

# **Reef habitats of Gulf St Vincent.**

Data report to Adelaide Aqua April - May 2011

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## **Background**

The desalination plant at Port Stanvac will discharge saline concentrate (above oceanic salinity levels) into the waters adjacent to the plant site. In order to detect any environmental impact (if any) of this discharge, data needs to be collected on the current state of subtidal reefs (specifically the biological community) adjacent to the discharge and at reference sites at a distance from the discharge site.

As part of this survey, data is being collected before the plant begins operation as well as being part of any ongoing monitoring program. As such, all data need to be collected using standard procedures (Turner *et al.* 2007) and site locations that were used for the initial desalination plant site assessment (Theil & Tanner 2009). Data is being collected across a number of seasons before the plant begins operation. The survey includes reefs that will potentially be impacted (i.e. close to the plant) and reference sites at a distance from the plant.

## **Methods**

The methods used in gathering the data in the current report were the same as those used for the initial environmental assessment (Theil & Tanner 2009) to ensure comparability, consistency and commensurability with past (e.g. EIS surveys) and future work (e.g. ongoing monitoring). The full complement of surveys will involve surveys throughout 2009 - 2011. Data for 2009 are presented in Russell and Connell (2010), with data presented here are for the surveys in April - May 2011.

Surveys of benthic algae, invertebrates and fish were done at two shallow subtidal reefs adjacent to the Port Stanvac desalination plant discharge, as well as on each of 4 reference sites (Hallet Cove, Noarlunga, Horseshoe and Moana reefs); two reefs were surveyed at each

site (Figure 1, Table 1), with two transects at each of the reefs (20 transects in total). Surveys were conducted using the Reef Health survey protocols (Turner *et al.* 2007, Appendix A & B). Each site consisted of a pair of transects that were surveyed for macroalgae, benthic invertebrates, mobile invertebrates and fish. Along each transect, mobile fish were first enumerated by a SCUBA diver (50 × 5 m belt transect). Benthic invertebrates were then counted by this same diver returning along the transect (50 × 1 m belt transect). Both fish and invertebrates were identified to the lowest taxonomic resolution possible. Meanwhile, another diver identified the percentage cover of different types of algae along a 20 m transect using the line intercept transect method (LIT) and collected specimens of all algae to be identified to species.

