forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Agulhas sole

Abundance estimates within the sole grounds

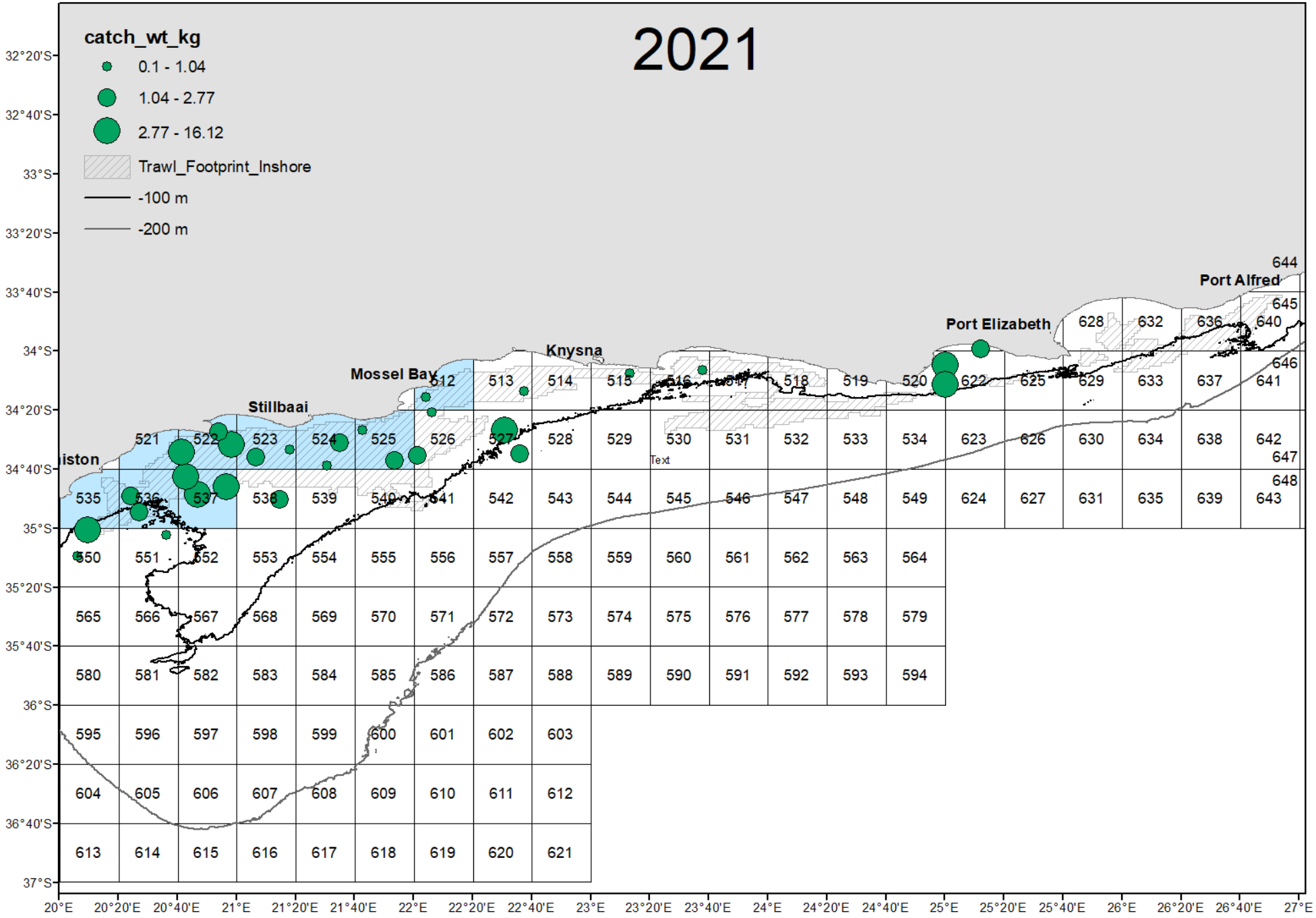
Survey length frequency by strata

Commercial CPUE and CAL

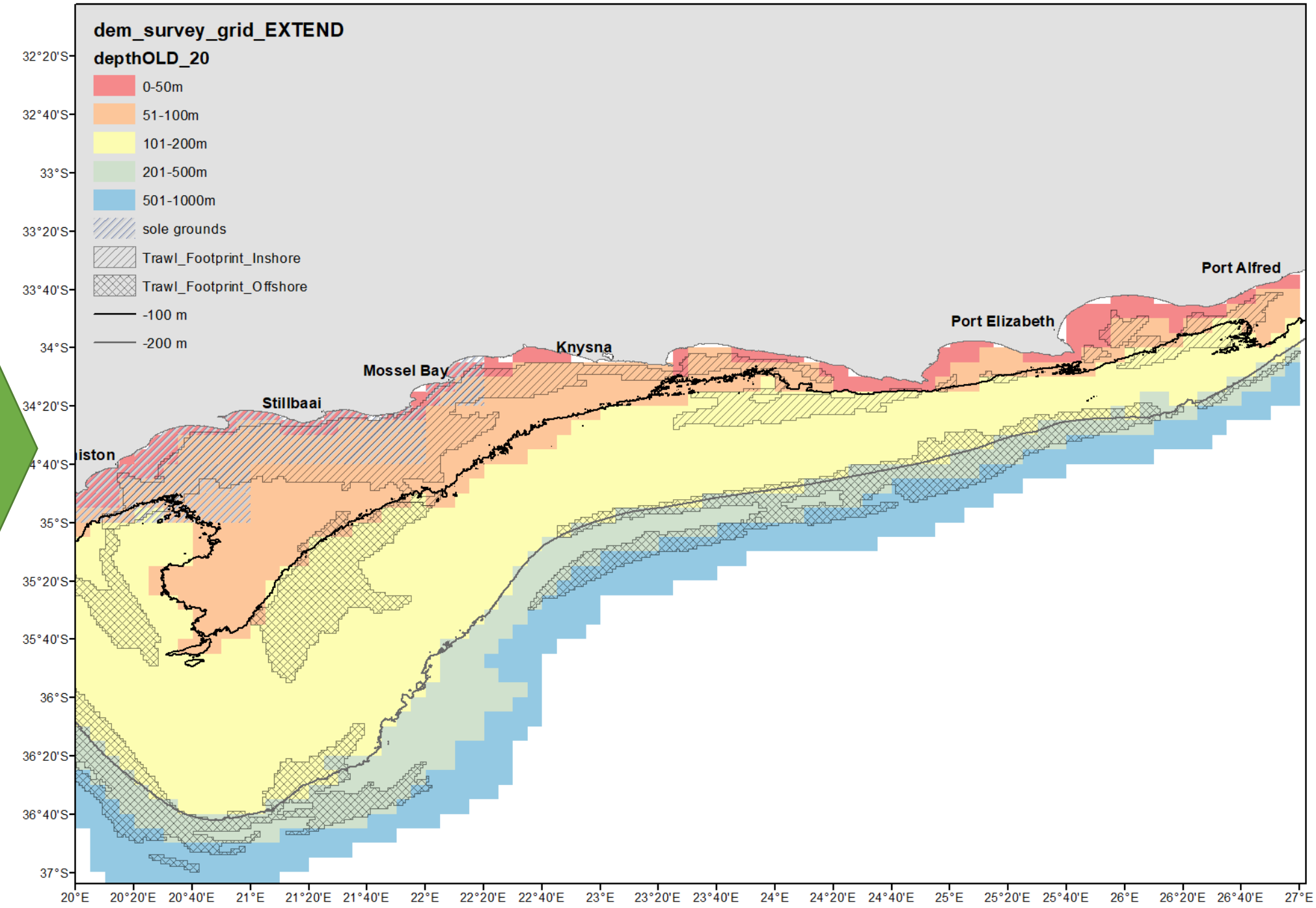
Updated graph for model fit

Tracey P Fairweather

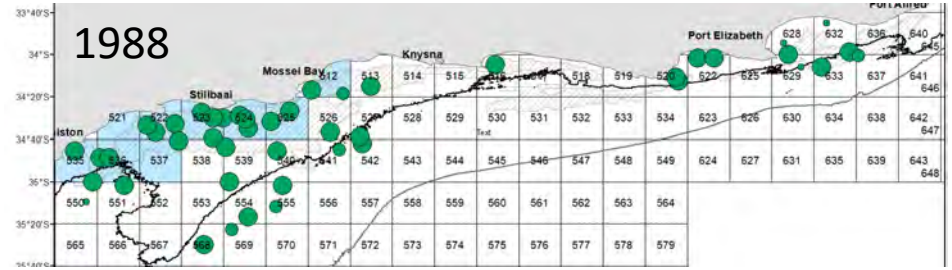
