CSIRO

DIVISION OF FISHERIES

CRUISE PLAN

SS1/93

TOWNSVILLE TO DARWIN

10 JANUARY – 12 FEBRUARY 1993

FRV

SOUTHERN SURVEYOR

CSIRO
AUSTRALIA

Itinerary

Leg 1

Depart Townsville: 1800 h Sunday, 10 January 1993
Arrive Weipa: 1900 h Tuesday, 19 January 1993

Leg 2

Depart Weipa: 1500 h Wednesday, 20 January 1993
Arrive Darwin: 0800 h Friday, 12 February 1993

Area of Operation

Leg 1

Far northern section of the Great Barrier Reef Marine Park Protection (Green) Zone (Figure 1)

Leg 2

Gulf of Carpentaria Zone of the Northern Fish Trawl Fishery (Figure 2)

Research Background

Leg 1

Leg 1 of the cruise will provide information on the fish, bird and benthic communities currently being investigated by the Effects of Fishing project funded by the Great Barrier Reef Marine Park Authority. The results of this summer cruise will allow a useful comparison with those of the autumn cruise of May–June 1992. However, only about a quarter of the autumn cruise stations will be made; this cruise is restricted to the vicinity of the commercial prawn grounds inside the Green Zone and north and south of the Green Zone. In addition, the Defence Science and Technology Organisation (DSTO) will be servicing current meters in Torres Strait four days before the steam for Weipa. This work is separate from CSIRO's; a separate cruise plan has been submitted by DSTO.

Leg 2

Leg 2 of the cruise has two goals. The first is to make a fish stock assessment, using a standard Frank and Bryce net with a 50 mm mesh. This will continue the work of two previous *Southern Surveyor* cruises, SS3/90 and SS5/91. The information, together with the results of similar work carried out by the Northern Territories Fisheries in the Arafura Sea, will be used by the Australian Fisheries Management Authority in assessing total allowable catches (TACs). This is the basis of personnel exchanges with Northern Territories Fisheries on these cruises.

The second goal is to compare the semi-demersal "environmentally friendly" (Julie Ann) fish trawl net with an Engels high-rise net, the normal demersal net. Because the "environmentally friendly" net disturbs the bottom structure less, its use is now mandatory in the Gulf of Carpentaria Zone of the Northern Fish Trawl Fishery. The towing geometry of this net can be changed so it fishes at different heights from the bottom; comparisons will be made for this variable.

Cruise Objectives

Leg 1

1 To determine the species composition and abundance of the fish community between latitudes 11° and 12° S, using a Frank and Bryce demersal fish trawl.

2 To investigate the fish habitat by characterising the benthic flora and fauna at each site, using a 3 m Church dredge.

3 To record the bottom structure visually with a video camera mounted on a sled and deployed simultaneously with the Church dredge.

4 To measure the salinity, temperature and turbidity at the surface and bottom.

5 To collect seabird data from islands in the fish trawling area.

Leg 2

1 To determine the abundance of commercial species of lutjanids and lethrinids in the Gulf of Carpentaria.

2 To trawl areas with bottom structure at random, using both the demersal Engels high-rise net and the "environmentally friendly" net.

3 To document the benthic community at these comparison trawl sites in order to compare the effect of each net on the bottom structure.

4 To document the bottom structure visually with video cameras towed simultaneously with the Church dredge.

5 To collect samples of *Lutjanus malabaricus* and *L. sebae* for population genetics studies.

6 To collect specimens for the I. S. R. Munro Fish Collection in Hobart.

7 To collect cephalopods from the Great Barrier Reef and the Gulf of Carpentaria (Museum of Victoria and Queensland Department of Primary Industry Fisheries)

Cruise Plan

Leg 1

This part of the cruise is designed to make a seasonal comparison of the fish and benthic communities of the inner Green Zone of the far northern section of the Great Barrier Reef (Figure 1). The information will help in the overall study of the Effects of Fishing in the Green Zone.

The 22 stations, which are randomly chosen from a one-nautical-mile-square grid matrix. are the same as those used on the first Effects of Fishing cruise in May 1992 on the FV *Clipper Bird.* All stations will be sampled twice: once in the daytime and once at night, with daytime having priority. (All trawls in May 1992 were daytime only.) The stations will be in 10–50 m depths, with the following operations at each:

30-minute Frank and Bryce fish trawl
15-minute Church dredge for benthos
Hydrology samples (Niskin bottle/submersible data logger)
Video taping of bottom (to be analysed later in Cleveland)

The fish will be identified, counted and weighed. The length frequencies of the commercial species will be recorded. Benthos from the dredge will be sorted into broad categories, counted and weighed; subsamples will be taken to Cleveland for complete identification.

A dinghy or inflatable will be deployed over three days (daytime only, weather permitting) to collect seabird data from up to four island sites: Magra Island, Wallace Island, Halfway Island and Cairnscross Islets (in order of priority) (Figure 1) .

Leg 2

This leg of the cruise has two components:

A Fish Biomass Estimates:

Frank and Bryce fish trawls (30 minutes) of previously sampled stations to obtain comparable estimates of the biomass of commercial species of lethrinids and lutjanids in the fishing zone of the Gulf of Carpentaria. This study, which involves trawling only, should take 3-4 days.