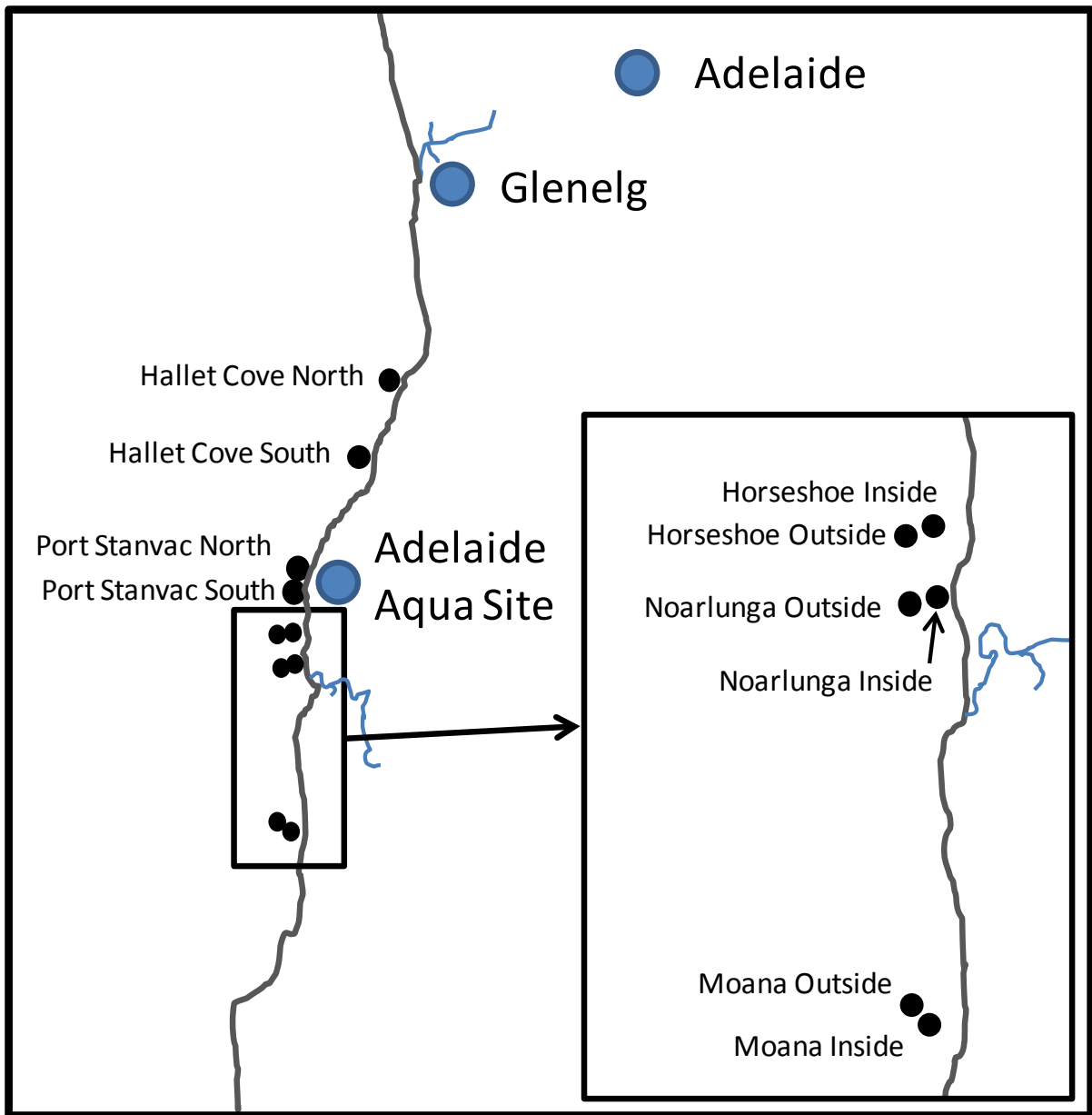


Figure 1. Map of the study sites.

Table 1. GPS coordinates of the study sites.

<b>Site name</b>	<b>GPS Coordinate</b>
Hallet Cove North	35.0525° S 138.5027° E
Hallet Cove South	35.0736° S 138.4943° E
Port Stanvac North	35.0976° S 138.4775° E
Port Stanvac South	35.1034° S 138.4742° E
Horseshoe Reef Inside	35.1379° S 138.4629° E
Horseshoe Reef Outside	35.1394° S 138.4580° E
Noarlunga Reef Inside	35.1474° S 138.4630° E
Noarlunga Reef Outside	35.1474° S 138.4630° E
Moana Reef Inside	35.2065° S 138.4622° E
Moana Reef Outside	35.2091° S 138.4643° E

