
10000
20000
30000

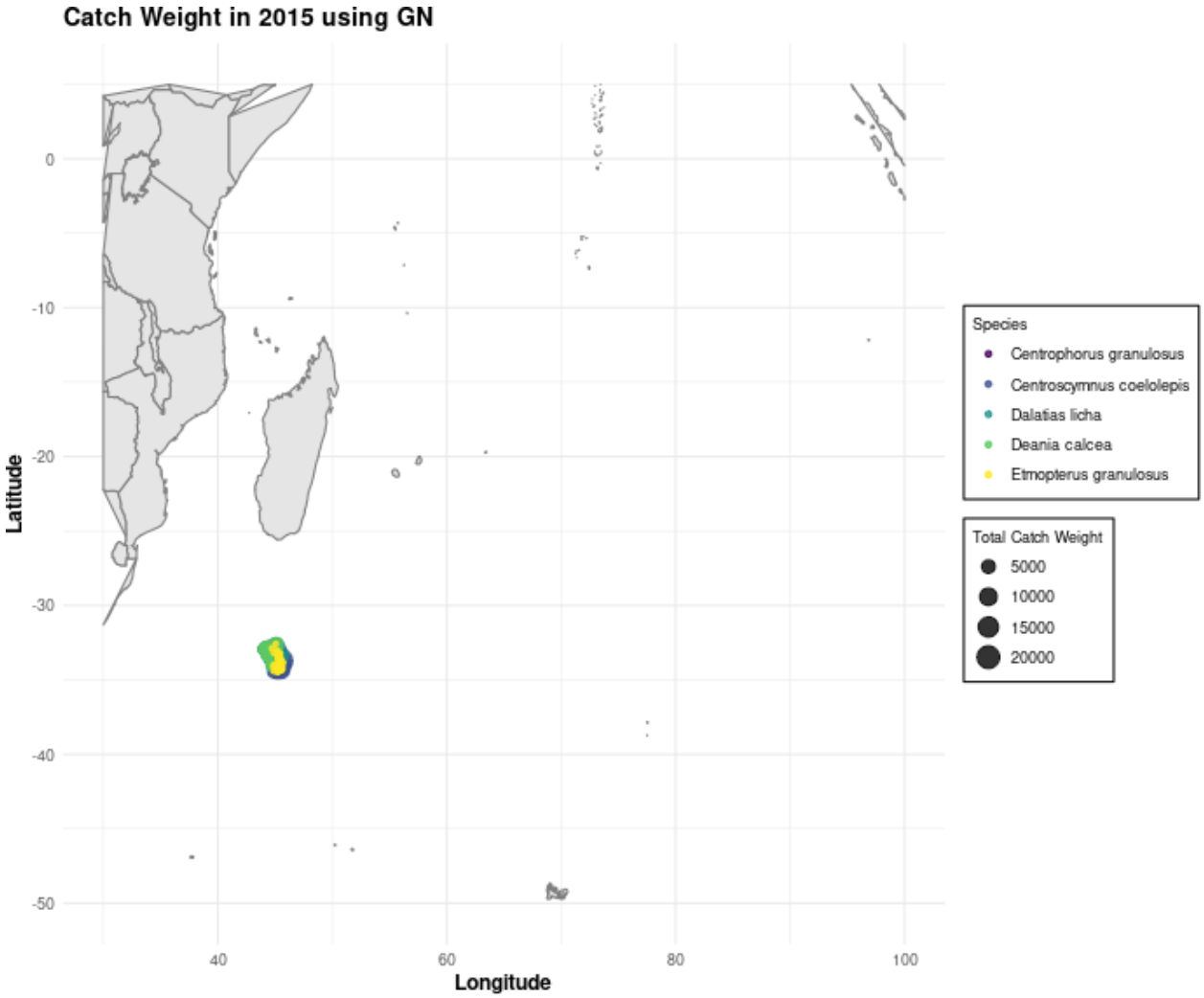

Catch Weight in 2008 using GN
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
3000
6000
9000
12000
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus

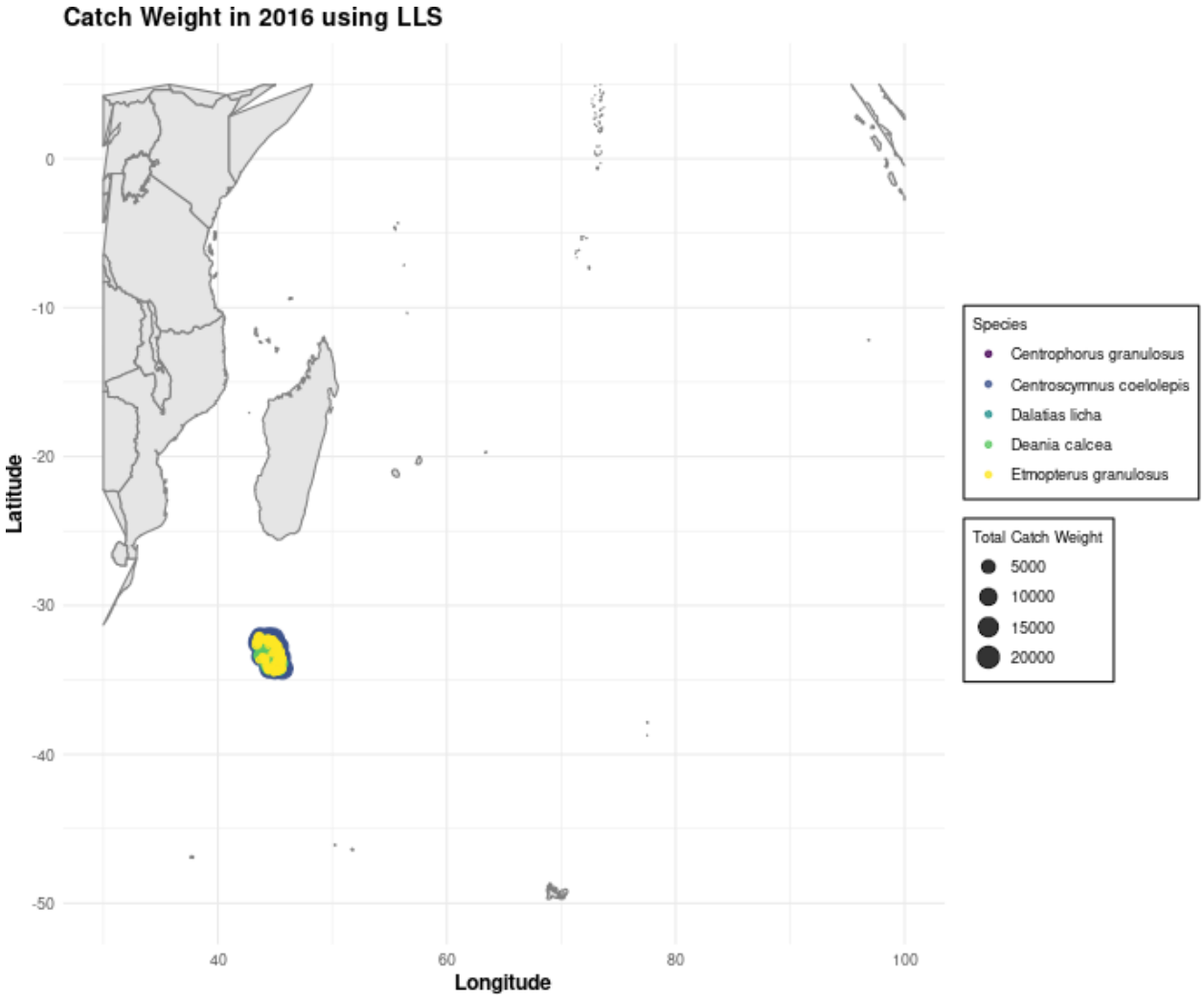

Catch Weight in 2009 using GN
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
1000
2000
3000
4000
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus

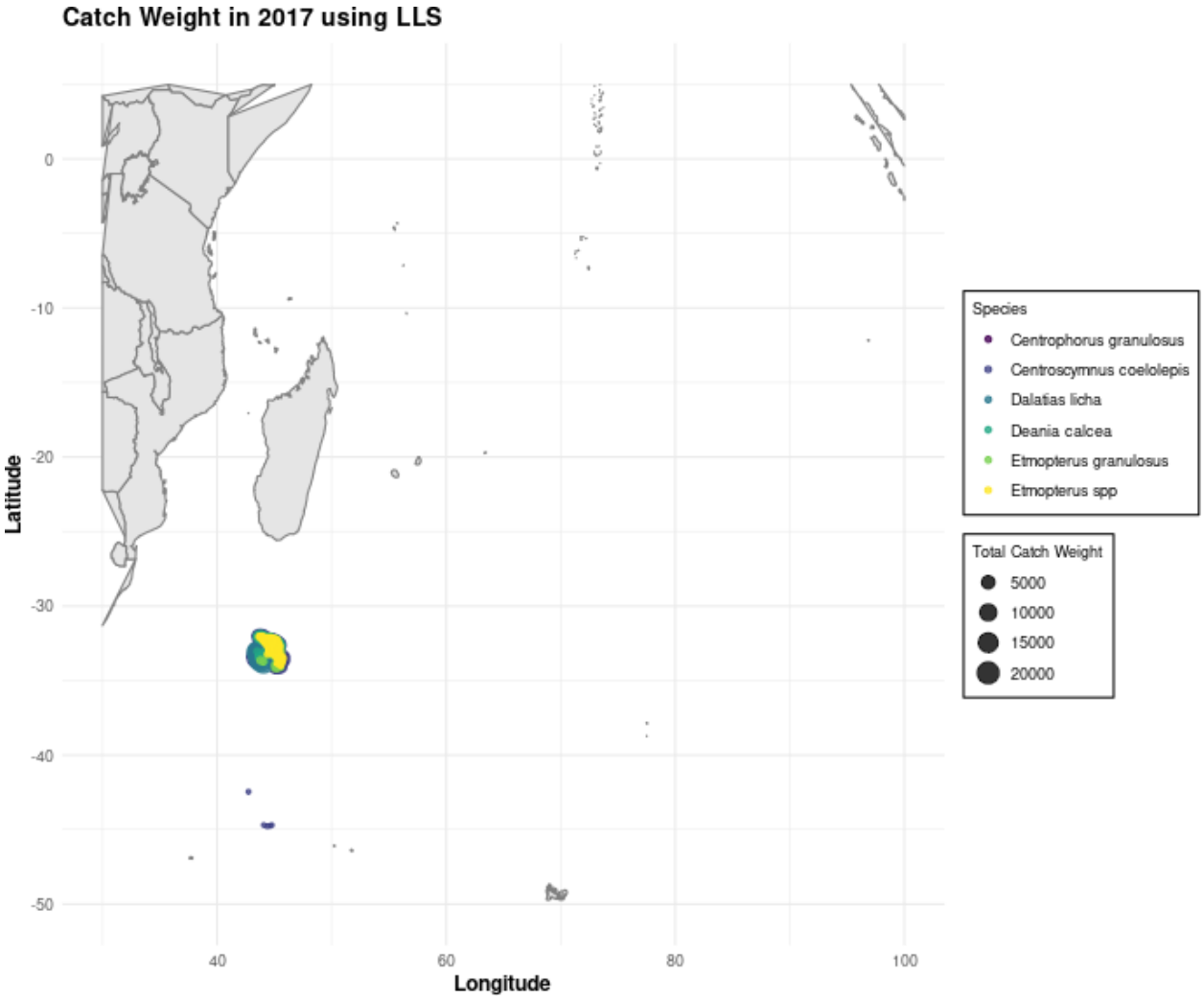

Catch Weight in 2013 using GN
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
2000
4000
6000
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus

