

MARINE
NATIONAL FACILITY

2006 program

RV Southern Surveyor



voyagesummaryss11/2006

SS11/2006

Survey and monitoring for South East Marine Protected Areas (MPA) including the Tasmanian Seamounts Marine Reserve

Itinerary

Depart Hobart 1400hrs, Tuesday 31 October, 2006

Arrive Hobart 0800hrs, Saturday 11 November, 2006

Principal Investigator(s)

Dr Alan Williams (Chief Scientist) **Email:** Alan.Williams@csiro.au

Mr Rudy Kloser **Email:** Rudy.Kloser@csiro.au

Dr Nicholas Bax **Email:** Nic.Bax@csiro.au

CSIRO Marine and Atmospheric Research, GPO Box 1538, Hobart 7001

Scientific Objectives

The scientific objectives of this survey support the process of South East Region 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 surveys 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 CMAR 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, including a functional morphological classification developed for the deep sea fauna

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 based on the mapping and photographic ground-truthing done on leg 1. Further camera work during leg 2 will provide data at sites where we were unable to successfully sample with the camera system during leg 1, and data from the offshore sites not visited during leg 1.

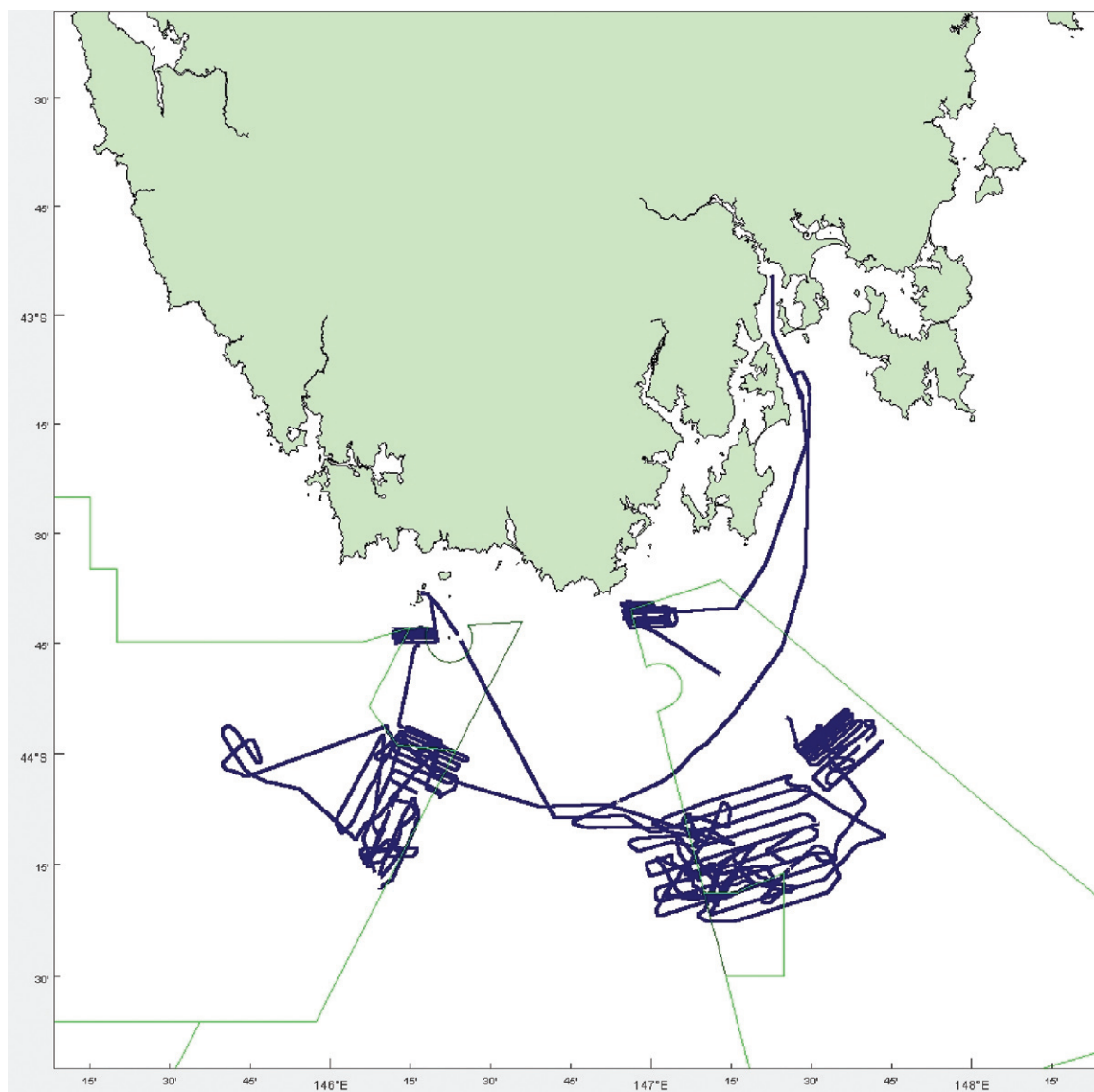


Figure 1: Map showing the voyage track for SS11/2006 to the study areas within the proposed Huon and Tasman Fracture MPA regions.

Results

A total of 75 operations were completed (Table 1): these included calibration of the Sonardyne tracking system, 19 successful sediment samples and 50 successful camera transects (full length transects that acquired high quality data). In addition, survey areas were mapped using the EM300 multibeam sonar (MBS) on the inner and outer shelf, upper and mid-slope and seamounts areas of each of the proposed Huon and Tasman Fracture MPAs. All camera imagery (video tapes and digital still images), together with telemetry data (depth, position, CTD etc.), were archived. Still images were renamed to enable database entry, and were georeferenced and examined to build a faunal inventory of benthic invertebrates and fishes to direct video scoring. Seabed mapping data were processed, and electronic copies loaded into a GIS for navigation and mapping of stations. All underway data, ADCP data and single beam acoustic data were logged and archived. All station data were captured in the shipboard Oracle database. This collection of data will enable all objectives to be met, and will underpin the sampling design for the follow-up voyage (SS02/2007) when the complementary biological sampling will be done.

