RV *Investigator* Voyage Plan

VOYAGE #:	IN2026_V04
Version Number:	Final 1.0
Voyage title:	Quaternary evolution of the Darumbal & Woppaburra Sea Country in the Southern Great Barrier Reef
Mobilisation	Brisbane, Monday 27th July, 2026
Depart:	Brisbane Tuesday 28th July 2026 1400 HRS Voyage change over at Heron Island – 7/8th August
Return:	~0800 Brisbane Thursday 20th August 2026
Demobilisation:	Brisbane, Thursday 20th August 2026
Voyage Delivery Coordinator:	Susan Carins
Voyage Manager	Matt Kimber
Chief Scientist:	Prof Helen Bostock
Affiliation:	University of Queensland

Scientific objectives

1) Characterise the Quaternary evolution of Darumbal and close neighbour Woppaburra Sea Country and integrate with traditional knowledge to contribute to understanding the cultural heritage values of the SGBR.

Previous research in the region has identified geomorophological features, such as river channels, estuary, beach ridges. The objective of this voyage is to systematically survey the GBR lagoon at water depths of 40-200 m, which were previously exposed as a coastal plain. Developing new geomorphological maps of the seafloor and the sub-surface will provide new maps of the sea country and how it has evolved over the past 60,000 years. These geomorphological features will be sampled to provide dates and paleo-vegetation reconstructions of the coastal plain and sea level rise. Working with the Darumbal and Woppaburra TUMRA sea country rangers and elders we will integrate traditional owners' cultural knowledge of the region with the new geomorphological data.

2) Assess the Quaternary evolution and development of the coral reefs in the SGBR.

The modern coral reefs of the Great Barrier Reef initiated around 9000 years ago when sea level reached close to the modern day. However, there is evidence from the central GBR that the reefs did not go extinct during lower sea levels, instead they shifted down slope with the sea level and continued to exist when sea level was 120 m below present on a series of terraces (Webster et al., 2018). Previous voyages in the SGBR have mapped a series of terraces at ~120 m below present offshore the Swains and Capricorn Bunker group reefs (McNeil et al., 2020). These will be sampled to ground-truth their origin to understand how the coral reefs in this region evolved over the last Quaternary. Longer sediment cores offshore provide continuous temporal records of reef development (Bostock et al., 2009). This is also of interest to the Darumbal and Woppaburra who utilise a wide range of resources from the reefs, and help to manage the modern reefs and ecosystems in their TUMRA.

3) Study the interaction of the modern ocean currents with the reefs and seascape of the SGBR – to help validate and improve eReefs models.

There have been few dedicated voyages or oceanography research on the SGBR (Burrage and Kleypas 1994; Middleton 1990; Burrage and Kleypas 1994; Weeks et al., 2010; Liu et al., 2014) and the limited observational data from satellites and a couple of moorings limit the testing and validation of the CSIRO eReefs Model that is used by the GBRMPA to manage the area. There is limited information of subsurface processes (uplift – upwelling that doesn't reach the surface). The exchange of water between the East Australian Current which flows around the Swain Reefs and the influence of the Capricorn Eddy, a lee eddy in the Capricorn Channel, is poorly studied. Based on the limited data and the eReefs model this region has been proposed as a potential refugia for coral reefs under future climate change (Sun et al., 2024), thus improving our understanding of the oceanographic processes in the region and testing the eReefs model is critical to assess this refugia hypothesis and manage the region appropriately. The eReefs model will be used in forecasting mode during the voyage (4 day lead time). This will be used to target observations to test the model in near real time.

4) Atmospheric measurements for the SGBR will contribute to the Reef Restoration Adaptation Project (RRAP)

The atmospheric monitoring on the RV Investigator aims to characterise aerosol properties and their interactions over the Great Barrier Reef, providing essential high-quality data to improve models used for predicting coral bleaching events. The atmospheric monitoring team at QUT would also like to test out a new piece of equipment on the voyage to investigate the gas-phase organic and inorganic compounds

present in marine atmosphere using Selective Ion Flow Tube Mass Spectrometer (SIFT-MS) with new reagent ions selection capability.

Voyage objectives

To meet this scientific objectives we will conduct a range of activities on the RV Investigator during IN2026_V04.

Objective 1

- Multibeam (EM2040 and EM712) and sub-bottom profile survey (grid) across the GBR lagoon in water depths of 40-200m in the upper part of the Capricorn Channel. This will not be a comprehensive survey – it will initially be a grid which will be used to identify areas of interest and past water ways, which are the most important locations for the Traditional owners.
- Drop/Deep towed camera will be used to visualise the geomorphological features on the seafloor prior to rock dredges and sediment sampling using the Box Core/Grab samples to ground-truth our understanding of these features and to date them and develop a sea level curve for the region.
- Gravity cores (Kasten cores) will be targeted in suitable sediment targets such as paleo-lakes and coastal environments to capture temporal changes in sediments and proxies to determine past environmental change over the last 60,000 years.

Objective 2

- Rock dredges and deep towed cameras will be used to assess submerged terraces between 60 and 130 m water depth to determine if these are relict glacial coral reefs.
- Sediment cores (Kasten and Piston cores) will be collected in the Capricorn Channel adjacent to the reefs, to provide temporal records of the coral reef evolution through time. (These longer cores will also be used for Objective 1).

Objective 3

- ADCP 150 (and ADCP75), CTD and Underway will be used to assess the oceanographic properties – temperature, salinity, oxygen, nutrients etc.
- Wirewalker – provided by AIMS will be used to undertake a temporal tidal cycle of the flows on and off the shelf. This region has strong macrotides. The wirewalker will be deployed at the start of the voyage at approx 100 m water depth in the centre of the Capricorn Channel, where the tidal flows are the strongest. The wirewalker would then be collected near the end of the voyage to maximise the data. More info on the wirewalker supplied in appendix. It has previously been used on the RVI.
- SLOCUM Glider (see piggy back below) – provided by IMOS glider facility. A routine glider survey has been requested to survey the Capricorn Channel region during the voyage to maximise the oceanography data collection. The glider will be deployed from Heron Island and will fly along the shelf edge, and will aim to be recovered from a small vessel from Heron Island, but may need to be recovered by the RVI during the voyage (a crate will be shipped to the RVI in Brisbane incase).
- Bioluminescence sensor, eDNA and plankton samplers (see piggy back below) will be used to assess biological productivity in the region.
- Triaxus will be used as an option for the CTD transects offshore in water depths >150 m – if conditions allow. Then a CTD will be undertaken at either end to collect samples for hydrochem.

Objective 4

- Atmospheric equipment – listed below in the tables are the required equipment already on the RVI. Additionally, we would like to also test a new SYFT Tracer i8. This is part of an indigenous PhD student David Corporal's project at QUT – David will be participating on the voyage.

To accommodate traditional owner and PI commitments there will be a Mid-voyage transfer from Heron Island on the 7th/8th August – this will divide the voyage into two legs. Transfers between the island and the ship will be on small boats from the Heron Island research station. This will follow the same protocol as was previously undertaken on a RVI voyage during October 2025.

Piggyback Projects

1. Glider oceanographic survey in the Capricorn Channel (recovery operations), Dr. Christine Hanson University of Western Australia.

Objective: To provide detailed spatial and depth surveys of key areas of the Southern GBR to understand the main oceanographic processes in the region and complement the oceanographic data collected during RVI IN2026_V04 and test the eReefs model.

Ocean gliders are an important oceanographic tool to undertake detailed regional surveys. Here we propose to undertake a glider survey of the Capricorn Channel region of the Southern Great Barrier Reef to complement the oceanographic surveys being undertaken by IN2026_V04.

The eReefs model for the Southern GBR is primarily validated off a couple of shallow moorings in this region, and surface satellite data for the region. The IN2026_V04 survey and the glider data will help to validate and test the eReefs model for this region.

The ocean glider will be deployed from Heron Island Research Station using their small vessels by staff from IMOS Ocean Gliders. The deployment is planned for late July 2026 (nominally 24 to 26 July). Slocum ocean gliders can generally operate for 3 weeks at a time. Once deployed, the glider will be operated remotely by the piloting team at IMOS Ocean Gliders. The glider will be directed northeast from Heron Island along the edge of the shelf, where it will conduct operations for up to 3 weeks.

The glider can be 'followed' in near-realtime during its mission by the Science Team and any other interested stakeholders using an active .kmz file that will be available following the launch. The glider is typically programmed to surface every 2 hours, and will upload a portion of its collected data which is automatically plotted & made available via both the IMOS Ocean Gliders website (https://anfog.ecm.uwa.edu.au/) & IMOS Ocean Current (https://oceancurrent.aodn.org.au/gliders/index.php). The IMOS Ocean Gliders team will work with the Science Team to review the near-realtime data & optimise the glider's trajectory throughout the mission.