## Data Results

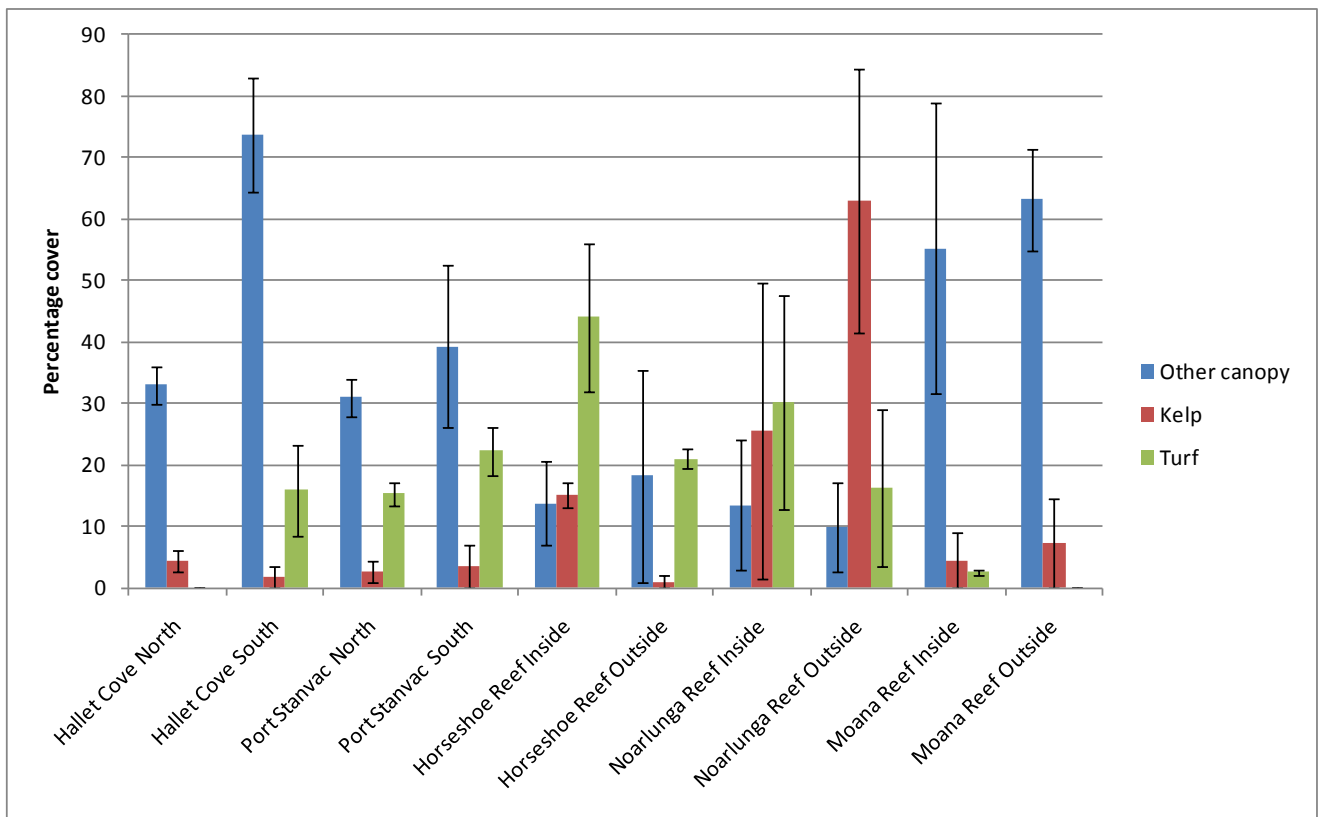


Figure 2. The percentage cover of kelp (*Ecklonia radiata*), other canopy-forming algae (fucoids) and turf-forming algae ( $\pm$  SE) at the 10 study sites in April - May 2011.

