

## The data used in the 2019 initial sardine assessment

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*Data to which the 2019 initial assessment of the South African sardine resource is to be conditioned are listed.*

### Summary

This document provides tables of data<sup>1</sup> to which the South African sardine initial assessment is to be tuned. The document is brief, providing updates of tables from de Moor *et al.* (2016). Unless otherwise specified, the manner in which the data are analysed and refined prior to use in the assessment remain unchanged from that of de Moor *et al.* (2016). A more comprehensive document of data to be used both sardine and anchovy assessments is planned for later in 2019. Given the urgency with which the initial sardine assessment was required, some of the data in these tables are not final (see, in particular, the footnotes). The data will be finalised for the comprehensive document.

- The monthly tonnage of directed sardine catch and sardine bycatch with round herring is shown by area in Tables 1a and 1b. The monthly tonnages of sardine bycatch with anchovy are given in Table 1c.
- The juvenile catch assumed taken prior to the start of the survey, together with the associated survey start date and survey recruit cut-off lengths are given in Table 2.
- The time series of total biomass estimates and associated CVs from the acoustic surveys in November each year, corresponding to the standard survey area between Hondeklip Bay and Port Alfred, are given in Table 3.
- The time series of recruit biomass and numbers and associated CVs from the May/June recruit surveys is given in Table 4.
- The time series of infection prevalence of the “tetracotyle” type digenean endoparasite by length as sampled from November surveys between 2010 and 2016 and 2018 is given in Table 5 (van der Lingen and Petersen 2019).

### References

- de Moor CL, Coetzee J, Merkle D, van der Westhuizen JJ and van der Lingen C. 2016. A record of the generation of data used in the 2016 sardine and anchovy assessments. DAFF: Branch Fisheries document FISHERIES/2016/APR/SWG-PEL/13rev.
- de Moor, C.L., and Butterworth, D.S. 2011. Extrapolation of recruit numbers to Cape Infanta in the years for which the survey only reached Cape Agulhas. DAFF: Branch Fisheries document FISHERIES/2011/AUG/SWG-PEL/42.
- van der Lingen CD and Petersen J. 2019. A description of parasite data (2010-2018) used in the sardine two mixing stock assessment model. FISHERIES/2019/FEB/SWG-PEL/02.

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<sup>1</sup> The length frequencies are not given here for space considerations, but are available upon request.

