

Length-frequency distributions for *M. paradoxus* on the south coast using SADSTIA observer data (2006- Sept 2014).

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Introduction

The South African Deep Sea Trawling Industry Association (SADSTIA) observer programme has been running since 2006 and has proven to be a valuable strategy for collecting biological, oceanographic and trawl vessel information. It contributes significantly to the scientific data collection of hake, other retained species and bycatch and is therefore an essential and integral component in the management of the hake resource. It also provides an additional source of information that can augment the independent data collection from research surveys and the commercial catch and effort data. Most importantly these data are beginning to give year-round trends, something, which is problematic in research-directed surveys that are only conducted at fixed periods of the year. Further, observer sampling provides real-time scientific data on commercial vessels providing more direct information of the activities of the commercial trawl industry than is possible in either research surveys or commercial catch landings. Observer data includes:

- Vessel data: (gear type, vessel name, specifications for gear, fishing area, effort)
- Catch composition data: (hake, retained bycatch and discard bycatch estimates)
- Biological data: (length-frequencies, weight, species identification, sex ratios, maturity stage of females¹)
- Environmental data (Beaufort scale, wind, cloud, temperature, air pressure)
- Bird counts and warp interactions
- Mitigation and compliance²: (tori lines, waste disposal)

Observer coverage

From 2006 to present, a total number of **674** deployments (averaging at **67** trips per year) have been carried out on both the west (Figure 1) and south coast (Figure 2) of South Africa. **8593** trawls were sampled and over a thousand tonnes of hake and bycatch were identified and measured (Table 1). Due to the spatial location and depth of the fishing grounds, a larger amount of *M. paradoxus* (709 tonnes) compared to *M. capensis* (183 tonnes) were measured and recorded. On average there were about 30 sea days per month which increased to 67 sea days in 2013. Currently, 84 sea days per month is being carried out which approximates the deployment levels of the DAFF observer programme. Between Aug 2013 and Aug 2014, 86 trawls have been observed for bird warp interaction information and during a similar time period, fish discard data was also collected for 54 trawls.

¹ The maturity stage for the male hake are not currently part of the SADSTIA sampling strategy however we recognize the importance of maturity staging for both sexes and intend on including it in the near future.

² Scientific observers are not required to perform compliance functions, although data collected through the programme can be utilized for compliance purposes

Table 1. Summary of the observer coverage between December 2005 and September 2014.

Year	Number of trips (deployments)	Number of Trawls	Number of sea days	Days per month	<i>M. capensis</i> (t)	<i>M. Paradoxus</i> (t)	Other species (t)	Total (t)
2006	37	737	280	23	21	64	0	85
2007	45	650	287	24	18	89	24	130
2008	28	399	165	14	8	49	11	68
2009	43	509	207	17	19	36	11	66
2010	53	501	267	22	8	39	10	57
2011	81	954	354	30	20	76	14	109
2012	125	1716	640	53	27	131	34	191
2013	138	1822	799	67	34	134	30	198
Sept 2014	121	1269	631	53	26	90	25	141
Total	674	8593	3644		183	709	159	1047
Average	67	859	364	30	18	71	16	105

