On-board observer program in the Suriname demersal finfish trawl fishery

Preliminary report - June 2025

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Since 2023, the Suriname Fisheries Department and the Centre for Development and Sustainable fisheries (CeDePesca) jointy implement an onboard observer program in the demersal finfish trawl fishery operating off Suriname. Up to March 2023, 16 trips were observed, including 369 sampled drags (hauls), spread accross the fishing zone at an average depth of 28m. Drags lasted 3.3 hours on average, yielding an average total catch of 2.3 tons, of which slightly more than half is generally retained and landed. During the observed trips, the fishery landed 39 different species, while the highest catch rates were observed for King mackerel, Barracuda and Green weakfish. Corocoro grunt and various other weakfish species made up an import part of the retained catch as well. The fishery was seen to interact with 22 different (potential) Endangered, Threathened and Protected (ETP) species, including sharks (10), rays (7), other batoid fishes (2) and marine turtles (3). The impact of the fishery on these species is currently little understood since local population or vulnerability assessments are not available for any the ETP species. This report aims to provide a preliminary analysis of the data that is being collected through the onboard observer program in this fishery. It will be used for discussion with key fishery stakeholders in order to (1) improve and expand the analyses for future reports and (2) start formulating potential management measures for the fishery, especially in relation to the ETP species bycatch.

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1 Introduction

1.1 Suriname demersal finfish trawl fishery

The trawl fishery for the capture of demersal fish (fish trawl for short) is an important branch within the fisheries sector in Suriname. The fishery developed in the 1980s with the introduction of several former beam trawlers from the Netherlands. Currently (license year 2025) the fleet consists of 26 active vessels. Although the fleet is diverse in composition, most vessels are between 20 and 30 m long with an engine capacity of maximum 500 hp. The vessels drag one or more bottom trawl nets over the seabed (Figure 1).

Fish trawlers target a variety of target species including Green weakfish (*Cynoscion virescens*), Whitemouth croaker (*Micropogonias furnieri*), Barracuda (*Sphyraena guachancho*), Lane snapper (*Lutjanus synagris*), Corocore grunt (*Orthopristis ruber*), kingfish (*Scomberomorus cavalla*) and many others. Fishing trips typically last 6-8 days, with the catch being preserved on ice. In 2022 the fish trawl fishery landed a total of approximately 13,000 tonnes of fish.

1.2 Suriname Corvina (*Cynoscion virescens*) and Acoupa weakfish (*C. acoupa*) drifnet and trawl FIP

In 2020, a Fishery Improvement Program (FIP) was initiated for the Suriname Corvina (*Cynoscion virescens*) and Acoupa weakfish (*C. acoupa*) fishery, including an industrial fishery (the Suriname fish trawl fishery) and a smaller-scale fishery using driftnets to target the same species. After a pre-assessment against the MSC standard, an action plan for the fishery was formulated and started implementation in October 2020. More information on the current status of this FIP can be found on the website of FisheryProgress.

1.3 Onboard observer program

As part of the FIP action plan, which is executed in close collaboration with the government of Suriname, the Fisheries Department's onboard observers program was re-initiated. The program aims to collect key information onboard the vessels in the Suriname fish trawl fishery, notably in relation to bycatch and discards. This information should serve as a basis for potential management measures and ensure the environmental impact of the fishery can be minimized.

This report summarizes the observer activities carried out under the FIP up till March 2025, outlines the sampling methods used, and presents preliminary observations. The data collected through this program are intended to guide future management decisions and support the long-term sustainability of Suriname's trawl fishery.

Figure 1: A demersal finish trawler in the Surinamese fleet (c)Marisa Fisheries

2 Methods

To gather information on board, three observers were trained that take rotations, working in pairs. In principle, the aim is to observe one complete fishing trip each month. This is not always possible, as the program depends on the availability of active vessels that have enough space onboard to accomodate the observers. The methodology used in the onboard observer program follows a standardized protocol to guarantee consistency, transparency, and scientific validation (Figure 2). For each drag (haul), all metadata are recorded (time, position, depth, etc.) before the catch is sampled according to a fixed protocol that aims to collect data on both retained and discarded catch, estimating weights of catch fractions and gathering length data for selected species.

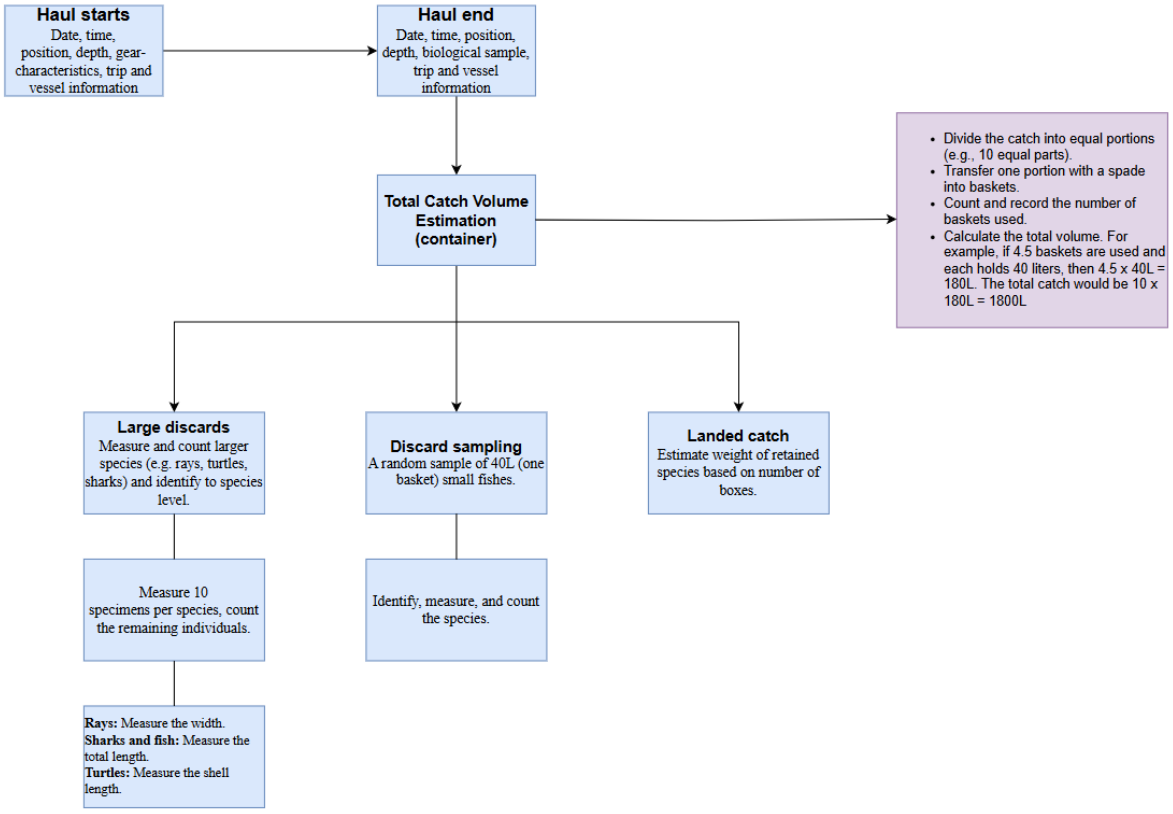


Figure 2: Flowchart showing the sampling methodology used in the onboard observer program in the Suriname demersal finfish trawl fleet.

