

FRANKLIN

National Facility
Oceanographic Research Vessel

RESEARCH PLAN

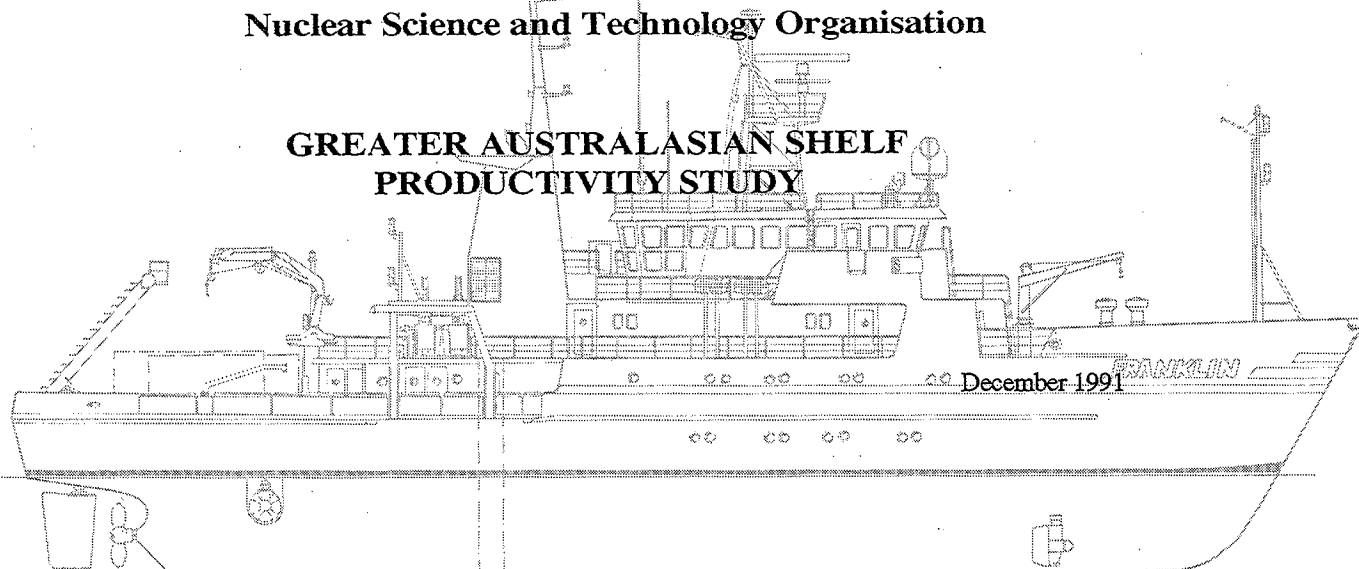
FR 3/92

Depart:	Townsville:	0600 hrs	Wed	1 April, 1992
Arrive:	Gove:	0600 hrs	Wed	15 April, 1992
Depart:	Gove:	0600 hrs	Thu	16 April, 1992
Arrive:	Townsville:	2000 hrs	Tue	28 April, 1992

Drs Miles Furnas & Daniel Alongi
Australian Institute of Marine Science

Dr Davis Waite
Nuclear Science and Technology Organisation

GREATER AUSTRALASIAN SHELF PRODUCTIVITY STUDY



For further information contact:

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RESEARCH PLAN

Franklin - FR 03/92

Itinerary:

Depart: Townsville:	0600 hrs	Wed	1 April, 1992
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The above calculation assumes a steaming speed of 11.5 kts throughout and a 30 hour turnaround in Gove (arrive off Gove at ca. 0100 and depart at 0600 the following morning). No contingency steaming time is explicitly included. The schedule includes experimental studies will be carried out at:

Timor Sea	11°50'S: 127°45'E	96 hrs
Arafura Sea	9°30'S: 134°10'E	72 hrs
Gulf of Carpentaria	12°20'S: 139°15'E	72 hrs
Gulf of Papua	9°00'S: 144°00'E	72 hrs

Scientific Program

- 1 Make daily measurements of water column plankton biomass and primary production while on experimental stations and in transit. Do hydrography and nutrient measurements in support of above.
- 2 While on scientific stations, make measurements of carbon/nitrogen/phosphorus deposition rates with floating and moored sediment traps.
- 3 Carry out experiments to measure particle turnover times in water column using sediment traps and natural radioisotopes.
- 4 Conduct experiments to determine concentrations of trace metals (Fe, Mn, Cu[?]) in the water column and dynamics in relation to biological activity.
- 5 Collect sediment cores to measure benthic metabolism, nutrient excretion, porewater gradients and ²¹⁰Pb gradients in sediments.

- 6 Collect sediment samples to measure soft bottom community structure and biomass on northern Australian shelves.

