

## NORTHERN DEMERSAL SCALEFISH TABLE 1

Recent annual catches of major target and by-product species or species groups by the NDSF. Note Tables 1 and 2 give updated figures that may differ slightly from those reported in previous years.

SPECIES	NDSF ANNUAL CATCH (tonnes)				
	1998	1999	2000	2001	2002
Goldband snapper ( <i>Pristipomoides</i> spp.)	233	292	189	209	152
Red emperor ( <i>Lutjanus sebae</i> )	109	101	90	95	101
Scarlet perch ( <i>Lutjanus malabaricus</i> )	17	18	23	39	61
Spangled emperor ( <i>Lethrinus nebulosus</i> )	26	27	32	36	35
Cod/grouper (Serranidae)	96	76	75	84	49
Other species	61	63	67	45	36
<b>Total Demersal Scalefish Catch</b>	<b>542</b>	<b>577</b>	<b>476</b>	<b>509</b>	<b>434</b>

## NORTHERN DEMERSAL SCALEFISH TABLE 2

Catches (t) of demersal finfish and effort (days) by line and trap vessels in the NDSF since the introduction of full management arrangements in 1998.

YEAR	TOTAL ALLOWABLE EFFORT (days)	LINE CATCH (tonnes)	LINE EFFORT (days)	TRAP CATCH (tonnes)	TRAP EFFORT (days)	TOTAL CATCH (tonnes)
1998	1,684	45	78	497	916	542
1999	1,716	91	228	486	992	577
2000	1,562	67	155	409	890	476
2001	1,672	47	136	462	928	509
<b>2002</b>	<b>1,760</b>	<b>0</b>	<b>0</b>	<b>434</b>	<b>900</b>	<b>434</b>

## Pilbara Demersal Finfish Fisheries

### Management Summary

The majority of demersal finfish produced from the North West Shelf are taken by fish trawling activities, with a lesser quantity taken by fish traps and line. Both the Pilbara Fish Trawl (Interim) Managed Fishery and the Pilbara Trap Managed Fishery are controlled through a combination of area closures, gear restrictions, and total and area effort limitations. The individually transferable effort regimes are monitored by the satellite-based Vessel Monitoring System.

Since the trawl fishery came into a formal management framework in 1998, effort has been reduced and redistributed to achieve the best yield from the fishery while keeping exploitation rates of key indicator species (red emperor, *Lutjanus sebae* and Rankin cod, *Epinephelus multinotatus*) at sustainable levels. The ITE management arrangements introduced into the trap fishery in January 2000 dealt with the issue of latent effort in the fishery and proved effective at holding the fishery within its acceptable 300 t limit. However, the ability of the fishery to target red emperor may require species limits in the future.

The trawl fishery underwent significant restructuring during 2002/03. To reflect the fact that the peak fishing period is over the months of December and January, the operational year has been changed from a calendar year to a financial year, to take effect on 1 July 2003. Implementation of this shift required a six-month fishery season, with half the normal effort allocation, in the period 1 January to 30 June 2003. Additionally, following a research stock assessment, 10% of the allocated effort was removed from Areas 1 and 5 of the trawl fishery, equal to a total effort reduction of 7%. The trap fishery also underwent a 7% reduction in total effort.

The management plan for the trap fishery was amended during 2002/03 to allow for more flexible nominations of trap. In addition, the trap vessels may now also utilise the Port of Broome.

Some demersal scalefish are also taken by 'wetline only' vessels that do not have access to specific managed fisheries.

A draft application has been submitted for the fishery as part of Environment Australia's ecological sustainability reporting process under the *Environment Protection and Biodiversity Conservation Act 1999*. A final application is being developed which will be submitted to EA in 2004.

# NORTH COAST BIOREGION

## Governing Legislation/Fishing Authority

Pilbara Fish Trawl Fishery (Interim) Management Plan 1997  
Pilbara Trap Management Plan 1992  
Fishing Boat Licence (line fishing)

## Consultation Process

Department–industry meetings

## Research Summary

Baseline research for managing these important fish stocks was conducted in two FRDC-funded projects from 1993 to 1999, providing a basis for long-term research monitoring of the stocks.

In addition, research surveys of both the deeper and the inshore areas adjacent to the existing trawl grounds have been completed under separate FRDC-funded projects. A draft report on bycatch from the Pilbara trawl fishery, funded by the Natural Heritage Trust (NHT) and the Department of Fisheries, was released in 2002. Further work is planned to develop gear modifications to reduce impact on protected species.

The following status report, which provides a synthesis of the data from the fishery, utilises the results of the earlier research together with ongoing catch and effort data provided through the research logbook system, CAES and VMS.

