

CRUISE REPORT SS 07/97

August 7 – September 1, 1997

CSIRO Marine Research

Marine Laboratories

Headquarters

Telephone (03) 6232 5222

Facsimile (03) 6232 5000

E-mail: pirrone@ml.csiro.au

Telex AA 57-812

GPO Box 1538

Hobart Tasmania 7001, Australia

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MARINE RESEARCH

ITINERARY

Leg 1

Departure: Dampier 12:00 (WST) Thursday, 7 August 1997
Arrival: Dampier 19:00 (WST) Tuesday, 19 August 1997; refuel and changeover some scientific personnel

Leg 2

Departure: Dampier 17:00 (WST) Wednesday, 20 August 1997
Arrival: Broome 10:30 (WST) Monday, 1 September 1997

PRELIMINARY

The CSIRO Division of Marine Research (formerly Division of Fisheries) began studying the fisheries of the North West Shelf (NWS) in 1978, one year before the 200 nautical mile Australian fishing zone was declared. Subsequently, during 1982/83, an intensive research program was undertaken. An actively adaptive or experimental management program followed, and has been ongoing since 1986. This cruise is the eighth in the series. The main objective was to measure changes in abundance of benthos and fish species in the intervening years.

The program was designed to:

- provide data on the changing structure of the NWS fish and epibenthic community
- improve the estimates of parameters required by existing methods of fisheries analysis
- provide the ecological background for development of new concepts in tropical multi-species management.

AREA OF OPERATIONS

The North West Shelf, extending from Barrow Island in the west to Port Hedland in the east. The study area comprises three experimental management zones (see attached map).

CRUISE OBJECTIVES

1. Determine the composition of the demersal fish community and the distribution and abundance of demersal habitats (based on epibenthic fauna) in each of the three experimental management zones.
2. Collect data and samples from which the basic fish population parameters (recruitment, growth and mortality) can be measured.
3. Conduct submersible data logger (SDL) transects (see attached chart).
4. Obtain taxonomic specimens and photographs of fish and invertebrate species.
5. Conduct trawls in deeper water (300 – 800m) in an attempt to collect species of importance to the Fish Taxonomy Section's research. These night-time trawls to be conducted only if time permits.

COMPLEMENTARY OBJECTIVES

Facilitate whale-spotting for Environment Australia.

Facilitate the collection of biological samples for W.A. Fisheries.

Enable the biodiversity group of Environment Australia to gain a direct knowledge of areas under their jurisdiction.

Collect acoustic data for a fish recognition project.

RESULTS

Aim 1

All random trawl stations were successful (Appendix 1).

Catches were identified and weighed by species. Up to 90 species were caught in a half hour trawl, with greatest diversity at the shallower stations. All sponge was weighed.

The 35 mm camera, which was mounted on the headline, was successfully deployed on 59 of the 105 random stations. This was a marked improvement on the 1995 survey. Equipment failures and turbid water were responsible for the unsuccessful shots.

All catch-composition data were entered onto the ORACLE data base during the cruise. After initial 'teething problems' this was successful, though a bit slow.

Aim 2

Length-frequency data were successfully collected for 14 species of fish (*Saurida undosquamis*, *Saurida* sp. 2, *Epinephelus areolatus*, *E. multinotatus*, *Lutjanus vittus*, *L. sebae*, *L. malabaricus*, *Nemipterus furcosus*, *N. celebicus*, *Diagramma labiosum*, *Lethrinus* sp., *L. nebulosus*, *L. genivittatus* and *Parupeneus heptacanthus*). All length-frequency data were entered by the electronic measuring boards (developed by the electronics section). This proved extremely successful. All data were dumped directly onto PCs and then downloaded onto the central computer each evening.

Otoliths were collected for four of the major species (*L. sebae*, *L. sp.*, *S. undosquamis* and *N. furcosus*. Table 1).

Table 1. Number of fish sampled for otoliths by species and management zone

Zone	<i>L. sp.</i>	<i>S. undosquamis</i>	<i>N. furcosus</i>	<i>L. sebae</i>
Barrow	124	90	201	38
Legendre	200	200	200	49
Port Hedland	195	200	201	82

Aim 3

All three hydrographic transects were successfully completed (see chart), with SDL profiles carried out between 50 and 250 m.

Aim 4

A number of voucher specimens were photographed and retained for the *Handbook of Australian Seafood*. A number of unidentified taxonomic specimens were also retained; most were deepwater species and the ubiquitous small form of the lizard fish.

