

DEMERSAL TRAWLING IN THE NEARSHORE REGION
BETWEEN CAPE SEAL AND KLIPPEN POINT,
REPUBLIC OF SOUTH AFRICA, 1977-1979.

R. J. M. CRAWFORD

*Department of Research and Information
Tsitsikamma Coastal National Park
Storms River
6308*

Abstract — Annual landings of fishes trawled demersally in the vicinity of the Tsitsikamma Coastal National Park increased by almost 75% between 1977 and 1979. Catches of sole *Austroglossus pectoralis* showed a large decrease over the same period, but catch rates for other species remained relatively constant suggesting that they have not yet been overexploited. Hake *Merluccius capensis* and horse mackerel *Trachurus trachurus* dominated the landings in all three years.

Introduction

The Tsitsikamma Coastal National Park (TCNP) Republic of South Africa, is located between Cape Seal and Klippen Point (Fig. 1) and ranges over a coastline of about 60 km. It is bounded both to the west and east by rivers (both known as Groot River), one entering the sea at Nature's Valley (33° 59'S, 23°34'E) and the other near Oubosstrand 34° 04'S, 24° 12'E). The marine sanctuary extends seawards 0,8 km from the highwater mark. Within this region all forms of fishing and collecting are prohibited, except for shore angling over a limited section (about 2 km) of the coast. However, there is doubt whether the area is sufficient to provide adequate protection for the subtidal fauna.

Off South Africa, purse-seining is largely confined to the waters west of Cape Agulhas (Crawford 1981a), but commercial handline and skiboat fisheries operate from many harbours along the southern Cape coast and there are indications that even relatively low levels of exploitation can significantly alter species compositions (Crawford & Crous 1982). Demersal trawling is also engaged in between Cape Agulhas and East London (Zoutendyk 1973) and has the potential to remove large quantities of fish. This note reviews recent trends in demersal catches made in the vicinity of the Tsitsikamma Coastal National Park.

Along the south coast, inshore demersal trawling is conducted mainly by small wooden boats, up to about 18 m in length (Botha 1977). These vessels seldom operate in waters deeper than 135 m and use trawl nets having a minimum mesh

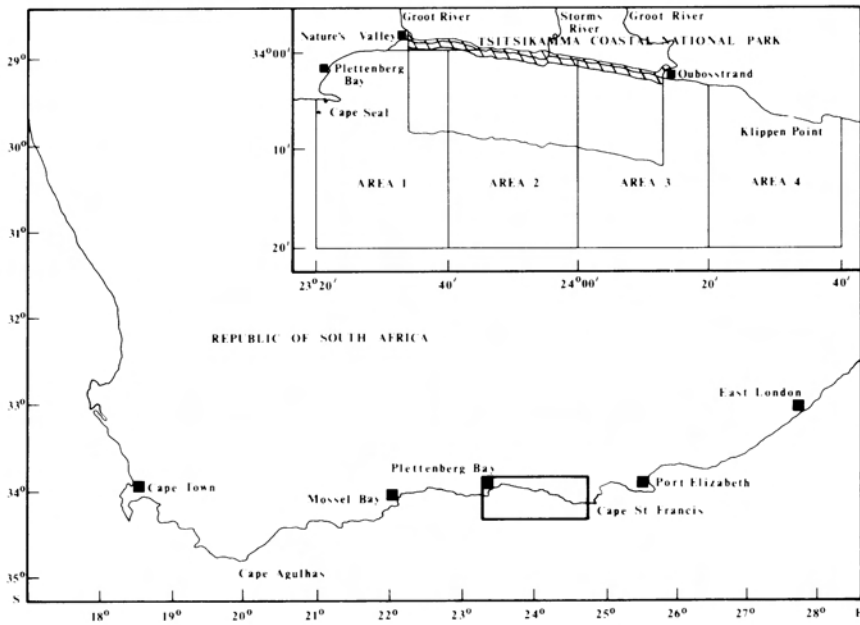


Fig. 1. The Tsitsikamma Coastal National Park (shaded) showing the proposed seaward extension and the four nearshore fishing areas considered in the paper.

size of 75 mm (Payne 1980). This relatively small mesh has been sanctioned because the fishery is mixed species and the contribution of hake *Merluccius* sp. is less than 30% of the total catch (including discards) (Payne *pers. comm.*). The present minimum mesh size allowable for trawling on grounds falling under the jurisdiction of the International Commission for the South East Atlantic Fisheries (ICSEAF) is 110 mm where the catch of hake normally exceeds 30%.

