

**ALBACORE TUNA
AND ITS FISHERIES
IN THE
AUSTRALIAN FISHING ZONE**

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SUMMARY

Fishing operations currently taking albacore (*Thunnus alalunga*) are summarized and past biological research and fisheries surveys are reviewed.

Albacore are an incidental catch of commercial tuna fishing operations in the Australian 200 nautical mile fishing zone (AFZ). Catches of albacore are most strongly represented in longline fishing operations; in recent years the annual catch of albacore by Japanese longliners has been 1 300 tonnes and the domestic longline catch has been about 100 tonnes. Domestic surface fishing (poling and purse seining) for southern bluefin tuna (*T. maccoyii*) accounts for about 100 tonnes of albacore in most years. The amount of albacore caught by recreational fishers is unknown, but is thought to be in the order of 200-400 tonnes annually. Drift gillnetting does not currently occur in the AFZ (albacore were absent in catches off northern Australia by gillnetters from Taiwan during the early 1980s).

Japanese longline fishing data and domestic poling and purse seining data have been collected and stored in the Australian Fishing Zone Information System since 1979. Domestic longline catch data have been collected since 1985 but comprehensive coverage was not achieved until recently. No data are as yet available on the recreational catch of albacore.

The catch of albacore by Japanese longliners is investigated in detail. Distribution and levels of albacore catches closely reflected that of fishing effort, demonstrating the incidental nature of the species to the Japanese operations. Catches and catch rates were highest in north-eastern areas of the AFZ, well offshore of the east coast, in winter. Catch rates increased steadily in the north-east during the 1980s to 10 fish per 1000 hooks, while declining in southern areas from 18 fish per 1000 hooks in 1985 to less than 8 per 1000 hooks in 1988. Catches of albacore associated with southern bluefin tuna longlining activity off Tasmania were low or absent. Catches and catch rates off western Australia were considerably lower than in the east and catches tended to be more common during the summer.

Virtually no biological research has been undertaken on albacore in Australia. Several surveys were conducted in the 1960s and in 1981, indicating promising albacore resources off south-eastern Australia (8-18 albacore per 100 hook hours trolling). Sixty-five albacore were tagged during the 1960s with no recaptures reported, but 3 recoveries have been reported from releases of tagged albacore in the 1970s and 1980s by the New South Wales Game Fish Tagging Program.

INTRODUCTION

Whereas albacore (*Thunnus alalunga*) has been prized in the United States as "the chicken of the seas" because of its light flesh colour compared with other tunas, it has never been an important commercial species in Australia. Serventy (1941) highlighted its reputation in the United States, indicating trolling, supplemented by live-bait fishing, as the method by which it was commercially fished there - "They cannot be seined and have the reputation of being able to elude any kind of net" (p. 24). Recently, that reputation has changed; global expansion of drift gillnet fisheries has directed attention to the biological condition of albacore stocks in many regions. To facilitate consideration of the albacore resources in waters adjacent to Australia, the present paper provides a summary of past and current fishing activities in the Australian 200 nautical mile fishing zone (AFZ) (figure 1) which catch albacore. A preliminary survey of sources of biological and fisheries data relating to albacore is also presented.

RESEARCH

Early Australian research on tunas was primarily concerned with an examination of their commercial potential and was centred off the south eastern Australian coast, where CSIRO carried out trolling tests (Serventy, 1941 & 1947). Small catches of most of the now commercially exploited larger pelagic fish were taken by trolling gear. However, a significant commercial tuna fishery was not established until the early 1950s when live-bait-and-pole techniques for southern bluefin tuna (*Thunnus maccoyii*) were successfully used off New South Wales and South Australia.

Tuna research activity intensified in the 1960s with development of CSIRO studies of the biology of southern bluefin tuna. Small, but regular, catches of albacore were taken in the live-bait-and-pole fishery and some observations on albacore were included in the CSIRO work. For example, Bill Hearn, CSIRO Division of Fisheries, Hobart, reports that in the 1950s CSIRO caught albacore for length-weight and morphometric samples, mainly off the east coast of Australia, as far south as Maria Island (c.42° 30' S) off Tasmania. Many of the albacore were 50cm to 60cm length to caudal fork. Table 1 is an example of one of the length-weight samples. He also advised that, in addition to this CSIRO work, during February and March 1960 the Japanese Fisheries Research Vessel "*Shoyo Maru*" caught a number of albacore for

morphometric samples. They were caught south of South Australia and Western Australia from 42 S140 E to 37 S114 E; many were more than 100cm fork length.

From 1986 to 1988 a study of the biology of tunas and billfish resources of the eastern AFZ, with particular reference to yellowfin tuna (*Thunnus albacares*), was carried out to assemble information in support of their management (Anon. 1989). Incidental observations on albacore were made on an *ad hoc* basis and a small amount of data was gathered. The main legacy of the project has been the documentation of albacore catches from the domestic longline fishery and the impetus it provided for establishment of a logbook collection.

The observer programme on board Japanese longliners has been a useful source of biological data on albacore since establishment of the AFZ in 1979. The main function of the observer programme is to monitor reporting procedures for catch, species composition of the catch, and effort but observers regularly undertake size frequency sampling of the catch and collect other data and biological samples (e.g. hard parts for ageing) for specific research projects. Albacore length-weight data, assembled by observers based in Tasmania, but incorporating activities throughout the eastern and southern AFZ, is appended to indicate the nature and extent (temporally and spatially) of the observer data set.

The summer sea surface temperatures off southeastern Australia (figure 2) are similar to those east and west of New Zealand where successful albacore troll and drift gillnet fisheries have been established. Albacore are commonly found in the same general latitudes off Australia during summer. CSIRO maintains a comprehensive programme of oceanographic research around Australia but, while sea surface temperature imagery is processed routinely, the relationship between the distribution of albacore off Australia and sea surface temperature has not been examined.

Surveys

Serventy (1941) noted that albacore were present around south-eastern Australia from southern-most Tasmania to about Montague Island (southern New South Wales) and that they appeared in greatest abundance off eastern Tasmania in the summer months. Hynd and Robins (1967) reported results of their 1965 spotting aircraft and research vessel survey of tuna off Tasmania which

concentrated on the fishery prospects for southern bluefin tuna, striped tuna (skipjack, *Katsuwonus pelamis*) and jack mackerel (*Trachurus declivis*). Albacore were strongly represented (table 2) in total catches of tunas by the three survey vessels.

The catches relative to effort (hours trolled by the vessels) are not indicated specifically nor is there an indication of hook hours trolling in Hynd and Robins' (1967) report. One (the research) vessel concentrated on oceanographic observation. The first fishing vessel caught 61 albacore in a total "steaming" time of 710 hours and the other 42 in 840 hours. If the vessels trolled continuously while steaming, these catches equate to 8.6 and 5 albacore per 100 hours trolling. However, the two fishing vessels took most of their albacore catch during February (66 fish) and March (33 fish). No individual fishing vessel monthly steaming hours are provided; however, the overall average weekly hours steaming were 48.9 hours and 41.4 hours respectively, representing a combined monthly total of approximately 365 hours for February and 400 hours for March. On this basis the catch per 100 hours steaming would be 18.6 and 8.2 for February and March respectively.

In 1981 the Tasmanian Department of Sea Fisheries carried out a trolling survey for albacore off the central eastern coast of Tasmania (Wolfe, 1981). The survey vessel, Challenger, followed transect lines, occasionally circling once after a strike, but not "working-up" a school. Catch rates (table 3; from Wolfe, *op.cit.*) averaged 13 fish per 100 hook hours trolling, compared to 19.3 fish per 100 hook hours trolling reported during the 1973-75 New Zealand albacore trolling surveys (Roberts, 1980), and 17 fish per 100 hook hours trolling obtained during the 1986 "Coriolis" survey of the south-western Pacific east of New Zealand (Hallier and LeGall, 1986). Despite the promising survey results, no sustained commercial activity developed off Tasmania. Small quantities of albacore are regularly caught by recreational fishers off the east coast of Tasmania.

Tagging

W. Hearn, CSIRO, reports (pers. comm.) that, during 1960-63, CSIRO personnel single-tagged 63 albacore with tuna dart tags off New South Wales from FRV Marelda (two other albacore were double-tagged during 1967-68 by a fisherman under contract to CSIRO). The lengths to caudal fork of the albacore at release ranged between 43cm and 94cm (table 4). No reports of any recaptures were received. During the same project 774 southern

bluefin tuna were single-tagged off New South Wales. A total of 63 tagged southern bluefin tuna (8.1%) were subsequently reported recaptured, indicating that, for southern bluefin tuna at least, the tagging technique was satisfactory.

J. Pepperell and K. Deguara, New South Wales Fisheries Research Institute (NSWFRI), Cronulla, report (pers. comm.) that the Institute has managed the New South Wales Game Fish Tagging Program since 1973. The programme encourages recreational fishers to tag and release fish. Competitions have developed where points are awarded for tag and release of game fish, rather than their retention. Releases of albacore by the programme totalled 1319 at the end of June 1987, with several hundred additional releases since then. Three recoveries have been reported, all recaptured in the domestic longline fishery (table 5). The release and recovery information is held in a computer database and represents a source of data on the approximate size composition (length or weight are usually estimated) of the fish released by the recreational fishery. Additional size composition data have been gathered by NSWFRI during recreational fishing competition weigh-ins.

FISHERIES

The tuna fisheries of the AFZ consist of:

- . a Japanese longline fishery;
- . a domestic longline fishery;
- . a domestic surface fishery;
- . a recreational fishery; and
- . a Japanese surface fishery.

Catches of albacore have been reported from each of the above fisheries but are most strongly represented in longline catches. Average annual catch of albacore by the Japanese longline fishery during the last five years was 1290 tonnes compared with about 100 tonnes annually reported from the domestic longline fishery. Catches of albacore are rare or absent in the Japanese surface fishery (handline and pole-and-line fishing for yellowfin tuna and bigeye tuna during October-December in the north-west Coral Sea) and are not discussed here.

A gillnet fishery targeting sharks and involving vessels from Taiwan operated around northern Australia between 120E and 140E until the introduction of gear restrictions in 1986 made the

fishery uneconomic. Tunas (predominantly longtail tuna, *T. tonggol*, and little tuna, *Euthynnus affinis*, black marlin (*Makaira indica*.) and sailfish (*Istiophorus platypterus*) were taken incidentally but no albacore were reported by observers aboard the vessels. Apart from this activity there are no tuna other gillnetting activities known to have occurred in the AFZ; longlining was carried out by foreign vessels in the area now enclosed by the AFZ prior to its establishment in 1979 but there is no information to indicate whether drift gillnetting occurred in other areas before 1979.

Japanese longline fishery

Substantial Japanese longline activity occurs in eastern, south-eastern and western areas of the AFZ. Japanese longlining commenced in the region in the 1950s and was well established by 1960. Levels of activity in the area have fluctuated widely from year to year during the 1960s, 1970s and 1980s. During the 1980s the number of Japanese vessels undertaking licensed fishing operations in the AFZ ranged between 109 and 184.

With the establishment of the AFZ activities off the east coast during the 1980s were marked by progressive access restrictions associated with development of Australian commercial and recreational fisheries and concern over the biological status of southern bluefin tuna. Currently, for example, operations of Japanese longliners are subject to the access restriction summarised in figure 1. Their forced departure from areas where southern bluefin tuna was targeted has resulted in activities in other areas, some directed at other species.

Longlines deploying 2000-3250 hooks are set and retrieved in a daily operation. The average size of Japanese longline vessels has increased over the years, and also the number of hooks set per day. Ward and Caton (in prep.) indicate that the number of hooks set per day in eastern AFZ waters has increased from 1800 in 1962 to 2900 in 1988. The trend in vessel numbers and hooks per set during the 1980s is shown in table 6 for the north-eastern, north-western, south-eastern, south-western and Tasmanian areas of the AFZ.

The vessels operating in the AFZ make up several fleets, partly reflecting port of origin, target species and company links. The fleets tend to adopt different campaign patterns, operating in different seasons and areas of the AFZ.

. "Large" longliners (350 tonnes or more) operate adjacent to, and to the south of, Tasmania during May-August and December-January. Southern bluefin tuna are the target and albacore are a minor by-catch. At other times the longliners fish for southern bluefin tuna more broadly westwards and, to a lesser extent now, eastwards in the Southern Ocean. Vessels of the Southern Ocean fleet are generally the largest and most seaworthy of the Japanese distant water longline fleet, remaining away from Japan for up to 18 months, though port calls at foreign ports are made every 2 or 3 months.

. As mentioned above, large longliners now frequent the western AFZ during October-January, many augmenting more southern and more extensive southern bluefin tuna operations. Bigeye tuna (*Thunnus obesus*) are the main target of operations off the south-western coast, while a variety of species - bigeye tuna, marlins, and yellowfin tuna - are important in the north west. Albacore appear as a by-catch to these operations.

. Smaller longliners (180-350 tonnes), mostly from the northern islands of Japan, fish a mixture of tunas and billfishes in equatorial and tropical waters. The vessels concentrate on the eastern AFZ, some incorporating activities in New Zealand, Hawaii, or both. They take yellowfin tuna and bigeye tuna in the Coral Sea and these species plus southern bluefin tuna in the Tasman Sea. Billfishes (particularly broadbill swordfish, *Xiphias gladius*, and striped marlin, *Tetrapturus audax*) and albacore constitute a significant by-catch.

The catch is sold at frozen-sashimi markets in Japan. Since 1987 several Japanese-style longliners operated by Australians have commenced fishing in offshore areas and, in 1989, 20 Japanese longliners entered into joint-venture arrangements with Australian fishers.

Domestic longline fishery

Experimental, small-vessel longlining was carried out irregularly off the Australian east coast in the 1950s, 1960s and 1970s. A viable commercial fishery was not established until the mid 1980s after fishers operating off the New South Wales central and southern coasts successfully exported high quality fresh-chilled yellowfin tuna to the Japanese sashimi market. The fishery expanded rapidly from 1985, with over 130 full-time participants

and a further 120 longlining on a part-time basis. Yellowfin tuna and bigeye tuna are the target species of. Albacore constitutes a significant component of the catch but its low value compared with yellowfin and bigeye tunas mitigates against air freighting it to Japan. Instead small quantities are sold on the Sydney fresh fish market, or to the local cannery.

The domestic longline vessels are smaller than those operated by the Japanese in the AFZ. The former usually set between 200 and 500 hooks daily and generally return to port after one or two days fishing. Some vessels occasionally work in the region of Lord Howe Island or as far south as the eastern approach to Bass Strait, but the major activity is concentrated within 80km of the Australian east coast, between Mooloolabah (southern Queensland) and Eden (southern New South Wales). Activity has recently been reported from Tasmania, South Australia and south-western Western Australia.

A logbook programme, established in 1985 but not fully supported with field liaison until 1988, now provides a reasonable representation of species composition and catch in the fishery. For example, yellowfin tuna catches for the 1987/88 financial year from logbooks (table 7) amount to approximately 95% of the catch estimated from Fishermen's Cooperative records, market reports and export statistics (Diplock and Watkins, in prep.). In the case of albacore, the logged catches (table 7) are believed to under-represent catch but, despite this, are more representative than Fishermen's Cooperative and market reports. Domestic market price for albacore is poor at times because of limited demand. Furthermore, nett value of the small quantities caught may make transport to the cannery uneconomic. In such cases, the fish might not be landed, or recorded in logbooks.

Domestic surface fishery

Albacore commonly occur as a by-catch in the domestic poling and purse seining fishery for southern bluefin tuna around southern Australia. By far the largest annual albacore catch from the surface fishery was taken off South Australia in 1981-82 when 2 024 tonnes were taken incidentally to the 12 748 tonnes southern bluefin tuna catch. Otherwise catches are unlikely to have exceeded 100 tonnes.

Recreational fishery

Recreational fishers take a wide range of pelagic species along the east coast at various locations from Cairns (north Queensland) to Eaglehawk Neck (eastern Tasmania), and Lord Howe Island. The main concentration of eastern activity is off central and southern New South Wales. Low levels of recreational fishing activity for pelagic fishes are also reported from Western Australia and, to a lesser extent, South Australia and Northern Territory. No catch data are readily available for the fishery but, assuming a ratio of 2 albacore to 1 yellowfin tuna in recreational catches and approximately equal reports of tag recaptures from recreational and commercial yellowfin catches, it is estimated that the annual recreational fishery albacore catch is in the order of 200-400 tonnes, off eastern Australia.

ALBACORE CATCH, EFFORT AND CATCH RATE IN THE JAPANESE LONGLINE FISHERY

Japanese longline vessels fishing in the AFZ have maintained logbooks of daily position, catch-by-species and hooks set since the zone was established in November 1979. Details of trends within the AFZ are provided here for comparison with broader south-western Pacific catch information. Catch and effort information is summarised by sub-area separated east and west by 140 E and north and south by 30 S (figure 3); catch rates in the intervening areas were lower. "Winter" and "summer" activities are regarded as commencing at the beginning of April and October respectively; separation of data by season fits the general pattern of Japanese longline activity in the AFZ (figure 4 and table 8).

The catch and effort data presented below are summarised by region and plotted on a one-degree-square grid rather than a five-degree-square grid. Presentation on a five-degree grid could tend to misrepresent the catch data because, in many cases, five-degree-squares extend beyond the boundary of the AFZ (figure 5).

Details of catch, effort, and average size by month are presented in figures 6 to 11 and in table 9. Effort is calculated as the number of hooks set in "albacore-grid-months"; all one-degree-square grids within which albacore have been caught during the period 1980-1989. However, only those hook-sets in months for which albacore have been recorded are included so that seasonal effort directed at other species is avoided. Generally there is little difference between total hook-sets and those in "albacore-grid-

months" (table 9). However, around Tasmania (*i.e.* south of 40 S) the latter represent only 60% of the former, illustrating the effectiveness of the vessels' targeting on southern bluefin tuna in that area.

Distribution of catch and effort

The main target species of Japanese longliners in north-eastern and north-western regions of the AFZ are yellowfin tuna, bigeye tuna, broadbill swordfish and striped marlin and, in southern waters, is southern bluefin tuna. Albacore tends to be a by-catch.

Off the Australian east coast (figures 6, 7 and 8), Japanese activity (figure 6) is concentrated on the southern Coral Sea, western Tasman Sea and waters south of Tasmania. Despite high levels of effort in the Tasmanian region, albacore catches (figure 7) and catch rates (figure 8) are low (generally less than 1 fish per 1000 hooks [table 9]). This probably illustrates the tendency for vessels to aggregate in areas where most profitable concentrations of southern bluefin tuna occur. Activity in the southern Coral Sea and western Tasman Sea is seasonal, concentrated more southerly (and more intensively) in winter and more northerly in summer. Albacore catches reflect levels of effort (figures 6 and 7). Catch rates of albacore (figure 8) tend to be higher offshore. In both seasons, there appear to be two main centres of high albacore catch rate. One is located between 30 S and 35 S, to the south of Lord Howe Island; the other is situated between 14 S and 20 S, 200 km to 400 km east of Cairns. The overall catch rates for albacore (table 9) are higher in the south-east (generally in the order of 13 fish per 1000 hooks) than in the north-east (approximately 7 fish per 1000 hooks).

Off the western Australian coast (figures 9, 10 and 11), activity is concentrated in summer and levels of fishing effort are considerably lower than those off the east coast. Furthermore, relative catch rates are lower (in most years approximately 2-4 fish per 1000 hooks (table 9)). As observed for the east coast, areas of high effort and high albacore catches coincide, whereas the centres of highest albacore catch rates tend to be separate from (and further offshore than) the main centres of effort (figures 9 and 10).

Catch rate trends

Examination of annual trends in catch rates in the AFZ is complicated by the changing access restraints to which the

Japanese longline fleet has been subject. Access restraints have gradually increased since the establishment of the AFZ. This is especially so off southern and eastern Australia. The area where albacore catches have been most affected by access restraints is the region between 30 S and 40 S off New South Wales, totally closed since 1984/5 and in the current year accessible only to the 20 joint venture Japanese longliners. A total closure of the zone south of 34 S was imposed for one year (1984/5), redirecting some of the effort previously applied there to regions above 34 S.

The pattern of catch rates during the years 1980-1988 for north-eastern south-eastern, north-western and south-western Australia is shown in figure 3 and discussed below. The "Number of albacore per 1000 'albacore-grid-month' hooks" data are shown in table 9.

The lower catch rates off Western Australia are apparent, especially for the north-western quadrant, where variability is low also. The reason for the greater variability off south-western Australia is unclear; the main feature noticeable in relation to the 1985 catch rate peak is a substantial decline in hook-sets in the quadrant (table 9), with almost an order of magnitude increase over the next two years. This increase was associated with a period of high bigeye catch rates there from January to April, 1987, with very little by-catch (Schubert, 1987), and so may represent the effect of targeting.

The catch rate of albacore in the north-eastern quadrant shows a steady increase (by a factor of 5 between 1980 and 1988) levelling off in 1988 at about 10 fish per 10000 hooks. Catch rates remained at this level in 1988 despite the level of effort being twice that of any one of the previous five years (table 9).

Albacore catch rates increase substantially in the south-east during 1980-1985, then declined steadily to between a half and one third of the peak catch rate. Annual catch rates and numbers of hooks set during 1980-1988 in the south-eastern area between 30 S and 40 S are provided in table 9 (the Tasmanian region is separated from this latitude band in the table but combined with it for figure 3). It is evident that while effort declined during 1980-1985 catch rate increased. The converse applied as effort increased in subsequent years; albacore catch rate declined.

The trend in albacore catch rate described above may be partly attributed to the impact of exclusion of Japanese longliners in the

western Tasman Sea between 34 S and 39 S. The winter southern bluefin fishery there contained an albacore by-catch. Effort declined in the area in conjunction with the increase in restrictions on access. Subsequently, effort built up northwards between latitudes 28 S and 34 S, with longliners targeting bigeye instead of southern bluefin tuna but again taking a substantial albacore by-catch. While one interpretation might be the existence of a direct relationship between catch rate and effort levels, this is not corroborated by the pattern in the north-eastern quadrant where, between 1980 and 1988, there was an increase in effort over three years, a decline over five years and finally a doubling of effort for the last year; regardless of this, catch rate increased steadily throughout the period.