## Pilbara Demersal Finfish Fisheries Status Report

Prepared by P. Stephenson and J. King

### FISHERY DESCRIPTION

#### 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 a boundary approximating the 200 m isobath and seaward of a line generally following the 30 m isobath. The exact latitudes and longitudes delineating the fishery are listed in the Pilbara Trap Management Plan 1992. In 2000, effort quota was introduced, with transferable trap units being allocated and their utilisation being monitored by VMS.

The boundaries of the Pilbara Fish Trawl (Interim) Managed Fishery 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 a boundary approximating the 200 m isobath and seaward of a line generally following the 50 m isobath. Pilbara Figure 1 is a general diagram showing the management areas within this fishery. The exact latitudes and longitudes delineating the areas are listed in the Pilbara Fish Trawl Fishery (Interim) Management Plan 1997.

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 introduced in 1998 set down boundaries for six management sub-areas. There are 11 licence units with varying time allocations throughout Areas 1 to 6, with Areas 3 and 6 having zero time allocation. The allocated effort quota is transferable and monitored by VMS.

In addition, some wetline fishing occurs within the boundaries of the trawl and trap fisheries. Planning for consolidation of the general wetline catch in the Pilbara is continuing.

## Main fishing method

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

## RETAINED SPECIES

**Commercial production (season 2002):**  
**Trawl 2,310 tonnes**

**Trap 306 tonnes**  
**Line 90 tonnes**

## Landings

Catches of the major species for 2002 are shown in Pilbara Table 1. The catches by different fishing methods for the years 1985 to 2002 are shown in Pilbara Table 2 and illustrated in Pilbara Figure 2.

Demersal scalefish catch by trawl, trap and line was 2,310 t, 306 t, and 90 t respectively.

The 2002 trawl fishery demersal scalefish catch had a similar species composition to that in 2001 apart from an increase in the catches of some small species (blue spot emperor, flagfish and threadfin bream) and a decrease in catches of some larger species (spangled emperor, red snapper and goldband snapper). The major target species landed in 2002 (2001 catch in brackets) were threadfin bream (*Nemipteridae*) 363 t (228 t), blue spot emperor (*Lethrinus hutchinsi*) 353 t (318 t), red snapper (*Lutjanus erythropterus*) 278 t (365 t), flagfish (*Lutjanus vitta*) 211 t (171 t), goldband snapper (*Pristipomoides multidens*) 99 t (122 t), scarlet perch (*Lutjanus malabaricus*) 82 t (88 t), red emperor (*Lutjanus sebae*) 79 t (74 t), spangled emperor (*Lethrinus nebulosus*) 19 t (24 t), and Rankin cod (*Epinephelus multinotatus*) 17 t (19 t). Retained by-product totalled 180 t, including shark 68 t (73 t), bugs 5 t (7 t), and cuttlefish 104 t (67 t). There is the potential to increase catches of smaller species such as flagfish and threadfin bream, but there has been little interest by industry due to increased levels of handling and low prices.

The trap fishery catch increased to 306 t in 2002 (266 t in 2001). Major species taken by the trap fishery in 2002 (2001 figures in brackets) were red emperor 36 t (30 t), blue spot emperor 57 t (43 t), goldband snapper 38 t (26 t), Rankin cod 20 t (21 t), and red snapper 41 t (35 t). There is no by-product in this fishery.

Demersal scalefish catches by line fishing were lower in 2002 at 90 t (99 t in 2001). The catches in 2002 (2001 figures in brackets) were mainly goldband snapper 27 t (38 t), spangled emperor 11 t (8 t), red emperor 6 t (4 t) and Rankin cod 3 t (4 t). In addition, line vessels recorded catches of 193 t (117 t) of sharks and rays (which includes part of the North Coast Shark Fishery catch) and 119 t (103 t) of mackerel in the Pilbara.

The Pilbara shark catch is reported in more detail in the Northern Shark Fisheries Status Report (pp. 104–107), and the mackerel catch in the Spanish Mackerel Stock Status Report (pp. 98–102).

## 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 2002 is also recorded as the net bottom time (hours) taken from skippers' logbook data.

In the trawl fleet there are the equivalent of four full-time vessels. The number of hours allocated to the fleet in each area of the fishery (verified by a satellite monitoring system), the number of hours used (VMS effort), and the percentage of the allocation used in 1998 to 2002 are shown in Pilbara Table 4.

The management plan allows for some flexibility in the effort distribution between areas, which resulted in an effort over-run in 2002 of 1% in Area 2 and 3% in Area 4 (compared with 8% and 3% in 2001). This decrease was due to management changes reducing the allowable over-run. There was no trawling in Area 3 or Area 6 in 2002.

Two trap boats were allocated 5,867 trap units in 2002 (days multiplied by number of traps) and the number of units used, calculated from VMS, was 5,828. This number of units equates to 382 days fished with an average of 15.2 traps per day, an increase from the average of 13.7 traps used per day in 2001. The number of days allocated, the number of days used and the percentage of the allocation used in 2000–2002 are shown in Pilbara Table 5.