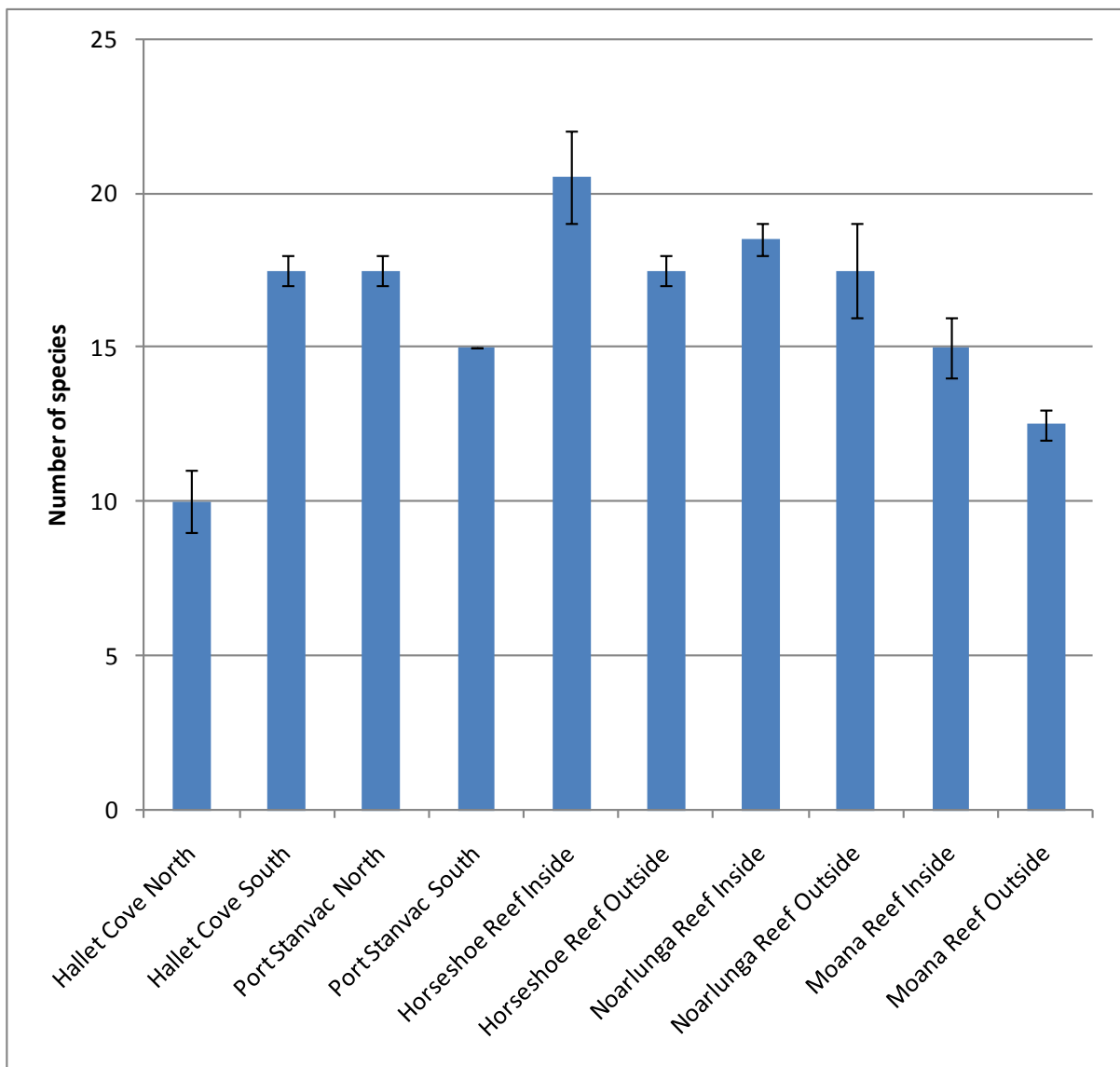


Figure 3. The mean species richness of invertebrates ( $\pm$  SE) at the 10 study sites in April - May 2011. Note: At Hallet Cove North, transect 1 was only 40 m long.

