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Common sole (*Solea solea*) in Lyme bay

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Contents

1. Introduction

1.1. Common sole

Sole (*Solea solea*) is a common commercial fish species that inhabits shelf waters of the Northeast Atlantic, ranging from the northwest African coast and Mediterranean Sea to Scottish waters and extending across the Irish Sea and North Sea to the Skagerrak and Kattegat, with occasional specimens from the western Baltic Sea (Heessen *et al.*, 2015; Pawson, 1995; Wheeler, 1978). Around the British Isles, the highest catch rates of sole are observed in the southern North Sea (Division 4.c), English Channel (Divisions 7.d–e), Bristol Channel (Divisions 7.f) and Irish Sea (Divisions 7.a). Sole is generally found in lower densities off the coasts of north-west Scotland, eastern Scotland and north-east England (Pawson, 1995; Parker-Humphreys, 2004a, 2004b, 2005; Heessen *et al.*, 2015).

Whilst Heessen *et al*. (2015) reported a depth range extending down to 550 m, they are reported only occasionally at depths deeper than 250m, and most records of sole are from inner shelf waters, usually at depths <50 m. There are also differences in depth distribution related to size composition, with 0-group sole largely restricted to coastal waters, while larger sole will move into deeper waters (Le Pape *et al*., 2003).

There are several nominal sole stocks of relevance to the UK for which ICES provide advice. These are the Celtic Sea (ICES Divisions 7.f and 7.g), Irish Sea (7.a), eastern English Channel (7.d), western English Channel (7.e) and North Sea (Subarea 4) stocks. These stocks are assessed by the ICES Working Group for the Celtic Seas Ecoregion (WGCSE) and ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

1.2. ICES assessments and advice

The most recent ICES assessment and advice for sole in the Western English Channel (ICES Division 7.e) is summarised below:

Catches

Recent catches have increased since 2015, due to increase TAC. Total catches 1405t in 2021.

Recruitment

Recruitment relatively stable throughout time series. In recent years, recruitment has been variable again, with very high recruitment estimates in 2018 and 2020 but a very low estimate in 2021.

Fishing pressure

Fishing pressure (F), relatively stable until 2009, when there is an abrupt decrease below F_{MSY}. Since then, F has remained below this level but has been increasing again and was just below FMSY in 2021.

Stock biomass

SSB remained stable until 2008. After this period, SSB increased and is currently above MSY $B_{trigger}$

According with the latest ICES advice the western English Channel stock (7.e) is in a desirable state, both in term of spawning-stock biomass and fishing mortality (ICES, 2022). However, the latest data showed a reduced recruitment for 2021, which resulted in a decrease in the catch advice for 2023.

1.3. Management applicable

The management of sole in Western English Channel is by total allowable catches (TACs) and technical measures. Additional management measures have been incorporated into the fishery on this stock:

- Minimum MCRS (Minimum Conservation Reference Size) of 24cm
- In the UK, the MCRS of 24 cm is also enforced across all local IFCAs.
- Effort restrictions limiting the numbers of days at sea for vessels in this fishery using beam trawls (≥80 mm mesh size) and static nets (≤120 mm mesh size). The limits for effort are set annually for vessels over 10m which catch more than 300 kg of sole annually.

- Mesh restrictions for towed gears are set to 80 mm codends, which correspond well with the minimum landing size of sole at 24 cm (25 cm for Belgian vessels since December 2017).
- Since 2019, the landing obligation is fully applied to Sole in Division 7.e for the EU and UK waters. However, a *de minimis* exemption for sole caught with trammel nets and beam trawls with a Flemish pane is included.

1.4. Present study

The basis for the present work is to evaluate the impact of increased fishing effort on common sole in Lyme bay. Concerns that the stock might be overfished has been raised by the local fishing community at meetings of the south-western Regional Fisheries Group (RFG).

The overall objective of the study is to collate and analyse the available commercial data for sole:

1. Analysis of landings, effort and landings per Unit effort (LPUE) between 2001 and 2022, inside Lyme bay and the wider ICES 7.e
2. Analyse the biological data (length compositions) and discard rates from Cefas commercial sampling programmes: Offshore and Onshore programmes

2. Commercial landings and effort data

This section of the report considers the reported landings data, for UK-vessels. Reported landings cover the years 2001 till 2022.

2.1. Data sources

UK landings and effort data in ICES Division 7.e were derived from the official national fisheries statistics, as recorded under the control regulation. This information was obtained from official logbooks, for vessels ≥10 metres, and/or sales slips for vessels <10 metres.

Landings data for common sole and all effort (number of trips and number of fishing days) in Division 7.e were retrieved from the IFish database (6th December 2022) for the years 2001–2022[1].

Corresponding information on year, month (and quarter), spatial coverage (ICES rectangle) and gear were extracted. Data relating to gear codes were aggregated into broader fleet definitions for subsequent analyses: demersal otter trawl, beam trawl, set net, demersal seines, midwater trawl, purse seines, dredges, hooks and lines, pots and traps, and miscellaneous gears.

Vessels smaller or equal to 10m in length were grouped as under 10. Everything above 10m length was grouped in over 10m.

2.2. Reported annual landings

Reported landings of sole in 7e have doubled (+102%) since 2015 resulting in 985 tonnes landed in 2022. Overall, the main increases in landings can be noted in 2016, 2017 and 2019 with respectively +27%, +20% and +19% increase in landings in comparison with the previous year. In 2020 and 2021 the increase in landings was smaller with +4% and +9% respectively. The last reported year, 2022, landings in area 7.e decreased with -7% compared to the previous year (Figure 1), though these figures are still provisional.

[1] Landings data for 2022 should be considered provisional.

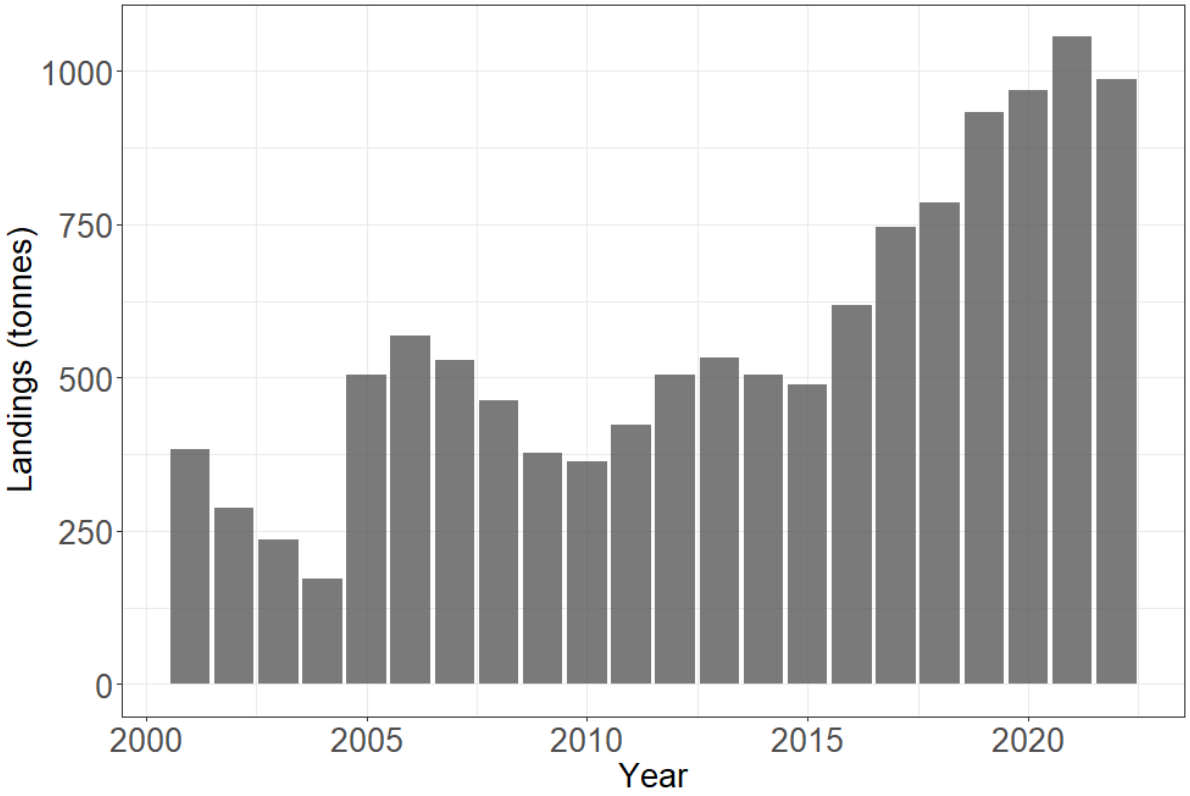

Figure 1: Landings per year in whole area ICES 7.e

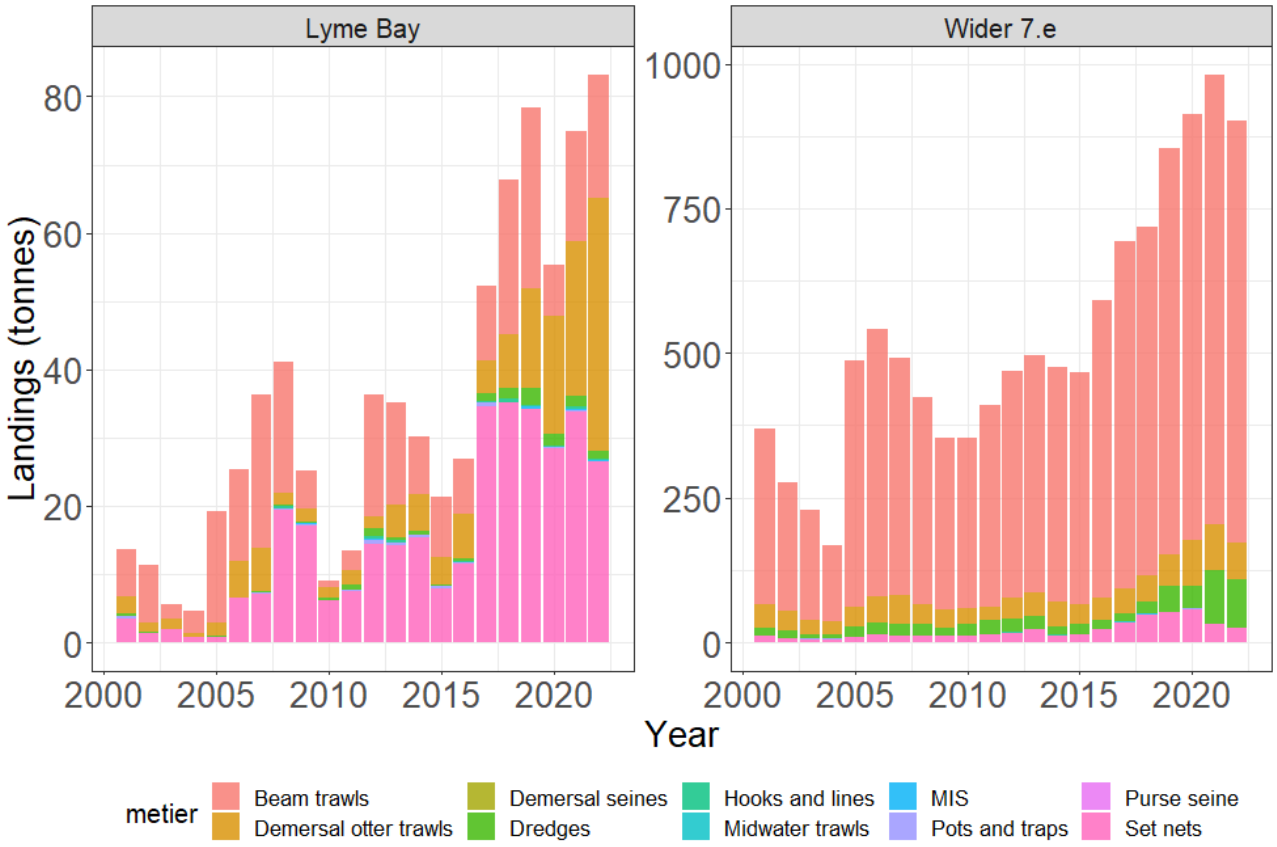

Figure 2: Yearly landings inside Lyme bay (left) and wider ICES area 7.e. (right) by different fishing gears.

The majority, 92% or 902 tonnes, of ICES 7.e landings came from the wider 7.e area, “out” of Lyme bay in 2022 (Figure 2). Landings are mainly caught in ICES rectangle 29E6 next to Lyme bay consistently across all years (Figure 3). 2019 had the highest landings in this rectangle and was slightly lower in the last 3 years. Landings “in” Lyme bay, ICES rectangles 30E6 and 30E7, accounted for 8% of the landings in 7e in 2022 (83 tonnes). Despite the fact that landings went down for the wider area 7.e, “out” of Lymebay with -8% in 2022, landings went up inside of Lymebay with +11% in comparison with last year 2021. Still landings “in” and “out” of lymebay are respectively almost four (+291%) and two (+93%) times higher in comparison with 2015 landings, so landings have increased in Lyme bay at a higher rate than outside of Lyme bay (Figure 2).

