

SHORT SUMMARY

CRC.21.002 – Baseline Survey of the Blue Economy Zone (Phase II)

RESEARCH PROGRAM: RP4 ENVIRONMENTAL AND ECOSYSTEMS (EE)

KEY POINTS

This report details the characterization of the environment within an area of interest for a potential Blue Economy Zone (BEZ) in Commonwealth Waters off Northern Tasmania through field work survey. While the area surveyed is larger than Fisheries Management Area designated by the Federal Government in 2022, and the smaller proposed research trial site within the Fisheries Management Area, this survey provides a useful broader ecosystem context, with results indicating:

- △ Mild sloping bathymetry with water depths ranging between 35–45 m at the southern (shoreward) edge and exceeding > 60 m at its offshore boundary, consisting of rocky reef and rubble with limited quantities of sand in the shallower regions (35 m to 45 m depth) and further offshore increasing layers of mud.
- △ Mean tidal currents of 0.09 m/s with maximum of 0.48 m/s measured, with wind-driven current speed increase towards surface layers.
- △ Average wave heights of approximately 1 m with maximum significant height of 4.95 m. Wave direction was found to be strongly focused between North-Westerly directions in winter to North-Easterly directions in summer.
- △ Water column was stratified during the summer months, with temperatures > 19° C found, reducing to a well-mixed column at 14° C during winter. Dissolved Oxygen at ~ 8mg/L, salinity from 35.5 PSU and 35.7 PSU, and Chlorophyll levels from 1.5 to 3mg/L were measured.
- △ During Fish trawls the overall catch composition consisted of sessile (58.7%) and mobile (41.3%) epifauna by weight. Fifty-one different species were identified in the mobile epifauna with the common gurnard the most abundant species.

THE CHALLENGES

Moving new Blue Economy industries offshore is a significant challenge that requires new approaches to the development and application of traditional site selection criteria and new approaches to accommodating multiple sea users in areas that have traditionally been the ‘high seas’. The requirements for monitoring systems also becomes more complex with respect to reducing risks to staff and infrastructure through the operation of automated systems, data collection and environmental impact assessments. Specifically, the survey area in Northern Tasmania is well known to local fishermen but there is no wave gauge, water velocity measurements or wind data in close proximity that could be used as a reliable data source. Likewise, there is no detailed data about the seafloor characteristics (including ground penetrating radar data) and no known published data of the species composition within the survey area. This report therefore constitutes a first scientific approach to characterise the site conditions and potential use of sea space for BE CRC R&D activities. Noting the area surveyed and reported has provided the context to identify and ultimately designate the final aquaculture research trial area.

THE OPPORTUNITY

This project lays the groundwork to linking all physical, environmental, cultural and heritage, resource potential, operational logistics and risks into a comprehensive decision support tool (or suite of tools). There is a paucity of information on the environmental conditions in the BEZ area of interest, which is needed to underpin planning of industry trials and other BE CRC projects that will utilise the smaller research trial site within the BEZ. This broader mapping across the survey area informs regulatory submissions and subsequent reporting for the final designated BEZ research trial site.

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OUR RESEARCH

Objective

To characterize a proposed BEZ area of interest– a designated marine area for emerging Blue Economy R&D activities – in Commonwealth Waters off Northern Tasmania. The approaches developed in this project will be transferrable to other potential and appropriate BEZ’s around Australia.

Methodology

Field data was collected between March 2021 and December 2022 within the BEZ. This fieldwork was a collaboration between the University of Tasmania, University of Queensland, Griffith University and industry partners Tassal and Xylem. The major activities performed included mapping of the seafloor, sediment and benthic habitat, monitoring the local wave, wind and ocean current climates as well as getting an understanding of fish species in the BEZ survey area.

remaining 12% of taxa consisted of diverse taxonomic groups. There were no significant differences in taxonomic composition between the stations along the presumed gradients (offshore to inshore or east to west).