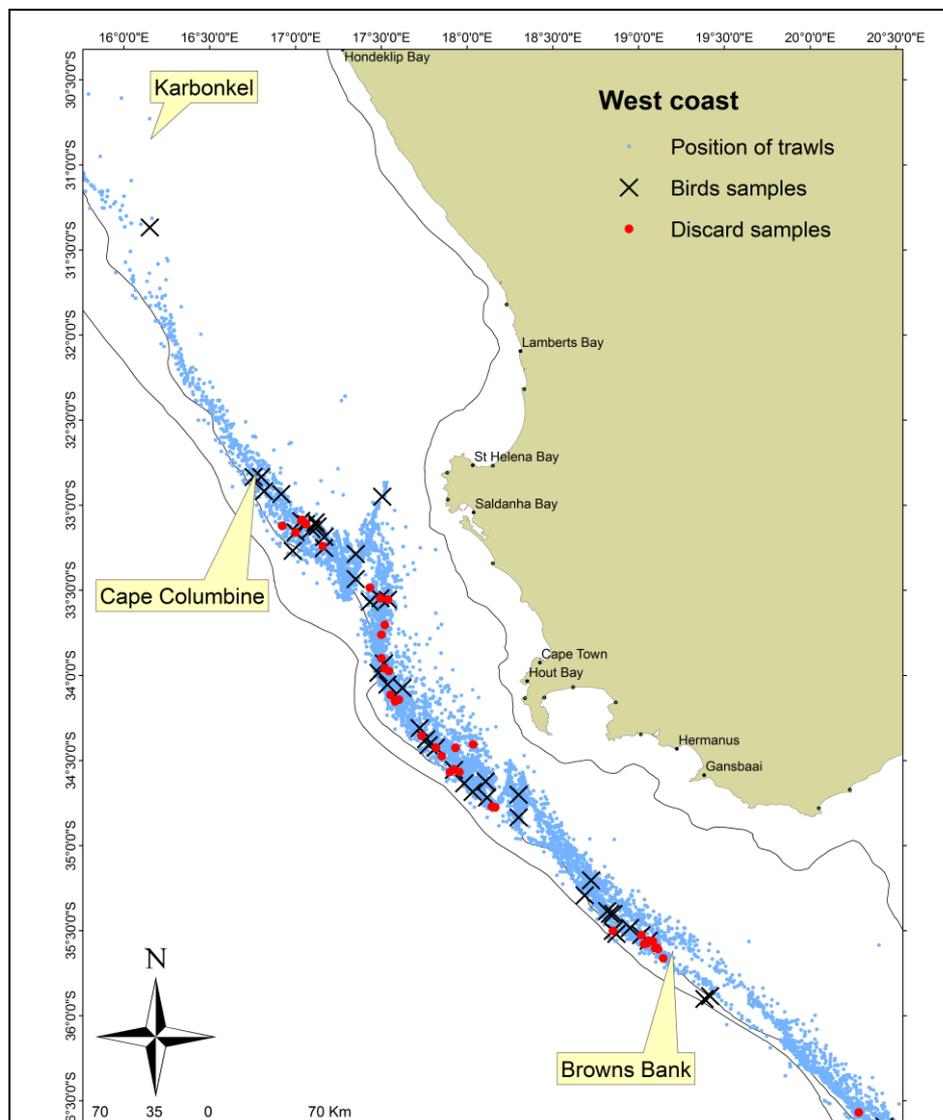
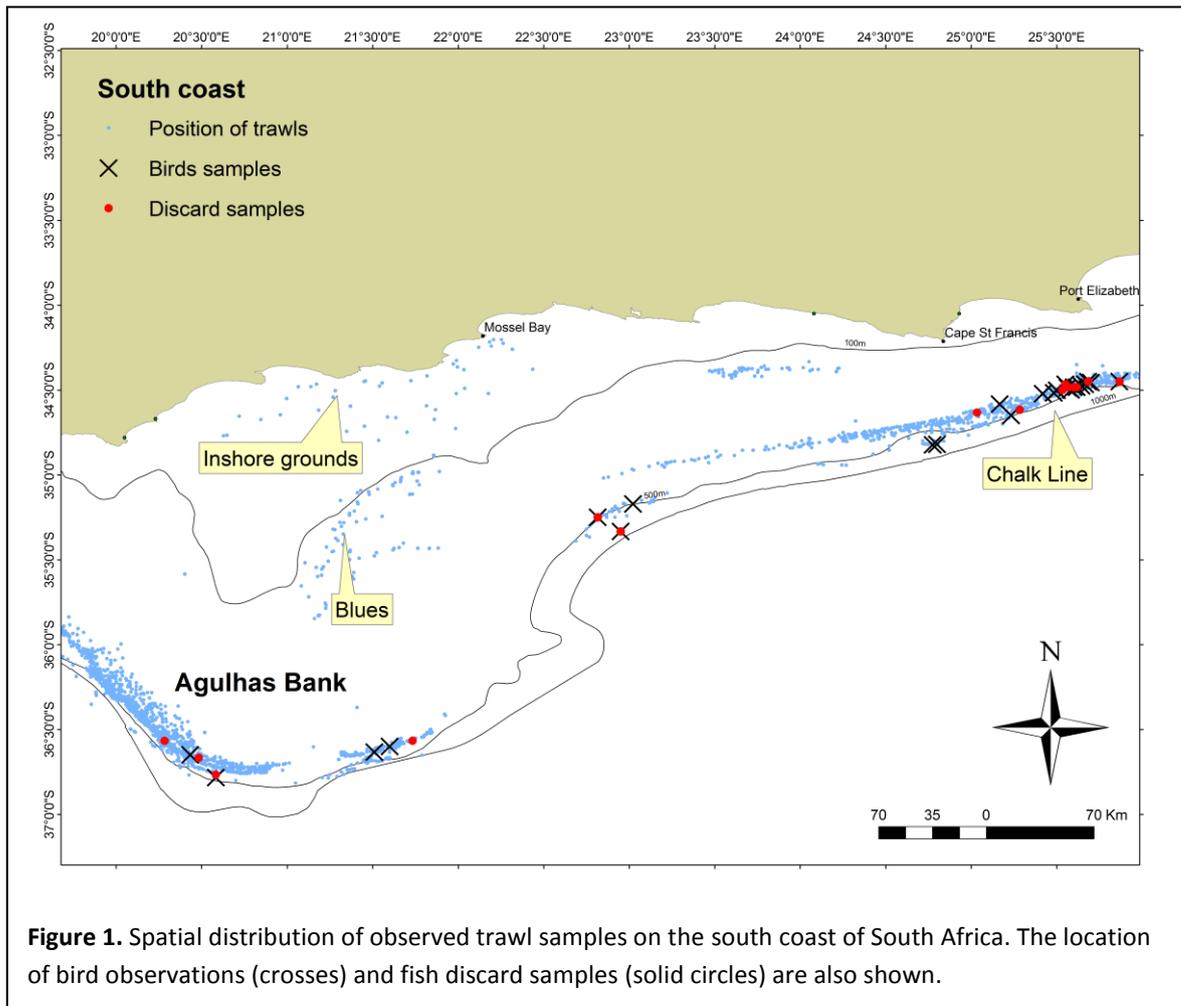
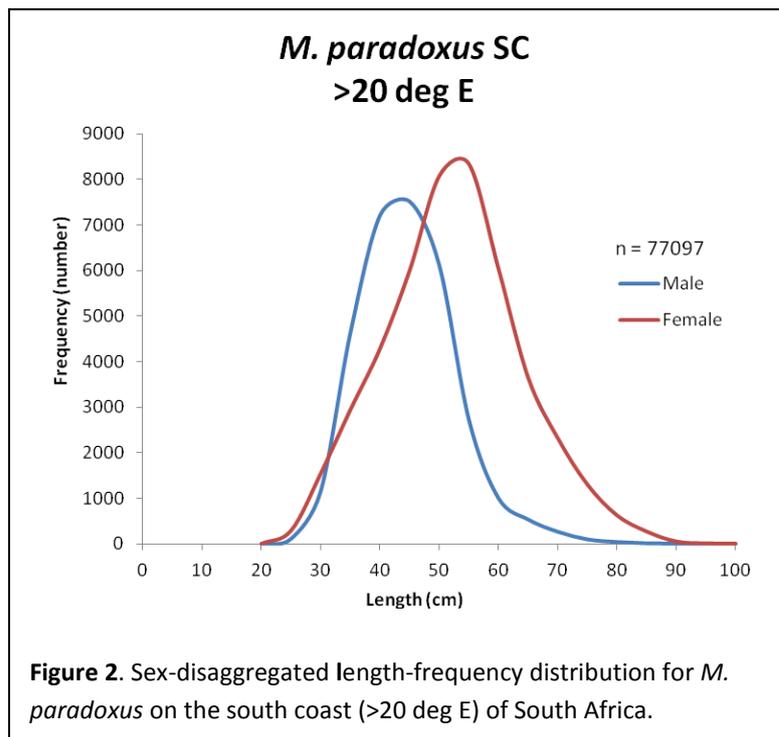


Figure 1. Spatial distribution of observed trawl samples on the west coast of South Africa. The location of bird observations (crosses) and fish discard samples (solid circles) are also shown.



Length-frequency distributions

The SADSTIA observer data can be used to understand the stock structure of *M. paradoxus* given that sex-disaggregated length-frequency data for the two hake species has been collected by observers on the south coast since 2006 (Figure 3 and Appendix 1).



Appendix 1. Sex-disaggregated length-frequency data for *M. paradoxus* on the south coast per degree longitude.