Results and Discussion

Records of individual trawls from each of four areas, 20' longitude by 20' latitude in extent, located between Cape Seal and Klippen Point (Fig. 1) are available for the period 1977-1979. Details of mass and species composition of catches indicate that the annual catch for the four areas combined rose from 346 tonnes in 1977 to 603 in 1979 (Table 1). This was largely the result of an increase in fishing effort, catch per unit effort remaining relatively constant. (Table 1).

In all three years, hake *M. capensis* and horse mackerel (maasbanker) *Trachurus trachurus* dominated the landings, accounting for 65-75% of the total catch. The yield of hake more than doubled after 1977, and a similar trend was evidenced by panga *Pterogymnus laniarius*. Landings of horse mackerel increased by almost 50%. Lesser quantities of gurnard *Trigla capensis*, kingklip *Genypterus capensis*, Agulhas sole *Austroglossus pectoralis*, red stumpnose *Chrysoblephus gibbiceps* and skate (Rajidae) were recorded. Totals for other species, which included kob *Argyrosoma hololepidotus*, monk *Lophius piscatorius* and snoek *Thyrsites atun*, were small in

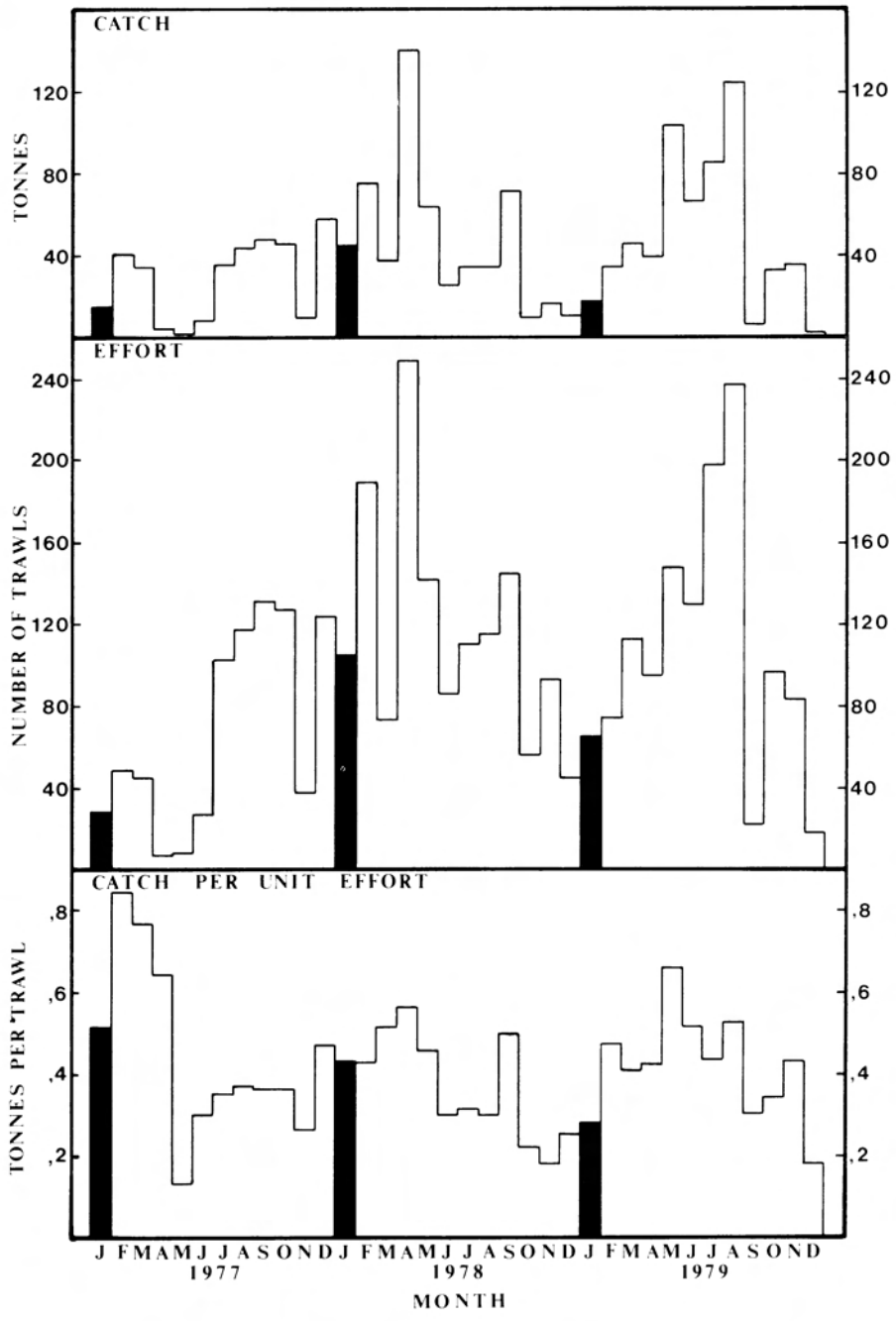


Fig. 2. Demersal catch, effort and catch per unit effort in the nearshore region between Cape Seal and Klippen Point, 1977-1979.

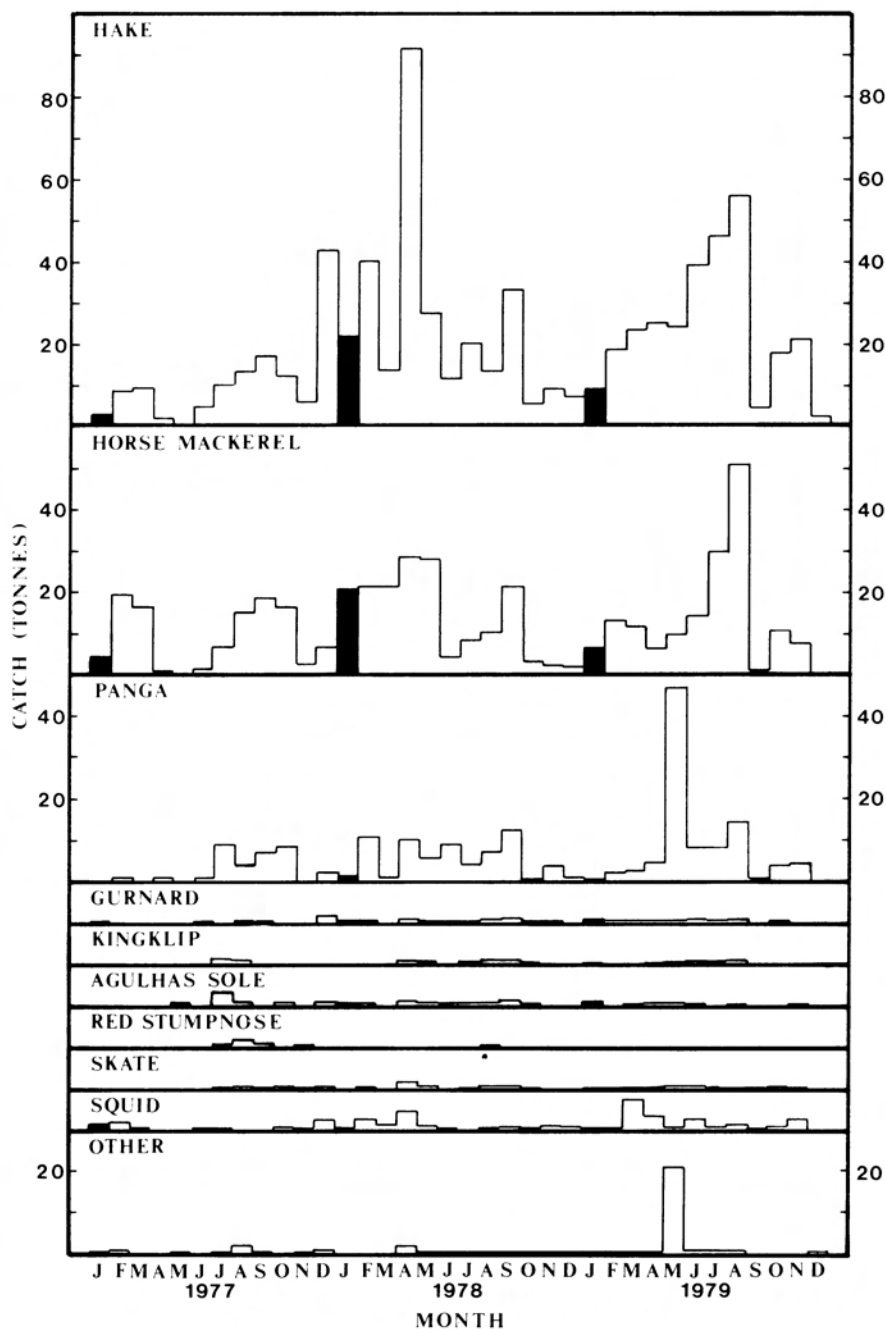


Fig. 3. Seasonal fluctuations in demersal catches of individual species in the nearshore region between Cape Seal and Klippen Point, 1977-1979.

