



# 2007 RV Southern Surveyor program

## voyageplan SS02-2007

Survey and monitoring for SE MPAs including  
the Tasmanian Seamounts Marine Reserve

### Itinerary

Leg 2: SS02/2007

Depart Hobart (as soon as possible following mobilization), Wednesday 28th March 2007

Arrive Hobart 1400 hrs, Wednesday 11th April, 2007

### Principal Investigators

Dr Alan Williams (Chief Scientist) – CSIRO Marine and Atmospheric Research. GPO  
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Mr Rudy Kloser – **email:** Rudy.Kloser@csiro.au

Dr Nicholas Bax – **email:** Nic.Bax@csiro.au

### Scientific Objectives

The scientific objectives of this survey support the process of SER Estate inventory and management performance assessment by providing *interpreted* benthic habitat maps, faunal inventories and documented conservation values in scientific reference sites from selected MPA areas in the SER estate. Data will enable us to further test and refine predictive methods for identifying seabed habitat types using acoustic swath data (primarily backscatter, bathymetry and bathymetric derivative variables such as slope and aspect).



The scientific objectives for the survey – split across two voyages (SS11/2006 for leg 1 and SS02/2007 for leg 2) are to:

- use advanced sampling tools and techniques that are, to the extent possible, non destructive
- collect precisely georeferenced baseline data at scientific reference sites to enable indicators to be quantified (e.g. biodiversity metrics and levels of fishing effort at each site). These data will be documented and available for use for targeted monitoring during subsequent surveys
- provide results that can assess the achievement of the TSMR management plan to date (revisit four seamounts photographed in 1997 – Main Pedra, Sister 1, K1 and D1; look for changes in fished and unfished sites) and refine baseline data
- enable future assessment against performance objectives for the TSMR and selected proposed Commonwealth MPAs – Huon, Tasman Fracture and possibly South Tasman Rise and Freycinet depending on the time available at sea
- test efficiency of the various biodiversity metrics to determine effectiveness, cost and potential for monitoring other deepwater reserves
- provide samples for key taxa that can be used in subsequent genetic research to refine definition and extent of endemism in deepwater fauna
- complete swath mapping of relevant parts of continental slope between Hobart and SW Cape

These scientific objectives aim to:

1. Develop specific and generic research and monitoring options for the benthic ecosystems of offshore MPAs using ecological indicators identified through comparative deep water surveys
2. Trial and develop these through scientific survey of *selected* MPA areas in the SE estate
3. Evaluate and report the baseline data acquired
  - a) at established scientific reference/ monitoring sites within and outside MPAs
  - b) in forms that can be understood by, and are available to, all stakeholders
  - c) in forms that can be presented to general public through the print and television media

## Voyage Objectives

The overall voyage objectives are to:

1. Generate swath acoustic maps of target areas with the Simrad EM300 multibeam.
2. Collect targeted biological, physical and photographic ground-truth samples with a sediment grab, rock sled, epibenthic sleds and the CMR SVS or MVS camera platform from regions of upper continental slope seabed (~100-2000 m)
3. Collect and curate benthic invertebrates to provide a biological inventory at various scales of taxonomic resolution.

These objectives are split across two legs (separate voyages): during leg 1 (SS11/2006) we plan to map the areas of interest using the EM300 multibeam and then ground-truth habitats using the towed camera system. There may also be opportunistic sampling of sediments using the sediment grab and or rock sled during leg 1. During leg 2 (SS02/2007) we plan for mostly biological sampling of seabed communities using the sleds. Sample locations for leg 2 will be largely based on the mapping and photographic ground-truthing done on leg 1, however, if time permits, and 'weather window' is available, we will also complete sampling on the South Tasman Rise and Cascade Plateau.