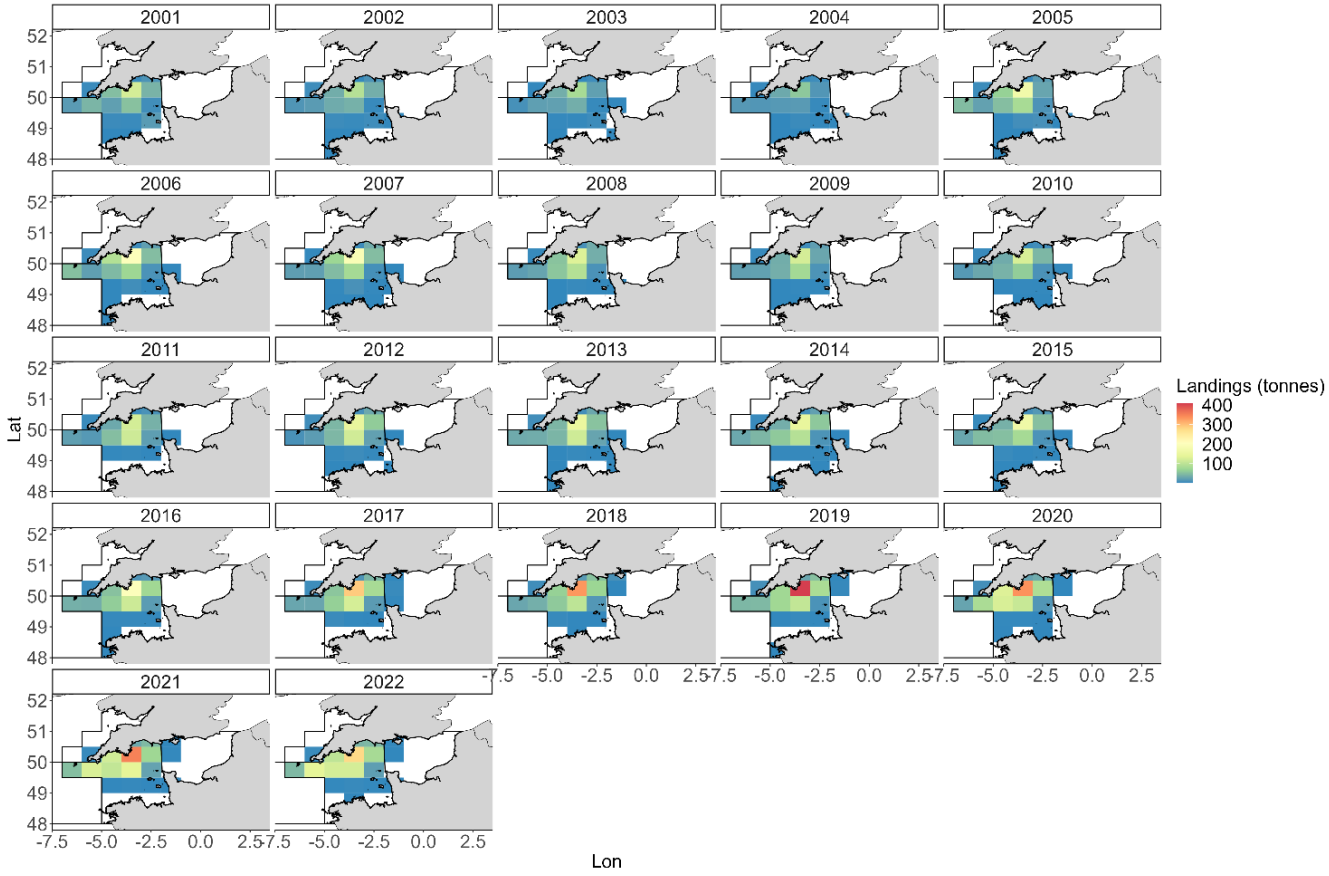

Figure 3: Landings per ICES rectangle per year in area 7.e

2.2.1. Reported landings by gear

The main gear landing from 7.e is beam trawls catching 731 tonnes or 81% of the landings “out” and to a lesser extend 18 tonnes or 22% “in” Lyme bay in 7e in 2022 (Figure 2). In contrast, the main gears in Lyme bay are nets and otter trawls. Landings from beam trawls “out” of Lyme bay have almost doubled in 2022 in comparison with 2015 when 400 tonnes were caught outside of Lyme bay by beam trawlers. In absolute numbers, beam trawlers are

the main cause of the increase in landings in 7.e. Spatial patterns follow a similar trend as the general landings as the main gear involved are beam trawls (Figure 5), with main landings coming from rectangle 29E6 and a slight reduction since 2019. In Lyme bay the pattern is more variable with peaks in 2018 and 2019 catching 22 and 26 tonnes respectively, three times more than the 2015 value of 8.8 tonnes. Hereafter, landings by beam trawls dropped to 7.5 tonnes. In 2022 landings increased again up to 18 tonnes, double of what was caught in 2015. Most beam trawls as well “in” and out of Lyme bay are over 10m (Figure 4).

Figure 4: Under and over 10m vessels for main metiers in and outside of Lyme bay in 7.e.

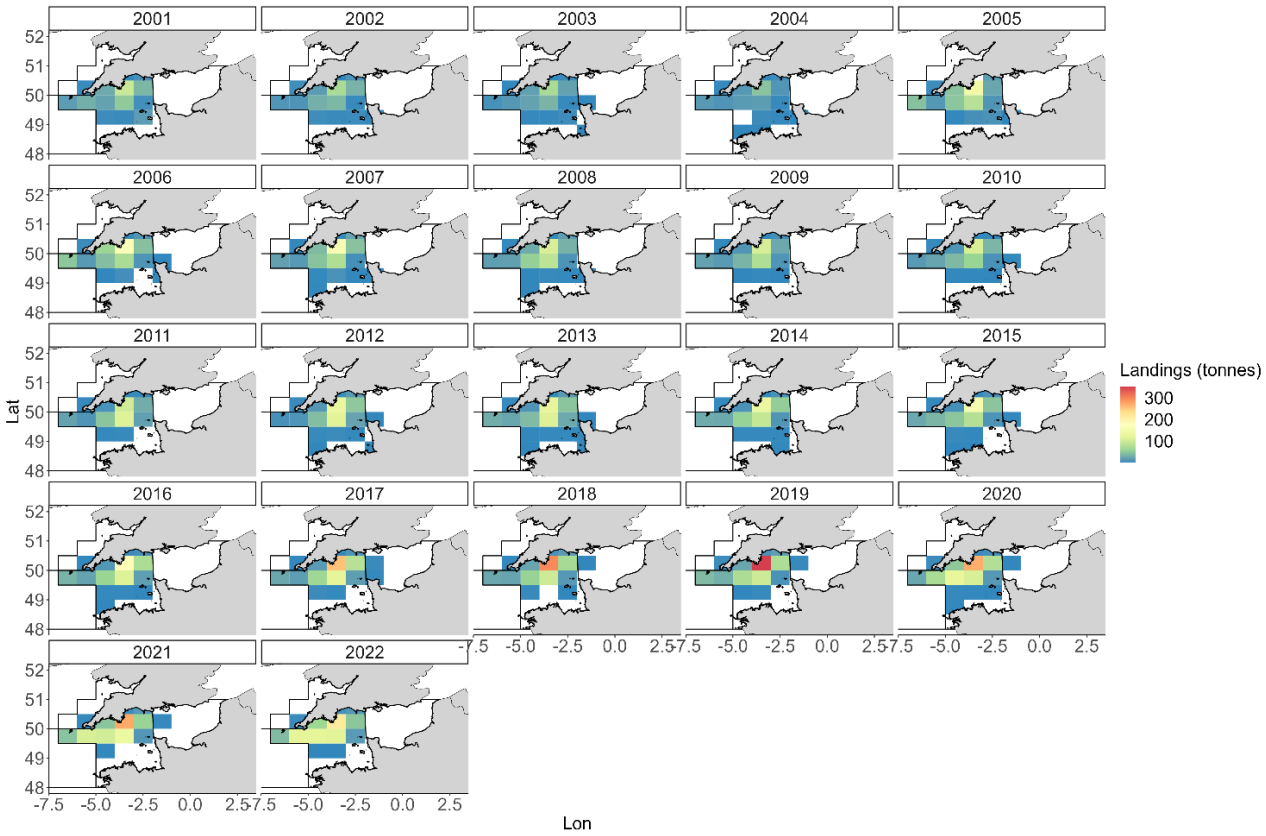

Figure 5: Beam trawls spatial distribution of landings in 7.e per year.

The main gear catching sole “in” Lyme bay are demersal otter trawlers, accountable for 45% of the sole catches or 37 tonnes in ICES rectangles 30E6 and 30E7 in 2022. They are only responsible for 7% of catches “out” of Lyme bay catching 62 tonnes in the wider 7.e area “in 2022. The landings from otter trawlers hugely increased “in” Lyme bay over the last two decades catching 10 times more in 2022 in comparison with the 3.4 tonnes they caught in 2015. Otter trawls is the gear that increased the most in Lyme bay. Also “out” of Lyme bay catches have been increasing steadily with 62 tonnes being caught in 2022, this is almost double in comparison with 2015. As with beam trawls, main catches come from rectangles 29E6, but also the adjacent inshore area 29E5 is involved especially during 2020 and 2021 (Figure 6). In Lyme bay catches from otter trawls are mainly from 30E6 rectangle and less from the 30E7 rectangle. Around half, the otter trawls are under 10m in and out of Lyme bay in 2022 (Figure 4). In Lyme bay this split was similar in 2015, so both under and over 10m contributed to the significant increase in landings. In the wider 7.e area under 10m vessel contributed less, 20% in 2015. In this area especially under 10s catch more nowadays while the amounts caught by over 10s stayed similar over the years.

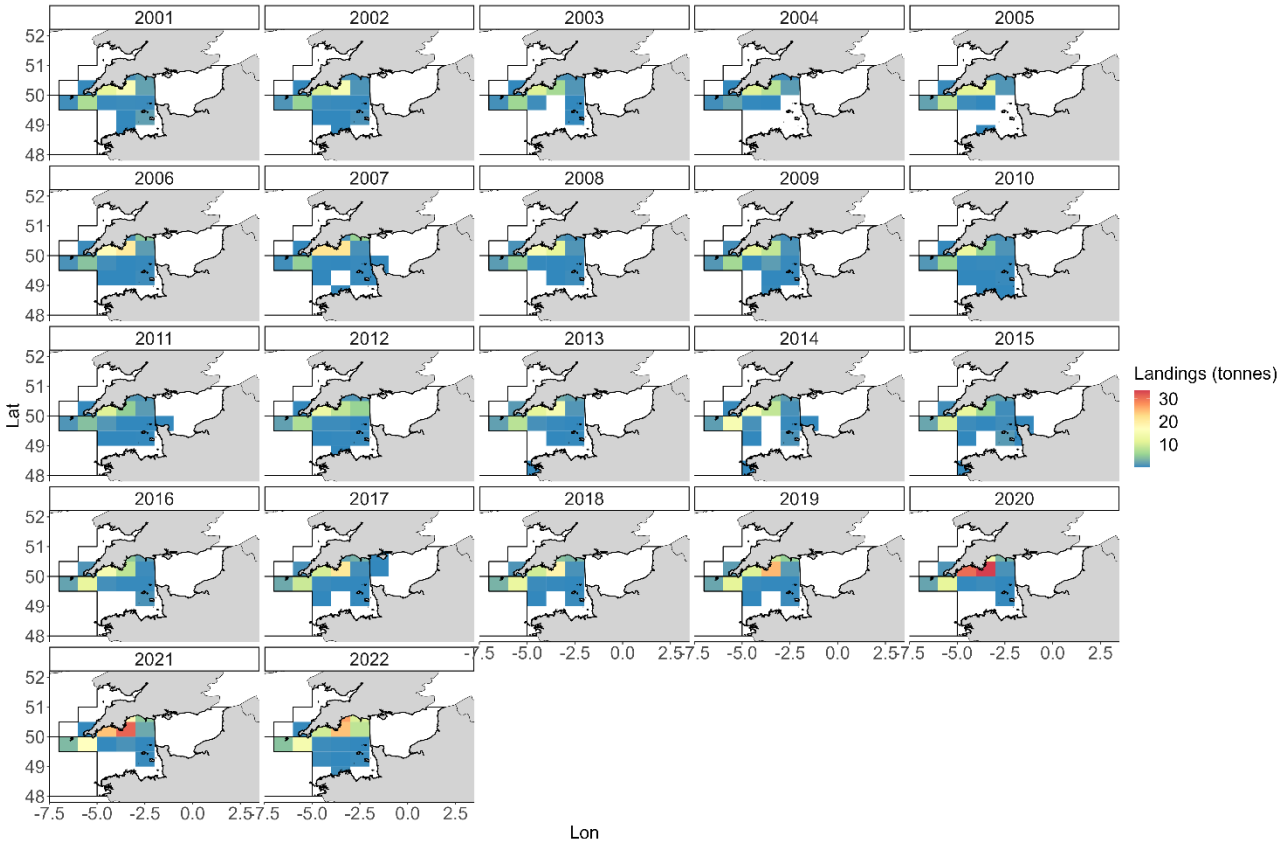

Figure 6: Demersal otter trawls spatial distribution landings in 7.e per year

Only in the last year have otter trawlers been responsible for most of the catches in Lyme bay. Previously Set nets were the main gears since 2016. Responsible for 32% of catches of sole, 26 tonnes, in Lyme bay in 2022 and 2.6% in the wider 7.e catching a similar amount, 24 tonnes in 2022. Landings tripled in Lyme bay and almost doubled (+75%) in the wider 7.e area since 2015. In contrast with otter trawls, landings from set nets in Lyme bay come from rectangle 30E7. Set nets out of Lyme bay are mainly active in the adjacent bay 29E5 rectangle, especially in 2020 (Figure 7). Set nets are mainly represented by under 10m vessels, above 90% for the last 8 years (Figure 4). Consequently, they are also the main vessels involved in the increase of catches.

Dredges only account for 1%, 1 tonne of catches in Lyme bay and for 9%, 84 tonnes out of Lyme bay. Still they are the second most important gear after beam trawls out of Lyme bay since 2 years. Their landings in this area increased with 67 tonnes, 5 times more than in 2015. Especially since 2018 dredges became more important. They are mainly active in rectangle 29E6, the same area as the beam trawls (Figure 8). These vessels are mainly over 10m (Figure 4).

