



RV *Investigator* Voyage Plan

VOYAGE #: IN2026_T04			
Version Number:	Final		
Voyage title:	Collaborative Australian Postgraduate Sea Training Alliance Network (CAPSTAN) 06		
Mobilisation:	Brisbane, Thursday, 10 September 2026		
	Science mobilisation Thursday, 10 September 2026		
Depart:	Brisbane 0400 Friday, 11 September 2026		
Return:	Wednesday 23 September 2026		
Demobilisation:	Science demobilisation Wednesday 23 September 2026		
	No demobilisation		
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Scientific objectives

The Collaborative Australian Postgraduate Sea Training Alliance Network ([CAPSTAN](#)) is a maritime education and training initiative of CSIRO, the University of Tasmania's Institute for Marine and Antarctic Studies (IMAS) and the Australian and New Zealand International Scientific Drilling Consortium (ANZIC). The Program is supported by grants of sea time on RV *Investigator* (RVI) from the CSIRO Marine National Facility and through funding from the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS). There are no specific scientific objectives for this voyage, however the CAPSTAN platform aims to:

- Develop and provide an effective vessel-based tertiary education experience involving national stakeholders and post-graduate students, by pooling national tertiary teaching expertise and personnel resources;
- Develop a national curriculum to standardise teaching protocols/methods and learning outcomes in conjunction with the new data collection equipment and facilities of the CSIRO research vessel RVI, the Integrated Marine Observatory System and external stakeholders, and;
- Provide and test a multi-disciplinary research-based teaching module for marine science postgraduates with opportunities for student mobility and national network development.

In addition to CAPSTAN's core training objectives, this multidisciplinary voyage will explore:

1. The collection of geological samples of the Loyalty Ridge.

This Ridge is assumed to be an Eocene Island Arc, with no samples ever collected from the region. Samples will consist of rock dredges and sediment cores (Kasten core).

2. Measurement of the biogeochemical and physical properties upstream and downstream of a seamount in the Western Coral Sea.

This will be achieved through CTD sampling and the deployment of drifters and Argo floats. If time permits, we will tow the triaxus between stations to understand how physical properties of the surface water column change with distance from the seamount.

3. Underwater Cultural Heritage (UCH) Surveys

In consultation with the Australian Underwater Cultural Heritage Program (DCCEEW), the voyage may optimise its track and timings to facilitate the collection of data relating to several shipwrecks. This will assist with the aims of the UCH program in addition to providing an opportunity for students to plan and deliver a wreck survey. Surveys will either comprise a dedicated survey with allocated time or passing over a pre-identified target location during transit. Vessel speed for surveys is 2-4knots.

For all targets, main data of interest is MBES showing site location in marine environment, spread of features/condition, direction bow pointing (if discernible), depth, confirmation of exact location. If deployment of drop camera possible, any images of features with direction camera pointing and depth.

4. Investigation into the distribution of microplastics in surface/subsurface water

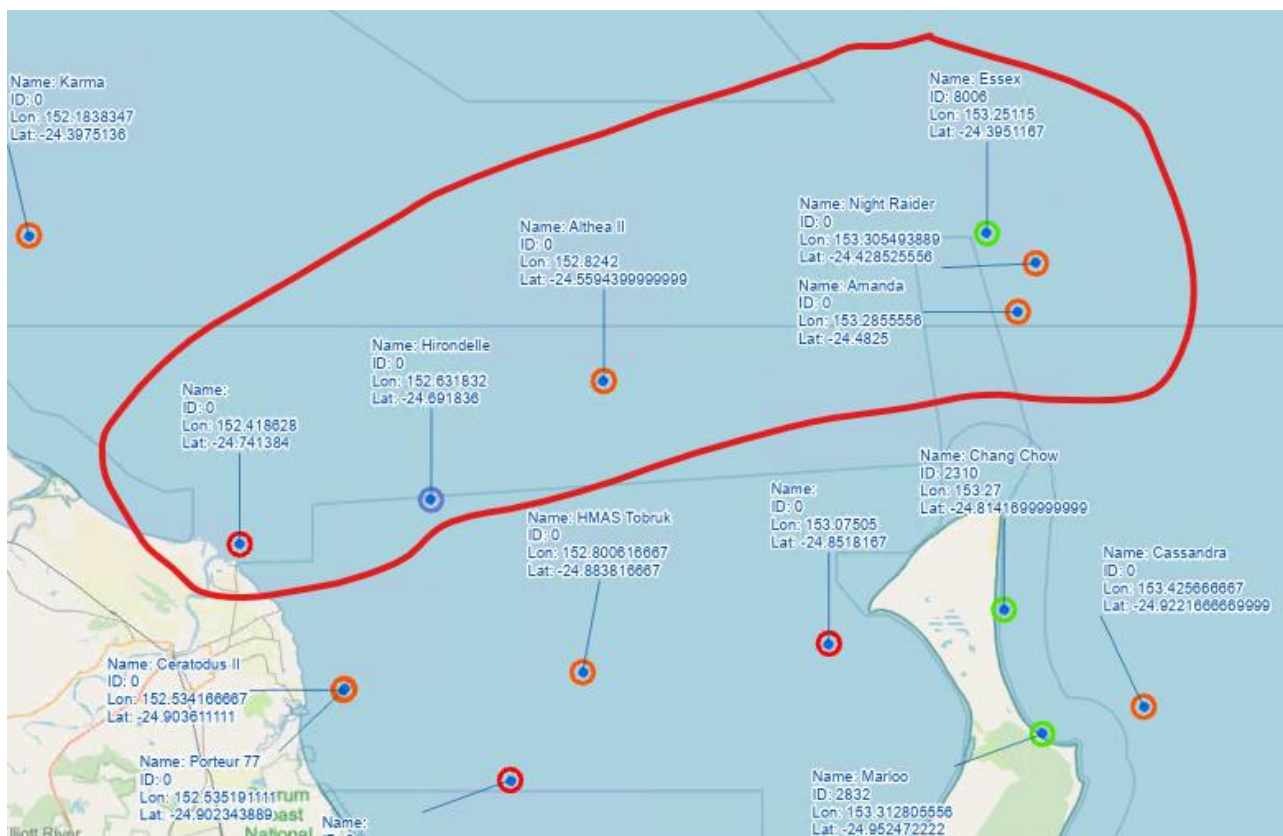
This will be achieved through the deployment of net tows and bulk water samples to collect particulate samples for subsequent microplastic quantification and analysis. Water and net samples will be collected, filtered and subsequently analysed using a microscope to identify smaller microplastic pieces. Water will be filtered using a small low-pressure bench pump connected to filtering system and stainless steel weave mesh filters. No chemicals, reagents or hazardous substances will be used during sampling or filtration.