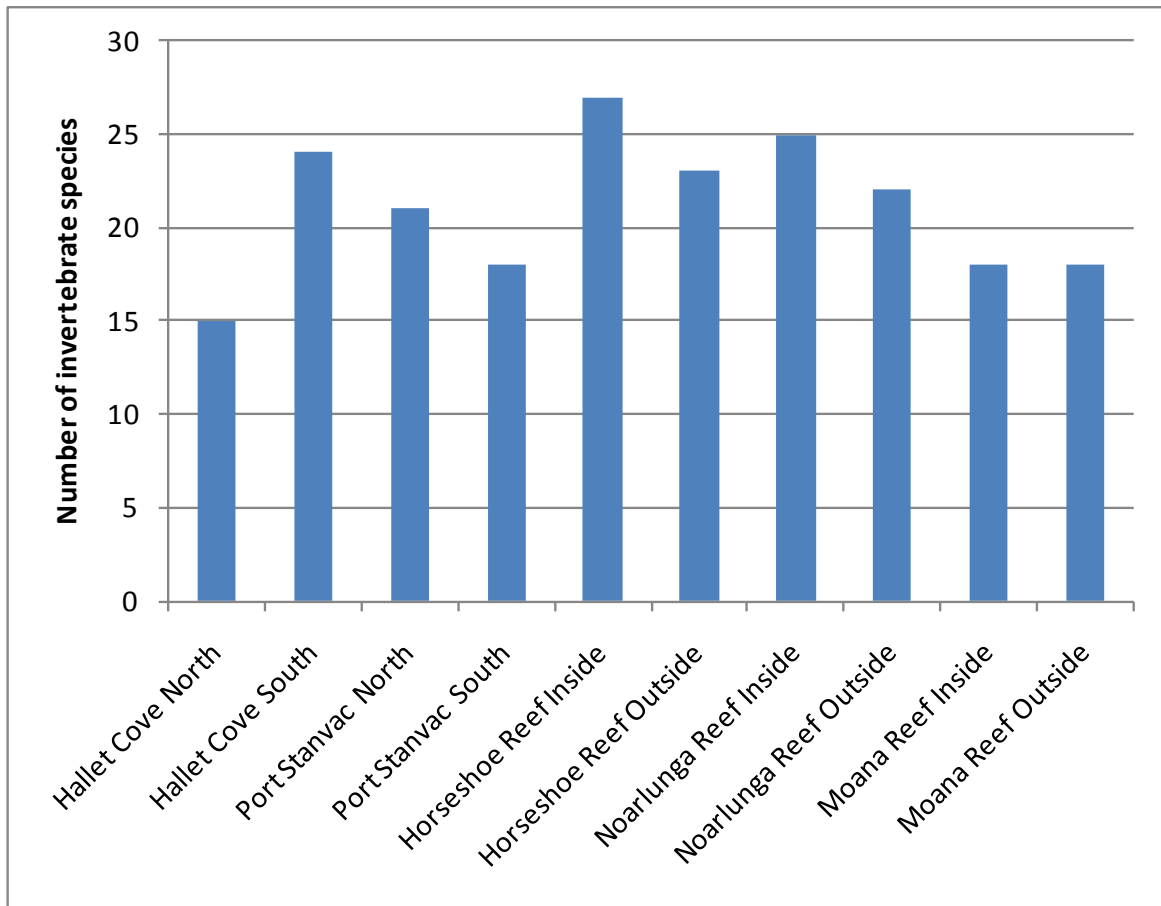


Figure 4. The total species richness (total number of species) of invertebrates at the 10 study sites in April - May 2011. Note: At Hallet Cove North, transect 1 was only 40 m long.



