

Oceana Sustainability Report 2016

South African Small Pelagic Fisheries

The South African small pelagic fishery targets three species, anchovy (*Engraulis encrasicolus*), sardine (*Sardinops sagax*) and round herring (*Etrumeus whiteheadi*). It generates the highest total annual catches of all South Africa's fisheries and, based on the wholesale value of the catch in 2012, is the second most important after the demersal trawl fishery in terms of annual economic value of catches (wholesale values from J. Augustyn, pers.comm.). In 2006, fishing rights for the fishery were allocated to 109 entities for a 15-year period ending in 2020. At that time there were 106 vessels operating in the fishery, which was considered by DAFF to be the optimal effort. The policy on allocation and management of rights, while allowing for replacement of vessels, is therefore intended to prevent an increase in the total effort in the fishery (DEAT, 2005).

The fishery is managed primarily through the setting of an annual total allowable catch (TAC) that is determined each year through the application of an *Operational Management Procedure* (OMP). The OMP is designed to achieve the maximum average annual directed sardine and anchovy catches in the medium term, with limits on how much the total allowable catches (TACs) can vary from year to year to ensure some stability, while ensuring there is only a low probability that the anchovy and sardine stocks will drop to levels at which future recruitment might be compromised (DAFF, 2015). When applying the OMP, the results from the latest pelagic biomass surveys provide the primary information, from which the TAC and total allowable bycatch (TAB) recommendations for the year or revised limits at the mid-year revision are generated.

The current version of the OMP (OMP-14) has been applied since the start of the 2015 season and was described in the 2015 Oceana Annual Report. A revised, updated OMP is expected to be finalized and applied to the anchovy and sardine fisheries from early in 2017. A key aspect of the update will be that it will take better account than previous versions of the spatial distribution of the sardine resource between the south and west coasts, the differences in the dynamics of the 'stocks' in those two areas and the degree of mixing between them. However, there is still considerable uncertainty about these features and the OMP will therefore be developed to ensure that the risk to the combined population is not unacceptably high, whether the fishery is, in reality, harvesting from one stock or two stocks. This issue is discussed further below.

Total Allowable Catches and Management in the 2016 Season (15 January to 31 December)

Anchovy and sardine are both relatively short-lived species and, as a result, population sizes and biomass can vary considerably from one year to the next depending on the size of the recruitment to the population each year. For this reason, conservative TACs are set at the start of the year for anchovy and adult sardine and similarly conservative TABs for juvenile sardine caught in the directed anchovy and sardine fisheries. These allowable catches can be revised upwards if recruitment is found to have been sufficiently good to justify an increase once the results of the May recruitment surveys are known. In addition, annual TABs are set at the start of the year for bycatches of adult sardine taken in the round herring and anchovy fisheries and juvenile sardine caught in the round herring fishery. There is also a special anchovy TAB for those who only hold rights in the sardine fishery.

The initial recommendations for TACs in 2016 were released in December 2015 after the results from the November 2015 pelagic biomass survey had been made available. The anchovy biomass had been estimated at approximately 1.9 million tonnes, which was lower than in the preceding years and less than the estimated average anchovy biomass of 2.28 million tonnes. The sardine biomass was estimated at approximately 363 000 tonnes, which was about 80 000 tonnes less than the biomass

estimate in November of the previous year and well below half of the estimated long-term average biomass of nearly 970 000 tonnes. The round herring result was more positive and, at over 1.3 million tonnes, was approximately the same as in 2014 and considerably higher than the estimated long-term average of about 967 000 tonnes. These results provided the basic information for setting the initial TACs for 2016 (Table 1).