**Table 1a.** The monthly sardine commercial catch tonnage (in thousands of tons) landed as directed catch or bycatch with the round herring fishery (1987-2011) or 'large' sardine bycatch (2012-2018), west of Cape Agulhas.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1983											0.072	0.083
1984	1.980	6.802	4.975	6.520	5.114	1.361	0.010	0.000	0.000	0.261	0.131	0.000
1985	3.641	5.715	6.198	4.255	3.274	5.640	1.964	0.011	0.014	0.000	0.000	0.000
1986	1.310	7.319	8.638	3.539	2.714	4.042	2.855	0.162	0.060	0.000	0.000	0.000
1987	3.675	6.322	7.013	5.638	1.851	1.398	0.524	0.218	0.066	0.000	0.000	0.000
1988	1.824	5.312	2.739	5.892	3.904	4.159	2.624	1.323	0.353	0.208	0.912	0.657
1989	1.374	2.549	7.463	4.339	2.639	2.979	1.938	0.774	0.178	0.037	0.176	0.072
1990	3.017	6.014	7.676	6.569	9.338	4.825	3.587	5.148	1.715	0.695	0.344	0.428
1991	2.525	6.128	4.017	6.159	7.451	5.552	5.699	3.993	1.586	1.098	0.124	0.188
1992	0.781	5.147	5.595	2.331	1.967	7.055	2.877	5.347	6.051	1.088	0.292	0.941
1993	4.637	7.868	6.511	4.301	6.452	5.292	1.028	0.990	0.908	1.166	1.306	1.709
1994	1.692	6.264	11.375	7.879	16.378	6.225	6.696	7.297	4.662	5.206	1.224	0.377
1995	2.702	6.036	11.133	6.255	13.839	6.430	5.848	14.945	8.313	12.834	5.350	0.336
1996	2.891	9.022	9.449	7.745	10.287	7.736	5.651	7.590	8.834	10.340	11.219	1.468
1997	1.212	8.445	10.830	12.309	13.970	6.769	13.759	11.877	17.852	7.654	3.164	0.369
1998	2.384	8.419	14.266	6.244	8.491	13.170	13.223	18.716	11.303	14.341	4.447	0.814
1999	2.220	0.225	5.196	5.432	12.910	8.390	13.705	14.801	14.946	6.235	22.781	10.454
2000	0.000	2.458	7.796	10.812	12.949	16.912	11.126	12.413	10.336	19.398	15.934	1.796
2001	2.280	10.687	17.207	13.329	12.713	11.208	5.872	8.497	4.327	25.530	25.739	28.928
2002	0.106	12.317	14.810	26.716	12.163	8.193	8.168	13.312	22.815	25.341	47.652	29.528
2003	3.895	25.308	29.125	21.233	14.750	12.139	6.205	1.838	3.677	22.969	59.235	18.043
2004	8.484	40.646	31.707	17.499	30.774	18.458	15.263	3.619	25.090	18.682	60.672	19.235
2005	0.211	19.855	29.290	18.272	1.009	0.158	1.118	0.130	0.067	4.268	10.148	1.410
2006	1.123	0.907	19.201	5.685	0.593	1.061	0.214	0.304	11.908	19.009	15.628	7.344
2007	3.474	7.503	5.919	5.780	7.019	1.667	3.602	4.877	6.615	3.899	2.850	1.175
2008	0.000	0.767	8.000	7.459	1.455	3.664	1.179	1.195	0.000	7.055	9.012	2.913
2009	0.049	9.052	17.895	12.210	7.563	5.036	3.192	1.911	0.063	0.243	0.161	0.003
2010	0.805	7.418	13.821	9.120	9.261	6.335	6.774	3.008	2.184	0.037	8.920	0.673
2011	0.628	7.671	15.555	7.643	6.199	3.998	11.941	6.616	6.664	2.890	0.126	0.026
2012	5.037	14.860	13.816	10.880	9.071	6.410	1.049	0.850	3.006	4.842	5.715	0.000
2013	1.837	12.260	12.554	11.435	6.904	1.146	0.000	0.000	0.220	2.504	3.797	0.897
2014	5.941	12.185	13.043	9.193	0.946	0.031	0.105	2.890	1.902	4.486	4.534	1.582
2015	1.003	9.537	11.030	4.463	1.082	4.397	1.532	2.311	0.564	9.923	14.476	1.526
2016	0.088	12.799	10.964	4.691	2.966	2.712	0.034	0.165	2.488	4.863	3.215	0.541
2017	0.265	0.588	8.224	1.906	1.148	0.009	0.006	0.007	0.831	1.138	8.181	4.827
2018	0.123	3.913	8.195	2.727	0.321	0.014	0.052	0.017	0.008	5.581	2.423	0.000

**Table 1b.** The monthly sardine commercial catch tonnage (in thousands of tons) landed as directed catch or bycatch with the round herring fishery (1989-2011) or 'large' sardine bycatch (2012-2018), east of Cape Agulhas. There was no catch east of Cape Agulhas prior to 1989.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1989	0.000	0.000	0.167	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.047	0.000
1990	0.011	0.031	0.153	0.061	0.046	0.031	0.059	0.014	0.000	0.000	0.057	0.016
1991	0.010	0.224	0.114	0.158	0.272	0.074	0.000	0.000	0.000	0.230	0.134	0.164
1992	0.039	0.155	0.544	0.387	0.338	0.201	0.013	0.056	0.126	0.352	0.205	0.051
1993	0.097	0.234	0.378	0.318	0.227	0.196	0.005	0.152	0.161	0.119	0.142	0.270
1994	0.011	0.633	0.270	0.315	0.561	0.607	0.534	0.481	0.144	0.395	0.072	0.345
1995	0.365	0.743	0.605	0.062	0.481	0.159	0.309	0.135	0.257	0.837	0.594	0.395
1996	0.064	0.533	0.456	0.400	1.073	0.731	0.625	0.539	0.672	0.398	1.136	0.915
1997	0.093	0.290	0.741	0.362	0.640	0.369	1.234	0.134	0.105	0.298	0.000	0.000
1998	0.012	0.000	0.536	0.612	0.972	1.156	0.554	0.069	0.168	0.016	0.100	0.000
1999	0.708	0.061	0.413	0.692	0.817	0.943	0.255	0.408	0.457	0.709	1.006	0.623
2000	0.000	0.271	0.541	0.754	1.444	1.133	0.138	0.688	0.357	0.172	0.505	0.044

