CRUISE REPORT SS 5/95

16 June–23 June, 1995

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CSIRO
AUSTRALIA

DIVISION OF **FISHERIES**

ITINERARY

LEG 1

Departed Weipa:	1815 h Friday, 16 June 1995
Arrived Weipa:	1230 h Friday, 23 June 1995

AREA OF OPERATION

Return transect west of Weipa, across the Gulf of Carpentaria between 12°S - 13° 30'S, and 136° 50'E and 141° 35'E (see Fig. 1).

Research Background .

CRUISE OBJECTIVES

1. To monitor Penaeus semisulcatus prawn distribution and abundance across the Gulf of Carpentaria in a roughly east-west transect from Weipa to north of Groote Eylandt using 14 fathom Florida Flyer prawn nets.

2. To compare an AusTED codend and a standard diamond mesh codend for bycatch reduction.

3. To collect frozen P. semisulcatus for isotope and genetic analysis of population structure.

4. To collect sediment samples each dawn and dusk before completion and commencement of night time trawling.

5. To collect stratified water samples with the CTD each morning and analyse the samples for primary productivity.

6. To streamline the Oracle data entry from the fish laboratory and resolve other onboard computing problems as they arise.

RESULTS

1 The distribution of P. semisulcatus across the GOC was investigated during 39 paired Florida Flyer prawn trawls centred on 6 nm grids as in Fig. 1.

2 The AusTED bycatch reduction device and a standard codend were compared over 39 trawls across the GOC.

3 Representative samples of P. semisulcatus from each night's trawling were kept frozen for genetic and isotope analyses.

4 Sediment samples were collected on each day except the fifth day when the substrate was too soft to trigger the Smith-Mac grab.

5. The CTD was deployed twice each day and water samples collected from selected depths for analysis on board.

6. Data entry from the Fish Laboratory was streamlined and de-bugged during the cruise.

7. Leiognathids were systematically collected to complete sampling for a PhD study (Jonathan Staunton Smith).

CRUISE NARRATIVE

Southern Surveyor departed Weipa at 1815 h on 16 June 1995; this delay was due to the late delivery of the AusTED codends. At a cruise debriefing soon after departure, cruise objectives were explained, shifts allocated and first time participants informed of ship safety and day to day house-keeping procedures. The Master, Ian Taylor, advised of a Muster and Fire drill for all scientific crew to be held the next day at 1700 h; this drill was successfully completed. During the steam out to position 12° 45'S, 141° 33'E, both Florida Flyer prawn nets were fitted with standard mesh codends prior to calibrating the nets in order to obtain even catches on both side (nets) before starting the paired comparisons. Difficulties were encountered deploying the trawl nets but three trial shots were completed during the night with even catches of prawns and bycatch in both nets on the third trawl. This effectively removed the spare night available for trawling in a selected area of high *P. semisulcatus* abundance. Seas were moderate to rough for the first five days due to strong south to south easterly winds with surprisingly cold air temperatures.

NIGHT TIME SAMPLING

On the second night of the cruise, the AusTED codend replaced the standard codend on the starboard net for the first comparison trawl. The AusTED was changed from one side to the other between trawls according to a Latin Square design with each block consisting of the two possible combinations ie AusTED on starboard side followed by AusTED on the port side. There were only two block types possible, AusTED on port side first or AusTED on the starboard side first and each block was chosen at random. Planning was based on an expected eight trawls per night consisting of four blocks of two trawls each.

During the first night of comparisons, Saturday 17 July, four stations were completed. The first trawl station, cruise station 3, was repeated due to gear problems; this station was abandoned when the starboard (AusTED) codend parted from the net and required about 1.5 hours to repair. The port trawl board on station 5 was retrieved in a "flipped" state and obviously did not ride on the bottom correctly as the catch from that net (port side) consisted almost entirely of rubble. There was no time for repeating the trawl and the next station, 6, was successfully completed before sunrise.