Other gears such as pots and traps, hooks and lines and demersal seines catch less than 1% of the catches in and out of Lyme bay and are considered less important.

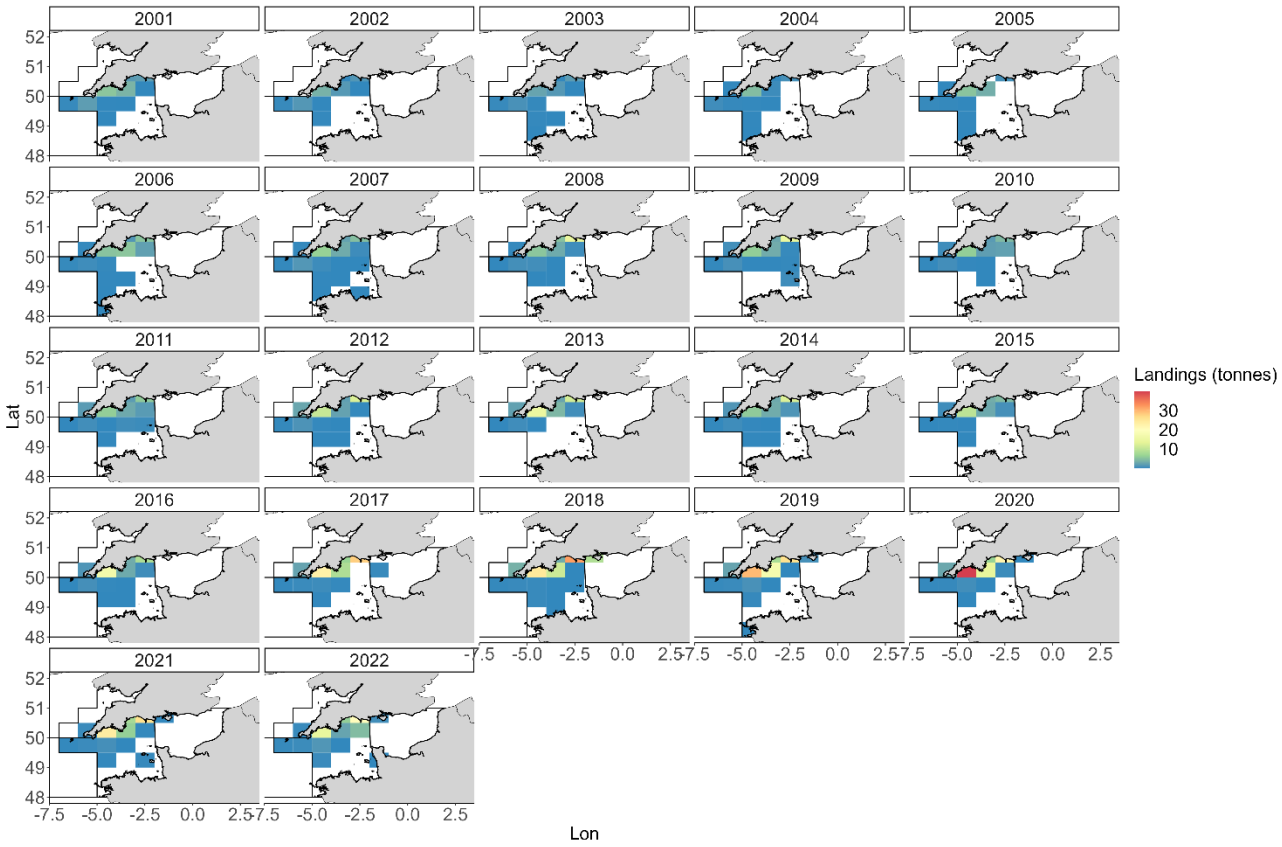

Figure 7: Set nets spatial distribution landings in 7.e per year

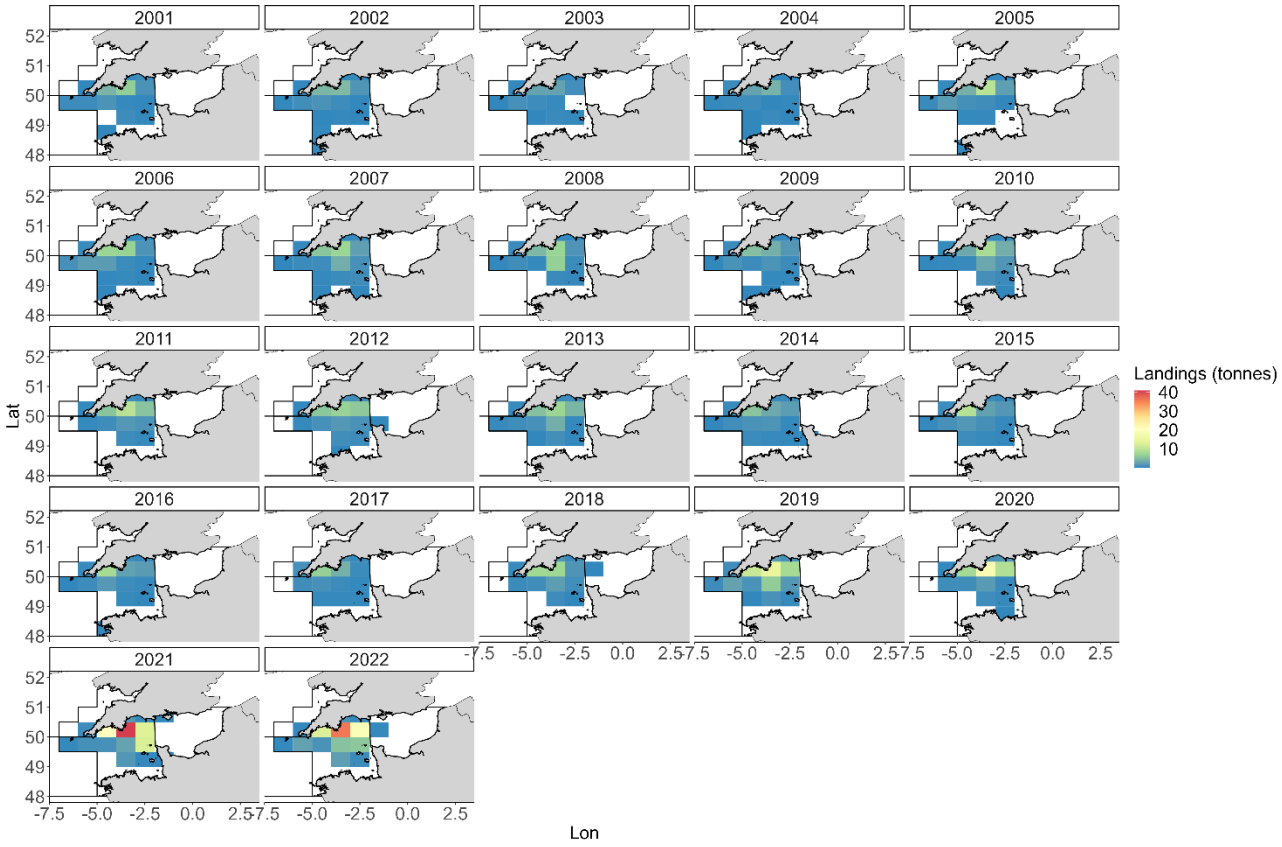

Figure 8: Dredges spatial distribution landings in 7.e per year

2.2.2. Reported landings by season

There seems to be a stronger seasonality for landings caught inside Lyme bay, with quarters 3 and 4, summer and autumn being the main seasons for almost all gears. In recent years there is also a significant proportion of the otter trawl catch inside lyme bay caught in spring, quarter 2. However, it is mainly quarter 3 and 4 that landings peak for all gears (Figure 9).

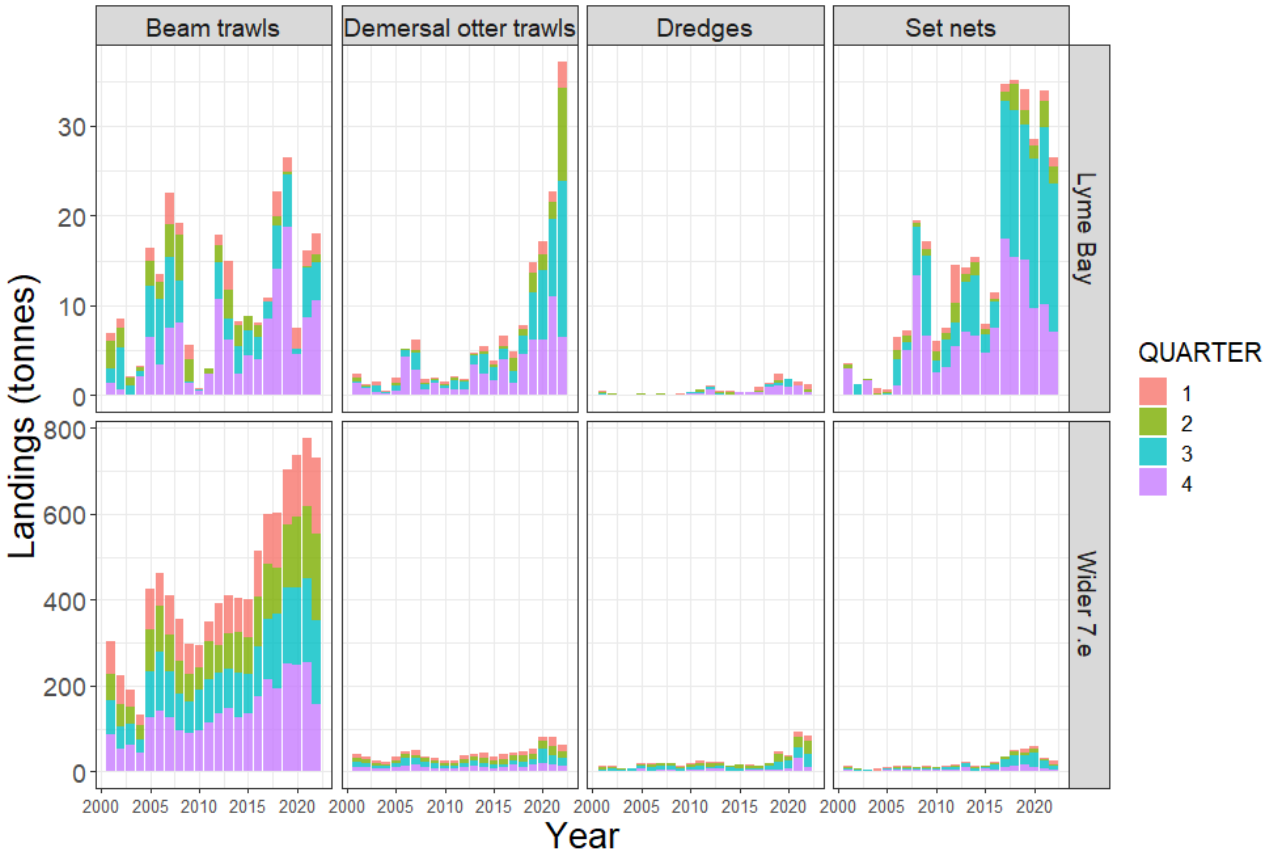

Figure 9: Seasonal patterns per metier in and outside of Lyme bay

2.3. Effort changes:

Although landings have doubled over the last 20 years the number of vessels stayed relatively stable “in Lyme bay” and even reduced in the wider 7.e area (Figure 10). Beam trawls catch most but are not the highest in number of vessels, Set nets, followed by otter trawls are. Effort expressed in days at sea in the wider 7.e area is relatively stable over the last 20 years and slightly reduced in the last 3 years (Figure 11). Effort of beam trawls increased over the years while effort of otter trawls and set nets in the wider 7.e area reduced. In Lyme bay there is an increase of effort since 2017 mainly caused by set nets, but also the effort from dredges increased significantly.