Clearly there could be other explanations for the recent decline in albacore catch rates in the south-east. Distinct northern and southern centres of high albacore catch rates during winter off eastern Australia (figure) could be interpreted to indicate that different albacore sub-groups are exploited in the two regions. The declining catch rate in the southern region commenced after the introduction and build-up of drift gillnet activity in the Tasman Sea between the Australian and New Zealand fishing zones, so this could be an explanation. Another might be the influence of changing oceanographic patterns.

A more comprehensive examination of seasonal effort distribution changes in longliner operations during the years in question, species targeting and albacore catch rate patterns would seem to be necessary before further comment.

CONCLUSION

Albacore are regularly represented in longline catches of the eastern AFZ. Similar catch rates were obtained in the 1981 Tasmanian trolling survey to those obtained during trolling surveys in the Tasman Sea and the western South Pacific Ocean east of New Zealand where viable trolling and gillnet fisheries subsequently developed. Despite these indicators that potential exists for a fishery targeting albacore in the AFZ, its exploitation there remains an incidental activity in a range of fisheries.

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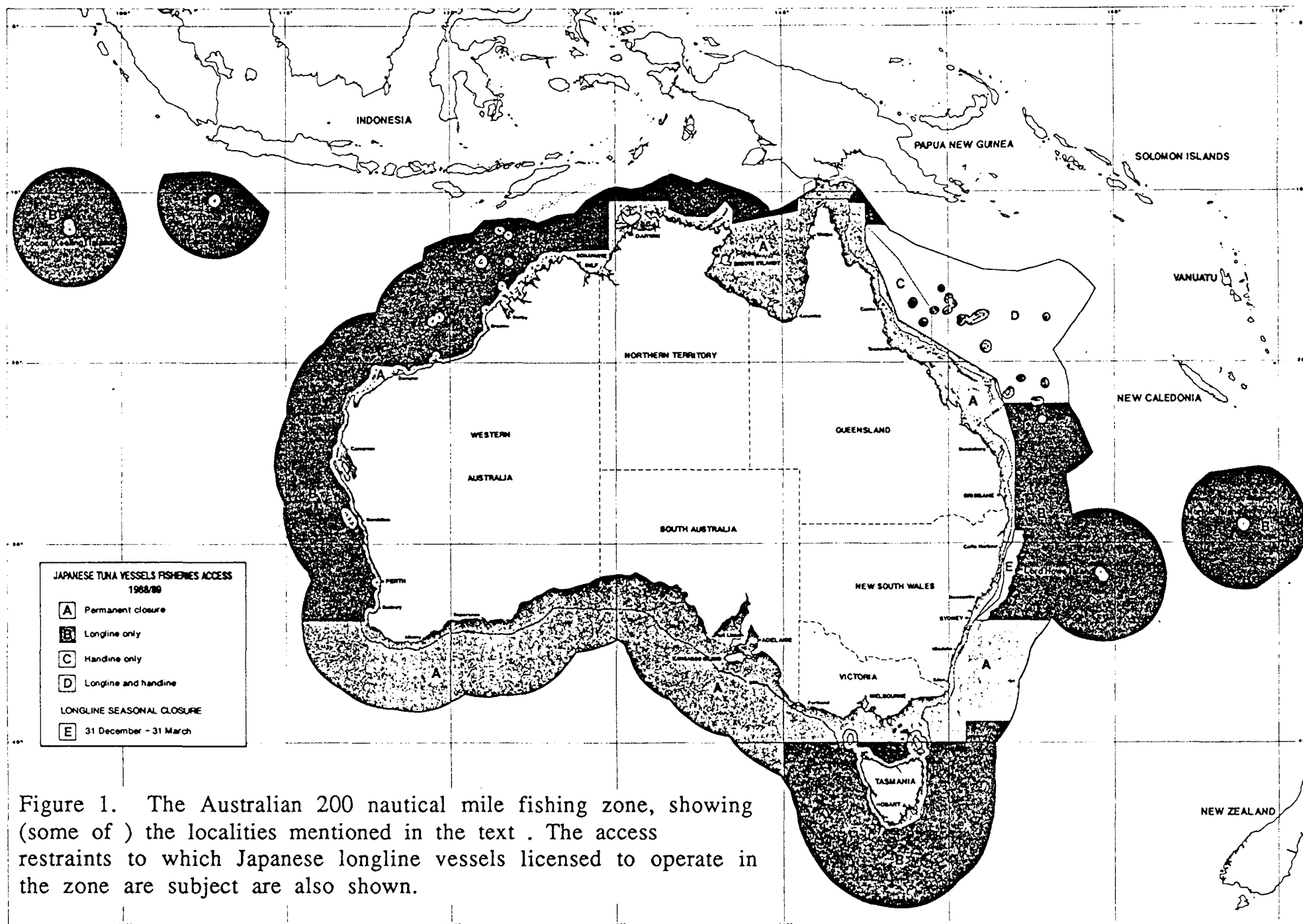
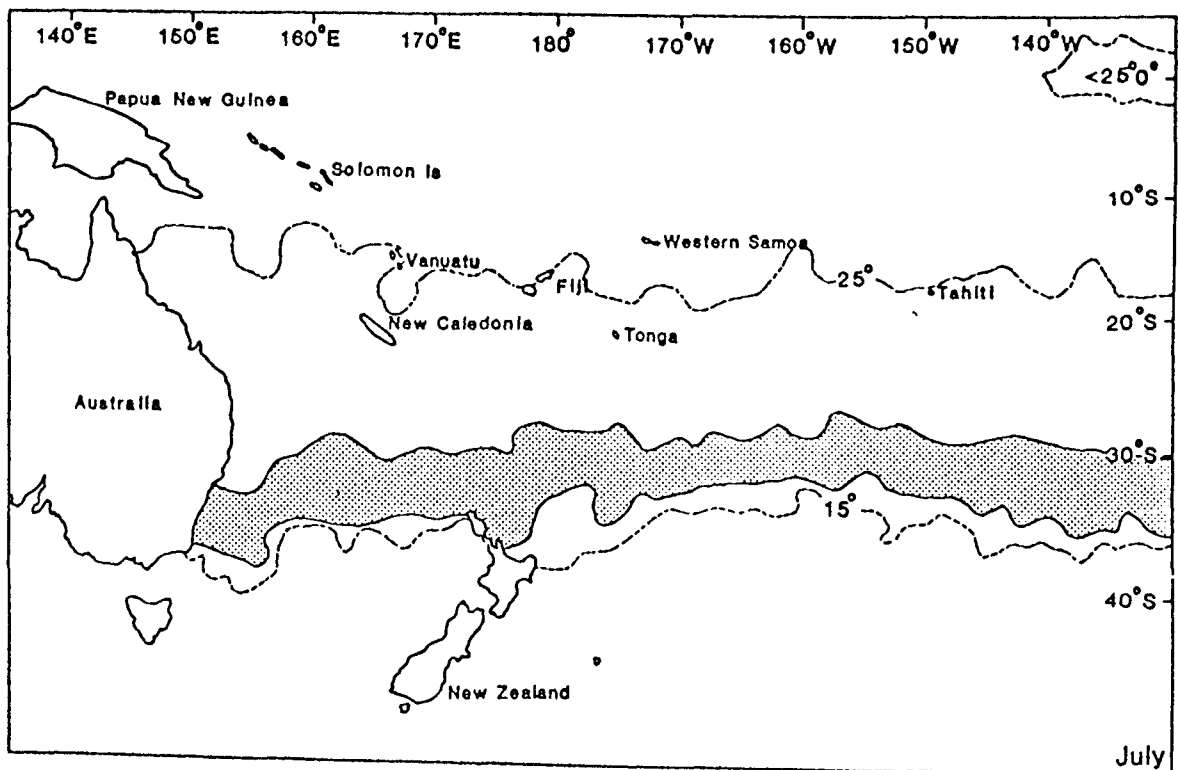
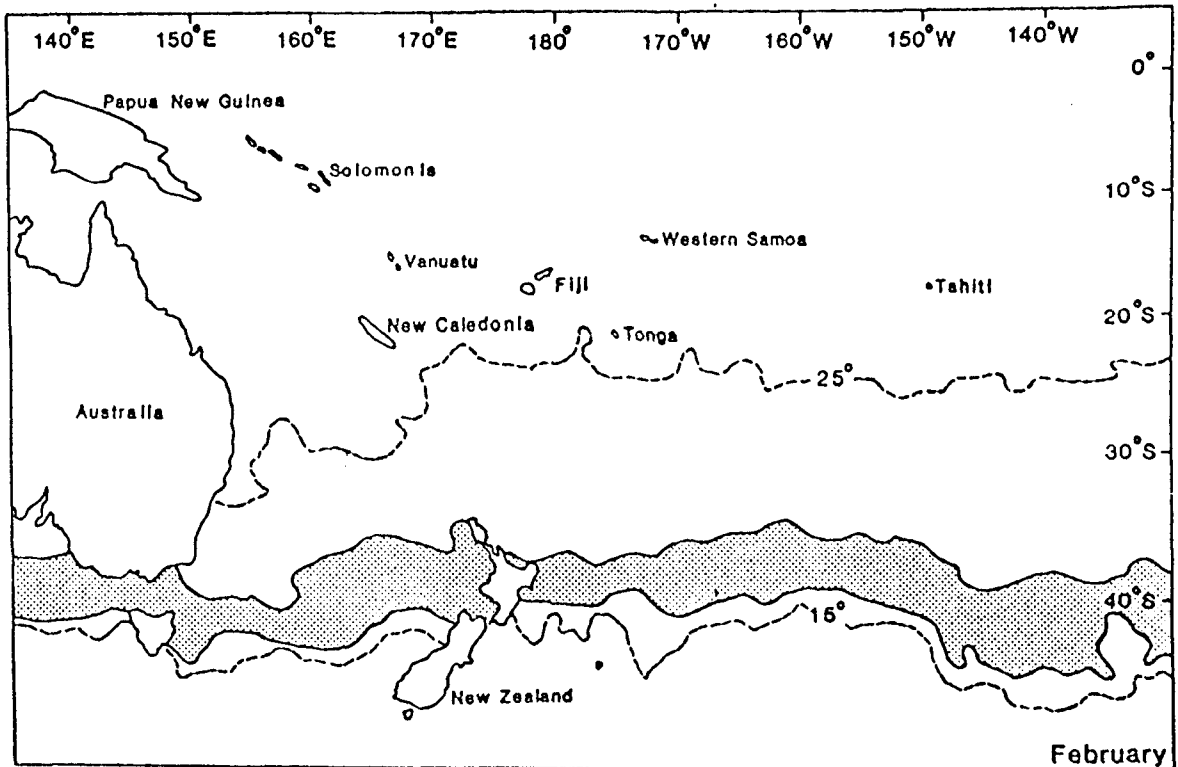


Figure 1. The Australian 200 nautical mile fishing zone, showing (some of) the localities mentioned in the text . The access restraints to which Japanese longline vessels licensed to operate in the zone are subject are also shown.

Figure 2. The distribution of 17-19 C surface water (stippled area) in summer and winter months of 1982 in the south-west Pacific based on mid-month GOSSTCOMP portrayals for February and July. (source: Talbot and Ross, 1986, fig. 1).



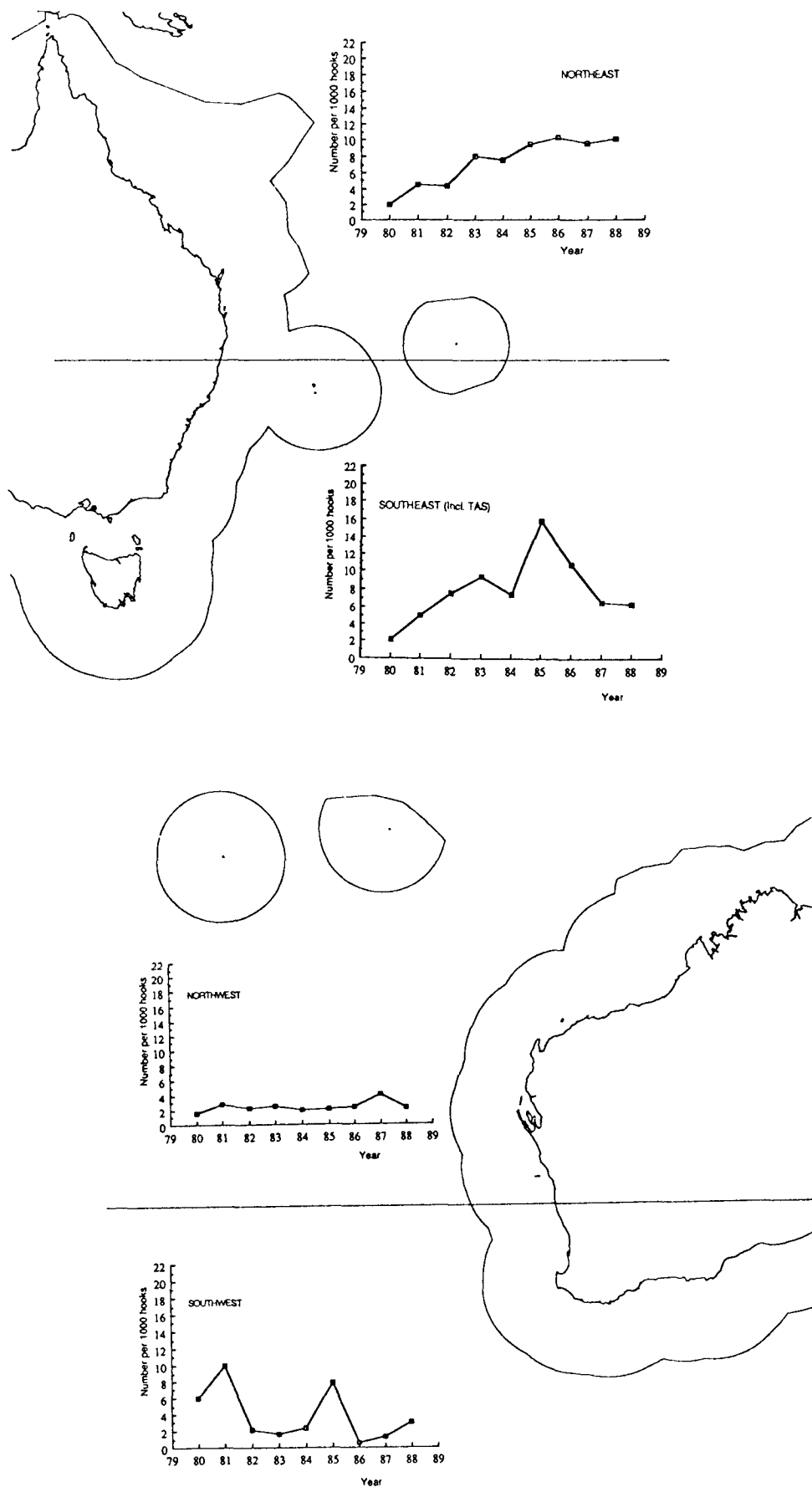


Figure 3. Yearly albacore CPUE (number per 1000 hooks*) in the north-eastern, south-eastern, north-western and south-western AFZ.

* The number of hooks is the number set in "albacore-1 degree squares" in "albacore-months" for those 1 degree squares; these "grid-square-months" have been identified by pooling 1979-1989 data.

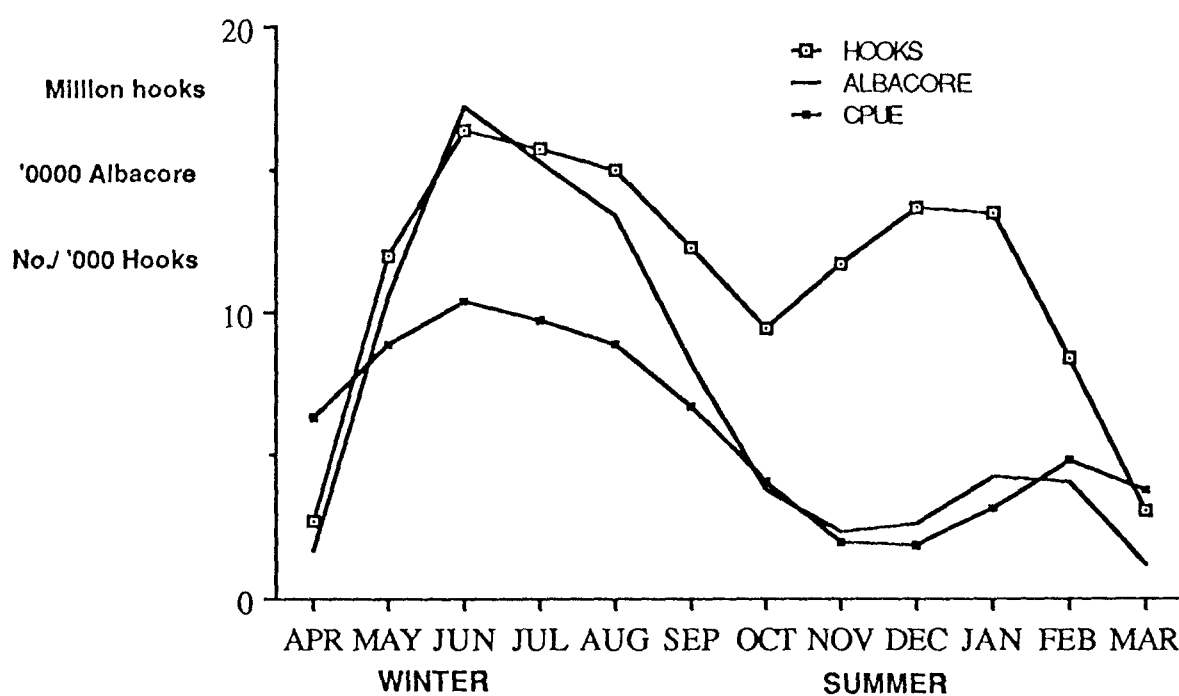


Figure 4. Number of albacore caught, hooks set and number of albacore per thousand hooks set by Japanese longliners in the Australian fishing zone, 1979-89.

(The number of hooks is the number set in "albacore-1 degree squares" in "albacore-months" for those 1 degree squares; "grid-square-months" were identified by pooling 1979-89 data.)

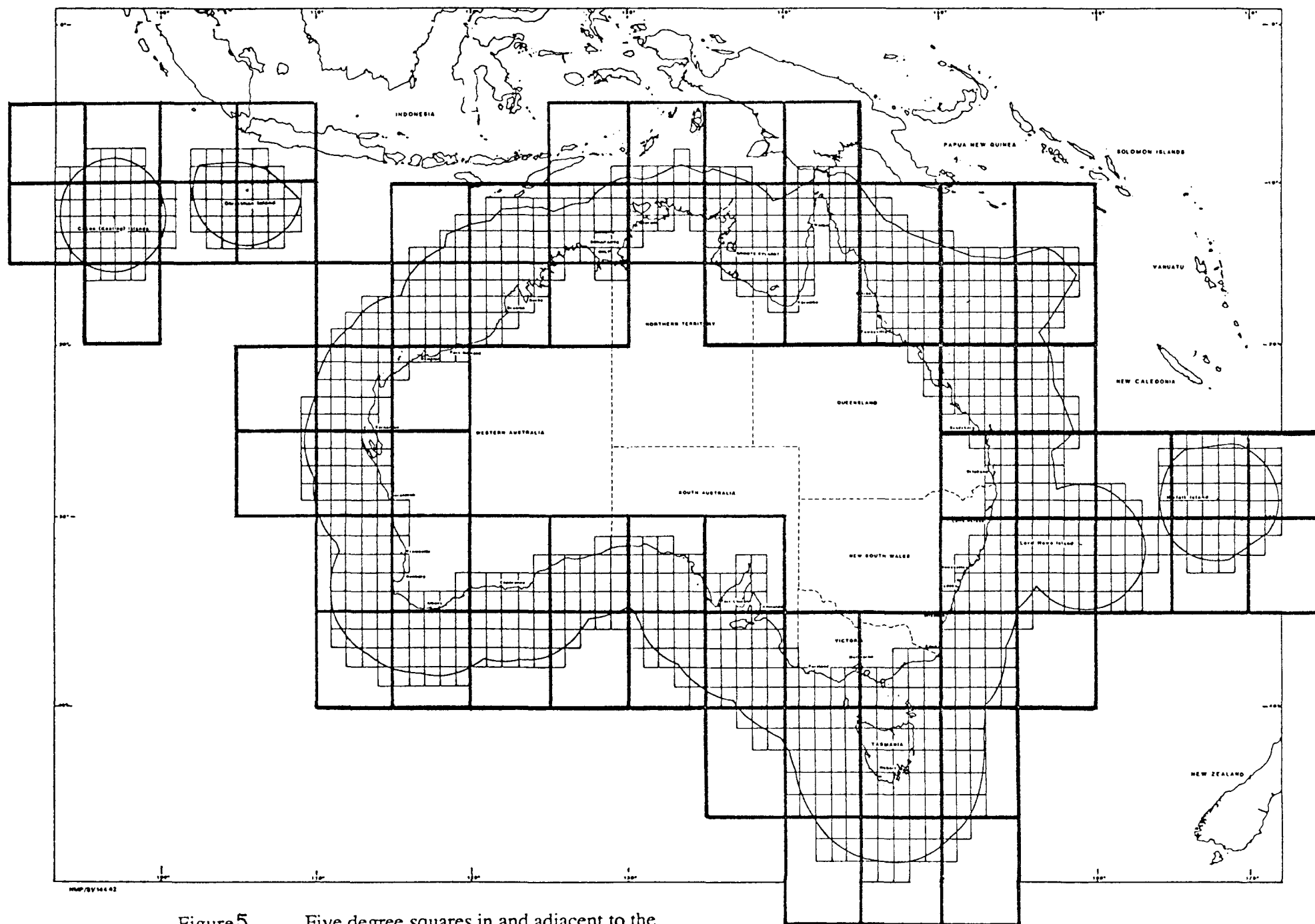


Figure 5 . Five degree squares in and adjacent to the Australian 200 nautical mile fishing zone

Figures 6-11. Distribution of catches and catch rates of albacore and "albacore fishing effort" by Japanese longliners in eastern and western regions of the Australian fishing zone. Data are from the Australian Fishing Zone Information System and combine all data for the period 1980-88.

