

Voyage plan SS2013_t02



SS2013_t02





ss2013_t02 (Hobart to Fremantle)

Title

The benthic fauna of the Great Australian Bight

Itinerary

Mobilise Hobart on Monday the 17^{th} of June, 2013 (students to be onboard by 14:00).

Depart Hobart at 18:00 hrs on Monday the 17th of June, 2013.

Arrive Fremantle at 15:00 hrs on Saturday the 29th of June, 2013 and demobilise.

Principal Investigator

Dr Sebastian Holmes (Chief Scientist, not participating on voyage)

The University of Western Sydney

The School of Science & Health, The University of Western Sydney, Locked Bag 1797, Penrith NSW 2751.

Email: s.holmes@uws.edu.au Phone: 02 9685 9904

Other Principal Investigators

Dr Gordon Keith (Swath Track) – CSIRO Marine and Atmospheric Research Email: gordon.keith@csiro.au Phone: 03 6232 5058

GAB Benthic faunal survey (Jason Tanner (SARDI) & Alan Williams (CSIRO)) (Chief Scientist on board)

Dr Karen Gowlett-Holmes (Benthic Fauna GAB) – CSIRO Marine and Atmospheric Research Email: karen.gowlett-holmes@csiro.au Phone: 03 6232 5128

Dr Shirley Sorokin (Benthic Fauna GAB) – SARDI Email: shirley.sorokin@sa.gov.au Phone: 08 8207 5336

Voyage Plan



RV Southern Surveyor

Scientific Objectives

The focus of this program is to give students a taste of what it is like to live and work on an ocean going research vessel and to expose them to some of the different sampling methods and equipment that are used in oceanographic research. The students will have three quasi scientific aims as follows: 1) to sample and characterise the benthic communities in the Great Australian Bight (GAB); 2) to investigate surface and water column productivity along Australia's southern seaboard; 3) to map Australia's seafloor. The students will be involved in all aspects of the research – sorting and curating the fauna – milking the rosette/changing the filters and measuring the dissolved oxygen and salinity – operating and monitoring the swath. Outside of sampling stations and designated tasks, students will take it in turns to watch for marine mammals and we may supplement the sampling and research with a series of lectures and practicals utilising the material/data collected.

For Keith, the voyage provides an ongoing opportunity to use vessel transit time to complete a national mapping of the upper-mid slope seabed with multi-beam mapping and associated ecological interpretation. The upper-slope and mid-slope seabed 100 m to 1500 m depth range, are regions important for regional marine planning, biodiversity and conservation assessments and fisheries habitat mapping. The swath mapping will be integrated as a part of the student activities and there is a 12h portion of the transit dedicated to targeting some canyons off Esperance and filling the swath track adjacent to the 500 m isobath.

For Tanner & Williams the voyage provides an opportunity to gain further specimens and add a temporal aspect to their study of the epifaunal assemblages (benthic) of the GAB Marine Park and its surrounds. The GAB is a unique ecosystem, with diversity similar to the Great Barrier Reef, and a much higher proportion of endemic species, but only a fraction of the scientific effort.

Voyage Objectives

The voyage objectives fall into three categories, pelagic sampling, benthic sampling and swath mapping.

Pelagic sampling

Throughout the voyage, surface seawater will be filtered (using the onboard seawater supply) to look at the isotopic signature of surface particulate organic matter (POM) along the transect path.

At each of the stations, a standard hydrocast will be made to 120 m and water collected from 120, 60 & 5 m, filtered, fixed and the oxygen, salinity and macro-nutrients (NO₂, NO₃, NH₃, PO₄, SiO₂) analysed. Along the route XBT's will be deployed to calibrate the swath mapper, throughout the voyage the CPR will be deployed (retrieval and redeployment will depend on station arrival/departure and the necessity to replace silks) and on the first leg of the voyage (Hob – St. 1) 7 ARGO floats will be deployed.





Benthic sampling

At each station (2 at 2000 m; 2 at 1500 m; 2 at 1000 m; 2 at 400 m; and 2 at 200 m), successive beam trawls will be deployed to sample the benthic macro-fauna. All fauna collected will be sorted into taxonomic groups, identified to species level where possible, weighed and measured and then preserved. At station 10 (200 m), the Smith McIntyre grab will be used to recover a sediment sample.

Swath mapping

Throughout the voyage the swath will be continuously operated, providing another valuable track, at the 500 m depth contour, outlining Australia's continental shelf. In addition, part of the voyage will focus on mapping a series of canyons off Esperance.







