

**MARINE  
NATIONAL FACILITY**

# 2004 RV Southern Surveyor program

## **voyageplan**

### **SS07/2004**

Characterising the winter oceanic environment  
off the west coast of Tasmania

#### **Itinerary**

Depart Hobart 1000 hrs, Friday 23rd July 2004

Arrive Hobart 1000hrs, Monday 6th August 2004

#### **Principal Investigators**

• Rudy Kloser (Chief Scientist) • Scott Condie • Alan Williams  
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**CSIRO  
MARINE RESEARCH**

## Scientific Objectives

The research voyage has two aims. Firstly, it will further develop acoustic remote sensing methods to help determine the population size, species discrimination and spatial gradients, applied to the dominant acoustic species and their dynamics on the west coast of Tasmania. Secondly, it will provide underpinning observations of the physical and biological environment of the west coast of Tasmania's winter spawning blue grenadier population and the relationship with key canyon features within the region. The research voyage will be part funded by a 3 year collaborative FRDC/CSIRO/ Fishing Industry (Ocean Fresh and Petuna Sealords) project to develop a long-term sustainable observation strategy using industry vessels on the west coast of Tasmania.

A major limitation in assessing the sustainability of fisheries (blue grenadier in this instance) is our knowledge of the absolute biomass or trend in relative biomass over time. Acoustic methods can provide a cost effective method for obtaining absolute or relative biomass using industry vessels. Industry vessels can be effectively used to carry out routine acoustic surveys providing a data source of fishery independent stock size. To underpin this activity requires acoustic remote sensing research to understand species reflectivity and species discrimination. This project will provide essential research into the acoustic target strength of the dominant species and the ability to discriminate species using multi-frequency acoustic methods. Results from the research will underpin the industry vessel acoustic surveys providing an essential input into the sustainability of the fishery. Industry vessels will be surveying the blue grenadier throughout the winter season to provide the index of abundance.

The blue grenadier fishery is characterised by large recruitment anomalies that occur on ~8 year cycles. These recruitment anomalies set the scene for the sustainability of the fishery for subsequent years. Understanding the relationship of the physical and biological environment that is associated to these events is a scientific challenge and a management need. This project will characterise the large scale and selected fine scale winter oceanographic processes on the west coast of Tasmania and their spatial and temporal relationship with biotic assemblages. Fine scale seabed topography and the associated oceanographic biotic associations will be mapped for selected upper slope canyons. One hypothesis to be tested will be fine scale canyon circulation and its propensity to provide entrapment, enrichment and retention for successful blue grenadier egg fertilisation and larvae growth. The field results will be incorporated into broad scale and fine scale bio-physical models to investigate within season and between season variability to develop hypotheses on conditions which are shown to provide good recruitment to the fishery.

## Voyage Objectives

Development of acoustic remote sensing technology and environmental indicators of fisheries recruitment.

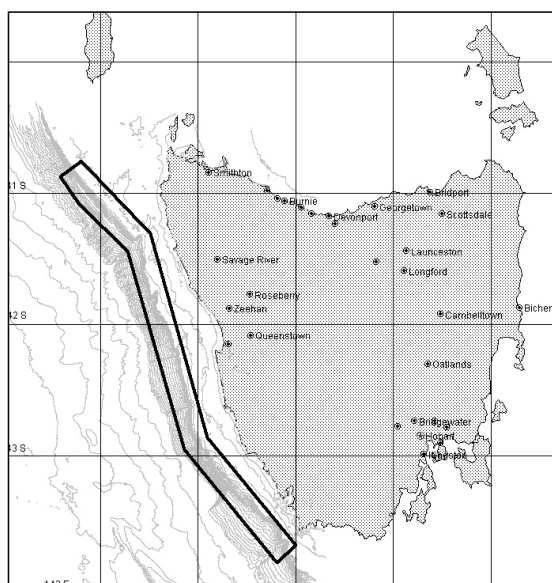
### 1. Develop the acoustic methodology to estimate blue grenadier stock size and environmental parameters by:

- Measuring the in-situ target strength of the dominant acoustic species groups in the ecosystem for absolute and relative biomass assessments and trophodynamic models.
- Investigate methods to remotely determine species composition and map biotic distributions.
- Develop the new swath mapper raw data capture facility to provide water column measurements and 3D maps of nekton distributions.