Table 1b (continued).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Sep	Aug	Oct	Nov	Dec
2001	0.135	0.304	0.537	0.497	0.657	0.992	1.253	1.798	2.178	1.481	1.152	0.296
2002	0.000	0.885	0.671	0.678	2.493	2.880	4.275	4.873	3.314	3.051	2.712	1.419
2003	0.586	2.005	2.172	2.669	6.255	7.391	9.603	6.849	9.180	6.531	6.066	1.693
2004	0.534	1.660	2.543	4.306	7.630	10.285	10.250	15.521	9.307	9.738	4.287	1.393
2005	0.468	4.889	5.332	10.422	19.516	24.672	25.615	18.544	18.181	9.052	16.047	2.232
2006	0.947	6.454	10.630	12.736	28.192	25.894	17.695	8.775	3.450	3.823	3.469	3.114
2007	0.441	6.538	10.762	12.977	16.470	15.113	7.227	4.603	3.252	0.160	2.033	1.608
2008	0.344	2.088	3.175	13.837	8.529	3.685	7.192	2.254	0.236	1.055	1.055	0.567
2009	0.671	2.725	4.318	6.829	7.009	4.400	3.328	0.374	0.932	1.267	0.876	1.412
2010	0.814	2.443	3.156	2.836	3.460	3.256	3.030	3.262	2.607	0.292	0.032	0.905
2011	0.419	3.115	3.551	2.018	4.591	3.571	3.719	4.794	2.347	0.905	1.330	0.434
2012	1.048	2.582	4.278	4.027	5.513	4.092	1.958	0.863	0.807	0.215	0.312	0.437
2013	0.476	1.900	2.732	4.032	4.811	6.063	5.114	5.657	1.741	2.457	0.015	0.210
2014	0.088	0.669	3.832	3.782	6.940	6.277	9.034	1.683	1.696	0.439	0.000	0.000
2015	0.000	0.003	0.347	3.988	7.164	3.915	3.333	2.246	0.172	0.000	0.000	0.000
2016	0.000	0.036	0.004	1.592	10.245	3.921	3.800	2.726	0.000	0.062	0.000	0.000
2017	0.041	0.119	0.318	0.001	1.591	0.807	0.067	0.000	0.058	0.534	0.784	0.775
2018	0.033	0.294	0.839	0.786	2.338	0.941	0.773	0.000	0.409	0.000	0.000	0.000

