

## RV Investigator Voyage Plan

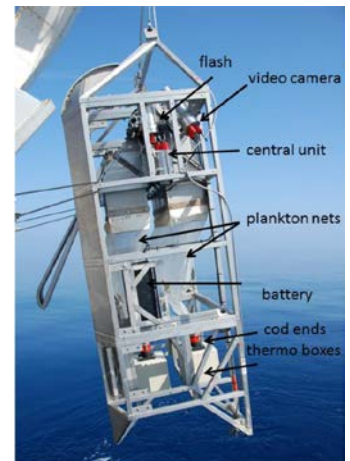
<b>Voyage #:</b>	IN2017_V03		
<b>Voyage title:</b>	Sampling the abyss: latitudinal biodiversity patterns along the base of Australia's eastern continental margin		
<b>Mobilisation (equipment):</b>	Hobart, 0800 Wednesday, 3 May 2017		
<b>Mobilisation (personnel only)</b>	Bell Bay, 1200, Monday, 15 May 2017		
<b>Depart:</b>	Bell Bay, 1800, 15 May 2017		
<b>Return:</b>	Brisbane, 1000 Friday, 16 June 2017		
<b>Demobilisation:</b>	Brisbane, Saturday, 17 June 2017		
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## Voyage outline

The primary objective of this voyage is to sample the biodiversity of lower bathyal (2500 m) and abyssal (4000 m) seafloor habitats off south-eastern Australia, and in particular deep-water ecosystems of seven Commonwealth marine reserves. We will also sample a few shallower stations at 300 m (to trial the Brenke sled) and at 1000m (to ensure a supply of live animals). The depth and sites listed below are indicative only, and may change slightly based on topography and weather.

To meet these objectives we will deploy a variety of gear to sample different components of biodiversity. The gear will also vary depending on the nature of the substratum (soft sediments or rock). The prime gear types include:

1. Beam trawl (O&A). This will only be used at sites with soft substrata
2. Heavy sled (Sherman) (MNF). This will only be used for sites that are determined to be hard ground from the multi-beam data. Sherman must be deployed off a stern trawl winch, which will require shifting of a trawl door (there will be plenty of time for this operation as all the soft-sediment gear will not be used at a rocky site).
3. Demersal trawl (NCRA) including floats (NCRA) & doors (Antarctic Division), the latter will be mounted on the stern near the trawl winches when not in use. Soft sediment only.
4. Brenke sled (MNF). Soft sediment or mixed soft-hard ground. It may require 2-3 floats to ensure it remains upright when deployed. It should be retrieved in an upright position using the A-Frame. A stand-alone CTD or camera can be mounted on the frame (see figure).
5. Biological box corer (MNF, previously belonging to Geoscience Australia) of dimensions 500 x 500 mm, sampling size 0.25 m<sup>2</sup> (soft sediment only). If possible, this is best deployed on the side winch.
6. Deep-towed camera (MNF) with CTD
7. Surface plankton & mantra nets (O&A and MV), including depression plate and flow meter.



In addition, we require multi-beam (Kongsberg EM122 & EM710) and sub bottom profiler for seafloor mapping, and echo sounders for bioacoustics (particularly the Simrad EK60).

At each site, the procedure will be to first multi-beam the site to assess the distribution of rock and soft sediment habitats (if previous multi-beam data not available. This will guide the choice of gear and tow track. If the substratum contains mostly rock (possible for some 2500m sites), the heavy sled (Sherman) will be deployed. Otherwise a combination of beam trawl (with mounted camera), Brenke sled, demersal trawl and box core will be deployed. Box cores will be sub-sampled for sediment size and micro-plastics. For shallow water sites within CMRs, the deep-towed camera will be deployed instead of the box corer. The surface plankton net can be deployed during trawling (at appropriate slow ship speeds of under 2 knots).

On this voyage there will be a particular emphasis on ensuring that the animals are collected and preserved in excellent condition for photographic and genetic analyses. Keeping the animals cold is the key. Consequently, the catch will be transferred to chilled water (5°C) as soon as it safe to approach the sampling gear. The animals will be sorted, identified and photographed in chilled water to prevent DNA degradation. The box cores will be elutriated (animals separated from mud) in chilled water also (at least for the upper 2 cm). This will require a user-supplied system to chill water

in the vessel's walk in cool room. The bulk ethanol and formalin will be stored in the HazMat container, as will the 25L plastic drums full of preserved animals.

The scientific participants will be divided into fish and invertebrate teams that reflect the different processes of collection and preservation. There will be two shifts (2:00-14:00, 14:00-2:00). The long duration of each operation will be used to identify the previous catches to high taxonomic resolution using microscopes. There will be a few participants who will focus on bioluminescence and isotope analyses.

Finally, there will be a two person team of photographers (still and video) and written communicators, who will document life at sea and the important science and conservation (CMR) stories that emerge during the voyage. Our model is the successful terrestrial Bio-blitz/Bio-scan expeditions that have communicated the values of terrestrial parks to school audiences and the general public over the past few years. We will lodge media stories directly from the vessel, in conjunction with media teams at Museum Victoria, the NESP biodiversity Hub, and the MNF. We will have a live stream to schools from the vessel on World Oceans Day (June 8<sup>th</sup>), with a potential audience of 5,000 students across Australia (years 5-8), supplemented by video clips obtained aboard the vessel.