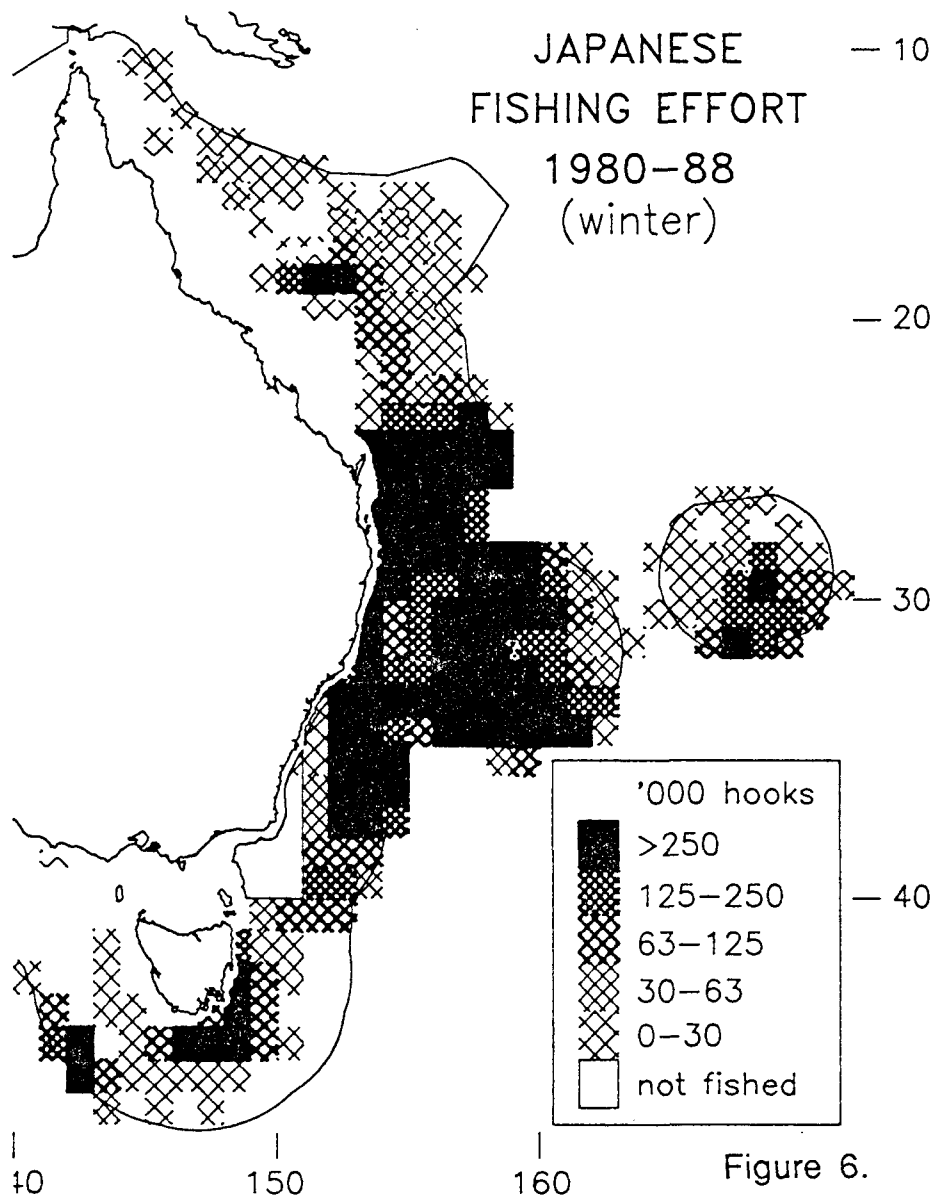


Figure 6.

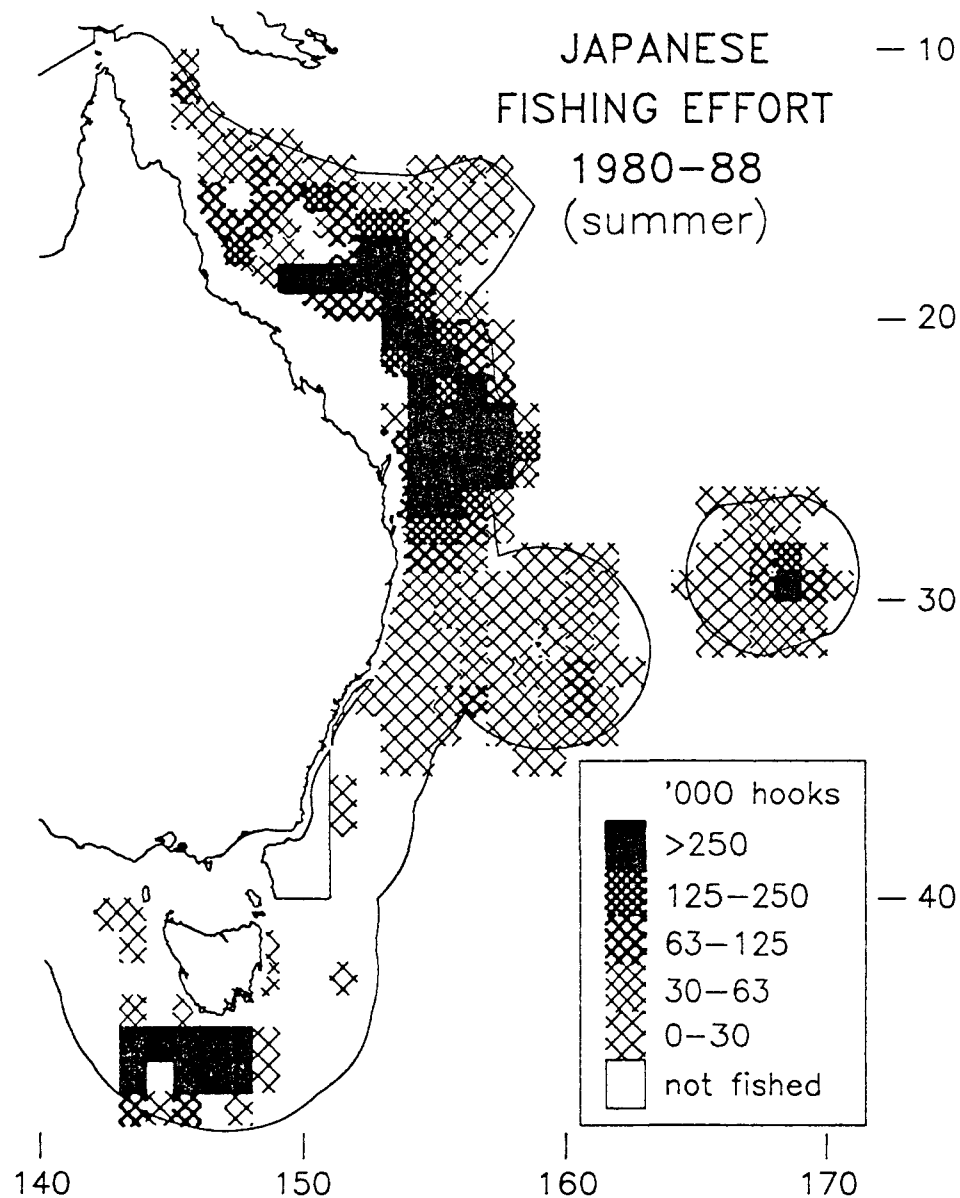
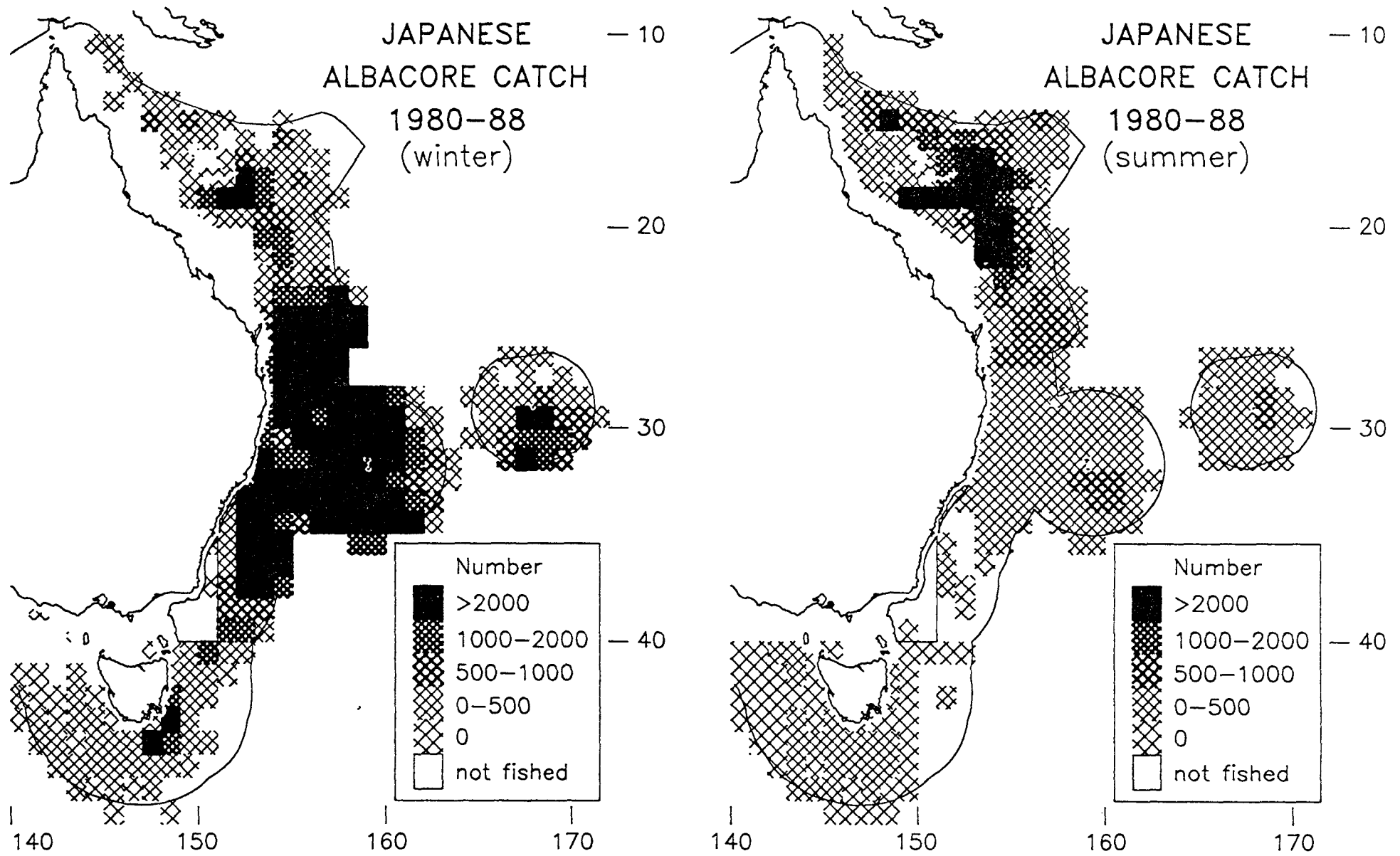


Figure 7.



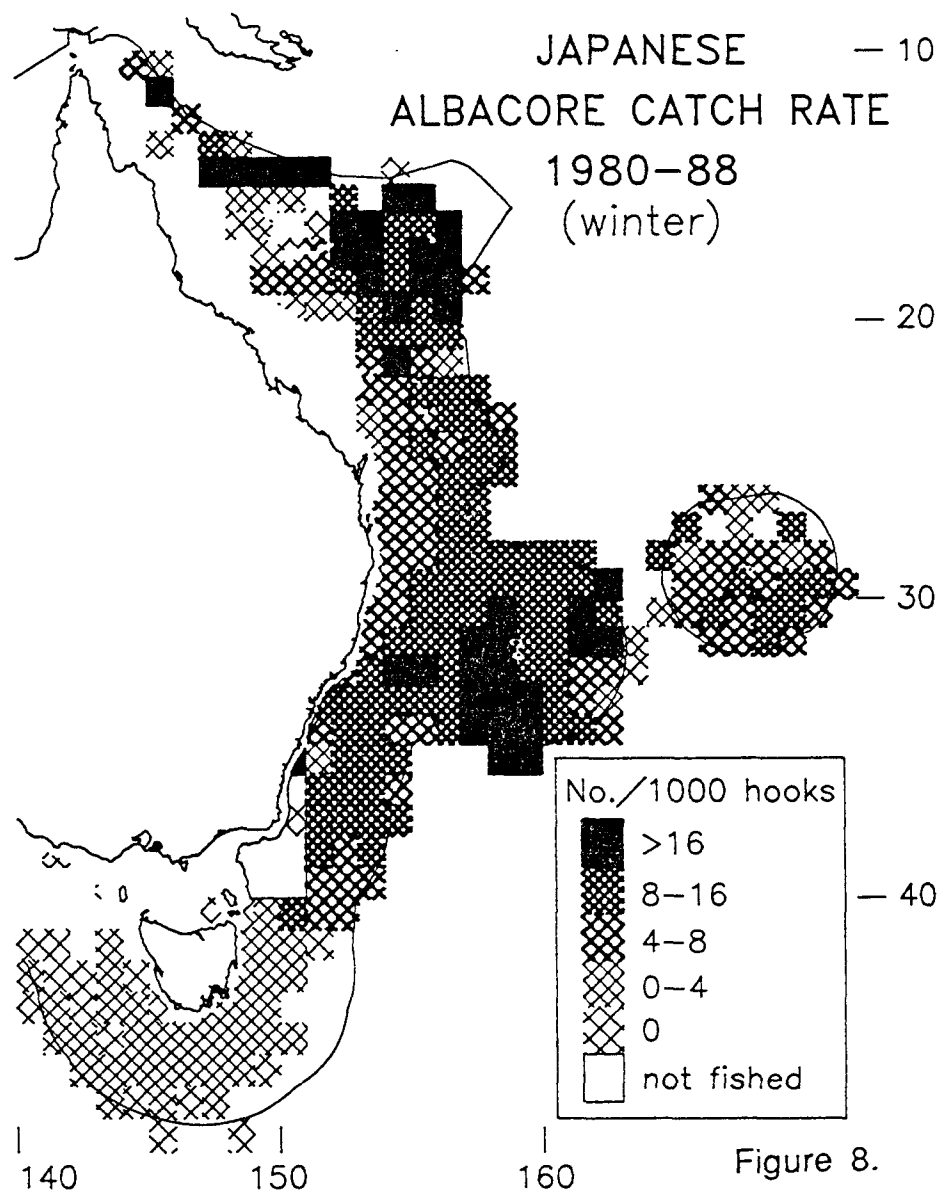


Figure 8.

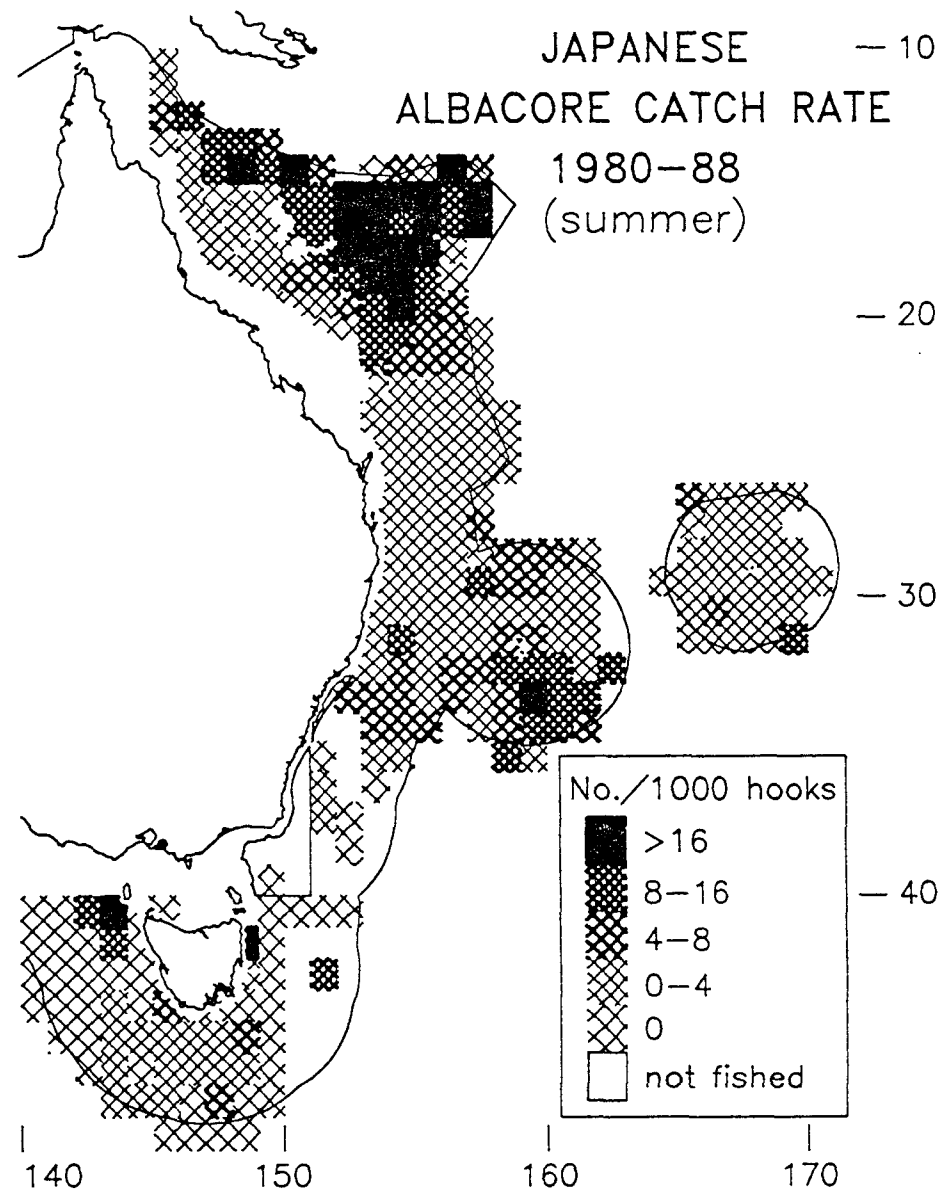
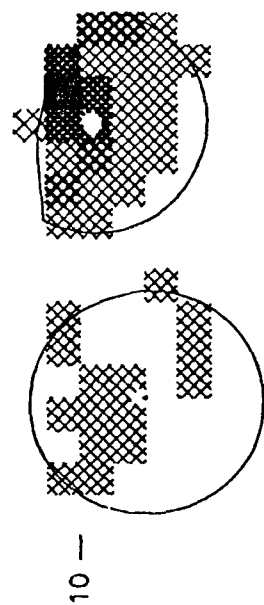
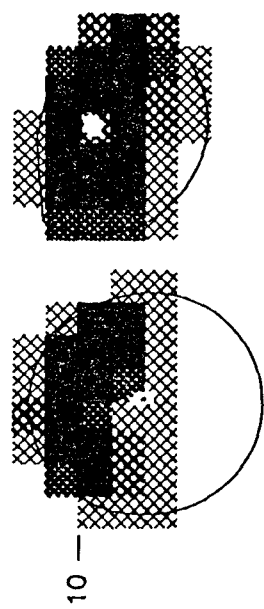
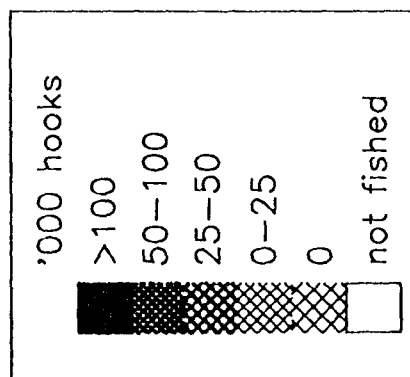


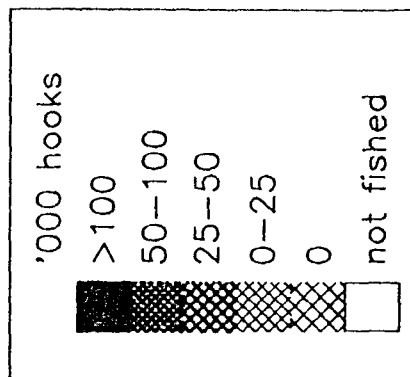
Figure 9.



