

MARINE
NATIONAL FACILITY

2010

RV Southern Surveyor
program



voyagesummaryss2010_t04

SS2010_t04

An examination of the temperate reef and deep sea benthic fauna of the south eastern Australian shelf and the trophic relationships between euphausiids and larval fish

Voyage period

Start: 03/11/2010

End: 08/11/2010

Port of departure: White Bay (Sydney), Australia

Port of return: CSIRO wharf (Hobart), Australia

Responsible laboratory

Dr Sebastian Holmes – Water & Wildlife Ecology (WWE) Group,
School of Natural Sciences, The University of Western Sydney,
Locked Bag 1797, Penrith, NSW, 2751, Australia

Chief Scientist

Dr Sebastian Holmes – The University of Sydney (USYD)/
The University of Western Sydney

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

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 biological research programs. The students will have three (quasi) scientific aims, which will contribute to our knowledge about Australian waters, as follows: 1) to characterise the macro-fauna inhabiting a unique geological feature (reef) off the coast of Wollongong; 2) to examine the effect of depth on species composition in Bass Canyon and 3) to examine the trophic relationships between euphausiids and larval fish, extending the work of the Taylor voyage (ss2010_v08).

To a large extent aims 1 and 2 align with those of Dr Rudy Kloser (CMAR) and complement the piggyback project of Dr Ronald Thresher, which will provide the students with a window into another benthic habitat. For Kloser, 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.

On this voyage we will use a ongoing and developing piece of equipment, the Benthic Optical Acoustic and Grab sampler (BOAGS), which can survey, by video and acoustically, and selectively sample (surface fired Smith-Macintyre grab) the benthos. The benthic sampling carried out by the students will supplement BOAGS. Conversely and importantly, BOAGS will allow the students to survey a much broader area and ensure the correct gear is deployed, thereby increasing their exposure to deep sea fauna. In addition, depending on what is obtained, some of the benthic material collected (macro fauna) will be used by a postgraduate student at the University of Wollongong for their Ph.D. in natural products chemistry.

Voyage objectives

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

Pelagic sampling

Sampling (Ben Harris) will be carried out two locations, Jervis Bay & Eden, with a vertical CTD cast, two N70 casts and three EZ net casts (deep/slope/shelf) at 5 depths from 200m to the surface. EZ net samples will be sorted to remove and ID any euphausiids and larval fishes. A subset of these will be flash frozen for later use in lipid, stable isotope and RNA analyses. The remaining individuals will be examined under dissecting microscopes, separated into the main taxonomic groups, photographed and preserved for later examination. In addition, a few expendable bathythermograph (XBT) casts will be made to characterise the water masses and absorption and sound velocity profiles for calibrating the swath mapper.

Benthic sampling

Sampling will occur at three different sites:

Wollongong reef > The reef, which has extremely high back scatter reflectance, sits in 350 - 400 m of water, 38 km south east of Wollongong and is 32 km long and 2 km wide supporting a diverse and abundant fauna (a serendipitous observation was made during ss2009_T03). Sampling will take place at four stations along the reef, two on top and two on the sea-bed immediately adjacent to it.

At each station, BOAGS will be deployed to provide a 30 minute video transect of the sea floor and obtain a sample of the sediment. The fauna observable on the video feed from BOAGS will be classified in real-time by the students and samples taken from the sediment for physical characterisation (organic content/grain size analysis), microbial diversity and meio-fauna. The water column will be profiled using the CTD (water samples will be taken at some stations and an XBT will be substituted at some of the stations) before the bottom is trawled/dredged (beam trawl/seamount sled).

Bass Canyon > Sampling will be made at 3 sites transiting from North to South up slope at 2500 m (or as close to as possible), 1500 m and 700 m. Sampling will follow a very similar schedule to that for the Wollongong reef with the Smith-MacIntyre grab being additionally deployed at the 700 m station.

St. Helen's seamount > The water column will be profiled using the CTD to a depth of 2500 m, with water samples taken at 500, 750 and, thereafter, at 100 m intervals below 1000 m. Moving up slope to around 1100 m, BOAGS will be deployed, the seabed surveyed (30 min) and a live sample of coral collected at two different sites. Depending on the bottom composition a trawl/dredge will be deployed to collect further material from these sites.