As the mission proceeds, the IMOS pilots will be in contact with Science team and MNF staff if glider recovery by the RV Investigator is required during the IN2026_V04 voyage. Recovery is nominally planned for the week of 10 August 2026, although this may need to be adjusted depending on how the glider is travelling. It is important to note that gliders are often at the mercy of ocean currents, and so the IMOS Ocean Gliders team will keep a close eye on the glider's trajectory & will work with MNF staff to plan for the most sensible recovery location & timing.

A detailed SOP/SWI has been be developed for the recovery of the glider. Gliders have previously been deployed and recovered from the RV Investigator and there is a rigid frame with a net on the vessel to undertake this recovery.

To facilitate safe glider storage following recovery, a travel crate + storage trolley has been mobilised to Brisbane for onboarding RV Investigator prior to departure. Safe glider handling and storage information will be included in the SOP/SWI.

The glider will be taken off RV Investigator during demobilisation in Brisbane, and shipped back to the IMOS Ocean Glider Facility in Perth, WA. The full dataset will be downloaded from the glider once it is safely back in the lab. The data will then undergo standard QA/QC procedures, and be made available via the AODN.

2. Chumbucket: low tech, high return sampling for phytoplankton diversity, Dr Ruth Eriksen CSIRO

Objective: The objective is to describe the diversity of phyto and microplankton species, especially in low productivity regions or seasons, using low-tech, high return sampling methodology.

To achieve this, we will collect, and pre-concentrate onboard, seawater samples from Niskin bottles deployed at pre-determined locations, as part of the selected voyages. The sampling is designed to require minimal attention, by pre-concentrating 10-12 L of water from selected depths (typically 4 or 5 depths to align with other sampling) through a 10-micron net. The Chumbucket method has been tested on 2 SEA-MES voyages and has produced outstanding samples for biodiversity analysis by virtue of a) the gentle nature of sampling that minimises damage to fragile cells b) concentrating cells by a factor of 200, dramatically increasing our capacity to sample rare species and c) minimising chemical preservative use by preserving small, concentrated samples that reduce storage, shipping and resource footprints, at sea and on land.

Sampling gear has been assembled in a manner that makes training and use as straight forward as possible. The set-up has been tested on two SEA-MES voyages (IN2025_V04 and IN2024_V05) and the results are excellent. We have developed SOPs for the use of the gear, and we can provide training for voyage participants. During voyages we will be available for Zoom/Teams calls to liaise with students/operators about what they are seeing , and address any issues with either the deployment of the CPR, the use of the CHUMBUCKET , and phytoplankton ecology in general etc. Samples are returned to Hobart for analysis in the SOTS lab, or IMOS plankton lab (depending on voyage region).

We propose collecting water from a range of depths at each of the planned CTD casts. Our target depths are 1) surface (~5m, or nearest practical with CTD cast), 2) the Deep Chlorophyll Max (DCM) 3) one depth between the surface and DCM (if more than 10 m between these 2 features) 4) 100 m depth 5) one other depth to either align with eDNA sampling or water column features observed during the down cast. This gives a target of maximum 5 samples per CTD cast, with the number of CTD casts to be determined with primary voyage PI's. The CHUMBUCKET requires 10 -12 litres of water to be passed through the phytoplankton net, and thus it is preferred that there is a dedicated Chumbucket Niskin if possible to avoid interference with other planned sampling for time-critical analysis e.g Dissolved Oxygen, nutrients etc. Details of set-up, processing, preservation and storage are provided in the SOP, and can be explained during training pre-departure. Preserved samples will be returned to our Hobart Plankton Laboratory and processed for diversity and abundance using our standard methods (see Eriksen et al 2018). Data can be made available through our open-access database (see Australian Ocean Data Network) and the CSIRO Data Centre.

Samples from this sampling method, developed specifically for RV Investigator, have yielded high quality samples that have already expanded our understanding of phytoplankton dynamics and biodiversity in Australian waters. The combination of gentle sampling method and preservative have doubled the number of species that can typically be observed and counted, using light microscopy and standard collection methods. We are in a stronger position to compare CHUMBUCKET samples with eDNA methods, collected from both underway (GLOMBO) and CTD casts on target voyages with samples that better represent biodiversity of microscopic taxa. Chumbucket samples will also complement towed samplers (Continuous Plankton Recorder) managed by CSIRO through the Integrated Marine Observing System IMOS. Samples from other voyages will have relevance to the IMOS National Reference Stations which have sampled phytoplankton diversity for 20+ years - critically, the Chumbucket concentration and preservation method

is expected to greatly increase our understanding of biodiversity as a wide group of phytoplankton functional groups can be resolved.

3. GLOMBO, Dr Sahan Jayasinghe and Dr Pascal Craw, CSIRO

Environmental DNA (eDNA) is a powerful tool for monitoring marine biodiversity, offering a non-invasive method to detect and identify a wide range of species from a small volume of seawater. It provides a snapshot of the organisms present in an ecosystem, from microbes to marine mammals, by capturing the genetic material they shed into their environment. This technique is transforming marine biology by enabling large-scale, cost-effective biodiversity assessments that are far less resource-intensive than traditional survey methods. By analysing eDNA, scientists can gain a more comprehensive understanding of species distribution, abundance, and ecosystem health.

The RV Investigator (RVI) has been a crucial platform for advancing eDNA research in Australia, serving as a key vessel of opportunity for several projects such as the first deep sea surveys in Australia's Indian Ocean Territories (IN2021_V04 & IN2022_V08) and the recent South-East Australian Marine Ecosystem Survey (SEA-MES) (IN2023_V05 & IN2024_V03). These initiatives have utilised the ship's advanced capabilities to conduct targeted eDNA surveys and demonstrated the immense potential of eDNA to map marine life in diverse and remote oceanic environments, providing valuable foundational data for conservation and management efforts.

Building on this foundational work, the current project aims to develop and deploy an autonomous eDNA sampling system that can be seamlessly integrated into the RVI's underway seawater system. The system will automatically filter water samples at pre-programmed intervals, operating with minimal human intervention. The successful deployment of this device will deliver a scalable technology capable of transforming a wide range of vessels into mobile eDNA sampling platforms, creating a global network for continuous, high-resolution biodiversity monitoring that will provide vital data for fisheries management, conservation, and climate change research.

This project aims to deploy an autonomous system for sampling environmental DNA (eDNA) from seawater. The primary objective is to develop a reliable, self-contained eDNA sampling unit that can be easily integrated into a vessel's existing underway seawater collection system. This unit will automatically collect and filter water samples at pre-programmed intervals. Our approach involves leveraging the infrastructure and scientific expertise of the *RV Investigator* to design, build, and test a prototype. We expect to deliver a fully functional, autonomous eDNA sampling device that can operate with minimal human intervention. This technology will significantly expand our ability to monitor marine biodiversity on a global scale. By converting a wide range of vessels into mobile eDNA sampling platforms, we will create an unprecedented network for long-term ecological monitoring. The data collected will be vital for conservation efforts, fisheries management, and understanding the impacts of climate change and invasive species on marine ecosystems. This project will transform how we study the oceans, providing a continuous, high-resolution stream of biodiversity data from all corners of the globe.

The project to deploy an autonomous eDNA sampling system directly addresses a critical gap in marine ecological monitoring, rooted in the disciplines of marine biology and oceanography. Current research questions of recognised importance include understanding the global distribution of marine species, assessing biodiversity in hard-to-reach environments, and rapidly detecting the presence of invasive species or Harmful Algal Blooms (HABs). This project will test the hypothesis that an autonomous eDNA collection system can provide a continuous, high-resolution stream of biodiversity data, thereby contributing significantly to advancing knowledge by creating an unprecedented network for long-term ecological monitoring. This technology will deliver significant benefits across policy, industry, and scientific sectors by providing continuous, high-resolution biodiversity data that is currently unattainable. The primary

stakeholders for this research are the scientific community, fisheries management bodies, and conservation organizations. Next-users, such as the crew and scientific staff of the RV Investigator, have been integrated into the development process to ensure the prototype is robust, reliable, and easily integrated into existing vessel infrastructure. End-users, including marine biologists and government agencies, will benefit from a low-intervention, high-efficiency tool that significantly expands their ability to gather vital data for conservation efforts and understanding the impacts of climate change and invasive species. By transforming a wide range of vessels into mobile eDNA platforms, this project will create an unprecedented global network for monitoring marine biodiversity, providing a continuous stream of data that will be instrumental for future policy decisions and sustainable management of ocean resources.

The autonomous eDNA sampler will be installed in the underway lab aboard the RVI and will be directly connected to the underway seawater line. The system will be programmed to collect a sample every three hours. With a capacity of 24 samples, the system will operate continuously for 72 hours (three days) before requiring a reset. This reset process, including the cleaning of the instrument and replacement of filters, is estimated to take approximately 45 minutes and will be conducted by either a member of the SIT team or nominated member of the science party. All sampling will occur along the primary voyage track. As the system is fully autonomous, it will not require any additional ship time or alterations to the vessel's predetermined course, ensuring no impact on other operational objectives.