AIM 5

A trawl to 800 m was attempted to the west of Barrow Island; unfortunately, due to a fine mud bottom, the head line buried itself and the net was fatally damaged. A number of specimens were nevertheless recovered. This trawl was not repeated. Two other trawls, at 310 and 105 m, were carried out to the east of Rowley Shoals. Representative samples of fish, crustacea and echinoderms were retained.

FURTHER ACCOMPLISHMENTS AND OBSERVATIONS

The SCANMAR equipment was operational for most of the trawls. These data were recorded on the ship's logging system.

Two whale-watchers (one on each leg) from Environment Australia observed whales during the cruise. This was very successful: 184 humpback whales, 24 unidentified cetaceans and about 175 dolphins (*Tursiops* and *Delphinus*) were sighted. Twenty-one humpback whales were observed while the *Southern Surveyor* was anchored alongside Trimouille Island (northern-most island of the Monte Bello group). The whales appeared to be travelling a 'path' between the vessel and the island that ensured that they passed quite close.

The cruise was also successful in exhibiting the Division's capabilities to a representative from Environment Australia who was on-board to gain a direct knowledge of areas under their jurisdiction. Half days were spent looking at the Monte Bello and Rowley Shoal inshore ecosystems.

VESSEL AND GEAR OPERATIONS

The vessel worked well for the duration of the cruise. Running repairs were required for the cameras and electronic flashes during the cruise, while most other electronic equipment worked well. There were occasional problems with the top of the net ripping due to the strain of having the camera and frame attached. These were repaired.

CRUISE NARRATIVE

We left Dampier on time at 12:00 on 7 August and steamed north-east to the study area. Onboard we had eight CSIRO personnel, two from Environment Australia and one from the University of W.A.

We decided to carry out a 'shakedown' trawl. This was successful and so was counted as the first random trawl of the cruise.

Our plan was to steam at night to the westernmost stations so that we could slowly work our way back to Dampier for refuelling and to change over some of the scientific crew.

Random trawls, carried out during daylight hours, continued for the next eight days, averaging 5-6 trawls per day. This involved some fairly 'hard' days of weighing, measuring and cutting up fish and sponge. The main 'shot' of interest was where we caught about 50 kg of 'bonefish' (*Albula neoguinaica*), which normally occur in estuaries and mud-flats. The Legendre SDL transect was carried out on the night of 10 August. The next day was a late start because a life-buoy was spotted in the water. After retrieving the buoy we contacted the Australian Marine Safety Authority and were told that it had recently (July) fallen off a Hong Kong registered vessel close to where we found it. Even within this time it still exhibited a fair amount of fouling, with barnacles in abundance.

The Barrow Zone hydro transect was successfully carried out on the night of 14 August.

Trawling continued until 16 August, when we spent half a day investigating the inshore fauna and flora of Trimouille Island (part of the Monte Bello group of islands). This excursion gave the personnel from Environment Australia an opportunity to scrutinise, at first hand, some of the area under their jurisdiction. Twenty-one whales were observed travelling between the vessel and the island. This provided an excellent opportunity for the whale watcher to record cetacean movements and habits in this area.

Trawling continued for the next few days with unseasonally strong winds and swell, with winds of over 40 knots blowing for a couple of days; trawling continued regardless.

Some scientific crew were exchanged with 'new blood' in Dampier on 20 August: Three CSIRO personnel, one scientist from N.T. Fisheries and one from W.A. Fisheries

The second leg left Dampier at 17:00 on Wednesday 20 August. Trawling was completed in the Legendre Zone two days later, so we continued into the Hedland (eastern) Zone. Again, 5 stations (on average) were completed each day. One trawl caught over 1 tonne of *Lutjanus malabaricus* (saddle-tail sea perch). The weather at this stage was perfect, with calm seas and beautiful sunsets – our 'Jonah' must have left. The third hydro transect was carried out on the evening of 24 August.

On 27 August, we came close to Port Hedland to deploy the rubber duckie to enable one of the scientific members to disembark to attend a meeting in New Guinea. We still managed to carry out two trawls in this inshore area; unfortunately they were quite full of sponge and we spent a fair amount of time cutting, weighing and grumbling.

The next day we continued our random trawls in the inshore Hedland area. We encountered fairly large quantities of sponge with a diverse catch composition. There was some fairly major net damage in this area. Thankfully the next day we were trawling in deeper, friendlier waters. All random stations were completed by 30 August. We took the opportunity to carry out a couple of deeper trawls looking for juvenile *Pristipomoides*. Unfortunately none were caught, though some good crustacean taxonomic specimens were obtained.