Survey catch compared to sole grounds

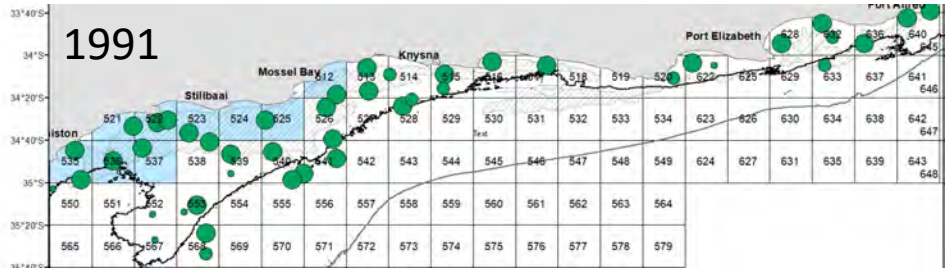


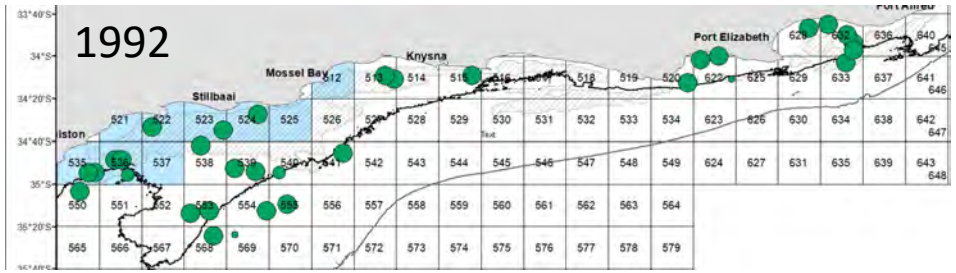
Survey design & fishing grounds

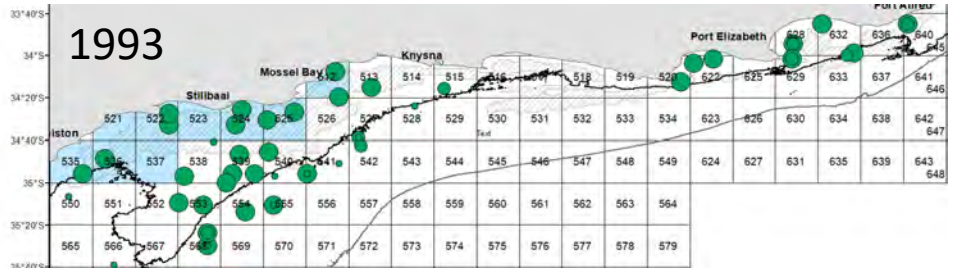


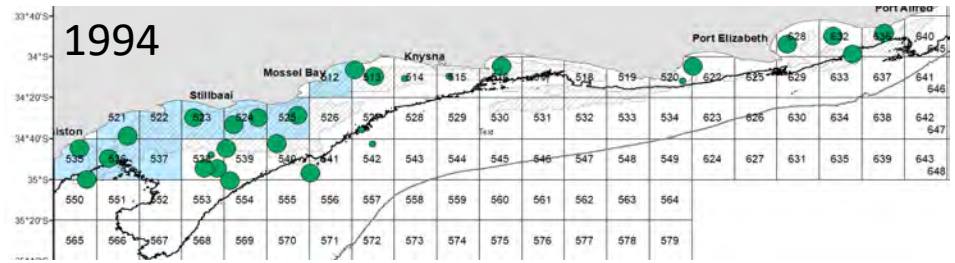
Autumn surveys 1988 to 2002

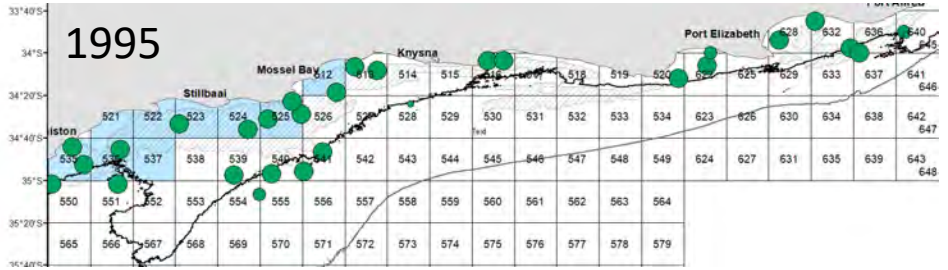


