

MARINE
NATIONAL FACILITY

voyageplan
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2011

RV Southern Surveyor
program

Next Wave
tomorrow's marine scientists

The distribution of pelagic and benthic fauna along Australia's southern seaboard

Itinerary

Mobilise Hobart on Friday the 12th of August, 2011 (students to be onboard by 13:00).

Depart Hobart 08:00 hrs on Saturday the 13th of August, 2011.

Arrive Fremantle 08:00 hrs on Tuesday the 23rd of August, 2011 and demobilise.

Principal Investigators

Dr Sebastian Holmes (Chief Scientist/Benthic Invertebrates)

The University of Western Sydney

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Other Principal Investigators:

Dr Rudy Kloser (swath) – CSIRO Marine and Atmospheric Research

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Ms Julia Reisser (FMD) – CSIRO Marine and Atmospheric Research
and the University of Western Australia (UWA).

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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 two (quasi) scientific aims, each of which will contribute to our knowledge about Australian waters, as follows: 1) to characterise the macro-fauna inhabiting the benthos at range of depths along Australia's southern coast; 2) to investigate regional surface productivity (POM) and the distribution of pelagic organisms along the southern shelf of Australia.

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. The swath mapping will be integrated as a part of the student activities.

For Reisser, the voyage will facilitate her ongoing research on the distribution, abundance and composition of floating marine debris (FMD) around Australia. Marine debris has become a major hazard to marine life and is also leading to aesthetic degradation, economic losses and human health hazards. At present, limited data exist to quantify and explain the geographical range and content of marine debris in our oceans.

In addition, the collection of benthic isopods under the benthic component of the voyage will facilitate the research of Luana Lins (Ph.D. student USYD), who is investigating isopod phylogeny and their gut flora. The collection of salps, if present, are likely to contribute to an ongoing Ph.D. (Natasha Henscke, UNSW). Sponges and corals collected will contribute to a Ph.D. in natural products chemistry at the University of Wollongong and provide samples for ongoing work examining trophic interactions (stable isotopes) in deep sea communities.

Voyage Objectives

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

Pelagic sampling

Sampling will be carried out throughout the whole voyage. At regular intervals, every 100 Nm, 20 minute surface tows with a Neuston net will be made to examine the distribution of microscopic floating marine debris along the southern seaboard of Australia (Julia Reisser). This will be supplemented by visual surveys for larger floating marine debris (trees, barrels etc.) from the bridge. 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 (Seb Holmes).

At each of the stations the EZ net will be deployed to three depths, 500, 300 & 100 m (10 minute tows), to examine both the spatial and vertical distribution of pelagic fauna (salps and gelatinous fauna are of particular interest) and a standard hydrocast made. XBT's may be deployed at some stations rather than a CTD to calibrate the swath mapper.

Benthic sampling

At each station, three Smith-McIntyre grabs, 500 m water depth, will be taken to collect both benthic macro-fauna and infauna. Grabs will be carefully sieved and all fauna collected and identified. Of particular interest are any isopods for further phylogenetic analysis and identification of their gut flora (Luana Lins/Nate Lo). In addition, the epi-benthic sled will be deployed to collect macro-fauna and/or salp carcasses, both of which will feed into research on the trophic nature of offshore benthic communities and extent of benthic-pelagic coupling (Seb Holmes).