All data and specimens collected by the students will be made freely available to the key voyage participants. In addition, during the voyage and outside of sampling stations, students will take it in turns to watch for marine mammals, assist with the swath mapping/processing and manually process water samples for dissolved oxygen content (weather dependant). In addition, we may supplement the sampling and research with a series of lectures and practicals utilising the material/data collected.

Swath mapping > Throughout the voyage the swath will be operated with the Canyon Head off Jervis Bay being of particularly high priority.

Results

Pelagic sampling

Under the original voyage plan, pelagic sampling was to take place at Jervis Bay and Eden, using the CTD, EZ and N70 nets. However, following Taylor's voyage (SS2010-V08) because both an eddy was still in place, approximately 50Nm off Bermagui, and because it wasn't possible to use the EZ net, a new plan was drawn up to sample the eddy. Deviating from the original transect line at Wollongong reef, the vessel followed a south easterly bearing out to the centre of the eddy, to return back to the transit path, on a southwest trajectory, off Eden, with the CTD and N70 net (50 m vertical tows) being deployed on both legs. From the CTD profiles no stratification was evident, which in turn was reflected in low euphausiid and larval fish densities. Correspondingly salps were effectively absent, with only 1 salp (*Thalia democratica*) being recovered at one site. Of particular note was a serendipitous observation of what appeared to be "red waves" streaming along the bow, which when sampled turned out to be larvacean swarms.

Benthic sampling

Wollongong reef > It was originally intended to deploy BOAGS four times at Wollongong reef, followed by four consecutive dredges. Unfortunately after the second deployment of BOAGS it was clear there was a problem with the winch necessitating its recovery. Video footage was obtained on both the 1st and 2nd deployment and a sediment sample obtained on the 2nd deployment. A single deployment of the Seamount sled (Sherman) on the reef was very successful and produced the biggest haul of the voyage, with sponges making up the majority of the catch, much to the delight of the natural products scientist (Ana Zivanovic).

Bass Canyon > Initial trials in 700 m with BOAGS revealed problems with the stills camera. A further deployment to 2000m (despite the best efforts of Jeff Cordell & Matt Sherlock) revealed that there were still serious problems with the winch, necessitating the abandonment of BOAGS for the rest of the voyage. The beam trawl was deployed in >2500 m of water in Bass Canyon returning a marginal catch, i.e. the beam had folded.

St Helens seamount > The seamount sled was deployed successfully twice at St Helens returning good hauls with many live specimens (more so on the second haul) for Ron Thresher.

Swath mapping

Between Amelia Shannon and Rudy Kloser, the majority of the pre-designated transect from Sydney to Hobart was successfully swathed. Of particular note, was a new undiscovered seamount that was found off St Helens Hill at 41:14:32.49 S, 148:49:34.38 E (summit of mount) on Amelia's watch, which is now designated as Amelia's mount (see Figure 1).

Student experience

Apart from station activities. All students took a turn in operating and processing the swath, and in marine mammal watching. For them the voyage was very enjoyable and a resounding success perhaps best exemplified in their own words, as follows:

"My time at sea was a truly incredible and eye-opening experience. Witnessing how crew members from various fields integrated into a cohesive unit was fantastic, and it was great to feel that I was a part of it all. What excited me the most was seeing deep-sea creatures that I'd never even imagined existed! For me, the Southern Surveyor was unforgettable, and I hope that many more students are given the same opportunity in the future."

"It was an amazing experience to get a chance to work with equipment and software that I had never seen, or only ever read about. Learning how to apply my love for all things marine was one of the most rewarding parts of the voyage."

Voyage narrative

A daily blog of the voyage activities can be found at:

http://blogs.usyd.edu.au/allatsea/2010/11/next_wave_2010_next_generation.html

A full voyage track is given in Figure 2.

Tuesday the 2nd of November 2011

Everyone onboard by 1600 to settle in, undergo a quick tour of the ship and a safety briefing. Six pm everyone has tea with the crew followed by a short science briefing. Midnight and nothing but snores rebound around the ship.