Brief summary of the RIS & SWI:

- GLOMBO team responsible for installing sampler pre-voyage and will perform system initialisation steps. Installing personnel will coordinate with voyage mobilisation team to coordinate transfer of instrument onto vessel.
- When handling the instrument and samples ensure appropriate protective gear and clothing is worm (long-sleeved clothing, enclosed footwear, gloves).
- The GLOMBO team will attend to uninstall the sampler from the underway lab and will coordinate removal of the instrument with voyage demobilisation team.
- GLOMBO personnel will organise collection of eDNA samples from the ship's freezers. They will also inform MNF & Scientific party of permitting and transport if required.
- GLOMBO personnel will organise collection of eDNA samples from the ship's freezers. They will also inform MNF & Scientific party of permitting and transport if required.
- For instrument troubleshoot, refer to the user manual or contact the GLOMBO team (pascal.craw@csiro.au or sahan.jayasinghe@csiro.au)

The following permits cover GLOMBO activities:

- Commonwealth Marine Parks: PA2026-00029-1 to PA2026-00029-7
- GRM Section 8A: AU-COM2026-022
- AQIS Biosecurity permit: 0010379192
- GBR permit: G23/48600.1

MNF Sustained Observation Program

The MNF operates a Sustained Observation Program (SOP) through the collection and analysis of a range of parameters. Where it does not conflict with Primary or Supplementary voyage activities, the MNF may undertake the following data collection and deployment activities:

- Meteorological data collection with Weather Radar and meteorological measurement suite
- Atmospheric aerosol, greenhouse gas, and reactive gas data collection with a suite of air sampling instrumentation

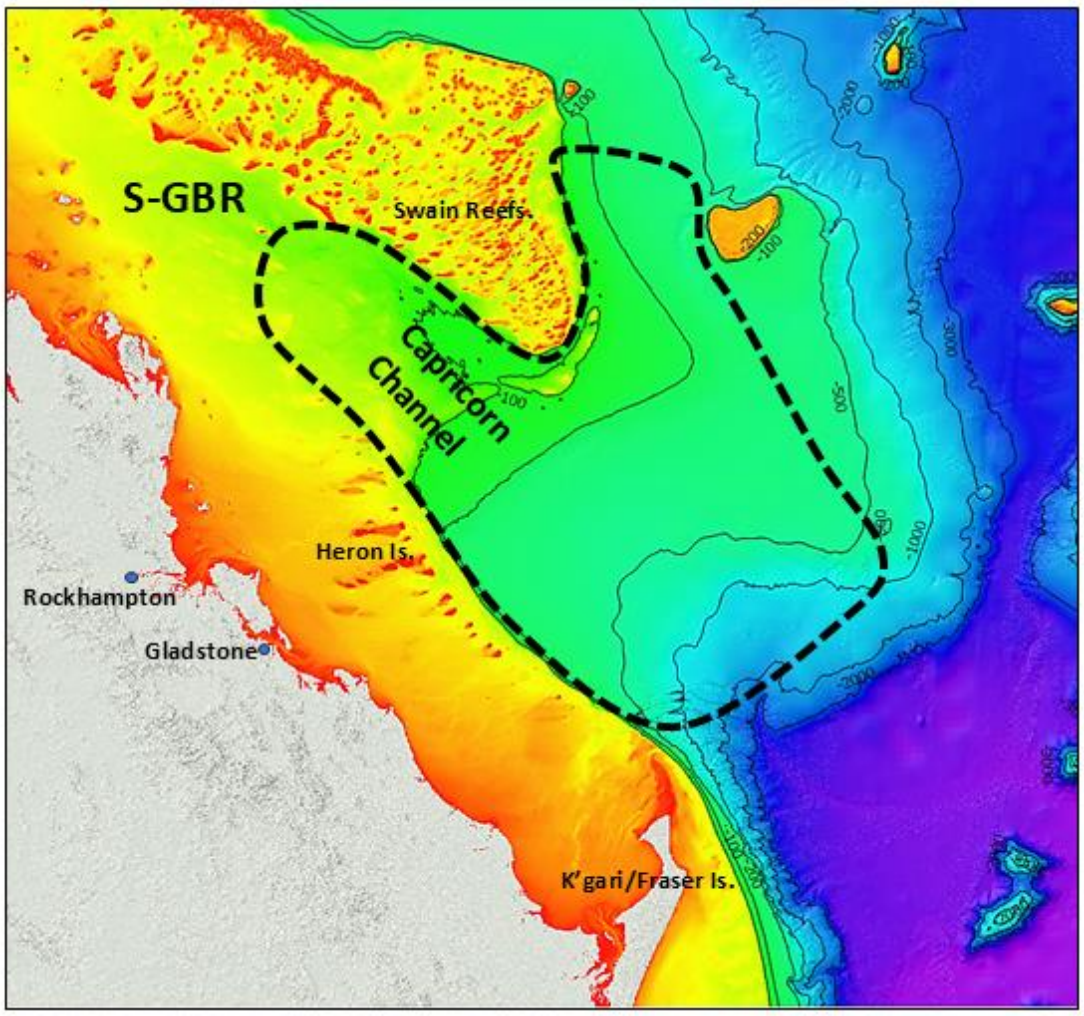
- Surface temperature, salinity and biogeochemical parameters with a suite of seawater sensors
- Bathymetry and geophysical data collection with multibeam echosounders, backscatter, and sound velocity.
- Water column data measurement with XBT deployments and on-board ADCP systems (Expendable Bathy-Thermosalinograph, Acoustic Doppler Current Profiler)
- Measurement of the abundance and distribution of mid-trophic biology with bio-acoustic echosounder systems
- Mixed layer plankton collection with a towed CPR (Continuous Plankton Recorder)

These activities contribute to national and global public data repositories including:

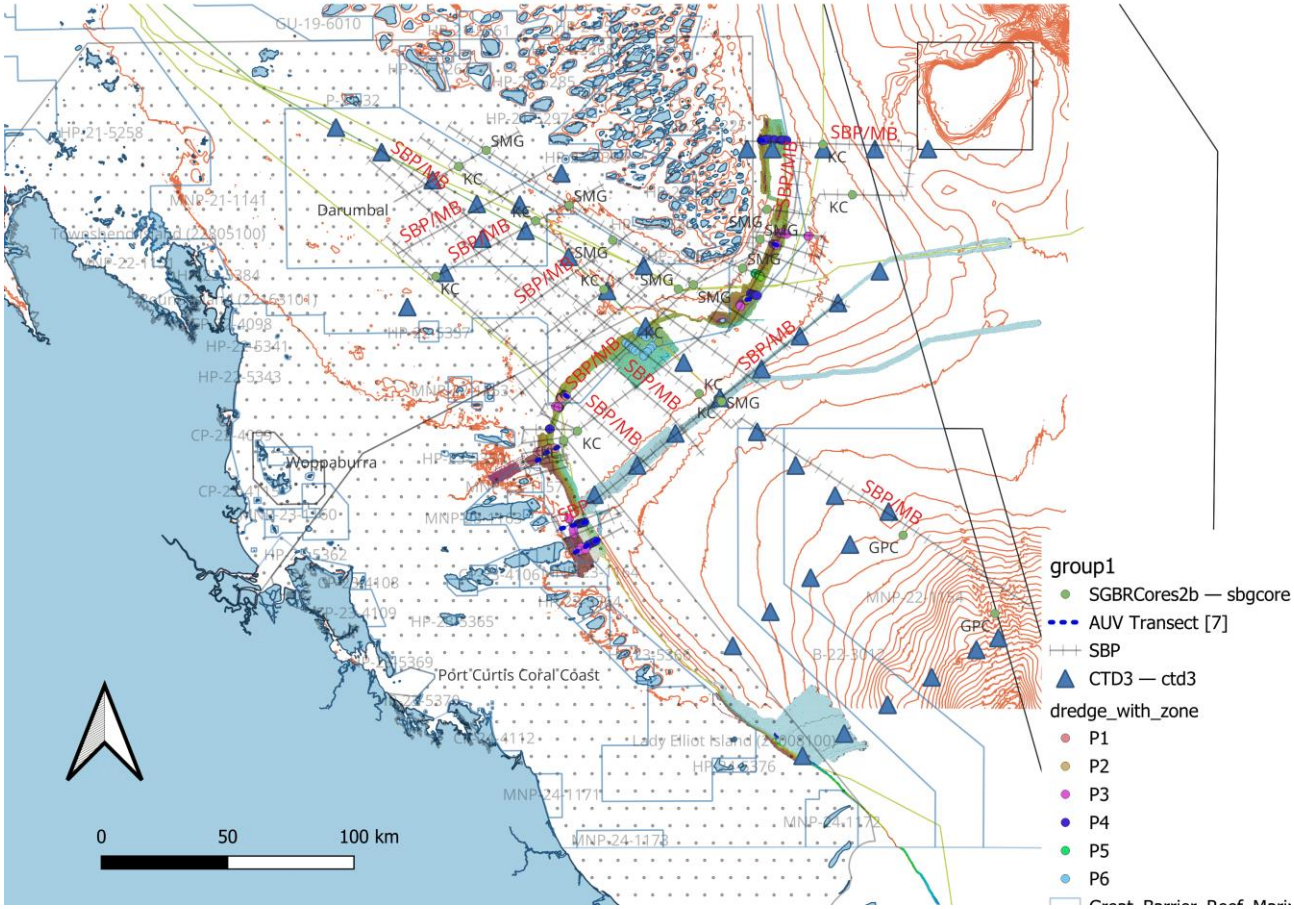
- Integrated Marine Observing System (IMOS)
- AusSeabed
- World Meteorological Organisation Global Atmosphere Watch (WMO-GAW)

Voyage track

Map of the area of operation in the Southern GBR, showing the location of the main towns and islands and reefs. Detailed map of the operational area with stations on is below.