5. Biodiversity characterisation using eDNA metabarcoding

Generating high-resolution biodiversity profiles across the water column, characterising mesophotic and deep-water communities through the collection of water samples from CTD-Rosette system. Onboard, water samples will be filtered directly from Niskin bottles using peristaltic pumps onto fine mixed-cellulose ester filter papers (0.45µm and 0.8µm), which will be stored in a preservative buffer and frozen at –80. DNA extraction, metabarcoding, sequencing, and bioinformatics will then be conducted at the Minderoo OceanOmics Centre at UWA.

Table 1: Shipwrecks within the region of this voyage.

Wreck Name	Latitude	Longitude	Description
Shipwrecks considered for dedicated survey (time dependant)			
<i>Essex</i> Location known	-24.3951167	153.25115	A modern steel barge sunk in 2011. Length 50m Erroneously associated with a historic shipwreck of the same name and clarification is sought. Survey of this wreck is included in the voyage track (Figures 2,3 and Table 2). Main data of interest is MBES data showing site location in marine environment, spread of features/condition, direction bow pointing (if discernible), depth, confirmation of exact location. If you drop camera is deployed, any images of features with direction camera pointing and depth. Also keen to know negative results - if we go over a target location and there is nothing in that spot.
<i>Kowarra</i> Location unknown	-24.261	153.694	A merchant ship of 2125 tons (82.3m L 12.2m B 5.5m D) was bound from Bowen to Brisbane. The vessel sank after it was struck by a Japanese torpedo in April 1943, 35 miles north-east of Sandy Cape, off Maryborough. The vessel had 24 crew members on board at the time and all were killed. A differing account suggests the vessel was sunk by the Japanese submarine I-26 approximately 60km north-east of Sandy Cape, on the 24th of April 1943. The eleven survivors from the crew were picked up by an American submarine chaser almost 24 hours after the 'Kowarra' sank.
Passover Surveys			
<i>Unknown</i>	-24.741384	152.418628	
<i>Hirondelle</i>	-24.691836	152.631832	
<i>Anthea II</i>	-24.5594399	152.8242	Survey of this wreck is included in the voyage track (Figures 2,3 and Table 2)
<i>Amanda</i>	-24.4825	153.28555	
<i>Night Raider</i>	-24.4285255	153.30549	



Voyage objectives

The training objectives of the 2026 CAPSTAN 06 Voyage are to:

- Enable national access to the RVI to postgraduate students enrolled in Australian tertiary institutions.
- Provide hands-on training experiences with standard modern sampling equipment used in marine research, encompassing geological, biological, chemical, physical oceanographic and atmospheric equipment.
- Establish a national network of a new generation of marine scientists.
- Involve a diverse number of national trainers and students in the program.
- Provide trainers with the opportunity to gain experience as PI/Chief Scientist/Co Chief Scientist and demonstrators.

