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Round herring bonanza: Short-term relief or long-term disaster?

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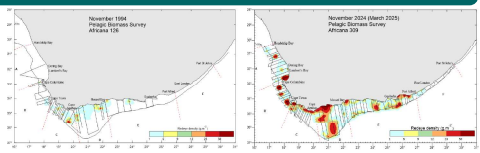
INTRODUCTION

- Round herring *Etrumeus whiteheadi* (or redeye), anchovy *Engraulis encrasicolus* and sardine *Sardinops sagax* account for more than 95% of the total pelagic purse-seine fishery catch. Redeye are targeted opportunistically by the small pelagic purse-seine fleet and prior to 2024, the annual catch had never exceeded 100 000 t or dominated the pelagic landings. Catches of redeye are managed by the setting of an annual precautionary upper catch limit (PUCL), which is set each year in proportion to the biomass.
  Redeye is mostly reduced to fish meal and oil in industrial-scale factories for use in feed formulations.
- Redeye are predominantly targeted on the west coast, close to the fishmeal factories in St Helena Bay. The industry is encouraged to optimise catches of redeye so as to preserve anchovy and sardine stocks when the biomasses of these are low. Catches of redeye have increased dramatically since 2022, in response to a sharp decline in anchovy biomass and Total Allowable Catch.
- Small pelagic fish, such as redeye, occupy a key position in the marine food web where they are the link that transfers energy produced by plankton to large-bodied predatory fish, seabirds, and marine mammals. Escalating catches of redeye could therefore have major effects on higher trophic levels as well as on lower trophic levels potentially disrupting the ecosystem. For this reason, it is essential to not only understand the impact of increased catches of redeye on dependent predators but also the potential for increased redeye biomass to affect the recovery of anchovy and sardine.

METHODS



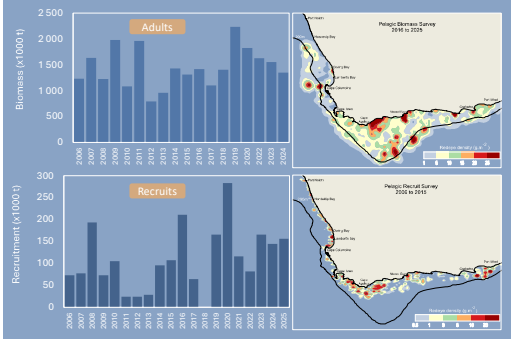
- Bi-annual hydro acoustic surveys have been conducted in South African waters since 1984. These estimate the biomass of small pelagic fish species. Initially focussed on anchovy, these surveys have been extended to cover the whole coast from Hondeklip Bay to Port Alfred. This has allowed for defensible, biomass estimates of the wider distributed redeye as well.

- Refitted the 1978-2015 *Ecosim* base model for the Southern Benguela (Shannon et al 2020) with updated anchovy, sardine and redeye catch and survey biomass data up to 2024.

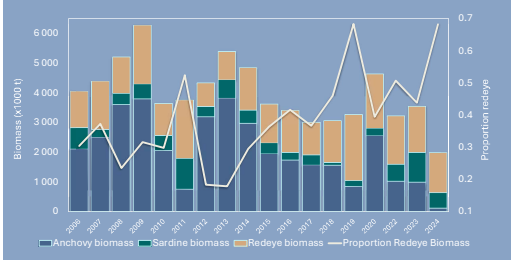
- Simulated increased catches of redeye for a 50-year period (2026-2076) relative to base exploitation levels (F~0.05).
- Catch levels of all other species were retained at their historical (base) levels. Outputs at the end of the projection period for $F_{0.1}$ and $F_{0.2}$ are presented.