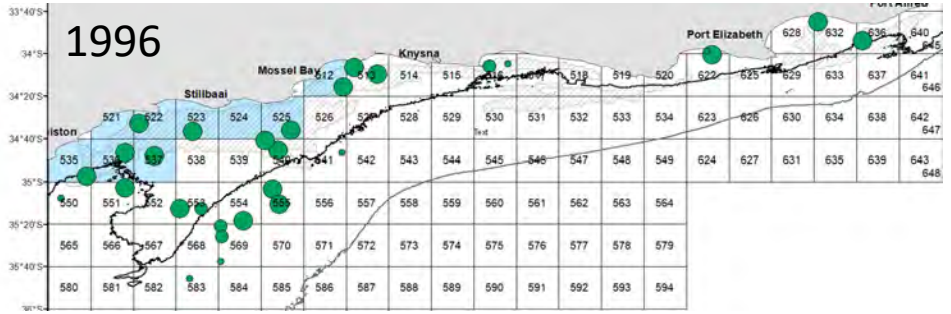


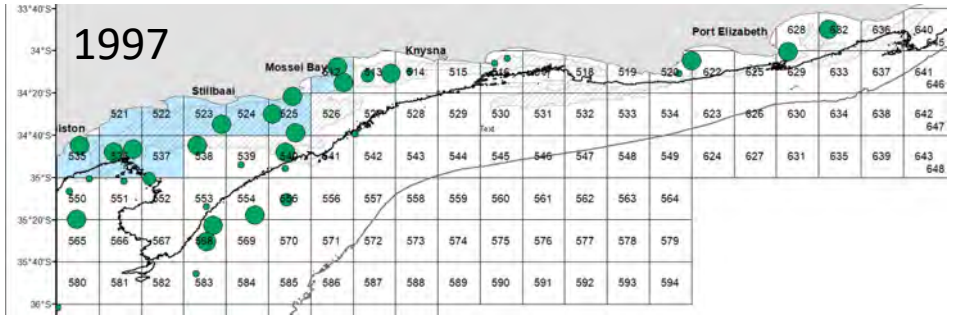


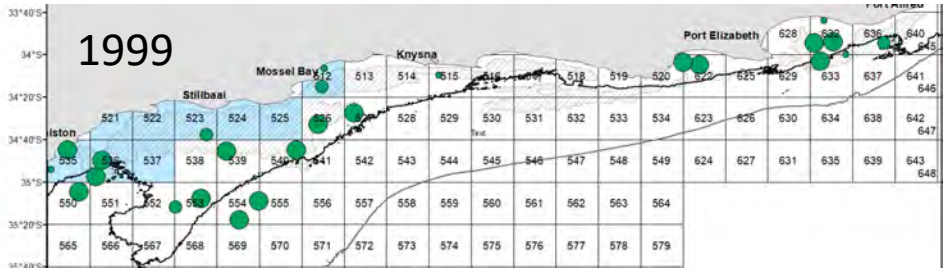




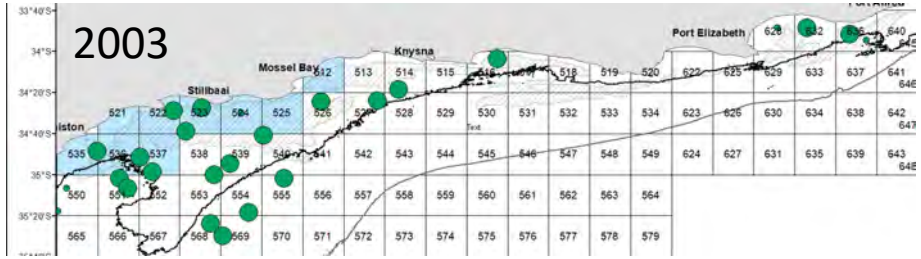


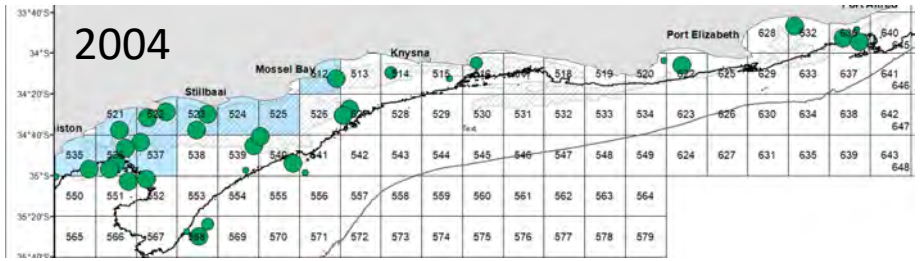


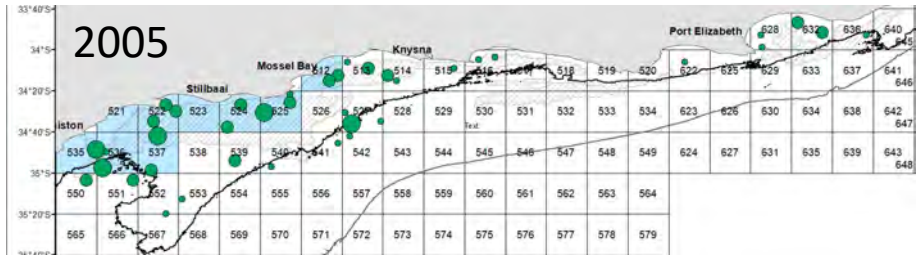


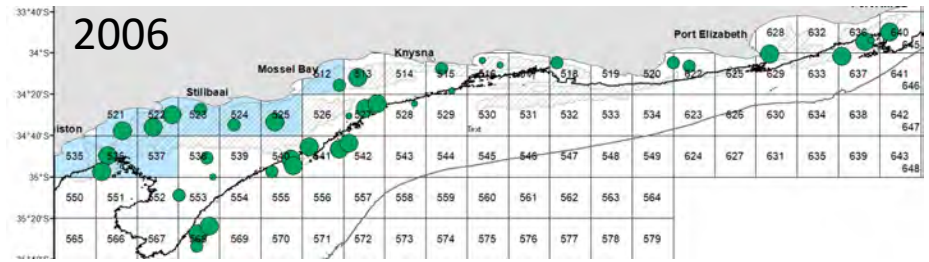


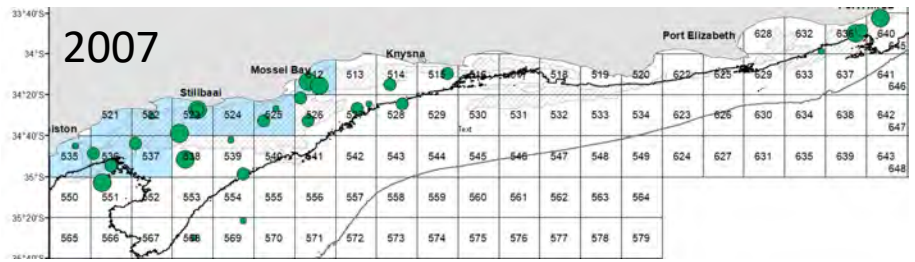