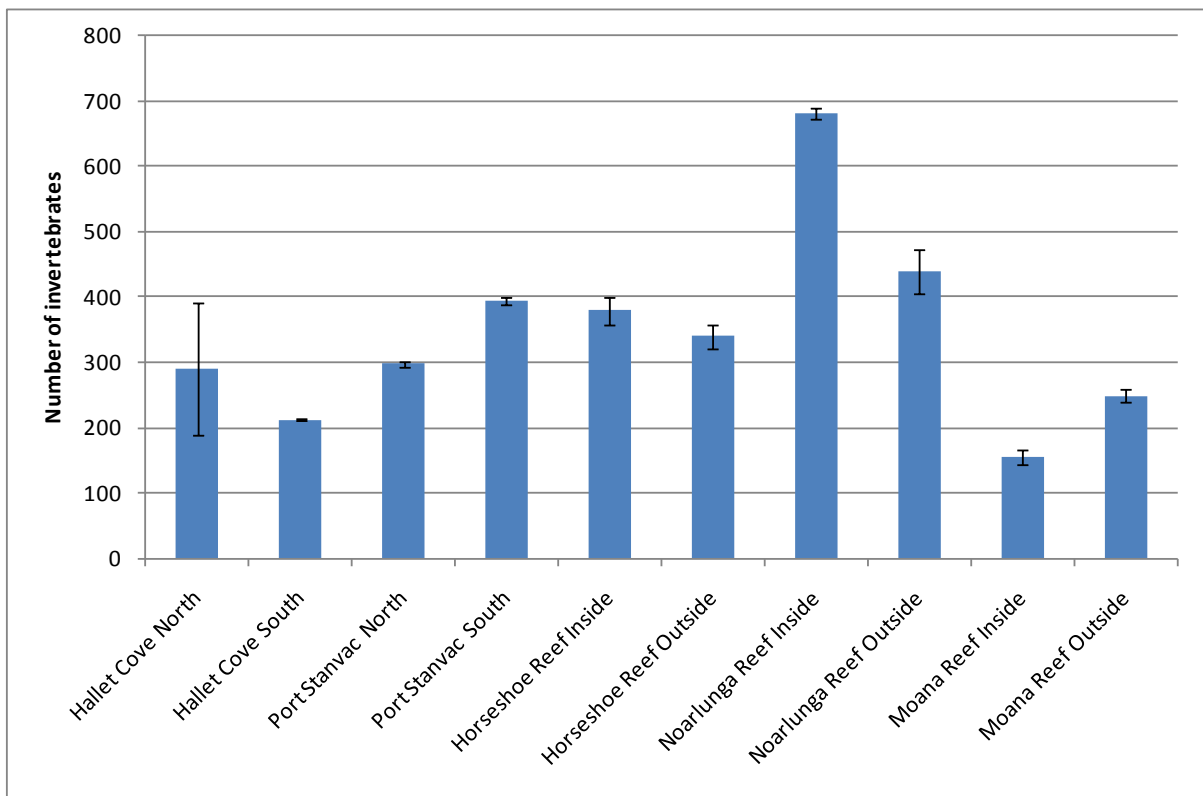


Figure 5. Mean abundance of invertebrates ( $\pm$  SE) present within survey transects at the 10 study sites in April - May 2011. Note: At Hallet Cove North, transect 1 was only 40 m long.

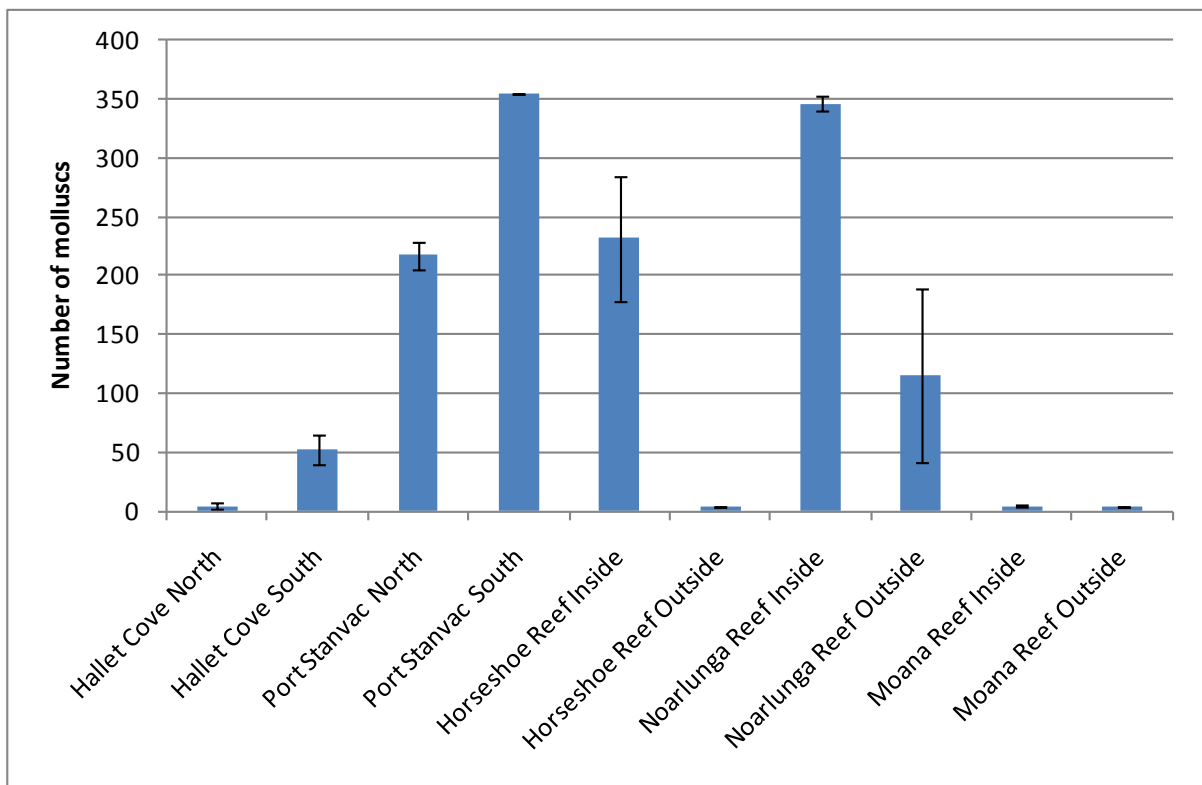


Figure 6. Mean abundance of molluscs ( $\pm$  SE) at the 10 study sites in April - May 2011. Note: At Hallet Cove North, transect 1 was only 40 m long.