Voyage Track



Main sampling region



Voyage Plan



RV Southern Surveyor

Time Estimates

A full list of activities and timings are tabulated below. Highest priority tasks are in bold, medium priority tasks are underlined and lowest priority tasks are italicised. If time is tight or bad weather is forecast – **the number of replicate beam trawls at each site will be reduced, e.g. deep stations to 1 and shallow stations to 2 or less.**

In event of bad weather etc. resulting in the loss of time and after the number of preceding beam trawls has been cut, **Stations 2 & 3 (1500 m) and 8 & 10 (200 m) are deemed as the lowest priority.**

Hobart to Station 1 (2000m) (~970 Nm)

Departing Hobart at 18:00 on Monday the 17th of June, the vessel will steam out to Storm Bay where the CPR will be deployed. The ship will then sail directly to the first station, slowing down to change the CPR cassettes (@ 450 Nm), to deploy XBT's and to deploy the ARGO floats.

Once at station on Saturday the 22nd of June at 00:00, the CTD will be deployed (**120 m depth**) and the benthic fauna sampled twice using the beam trawl (**2000 m depth**). The vessel will move off station at 06:30 to station 2.

Location	Day/tim e of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)		
Hobart		Monday 18:00							
Storm Bay	Monday 20:00	Monday 20:05	Deploy CPR	Follow shortest route to station 1					
On route to station 1	N/A	N/A	Deploy ARGO floats (n=7)	See table below					
Station 1	Saturday 00:00		Retrieve CPR			35.06066 E 131.07391 S	102 h (970 Nm)		
			Deploy CTD to 120m – 0.5 h	2000m	120m	35.06066 E 131.07391 S	102 h/108.5 h (970 Nm)		
			Deploy 1 x beam trawl – 3 h.		2000m				
			<u>Deploy 1 x beam</u> trawl – 3 h.						
Depart for Station 2		Saturday 06:30							

Argo float deployment (on route to station 1)

Latitude	Longitude	Serial numbers
-41.3	141	6379
-40.3	139	6380
-39	137	6381
-37.75	135	6382
-36.4	133	6636
-35.1	131	6637
-42.3	143	6638





Station 1 to Station 2 (~22 Nm)

Arriving at Station 2 on Saturday the 22nd of June at 09:00, the CTD will be deployed (**120 m depth**), followed by 2 beam trawls (**2000 m depth**). The vessel will move off station on Saturday at 16:00 to station 3.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 2	Saturday 09:30					34.86111 S 130.67424 E	111.5 h (992 Nm)
Station 2			Deploy CTD to 120m – 0.5 h	2000m	120m	34.86111 S 130.67424 E	111/118 h (992 Nm)
			Deploy 1 x beam trawl – 3 h.		2000m		
			<u>Deploy 1 x beam</u> trawl – 3 h.				
Depart		Saturday					
for		16:00					
Station 3							

Station 2 to Station 3 (~20 Nm)

Arriving at Station 3 on Saturday the 24th of June at 18:30, the CTD will be deployed (**120 m depth**), followed by 2 beam trawls (**1500 m depth**). The vessel will move off station on Sunday at 00:00 to station 4.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 3	Saturday 18:30					34.54953 S 130.67094 E	120.5 h (1012 Nm)
Station 3			Deploy CTD to 120m – 0.5 h	1500m	120m	34.54953 S 130.67094 E	120.5/126 h (1012 Nm)
			Deploy 1 x beam trawl – 2.5 h.		1500m		
			<u>Deploy 1 x beam</u> trawls – 2.5 h.				
Depart for Station 4		Sunday 00:00					





Station 3 to Station 4 (~20 Nm)

Arriving at Station 4 on Sunday the 23rd of June at 02:30, the CTD will be deployed (120 m depth), followed by 2 beam trawls (1500 m depth). The vessel will move off station on Sunday at 08:00 to station 5.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 4	Sunday 02:30					34.60025 S 131.06790 E	128.5 h (1022 Nm)
Station 4			Deploy CTD to 120m – 0.5 h	1500m	120m	34.60025 S 131.06790 E	128.5/134 h (1022 Nm)
			Deploy 1 x beam trawl – 2.5 h.		1500m		,
			<u>Deploy 1 x beam</u> trawl – 2.5 h.				
Depart for	Sunday						
Station 5	08:00						