Wednesday the 3rd of November 2011

Cast off at 0600 for the first site, Wollongong reef. Bright breezy excited faces as we sail out of Sydney Harbour, until we sail out of the heads into a mild but blustery breeze, then the faces start to turn green including that of the chief scientist! Just after lunch we arrive at Wollongong reef for the first deployment. At 1400, BOAGS is the first piece of equipment to enter the water on this voyage. There are problems with the camera working intermittently on the way down to the reef (230 m) which appear to resolve once we get to the bottom, a quick 15 minute survey of the seafloor, the grab is fired and BOAGS is hauled back on board. Although the grab fired, once on board, it clear that it has failed to retrieve a sample. After some tinkering at 16:15 BOAGS enters the water again for a second trial, on the way down it is clear that there is a spooling problem with the winch, so as soon as it hits the bottom, the grab is fired (successfully) and BOAGS is retrieved. Following a gear change, including some winch testing, the seamount dredge (Sherman) entered the water at 2009 to sample the macrofauna found on the reef (235 m). By 2054 the dredge is back on deck with an excellent haul, including many sponges which light up the eyes of the very seasick, but now very happy natural chemist (Ana Zivanovic) onboard.

Abandoning the rest of the sampling program at Wollongong reef, because of time considerations and the need to test and fix BOAGS, we move offshore on a southeast bearing to sample for Ben Harris, a gyre situated approximately 50 Nm off Bermagui.

Thursday the 4th of November 2011

First deployment on a bright and clear day is a CTD cast to 400 m at 1034 at the edge of the gyre (water taken for sensor calibration), followed by two successive vertical tows from 50 m with the N70. After lunch, we have reached the middle of the gyre (1505), where a CTD cast is made (400 m), followed by two successive vertical tows from 50 m with the N70. Just before tea (1750) we arrive at the centre of the gyre, a CTD cast is made (400 m), followed by three successive vertical tows from 50 m with the N70. We switch to a south westerly bearing and steam away from the centre of the gyre back towards the swath line. At 1912, several students (whale watching) and the crew on the bridge notice what appears to be red waves in the bow wake. A surface horizontal tow with the N70 reveals them to be dense concentrations of larvaceans. At 2118, in the latter half of the gyre, a CTD cast is made (400 m), followed by two successive vertical tows from 50 m with the N70. At 2200, back on the swath line, the CPR is deployed and we steam to Bass Canyon.

Friday the 5th of November 2011

A bright clear day, with an easy morning as we steam to Bass Canyon. At 1051, as both a demonstration and to calibrate the swath sonar an XBT is fired. Unfortunately we had forgotten to set the computer to record mode, so a second XBT is fired (1147). Just after lunch we arrive at the first site in Bass Canyon. Because of previous problems with the BOAGS winch, the first station is shallow (550-650 m) followed by deeper stations if all is successful. BOAGS is deployed (1349), hits the bottom and the grab won't fire. A few stills are taken and BOAGS is retrieved to the surface. Following some adjustments, BOAGS is redeployed at 1657 down to 1500 m. The survey camera fails, but some stills are taken and the grab fires successfully with material retrieved. Despite Jeff & Matt's best efforts, the BOAGS winch is still playing up necessitating some further tinkering time. At 2008, a CTD cast is made down to 2000m (including the inevitable polystyrene cups), followed by two vertical tows from 50 m with the N70. Because of safety considerations (i.e. so we don't have to change gear around on the back deck at night), all deck activity stops at 2200 to resume with BOAGS at daybreak (0630).

Saturday the 6th of November 2011

At 0630, BOAGS is the first piece of equipment in the water, with a planned drop down to 2450 m. At 2000m it is clear there is still a major problem with the winch and the decision is taken to retrieve BOAGS, while the winch still functions, rather than lose it. Following a gear change over, the Beam Trawl is deployed to 2500 m for a 30 minute bottom tow (3500 m of wire payed out).

On retrieval, it is clear that the weak-link in the beam must have snapped very quickly after it hit the bottom, i.e. folded beam and very low catch. The CPR is deployed at 1345 for the steam to St Helens seamount.

Sunday the 7th of November 2011

Arrive at St Helens at 0600 where the first deployment is the Seamount dredge (Sherman) for Ron Thresher to 1400 m. Dredge off deck at 0615 and on bottom for 5 minutes, with a good haul, but unfortunately of mostly dead coral. A second slightly shallower (1350 m) deployment is made at 0842 capturing many more live specimens. At 1104 am a CTD cast is made to 2500 m.

Amelia Shannon, who is operating the swath, makes an exciting discovery of a previously unrecorded/document seamount off St Helens Hill at 41:14:32.49 S, 148:49:34.38 E (summit of mount), which is now designated as Amelia's mount (see Figure 1).