RESULTS

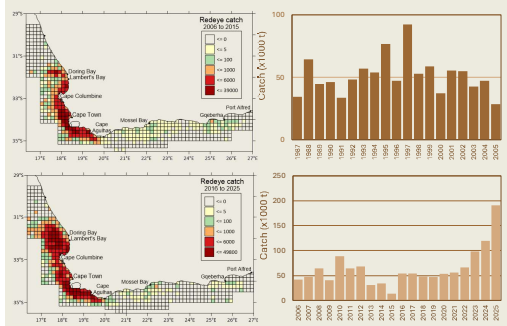
BIOMASS



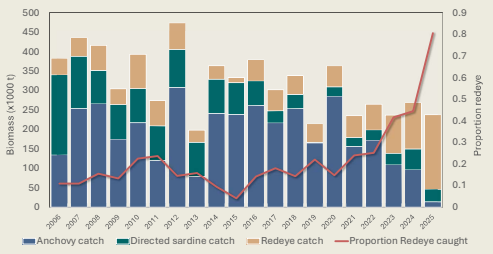
- The biomass of redeye has fluctuated between 0.8 and 2.2 million t since 2006 (average 1.4 million t), considerably higher than the ~0.8 million t average prior to 2006.
- Redeye is widely distributed across the entire shelf, but the bulk of the biomass (>71% on average) is located on the south coast. The high biomass is sustained by regular above average recruit pulses with recruitment both on the West Coast and on the south Coast.
- Given the recent decline of anchovy, and a protracted period of average to below-average sardine recruitment, redeye is currently the most abundant species of small pelagic fish. This situation is likely to persist for the foreseeable future.
- Additionally, estimates of the multiplicative hydro-acoustic survey bias suggest that the biomass of redeye may in fact be two to three times higher than that measured during routine November biomass surveys. There is consequently large potential to develop a targeted redeye fishery and to increase the annual PUCL.



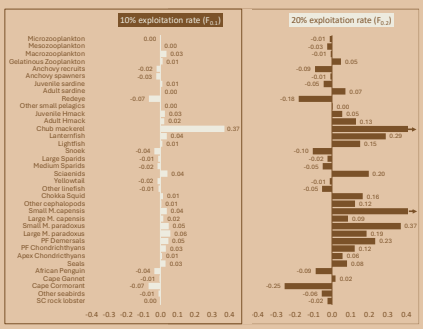
CATCHES



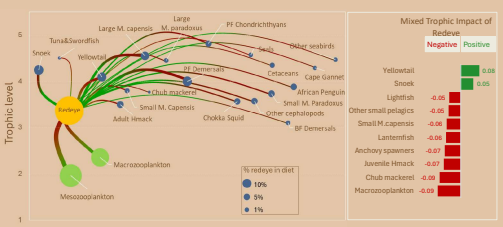
- Redeye were traditionally targeted only during the first three months of the year, prior to the arrival of anchovy recruits on the West Coast. Catches prior to 2006 only exceeded 50 thousand t on a few occasions, despite the PUCL having been set at around 100 000 t and industry having been encouraged to make better use of a lightly-fished and abundant resource.
- Redeye catches have increased exponentially since 2006 and now account for the bulk of the annual small pelagic landings (80% in 2025). Redeye are still only targeted on the West Coast, close to factories in St Helena Bay, with catches extending further offshore in years of large catches. Small amounts of redeye are taken as bycatch in anchovy and sardine-directed fishing.
- However, redeye frequently occur in mixed aggregations with adult sardine and hence a trade-off exists between redeye catches and the directed sardine Total Allowable Catch (TAC). In 2025, >11 000 t of adult sardine has been landed as bycatch with redeye.



ECOSYSTEM



- Outputs from the 50-year simulation suggests that the relative impact of increasing the catch of redeye from the current 5% exploitation level to 10% is relatively small. The most pronounced change is a large increase in chub mackerel biomass. This likely results from continued low fishing pressure on chub mackerel and reduced competition for macrozooplankton prey, given a slight decrease in redeye abundance.
- Increasing the redeye exploitation level to 20%, results in major changes to most components of the ecosystem. Species sharing the macrozooplnkton prey base, such as small *M. capensis* and *paradoxus*, mesopelagics and other pelagic feeding demersal species likely benefit from the reduced pressure on their prey.
- The negative impact on anchovy recruits is most likely through prey switching by predators such as snoek, geelbek and tunas from redeye to anchovy recruits. This has an indirect effect on seabirds that do not primarily depend on redeye for prey.



DISCUSSION AND CONCLUSION

- The recent high biomass and availability of redeye to the purse-seine fleet has offered the small pelagic fishing industry a socio-economic lifeline and largely has negated the negative consequences of three successive years of low anchovy recruitment. The high level of redeye catches in 2025 is, however, unprecedented and has led to concerns being raised about its likely impact on dependent predators.
- Predators most dependent on redeye for prey include snoek, yellowtail, large *M. Capensis* and other pelagic-feeding demersal species. Simulations suggest that if the exploitation level on redeye does not exceed 10% of the biomass, the consequences of these increased catches on dependent predators is small. However, exploitation levels as high as 20% could lead to substantial changes in the flow of energy through the ecosystem. The exploitation level in 2025 is approximately 7%.
- The Department is currently developing a management plan for redeye to promote its sustainable harvest. This plan will likely include improved harvest control rules for the setting of the PUCL based on survey biomass estimates and involve trade-offs with the annual maximum PUCL and adult sardine bycatch. It is essential that biomass estimates for redeye be improved including the estimation of a species-specific target strength regression for redeye and insights into target strength variability with depth. The survey coverage also likely needs to be expanded further northwards to the Orange River.
- The simulation results should be seen as indicative of what might be expected. A full update of the 1978-2015 *Ecosim* base model for the Southern Benguela is currently underway and will lead to improved insights.

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