Station 4 to Station 5 (~40 Nm)

Arriving at Station 5 on Sunday the 23rd of June at 13:00, the CTD will be deployed, followed by 2 beam trawls. The vessel will move off station on Sunday at 17:30 to station 6.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 5	Sunday 13:00					33.92655 S 131.07092 E	139 h (1062 Nm)
Station 5			Deploy CTD to 120m – 0.5 h	1000m	120m	33.92655 S 131.07092 E	139/143.5 h (1062 Nm)
			Deploy 1 x beam trawl – 2 h.		1000m		
			<u>Deploy 1 x beam</u> trawl – 2 h.				
Depart for Station 6	Sunday 17:30						





Station 5 to Station 6 (~25 Nm)

Arriving at Station 6 on Sunday the 23rd of June at 20:30, the CTD will be deployed (**120 m depth**), followed by 2 beam trawls (**1000 m depth**). The vessel will move off station on Monday the 24th of June at 01:00 to station 7.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 6	Sunday 20:30					33.71406 S 130.66764 E	146.5 h (1087 Nm)
Station 6			Deploy CTD to 120m – 0.5 h	1000m	120m	33.71406 S 130.66764 E	146.5/151 h (1087 Nm)
			Deploy 1 x beam trawl – 2 h.		1000m		
			<u>Deploy 1 x beam</u> trawl – 2 h.				
Depart for Station 7	Monday 01:00						

Station 6 to Station 7 (~25 Nm)

Arriving at Station 7 on Monday the 24th of June at 04:00, the CTD will be deployed (**120 m depth**), followed by 3 beam trawls (**400 m depth**). The vessel will move off station on Monday the 24th of June at 09:00 to station 8.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 7	Monday 04:00					33.48430 S 131.06973 E	154 h (1112 Nm)
Station 7			Deploy CTD to 120m – 0.5 h	400m	120m	33.48430 S 131.06973 E	154/159 h (1112 Nm)
			Deploy 2 x beam trawls – 3 h.		400m		
			<u>Deploy 1 x beam</u> trawl – 1.5 h				
Depart for Station 8	Monday 09:00						





Station 7 to Station 8 (~6 Nm)

Arriving at Station 8 on Monday the 24th of June at 10:00, the CTD will be deployed (**120 m depth**), followed by 3 beam trawls (**200 m depth**). The vessel will move off station on Monday at 14:00 to station 9.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 8	Monday 10:00					33.41295 S 131.06544 E	160 h (1118 Nm)
Station 8			Deploy CTD to 120m – 0.5 h	200m	120 m	33.41295 S 131.06544 E	160/164.5 h (1118 Nm)
			Deploy 2 x beam trawls – 2.5 h.		200 m		
			<u>Deploy1 x beam</u> trawl – 1 h.				
			1 x Smith Mac grab – 0.5 h.				
Depart for Station 9	Monday 14:30						

Station 8 to Station 9 (~20 Nm)

Arriving at Station 9 on Monday the 24th of June at 17:00, the CTD will be deployed (**120 m depth**), followed by 3 beam trawls (**400 m depth**). The vessel will move off station on Monday the 24th of June at 22:00 to station 9.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 9	Monday 17:00					33.41690 S 130.66764 E	167 h (1138 Nm)
Station 9			Deploy CTD to 120m – 0.5 h	400m	120m	33.41690 S 130.66764 E	167/172 h (1138 Nm)
			Deploy 2 x beam trawls – 3 h.		400m		
			<u>Deploy1 x beam</u> trawl – 1.5 h.				
Depart for Station 10	Monday 22:00						





Station 9 to Station 10 (~5 Nm)

Arriving at Station 10 on Monday the 24th of June at 22:30, the CTD will be deployed (**120 m depth**), followed by 3 beam trawls and Smith Mac grab (**200 m depth**). The vessel will move off station on Tuesday the 25th of June, after deploying the CPR, at 03:00 to the start of the Canyon swath track.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Water depth	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Station 10	Monday 23:00					33.35677 S 130.66764 E	173 h (1143 Nm)
Station 10			Deploy CTD to 120m – 0.5 h	200m	120 m	33.35677 S 130.66764 E	173/177 h (1143 Nm)
			Deploy 2 x beam trawls – 2.5 h. Deploy1 x beam trawl – 1 h. Deploy CPR.		200 m		
Depart for start of canyon track	Tuesday 03:00						

Station 10 to start of canyon track (~480 Nm)