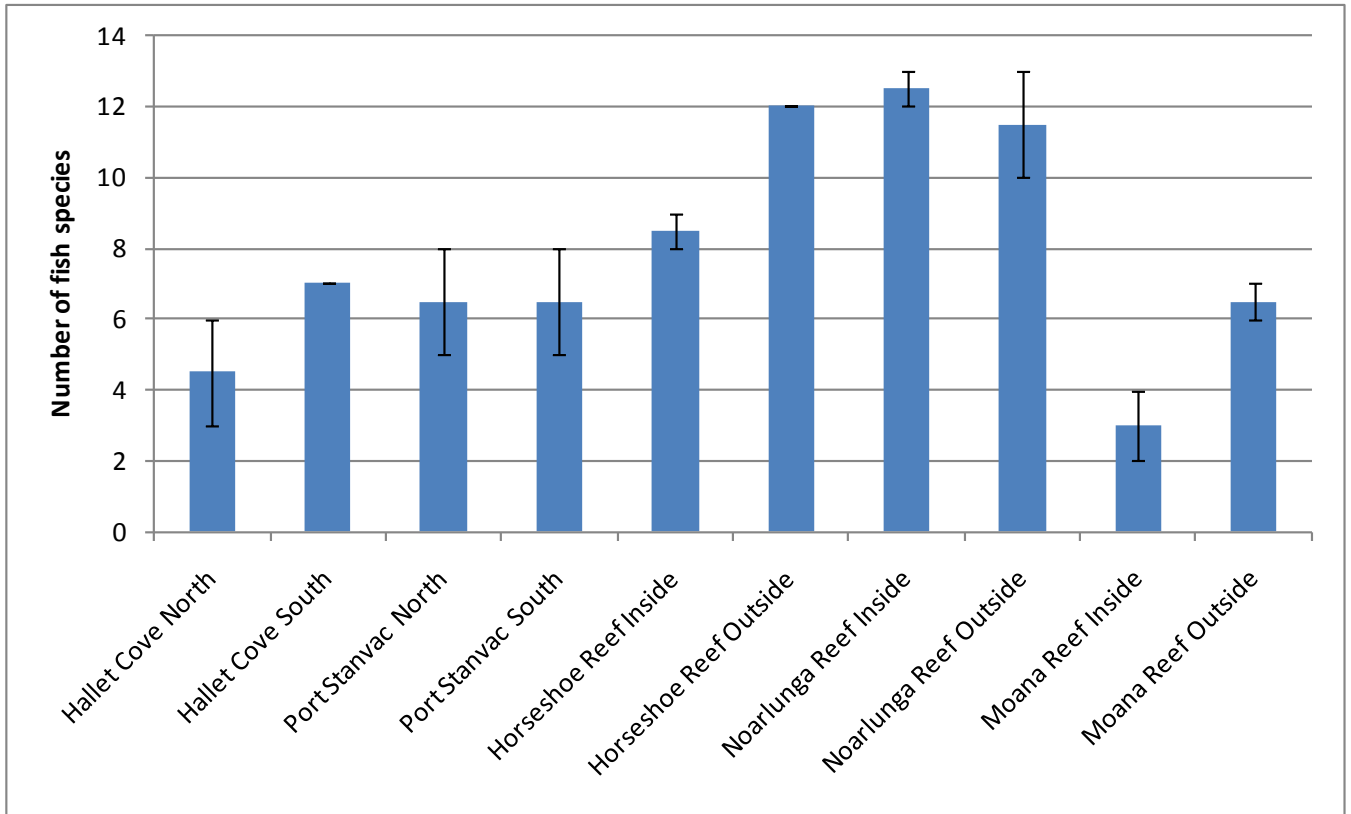


Figure 7. Mean species richness ( $\pm$  SE) of fish at the 10 study sites in April - May 2011.