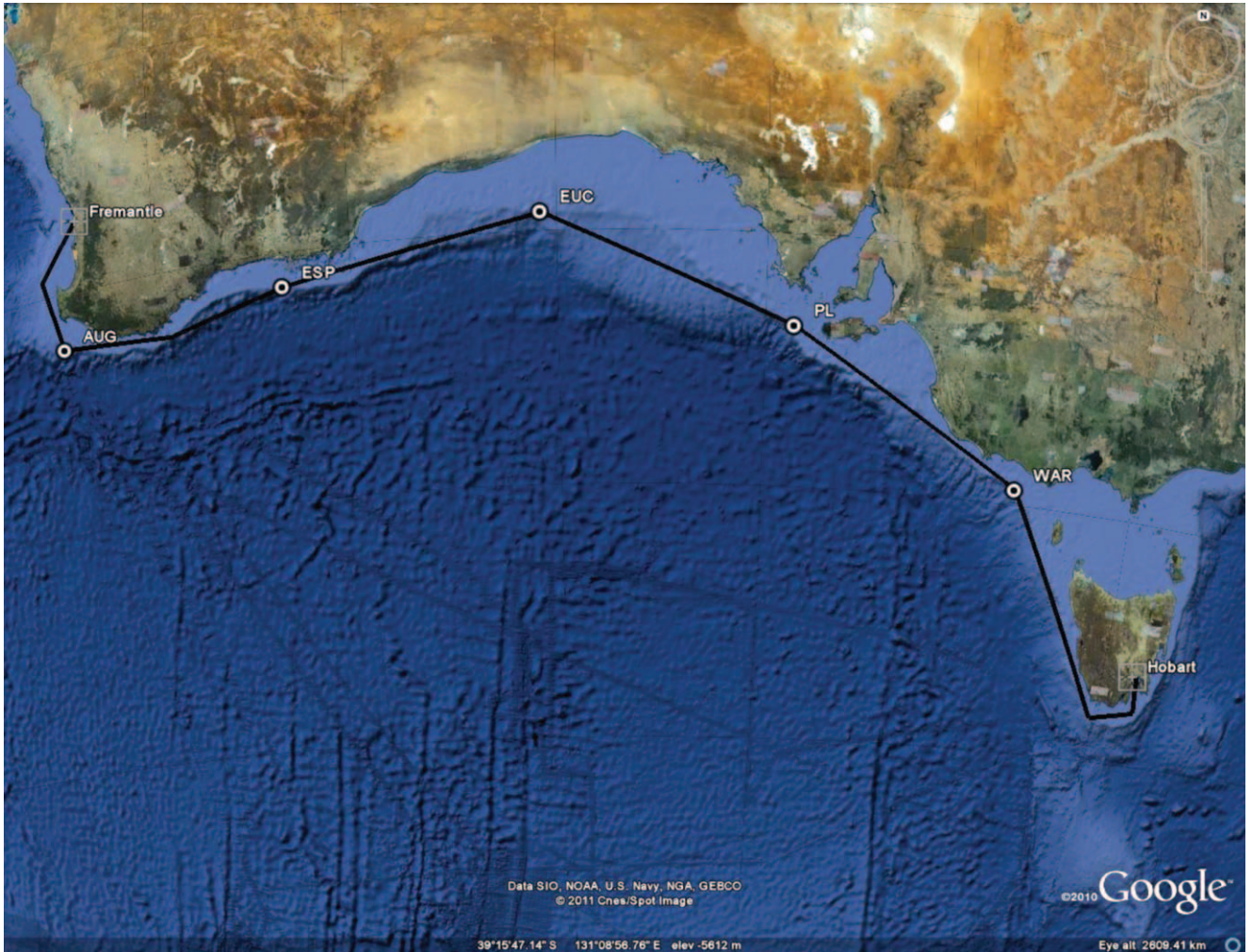
Swath mapping

Throughout the voyage the swath will be continuously operated, providing another valuable track outlining Australia's continental shelf.

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. At some stations, XBT's will be substituted for CTD's.

Throughout the voyage the neuston net will be deployed opportunistically (every 100 Nm or so) off the hydrographic A-frame for a 10- 20 minute surface tow (1 ½ - 2 knots) to collect any microscope floating marine debris (Julia Reisser). Similar tows will also be made during the EZ net deployment on stations.



Indicative map of the transit from Hobart to Fremantle denoting the 5 stations, Warrnambool (WAR), Port Lincoln (PL), Eucla (EUC), Esperance (ESP) and Augusta (AUG).