Just before arrival at the canyon track on Thursday the 27^{th} of June at 05:00, the CPR will be retrieved. The vessel will move along the track following the line and scanning adjacent features. At the end of the track at ~ 15:00 on Thursday the 27^{th} of June the vessel will steam directly to Fremantle.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Start of the	Thursday		Retrieve CPR		34.56 S	227 h (1623 Nm)
canyon track	05:00		before arrival		121.30 E	
Start of			Swath canyon	N/A	34.56 S	227/238 h (1723
canyon track			track and		121.30 E	Nm)
			features (~12 h)			
End of canyon				N/A	35.53 S	237 h (1723 Nm)
track					120.70 E	
End of canyon	Thursday		Deploy CPR			
track steam to	15:00					
Fremantle						





End of Canyon track to Fremantle (~460 Nm)

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Fremantle	Saturday		Pull in CPR 1 h		32 02.88 S	285 h (2183 Nm)
Port	15:00		before arrival.		115 44.75 E	

NB for all dredges/trawls the vessel is assumed to be effectively stationary/not heading in a particular direction (normally $\frac{1}{2}$ - 1 knot trawl speed) with a bottom time of 30 minutes. The a winch speed used is 60 m per minute and the appropriate amount of extra wire added in (1.5 x the bottom depth for stations deeper than 800 m & 2 x the bottom depth for stations > 800 m deep). For the CTD casts, a retrieval winch speed of 20 m per minute has been used. <u>Steaming speed has been calculated as 9.5 knots throughout.</u>





Piggy-back Projects

<u>Greenhouse gases and marine sensors</u> Dr Dagmar Kubistin (University of Wollongong)

The project aims to improve our understanding of the sources, sinks and background concentrations of key greenhouse gases in the Southern Hemisphere. Measurements of the concentrations of carbon dioxide, methane, nitrous oxide, carbon monoxide and ozone will be made in the marine atmosphere, revealing how these concentrations change with location and time. These measurements will help to constrain a number of global atmospheric chemical transport models by providing up-to-date measurements of background values for key trace gases in clean Southern Hemisphere marine boundary layer conditions.

Distribution of plankton along the southern Australian seaboard

Frank Coman (AusCPR)

Using the continuous plankton recorder (CPR) a transect of plankton distributions along the Southern seaboard of Australia will be obtained. This will be third successive annual deployment of the CPR along this route at the same approximate time of year.

Voyage Plan



RV Southern Surveyor

Southern Surveyor Equipment

Smith-McIntyre grab Small epi-benthic sled XBT CTD + bottles Underway clean seawater supply Underway thermosalinograph, fluorometer and pCO₂ monitoring – systems running throughout the voyage duration Blast freezer (-80°C) Walk in freezer Small winch set up for the continuous plankton recorder

User Equipment

Continuous plankton recorder (Frank Coman). General sampling preservation equipment /material. General laboratory equipment (microscopes, scales). Beam trawl. Fourier transform spectrometer, 2 x Nitrogen cylinders (48 l), 1 x compressed air cylinder (7 l).

Special Requests

None.

Personnel List

Alan Williams	CMAR	Chief Scientist/1 st watch leader
Sabine Piller	UWS	2nd watch leader
Amber Louise Burberry	UTS	Student-swath
Bethany Ellis	UNSW	Student-swath
Peter Fisher	UWS	Honours student
Sian Bruce	UTS	Student
Dagmar Kubistin	UOW	Piggy-back
Karen Gowlett-Holmes	CMAR	Faunal identification & curation
Shirley Sorokin	SARDI	Faunal identification & curation
Mark Lewis	CMAR	Beam trawl support
Rod Palmer	CMAR	MNF Voyage Manager
Anoosh Sarraf	CMAR	MNF Computing support
Tony Veness	CMAR	MNF Swath support
Mark Rayner	CMAR	MNF Hydrochemistry support
Brett Muir	CMAR	Electronics support





As per AMSA requirements for additional berths on Southern Surveyor, the following personnel are designated as System Support Technicians and are required to carry their original AMSA medical and AMSA Certificate of Safety Training on the voyage:

Name	AMSA Certificate of Safety Training No.
Rod Palmer	BB05328
Anoosh Sarraf	BB02298
Brett Muir	BB07279

This voyage plan is in accordance with the directions of the Marine National Facility Steering Committee for the Research Vessel Southern Surveyor.

Sebastian Holmes

Chief Scientist