**JAPANESE
FISHING EFFORT
1980-88
(winter)**



**JAPANESE
FISHING EFFORT
1980-88
(summer)**



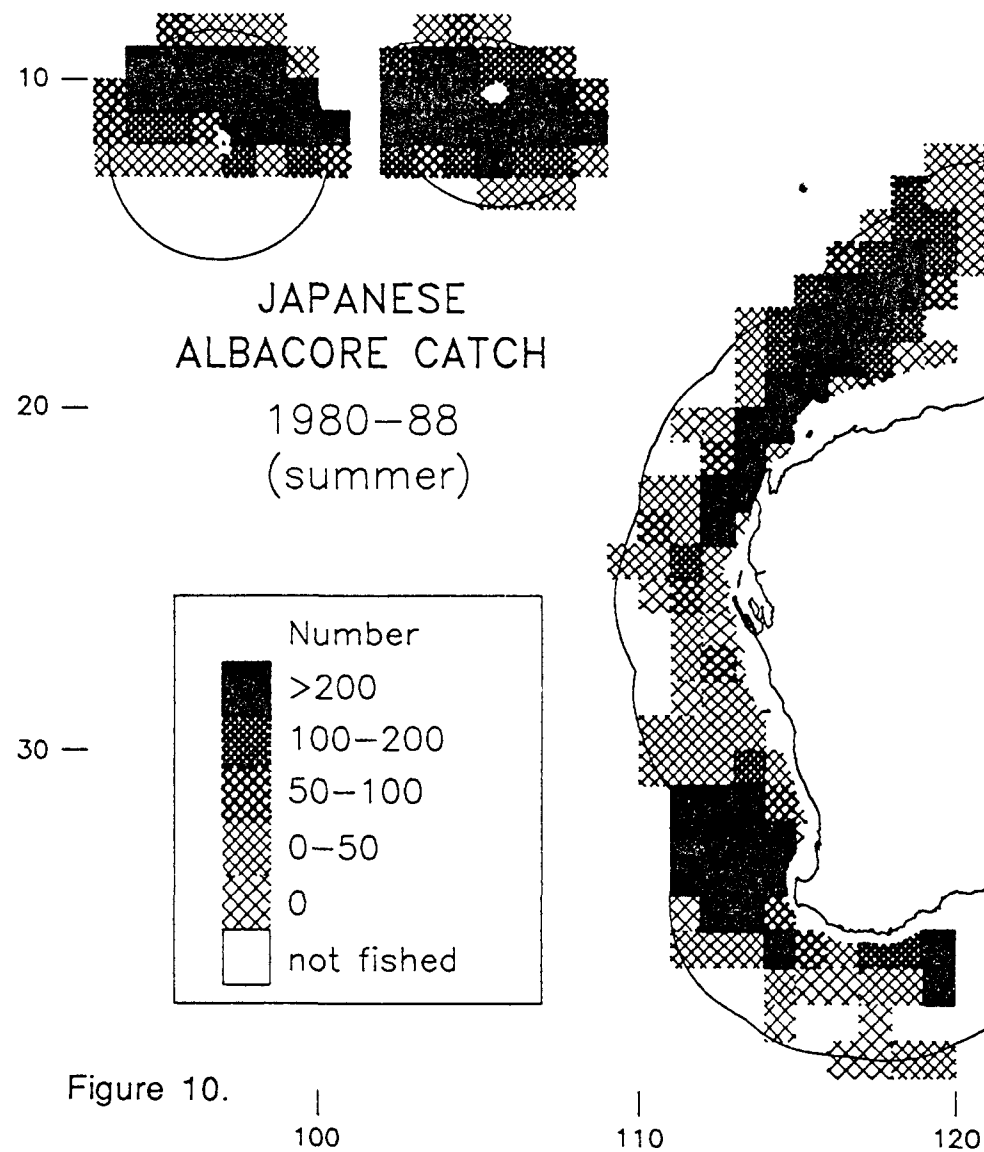
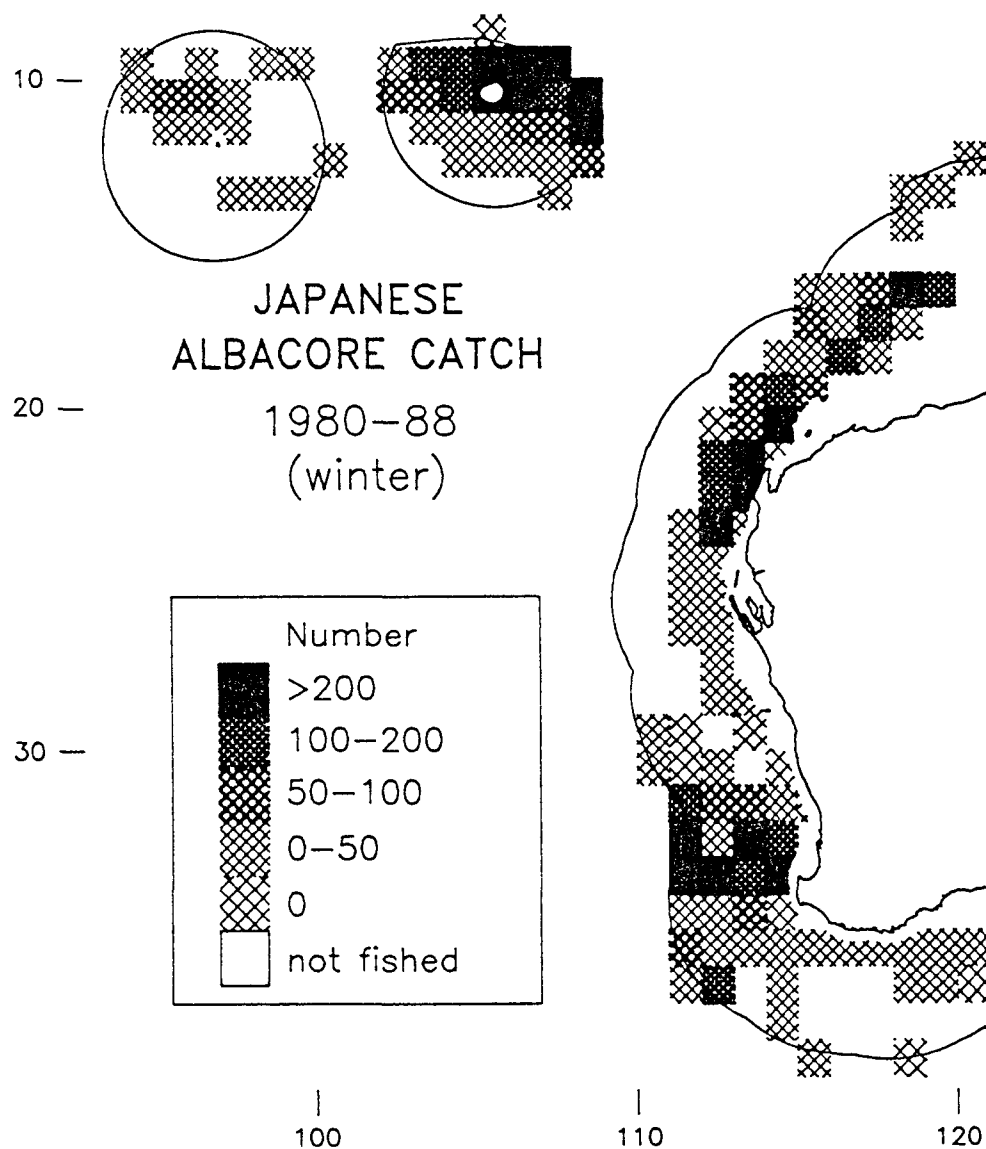


Figure 10.

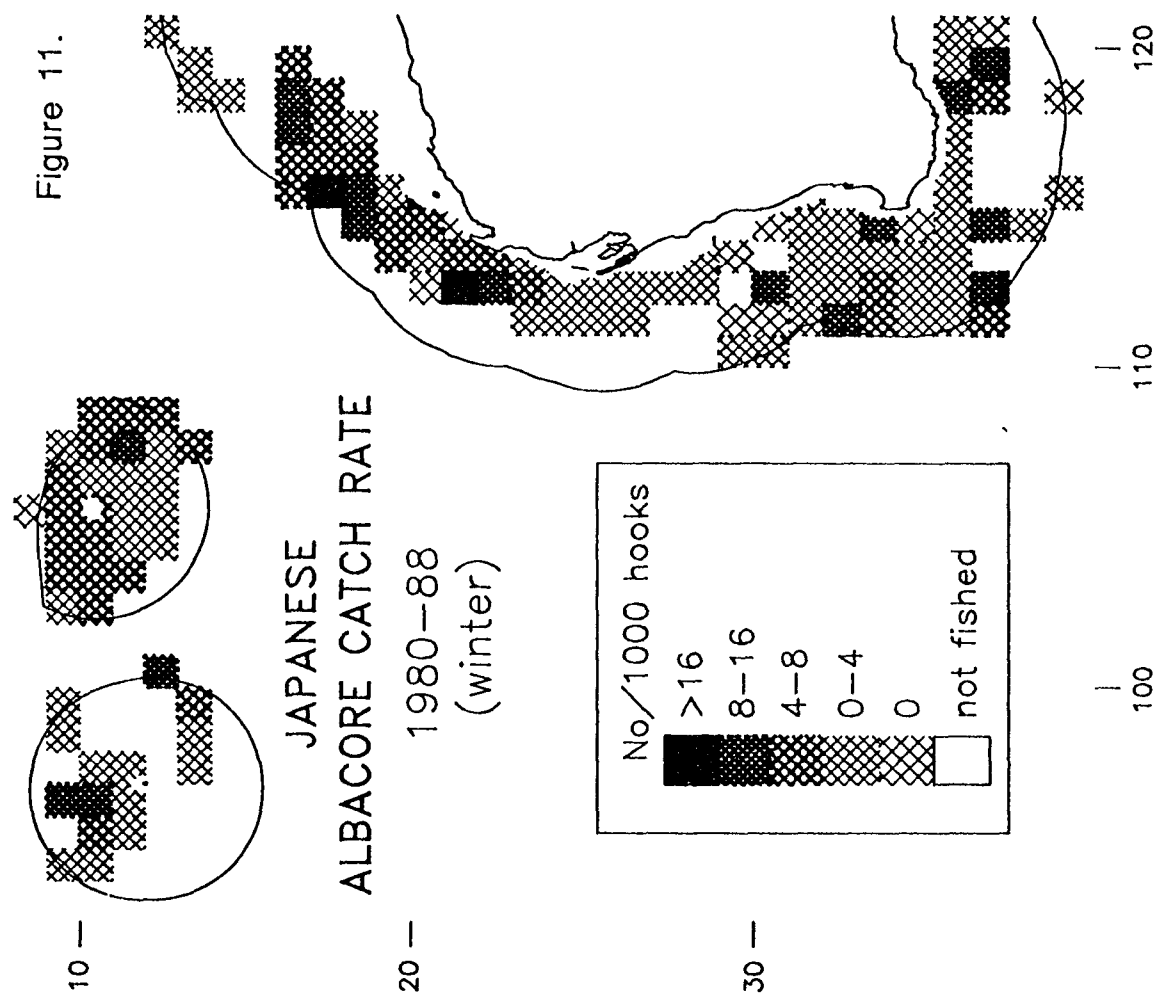
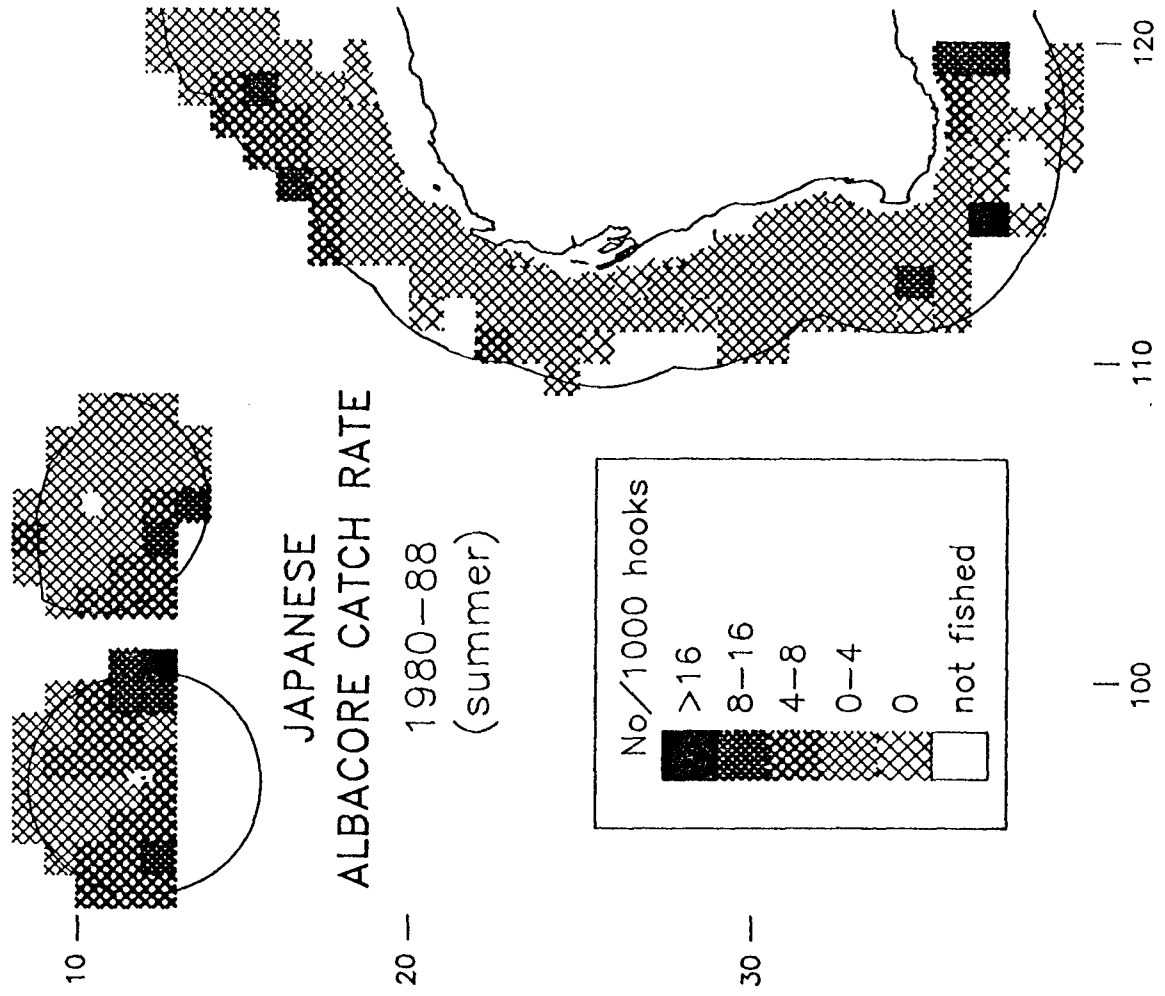


Table 1. CSIRO albacore length-weight sample from Tasmanian east coast, 18 March 1952 to 5 April 1952.

Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)
6.5	52.9	7.0	53.8	8.75	58.5
6.5	54.3	6.5	52.5	8.0	57.1
6.5	52.9	8.5	59.7	12.0	64.8
10.0	62.7	5.75	51.8	6.5	52.8
7.0	54.2	10.75	61.3	11.0	62.2
10.5	60.7	15.5	69.0	22.5	80.7
6.25	51.6	5.75	51.0	6.0	51.6
6.0	51.7	7.0	53.5	5.5	51.4
6.0	52.5	6.0	52.4	11.0	62.7
6.75	52.8	6.25	51.1	5.5	51.5
5.25	51.5	6.0	51.6	6.25	52.6
5.5	50.1	7.0	54.0	6.5	52.9
7.0	53.4	10.0	60.5	6.75	52.1
6.5	51.5	7.5	54.0	6.25	52.3
6.5	51.1	6.25	51.5	6.5	52.3
5.75	51.4	5.5	49.6	6.25	52.0
7.5	55.0	8.0	57.2	7.0	52.8
12.0	62.6	7.5	52.5	5.5	51.0

Table 2. Summary of monthly catches (number of fish) of southern bluefin, albacore and striped tunas during the Tasmanian Tuna Survey, February to May 1965 (Hynd and Robins, 1967, p.34).

Month	Southern Bluefin Tuna	Albacore	Striped Tuna (Skipjack)
February	67	72	10
March	79	57	99
April	34	8	22
May	20	0	12
Total	200	137	143

Table 3. Summary of FRV "Challenger" albacore survey 1981 (from Wolfe, 1981)

Month	Days Trolled	Hours Trolled	Hook Hours	Albacore (kg)	Albacore (number)	Albacore per 100 Hook hours
JAN	5	29.46	258.64	162.00	37	14.34
FEB	7	31.23	332.80	748.80	152	45.64
FEB	8	62.02	744.20	257.09	80	10.75
MAR	7	54.50	621.00	252.98	74	11.92
MAR	7	58.00	696.00	342.95	77	11.06
APR	4	27.00	315.00	4.00	1	0.32
APR	6	33.00	340.00	21.47	8	2.35

Table 4. Albacore tagged by CSIRO between March 1960 and September 1968. Albacore were caught by trolling.

(P COL - colour of tag, PTAG - tag number, REL DATE - date of release,REL LAT - latitude at release, REL LON - longitude at release,REL LEN - length at release)

P COL	PTAG	CTAG	REL DATE	REL LAT	REL LON	REL_LEN
R	00147		600309	3620	15010	79
R	00164		600406	3605	15020	79
R	00165		600409	3540	15010	85
R	00182		600630	3505	15055	61
R	00183		600630	3505	15055	58
R	00184		600630	3505	15055	69
R	00185		600630	3510	15040	66
R	00198		600910	3540	15025	69
R	00214		601014	3700	15010	70
R	00390		610919	3500	15100	74
R	00451		611008	3505	15040	80
R	00452		611008	3505	15040	80
R	00453		611008	3505	15040	83
R	00459		611031	3500	15100	81
R	00471		611108	3700	15010	76
R	00472		611108	3700	15010	80
R	00473		611108	3700	15010	72
R	00474		611108	3700	15010	59
R	01826		621018	3435	15105	48
R	01827		621018	3435	15120	55
R	01828		621018	3435	15120	57
R	01829		621019	3505	15105	94
R	01830		621019	3505	15105	48
R	01831		621019	3505	15105	83
R	01832		621019	3505	15105	81
R	01833		621019	3505	15105	82
R	01834		621019	3505	15100	55
R	01835		621019	3505	15100	46
R	01836		621020	3510	15100	49
R	01837		621020	3510	15100	45
R	01838		621020	3510	15100	53
R	01845		621112	3635	15020	76
R	01847		621113	3535	15040	73
R	01848		621113	3535	15040	81
R	01849		621113	3535	15040	80
R	01850		621113	3535	15040	79
R	01864		621129	3550	15030	49
R	01865		621129	3550	15030	51
R	01870		621209	3655	15020	59
R	01871		621209	3655	15020	61
R	01872		621209	3655	15020	59
R	01873		621209	3655	15020	71
R	01874		621209	3655	15020	56
R	01875		621209	3655	15020	61
R	01876		621209	3655	15020	74
R	01879		621209	3635	15020	48
R	01882		621209	3635	15020	57
R	01885		621209	3640	15020	62
R	01886		621209	3640	15020	60
R	01889		621210	3610	15020	49
R	01890		621210	3600	15025	50
R	01892		621213	3510	15055	56
X	13194	13194	680902	3435	15105	43
X	22724	22724	670901	3620	15025	70
Y	14027		631010	3505	15100	56
Y	14028		631010	3510	15055	71
Y	14031		631023	3400	15150	68
Y	14032		631023	3400	15150	73
Y	14033		631023	3400	15200	70
Y	14034		631023	3400	15200	67
Y	14035		631023	3400	15200	65
Y	14036		631023	3400	15205	60
Y	14037		631023	3400	15205	61
Y	14039		631023	3400	15135	62
Y	14040		631103	3400	15130	79

Table 5. Release and recovery details, time at liberty, and distance and direction travelled, for tagged albacore recovered from New South Wales Game Fish Tagging Program releases.

	Fish 1	Fish 2	Fish 3
Release			
Date	27-10-81	9-6-83	?-1-87
Length (cm)	51 (o'all)	72 (o'all)	?
Weight (kg)	2	~9	~2
Location	off Sydney	off Bateman's Bay	off Sydney
Recapture			
Date	21-9-86	25-5-84	?-5-89
Length (cm)	87 (LCF)	?	?
Weight (kg)	13	~15	~5
Location	off Jervis Bay	off Tuross	off Eden
Interval (days)	1790	351	~875
Distance travelled	170 km south	38 km south	~300 km south

Table 6.

YEARLY JAPANESE LONGLINE VESSEL ACTIVITY BREAKDOWN FOR NORTH-EASTERN, NORTH-WESTERN, SOUTH-EASTERN, SOUTH-WESTERN AND TASMANIAN SUBAREAS OF THE AUSTRALIAN 200 NAUTICAL MILE FISHING ZONE (AFZ)
 FOR ACTIVITY IN "ALBACORE GRIDS" (LATLONG-MONTH GRIDS)
 NOTE THAT SUBAREA VESSEL TOTALS ARE NOT CUMULATIVE BECAUSE SOME VESSELS FISH MORE THAN ONE SUBAREA
 SOURCE: BUREAU OF RURAL RESOURCES; JAPANESE LONGLINE LOGBOOKS FOR AFZ

A R E A	Y E A R	VESSELS >10 SETS IN		TOTAL SETS IN		TOTAL HOOKS IN		HOOKS PER SET IN	
		TOTAL VESSELS	ALBGRDS	TOTAL SETS	ALBGRIDS	TOTAL HOOKS IN ALBGRDS	ALBGRDS	TOTAL HOOKS IN ALBGRDS	ALBGRDS
NE	80	31	24	1093	1083	2600542	2401		
	81	82	72	3221	3121	7509123	2406		
	82	90	73	3873	3744	9469451	2529		
	83	62	53	2120	1977	5113038	2586		
	84	50	42	2019	2012	5422060	2695		
	85	48	47	2075	1996	5582570	2797		
	86	40	34	1250	1183	3396857	2871		
	87	48	39	1536	1445	4097957	2836		
	88	83	77	2914	2906	8394968	2889		
NW	80	6	6	218	213	435310	2044		
	81	37	25	638	627	1429508	2280		
	82	30	20	566	536	1349586	2518		
	83	35	25	652	631	1607923	2548		
	84	58	43	1359	1308	3255855	2489		
	85	55	35	1268	1241	3307070	2665		
	86	66	39	1192	1170	3136405	2681		
	87	32	21	572	537	1472848	2743		
	88	13	9	275	274	753446	2750		
SE	80	22	15	750	749	1642207	2193		
	81	75	50	2105	2074	4679126	2256		
	82	54	36	1477	1415	3508342	2479		
	83	44	33	1528	1476	3854895	2612		
	84	42	29	1019	1017	2689257	2644		
	85	32	21	816	814	2295076	2820		
	86	35	28	1068	1016	2913092	2867		
	87	40	35	1226	1143	3268893	2860		
	88	64	50	1826	1812	5224297	2883		
SW	80	17	8	328	313	753865	2409		
	81	49	11	639	625	1509272	2415		
	82	7	1	32	24	50428	2101		
	83	28	8	305	244	621056	2545		
	84	39	5	273	240	615710	2565		
	85	20	4	126	125	326576	2613		
	86	27	13	324	308	826664	2684		
	87	63	29	1085	1033	2879610	2788		
	88	16	1	64	63	175630	2788		
TS	80	141	60	2843	1568	4066706	2594		
	81	150	53	3169	1498	3941050	2631		
	82	43	11	939	310	784861	2532		
	83	66	42	1935	1136	3083246	2714		
	84	40	19	784	683	1868458	2736		
	85	47	9	795	278	771181	2774		
	86	34	19	825	693	1876634	2708		
	87	64	38	1940	1444	4062600	2813		
	88	48	33	2066	1606	4537115	2825		

* NOTE: "ALBACORE-GRIDS" ARE 1 DEGREE SQUARES IN WHICH ALBACORE HAVE BEEN CAUGHT DURING THE PERIOD 1980-1988; ADDITIONALLY, THEY ARE ONLY "ALBACORE-GRIDS" FOR THE MONTHS IN WHICH ALBACORE HAVE BEEN CAUGHT IN THEM.