Mid-afternoon, the CPR is deployed for the homeward steam to Hobart, to be retrieved at Iron Pot.

Monday the 8th of November 2011

Arrive alongside the wharf at Hobart at 0800.

Summary

The voyage was very successful for Dr Ron Thresher and for the natural products chemist (Ph.D. student) Ana Zivanovic. Although BOAGS didn't perform as well as hoped, voyages such as these are necessary in order to identify and "iron out the bugs" inherent to the development of any new piece of a equipment. So in that respect for BOAGS, despite our frustrations, the voyage was a success. For Ben Harris, the lack of stratification within the eddy and lack of euphausiids, is interesting, although he didn't obtain the samples he desired. For the CPR, the voyage was a success and will constitute the 1st East Coast transect, ever. From a benthic perspective, it would have been nicer to get a better haul with the beam trawl in Bass Canyon. The specimens that were obtained are valuable, and will build on existing datasets and furnish further information about the trophic ecology of deep-sea communities.

Principal investigators

A) Dr Sebastian Holmes (SH). Water & Wildlife Ecology (WWE) Group, School of Natural Sciences, The University of Western Sydney, Locked Bag 1797, Penrith, NSW 2751, Australia.

B) Dr Rudy Kloser (RK). CSIRO Marine and Atmospheric Research, GPO Box 1538, Hobart, TAS, 7001, Australia.

C) Dr Ron Thresher (RT). CSIRO Marine and Atmospheric Research, GPO Box 1538, Hobart, TAS, 7001, Australia.

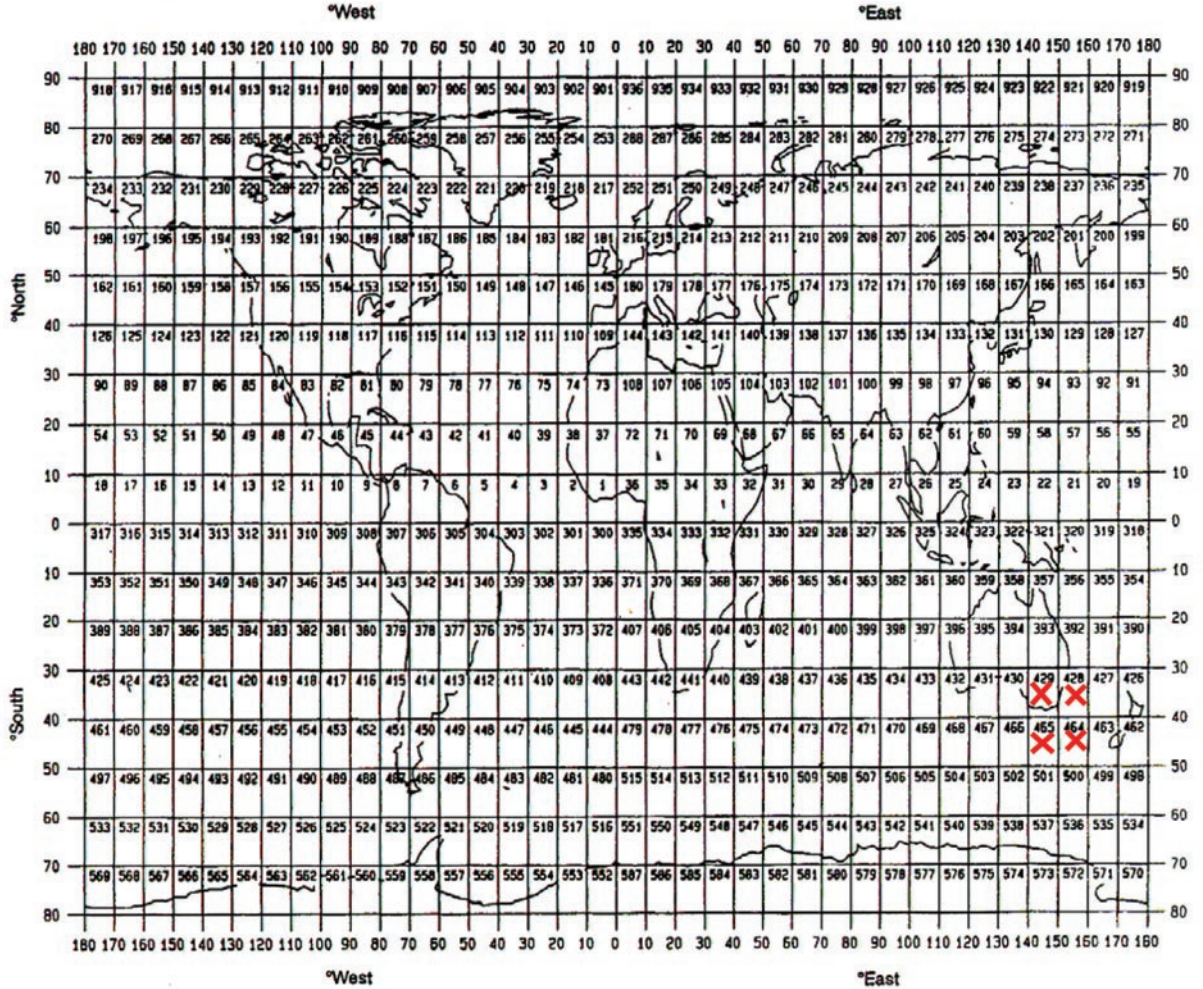
D) Mr Ben Harris (BH). The University of New South Wales, School of Biological Earth and Environmental Science, Sydney, NSW 2052, Australia.