Problems deploying the trawl gear persisted throughout the cruise although all eight stations were trawled on three nights, Sunday 18 July, Monday 19 July and Wednesday 21 July. Despite trawling with the observed currents across the GOC ie in a north-westerly direction, there was a consistently higher catch in the starboard net than in the port net. The statistical design of the codend switching should allow this effect to be isolated and the true comparison of the treatment codend (the AusTED) and the control condend (standard diamond mesh). Of the 48 planned comparison trawls, 39 were completed. Whole Penaeus semisulcatus were kept each night for genetic and isotope analysis after the cruise. When trawl catches could not be sorted and recorded quickly enough, the species composition sub-sample was frozen for processing in Cleveland.

The direct data entry from the terminal in the fish laboratory work very well, especially with Miroslaw available to rectify any software problems. The extra terminal installed by Matt in the fish laboratory proved to be of great value for instantaneous readings of ships position.

DAYTIME SAMPLING

Sediment samples were taken at the start and end of each evening except on three occasions when the sediment was too soft to trigger the Smith-MacIntyre grab (stations 34, 41 and 53). These samples were frozen for particle size analysis at the Cleveland laboratory..

CTD profiling to determine salinity, temperature, light, fluorescence through the water column was done once a day (0900h) for 6 days. The transect across the Gulf and back made it possible to collect information on one shallow (off Duyfken Point) and five deep water (40 m +) stations. Water samples were also collected from 5 depths at these sites for experimental work. The Gulf appeared to be well mixed as indicated by the lack of thermolines, haloclines or fluorescence maxima, with the exception of one station, station 8,9 where there was a distinct increase in fluorescence at 46-48m.

Primary productivity incubations were done on water samples from each sampling station using the PI light box in the Productivity lab. Water samples from five depths were incubated under 7 different light regimes to determine the effect of light on productivity. In addition on–deck incubations using water from a shallow and a deep water station were done on two days following the same technique as that used on the Franklin cruise in 1988. This will allow a direct comparison of results. On Day 5 water samples were taken using both black and white silicone rubber bands and o-rings in the Niskin bottles. This was done to determine if there is a growth suppression of phytoplankton sampled in Niskin bottles with black rubber o-rings, as suggested by Brian Griffith. Initial results suggest that there is indeed a suppression, however it is not yet known if this is statistically significant.

Water samples were also spiked with nutrients (nitrate, phosphate and silicate) and incubated on deck for 20 hours. Samples were then incubated for primary productivity measurements. In addition samples were spiked with ^{15}N-nitrate and ammonium to determine the uptake rates of nitrogen by phytoplankton.

Samples were also taken daily for pigment analysis and flow cytometry analysis. On Day 5 significant amounts of 'marine snow' were observed in the water collected in the Niskin bottles. Microscopic observations showed that this was predominantly the diatom *Thalassiosira* with a mucous binding the cells together. Other diatom species , *Nitzschia, Navicula* and *Pleurosigma* were also present.

ELECTRONICS AND COMPUTING

BRISBANE TO WEIPA

Electronics Personnel -Matt Sherlock
Computing Personnel - Miroslaw Ryba

The steaming leg from Brisbane to Weipa prior to commencement of trawling operations for SS595 provided an excellent opportunity for electronics (Matt Sherlock) and computing personnel (Miroslaw Ryba) to prepare and upgrade shipboards systems. The following is a summary of achievements:

SUN WORKSTATION PRINTER

The existing dot matrix printer connected to the SUN computer used for SSDLS data logging and Oracle was replaced with a new laser printer. Drivers for this printer were loaded onto both the SUN and other Windows based P.C.'s. for later use over the network.

SEABIRD THERMOSALINOGRAPH

The original underway thermosalinograph (SDL based) in the chemistry laboratory was replaced on the preceding cruise with a new, more stable and accurate Seabird thermosalinograph. The software module which allows the SSDLS system to communicate with the thermosalinograph was modified and tested during the transit leg to allow the system to be fully operational during the cruise.

LIGHT MEASUREMENT SYSTEMS

Both the masthead ambient light sensor and CTD light sensor were calibrated against a reference sensor. In addition the interface electronics for both light systems were completely checked and results used to generate new calibration coefficients for the two systems. These sensors were used extensively during the cruise for targetting water samples for biological productivity work.

