

DIVISION OF FISHERIES

1994 RESEARCH VESSEL PROGRAM

CRUISE PLAN

**FRV *SOUTHERN SURVEYOR*
CRUISE SS3/94**

16 MAY - 1 JUNE 1994

CSIRO DIVISION OF FISHERIES
MARINE LABORATORIES
GPO BOX 1538
HOBART TAS 7001
AUSTRALIA

TELEPHONE (002) 325 222
TELEX AA 57-812
FAX (002) 325 000

ITINERARY

DEPARTURE: HOBART 0900 H 16 MAY 1994

ARRIVE: SYDNEY 1200 H 31 MAY 1994

AREA OF OPERATION:

East of Tasmania in the area of the Japanese longline fishery and the Hippolyte Rocks (Figure 1)

RESEARCH BACKGROUND

This research cruise is the last in a study begun in 1992 (see Cruise reports SS 2/92, 4/93) to examine the physical and biological structure of the waters of the southern bluefin tuna fishing grounds off eastern Tasmania. This study will focus mainly on the fishing grounds of the offshore longline fishery, but we will also sample the waters of the inshore trolling fishery around the Hippolyte Rocks area (Fig. 1). We aim to quantify the biological productivity on fine and broad scales in these areas to further our understanding of the waters in which the southern bluefin tuna fishing grounds are located. The main focus of this cruise will be to compare the biomass of tuna prey species in the fishing grounds to that of surrounding areas. As many of these prey species are difficult to catch, we will also be sampling the zooplankton that the main tuna prey species eat.

CRUISE PLAN:

1. HIPPOLYTE STUDY

From Hobart we will steam directly to the Hippolyte Rocks area (site 1 in Fig. 1) to augment data on the physical oceanography and biological production of the area gathered in 1992 and 1993. Two Sea Cat / CTD transects (one cross-shelf and the other longshore) will be completed to map the physical structure and biological production of the area. Zooplankton tows, followed by midwater trawls will examine the spatial distribution of midwater fauna in the area.

Time: 2 days

2. SURVEY OF TUNA GROUNDS

We will then steam east to the area in which the Japanese longline fleet usually operates. Unfortunately, the tuna season will not start until 1 June this year. Therefore we will have to use our past experience and predictions made by the Australian Fisheries Management Authority to locate the likely area. We will initially make a CTD transect through the area to establish the west to east vertical structure of the EAC filament, and to groundtruth satellite imagery prepared before the cruise. On this transect we will aim to complete 8 CTD casts at approximately 10 n.mile intervals to a depth of 1000 m. On each cast, temperature, salinity, dissolved oxygen, chlorophyll *a* concentration and nutrients (NO_3^- , PO_4^{3-} , silicates) will be collected. Replicate vertical drop nets (mesh size 100 μm) to 100 m and 10minute surface tows (mesh size 1000 μm) will be made after each cast.

Time 1 day

GRID SURVEYS

Once the area of the main front is established, we plan to complete three separate grids (dimensions 25 x 25 n.miles), each of 30 stations (spaced 5 n.miles apart), to compare the daytime biomass of the different faunal size spectra within and on either side of the main front (Sites 2, 3 and 4, Fig. 1). At each station a bongo net (mesh size 1 mm) will be towed obliquely from 200 m to the surface for approximately 20 minutes. Each net will be accompanied by a 10minute surface tow of the same mesh size. At each station the EK 500 (using the 38 and 120 KHz transducers) will be run for later comparison of the tow biomass with acoustic backscatter. At night, oblique tows with the midoc net will be made to estimate the biomass of micronekton in the three areas. At dawn and dusk, CTD casts will be deployed to 1000 m to describe the physical structure of the grid areas. An array of archival tags will be deployed at two different latitudes during this period.

Time: 9 days

TWENTY-FOUR HOUR STUDY

To confirm previous data showing the vertical distributions of some tuna prey species, we plan to occupy a site in cold water for 24 hours to compare their night and day time distributions. Samples will be collected with the midoc net at four depth strata (100, 200, 300 and 400 m) from 400 m to the surface. Replicate surface tows will be timed to coincide with each stratum sampled. Each tow will take about 2 h. Acoustic data will also be collected on this study.

Time: 1 day

Arrangements are presently being made for a separate transect alongside the longline of an Australian longline vessel (FV *Sovereign*). Its position depends on its fishing success, but is likely to be east of Eden towards the end of May. We have set aside one day to collect physical and biological data, which will be compared later with their catches.

We will then steam to Sydney to be dockside at 1200 h on 31 May 1994.

CRUISE OBJECTIVES:

1. Describe the physical oceanography around the Hippolyte Rocks area off eastern Tasmania, using CTD casts to just above the bottom. This work will be timed to coincide with the release of archival tags in the area.
2. Complete a study of the species composition of the midwater and zooplankton fauna around the Hippolyte Rocks.
3. Map the physical oceanography of the area east of Tasmania in which the winter Japanese longline fishery operates.
4. Investigate the biological production in these waters in relation to the main water masses, using CTD casts and a grid of zooplankton trawls.
5. Complete comparisons of the day-night vertical distribution of the micronekton in these waters.
6. Liaise with inshore fishermen and longliners to collect tuna stomachs for comparing gut contents with net captures.

SECONDARY OBJECTIVES

1. Continue investigations of the distribution of ichthyoplankton in relation to the main water masses off eastern Tasmania.
2. Conduct a health and safety audit of the scientific facilities on board *Southern Surveyor* during normal scientific operations.
3. Deploy an array of archival tags to examine the effect of depth on light levels at sunrise and sunset at two different latitudes.