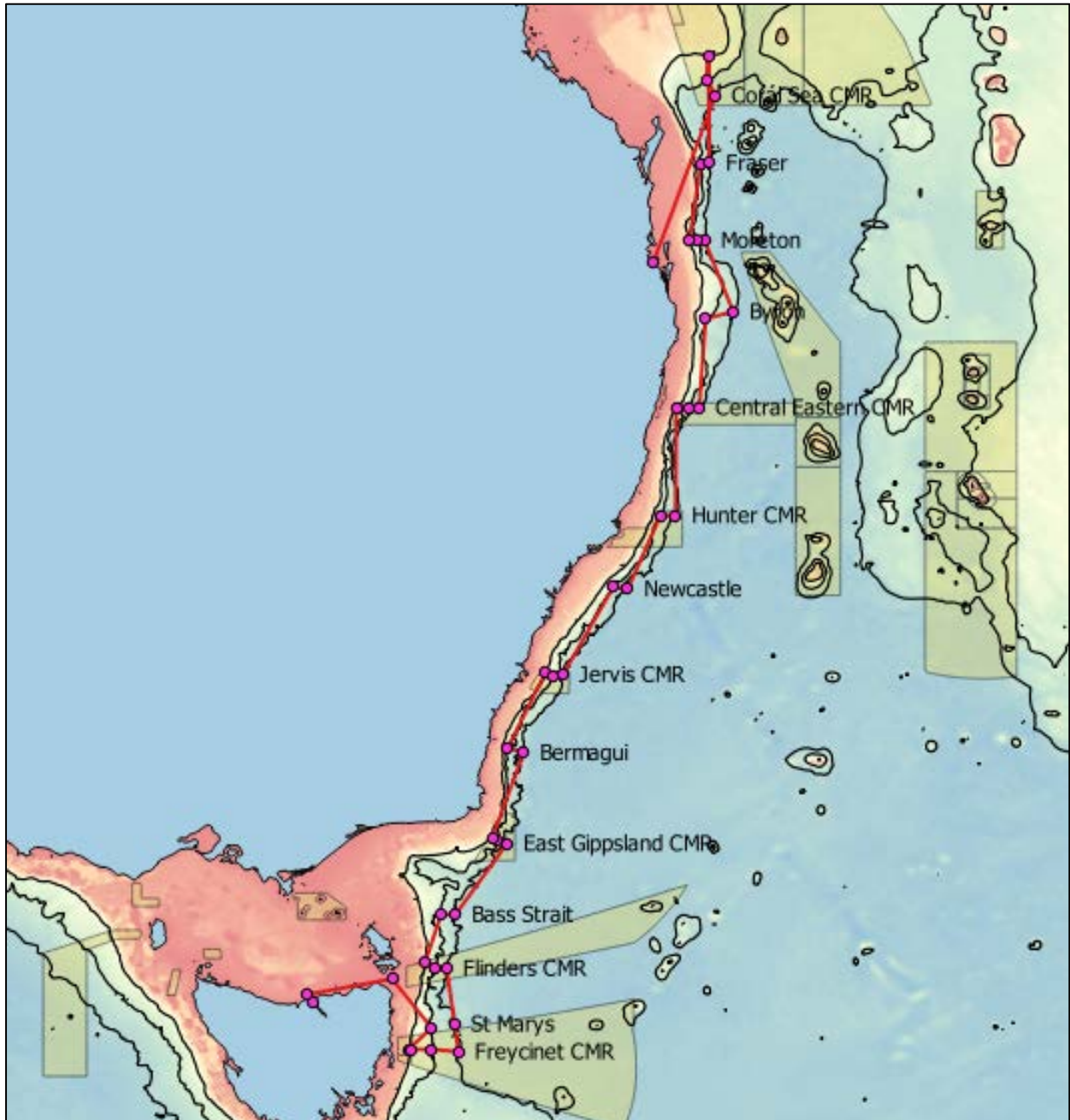
## Permits and ethics

The following permits have been obtained for the voyage:

- 1) AFMA: "Application for Scientific Permit" (approved 2/5/17)
- 2) Parks Australia: "Application for a permit to access biological resources in Commonwealth areas" (approved 5/5/17)
- 3) Parks Australia: "Application to Conduct Research Activities Within Commonwealth Marine Reserves" (approved 5/5/17)
- 4) QLD DPI: "General Fisheries Permit" (approved 2/5/17)
- 5) NSW DPI: "Scientific Collection Permit" (not required)
- 6) Museums Victoria Ethics committee (approved 28/4/17)

## Voyage track example

The voyage track is along the SE Australian continental margin from Freycinet to the southern Coral Sea, traversing seven Commonwealth Marine Reserve (CMRs) (Figure 1).