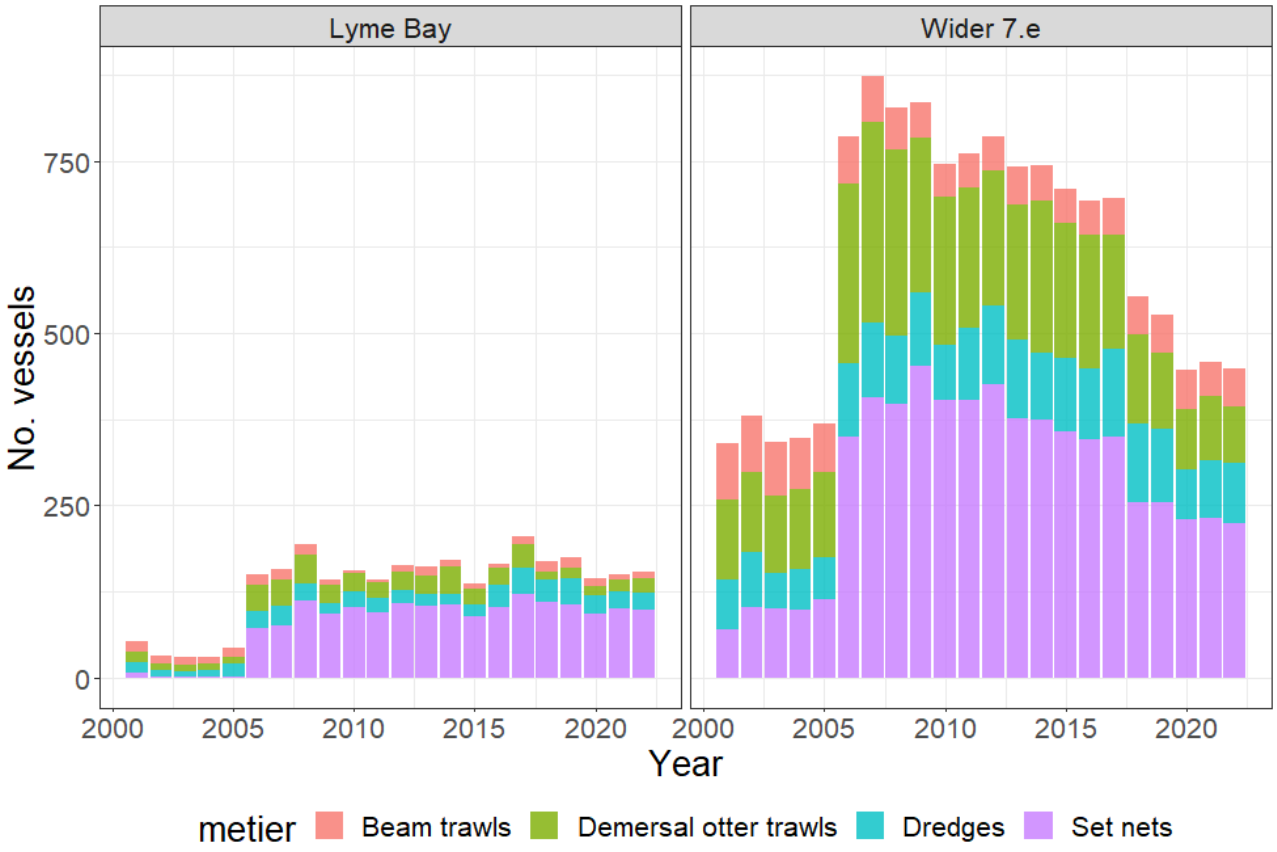

Figure 10: Number of vessels per gear in and out of Lyme bay

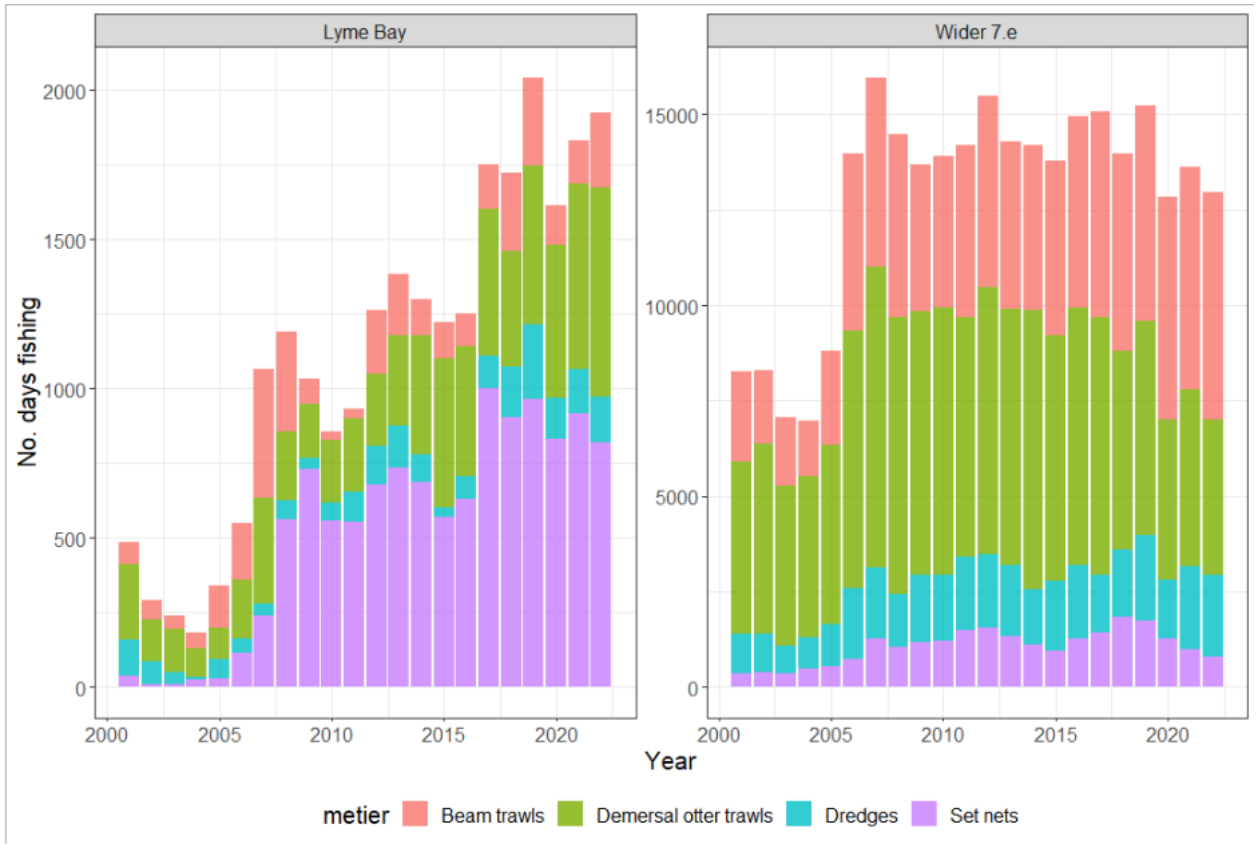

Figure 11: Days at Sea per gear in and out of Lyme bay

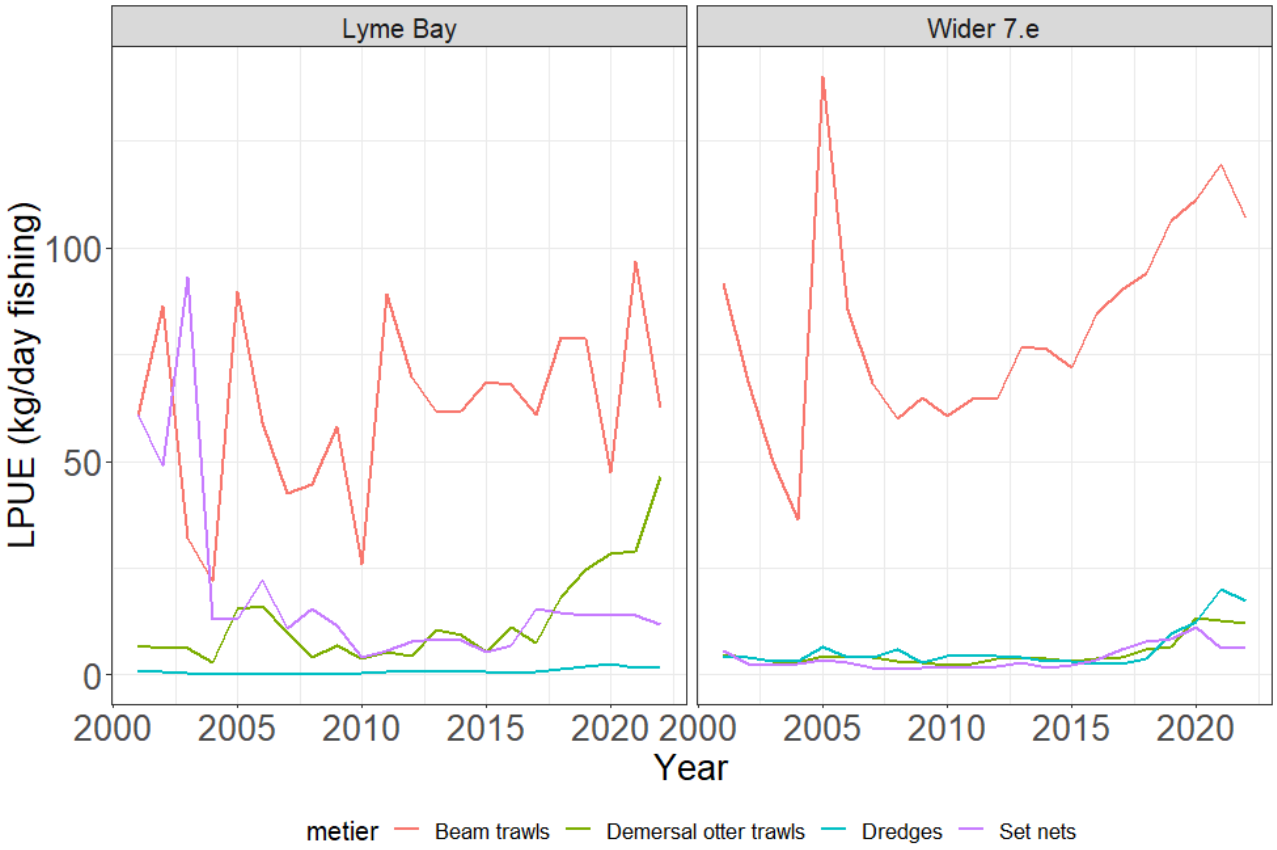

Figure 12: LPUE of sole per gear in and out of Lyme bay

Sole landings per unit effort (LPUE) is comparable between areas (Figure 12). Beam trawls seem most efficient in catching sole as well in Lyme bay as the wider 7.e area with the highest LPUE rates. The LPUE of beam trawls stayed same in Lyme bay but increased with 50% over the years outside of Lyme bay. Efficiency of dredges significantly increased over the last 2 years catching 5 times more in comparison with 2015 outside of Lyme bay. Inside Lyme bay mainly LPUE of otter trawls increased. Under 10s land 8 times more per day than what they used to in 2015 as well in and outside of Lyme bay. Over 10s can catch up to 8 times more per day inside and 2.3 times more outside of Lyme bay. Set nets seem relatively stable but in fact also land at least double per day fishing than what they used to in 2015.

3. : Onshore (market) sampling data

3.1. Introduction

Commercial catches are either sampled onshore at landing or selling sites, or offshore onboard fishing vessels (see Section 3). In combination, they aim to cover the different catch components, different parts of the species populations and provide complementary data.

The overall objective of the onshore catch sampling programme is to collect biological data for landings of all finfish and shellfish species landed into England for the provision of landings at age or length required for stock assessments. Biological data, collected as part of the market sampling programme, provides valuable information on the species and size ranges that are commercially landed. The onshore programme is an effective and efficient way of collecting biological data from the retained component of the catch, from multiple trips at relatively low cost. These data may be the only reference to the population structure removed by commercial fishing. However, the onshore programme is limited to some extent in that it does not capture all catch components (i.e., fish that are discarded at sea) and may also lack certain catch details, such as spatial and effort information, particularly from smaller (<10 m) vessels.

The data used for this analysis were collected in the ongoing Cefas market (onshore) sampling programme between 2012 and 2022. The length frequency distributions, indicating the size of fish that were landed for each fleet segment, are presented, as well as the change in the mean length of the catches.

3.2. Length distribution of landed common sole

In Lyme bay there is a decrease of mean length landed between 2012 and 2022 for demersal otter trawls and Nets (Figure 13). Length distributions in Lyme bay for set nets and otter trawls are rather variable (Figure 15 and 16). There is no or very limited data for length distributions of beam trawls and dredges in this area (Figure 17 and 18).

Outside of Lyme bay a decrease of mean length between 2012 and 2022 for beam trawls and otter trawls can be noted (Figure 14). Especially for beam trawls a shift with more small sole being landed can be observed since 2019 (Figure 17). For otter trawls the number of small sole also increased in 2020 and 2021, but this pattern is less obvious in 2022 (Figure 16). Mean length for dredges and set nets under 10m are rather similar over time. Set nets over 10m have an increased mean length. This trend is mainly driven by 2017 and 2021 data (Figure 15).