3 Results

3.1 General characteristics of the data

3.1.1 Vessel and gear charcteristics

Data was collected onboard 5 different vessels in the Suriname demersal finfish trawl fleet. While a variety of rigging configurations exist in the fleet, all the sampled vessels used two trawl nets in twin-rig configuration (Figure 3, Table 1). All vessels had a stretched mesh size in the codend of 80 mm, as stipulated by the Suriname Fisheries License Conditions Decree.

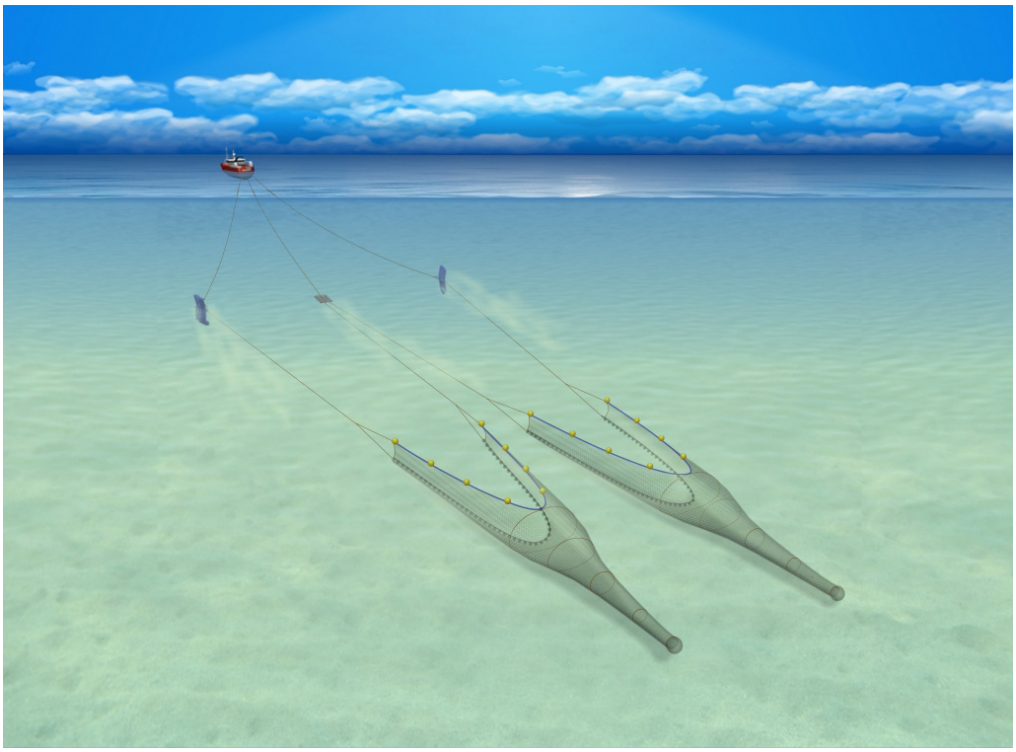


Figure 3: Drawing of a twin-rig trawl configuration (also referred to as twin bottom otter trawl) (c)Seafish.org

Table 1: Vessel sampled in the onboard observer program and some of their gear characteristics

Vessel name	Registration Number	Number of trawls	Twinrig configuration	Codend stretched mesh size (mm)
Aravis	SA00173	2	yes	80
Javro	SA00148	2	yes	80

Vessel name	Registration Number	Number of trawls	Twinrig configuration	Codend stretched mesh size (mm)
Opportune	SA00174	2	yes	80
Minerva	SA00135	2	yes	80
Kjell	SA00147	2	yes	80

3.1.2 Trips and drags

A total of 16 onboard observer trips were completed up to March 2025 and included in the current analysis, including 7 trips in 2023, 8in 2024 and 1 trip in 2025. Table 2 summarizes the number of trips by month for each of the three years included in the dataset.

Table 2: Number of onboard observer trips executed in the Suriname fish trawl fleet

Year	January	February	April	May	June	August	September	October	November
2023	-	-	-	1	1	2	1	1	1
2024	1	1	1	1	1	-	2	-	1
2025	-	1	-	-	-	-	-	-	-

The dataset included a total of 415 drags that were observed, of which 369 were fully sampled according to the sampling protocol described above.

The number of sampled drags by year and month is summarized in Table 3.

Table 3: Number of sampled drags in the Suriname fish trawl fleet

Year	January	February	April	May	June	August	September	October	November
2023	-	-	-	15	25	48	14	27	22
2024	25	26	23	26	27	-	32	-	28
2025	-	31	-	-	-	-	-	-	-

3.1.3 Drag duration

The average duration of sampled drags was 3.3 hours (SD=0.6 hours). The drag duration was similar through the years (Figure 4).

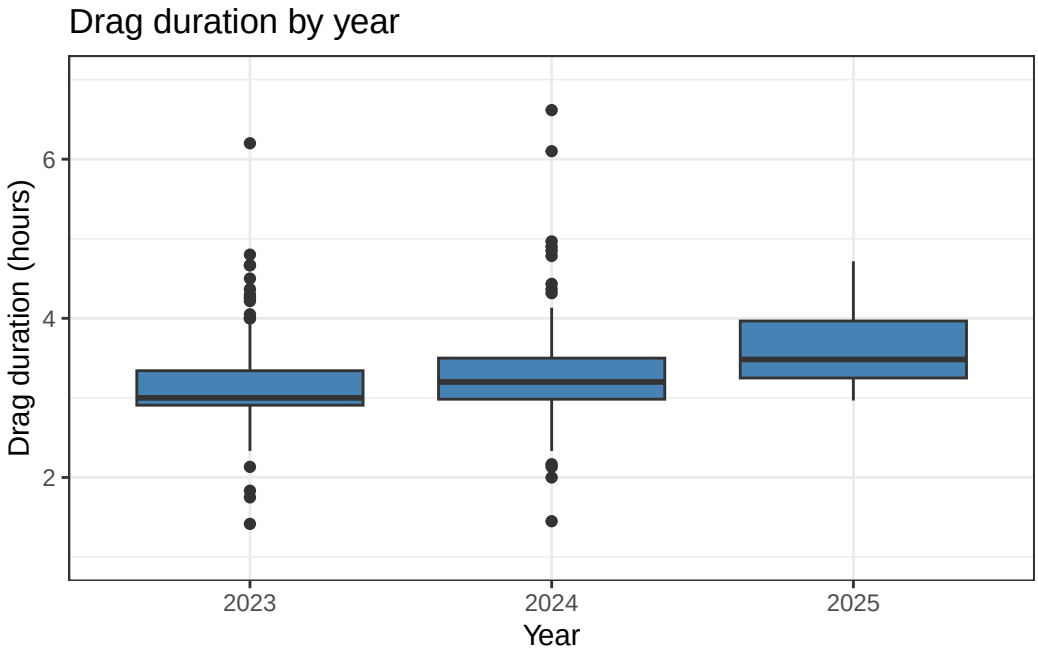


Figure 4: Duration of sampled drags by the onboard observer progam in the Suriname demersal finfish trawl fleet.

3.1.4 Spatial distribution of drags

The spatial distribution of the 369 sampled drags is shown in Figure 5.