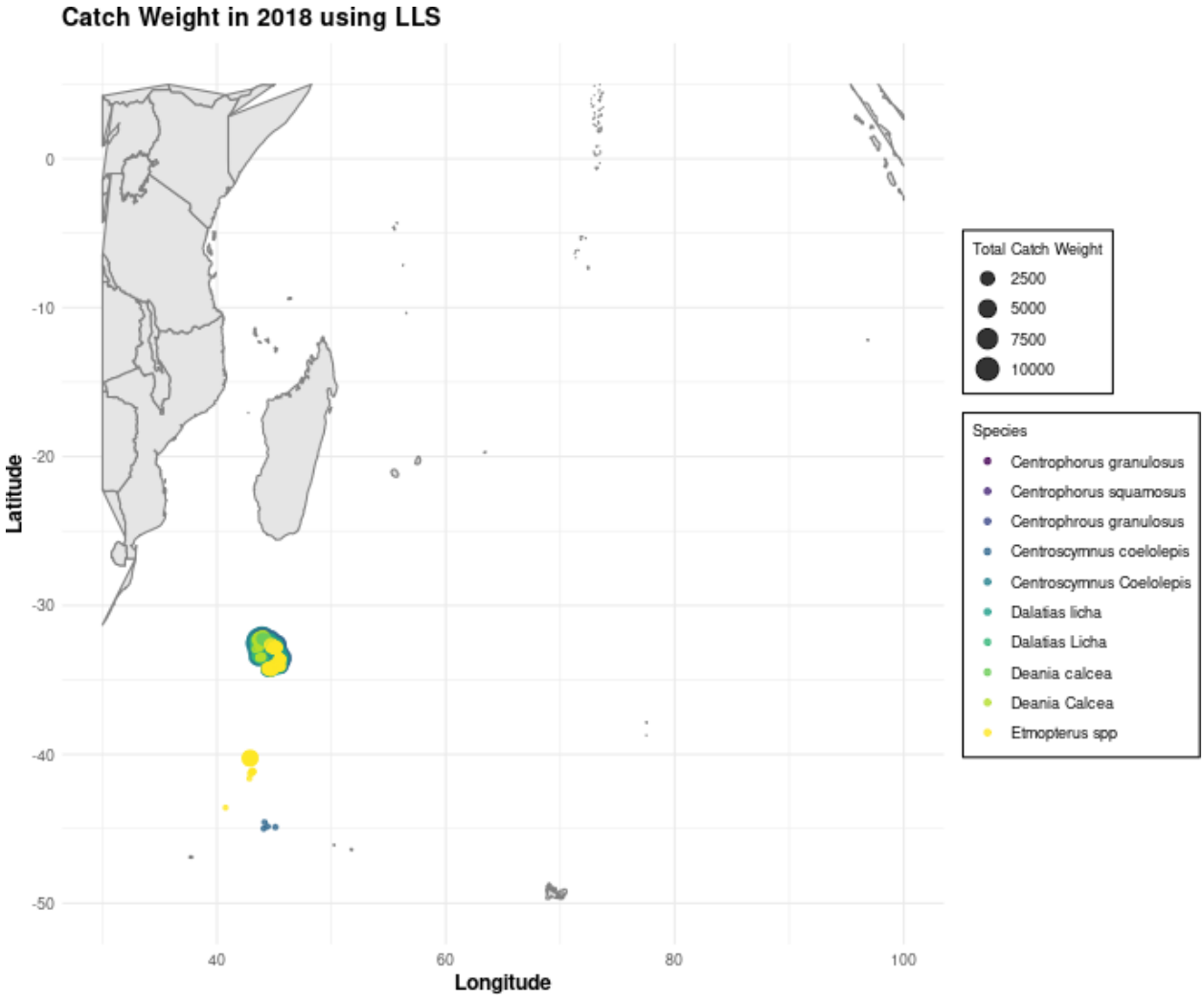

Catch Weight in 2014 using GN
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Total Catch Weight
2500
5000
7500
10000
12500

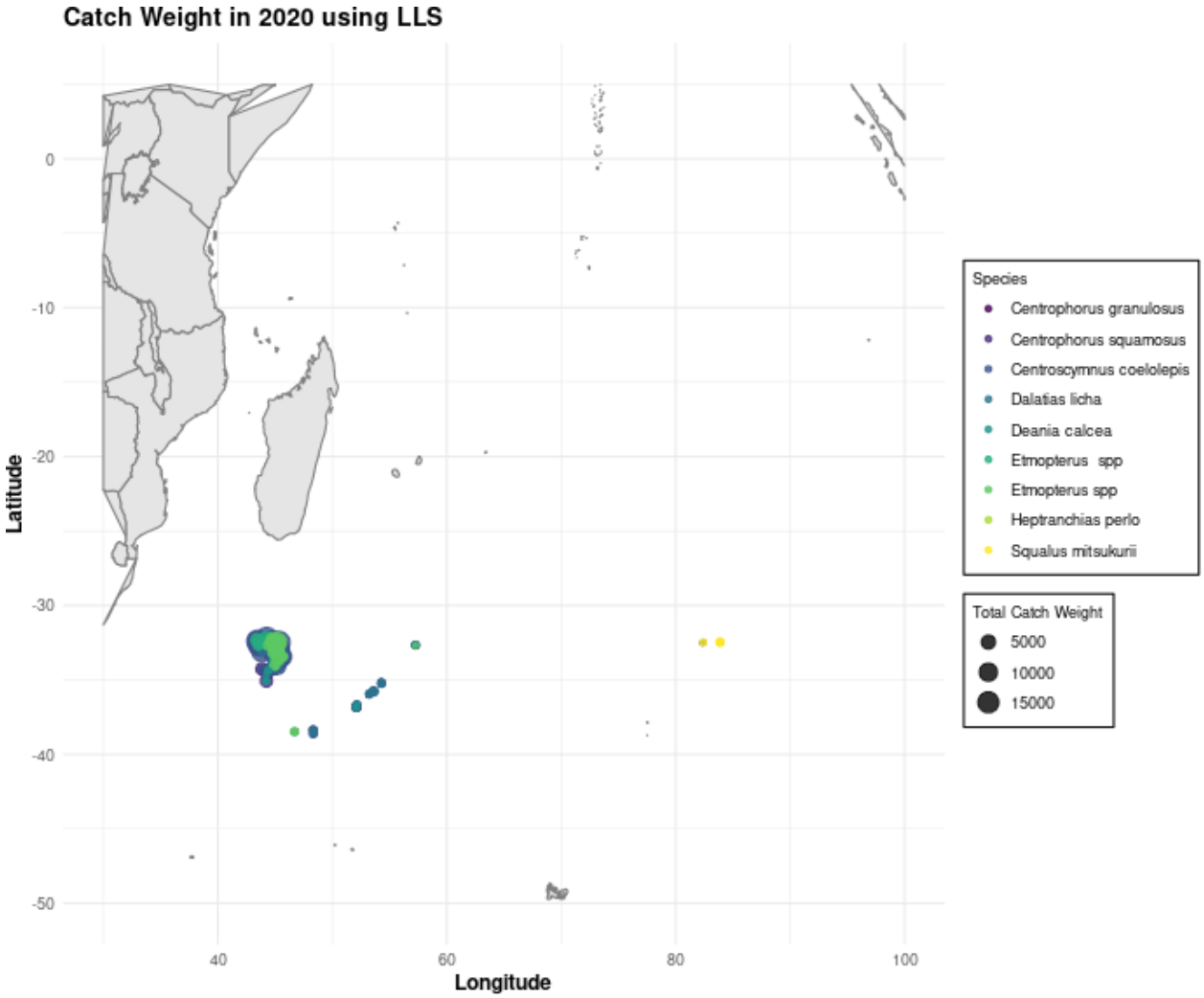

Catch Weight in 2015 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Total Catch Weight
5000
10000
15000
20000

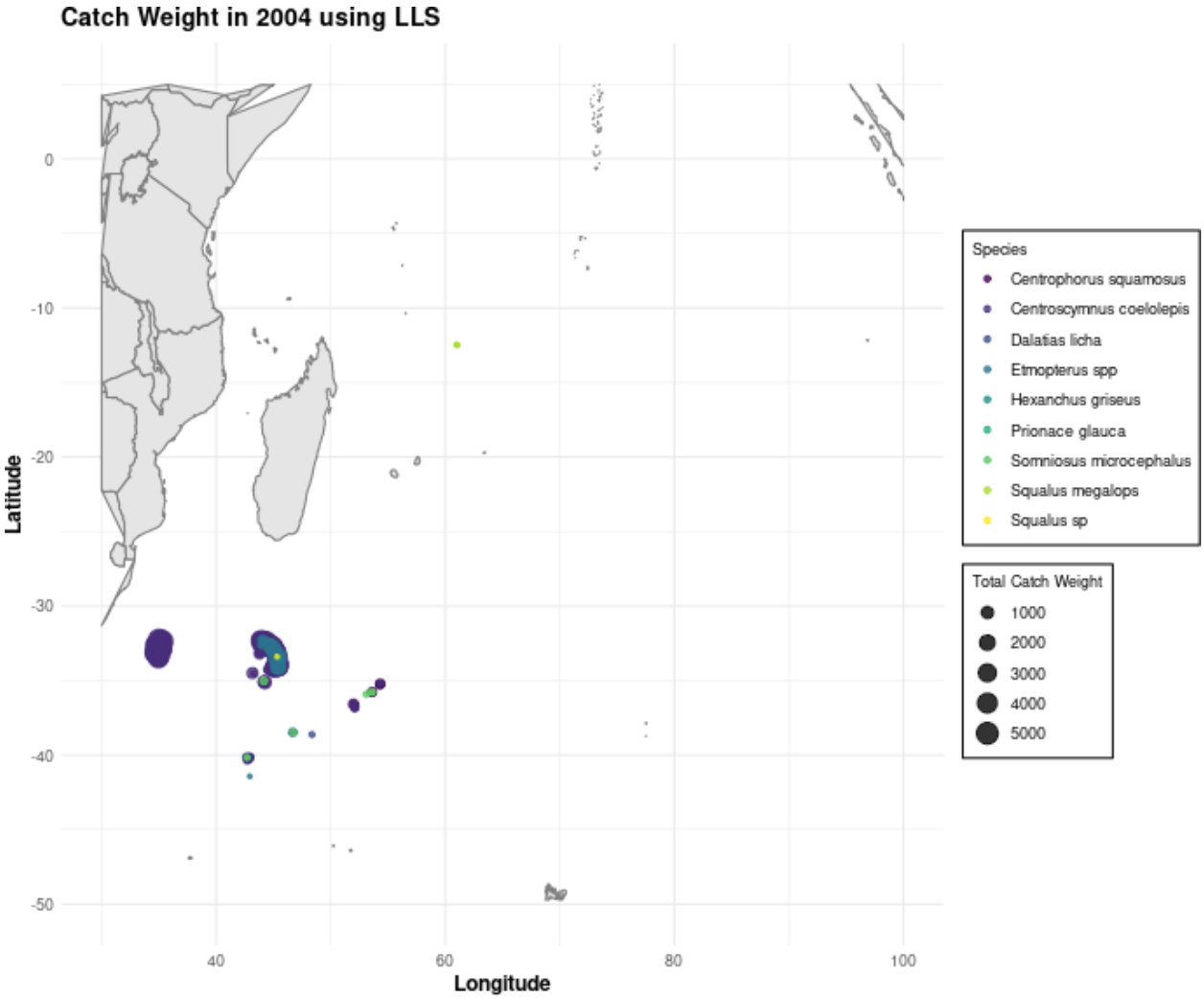

Catch Weight in 2015 using GN
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Total Catch Weight
5000
10000
15000
20000