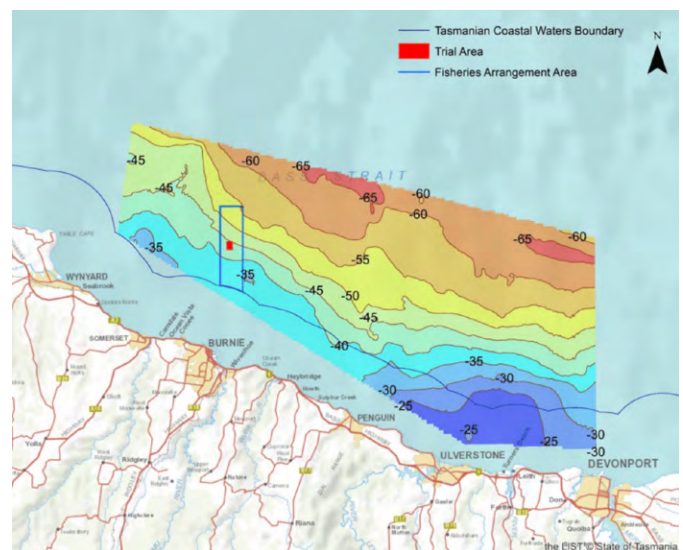


Figure 1104:
Single Beam
Bathymetry in
BEZ

Fisheries Arrangement Area	
NW 145° 55' 11.86061" E	40° 55' 34.99345" S
NE 145° 56' 46.03965" E	40° 55' 34.99345" S

Trial Area	
NW 145° 55' 36.48312" E	40° 57' 22.76261" S
SW 145° 55' 36.76380" E	40° 57' 50.32994" S
SE 145° 56' 02.09006" E	40° 57' 50.33792" S
NE 145° 56' 01.16491" E	40° 57' 22.76464" S

OUTCOMES

Sub-bottom Habitat and Mapping

The area of interest has a mild sloping bathymetry with water depths ranging between 35-45 m at the southern (shoreward) edge and depths exceeding > 60 m at its offshore boundary (Figure 1). Sediment grabs and Sub-bottom profiling revealed rocky reef and rubble with limited quantities of sand in the shallower regions (35 m to 45 m depth). In the deeper regions and further offshore a layer of mud is present that gradually increases in thickness with increasing water depths. The sub-tidal microbenthic assemblage was dominated by annelid worms (46% of total recorded taxa), arthropods (23% of total recorded taxa), molluscs (19% of total recorded taxa) and the

Currents and Wave Characterisation

The currents in the BEZ survey area were minimal during the ADCP deployment period, with mean current speeds of 0.09 m/s found. Maximum current speeds of 0.41 m/s at the bottom and middle water column to 0.48 m/s at top water column were found, with this increase due to the wind-driven current increasing the tidal velocities on the surface layers. Average wave heights during the deployment were between 0.91 m and 1.02 m for the Sofar Wave Spotter buoy and the ADCP respectively. The maximum significant wave height recorded was $H_s = 4.95m$ which occurred in November 2022. Mean wave periods ranged between $T_m = 2.96 s$ and $T_m = 4.26 s$ (depending on measuring device and period of

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measurement). The wave direction remained strongly focused between North-Westerly directions in winter to North-Easterly directions in summer throughout the deployment period.

Water Column Parameters

Preliminary water column profiling suggests that the water column is well mixed within the top 40 meters but was periodically stratified in the bottom 5 meters. Between March and May the DO levels remained relatively constant throughout the time at ~ 8mg/L. Salinity varied only little and was found to be between 35.5 PSU 35.7PSU.

The water temperature was also monitored with a separate thermistor string which was operating between July 2021 and December 2022. Supporting the data from the profiling system the water was stratified during the summer months, with water temperatures exceeded >19° C throughout the water column in the later period of the summer of 2021. In late February the water starts to cool down and becomes well mixed again. A constant decrease from 19° C to < 14° C was recorded until the end of April, where the temperature again rose to >15° C (at the surface) by the onset of summer of 2022.



Figure 2: Catch sorting on FTV Bluefin

Fish Species

For the fish trawls (Figure 2) the overall catch composition consisted of sessile (58.7%) and mobile (41.3%) epifauna by weight. The proportion of sessile epifauna varied between trawls from 82.2% (trawl 6) to 41.4 (trawl 4). Fifty-one different species were identified in the mobile epifauna and most (75.5%) of the mobile epifauna by numbers consisted of fish, and the common gurnard (*Neosebastes scorpaenoides*) was the most abundant species.

NEXT STEPS

Among other parameters, the wave climate, water depths, the benthic habitat as well as seafloor conditions suggest suitability for offshore projects. The next steps are to continue monitoring the BEZ survey area to generate longer-term data sets for use in other BE CRC research programs including MSP data inputs. In particular, more data on water temperature, salinity and dissolved Oxygen would be beneficial especially for initiatives to advance the aquaculture industry in Commonwealth waters off Northern Tasmania. Longer-term deployments over larger spatial areas will also capture any temporal and spatial variations. The required monitoring could be achieved with a “Site/Resource Characterization” project” within the BE-CRC in 2023.

PROJECT TEAM

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