Table 1. Initial and revised total allowable catches (TAC) and bycatches (TAB) for 2016. Adult sardine are defined as those greater than 14 cms in length and juvenile sardine as those equal to or less than 14cms. From DAFF (2015) and DAFF (2016a)

| | Allowable Catch set at start of the year (tonnes) | Revised (final) allowable catch after May recruit survey (tonnes) |
|---|--|--|
| Directed adult sardine TAC | 64 563 | 64 928 |
| Juvenile sardine TAB for directed adult sardine fishing | 4 519 | 5 545 |
| Directed anchovy TAC | 254 483 | 354 326 |
| Juvenile sardine TAB with directed anchovy fishing | 25 866 | 31 463 |
| Adult sardine TAB with directed round herring and anchovy fishing | 7 000 | n/a |
| Juvenile sardine TAB with directed round herring fishing | 1 000 | n/a |
| Anchovy TAB for sardine-only rights holders | 500 | n/a |

The 2016 recruitment survey took place in May (Figure 1) and, from the results of that survey, anchovy recruitment for 2016 was estimated at 118 billion recruits. This was considerably less than the 263 billion estimated in 2015 but, following the OMP rules, was nevertheless sufficient to allow an increase of nearly 100 000 tonnes in the directed anchovy TAC for 2016 to give a final TAC of 354 326 tonnes. This was accompanied by an increase of nearly 5 600 tonnes for juvenile sardine caught in the directed anchovy fishery to give a final allowable bycatch of 31 463 tonnes.

The sardine recruitment estimate was 0.811 billion recruits (Figure 2), which is much lower than the 9 billion recruits estimated for 2015 and is the lowest annual recruitment since 1988. The average annual recruitment since surveys began in 1985 is 13 billion fish. The low 2016 estimate is cause for considerable concern. As a result and again in accordance with the OMP results, the directed adult sardine TAC could only be increased by a few hundred tonnes from the initial TAC to a final allowable catch of 64 928 tonnes. The final juvenile sardine TAB for directed adult sardine fishing was just over 1 000 tonnes higher than the initial allowance at 5 545 t.

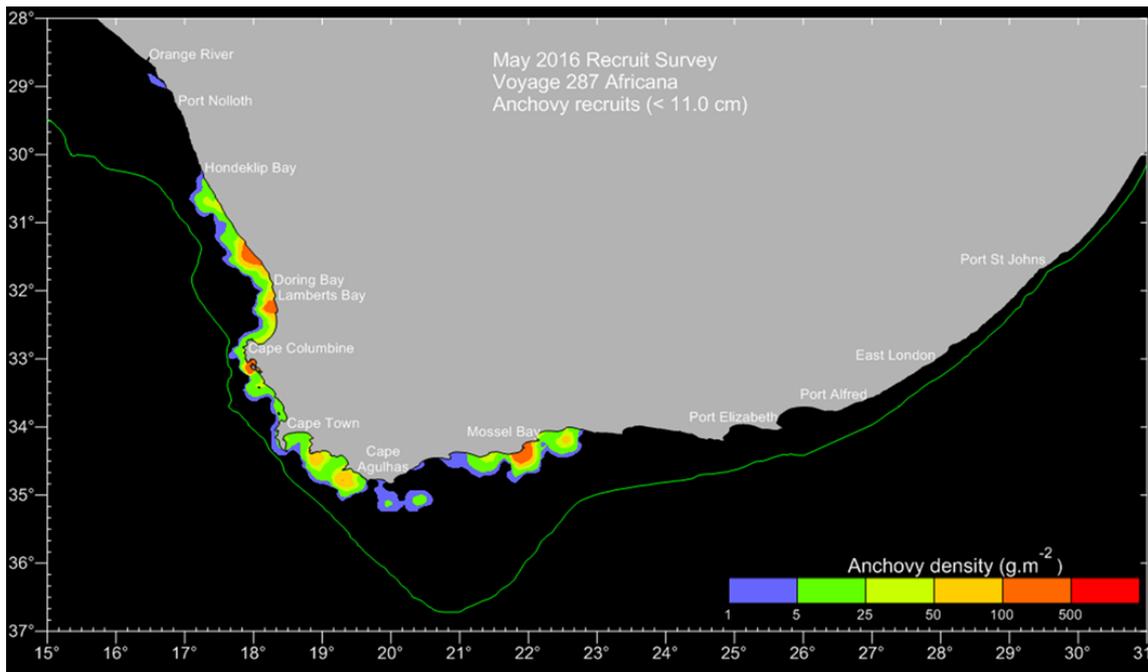


Figure 1: Spatial distribution of anchovy from the May 2016 recruitment survey (Coetzee et al. 2016)