PERSONNEL

(Note: unless indicated otherwise, all personnel are staff of the CSIRO Division of Fisheries)

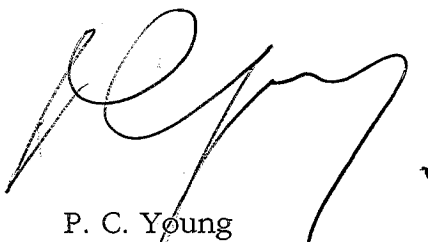
Mr Jock Young (Cruise leader)
Dr Clive Stanley (Assistant cruise leader)
Mr Tim Lamb
Mr Russ Bradford
Mr Dave Wright
Mr Duyet Le
Ms Caroline Sutton
Ms Caroline Langley
Mr Jeff Cordell
Mr Lindsay Macdonald
Mr Mark Raynor (CSIRO Division of Oceanography)
Mr Les Drury

CONTACTS

For further information about the cruise please contact:

Mr Jock Young
CSIRO Division of Fisheries
GPO Box 1538
Hobart, 7001
Phone (002) 32 5360; Fax (002) 32 5000

Mr. Clive Liron (Vessels Operation Manager)
CSIRO Division of Fisheries
GPO Box 1538
Hobart, 7001
Phone (002) 32 5234; Fax (002) 32 5000



P. C. Young
Chief, Division of Fisheries

May 3, 1994

APPENDIX 1: CRUISE TIME ESTIMATES

Activity	Time (hours)
Steaming to Hippolytes	8
Hippolyte study	48
Individual transect time	24
Grid of stations	3 x 72
24 h Midoc station	24
Alongside fishing vessel	24
transit to Sydney	30
Total	368 (15.3 days)

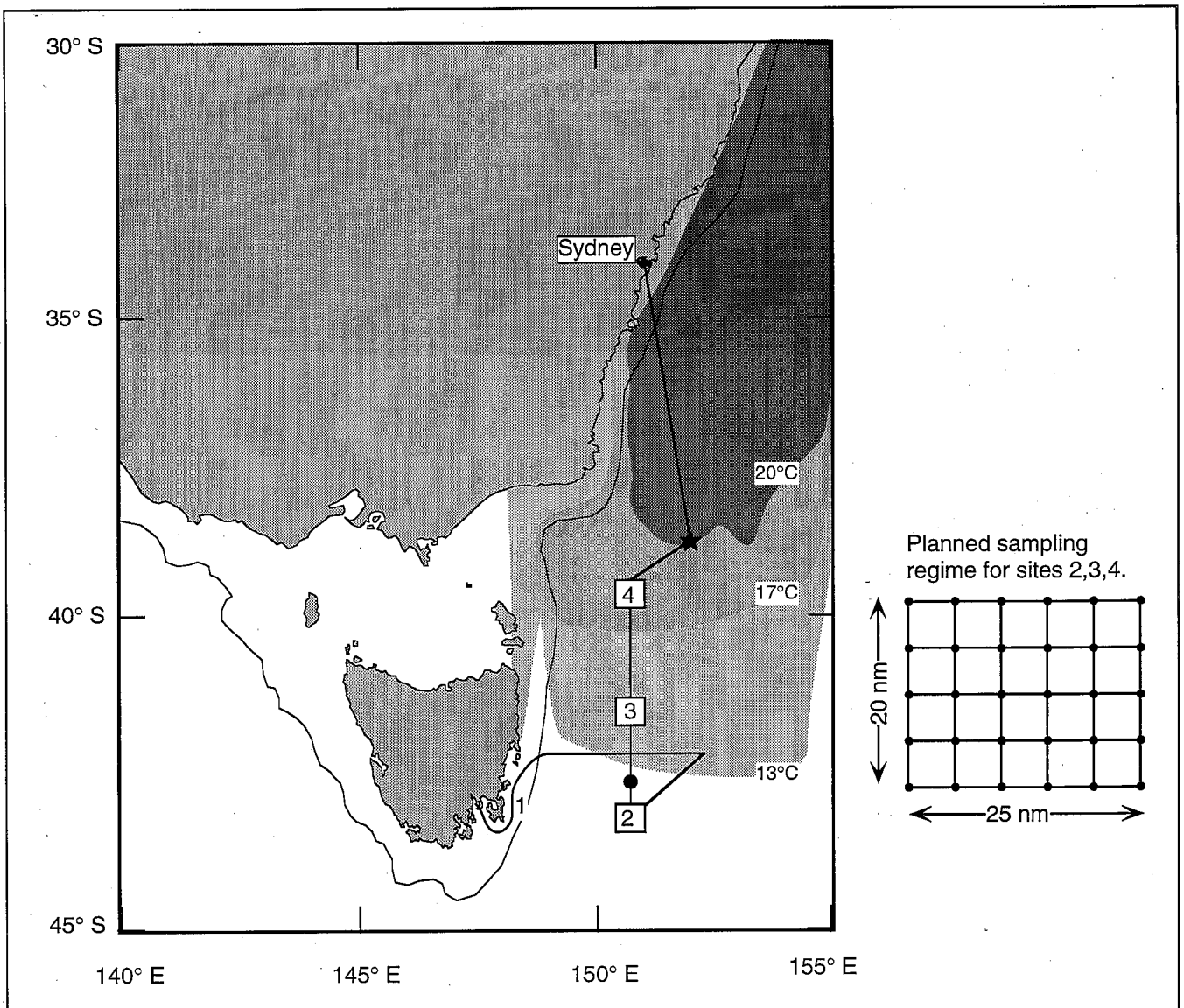


Figure 1. Planned Cruise Track for SS3/94. ★ Sampling alongside Australian long-line vessels. ● MIDOC sampling.