In 2002, line fishers reported operating for 660 days, compared with 401 days in 2001. This effort does not include trolling, which is reported in the Spanish Mackerel Stock Status Report (pp. 98–102), nor the dropline and longline effort in the Northern Shark Fisheries (pp. 104–107). Plans for future management of line fishing in the Pilbara will be considered during the statewide wetline fishing review.

## Catch rate

The trawl catch rates (based on nominal VMS effort) for red emperor are now relatively stable. In the recently developed Areas 4 and 5 the catch rates, which were 4.6 and 5 kg/hour respectively in 1998, were 5.2 and 3.4 kg/hour in 2002. Similarly, in Area 1 the catch rate has stabilised at a low level of 2 kg/hour and in Area 2 it has been between 4.5 and 6.3 kg/hour for the last four years.

Blue spot emperor catch rates have steadily decreased in Area 1 from 44.8 kg/hour in 1996 to 18.7 kg/hour in 2001, with a slight increase to 21.3 kg/hour in 2002. In Area 5, catch rates have decreased steadily from 13 kg/hour in 1996 to 7.9 kg/hour in 2002. In Area 2 and Area 4, blue spot emperor catch rates have been stable at approximately 19 and 11 kg/hour respectively from 1996 to 2002.

Rankin cod catch rates have decreased in Area 1 and Area 5, from 0.8 and 1.9 kg/hour respectively in 1998 to 0.4 and 1.1 kg/hour in 2002, but appear to be stable in Area 2 and Area 4 at approximately 1.2 and 1.5 kg/hour respectively in recent years.

Despite the declines in some of the indicator species, the overall trawl catch rate has increased during the past three

years. In 2002, the catch rate for all retained species was 112.4 kg/hour, which was up significantly from 96.6 kg/hour in 2001. There has probably been little efficiency increase on individual vessels in the last 12 months, but the consolidation of the fleet has resulted in the effort allocation being used by the more efficient vessels. There is likely to be some efficiency increase in the future that will bias the observed catch rates upwards in future years.

Catch rates for the trap fishery (based on the reported number of days fished) have increased considerably in the last two years. This can be attributed to efficiency gains flowing from the consolidation of the fleet. The line catch rate in 2002 was considerably lower than in 2001.

### Recreational component:

**Not assessed**

There is a major recreational fishery in the Pilbara and the charter sector in this area is an increasing user of the resource. The reported charter catches of the two key commercial species, red emperor and Rankin cod, were 3 t and 1 t respectively in the Pilbara in 2002.

In addition, there are data available from a 12-month creel survey of recreational boat-based and shore-based fishing in the Pilbara and West Kimberley region conducted from December 1999 to November 2000 (Williamson et al., in prep.). In the entire survey area (Onslow to Broome), the total recreational fishing effort for the year was estimated to be 190,000 fisher days. The total recreational scalefish catch was estimated to be about 300 t. Recreational fishers in the survey area reported an estimated total catch of around 12 t of spangled emperor and 6 t of red emperor, whereas the estimated total catch of scarlet perch was less than 1 t. Boat- and shore-based recreational fishers do not catch significant quantities of the other species that are targeted by the commercial Pilbara trawl, trap and line fisheries.

### Stock assessment completed:

**Yes**

Red emperor and Rankin cod were used as indicators of long-lived species and blue spot emperor was used as an indicator of short-lived species.

*Trawl and trap fishery:* In 2002 the stock assessment model was updated with catch and catch rate data for the three indicator species. Red emperor age composition data for 1982, 1983, 1995, and 2002 were also incorporated into the model. The assessment indicated upward trends in spawning biomass of red emperor in all areas except Area 4, with satisfactory and increasing spawning stock over the whole fishery (Pilbara Figure 3). Rankin cod appeared to be depleted in Area 5 and in the area west of the trawl fishery, although overall spawning stock level was adequate (Pilbara Figure 4). The blue spot emperor stock in Area 1 appears to be depleted, although there is an increase in the catch rate in 2002. Overall, however, the stock of this species appears to be adequate. A 10% trawl effort reduction in Areas 1 and 5 of the trawl fishery, and an equivalent effort reduction in the trap fishery, was mandated for 2003.

Anticipated increases in efficiency, especially as a result of consolidation in the trap and trawl fleets, may make further effort adjustment necessary in the future.

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**Line fishing:** The line catch was lower in 2002, although the recorded number of days fished increased. These fluctuations in catch and effort are due to dedicated and skilled operators moving in and out of the fishery.

While goldband snapper is not an indicator species, the high catch in 2001 was cause for concern. In addition, this deeper-water species matures at a relatively large size and is long-lived and thus more vulnerable to over-exploitation. Recent stable isotope ratio studies indicate there is little mixing of recruited goldband snapper between the Pilbara and Kimberley fisheries. However, there may be exchange of eggs and larvae. This has management implications, as stock depletion in one fishery may reduce recruitment in adjacent fisheries. The goldband snapper catch decreased in the line and trawl fishery in 2002 but increased considerably in the trap fishery.