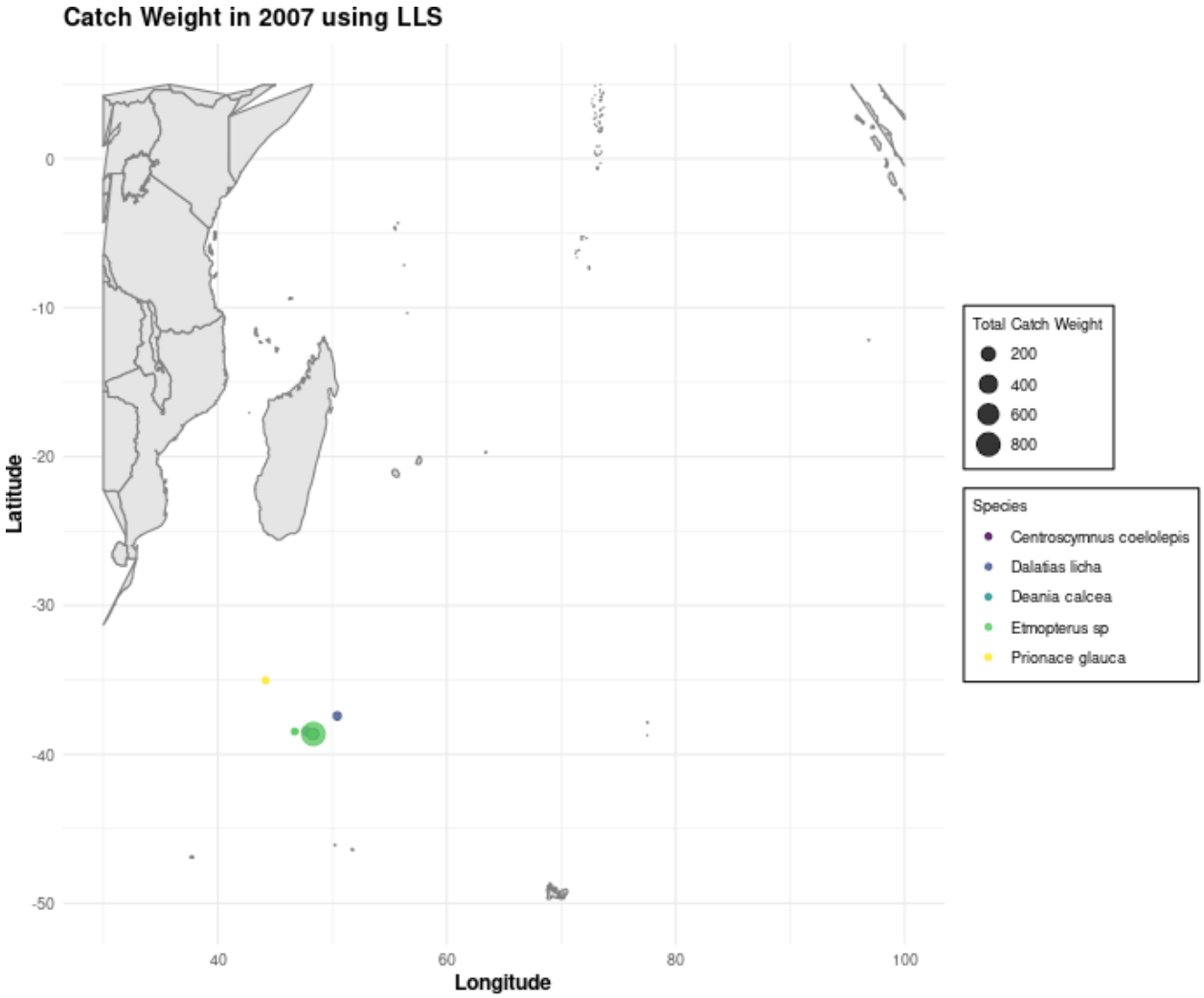

Catch Weight in 2016 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Total Catch Weight
5000
10000
15000
20000

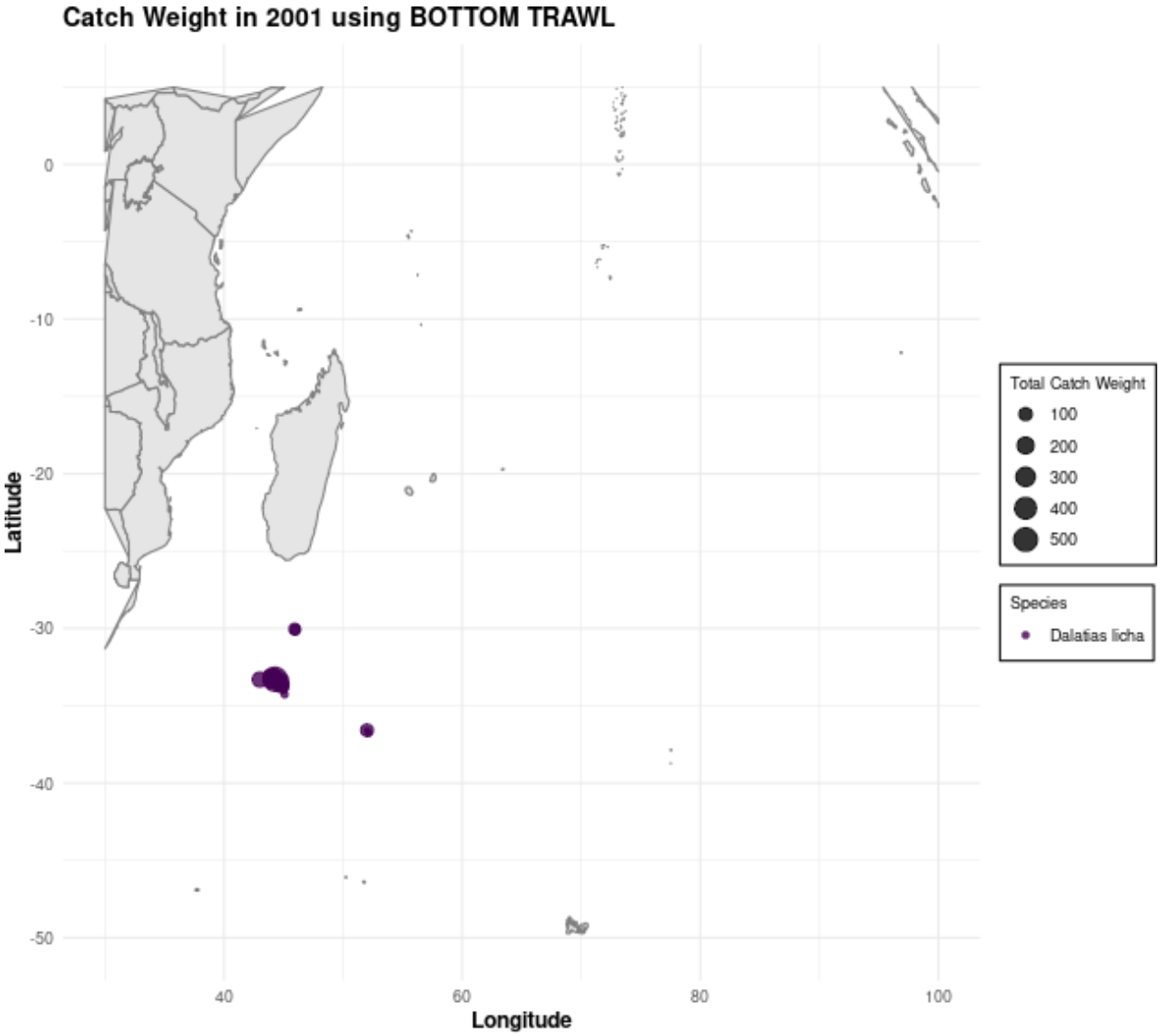

Catch Weight in 2017 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Species
Centrophorus granulosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus granulosus
Etmopterus spp
Total Catch Weight
5000
10000
15000
20000

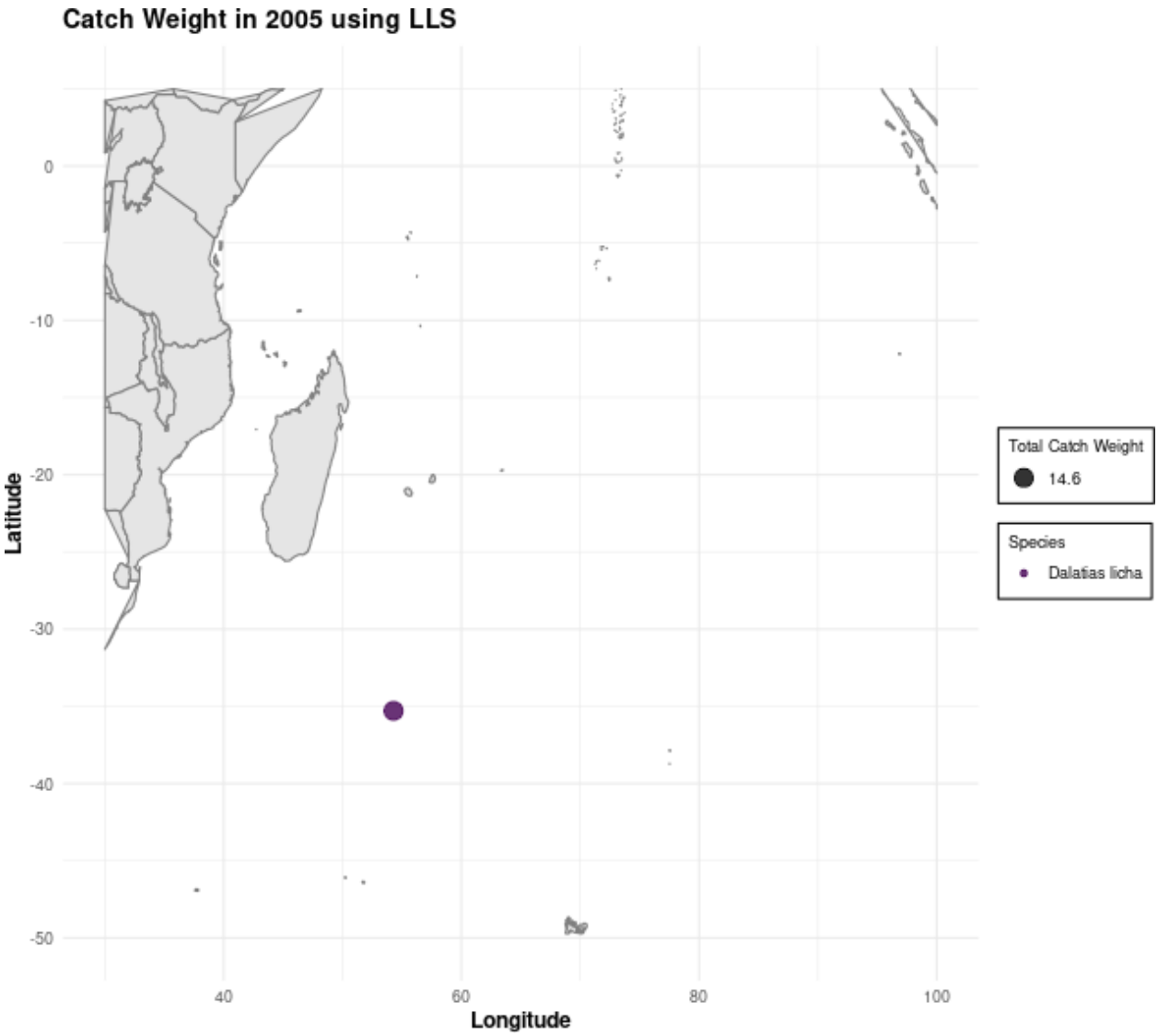

Catch Weight in 2018 using LLS
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Total Catch Weight
2500
5000
7500
10000
Species
Centrophorus granulosus
Centrophorus squamosus
Centrophrous granulosus
Centroscymnus coelolepis
Centroscymnus Coelolepis
Dalatias licha
Dalatias Licha
Deania calcea
Deania Calcea
Etmopterus spp


Catch Weight in 2020 using LLS
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Species
Centrophorus granulosus
Centrophorus squamosus
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus spp
Etmopterus spp
Heptranchias perlo
Squalus mitsukurii
Total Catch Weight
5000
10000
15000


Catch Weight in 2004 using LLS
Latitude
Longitude
0
-10
-20
-30
-40
-50
40
60
80
100
Species
Centrophorus squamosus
Centroscymnus coelolepis
Dalatias licha
Etmopterus spp
Hexanchus griseus
Prionace glauca
Somniosus microcephalus
Squalus megalops
Squalus sp
Total Catch Weight
1000
2000
3000
4000
5000


Catch Weight in 2007 using LLS
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
200
400
600
800
Species
Centroscymnus coelolepis
Dalatias licha
Deania calcea
Etmopterus sp
Prionace glauca


Catch Weight in 2001 using BOTTOM TRAWL
0
-10
-20
-30
-40
-50
Latitude
40
60
80
100
Longitude
Total Catch Weight
100
200
300
400
500
Species
Dalatias licha