Voyage Narrative

Monday 30 October

Following a very busy period of preparations alongside in Hobart, Southern Surveyor departed for the beginning of a 13-day survey off the southern coast of Tasmania at 2200 hrs.

Tuesday 31 October

We completed a transit to the first station in the proposed Huon MPA, arriving at 0630 hrs. Sampling began with swath mapping in the NW corner of the MPA in an area with mixed rocky and sediment seabed types. An area of clear sediments was identified to deploy the Sonardyne beacon for the CASIUS calibration, and that was completed successfully. The Prizm parts that arrived late in Hobart were delivered successfully by light-aircraft drop at 1500 hrs. Three sediment grabs were completed in 115 m depth at the Huon 100 m site; these contained a mix of coarse bryozoan fragments and sand. The first deployment with the newly configured camera platform delivered reasonable imagery – although identifying several necessary adjustments to camera and light angles – but one of the two strobe pressure cases flooded. We steamed south towards the next site, Huon 200 m, at 0030hrs.

Wednesday 1 November

Work started with video transects at the Huon 200 m and Huon 400 m sites on unfished areas just inside the shelf break and on the upper slope. Three replicate sediment grab samples were then taken at both these sites. Two of a series of four video transects on the mid-slope (Huon 1000 m) were completed before midnight.

Thursday 2 November

Two deeper video transects were completed successfully on the Huon mid-slope (with the gear flown between them). The vessel then moved down the Huon seamounts area where three swath lines were run over priority seamounts. Effort then focused on video transects and four were completed by midnight: Sister, Pedra, Hill U and Mongrel.

Friday 3 November

Work started with a westwards video tow on Hill U, and this was extended to also cover Dory Hill. The arrival of a front soon after made further camera tows impractical. The remainder of the day was spent running swath lines.