Table 7.

ALBACORE CATCH BY DOMESTIC LONGLINERS IN THE AUSTRALIAN FISHING ZONE
SOURCE: BUREAU OF RURAL RESOURCES, LOGBOOKS FROM DOMESTIC LONGLINERS

Y E A R	M O N T H	'000 HOOKS (ALL DAYS)		NUMBER ON ALL LOGS		NUMBER ON NUM&WT LOGS		WEIGHT ON ALL LOGS		TONNES ON NUM&WT LOGS		AVERAGE WEIGHT FROM NUM&WT DAYS		NUMBER PER TOTAL 1000 HOOKS		'000 HOOKS ON NUM&WT ALB&WT DAYS		TONNES PER 1000 NUM&WT HOOKS	
85	10		1-800	0	0	0	0	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000
	11		4-600	5	2	2	2	-010	-010	-010	-010	5-000	5-000	1-087	1-087	-400	-400	-025	-025
	**		6-400	5	2	2	2	-010	-010	-010	-010	5-000	5-000	-781	-781	-400	-400	-025	-025
86	10		-130	0	0	0	0	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000	0-000
	11		9-870	47	23	23	23	-200	-200	-200	-200	8-696	8-696	4-762	4-762	3-710	3-710	-054	-054
	12		57-598	1181	1181	1181	1181	14-373	14-373	14-373	14-373	12-170	12-170	20-504	20-504	52-548	52-548	-274	-274
87	01		21-150	22	22	22	22	-225	-225	-225	-225	10-227	10-227	1-040	1-040	10-820	10-820	-021	-021
	02		54-820	94	94	94	94	-918	-918	-918	-918	9-596	9-596	1-715	1-715	41-680	41-680	-022	-022
	03		80-500	247	247	247	247	2-419	2-419	2-419	2-419	10-424	10-424	3-076	3-076	59-840	59-840	-040	-040
88	04		106-488	925	925	925	925	9-031	9-031	9-031	9-031	9-763	9-763	8-686	8-686	84-342	84-342	-107	-107
	05		75-325	522	522	522	522	5-416	5-416	5-416	5-416	10-276	10-276	6-930	6-930	63-815	63-815	-084	-084
	06		105-824	442	442	442	442	4-729	4-729	4-729	4-729	10-784	10-784	4-177	4-177	81-410	81-410	-056	-056
87	07		204-267	875	875	875	875	10-527	10-527	10-527	10-527	12-072	12-072	4-284	4-284	150-838	150-838	-070	-070
	08		187-609	1029	1029	1029	1029	15-973	15-973	15-973	15-973	15-706	15-706	5-485	5-485	122-292	122-292	-131	-131
	09		203-315	1300	1300	1300	1300	17-573	17-573	17-573	17-573	13-679	13-679	6-394	6-394	147-054	147-054	-116	-116
87	10		112-773	574	574	574	574	7-881	7-881	7-881	7-881	13-730	13-730	5-090	5-090	75-318	75-318	-105	-105
	11		101-969	1066	1066	1066	1066	17-163	17-163	17-163	17-163	16-531	16-531	10-454	10-454	76-720	76-720	-212	-212
	12		55-354	223	223	223	223	3-815	3-815	3-815	3-815	17-136	17-136	4-029	4-029	28-860	28-860	-131	-131
88	**		1309-194	7319	7319	7319	7319	95-670	95-670	95-670	95-670	13-177	13-177	5-590	5-590	942-989	942-989	-100	-100
	01		21-260	64	64	64	64	-560	-560	-560	-560	8-750	8-750	3-010	3-010	7-030	7-030	-080	-080
	02		22-001	134	134	134	134	1-132	1-132	1-132	1-132	8-448	8-448	6-091	6-091	5-385	5-385	-210	-210
88	03		36-485	140	140	140	140	1-385	1-385	1-385	1-385	9-893	9-893	3-837	3-837	18-850	18-850	-073	-073
	04		148-440	733	733	733	733	7-489	7-489	7-489	7-489	10-231	10-231	4-938	4-938	126-830	126-830	-059	-059
	05		131-247	1217	1217	1217	1217	14-688	14-688	14-688	14-688	12-069	12-069	9-273	9-273	109-795	109-795	-134	-134
88	06		88-665	914	914	914	914	8-751	8-751	8-751	8-751	9-571	9-571	10-308	10-308	70-300	70-300	-124	-124
	07		126-340	759	759	759	759	11-317	11-317	11-317	11-317	14-910	14-910	6-008	6-008	116-765	116-765	-097	-097
	08		122-322	651	651	651	651	10-905	10-905	10-905	10-905	16-736	16-736	5-322	5-322	91-086	91-086	-119	-119
88	09		71-416	166	166	166	166	2-085	2-085	2-085	2-085	12-681	12-681	2-324	2-324	42-886	42-886	-047	-047
	10		139-187	1037	1037	1037	1037	15-379	15-379	15-379	15-379	14-830	14-830	7-450	7-450	112-322	112-322	-137	-137
	11		87-268	235	235	235	235	2-895	2-895	2-895	2-895	12-319	12-319	2-693	2-693	48-910	48-910	-059	-059
88	12		15-187	224	224	224	224	1-260	1-260	1-260	1-260	5-726	5-726	14-749	14-749	7-970	7-970	-154	-154
	**		1009-818	6274	6274	6274	6274	77-846	77-846	77-846	77-846	12-423	12-423	6-213	6-213	758-129	758-129	-102	-102

Table 8. Monthly longline effort (number of hooks set)¹, albacore catch (number of fish) and catch rate (number of albacore per thousand hooks) by Japanese longliners in the AFZ during 1979-89.

	EFFORT	CATCH	CATCH RATE
Month	(Million Hooks)	(Albacore [10,000s])	(Albacore per 1000 hooks)
APR	2.7	1.7	6.4
MAY	12.0	10.6	8.9
JUN	16.4	17.2	10.4
JUL	15.7	15.2	9.7
AUG	15.0	13.4	8.9
SEP	12.2	8.2	6.7
OCT	9.4	3.8	4.1
NOV	11.7	2.3	2.0
DEC	13.6	2.6	1.9
JAN	13.5	4.3	3.2
FEB	8.4	4.1	4.9
MAR	3.1	1.2	3.8

¹* "Number of hooks" is the number set in "albacore-1 degree squares" in "albacore-months" for those 1 degree squares; "grid-square-months" were identified by pooling 1979-89 data.

Table 9.

ALBACORE CATCH BY JAPANESE LONGLINERS IN THE AUSTRALIAN FISHING ZONE
 BY SUBAREA: NE - EAST OF 140E, NORTH OF 30S; SE - EAST OF 140E, 30-40 DEGREES SOUTH;
 NW - WEST OF 140E, NORTH OF 30S; SW - WEST OF 140E, SOUTH OF 30S; TS - TASMANIA (SOUTH OF 40S)
 FOR OPERATIONS INSIDE THE 200MILE AFZ

SOURCE: ;BUREAU OF RURAL RESOURCES; LOGBOOKS FROM JAPANESE LONGLINERS

A R E A	Y E A R	'000 HOOKS (ALL DAYS)	'000 HOOKS (ALBA CORE GRIDS)	NUMBER ON ALL LOGS	NUMBER ON NUM&WT LOGS	TONNES ON NUM&WT LOGS	AVERAG WEIGHT FROM NUMWT DAYS	NUMBER PER TOTAL 1000	NUMBER PER1000 ALBGRID HOOKS	'000 HOOKS ON NUM&WT ALBDAYS	TONNES PER 1000 N&WALB HOOKS
NE	80	2609.842	2600.542	5146	0	0.000	0.00	1.972	1.979	0.000	0.000
	81	7570.036	7509.123	34701	0	0.000	0.00	4.584	4.621	0.000	0.000
	82	9536.147	9469.451	41200	0	0.000	0.00	4.320	4.351	0.000	0.000
	83	5136.348	5113.038	40713	9311	169.054	18.16	7.926	7.963	363.790	.465
	84	5439.340	5422.060	41153	40188	635.806	15.82	7.566	7.590	4758.140	.134
	85	5614.718	5582.570	53049	50800	744.320	14.65	9.448	9.503	4788.315	.155
	86	3402.137	3396.857	34996	32521	402.113	12.36	10.286	10.302	2880.145	.140
	87	4114.731	4097.957	39507	38869	517.167	13.31	9.601	9.641	3485.433	.148
	88	8403.398	8394.968	85952	84753	1220.727	14.40	10.228	10.239	7340.548	.166
NW	80	443.370	435.310	703	0	0.000	0.00	1.586	1.615	0.000	0.000
	81	1541.836	1429.508	4025	0	0.000	0.00	2.611	2.816	0.000	0.000
	82	1393.696	1349.586	3154	0	0.000	0.00	2.263	2.337	0.000	0.000
	83	1635.453	1607.923	3970	936	18.434	19.69	2.427	2.469	213.131	.086
	84	3377.231	3255.855	6460	5053	99.541	19.70	1.913	1.984	1686.169	.059
	85	3367.614	3307.070	6782	6440	117.873	18.30	2.014	2.051	1709.255	.069
	86	3189.643	3157.185	7623	7623	144.420	18.95	2.390	2.414	2017.239	.072
	87	1539.365	1472.848	5988	5988	99.316	16.59	3.890	4.066	1001.864	.099
	88	756.146	753.446	1669	1669	31.300	18.75	2.207	2.215	502.590	.062
SE	80	1644.787	1642.207	12188	0	0.000	0.00	7.410	7.422	0.000	0.000
	81	4696.286	4679.126	42412	0	0.000	0.00	9.031	9.064	0.000	0.000
	82	3520.402	3508.342	32409	0	0.000	0.00	9.206	9.238	0.000	0.000
	83	3862.655	3854.895	64618	593	6.190	10.44	16.729	16.763	42.200	.147
	84	2694.717	2689.257	33395	32867	368.046	11.20	12.393	12.418	2509.380	.147
	85	2295.076	2295.076	48866	45134	427.946	9.48	21.292	21.292	2089.571	.205
	86	2927.720	2913.092	49595	48051	417.684	8.69	16.940	17.025	2683.605	.156
	87	3268.893	3268.893	46794	45678	466.374	10.21	14.315	14.315	3067.041	.152
	88	5256.765	5224.297	56114	54863	547.947	9.99	10.675	10.741	4903.925	.112
SW	80	756.635	753.865	4532	0	0.000	0.00	5.761	6.012	0.000	0.000
	81	1524.692	1509.272	15118	0	0.000	0.00	9.915	10.017	0.000	0.000
	82	52.678	50.428	105	0	0.000	0.00	1.993	2.082	0.000	0.000
	83	746.730	621.056	1002	39	.418	10.72	1.342	1.613	22.265	.019
	84	669.292	615.710	1415	1077	14.529	13.49	2.114	2.298	259.042	.056
	85	328.976	326.576	2592	2592	32.564	12.56	7.879	7.937	294.461	.111
	86	834.684	826.664	464	463	7.149	15.44	.556	.561	284.788	.025
	87	2939.840	2879.610	3713	3552	45.565	12.83	1.263	1.289	1137.840	.040
	88	178.030	175.630	544	544	6.730	12.37	3.056	3.097	131.810	.051
TS	80	7308.755	4066.706	7	0	0.000	0.00	.001	.002	0.000	0.000
	81	7984.409	3941.050	905	0	0.000	0.00	.113	.230	0.000	0.000
	82	2395.420	784.861	139	0	0.000	0.00	.058	.177	0.000	0.000
	83	5238.111	3083.246	326	0	0.000	0.00	.062	.106	0.000	0.000
	84	2138.993	1868.458	803	803	9.074	11.30	.375	.430	615.260	.015
	85	2207.200	771.181	3	3	.035	11.67	.001	.004	5.400	.006
	86	2172.953	1876.634	1881	1881	18.333	9.75	.866	1.002	852.530	.022
	87	5438.436	4062.600	1812	1812	18.045	9.96	.333	.446	1216.365	.015
	88	5863.482	4537.115	5059	5047	53.215	10.54	.863	1.115	1865.096	.029

NOTE THAT "ALBACORE-GRIDS" ARE 1 DEGREE SQUARE IN WHICH ALBACORE HAVE BEEN CAUGHT DURING THE PERIOD 1980-1988; ADDITIONALLY, THEY ARE ONLY "ALBACORE-GRIDS" FOR THE MONTHS IN WHICH ALBACORE HAVE BEEN CAUGHT IN THEM.

NOTE THAT BEFORE NOVEMBER 1984 LOGBOOKS FROM JAPANESE LONGLINERS DID NOT INCLUDE WEIGHT OF CATCHES

APPENDIX

Albacore data collected by observers from Japanese longline catches. Catches were not always sampled on a statistical basis.

1	A	B	C	D	E	F	G	H	I	J	K
2	DATE	START	POSITION	HAUL	TEMP				WEIGHTS		
3		LAT (S)	LONG (E)	START	MINIMUM	MAXIMUM	ALIVE	LOF	WHOLE	DRESSED	SEX
4				TIME	SURF. TEMP.	SURF. TEMP.	OR DEAD	(cm)	(kgs)	(kgs)	
4	5/7/89	44 06	147 49	2032	14	14.3	A	80			
5	5/7/89	44 06	147 49	2032	14	14.3	A	72			
6	5/7/89	44 06	147 49	2032	14	14.3	A	72			
7	5/7/89	44 06	147 49	2032	14	14.3	A	91			
8	5/7/89	44 06	147 49	2032	14	14.3	D	76			
9	5/8/89	44 01	147 59	1934	13.9	14.2	D	81			
10	5/8/89	44 01	147 59	1934	13.9	14.2	D	73			
11	5/8/89	44 01	147 59	1934	13.9	14.2	A	85			
12	5/8/89	44 01	147 59	1934	13.9	14.2	A	76			
13	5/8/89	44 01	147 59	1934	13.9	14.2	A	72			
14	5/9/89	44 04	148 05	1940	14	14.6	D	68			
15	5/9/89	44 04	148 05	1940	14	14.6	D	103			
16	5/10/89	44 03	148 08	1945	14	14.6	D	75			
17	5/10/89	44 03	148 08	1945	14	14.6	D	68			
18	8/1/82			130	21.3	21.6					10
19	8/1/82			130	21.3	21.6					11
20	8/1/82			130	21.3	21.6					18
21	8/1/82			130	21.3	21.6					19
22	8/1/82			130	21.3	21.6					13
23	8/1/82			130	21.3	21.6					18
24	8/1/82			130	21.3	21.6					22
25	8/1/82			130	21.3	21.6					14
26	8/1/82			130	21.3	21.6					17
27	8/1/82			130	21.3	21.6					20
28	8/1/82			130	21.3	21.6					12
29	8/1/82			130	21.3	21.6					12
30	8/1/82			130	21.3	21.6					13
31	8/21/87	33 31	155 17	1140		19.7	D	64	5		
32	8/21/87	33 31	155 17	1140		19.7	A				
33	8/21/87	33 31	155 17	1140		19.7	A	80	11		
34	8/21/87	33 31	155 17	1140		19.7	A	82	11		
35	8/21/87	33 31	155 17	1140		19.7	A	76	9		
36	8/21/87	33 31	155 17	1140		19.7	A	77	9		
37	8/21/87	33 31	155 17	1140		19.7		83			F
38	8/21/87	33 31	155 17	1140		19.7	D	78			
39	8/21/87	33 31	155 17	1140		19.7	A	85			
40	8/21/87	33 31	155 17	1140		19.7	D	79	9		
41	8/21/87	33 31	155 17	1140		19.7		79	9		M
42	8/21/87	33 31	155 17	1140		19.7		81	10		
43	8/21/87	33 31	155 17	1140		19.7		63	5		M
44	8/21/87	33 31	155 17	1140		19.7		82	10		
45	8/21/87	33 31	155 17	1140		19.7		78	9		
46	8/21/87	33 31	155 17	1140		19.7		83	10		
47	8/21/87	33 31	155 17	1140		19.7		82	11		
48	8/21/87	33 31	155 17	1140		19.7		80	11		F
49	8/21/87	33 31	155 17	1140		19.7		86	12		
50	8/21/87	33 31	155 17	1140		19.7		84	11		
51	8/21/87	33 31	155 17	1140		19.7		85	11		M
52	8/21/87	33 31	155 17	1140		19.7		79	9		F
53	8/21/87	33 31	155 17	1140		19.7		82	11		
54	8/21/87	33 31	155 17	1140		19.7		75	8		
55	8/21/87	33 31	155 17	1140		19.7		78	9		
56	8/21/87	33 31	155 17	1140		19.7	D	79	9		
57	8/21/87	33 31	155 17	1140		19.7		82	11		
58	8/21/87	33 31	155 17	1140		19.7	D	86	13		F
59	8/21/87	33 31	155 17	1140		19.7		81	11		
60	8/21/87	33 31	155 17	1140		19.7	D	85	12		
61	8/21/87	33 31	155 17	1140		19.7	D	84	11		
62	8/22/87	32 50	153 23	1230		19.7	D				
63	8/22/87	32 50	153 23	1230		19.7	D				
64	8/22/87	32 50	153 23	1230		19.7	A	84	11		
65	8/22/87	32 50	153 23	1230		19.7	A	77	9		M
66	8/22/87	32 50	153 23	1230		19.7	A	84	11		
67	8/22/87	32 50	153 23	1230		19.7					
68	8/22/87	32 50	153 23	1230		19.7					
69	8/22/87	32 50	153 23	1230		19.7					
70	8/22/87	32 50	153 23	1230		19.7					
71	8/22/87	32 50	153 23	1230		19.7					
72	8/22/87	32 50	153 23	1230		19.7	D				
73	8/23/87	32 56	153 37	1410	19.5	19.7					
74	8/23/87	32 56	153 37	1410	19.5	19.7	A	83			F
75	8/23/87	32 56	153 37	1410	19.5	19.7	A				
76	8/23/87	32 56	153 37	1410	19.5	19.7	A				
77	8/23/87	32 56	153 37	1410	19.5	19.7	A				
78	8/23/87	32 56	153 37	1410	19.5	19.7	A				
79	8/23/87	32 56	153 37	1410	19.5	19.7	A				
80	8/23/87	32 56	153 37	1410	19.5	19.7	A				
81	8/23/87	32 56	153 37	1410	19.5	19.7	A				
82	8/23/87	32 56	153 37	1410	19.5	19.7	D				
83	8/23/87	32 56	153 37	1410	19.5	19.7	D				
84	8/23/87	32 56	153 37	1410	19.5	19.7	A				
85	8/23/87	32 56	153 37	1410	19.5	19.7	A				
86	8/23/87	32 56	153 37	1410	19.5	19.7	D				
87	8/23/87	32 56	153 37	1410	19.5	19.7	A				
88	8/23/87	32 56	153 37	1410	19.5	19.7	A				
89	8/23/87	32 56	153 37	1410	19.5	19.7	A				
90	8/23/87	32 56	153 37	1410	19.5	19.7	A	73	8		F
91	8/23/87	32 56	153 37	1410	19.5	19.7					
92	8/23/87	32 56	153 37	1410	19.5	19.7					
93	8/23/87	32 56	153 37	1410	19.5	19.7					