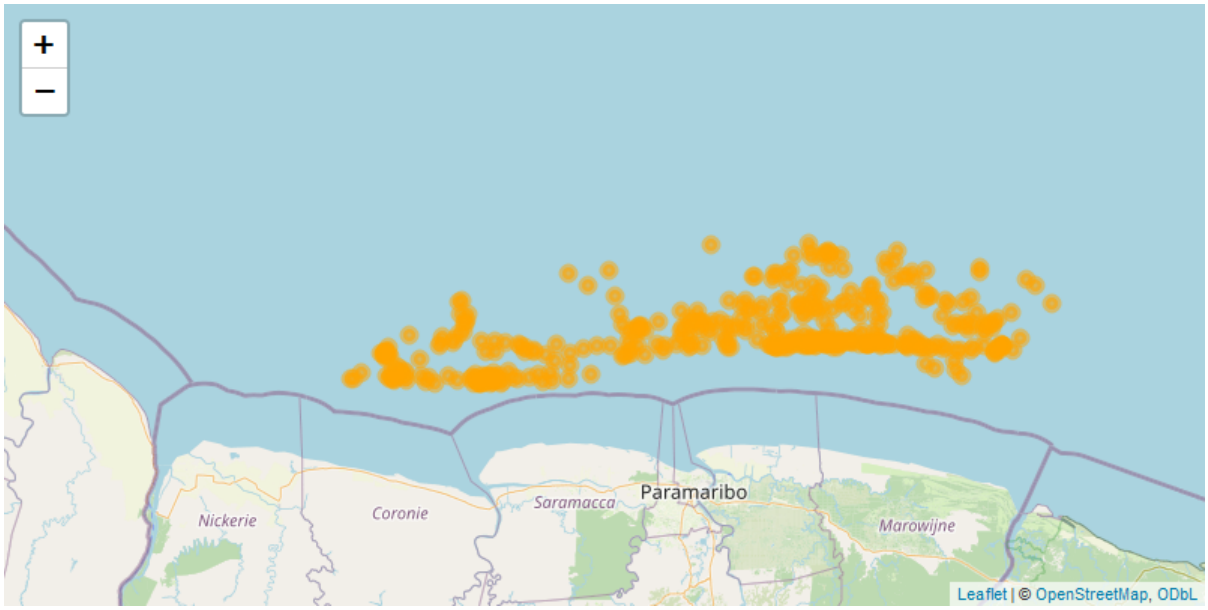


Figure 5: Spatial distribution of sampled drags in the onboard observer program of the Suriname demersal finfish trawl fleet. The dots on the map represent the haulback coordinates of each sampled drag.

3.1.5 Depths

The sampled drags took place at an average water depth of 28 m (SD=7.8 m). The trawling depth was similar through the years (Figure 6).

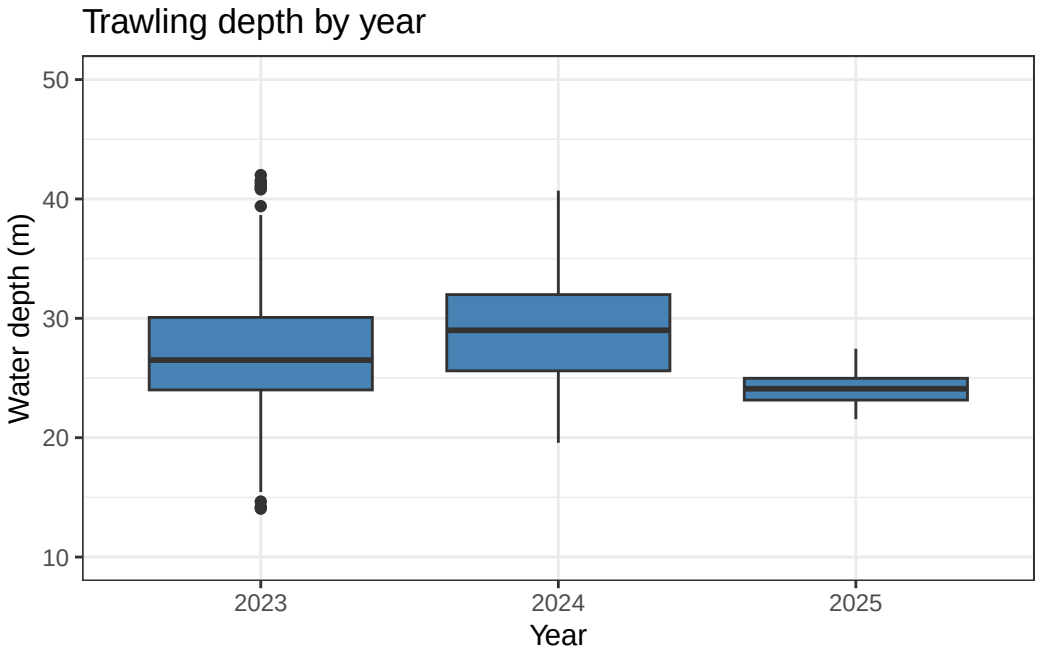


Figure 6: Water depth of sampled drags by the onboard observer progam in the Suriname demersal finfish trawl fleet.

3.2 Catch characteristics

3.2.1 Total catch

The estimated total catch volume of the sampled drags was 3.9 m^3 (SD=3.1 m^3), corresponding to a total estimated weight of 2353.3 kg (SD=1870). The distribution of estimated total catch volumes and weight are shown in Figure 7 and Figure 8.

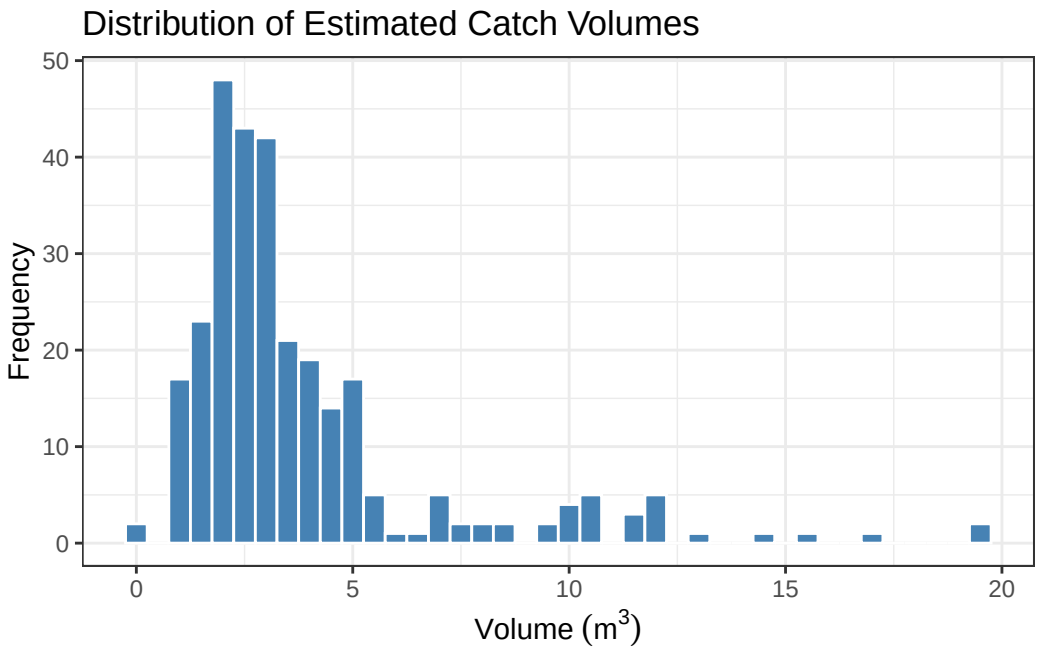


Figure 7: Estimated total catch volume of sampled drags by the onboard observer progam in the Suriname demersal finfish trawl fleet.