Saturday 4 November

Winds blew to 45 knots overnight preventing any further camera work, however swath data was collected successfully. Winds moderated, allowing us to resume camera work at 1330 hrs and successfully completed transects over five seamounts (Sister2, z19, Hill U, z15, z24).

Sunday 5 November

Winds moderated further, and we continued running back-to-back camera transects to make the most of the good weather. Thirteen were completed: Hill K1 (three transects) z22, The Sisters (south) (two transects), Little Sister, Conger, Pedra, z16, Hill U, Hill B1 and z5.

Monday 6 November

Work commenced with video tows in the Huon region over a small seamount in mid slope at depths from 500 to 1100 m. A few technical problems with the camera arose which required the system to be on deck for an hour. Several sediment grabs were attempted in 1100 m on low backscatter but were unsuccessful. At 1300 hrs we commenced our way to the next region (Tasman Fracture MPA) swath mapping in the 400 to 1000m mid slope region. The ship diverted to Maatsuyker Island to drop off one participant, then proceeded to the Tasman 100m site where a 10 sq n.m. box was swathed. Work started with a camera tow over a small reef and adjacent sediments at the 100m site.

Tuesday 7 November

Three sediment grabs were completed at the 100m site before the ship moved out to sample at the shelf edge. A relatively large area was swath mapped because it was too rough to deploy the cameras. The first video tow commenced at midday as winds abated; tows were completed at the Tasman 200m site and 400m sites. Sediment samples were then taken from both, with six attempts required for two successful samples at 400 m. The 200 m site was sampled at 187 m due to the steepness of the shelf edge. Two video tows were then completed in the large canyon feature at this site: a relatively short transect over the shelf break followed by a very long transect from 300 to 900 m that crossed the canyon thalweg.

Wednesday 8 November

Most of the day was spent mapping the target area offshore around the “Maatsuyker” group of seamounts. Three video transects were then completed successfully on NW Matt, Main Matt and Mini Matt.

Thursday 9th November

Eight video transects were completed – 7 successfully and one abandoned after a pin-up on the top of the Main Matt seamount. Good data was taken from Main Matt (three transects), Monitor, and three adjacent mid-slope areas over a depth range of ~900 to 1400 m. The vessel then moved westwards to sample a deep (1,400 m peak) isolated seamount.

Friday 10 November

The offshore peak was sampled successfully (between 1,400 and 1,800 m) in the early hours of the morning. The vessel then returned to the Tasman area to do one additional video transect, however bad weather intervened. No sampling was possible during the day as conditions deteriorated, and the vessel was hove to from mid-afternoon. At 1645hrs, with no prospect of additional data collection before the survey ended, the decision was made to return to Hobart early.

Saturday 11 November

Docked at the CSIRO wharf in Hobart at 1130hrs.

Summary

This was a highly successful voyage that largely succeeded in meeting its ambitious sampling schedule despite three periods of inclement weather during the 11 days at sea. The volume, quality and distribution of the data collected has ensured that the overarching scientific objectives dependent on this voyage can be met.

Personnel

Scientific participants

Alan Williams	CMAR	Chief Scientist (Principal investigator)
Rudy Kloser	CMAR	Watch leader (Principal investigator)
Bruce Barker	CMAR	Camera systems
Rick Smith	CMAR	Mapping
Pamela Brodie	CMAR	Data manager
Jeff Cordell	CMAR	Camera systems
Drew Mills	CMAR	MNF Electronics support
Bernadette Heaney	CMAR	MNF Computing support
Karen Gowlett-Holmes	CMAR	Invertebrate taxonomy
Mark Lewis	CMAR	Gear operations/ camera systems
Matt Sherlock	CMAR	Camera systems
Cameron Buchanan	GA	Multibeam sonar
James Seager	SeaGIS	Camera systems
Daniel Clifton	DEH	General operations

