

Pilbara Demersal Finfish Fisheries

MANAGEMENT OVERVIEW

Since the early 1990s, the majority of demersal finfish taken off the North-West Shelf have come from the Pilbara Fish Trawl Interim Managed Fishery. There are 11 licensed fishing boats in this fishery.

Fishing effort in this fishery is controlled through area closures, gear restrictions and time units monitored by the Vessel Monitoring System (VMS). Owing to concerns about excess effort in this fishery, a 33% reduction in time units was introduced under the management plan in January 1999.

There are six licensees in the Pilbara Trap Managed Fishery. Each licensee has been granted an initial allocation of 13 traps which are transferable amongst licensees, although the management plan allows the Executive Director to alter the value of a trap unit. New management arrangements for the Pilbara Trap Managed Fishery are currently being developed.

Management arrangements for the Pilbara Line Fishery are also currently under review, with consideration being given to submissions received from the discussion paper 'Management options for Pilbara demersal line fishing', released in November 1997.

COMPLIANCE AND COMMUNITY EDUCATION OVERVIEW

Since January 1998, the Pilbara Fish Trawl Interim Managed Fishery has been primarily monitored from the Karratha District Office via the Fisheries WA Vessel Monitoring System. In addition, Fisheries Officers from the Pilbara region have carried out numerous land-based and sea patrols to inspect the Pilbara fish trawl fleet, concentrating mainly on ensuring that all crew and vessels are appropriately licensed and that only the permitted fishing gear is being used. Catches are also checked on a regular basis.

Within the Pilbara Trap Managed Fishery, Fisheries Officers, with officers from DOT, completed two patrols utilising the PV *Walcott*. At sea inspections, as well as checks on licences and catches were carried out.

A number of checks on catches and licences were also carried out on Pilbara Line Fishery vessels, specifically at Port Headland, Point Sampson, Dampier and Onslow. No offences were detected.

RESEARCH OVERVIEW

Baseline research for managing these important fish stocks began in 1994/95. A second three-year FRDC-funded project, ending in June 1999, completes the work on the major target species and has provided a basis for long-term research monitoring of the stocks.

In addition, research surveys of the deeper areas adjacent to the existing trawl grounds have been undertaken in conjunction with commercial trawlers under a separate FRDC-funded project.

The following status report, which provides a synthesis of the data from the fishery, is based on the results of this research and monitoring.

Fishery Status Report

Main Features

Stock assessment complete:

Trawl fishery	Yes
Trap and line fishery	No

Exploitation status:

Trawl fishery	The most abundant, short-lived species range from under-exploited in some areas to over-exploited in other areas. Some long-lived species are over-exploited.
Trap and line fishery	Fully exploited

Breeding stock levels:

Red emperor spawning stock is not adequate in the west of the trawl fishery

Previous catch projections for year 1998:

Trawl fishery	2,300-2,700 tonnes
Trap and line fishery	Not available

Catch current season (1998):

Trawl fishery	2,512 tonnes
Trap fishery	250 tonnes
Line fishery	78 tonnes
Troll (mackerel)	121 tonnes
Shark (all fishing methods)	333 tonnes
Charter	36 tonnes
Netting (excluding shark)	24 tonnes

Estimated annual value (to fishers) for year 1998:

\$10.3 million

Catch projection next year (1999):

Trawl fishery	2,300-2,600 tonnes
Trap and line fishery	Not available
Mackerel, tuna, shark	Not available

Recreational component (1999):

Unknown

Boundaries and Access

The Pilbara Trap Managed Fishery (Pilbara Figure 1) lies north of latitude 21°44' S and between longitudes 114°9'36" E and 120° E on the landward side of the 200 m isobath and seaward of a line generally following the 30 m isobath. This has been a managed fishery since 1992. The number of licences was reduced from 12 to six in 1996. In 1997, this fishery was converted to trap units, with a limit of 78 traps, or 13 traps/licence. The trap units are fully transferable.