Detailed map of the stations planned for the voyage. The different permit zones are outlined by blue lines, the dotted areas are TUMRA regions. Previous multibeam mapping is shown. CTDs - blue triangles, cores – green dots, dredge – other colour dots, SBP/MB lines – grey lines with crosses.



Activity plan for first 24-48 hours of voyage

Date	Activity
27th July 2026	MOBILISATION Science Party contractor induction with CYAN Crew- time TBC MNF Equipment setup Hazmat delivery & loading Lab and equipment setup 1600 – Full science party onboarding with Voyage Manager 1700- Dinner ~1800- Sea-going Induction with CYAN Crew
28th July 2026	ONBOARDING & DEPARTURE 1130-Smoking Ceremony and Welcome to Country 1145- MNF staff Sea-going induction refresher 1200 – Arrival of MNF team 1300 –Muster Drill 1400– Departure and transit to PBG (~6hrs)

Date	Activity
	1430 – Voyage Manager briefing (introductions, roles & responsibilities, living onboard etc.) 1530– DAP briefing (connecting to RVI intranet, wifi etc.) 1600 – Lab inductions 1630 – Rear deck Inductions-TBC TBC– CTD Training TBC – Senior Management Team meeting @ Bridge Transit PBG to Test CTD station (200nm, ~20hrs)
29th July 2026	~1000 – Test CTD Cast (1000m) depending on the SBP we will also do a test Kasten core. ~TBC Transit to CTD Cap Ch13 (84nm, ~8.5hrs)
7th / 8th August	Personnel transfer @ Heron Island
20th August 2026	ARRIVAL & DEMOBILISATION

Waypoints and stations and Time estimates

Here is the plan for the first 5-7 days of the voyage – We need the initial mapping to prioritise the sites for dredging and coring. We may do a Kasten core on the initial CTD transect. Where possible we would like to use the Triaxus for the CTD transects and then just take a CTD at the start and end, but have planned for a CTD transect in case the weather is bad. If Triaxus transect then we will need to steam at a reduced speed of 8 knots. RVI will conduct multibeam/SBP and Triaxus at the same time if possible.

SITE	DEGREES DECIMAL MINUTES LATITUDE	DEGREES DECIMAL MINUTES LONGITUDE	DISTANCE (NM)	TOTAL DISTANCE (NM)	STEAMING TIME (HRS)	TOTAL STEAM (HRS)	Time on station (hrs)	Total time	Notes
Brisbane	27°20.294’ S	153°8.763’ E	0	0	0	0			
MNF Test CTD @ 1,000m	23° 41.381’ S	153° 49.277’ E	180	180	18	18	1.5	19.5	Depending on SBP we may do a Kasten core also at this site. - add 1.5 hours
CTD Cap Ch 13	23° 0.695' S	152° 48.395' E	68	248	7	25	1	27.5	Triaxus/SBP/MB line
CTD Cap Ch 12	23° 7.926' S	152° 57.337' E	13	261	1.5	26.5	1	30	Triaxus/SBP/MB line
CTD.CapChan11	23° 14.397' S	153° 6.472' E	11	272	1	27.5	0.5	31.5	Triaxus/SBP/MB line
CTD.CapChan1	22° 53.386' S	152° 39.798' E	34	306	3.5	31	0.5	35.5	Triaxus/SBP/MB line

CTD.CapChan2	22° 45.765' S	152° 31.420' E	11	317	1	32	0.5	37	Triaxus/SBP/MB line
CTD.CapChan3	22° 37.948' S	152° 22.654' E	11	328	1	33	0.5	38.5	Triaxus/SBP/MB line
CTD.CapChan4	22° 30.311' S	152° 13.803' E	13	341	1.5	34.5	0.5	40.5	Triaxus/SBP/MB line
Wirewalker	22° 30.311' S	152° 13.803' E					6	46.5	Deploy Wirewalker Close to Capch mooring
CTD.CapChan5	22° 22.946' S	152° 4.966' E	11	352	1	35.5	0.5	48	Triaxus/SBP/MB line
CTD.CapChan6	22° 17.305' S	151° 55.063' E	10	362	1	36.5	0.5	49.5	Triaxus/SBP/MB line
CTD.CapChan7	22° 11.435' S	151° 43.873' E	11	373	1	37.5	0.5	51	Triaxus/SBP/MB line
CTD.CapChan8	22° 6.245' S	151° 33.772' E	10	383	1	38.5	0.5	52.5	Triaxus/SBP/MB line
CTD.CapChan9	22° 0.132' S	151° 22.074' E	10	393	1	39.5	0.5	54	Triaxus/SBP/MB line
SBP/MB lines 2			50	443	5	44.5	0	59	SBP/MB line perpendicular to the Capricorn channel
SBP/MB lines 3			50	493	5	49.5	0	64	SBP/MB line perpendicular to the Capricorn channel
SBP/MB lines 4			50	543	5	54.5	0	69	Triaxus/SBP/MB line perpendicular to the Capricorn channel
CTD transect Cap Chan Trav (5 CTD)									if weather doesn't allow for triaxus deployment
SBP/MB lines 5			50	593	5	59.5	0	74	SBP/MB line perpendicular to the Capricorn channel
SBP/MB lines 6			50	643	5	64.5	0	79	SBP/MB line perpendicular

									to the Capricorn channel
SBP/MB lines 7			50	693	5	69.5	0	84	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 8			70	763	7	76.5	0	91	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 9			70	833	7	83.5	0	98	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 10			70	903	7	90.5	0	105	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 11			70	973	7	97.5	0	112	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 12			70	1043	7	104.5	0	119	SBP/MB line parallel to the Capricorn channel
SBP/MB lines 13			70	1113	7	111.5	0	126	SBP/MB line parallel to the Capricorn channel

CTD Configuration

	PLEASE SELECT:
Fundamentals	
Which CTD rosette to be used for this voyage (24 or 36 Niskin bottles):	36
Likely total number of casts:	Up to 40
Likely maximum depth of deepest cast:	1500
Standard CTD Configuration - Instrumentation (maximum 6 auxiliary channels plus 2 x DO) 6000m	**Yes**
1 x SBE9+ (CTD) 2 x SBE3P Temperature Sensors 2 x SBE4C Conductivity Sensors	yes

	PLEASE SELECT:
2 x SBE5T pumps	
2 x SBE43 Dissolved Oxygen Sensors	yes
1 x Tritech PA200/500 Altimeter	yes
1 x Biospherical QCP2300HP PAR Sensor	yes
1 x Wetlabs C-Star 25cm Transmissometer	yes
1 x Wetlabs ECO FLCDRTD Fluorometer – CDOM (370/460nm)	yes
1 x Wetlabs ECO FLBBRTD Fluorometer – Chlorophyll-a & Backscatter (2 x channels - 470/695nm)	yes
Alternative Instruments (Instruments highlighted in grey can be substituted from standard configuration)	
Seapoint Turbidity Meter – Nephelometer	
Chelsea Aquatracka III (430/685nm) Fluorometer – Chlorophyll-a	
Seabird SUNA – Ultraviolet Nitrate Analyzer (**Serial Connection - 2000m**)	
Standard LADCP Configuration – Instrumentation: 6000m	yes
1 x Teledyne 300 kHz LADCP (Slave - Up) 1 x Teledyne 150 kHz LADCP (Master - Down) 1 x 48V Deep Sea Battery	
Alternative LADCP Configuration - Instrumentation: 6000m	
1 x Teledyne 300 kHz LADCP (Slave - Up) 1 x Teledyne 300 kHz LADCP (Master - Down) 1 x 48V Deep Sea Battery	
Hydrochemistry Analyses	Yes
Salinity	
Dissolved Oxygen	
Nutrients: Nitrate	
Nutrients: Phosphate	
Nutrients: Silicate	
Nutrients: Nitrite	
Nutrients: Ammonia	

Permits

This voyage is operating under the following permits:

- Parks Australia (MNF multi-network)
- Parks Australia (science party)
- Other

And the following operations are planned in these areas under the current approved permits:

Area	Activity
• Great Barrier Marine Park	CTDs, Multibeam mapping, Sub-bottom profiling,

• Zones listed below	Cores, dredges, sediment grabs (permit required) List of rock dredges in appendix with zones
Marine National Park Zone	MNP-21-1141 (3 KC- Kasten Cores, 5 SMG – Smith-Mac Grabs, 6 RD – Rock Dredges)
General Use Zone	GU-21-6016 (34 RD)
Habitat Protection Zone	HP-20-5225 (22 RD)
Marine National Park Zone	MNP-21-1154 (2 GPC cores requested)

Communication plan

Reef Guardians program has requested some online virtual tours and talks during the voyage for National Science week (which coincides with the final week of the voyage). Talks scheduled for

1. Mon 17 Aug, 10:30-11-30am AEST (primary schools)
2. Tue 18 Aug, 10:30-11-30am AEST (secondary schools)
3. Tue 18 Aug, 5:30-6:30pm AEST (adult groups)

We will also be hosting virtual tours and discussions with the traditional owners during the voyage to communicate the findings – these will be co-led by the Sea country rangers and the science team on board.