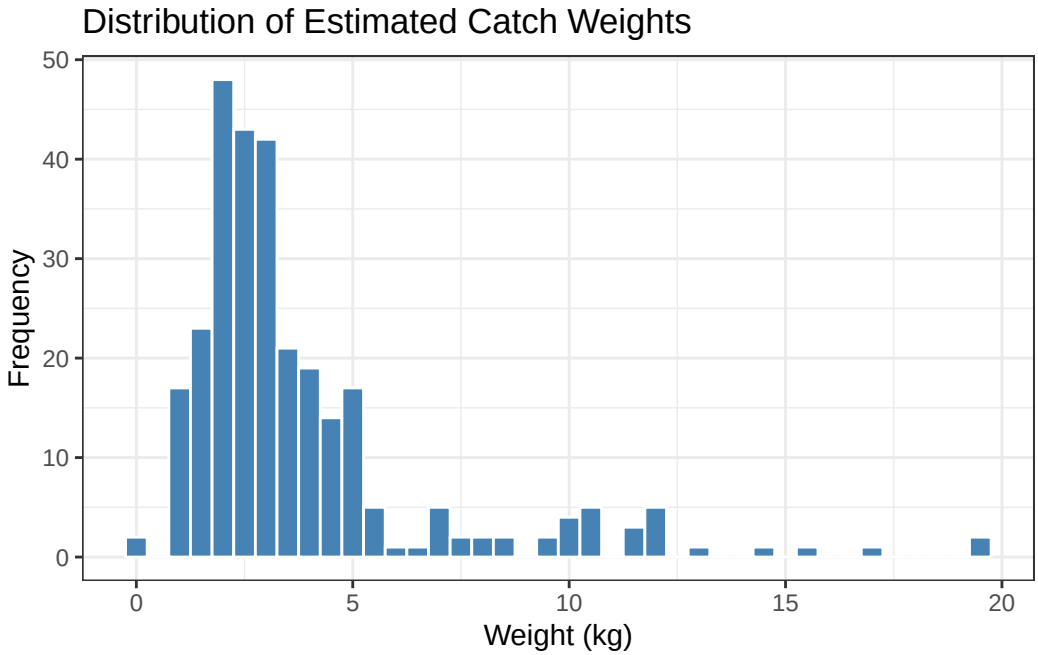


Figure 8: Estimated total catch weight of sampled drags by the onboard observer progam in the Suriname demersal finfish trawl fleet.

3.2.2 Retained catch

The weight of retained (i.e., landed) catch was on average 1301.3kg per drag (SD=1230.5 kg).

3.2.3 Discarded catch

The weight of discarded catch (i.e., thrown back overboard) was on average 1209.3kg per drag (SD=1767.2 kg).

3.2.4 Catch composition

Figure 9 combines the estimated values of the three catch fractions discussed above. Median values of retained and discarded catch weights per drag are almost similar, both representing about half of the total catch weight.

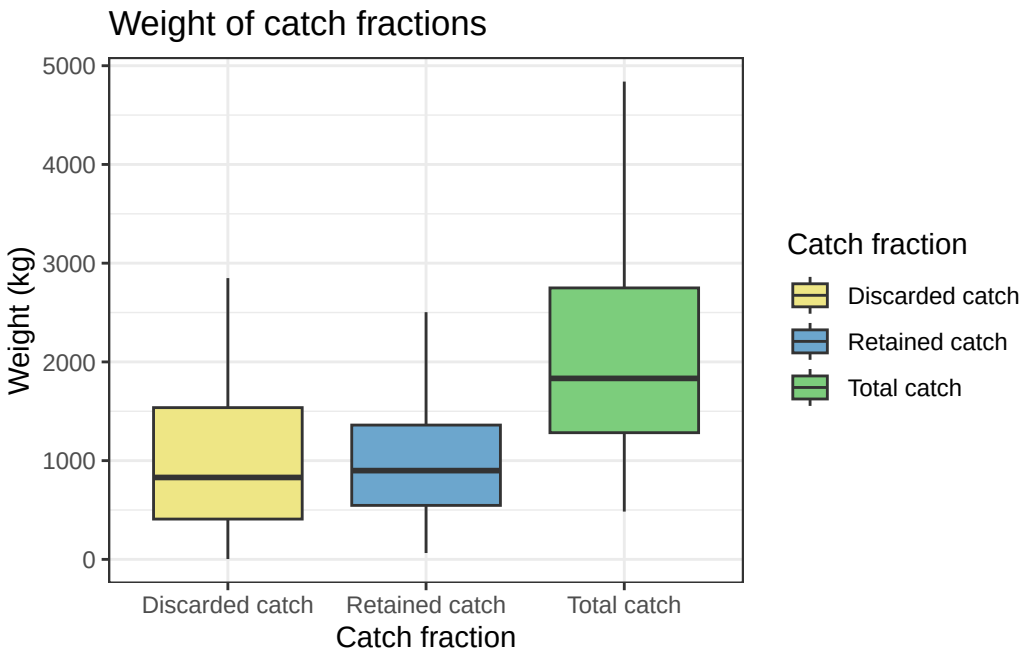


Figure 9: Estimated weights of the different catch fractions per haul based on sampled drags by the onboard observer progam in the Suriname demersal finfish trawl fleet.

3.3 Catch-per-unit-effort

3.3.1 CPUE of catch fractions

While the values in previous sections represented estimates of actual weights of the various catch fractions per drag, the remainder of the results will be presented as catch rates or catch-per-unit-effort (CPUE), by standardizing the weight values by the trawling time per drag. Catch rates allow to make meaningfull comparisons of weight values, independent of the effort (i.e., trawl time).

The three catch fractions (total, retained and discarded catch) are presented as CPUE values in Table 4.

Table 4: Average catch-per-unit-effort (CPUE in kg/hour) of various catch fractions in the Suriname demersal finfish trawl fleet (SD = standard deviation)

Total catch	SD	Retained catch	SD	Discarded catch	SD
743.7	609.4	356.2	273.9	387.6	566.7

3.3.2 Retained catch CPUE

Looking at the retained catch fraction, highest catch rates were observed for King mackerel (*Scomberomorus cavalla*) and Barracude (*Sphyraena spp.*), but catches were highly variable, as indicated by the high standard deviation (SD) values (Table 5). Green weakfish (*Cynoscion virescens*) was the third most abundant species, followed by Corocoro grunt (*Orthopristis ruber*) and a number of other weakfish species. A total of 39 different species were landed during the observed drags.