On 31 August we carried out an *ad hoc* inter tidal fauna assemblage survey at Clerk Reef (part of the Rowley Shoal complex). This also gave our whale watcher the opportunity for more observations in this rarely visited area.

The *Southern Surveyor* berthed at Broome wharf at 10:30 on 1 September 1997.

The main problems during the cruise were breakdowns of the camera and strobes, with some major rebuilding of components required at times. It got to the point where we were running short of spares. The camera and strobes have provided good service over the years.

The cruise was very successful, with all objectives attained. The cooperation between the various research organisations was excellent; we all benefited from being able to carry out research together. Thanks to all the crew and scientists; it was a most pleasant cruise.

PERSONNEL

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

W. Whitelaw (Cruise leader)	leg 1	leg 2
Stanley	leg 1	leg 2
Cherry	leg 1	leg 2
G. Dews	leg 1	leg 2
A. Graham	leg 1	
S. Davenport	leg 1	
J. Siwabessy (Uni of W.A.)	leg 1	
H. Webb	leg 1	
J. Cordell	leg 1	
K. Evans (Env. Aust.)	leg 1	
B. Oneil (Env. Aust.)	leg 1	
T. Hay (N.T. Fisheries)		leg 2
S. Newman (W.A. Fisheries)		leg 2
C. Burton (Env. Aust.)		leg 2
L. McDonald		leg 2
G. West		leg 2
R. Campbell		leg 2

ACKNOWLEDGEMENTS

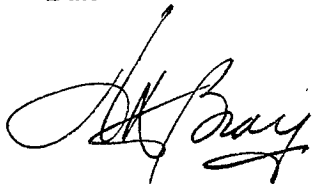
I would like to thank the skipper Bruce Wallis, fishing masters Roger Pepper and John Boyes and the crew of FRV Southern Surveyor for their efforts during the cruise. I would also like to thank the CSIRO and other scientific personnel on this cruise, not only for their efforts, but also for their continued good humour and esprit de corp.

This cruise report may not be cited without reference to the author.