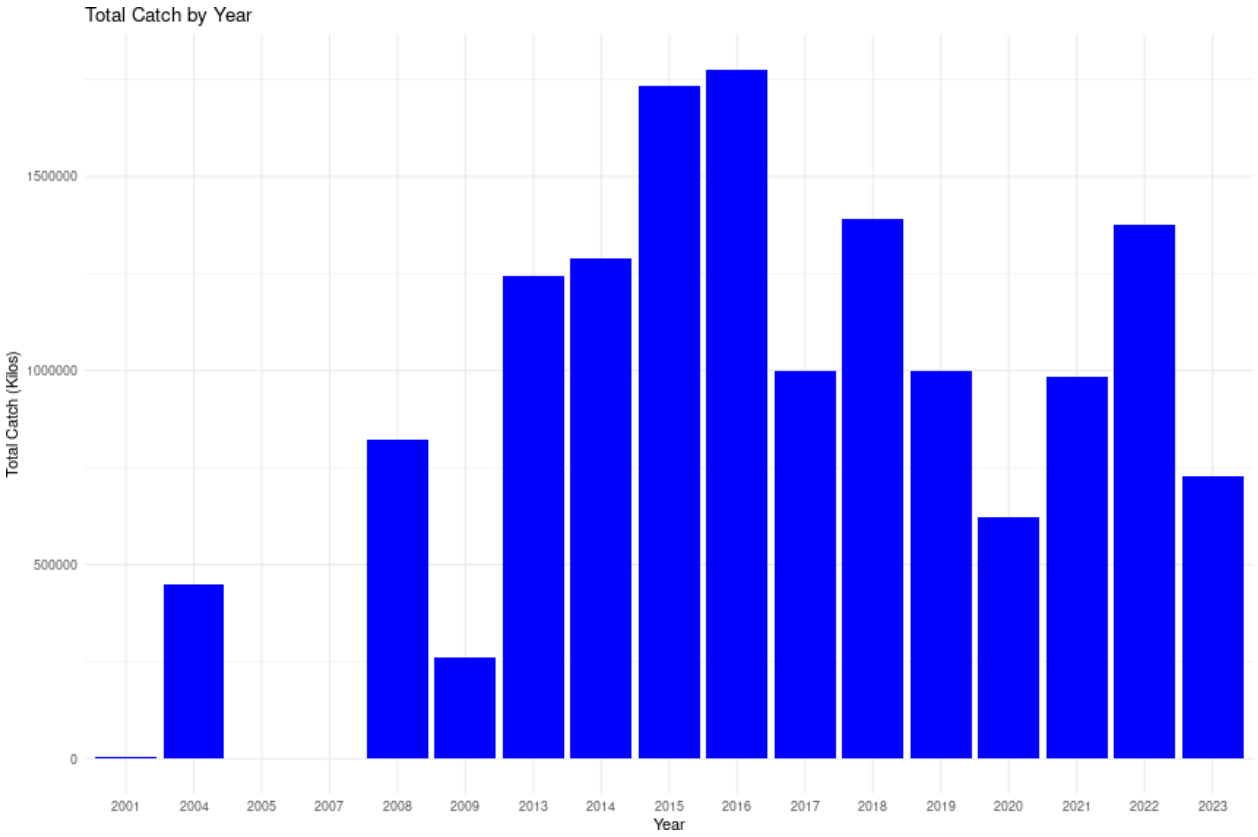


Catch Composition

In this section, we analyse the shark catch data, focusing on how the catch varies both annually and across different geographic areas.

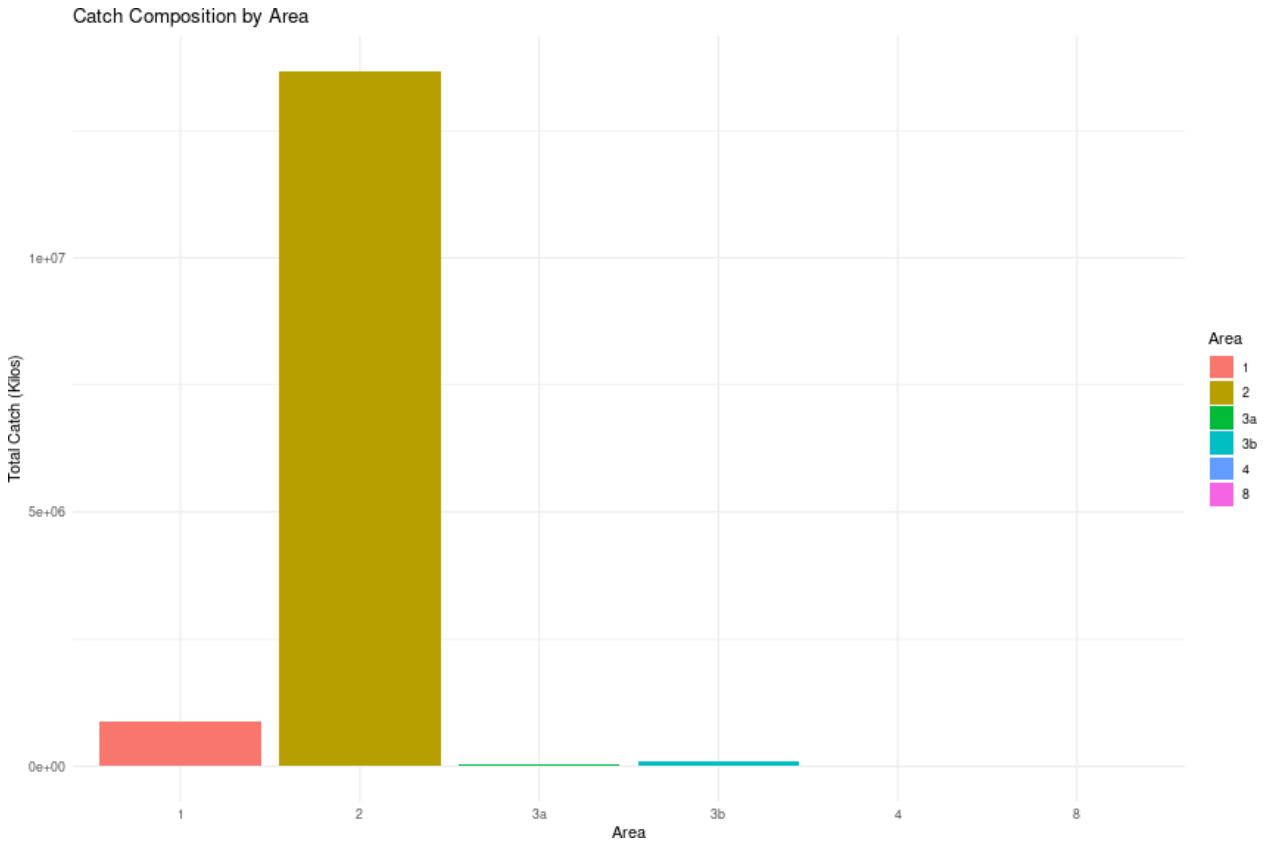
Total catch by year

Here we examine the total shark catch over different years. By aggregating the total weight of catches annually, we aim to identify trends, such as increases or decreases in catch volumes over time.



Catch composition by area

Here, we explore the catch composition across different fishing areas. By summarizing the total catch weight in each area, we gain an understanding of the geographical distribution of fishing efforts and shark abundance.

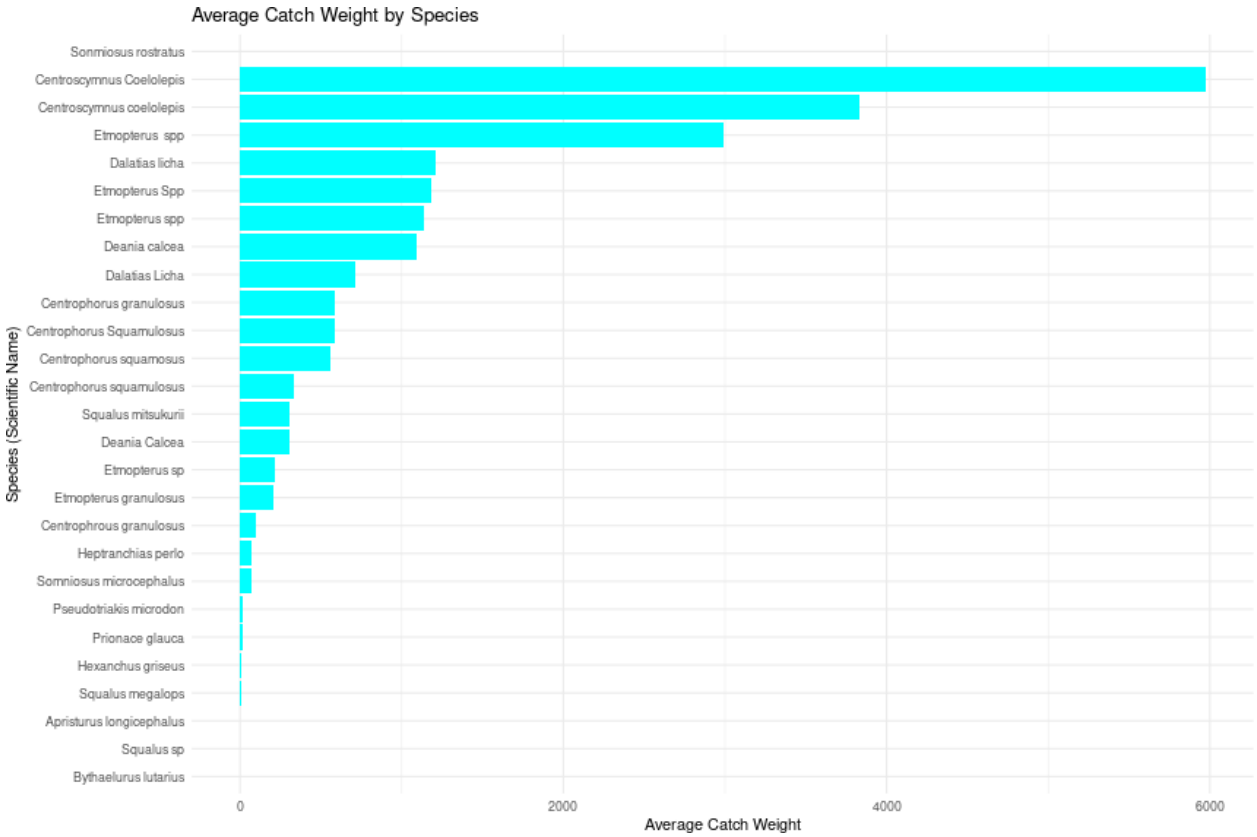


Species Composition

This section is dedicated to analyzing the shark catch data from a species-centric viewpoint. It provides insights into the average catch weight of each species, the total catch composition broken down by species, and an exploration of species diversity across different fishing areas.

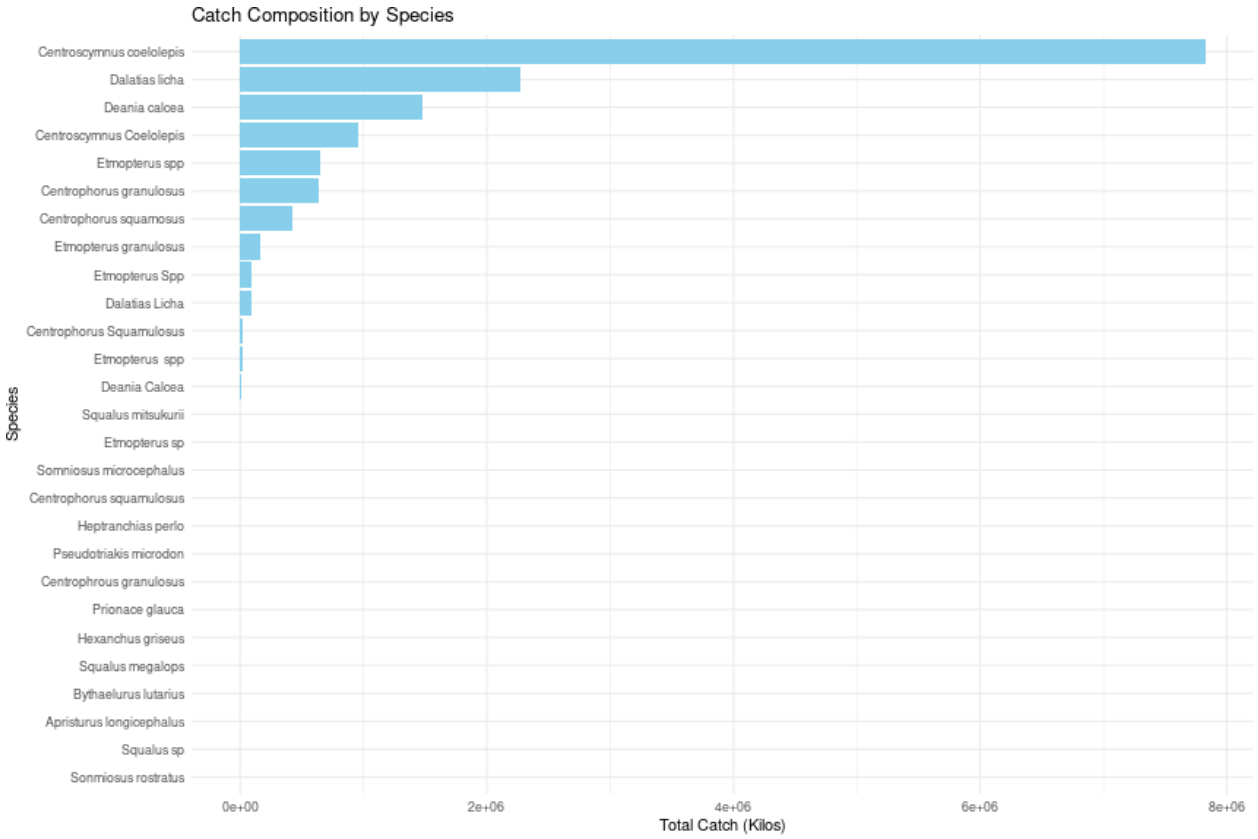
Average catch weight by species

Here, we examine the average weight of catches for each shark species. This helps in identifying which species are predominantly heavier or lighter in the catches, potentially indicating their abundance and size in the fishing areas.