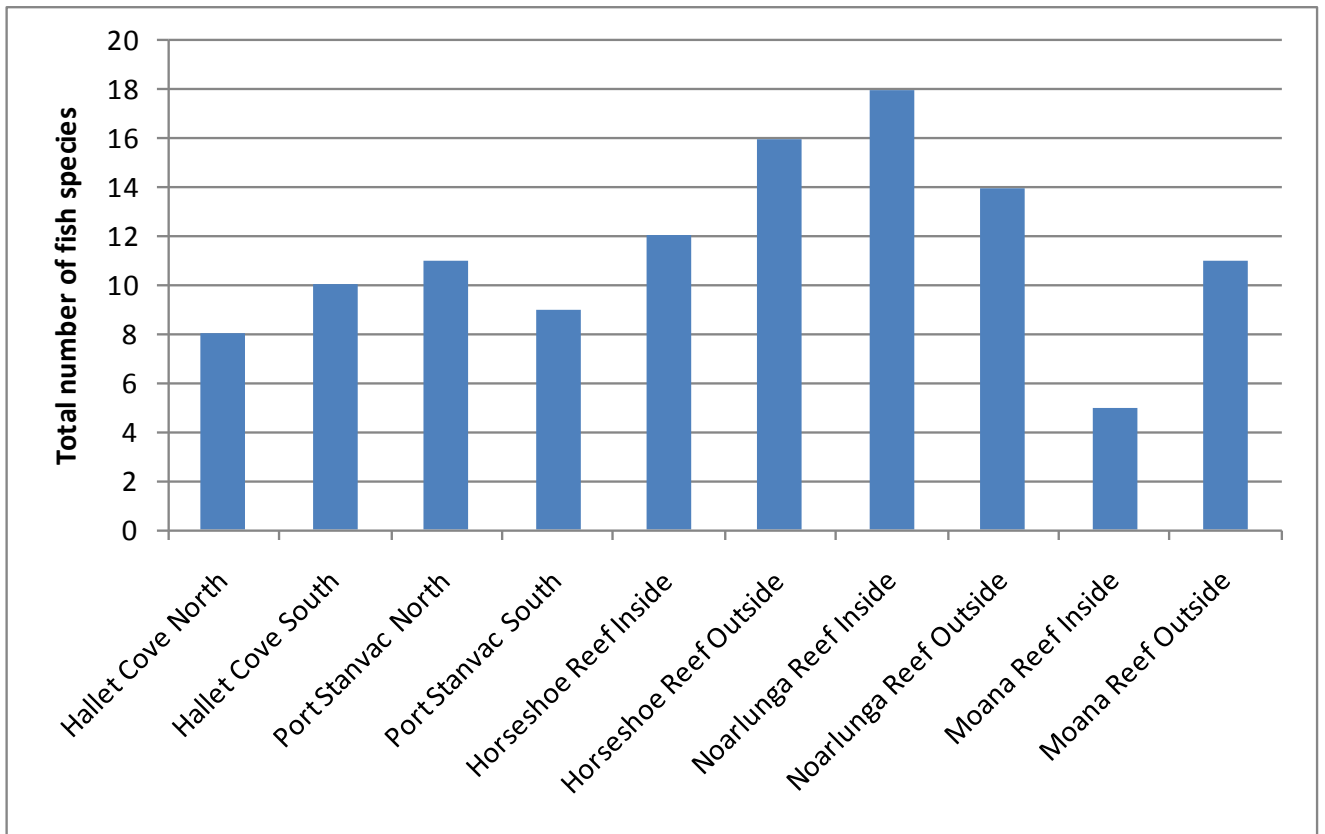


Figure 8. Total species richness (total number of species) of fish within the 10 study sites in April - May 2011.

## References

Russell BD, Connell SD (2010) Patterns of rocky subtidal assemblages across the Adelaide Metropolitan coast: a baseline in relation to future coastal desalination for Adelaide City. Published by the School of Earth and Environmental Sciences, University of Adelaide. 35 pp.

Theil MJ, Tanner JE (2009) Marine characterisation study for possible seawater desalination plant to supply Adelaide, final report prepared for South Australian Water Corporation. SARDI publication number F2008/001128-1. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. 66 pp.

Turner DJ, Kildea TN, Westphalen G (2007) Examining the health of subtidal reef environments in South Australia, Part 2: Status of selected South Australian reefs based on the results of the 2005 surveys. South Australian Research and Development Institute (Aquatic Sciences), Adelaide, 97pp. SARDI Publication Number RD03/0252-6.