**Figure 1.** Indicative collection sites for voyage IN2017 – V03.

## Site locations and estimated time

Site	Depth (m)	Lat <sup>1</sup>	Long <sup>1</sup>	Transit (km)	Transit time	Multi beam (hr)	Dem. trawl (hr)	Brenk sled (hr)	Beam trawl (hr)	Box core (hr)	Deep tow Cam (hr)	Time on site (hr)	Total site time (hr)	Date/time
Bell Bay (start)		-	146.86											15/05/2017
St Marys	2500	-	149.04	269.	12.2	2	7					9	21.2	16/05/2017
Freycinet CMR	300	-	148.63	56.4	2.6	1		2				3	5.6	16/05/2017
Freycinet CMR	1000	-	148.66	2.8	0.1			3	3			6	6.1	17/05/2017 2:55
Freycinet CMR	2500	-	149.05	32.4	1.5	2		5	5	3	5	20	21.5	18/05/2017 0:23
Freycinet CMR	4000	-	149.55	41.1	1.9			6.5	6.5	4	6.5	23.5	25.4	19/05/2017 1:45
St Marys	4000	-	149.47	57.6	2.6	4	8					12	14.6	19/05/2017
Flinders CMR	4000	-	149.33	115.	5.2	2		6.5	6.5	4		19	24.2	20/05/2017
Flinders CMR	2500	-	149.11	18.3	0.8			5	5	3	5	18	18.8	21/05/2017
Flinders CMR	1000	-	148.93	18.5	0.8	2			3			5	5.8	21/05/2017
Bass Strait	2500	-	149.22	102.	4.6	2		5	5	3		15	19.6	22/05/2017
Bass Strait	4000	-	149.49	23.2	1.1			6.5	6.5	4		17	18.1	23/05/2017 6:59
East Gippsland CMR	4000	-	150.45	168.	7.6	2	8	6.5	6.5	4		27	34.6	24/05/2017
East Gippsland CMR	2500	-	150.25	19.1	0.9		7	5	5	3	5	25	25.9	25/05/2017
East Gippsland CMR	1000	-	150.17	8.1	0.4	1			3			4	4.4	25/05/2017
Bermagui	4000	-	150.76	182.	8.3			6.5	6.5	4		17	25.3	27/05/2017 1:09
Bermagui	2500	-	150.46	28.4	1.3	2		5	5	3		15	16.3	27/05/2017
Jervis CMR	1000	-	151.16	166.	7.6	1			3			4	11.6	28/05/2017 5:02
Jervis CMR	2500	-	151.30	15.3	0.7	2	7	5	5	3	5	27	27.7	29/05/2017 8:43
Jervis CMR	4000	-	151.48	16.8	0.8	1	8	6.5	6.5	4		26	26.8	30/05/2017
Newcastle	2500	-	152.42	200.	9.1	2		5	5	3		15	24.1	31/05/2017
Newcastle	4000	-	152.68	24.8	1.1	2		6.5	6.5	4		19	20.1	1/06/2017 7:45
Hunter CMR	2500	-	153.29	162.	7.4	1	7	5	5	3	5	26	33.4	2/06/2017 17:07
Hunter CMR	4000	-	153.57	26.3	1.2		8	6.5	6.5	4		25	26.2	3/06/2017 19:19
Central Eastern	1000	-	153.58	222.	10.1	1			3			4	14.1	4/06/2017 9:25
Central Eastern	2500	-	153.81	22.1	1.0	2	7	5	5	3	5	27	28.0	5/06/2017 13:26
Central Eastern	4000	-	154.01	19.1	0.9	1	8	6.5	6.5	4		26	26.9	6/06/2017 16:18
Byron	2500	-	154.13	183.	8.3	2		5	5	3		15	23.3	7/06/2017 15:38
Byron	4000	-	154.64	52.2	2.4			6.5	6.5	4		17	19.4	8/06/2017 11:00
Moreton	4000	-	154.11	155.	7.1	2	8	6.5	6.5	4		27	34.1	9/06/2017 21:06
Moreton	2500	-	153.95	15.4	0.7	2	7	5	5	3		22	22.7	10/06/2017
Moreton	1000	-	153.83	12.6	0.6	1			3			4	4.6	11/06/2017 0:22
Fraser	2500	-	154.04	160.	7.3	2		5	5	3		15	22.3	11/06/2017
Fraser	4000	-	154.20	16.5	0.7	2		6.5	6.5	4		19	19.7	12/06/2017
Coral Sea CMR	1000	-	154.18	220.	10.0	1			3			4	14.0	13/06/2017 8:26
Coral Sea CMR	2500	-	154.16	49.3	2.2	2	7	5	5	3	5	27	29.2	14/06/2017
Coral Sea CMR	4000	-	154.31	35.3	1.6	2	8	6.5	6.5	4		27	28.6	15/06/2017
Brisbane (end)		-	153.16	361.	16.4	0						0	16.4	16/06/2017
<b>Total</b>				<b>3283</b>	<b>149</b>							<b>604</b>	<b>754</b>	

<sup>1</sup> The location of sites is indicative, precise sample locations will be dependent on results of multi-beam analysis.