E) Dr Danielle Skropeta (DS). The University of Wollongong, School of Chemistry, Wollongong, NSW 2522, Australia.

F) Dr Kerrie Swadling (KS). The University of Tasmania, Private Bag 50, Hobart, TAS 7001, Australia.

MARSDEN SQUARES

GEOGRAPHIC COVERAGE - INSERT 'X' IN EACH SQUARE IN WHICH DATA WERE COLLECTED



Details of all deployments during transit

Item no.	PI	Latitude			Longitude			Data type	Description
		deg	min	N/S	deg	min	E/W		
1	SH/RK	34	44	S	151	10	E	C	BOAGS to 230 m, 15 minute bottom tow, failed grab.
2	SH/RK	34	47	S	151	10	E	B64/G71	BOAGS to 268 m, 20 minute bottom tow, grab sample taken.
3	SH/DS	34	44	S	151	10	E	B18	Seamount dredge , 20 minute bottom tow @ 235 m.
4	BH	36	22	S	151	38	E	H10	CTD from 400 m, water taken at bottom and top for sensor calibration.
5	BH	36	22	S	151	39	E	B10	N70 50 vertical tow for euphausids and larval fish.
6	BH	36	22	S	151	39	E	B10	N70 50 vertical tow for euphausids and larval fish.
7	BH	36	35	S	151	05	E	H10	CTD from 400 m.
8	BH	36	35	S	151	06	E	B10	N70 50 vertical tow for euphausids and larval fish.
9	BH	36	35	S	151	06	E	B10	N70 50 vertical tow for euphausids and larval fish.
10	BH	36	45	S	150	48	E	H10	CTD from 400 m.
11	BH	36	45	S	150	48	E	B10	N70 50 vertical tow for euphausids and larval fish.
12	BH	36	45	S	150	48	E	B10	N70 50 vertical tow for euphausids and larval fish.
13	BH	36	45	S	150	48	E	B10	N70 50 vertical tow for euphausids and larval fish.
14	SH	36	49	S	150	43	E	B10	Serendipitous tow to investigate larvacean swarms.
15	BH	36	59	S	150	30	E	H10	CTD from 400 m.
16	BH	36	59	S	150	30	E	B10	N70 50 vertical tow for euphausids and larval fish.
17	BH	36	59	S	150	30	E	B10	N70 50 vertical tow for euphausids and larval fish.
18	KS	36	59	S	150	30	E	B10	CPR tow.
END		38	22	S	148	43	E		
19	N/A	38	18	S	149	08	E	H10	XBT (failed)
20	N/A	38	18	S	149	06	E	H10	XBT to 555 m to calibrate swath sonar.
21	SH/RK	38	24	S	148	39	E	B64/G71	BOAGS to 635 m, grab failed, stills poor, 20 minute bottom tow.
22	SH/RK	38	36	S	148	42	E	B64/G71	BOAGS to 1500 m, grab taken, survey camera failed, stills camera failed.
23	RT	38	33	S	148	44	E	H10	CTD to 2500 m, water taken at 2000, 1500, 1250, 1000, 1000 and 500 m.
24	BH	38	32	S	148	45	E	B10	N70 50 vertical tow for euphausids and larval fish.
25	BH	38	32	S	148	45	E	B10	N70 50 vertical tow for euphausids and larval fish.
26	SH/RK	38	33	S	148	44	E	B64/G71	BOAGS to 2500 m. Winch problems, station abandoned (end of BOAGS activities).
27	SH	38	33	S	148	46	E	B18	Beam trawl @ 2500 m, 27 minutes on the bottom.
28	KS	38	33	S	148	51	E	B10	CPR tow.
END		41	15	S	148	50	E		
29	RT	41	14	S	148	50	E	B18	Seamount dredge @ 1461 m 5 minute bottom time.
30	RT	41	15	S	148	49	E	B18	Seamount dredge @ 1350 m 5 minute bottom time.
31	RT	41	14	S	149	02	E	H10	CTD to 2500 m, water taken at 2500, 2000, 1500, 1250, 1000, 1000 and 500 m.
32	KS	41	15	S	148	54	E	B10	CPR tow.
END		43	03	S	147	24	E		