Table 5: Average catch-per-unit-effort (CPUE in kg/hour) per species of retained catch in the Suriname demersal finfish trawl fleet (SD = standard deviation)

Species Code	Common name	Scientific name	Average CPUE (kg/h)	SD (kg/h)
KGM	King mackerel	Scomberomorus cavalla	120.3	159.8
BAR	Barracudas nei	Sphyraena spp	95.1	223.3
YNV	Green weakfish	Cynoscion virescens	85.8	80.7
OTR	Corocoro grunt	Orthopristis ruber	79.3	113.5
WKX	Weakfishes nei	Cynoscion spp	75.1	138.6
WKK	King weakfish	Macrodon ancylodon	70.4	49.4
YNJ	Jamaica weakfish	Cynoscion jamaicensis	70.3	82.3
YNM	Smallscale weakfish	Cynoscion microlepidotus	65.5	118.6
LHT	Largehead hairtail	Trichiurus lepturus	48.0	54.0
BRS	Serra Spanish mackerel	Scomberomorus brasiliensis	45.5	43.6
YNS	Tonkin weakfish	Cynoscion similis	43.2	63.6
RDU	Longnose stingray	Hypanus guttatus	40.7	51.4
STT	Stingrays, butterfly rays nei	Dasyatidae	39.6	35.6
SNL	Lane snapper	Lutjanus synagris	38.3	32.0
CKM	Whitemouth croaker	Micropogonias furnieri	36.1	35.6
CVJ	Crevalle jack	Caranx hippos	35.0	36.3
BUA	Atlantic bumper	Chloroscombrus chrysurus	33.9	27.2
NGZ	Thomas sea catfish	Notarius grandicassis	33.9	26.6
ERP	American harvestfish	Peprilus paru	33.7	31.9
YNA	Acoupa weakfish	Cynoscion acoupa	30.8	31.1
MOA	Atlantic moonfish	Selene setapinnis	30.6	46.7
KGX	Seerfishes nei	Scomberomorus spp	27.9	33.3

Species Code	Common name	Scientific name	Average CPUE (kg/h)	SD (kg/h)
BRG	Barred grunt	Conodon nobilis	26.3	32.8
LRJ	Shorthead drum	Larimus breviceps	24.6	22.3
RUB	Blue runner	Caranx crysos	19.8	29.6
AXP	Crucifix sea catfish	Sciades proops	18.5	19.8
KGB	Southern kingcroaker	Menticirrhus americanus	17.9	15.5
THA	Atlantic thread herring	Opisthonema oglinum	14.3	6.4
NBM	Smalleye croaker	Nebris microps	13.9	10.6
AZS	Bressou sea catfish	Aspistor quadriscutis	13.6	7.1
SNC	Southern red snapper	Lutjanus purpureus	13.5	9.4
BLU	Bluefish	Pomatomus saltatrix	12.1	7.2
MZZ	Marine fishes nei	Actinopterygii	11.8	9.5
PQT	Bluewing searobin	Prionotus punctatus	9.8	0.2
TCN	Cayenne pompano	Trachinotus cayennensis	9.8	0.6
BEB	Coco sea catfish	Bagre bagre	9.3	3.3
POX	Pompanos nei	Trachinotus spp	8.5	2.4
CCL	Blacktip shark	Carcharhinus limbatus	7.4	3.2
CGX	Carangids nei	Carangidae	5.4	4.7

3.3.3 ETP species CPUE

Endangered, Threatened or Protected (ETP) species are commonly captured in the Suriname demersal finfish trawl fishery. Due to a lack of clear standard or definition, for the sake of this analysis all elasmobranchs (rays, sharks and batoid fishes) and marine turtles are considered 'ETP species'. It should be noted that for many of these species no population assessment are available for Suriname or the wider region, so the conservation status of many species is currently uncertain. While marine mammals would also be considered ETP species, none were captured in the observed trips.

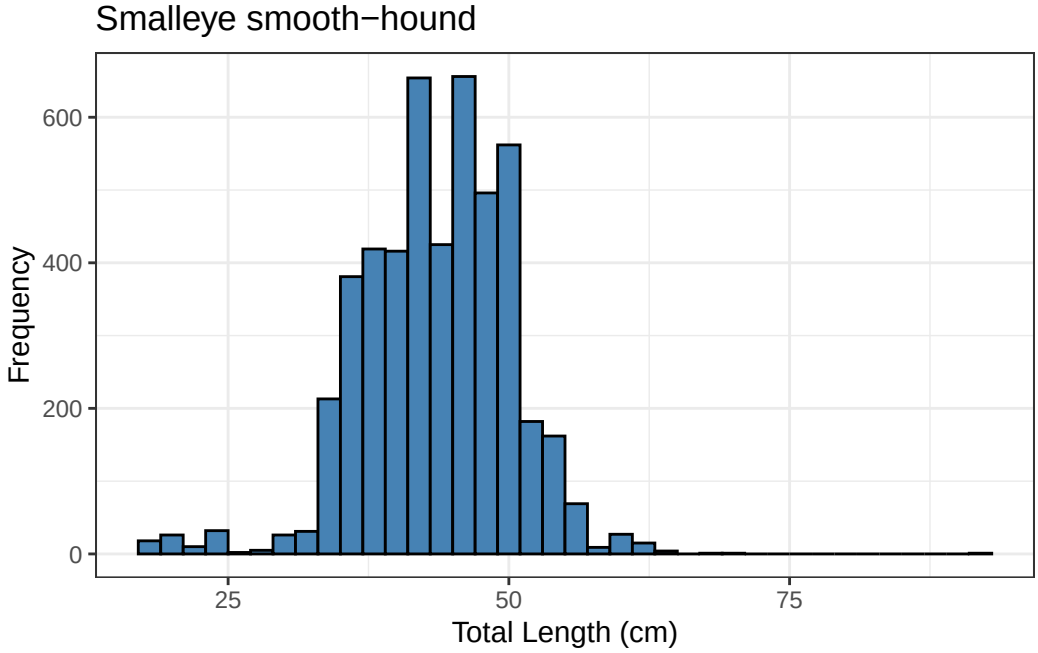
Smalleye smooth-hound (*Mustelus higmani*), a small-sized shark, was the most abundant ETP species, followed by longnoze stingray (*Hypanus guttatus*) and cownose ray (*Rhinoptera bonasus*). A total of 22 different ETP species were captured, including 10 sharks, 7 rays, 3 turtles and 2 batoid fishes.

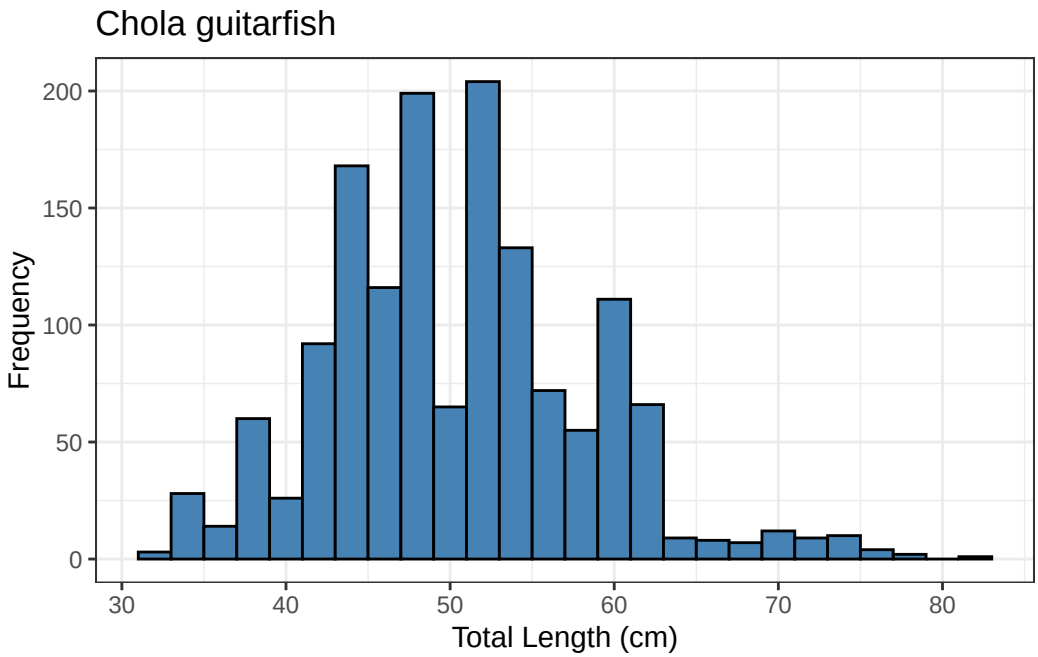
Table 6: Average catch-per-unit-effort (CPUE in individuals/hour) for ETP species in the Suriname demersal finfish trawl fleet (SD = standard deviation)