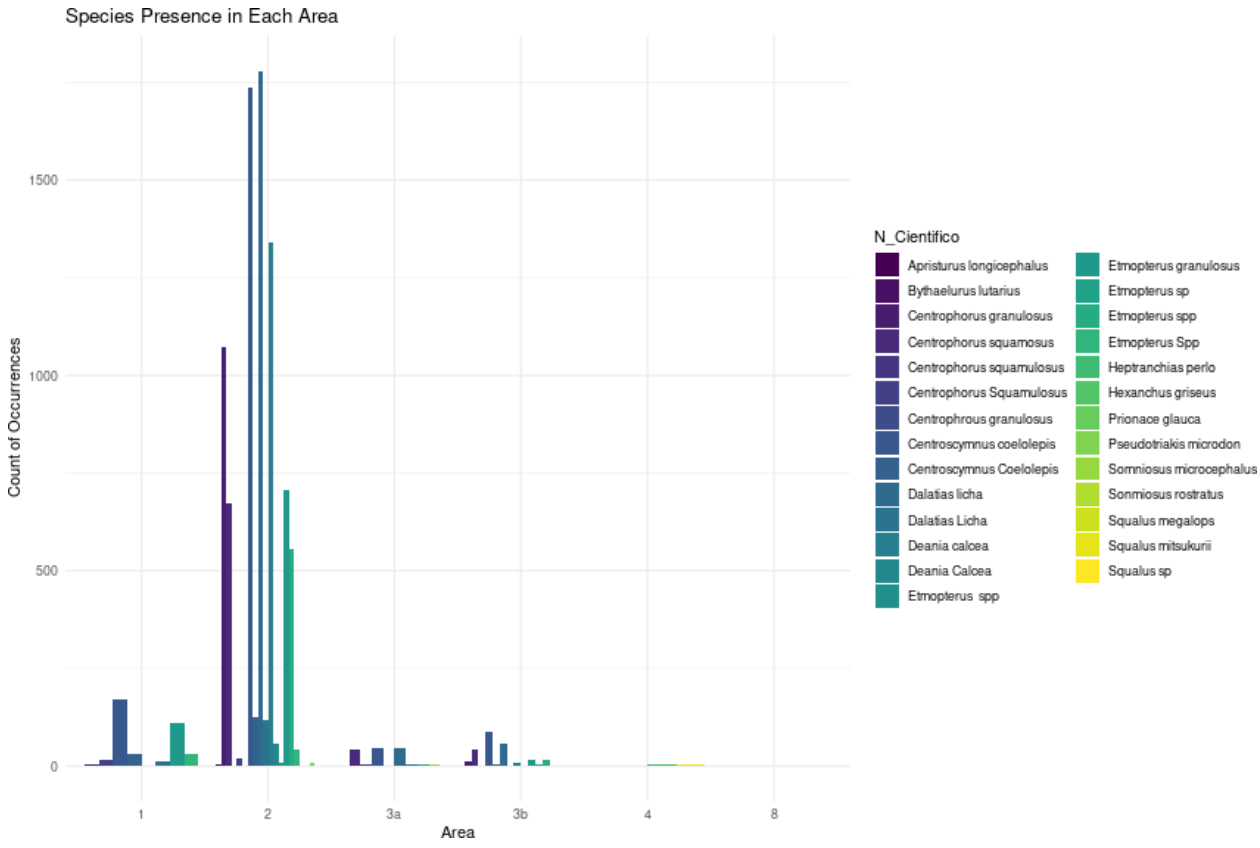
Total catch composition by species

This analysis visualizes the total catch quantity for each shark species. It highlights which species are more frequently caught, thereby allowing us to assess the impact of fishing on different shark populations.



Species composition by area

In this subsection, we investigate the presence and prevalence of shark species in various fishing areas. This spatial distribution analysis helps in understanding the habitat preferences of different shark species.

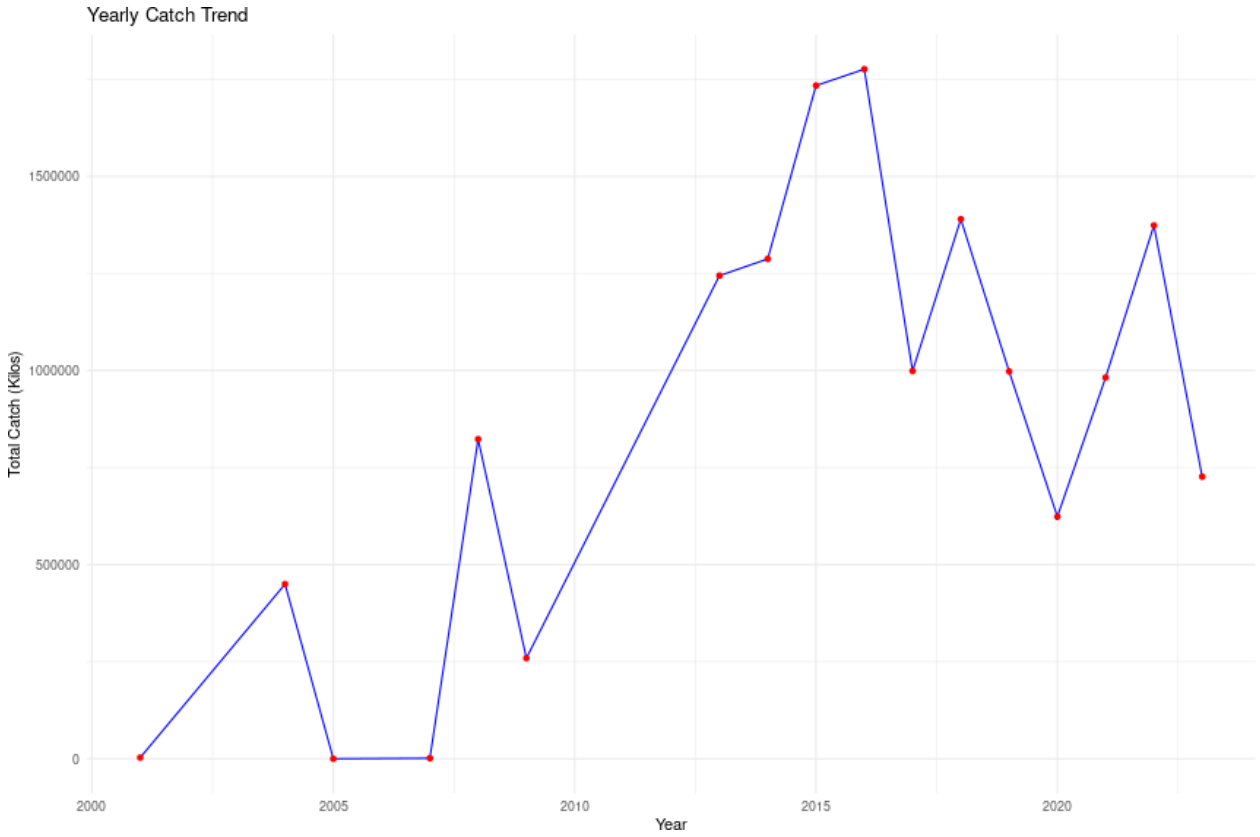


Temporal Analysis

This section focus on the temporal dynamics of shark catches, providing insights into catch trends over different time scales. Understanding these trends is crucial for assessing the health and sustainability of shark populations over time.

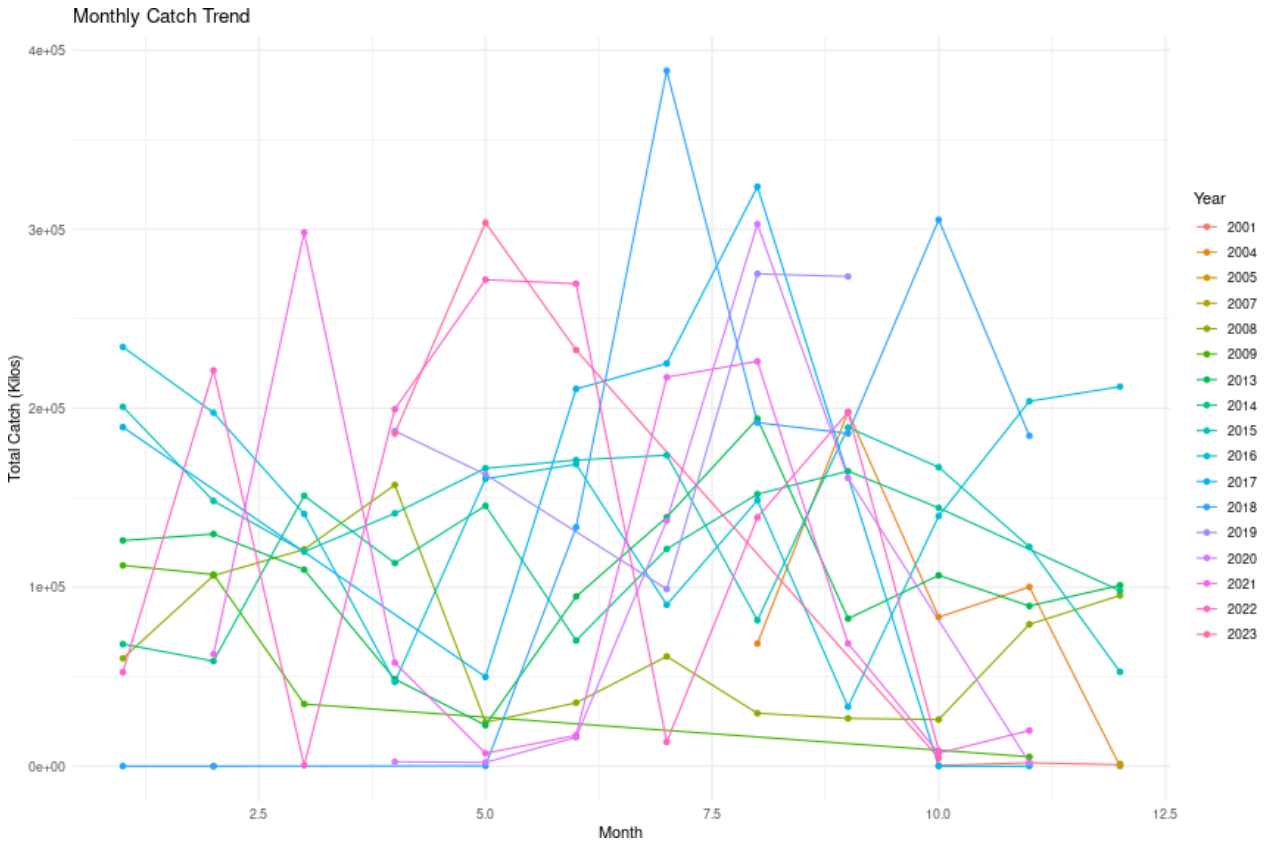
Overall catch trends on a yearly basis

This analysis focuses on how the total shark catch has varied year by year. The line graph highlights any significant increases or decreases in catch over the years, which can be indicative of changes in shark populations, fishing effort, or regulations.