We aim to deliver a program that encompasses the following:

- Plan and participate in a multidisciplinary marine science research survey focusing on the core disciplines of e.g. oceanography, ecology, geosciences, biology, hydrochemistry, and atmospheric sciences.
- Demonstrate the application and operation of various scientific sampling equipment and instrumentation on board the RVI.
- Acquire, process and analyse quantitative and qualitative samples.
- Perform data analysis, quality control, interpretation and integration.
- Prepare a final voyage report.
- Prepare and present an element of the final cruise report to peers and crew.
- Master the skills required to operate and conduct oneself safely in the marine environment including specific MNF sea-survival skills and laboratory safety.
- Foster collaboration and communication by guiding participants in preparing and presenting voyage findings to peers and crew
- Prepare and learn about science communication to present research to a wider audience

MNF Sustained Observation Program

The CSIRO Marine National Facility (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, sound velocity, and gravity measurement systems
- 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)
- Deployment of Argo floats
- Deployment of the Triaxus profiling system to create section plots of key variables relevant to tracking the island wake effect of a key seamount along our route.

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)

Activity plan for first 72 hours of voyage

Date	Time	Activity
10/09/26	1400	Science Party Boards
	By 1500	MNF staff board, complete induction if required
	1500-1600	Test and Tag – location Dirty Wet Lab
	1500	Ship induction and tour
	1630	Muster
11/09/26	0400	Departure from Brisbane
	0800	Pilot off, passage to Bundaberg (approx. 20 hrs)
	1000	VM Briefing
	TBC – PM	Test CTD

12/09/26	0400	Anchor IVO Bundaberg for hull clean
	0900 onwards	CAPSTAN workshop
13/09/26	All day	Hull cleaning
	TBC - AM	CTD Training
	TBC – AM	Lab Inductions
	~1400	E&T team Introductions

Voyage track

On receipt of this voyage plan (as a draft document) showing the intended voyage track, CYAN Ship Management will confirm the locality of any Particularly Sensitive Sea Area (PSSA), CMR or MPA, on, or close to, the intended voyage track.



Figure 2: Proposed Voyage track with waypoints and sampling stations.