CMAR – CSIRO Marine and Atmospheric Research

GA – Geoscience Australia

DEH – Department of Environment and Heritage

Marine Crew

Les Morrow	Master
Drew Meincke	First Mate
Rob Ferries	Second Mate
Roger Thomas	Chief Engineer
Rob Cave	First Engineer
Seamus Elder	Second Engineer
Tony van Rooy	Boatswain
John Howard	Integrated Rating
Vince Wesley	Integrated Rating
George Cook	Integrated Rating
Phil Bird	Integrated Rating
Phil French	Integrated Rating
Terry Reid	Chief Steward
Bob Cumming	Chief Cook
Jason Phillips	Second Cook

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

Acknowledgements

The success of this voyage can be attributed to the wide variety of expertise and hard work provided by the science team, and to the very high standard of support given by the marine crew – especially the Bridge Officers. We would also like to acknowledge the efforts of other support staff at CSIRO Marine and Atmospheric Research – particularly from the mechanical and electronic workshops and administration section – for their support in getting this survey mobilized and the overarching project organised.

Dr Alan Williams

Chief Scientist (on behalf of the project team, Rudy Kloser and Nic Bax)

Table 1: List of operations

Op #	Gear	Site	Start Longitude	Start Latitude	Finish Longitude	Finish Latitude	Start Depth (m)	End Depth (m)
1	Sonardyne cal	100 m	—	—	—	—	100	—
2	sediment grab	Huon 100	146.964	-43.701	—	—	116	—
3	sediment grab	Huon 100	146.964	-43.702	—	—	115	—
4	sediment grab	Huon 100	146.964	-43.703	—	—	115	—
5	sediment grab	Huon 100	146.964	-43.701	—	—	115	—
6	camera tow	Huon 100	146.981	-43.6866	146.967	-43.6985	101	110
7	camera tow	Huon 200	147.527	-43.965	147.54	-43.9812	156	304
8	camera tow	Huon 400	147.547	-43.9916	147.567	-43.9959	387	419
9	sediment grab	Huon 400	147.556	-43.9934	—	—	398	—
10	sediment grab	Huon 400	147.556	-43.9935	—	—	398	—
11	sediment grab	Huon 400	147.556	-43.9937	—	—	400	—
12	sediment grab	Huon 200	147.532	-43.9731	—	—	189	—
13	sediment grab	Huon 200	147.533	-43.973	—	—	183	—
14	sediment grab	Huon 200	147.533	-43.9729	—	—	182	—
15	camera tow	Huon 1000	147.587	-44.0366	147.594	-44.0351	970	1050
16	camera tow	Huon 1000	147.581	-44.0312	147.59	-44.0385	840	1018
17	camera tow	Huon 1000	147.594	-44.0418	147.602	-44.0494	1150	1150
18	camera tow	Huon 1000	147.609	-44.055	147.616	-44.0594	1190	1225
19	camera tow	Sister	147.251	-44.277	147.237	-44.2885	834	1402
20	camera tow	Pedra (main)	147.096	-44.26	147.063	-44.2487	840	1400
21	camera tow	Hill U	147.173	-44.3246	147.16	-44.3175	1327	1470
22	camera tow	Mongrel	147.114	-44.2582	147.097	-44.2363	730	1225
23	camera tow	Hill U	147.18	-44.3206	147.167	-44.3228	1100	1444
24	camera tow	Dory Hill	147.121	-44.3265	147.107	-44.3251	1122	1424
25	camera tow	Sister 2	147.239	-44.266	147.222	-44.27	822	1340
26	camera tow	z19	147.189	-44.3021	147.186	-44.3086	1070	1400
27	camera tow	Hill U	147.18	-44.3215	147.178	-44.3308	1130	1335
28	camera tow	z15	147.472	-44.2325	147.464	-44.2379	1090	1600
29	camera tow	z24	147.428	-44.2589	147.42	-44.2651	1166	1600
30	camera tow	Hill K1	147.372	-44.3092	147.378	-44.3002	1235	1775
31	camera tow	Hill K1	147.386	-44.293	147.376	-44.2908	1235	1600
32	camera tow	z22	147.34	-44.2771	147.335	-44.2743	1179	1480
33	camera tow	Sister 2	147.237	-44.2664	147.215	-44.2553	912	1270
34	camera tow	Little Sister	147.207	-44.2505	147.225	-44.2631	1080	1297
35	camera tow	Conger	147.176	-44.2524	147.166	-44.2563	990	1287
36	camera tow	Pedra (main)	147.098	-44.2574	147.08	-44.2799	770	1335
37	camera tow	z16	147.068	-44.2912	147.063	-44.2981	1020	1434
38	camera tow	Hill U	147.18	-44.3233	147.204	-44.3252	1130	1470
39	camera tow	Hill B1	147.28	-44.3074	147.293	-44.3023	1070	1600
40	camera tow	Hill K1	147.386	-44.2934	147.398	-44.2946	1270	1650
41	camera tow	Sister 1	147.25	-44.2746	147.261	-44.2648	923	1340
42	camera tow	z5	147.28	-44.2458	147.281	-44.2443	1291	1406
43	camera tow	Mongrel	147.111	-44.2583	147.121	-44.2472	779	1130