**Exploitation status:** Fully exploited

**Breeding stock levels:** Adequate

Breeding stocks of the short-lived species (e.g. flagfish, threadfin bream) have been assessed as adequate overall. Catch rates of blue spot emperor show a declining trend in Areas 1 and 5 of the trawl fishery, but it is likely that an adequate breeding stock exists over the whole fishery.

The spawning biomass of red emperor and Rankin cod was estimated to be satisfactory over the whole fishery, although there appears to be local depletion in Area 1 of the trawl fishery, in the portion of the trap fishery off Onslow, and in Area 5 of the trawl fishery.

The effort reduction in 2003 should ensure breeding stock levels of the indicator species are maintained at satisfactory levels in the short to medium term.

## NON-RETAINED SPECIES

**Bycatch species impact:** Low

The NHT-funded project on bycatch in the trawl fishery conducted in 2002/03 indicated that the bycatch of under-size and unmarketable scalefish varied considerably between vessels and was approximately 1,000 t in 2002. The landed catch of sharks was 68 t in 2002, which is approximately 40% of the weight of shark caught. The scalefish returned to the water are expected to have poor survivorship.

The trap and line fisheries have minimal bycatch.

**Protected species interaction:** Moderate

During the trawl bycatch survey, the capture of protected species was recorded for 100 days at sea (approximately 7.7% of the effort in 2002). Dolphins were attracted to the trawl and swam freely in and out of the trawl net. In the survey period, four dead bottlenose dolphins were found in the cod-end of the trawl net, but the significance of these accidental captures, relative to the population size and natural mortality of the North West Shelf dolphin population, is unknown. Mechanisms to reduce this interaction are being investigated.

Sea snakes and turtles are occasionally captured in the fish trawl nets. Of the seven turtles captured in the bycatch survey

conducted in 2002, five were released alive. All sea snakes were released alive. Pipefish and seahorses are captured in the trawl fishery, and are generally dead when landed. Given the area of distribution and expected population size of these protected species, the impact of the trawl on protected species is probably minimal.

There is no indication of interaction between the line fishery and protected species. The trap fishery has a negligible impact on protected species.

## ECOSYSTEM EFFECTS

**Food chain effects:** Moderate

The current fish trawl fishery operates with standard stern trawling gear (single net with extension sweeps) within an area previously trawled by a Taiwanese fleet. Historical research by CSIRO has suggested that the extensive Taiwanese pair trawl fishery caused a significant decrease in the biomass of finfish on the North West Shelf, and a change in species composition towards smaller species. The current Australian trawl fishery, which developed when the fish stocks had somewhat recovered, uses a much larger mesh size and much lighter ground rope, and operates at lower exploitation rates. At the now permitted levels of trawl and trap exploitation, it is expected that the stocks will stabilise, albeit at a low level for some species in some areas. Overall, the effect of the fishery on the food chain of the North West Shelf is considered to be an acceptable impact.

**Habitat effects:** Moderate

Impacts to the habitat are restricted to those of the trawl fishery, which in turn is restricted to a relatively small proportion of the North West Shelf (Pilbara Figure 1). Area 3 and the waters inside 50 m are permanently closed to trawling, Zone 1 is currently closed to trawling, and Area 6 has had no trawl effort allocation since 2000.

Within the area open to trawling, research has indicated that approximately 10% of the sessile benthic fauna (e.g. sponges) is detached per year, with higher rates in Area 1 where the effort is concentrated. Recent analysis of archived photographs of benthos by CSIRO indicates the diversity was greatest in Area 1 of the trawl fishery. It is not known whether the detachment rate exceeds the rate of regrowth.

## SOCIAL EFFECTS

It is estimated that 22 fishers on 5 vessels were directly employed during 2002 in the Pilbara trawl fishery, and 7 fishers on 2 vessels in the trap fishery. The level of employment in line fishing is not available.

## ECONOMIC EFFECTS

**Estimated annual value (to fishers) for year (2002):**  
**\$9 million**

This estimate is based on the landed weight and price of each species as supplied by fish processors.

There has been little overall increase in fish prices in the last two years. The trawl demersal finfish catch is dominated by

lower-valued species such as blue spot emperor and threadfin bream, and its value in 2002 was \$7.2 million, with a retained by-product valued at \$400,000. The trap and line catches are dominated by the valuable species such as red emperor and goldband snapper, and the demersal scalefish catch from these sectors was valued at approximately \$1.3 million (trap) and \$400,000 (line). Important components of the line catch are shark and spanish mackerel, which have not been included in the value of the line fishery, but are recorded in the Northern Shark Fisheries Status Report (pp. 104–107) and the Spanish Mackerel Stock Status Report (pp. 98–102) respectively.