Hobart to Warrnambool (WAR) (~815 km/440 Nm), leg 1

Departing Hobart at 08:00 on Saturday the 13th of August, the vessel will steam out to Storm Bay where the CPR will be deployed. Following the 500 m isobath it will then sail south westerly along the Tasmanian coastline arriving at approximately 70 km directly off Warrnambool at 06:00 on Monday the 15th of August. Once at station, the EZ net will be deployed (3 depths/fires @ 500 m 300 m and 100 m), then the CTD deployed, followed by 3 Smith-McIntyre grabs (500 m) and finally the benthic fauna sampled using the epi-benthic sled. The vessel will move off station at 13:00 sailing westerly to the next station off Port Lincoln.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Hobart		Saturday 08:00				
Storm Bay	Saturday 10:00	Saturday 10:05	Deploy CPR for steam to Warrnambool	Follow designated swath track		
Warrnambool	Monday 06:00		Retrieve CPR		39 01.15 S 142 28.90 E	46 h (440 Nm)
Station 1 (WAR 1)			Deploy EZ net to 500 m, sample at 3 depths (500, 300, 100 m) ten minute tows at each depth – 1 h. Deploy CTD to bottom – 1 h (time dependant use an XBT instead). Take 3 x Smith-McIntyre grabs – 1 h. Deploy epi-benthic sled – 1 h.	500 m	39 01.15 S 142 28.90 E	46 h/51 h (440 Nm)
Depart for Port Lincoln		Monday 13:00	Deploy CPR	Follow designated swath track		

Warrnambool to Port Lincoln (PL) (~685 km/370 Nm), leg 2

Arriving 110 km off Port Lincoln on Wednesday the 17th of August at 03:00, the EZ net will be deployed (3 depths/fires @ 500 m 300 m and 100 m), then the CTD deployed, followed by 3 Smith-McIntyre grabs (500 m) and finally the benthic fauna sampled using the epi-benthic sled. The vessel will move off station at 08:00 sailing westerly to the next station off Eucla.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Port Lincoln	Wednesday 03:00		Retrieve CPR		35 48.53 S 135 47.46 E	89 h (810 Nm)
Station 2 (PL 2)			Deploy EZ net to 500 m, sample at 3 depths (500, 300, 100 m) ten minute tows at each depth – 1 h. Deploy CTD to bottom – 1 h (time dependant use an XBT instead). Take 3 x Smith-McIntyre grabs – 1 h. Deploy epi-benthic sled – 1 h.	500 m		89 h/ 94 h (810 Nm)
Depart for Eucla		Wednesday 08:00		Follow designated swath track		

Port Lincoln to Eucla (EUC) (~685 km/370 Nm), leg 3

Arriving 180 km off Eucla on Thursday the 18th of August at 22:00, the EZ net will be deployed (3 depths/fires @ 500 m 300 m and 100 m), then the CTD deployed, followed by 3 Smith-McIntyre grabs (500 m) and finally the benthic fauna sampled using the epi-benthic sled. The vessel will move off station on Friday the 19th of August at 03:00 sailing westerly to the next station off Esperance.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Eucla	Thursday 22:00		Retrieve CPR		33 18.18 S 128 57.45 E	132 h (1180 Nm)
Station 3 (EUC 3)			Deploy EZ net to 500 m, sample at 3 depths (500, 300, 100 m) ten minute tows at each depth – 1 h. Deploy CTD to bottom – 1 h (time dependant use an XBT instead). Take 3 x Smith-McIntyre grabs – 1 h. Deploy epi-benthic sled – 1 h.	500 m		132 h/137 h (1180 Nm)
Depart for Esperance		Friday 03:00	Deploy CPR	Follow designated swath track		

Eucla to Esperance (ESP) (~685 km/370 Nm), leg 4

Arriving 70 km off Port Esperance on Saturday the 20th of August at 17:00, the EZ net will be deployed (3 depths/fires @ 500 m 300 m and 100 m), then the CTD deployed, followed by 3 Smith-McIntyre grabs (500 m) and finally the benthic fauna sampled using the epi-benthic sled. The vessel will move off station at 21:00 sailing westerly to the next station off Augusta.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Esperance	Saturday 17:00		Retrieve CPR		34 31.48 S 121 49.64 E	175 h (1550 Nm)
Station 4 (ESP 4)			Deploy EZ net to 500 m, sample at 3 depths (500, 300, 100 m) ten minute tows at each depth – 1 h. Deploy CTD to bottom – 1 h (time dependant use an XBT instead). Take 3 x Smith-McIntyre grabs – 1 h. Deploy epi-benthic sled – 1 h.	500 m		175 h/180 h (1550 Nm)
Depart for Augusta	Saturday 21:00		Deploy CPR	Follow designated swath track		

Esperance to Augusta (AUG) (~630 km/340 Nm), leg 5

Arriving 70 km off Augusta on Monday the 22nd of August at 08:00, the EZ net will be deployed (3 depths/fires @ 500 m 300 m and 100 m), then the CTD deployed, followed by 3 Smith-McIntyre grabs (500 m) and finally the benthic fauna sampled using the epi-benthic sled. The vessel will move off station at 12:00 sailing westerly to Fremantle port to arrive at 08:00 on Tuesday the 22nd of August.