Other tasks undertaken included testing of a new Ethernet repeater unit for the shipboard network, attempted servicing of the underway fluorometer, testing of a spare G.P.S. antenna, investigation of radar problems in the wheelhouse and discussion of options for future expansion of computing facilities in the fish lab.

WEIPA TO WEIPA

During the cruise, electronics support was provided in running the CTD system, operation and data backup for the vessel logging system and repairs and maintenance of various shipboard systems.

CTD SYSTEM

The CTD system was used for collection of water samples and characterisation of the water mass in depths to 62 metres. Two casts were carried out each day in quick succession using either the fluorometer or light sensor to determine position in the water column for samples. The altimeter was used to allow the CTD to be positioned within 2 -3 metres of the bottom. On

one occasion the CTD rosette touched bottom due to excessive rolling of the vessel. The bottom consisted of soft mud which caused no damage to the unit.

During the cruise temperature and salinity measurements from Niskin bottles were compared with the CTD and found to be in agreement within the limits of measurements. Hence the CTD calibration is very accurate at present.

Capturing bottle samples at different percentages of surface light proved difficult due to roll of the vessel and high turbidity of the water. This turbidity resulted in the attenuation of surface light to less than twenty percent in the first 5 meters making accurate collection of water difficult.

Lower light levels of 5%, 10% etc were somewhat easier to achieve as it was possible to take the CTD deep to obtain an accurate dark level reading and then come up slowly to the desired point.

DATA LOGGING SYSTEM

The data logging system performed well with no hangups, a credit to the efforts made on the previous cruise to resolve problems with the Oracle data base and networking. A batch file called FIXCRU still needs to be run before each cruise to globally update the cruise number. The forms really need to be changed to allow the cruise number to be picked up from an easily modified source file as FIXCRU does a recompilation of all forms which is potentially risky.

All the biological data were copied to a cassette tape for down loading to the Cleveland SUN Sparc station

SUMMARY

The distribution of *Penaeus semisulcatus* was monitored across the GOC with an observed decline in abundance in the central Gulf. The AusTED bycatch reduction device was compared to a standard codend at all trawl stations. A noticeable reduction in bycatch was observed although a bias towards higher catches on the starboard side regardless of codend type, compounded the AusTED's effect. Most sediments samples were successfully obtained except at three stations where the sediment was too soft to trigger the grab.

All the primary productivity work planned for cruise SS595 was successfully completed and analysis of the samples and data is continuing.

REPORTING OF RESULTS

The results will be analysed and reported in the scientific literature where appropriate. All the collected data resides on the Oracle database at the CSIRO Marine Laboratories in Cleveland.

PERSONNEL

(Note: unless otherwise stated, all personnel are staff of the CSIRO Division of Fisheries or students based at CSIRO Cleveland.)

SCIENTIFIC CREW

John Salini	Cruise Leader/Fish/Prawns/Data
Jonathan Staunton Smith	Fish
Mick Haywood	Prawns
Don Heales	Prawns
Peter Rothlisberg	Primary Productivity
Michele Burford	Primary Productivity
Ron Plaschke (OMS Hbt) CTD	Primary Productivity
Matt Sherlock	Electronics
John Wallace (Hbt OIC)	Fish
John McCartie (NTDPIE)	Gear
Jason McGilvray (QDPI)	Gear
Miroslaw Ryba	Computing

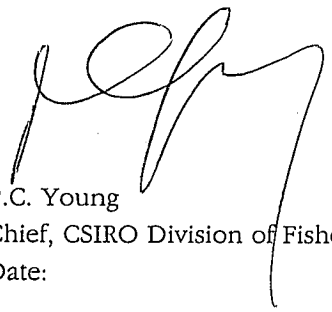
SHIP'S CREW

Ian Taylor	Master
Roger Pepper	First Mate/Fishing Master
John Boyes	Second Mate/Fishing Master
Ian McAllister	Chief Engineer
Rick Miller	First Engineer
John Hinchliffe	Electrical Engineer
Noel Anderson	Chief Steward
Alan Smith	Chief Cook
Don Collins	Second Cook
Malcolm McDougall	Bosun
Len Darling	A. B. 1
Tony Hearne	A. B. 2
Lou Jacomos	A. B. 3
Drew Meincke	A. B. 4
Graham McDougall	A. B. 5
Tom Stephen	A. B. 6
Chris Williams	A. B. 7

ACKNOWLEDGEMENTS

We thank the Master, Ian Taylor; the Fishing Masters, Roger Pepper and John Boyes and the crew of *Southern Surveyor* for their skills during the cruise. John MacCartie (NT Fisheries) and Jason McGilvray (QDPI) contributed many extra hours of duty setting-up the standard nets on the first night and the AusTED during the next day (when they should have been off shift).