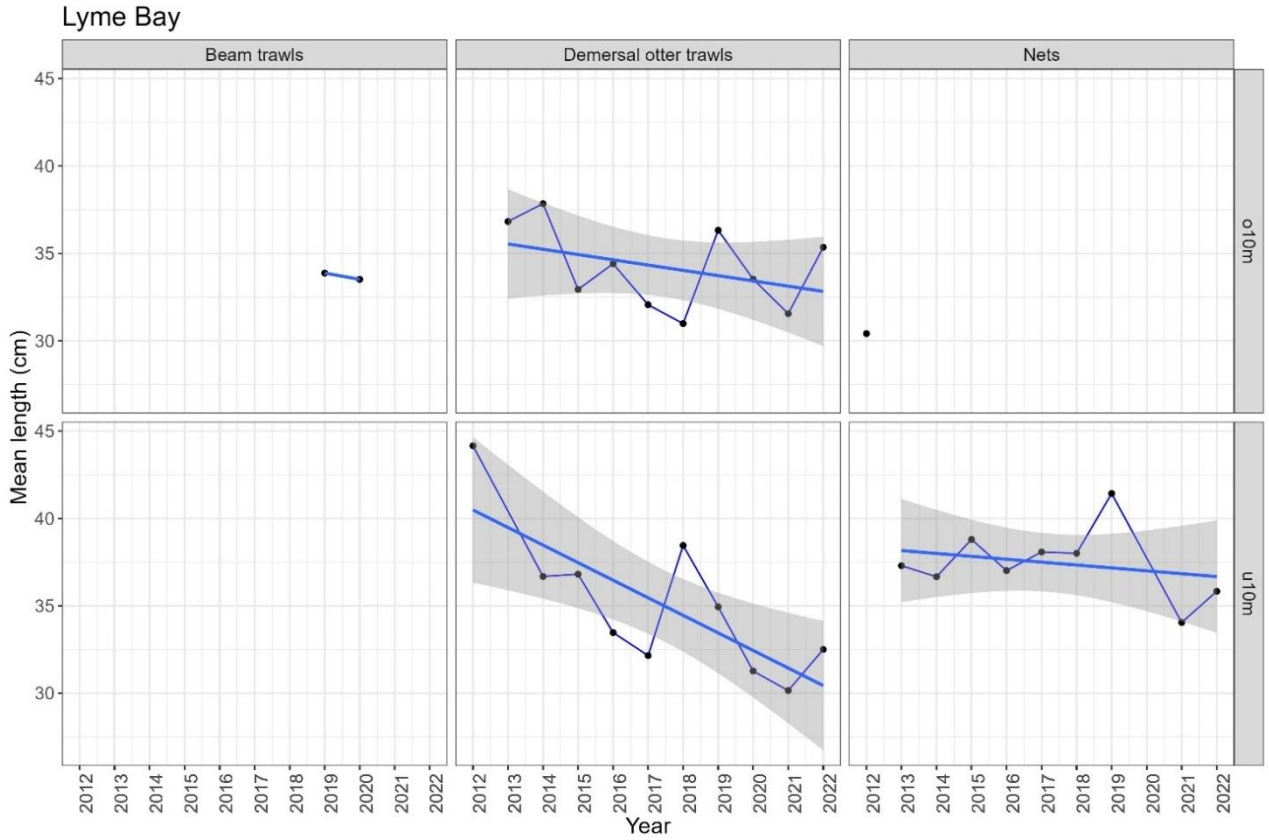

Figure 13: Mean length of landed sole per metier in Lyme bay

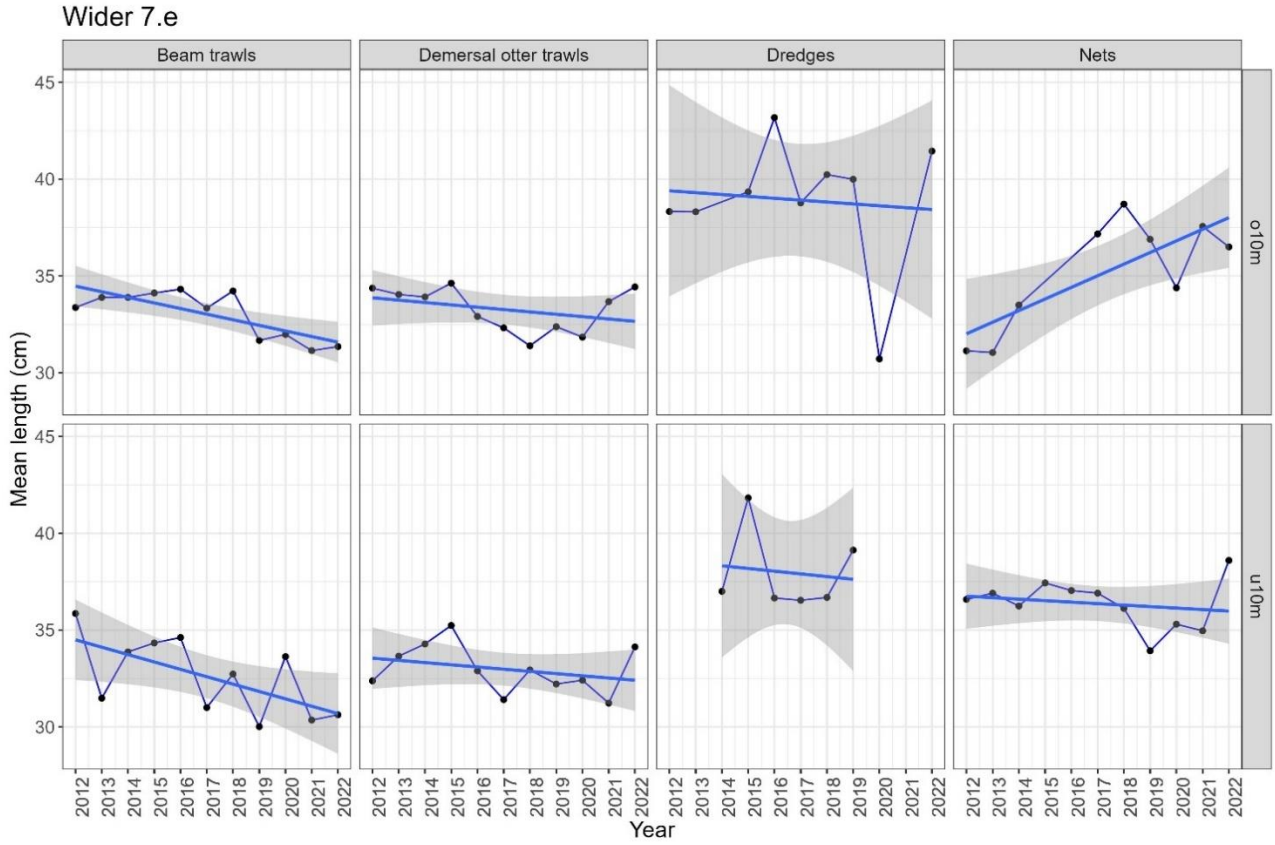

Figure 14: Mean length of landed sole per metier in wider area 7.e

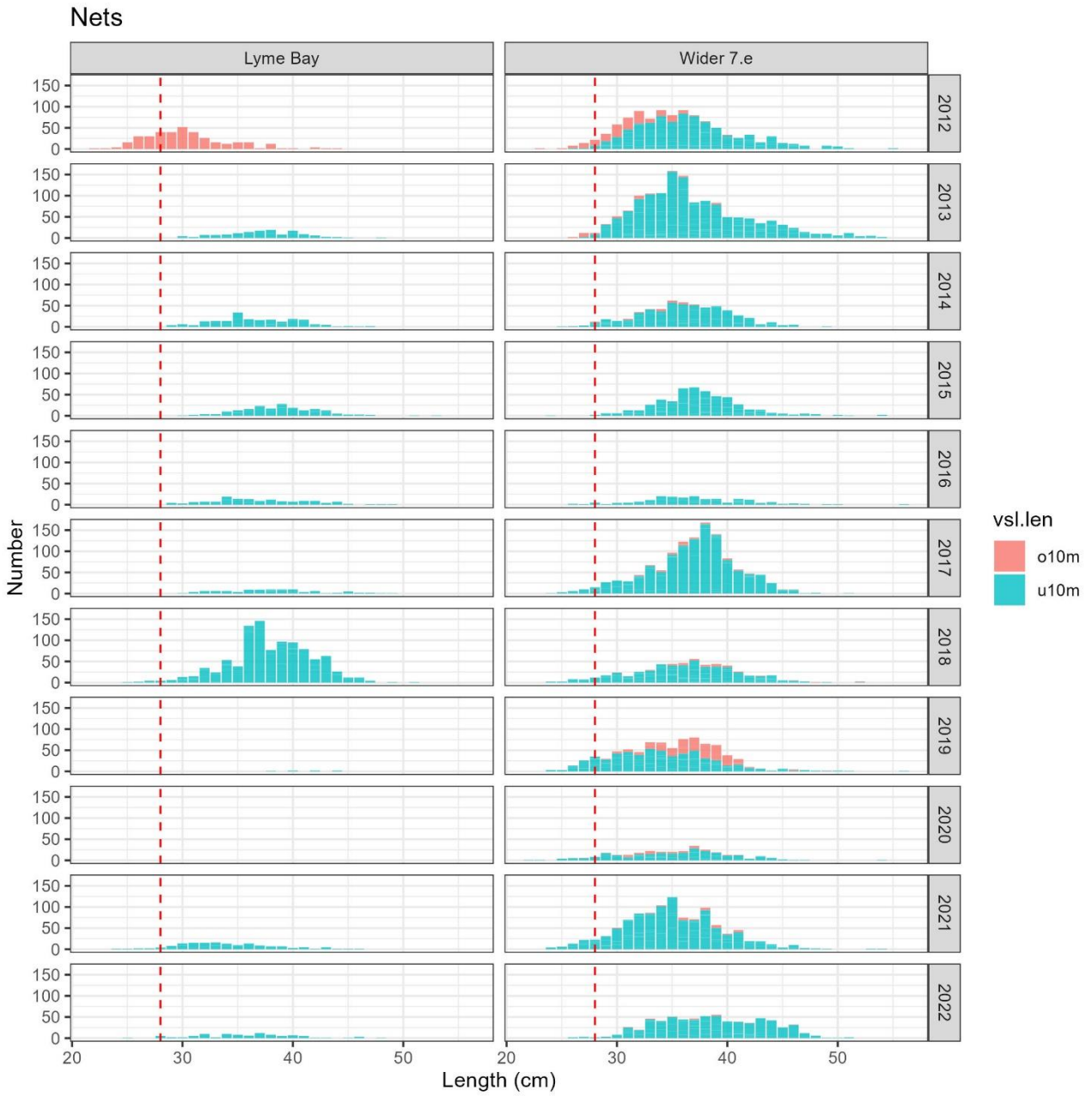

Figure 15: Length distribution Set nets (red line = Length at which 50% of the population are mature - L_{50})

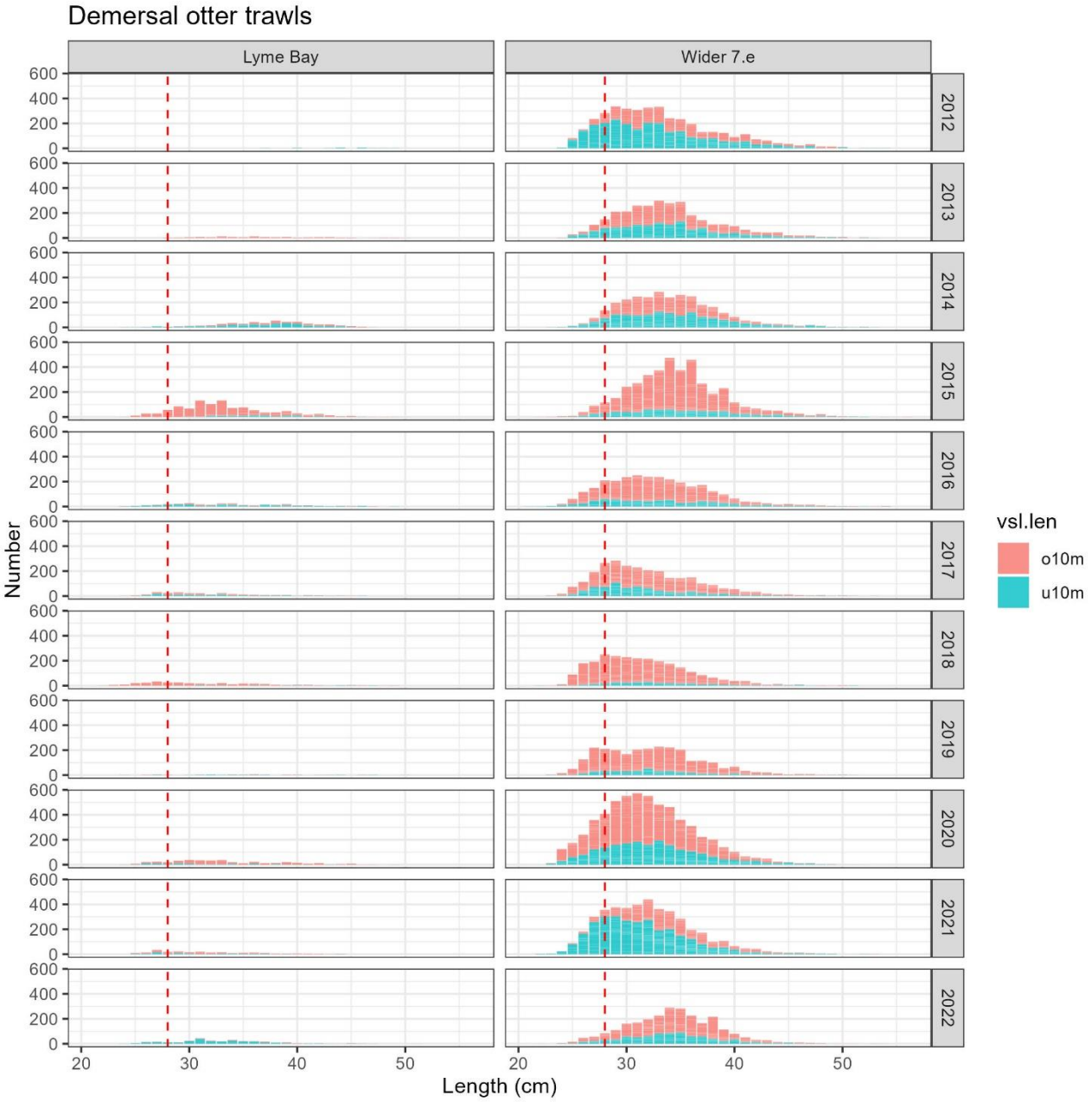

Figure 16: Length distribution demersal otter trawls (red line = Length at which 50% of the population are mature - L_{50})