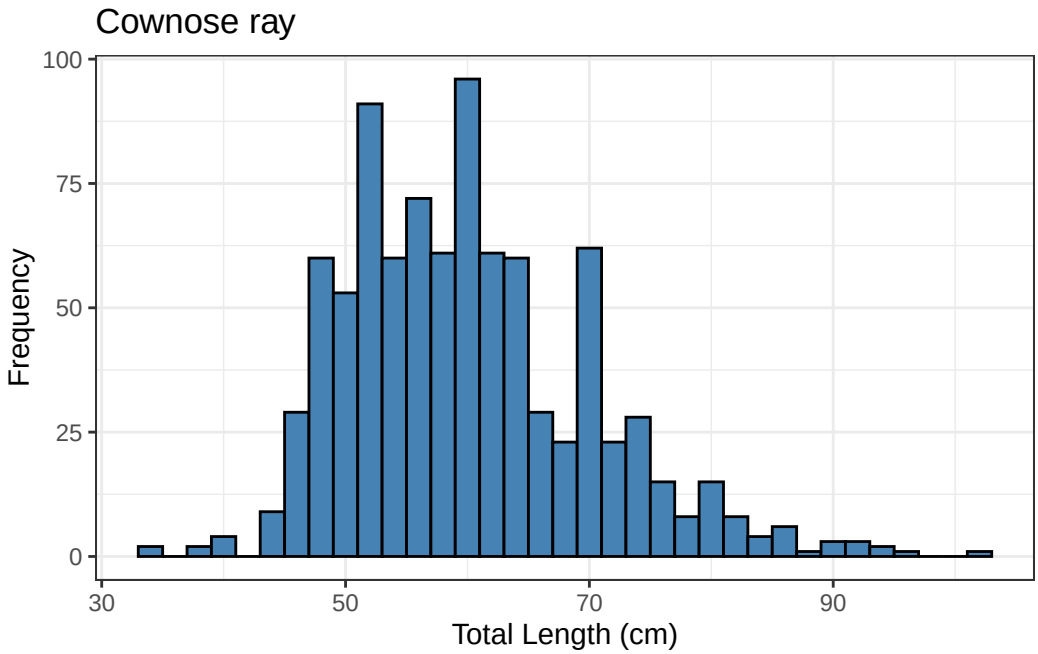
Species Code	Common name	Scientific name	Average CPUE (indiv/h)	SD (indiv/h)
CTJ	Smalleye smooth-hound	Mustelus higmani	8.2	7.5
RDU	Longnose stingray	Hypanus guttatus	7.1	7.6
MRB	Cownose ray	Rhinoptera bonasus	5.8	6.9
RHL	Brazilian sharpnose shark	Rhizoprionodon lalandii	4.7	5.8
RDJ	Sharpsnout stingray	Fontitrygon geijskesi	3.7	5.0
CCL	Blacktip shark	Carcharhinus limbatus	3.6	9.7
RHR	Caribbean sharpnose shark	Rhizoprionodon porosus	3.1	3.2
RGI	Smooth butterfly ray	Gymnura micrura	2.2	1.8
GUD	Chola guitarfish	Pseudobatos percellens	1.4	1.8
CCR	Smalltail shark	Carcharhinus porosus	1.2	1.3
TZB	Bancroft's numbfish	Narcine bancroftii	0.9	0.5
DHH	Chupare stingray	Styracura schmardae	0.7	0.5
CCN	Blacknose shark	Carcharhinus acronotus	0.6	0.3
RDA	Southern stingray	Hypanus americanus	0.4	0.2
SPL	Scalloped hammerhead	Sphyrna lewini	0.4	0.1
SPE	Scoophead	Sphyrna media	0.4	0.1
TUG	Green turtle	Chelonia mydas	0.4	0.1
CCV	Caribbean reef shark	Carcharhinus perezi	0.3	0.0
LKV	Olive ridley turtle	Lepidochelys olivacea	0.3	0.0
GNC	Nurse shark	Ginglymostoma cirratum	0.3	0.0
MAE	Spotted eagle ray	Aetobatus narinari	0.3	0.0
TTL	Loggerhead turtle	Caretta caretta	0.3	0.0