## Operations schedule

Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Launceston, Bell Bay				Mobilisation		15/05/2017 8:00	15/05/2017 18:00
				Transit (269km)	12.23	15/05/2017 18:00	16/05/2017 6:13
St Marys	2500	-41.6	149.049	Multi-beam	2	16/05/2017 6:13	16/05/2017 8:13
St Marys	2500	-41.6	149.049	Demersal trawl	7	16/05/2017 8:13	16/05/2017 15:13
				Transit (56km)	2.57	16/05/2017 15:13	16/05/2017 17:47
Freycinet CMR	300	-42	148.63	Multi-beam	1	16/05/2017 17:47	16/05/2017 18:47
Freycinet CMR	300	-42	148.63	Brenke sled	2	16/05/2017 18:47	16/05/2017 20:47
				Transit (3km)	0.13	16/05/2017 20:47	16/05/2017 20:55
Freycinet CMR	1000	-42	148.664	Brenke sled	3	16/05/2017 20:55	16/05/2017 23:55
Freycinet CMR	1000	-42	148.664	Beam trawl	3	16/05/2017 23:55	17/05/2017 2:55
				Transit (32km)	1.47	17/05/2017 2:55	17/05/2017 4:23
Freycinet CMR	2500	-42	149.056	Multi-beam	2	17/05/2017 4:23	17/05/2017 6:23
Freycinet CMR	2500	-42	149.056	Brenke sled	5	17/05/2017 6:23	17/05/2017 11:23
Freycinet CMR	2500	-42	149.056	Beam trawl	5	17/05/2017 11:23	17/05/2017 16:23
Freycinet CMR	2500	-42	149.056	Box core	3	17/05/2017 16:23	17/05/2017 19:23
Freycinet CMR	2500	-42	149.056	Towed video	5	17/05/2017 19:23	18/05/2017 0:23
				Transit (41km)	1.87	18/05/2017 0:23	18/05/2017 2:15
Freycinet CMR	4000	-42.046	149.55	Brenke sled	6.5	18/05/2017 2:15	18/05/2017 8:45
Freycinet CMR	4000	-42.046	149.55	Beam trawl	6.5	18/05/2017 8:45	18/05/2017 15:15
Freycinet CMR	4000	-42.046	149.55	Box core	4	18/05/2017 15:15	18/05/2017 19:15
Freycinet CMR	4000	-42.046	149.55	Towed video	6.5	18/05/2017 19:15	19/05/2017 1:45
				Transit (58km)	2.62	19/05/2017 1:45	19/05/2017 4:22
St Marys	4000	-41.531	149.479	Multi-beam	4	19/05/2017 4:22	19/05/2017 8:22
St Marys	4000	-41.531	149.479	Demersal trawl	8	19/05/2017 8:22	19/05/2017 16:22
				Transit (115km)	5.24	19/05/2017 16:22	19/05/2017 21:37
Flinders CMR	4000	-40.5	149.332	Multi-beam	2	19/05/2017 21:37	19/05/2017 23:37
Flinders CMR	4000	-40.5	149.332	Brenke sled	6.5	19/05/2017 23:37	20/05/2017 6:07
Flinders CMR	4000	-40.5	149.332	Beam trawl	6.5	20/05/2017 6:07	20/05/2017 12:37
Flinders CMR	4000	-40.5	149.332	Box core	4	20/05/2017 12:37	20/05/2017 16:37
				Transit (18km)	0.83	20/05/2017 16:37	20/05/2017 17:27
Flinders CMR	2500	-40.483	149.116	Brenke sled	5	20/05/2017 17:27	20/05/2017 22:27
Flinders CMR	2500	-40.483	149.116	Beam trawl	5	20/05/2017 22:27	21/05/2017 3:27
Flinders CMR	2500	-40.483	149.116	Box core	3	21/05/2017 3:27	21/05/2017 6:27
Flinders CMR	2500	-40.483	149.116	Towed video	5	21/05/2017 6:27	21/05/2017 11:27
				Transit (19km)	0.84	21/05/2017 11:27	21/05/2017 12:17
Flinders CMR	1000	-40.391	148.934	Multi-beam	2	21/05/2017 12:17	21/05/2017 14:17
Flinders CMR	1000	-40.391	148.934	Beam trawl	3	21/05/2017 14:17	21/05/2017 17:17
				Transit (102km)	4.64	21/05/2017 17:17	21/05/2017 21:56
Bass Strait	2500	-39.5	149.226	Multi-beam	2	21/05/2017 21:56	21/05/2017 23:56
Bass Strait	2500	-39.5	149.226	Brenke sled	5	21/05/2017 23:56	22/05/2017 4:56
Bass Strait	2500	-39.5	149.226	Beam trawl	5	22/05/2017 4:56	22/05/2017 9:56
Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Bass Strait	2500	-39.5	149.226	Box core	3	22/05/2017 9:56	22/05/2017 12:56
				Transit (23km)	1.05	22/05/2017 12:56	22/05/2017 13:59

Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Bass Strait	4000	-39.5	149.496	Brenke sled	6.5	22/05/2017 13:59	22/05/2017 20:29
Bass Strait	4000	-39.5	149.496	Beam trawl	6.5	22/05/2017 20:29	23/05/2017 2:59
Bass Strait	4000	-39.5	149.496	Box core	4	23/05/2017 2:59	23/05/2017 6:59
				Transit (168km)	7.65	23/05/2017 6:59	23/05/2017 14:38
East Gippsland CMR	4000	-38.183	150.452	Multi-beam	2	23/05/2017 14:38	23/05/2017 16:38
East Gippsland CMR	4000	-38.183	150.452	Brenke sled	6.5	23/05/2017 16:38	23/05/2017 23:08
East Gippsland CMR	4000	-38.183	150.452	Beam trawl	6.5	23/05/2017 23:08	24/05/2017 5:38
East Gippsland CMR	4000	-38.183	150.452	Box core	4	24/05/2017 5:38	24/05/2017 9:38
East Gippsland CMR	4000	-38.183	150.452	Demersal trawl	8	24/05/2017 9:38	24/05/2017 17:38
				Transit (19km)	0.87	24/05/2017 17:38	24/05/2017 18:30
East Gippsland CMR	2500	-38.108	150.256	Brenke sled	5	24/05/2017 18:30	24/05/2017 23:30
East Gippsland CMR	2500	-38.108	150.256	Beam trawl	5	24/05/2017 23:30	25/05/2017 4:30
East Gippsland CMR	2500	-38.108	150.256	Box core	3	25/05/2017 4:30	25/05/2017 7:30
East Gippsland CMR	2500	-38.108	150.256	Towed video	5	25/05/2017 7:30	25/05/2017 12:30
East Gippsland CMR	2500	-38.108	150.256	Demersal trawl	7	25/05/2017 12:30	25/05/2017 19:30
				Transit (8km)	0.37	25/05/2017 19:30	25/05/2017 19:52
East Gippsland CMR	1000	-38.072	150.176	Multi-beam	1	25/05/2017 19:52	25/05/2017 20:52
East Gippsland CMR	1000	-38.072	150.176	Beam trawl	3	25/05/2017 20:52	25/05/2017 23:52
				Transit (182km)	8.29	25/05/2017 23:52	26/05/2017 8:09
Bermagui	4000	-36.5	150.76	Brenke sled	6.5	26/05/2017 8:09	26/05/2017 14:39
Bermagui	4000	-36.5	150.76	Beam trawl	6.5	26/05/2017 14:39	26/05/2017 21:09
Bermagui	4000	-36.5	150.76	Box core	4	26/05/2017 21:09	27/05/2017 1:09
				Transit (28km)	1.29	27/05/2017 1:09	27/05/2017 2:27
Bermagui	2500	-36.408	150.464	Multi-beam	2	27/05/2017 2:27	27/05/2017 4:27
Bermagui	2500	-36.408	150.464	Brenke sled	5	27/05/2017 4:27	27/05/2017 9:27
Bermagui	2500	-36.408	150.464	Beam trawl	5	27/05/2017 9:27	27/05/2017 14:27
Bermagui	2500	-36.408	150.464	Box core	3	27/05/2017 14:27	27/05/2017 17:27
				Transit (167km)	7.58	27/05/2017 17:27	28/05/2017 1:02
Jervis CMR	1000	-35.02	151.16	Multi-beam	1	28/05/2017 1:02	28/05/2017 2:02
Jervis CMR	1000	-35.02	151.16	Beam trawl	3	28/05/2017 2:02	28/05/2017 5:02
				Transit (15km)	0.69	28/05/2017 5:02	28/05/2017 5:43
Jervis CMR	2500	-35.086	151.307	Multi-beam	2	28/05/2017 5:43	28/05/2017 7:43
Jervis CMR	2500	-35.086	151.307	Brenke sled	5	28/05/2017 7:43	28/05/2017 12:43
Jervis CMR	2500	-35.086	151.307	Demersal trawl	7	28/05/2017 12:43	28/05/2017 19:43
Jervis CMR	2500	-35.086	151.307	Beam trawl	5	28/05/2017 19:43	29/05/2017 0:43
Jervis CMR	2500	-35.086	151.307	Box core	3	29/05/2017 0:43	29/05/2017 3:43
Jervis CMR	2500	-35.086	151.307	Towed video	5	29/05/2017 3:43	29/05/2017 8:43
				Transit (17km)	0.77	29/05/2017 8:43	29/05/2017 9:29
Jervis CMR	4000	-35.051	151.487	Multi-beam	1	29/05/2017 9:29	29/05/2017 10:29
Jervis CMR	4000	-35.051	151.487	Demersal trawl	8	29/05/2017 10:29	29/05/2017 18:29
Jervis CMR	4000	-35.051	151.487	Brenke sled	6.5	29/05/2017 18:29	30/05/2017 0:59
Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Jervis CMR	4000	-35.051	151.487	Beam trawl	6.5	30/05/2017 0:59	30/05/2017 7:29
Jervis CMR	4000	-35.051	151.487	Box core	4	30/05/2017 7:29	30/05/2017 11:29
				Transit (201km)	9.13	30/05/2017 11:29	30/05/2017 20:37



Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Newcastle	2500	-33.42	152.427	Multi-beam	2	30/05/2017 20:37	30/05/2017 22:37
Newcastle	2500	-33.42	152.427	Brenke sled	5	30/05/2017 22:37	31/05/2017 3:37
Newcastle	2500	-33.42	152.427	Beam trawl	5	31/05/2017 3:37	31/05/2017 8:37
Newcastle	2500	-33.42	152.427	Box core	3	31/05/2017 8:37	31/05/2017 11:37
				Transit (25km)	1.13	31/05/2017 11:37	31/05/2017 12:45
Newcastle	4000	-33.465	152.689	Multi-beam	2	31/05/2017 12:45	31/05/2017 14:45
Newcastle	4000	-33.465	152.689	Brenke sled	6.5	31/05/2017 14:45	31/05/2017 21:15
Newcastle	4000	-33.465	152.689	Beam trawl	6.5	31/05/2017 21:15	1/06/2017 3:45
Newcastle	4000	-33.465	152.689	Box core	4	1/06/2017 3:45	1/06/2017 7:45
				Transit (162km)	7.37	1/06/2017 7:45	1/06/2017 15:07
Hunter CMR	2500	-32.1	153.296	Multi-beam	1	1/06/2017 15:07	1/06/2017 16:07
Hunter CMR	2500	-32.1	153.296	Brenke sled	5	1/06/2017 16:07	1/06/2017 21:07
Hunter CMR	2500	-32.1	153.296	Beam trawl	5	1/06/2017 21:07	2/06/2017 2:07
Hunter CMR	2500	-32.1	153.296	Box core	3	2/06/2017 2:07	2/06/2017 5:07
Hunter CMR	2500	-32.1	153.296	Towed video	5	2/06/2017 5:07	2/06/2017 10:07
Hunter CMR	2500	-32.1	153.296	Demersal trawl	7	2/06/2017 10:07	2/06/2017 17:07
				Transit (26km)	1.19	2/06/2017 17:07	2/06/2017 18:19
Hunter CMR	4000	-32.1	153.575	Brenke sled	6.5	2/06/2017 18:19	3/06/2017 0:49
Hunter CMR	4000	-32.1	153.575	Beam trawl	6.5	3/06/2017 0:49	3/06/2017 7:19
Hunter CMR	4000	-32.1	153.575	Box core	4	3/06/2017 7:19	3/06/2017 11:19
Hunter CMR	4000	-32.1	153.575	Demersal trawl	8	3/06/2017 11:19	3/06/2017 19:19
				Transit (222km)	10.11	3/06/2017 19:19	4/06/2017 5:25
Central Eastern CMR	1000	-30.1	153.585	Multi-beam	1	4/06/2017 5:25	4/06/2017 6:25
Central Eastern CMR	1000	-30.1	153.585	Beam trawl	3	4/06/2017 6:25	4/06/2017 9:25
				Transit (22km)	1.01	4/06/2017 9:25	4/06/2017 10:26
Central Eastern CMR	2500	-30.1	153.815	Multi-beam	2	4/06/2017 10:26	4/06/2017 12:26
Central Eastern CMR	2500	-30.1	153.815	Demersal trawl	7	4/06/2017 12:26	4/06/2017 19:26
Central Eastern CMR	2500	-30.1	153.815	Brenke sled	5	4/06/2017 19:26	5/06/2017 0:26
Central Eastern CMR	2500	-30.1	153.815	Beam trawl	5	5/06/2017 0:26	5/06/2017 5:26
Central Eastern CMR	2500	-30.1	153.815	Box core	3	5/06/2017 5:26	5/06/2017 8:26
Central Eastern CMR	2500	-30.1	153.815	Towed video	5	5/06/2017 8:26	5/06/2017 13:26
				Transit (19km)	0.87	5/06/2017 13:26	5/06/2017 14:18
Central Eastern CMR	4000	-30.1	154.013	Multi-beam	1	5/06/2017 14:18	5/06/2017 15:18
Central Eastern CMR	4000	-30.1	154.013	Brenke sled	6.5	5/06/2017 15:18	5/06/2017 21:48
Central Eastern CMR	4000	-30.1	154.013	Beam trawl	6.5	5/06/2017 21:48	6/06/2017 4:18
Central Eastern CMR	4000	-30.1	154.013	Box core	4	6/06/2017 4:18	6/06/2017 8:18
Central Eastern CMR	4000	-30.1	154.013	Demersal trawl	8	6/06/2017 8:18	6/06/2017 16:18
				Transit (183km)	8.34	6/06/2017 16:18	7/06/2017 0:38
Byron	2500	-28.454	154.131	Multi-beam	2	7/06/2017 0:38	7/06/2017 2:38
Byron	2500	-28.454	154.131	Brenke sled	5	7/06/2017 2:38	7/06/2017 7:38
Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Byron	2500	-28.454	154.131	Beam trawl	5	7/06/2017 7:38	7/06/2017 12:38
Byron	2500	-28.454	154.131	Box core	3	7/06/2017 12:38	7/06/2017 15:38
				Transit (52km)	2.37	7/06/2017 15:38	7/06/2017 18:00
Byron	4000	-28.321	154.643	Brenke sled	6.5	7/06/2017 18:00	8/06/2017 0:30