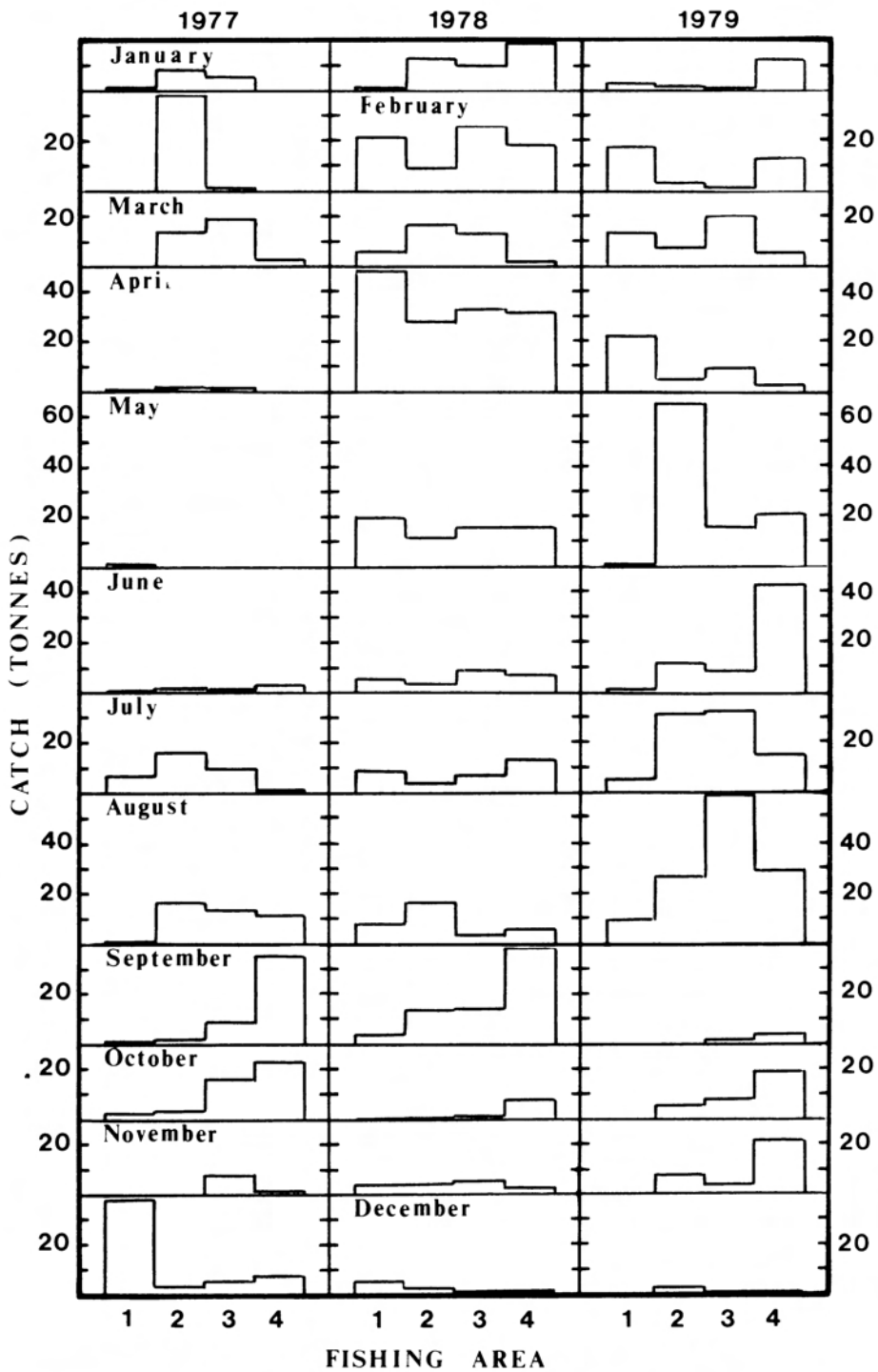


Fig. 4. Recorded demersal catches for four nearshore areas between Cape Seal and Klippen Point, 1977-1979.