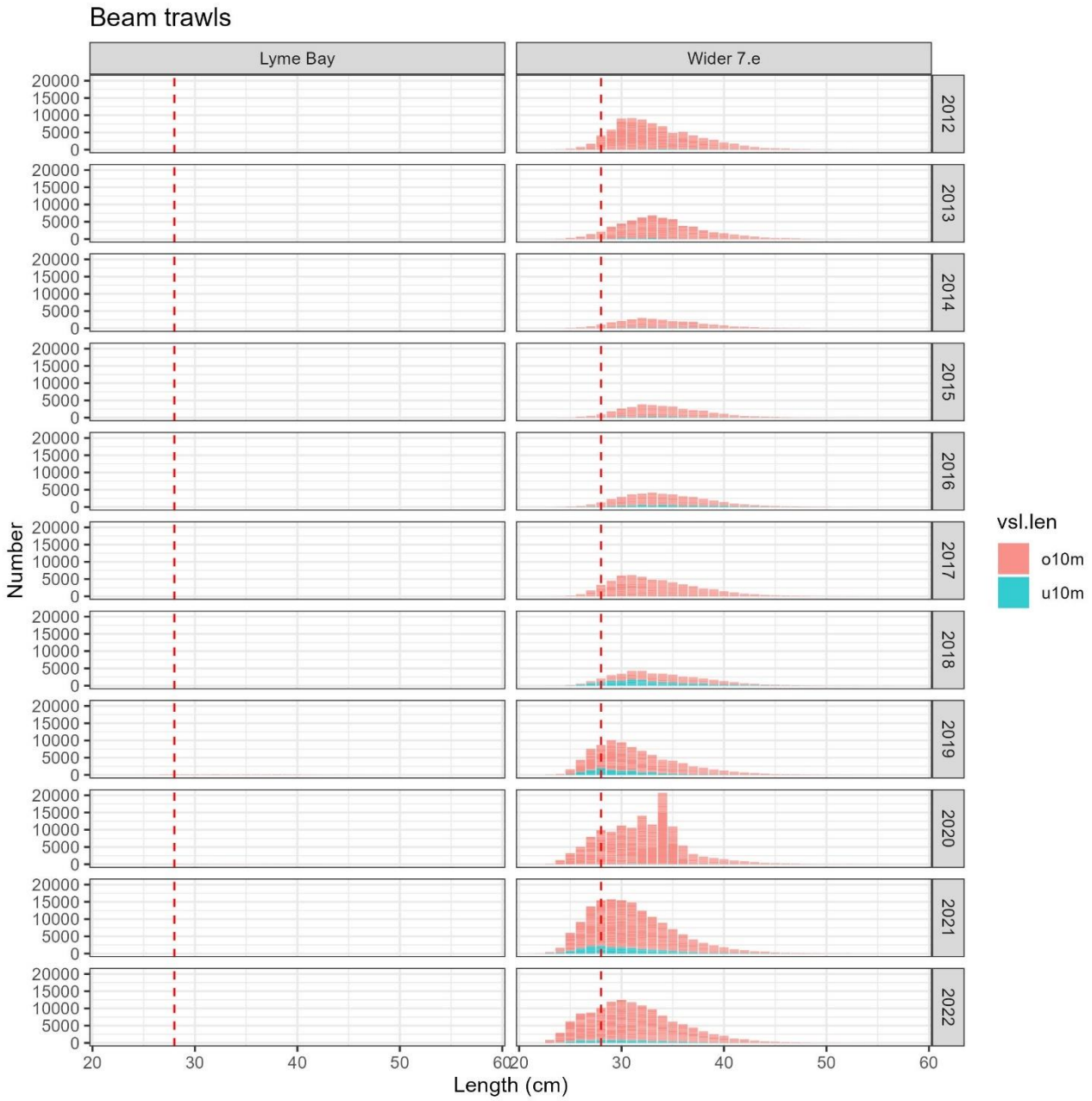

Figure 17: Length distribution beam trawls (red line = Length at which 50% of the population are mature - L_{50})

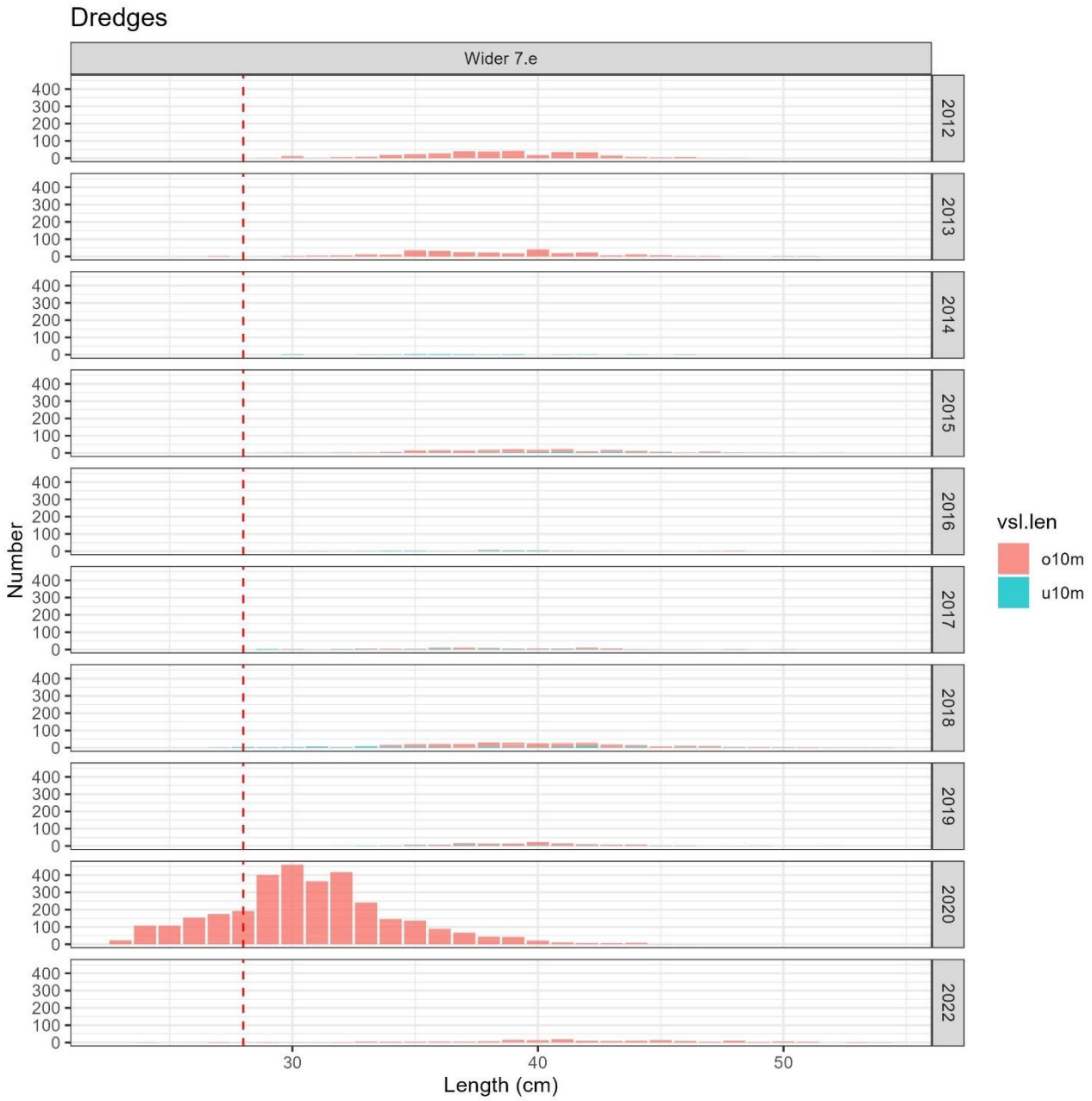

Figure 18: Length distribution dredges (red line = Length at which 50% of the population are mature - L_{50})

3.3. Sampling effort market data:

The number of samples taken in Lyme bay is very low for otter trawls and nets. Dredges and beam trawls are often not sampled in Lyme bay (Figure 19). Outside Lyme bay, beam trawls have better sampling coverage, they are also the most abundant gear in the area according to the landings data.

Sampling effort for under and over 10m vessels is matching the figures in the landings data. On average 83% (between 66% and 100%) of netters sampled are under 10m outside of Lyme bay over the years 2012-2022. In Lyme Bay sample numbers are low and all vessels are below 10m. For demersal otter trawls, between 38% and 54% of sampled vessels are under 10m in the wider area 7.e over the time period. In Lyme Bay sample numbers are low and between 25 and 100% are under 10m vessel otter trawls. Beam trawls under 10m are not often sampled, only 6% of the samples per year on average in the wider 7.e area, as most beam trawls are over 10m according to the landings data. Dredges have low sample numbers and between 22 and 100% are below 10m in the wider 7.e area. For the latter the sampling of the under 10s seems overrepresented as most dredges are over 10m according to the landings data.

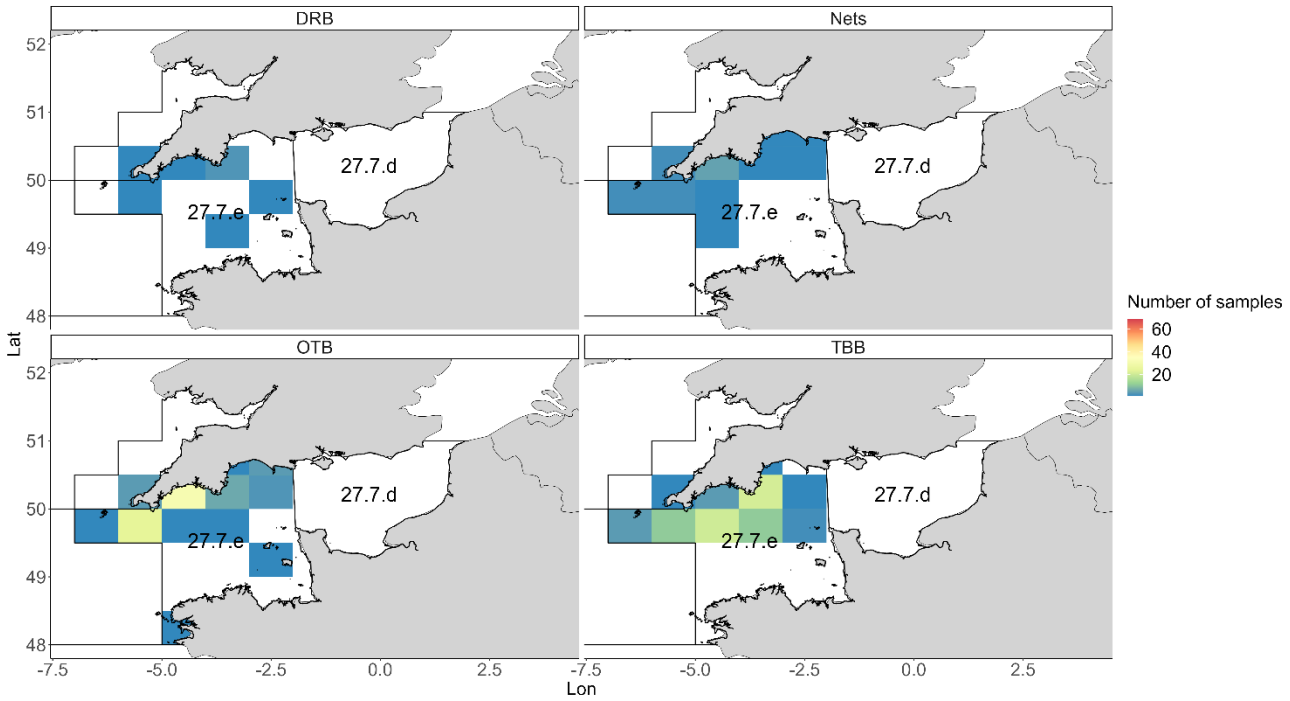

Figure 19: Sampling effort from 2012 till 2022 per gear.

4. At-sea observer data

4.1. Introduction

The current English at-sea observer programme (Cefas' Observer Programme) was implemented in 2002 to collect information on the quantities, length distributions and, where relevant, associated biological data, for the discarded and retained portions of commercial catches. It is currently the only source of data which allows full estimates of total removals by commercial fishing for assessed stocks and non-quota species.

The programme is designed to sample fishing vessels, using a random stratified selection of fishing trips from vessels that are statistically representative of the English fishing fleets. Vessels are selected for sampling using a randomly ordered list which is generated each quarter. The allocation of sampling effort to fleets is stratified in proportion to the effort, estimated discards and number of vessels operating during the same quarter of the previous year.

The offshore observer programme complements the onshore fishery dependent sampling in that it provides more comprehensive spatial information due to the observer collecting finer resolution effort data in relation to the catches sampled (e.g., including the recording of the commercial species that are landed and the unmarketable catch components[2] that are discarded). Due to the high costs associated with this method of sampling, less than 0.5 % of the English fishery effort is sampled under the current offshore observer programme (Lambert *et al*., 2019). These figures exclude vessels <7 m, dredgers (other than scallop), potters and pelagic vessels.

4.2. Data preparation and analysis

The data used for this analysis were collected in the ongoing Cefas observer (off-shore) programme between 2012 and 2022.

The off-shore programme is randomly stratified by region (landing port location i.e., northeast, east, northwest, south), predominant fishing gear (nets, lines, scallop dredges, beam trawls, otter trawls) and vessel length (7–10m, ≥10m). Within each stratum vessels were selected randomly using a vessel draw list that corresponds to each stratum.

For each stratum, a target number of trips is defined quarterly. The sampling effort allocation to each stratum, is based on a number of information sources from the previous year of

[2] Discarded fish may include non-commercial species, those species designated as not to be landed, individuals that are below the minimum conservation reference size, and individuals outside the catch limits available to the vessel (e.g. in relation to quota).

fishing and is distributed in a statistically sound manner. Information on catch (landings and discards) and effort (number and length of fishing trips and number of vessels) are used as equal weights to split the number of sampling days between strata. The current stratification of the observer programme includes several fleets and fisheries within a stratum that are highly variable in terms of gear, mesh size, trip duration, and catch composition.

The catch sampling scheme on each trip is a multi-stage process in which discards are recorded for the haul or estimated from a fraction of a haul, and typically >60% of the hauls are sampled during a trip. In each sampled haul, all the species are sampled; length measurements are recorded for all fish, commercial crustaceans and cephalopod species. When it is not possible to sample the whole haul catch, the observer estimates the volume measured relative to the total catch to generate a raising factor that is used to estimate the total catch of the haul. For each sampled haul, the following information is collected: gear type and mesh size, tow duration, shot and haul position, species catch composition and the different catch components, namely (i) landings, for the fraction that is landed, (ii) discards, for the fraction that is returned back to sea, (iii) landings that are below minimum size (BMS), the fraction below minimum conservation size and (iv) landings that are used to supply bait (e.g., for pot fisheries).

For each observer-sampled trip, numbers-at-length of fish landed and discarded were raised to the haul, based on an estimated proportion of the total catch volume sampled, then to the trip, based on the proportion of sampled hauls and fished hauls. The length data were converted to biomass, using length-weight relationships. Trips were aggregated by fleet (using the same definition used for the landings data), ICES rectangle and quarter.

