Northern Demersal Scalefish Managed Fishery

Management Summary

The Northern Demersal Scalefish Managed Fishery (NDSF) operates off the north-west coast of Western Australia in the waters east of 120° E longitude. The permitted means of operation within the fishery include handline, dropline and fish traps. Commercial catches are dominated by tropical snappers, emperors (or nor-west snappers) and groupers (or cods).

The fishery is managed by input controls, including individually transferable effort allocations, gear restrictions and area closures. The total effort allocation, based on a nominal total sustainable catch (TSC), is allocated on an annual basis. In 2002, the nominal TSC was 800 t of demersal scalefish and the total effort allocation was 1,760 days.

A draft application has been submitted for the northern demersal 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.

The Northern Demersal Scalefish Management Advisory Committee recommended the introduction of trigger points for catches of red emperor and goldband snapper at its 2002 meeting.

Governing Legislation/Fishing Authority

Northern Demersal Scalefish Managed Fishery Management Plan 2000

Northern Demersal Scalefish Managed Fishery Managed Fishery Licence

Consultation Process

Northern Demersal Scalefish Management Advisory Committee

Research Summary

Baseline research data on growth rates, age structure, reproductive biology and yield analyses, together with information gathered from the fishery, have been used within age-based stock assessment models to assess the status of the two key species, red emperor and goldband snapper. Ongoing monitoring of this fishery is being undertaken using both CAES data and VMS records.

The third largest component of the NDSF catch is the cod/grouper group. Little information is currently available on their species composition and relative abundance. A number of cod species which occur in the NDSF are Indian Ocean endemics about which little is known. This gap in the knowledge of the NDSF represents an area of future research work, as does an improved understanding of the catchability of the key species in the fishery that would facilitate improved stock assessments and management arrangements.

The future catch from the NDSF may also include some species from the waters of Area 2 in depths greater than 200 m. This area of the fishery is available as a research fishing zone, and fishers have the option to explore the deeper waters, though to date industry has had little success in this zone. The resources of this sub-region are therefore unlikely to be substantial, and given the lower production potential of these longer-lived deeper-slope reef fish, the sustainable catch from this zone is likely to be low.

The following status report provides a synthesis of the current data from the fishery.

Northern Demersal Scalefish Fishery Status Report

Prepared by S. Newman

FISHERY DESCRIPTION

Boundaries and access

The waters of the NDSF are defined as all Western Australian waters off the north coast of Western Australia east of longitude 120° E. These waters extend out to the edge of the Australian Fishing Zone (200 nautical mile) limit under the Offshore Constitutional Settlement arrangements (Northern Demersal Scalefish Figure 1).

The fishery is further divided into two fishing zones, an inshore zone (Area 1) and an offshore zone (Area 2) (see Northern Demersal Scalefish Figure 1). The demersal scalefish resources of the deeper waters of the offshore zone (greater than 200 m depth) remain to be adequately investigated; these waters are shown on Northern Demersal Scalefish Figure 1 as a 'research fishing zone'. Access to the research zone can be facilitated by the licence holders through the submission of an agreed research framework.

The inshore waters in the vicinity of Broome are closed to commercial fishing. The closed area extends from Cape Bossut to Cape Coulomb, inside a line that approximates, as closely as possible, the 30 m bathymetric contour.

Access to the offshore zone (Area 2) of the NDSF is currently limited to 11 licences under an individually transferable effort quota system. This allows the effort quota to be operated by a lesser number of vessels. For example, during 2002, 5 vessels (trap fishing only) collectively held and operated the effort individually assigned to the 11 licences.

Main fishing method

Principally fish traps, and to a lesser extent line fishing methods such as handline and/or dropline.

RETAINED SPECIES

Commercial production (season 2002): 434 tonnes

Landings

The reported catch in the NDSF rose steadily after the initial development period from 1990 to 1992, reaching a peak in

catch levels in 1996 (Northern Demersal Scalefish Table 1 and Figure 2). However, since 1996 catch levels have decreased. In the five years since the implementation of management controls, the reported catch in the NDSF has ranged between 430 t and 580 t, reflecting an annual average in this five-year period of approximately 508 t. The catch of demersal scalefish in the NDSF in 2002 was lower than that reported in the previous year as the result of a reduced trap catch and no line catch (Northern Demersal Scalefish Table 1, Northern Demersal Scalefish Figure 2). The NDSF principally targets red emperor (*Lutjanus sebae*) and goldband snapper (*Pristipomoides multidens* and related *Pristipomoides* species), with many species of snappers (Lutjanidae), emperors (Lethrinidae) and cods (Serranidae) comprising a large component of the landed by-product. The catch of the major target and by-product species over the last five years is provided in Northern Demersal Scalefish Table 1. The species composition of the landed catch is similar to that reported in 2001. There was a slight increase in the landed catch of red emperor, up from 95 t to 101 t, whereas the catch of goldband snapper was down from 209 t to 152 t.