Site	Target depth	Latitude	Long-itude	Operation	Duration (hours)	Start date and time	End date and time
Byron	4000	-28.321	154.643	Beam trawl	6.5	8/06/2017 0:30	8/06/2017 7:00
Byron	4000	-28.321	154.643	Box core	4	8/06/2017 7:00	8/06/2017 11:00
				Transit (156km)	7.09	8/06/2017 11:00	8/06/2017 18:06
Moreton	4000	-27	154.114	Multi-beam	2	8/06/2017 18:06	8/06/2017 20:06
Moreton	4000	-27	154.114	Brenke sled	6.5	8/06/2017 20:06	9/06/2017 2:36
Moreton	4000	-27	154.114	Beam trawl	6.5	9/06/2017 2:36	9/06/2017 9:06
Moreton	4000	-27	154.114	Demersal trawl	8	9/06/2017 9:06	9/06/2017 17:06
Moreton	4000	-27	154.114	Box core	4	9/06/2017 17:06	9/06/2017 21:06
				Transit (15km)	0.7	9/06/2017 21:06	9/06/2017 21:47
Moreton	2500	-27	153.959	Multi-beam	2	9/06/2017 21:47	9/06/2017 23:47
Moreton	2500	-27	153.959	Brenke sled	5	9/06/2017 23:47	10/06/2017 4:47
Moreton	2500	-27	153.959	Beam trawl	5	10/06/2017 4:47	10/06/2017 9:47
Moreton	2500	-27	153.959	Demersal trawl	7	10/06/2017 9:47	10/06/2017 16:47
Moreton	2500	-27	153.959	Box core	3	10/06/2017 16:47	10/06/2017 19:47
				Transit (13km)	0.57	10/06/2017 19:47	10/06/2017 20:22
Moreton	1000	-27	153.832	Multi-beam	1	10/06/2017 20:22	10/06/2017 21:22
Moreton	1000	-27	153.832	Beam trawl	3	10/06/2017 21:22	11/06/2017 0:22
				Transit (160km)	7.29	11/06/2017 0:22	11/06/2017 7:39
Fraser	2500	-25.57	154.043	Multi-beam	2	11/06/2017 7:39	11/06/2017 9:39
Fraser	2500	-25.57	154.043	Brenke sled	5	11/06/2017 9:39	11/06/2017 14:39
Fraser	2500	-25.57	154.043	Beam trawl	5	11/06/2017 14:39	11/06/2017 19:39
Fraser	2500	-25.57	154.043	Box core	3	11/06/2017 19:39	11/06/2017 22:39
				Transit (16km)	0.75	11/06/2017 22:39	11/06/2017 23:24
Fraser	4000	-25.567	154.207	Multi-beam	2	11/06/2017 23:24	12/06/2017 1:24
Fraser	4000	-25.567	154.207	Brenke sled	6.5	12/06/2017 1:24	12/06/2017 7:54
Fraser	4000	-25.567	154.207	Beam trawl	6.5	12/06/2017 7:54	12/06/2017 14:24
Fraser	4000	-25.567	154.207	Box core	4	12/06/2017 14:24	12/06/2017 18:24
				Transit (221km)	10.03	12/06/2017 18:24	13/06/2017 4:26
Coral Sea CMR	1000	-23.584	154.18	Multi-beam	1	13/06/2017 4:26	13/06/2017 5:26
Coral Sea CMR	1000	-23.584	154.18	Beam trawl	3	13/06/2017 5:26	13/06/2017 8:26
				Transit (49km)	2.24	13/06/2017 8:26	13/06/2017 10:40
Coral Sea CMR	2500	-24.027	154.163	Multi-beam	2	13/06/2017 10:40	13/06/2017 12:40
Coral Sea CMR	2500	-24.027	154.163	Demersal trawl	7	13/06/2017 12:40	13/06/2017 19:40
Coral Sea C4MR	2500	-24.027	154.163	Brenke sled	5	13/06/2017 19:40	14/06/2017 0:40
Coral Sea CMR	2500	-24.027	154.163	Beam trawl	5	14/06/2017 0:40	14/06/2017 5:40
Coral Sea CMR	2500	-24.027	154.163	Box core	3	14/06/2017 5:40	14/06/2017 8:40
Coral Sea CMR	2500	-24.027	154.163	Towed video	5	14/06/2017 8:40	14/06/2017 13:40
				Transit (35km)	1.61	14/06/2017 13:40	14/06/2017 15:17
Coral Sea CMR	4000	-24.314	154.312	Multi-beam	2	14/06/2017 15:17	14/06/2017 17:17