**Table 1c.** The monthly sardine commercial catch tonnage (in thousands of tons) landed as bycatch with the anchovy fishery (1987-2011) or 'small' sardine bycatch (2012-2018), west of Cape Agulhas. These data include the small amounts of sardine landed east of Cape Agulhas.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987	0.018	0.187	0.280	1.415	0.329	1.462	1.521	1.407	0.206	0.000	0.000	0.000
1988	0.032	0.291	0.115	0.058	1.216	2.391	0.520	0.724	0.154	0.689	0.235	0.000
1989	0.135	2.144	0.970	1.783	2.988	1.576	0.399	0.000	0.000	0.000	0.000	0.000
1990	0.019	0.193	0.477	1.012	2.073	3.797	0.012	0.000	0.000	0.000	0.000	0.000
1991	0.010	0.074	1.473	2.778	0.518	2.174	0.029	0.005	0.000	0.000	0.000	0.000
1992	0.142	0.501	0.465	2.456	1.668	2.565	2.281	2.767	0.277	0.008	0.000	0.000
1993	0.070	0.179	0.500	1.397	1.376	0.204	0.619	1.552	0.559	0.163	0.000	0.000
1994	0.286	1.972	1.683	1.359	4.447	1.936	0.039	3.460	0.032	0.000	0.000	0.000
1995	0.046	0.026	1.025	0.735	1.890	4.306	5.076	6.133	0.447	1.970	0.535	0.000
1996	1.015	1.931	0.689	0.624	1.846	1.960	0.007	0.000	0.000	0.004	0.000	0.000
1997	0.073	0.006	0.005	0.002	0.243	0.267	1.469	0.735	3.226	0.863	0.000	0.000
1998	0.028	1.118	0.143	1.762	3.674	4.492	0.960	0.183	0.697	0.262	0.000	0.000
1999	0.000	0.000	0.318	0.381	1.364	2.288	0.490	0.730	1.393	0.482	0.089	0.000
2000	0.000	0.000	1.403	1.798	1.897	1.146	0.611	0.317	0.030	0.021	0.000	0.000
2001	0.001	0.244	0.243	0.981	2.258	2.623	1.098	3.431	1.291	1.689	0.046	0.028
2002	0.040	0.185	0.000	0.353	0.402	1.836	1.297	5.681	2.709	0.000	0.000	0.009
2003	0.000	0.000	0.182	1.845	2.137	4.290	1.130	0.118	0.280	0.462	0.130	0.000
2004	0.000	0.017	0.002	0.956	3.298	0.474	0.706	0.604	0.186	0.000	0.003	0.000
2005	0.000	0.072	0.995	1.279	1.507	0.384	0.393	0.260	0.520	0.266	0.131	0.000
2006	0.000	0.000	0.142	0.352	0.698	2.303	2.764	0.980	1.818	0.065	0.006	0.000
2007	0.000	0.003	0.061	0.724	1.972	0.365	0.202	0.291	0.123	0.191	0.000	0.004
2008	0.000	0.042	0.156	0.503	1.461	0.756	0.289	0.490	0.137	0.090	0.273	0.004
2009	0.000	0.066	0.181	0.776	0.382	0.327	0.360	0.564	0.059	0.081	0.010	0.000
2010	0.088	0.187	1.856	2.124	2.512	5.356	4.166	1.598	0.036	0.046	0.015	0.000
2011	0.008	0.066	0.162	1.523	3.372	1.257	3.787	1.215	0.000	0.000	0.000	0.000
2012	0.553	0.913	0.600	0.948	2.856	0.653	0.253	0.190	0.216	0.495	0.017	0.000
2013	0.053	0.000	0.000	0.625	2.010	0.633	0.006	0.000	0.005	0.000	0.055	0.000
2014	0.000	1.071	1.247	1.957	1.550	0.015	0.026	0.112	0.046	0.009	0.000	0.000
2015	0.000	1.677	4.222	2.335	4.633	0.414	0.057	0.008	0.003	0.002	0.001	0.000
2016	0.001	0.808	0.094	3.781	3.844	2.205	0.153	0.323	0.572	0.020	0.001	0.000
2017	0.018	0.213	0.175	1.410	1.861	0.274	0.330	0.054	0.010	0.144	0.211	0.013

**Table 1c (continued).**

2018	0.003	0.043	0.135	0.328	0.546	0.083	0.106	0.166	0.036	0.051	0.038	0.000
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**Table 2.** The date of the commencement of the annual recruit survey; the cut-off lengths used to estimate juvenile sardine from the recruit surveys; and juvenile sardine catch (in billions) from 1 May to the day before the annual recruit survey.

Year	Date of commencement of survey	Time of the recruit survey after 1 May	Cut-off length (cm) for sardine juveniles in the survey	Juvenile sardine catch between 1 May and the start of the survey	
				West of Cape Agulhas	East of Cape Agulhas
1985	20-May	0.613	<15.50	0.1437	0.0000
1986	10-Jun	1.300	<15.50	0.2924	0.0000
1987	20-Jul	2.613	<15.00	0.1950	0.0000
1988	27-Jun <sup>2</sup>	1.867	<16.00	0.2940	0.0000
1989	08-Jun <sup>3</sup>	1.233	<16.00	0.3420	0.0000
1990	22-Jun	1.700	<16.00	0.7215	0.0000
1991	07-May	0.194	<16.00	0.0084	0.0000
1992	13-May	0.387	<16.00	0.0290	0.0000
1993	21-May	0.645	<16.00	0.0423	0.0001
1994	05-May	0.129	<16.00	0.0671	0.0000
1995	10-Jun	1.300	<16.00	0.5299	0.0000
1996	05-Jun	1.133	<15.00	0.3304	0.0000
1997	17-May	0.516	<14.00	0.0348	0.0000
1998	20-May	0.613	<14.00	0.4215	0.0000
1999	10-May	0.290	<17.00	0.0223	0.0001
2000	15-May	0.452	<17.00	0.1075	0.0001
2001	05-May	0.129	<12.00	0.0003	0.0000
2002	05-May	0.129	<16.00	0.0325	0.0000
2003	14-May	0.419	<16.00	0.0732	0.0007
2004	08-May	0.226	<14.00	0.0303	0.0000
2005	13-May	0.387	<12.5	0.0853	0.0000
2006	19-May	0.581	<14.0	0.0334	0.0000
2007	18 May	0.548	<13.5	0.0597	0.0000
2008	21 May	0.645	<14.0	0.0993	0.0000
2009	15 May	0.452	<14.0	0.0256	0.0000
2010	27 May	0.839	<13.5	0.2269	0.0009
2011	27 May	0.839	<15.5	0.3987	0.0286
2012	16 June	1.500	<14.0	0.2235	0.0002
2013	23 May	0.710	<13.5	0.1308	0.0000
2014	10 May	0.290	<14.0	0.0001	0.0000
2015	22 May	0.677	<14.0	0.1843	0.0000
2016	8 Jun	1.233	<13.5	0.4809	0.0004
2017	12 Jun	1.367	<12.5	0.1813	0.0000
-	-	-	-	-	-