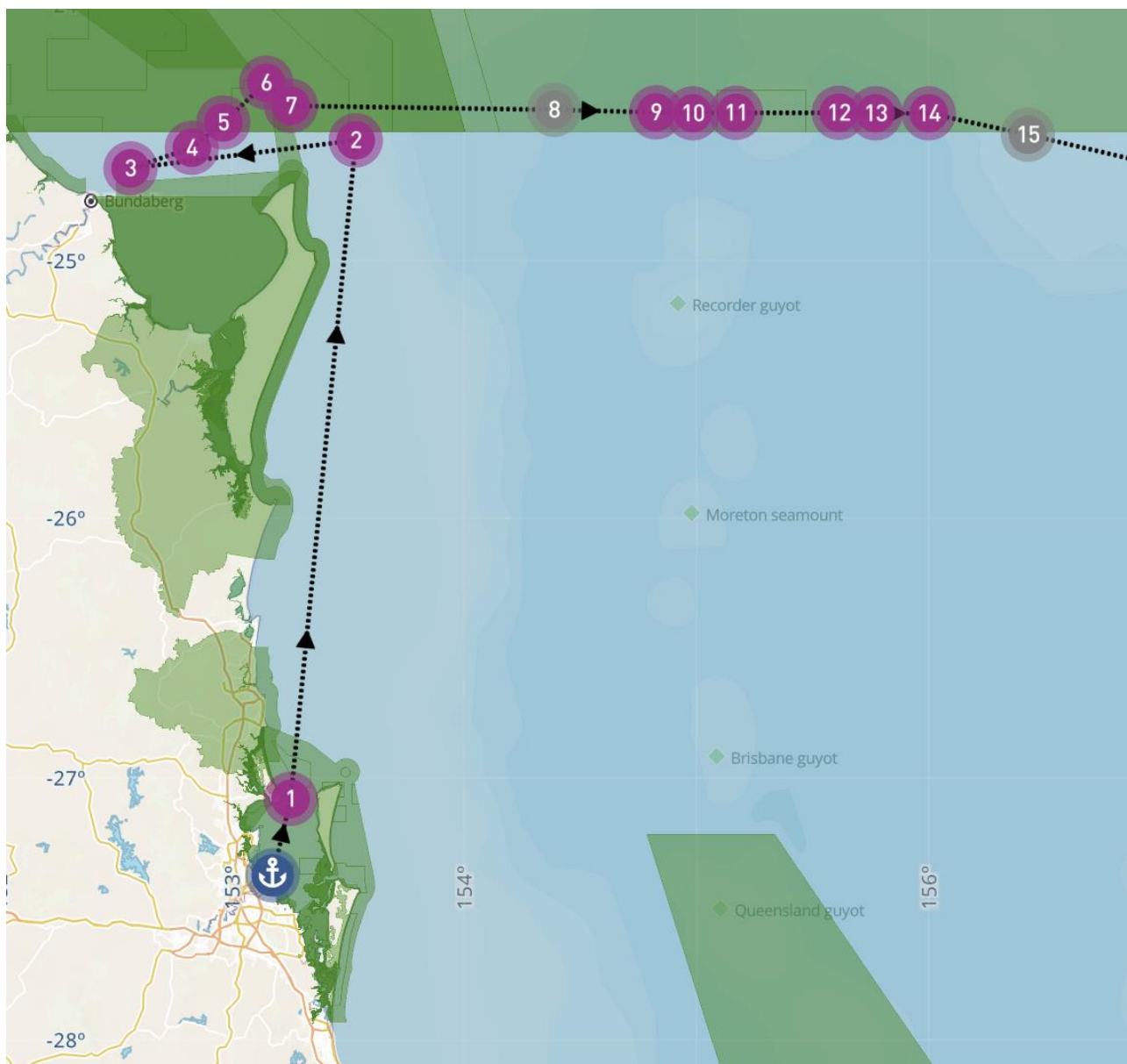


Figure 3: Zoom into the first waypoints and sampling stations of the voyage, from Brisbane, into Bundaberg, and then departing from Bundaberg. The sampling pattern of stations 8-13 might change according to oceanographic conditions.

Waypoints and stations

Table 2: Tentative waypoints and stations for the voyage. These estimates are based on a steaming speed of 8 knots

Way point	Way point Name	Latitude	Longitude	Sea Depth	Work Description	Time Needed	Distance	Ship Time / Speed
	Brisbane						18.09 NM	00d 02h 15m / 8 knots
ST001	Leaving Brisbane	-27.08	153.25	11m		00d 00h 45m	153.89 NM	00d 19h 14m / 8 knots

ST002	CTD test	-24.53	153.53	1263m	CTD test	00d 01h 00m	53.37 NM	00d 06h 40m / 8 knots
ST003	Bundaberg Cleaning	-24.64	152.56	21m	Bundaberg cleaning	02d 00h 00m	15.21 NM	00d 01h 54m / 8 knots
ST004	Anthea II	-24.56	152.82	37m	Pass over wreck	00d 00h 00m	9.52 NM	00d 00h 11m / 8 knots
ST005	Leaving Bundaberg	-24.46	152.96	39m		00d 00h 45m	13.74 NM	00d 01h 43m / 8 knots
ST006	Leaving Bundaberg	-24.30	153.14	110m		00d 00h 45m	7.99 NM	00d 00h 59m / 8 knots
ST007	Essex	-24.40	153.25	63m	Pass over wreck, 2 hours for MBES survey	00d 02h 00m	61.95 NM	00d 08h 44m / 8 knots
ST008	Start Triaxus	-24.41	154.38		Start triaxus (optional)		23.94 NM	00d 02h 59m / 8 knots
ST009	End Triaxus/Fraser Seamount	-24.42	154.82	4370m	End triaxus, 2000 m CTD cast & USA BGC Argo Deployment	00d 02h 00m	8.68 NM	00d 01h 05m / 8 knots
ST010	Fraser Seamount	-24.42	154.98	4422m	~2000 m CTD cast	00d 02h 00m	10.18 NM	00d 01h 16m / 8 knots
ST011	Start Triaxus/Fraser Seamount	-24.42	155.17	3814m	Start triaxus, 2000 m CTD cast	00d 02h 00m	24.17 NM	00d 03h 01m / 8 knots
ST012	End Triaxus/Fraser Seamount	-24.42	155.61	4285m	End triaxus, 2000 m CTD cast	00d 02h 00m	8.68 NM	00d 01h 05m / 8 knots
ST013	Fraser Seamount	-24.42	155.77	4294m	~2000 m CTD cast	00d 02h 00m	12.49 NM	00d 01h 33m / 8 knots
ST014	Start Triaxus/Fraser Seamount	-24.42	156.00	4104m	Start triaxus, 2000 m CTD cast	00d 02h 00m	23.87 NM	00d 02h 59m / 8 knots
ST015	End Triaxus/Waypoint	-24.92	156.78	2924m	End triaxus		513.29 NM	02d 16h 09m / 8 knots
ST016	1000m CTD cast & Argo & drifter deployment	-26.21	165.70	3212m	1000 m CTD cast, Australian BGC	00d 02h 00m	5.06 NM	00d 00h 37m / 8 knots