Fishing effort

Annual fishing effort quotas are allocated to Area 2 (trap or line fishing) permit holders with the NDSF. Vessels may use their allocated quota anywhere within the boundary of Zone 2. The five fish trap vessels that fished in the NDSF in 2002 reported using between 20 and 40 fish traps per day. No line fishing was undertaken in the NDSF in 2002. The effort allocated in 2002 was 160 fishing boat days per licence, or a total of 1,760 standard fishing days. A standard fishing day is defined as using up to 20 traps or 5 lines per day; if more are used, the number of days declines proportionally.

The number of days fished that is recorded in the VMS database is converted to standard fishing days and adjusted to take into account an allocation of travel days for travelling across sectors within the NDSF. The number of standard fishing days (SFDs) reported using VMS data was 900, indicating that 860 SFDs remained unutilised in the fishery at the end of the 2002 fishing season.

The fish trap effort in 2002 was marginally lower than that recorded in 2001 (Northern Demersal Scalefish Table 2). Since the introduction of management controls, fish trap effort has varied from 890 to 992 SFDs and a large proportion of the effort allocated to both line and trap vessels in the fishery has remained voluntarily unutilised in each fishing year.

Catch rate

The average trap CPUE during 2002 was 478.1 kg per standard trap fishing day (20 traps x 23.91 kg/trap/day). The annual average trap CPUE in the fishery has ranged from 400 kg/day to 545 kg/day in the period from 1990 to 2002.

The introduction of management controls in 1998 resulted in an increase in catch per unit effort for trap vessels in the NDSF. This increase in CPUE was related to increases in efficiency as fishers sought to maximise their catch return from each day fished in the fishery as the available fishing effort was limited. Since 1998, however, the CPUE for trap vessels has stabilised in the range 457–504 kg/day, which is similar to the range prior to the introduction of direct management control through the effort quota system. No trend is evident. The CPUE for line vessels (handline and dropline only) in the period from 1998 to 2001 declined from 527 kg/day to 316 kg/day and subsequently no line fishing was undertaken in the fishery in 2002. Prior to 1998 the handline and dropline CPUE was low and variable.

Recreational component: **Not assessed**

At present there is little recreational or charter boat fishing effort directed towards the deeper-water fish species in Area 2 of the NDSF that are the key species targeted by commercial fishers. Most of the recreational fishing effort targeting demersal finfish in the Kimberley region is thought to be concentrated in the Broome sector of Area 1, which is closed to commercial fishing. The magnitude of recreational fishing catch is expected to be small relative to the total commercial catch.

A 12-month creel survey of recreational boat-based and shore-based fishing in the Pilbara and West Kimberley region was 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 NDSF. The proportion of the recreational catch from the West Kimberley region will be available during 2003. In addition, data has been collected from a recent National Recreational Fishing Survey and it is hoped that this data will become available on a regional basis in the near future.

Recreational fishing records from charter boats were not included in the Pilbara and West Kimberley survey data. In late 2001, 85 fishing tour licences and 5 ecotour licences were issued for the north coast bioregion (Pilbara and Kimberley coasts). At the same time, a logbook system was instigated to collect catch and fishing effort information from tour operators. These data are being analysed and will be available in 2003.

Stock assessment completed: **Yes**

The introduction of formal management procedures has restricted the number of vessels permitted to fish in the waters of the NDSF. A notional target TSC of 800 t was initially adopted in order to constrain harvest rates to historical levels while formal management arrangements were put in place. The control mechanism implemented to maintain a catch level of approximately 800 t was a restriction on the number of trap or line days that could be fished by each vessel exploiting the NDSF resource.

Trap and line effort units (fishing days) are allocated annually on the basis of historical catch rate trends and set to enable the target TSC to be achieved within each year. The outcome

from this effort determination process for the 2003 fishing season is outlined in the 'Acceptable catch range' section below. However, it should be noted that the level of catch in the NDSF over the past five years since effort controls were implemented appears to have stabilised in the range of 500–600 t due to the decision by vessel operators not to fully utilise the allocated effort each year.

Detailed biological information is now available on the two key demersal finfish species in the NDSF, red emperor and goldband snapper. This biological information has provided the foundation for detailed age-structured stock assessment models to be developed for the two key species.