The boundaries of the Pilbara Fish Trawl Interim Managed Fishery (Pilbara Figure 1) are the waters lying north of latitude 21°35' S and between longitudes 114°9'36" E and 120° E on the landward side of the 200 m isobath and seaward of a line generally following the 50 m depth contour. The trawl fishery consists of two zones. Zone 1, in the west of the fishery, is currently not being trawled. In Zone 2, the interim management plan in 1998 set down boundaries for six management sub-areas. There are 11 licence units with varying time allocations throughout Areas 1 to 6.

Line fishing is unrestricted in all areas of the fishery, but planning for limiting access began with the release of a discussion paper in November 1997.

Pilbara Figure 1 is a general diagram showing areas where specific fishing activities are permitted within this fishery. The exact latitudes and longitudes delineating the sectors of the Pilbara fishery are listed in the Pilbara Trap Managed Fishery Management Plan 1992 and the Pilbara Fish Trawl Interim Managed Fishery Management Plan 1997.

Annual Production

Main fishing method

Trawling is the dominant fishing method, with line fishing, trapping and trolling being relatively minor components.

Landings

Catch of the major species for 1998 is shown in Pilbara Table 1. The catches by different fishing methods for the years 1985 to 1998 are shown in Pilbara Table 2. A summary for 1998 is given below.

Demersal scalefish by trawl,	
trap and line	2,840 tonnes
Mackerel	121 tonnes
Shark	333 tonnes

The 1998 trawl fishery catch (1997 catch in brackets) was 2,512 tonnes (2,630 t). The reduced catch was expected as a result of effort reductions contained in the management plan introduced in January 1998. The major species landed in 1998 (1997 catch in brackets) were blue spot emperor 466 tonnes (446 t), red snapper 309 tonnes (253 t), red emperor 91 tonnes (149 t), flagfish 197 tonnes (188 t), threadfin bream

288 tonnes (273 t), and Rankin cod 33 tonnes (44 t).

The catches of the larger, valuable species – red emperor, Rankin cod and scarlet perch – decreased in 1998 (as they did in 1997). The catches of blue spot emperor, flagfish, and rosy threadfin bream were similar to last year's catches.

The trap fishery catch is still stable, being 250 tonnes in 1998 (234 tonnes in 1997); line fishing catches were lower at 78 tonnes (109 tonnes), while trolling produced 121 tonnes (152 tonnes). Major species taken by trap and line were spangled emperor, red emperor, jobfish, Rankin cod and red snapper.

Shark fishing in 1998 produced a catch of 333 tonnes (96 tonnes), the increase being due to the three-month operation of a foreign longliner and increased retention of shark. Troll catches were predominantly mackerel.

The reported charter fishing catches are for vessels operating out of Exmouth and Onslow. These vessels fish primarily in the area between longitudes 114° and 116° east, where fish are plentiful around the offshore islands. The reported catches had been steadily increasing up to 1996, before a substantial decrease in 1997 and recovery in 1998.

Fishing effort

The fishing effort in the trap, line and trawl sectors of the commercial fishery is shown in Pilbara Table 3. The effort in days is from monthly catch and effort returns, however for the trawl fishery, the effort from 1991 to 1998 is also recorded as the net bottom time taken from skippers' logbook data.

In the trawl fleet there are the equivalent of seven full-time vessels. The number of hours the fleet spent in each area of the fishery (measured by a satellite monitoring system), and the allocated effort in brackets, were:

Area 1	15,076 (17,136)
Area 2	3,842 (3,360)
Area 3	0 (0)
Area 4	3,736 (3,360)
Area 5	4,955 (5,712)

The plan allows for some flexibility in the effort distribution between areas which resulted in an effort over-run of 14% and 11% in Areas 2 and 4 respectively. The deeper waters of Area 6 have a different species composition, and these species are expected to be more vulnerable to over-fishing than those closer to shore. This area was open to research trawling only, and the extent and nature of the resource have been investigated through research surveys undertaken by commercial trawlers.

Trapping by five boats resulted in 503 days effort in 1998 (compared to 330 days in 1997). Considerable effort increase is possible in the future, and further measures are required to reduce latent effort in this fleet.

In 1998, 39 line fishers reported operating for 692 days (733 days in 1997). The unrestricted access of line fishers to the Pilbara remains a potential problem but is being addressed by a line fishing review currently in progress.

The fishing activities of trap and line fishers have continued to expand into the waters seaward of the 100 m depth contour.