					Argo & drifter deployment			
ST017	Entering Norfolk EEZ	-26.21	165.70	3220m		00d 00h 45m	203.31 NM	01d 01h 24m / 8 knots
ST018	Leaving Norfolk EEZ	-25.95	169.55	3180m		00d 00h 45m	11.50 NM	00d 01h 26m / 8 knots
ST019	Dredge sampling	-25.86	170.45	2003m	Sediment Sampling - dredge	00d 04h 00m	4.80 NM	00d 00h 36m / 8 knots
ST020	Entering Vanuatu/NewCal EEZ	-25.67	170.62	2904m		00d 00h 45m	331.86 NM	01d 17h 28m / 8 knots
ST021	Leaving Vanuatu/NewCal EEZ	-21.22	173.06	3271m		00d 00h 45m	8.73 NM	00d 01h 05m / 8 knots
ST022	Entering Fiji EEZ	-21.11	173.17	2878m		00d 00h 45m	156.61 NM	00d 19h 34m / 8 knots
ST023	Argo & drifter deployment	-19.08	174.91	3263m	Australian core Argo & drifter deployment	00d 00h 30m	169.27 NM	00d 21h 09m / 8 knots
	Lautoka					Total: 12 days 19 hours		

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:	7 (including test cast)
Likely maximum depth of deepest cast:	~3200m
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 Triton 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)	
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	No
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.

Piggyback projects

Global Marine Biodiversity Observations (GLOMBO): Autonomous Genomic Sampling Systems

Principal Investigator: Sahan Jayasinghe (CSIRO)

Voyage Lead: Marcelle Ayad

Environmental DNA (eDNA) 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 current project aims to develop and deploy an autonomous eDNA sampling system that can be seamlessly integrated into the RVI's underway seawater system.

Sampling regime

- 3 hourly samples along voyage (including Australia International and Fijian waters).
- No samples in New Caledonia/Vanuatu EEZ.

Deployment of Argo floats including Australian core, deep, and BGC, and floats from international partners.

Principal Investigators: Christina Schallenberg, Peter Oke

Voyage Lead: Gabriela Semolini Pilo

The International Argo program aims to monitor subsurface ocean properties of the global ocean – delivering data in real-time to support operational services, and in delayed-mode to underpin climate research. Argo Australia collaborates with over 30 other countries to implement and maintain this global ocean observing program. Argo Australia is a major player, maintaining 10% of the global array. During CAPSTAN6 one Core and two BGC Argo floats will be deployed in the Coral Sea along the voyage track.

Deployment of Surface Drifters

Principal Investigator: Aidan McMahon

Voyage Lead: Gabriela Semolini Pilo

The Global Drifting Buoy Program is a component of the Global Ocean Observing System (GOOS). The program provides sustained, near-real-time measurements of near-surface ocean conditions worldwide. Its primary goal is to maintain a globally distributed array of approximately 1,250–1,300 satellite-tracked drifting buoys, with roughly one drifter in each $5^\circ \times 5^\circ$ open-ocean grid cell. This network delivers accurate and globally consistent observations of surface currents, sea surface temperature, and barometric pressure. The drifters are designed to follow ocean currents within the upper mixed layer, enabling direct measurement of ocean surface circulation and energy. We plan to deploy TWO drifters, at the same deployment coordinate of two of the three Argo floats that will also be deployed.

Chumbucket: low tech, high return sampling for phytoplankton diversity

Principal Investigator: Dr Ruth Eriksen (CSIRO)

Voyage Lead: Pier van der Merwe

Understanding and document biodiversity of lower trophic levels (phytoplankton and microzooplankton) in Australian marine waters is dependent on complimentary sampling and analysis methods that combined, provide information on diversity, ecology, toxicology and phenology of both rare and dominant species. The voyages selected for this piggy-back project extend the type and coverage of plankton samples beyond our existing methods and programs (e.g. IMOS SOTS, AusCPR and NRS). By sampling the phytoplankton community using a novel method developed onboard RVI for the SEA-MES voyages ("Chumbucket") we will be able to correlate community composition by microscopy with allied measurements planned as part of multiple voyages (AusCPR, eDNA, underway sensors, remote sensing etc). These measurements will contribute to several observation programs in the region, to enhance our understanding of primary producers and grazers, and the broader phytoplankton community composition, in the context of rapid environmental change.

Sampling regime:

- Shallow CTDs - surface and DCM samples
- Deep CTD - four samples within top 200m
- Argo/drifter site (within Fiji EEZ) – Net and bucket sample under underway seawater tap run for 15-20mins.

Developing Jonathan: An On-vessel Automated Seabird Detector

Principal Investigators: Carlie Devine, Rich Little (CSIRO)

No voyage lead required

The objective of this project is to collect seabird counts using an automatic on-vessel seabird edge detector in coastal and open ocean environments.

Planned activities include:

1. During IN2026_T04 the camera, processor will operate while Investigator is underway. The system will be supervised remotely from Hobart with DAP support on the vessel. A daily csv report and mp4 trip files will be saved to system hardware and backed up by DAP, indicating the number of seabirds detected at specific time intervals throughout daylight hours.