John Salini
Cruise Leader



P.C. Young
Chief, CSIRO Division of Fisheries
Date:

CONTACTS

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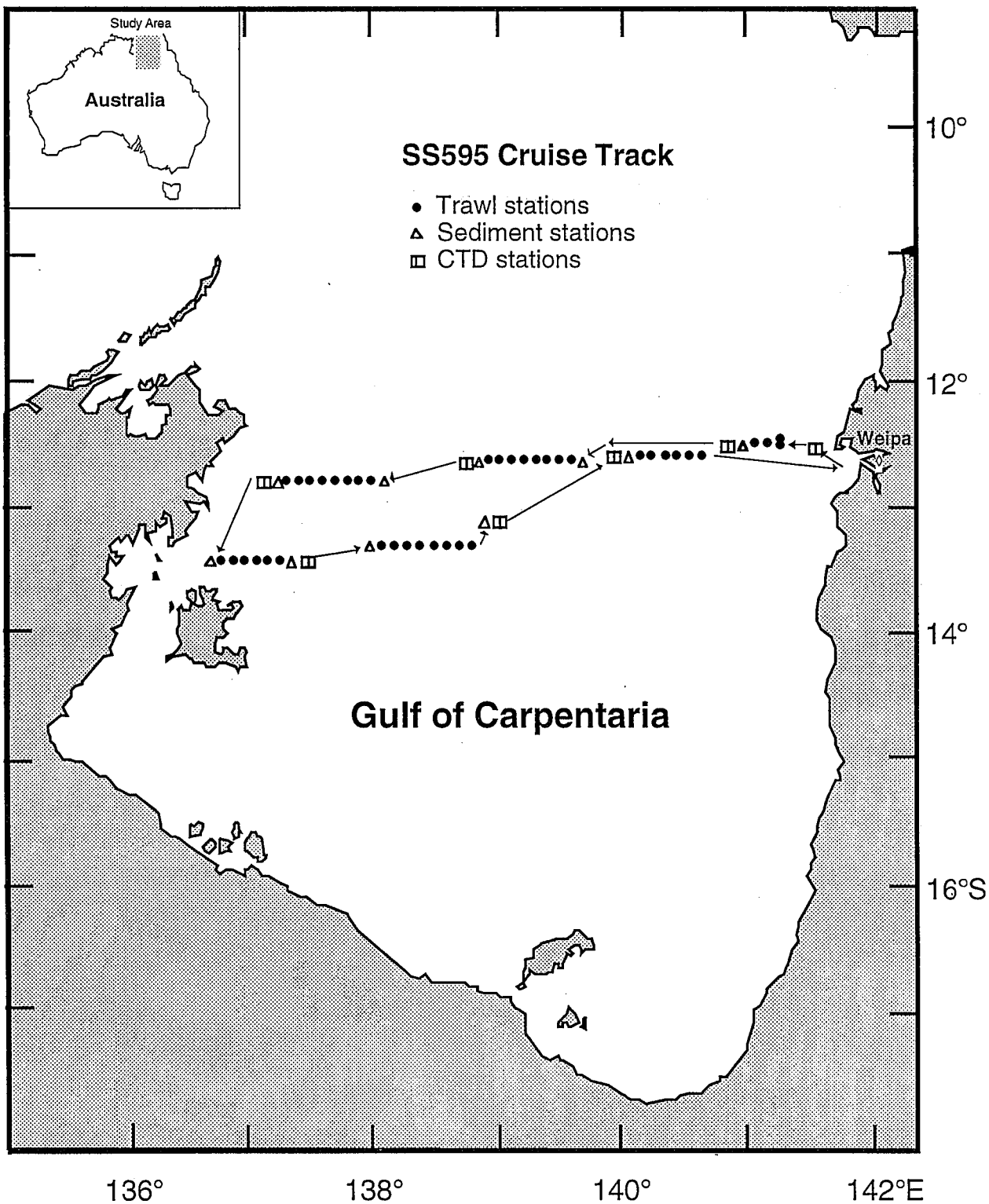
Distribution:
Normal circulation
Cruise participants

FIGURE 1

The cruise track showing prawn trawl stations (•), Grab stations (◫) and CTD stations (Δ).