UQ will be the lead research agency and the science media team. He will liaise with MNF media – Matt Marrison. The Chief scientist – Helen Bostock will discuss a plan with Matt and SJ Stevenson and liaise with the Traditional Owners.

Social media pages on Facebook and Instagram will be set up for the voyage, with posts approved by MNF media.

CSIRO will work in close collaboration with the Primary Agency to support the successful delivery of their voyage communication plan. In addition, CSIRO may also seek opportunities during the voyage to profile and promote the scientific infrastructure, equipment and expertise that are enabling the research, which it would do in consultation with the Primary Agency.

Indigenous Engagement

This Sea Country voyage has been co-designed with the Darumbal and Woppaburra TUMRA, based on a number of workshops, on country and online, over the last 4 years (starting in 2022). There have been on-going discussions about the main interest of the different TUMRA to map and understand the evolution of Country to Sea Country with sea level rise, and identify sacred Sea Country sites – primarily around water ways (Objective 1) and reefs (Objective 2), as well as an improved understanding of the modern oceanography (Objective 3) to help them manage their TUMRA. There are several sea country rangers and knowledge holders participating on the voyage. The voyage will also contribute to capacity building for their Sea Country rangers.

The voyage data will feed directly into the Southern GBR management review that is currently underway between the Reef Authority (GBRMPA) and TUMRA.

Signature

Your name	Helen Bostock
Title	Chief Scientist
Date:	15/3/2026

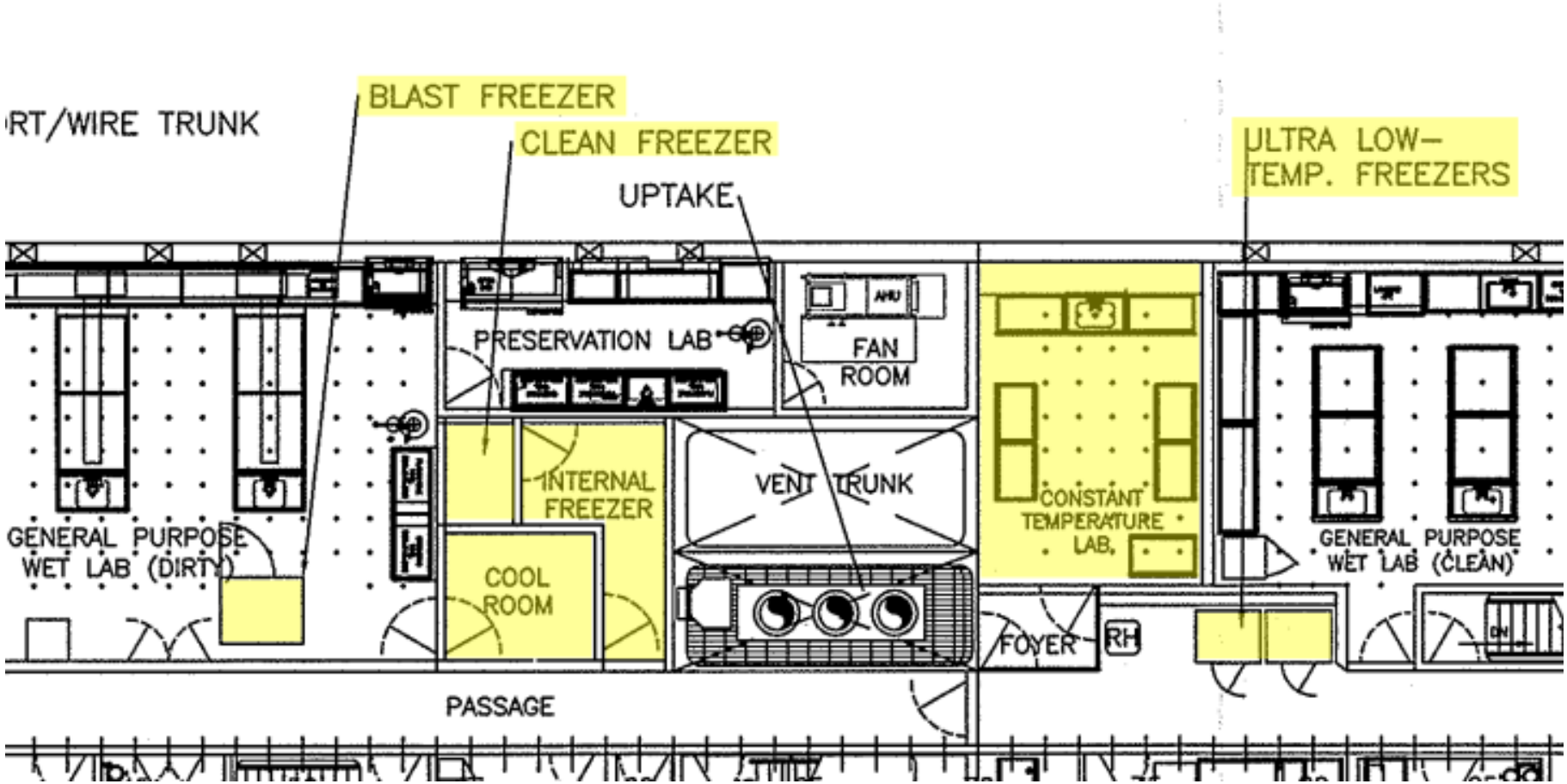
Appendix A

Scientific equipment and facilities provided by the Marine National Facility

Some equipment items on the list may not be available at the time of sailing. Applicants will be notified directly of any changes. Indicate what equipment and facilities you require from the Marine National Facility by placing an X in the relevant box.

STANDARD LABORATORIES AND FACILITIES		
NAME	**REQUIRED**	**NOTES/COMMENTS**
Aerosol Sampling Lab	X	• Please indicate the intended activity in this lab – check on instruments
Air Chemistry Lab	X	• SYFT, plus all normal equipment
Preservation Lab	X	• Photography
Constant Temperature Lab (Min temp: ~4°C / Max temp ~35°C)	X	• Cool Storage of cores and samples during the voyage • 4C
Underway Seawater Analysis Laboratory	X	• Sampling for nutrients throughout the voyage and potential to sample for Microplastics
GP Wet Lab (Dirty)	X	• Sample and Core processing
GP Wet Lab (Clean)	X	• Microscopes and water samples – Alk, DIC
GP Dry Lab (Clean)	X	• Extra lab space for science team
Sheltered Science Area	X	• Access to the back deck
Observation Deck 07 Level		• Please indicate the intended activity in this area
Internal Freezer (Dirty Wet lab) (Min temp -25°C / Max temp 0°C) Volume: >20m^3		• Please indicate the intended activity in this area • Please indicate the required setpoint temperature

STANDARD LABORATORIES AND FACILITIES		
NAME	**REQUIRED**	**NOTES/COMMENTS**
Clean Freezer (Dirty Wet lab) (Min temp -25°C / Max temp 0°C) Volume: >2.5m^3 Co-located within the Internal freezer and separated by a door		• Please indicate the intended activity in this area • Please indicate the required setpoint temperature
Blast Freezer (Dirty Wet lab) (Min temp -30°C / Max temp 0°C) Internal volume >1.5m^3 Capable of reducing the temperature of 150kg of water from +20C to -30C in one hour.		• Please indicate the intended activity in this area • Please indicate the required setpoint temperature
Cool Room (Dirty Wet lab) (Min temp 0°C / Max temp 10°C)	X	• Storage of sediment samples and rocks that are still being processed. Temp 4C.
Ultra-Low Temperature Freezers x2 (Main Deck) Min temp -80°C / Max temp -80°C)	X	• EDNA and foraminiferal samples
YODA Freezers (x2) (Clean Dry lab) (Min temp -20°C / Max temp 10°C)		• Please specify if both or only one are needed • Please indicate the intended activity in this area • Please indicate the required setpoint temperature



MOBILE LABORATORY AND FACILITIES *(MAY REQUIRE ADDITIONAL SUPPORT)*			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Modular Isotope Laboratory			If nominated, additional processes to be completed.