The expected outcome of this project is to bring together the hardware and software needed for an on-vessel seabird Edge detector that will provide a running count of seabirds seen by a fixed camera over the course of a day on a sea-going vessel. Successful development of such a system will be the first step in providing more comprehensive and detailed baseline environmental data. This project has the appropriate CWLLA AEC approval in place.

Building student capacity in marine mammal and seabird observation for marine conservation

Principal Investigator: Saia Bartes (Deakin)

Voyage Lead: Ben Arthur and Nina Wootton

This project will establish a low-cost, standardised marine megafauna observation program with the dual aim of generating ecologically meaningful observations and providing students with hands-on training in observational marine science. It will compare marine mammal and seabird occurrence and composition across different Australian coasts while integrating these observations with the broader oceanographic, geological, geomorphological, and ecosystem context sampled during the voyage. This project addresses both a disciplinary gap and a growing national need for accessible, scalable approaches to ecosystem observation in Australian marine systems facing increasing anthropogenic pressures. This need is particularly relevant as expanding offshore industries, including resource extraction, seismic exploration, and offshore wind energy, increasingly require robust ecological baselines and trained Marine Mammal Observers to support environmental assessment, mitigation, and compliance.

Permits

Fiji EEZ

We will navigate within the Fiji EEZ from station 20. In that EEZ we will operate under permit UN-FORM-A-IN2026_V06. We can have underway sampling systems enabled, deploy Argo floats and surface drifters.

Vanuatu/New Caledonia EEZ

The Matthew and Hunter Island area is jointly claimed by Vanuatu and New Caledonia (in dispute). We have no permits for activities within this EEZ – therefore all underway sampling systems not essential for safe navigation of the vessel will be disabled between stations 18 and 19 (Figure 2, Table 2).

Shutdown underway sampling systems not essential for safe navigation

All underway sampling systems not required for the safe navigation of the vessel (as determined by the Master) are to be shutdown upon entering this area.

- Underway sampling systems – DAP, SIT and GSM
- Piggyback projects
 - eDNA
 - Jonathon seabird camera (contact Carlie Devine)
- Livestream camera

Australian Marine Parks

For Australian Marine Parks, the following applies:

The permit requires relevant participants to be fully informed of and understand the specific permit conditions before they take part in the Permitted Activity.

Records must be kept of cetacean sightings whilst in a Marine Park. The MNF has a formal process for this and if anyone does sight a cetacean, though it may well have already been reported by the Bridge, please let the Ops room know so it can be recorded.

The vessel has a Standard Operating Procedure (SOP) to manage interactions with cetaceans, which will impact the collection of data associated with the ship's acoustic systems.

An electronic or hard copy of this permit is available through the Voyage Manager, if you wish to review or need to review the conditions you may be operating under.

This voyage will traverse through the following Marine Parks which RVI is permitted to operate under PA2020-00041-5 (VARIATION PA2020-00041-18) Coral Sea Marine Park and PA2020-00041-6 (VARIATION PA2020-00041-19) Temperate East Network:

- Coral Sea Marine Park (Fraser Seamount is within this Marine Park)
- Norfolk Marine Park

No XBTs are permitted in Marine Parks, however Rapid Cast operations are permitted.

The vessel has a Standard Operating Procedure (SOP) to manage interactions with cetaceans, which will impact the collection of data associated with the ship's acoustic systems. All cetacean sightings within Marine Parks must be documented and reported back to Marine Parks as part of the post voyage notification. Records must be kept of cetacean sightings whilst in a Marine Park. The MNF has a formal process for this and if anyone does sight a cetacean, though it may well have already been reported by the Bridge, please let the Ops room know so it can be recorded.

The deployment of Argo floats in Marine Parks is permitted under PA2025-00104-6 Coral Sea. We don't have a permit to deploy surface drifters inside marine parks.

Voyage Activities within marine parks:

Area	Activity
Coral Sea Marine Park	CTD, Argo deployment, net tows, underway systems
Norfolk Marine Park	Underway systems

Quarantine

The import of eDNA samples is approved under DFAT permit 0010379192.

Minderoo OceanOmics Centre at UWA - Permit to import conditionally non-prohibited goods DAFF permit 0009566683 for importing eDNA samples back into Australia

Chumbucket samples are quarantine exempt as they are classified as open ocean water samples.

Communication plan

Communication activities for the voyage will be aligned with the CAPSTAN program Communications Plan. Voyage specific activities will be updated here if required.

