



RESEARCH NOTE

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How Many Fish in the Sea?

Since 1950 growing world demand for fish has meant increased exploitation of wild stocks of fish, crustaceans and molluscs. Between 1950 and 1970 total reported marine capture landings rose from 18.5 million tons to 59 million tons.¹ Since the late 1980s marine capture fisheries have remained at about 83 million tons, although the overall production figure disguises changes in the composition of the catch and the fishing effort expended to maintain it.

At the Twentieth Session of the FAO Committee on Fisheries in 1993, it was reported that 69 percent of the world's marine stocks for which data are available were either fully to heavily exploited (44 percent), overexploited (16

percent), depleted (6 percent) or very slowly recovering from overfishing (3 percent), and therefore were in need of urgent corrective conservation and management measures.² The purpose of this Research Note is to provide a brief overview of the current state of Australia's wild fish resources.

Australian Fish Catch

Australia has the world's third largest fishing zone which, at 8.94 million square kilometres, is bigger than our land area and extends 200 nautical miles out to sea. However, it is only ranked fifty-fourth in world fishery production tonnage, as our waters are relatively nutrient poor and unable to sustain large fish popu-

lations.³ Fishing is Australia's fourth largest primary industry, with a gross production of 218273 tonnes in 1994-95 and a gross value of production (GVP) of \$1744 million.⁴ (See also Research Note No. 55 *On High Seas?—Australia's Fishing Industry*). The GVP is high because a significant portion of the commercial catch is highly priced species such as prawns, rock lobsters, scallops and abalone.

Fisheries Management

Fisheries resources are usually managed in units termed 'a fishery'. A fishery may be variously defined by (i) the area (e.g., the South East Fishery, which extends from New South Wales down to and around Tasmania to

South Australia) or (ii) a combination of the area with a species (e.g., Northern Prawn Fishery or East Coast Tuna Fishery) or (iii) a combination of the area and the fishing gear/methods used (e.g., Western Deepwater Trawl Fishery). By 1991 Commonwealth and State legislation had defined about seventy fisheries.

Concerns over exploitation levels of Australia's fisheries resources have existed for over a century. A variety of fisheries management tools has been used to conserve fish stocks. These

Table 1. Status of Commercial Fisheries Resources under Commonwealth or Joint Jurisdiction

Fishery	Status	Catch trend
Northern Prawn	Fully exploited	Variable
Torres Strait Prawn	Fully exploited	Variable
Torres Strait Lobster	Underexploited	Variable
Northern Fish Trawl	Underexploited by domestic fishers	Unavailable
Northern Shark	Underexploited by domestic fishers	Stable
East Coast Tuna (<i>Yellowfin</i>)	Uncertain	Variable
East Coast Tuna (<i>Skipjack</i>)	Uncertain, probably underexploited	Declining
Southern Bluefin Tuna	Overexploited	Limited by quotas
Southern Shark	<i>School</i> overexploited <i>Gummy</i> fully exploited	<i>School</i> declining <i>Gummy</i> stable
South East Fishery, 14 quota species	7 fully exploited, 1 underexploited 6 uncertain	Limited by quotas
South East Fishery, <i>Eastern Gemfish</i>	Overexploited	Limited by quotas
South East Fishery, <i>Orange Roughy</i>	At or near full exploitation	Declining, limited by quotas
Great Australian Bight, Shelf and Slopes	Uncertain	Shelf stable, slopes declining
Jack Mackerel	Uncertain	Variable
Squid	Probably underexploited	Stable
North West Slope Trawl	Fully exploited	Declining
Western Deepwater Trawl	Underexploited	Variable

Source: Bureau of Resource Sciences, *Fishery Status Reports 1994*

Table 2

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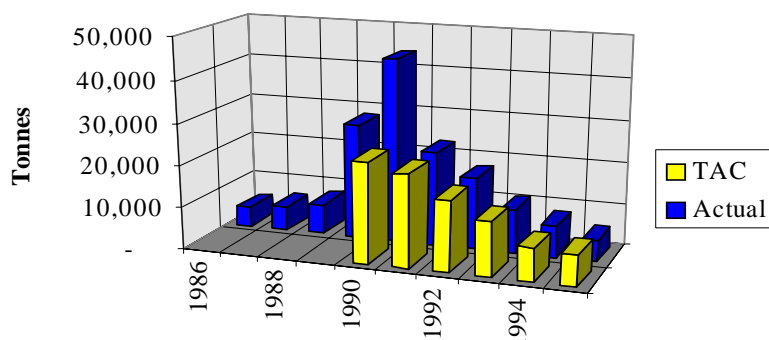
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include area closures during spawning, minimum legal sizes, season closures, limited entry (only licence holders with specific endorsement) and catch quotas. The Commonwealth is currently emphasising 'output controls' such as 'total allowable catch' (TAC) to restrict the catch to sustainable levels. An annual TAC is applied to some species. The TAC is divided into 'individual transferable quotas' (ITQs) within the fishery.

Status of Fish Stocks

Despite these efforts, nine of our species have been assessed as overexploited.⁵ About twenty-two of the one hundred-odd commercially fished species are 'considered heavily or fully exploited to the extent that any higher average catches could start to affect the stock replacement (recruitment) potential of their populations.'⁶ The Bureau of Resource Sciences says that although nine species have been assessed as underexploited, there is probably not much room for expansion of the total landed catch.⁷

SEF Orange Roughy Catch



For at least half of the commercially fished species there is insufficient knowledge to determine the effects of fishing on stock levels. Table 1 illustrates the status of fisheries under some form of Commonwealth management.

Sustainable fishing

Substantial knowledge is required to predict sustainable fishing levels of our fisheries resources. The life history of each species is unique and a great deal of biological information is required on factors such as growth, reproduction, recruitment and mortality. Other factors such as interactions with other species; the effects of changing oceanic conditions; the effects of trawling (dragging a net across the sea floor) and pollution on habitats and nurseries; the effects of fishing, not only on a target species but also on its predators or prey; and patterns of behaviour, should also be understood.

Orange Roughy

The orange roughy is an example of a species which was intensively fished before key knowledge of its breeding cycle (it doesn't become sexually mature until it is over 27 years old) and longevity (it can live to over 100 years) became widely available. Commercial fishing began in earnest for this high value species in 1986 with a recorded landed

catch of 4200 tonnes (see above). The catch peaked in 1990 at 45000 tonnes. The first TAC for the Eastern area of this fishery of 24000 tonnes was introduced in May 1990. Improved knowledge of the population dynamics of the orange roughy have seen the TACs dramatically reduced. The most recent TAC (for 1996) was for 6500 tonnes. A recent estimate of the long-term sustainable yield for orange roughy was around 3000 tonnes for the whole South East Fishery.⁸

Uncertainty

Many of our fisheries resources are still not well known as most of the research has been directed to the more valuable species (such as prawns and southern bluefin tuna). Hence the large number of species (fifty-nine out of one hundred) whose status is categorised as 'uncertain' or 'unknown'.

- 1 FAO, *The State of World Fisheries and Aquaculture*, Rome 1995, p.47
- 2 FAO, *ibid.* p.8
- 3 FAO, *ibid.* p.52
- 4 ABARE, *Australian Fisheries Statistics 1995*, Canberra 1995
- 5 Kailola, Patricia J. et al, *Australian Fisheries Resources*, Canberra 1993, pp.404-7
- 6 Kailola, P. et al., *ibid.* p.2
- 7 Kailola, P. et al., *ibid.* p.2
- 8 Tilzey, R. (ed), *The South East Fishery*, Canberra 1994, p.113