Catch rate

The catch rates (based on nominal effort) of red emperor and Rankin cod have declined in Areas 1, 3, 4 and 5, and blue spot emperor catch rates have declined in Areas 1 and 2 over the last three years. No decline in catch rates is evident for flagfish or rosy threadfin bream. However, the efficiency of the fish trawl fleet has probably continued to increase because of improving skipper efficiency and use of electronic equipment to target fish. This expected efficiency increase means that the catch rate decrease is likely to be greater than that observed from the catch and effort data.

Catch rates for the trap fishery (based on the reported number of days fished) peaked in 1996 in the west of the fishery, and after a decline in 1997 recovered in 1998. The catch rates are generally higher in the east than in the west and this pattern has been constant for the last three years. The catch rates fluctuate, however, as skilled operators move in and out of the fishery.

The catch rates in the line fishery (based on the reported number of days fished) continue to fluctuate in both the western and eastern areas of the fishery as a few skilled operators commence and cease operations.

Catch rates for mackerel and shark are not available owing to the lack of detail in the reported effort information.

Stock Assessment

Trawl fishery: The continued decline in the catch rates of the long-lived species red emperor and Rankin cod, and the recent decline in blue spot emperor catch rates, indicate that the stocks of some species continue to be over-exploited. An age-structured model (using biological information, age structure, catch and catch rates) was used to assess the red emperor and blue spot emperor stocks. The assessment criterion was that 'the spawning biomass should not decrease below 25% of the virgin level'. The assessment indicated that red emperor decreased below the reference criterion in 1997 and 1998 in Area 1 and would decline to a low

level at the current effort levels. In Area 2, the red emperor spawning biomass was close to the reference criterion in 1998 but at the 1998 effort level would be expected to increase. At the 1998 effort level, blue spot emperor spawning biomass would be expected to decline in Area 1 for the next few years but then remain steady at a level above the reference point. There was no indication of decline for this species in Area 2. For red emperor and blue spot emperor, there was insufficient information for an assessment to be made in Areas 4, 5 or 6. In light of this assessment, the management plan was modified for 1999 with a 33% effort reduction in Area 1 and a 9% effort reduction in Areas 4 and 5.

Trap and line fishery: The catch rates have shown no decline in recent years but fluctuate with the changing efforts of a few skilful and dedicated operators. The effort and catch should be contained at the level of the last two years.

100 m to 200 m depth zone: Data has been collected on the species composition and the extent of the resource in this area but the results are not yet available.

Breeding Stock Levels

The spawning biomass of red emperor was estimated to have fallen below the reference point in Area 1 in 1997 and 1998. However, this represents a local depletion, as Area 1 consists of only one-eighth of the area where this species occurs in the Pilbara fishery. Recovery of the spawning stocks in Area 1 is expected with the 1999 effort reductions. Careful ongoing monitoring to ensure compliance with effort reductions is required to maintain satisfactory breeding stock levels of the long-lived species.

Catch Projection for Year 1999

The catch projection for the trawl fishery is 2,300–2,600 tonnes, in line with the decrease in effort instigated by the management plan. Line and trap fishing, trolling and shark fishing are in a dynamic state and catch projections are not possible.

Product Value for Year 1998

\$10.3 million.

There has been little overall increase in prices in the last 12 months, but the price of red emperor has continued to rise. The value of the trawl fish catch varies depending on the species mix of the catch, which consists of low-valued species such as blue spot emperor and threadfin bream (landed value \$2/kg), and higher-valued species, like red emperor and jobfish, with a landed value of \$5–\$8/kg. The trap and line catch is dominated by the valuable species such as red emperor and jobfish.

The estimated value of the production of each sector in 1998 is:

Trawl	2,512 t @ \$2.95/kg	\$7.4 million
Trap and line	328 t @ \$5.00/kg	\$1.6 million
Troll	121 t @ \$6.50/kg	\$0.8 million
Shark	333 t @ \$1.50/kg	\$0.5 million
Total		\$10.3 million

The prices above may contain some component of freight and handling and landed prices may in some cases be lower.