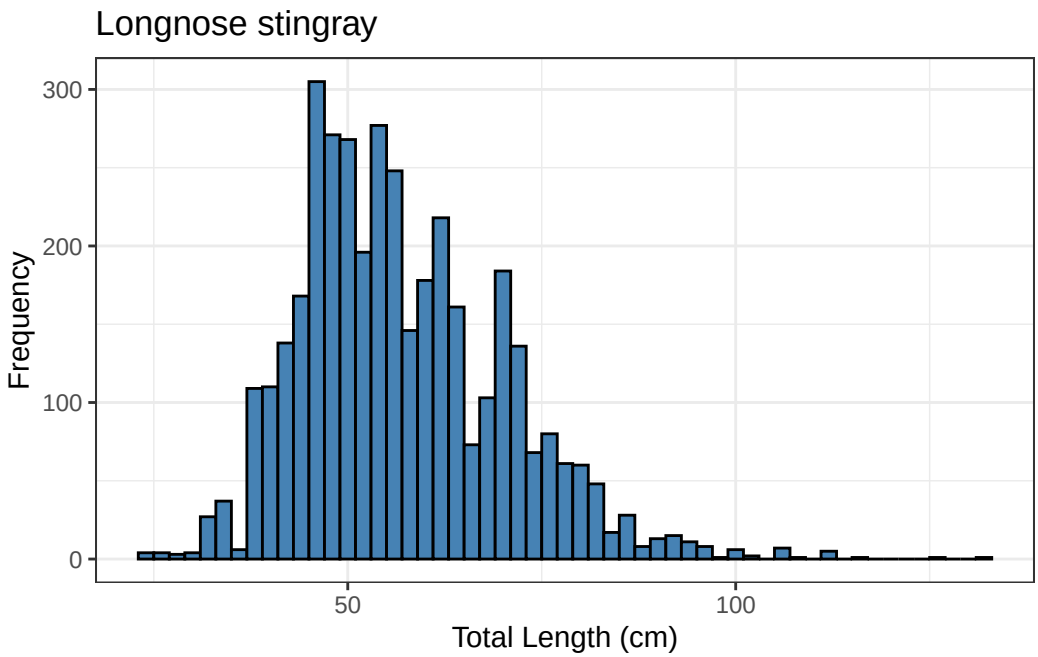
3.4 Length data analysis

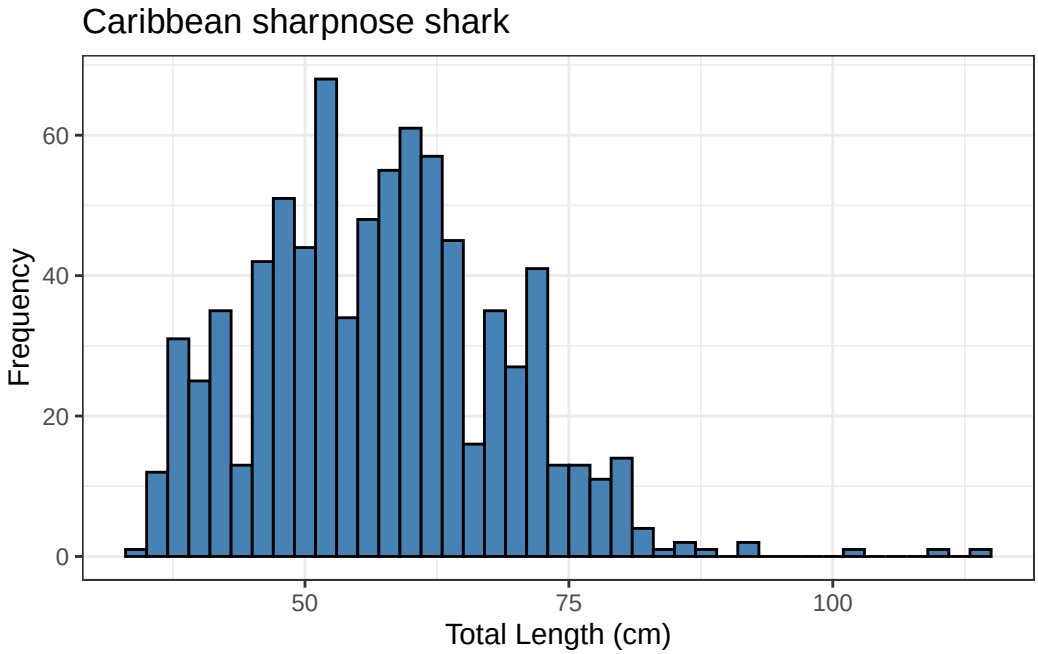
Size data of selected ETP species are presented in the histograms below. Note that for shark species, total length was measured, while body width was measured in ray species.

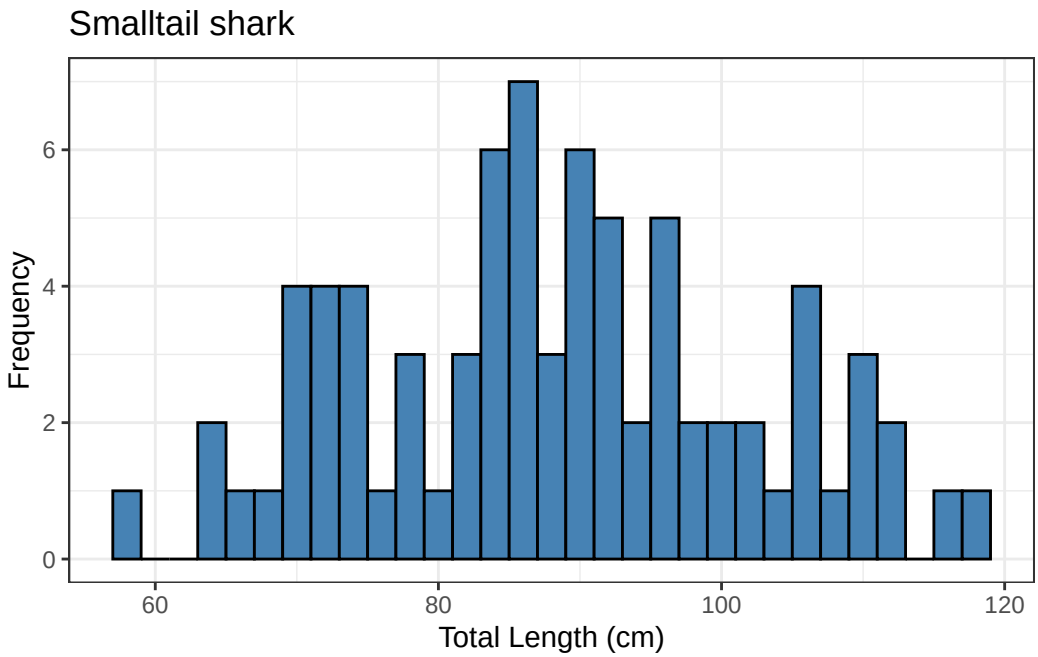


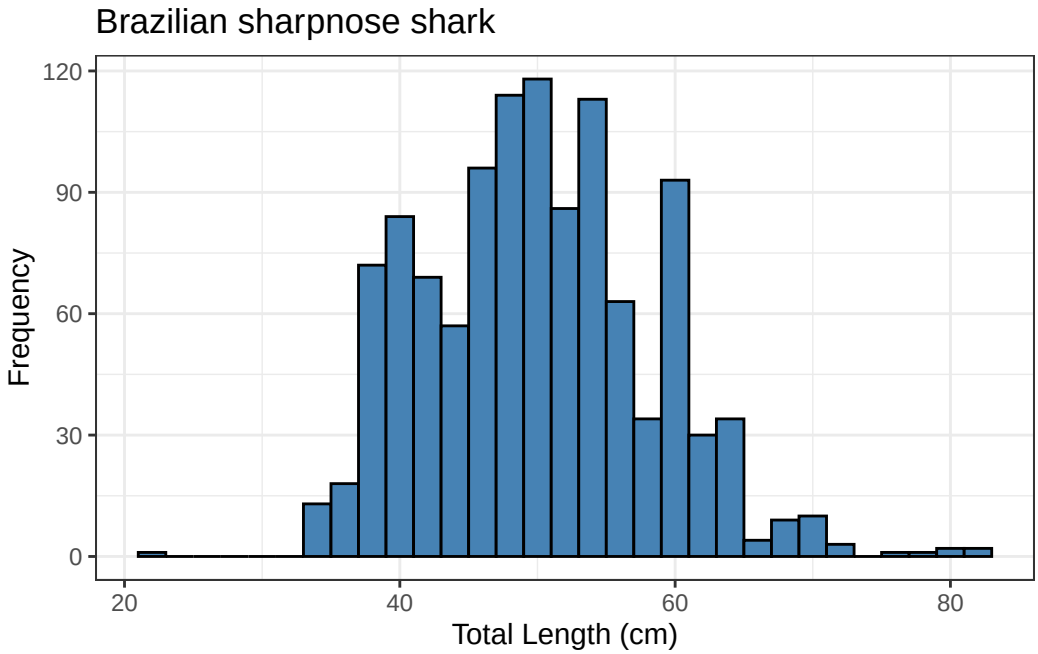

Chola guitarfish
Frequency
200
150
100
50
0
30
40
50
60
70
80
Total Length (cm)