The catches from the Pilbara fisheries dominate the Western Australian metropolitan markets and support the local fish processing sector. There is also an increasingly important export of scalefish to Europe and Asia.

## FISHERY GOVERNANCE

**Acceptable catch range:**      **Trawl 1,900–2,200 tonnes**  
    **Trap 150–300 tonnes**  
    **Line 50–115 tonnes**

In the trap and line fisheries, the catch range is based on the catch variation of the target species over the period 1993 to 2001. In the trawl fishery, due to reduction in the allocated effort, there were decreases in catch from 1996 to 2000. The acceptable catch range has been determined from the catch rate and the allocated effort. The trawl catch in 2001 was slightly above the upper limit of the defined range, due to fleet consolidation which has seen the more efficient vessels forming a larger proportion of the fleet. In 2002,

there were 2,546 hours of unused trawl effort, but the catch was higher than the previous year due to increased catch rates and the fact that more scalefish were retained on some vessels. Consequently, the 2002 catch of 2,310 t exceeded the acceptable range.

For 2003, the effort allocation in the trap and trawl fishery has been decreased by 7%, but the increased catch rate is likely to result in further increases in the trawl and trap catch. Consequently, in 2004, either the catch range should be increased or further adjustments be made to the trap and trawl effort allocation.

Following the consolidation of the trap and trawl fisheries into a smaller number of dedicated operators in recent years, it would be beneficial to set an effort level which could be left unadjusted for several years. If this were to occur, there might need to be appropriate adjustment to the allocated effort in the trawl and trap sectors. The increased line catch of goldband snapper and the increasing charter catch are also cause for concern, as these sectors do not have effort or catch limits at present.

## EXTERNAL FACTORS

The area available for fishers has decreased over recent years as a result of exclusion zones for gas pipeline and facilities. Seismic surveys also restrict the operation of fishers. However, neither of these operations is expected to adversely affect fish catches.

## PILBARA TABLE I

Commercial catches (to the nearest tonne) and the percentages (to the nearest 1%) of each major species taken by trawl, trap and line in the Pilbara in 2002.

		FISH TRAWL CATCH		TRAP CATCH		LINE CATCH		TOTAL CATCH
		tonnes	%	tonnes	%	tonnes	%	tonnes
Blue spot emperor	<i>Lethrinus hutchinsi</i>	353	86%	57	14%	1	0%	411
Threadfin bream	<i>Nemipteridae</i>	363	100%	-	-	-	-	363
Red snapper	<i>Lutjanus erythropterus</i>	278	87%	41	13%	-	-	319
Flagfish	<i>Lutjanus vitta</i>	211	94%	13	6%	-	-	224
Goldband snapper	<i>Pristipomoides multidens</i>	99	60%	38	23%	27	17%	164
Red emperor	<i>Lutjanus sebae</i>	79	65%	36	30%	6	5%	121
Scarlet perch	<i>Lutjanus malabaricus</i>	82	82%	12	12%	6	6%	100
Spangled emperor	<i>Lethrinus nebulosus</i>	19	28%	37	55%	11	12%	67
Frypan snapper	<i>Argyrops spinifer</i>	42	98%	1	2%	-	-	43
Rankin cod	<i>Epinephelus multinotatus</i>	17	42%	20	50%	3	8%	40
Other demersal scalefish		767	90%	51	6%	36	4%	854
<b>All demersal scalefish</b>		<b>2,310</b>	<b>85%</b>	<b>306</b>	<b>11%</b>	<b>90</b>	<b>4%</b>	<b>2,706</b>
Shark and ray		68	26%	0		193*	74%	261
Other by-product		112	100%	0		0		112

\* Includes part of the North Coast Shark Fishery catch.

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## PILBARA TABLE 2

Summary of reported commercial catches (t) of demersal scalefish by line, trap and trawl in the Pilbara fishery, as well as by-product from the fish trawl fishery.

YEAR	DEMERSAL SCALEFISH			Total	BY-PRODUCT*
	Line	Trap	Trawl		Trawl
1985	180	168	-	348	-
1986	65	113	-	178	-
1987	67	192	3	262	-
1988	136	243	3	382	-
1989	104	457	124	685	-
1990	157	407	421	985	4
1991	107	119	754	980	14
1992	63	148	1,413	1,624	21
1993	67	178	1,724	1,969	42
1994	79	207	2,506	2,792	102
1995	95	222	2,821	3,138	77
1996	136	302	3,201	3,639	102
1997	109	234	2,630	2,973	133
1998	78	250	2,512	2,840	119
1999	50	371	2,136	2,419	69
2000	59	257	1,995	2,314	80
2001	99	266	2,221	2,592	150
<b>2002</b>	<b>90</b>	<b>306</b>	<b>2,310</b>	<b>2,706</b>	<b>180</b>

\* By-product consists of shark, cuttlefish, rays, bugs, and tropical lobster.