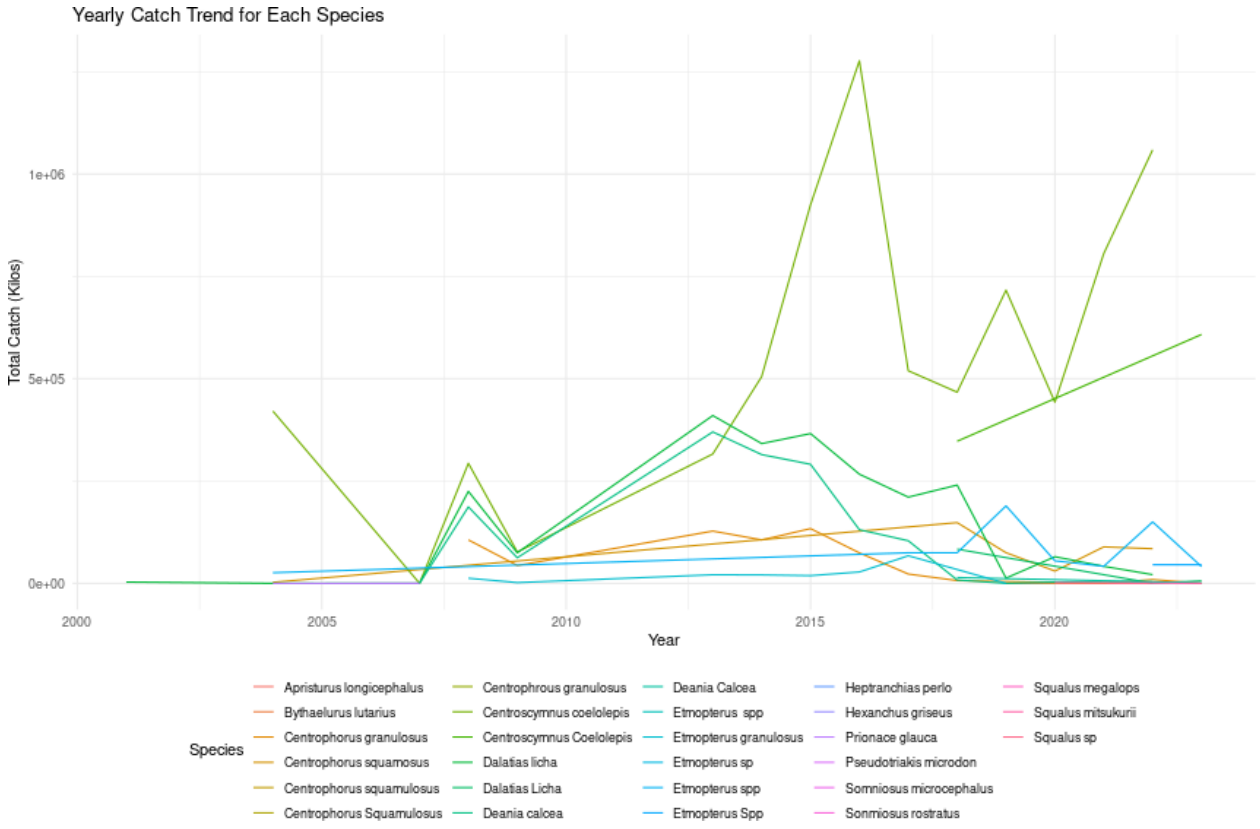
Overall catch trends on a montly basis

Here, we extend the temporal analysis to a finer scale by examining monthly trends in shark catches. This can reveal seasonal patterns in fishing activities or shark abundance, offering a more detailed understanding of the dynamics within each year.



Species temporal trend analysis

In this part, we look at the yearly catch trends by species. This species-specific temporal analysis helps in identifying which shark species have seen significant changes in their catch over time, potentially signaling shifts in species-specific abundance or susceptibility to fishing pressures.

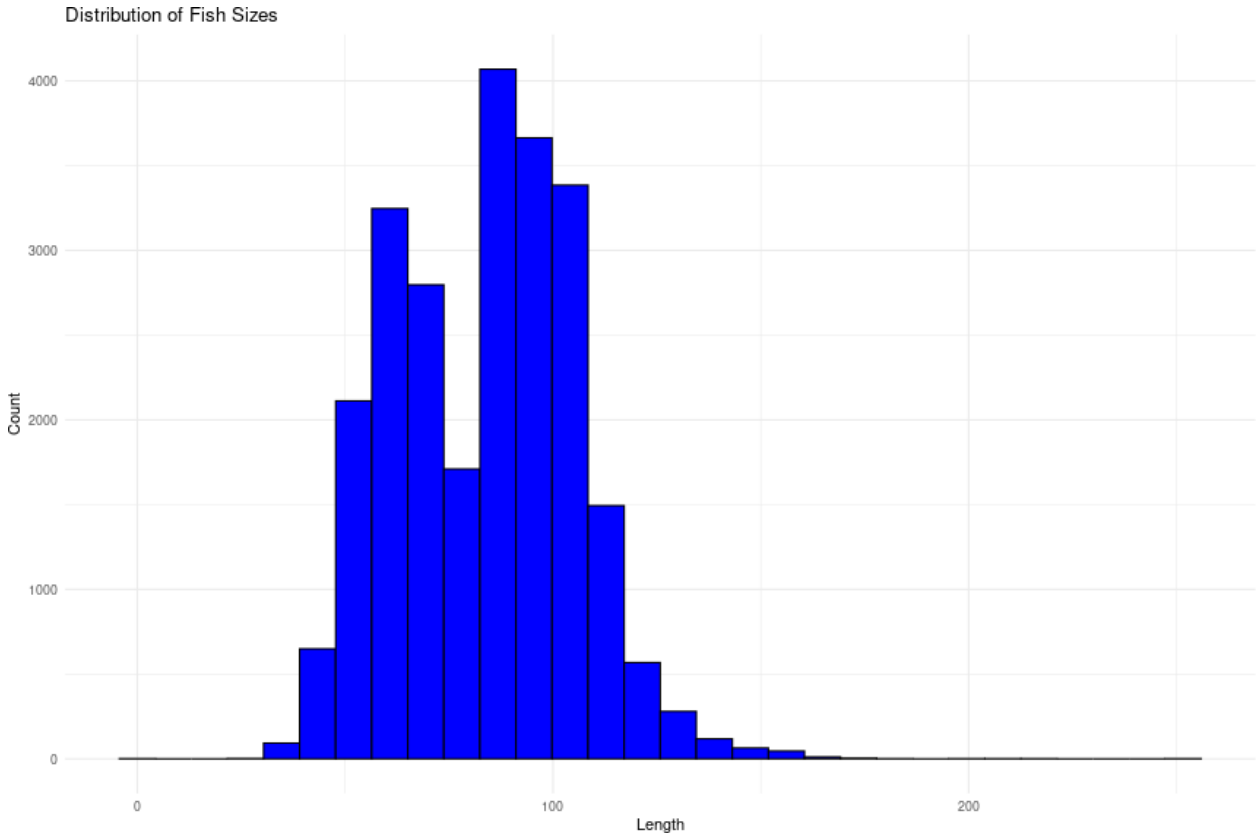


Species Distribution By Length

This section provides an in-depth look at the distribution of shark sizes within the dataset. Analyzing the length of sharks is crucial for understanding their growth patterns, population structure, and the impact of fishing on different size classes.

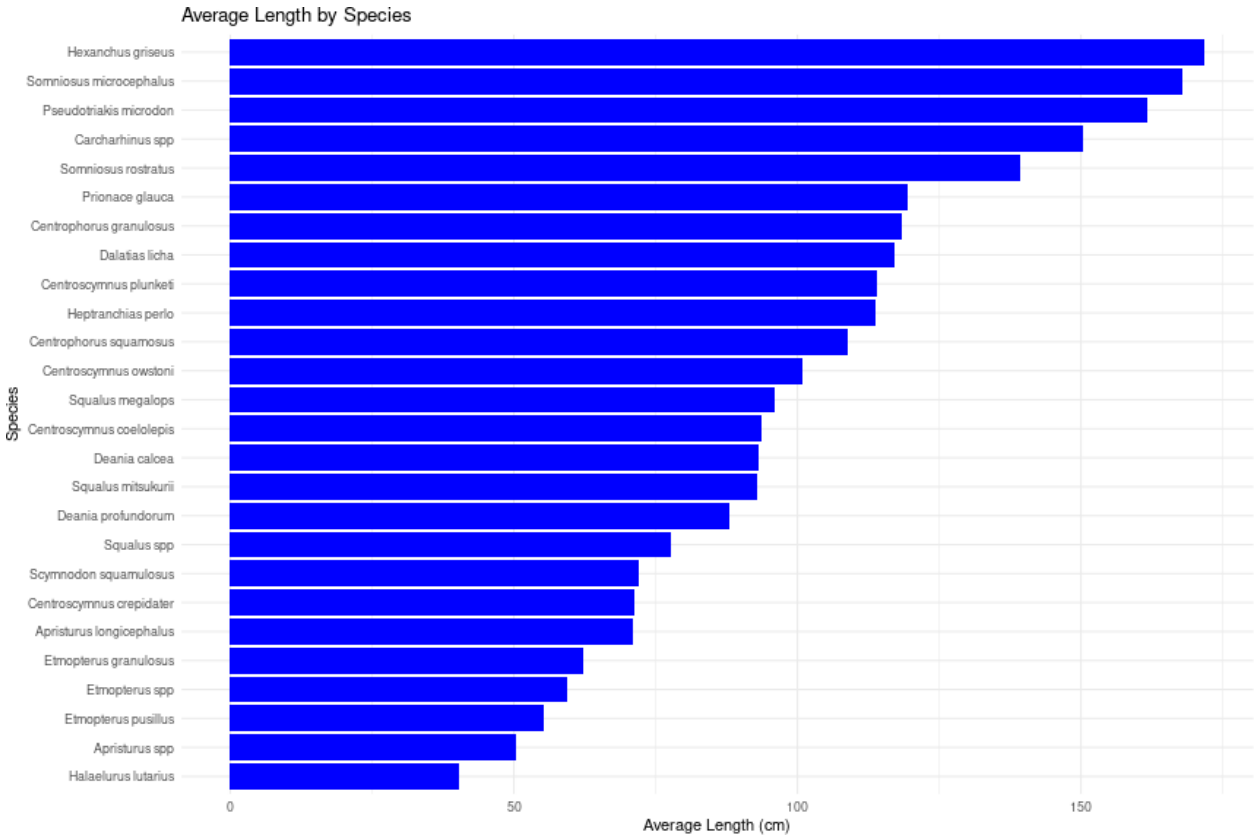
Overall sizes distribution

This histogram offers a broad overview of the sizes of sharks across all species in the dataset. It reveals the most common size ranges and any notable size-related trends or anomalies.



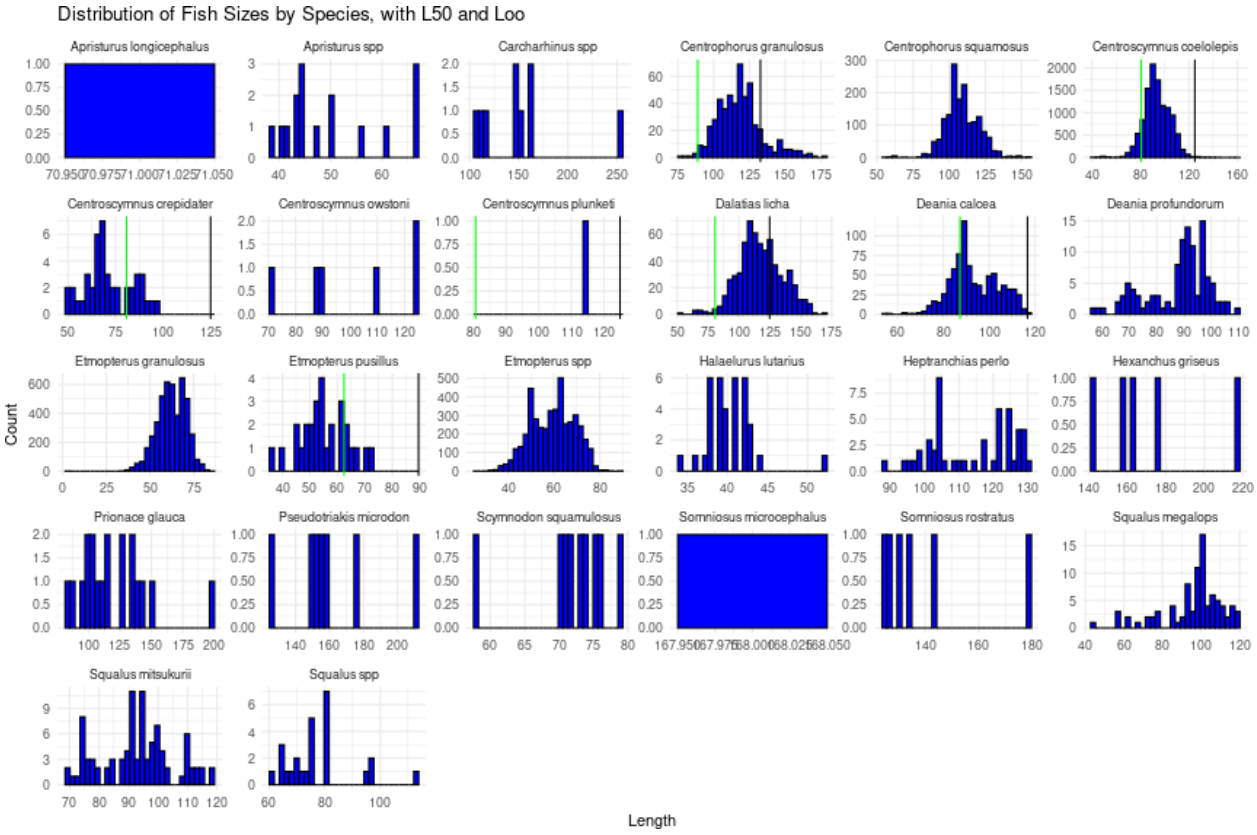
Average length by species

The bar chart here displays the average length of each shark species, allowing for a comparative analysis of size across different species. This can be particularly informative for understanding species-specific growth patterns and identifying outliers.