<sup>2</sup> The first station was on 27<sup>th</sup> June 1988, although the first acoustic interval was only logged after midnight, i.e. on 28<sup>th</sup> June 1988.<sup>3</sup> The first station was on 8<sup>th</sup> June 1989, although the first acoustic interval was only logged after midnight, i.e. on 9<sup>th</sup> June 1989.

**Table 3.** Sardine total biomass (in tons) as far as Port Alfred and associated CV from the November acoustic survey.

Area	Hondeklip Bay to Port Alfred		Hondeklip Bay to Cape Agulhas		Cape Agulhas to Port Alfred	
Year	Sardine Biomass	CV	Sardine Biomass	CV	Sardine Biomass	CV
1984	48378	1.118	48009	1.127	369	0.644
1985	45013	0.509	25457	0.680	19556	0.767
1986	299797	0.848	238230	1.054	61566	0.672
1987	111285	0.630	94165	0.734	17120	0.693
1988	134362	0.957	128043	1.005	6319	0.525
1989	256655	0.274	198328	0.334	58327	0.397
1990	289876	0.352	248855	0.382	41020	0.905
1991	597858	0.395	517180	0.444	80678	0.675
1992	494157	0.658	247756	0.560	246401	1.191
1993	560019	0.427	480822	0.488	79198	0.603
1994	518354	0.370	389730	0.432	128624	0.709
1995	843944	0.713	363542	0.302	480402	1.229
1996	529456	0.471	257763	0.352	271693	0.849
1997	1224632	0.329	964835	0.322	259797	0.982
1998	1607328	0.251	1082547	0.341	524781	0.305
1999	1635410	0.212	708029	0.324	927381	0.280
2000	2292380	0.500	726230	0.633	1566150	0.670
2001	2309600	0.142	669617	0.313	1639983	0.154
2002	4206250	0.227	1184713	0.247	3021538	0.300
2003	3564171	0.197	1343118	0.300	2221053	0.258
2004	2619301	0.333	296108	0.432	2323193	0.372
2005	1048991	0.300	75604	0.524	973386	0.321
2006	712557	0.346	177889	0.414	534667	0.441
2007	252199	0.351	53138	0.541	199061	0.421
2008	384080	0.422	211871	0.528	172209	0.682
2009	501575	0.271	262175	0.285	239400	0.474
2010	508363	0.235	309465	0.328	198897	0.314
2011	1037060	0.235	182825	0.187	854235	0.283
2012	345054	0.345	186109	0.517	158945	0.440
2013	611763	0.346	467613	0.432	144150	0.443
2014	444500	0.291	195786	0.476	248715	0.361
2015	363230	0.297	98467	0.312	264763	0.391
2016	258575	0.353	183356	0.409	75219	0.690
2017	334804	0.449	107173	0.346	227631	0.640
2018	90768	0.502	34845	0.359	55922	0.783

**Table 4.** Sardine recruitment (in tons and numbers in billions) from Hondeklip Bay to Cape Infanta and associated CV from the recruitment acoustic survey. The mean recruit weight is also given (in grams). The sardine recruitment and associated CV from Cape Infanta to Cape St Francis is also given for some years. Blank cells correspond to years/areas for which data are not available, e.g. the survey did not reach Cape St Francis.