APPENDIX 1

Stations occupied by *Southern Surveyor* during Cruise SS595.

Time:	start time
Grabs:	Smith-MacIntyre sediment grab
F-Flyers:	Florida Flyer prawn trawl
StartLat:	start latitude
StartLong:	start longitude
EndLat:	end latitutde
EndLong:	end longitude
Depth:	depth in metres
*	grab failed to trigger due to soft sediment.

Station	Time	Date	Gear	Depth	StartLat	StartLong	EndLat	EndLong
1	0900	17-Jun-95	CTD	11	12°37.3'	141°32.7'		
2	0955	17-Jun-95	CTD	11	12°35.1'	141°28.5'		
3	1930	17-Jun-95	F-Flyers	47	12°38.6'	141°02.2'	12°52.4'	140°56.5'
3a	2054	17-Jun-95	F-Flyers	46	12°38.3'	141°03.1'	12°39.3'	141°02.4'
4	0125	18-Jun-95	F-Flyers	49	12°38.7'	140°57.7'	12°37.3'	140°57.0'
5	0255	18-Jun-95	F-Flyers	55	12°39.0'	140°52.0'	12°38.1'	140°51.3'
6	0605	18-Jun-95	F-Flyers	60	12°39.0'	140°43.0'	12°27.6'	140°42.4'
7	0830	18-Jun-95	Grabs	60	12°40.9'	140°42.5'		
8	0915	18-Jun-95	CTD	60	12°41.8'	140°38.0'		
9	1000	18-Jun-95	CTD	61	12°41.8'	140°38.0'		
10	1800	18-Jun-95	Grabs	57	12°47.1'	139°33.4'		
11	1840	18-Jun-95	F-Flyers	57	12°44.5'	139°32.5'	12°43.1'	139°32.1'
12	2010	18-Jun-95	F-Flyers	58	12°44.6'	139°27.3'	12°43.3'	139°26.3'
13	2155	18-Jun-95	F-Flyers	56	12°43.8'	139°19.9'	12°42.9'	139°18.7'
14	2330	18-Jun-95	F-Flyers	57	12°44.8'	139°15.0'	12°44.0'	139°13.8'
15	0100	19-Jun-95	F-Flyers	55	12°45.6'	139°08.9'	12°44.3'	139°08.4'
16	0250	19-Jun-95	F-Flyers	56	12°45.6'	139°03.0'	12°44.4'	139°02.8'
17	0430	19-Jun-95	F-Flyers	54	12°45.3'	138°57.0'	12°43.8'	138°56.0'
18	0612	19-Jun-95	F-Flyers	54	12°45.5'	138°51.0'	12°43.9'	139°50.7'
19	0810	19-Jun-95	Grabs	53	12°44.3'	138°50.6'		
20	0900	19-Jun-95	CTD	53	12°43.7'	138°50.2'		
21	0950	19-Jun-95	CTD	53	12°43.0'	138°49.5'		
22	1810	19-Jun-95	Grabs	49	12°53.8'	138°43.1'		
23	1830	19-Jun-95	F-Flyers	49	12°53.3'	138°04.2'	12°51.8'	138°03.7'
24	2015	19-Jun-95	F-Flyers	49	12°52.5'	137°57.2'	12°50.0'	137°56.9'
25	2230	19-Jun-95	F-Flyers	48	12°51.6'	137°51.0'	12°49.9'	137°50.7'
26	0055	20-Jun-95	F-Flyers	48	12°52.8'	137°44.9'	12°1.3'	137°44.0'
27	0215	20-Jun-95	F-Flyers	48	12°51.1'	137°39.1'	12°50.3'	137°37.8'
28	0330	20-Jun-95	F-Flyers	48	12°50.6'	137°33.5'	12°49.8'	137°32.3'