MOBILE LABORATORY AND FACILITIES *(MAY REQUIRE ADDITIONAL SUPPORT)*			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Trace Metal Niskin Sampling Container (TM1-blue - 20ft)			• Used for the determination of trace metal concentrations. It is a clean laboratory containing laminar flow cabinets and is stored on the main deck (if possible).
Trace Metal Seawater Analysis Laboratory (TM2-white - 20ft)			• Used for wet sampling of trace metal clean Niskins and is stored on the main deck (if possible). • Cannot be overstacked
Trace Metal Rosette and Niskin Storage Container			10-foot container
Modular Hazchem Locker			
Stabilised Platform Container			Please indicate what instruments are to be installed in the container. Cannot be overstacked
Clothing Container			The use of this container will be identified by MNF

STANDARD SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Continuous Plankton Recorder (CPR)		X	Cassettes will be provided by CSIRO team. Aim to do one CPR tow on the way to the survey area.

SPECIALISED SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)**
TRIAXUS – Underway Profiling CTD		X	Triaxus is a pilotable towed vehicle capable of carrying a variety of instrumentation. Constant depth towing or undulating profiles (e.g. cyclic depth pattern from the surface to 200m) are possible. Towing speed depends on the

SPECIALISED SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)**
			tow profile, instrumentation payload and prevailing conditions. Typically, undulations from the surface to 200m are possible at 8knt, with slower speeds for deeper profiles and faster for constant-depth towing. Maximum achievable depth typically 300m to a distance of approximately 1.5km from the ship. Triaxus is normally configured with the following sensors as a minimum: • Dual temperature, conductivity and dissolved oxygen (SBE9plus and dual pumped temperature/conductivity/dissolved oxygen circuits) • PAR • Chlorophyll-A, CDROM, optical backscatter (Eco-triplet – 2000m Max) • Plankton counter (Laser Optical Plankton Counter) • Transmissometer Contact MNF for further details on other instrumentation and capability. - SUNA
Desired towing profile:			
Additional instrumentation: (please supply, make and model and datasheets and a contact person for discussion on integration)			
Piston Coring System	X		
Gravity Coring System	X		Back up for the piston corer?
Multi Corer	X		
Kasten Corer	X		
Smith Mac Grab	X		

SPECIALISED SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)**
Rock Dredges	X		
Rock Saw			
Seaspy Magnetometer			
Portable Pot Hauler			
Equipment to measure seawater sound velocity/CTD:			
XBT System			
Valeport Rapid SV			
Valeport Rapid CTD			
Valeport SVX2			
Trace Metal Rosette and Bottles			
Trace Metal In-situ Pumps (x6)			• See non-MNF owned section below for additional 2 units. • Science team to organise and pay for battery packs for this system (+ spare). • They can be sourced through a supplier such as 'Batteryworld Hobart' (Graham Cowie, 03 6272 3900) who has made these previously. • The science teams need to calculate how long they will be deployed and bring enough batteries to cover their deployment times. They are rated to 30 Amp hours, which equals to 36,000 litres of sea water being filtered.
Deep Towed Camera	X		
Drop Camera	X		

SPECIALISED SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)**
Sherman Epibenthic Sled			
Brenke Sled			
Hydro-Bios MultiNet (Mammoth) (1m x 1m)			Please specify 100-micron, 335-micron, or 500-micron mesh Can be used in a vertical or horizontal operations
Surface Net (1m x 1m)			Please specify 335-micron, 500-micron, or 1,000-micron mesh
Bongo Net			750mm frame, 500-micron mesh net and 335-micron cod end
Beam Trawl			
MIDOC			Multiple opening/closing net system with cod ends- suitable for pelagic trawls
Pelagic Trawl System (net, doors)			Contact MNF to discuss net and mesh dimensions
Demersal Trawl System (net, doors)			Contact MNF to discuss net and mesh dimensions
RMT-8 (Rectangular Midwater Trawl) Utilises a single warp so can be deployed on the general-purpose towing wire in self-contained mode. Must be deployed with stern ramp covered.			8m2 mouth area Tow speed ≤2 knots
RMT-16 (Rectangular Midwater Trawl) Utilises a single warp so can be deployed on the general-purpose towing wire in self-contained mode. Must be deployed with stern ramp covered.			16m2 mouth area Tow speed ≤2 knots
Trawl Monitoring Instrumentation (ITI) (2,000m depth limit)			MNF to identify this need, dependent on pelagic or demersal trawling requirement

SPECIALISED SAMPLING EQUIPMENT			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)**
Stern ramp	**EXPOSED**	**INSTALLED**	MNF to identify this requirement

RESEARCH SUPPORT INFRASTRUCTURE			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Saltwater Ice Machine (Dirty Wet lab)			
Radiosonde Receiver System			
Laboratory Incubators (Clean Dry lab)			
Deck Incubators			Temperature controlled deck incubators
Milli-Q System		X	
Sonardyne USBL System			

SCIENTIFIC / SAMPLE ANALYSIS SYSTEMS				
MICROSCOPES:				**NOTES/COMMENTS**
BRAND / MODEL	**TYPE**	**ESSENTIAL**	**DESIRABLE**	
Leica / M80	Dissecting		X	
Leica / M80	Dissecting			
Leica /MZ6	Dissecting			
Olympus / CH	Compound		x	
Olympus /CH	Compound			
Leica / MTU282	Camera tube			

SCIENTIFIC / SAMPLE ANALYSIS SYSTEMS				
MICROSCOPES:				**NOTES/COMMENTS**
Adapters for tube / Nikon	Pentax			
Ring Light *2 / MEB121	LED			
Heavy Duty Electronic Balance (80kg)				
Medium Duty Electronic Balance (15kg/5g resolution)				
Light Duty Electronic Balance (3kg/1g resolution)				

Underway systems

ACOUSTIC UNDERWAY SYSTEMS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
75kHz ADCP	X		
150kHz ADCP	X		
Multi Beam Echo Sounder EM2040-MKII 200-700kHz (0 – 250m approx.)	X		
Multi Beam Echo Sounder EM124 12kHz (100m to full ocean depth)	X		
Multi Beam Echo Sounder EM712 70-100kHz (0 –1000-m approx.)	X		
Sub-Bottom Profiler SBP29	X		
Scientific Narrowband/Broadband Echo Sounders EK80 (6 bands, 18kHz-333kHz)			EK80s will be used in narrowband mode unless otherwise requested

ACOUSTIC UNDERWAY SYSTEMS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
			Quantitative measurements from scientific echosounders requires sphere calibration in the watermass of sampling
Multibeam Scientific Echo Sounder ME70 (70100 kHz)			
Omnidirectional Echo Sounder SH90			
Gravity Meter			

ATMOSPHERIC UNDERWAY SENSORS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Nephelometer		X	Zoran Ristovski can provide support to SIT to set up all of these instruments (other than the Radon Detector) prior to the voyage. They would like to do remotely daily checks throughout the voyage and would like to have remote access to the essential ones if possible.
Multi Angle Absorption Photometer (MAAP)	X		
Scanning Mobility Particle Sizer (SMPS)	X		
Radon Detector	X		
Ozone Detector		X	
Condensation Particle Counter (CPC)	X		
Picarro Spectrometer (analysis of CO_2/CH_4/H_2O)		X	
Aerodyne Spectrometer (analysis of N_2O/CO/H_2O)		X	

ATMOSPHERIC UNDERWAY SENSORS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Cloud Condensation Nuclei (CCN)	X		
Polarimetric Weather Radar			
Filter Aerosol Sampling units (FAS) x 3			Used for collecting physical aerosol samples on filters. FAS includes pumps, filter holders, flow controllers, totalizer, Very Sharp Cut Cyclone (VSCC) PM1 and PM2.5. • User to specify how many units are required (maximum 3 supplied by MNF). • User to provide own filters. • User to outline sampling requirements with MNF Seagoing Instrumentation Team (SIT) i.e. ship exhaust sample avoidance etc.