Autumn surveys 2003 to 2014

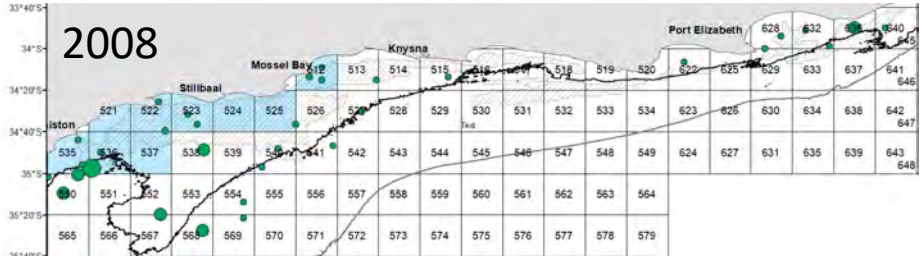


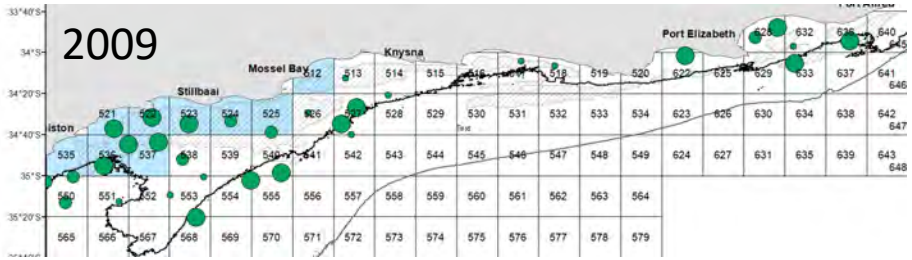


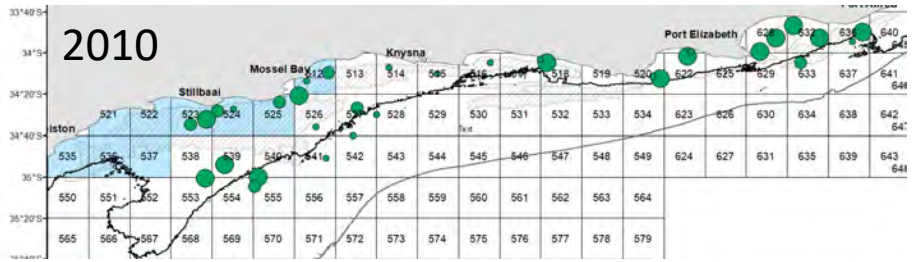


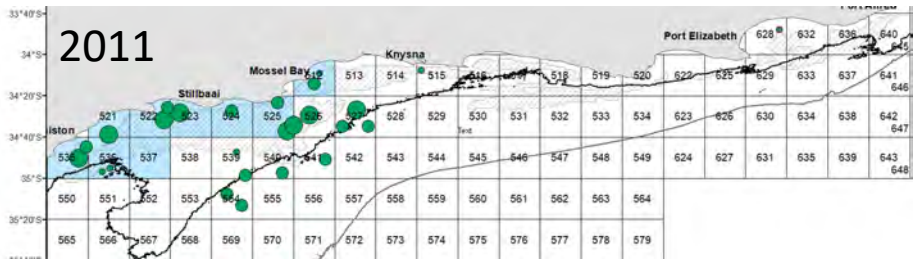


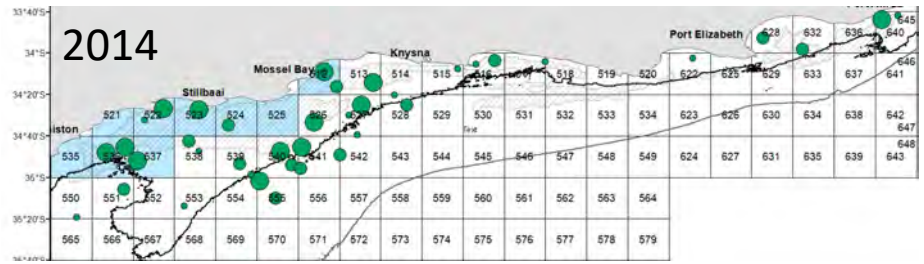




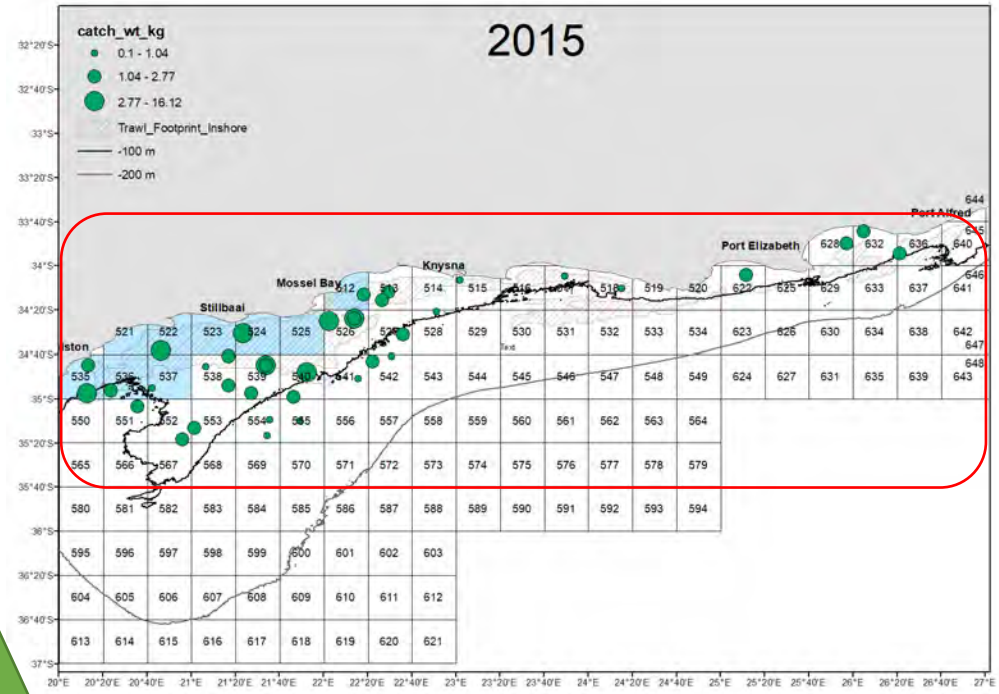


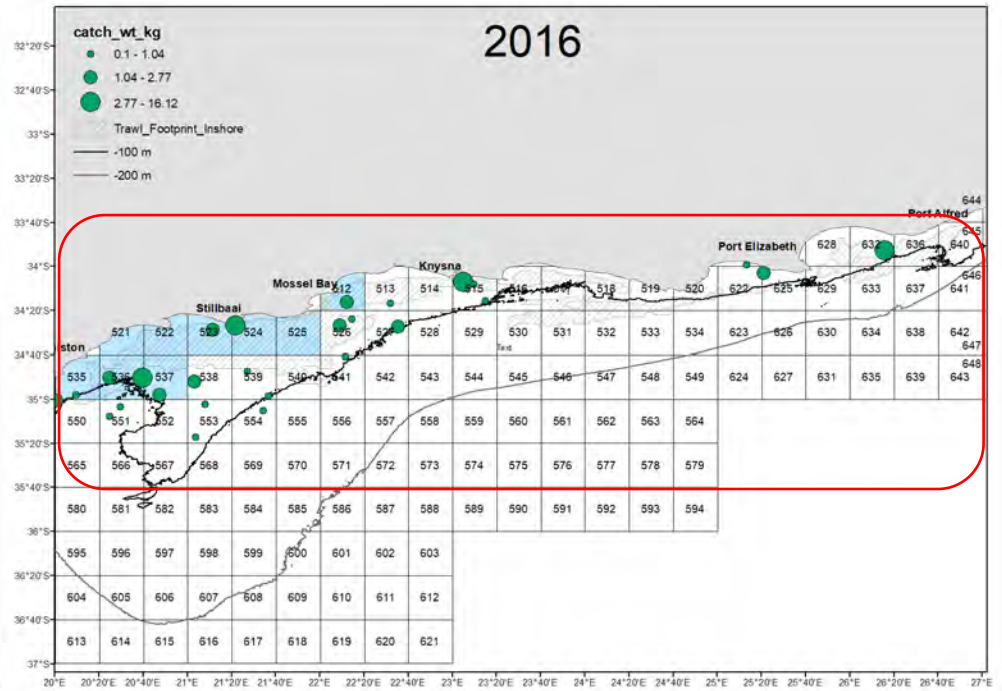