General Comments

The trap and line fishery continues to operate at a low level in the Pilbara region, but there is considerable latent effort in the trap fishery and, at present, unrestricted access by line fishers. The Pilbara fish trawl fleet catches declined in 1998 and the further

effort reductions in 1999 are likely to allow recovery of the long-lived species like red emperor and Rankin cod. The smaller species such as flagfish and threadfin bream are probably under-exploited and to some extent the effort distribution can be directed to areas where small species are more abundant and long-lived species less abundant, but it would be valuable to develop fishing methods which increase catches of these species without increasing catches of the large, long-lived species. Improved marketing strategies are required to get a better economic return from the small species. Research is needed to obtain a better understanding of the relationship between habitat changes and recruitment levels within the trawl fishery area.

Pilbara Table 1 Commercial catches in tonnes and the percentages of each major species taken by trawl, trap and line in the Pilbara fishery in 1998.

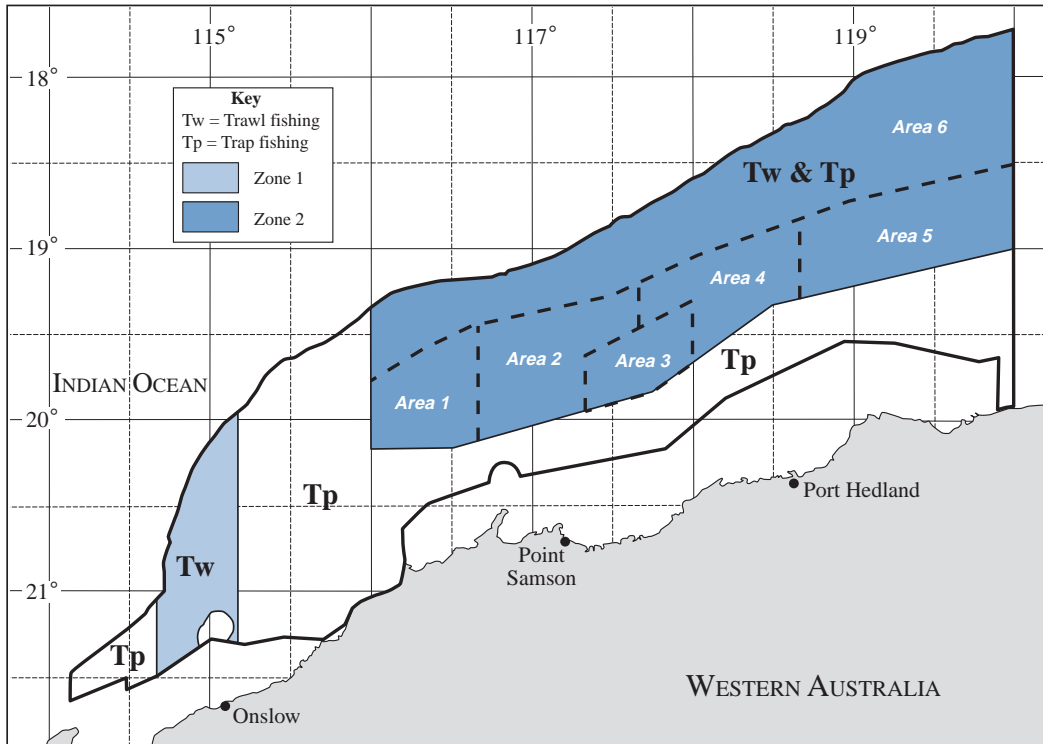
	Fish trawl catch		Trap catch		Line catch		Total catch tonnes
	tonnes	%	tonnes	%	tonnes	%	
red emperor	91	65	42	30	7	5	140
Rankin cod	33	43	39	51	5	6	77
scarlet perch	91	89	8	8	3	3	102
red snapper	309	95	14	4	3	1	326
jobfish	104	80	15	12	11	8	130
spangled emperor	48	47	36	35	18	18	102
blue spot emperor	466	91	46	9	1	0	513
flagfish	197	99	2	1	-	0	199
threadfin bream	288	100	-	0	-	0	288
frypan snapper	76	99	1	1	-	0	77
other species	809	91	47	5	31	4	887
All demersal	2,512	88	250	9	78	3	2,840

Pilbara Table 2 Summary of reported commercial catches (tonnes) of demersal scalefish by line, trap and trawl, total demersal scalefish, scombrid catch by trolling, shark catch by all methods, and the reported charter catch, in the Pilbara fishery.