Principal Investigators

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Dr. T. David Waite

Nuclear Science and Technology Organization
Locked Mail Bag, Menai, NSW

Cruise Objectives:

Experimental Stations:

1. Deploy and recover drifting and moored sediment traps to measure vertical fluxes of carbon, nitrogen, phosphorus and ^{234}Th in the water column in relation to system productivity, nutrient stock/sources and hydrographic features.
2. Make concurrent measurements of water column primary production to couple with production measurements.
3. Make concurrent measurements of benthic metabolism (C, N, P) to ascertain the fraction of deposited carbon returned to the water column by biological activity.
4. Make shallow cores of the benthos to ascertain the net burial rate of carbon, nitrogen, phosphorus and ^{210}Pb on the northern shelves of Australia.
5. Carry out experimental studies to elucidate factors controlling the concentration and speciation of bioactive trace metals in the water column in relation to biological and hydrographic features.

Transit Legs:

1. Make daily measurements of water column primary production and plankton biomass.
2. Carry out experimental studies to measure concentrations and speciation of bioactive trace metals.

Cruise Track:

After departing Townsville, *Franklin* will proceed to the experimental station in the Timor Sea by way of the Torres Strait. Experimental studies will be carried out over a four day period at that station. Thereafter, *Franklin* will proceed directly to the Arafura Sea experimental station for a further 72 hours of experimental work. After completing the Arafura Sea work, *Franklin* will sail to Gove for fuel and water. Departing Gove, a 72 hour experimental station will be occupied in the northern central Gulf of Carpentaria. A final 72 hr (96hr if time permits) experimental station will be occupied at a mid-shelf site in the western Gulf of Papua. Upon completion of that station, the cruise will be terminated in Townsville.

Time Budget(Days):

Steaming (Townsville-Timor Sea)	1480 nm	5.4
Timor Sea Experimental Station		4.0
Steaming	400 nm	1.4
Arafura Sea Experimental Station		3.0
Steaming	280 nm	1.0
Gove - refueling		1.2
Steaming	40 nm	0.5
Gulf of Carpentaria Experimental Station		3.0
Steaming	400 nm	1.4
Gulf of Papua Experimental Station		3.0
Steaming (Gulf of Papua - Townsville)	680 nm	2.5
Station time en route		1.0
Total		<u>27.4</u>

ORV Equipment:**Electronics**

Navigation (Satnav or GPS)
 CTD profiler and rosette sampler
 Scientific echo sounder
 Met station (including daily irradiance)
 Ships computer system and data logging system
 Graphics terminals and microcomputers (IBM and MacIntosh)
 Thermosalinograph
 XBT - T7

Chemistry and Laboratory

Clean freezer for storing nutrient samples
 Spectrophotometer

Scientific freezer for mud samples
Refrigerator for storage of microbial samples
Deionized/RO unit
Scintillation counter
Turner Designs Mod 10 Fluorometer (backup for AIMS unit)
Biology Trailer (for radioisotope work)
Trace Metal Clean van
Laminar Flow Hood in GP lab

Oceanographic Sampling Gear

10-litre Go-Flo bottles for rosette (or equivalent)
10-litre Niskin bottles for rosette (backup)
Reversing Thermometers for above
Inductive Salinometer
Deck Rack for 30-liter Niskin Bottles

Deck Machinery

Starboard A-frame and oceanographic winches
Stern A frame, trawling winch and gypsy heads (for box-coring and sediment trap deployment/recovery)
Running seawater aft for sediment washing and incubators

User Supplied Equipment:

Electronics

U/w light profiler
Loggers for U/w light profiler
Microcomputers for data acquisition and data processing
HPGL Plotter

Chemistry

Spectrofluorometer
Filter Fluorometer
AIMS Autoanalyser system
Inductive salinometer (backup to ORV unit)
Centrifuge
Labware for general use

Microscopy

Dissecting microscopes

Sampling and sample processing

Floating sediment traps (2)
Moored sediment traps (3)
30 Litre Niskin bottles
Secchi Disk
5-litre Go-Flo Bottles (8)

Zooplankton nets
Benthic grabs
Box corers
Sieves for processing benthic samples
Lab bench workstations for
radioisotope handling (^{14}C , ^3H)
Water sample size fractionation
Water sample filtration
trace metal processing
Vacuum pumps for isotope and particulate filtrations

Deck gear

Deck sieves for screening mud samples
Incubator baths

Personnel

Australian Institute of Marine Science

Miles Furnas - (Chief Scientist)

Alan Mitchell

John Wellington

Paul Christofferson

Irena Zagorskis

Otto Dalhaus

Australian Nuclear Science and Technology

Organization

T. David Waite

Ron Szymczak

Quentin Espey

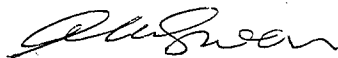
CSIRO ORV Core Staff

Dave Vaudrey - Cruise Manager/Computer Operator

Phil Adams

Gary Critchley

This cruise plan is in accordance with the directions of the National Facility Steering Committee for the oceanographic research vessel *Franklin*.



A D McEwan
CSIRO Division of Oceanography



G Paltridge
National Facility Steering
Committee