Full details of swath path given are given in the original voyage plan, with a deviation occurring between Wollongong reef and the return to the transit path off Eden.

SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN					
Item No.	PI see page above	NO see above	UNITS see above	DATA TYPE Enter code(s) from list on last page	DESCRIPTION
N70 net (50 m vertical hauls)					
5	D	12	Individual hauls.	B10	Plankton tows for euphausiids and larval fish (Ben Harris), samples preserved in formalin.
6					
8					
9					
11					
12					
13					
14					5 minute horizontal tow only.
16					
17					
24					
25					
BOAGS					
1	B	5	Individual hauls.	B64/G74	Test and deployment of BOAGS. 0-20 minutes of video/stills footage collected at each site (benthic & pelagic), grab samples taken at some sites for sediment analysis.
2					
21					
22					
26					
Beam trawl					
27	A	1	Individual hauls.	B18	30 minute bottom tows for benthic macrofauna. All fauna preserved, Alan Williams beam trawl.
CTD					
4	B/C	6	Individual casts.	H10	Standard CTD data from 2500 m up. Water samples taken at stations 23 & 31 (2500/2000/1750/1500/1250/1000/500 m).
7					
10					
15					
23					
31					
Seamount dredge (Sherman)					
3	A/C/E	3	Individual hauls.	B18	5-20 minute bottoms tows for benthic macrofauna. All fauna preserved/retained.
29					
30					
XBT					
19	B	2	Individual deployments.	H11	Standard XBT data (1 station only).
20					
CPR					
18					
28					
32					
Swath data					
N/A	B	N/A	Whole transit	G74	Seafloor along transit

CURATION REPORT	
Item No.	Description
BH	N70 net samples Plankton and larval fish collected (formalin preserved) by the N70 net will be retained and used for research by Ben Harris at the University of New South Wales
	CTD/XBT data Data requests should be directed to: http://www.marine.csiro.au/datacentre/request.htm or data-requests-hf@csiro.au
	Swath The swath data is held by CSIRO (CMAR) and Geosciences Australia, and will be available for public use 2 years after the standard moratorium for such data. Data requests should be directed to: http://www.marine.csiro.au/datacentre/request.htm or data-requests-hf@csiro.au
RK	BOAGS footage and sediment samples Rudy Kloser (CMAR) will retain all BOAGS footage (video) and data on the sediment characteristics.
SH&DS	Macro fauna from dredge/trawls With the exception of the sponges collected all fauna that was collected, has been donated to the Australia Museum where it is being curated and will be retained. NB from frozen specimens Sebastian Holmes has taken tissue for stable isotope analysis. The sponges have been donated to Danielle Skropeta at the University of Wollongong for natural products research. Full details of what was collected and how it was preserved are given in appendix 2.
RT	Live corals from St Helens seamount Ron Thresher (CMAR) will retain all live specimens of <i>Solenosmilia variabilis</i> .
KS	CPR data CPR data request should be directed to Kerrie Swadling (UTAS).

Voyage track



GENERAL OCEAN AREA(S): Tasman Sea

SPECIFIC AREAS: East coast of Tasmania, Bass Canyon and reef off Wollongong.