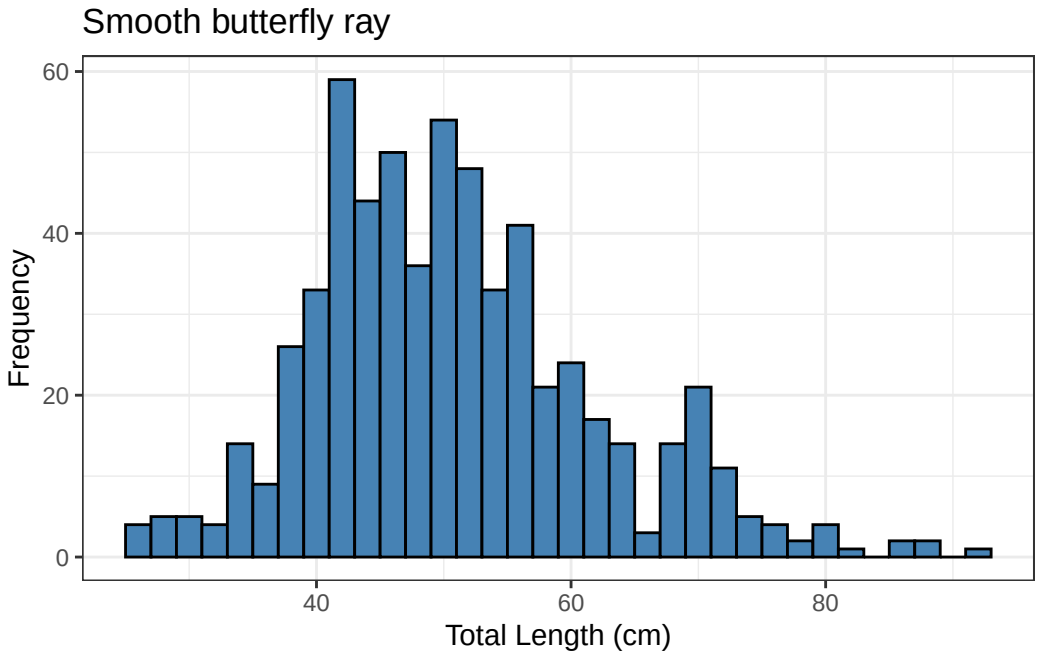

Cownose ray
Frequency
100
75
50
25
0
30
50
70
90
Total Length (cm)

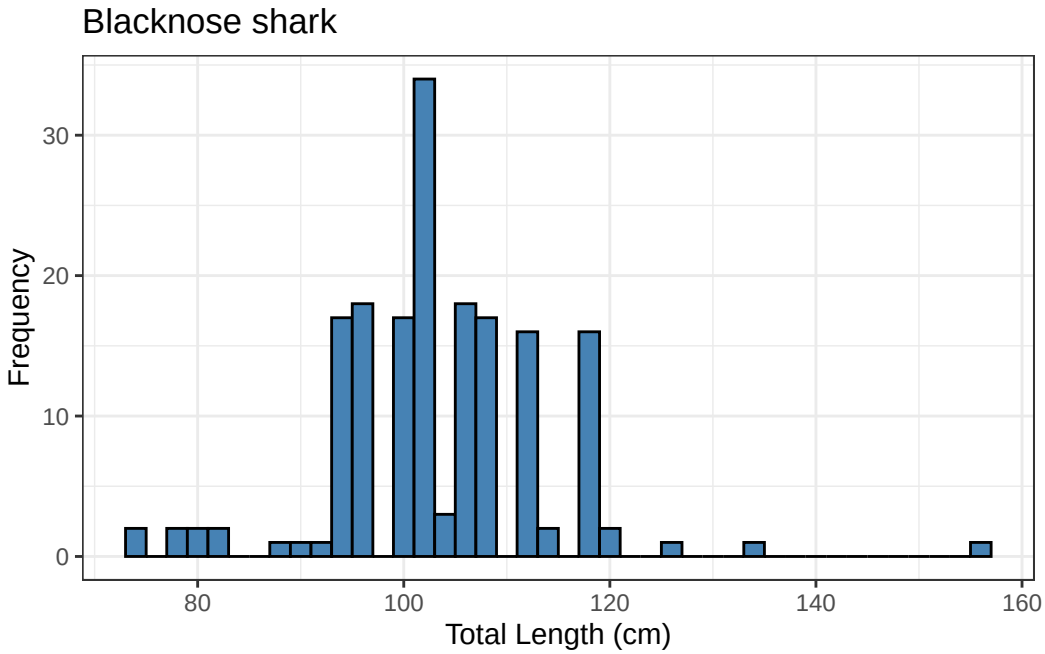

Longnose stingray
300
200
100
0
Frequency
50
100
Total Length (cm)

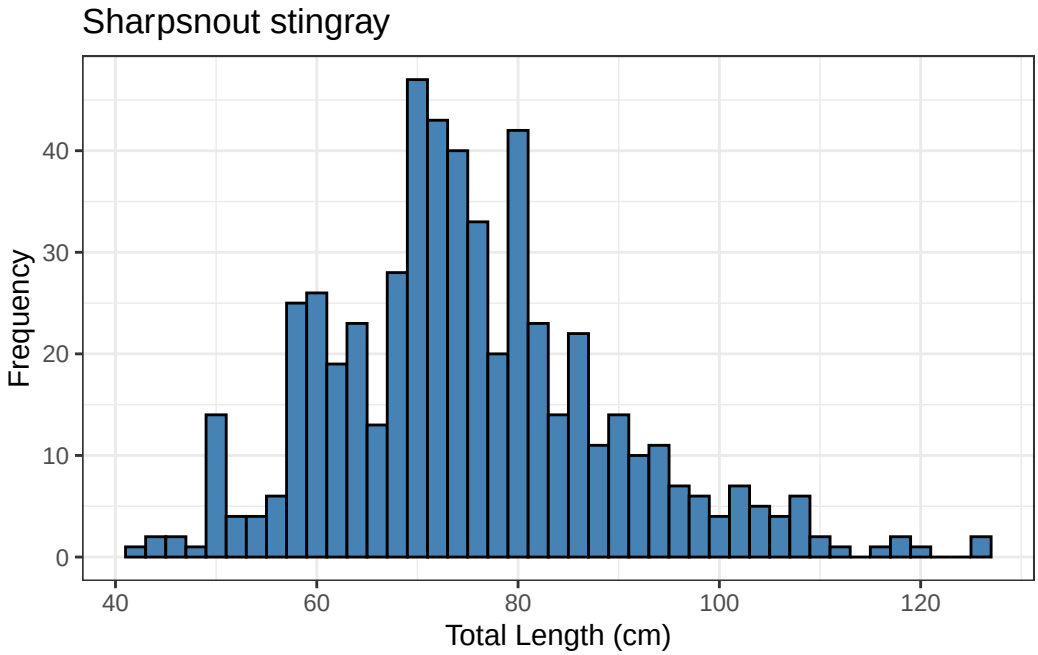

Caribbean sharpnose shark
60
40
20
0
Frequency
50
75
100
Total Length (cm)


Smalltail shark
Frequency
0
2
4
6
60
80
100
120
Total Length (cm)


Brazilian sharpnose shark
Frequency
0
30
60
90
120
20
40
60
80
Total Length (cm)


Smooth butterfly ray
Frequency
60
40
20
0
40
60
80
Total Length (cm)


Blacknose shark
Frequency
30
20
10
0
80
100
120
140
160
Total Length (cm)



4 Conclusion

The current report provides insights in the catches of the demersal finfish trawl fishery in Suriname, looking at retained versus discarded catch, catch rates, species composition and interaction with (potential) ETP species. It aims provide preliminary analyses of the data that is being collected through the onboard observer program in this fishery. Rather than a final document, this report is open for for discussion with key fishery stakeholders in order to (1) improve and expand the analyses for future reports and (2) start formulating potential management measures for the fishery, especially in relation to the ETP species bycatch.

5 Acknowledgements

The authors want to thank Marisa Fisheries for accommodating the onboard observers on their vessels. Further, the staff of the Suriname Fisheries Department is acknowledged for their support to the organization of the observer program, as well as data entry and quality control.