## 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	1,198	310	-
1990	1,332	1,321	698	-
1991	740	472	1,132	8,660
1992	514	681	983	10,030
1993	876	696	832	10,725
1994	732	545	1,484	22,087
1995	852	608	1,571	21,529
1996	814	513	1,550	25,246
1997	809	483	1,389	19,810
1998	692	503	1,291	20,555
1999	453	842	1,139	15,963
2000	500	518	957	14,084
2001	401	446	1,162	15,330
<b>2002</b>	<b>660</b>	<b>418</b>	<b>1,035</b>	<b>17,329</b>

**PILBARA TABLE 4**

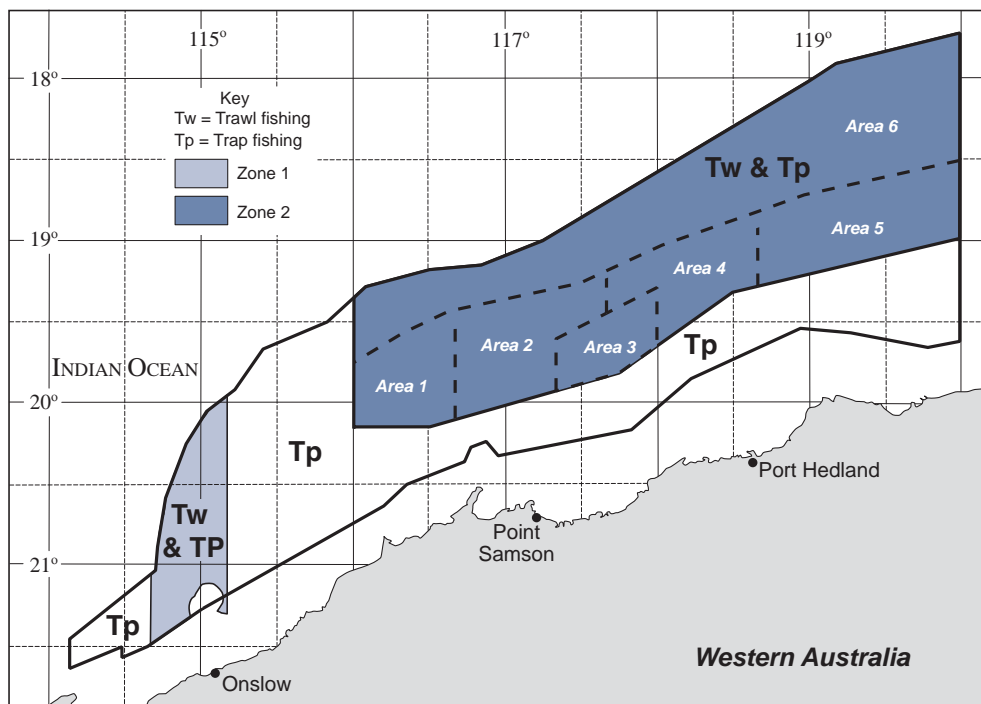
The number of hours allocated, the number of hours used and the percentage of the allocation used in each area of the Pilbara trawl fishery.

		AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	TOTAL
1998	time allocation	17,136	3,360	0	3,360	5,712	29,568
TRAWL	time used	15,076	3,842	0	3,736	4,955	27,609
	% of time used	88%	114%	-	111%	87%	93%
1999	time allocation	11,481	3,360	0	3,057	5,198	23,096
TRAWL	time used	10,237	3,767	0	3,213	4,973	22,190
	% of time used	89%	112%	-	105%	96%	96%
2000	time allocation	11,481	3,360	0	3,057	5,198	23,096
TRAWL	time used	9,438	3,928	0	3,358	4,476	21,199
	% of time used	82%	117%	-	110%	86%	92%
2001	time allocation	10,624	3,797	0	3,528	5,141	23,090
TRAWL	time used	10,428	4,091	0	3,644	4,819	23,000
	% of time used	98%	108%	-	103%	94%	100%
<b>2002</b>	<b>time allocation</b>	<b>10,624</b>	<b>3,797</b>	<b>0</b>	<b>3,528</b>	<b>5,141</b>	<b>23,090</b>
<b>TRAWL</b>	<b>time used</b>	<b>9,040</b>	<b>3,848</b>	<b>0</b>	<b>3,624</b>	<b>4,213</b>	<b>20,544</b>
	<b>% of time used</b>	<b>85%</b>	<b>101%</b>	<b>-</b>	<b>103%</b>	<b>82%</b>	<b>90%</b>

**PILBARA TABLE 5**

The number of days allocated, the number of days used and the percentage of the allocation used in the Pilbara trap fishery.