### 2. Characterise the dominant physical oceanographic processes and biotic associations at broad and fine scale on the west coast of Tasmania (150 – 1500 m) to assist in the development of blue grenadier recruitment variability hypotheses and baseline ecological data. Additionally:

- Collect deep water slope and canyon corals for paleoceanographic studies.
- Collect larvae from selected oceanic features and compare inside and outside canyon age classes.
- Map the canyon currents using an ADCP at fine scale.
- Collect data to validate satellite ocean colour measurements.

## Voyage Track



**Figure 1.** Area of operation of the Southern Surveyor voyage on the west coast of Tasmania.

## Time Estimates

### Calibration

0.5 days

### Gear trials/steaming

1 day

### Broad scale experiment

2.5 days – Acoustic/oceanographic synoptic surveys 600 n.mile @ 10 knots

2.5 days – Biological and physical sampling 2 sites (day and night sampling) outside canyon features based on the acoustic and oceanographic surveys

### Fine scale experiment inside canyons (highest priority)

2.5 days acoustic mapping (swath, ADCP and bioacoustics)

3 days – Biological and physical sampling Day and Night \*2

1 day – Target strength/species identification experiments

1 day – Species identification/vessel avoidance experiments

### Canyon seabed sampling

1 day – Swath acoustic and benthic fauna/sediment sampling

## Southern Surveyor Equipment

Underway Data and Services \*

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) \*

Chart and Navigation package \*

Simrad EK 500 sounder (12, 38 and 120KHz) and EA 500 sounder (12 kHz) \*

Sea Surface Temperature and Salinity \*

Sea Surface Fluorescence (requires support from users for calibration) \*

Laboratory Facilities and Scientific Equipment \*

Wet and Dry Laboratory Spaces \*

Controlled Temperature Laboratory/Cold Room	
Dark room	*
Photo/Preservation Lab	*
Walk-in Freezer	*
Laboratory Fridges and Freezer	*
UNIX Computers, Personal Computers	*
Transducer (low power, 12 KHz wide beam)	*
Winches and A-frames and Crane	*
Trawl winches with 5,000m of 24mm wire	*
CTD/Hydro winches each with 7,000m of 8mm single core conducting cable	*
Towed-body winch with 3,000m of 12mm 7 core conducting cable	*
Hydrographic A-frame (stbd)	*
Stern A-frame (SWL 15 tonnes)	*
EZ Net	*
7.0 tonne knuckleboom crane	*
Gilson winches (15 tonne, 5 tonne)	*
General purpose winch on stern A-frame (5 tonne)	*
Engel Hi-rise mid-water trawl	*

### User Equipment

- 38 kHz pole transducer – placed on pole of vessel
- Sonardyne positioning system – placed on moon pool fixture
- MIDOC net system
- Deep water winch with 3000m optical fibre cable– space on upper rear deck
- MUFTI towed body – rear launch
- Drop TS system – rear or side launch TBD
- Stills camera system – side or rear launch
- Benthic dredge – rear launch
- Lowered ADCP

## **Personnel List**

### **Project**

Rudy Kloser – CMR, Cruise leader/ bioacoustics  
Tim Ryan – CMR, Shift leader/ bioacoustics (logistics coordinator)  
Alan Williams – CMR, Lead biologist (midwater fishes specialist)  
Mark Lewis – CMR, Gear officer/biologist  
Gordon Keith – CMR, Swath mapper analyst  
Karen Gowlett-Holmes – CMR, Invertebrate taxonomist  
Dy Furlani – CMR, Larvae/zooplankton ecologist  
Paul Sandery – Flinders Uni, Oceanographer  
Matt Sherlock – CMR, Marine Instrumentation

### **National Facility**

Stephen Thomas – CMR, Electronics/Voyage Manager (TBC)  
Bernadette Heaney or Bob Beattie – CMR, Computing  
Rebecca Cowley – CMR, Hydrochemistry

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

### **Rudy Kloser**

*Chief Scientist*