

Case study 8: Rock lobsters in the Cape du Couedic Sanctuary Zone

Image credit: Stephen Barber

Background

The Cape du Couedic Sanctuary Zone (CDCSZ) lies within the Western Kangaroo Island Marine Park (WKIMP) and forms part of the WKIMP management plan. The CDCSZ was designed to protect rocky reef habitat characteristic of the region and also the species that live there including sea lions, fur seals, reef fishes and rock lobster. The CDCSZ at the south-western corner of Kangaroo Island was proclaimed in November 2012, and fully implemented on 1 October 2014 when fishing restrictions commenced, including the prohibition of commercial rock lobster fishing. In order to minimise potential impacts on rock lobster fishers the zoning of the South Australian marine parks network aimed to avoid key fishing grounds, and displaced fishing effort was removed from the fishery through a voluntary catch/effort reduction program (refer to Assessment 2a).

The commercial rock lobster industry had concerns that the CDCSZ had removed one of their most productive fishing grounds, and were also interested to find out if protection was having a positive effect on the rock lobster population. Following discussions and negotiations during 2016 a collaborative study was commenced involving DEWNR Marine Parks, PIRSA Fisheries, SARDI Aquatic Sciences and the SA Northern Zone Rock Lobster Fishermen’s Association.

In February 2017 a survey was undertaken by SARDI researchers using an experienced, local rock lobster fisher to estimate the size and abundance of rock lobster (*Jasus edwardsii*) inside and outside the CDCSZ, using commercial pots and fishing techniques. As part of the study, changes over the previous 20 years in the catch rates of rock lobster both inside and outside the CDCSZ, were also investigated by SARDI through comparison with historical fisheries survey data (see McLeay et al. 2017).

This case study highlights the key findings of the rock lobster study, the links with the WKIMP management plan strategies, and some early socio-economic and ecological outcomes as a result of implementation of the WKIMP management plan.

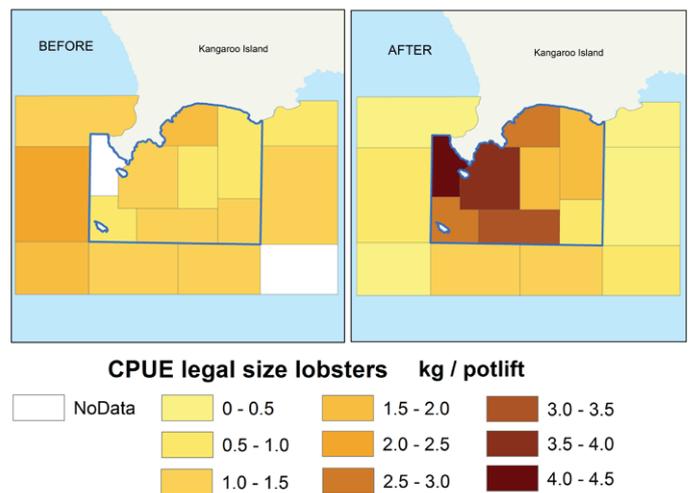
Key findings of the study (from McLeay et al. 2017)

The 2017 survey estimates of relative biomass (catch per unit effort (CPUE), kilograms per pot lift) and abundance (CPUE, number lobster per pot lift) of legal size lobsters (≥ 105 mm carapace length) were 4.4 and 3.5 times higher, respectively, inside compared to outside the CDCSZ.

Positive population responses within the CDCSZ were indicated by an 81.1% increase in relative biomass, 42.2% increase in relative abundance, and 4.1% and 12.5% increases in the mean size of legal size female and male lobsters, respectively, since the 2013/14 fishing season, when fishing was last permitted.

These results support other research into the effects of marine parks on commercial lobster stocks, and are biologically plausible considering that the lobsters have been protected through 3 summers and 2 winters since full implementation of sanctuary zones, providing ample time for the lobsters to moult and grow.

Analyses of the historical CPUE data indicate that the relative biomass and abundance inside and outside CDCSZ were similar between 1994/95 and 2013/14, prior to marine park implementation, indicating that the lobster population located south of Cape du Couedic was distributed relatively evenly across all rocky reef habitats inside and outside the CDCSZ during this period (see figure below).



Heat map showing historical catch rates before (=1994/95–2013/14) versus after (=2017 survey) implementation of the sanctuary zone (data taken from McLeay et al. 2017)



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Management plan strategies

The rock lobster study has addressed multiple strategies of the WKIMP management plan:

Strategies addressed					
5	10	11	12	13	15
✓	✓	✓	✓	✓	✓

Strategies 5, 12: Results of the rock lobster study have been released in the publically-available document by McLeay et al. (2017) and in this Status Report.

Strategies 10, 13: The rock lobster study was undertaken as part of the marine parks MER Program after being identified as priority research. The results support the predictions of change for the WKIMP management plan.

Strategy 11: The rock lobster study was a collaborative project between DEWNR, PIRSA, SARDI and the rock lobster industry.

Strategy 15: The marine parks compliance sub-program has undertaken activities in the Cape du Couedic SZ that have assisted with the positive ecological outcome seen in the rock lobster study.

Ecological outcomes

Specific evaluation questions addressed:

- ✓ Have sanctuary zones maintained or enhanced biodiversity and habitats?

While it is predicted that ecological changes will generally take many years or even decades to be observed, the rapid response of rock lobster in the CDCSZ is an early demonstration of the effectiveness of sanctuary zones in enhancing marine biodiversity. Rock lobster is a keystone species in temperate reef ecosystems and the recovery of this species will assist with the recovery and resilience of the entire ecosystem within the CDCSZ. One study has shown that temperate reef ecosystems with large rock lobsters are more resilient to the impacts of climate change and invasive species (Ling et al 2009).

Socio-economic outcomes

Specific evaluation questions addressed:

- ✓ Have local businesses and communities changed due to marine park management plans?

The positive ecological results of the rock lobster study demonstrate that compliance of illegal fishing has been good to date and that the rock lobster industry has respected the boundaries of the CDCSZ. While rock lobster fishers can no longer fish inside the CDCSZ, there is no evidence (based on catch rate) that the WKIMP zoning removed their most productive fishing ground. The Northern Zone Rock Lobster Fishery has continued to function since the CDCSZ and other sanctuary zones were fully implemented, with 99% of the

Northern Zone quota taken in the first fishing season following 1 October 2014 and 97% taken in 2015/16; these values are consistent with the three seasons prior to SZs where the quota taken ranged from 94% to 99% (see Linnane et al. 2017a).

References

- Ling, SD, Johnson, CR, Frusher, SD & Ridgway, KR (2009), Overfishing reduces resilience of kelp beds to climate-driven catastrophic phase shift, Proceedings of the National Academy of Science, vol. 106, no. 52, pp. 22341–22345.
- Linnane, A., McGarvey, R., Feenstra, J. and Grasse, D. (2017aziz). Northern Zone Rock Lobster Fishery 2015/16. Fishery Assessment Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2007/000320-11. SARDI Research Report Series No. 954. 78pp.
- McLeay, L., McGarvey, R., Linnane, A., Feenstra, J. and Hawthorne, P. (2017). Rock Lobster Survey of the Western Kangaroo Island Marine Park – Cape Du Couedic (Sanctuary Zone 3). Report to the Department of Environment, Water and Natural Resources. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000282-1. SARDI Research Report Series No. 962. 38pp.



Marine park interpretive signs on Kangaroo Island



Rock lobsters are protected by the Cape du Couedic Sanctuary Zone