Personnel list

Scientific Participants

Name	Affiliation	Role
Sebastian Holmes	USYD/UWS	Chief Scientist
Rudy Kloser	CMAR	BOAGS Scientist
Ron Thresher	CMAR	St Helens Seamount Scientist
Hiski Kippo	CMAR	MNF Computing support
Jeff Cordell	CMAR	MNF Voyage Manager/Electronics Support
Mark Lewis	CMAR	Gear Support
Matt Sherlock	CMAR	BOAGS support
Ana Zivanovic	UoW	Student
Amelia Shannon	USYD	Swath Support Scientist
Ben Harris	UNSW	Pelagic Scientist
Natasha Henschke	UNSW	2nd Watch Leader
Amanda Roe	USYD	Student
Belinda Dechnik	USYD	Student
Daniel Harrison	UoS	Student
Bevan Yui	USYD	Student

Marine Crew

Name	Role	Name	Role
Les Morrow	Master	Bruce Maher	2nd cook
John Boyes	1st mate	Alan Martin	Chief steward
Simon Smeaton	2nd mate	Tony Hearne	Chief IR
Upendra Kapugee	Chief engineer	Jonathon Lumb	IR
Dave Jonker	1st engineer	Graham McDougall	IR
Graeme Perkins	2nd engineer	Ellen Smith	IR
Geoff Coulson	Chief cook	Gareth Gunn	IR

Acknowledgements

Thanks are due to all of the crew and MNF staff onboard the RV Southern Surveyor who went out of their way to ensure that we accomplished as much as possible and beyond. Especial thanks are due to Jeff Cordell, Matt Sherlock and Mark Lewis for tirelessly making sure everything worked. Especial thanks are due to Alan Williams for letting us borrow the beam trawl and Hiski Kippo for providing excellent computing support and producing the voyage DVD. Additional thanks are due to Bernadette Heaney who was a very patient teacher in instructing Seb, Amelia & Rudy in how to operate and make sure the swath behaved. Finally, additional thanks are due to Don McKenzie and Lisa Woodward, both who went beyond the call of duty, as always, to make sure the voyage was a success.

Dr Sebastian Holmes

Chief Scientist

Appendix 2: fauna collected in seamount dredge at Wollongong and in the beam trawl at Bass Canyon

List of fauna collected by the seamount dredge at Wollongong reef

Common name	No.	Weight (g)	Lot no.	Preservation	Site of curation
Crested bellowsfish	3	68.2	30001	Frozen	Aust. museum
Orange perch	2	258.6	30002	Frozen	Aust. museum
Batfish	2	13	30003	Frozen	Aust. museum
Luminescent cod	5	70	30004	Frozen	Aust. museum
Shark egg	1	31	30005	Ethanol	Aust. museum
Red gurnard perch	1	11	30006	Frozen	Aust. museum
Green backed stingray	1	161.2	30007	Frozen	Aust. museum
Juvenile perch	1	5	30008	Frozen	Aust. museum
Salp	5	53.2	30009	Frozen	SH
Brittlestar spp. 1	1	2.4	30010	Frozen	Aust. museum
Brittlestar spp. 2	1	1	30012	Ethanol	Aust. museum
Brittlestar spp. 3	1	0.8	30013	Frozen	Aust. museum
Brittlestar spp. 4	1	0.4	30015	Frozen	Aust. museum
Polychaete spp. 1	8 pieces	10	30016	Ethanol	Aust. museum
Polychaete spp. 2	2 pieces	1.4	30017	Ethanol	Aust. museum
Polychaete spp. 3	9 pieces	2.4	30018	Ethanol	Aust. museum
Polychaete spp. 4	1	1	30019	Ethanol	Aust. museum
Sponge spp. A	2	1738	30020	Frozen	DS
Sponge spp. B	2	422.5	30021	Frozen	DS
Sponge spp. C	10	2420	30022	Frozen	DS
Sponge spp. D	7	10733	30023	Frozen	DS
Sponge spp. E	parts	2092	30024	Frozen	DS
Sponge spp. F	3	302.5	30025	Frozen	DS
Sponge spp. G	7	140.8	30026	Frozen	DS
Sponge spp. H	3	219	30027	Frozen	DS
Sponge spp. I	1	16	30028	Frozen	DS
Sponge spp. J	1	143	30029	Frozen	DS
Sea fan	pieces	185	30030	Frozen	Aust. museum
Rocks/shells/gravel		2484		Thrown	Thrown