Station	Time	Date	Gear	Depth	StartLat	StartLong	EndLat	EndLong
29	0445	20-Jun-95	F-Flyers	46	12°50.8'	137°27.7'	12°50.3'	137°26.4'
30	0610	20-Jun-95	F-Flyers	46	12°51.0'	137°21.0'	12°50.3'	137°19.8'
31	0810	20-Jun-95	Grabs	44	12°52.9'	137°21.6'		
32	0910	20-Jun-95	CTD	45	12°52.9'	137°21.6'		
33	0945	20-Jun-95	CTD	45	12°52.9'	137°21.6'		
34*	1800	20-Jun-95	Grabs	31	13°22.5'	136°50.7'		
35	2110	20-Jun-95	F-Flyers	31	13°20.4'	136°50.2'	13°21.6'	136°49.7'
36	2245	20-Jun-95	F-Flyers	38	13°20.7'	136°56.3'	13°19.7'	136°57.4'
37	0045	21-Jun-95	F-Flyers	43	13°21.2'	137°03.4'	13°19.5'	137°02.9'
38	0300	21-Jun-95	F-Flyers	45	13°21.4'	137°09.6'	13°19.8'	137°09.1'
39	0500	21-Jun-95	F-Flyers	46	13°21.8'	137°15.8'	13°20.5'	137°15.0'
40	0620	21-Jun-95	F-Flyers	45	13°20.7'	137°17.9'	13°19.6'	137°17.5'
41*	0805	21-Jun-95	Grabs	46	13°20.8'	137°20.8'		
42	0900	21-Jun-95	CTD	46	13°20.1'	137°20.0'		
43	0945	21-Jun-95	CTD	46	13°20.1'	137°20.0'		
44	1800	21-Jun-95	Grabs	51	13°14.9'	138°08.5'		
45	1845	21-Jun-95	F-Flyers	51	13°14.9'	138°08.5'	13°14.9'	138°10.0'
46	2025	21-Jun-95	F-Flyers	52	13°15.1'	138°15.1'	13°13.5'	138°15.3'
47	2210	21-Jun-95	F-Flyers	52	13°15.2'	138°21.2'	13°13.5'	138°21.1'
48	2250	21-Jun-95	F-Flyers	52	13°14.8'	138°26.9'	13°13.2'	138°26.9'
49	0125	22-Jun-95	F-Flyers	54	13°15.0'	138°32.6'	13°13.4'	138°32.9'
50	0305	22-Jun-95	F-Flyers	53	13°15.3'	138°38.8'	13°14.0'	138°39.4'
51	0430	22-Jun-95	F-Flyers	54	13°15.2'	138°44.6'	13°14.0'	138°45.3'
52	0600	22-Jun-95	F-Flyers	55	13°15.3'	138°50.6'	13°13.8'	138°51.2'
53*	0800	22-Jun-95	Grabs	57	13°04.3'	139°11.5'		
54	0900	22-Jun-95	CTD	57	13°04.3'	139°11.5'		
55	0945	22-Jun-95	CTD	57	13°04.3'	139°11.5'		
56	1700	22-Jun-95	Grabs	56	12°40.2'	139°55.3'		
57	2015	22-Jun-95	F-Flyers	60	12°37.5'	139°56.4'	12°36.1'	139°57.2'
58	2145	22-Jun-95	F-Flyers	59	12°38.6'	140°00.0'	12°37.3'	140°010'
59	2305	22-Jun-95	F-Flyers	60	12°38.8'	140°05.0'	12°37.5'	140°05.9'
60	0030	23-Jun-95	F-Flyers	60	12°39.1'	140°09.9'	12°37.8'	140°10.5'
61	0210	23-Jun-95	F-Flyers	61	12°39.9'	140°16.5'	12°38.3'	140°17.4'
62	0355	23-Jun-95	F-Flyers	61	12°39.3'	140°22.1'	12°39.6'	140°20.4'