## Voyage Track

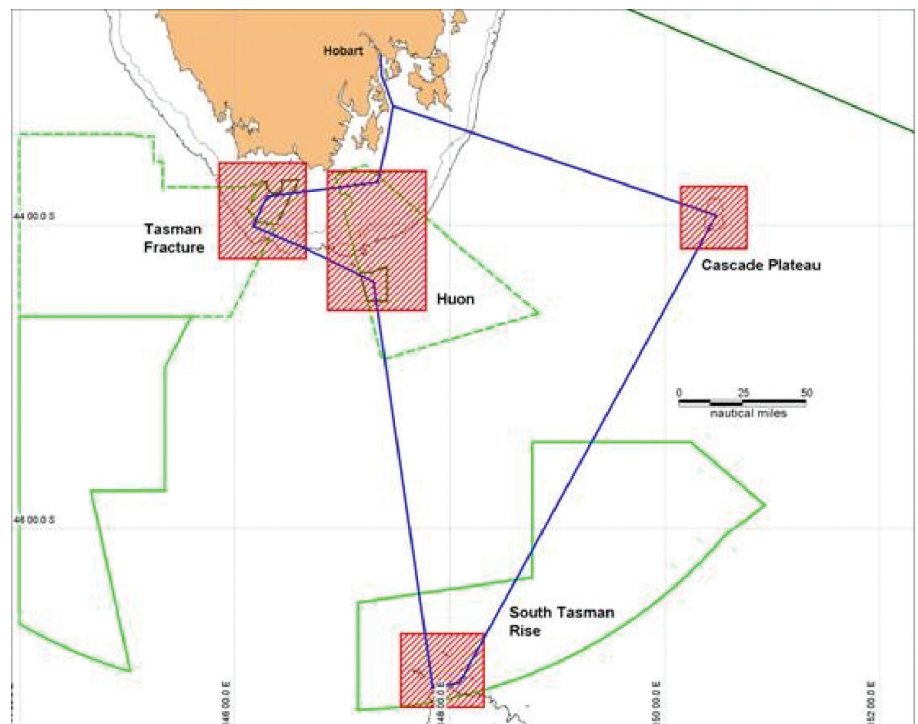


Figure 1. A map showing the proposed voyage track (blue line) for SS02/2007 to the Huon, Tasman Fracture, South Tasman Rise and Cascade Plateau study areas (hatched red) within the proposed MPA regions in green (excepting Cascade Plateau).

## Time Estimates

**Table 1.** Time estimates for steaming and surveys at study areas for leg 2 (SS02/2007).

Steaming (see map Fig. 1)	Distance (nm)	Time (hrs) @11 knots	Total hrs and (days)
Hobart to Huon	65	6	
Huon to Tasman Fracture	55	5	
Tasman Fracture to Huon	55	5	
Huon to South Tasman Rise	162	15	
South Tasman Rise to Cascade Plateau	212	20	
Cascade Plateau to Hobart	155	14	
Steaming leg 2 (SS02/2007)	704 nm		64 hrs (2.6 days)
Survey	Activities	Time (hrs)	
Tasman Fracture	Swath mapping,	48 (2 days)	
Huon	camera tows,	72 (3 days)	
South Tasman Rise	sediment sampling,	72 (3 days)	
Cascade Plateau	biological sampling	72 (3 days)	
Survey leg 2 (SS02/2007)			264 hrs (11 days)
<b>Combined leg 2 steaming and survey times</b>			<b>328 hrs (13.6 days)</b>

**Target sample numbers and indication of priority for this voyage, with reference to the total collection expected from the sister voyage SS11/2006.**

*[Comments in square brackets show the relative importance of the total collection and indicate which components will be sacrificed if time is lost to bad weather or equipment breakdown.]*

Video transects: 21 (10 planned; 10 supplements for voyage 1, plus 1 calibration tow) [16 high; 5 medium]

Sled tows: 56 (some reduction of replicates possible based on analysis of video results from voyage 1) [46 high; 10 medium]

Sediment grabs: 22 (12 planned; 10 supplements for voyage 1) [12 medium; 10 low]

Trap sets: 4 [4 medium]

LADCP casts: 12 (6 planned plus 6 uncompleted from voyage 1) [6 high; 6 medium]

Beam trawls: 6 [6 low]

This tally of samples is based on timing estimates and achievements using the same samplers from the National Facility vessel in comparable surveys in 2005/ 2006. Additionally, a calibration of the Sonardyne USBL will be undertaken before sampling is commenced – provisionally at the first station on the inner shelf in the Huon MPA. This will require use of the vessel DP system, which may also be required later in the voyage for other operations.

## **Piggy-back Projects**

**Project title:** Connectivity Among Seamounts in the Southeast Marine Region

PI Dr Karen Miller, University of Tasmania

### **Scientific objectives**

Seamounts are areas of high biodiversity that face increasing risk from fishing, mining, and climate change. However the ecology of seamounts is poorly understood which limits our ability to effectively manage these important resources. We will use molecular data to determine the genetic diversity of seamount coral populations, and use these results to infer larval dispersal among seamounts in the Southeast Marine Region. Understanding how genetic diversity is distributed, and if and how populations are connected via larval dispersal, is essential to create meaningful conservation management strategies. The results of this project will directly support the development and management of marine protected areas within Australia.