List of fauna collected by the beam trawl in Bass Canyon

Common name	No.	Weight (g)	Lot no.	Preservation	Site of curation
Fish Spp. A (eel)	1	95.4	270001	Frozen	Aust. Museum.
Fish spp. B	1	73.2	270002	Frozen	Aust. Museum.
Sea cucumber spp. A	2	314.5	270003	Formalin	Aust. Museum.
Sea cucumber spp. B	3	62.4	270004	Formalin	Aust. Museum.
Sea cucumber spp. C	1	37.2	270005	Formalin	Aust. Museum.
Sea cucumber spp. D	1	2.4	270006	Formalin	Aust. Museum.
Sea cucumber spp. E	3	4	270007	Formalin	Aust. Museum.
Sipunculid spp. A	11	46.6	270008	Formalin	Aust. Museum.
Sipunculid spp. B	3	5.6	270009	Formalin	Aust. Museum.
Sipunculid spp. C	1	1.4	270010	Formalin	Aust. Museum.
Sipunculid spp. D	1	9	270011	Formalin	Aust. Museum.
Sipunculid spp. E	1	4.8	270012	Formalin	Aust. Museum.
Sipunculid spp. F	6	31	270013	Formalin	Aust. Museum.
Anemone	1	3	270014	Formalin	Aust. Museum.
Serolid isopod	3	3.6	270015	Frozen	SH
Bivalve spp.	9	13.6	270016	Frozen	Aust. Museum.
Salp	3	6.2	270017	Frozen	SH.
Polychaete	1	1.2	270018	Formalin	Aust. Museum.
Gastropod spp. A	1	0.6	270019	Formalin	Aust. Museum.
Starfish spp. A	2	81.2	270020	Frozen	Aust. Museum.
Starfish spp. B	6	7.2	270021	Frozen	Aust. Museum.
Scallop spp. A	1	0.1	270022	Formalin	Aust. Museum.
Starfish spp. C	3	19.4	270023	Frozen	Aust. Museum.
Brittlestar spp. A	11	27.2	270024	Frozen	Aust. Museum.
Brittlestar spp. B	3	1.2	270025	Frozen	Aust. Museum.
Gastropod spp. B	1	2.8	270026	Frozen	Aust. Museum.
Calliostomids	6	10.4	270027	Frozen	Aust. Museum.

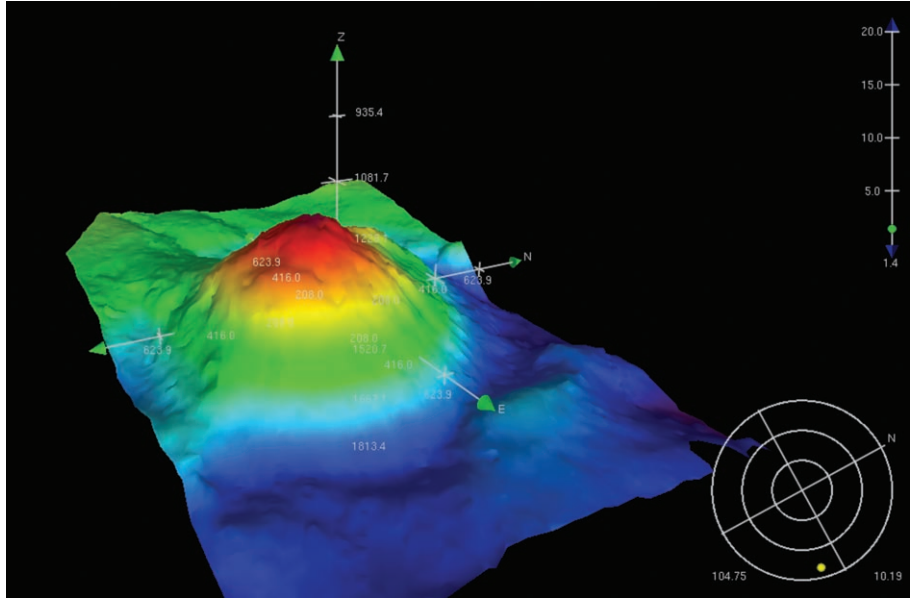


Figure 1: Amelia's mount off St Helens Hill (41:14:32.49 S, 148:49:34.38 E)



Figure 2: Voyage track ss2010-t04, detailing swath track and locations of CTD stations