Wade Whitelaw
Cruise Leader

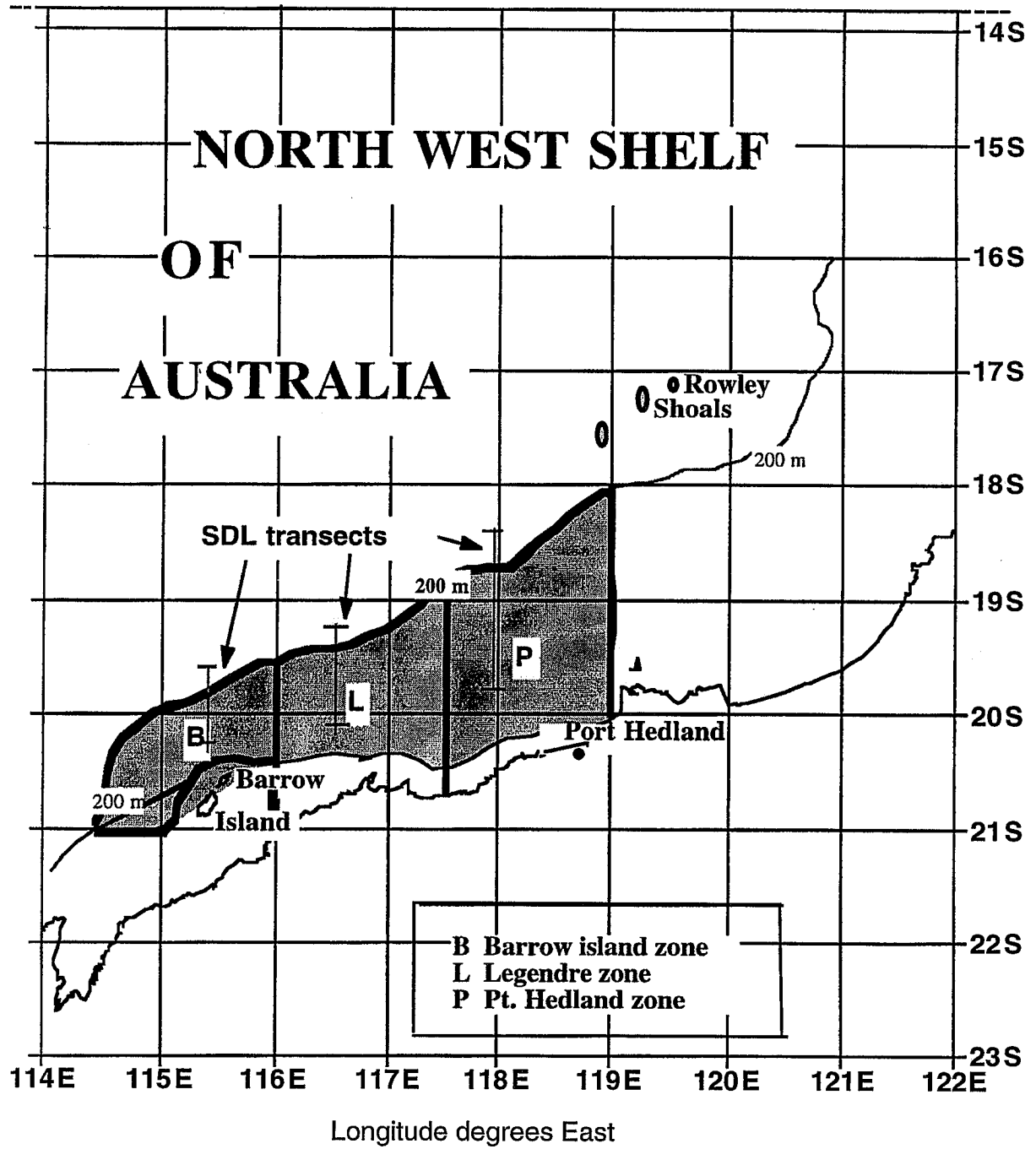
Date



Dr Nan Bray
Chief, CSIRO Marine Research

Date

Southern Surveyor cruise, North West Shelf, August 1997.



Appendix 1

Station number, date, location selection method (2 = random, 1 = aimed), positions, strata, depth and total sample weight.

Station number	Date	Trawl duration (min)	Location selection method	Start Lat.	Start Long.	Strata	Depth (m)	Total catch (kg)
1	7-Aug-97	30	2	20° 07.8'	116° 57.7'	1	44	74.1
2	8-Aug-97	30	2	19° 59.8'	117° 02.2'	7	50	1031.9
3	8-Aug-97	30	2	20° 03.9'	117° 01.4'	3	47	233.3
4	8-Aug-97	30	2	19° 57.2'	116° 57.4'	7	56	62.4
5	8-Aug-97	30	2	19° 48.4'	116° 47.8'	7	69	117.9
6	8-Aug-97	30	2	19° 39.7'	116° 53.9'	7	74	60.8
7	9-Aug-97	30	2	19° 06.8'	117° 00.1'	13	196	135.3
8	9-Aug-97	30	2	19° 12.9'	116° 53.9'	13	156	69.8
9	9-Aug-97	30	2	19° 18.7'	116° 54.6'	9	114	82.4
10	9-Aug-97	30	2	19° 19.0'	117° 04.3'	9	109	61.2
11	9-Aug-97	30	2	19° 23.1'	116° 57.7'	9	114	107.1
12	10-Aug-97	30	2	19° 28.0'	116° 45.0'	5	72	154.5
13	10-Aug-97	30	2	19° 32.0'	116° 44.0'	5	50	292.2
14	10-Aug-97	30	2	19° 43.1'	116° 40.1'	1	49	171.7
15	10-Aug-97	30	2	19° 44.9'	116° 37.4'	7	53	126.9
16	10-Aug-97	30	2	19° 50.9'	116° 30.0'	7	63	39.5
17	10-Aug-97	30	2	20° 08.5'	116° 36.0'	3	49	122.2
18	10-Aug-97		1	20° 07.3'	116° 31.8'		50	SDL
19	10-Aug-97		1	19° 29.2'	116° 30.9'		99	SDL
20	10-Aug-97		1	19° 17.0'	116° 30.8'		150	SDL
21	11-Aug-97		1	19° 11.4'	116° 30.4'		202	SDL
22	11-Aug-97		1	19° 08.6'	116° 30.3'		253	SDL
23	11-Aug-97	30	2	19° 10.9'	116° 37.4'	13	200	43.5
24	11-Aug-97	30	2	19° 22.2'	116° 21.1'	13	28	17.9
25	11-Aug-97	30	2	19° 27.5'	116° 25.8'	9	116	96.9
26	11-Aug-97	30	2	19° 40.4'	116° 21.0'	9	67	122
27	12-Aug-97	30	2	19° 54.6'	116° 08.7'	9	65	225.5
28	12-Aug-97	30	2	20° 00.2'	116° 03.2'	5	60	38.6
29	12-Aug-97	30	2	20° 01.1'	115° 55.1'	18	65	962.5
30	12-Aug-97	30	2	20° 05.9'	115° 48.3'	18	63	346
31	12-Aug-97	30	2	20° 10.0'	115° 57.2'	18	56	139.3
32	12-Aug-97	30	2	20° 13.0'	116° 08.6'	5	50	848
33	13-Aug-97	30	2	20° 42.8'	115° 16.2'	17	43	196.1
34	13-Aug-97	30	2	20° 38.0'	115° 12.8'	18	50	184
35	13-Aug-97	30	2	20° 45.9'	114° 57.0'	18	92	241.1
36	13-Aug-97	30	2	20° 53.7'	114° 50.8'	18	102	136.9
37	13-Aug-97	30	2	20° 22.1'	114° 53.6'	19	175	85.8
38	13-Aug-97		1	20° 25.4'	114° 40.2'	-	806	-
39	14-Aug-97	30	2	19° 54.9'	115° 40.1'	18	79	76.7
40	14-Aug-97	30	2	19° 51.3'	115° 39.0'	18	73	65.8
41	14-Aug-97	30	2	19° 42.1'	115° 40.3'	19	179	217.1
42	14-Aug-97	30	2	19° 39.9'	115° 48.7'	19	131	231.7
43	14-Aug-97	30	2	19° 37.0'	115° 51.3'	19	137	4.5
44	14-Aug-97		1	19° 35.0'	115° 30.2'		252	SDL