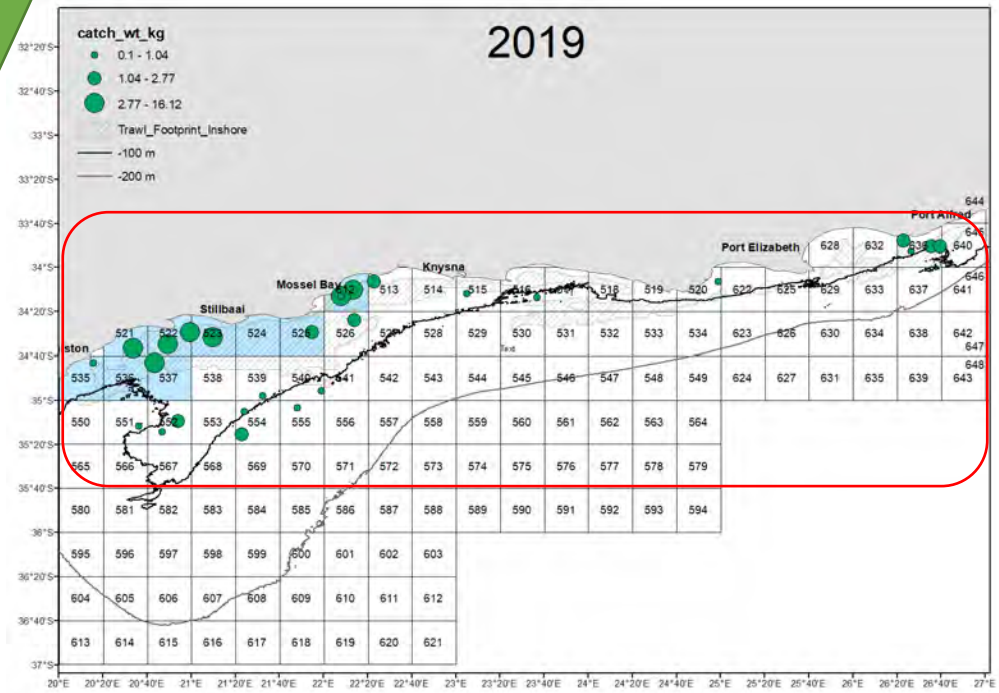


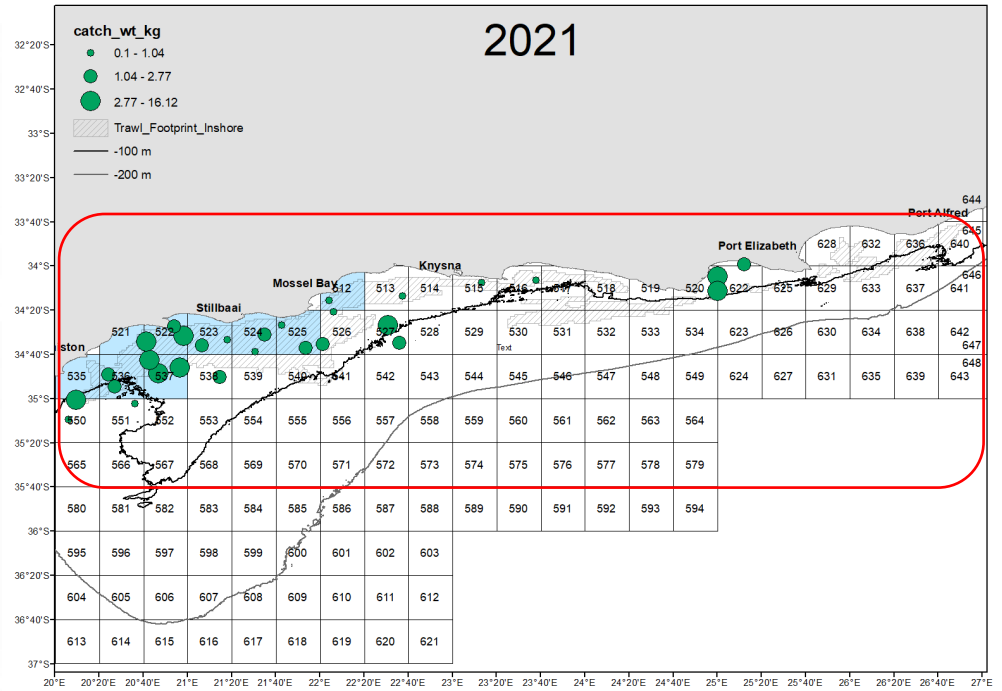


Autumn surveys 2015 to 2021

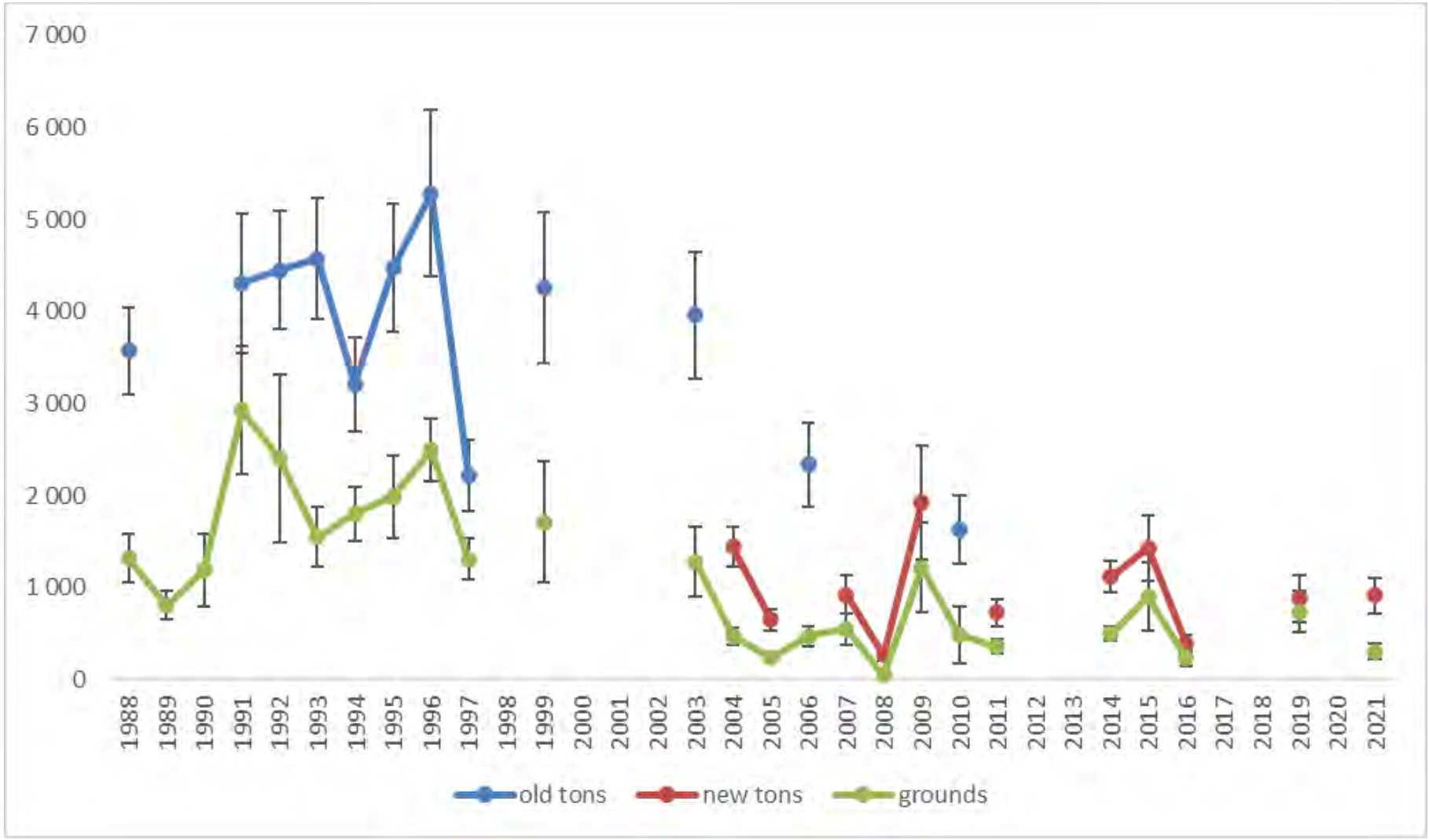




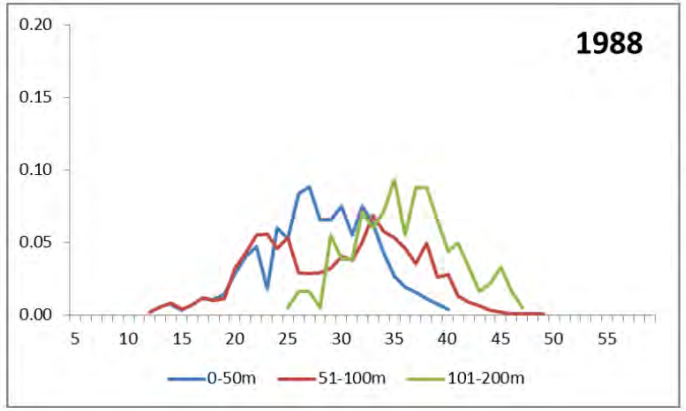


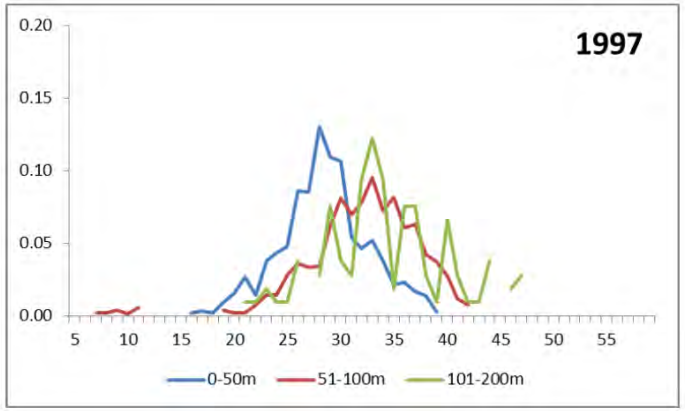


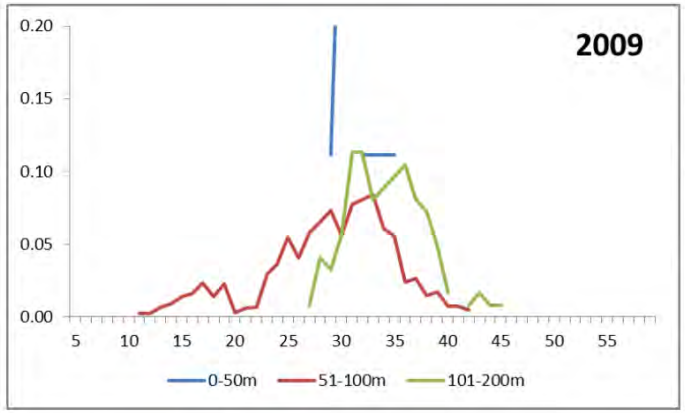
Survey estimates 0-500m (old/new) & sole grounds