Op #	Gear	Site	Start Longitude	Start Latitude	Finish Longitude	Finish Latitude	Start Depth (m)	End Depth (m)
44	camera tow	Lit. Mongrel	147.121	-44.2458	147.126	-44.2413	1065	1240
45	camera tow	Huon 1000	147.247	-44.1258	147.247	-44.1372	740	1050
46	camera tow	Huon 1000	147.127	-44.1476	147.129	-44.149	695	720
47	camera tow	Huon 1000	147.126	-44.1476	147.14	-44.1794	660	1160
48	sediment grab	Huon 1000	147.14	-44.1869	—	—	1112	—
49	sediment grab	Huon 1000	147.16	-44.1968	—	—	1136	—
50	camera tow	Tasman 100	146.277	-43.7207	146.243	-43.7346	124	123
51	sediment grab	Tasman 100	146.258	-43.7285	—	—	127	—
52	sediment grab	Tasman 100	146.258	-43.7287	—	—	130	—
53	sediment grab	Tasman 100	146.258	-43.7287	—	—	129	—
54	camera tow	Tasman 200	146.333	-43.9929	146.326	-44.009	175	250
55	camera tow	Tasman 400	146.318	-44.0277	146.306	-44.0572	344	490
56	sediment grab	Tasman 400	146.329	-44.0304	—	—	343	—
57	sediment grab	Tasman 400	146.328	-44.03	—	—	343	—
58	sediment grab	Tasman 200	146.333	-43.9975	—	—	184	—
59	sediment grab	Tasman 200	146.333	-43.9975	—	—	183	—
60	sediment grab	Tasman 200	146.333	-43.9973	—	—	186	—
61	camera tow	Tasman canyon	146.299	-43.9779	146.287	-43.9867	172	350
62	camera tow	Tasman canyon	146.312	-44.006	146.212	-44.0827	308	900
63	camera tow	NW Matt	146.154	-44.1881	146.141	-44.2046	808	1235
64	camera tow	Main Matt	146.165	-44.2445	146.175	-44.224	680	1138
65	camera tow	Mini Matt	146.191	-44.2147	146.161	-44.252	1135	1430
66	camera tow	Main Matt	146.19	-44.2146	146.191	-44.2147	646	646
67	camera tow	Main Matt	146.148	-44.2125	146.171	-44.214	660	1060
68	camera tow	Tasman 1200	146.155	-44.2199	146.144	-44.2125	1220	1350
69	camera tow	Monitor	146.192	-44.2147	146.141	-44.222	938	1400
70	camera tow	Main Matt	146.19	-44.2129	146.223	-44.2123	690	1200
71	camera tow	Main Matt	146.217	-44.1651	146.205	-44.1933	700	1170
72	camera tow	Tasman 1200	146.181	-44.1112	146.228	-44.1562	960	1175
73	camera tow	Tasman 1000	145.714	-43.984	146.105	-44.16	967	1280
74	camera tow	Nancy's	145.704	-44.993	145.695	-43.9969	1430	1805
75	sediment grab	Tasman 400	146.34	-44.0552	—	—	400	—