The mean total weight (kg) and mean number of fish per trip were calculated for common sole for each area: Lyme bay and Wider 7.e and fleet segment. To calculate the mean weight and number per haul for each area and fleet segment, zero catches were included in the calculation. Mean discard rates by species-gear combination are presented for year, where data are available. This indicates whether the proportion of the catch discarded changed over the period. Finally, the length frequency distributions of the catches for each fleet segment, are presented, as well as the change in the mean length of the catches.

4.3. Change in discard patterns

Discard rates across gears for sole are low, less than 1% discard rate (DR), in both areas (Figure 20). Some spikes in the data can be found with the highest rate up to 8% from dredges in the wider 7.e area. In Lyme bay the highest discard rate comes from otter trawls. Up to 6% of sole was discarded in 2015 by otter trawls and 3% DR can be observed for the years 2018 and 2019. There is no evidence of change in discard patterns in both areas.

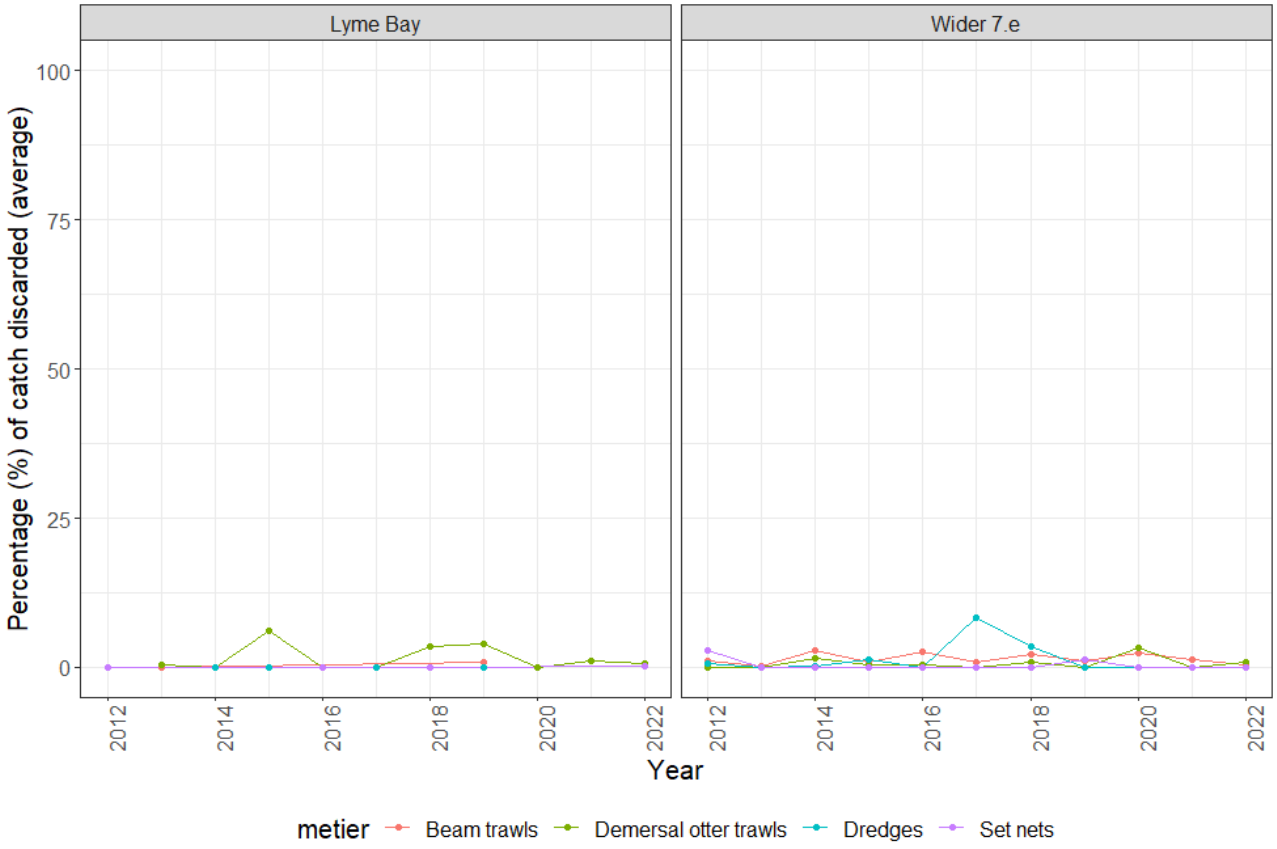

Figure 20: Percentage of sole catch being discarded in and out of Lyme bay

4.4. Length distribution of discarded and landed common sole

In contrast with the market sampling, there is no evidence for a change in mean length of common sole in both areas, across gears (Figure 21 and 22).

The mean length for beam trawls is 31cm in Lyme bay and 33cm in the wider 7.e area. There is no evidence of a change in length composition. The drop in beam trawl mean length outside of Lyme bay can be attributed to no length data from the retained component being recorded due to covid restrictions in 2021 (Figure 22). Most samples are from the over 10m vessels and from outside Lyme bay. There is very limited sampling inside the Bay. 77% of fish sampled was bigger than the 28cm length where 50% of the fish reached maturity (L50) (Figure 23).

Mean length for set nets is 37cm in both areas (Figure 21 and 22). There is no evidence of a change in length composition. Most samples are from the under 10m fleet and from the wider area 7.e. 99% of fish sampled was bigger than the L50 length of 28cm (Figure 24).

Mean length of sole caught by otter trawls is 33cm in both areas (Figure 21 and 22). Otter trawls have better sampling coverage, but sampling is less inside Lyme bay. Approximately 88% of the sampled sole are bigger than 28cm, the length at which 50% of fish reached maturity (Figure 25).

The length distributions for the three main gears did not show any obvious changes between the time series 2012-2022 (Figure 23-25). The length distribution in 2021 should not be considered as due to COVID restrictions the offshore programme did not run as normal and the data collected during that period was limited – only length data was collected for the discards component for the beam trawlers and for the other gears the data was considerably limited in comparison with previous years.

4.5. Sampling effort

There is low sampling effort for beam trawls in Lyme bay with only 3 data points in the last 10 years. There is a reduced number of trips sampled inside Lyme Bay in general, like beam trawls also nets were not sampled every year in this area. Otter trawls have better sampling coverage in Lyme bay for the observer database.

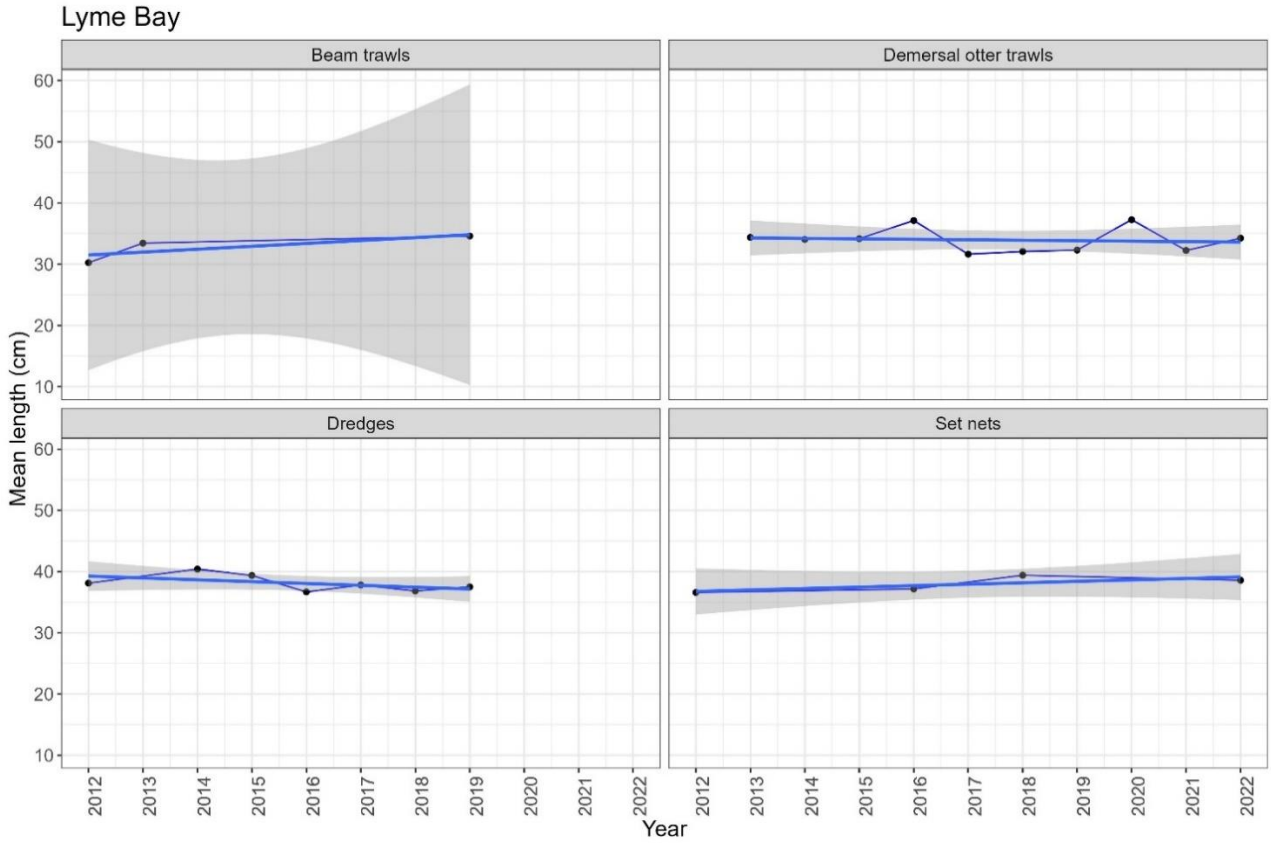

Figure 21: mean length of sole catches across gears in Lyme bay

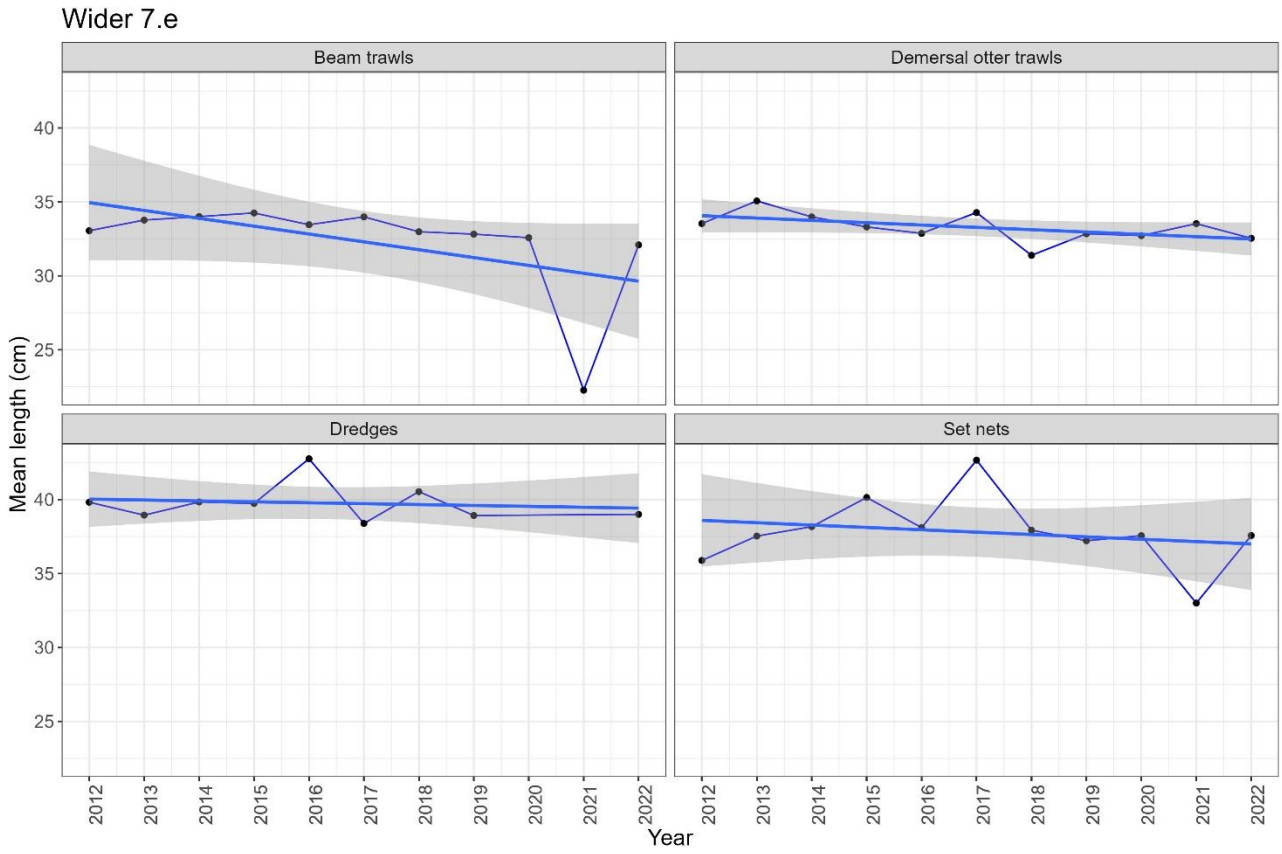

Figure 22: mean length of sole catches across gears out of Lyme bay in the wider 7.e area.