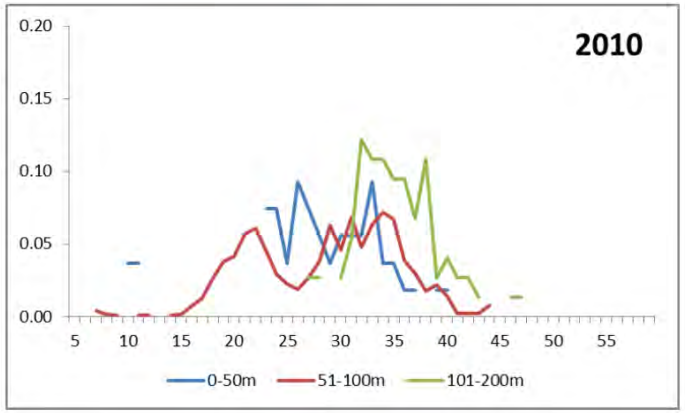


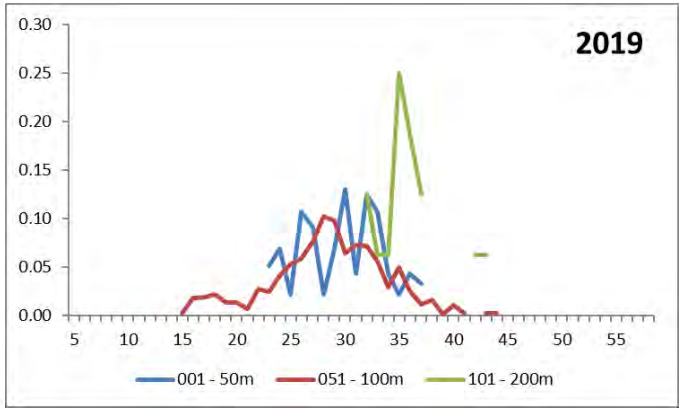
Survey length data

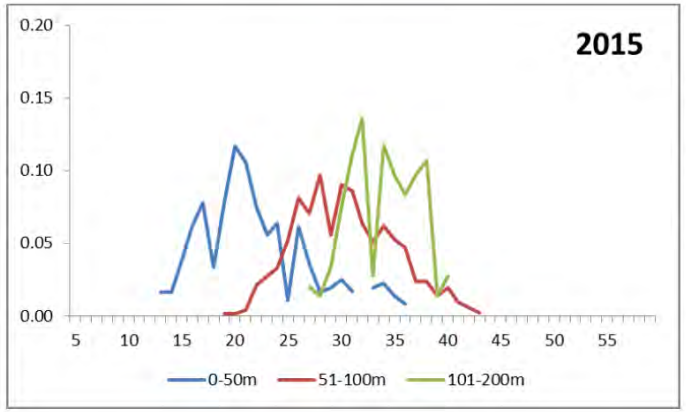


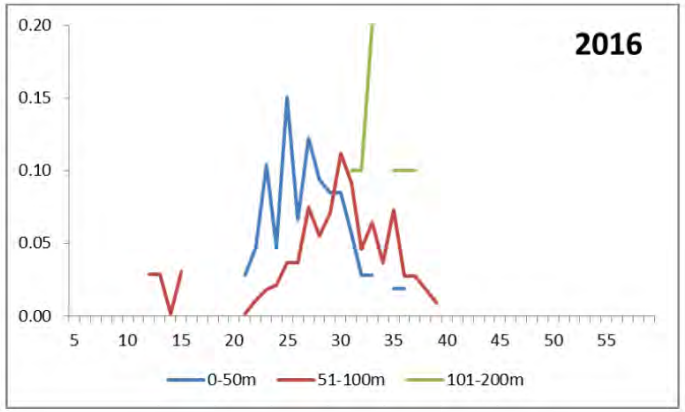


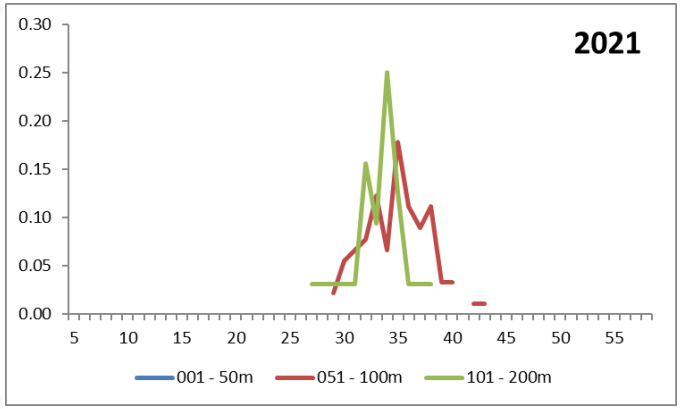




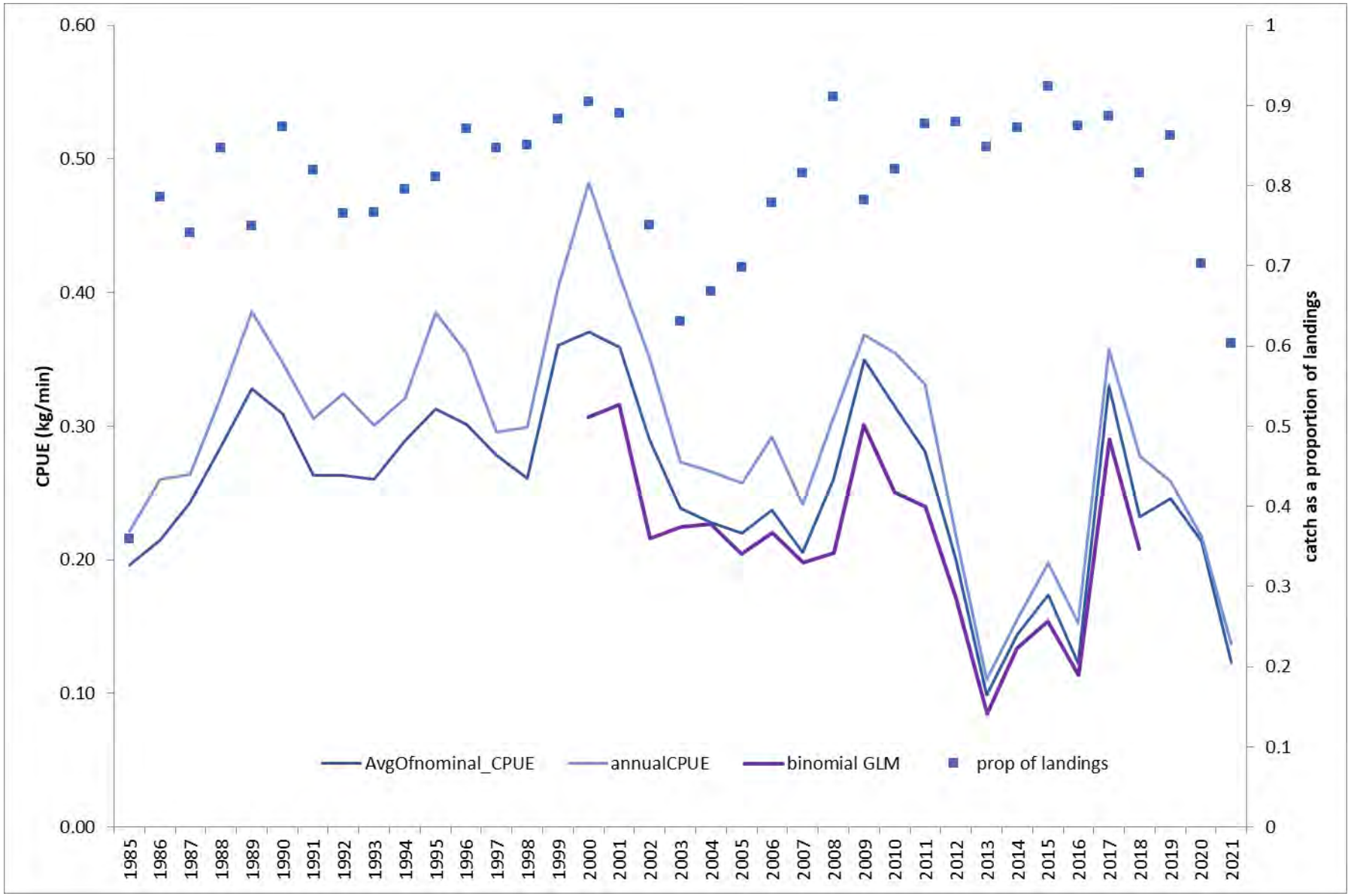








CPUE series


CPUE (kg/min)
catch as a proportion of landings
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1985
1986
1987
1988
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2016
2017
2018
2019
2020
2021
AvgOfnominal_CPUE
annualCPUE
binomial GLM
prop of landings

CPUE

Extension of the Agulhas sole CPUE time series – a considered briefing

Tracey P. Fairweather

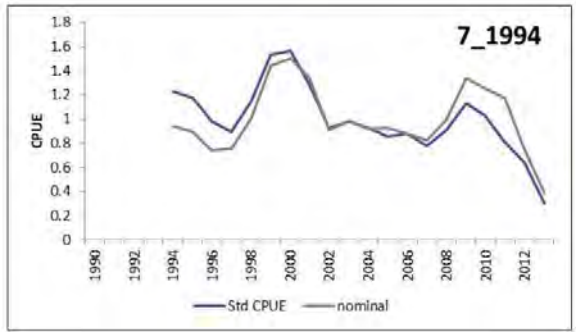
In order to include data prior to 2000, it is necessary to identify the sole specialist vessels th at operated during that period. Given that it is reasonable to assume that sole specialists would direct the majority of their effort on the sole grounds where catch rates would be high, and if analysis of the 2000-2012 data confirms the current seven specialists, then the same logic can be applied to the pre-2000 data and potential