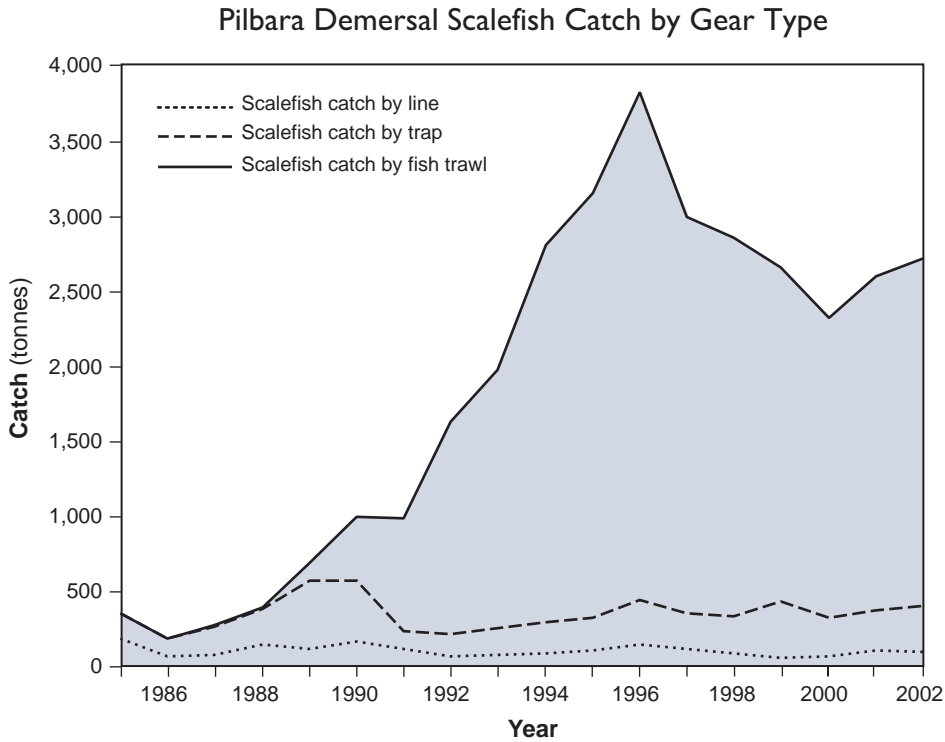
2000	time allocation	524	2001	time allocation	420	<b>2002</b>	<b>time allocation</b>	<b>385</b>
TRAP	time used	507	TRAP	time used	414	<b>TRAP</b>	<b>time used</b>	<b>382</b>
	% of time used	97%		% of time used	99%		<b>% of time used</b>	<b>99%</b>



**PILBARA FIGURE 1**

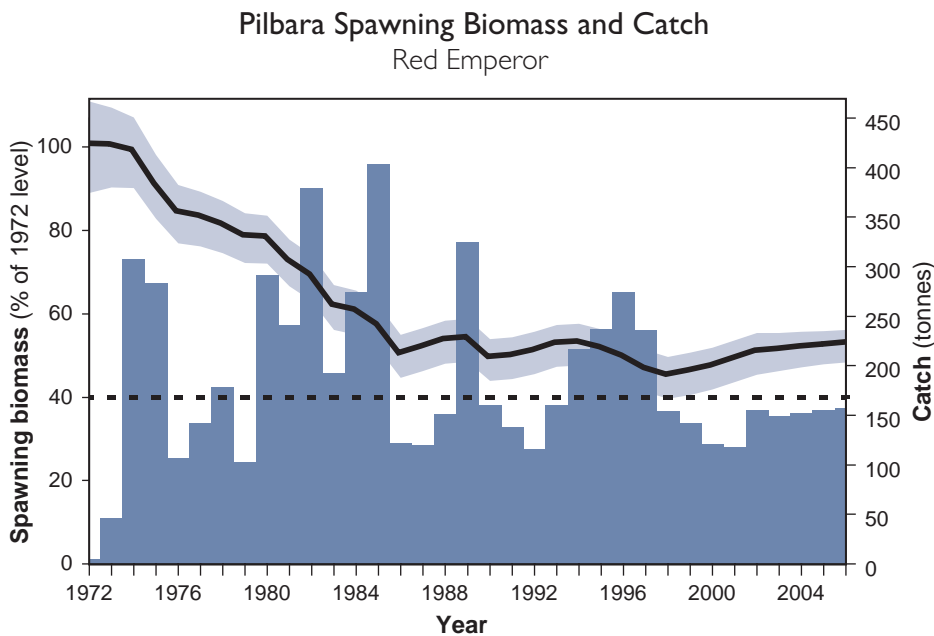
Demersal scalefish fisheries of the Pilbara region of Western Australia. Areas 1 to 6 refer to the management regions in Zone 2 of the trawl fishery. Zone 1 has been closed to trawling since 1998.

