SS 3/91(c) plan

CSIRO MARINE LABORATORIES

Division of Fisheries

1991 Research Vessel Program

F.R.V. Southern Surveyor, Cruise SS 3/91 Transit Leg

Staff:
D. McKenzie
M. Sherlock

Duration:
Depart Hobart 23 August 1991
Arrive Fremantle 29 August 1991

Location:
Transect south of Tasmania to Cape Leeuwin, W.A., thence to Fremantle.

Objectives:
1. To get the underway salinity, temperature and fluorescence system going, and establish calibration procedures for these instruments.
2. To measure surface salinity, temperature, and fluorescence, and to collect surface nutrients across the Sub-Tropical Convergence (STC) in late winter.
3. To drop XBT's at selected sites to determine the temperature structure in the upper 700 m of the water column.

Cruise Plan:
This cruise is an exploratory cruise, taking advantage of Southern Surveyor's transit to Fremantle, intended to establish the surface nutrient and fluorescence patterns in and on either side of the STC in the late winter period. The vessel would sail south from Hobart to about 45^{0}S, then follow a direct route to Cape Leeuwin, and thence to Fremantle. XBT's will be dropped at selected sites to obtain temperature profiles in the upper 700 m of the water column. If the STC is well defined, we would anticipate making additional transects during other transit periods to measure the interannual variability of carbon fixation rates, surface CO2, and the physical, chemical and biological structure of the water masses in the Great Australian Bight. These cruises would be done to describe the interaction of the biological and physical processes in determining the oceanic sink strength for atmospheric CO2 in the oceans around Australia as part of the Climate Change project.

Equipment Requirements:
The underway sampling system (thermosalinograph, fluorometer, and logging system), portable XBT launcher (borrowed from Division of Oceanography) plus 24 XBT's. Salinity bottles, nutrient tubes, and filtration equipment for chlorophyll samples, freezer in Chemistry Lab. for chlorophyll and nutrient samples.

D. McKenzie (Cruise Leader)
29 July 1991

P.C. Young
Chief, Division of Fisheries.

Distribution:

Normal Distribution
Don McKenzie (Scientist-in-Charge)
Matt Sherlock

CSIRO MARINE LABORATORIES
Division of Fisheries Research

1991 Research Vessel Programme

F.R.V. Southern Surveyor, Cruise SS3/91 Leg 1

Staff

B Phillips (Scientist-in-Charge)
S Braine
D Wright
J Garvey
D McKenzie
R Griffiths
M Sherlock
P Jolly
A Pearce (Division of Oceanography)
M Jessop-Jolly (Volunteer Fellow)

Duration

Leg 1: Depart Fremantle 0800h Friday 30 August 1991
Leg 1: Arrive Geraldton 1000h Thursday 12 September 1991

Locality

West Coast of Australia, Fremantle to Geraldton.

Leg 1 Objectives

1. Sample puerulus and phyllosoma distributions with depth over the outer continental shelf and slope in the vicinity of the Abrolhos Islands, in relation to the Leeuwin Current. Samples will be taken with both the EZ net system and simultaneously with a side mounted surface net.

2. Obtain hydrographic sections across the Leeuwin Current, to examine the structure and dynamics of the flow. Samples will be taken through the water column in the upper 500 m off the continental shelf and from surface to the bottom on the shelf, and will be processed for temperature/salinity/nutrients.

Cruise Plan

The ship will steam to an area near the Abrolhos Islands and then make cross-shelf transects of the Leeuwin Current. The location of the transects is largely dependent on the position of the Leeuwin Current in the vicinity of the islands, so the cruise track will be decided on the basis of satellite imagery near the time of the cruise. Two or three transects across the Leeuwin Current will be made at the start and end of the cruise, extending some 50 km beyond the outer boundary of the Current; one transect will intersect a current meander should such exist.

Trawls for both phyllosomata and puerulus will be made at stations offshore of the Leeuwin Current, within the Current, and inshore of the Current, the positions depending on the current structure and location.

Depending on the numbers of puerulus and phyllosomata collected, up to 4 days of net hauls may be made at fixed sites to examine the vertical movement of larvae.

B Phillips (Scientist-in-Charge)
Date:

24/7/91

Initialled: P C Young (Chief of Division)

Distribution:

Normal Distribution
B Phillips (Scientist-in-Charge)
S Braine
D Wright
J Garvey
D McKenzie
R Griffiths
M Sherlock
P Jolly
A Pearce (Division of Oceanography)
M Jessop-Jolly (Volunteer Fellow)

CSIRO MARINE LABORATORIES
Division of Fisheries

1991 Research Vessel Programme

F.R.V. Southern Surveyor, Cruise SS3/91 Leg 2

Cruise Title: The Ecology of the Phyllosoma and Puerulus Stage of the Western Rock Lobster and the Leeuwin Current

Staff

B Phillips (Scientist-in-Charge)
S Braine
D Wright
J Garvey
D McKenzie
R Griffiths
M Sherlock
P Jolly
A Pearce (Division of Oceanography)
M Jessop-Jolly (Volunteer)

Duration

Leg 2: Depart Fremantle 0800h Sunday 1 September 1991
Leg 2: Arrive Geraldton 1800h Tuesday 10 September 1991

Locality

West Coast of Australia, Fremantle to Geraldton.