Site	Target depth	Latitude	Longitude	Operation	Duration (hours)	Start date and time	End date and time
Coral Sea CMR	4000	-24.314	154.312	Brenke sled	6.5	14/06/2017 17:17	14/06/2017 23:47
Coral Sea CMR	4000	-24.314	154.312	Beam trawl	6.5	14/06/2017 23:47	15/06/2017 6:17
Coral Sea CMR	4000	-24.314	154.312	Box core	4	15/06/2017 6:17	15/06/2017 10:17
Coral Sea CMR	4000	-24.314	154.312	Demersal trawl	8	15/06/2017 10:17	15/06/2017 18:17
				Transit (362km)	16.45	15/06/2017 18:17	16/06/2017 10:00
Brisbane (end)		-27.4	153.166	Demobilisation		16/06/2017 10:43	17/06/2017 16:00

## **Investigator Equipment**

1. Sherman sled
2. Biological box corer (500 x 500 mm)
3. Deep towed camera & CTD system
4. Brenke Sled
5. Winches and sensors for demersal trawl
6. Large diameter block mounted on stern A-frame
7. USBL system
8. Multibeam sonar, ADCP, Sub-bottom Profiler
9. Simrad EK60 Echo-sounder, run using IMOS protocols
10. Rear deck facilities
11. Hazmat container
12. Wet/dry laboratory facilities (x3)
13. Biological processing areas
14. -80 and walk-in freezers
15. Constant temperature room
16. Shaved ice machine
17. Communication/control systems (e.g. Operations Room, Bridge, rear deck).
18. Conference facilities
19. Collapsible pallets

## **User Supplied Equipment**

1. CSIRO beam trawl (x 2)
2. CSIRO plankton net, depression plate and flow meter (x1)
3. CSIRO mantra surface net (x1)
4. MV plankton net (x1)
5. CSIRO demersal nets and floats (x2)
6. Standalone CTD (for mounting on Brenke Sled)
7. CSIRO core sample elutriation system
8. Aquariums
9. Laboratory equipment (trays, cameras, microscopes, balances, DNA sequencers)
10. Containers (drums, plastic jars, bags, labels)
11. Preservatives (95% ethanol, formaldehyde, RNALater)
12. Metal cage for temporary storage of formalin barrels (back Deck)
13. Plastic covered pallets (x2)

## Personnel list

<b>Name (Shift)</b>	<b>Position/Role</b>	<b>Organisation</b>
Tim O'Hara	Chief Scientist	Museums Victoria
Brett Muir	Voyage Manager	CSIRO MNF
Mark Lewis	Mech Tech	CSIRO O&A
TBA	Fishing IR	ASP
John Wakeford	Fishing master	ASP
Karen Gowlett-Holmes	Invertebrate processing	CSIRO NRCA
Magdalena Georgieva	Invertebrate processing (Polychaeta)	Natural History Museum UK
Melanie McKenzie	Invertebrate processing (Echinodermata)	Museums Victoria
Jerome Malfet	Bioluminescence	University of Louvain, Belgium
Marc Eléaume	Invertebrate processing (Echinodermata)	Muséum national d'Histoire naturelle, France
Di Bray	Fish processing	CSIRO NRCA
Martin Gomon	Fish processing	Museums Victoria
Anoosh Sarraf	DAP support	CSIRO MNF
Peter Shanks	DAP support	CSIRO MNF
TBA	Fishing IR	ASP
Elena Kupriyanova	Invertebrate processing (Polychaeta)	Australian Museum
Tina Molodstova	Invertebrate processing (Cnidaria)	P.P.Shirshov Institute of Oceanology, Russia
Izwandy Idris	Invertebrate processing (Polychaeta)	Universiti Malaysia Terengganu
Merrick Ekins	Invertebrate processing (Cnidaria & Porifera)	Queensland Museum
Phoebe Lewis	Isotope & micro-plastic sampling	Museums Victoria
Maylene Loo	Fish processing	Museums Victoria
John Pogonoski	Fish processing	CSIRO NRCA
Alistair Graham	Fish processing	CSIRO NRCA
Annekatriin Enge	Meiofauna	University of Vienna
Jasmine Bursic	Data entry	Deakin University
Lupita Bribiesca-Contreras	Invertebrate processing (Echinodermata)	University of Melbourne
Caroline Farrelly	Invertebrate processing (Crustacea)	Museums Victoria
Frank Koehler	Invertebrate processing (Mollusca)	Australian Museum

<b>Name (Shift)</b>	<b>Position/Role</b>	<b>Organisation</b>
David Staples	Invertebrate processing (Pycnogonida)	Museums Victoria
Lauren Hughes	Invertebrate processing (Crustacea)	Australian Museum
Kirrily Moore	Invertebrate processing (Cnidaria)	Tasmanian Museum & Art Gallery
Robert Zugaro	Videographer	Museums Victoria
Asher Flatt	Volunteer communicator	Museums Victoria
Alan Williams	Alt Chief Scientist	CSIRO O&A
Will Ponsonby	SIT Support	CSIRO MNF
Ian McRobert	SIT Support	CSIRO MNF
Amy Nau	GSM support	CSIRO MNF
Bernadette Heaney	GSM support	CSIRO MNF

## Signature

<b>Your name</b>	Dr Tim O'Hara	Chief Scientist	
<b>Date:</b>	6 May 2017		