Indigenous engagement

N/A

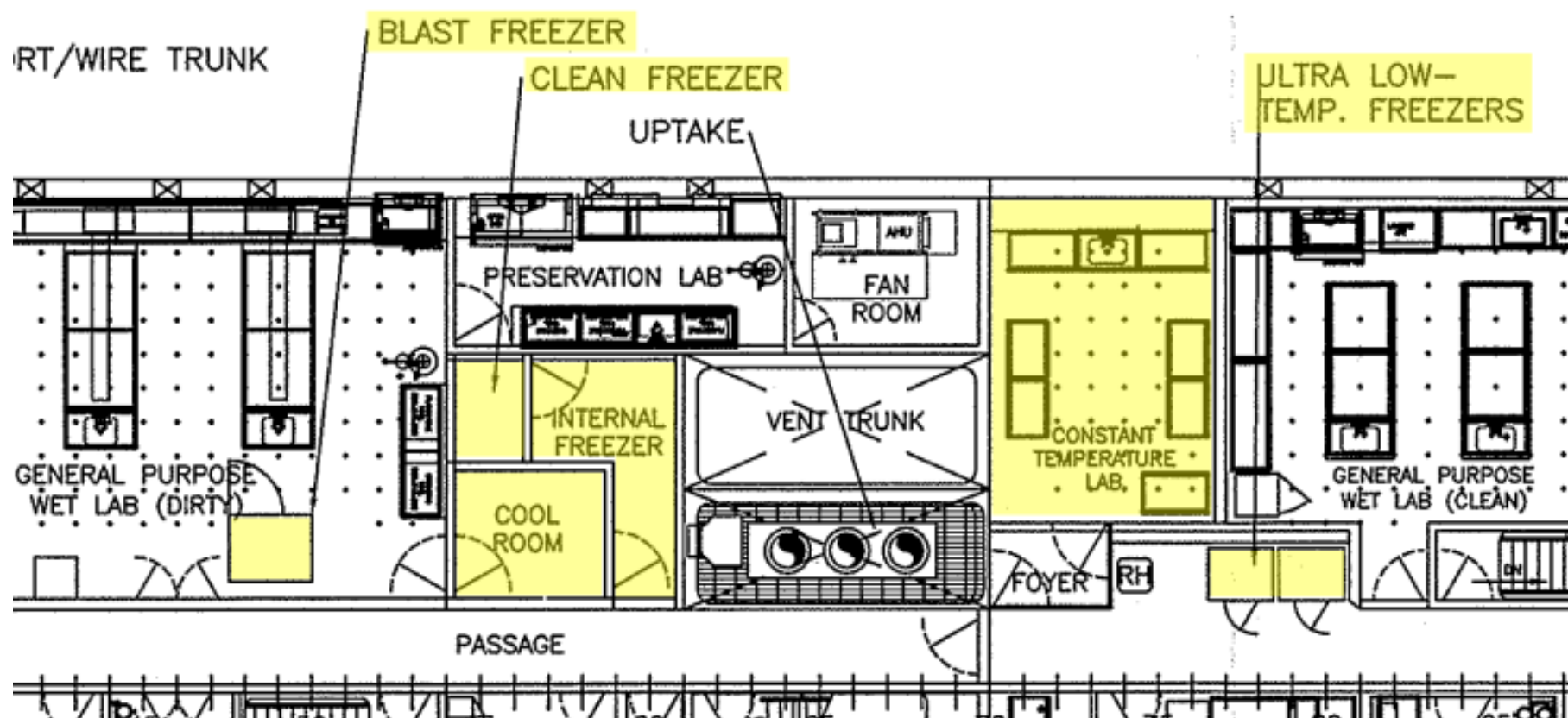
Appendix A

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		
Air Chemistry Lab		
Preservation Lab	X	Fume hood use
Constant Temperature Lab (Min temp: ~4°C / Max temp ~35°C)		
Underway Seawater Analysis Laboratory	X	Collection of underway sea water
GP Wet Lab (Dirty)	X	Processing of grabs/cores Preparation and preservation of CPR
GP Wet Lab (Clean)		
GP Dry Lab (Clean)	X	Processing of net samples Microscopy Underway seawater filtration and analysis for chlorophyll a extraction.
Sheltered Science Area	X	Preparation of XBTs
Observation Deck 07 Level	X	Marine mammal and seabird surveys
Internal Freezer (Dirty Wet lab) (Min temp -25°C / Max temp 0°C) Volume: >20m ³		

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		
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.		
Cool Room (Dirty Wet lab) (Min temp 0°C / Max temp 10°C)	X?	Storage of sediment cores?
Ultra-Low Temperature Freezers x2 (Main Deck) Min temp -80°C / Max temp -80°C)	X	Storage of eDNA samples
YODA Freezers (x2) (Clean Dry lab) (Min temp -20°C / Max temp 10°C)		



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

MOBILE LABORATORY AND FACILITIES (MAY REQUIRE ADDITIONAL SUPPORT)			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
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)			*note: Use of this item must be flagged with the relevant CSIRO Oceans & Atmosphere team responsible for CPR cassette preparation and sample processing. Please discuss your planned CPR use with your VDC, who will assist in liaising with the CPR team.

SPECIALISED SAMPLING EQUIPMENT			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)
TRIAXUS – Underway Profiling CTD		Yes, if available	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 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.