45	14-Aug-97		1	19° 38.8'	115° 31.0'		203	SDL
46	14-Aug-97		1	19° 40.3'	115° 30.2'		150	SDL
47	14-Aug-97		1	19° 41.5'	115° 28.9'		100	SDL
48	14-Aug-97		1	20° 13.8'	115° 32.1'		51	SDL
49	15-Aug-97	30	2	20° 14.8'	115° 18.6'	18	46	3
50	15-Aug-97	22	2	20° 09.4'	115° 18.3'	18	56	112.9
51	15-Aug-97	30	2	20° 09.2'	115° 23.3'	18	60	187.4
52	15-Aug-97	30	2	20° 21.8'	115° 54.3'	17	52	188.7
53	17-Aug-97	30	2	20° 25.7'	115° 50.9'	17	38	223.7
54	17-Aug-97	30	2	20° 32.1'	115° 51.2'	17	33	31.3
55	17-Aug-97	30	2	20° 36.6'	115° 42.4'	17	25	91.8
56	17-Aug-97	30	2	20° 30.7'	116° 02.7'	1	32	320.6
57	17-Aug-97	30	2	20° 29.8'	116° 03.4'	1	31	23.6
58	18-Aug-97	30	2	20° 22.2'	117° 13.0'	3	23	101.8
59	18-Aug-97	30	2	20° 13.7'	117° 15.9'	3	34	41.4
60	18-Aug-97	30	2	20° 06.8'	117° 27.7'	3	41	62.3
61	18-Aug-97	30	2	20° 03.6'	117° 27.3'	3	43	36.1
62	18-Aug-97	30	2	20° 03.7'	117° 19.4'	3	42	129
63	19-Aug-97	30	2	20° 10.1'	116° 32.7'	7	48	18.2
64	19-Aug-97	30	2	20° 15.0'	116° 30.8'	1	44	210.7
65	19-Aug-97	30	2	20° 23.7'	116° 15.9'	1	38	113.4
66	19-Aug-97	30	2	20° 23.3'	116° 25.1'	3	38	253.3
67	19-Aug-97	30	2	20° 19.8'	116° 33.7'	3	37	35.5
68	21-Aug-97	30	2	20° 02.2'	117° 27.7'	3	42	142.3
69	21-Aug-97	30	2	19° 51.4'	117° 25.3'	7	54	43.1
70	21-Aug-97	30	2	19° 49.1'	117° 24.3'	7	58	85.2
71	21-Aug-97	30	2	19° 40.2'	117° 15.4'	7	70	158.1
72	21-Aug-97	30	2	19° 15.0'	117° 21.0'	9	117	52.5
73	22-Aug-97	30	2	19° 05.5'	117° 45.4'	14	120	33.9
74	22-Aug-97	30	2	19° 06.8'	117° 45.9'	10	116	1022.5
75	22-Aug-97	30	2	19° 10.0'	117° 48.6'	10	100	70.6
76	22-Aug-97	30	2	19° 11.9'	117° 39.0'	10	107	110.4
77	22-Aug-97	30	2	19° 14.5'	117° 43.3'	10	88	307.9
78	23-Aug-97	30	2	19° 14.9'	117° 57.1'	8	82	179.4
79	23-Aug-97	30	2	19° 22.1'	117° 42.0'	8	80	508
80	23-Aug-97	30	2	19° 30.0'	117° 39.5'	8	67	166.6
81	23-Aug-97	30	2	19° 39.7'	117° 36.4'	8	64	177
82	23-Aug-97	30	2	19° 37.3'	117° 48.6'	6	60	189.2
83	23-Aug-97	30	2	19° 36.8'	118° 00.3'	6	57	444
84	24-Aug-97	30	2	20° 09.8'	117° 33.5'	4	33	59.3
85	24-Aug-97	30	2	20° 09.0'	117° 41.5'	2	32	112.9
86	24-Aug-97	30	2	20° 06.5'	117° 42.0'	2	33	32.3
87	24-Aug-97	30	2	20° 03.1'	117° 50.6'	2	35	108
88	24-Aug-97	30	2	19° 54.5'	117° 51.3'	2	46	62.3
89	24-Aug-97	30	2	19° 51.0'	117° 42.7'	6	51	261
90	24-Aug-97		1	19° 45.3'	117° 59.5'		50	SDL
91	24-Aug-97		1	19° 02.5'	117° 58.6'		112	SDL
92	25-Aug-97		1	18° 44.4'	118° 00.2'		149	SDL
93	25-Aug-97		1	18° 36.5'	118° 00.1'		198	SDL
94	25-Aug-97		1	19° 30.7'	118° 00.0'		249	SDL
95	25-Aug-97	30	2	18° 35.9'	118° 30.0'	12	144	133.9
'96	25-Aug-97	30	2	18° 37.5'	118° 14.7'	12	130	39.1