	A	B	C	D	E	F	G	H	I	J	K
94	8/23/87	32 56	153 37	1410	19.5	19.7	D		8		
95	8/23/87	32 56	153 37	1410	19.5	19.7					
96	8/23/87	32 56	153 37	1410	19.5	19.7			10		
97	8/23/87	32 56	153 37	1410	19.5	19.7					
98	8/23/87	32 56	153 37	1410	19.5	19.7					
99	8/23/87	32 56	153 37	1410	19.5	19.7					
100	8/23/87	32 56	153 37	1410	19.5	19.7					
101	8/23/87	32 56	153 37	1410	19.5	19.7					
102	8/23/87	32 56	153 37	1410	19.5	19.7					
103	3/1/88	24 51	157 27	1630		25.8	A			15	
104	3/1/88	24 51	157 27	1630		25.8	A	90		13	
105	3/1/88	24 51	157 27	1630		25.8	A	85		13	
106	3/1/88	24 51	157 27	1630		25.8	A			19	
107	3/1/88	24 51	157 27	1630		25.8	A	92		20	
108	3/1/88	24 51	157 27	1630		25.8	A	96		17	
109	3/1/88	24 51	157 27	1630		25.8	A	103		20	
110	3/1/88	24 51	157 27	1630		25.8	A	87		14	
111	3/1/88	24 51	157 27	1630		25.8	A	105		20	
112	3/1/88	24 51	157 27	1630		25.8	D	96		14	
113	3/1/88	24 51	157 27	1630		25.8	A	96		18	
114	3/1/88	24 51	157 27	1630		25.8	A	92		20	
115	3/1/88	24 51	157 27	1630		25.8	A	90			
116	3/1/88	24 51	157 27	1630		25.8	A	100	19		
117	3/5/88	22 35	155 45	1420		26.4	D	93			
118	3/5/88	22 35	155 45	1420		26.4	A	95		17	
119	3/5/88	22 35	155 45	1420		26.4	A	101		20	
120	3/5/88	22 35	155 45	1420		26.4	D	91		16	
121	3/5/88	22 35	155 45	1420		26.4	A	91		17	
122	3/5/88	22 35	155 45	1420		26.4	A	94		18	
123	3/5/88	22 35	155 45	1420		26.4	D	101		18	
124	3/5/88	22 35	155 45	1420		26.4	D	93		15	
125	3/5/88	22 35	155 45	1420		26.4	D	96		14	
126	3/5/88	22 35	155 45	1420		26.4	D	105		20	
127	3/5/88	22 35	155 45	1420		26.4	A	93		14	
128	3/5/88	22 35	155 45	1420		26.4	A	93			
129	3/8/88	22 36	156 35	1430		26.3	D	90			
130	3/9/88	23 07	156 33	1430		26.7	D	92		14	
131	3/9/88	23 07	156 33	1430		26.7	D	89		13	
132	3/9/88	23 07	156 33	1430		26.7	D	88		13	
133	3/10/88	23 04	156 14	1430		26.6	D	94			
134	3/10/88	23 04	156 14	1430		26.6	A	92			
135	3/10/88	23 04	156 14	1430		26.6	A	95			
136	3/11/88	22 53	155 55	1430		26.6	A	113		27	
137	3/11/88	22 53	155 55	1430		26.6	D	113		24	
138	11/10/87	1910	152 57			26.8	D	106	23		
139	11/10/87	1910	152 57			26.8	A	101	23		
140	11/10/87	1910	152 57			26.8	D	102	23	22	
141	11/11/87	20 40	153 45			26.1		101		21	
142	11/11/87	20 40	153 45			26.1	VA	95		18	
143	11/11/87	20 40	153 45			26.1	VA	94		18	
144	11/11/87	20 40	153 45			26.1	VA	101		22	
145	11/11/87	20 40	153 45			26.1	D	103		23	
146	11/11/87	20 40	153 45			26.1		94		18	
147	11/11/87	20 40	153 45			26.1	D			20	
148	11/11/87	20 40	153 45			26.1	D	103		22	
149	11/11/87	20 40	153 45			26.1	D	96		20	
150	11/11/87	20 40	153 45			26.1	D			20	
151	11/11/87	20 40	153 45			26.1	D				
152	11/11/87	20 40	153 45			26.1	D	96		19	
153	11/11/87	20 40	153 45			26.1	D	100		22	
154	11/11/87	20 40	153 45			26.1	VA	104		23	
155	11/11/87	20 40	153 45			26.1	D	96		19	
156	11/11/87	20 40	153 45			26.1	D	100			
157	11/11/87	20 40	153 45			26.1	VA				
158	11/11/87	20 40	153 45			26.1	D				
159	11/11/87	20 40	153 45			26.1	D				
160	11/11/87	20 40	153 45			26.1	D				
161	11/11/87	20 40	153 45			26.1	D	106	25		
162	11/11/87	20 40	153 45			26.1	D	102		22	
163	11/11/87	20 40	153 45			26.1	D			14	
164	11/11/87	20 40	153 45			26.1	D			23	
165	11/11/87	20 40	153 45			26.1					
166	11/12/87	21 25	154 45			26.1	D	93.5	19		
167	11/12/87	21 25	154 45			26.1	D	104		24	
168	11/12/87	21 25	154 45			26.1	D	105		25	
169	11/12/87	21 25	154 45			26.1	D	102		22	
170	11/12/87	21 25	154 45			26.1	D	103	24	24	
171	11/12/87	21 25	154 45			26.1	D	96	20		
172	11/12/87	21 25	154 45			26.1	D	105	24		
173	11/12/87	21 25	154 45			26.1	D	102	22		
174	11/12/87	21 25	154 45			26.1	D			23	
175	11/12/87	21 25	154 45			26.1	D			23	
176	11/12/87	21 25	154 45			26.1	D			15	
177	11/12/87	21 25	154 45			26.1	D			16	
178	11/12/87	21 25	154 45			26.1	D			20	
179	11/12/87	21 25	154 45			26.1	D			18	
180	11/12/87	21 25	154 45			26.1	A				
181	11/12/87	21 25	154 45			26.1	D				
182	11/12/87	21 25	154 45			26.1	D	102	23		
183	11/12/87	21 25	154 45			26.1	D	97	21		
184	11/12/87	21 25	154 45			26.1	D	102.5	24		
185	11/12/87	21 25	154 45			26.1	D	90			
186	11/12/87	21 25	154 45			26.1					

	A	B	C	D	E	F	G	H	I	J	K
187	11/12/87	21 25	154 45			26.1					
188	11/12/87	21 25	154 45			26.1					
189	11/13/87	21 25	154 45			25.9D		98		18	
190	11/13/87	21 25	154 45			25.9D		103		22	
191	11/13/87	21 25	154 45			25.9D				24	
192	11/13/87	21 25	154 45			25.9D				15	
193	11/13/87	21 25	154 45			25.9D				18	
194	11/13/87	21 25	154 45			25.9D				20	
195	11/13/87	21 25	154 45			25.9D					
196	11/13/87	21 25	154 45			25.9D				23	
197	11/13/87	21 25	154 45			25.9D		102		22	
198	11/13/87	21 25	154 45			25.9D		99		22	
199	11/13/87	21 25	154 45			25.9D		96		20	
200	11/13/87	21 25	154 45			25.9D		104		25	
201	11/13/87	21 25	154 45			25.9D		106	22		
202	11/13/87	21 25	154 45			25.9D		100	22		
203	11/13/87	21 25	154 45			25.9D			21		
204	11/13/87	21 25	154 45			25.9D					
205	11/13/87	21 25	154 45			25.9D		103	22		
206	11/13/87	21 25	154 45			25.9D		99	21		
207	11/13/87	21 25	154 45			25.9D		88	16		
208	11/13/87	21 25	154 45			25.9		95.5	20		
209	11/13/87	21 25	154 45			25.9		94		18	
210	11/13/87	21 25	154 45			25.9		97	19		
211	11/13/87	21 25	154 45			25.9		94		19	
212	11/13/87	21 25	154 45			25.9		100		22	
213	11/13/87	21 25	154 45			25.9		98		16	
214	11/13/87	21 25	154 45			25.9		96	20	20	
215	11/13/87	21 25	154 45			25.9				23	
216	11/13/87	21 25	154 45			25.9D				18	
217	11/13/87	21 25	154 45			25.9D					
218	11/13/87	21 25	154 45			25.9D		104		24	
219	11/13/87	21 25	154 45			25.9D		107		26	
220	11/13/87	21 25	154 45			25.9D		99		20	
221	11/13/87	21 25	154 45			25.9D		90		17	
222	11/13/87	21 25	154 45			25.9D		104		24	
223	11/13/87	21 25	154 45			25.9D		103	24.5	24	
224	11/13/87	21 25	154 45			25.9D		93		19	
225	11/13/87	21 25	154 45			25.9D					
226	8/6/87	32 55	154 14			19.7A					
227	8/6/87	32 55	154 14			19.7A					
228	8/6/87	32 55	154 14			19.7A					
229	8/6/87	32 55	154 14			19.7D					
230	8/6/87	32 55	154 14			19.7					
231	8/6/87	32 55	154 14			19.7A					
232	8/6/87	32 55	154 14			19.7D					
233	8/6/87	32 55	154 14			19.7D					
234	8/6/87	32 55	154 14			19.7A					
235	8/6/87	32 55	154 14			19.7A					
236	8/6/87	32 55	154 14			19.7A					
237	8/6/87	32 55	154 14			19.7D					
238	8/6/87	32 55	154 14			19.7					
239	8/6/87	32 55	154 14			19.7					
240	8/6/87	32 55	154 14			19.7					
241	8/6/87	32 55	154 14			19.7					
242	8/6/87	32 55	154 14			19.7A					
243	8/6/87	32 55	154 14			19.7					
244	8/6/87	32 55	154 14			19.7D					
245	8/6/87	32 55	154 14			19.7A					
246	8/6/87	32 55	154 14			19.7D					
247	8/6/87	32 55	154 14			19.7D					
248	8/6/87	32 55	154 14			19.7D					
249	8/6/87	32 55	154 14			19.7A					
250	8/6/87	32 55	154 14			19.7D					
251	8/6/87	32 55	154 14			19.7A					
252	8/6/87	32 55	154 14			19.7A					
253	8/6/87	32 55	154 14			19.7A					
254	8/6/87	32 55	154 14			19.7A					
255	8/6/87	32 55	154 14			19.7A					
256	8/6/87	32 55	154 14			19.7A					
257	8/6/87	32 55	154 14			19.7A					
258	8/6/87	32 55	154 14			19.7D					
259	8/6/87	32 55	154 14			19.7D					
260	8/6/87	32 55	154 14			19.7D					
261	8/6/87	32 55	154 14			19.7D					
262	8/6/87	32 55	154 14			19.7D					
263	8/6/87	32 55	154 14			19.7D					
264	8/6/87	32 55	154 14			19.7A					
265	8/6/87	32 55	154 14			19.7A					
266	8/6/87	32 55	154 14			19.7D					
267	8/6/87	32 55	154 14			19.7D					
268	8/6/87	32 55	154 14			19.7D					
269	8/6/87	32 55	154 14			19.7A					
270	8/6/87	32 55	154 14			19.7A					
271	8/6/87	32 55	154 14			19.7D					
272	8/6/87	32 55	154 14			19.7D					
273	8/6/87	32 55	154 14			19.7D					
274	8/6/87	32 55	154 14			19.7D					
275	8/6/87	32 55	154 14			19.7D					
276	8/6/87	32 55	154 14			19.7D					
277	8/6/87	32 55	154 14			19.7A					
278	8/6/87	32 55	154 14			19.7A					
279	8/6/87	32 55	154 14			19.7D					

	A	B	C	D	E	F	G	H	I	J	K
280	8/6/87	32 55	154 14			19.7 A					
281	8/6/87	32 55	154 14			19.7 D					
282	8/6/87	32 55	154 14			19.7 D					
283	8/6/87	32 55	154 14			19.7 A					
284	8/6/87	32 55	154 14			19.7 D					
285	8/6/87	32 55	154 14			19.7 A					
286	8/6/87	32 55	154 14			19.7 A					
287	8/6/87	32 55	154 14			19.7 A					
288	8/6/87	32 55	154 14			19.7 A					
289	8/6/87	32 55	154 14			19.7 A					
290	6/6/88	44 09	142 10	1650	10.8	11.2 A					
291	6/6/88	44 09	142 10	1650	10.8	11.2 D					
292	6/14/88	44 55	142 14	1700	10.9	11.9 A		110			
293	6/15/88	44 18	142 27	1630	10.3	11.1 D		96			
294	7/26/82			1330	21	21.2				10	
295	7/26/82			1330	21	21.2				8	
296	7/26/82			1330	21	21.2				6	
297	7/26/82			1330	21	21.2				10	
298	7/26/82			1330	21	21.2				10	
299	7/26/82			1330	21	21.2					
300	7/26/82			1330	21	21.2				10	
301	7/26/82			1330	21	21.2				10	
302	7/26/82			1330	21	21.2				9	
303	7/26/82			1330	21	21.2				7	
304	7/26/82			1330	21	21.2				10	
305	7/26/82			1330	21	21.2				10	
306	7/26/82			1330	21	21.2				10	
307	7/27/82			1330	19.1	19.9				10	
308	7/27/82			1330	19.1	19.9				10	
309	7/27/82			1330	19.1	19.9				7	
310	7/27/82			1330	19.1	19.9				10	
311	7/27/82			1330	19.1	19.9				16	
312	7/27/82			1330	19.1	19.9				20	
313	7/27/82			1330	19.1	19.9				10	
314	7/27/82			1330	19.1	19.9				10	
315	7/27/82			1330	19.1	19.9				14	
316	7/27/82			1330	19.1	19.9				8	
317	7/27/82			1330	19.1	19.9				20	
318	7/27/82			1330	19.1	19.9				17	
319	7/27/82			1330	19.1	19.9				17	
320	7/27/82			1330	19.1	19.9				14	
321	7/27/82			1330	19.1	19.9				17	
322	7/27/82			1330	19.1	19.9				20	
323	7/27/82			1330	19.1	19.9				10	
324	7/27/82			1330	19.1	19.9				14	
325	7/27/82			1330	19.1	19.9				17	
326	7/27/82			1330	19.1	19.9				18	
327	7/27/82			1330	19.1	19.9				14	
328	7/27/82			1330	19.1	19.9				12	
329	7/27/82			1330	19.1	19.9				22	
330	7/27/82			1330	19.1	19.9				17	
331	7/27/82			1330	19.1	19.9				23	
332	7/27/82			1330	19.1	19.9				11	
333	7/27/82			1330	19.1	19.9				19	
334	7/27/82			1330	19.1	19.9				10	
335	7/27/82			1330	19.1	19.9				21	
336	7/27/82			1330	19.1	19.9				15	
337	7/27/82			1330	19.1	19.9				15	
338	7/27/82			1330	19.1	19.9				10	
339	7/27/82			1330	19.1	19.9				11	
340	7/27/82			1330	19.1	19.9				10	
341	7/27/82			1330	19.1	19.9				20	
342	7/29/82			1300	22.4	22.4				15	
343	7/29/82			1300	22.4	22.4				17	
344	7/29/82			1300	22.4	22.4				20	
345	7/29/82			1300	22.4	22.4				19	
346	7/29/82			1300	22.4	22.4				20	
347	5/1/88	43 37	148 04	2016		15.8 D		78			
348	5/1/88	43 37	148 04	2016		15.8 D		73			
349	5/1/88	43 37	148 04	2016		15.8 D		92			
350	5/1/88	43 37	148 04	2016		15.8 A		78			
351	5/1/88	43 37	148 04	2016		15.8		77			
352	5/2/88	43 59	147 44	1800		13.7 A		86			
353	5/2/88	43 59	147 44	1800		13.7		77			
354	5/2/88	43 59	147 44	1800		13.7 D		96			
355	5/2/88	43 59	147 44	1800		13.7 D		88			
356	5/2/88	43 59	147 44	1800		13.7		58			
357	5/2/88	43 59	147 44	1800		13.7		60			
358	5/3/88	44 08	147 53	1800		14.2 A		97			
359	5/3/88	44 08	147 53	1800		14.2 A		79			
360	5/3/88	44 08	147 53	1800		14.2 A		68			
361	5/3/88	44 08	147 53	1800		14.2 A		92			
362	5/3/88	44 08	147 53	1800		14.2 D		74			
363	5/3/88	44 08	147 53	1800		14.2 A		96			
364	5/4/88	44 07	147 28	1800		14.2 A		62			
365	5/4/88	44 07	147 28	1800		14.2 A		91			
366	5/4/88	44 07	147 28	1800		14.2 A		96			
367	5/4/88	44 07	147 28	1800		14.2 A		72			
368	5/4/88	44 07	147 28	1800		14.2 A		63			
369	5/4/88	44 07	147 28	1800		14.2 D		63			
370	5/4/88	44 07	147 28	1800		14.2 D		52			
371	5/4/88	44 07	147 28	1800		14.2 D		58			
372	5/4/88	44 07	147 28	1800		14.2 A		93			

	A	B	C	D	E	F	G	H	I	J	K
373	5/5/88	44 08	147 17	1800		14.8	D	82			
374	5/6/88	44 12	148 14	1800		13.7		68			
375	5/6/88	44 12	148 14	1800		13.7	A	90			
376	5/6/88	44 12	148 14	1800		13.7		92			
377	5/6/88	44 12	148 14	1800		13.7	A	72			
378	5/6/88	44 12	148 14	1800		13.7	D	79			
379	5/6/88	44 12	148 14	1800		13.7	A	60			
380	5/7/88	44 20	148 23	1800		13.4	A	79			
381	5/7/88	44 20	148 23	1800		13.4	D	93			
382	5/8/88	44 07	148 29	1800		13.9	D	73			
383	5/8/88	44 07	148 29	1800		13.9	D	63			
384	5/8/88	44 07	148 29	1800		13.9	D	84			
385	6/12/88	43 01	149 06	1645		16.9	A				
386	6/12/88	43 01	149 06	1645		16.9	A	82			
387	6/13/88	43 00	149 01	1625		15.6	A				
388	6/15/88	42 55	149 00	1645		15.9	A	70			
389	6/16/88	42 53	149 00	1645		15.5	A	64			
390	6/16/88	42 53	149 00	1645		15.5	A	61			
391	6/17/88	42 55	149 01	1655		15.6	A	75			
392	6/17/88	42 55	149 01	1655		15.6	A				
393	6/17/88	42 55	149 01	1655		15.6	A	92			
394	6/17/88	42 55	149 01	1655		15.6	A	75			
395	6/17/88	42 55	149 01	1655		15.6	A	75			
396	6/18/88	43 00	149 01	1650		15.8	A	89			
397	6/18/88	43 00	149 01	1650		15.8	A	68			
398	6/22/88	43 32	148 50	1655		14.9	A	73			
399	6/22/88	43 32	148 50	1655		14.9	A	64			
400	6/10/88	43 00	149 08	1715		16.9	D	104			
401	6/14/88	42 59	149 01	1625		15.8	D	62			
402	6/14/88	42 59	149 01	1625		15.8	D	73			
403	6/14/88	42 59	149 01	1625		15.8	D	68			
404	6/15/88	42 55	149 00	1645		15.9	D				
405	6/15/88	42 55	149 00	1645		15.9	D	96			
406	6/15/88	42 55	149 00	1645		15.9	D	94			
407	6/15/88	42 55	149 00	1645		15.9	D	63			
408	6/16/88	42 53	149 00	1645		15.5	D	65			
409	6/16/88	42 53	149 00	1645		15.5	D	88			
410	6/16/88	42 53	149 00	1645		15.5	D	102			
411	6/17/88	42 55	149 01	1655		15.6	D	75			
412	6/18/88	43 00	149 01	1650		15.8	D	88			
413	6/18/88	43 00	149 01	1650		15.8	D	74			
414	6/18/88	43 00	149 01	1650		15.8	D	62			
415	6/22/88	43 32	148 50	1655		14.9	D	98			
416	8/11/88			915	20.5		A	83	10		
417	8/11/88			915	20.5		A	82	10	9	
418	8/11/88			915	20.5		A	81	10	9	
419	8/11/88			915	20.5		A	84	9		
420	8/11/88			915	20.5		D	86	12		
421	8/11/88			915	20.5		A	93	18		
422	8/11/88			915	20.5		A	87	12		
423	8/11/88			915	20.5		A	92	10		
424	8/11/88			915	20.5		A	92		15	
425	8/11/88			915	20.5		A	84	11		
426	8/11/88			915	20.5		A	89	13		
427	8/11/88			915	20.5		A	95	16		
428	8/11/88			915	20.5		A	97	20		
429	8/11/88			915	20.5		A	92	14		
430	8/11/88			915	20.5		A	84	11		
431	8/11/88			915	20.5		A	140	26		
432	8/11/88			915	20.5		A	81	10		
433	8/11/88			915	20.5		A	96	15		
434	8/11/88			915	20.5			93	12		
435	8/11/88			915	20.5			148	20		
436	8/11/88			915	20.5		A	74	10		
437	8/11/88			915	20.5		A	81	15		
438	8/11/88			915	20.5		A	97	18		
439	8/11/88			915	20.5		D	84	11		
440	8/11/88			915	20.5		D	81	10		
441	8/11/88			915	20.5		D		10		
442	8/12/88			1045	21.4		A	98	15		
443	8/12/88			1045	21.4		A	93	14		
444	8/12/88			1045	21.4		A	93	15		
445	8/12/88			1045	21.4		A	90	15		
446	8/12/88			1045	21.4		A				
447	8/12/88			1045	21.4		A	129	37		
448	8/12/88			1045	21.4		D	92	11		
449	8/12/88			1045	21.4		A	93	16		
450	8/12/88			1045	21.4		A	108	23		
451	8/12/88			1045	21.4		A	94	16		
452	8/12/88			1045	21.4		A	87	13		
453	8/12/88			1045	21.4		A	83	10		
454	8/12/88			1045	21.4		A				
455	8/12/88			1045	21.4		A				
456	8/12/88			1045	21.4		A				
457	8/12/88			1045	21.4		A				
458	8/12/88			1045	21.4		A				
459	8/12/88			1045	21.4		A	80	10		
460	8/12/88			1045	21.4		A	84	11		
461	8/12/88			1045	21.4		A				
462	8/12/88			1045	21.4		A	89	11		
463	8/12/88			1045	21.4		A	91	15		
464	8/12/88			1045	21.4		A	94	16		
465	8/12/88			1045	21.4		A	82	10		