Year	West of Cape Infanta					Cape Infanta to Cape St Francis				
	Biomass (Method 1 of App B)	Biomass (Method 2 of App B)	CV*	Mean Weight	Numbers *	Biomass (Method 1 of App B)	Biomass (Method 2 of App B)	CV*	Mean Weight	Numbers *
1985 <sup>4</sup>	37424	37636	0.649	10.420	3.592					
1986 <sup>5</sup>	45508	43569	0.609	12.284	3.705					
1987 <sup>5</sup>	90869	90184	0.554	12.266	7.408					
1988 <sup>5</sup>	4478	4760	0.462	10.134	0.442					
1989 <sup>5</sup>	47574	46591	0.426	22.176	2.145					
1990 <sup>5</sup>	27421	28391	1.079	10.920	2.511					
1991	22864	22769	0.269	11.939	1.915					
1992	68554	69608	0.363	12.170	5.633					
1993	108133	109591	0.367	7.096	15.238					
1994	58091	57208	0.324	21.886	2.654	19496	18227	0.555	28.028	0.696
1995	195250	194506	0.378	7.691	25.388	4528	3388	0.467	19.141	0.237
1996	52678	48154	0.453	16.441	3.204	7811	7547	0.480	19.113	0.409
1997	340160	342363	0.402	9.229	36.856					
1998	124952	129664	0.360	10.716	10.716	5238	5207	0.540	19.642	0.267
1999	220589	219249	0.376	10.378	10.378	58613	53909	0.519	45.419	1.290
2000	265489	264452	0.390	20.002	20.002	168591	165955	0.495	31.870	5.290
2001	553538	559079	0.287	60.065	60.065	0	3	0.713	9.932	0.0005
2002	610344	595913	0.182	49.153	49.153	41495	37613	0.958	31.103	1.334
2003	508911	501624	0.209	36.448	36.448	19948	19553	0.553	43.572	0.458
2004	25871	26003	0.342	4.089	4.089	4187	4477	0.732	7.191	0.582
2005	16307	16437	0.352 <sup>6</sup>	2.858	2.858	9315	9721	0.448 <sup>6</sup>	16.132	0.577
2006	47898	45804	0.403 <sup>6</sup>	9.506	9.506	61333	62444	0.654 <sup>6</sup>	17.539	3.497
2007	31343	34905	0.343	2.995	2.995	28705	30886	0.932	16.602	1.729
2008	25337	24157	0.266	4.090	4.090					
2009	59765	57181	0.776	9.289	9.289	64730	63827	1.013	17.792	3.638
2010	477437	479609	0.473	35.569	35.569	6984	6781	0.924	20.076	0.348
2011 <sup>7</sup>	66213	65876	0.475	5.799	5.799					
2012	100306	100265	0.316	7.986	7.986					
2013	114312	111813	0.416	12.587	12.587	5849	6097	0.509	26.639	0.220
2014	24171	25073	0.622	1.985	1.985	28866	28186	0.677	23.181	1.245
2015	132552	143768	0.388	6.258	6.258	16199	17004	0.607	23.934	0.677
2016	13910	12392	0.425	0.811	0.811	20728	20827	0.887	24.394	0.850
2017	26083	23598	0.531	7.180	7.180	26810	25694	0.560	15.228	1.761
2018										

<sup>4</sup> The 1985 survey area included a single stratum from east of Danger Point to Mossel Bay. This full area is included in the survey estimate and thus the estimate is higher than that which would correspond to a survey area west of Cape Infanta only. It is thus not strictly comparable with the rest of the time series, but given the low survey estimate, it is considered acceptable for this assessment.

<sup>5</sup> Biomass and numbers west of Cape Infanta should be estimated by taking that observed up to east of Danger Point and increasing by 0.038. This increase factor was the average 1991-5,1998,1999 ratios of numbers of recruits surveyed between Cape Agulhas-Cape Infanta to those surveyed west of Cape Agulhas, and thus the resultant values will be underestimates of that present for the full area west of Cape Agulhas. The CV should also be adjusted according to the method of de Moor and Butterworth (2011), but there was insufficient time to undertake this analysis before the initial assessment. Additionally, the above numbers were mistakenly adjusted twice. This will be corrected in the comprehensive data document planned for later during 2019.

<sup>6</sup> Some recruit numbers from 2005-2015 have been updated since de Moor *et al.* (2016), following a change in the cut-off length. The CVs for 2005 and 2006 used in the initial assessment only account for inter-transect variance and not the additional variance for the update to the timeseries to account for uncapped estimates and attenuation.