### **Voyage objectives**

To collect deepwater corals from seamounts during leg 2

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**Project title:** Collection of deep water corals for reconstructing climate and oceanographic variability

PI Dr Ronald Thresher, CSIRO Marine and Atmospheric Research

### **Scientific objectives**

Current efforts to use proxy records in deep water corals for temperature and salinity in temperate Australia are severely hampered by the lack of specimens collected from known depths and locations and of known condition when they were collected (i.e., living, recently dead). The data are critical in terms of reconstructing long term (millennial) variability in water mass formation and productivity in the Southern Ocean and Tasman Sea, which in turn can be related to patterns of ecosystem and fisheries production, on the one hand, and long-term climate variability on the other. In particular, the data will relate to testing the effects of recent anthropogenic climate change on deep ocean processes and ecosystems.

### **Voyage objectives**

To collect and suitably document collection details for corals (both solitary and colonial) collected during benthic sampling of the Southern Hills regions, as well as any other sites opportunistically sampled. Material should be stored dry, if possible, or frozen. Small material can be preserved in ethanol, if required, though this is less desirable. Material should not be stored in formalin, as this erodes calcified structures.

**Project title:** Utilizing the trace element signature contained within the siliceous spicules of deep-sea sponges with the aim of reconstructing changes in ocean chemistry through time.

PI Dr Michael Ellwood, Department of Earth and Marine Sciences & Research  
School of Earth Sciences, The Australia National University Canberra, ACT

### **Scientific objectives**

Reconstructing changes in ocean chemistry through time

### **Voyage objectives**

To collect deepwater sponge tissues from deepwater sampling during leg 2

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## **Southern Surveyor Equipment**

- Inmarsat B & C, Minisat M, Optus Mobilesat, CDMA - Voice/Data/Fax
- Navigation – One minute archiving of the underway data including Time, GPS position and bottom depth (plus DGPS within Optus mobilesat footprint)
- 3DGPS (for accurate heading, pitch and roll)
- Meteorological Data (temp, humidity, wind speed & dir, barometric pressure)
- Sea Plot Navigation package
- Simrad EK 500 sounder (12, 38 and 120KHz)
- Simrad EM300 multibeam swath mapper
- Simrad sub-bottom profiler
- Sea Surface Temperature and Salinity
- Sea Surface Fluorescence
- ADCP
- Lowered ADCP
- Smith-McIntyre grabs (2)
- Rock dredges (2)
- CTD (Seabird SBE 911 plus)
- Wet and Dry Laboratory Spaces
- Dark room
- Photo/Preservation Lab
- Walk-in Freezer
- Laboratory Fridges and Freezer
- UNIX Computers, Personal Computers
- Trawl winches with 5,000m of 24mm wire
- CTD/Hydro winches each with 7,000m of 8mm single core conducting cable
- Hydrographic A-frame (stbd)
- Stern A-frame (SWL 15 tonnes)
- 7 tonne knuckleboom crane
- Gilson winches (15 tonne, 5 tonne)
- Tugger winch (5 tonne)
- Scanmar net monitoring system (for use with benthic sled)

## User Equipment

- CMAR deep towed video system and winch
- CMAR shallow towed video system and winch
- 35 mm Photosea camera system, cage frame, 'Skipper sounder' and transducer
- Sonardyne USBL tracking system
- Multifrequency acoustic pod on SS pole
- Sleds (Sherman and Beam)

## Personnel List

Alan Williams	CMAR	Chief Scientist (Principal investigator)
Bruce Barker	CMAR	Watch leader/camera operations
Karen Gowlett-Holmes	CMAR	Invertebrate taxonomy coordination
Mark Lewis	CMAR	Gear operations
Cameron Buchanan	GA	Swath mapping
Bernadette Heaney	CMAR	Computing support
Jeff Cordell	CMAR	Voyage Manager /NF electronics support
Tim O'Hara	MOV	Invertebrate taxonomist
Monika Schlacher	QM	Invertebrate taxonomist
Karen Miller	UTas	Invertebrate taxonomist
Julian Finn	MOV	Invertebrate taxonomist
Trudy Costa	MOV	Invertebrate taxonomist
Mirielle Consalvey	NIWA	Invertebrate taxonomist
Stephen Keable	Aust Museum	Invertebrate taxonomist

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

**Dr Alan Williams**

*Chief Scientist*