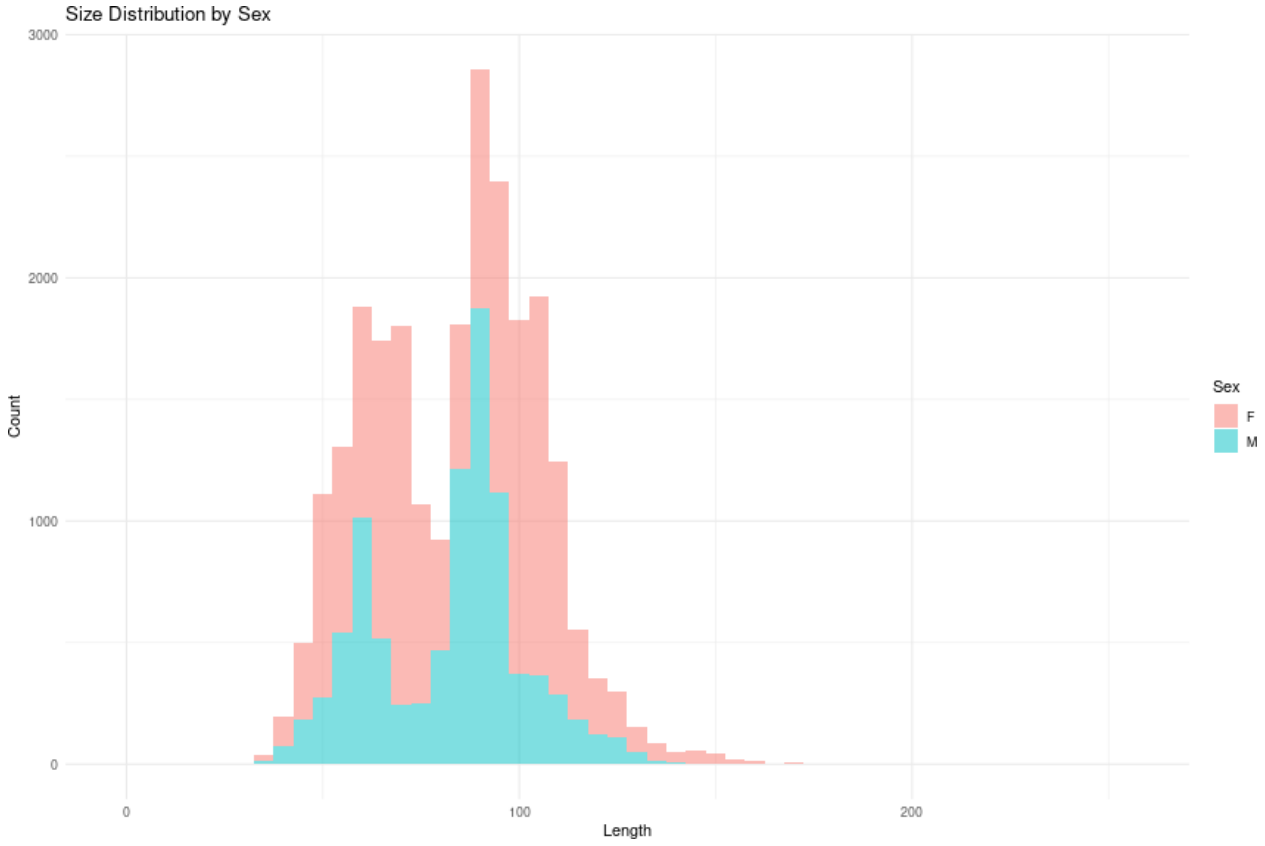
Distribution of fish sizes by species

This detailed histogram, with each facet representing a different species, provides a species-specific view of size distribution. It helps in identifying how size distribution varies across species, which is important for species-specific management and conservation strategies.



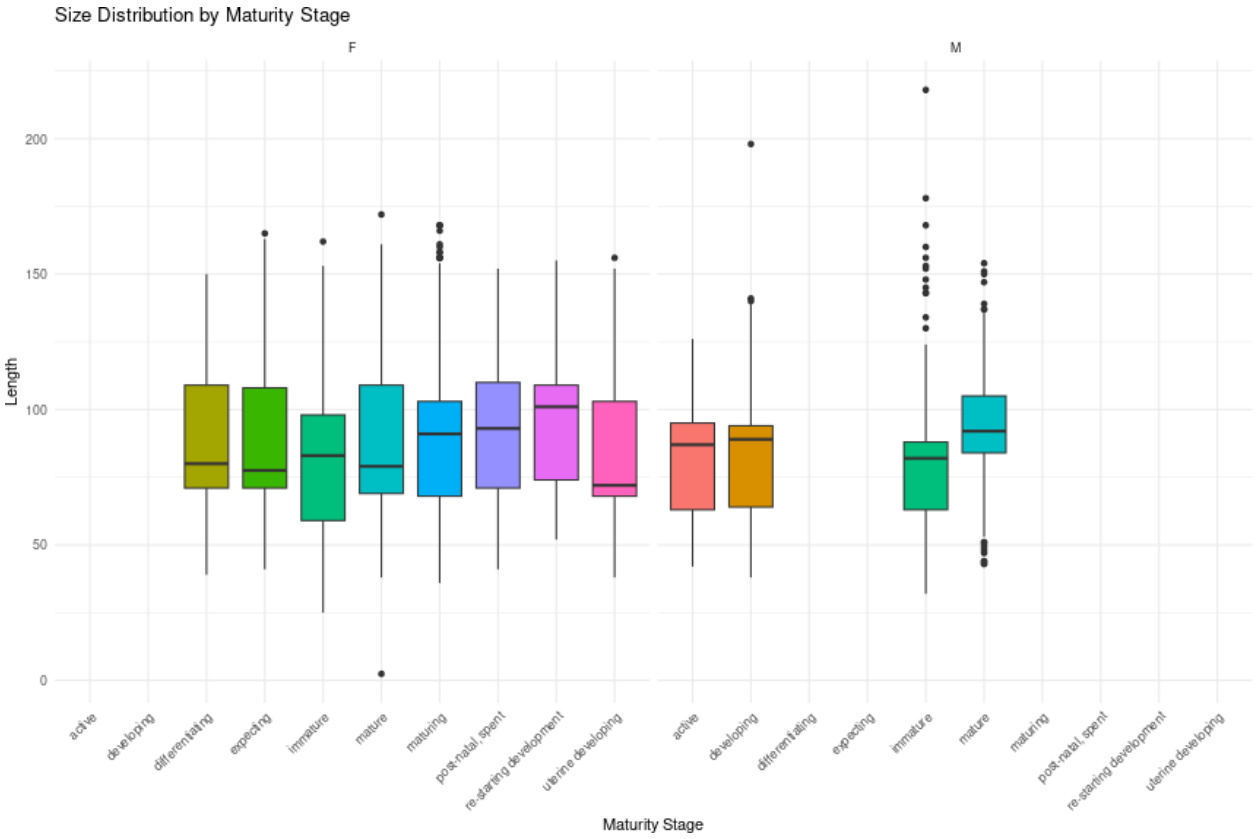
Size distribution by sex

The histogram here breaks down the size distribution based on sex, offering insights into potential sexual dimorphism in size. This can be crucial for understanding reproductive strategies and population dynamics.



Size distribution by maturity stage

Finally, the box plot in this section looks at the size distribution across different maturity stages. This visualization helps in understanding the growth trajectory of sharks and how their size correlates with their maturity stage, which is essential for effective population management. The plot is further faceted by sex to provide a more nuanced view of these dynamics.

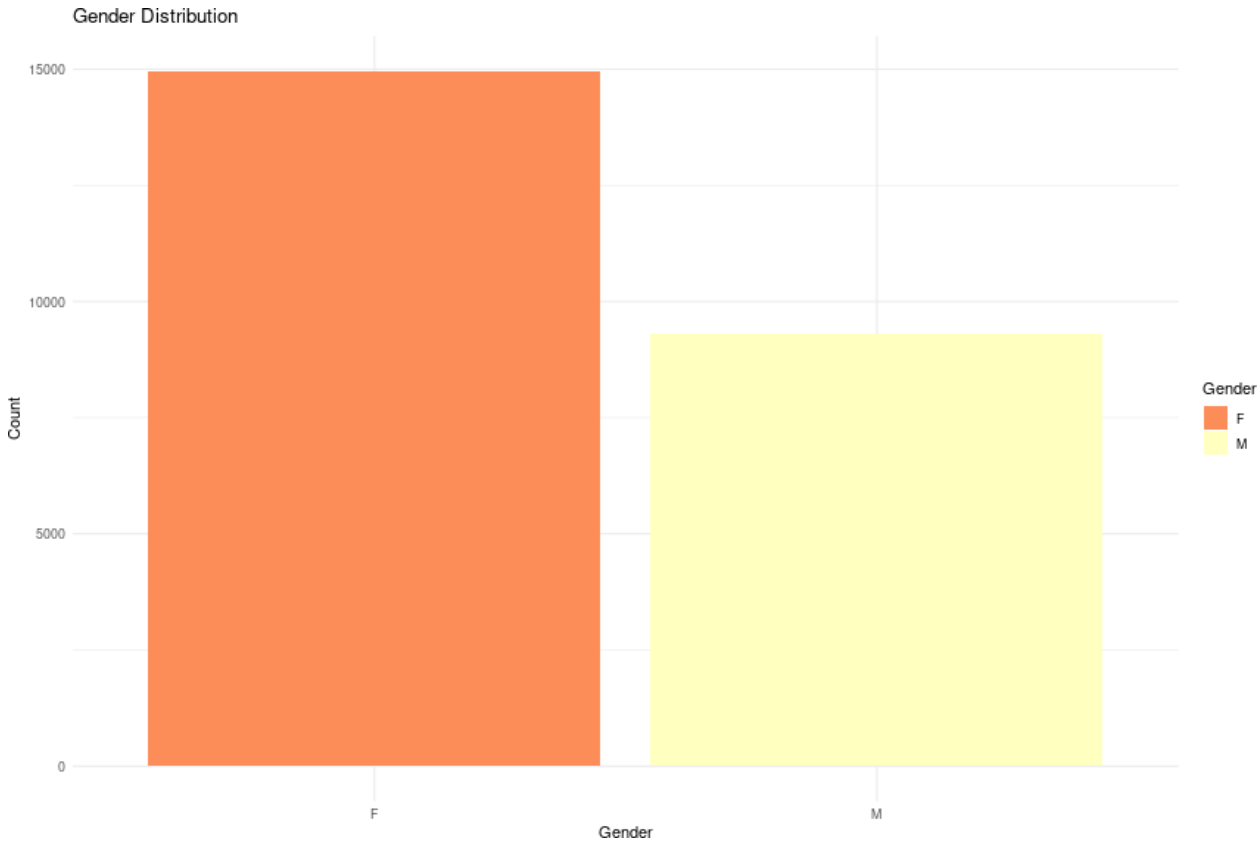


Gender Distribution

This section focus on the gender distribution within the shark dataset, providing insights into the male-to-female ratios among different shark species. Understanding gender distribution is crucial for assessing reproductive capacities and potential vulnerabilities of shark populations.