UNDERWAY SEAWATER SYSTEMS AND INSTRUMENTATION			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Thermosalinograph	X		
Fluorometer	X		
Optode	X		
pCO2	X		

SEAWATER SYSTEMS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Trace metal clean seawater supply			
Scientific clean seawater supplied to laboratories		X	

SEAWATER SYSTEMS			
NAME	**ESSENTIAL**	**DESIRABLE**	**NOTES/COMMENTS**
Raw seawater available on deck and in laboratories		X	

EQUIPMENT AND SAMPLING GEAR REQUIRING EXTERNAL SUPPORT (MAY REQUIRE ADDITIONAL SUPPORT FROM APPLICANTS)			
NAME	**ESSENTIAL**	**DESIRABLE**	**PLEASE GIVE THIS CAREFUL CONSIDERATION, AS THERE IS NO GUARANTEE THAT THESE RESOURCES WILL BE AVAILABLE UNLESS SPECIFICALLY REQUESTED. LIAISE WITH YOUR VOYAGE OPERATIONS MANAGER AS REQUIRED. ADDITIONAL STAFF MAY BE REQUIRED FOR THESE ACTIVITIES.**
Seismic Acquisition System			• Additional crew and seismic acquisition personnel will be required to be onboard to support this system. Number of personnel TBD by the MNF. • The science party is to provide an onboard seismic data processing resource.

NON-MNF OWNED EQUIPMENT WHICH MAY BE ACCESSED			
NAME	**ESSENTIAL**	**DESIRABLE**	**PLEASE GIVE THIS CAREFUL CONSIDERATION, AS THERE IS NO GUARANTEE THAT THESE RESOURCES WILL BE AVAILABLE UNLESS SPECIFICALLY REQUESTED. LIAISE WITH YOUR VOYAGE OPERATIONS MANAGER AS REQUIRED. ADDITIONAL STAFF MAY BE REQUIRED FOR THESE ACTIVITIES.**
D & N Francis winch			15mm electro-optical cable
UTAS In-Situ Pumps (x2)			

CTD Configuration

Note #1: On every departure a test CTD is to be undertaken, ideally 24 hours prior to the first planned CTD cast. This requirement is a single cast to a minimum of 1000m, firing half the bottles at the maximum depth of the cast, followed by firing of the remaining bottles near the chlorophyll maximum (requiring one stop on the retrieval). This test CTD is essential to the MNF Hydrochemistry team and supports the training of samplers, testing of Niskin bottles, collection of a tracking standard for the voyage, and ongoing quality and uncertainty calculations. Please allow for this cast in your voyage's Time Estimates (approximately 1 hour).

The MNF CTD is a Seabird 911 system with a variety of auxiliary sensors, installed on either a 24 or 36 bottle Niskin frame.

The science party may be required to assist with sampling the Niskin bottles, preparing the bottles for deployment and for setting up and logging each deployment of the CTD. Training will be given by the MNF DAP and hydrochemistry teams on board.

Plan for the following maximum rate of analyses based on 2 Hydrochemists:

- 48 nutrients, 48 dissolved oxygen, 48 salinity analyses per 24 hours; OR
- 72 nutrient, 36 dissolved oxygen, 36 salinity analyses per 24 hours; OR
- 160 nutrient analyses (only) per 24 hours.

	PLEASE SELECT:
Fundamentals	
Which CTD rosette to be used for this voyage (24 or 36 Niskin bottles):	36
Likely total number of casts:	#40
Likely maximum depth of deepest cast:	1500 m
Standard CTD Configuration - Instrumentation (maximum 6 auxiliary channels plus 2 x DO) 6000m	
1 x SBE9+ (CTD) 2 x SBE3P Temperature Sensors 2 x SBE4C Conductivity Sensors 2 x SBE5T pumps	Yes
2 x SBE43 Dissolved Oxygen Sensors	Yes
1 x Tritech PA200/500 Altimeter	Yes
1 x Biospherical QCP2300HP PAR Sensor	Yes
1 x Wetlabs C-Star 25cm Transmissometer	Yes
1 x Wetlabs ECO FLCDRTD Fluorometer – CDOM (370/460nm)	Yes
1 x Wetlabs ECO FLBBRTD Fluorometer – Chlorophyll-a & Backscatter (2 x channels - 470/695nm)	Yes
Alternative Instruments (Instruments highlighted in grey can be substituted from standard configuration)	
Seapoint Turbidity Meter – Nephelometer	
Seabird SUNA – Ultraviolet Nitrate Analyzer (**Serial Connection - 2000m**)	

	PLEASE SELECT:
Standard LADCP Configuration – Instrumentation: 6000m	
1 x Teledyne 300 kHz LADCP (Slave - Up) 1 x Teledyne 150 kHz LADCP (Master - Down) 1 x 48V Deep Sea Battery	Yes
Alternative LADCP Configuration - Instrumentation: 6000m	
1 x Teledyne 300 kHz LADCP (Slave - Up) 1 x Teledyne 300 kHz LADCP (Master - Down) 1 x 48V Deep Sea Battery	
Hydrochemistry Analyses	
Salinity	Yes
Dissolved Oxygen	Yes
Nutrients: Nitrate	Yes
Nutrients: Phosphate	Yes
Nutrients: Silicate	Yes
Nutrients: Nitrite	Yes
Nutrients: Ammonia	Yes

Please note any special requests – such as special sampling that is intended to be performed by the science party (e.g. sampling for dissolved gases, radioisotopes, etc.); or any user-supplied instrumentation to be fitted to the CTD frame; etc.

Special Requests – MNF Scientific Equipment and Facilities

- Video conferencing required for Reef Guardian Schools – three sessions during National Science Week.
    - Mon 17 Aug, 10:30-11-30am AEST (primary schools)
    - Tue 18 Aug, 10:30-11-30am AEST (secondary schools)
    - Tue 18 Aug, 5:30-6:30pm AEST (adult groups)
- Video conferencing to undertake outreach with the Darumbal and Woppaburra TUMRA and communities and schools.
- We will be running the eReefs model in forecasting mode. This may need some remote access to the models being run in Hobart (Clothilde Langlais, Mathieu Mongin, CSIRO)
- Lights off at night for bioluminescence measurements for up to 30 minutes (Mathieu Mongin, CSIRO).

Nominal Station lists

CTDs

Station name	field_4	Lat DDM	Long DDM
CTD 200 m Ledge T1	CTD	23° 0.989′ S	152° 29.441′ E
CTD 200 m Ledge T5	CTD	22° 47.209′ S	152° 49.392′ E
CTD 200 m Ledge T6	CTD	22° 40.147′ S	152° 58.298′ E
CTD 200 m Ledge T7	CTD	22° 33.014′ S	153° 7.121′ E
CTD 200 m Ledge T8	CTD	22° 26.184′ S	153° 16.737′ E
CTD 200 m Ledge T9	CTD	23° 7.836′ S	152° 20.557′ E
CTD 200 m Ledge T10	CTD	23° 14.075′ S	152° 10.612′ E
CTD.EAC1	CTD	21° 59.949′ S	152° 46.165′ E
CTD.EAC2	CTD	21° 59.955′ S	152° 51.978′ E
CTD.EAC4	CTD	21° 59.958′ S	153° 3.783′ E
CTD.EAC6	CTD	21° 59.946′ S	153° 15.589′ E
CTD.EAC8	CTD	21° 59.919′ S	153° 27.797′ E
CTD.CapChan1	CTD	22° 53.386′ S	152° 39.798′ E
CTD.CapChan2	CTD	22° 45.765′ S	152° 31.420′ E
CTD.CapChan3	CTD	22° 37.948′ S	152° 22.654′ E
CTD.CapChan4	CTD	22° 30.311′ S	152° 13.803′ E
CTD.CapChan5	CTD	22° 22.946′ S	152° 4.966′ E
CTD.CapChan6	CTD	22° 17.305′ S	151° 55.063′ E
CTD.CapChan7	CTD	22° 11.435′ S	151° 43.873′ E
CTD.CapChan8	CTD	22° 6.245′ S	151° 33.772′ E
CTD.CapChan9	CTD	22° 0.132′ S	151° 22.074′ E
CTD.CapChan10	CTD	21° 54.737′ S	151° 11.656′ E
CTD.CapChan11	CTD	23° 0.695′ S	152° 48.395′ E
CTD.CapChan12	CTD	23° 7.926′ S	152° 57.337′ E

Station name	field_4	Lat DDM	Long DDM
CTD.CapChan13	CTD	23° 14.397′ S	153° 6.472′ E
CTD.CapChanTrav1	CTD	22° 33.450′ S	151° 27.628′ E
CTD.CapChanTrav2	CTD	22° 11.666′ S	151° 53.756′ E
CTD.CapChanTrav3	CTD	22° 18.920′ S	151° 45.079′ E
CTD.CapChanTrav4	CTD	22° 26.166′ S	151° 36.386′ E
CTD.CapChanTrav5	CTD	22° 5.005′ S	152° 3.409′ E
CTD.SlopeTrav1	CTD	23° 17.805′ S	153° 18.916′ E
CTD.SlopeTrav2	CTD	23° 24.902′ S	153° 9.937′ E
CTD.SlopeTrav3	CTD	23° 32.037′ S	153° 0.788′ E
CTD.SlopeTrav4	CTD	23° 39.350′ S	152° 51.420′ E
CTD.SlopeTrav5	CTD	23° 46.655′ S	152° 42.645′ E
CTD.ShelfBreak1	CTD	23° 41.381′ S	153° 49.277′ E
CTD.ShelfBreak2	CTD	23° 47.432′ S	153° 39.427′ E
CTD.ShelfBreak3	CTD	23° 53.380′ S	153° 29.051′ E
CTD.ShelfBreak4	CTD	23° 59.316′ S	153° 18.761′ E
CTD.ShelfBreak5	CTD	24° 5.523′ S	153° 8.660′ E
CTD.ShelfBreak6	CTD	24° 10.285′ S	152° 58.911′ E
CTD.CapChanTrav6	CTD	22° 24.970′ S	152° 22.247′ E