# NORTH COAST BIOREGION



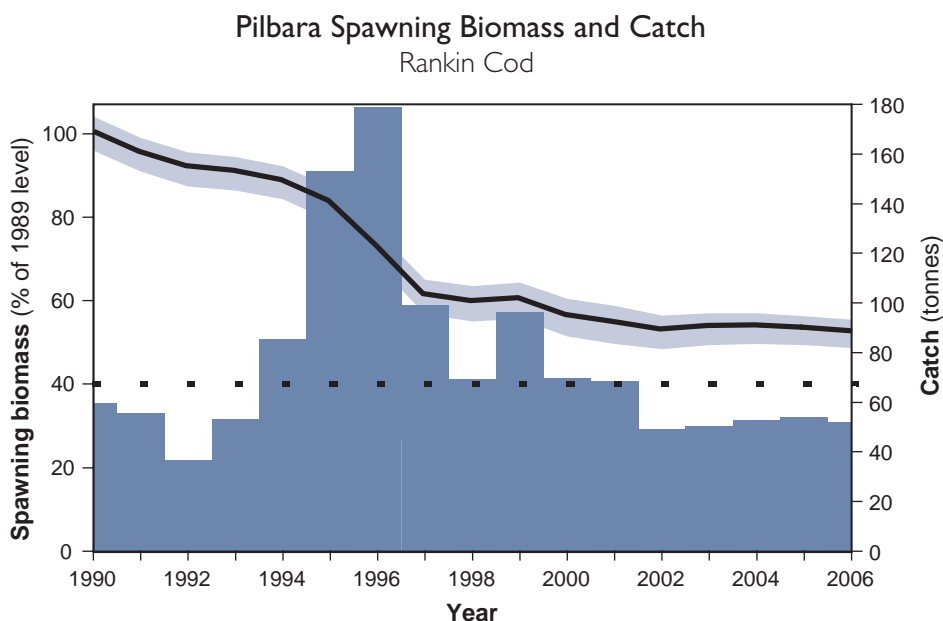
**PILBARA FIGURE 2**

Demersal scalefish catches by trawl, trap, and line from 1985 to 2002.



**PILBARA FIGURE 3**

Spawning biomass (with 95% confidence intervals) as a percentage of the 1972 level (black line); the biological reference point (40% of the 1972 level – dashed line); and the catch from all fishing sectors (columns) for red emperor in the Pilbara fishery. Data from 2003 onwards is projected from the model.



**PILBARA FIGURE 4**

Spawning biomass (with 95% confidence intervals) as a percentage of the 1990 level (black line); the biological reference point (40% of the 1990 level – dashed line); and the catch from all fishing sectors (columns) for Rankin cod in the Pilbara fishery. Data from 2003 onwards is projected from the model.

## Mackerel Fishery

### Management Summary

Fishing for mackerel species, which is currently available to all Western Australian licensed commercial fishing boats, was reported by 78 boats during 2002. Although most of these catches were made opportunistically by boats operating within other fisheries, there are about 10 boats which specifically target mackerel.

Owing to concerns over increased catches and evidence to suggest that the species may be in danger of over-fishing, the Mackerel Independent Advisory Panel was appointed in 2001 to make recommendations to the Executive Director on criteria for access to, and management arrangements for, the mackerel fishery. Following extensive consultation, recommendations from the advisory panel and advice from the Department of Fisheries, the Minister for Fisheries has approved the drafting of the Mackerel Fishery (Interim) Management Plan, to commence in 2004.

The mackerel fishery (including all mackerel of the genera *Scomberomorus*, *Grammatorcynus* and *Acanthocybium*) will be managed under an output (quota) management system. The fishery will be divided into three zones (Gascoyne/West Coast, Pilbara and Kimberley) with specified points of landing for mackerel catch. All zones will be managed through the use of VMS, the reporting of catch prior to landing and an option for the Executive Director to vary the mackerel fishing season.

The total allowable catch for each zone of the fishery will be set by the Executive Director, after taking the best scientific and operational advice available to him to ensure sustainability of the mackerel fishery.

Access to the fishery will be based on catch history in a specified criteria period, with the level of access entitlement being determined by catch levels during the criteria period.

A draft application has been submitted for the mackerel fishery as part of Environment Australia's ecological sustainability reporting process under the *Environment Protection and Biodiversity Conservation Act 1999*. A final application is being developed which will be submitted to EA in 2004.

#### **Governing Legislation/Fishing Authority**

Fish Resources Management Regulations 1995  
Fishing Boat Licence

#### **Consultation Process**

Department–industry meetings

### Research Summary

Two mackerel-related FRDC funded research projects were completed in 2002. Both projects focused on the narrow-barred Spanish mackerel, *Scomberomorus commerson*, which is the main target species in the Western Australian mackerel fishery. Firstly, a joint WA/NT/Qld project was conducted to determine the stock structure of Spanish mackerel in northern