	A	B	C	D	E	F	G	H	I	J	K
466	8/12/88			1045	21.4		A	82	10		
467	8/12/88			1045	21.4		A	97	16		
468	8/12/88			1045	21.4		D	84	12		
469	8/12/88			1045	21.4		D	80	10		
470	8/12/88			1045	21.4		D	87	11		
471	8/12/88			1045	21.4		D	81	10		
472	8/12/88			1045	21.4		D	81	10		
473	8/12/88			1045	21.4		D	87	14	14	
474	8/12/88			1045	21.4		D	82	12		
475	8/12/88			1045	21.4		D	82	10		
476	8/12/88			1045	21.4		D		39		
477	8/13/88			1120	22	22.5	A			30	
478	8/13/88			1120	22	22.5	A	109	24	24	
479	8/13/88			1120	22	22.5	A	91	15		
480	8/13/88			1120	22	22.5	A	95	17		
481	8/13/88			1120	22	22.5	A	93	16	15	
482	8/13/88			1120	22	22.5	A	94	17	16	
483	8/13/88			1120	22	22.5	A	97	18	17	
484	8/13/88			1120	22	22.5	A	102	22		F
485	8/13/88			1120	22	22.5	A	99	18		
486	8/13/88			1120	22	22.5	D	98	17		
487	8/13/88			1120	22	22.5	D	85	11		
488	8/13/88			1120	22	22.5	A	97	17		
489	8/13/88			1120	22	22.5	A	93	18		
490	8/13/88			1120	22	22.5	A	95	17		
491	8/13/88			1120	22	22.5	D	92	14		
492	8/13/88			1120	22	22.5	D	98	15		
493	8/13/88			1120	22	22.5	D				
494	8/13/88			1120	22	22.5	D				
495	8/13/88			1120	22	22.5	D				
496	8/13/88			1120	22	22.5	D				
497	8/13/88			1120	22	22.5	D				
498	8/13/88			1120	22	22.5	A				
499	8/13/88			1120	22	22.5	A	92	15	14	
500	8/13/88			1120	22	22.5	A	99	17		
501	8/13/88			1120	22	22.5	A	90	14		
502	8/13/88			1120	22	22.5	A	92	13		
503	8/13/88			1120	22	22.5	A	101	21		
504	8/13/88			1120	22	22.5	A	95	18		
505	8/13/88			1120	22	22.5					
506	8/13/88			1120	22	22.5	D	92	19	18	
507	8/13/88			1120	22	22.5	A	92	17		
508	8/13/88			1120	22	22.5	D				
509	8/13/88			1120	22	22.5	D				
510	8/13/88			1120	22	22.5	D	96	17		
511	8/13/88			1120	22	22.5	D	94	16		
512	8/13/88			1120	22	22.5	D	92	15		
513	8/13/88			1120	22	22.5	D				
514	8/14/88			1200		22.4	A				
515	8/14/88			1200		22.4	D				
516	8/14/88			1200		22.4	D				
517	8/14/88			1200		22.4	D				
518	8/14/88			1200		22.4	D	96	16		
519	8/14/88			1200		22.4	D	94	18		
520	8/14/88			1200		22.4	D	92	16	16	
521	8/14/88			1200		22.4	D	94	16		
522	8/14/88			1200		22.4	D	102	19		
523	8/14/88			1200		22.4	D	100	18		
524	8/14/88			1200		22.4	A	90	13	13	
525	8/14/88			1200		22.4	D				
526	8/14/88			1200		22.4	D	95	14		
527	8/14/88			1200		22.4	D	102	21		
528	8/14/88			1200		22.4	A				
529	8/14/88			1200		22.4					
530	8/14/88			1200		22.4					
531	8/14/88			1200		22.4					
532	8/14/88			1200		22.4	D	104	25	24	
533	8/14/88			1200		22.4	D	97	19		
534	8/14/88			1200		22.4	D				
535	8/14/88			1200		22.4	D				
536	8/14/88			1200		22.4	D	96	15		
537	8/14/88			1200		22.4	D	92	17	16	
538	8/14/88			1200		22.4	D	107	24	23	
539	8/14/88			1200		22.4	D			24	
540	8/14/88			1200		22.4	D	90	15	14	
541	8/14/88			1200		22.4	D	85	14	14	
542	8/14/88			1200		22.4	D	44	18	18	
543	8/14/88			1200		22.4	D				
544	8/14/88			1200		22.4	D			18	
545	8/14/88			1200		22.4	D	88		12	
546	8/15/88	25 08	156 50	1130	21.3	22	D	108	23		
547	8/15/88	25 08	156 50	1130	21.3	22	D	93	16	15	
548	8/15/88	25 08	156 50	1130	21.3	22	D			19	
549	8/15/88	25 08	156 50	1130	21.3	22	D	105	14		
550	8/15/88	25 08	156 50	1130	21.3	22	D				
551	8/15/88	25 08	156 50	1130	21.3	22	D				
552	8/15/88	25 08	156 50	1130	21.3	22	D	107	20		
553	8/15/88	25 08	156 50	1130	21.3	22	D	100	20		
554	8/15/88	25 08	156 50	1130	21.3	22	A	108	23		
555	8/15/88	25 08	156 50	1130	21.3	22	D	99	20		
556	8/15/88	25 08	156 50	1130	21.3	22	A	109	24	22	
557	8/15/88	25 08	156 50	1130	21.3	22	D	92	18		
558	8/15/88	25 08	156 50	1130	21.3	22	D	84	11		

	A	B	C	D	E	F	G	H	I	J	K
559	8/15/88	25 08	156 50	1130	21.3	22 D		87	16		
560	8/15/88	25 08	156 50	1130	21.3	22 A		89	13		
561	8/15/88	25 08	156 50	1130	21.3	22 D		95	18		
562	8/15/88	25 08	156 50	1130	21.3	22 A		96	18		
563	8/15/88	25 08	156 50	1130	21.3	22 A		96	17		
564	8/15/88	25 08	156 50	1130	21.3	22 A		100	18		
565	8/15/88	25 08	156 50	1130	21.3	22 D		90	24		
566	8/15/88	25 08	156 50	1130	21.3	22 D		91	16		
567	8/15/88	25 08	156 50	1130	21.3	22 A		96	17		
568	8/16/88	25 41	157 02	1200	20.6	21.2 D					
569	8/16/88	25 41	157 02	1200	20.6	21.2 D					
570	8/16/88	25 41	157 02	1200	20.6	21.2 D					
571	8/16/88	25 41	157 02	1200	20.6	21.2 A		97	18		
572	8/16/88	25 41	157 02	1200	20.6	21.2 D		82	10		
573	8/16/88	25 41	157 02	1200	20.6	21.2 A		96	18	18	
574	8/16/88	25 41	157 02	1200	20.6	21.2 D		89	13.5		
575	8/16/88	25 41	157 02	1200	20.6	21.2 A		81	11		
576	8/16/88	25 41	157 02	1200	20.6	21.2 D		86	10		
577	8/16/88	25 41	157 02	1200	20.6	21.2 D		84	11		
578	8/16/88	25 41	157 02	1200	20.6	21.2 D		86	13		
579	8/16/88	25 41	157 02	1200	20.6	21.2 D		82	12		
580	8/16/88	25 41	157 02	1200	20.6	21.2 D		84	11		
581	8/16/88	25 41	157 02	1200	20.6	21.2 D		98	17		
582	6/2/88	43 20	149 00	1700	13.2	D		74			
583	6/2/88	43 20	149 00	1700	13.2	A		78			
584	6/2/88	43 20	149 00	1700	13.2	A		74			
585	6/2/88	43 20	149 00	1700	13.2	A		140		43 F	
586	6/3/88	43 20	149 00	1700	13.2	A		171		90 M	
587	6/8/88	44 15	145 52	1730	13	13.6 D					
588	6/8/88	44 15	145 52	1730	13	13.6 D		98			
589	6/10/88	44 15	146 03	1630	12.6	13.6 D		92			
590	1/31/89	20 12	153 18	1400	27.3	27.5 D		109		24	
591	1/31/89	20 12	153 18	1400	27.3	27.5 VA		105		24	
592	1/31/89	20 12	153 18	1400	27.3	27.5 D					
593	1/31/89	20 12	153 18	1400	27.3	27.5 D					
594	2/1/89	21 00	154 00	1635	27.4	28.2 D		97		18	
595	2/1/89	21 00	154 00	1635	27.4	28.2 A		97		18	
596	2/1/89	21 00	154 00	1635	27.4	28.2 A		93		17	
597	2/1/89	21 00	154 00	1635	27.4	28.2 D		106		23	
598	2/1/89	21 00	154 00	1635	27.4	28.2 D		90		16	
599	2/1/89	21 00	154 00	1635	27.4	28.2 A		91		15	
600	2/1/89	21 00	154 00	1635	27.4	28.2 D		93		15	
601	2/1/89	21 00	154 00	1635	27.4	28.2 A		108		26	
602	2/1/89	21 00	154 00	1635	27.4	28.2 D					
603	2/1/89	21 00	154 00	1635	27.4	28.2 D		92		15	
604	2/1/89	21 00	154 00	1635	27.4	28.2 D		95			
605	2/1/89	21 00	154 00	1635	27.4	28.2 D		76		8	
606	2/1/89	21 00	154 00	1635	27.4	28.2 D		95		15	
607	2/1/89	21 00	154 00	1635	27.4	28.2 D		93		14	
608	2/1/89	21 00	154 00	1635	27.4	28.2 A		96		16	
609	2/1/89	21 00	154 00	1635	27.4	28.2				18	
610	2/1/89	21 00	154 00	1635	27.4	28.2				19	
611	2/2/89	21 50	154 47	1700	26.8	27.2 D					
612	2/2/89	21 50	154 47	1700	26.8	27.2 VA		105		20	
613	2/2/89	21 50	154 47	1700	26.8	27.2 D		99		19	
614	2/2/89	21 50	154 47	1700	26.8	27.2 A		101		21	
615	2/2/89	21 50	154 47	1700	26.8	27.2 D		96		18	
616	2/2/89	21 50	154 47	1700	26.8	27.2 A		100		19	
617	2/2/89	21 50	154 47	1700	26.8	27.2 A		104		20	
618	2/2/89	21 50	154 47	1700	26.8	27.2 A		96		19	
619	2/2/89	21 50	154 47	1700	26.8	27.2 D		92		16	
620	2/2/89	21 50	154 47	1700	26.8	27.2 VA		106		21	
621	2/2/89	21 50	154 47	1700	26.8	27.2 D		102		20	
622	2/2/89	21 50	154 47	1700	26.8	27.2 D		101		19	
623	2/2/89	21 50	154 47	1700	26.8	27.2 D		102		21	
624	2/2/89	21 50	154 47	1700	26.8	27.2 D		100		20	
625	2/2/89	21 50	154 47	1700	26.8	27.2 D		90		16	
626	2/2/89	21 50	154 47	1700	26.8	27.2 D		95		20	
627	2/2/89	21 50	154 47	1700	26.8	27.2 D		101		19	
628	2/2/89	21 50	154 47	1700	26.8	27.2 VA		92		15	
629	2/2/89	21 50	154 47	1700	26.8	27.2 D		96		16	
630	2/2/89	21 50	154 47	1700	26.8	27.2 D		97		18	
631	2/2/89	21 50	154 47	1700	26.8	27.2 D		94		16	
632	2/2/89	21 50	154 47	1700	26.8	27.2 D		100		19	
633	2/2/89	21 50	154 47	1700	26.8	27.2 D		95		18	
634	2/2/89	21 50	154 47	1700	26.8	27.2 D		106	25	24	
635	2/2/89	21 50	154 47	1700	26.8	27.2 VA		99		21	
636	2/2/89	21 50	154 47	1700	26.8	27.2 D		90		14	
637	2/2/89	21 50	154 47	1700	26.8	27.2 D		95	17		
638	2/2/89	21 50	154 47	1700	26.8	27.2 VA		94		18	
639	2/2/89	21 50	154 47	1700	26.8	27.2 D		105		21	
640	2/2/89	21 50	154 47	1700	26.8	27.2 D		95		18	
641	2/2/89	21 50	154 47	1700	26.8	27.2 D		104		22	
642	2/2/89	21 50	154 47	1700	26.8	27.2 D		115		25	
643	2/2/89	21 50	154 47	1700	26.8	27.2 D		98		18	
644	2/2/89	21 50	154 47	1700	26.8	27.2 D		103		21	
645	2/2/89	21 50	154 47	1700	26.8	27.2 D		90		14	
646	2/2/89	21 50	154 47	1700	26.8	27.2 D		103		20	
647	2/3/89	21 50	155 05	1600	26.7	27 D		93		16	
648	2/3/89	21 50	155 05	1600	26.7	27 A		92		17	
649	2/3/89	21 50	155 05	1600	26.7	27 A		109		20	
650	2/3/89	21 50	155 05	1600	26.7	27 A		103		22	
651	2/3/89	21 50	155 05	1600	26.7	27 D		92		16	

	A	B	C	D	E	F	G	H	I	J	K
652	2/3/89	21 50	155 05	1600	26.7	27 D		83		10	
653	2/3/89	21 50	155 05	1600	26.7	27 D		99		18	
654	2/3/89	21 50	155 05	1600	26.7	27 D		100		18	
655	2/3/89	21 50	155 05	1600	26.7	27 A		100		19	
656	2/3/89	21 50	155 05	1600	26.7	27 D		96		17	
657	2/3/89	21 50	155 05	1600	26.7	27 VA		90		12	
658	2/3/89	21 50	155 05	1600	26.7	27 VA		95		18	
659	2/3/89	21 50	155 05	1600	26.7	27 VA		90		16	
660	2/3/89	21 50	155 05	1600	26.7	27 D		93		14	
661	2/3/89	21 50	155 05	1600	26.7	27 D		93		16	
662	2/3/89	21 50	155 05	1600	26.7	27 A		103		23	
663	2/3/89	21 50	155 05	1600	26.7	27 D		90		17	
664	2/3/89	21 50	155 05	1600	26.7	27 D		100		21	
665	2/4/89	21 10	155 10	1730	26.8	27 A				16	
666	2/4/89	21 10	155 10	1730	26.8	27 A				15	
667	2/4/89	21 10	155 10	1730	26.8	27 D		94		16	
668	2/4/89	21 10	155 10	1730	26.8	27 A		95		17	
669	2/4/89	21 10	155 10	1730	26.8	27 D		96		17	
670	2/4/89	21 10	155 10	1730	26.8	27 D		94		17	
671	2/4/89	21 10	155 10	1730	26.8	27 D		93		17	
672	2/4/89	21 10	155 10	1730	26.8	27 A		97		18	
673	2/4/89	21 10	155 10	1730	26.8	27 A		105		24	
674	2/4/89	21 10	155 10	1730	26.8	27 D		97		19	
675	2/4/89	21 10	155 10	1730	26.8	27 D		100			
676	2/4/89	21 10	155 10	1730	26.8	27 D		97		19	
677	2/4/89	21 10	155 10	1730	26.8	27 A		108		25	
678	2/4/89	21 10	155 10	1730	26.8	27 D				18	
679	2/4/89	21 10	155 10	1730	26.8	27 D		102		21	
680	2/4/89	21 10	155 10	1730	26.8	27 D		98		17	
681	2/4/89	21 10	155 10	1730	26.8	27 D		94		15	
682	2/4/89	21 10	155 10	1730	26.8	27 D		100		20	
683	2/4/89	21 10	155 10	1730	26.8	27 D		99		19	
684	2/4/89	21 10	155 10	1730	26.8	27 D		93		15	
685	2/4/89	21 10	155 10	1730	26.8	27 D		99		20	
686	2/4/89	21 10	155 10	1730	26.8	27 D		105		18	
687	2/4/89	21 10	155 10	1730	26.8	27 D		105		23	
688	2/4/89	21 10	155 10	1730	26.8	27 D		102		20	
689	2/5/89	21 30	155 00	1930	27	27.2 D		93		16	
690	2/5/89	21 30	155 00	1930	27	27.2 D					
691	4/9/89	43 49	147 56	1630	14.5	15.1 A		78			
692	4/9/89	43 49	147 56	1630	14.5	15.1 A		85			
693	4/9/89	43 49	147 56	1630	14.5	15.1 A		73			
694	4/9/89	43 49	147 56	1630	14.5	15.1 A					
695	4/9/89	43 49	147 56	1630	14.5	15.1 D		99			
696	4/9/89	43 49	147 56	1630	14.5	15.1 D		95			
697	4/9/89	43 49	147 56	1630	14.5	15.1 D		100	17		
698	4/9/89	43 49	147 56	1630	14.5	15.1 A		86			
699	4/10/89	43 48	147 57	1730	14.5	15.6 D		75		8	
700	4/10/89	43 48	147 57	1730	14.5	15.6 D		90		12	
701	4/10/89	43 48	147 57	1730	14.5	15.6 D		80			
702	4/11/89	43 50	147 55	1845	14.5	15 D		83			
703	4/11/89	43 50	147 55	1845	14.5	15 D					
704	4/11/89	43 50	147 55	1845	14.5	15 D		92			
705	4/11/89	43 50	147 55	1845	14.5	15 D					
706	4/11/89	43 50	147 55	1845	14.5	15 D		94			
707	4/11/89	43 50	147 55	1845	14.5	15 A		100			
708	4/11/89	43 50	147 55	1845	14.5	15 D		80			
709	4/11/89	43 50	147 55	1845	14.5	15 A		76			
710	4/11/89	43 50	147 55	1845	14.5	15 A		105			
711	4/12/89	43 50	147 52	1815	14.5	15.1 D		80			
712	4/12/89	43 50	147 52	1815	14.5	15.1 D		90		11	
713	4/12/89	43 50	147 52	1815	14.5	15.1 A		73			
714	4/12/89	43 50	147 52	1815	14.5	15.1 A		73			
715	4/12/89	43 50	147 52	1815	14.5	15.1 A		72			
716	4/12/89	43 50	147 52	1815	14.5	15.1 A		82			
717	4/12/89	43 50	147 52	1815	14.5	15.1 A		77			
718	4/12/89	43 50	147 52	1815	14.5	15.1 A		96			
719	4/12/89	43 50	147 52	1815	14.5	15.1 A		68			
720	4/12/89	43 50	147 52	1815	14.5	15.1 D		73			
721	4/12/89	43 50	147 52	1815	14.5	15.1 D		105	23	22	
722	4/13/89	43 56	147 49	1815	14.7	15.1 A		95			
723	4/13/89	43 56	147 49	1815	14.7	15.1 D		73		6	
724	4/13/89	43 56	147 49	1815	14.7	15.1 D		80			
725	4/13/89	43 56	147 49	1815	14.7	15.1 D		88	12	11	
726	4/14/89	43 48	147 56	1815	14.6	15 D		80			
727	4/14/89	43 48	147 56	1815	14.6	15 D		91			
728	4/14/89	43 48	147 56	1815	14.6	15 A		78			
729	4/14/89	43 48	147 56	1815	14.6	15 A		95			
730	4/14/89	43 48	147 56	1815	14.6	15 D		73			
731	4/14/89	43 48	147 56	1815	14.6	15 A		75			
732	4/14/89	43 48	147 56	1815	14.6	15 A		71			
733	4/14/89	43 48	147 56	1815	14.6	15 D		77			
734	4/14/89	43 48	147 56	1815	14.6	15 D		75			
735	4/14/89	43 48	147 56	1815	14.6	15 D		99			
736	4/14/89	43 48	147 56	1815	14.6	15 D		97			
737	4/14/89	43 48	147 56	1815	14.6	15 D		77			
738	4/14/89	43 48	147 56	1815	14.6	15 D		76			
739	4/14/89	43 48	147 56	1815	14.6	15 A		71		7	
740	4/14/89	43 48	147 56	1815	14.6	15 D		82			
741	4/15/89	43 46	147 58	1830	14.7	14.9 D		69		7	
742	4/15/89	43 46	147 58	1830	14.7	14.9 D					
743	4/15/89	43 46	147 58	1830	14.7	14.9 A		73			
744	4/15/89	43 46	147 58	1830	14.7	14.9 D		72			

	A	B	C	D	E	F	G	H	I	J	K
745	4/15/89	43 46	147 58	1830	14.7	14.9	A	83			
746	4/16/89	44 12	147 53	1900	14.5	15.1	A	72			
747	4/16/89	44 12	147 53	1900	14.5	15.1	A	74			
748	4/16/89	44 12	147 53	1900	14.5	15.1	A	80			
749	4/16/89	44 12	147 53	1900	14.5	15.1	A	70			
750	4/16/89	44 12	147 53	1900	14.5	15.1	A	70			
751	4/16/89	44 12	147 53	1900	14.5	15.1	A	81			
752	1/31/89	18 05	152 50	1730	28.3	28.7	D	96			
753	1/31/89	18 05	152 50	1730	28.3	28.7	D	103			
754	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
755	1/31/89	18 05	152 50	1730	28.3	28.7	D	94			
756	1/31/89	18 05	152 50	1730	28.3	28.7	D	99			
757	1/31/89	18 05	152 50	1730	28.3	28.7	D	91			
758	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
759	1/31/89	18 05	152 50	1730	28.3	28.7	D	96			
760	1/31/89	18 05	152 50	1730	28.3	28.7	A	100			
761	1/31/89	18 05	152 50	1730	28.3	28.7	D	99			
762	1/31/89	18 05	152 50	1730	28.3	28.7	A	98			
763	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
764	1/31/89	18 05	152 50	1730	28.3	28.7		93			
765	1/31/89	18 05	152 50	1730	28.3	28.7		97			
766	1/31/89	18 05	152 50	1730	28.3	28.7		103			
767	1/31/89	18 05	152 50	1730	28.3	28.7		95			
768	1/31/89	18 05	152 50	1730	28.3	28.7		101			
769	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			
770	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
771	1/31/89	18 05	152 50	1730	28.3	28.7	D	96			
772	1/31/89	18 05	152 50	1730	28.3	28.7	D	102			
773	1/31/89	18 05	152 50	1730	28.3	28.7	A	98			
774	1/31/89	18 05	152 50	1730	28.3	28.7	A	96			
775	1/31/89	18 05	152 50	1730	28.3	28.7	A	98			
776	1/31/89	18 05	152 50	1730	28.3	28.7	A	106			
777	1/31/89	18 05	152 50	1730	28.3	28.7	A	96			
778	1/31/89	18 05	152 50	1730	28.3	28.7	D	103			
779	1/31/89	18 05	152 50	1730	28.3	28.7	D	94			
780	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
781	1/31/89	18 05	152 50	1730	28.3	28.7	D	99			
782	1/31/89	18 05	152 50	1730	28.3	28.7	D	105			
783	1/31/89	18 05	152 50	1730	28.3	28.7	D	99			
784	1/31/89	18 05	152 50	1730	28.3	28.7	D	94			
785	1/31/89	18 05	152 50	1730	28.3	28.7	D	96			
786	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
787	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
788	1/31/89	18 05	152 50	1730	28.3	28.7	D	95			
789	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
790	1/31/89	18 05	152 50	1730	28.3	28.7	D	107			
791	1/31/89	18 05	152 50	1730	28.3	28.7	A	103			
792	1/31/89	18 05	152 50	1730	28.3	28.7	A	104			
793	1/31/89	18 05	152 50	1730	28.3	28.7	A	96			
794	1/31/89	18 05	152 50	1730	28.3	28.7	D	77			
795	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
796	1/31/89	18 05	152 50	1730	28.3	28.7	D	103			
797	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
798	1/31/89	18 05	152 50	1730	28.3	28.7	D	104			
799	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			
800	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
801	1/31/89	18 05	152 50	1730	28.3	28.7	D	92			
802	1/31/89	18 05	152 50	1730	28.3	28.7	D	89			
803	1/31/89	18 05	152 50	1730	28.3	28.7	D	94			
804	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			
805	1/31/89	18 05	152 50	1730	28.3	28.7	A	96			
806	1/31/89	18 05	152 50	1730	28.3	28.7	D	102			
807	1/31/89	18 05	152 50	1730	28.3	28.7	A	96			
808	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
809	1/31/89	18 05	152 50	1730	28.3	28.7	D	90			
810	1/31/89	18 05	152 50	1730	28.3	28.7		90			
811	1/31/89	18 05	152 50	1730	28.3	28.7		90			
812	1/31/89	18 05	152 50	1730	28.3	28.7	D	91			
813	1/31/89	18 05	152 50	1730	28.3	28.7	D				
814	1/31/89	18 05	152 50	1730	28.3	28.7	D	103			
815	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
816	1/31/89	18 05	152 50	1730	28.3	28.7	D	104			
817	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
818	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
819	1/31/89	18 05	152 50	1730	28.3	28.7	D	91			
820	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			
821	1/31/89	18 05	152 50	1730	28.3	28.7	D	94			
822	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
823	1/31/89	18 05	152 50	1730	28.3	28.7	D	99			
824	1/31/89	18 05	152 50	1730	28.3	28.7	D	96			
825	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
826	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
827	1/31/89	18 05	152 50	1730	28.3	28.7	D	95			
828	1/31/89	18 05	152 50	1730	28.3	28.7	D	95			
829	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
830	1/31/89	18 05	152 50	1730	28.3	28.7	D	100			
831	1/31/89	18 05	152 50	1730	28.3	28.7	D	92			
832	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			
833	1/31/89	18 05	152 50	1730	28.3	28.7	D	101			
834	1/31/89	18 05	152 50	1730	28.3	28.7	D				
835	1/31/89	18 05	152 50	1730	28.3	28.7	D	93			
836	1/31/89	18 05	152 50	1730	28.3	28.7	D	97			
837	1/31/89	18 05	152 50	1730	28.3	28.7	D	98			