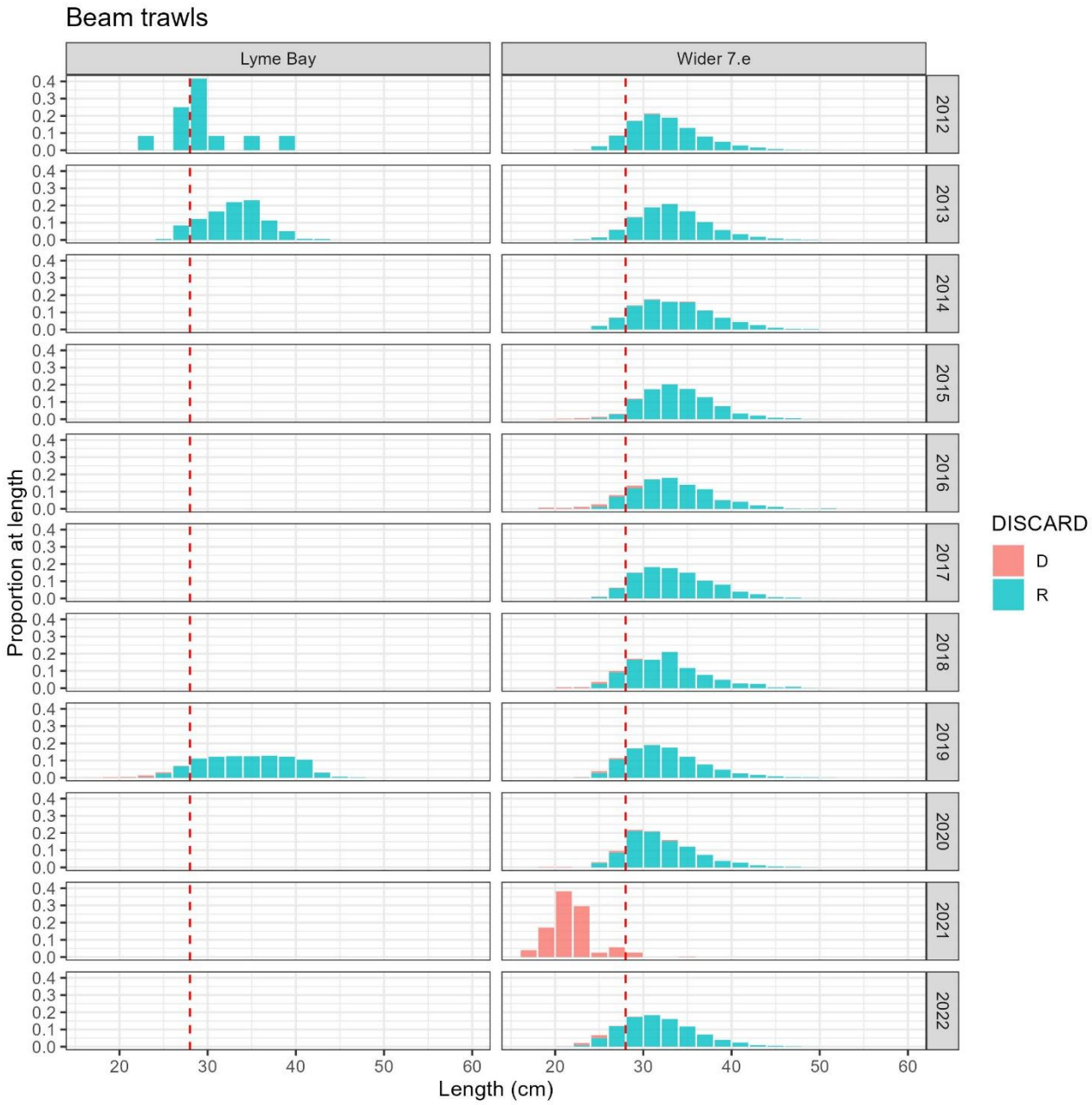

Figure 23: Length distribution beam trawls (red line = for retained (R) and discarded (D) common sole (red line = Length at which 50% of the population are mature - L_{50})

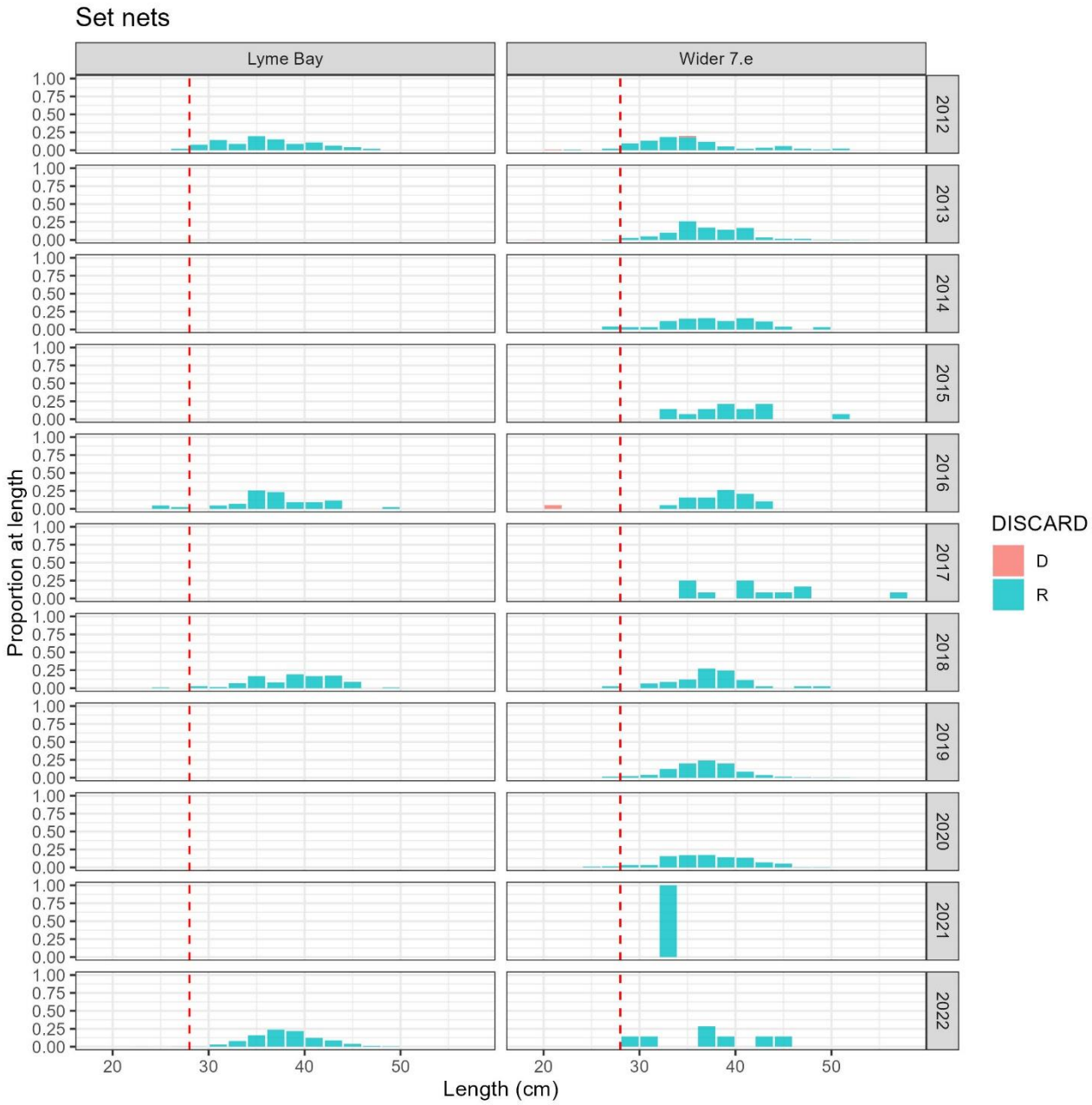

Figure 24: Length distribution Nets (red line = for retained (R) and discarded (D) common sole (red line = Length at which 50% of the population are mature - L_{50})

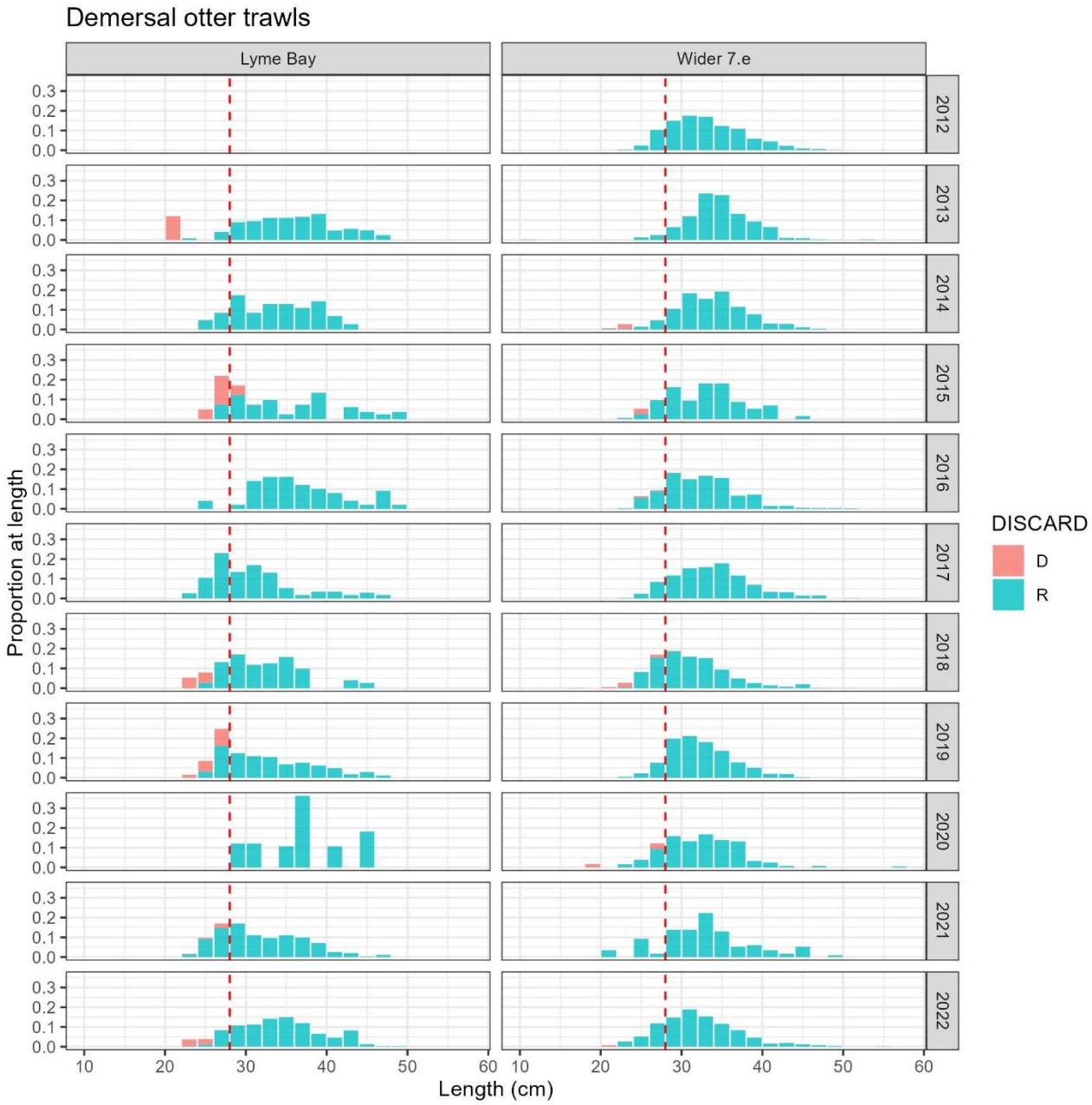

Figure 25: Length distribution otter trawls (red line = for retained (R) and discarded (D) common sole (red line = Length at which 50% of the population are mature - L_{50})

5. Summary

- In general there is a significant increase of sole 7.e landings (+50%) since 2015, mainly by beam trawls
- In Lyme bay an increase in sole landings mainly from nets and demersal otter trawls, can be observed since 2015. But also beam trawls and dredges increased to a lesser extent.
- An increase of effort (fishing days) in particular from set nets and to a lesser extend for demersal otter trawls and dredges in Lyme bay since 2015 is noted.
- An increase in LPUE since 2015, mainly for demersal otter trawls inside Lyme bay is also illustrated.
- Outside of Lyme Bay landings doubled since 2015 and this is mainly caused by beam trawls. Also dredges and to a lesser extend otter trawls and set nets increased landings since 2015.
- The effort (fishing days) outside of Lyme bay only increased for beam trawls, but decreased for otter trawls, Set nets and dredges.
- The LPUE of sole outside of Lyme bay for beam trawls and dredges increased
- This could indicate that gears became or more efficient or it could be the case that catch rates are up because biomass increased. It is impossible to distinguish between these two dynamics in the current study.
- The increases in effort and LPUE might be linked to increases in quota that also doubled since 2015.
- Onshore and Offshore sampling data derived mainly from Wider 7.e. There is limited sampling within Lyme bay
- No evidence of significant changes in length composition for the onshore sampling. Exception from demersal trawls and beam trawls with increase of smaller sole being landed since 2019, from the wider 7.e area.
- Evidence of decrease of mean length for otter trawls, in both areas based on market sampling. Decrease in mean length for beam trawls out of Lyme bay.
- Sole discard rates are low ~ 1% across gears
- No evidence of change in the length composition of catches across gears in both areas based on observer data

- No evidence of change in the mean length (2012 – 2022) based on observer data.
- The Western Channel Sole and Plaice fisheries independent Survey showed higher sole catches around The Wolf Rock (South Lizard peninsula), which matches with the highest catches observed in the Off-shore programme. The survey results also showed that over the time-series the numbers caught have been relatively stable, and although there was a slight decline in numbers in 2021 compared to 2020, catches were around the mean of the time-series.
- The commercial data, survey data and ICES advice show no major changes in the abundance of the stock nor the stock structure (length), in 7.e.

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