The current stock assessment analyses indicate that the maximum sustainable yield of the two target species can be obtained at current effort levels. The assessment models also indicated that the spawning biomass of both species was above the recommended limit of 40% of the virgin spawning biomass (54% for red emperor and 41% for goldband snapper). As such, the fishery is fully exploited.

It should also be noted that higher levels of catch from the fishery may be possible if the fishers modify their targeting practices to increase their exploitation of a number of secondary (lower-value) species which are faster-growing and more productive.

Exploitation status: **Fully exploited**

The two key species are fully exploited.

Breeding stock levels: **Adequate**

The length and age at maturity for goldband snapper and red emperor were reported in the *State of the Fisheries Report 2000/2001*. The spawning biomass of the key target species in the NDSF has been estimated by the stock assessment model and assessed in relation to accepted international reference points for these types of species.

The assessment of breeding stock levels for the two key species is based on outputs from age-structured stock assessment models incorporating catch history and catch rate data from the area of the fishery. Current levels of breeding stock from the stock assessment work indicate that goldband snapper is at approximately 41% of the estimated virgin level, while red emperor is at approximately 54% of the estimated virgin level. These levels are both above the recommended limit of 40% of the virgin spawning biomass and therefore the current breeding stock and catch levels are considered adequate.

NON-RETAINED SPECIES

Bycatch species impact: **Low**

As a result of the catching capacity of the gear and the marketability of most species caught, there is a limited quantity of non-retained bycatch in this fishery. The most common bycatch species is the starry triggerfish, *Abalistes stellatus*, but the numbers taken are not considered to be significant, and most are released alive.

Protected species interaction: **Negligible**

Trap fishing in deep water does not create any significant opportunities for the gear to interact with protected species.

ECOSYSTEM EFFECTS

Food chain effects: **Not assessed**

Habitat effects: **Low**

As a result of the gear design, the fishery has little impact on the habitat overall, although there may be some interaction with coral habitats. 'Ghost fishing' by traps is unlikely to be significant, as similar fish species have been observed on video to be able to exit traps if left undisturbed.

SOCIAL EFFECTS

Five vessels fished in the 2002 fishing season with an average crew level of 3 people per vessel, indicating that 15 people were directly employed in the NDSF.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year (2002): **$2.41 million**

The NDSF principally targets the higher-value species such as the goldband snapper and red emperor. The fishery landed a total of 434 t of demersal scalefish in 2002, for a catch value of over $2.41 million. This estimate is based on the landed weight of each species recorded in the CAES system and the average price per kilogram of whole weight of each species as supplied by fish processors (note value is calculated from prices based on a price survey undertaken in 2001). This value is lower than that reported in 2001 owing to the lower catch levels in the fishery.

FISHERY GOVERNANCE

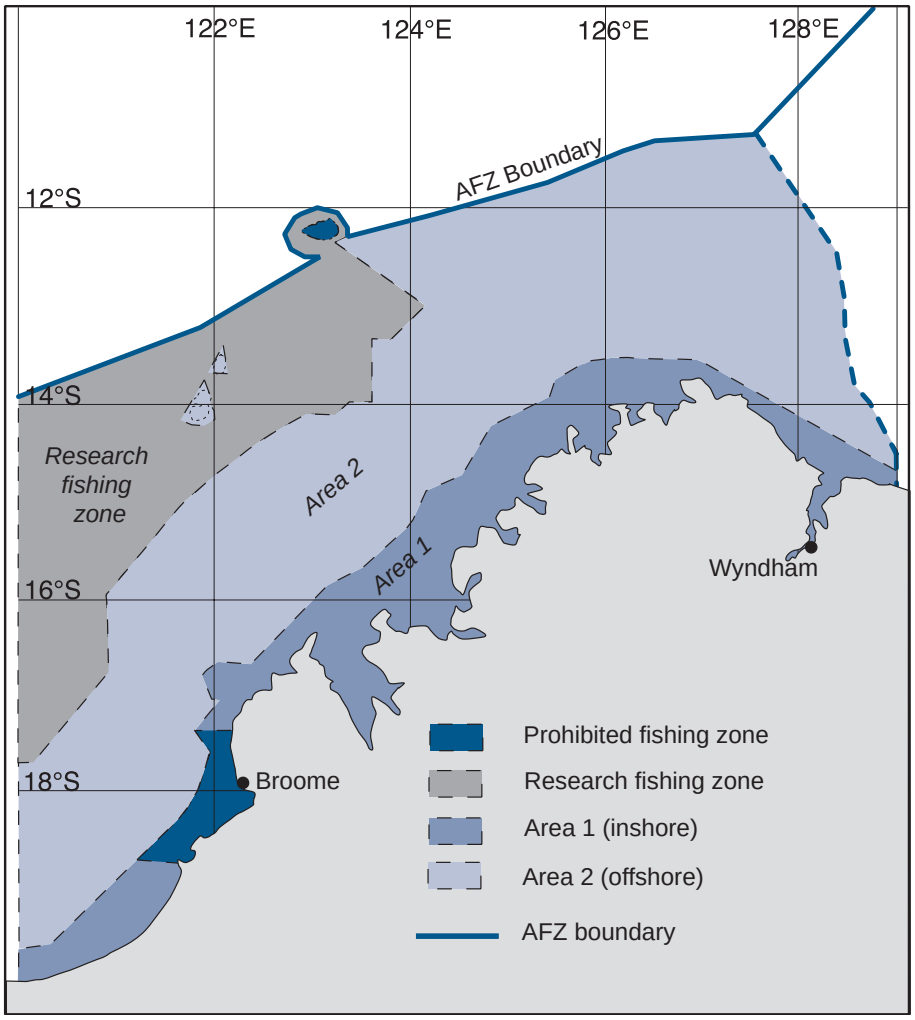
Acceptable catch range: **600–1,000 tonnes**