sole specialists could be identified on the basis of their fishing behavior. On average the seven specialists expended 92% of their effort on the sole grounds over the period 2000-2012.

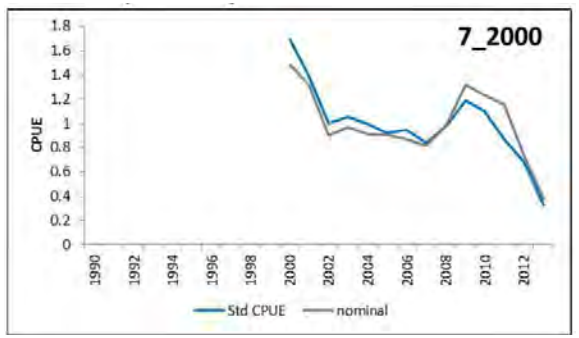
A model of the form $\ln CPUE = \ln t + \alpha year + \beta vessel + \varepsilon$ was fit to the annual CPUE values for each of the various time series reported above, where

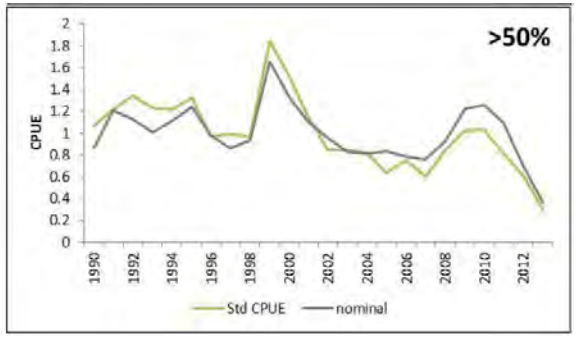
Int is the intercept,
year is the year effect
vessel is the vessel effect, and
ε is the error term, assumed to follow a normal distribution.

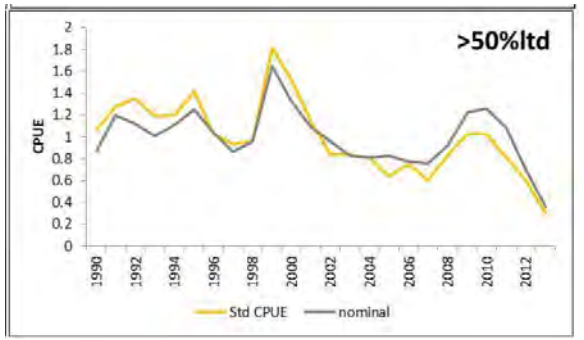
Four time series were standardised, and for the sake of simplicity are named as follows:

7_1994: The seven specialists from 1994-2013
7_2000: The seven specialists from 2000-2013
>50%: The 36 specialists which spent >50% of their effort on the sole grounds 1990-2013
>50%ltd: The 35 specialists which spent >50% of their effort on the sole grounds1990-2013 excluding records with insufficient catch and effort data









CPUE

Extending the Agulhas sole Catch per Unit Effort (CPUE) time series (1983- 2016)