Cores and sediment samples

Station name	Code	Priority	Lat DDM	Long DDM
GPC1	GPC	P1	23° 22.897′ S	153° 22.275′ E
GPC2	GPC	P1	23° 35.179′ S	153° 46.393′ E
CapRidgeDrift	KC	P3	22° 53.917′ S	152° 39.900′ E
OoidShoal	KC	P4	22° 41.345′ S	152° 25.648′ E
FitzD1	KC	P3	23° 2.388′ S	152° 3.552′ E
FitzD2	KC	P1	23° 0.422′ S	152° 6.757′ E
EACNorth	KC	P2	21° 59.020′ S	153° 3.583′ E

Station name	Code	Priority	Lat DDM	Long DDM
EACSouth	KC	P3	22° 9.787′ S	153° 10.427′ E
200mDrift	SMG	P3	22° 53.983′ S	152° 39.830′ E
200mDrirft2	SMG	P3	22° 54.051′ S	152° 40.020′ E
200mDrift3	SMG	P3	22° 54.197′ S	152° 40.198′ E
SwainGully1	SMG	P3	22° 12.910′ S	152° 50.790′ E
SwainGully2	SMG	P3	22° 19.363′ S	152° 49.127′ E
SwainGully3	SMG	P3	22° 25.561′ S	152° 45.095′ E
SwainGully4	SMG	P3	22° 29.070′ S	152° 33.681′ E
CapInlet1	KC	P1	22° 30.042′ S	152° 13.055′ E
CapInlet2	KC	P2	22° 15.202′ S	151° 57.386′ E
CapInlet3	SMG	P3	21° 59.969′ S	151° 46.137′ E
CapInletEast2	SMG	P3	22° 11.896′ S	152° 5.139′ E
CapInletEast3	SMG	P3	22° 19.457′ S	152° 15.133′ E
CapInletEast4	SMG	P3	22° 29.445′ S	152° 22.681′ E
CapInletEast5	SMG	P3	22° 30.010′ S	152° 30.244′ E
CapLedgeUpper	KC	P2	22° 52.466′ S	152° 34.987′ E
CapInletWest	KC	P2	22° 26.942′ S	151° 34.316′ E
CapInletNorth	KC	P2	22° 3.387′ S	151° 39.765′ E

Dredges

Target	TYPE	NAME	GROUP_ID	Priority	Lat DDM	Long DDM
Reef	General Use Zone	GU-21-6016	GUZ	P1	23° 4.775′ S	151° 57.409′ E
Dune/Reef	General Use Zone	GU-21-6016	GUZ	P1	23° 4.723′ S	151° 57.906′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P1	23° 4.737′ S	151° 58.176′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P1	23° 4.355′ S	151° 59.597′ E
Reef	General Use Zone	GU-21-6016	GUZ	P1	23° 4.324′ S	151° 59.743′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P1	23° 4.468′ S	151° 59.394′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P1	23° 4.727′ S	151° 58.389′ E

Target	TYPE	NAME	GROUP_ID	Priority	Lat DDM	Long DDM
Reef	General Use Zone	GU-21-6016	GUZ	P1	23° 4.280′ S	152° 0.016′ E
Reef	General Use Zone	GU-21-6016	GUZ	P1	23° 4.063′ S	152° 1.476′ E
Dune/Reef	General Use Zone	GU-21-6016	GUZ	P2	23° 5.746′ S	151° 58.297′ E
Dune/Reef	General Use Zone	GU-21-6016	GUZ	P2	23° 5.580′ S	151° 58.381′ E
Reef	General Use Zone	GU-21-6016	GUZ	P3	23° 22.385′ S	152° 5.784′ E
Reef	General Use Zone	GU-21-6016	GUZ	P3	23° 19.141′ S	152° 4.655′ E
Reef	General Use Zone	GU-21-6016	GUZ	P3	23° 26.015′ S	152° 7.322′ E
Reef	General Use Zone	GU-21-6016	GUZ	P3	23° 26.156′ S	152° 6.697′ E
Reef	General Use Zone	GU-21-6016	GUZ	P3	23° 25.779′ S	152° 8.449′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P3	22° 55.058′ S	152° 1.702′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P3	22° 55.296′ S	152° 2.468′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P3	22° 55.250′ S	152° 2.321′ E
Reef Tce	General Use Zone	GU-21-6016	GUZ	P3	22° 18.704′ S	153° 0.289′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 20.369′ S	152° 6.667′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 20.129′ S	152° 7.637′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 19.976′ S	152° 8.302′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 24.963′ S	152° 8.971′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 24.171′ S	152° 10.596′ E
Reef	General Use Zone	GU-21-6016	GUZ	P4	23° 24.027′ S	152° 10.894′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P4	22° 59.899′ S	152° 0.261′ E
Cst Ridge	General Use Zone	GU-21-6016	GUZ	P4	22° 59.928′ S	152° 0.378′ E
Reef	General Use Zone	GU-21-6016	GUZ	P5	22° 53.482′ S	152° 39.375′ E
Reef	General Use Zone	GU-21-6016	GUZ	P5	22° 53.667′ S	152° 39.567′ E
Drift	General Use Zone	GU-21-6016	GUZ	P5	22° 53.720′ S	152° 39.729′ E
Drift	General Use Zone	GU-21-6016	GUZ	P5	22° 54.203′ S	152° 40.167′ E
Shoal	General Use Zone	GU-21-6016	GUZ	P6	22° 42.828′ S	152° 23.555′ E
Outcrop	General Use Zone	GU-21-6016	GUZ	P6	22° 43.513′ S	152° 23.000′ E
Barc Dune	Habitat Protection Zone	HP-20-5225	HPZ	P2	22° 32.546′ S	152° 45.196′ E

Target	TYPE	NAME	GROUP_ID	Priority	Lat DDM	Long DDM
Barc Dune	Habitat Protection Zone	HP-20-5225	HPZ	P2	22° 32.523′ S	152° 45.240′ E
Dune/Reef	Habitat Protection Zone	HP-20-5225	HPZ	P2	22° 32.304′ S	152° 45.844′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 20.386′ S	152° 52.223′ E
Reef	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 20.548′ S	152° 52.775′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 20.587′ S	152° 52.913′ E
Reef Cts	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 18.082′ S	152° 53.262′ E
Reef Cts	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 18.123′ S	152° 54.148′ E
Dune/Reef	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 33.386′ S	152° 44.488′ E
Dune/Reef	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 33.449′ S	152° 44.533′ E
Dune/Reef	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 33.536′ S	152° 44.575′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P3	22° 33.759′ S	152° 44.593′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P4	21° 57.864′ S	152° 50.428′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P4	21° 57.944′ S	152° 52.237′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P4	21° 58.063′ S	152° 54.310′ E
Reef	Habitat Protection Zone	HP-20-5225	HPZ	P4	21° 58.080′ S	152° 49.452′ E
Reef Tce	Habitat Protection Zone	HP-20-5225	HPZ	P4	21° 58.107′ S	152° 49.615′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ	P4	22° 30.987′ S	152° 46.916′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ	P4	22° 31.299′ S	152° 47.993′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ	P4	22° 31.429′ S	152° 48.405′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ	P5	22° 26.691′ S	152° 47.946′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ	P5	22° 27.033′ S	152° 48.813′ E
Coast	Habitat Protection Zone	HP-20-5225	HPZ		22° 27.452′ S	152° 49.090′ E
Cst Ridge	Marine National Park Zone	MNP-21-1141	MPZ	P1	22° 53.145′ S	152° 2.783′ E
Cst Ridge	Marine National Park Zone	MNP-21-1141	MPZ	P1	22° 53.313′ S	152° 3.127′ E
Cst Ridge	Marine National Park Zone	MNP-21-1141	MPZ	P1	22° 52.522′ S	152° 3.700′ E

Target	TYPE	NAME	GROUP_ID	Priority	Lat DDM	Long DDM
Cst Ridge	Marine National Park Zone	MNP-21-1141	MPZ	P1	22° 52.841′ S	152° 4.223′ E
Shoal	Marine National Park Zone	MNP-21-1141	MPZ	P6	22° 41.576′ S	152° 18.112′ E
Shoal	Marine National Park Zone	MNP-21-1141	MPZ	P6	22° 39.164′ S	152° 20.708′ E