97	25-Aug-97	30	2	18° 52.0'	118° 04.1'	14	140	168.4
98	25-Aug-97	30	2	18° 51.2'	117° 57.2'	14	135	110.1
99	25-Aug-97	30	2	18° 59.9'	118° 00.1'	14	124	24.1
100	25-Aug-97	30	2	19° 00.0'	118° 03.9'	10	116	71.1
101	26-Aug-97	30	2	19° 46.1'	117° 46.1'	6	53	156.5
102	26-Aug-97	30	2	19° 42.8'	117° 48.9'	6	53	315.2
103	26-Aug-97	30	2	19° 42.6'	118° 17.6'	6	50	247.1
104	26-Aug-97	30	2	19° 45.4'	118° 08.8'	2	43	166.1
105	26-Aug-97	30	2	19° 49.9'	118° 16.3'	4	33	241.8
106	26-Aug-97	30	2	19° 56.9'	118° 16.5'	4	26	145.3
107	27-Aug-97	22	2	20° 04.2'	118° 11.2'	4	24	191.5
108	27-Aug-97	30	2	20° 04.4'	118° 14.2'	4	21	59.2
109	28-Aug-97	30	2	19° 45.2'	118° 42.0'	4	25	58.8
110	28-Aug-97	30	2	19° 30.6'	118° 56.7'	4	34	336.3
111	28-Aug-97	24	2	19° 28.6'	118° 48.0'	4	34	284.4
112	28-Aug-97	30	2	19° 25.2'	118° 30.1'	8	62	67.7
113	28-Aug-97	30	2	19° 30.1'	118° 21.9'	8	54	243.6
114	29-Aug-97	30	2	19° 04.2'	117° 32.2'	14	123	118.8
115	29-Aug-97	30	2	19° 03.2'	118° 21.3'	8	87	32.7
116	29-Aug-97	30	2	19° 00.8'	118° 27.8'	8	88	90
117	29-Aug-97	30	2	18° 55.3'	118° 24.9'	8	104	213.9
118	29-Aug-97	30	2	18° 53.8'	118° 26.6'	8	97	101.4
119	30-Aug-97	30	2	18° 50.3'	118° 37.6'	8	111	53.4
120	30-Aug-97	30	1	18° 49.4'	118° 42.8'	8	104	771.6
121	30-Aug-97	30	2	18° 37.2'	118° 37.5'	12	137	29.3
122	30-Aug-97	30	2	18° 15.4'	118° 57.8'	12	135	280.6
123	30-Aug-97	30	1	17° 38.9'	119° 00.3'	-	310	-

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