For the calendar year 2003, the total allowable effort was set at 1,760 fishing days distributed equally among the licences operating in the fishery. At this level of effort and at recent catch rates, the catch is expected to be in the range 600–1,000 t.

In the five years since the introduction of management controls (1998–2002), the fleet has been unable to achieve the 800 t TSC. In each of these years a large amount of unutilised effort has remained at the end of the fishing year. Results from the age-structured stock assessment models for each of the key species in the NDSF indicate that the current levels of catch for both species are acceptable with the spawning biomass of each species above the limit biological reference point. However, if the catch level of either of the key target species increases by more than 20%, this increased level of exploitation and its possible impact on the stocks will need to be re-assessed and discussed with industry.

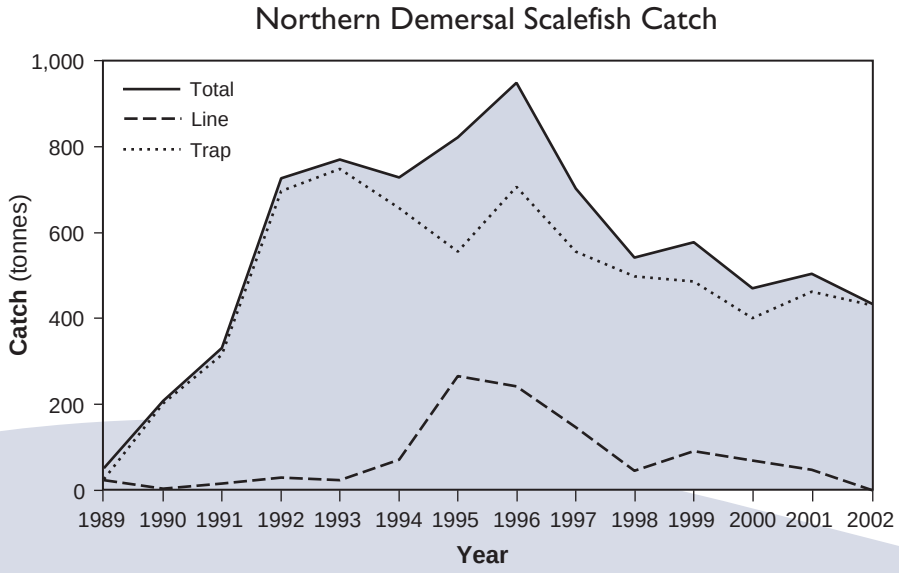
EXTERNAL FACTORS

The impacts of environmental variation on the fishery are not considered to be large. There are no data to indicate significant variation in recruitment amongst years for either of the two key species.



NORTHERN DEMERSAL SCALEFISH FIGURE 1

Location of the Northern Demersal Scalefish Managed Fishery in the Kimberley region of Western Australia. Access areas and boundaries within the fishery are shown.



NORTHERN DEMERSAL SCALEFISH FIGURE 2

Catches of demersal finfish in the NDSF by line and trap, 1989–2002.

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 (*Pristipomoides* spp.)	233	292	189	209	152
Red emperor (*Lutjanus sebae*)	109	101	90	95	101
Scarlet perch (*Lutjanus malabaricus*)	17	18	23	39	61
Spangled emperor (*Lethrinus nebulosus*)	26	27	32	36	35
Cod/grouper (Serranidae)	96	76	75	84	49
Other species	61	63	67	45	36
Total Demersal Scalefish Catch	**542**	**577**	**476**	**509**	**434**

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
2002	**1,760**	**0**	**0**	**434**	**900**	**434**

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.