	A	B	C	D	E	F	G	H	I	J	K
838	2/1/89	18 32	151 47	1710	28.3	28.8 D		94			
839	2/1/89	18 32	151 47	1710	28.3	28.8 D		96			
840	2/1/89	18 32	151 47	1710	28.3	28.8 D		90			
841	2/1/89	18 32	151 47	1710	28.3	28.8 D		88			
842	2/1/89	18 32	151 47	1710	28.3	28.8 D		96			
843	2/1/89	18 32	151 47	1710	28.3	28.8 A		104			
844	2/1/89	18 32	151 47	1710	28.3	28.8 D		108			
845	2/1/89	18 32	151 47	1710	28.3	28.8 D		95			
846	2/1/89	18 32	151 47	1710	28.3	28.8 A		100			
847	2/1/89	18 32	151 47	1710	28.3	28.8 D		98			
848	2/1/89	18 32	151 47	1710	28.3	28.8 A		92			
849	2/1/89	18 32	151 47	1710	28.3	28.8 D		96			
850	2/1/89	18 32	151 47	1710	28.3	28.8 D		101			
851	2/1/89	18 32	151 47	1710	28.3	28.8 D		102			
852	2/1/89	18 32	151 47	1710	28.3	28.8 D		96			
853	2/1/89	18 32	151 47	1710	28.3	28.8 D		105			
854	2/1/89	18 32	151 47	1710	28.3	28.8 A		95			
855	2/1/89	18 32	151 47	1710	28.3	28.8 D		94			
856	2/1/89	18 32	151 47	1710	28.3	28.8 D		98			
857	2/1/89	18 32	151 47	1710	28.3	28.8 D		96			
858	2/1/89	18 32	151 47	1710	28.3	28.8 D		97			
859	2/1/89	18 32	151 47	1710	28.3	28.8 D		98			
860	2/1/89	18 32	151 47	1710	28.3	28.8 D		93			
861	2/1/89	18 32	151 47	1710	28.3	28.8 D		99			
862	2/1/89	18 32	151 47	1710	28.3	28.8 D		98			
863	2/1/89	18 32	151 47	1710	28.3	28.8 D		95			
864	2/1/89	18 32	151 47	1710	28.3	28.8 D		94			
865	2/1/89	18 32	151 47	1710	28.3	28.8 D		102			
866	2/1/89	18 32	151 47	1710	28.3	28.8 D		97			
867	2/1/89	18 32	151 47	1710	28.3	28.8 D		97			
868	2/2/89	18 04	153 12	1710	28.5	28.7 D					
869	2/2/89	18 04	153 12	1710	28.5	28.7 D		97			
870	2/2/89	18 04	153 12	1710	28.5	28.7 D		99			
871	2/2/89	18 04	153 12	1710	28.5	28.7 D		110			
872	2/2/89	18 04	153 12	1710	28.5	28.7 D		104			
873	2/2/89	18 04	153 12	1710	28.5	28.7 D		107			
874	2/2/89	18 04	153 12	1710	28.5	28.7 A		101			
875	2/2/89	18 04	153 12	1710	28.5	28.7 A		97			
876	2/2/89	18 04	153 12	1710	28.5	28.7 A		99			
877	2/2/89	18 04	153 12	1710	28.5	28.7 A		98			
878	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
879	2/2/89	18 04	153 12	1710	28.5	28.7 D		89			
880	2/2/89	18 04	153 12	1710	28.5	28.7 D		92			
881	2/2/89	18 04	153 12	1710	28.5	28.7 D		97			
882	2/2/89	18 04	153 12	1710	28.5	28.7 D		93			
883	2/2/89	18 04	153 12	1710	28.5	28.7 D		99			
884	2/2/89	18 04	153 12	1710	28.5	28.7 D		88			
885	2/2/89	18 04	153 12	1710	28.5	28.7 D		96			
886	2/2/89	18 04	153 12	1710	28.5	28.7 A		97			
887	2/2/89	18 04	153 12	1710	28.5	28.7 A		103			
888	2/2/89	18 04	153 12	1710	28.5	28.7 D		92			
889	2/2/89	18 04	153 12	1710	28.5	28.7 D		103			
890	2/2/89	18 04	153 12	1710	28.5	28.7 D		90			
891	2/2/89	18 04	153 12	1710	28.5	28.7 D		95			
892	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
893	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
894	2/2/89	18 04	153 12	1710	28.5	28.7 D		81			
895	2/2/89	18 04	153 12	1710	28.5	28.7 D		93			
896	2/2/89	18 04	153 12	1710	28.5	28.7 D		92			
897	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
898	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
899	2/2/89	18 04	153 12	1710	28.5	28.7 D		92			
900	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
901	2/2/89	18 04	153 12	1710	28.5	28.7 D		96			
902	2/2/89	18 04	153 12	1710	28.5	28.7 D		104			
903	2/2/89	18 04	153 12	1710	28.5	28.7 D		102			
904	2/2/89	18 04	153 12	1710	28.5	28.7 D		95			
905	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
906	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
907	2/2/89	18 04	153 12	1710	28.5	28.7 D		109			
908	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
909	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
910	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
911	2/2/89	18 04	153 12	1710	28.5	28.7 D		101			
912	2/2/89	18 04	153 12	1710	28.5	28.7 D		94			
913	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
914	2/2/89	18 04	153 12	1710	28.5	28.7 D		98			
915	2/2/89	18 04	153 12	1710	28.5	28.7 D		104			
916	2/2/89	18 04	153 12	1710	28.5	28.7 D		94			
917	2/2/89	18 04	153 12	1710	28.5	28.7 D		109			
918	2/2/89	18 04	153 12	1710	28.5	28.7 D		99			
919	2/2/89	18 04	153 12	1710	28.5	28.7 D		97			
920	2/2/89	18 04	153 12	1710	28.5	28.7 D		101			
921	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
922	2/2/89	18 04	153 12	1710	28.5	28.7 D		99			
923	2/2/89	18 04	153 12	1710	28.5	28.7 D		102			
924	2/2/89	18 04	153 12	1710	28.5	28.7 D		93			
925	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			
926	2/2/89	18 04	153 12	1710	28.5	28.7 D		94			
927	2/2/89	18 04	153 12	1710	28.5	28.7		96			
928	2/2/89	18 04	153 12	1710	28.5	28.7 D		93			
929	2/2/89	18 04	153 12	1710	28.5	28.7 D		91			
930	2/2/89	18 04	153 12	1710	28.5	28.7 D		100			

Albacore Raw Data to May 89

	A	B	C	D	E	F	G	H	I	J	K
931	2/2/89	18 04	153 12	1710	28.5	28.7D		108			
932	2/2/89	18 04	153 12	1710	28.5	28.7D		101			
933	2/2/89	18 04	153 12	1710	28.5	28.7D					F
934	2/2/89	18 04	153 12	1710	28.5	28.7D		96			
935	2/2/89	18 04	153 12	1710	28.5	28.7D		100			
936	2/3/89	17 31	153 20	1718	28.4	29D		97			
937	2/3/89	17 31	153 20	1718	28.4	29		99			
938	2/3/89	17 31	153 20	1718	28.4	29A		107			
939	2/3/89	17 31	153 20	1718	28.4	29D		94			
940	2/3/89	17 31	153 20	1718	28.4	29D		91			
941	2/3/89	17 31	153 20	1718	28.4	29D		91			
942	2/5/89	16 06	151 52	1445	28.8	28.9A		101			
943	2/5/89	16 06	151 52	1445	28.8	28.9D		100			
944	2/5/89	16 06	151 52	1445	28.8	28.9D		95			
945	2/5/89	16 06	151 52	1445	28.8	28.9D		96			
946	2/5/89	16 06	151 52	1445	28.8	28.9A		98			
947	2/5/89	16 06	151 52	1445	28.8	28.9D					
948	2/5/89	16 06	151 52	1445	28.8	28.9D		109			
949	2/5/89	16 06	151 52	1445	28.8	28.9D		97			
950	2/5/89	16 06	151 52	1445	28.8	28.9D		96			
951	2/5/89	16 06	151 52	1445	28.8	28.9D		101			
952	2/5/89	16 06	151 52	1445	28.8	28.9D		82			
953	2/5/89	16 06	151 52	1445	28.8	28.9D		96			
954	2/5/89	16 06	151 52	1445	28.8	28.9D		92			
955	2/5/89	16 06	151 52	1445	28.8	28.9D		100			
956	2/5/89	16 06	151 52	1445	28.8	28.9D		101			
957	2/5/89	16 06	151 52	1445	28.8	28.9D		97			
958	4/23/88	43 20	148 23	1700		16.6D		80			
959	4/23/88	43 20	148 23	1700		16.6D		74			
960	4/23/88	43 20	148 23	1700		16.6D		70			
961	4/24/88	43 35	148 08	1830		16.2A		78			
962	4/24/88	43 35	148 08	1830		16.2D		74			
963	4/24/88	43 35	148 08	1830		16.2D		85			
964	4/24/88	43 35	148 08	1830		16.2A		73			
965	4/24/88	43 35	148 08	1830		16.2A		76			
966	4/25/88	43 34	148 07	1800		16.3A		77			
967	4/25/88	43 34	148 07	1800		16.3D		72			
968	4/26/88	43 36	148 18	1755		16.1A		75			
969	4/26/88	43 36	148 18	1755		16.1D		90			
970	4/26/88	43 36	148 18	1755		16.1A		74			
971	4/27/88	43 38	148 25	1746		15.6A		88			
972	4/27/88	43 38	148 25	1746		15.6A		68			
973	4/27/88	43 38	148 25	1746		15.6D		94			
974	4/27/88	43 38	148 25	1746		15.6D		91			
975	4/27/88	43 38	148 25	1746		15.6D		90			
976	4/27/88	43 38	148 25	1746		15.6D		85			
977	4/27/88	43 38	148 25	1746		15.6D		72			
978	4/27/88	43 38	148 25	1746		15.6D		73			
979	4/27/88	43 38	148 25	1746		15.6A		94			
980	4/2/89	44 18	147 20	1700	14.2	15.4D		80			
981	4/2/89	44 18	147 20	1700	14.2	15.4D		78		F	
982	4/2/89	44 18	147 20	1700	14.2	15.4D		82		F	
983	4/2/89	44 18	147 20	1700	14.2	15.4D		85			
984	4/2/89	44 18	147 20	1700	14.2	15.4D		83			
985	4/2/89	44 18	147 20	1700	14.2	15.4A		97			
986	4/2/89	44 18	147 20	1700	14.2	15.4D		81		M	
987	4/3/89	44 11	147 22	1800	14.1	15.5A		84			
988	4/3/89	44 11	147 22	1800	14.1	15.5D		78			
989	4/3/89	44 11	147 22	1800	14.1	15.5A		98			
990	4/3/89	44 11	147 22	1800	14.1	15.5D		80			
991	4/3/89	44 11	147 22	1800	14.1	15.5D		73			
992	4/3/89	44 11	147 22	1800	14.1	15.5D		74			
993	4/3/89	44 11	147 22	1800	14.1	15.5D		98			
994	4/3/89	44 11	147 22	1800	14.1	15.5D		98			
995	4/3/89	44 11	147 22	1800	14.1	15.5D		73			
996	4/4/89	44 12	147 16	1700	14.8	15.3A		62			
997	4/4/89	44 12	147 16	1700	14.8	15.3A		86			
998	4/4/89	44 12	147 16	1700	14.8	15.3A		64			
999	4/4/89	44 12	147 16	1700	14.8	15.3A		101			
000	4/4/89	44 12	147 16	1700	14.8	15.3D		63			
001	4/4/89	44 12	147 16	1700	14.8	15.3D		61			
002	4/4/89	44 12	147 16	1700	14.8	15.3D		68			
003	4/4/89	44 12	147 16	1700	14.8	15.3D					
004	4/4/89	44 12	147 16	1700	14.8	15.3D		82			
005	4/4/89	44 12	147 16	1700	14.8	15.3D		95			
006	4/5/89	44 20	147 00	1700	14.3	15.7D		78			
007	4/5/89	44 20	147 00	1700	14.3	15.7D		69			
008	4/5/89	44 20	147 00	1700	14.3	15.7A		76			
009	4/5/89	44 20	147 00	1700	14.3	15.7D					
010	4/5/89	44 20	147 00	1700	14.3	15.7D					
011	4/5/89	44 20	147 00	1700	14.3	15.7D					
012	4/5/89	44 20	147 00	1700	14.3	15.7D					
013	4/5/89	44 20	147 00	1700	14.3	15.7A					
014	4/5/89	44 20	147 00	1700	14.3	15.7D					
015	4/5/89	44 20	147 00	1700	14.3	15.7D					
016	4/5/89	44 20	147 00	1700	14.3	15.7D					
017	4/5/89	44 20	147 00	1700	14.3	15.7A					
018	4/5/89	44 20	147 00	1700	14.3	15.7D					
019	4/5/89	44 20	147 00	1700	14.3	15.7D					
020	4/7/89			1700	13.9	15.8					
021	4/23/88	44 15	146 52	1705	13.1	15.1A		70			
022	4/23/88	44 15	146 52	1705	13.1	15.1D		77			
023	4/23/88	44 15	146 52	1705	13.1	15.1D					

	A	B	C	D	E	F	G	H	I	J	K
024	4/23/88	44 15	146 52	1705	13.1	15.1	D	86			
025	4/23/88	44 15	146 52	1705	13.1	15.1	D	82			
026	4/23/88	44 15	146 52	1705	13.1	15.1	D	108			
027	4/24/88	44 08	147 52	1810	13.2	15.1	D	101			F
028	4/24/88	44 08	147 52	1810	13.2	15.1	A	92			
029	4/24/88	44 08	147 52	1810	13.2	15.1	A	90			
030	4/24/88	44 08	147 52	1810	13.2	15.1	A	100			
031	4/24/88	44 08	147 52	1810	13.2	15.1	A	98			
032	4/24/88	44 08	147 52	1810	13.2	15.1	D	75			
033	4/24/88	44 08	147 52	1810	13.2	15.1	D	87			
034	4/24/88	44 08	147 52	1810	13.2	15.1	D	88			
035	4/24/88	44 08	147 52	1810	13.2	15.1	D				
036	4/24/88	44 08	147 52	1810	13.2	15.1	A	88			
037	4/24/88	44 08	147 52	1810	13.2	15.1	A	63			
038	4/24/88	44 08	147 52	1810	13.2	15.1	A	92			
039	4/24/88	44 08	147 52	1810	13.2	15.1	A	74			
040	4/24/88	44 08	147 52	1810	13.2	15.1	A	86			
041	4/25/88	44 01	147 56	1710	13.1	15.3		69			
042	4/25/88	44 01	147 56	1710	13.1	15.3		87			
043	4/25/88	44 01	147 56	1710	13.1	15.3		97			
044	4/25/88	44 01	147 56	1710	13.1	15.3		90			
045	4/25/88	44 01	147 56	1710	13.1	15.3		81			
046	4/25/88	44 01	147 56	1710	13.1	15.3		84			
047	4/25/88	44 01	147 56	1710	13.1	15.3		72			
048	4/25/88	44 01	147 56	1710	13.1	15.3		75			
049	4/25/88	44 01	147 56	1710	13.1	15.3		72			
050	4/25/88	44 01	147 56	1710	13.1	15.3		95			
051	4/25/88	44 01	147 56	1710	13.1	15.3		74			
052	4/25/88	44 01	147 56	1710	13.1	15.3					
053	4/26/88	44 16	147 53	1707	13.3	15	D	88			
054	4/26/88	44 16	147 53	1707	13.3	15	D				
055	4/26/88	44 16	147 53	1707	13.3	15	A	98			
056	4/26/88	44 16	147 53	1707	13.3	15	A	74			
057	4/26/88	44 16	147 53	1707	13.3	15	A	73			
058	4/26/88	44 16	147 53	1707	13.3	15	A	69			
059	4/26/88	44 16	147 53	1707	13.3	15	A	75			
060	4/26/88	44 16	147 53	1707	13.3	15	A	73			
061	4/26/88	44 16	147 53	1707	13.3	15	D	84			
062	4/26/88	44 16	147 53	1707	13.3	15	A	63			
063	4/26/88	44 16	147 53	1707	13.3	15	A	84			
064	4/26/88	44 16	147 53	1707	13.3	15	D	89			
065	4/26/88	44 16	147 53	1707	13.3	15	A	91			
066	4/26/88	44 16	147 53	1707	13.3	15	A	73			
067	4/26/88	44 16	147 53	1707	13.3	15	A	71			
068	4/26/88	44 16	147 53	1707	13.3	15	A	75			
069	4/26/88	44 16	147 53	1707	13.3	15	A	91			
070	4/26/88	44 16	147 53	1707	13.3	15	A	83			
071	4/26/88	44 16	147 53	1707	13.3	15	A	75			
072	4/26/88	44 16	147 53	1707	13.3	15	A	89			
073	4/27/88	44 17	147 59	1720	13.5	15	D	65			
074	4/27/88	44 17	147 59	1720	13.5	15	D	69			
075	4/27/88	44 17	147 59	1720	13.5	15	D	73			
076	4/27/88	44 17	147 59	1720	13.5	15	A	80			
077	4/27/88	44 17	147 59	1720	13.5	15	A	86			
078	4/27/88	44 17	147 59	1720	13.5	15	A	67			
079	4/27/88	44 17	147 59	1720	13.5	15	D	75			
080	4/27/88	44 17	147 59	1720	13.5	15	D	100			
081	4/27/88	44 17	147 59	1720	13.5	15	D	103			
082	4/27/88	44 17	147 59	1720	13.5	15	A	109			
083	4/27/88	44 17	147 59	1720	13.5	15	A	90			
084	4/27/88	44 17	147 59	1720	13.5	15	D				
085	4/27/88	44 17	147 59	1720	13.5	15	A	87			
086	4/27/88	44 17	147 59	1720	13.5	15	A	71			
087	4/27/88	44 17	147 59	1720	13.5	15	A	93			
088	4/27/88	44 17	147 59	1720	13.5	15	D	68			
089	4/27/88	44 17	147 59	1720	13.5	15	A	69			
090	4/27/88	44 17	147 59	1720	13.5	15	D	96			
091	6/8/88	43 43	148 27	1550	16.2	16.7	A	85			
092	6/8/88	43 43	148 27	1550	16.2	16.7	D	76			
093	6/9/88	44 02	148 20	1600	15.8	15.9	D	100			
094	6/12/88	43 53	148 24	1630	14.6	16.1	D	65			
095	6/14/88	43 44	148 27	1640	15.4	16	D	103			
096	6/14/88	43 44	148 27	1640	15.4	16	D	95			
097	6/15/88	43 40	148 33	1635	15.3	16.2	D	95			
098	6/15/88	43 40	148 33	1635	15.3	16.2	D	79			
099	6/15/88	43 40	148 33	1635	15.3	16.2	D	88			
100	6/15/88	43 40	148 33	1635	15.3	16.2	D	104			
101	6/17/88	43 41	148 27	1625	14.8	16	D	65			
102	6/17/88	43 41	148 27	1625	14.8	16	A	75			
103	6/17/88	43 41	148 27	1625	14.8	16	D	78			
104	6/18/88	43 58	148 18	1630	14.9	16.1	A	92			
105	6/18/88	43 58	148 18	1630	14.9	16.1	A	76			