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Augusta	Monday 08:00		Retrieve CPR		35 03.42 S 115 03.59 E	215 h (1890 Nm)
Station 5 (AUG 5)			Deploy EZ net to 500 m, sample at 3 depths (500, 300, 100 m) ten minute tows at each depth – 1 h. Deploy CTD to bottom – 1 h (time dependant use an XBT instead). Take 3 x Smith-McIntyre grabs – 1 h. Deploy epi-benthic sled – 1 h.	500 m		215 h/220 h (1890 Nm)
Depart for Fremantle		Monday 12:00	Deploy CPR			Follow designated swath track

Augusta to Fremantle (~370 km/200 Nm), leg 6

Location	Day/time of arrival	Day/time of departure	Gear/deployment time	Sampling depth	Lat/Long	Cumulative time arrival/departure (distance)
Fremantle Port	Tuesday 08:00		Pull in CPR 1 h before arrival.			240 h (2090 Nm)

NB: for all dredges/trawls the vessel is assumed to be effectively stationary/not heading in a particular direction (normally ½ - 1 knot trawl speed) and for calculating winch times for the benthic sampling a rate of 60 m per minute has been used and the appropriate amount of extra wire added in. For the CTD casts a retrieval winch speed of 20 m per minute has been used.

Piggy-back Projects

Distribution of plankton along the southern Australian seaboard

Kerrie Swadling (UTAS)/
Frank Coman (AusCPR)

Using the continuous plankton recorder (CPR) our knowledge about the distribution of plankton can be greatly improved without impacting ship-time and/or activities.

Scientific objective: to obtain a transect of plankton distributions along the east coast of Tasmania.

Voyage objective/s: the CPR will be deployed on 6 legs of 200-440 Nm during the voyage.

Phylogeny and gut flora of Australian benthic isopods

Luana Lins & Nate Lo (USYD)

The phylogeny of Australian isopods is little understood and almost nothing is known about their gut flora, this piggy back project aims to redress some of this.

Scientific objective: to determine the phylogeny of infaunal isopods and the identity of their gut flora.

Voyage objective/s: the infauna collected by the Smith-McIntyre grab at each station will be examined, and any isopods removed.

Southern Surveyor Equipment

Smith-McIntyre grab
Rock dredge
Small epi-benthic sled
XBT
CTD + bottles
Underway clean seawater supply
Underway thermosalinograph, fluorometer and pCO₂ monitoring
– systems running throughout the voyage duration
Ultra freezer
Small winch set up for the continuous plankton recorder
EZ net (330 um mesh nets please).

User Equipment

Neuston/Manta net (Julia Ressler).
Continuous plankton recorder (Kerrie Swadling/Frank Coman).
General sampling preservation equipment /material (ethanol < 20 l, formalin).
General laboratory equipment (microscopes, scales).

Special Requests

Rear deck space may have to be carefully assessed to aid successive deployment of different gear. For dredge versus EZ net the last gear used will be the first to be deployed with change over occurring during CTD deployment.

Personnel List

Dr Sebastian Holmes	UWS	Chief Scientist
Ms Julia Ressler	CSIRO & UWA	PI FMD
Ms Mailie Gall	UWS	Ph.D. student, productivity.
Ms Luana Lins	USYD	Ph.D. student, isopods.
Antony Gould	UWS	PhD Student
David McLeod	CSIRO	CPR Scientist
Tiffany Cole (TBC)	UWS	Honours Student
Blaise Bratter (TBC)	UNSW	Student
TBA	UNSW	Student
Lindsay Pender	CMAR/MNF	Computing support/Voyage Manager
Matt Sherlock	CMAR/MNF	Electronics support
Trevor Goodwin	CMAR/MNF	Trainee 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.
Lindsay Pender	AS02763
Matt Sherlock	

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