Leg 2 Objectives

1. Sample puerulus and phyllosoma distributions of the western rock lobster with depth over the outer continental shelf and slope in the vicinity of the Abrolhos Islands, in relation to the Leeuwin Current. Samples will be taken with both the EZ net system and simultaneously with a side mounted surface net.

2. Obtain hydrographic sections across the Leeuwin Current, to examine the structure and dynamics of the flow. Samples will be taken through the water column in the upper 500 m off the continental shelf and from surface to the bottom on the shelf, and will be processed for temperature/salinity/nutrients.

Cruise Narrative

The vessel departed from Fremantle at 0800 on Sunday 1 September after two days delay caused by severe weather conditions encountered by the vessel during the trip across the Great Australian Bight.

A fire and muster drill was conducted at 1030 h on 1 September.

After examination of a satellite image clearly showing the position of the Leeuwin Current, obtained on 30 August, it was decided to steam to a position at 30 30 S and 114 20 E. On arrival at this station at 1845 a CTD station was conducted, and the vessel then made a transect along 30 30 S using the EZ net and a surface net operated from a boom on the starboard side. The plan called for trawls for both phyllosomata and puerulus to be made at stations offshore of the Leeuwin Current, within the Current, and inshore of the Current. Unfortunately the surface net had bridle troubles and only fished on two out of five occasions, and the EZ net failed completely and none of the nets opened. The EZ net worked correctly on the second launching.

A transect using CTD casts was made across the Leeuwin Current back along 30 30 S extending some 50 km beyond the outer boundary of the Current. The vessel then steamed north east on a line to intersect the Current to an inshore point near Knobby Head. Ten CTD casts were made along this line. The vessel the steamed west along 29 45 S , again making CTD casts.

On the night of 3 September seven XBTs were launched across the edge of the continental shelf as the vessel steamed along 29 45 S.
Two hauls were also made with the EZ net and surface net as we crossed the Current. On the first of these, the EZ net did not operate. The vessel then continued steaming along 29 45 S making CTD casts out to 113 30 E.

A series of plankton stations were then made travelling westward back along 29 45 S . Four sites were selected. The starting positions of the transects are given:

i) Beyond the Current influence. (29 40 S 113 30 E)

ii) On the outer edge of the Current (29 40S 114 05 E)

iii) Within the Current (29 39 S 114 09 E)

iv) On the shelf, not in the Current (29 39 S 114 27 E)

Day and night net hauls were made using both surface net and the EZ sampling system to examine the vertical movement of the phyllosoma larvae and puerulus. A CTD cast was made at the beginning of each sampling transect and then after every two net hauls along the transect.

EZ hauls were initially made at depths from 500m to the surface in daylight and from 200m to the surface at night. Additional samples were then taken at night between 100m and the surface beyond the shelf, and between 45 m and the surface on the shelf.

Large catches of phyllosoma larvae were made at the surface during the night at both the station beyond the Leeuwin Current and the station within the Leeuwin Current on the nights of the 3rd to the 5th of September. Sampling at the station on the shelf on the night of 6th September showed that the phyllosoma larvae were not present on the shelf. No puerulus were caught on the shelf and only three in the earlier sampling off the shelf.

On the 7th September a series of offshore to inshore transects was commenced. Initially in daylight to define the day time distribution, they were then used to define the distribution of the phyllosoma larvae in the upper 30m and also the inner boundary of the Leeuwin Current.

An intense storm on 8th September forced us to shelter in the lee of the southern group of the Abrolhos Islands for 24 hours.

During the day of 8th a series of daylight samples were taken offshore to further delineate the daytime distribution of the phyllosoma. Sampling on the nights of the 9th and 10th September was directed to defining the distribution of the puerulus stage on the shelf. On the 9th, samples were taken travelling inshore along 29 20 S and on 10th, inshore of the Abrolhos Islands.

On 10th September at 1300h, there was a meeting of all scientific staff to plan the arrangements for the conclusion of the cruise and the completion of all documentation. As a result of an unfortunate accident to Dr Phillips later that afternoon, the vessel had to head for Geraldton immediately for medical treatment, and came alongside at 1800h. The scientists stayed aboard overnight, and as planned, there was an official inspection of all cabins and laboratories at 0700h on the 11th September.

Overall the cruise was extremely successful. All the scientific staff worked hard and performed their duties with diligence. This was in large part due to the professionalism of the Master, officers and crew of the vessel who were at all times cooperative and enthusiastic to see that optimum results were achieved, regardless of the weather.

B Phillips (Scientist-in-Charge)
Date: 11 September 1991

17/9/91

Initialled P C Young (Chief of Division)

Distribution:

Normal Distribution:
B Phillips (Scientist-in-Charge)
S Braine
D Wright
J Garvey
D McKenzie
R Griffiths
M Sherlock
P Jolly
A Pearce (Division of Oceanography)
M Jessop-Jolly (Volunteer)