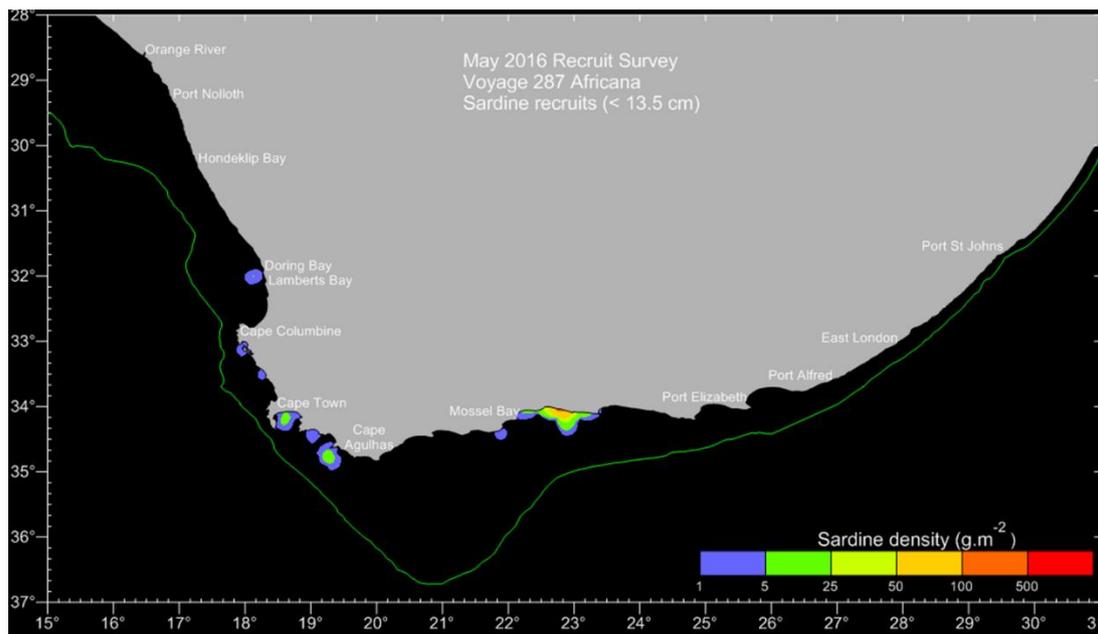


Figure 2: Spatial distribution of sardine from the May 2016 recruitment survey (Coetzee et al. 2016)

The adult sardine TAB with directed round herring and anchovy fishing, juvenile sardine TAB with directed round herring fishing, and anchovy TAB for sardine-only right holders were set at 7 000t, 1 000 t and 500 t respectively at the start of the year and are not revised during the year. Precautionary upper catch limits (PUCLs) were set at 7 268 t for bycatch of horse mackerel (predominantly juveniles), 100 000 t for round herring, and 50 000 t for mesopelagics, comprising lightfish and lanternfish (DAFF, 2015)).

When issuing the final recommendations in July, DAFF reported concern at the current status of the sardine population following several years of poor recruitment, and advised the pelagic industry to try to keep the bycatch of juvenile sardine as low as possible. Industry was also requested to spread their fishing effort for sardine over both south and west coasts. This issue is discussed further below.

Spatial management and the two stock debate

Despite many years of intensive research on sardine some uncertainty still remains about how many stocks of sardine exist. The present OMP is based on an assumption of a single stock on the south and west coasts. However, there is emerging evidence that this assumption is incorrect. Using information from biological differences in individuals from different localities, the distribution of the population around the coast, location of spawning sites and differences in parasite infestation across their range, it now appears that there are actually three distinct stocks of sardine: one each on the west coast, south coast and east coast (van der Lingen et al. 2015). The west and south coast ‘stocks’ are the most important for the sardine fishery. These are not totally isolated from each other and there is thought to be movement of fish between them, with recruitment from the more productive ‘west stock’ to the ‘south stock’ thought to be particularly important for maintaining the productivity of the latter.