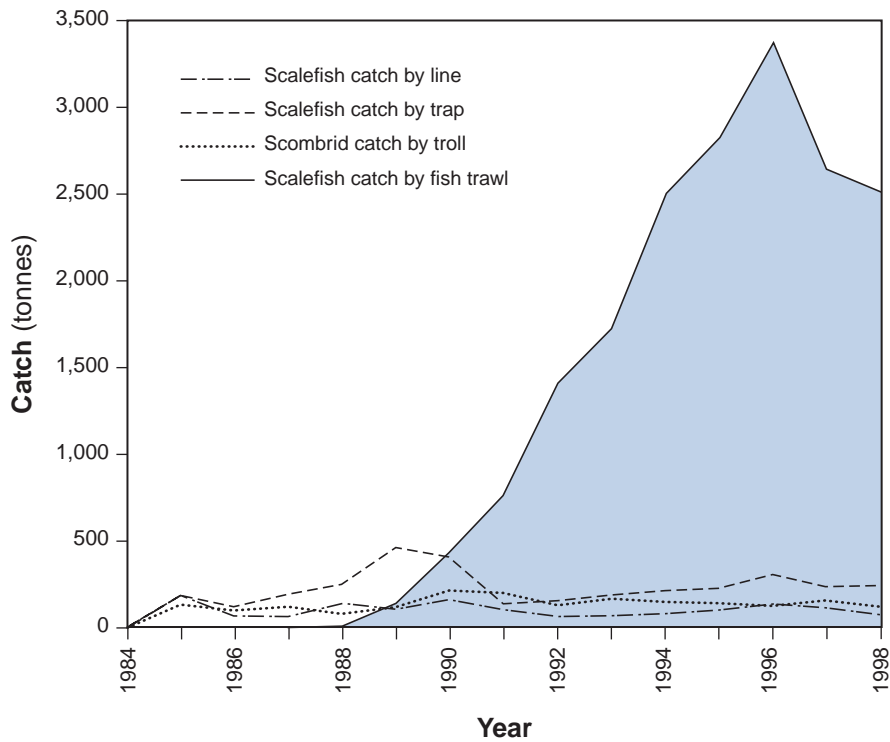
Year	Line	Trap	Trawl	Demersal scalefish	Troll	Shark	Charter
1985	180	168	-	348	132	22	-
1986	65	113	-	178	97	25	-
1987	67	192	3	262	119	19	-
1988	136	243	3	382	79	24	-
1989	104	457	124	685	116	29	-
1990	157	407	421	985	209	57	-
1991	107	119	754	980	196	132	3
1992	63	148	1,413	1,624	125	273	7
1993	67	178	1,724	1,969	160	143	7
1994	79	207	2,506	2,792	144	144	12
1995	95	222	2,821	3,138	131	67	15
1996	136	302	3,201	3,639	119	123	33
1997	109	234	2,630	2,973	152	96	22
1998	78	250	2,512	2,840	121	333	36

Pilbara Table 3 Summary of effort in the Pilbara fishery. The trap, line and trawl effort (days) is from monthly catch and effort returns. The trawl effort (hours) is nominal effort from operators' logbook data.

Year	Line (days)	Trap (days)	Trawl (days)	Trawl (hours)
1985	809	709	-	-
1986	655	548	19	-
1987	614	507	17	-
1988	985	804	32	-
1989	863	1198	310	-
1990	1332	1321	698	-
1991	740	472	1132	8,660
1992	514	681	983	10,030
1993	876	696	832	10,725
1994	732	545	1484	22,087
1995	852	608	1571	21,529
1996	814	513	1550	25,246
1997	809	483	1389	19,810
1998	692	503	1291	20,555



Pilbara Figure 1 Demersal scalefish fisheries of the Pilbara region of Western Australia. Areas 1 to 6 refer to the management regions in Zone 2 of the trawl fishery.



Pilbara Figure 2 Catches of demersal scalefish (tonnes) in the Pilbara fishery by trap, line, troll and trawl.