Tracey P Fairweather & Jean P Glazer

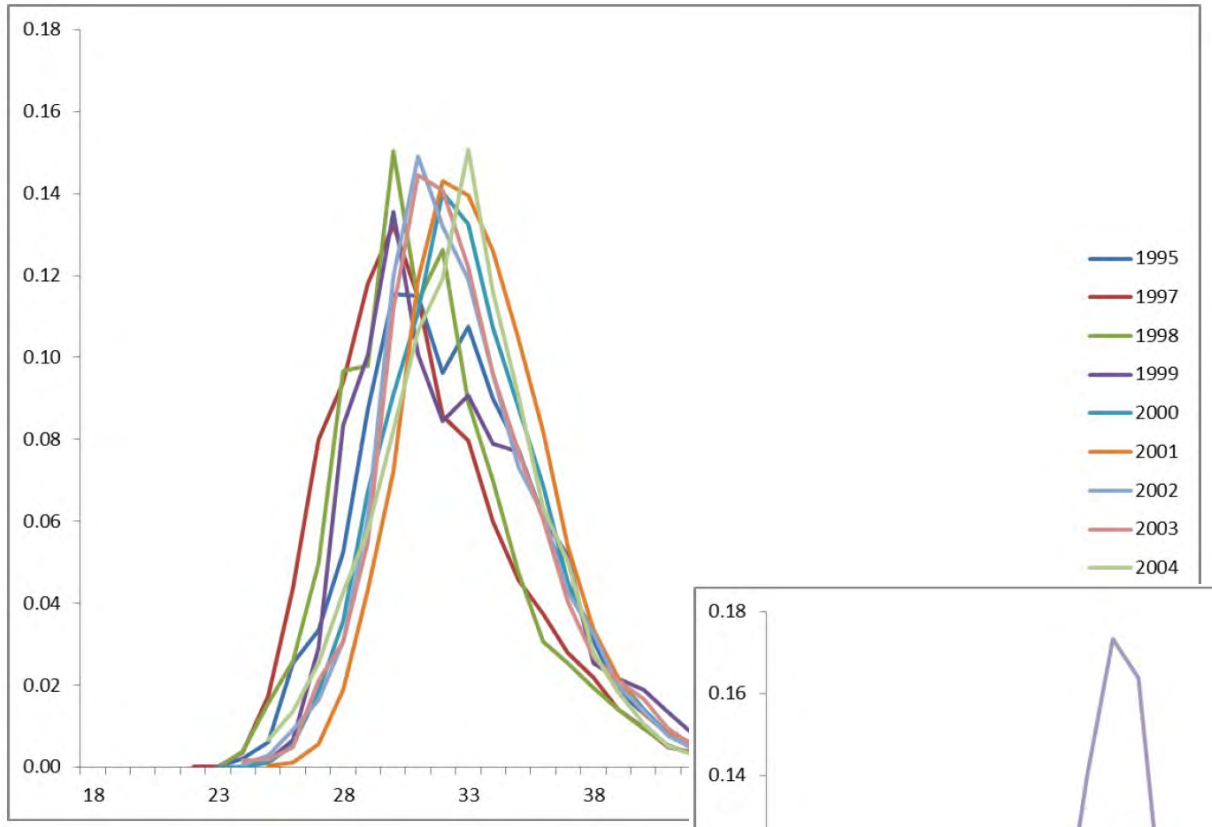
	1983-1989	1990-1999	2000-2016	1985-2016
1. Calculate effort per drag by inshore vessels.	180 874	210 128	266 862	The commercial data is held in three separate Access databases. Identical queries were run in all three and the final data copied into a database to allow creation of the code required to calculate the overall standardized CPUE.
2. Calculate nominal kg per landing (all species combined).	18 450	24 211	40 877	
3. Calculate catch per drag (all species combined) for step 1.	6 418	9 234	13 373	
4. Calculate the proportion of catch per drag (summed across landing) to the catch per landing and limit to landings where the proportion was > 0.49.	5 080	8 751	11 141	
5. The inshore effort data (step 1) was then further limited to landings which met the criteria in step 4 – creating table *inshore effort ltd*.	139 618	201 348	223 400	
6. Assign effort per drag (from step 1) to either inside or outside of the sole grounds (grids 512, 521-525, 535-537), excluding those drags where effort was < 9 or > 500 minutes.	152 101	191 268	266 717	
7. The proportion of effort inside the sole grounds was then calculated per drag.	152 101	191 268	266 717	
8. The table *sole-directed effort* was then created by limiting the data in step 7 to records where > 49.99% was in the grounds.	58 389	92 028	121 230	
9. The tables, *inshore effort ltd* and *sole-directed effort,* were then linked at drag level.	44 811	90 558	98 833	
10. The total catch of Agulhas sole was calculated per drag within the sole grounds.	66 342	106 558	121 022	
11. The data from step 9 & 10 were then matched to create the table *solegrounds_CPUE*.	44 811	90 558	98 833	
12. The exclusions for model Cb (grids 512 & 521-525; target species ECSOLE; effort >29 and <401 minutes) were then applied to *solegrounds_CPUE*.	2 859	5 970	4 873	13 376

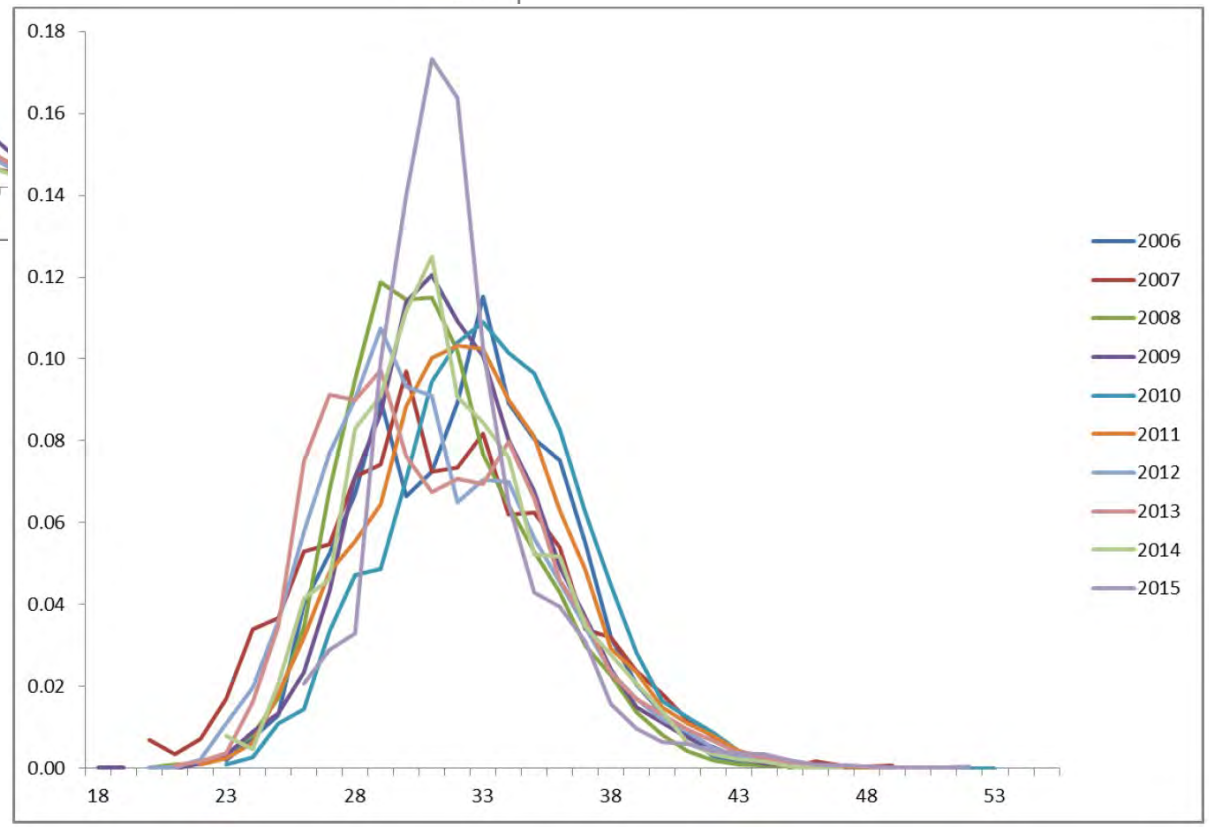
Steps 1-4 ensure the data are limited to logbooks where more than 49% of the landing is accounted for by drag catches; thereby excluding trips where most of the catch cannot be assigned to an area.

Steps 5-7 ensure the data are limited to trips where more than 49.99% of the catch was taken in the sole grounds; essentially limiting the data to sole specialists.

Steps 8-12 combine the variously limited data to provide the data required for the CPUE analysis.

CAL





No time to update, data collection compromised by covid and 2021 data capture is still underway

FISHERIES/2016/AUG/SWG-DEM/31

Updated graphs of model fit