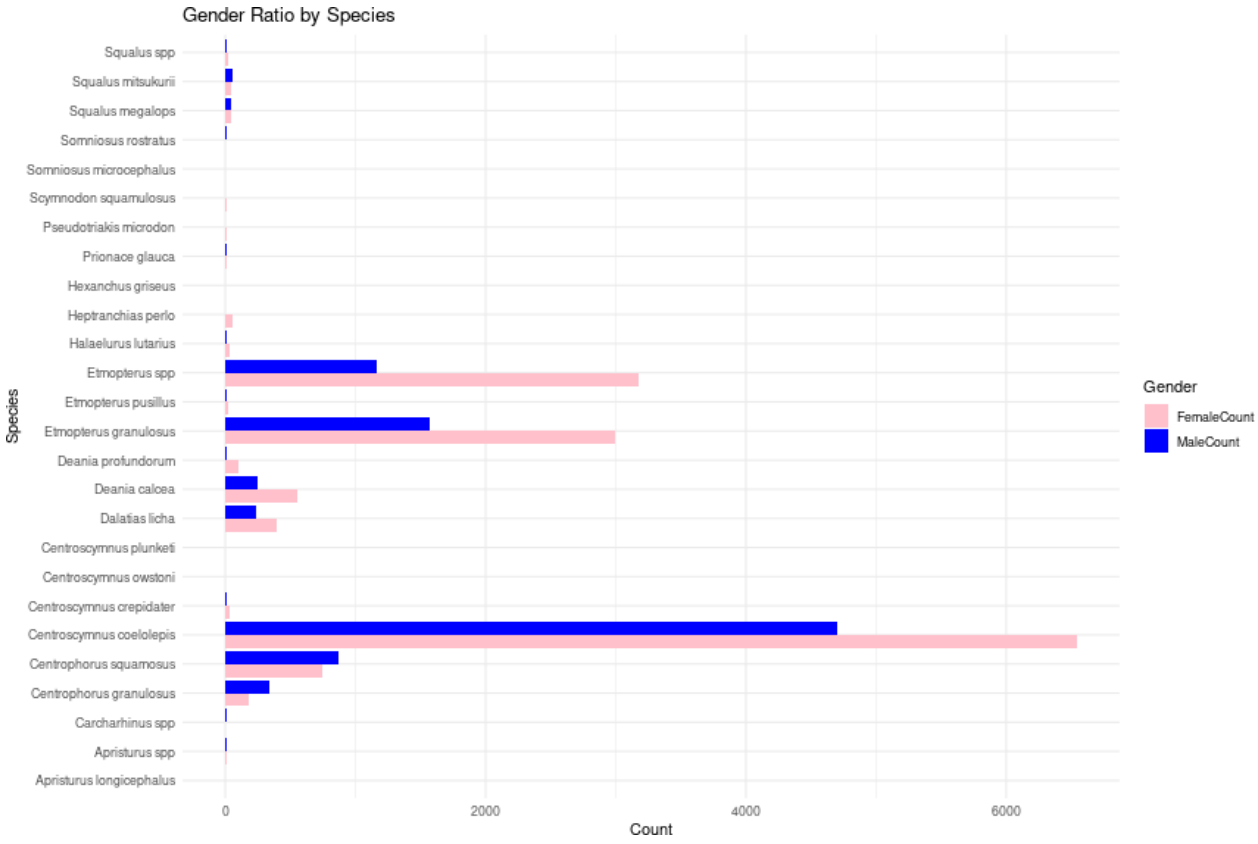
Overall gender distribution

The bar plot in this subsection gives an overview of the gender distribution across all shark species. This helps in understanding the overall balance between male and female sharks in the dataset, which is vital for population studies and conservation efforts.



Gender ratio by species

This plot takes a species-specific approach to analyzing gender distribution. By breaking down the male and female counts for each species, it highlights any disparities in gender ratios among different shark species. Such information is essential for species-specific management practices, especially for species that might have skewed gender ratios due to fishing pressures or other environmental factors.

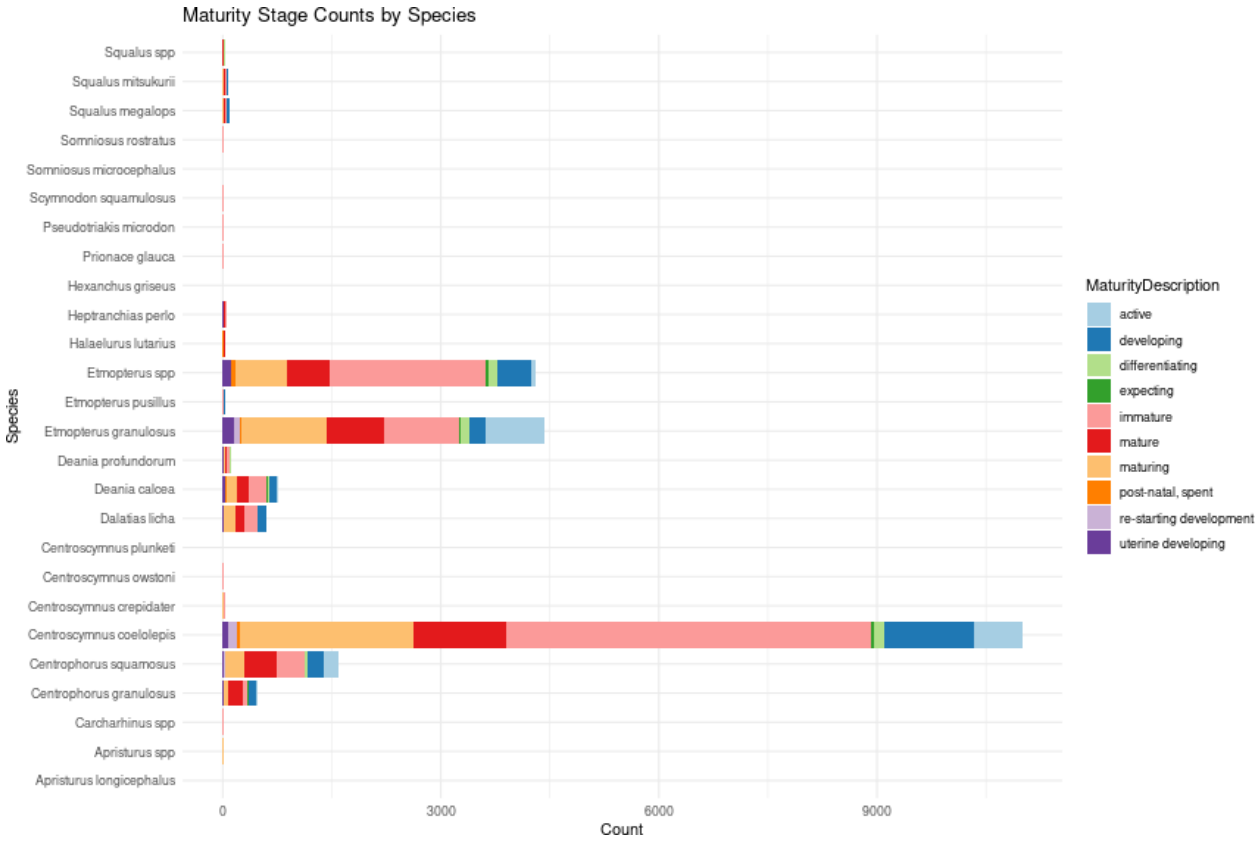


Maturity

This section focuses on the maturity stages of sharks, a critical aspect for understanding their reproductive status and health. The analysis is conducted both at the species level and by sex, providing a comprehensive view of the maturity distribution.

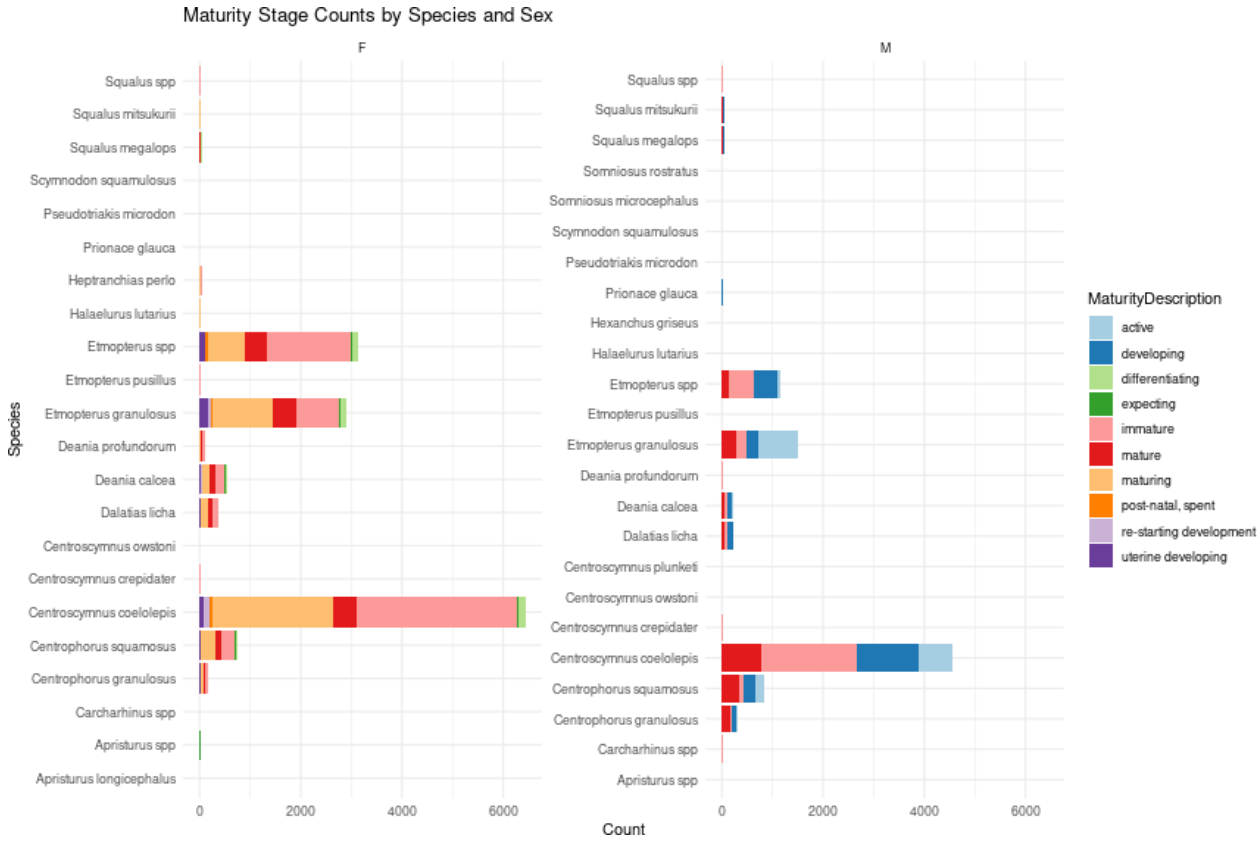
Proportion of each maturity stage within each species

In this subsection, a stacked bar plot is used to depict the distribution of various maturity stages across different shark species. This visualization allows for a quick assessment of the predominant maturity stages in each species, which is crucial for understanding their reproductive cycles and potential for recruitment.



Proportion of each maturity stage within each species, separated by sex

This plot separates the data by sex, providing a gender-specific view of maturity stages for each species. This approach is particularly useful for identifying any sex-based differences in maturity stages. The facet wrap creates individual panels for each sex, making it easier to compare and contrast these patterns across species.


Maturity Stage Counts by Species and Sex
F
M
Species
Squalus spp
Squalus mitsukurii
Squalus megalops
Scymnodon squamulosus
Pseudotriakis microdon
Prionace glauca
Heptranchias perlo
Halaelurus lutarius
Etmopterus spp
Etmopterus pusillus
Etmopterus granulosus
Deania profundorum
Deania calcea
Dalatias licha
Centroscymnus owstoni
Centroscymnus crepidater
Centroscymnus coelolepis
Centrophorus squamosus
Centrophorus granulosus
Carcharhinus spp
Apristurus spp
Apristurus longicephalus
Somniosus rostratus
Somniosus microcephalus
Hexanchus griseus
Centroscymnus plunketi
0
2000
4000
6000
Count
MaturityDescription
active
developing
differentiating
expecting
immature
mature
maturing
post-natal, spent
re-starting development
uterine developing