The relatively recent awareness of different stocks and the relationships between them has important implications for management because it means that care must be taken not only to ensure that the stock as a whole is not over-exploited and reduced below thresholds at which future recruitment could be threatened, but also that the separate stocks are similarly maintained above critical thresholds. In 2015 and 2016 this was done through an informal agreement between DAFF and the fishing industry that the proportion of the TAC that could be caught west of Cape Agulhas would not exceed 70% and 45.6 %, respectively. In formulating this rule, the underlying rationale was that overall sardine recruitment was primarily dependent on spawning products from the area to the west of Cape Agulhas reaching the West Coast nursery area. Hence it was considered there was a need to ensure a sufficiently large spawner biomass in this western area. In 2016, this arrangement had been particularly problematic for the industry and the arrangements for landing and offloading catches of sardine in Mossel Bay and transporting them to processing plants on the west coast were not working well (DAFF, 2016b). In response to a request from industry, in August this year DAFF and the Small Pelagics Scientific Working Group (SPSWG) reviewed the available evidence on the implications of relaxing the informal arrangement for the remainder of the 2016 season and an interim compromise was reached for this year. The current informal arrangement will need to be reviewed for 2017 and the new OMP to be implemented next year will need to take into account the spatial distribution of the sardine resource and the existence of interacting stocks in these different areas so as to ensure that none are subjected to excessive risk of over-fishing.

The economic and operational implications of a spatially divided TAC are profound, whether this is done directly by the OMP or subsequently through a set of rules such as the current informal arrangement. Failure to take a spatial approach could, however, have major negative impacts on the resource and the ecosystem given the current spatial mismatch between the distribution of the sardine resource and the location of the major landing and processing facilities. Potential adaptation by the industry is further complicated by likely variability in the distribution of the two stocks between the west and the south coasts, which could make planning of, for example, future infrastructure development difficult. The current ad hoc arrangement of landing on the south coast and shipping to the factories on the west coast is clearly not working well but it appears that the need to catch a substantial portion of the sardine TAC on the south coast is not going to go away and that more efficient approaches to landing and processing will have to be pursued.

Interactions between fishing for small pelagic species and conservation of seabirds.

As reported in last year’s Annual Report, the status of the African penguin *Spheniscus demersus* remains an urgent concern and the population numbers are continuing to decline. The total size of the Cape penguin population was estimated to be just over 19 000 breeding pairs in 2015, approximately

37% of the number estimated in 2004 (DEA, unpublished data) and a small fraction of the number thought to exist at the start of the 20th century (DEA, 2013). There are a number of factors considered to be contributing to the decline in penguin abundance, one of which is that pelagic fishing in the vicinity of islands used by penguins for breeding could be having a negative impact on the breeding success of penguins. This possible impact is being examined through an experiment, initiated in 2008, that involves alternately opening and closing the areas around two pairs of islands, Robben and Dassen Islands on the West Coast and Bird and St Croix Islands on the south coast and testing to see whether there is a measureable difference in breeding success between those periods when an island is closed to fishing compared to when fishing is allowed in the vicinity. A Task Team, working under the auspices of the SPSWG, is currently investigating whether this experiment should be able to detect any differences and if so, how much longer the experiment will need to be continued before a meaningful difference can be detected. The Task Team should complete its work and be able to report to the SPSWG and the 2016 DAFF/MARAM International Review Panel before the end of the year.

In parallel with this process, a complementary study of the economic impacts of closing the areas around Robben and Dassen Islands was completed this year. The results from the study suggest that the cost of alternately closing Dassen and Robben Islands would be between ZAR 9.5 million and 50 million per year with an average estimate of ZAR 24 million (Bergh et al. 2016).

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