<sup>7</sup> Biomass and numbers west of Cape Infanta were estimated by taking that observed up to Cape Agulhas and increasing by 0.03 (de Moor and Butterworth 2011). The 0.03 proportion was based on an old timeseries of data, but there was insufficient time to update the analysis of de Moor and Butterworth (2011) before the initial sardine assessment.

**Table 5a.** The number of sardine sampled by length class for the “tetracotyle” type digenean endoparasite, west and east of Cape Agulhas (note that data for samples east of Cape Agulhas excludes those collected between 20 and 22°E).

cm	West of Cape Agulhas								East of Cape Agulhas							
	2010	2011	2012	2013	2014	2015	2016	2018	2010	2011	2012	2013	2014	2015	2016	2018
10	3		5				30	15					3		18	5
10.5	9		11		2		19	14					5	6	5	7
11	7	1	21		5		25	13					2	12	2	17
11.5	3	2	43	1	5		29	34	9				5	26		22
12	16	1	32	4	2		33	33	23				5	21	2	22
12.5	23	4	23	8	5		38	30	55	1			3	26	1	11
13	35	9	14	25	6		44	11	53				13	32		11
13.5	33	11	10	36	12	3	64	10	41	1	1		19	37		6
14	40	9	13	22	22	3	42	3	14		2		16	22	1	4
14.5	33	3	16	17	21	3	53	3	9	2	7		13	22	2	7
15	30	2	11	8	23	5	43	4	4	1	7		4	21		10
15.5	21	8	11	3	6	6	43	1	10	2	8		2	28	3	5
16	24	8	3		11	7	28	1	3	7	8			13		13
16.5	14	22	7	2	7	16	14		11	24	12			15	2	2
17	9	17	5	4	14	44	13		9	11	9			24		3
17.5	3	73	8	8	14	48	5	1	1	41	3			20		2
18	12	76	10	10	18	14	9		3	21	2			19		
18.5	17	98	18	11	13	24	12			59	2		1	9		1
19	17	91	15	6	11	21	30	1	1	30	1		4	7	1	
19.5	15	36	13	9	14	22	44		3	36	2		6	7		
20	3	28	4		7	16	28			3	2		15	14	3	
20.5	1	7	2	1	3	5	18			2	1		19	7	3	
21		2	2		2	3	2						8	3		
21.5		1				3				1			3	2	2	
22		3				4										
22.5		5				7										
23						9										

**Table 5b.** The number of sardine infected by length class with the “tetracotyle” type digenean endoparasite, west and east of Cape Agulhas (note that data for samples east of Cape Agulhas excludes those collected between 20 and 22°E).

cm	West of Cape Agulhas								East of Cape Agulhas							
	2010	2011	2012	2013	2014	2015	2016	2018	2010	2011	2012	2013	2014	2015	2016	2018
10	0		0				5	0					0		0	0
10.5	0		3		0		4	0					0	0	0	0
11	0	0	5		0		4	0					0	0	0	0
11.5	0	0	5	1	1		5	1	1				0	4		0
12	0	0	4	3	0		6	0	1				0	1	0	0
12.5	1	1	1	2	1		8	0	4	0			0	0	0	0
13	1	0	0	7	1		6	0	2				0	0		0
13.5	4	0	0	11	2	0	13	0	7	0	0		0	0		0
14	5	2	1	8	6	0	7	0	3		0		0	1	0	0
14.5	2	0	2	6	2	1	9	0	0	1	0		0	0	0	0
15	6	0	0	5	4	0	15	1	0	1	0		0	1		0
15.5	5	3	2	1	3	0	9	0	0	1	0		0	1	0	0
16	9	3	0		2	1	12	0	0	1	0			0		0
16.5	7	3	0	2	2	1	5		0	1	0			1	0	0
17	5	6	2	0	6	8	5		1	3	0			3		0
17.5	2	17	5	5	5	10	4	0	0	11	0			3		0
18	1	6	4	10	13	3	7		0	5	0			4		
18.5	11	24	10	9	11	4	10			18	1		0	3		0
19	9	22	5	5	8	3	23	0	0	10	1		2	1	1	
19.5	6	5	6	8	11	7	31		1	12	0		3	3		
20	3	5	1		5	0	20			1	1		11	1	1	
20.5	1	2	2	1	2	1	13			0	0		15	1	0	
21		1	1		2	1	2						8	2		
21.5		0				1				1			2	1	0	
22		2				0										
22.5		3				3										
23						5										