SPECIALISED SAMPLING EQUIPMENT			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)
			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.
Desired towing profile:			Undulating profile
Additional instrumentation: (please supply, make and model and datasheets and a contact person for discussion on integration)			None
Piston Coring System			
Gravity Coring System			
Multi Corer			
Kasten Corer	X		
Smith Mac Grab	X		
Rock Dredges	X		
Rock Saw			Requires trained science personnel
Seaspy Magnetometer			
Portable Pot Hauler			

SPECIALISED SAMPLING EQUIPMENT			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)
Equipment to measure seawater sound velocity/CTD:			
XBT System		X	2 per day provided if requested; 20 probes will be loaded during mobilisation.
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			
Drop Camera		X	For viewing shipwrecks once found
Sherman Epibenthic Sled			Stern ramp must be removed to operate this system.
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)	X		335-micron (preferred) for microplastics and biological sample collections

SPECIALISED SAMPLING EQUIPMENT			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS (THESE ITEMS MAY REQUIRE ADDITIONAL MNF SUPPORT STAFF)
Bongo Net	X		750mm frame, 500-micron mesh net and 335-micron cod end – for microplastics and biological sample collections
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.			8m ² 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.			16m ² 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
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			

RESEARCH SUPPORT INFRASTRUCTURE			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
Laboratory Incubators (Clean Dry lab)		X	Drying of Sediment Samples (40 to 50 degrees Celsius overnight)
Deck Incubators			Temperature controlled deck incubators
Milli-Q System	X		Needed for rinsing labware for underway sample collection and eDNA sampling
Sonardyne USBL System			

SCIENTIFIC / SAMPLE ANALYSIS SYSTEMS				
MICROSCOPES:				NOTES/COMMENTS
BRAND / MODEL	TYPE	ESSENTIAL	DESIRABLE	
Leica / M80	Dissecting	X		Biological and Sediment Sample Examination
Leica / M80	Dissecting	X		Biological and Sediment Sample Examination
Leica /MZ6	Dissecting	X		Biological and Sediment Sample Examination
Olympus / CH	Compound			
Olympus /CH	Compound			
Leica / MTU282	Camera tube			
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)			X	Biological and Sediment Sample Examination

Underway systems

ACOUSTIC UNDERWAY SYSTEMS			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
75kHz ADCP	X		Measurement of currents
150kHz ADCP	X		Measurement of currents
38kHz ADCP	X		Discuss with GSM if we wish to use it for extended periods of time
Multi Beam Echo Sounder EM2040-MKII 200-700kHz (0 – 250m approx.)	X		Underway Bathymetric Mapping
Multi Beam Echo Sounder EM124 12kHz (100m to full ocean depth)	X		Underway Bathymetric Mapping
Multi Beam Echo Sounder EM712 70-100kHz (0 –1000-m approx.)	X		Underway Bathymetric Mapping
Sub-Bottom Profiler SBP29	X		Underway Geophysical Profiling of the seafloor
Scientific Narrowband/Broadband Echo Sounders EK80 (6 bands, 18kHz-333kHz)	X		EK80s will be used in narrowband mode unless otherwise requested 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		X	Underway Geophysical Profiling

ATMOSPHERIC UNDERWAY SENSORS			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
Nephelometer			
Multi Angle Absorption Photometer (MAAP)			

ATMOSPHERIC UNDERWAY SENSORS			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
Scanning Mobility Particle Sizer (SMPS)			
Radon Detector			
Ozone Detector			
Condensation Particle Counter (CPC)			
Picarro Spectrometer (analysis of CO ₂ /CH ₄ /H ₂ O)			
Aerodyne Spectrometer (analysis of N ₂ O/CO/H ₂ O)			
Cloud Condensation Nuclei (CCN)		x	For correlation with Chla abundance
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		
pCO ₂	X		

SEAWATER SYSTEMS			
NAME	ESSENTIAL	DESIRABLE	NOTES/COMMENTS
Trace metal clean seawater supply			
Scientific clean seawater supplied to laboratories	X		For underway seawater sample collection
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)			

Appendix B

User Supplied Equipment

The table below will include information provided by the Chief Scientist / Principal Investigators in the '*Equipment Manifest-user supplied voyage specific*' document. The Chief Scientist will co-ordinate the completion of this Manifest with all PIs and forward the completed document to the Voyage Operations Manager.

NOTE: User supplied equipment will remain the responsibility of the science party throughout the voyage. The MNF technicians and ship's crew endeavour to assist wherever possible, however the MNF take no responsibility for the pre-deployment checks or repairs and maintenance of this equipment

This information will also be used for the mobilisation list and deck plan for the voyage.

See [IN2026_TO4 User Supplied Voyage Specific Equipment Manifest.xlsx](#)

Appendix C

Hazardous Materials Manifest

See [IN2026 T04 CAPSTAN Hazardous Materials Manifest.xlsx](#)