B Comparison of "Environmentally Friendly" Net:

The effects of the "environmentally friendly" trawl net and the Engels high-rise net on the structure of the bottom (degree of perturbation and retention) will be compared, as will their efficiency at catching fish (both species and numbers will be recorded). Some "setting up" time with the Julie Anne net is likely, but 14–16 days of comparative trawls in the western Torres Straits (Figure 2) are planned. This area has

been chosen because previous cruises, especially SS5/91, reported an abundance of lethrinids and areas of bottom with benthos such as sponges and seagrass.

Stations will be chosen at random from 100 grids of 2 x 2 nautical miles. Each trawl site will be sampled with both the Engels high-rise and the Julie Anne nets.

Part of the "setting up" time will be spent calibrating the "environmentally friendly" net geometry to fish in two ways:

(i) as close to the bottom as possible and

(ii) half a metre (or more) off the bottom.

This will allow a comparison of the net (i) when it is conceivably fishing optimally with regard to commercial fish and (ii) when it is fishing optimally with regard to minimising its impact on bottom structure.

The Australian Maritime College is participating in this cruise principally to work on this project. The college assisted in preparing the net for deployment before the cruise.

Video images of the bottom will be obtained on all these stations if visibility is not too poor. All operations will follow those of Leg 1.

Personnel

Leg 1

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

J. Salini (Cruise Leader)	D. Milton
C. Liron	T. Wassenberg
G. Yearsley	D. Ramm (NT Fisheries)
M. White (QDPI)	L. McDonald
J. Boyle (DSTO)	M. Savage (DSTO)

Leg 2

J. Salini (Cruise Leader)	T. Wassenberg
D. Brewer	P. McKenna (NT Fisheries)
N. Elliot	P. Grewe
G. Yearlsey	C. Souris
(not decided)	S. Eayrs (Australian Maritime College)
J. Cordell	C. Lu (Museum of Victoria)

Contacts

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P. C. Young
Chief, CSIRO Division of Fisheries **Date: 23 December 1992**

Distribution

Normal distribution
Cruise participants

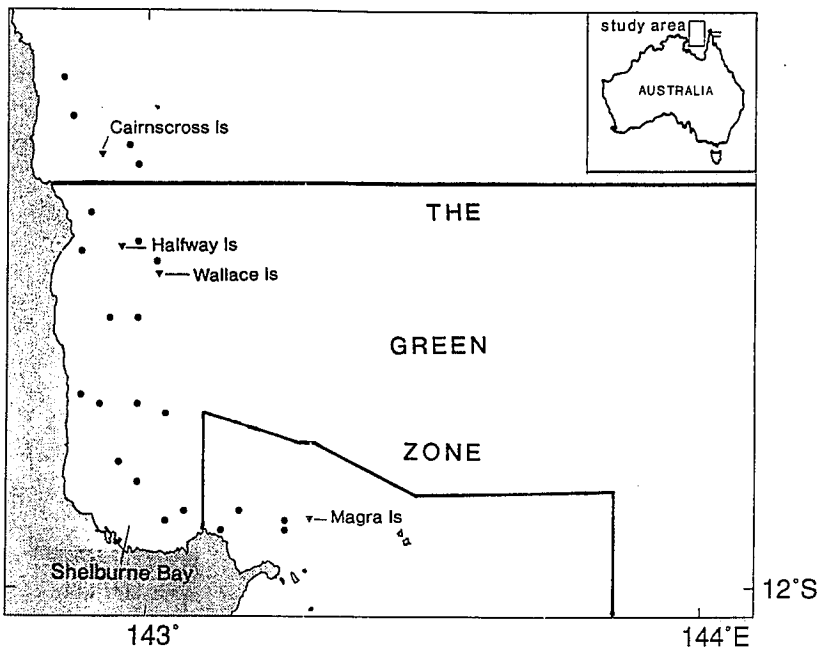

Figure 1. Cruise track for Leg 1 on the Great Barrier Reef (east coast study area).
Circles = station sites; triangles = islands to be visited for the seabird component of the study

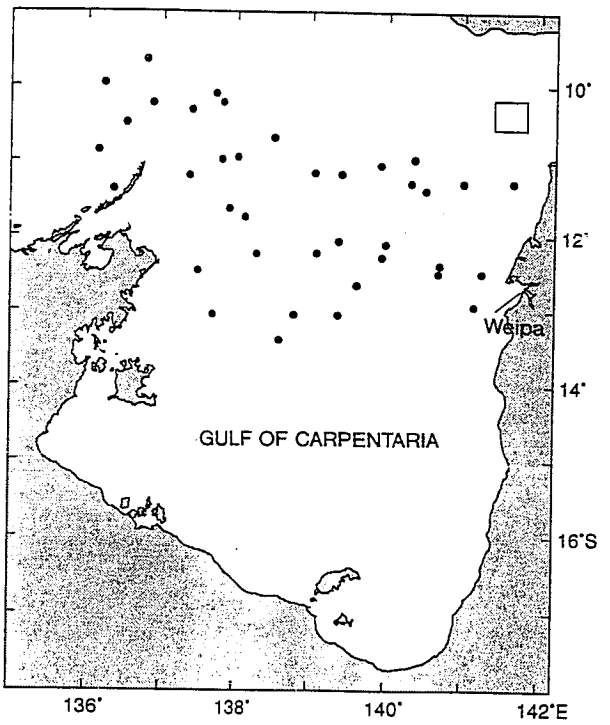

Figure 2. Gulf of Carpentaria (Leg 2) stations to be trawled for fish biomass estimates (circles) and area in the western Torres Straits to be used in the comparison of the "environmentally friendly" net and the Engels high-rise demersal net (open square).