Table 1

Trawl catch (tonnes), fishing effort (trawls) and catch per unit effort (tonnes per trawl) in the nearshore region between Cape Seal and Klippen Point, 1977-1979

Catch	1977	1978	1979
Hake	132	298	290
Horse mackerel	110	174	162
Panga	38	68	96
Gurnard	2	4	3
Kingklip	1	3	4
Agulhas Sole	5	4	2
Red stumpnose	2	0	—
Skate	2	4	3
Squid	7	13	20
Other	5	3	23
Heads, roe and offal	42	—	—
Total	346	571	603
Fishing effort	800	1 398	1 288
Catch per unit effort	,431	,408	,468

1977 and 1978, but amounted to 23 tonnes in 1979. The catch of squid *Loligo reynaudi* rose from seven tonnes in 1977 to 20 in 1979. Hake, horse mackerel, panga, gurnard and the less abundant, but valuable, kingklip and Agulhas sole are specifically sought by demersal trawlers (Hecht 1976). Landings of other species may be regarded as incidental, although squid sells well as bait.

In the inshore region between Cape Seal and Klippen Point there were two major peaks in catch and effort over the three-year period: summer to early autumn 1977/78 and late summer to winter 1979 (Fig. 2). Lesser peaks occurred in late summer and early autumn 1977, mid-winter to mid-spring 1977, spring 1978 and spring 1979. Catch rates on each of these six occasions were noticeably higher than those recorded in intervening months (Fig. 2), suggesting that skippers moved out of the area when trawling operations were not successful.

Monthly yields of the various species are illustrated in Fig. 3. The hake catch showed considerable fluctuation, with no distinct seasonal pattern, although landings generally decreased during spring. Comparison with Fig. 2 indicates that hake was largely responsible for determining overall trends in catch and effort. The

Table 2

Catch of Agulhas sole (kg) per area in the nearshore region between Cape Seal and Klippen Point, 1977-1979

Year	Area				Total
	1	2	3	4	
1977	4 100	450	500	—	5 050
1978	2 348	1 000	50	1 100	4 498
1979	1 650	—	200	50	1 900
Total	8 098	1 450	750	1 150	11 448
Per cent	70.7	12.7	6.6	10.0	100.0

inshore fishery is active on the nursery grounds of *M. capensis*, a species caught in shallower waters than *M. paradoxus* (Botha 1973), and concern has been expressed about the impact of the fishery on recruitment of young hake to offshore regions, escapement of small fish through mesh sizes of 75 mm being low (Payne 1980).

In each year the catch of horse mackerel showed two distinct peaks: one in late summer and autumn, the other in late winter or early spring (Fig. 3). Off southern Africa the diet of this species comprises mainly zooplankton, although myctophids are also eaten (Ja Lipskaja 1972; Hecht 1976; Kompowski & Slosarczyk 1976). Horse mackerel trawled off the south coast range in size from 26-51 cm total length (Hecht 1976). Thus they are aged four years or older (Geldenhuis 1973) and are probably sexually mature (Ja Lipskaja 1972; Macer 1974). Along the west coast adult horse mackerel exhibit seasonal patterns of distribution and availability, which are believed to be related to requirements for spawning and feeding (Crawford 1981b). Horse mackerel occurring off the south coast form part of a separate stock (Draganik 1977; Crawford 1981b), but their behaviour is probably also influenced by similar factors.

Good yields of panga were recorded during winter of all three years, and sometimes in late autumn or early spring whereas those of both kingklip and Agulhas sole were made mainly between late autumn and early spring. The sole is restricted to muddy substrates, which are not found between Plettenberg Bay and Cape St Francis (Zoutendyk 1973). Catches of sole per area are shown in Table 2, from which it is evident that 70% of the yield recorded during the three years was from the Plettenberg Bay — Nature's Valley vicinity (area 1). Landings from further east were much smaller. Since 1972 there has been a serious decline in the stocks of Agulhas sole between Cape Agulhas and East London, a decline attributed to overexploitation (Botha 1977). This is reflected by the catch in the vicinity of the TCNP, which in 1979 was less than 40% that of 1977.

The best hauls of squid were recorded in April 1978 and March and April 1979.

Catches generally declined in winter (Fig. 3). Hecht (1976) found squid to be most plentiful in trawl catches off Port Elizabeth during summer months.

The overall catch per area is plotted on a monthly basis in Fig. 4. Most fishing was conducted in the western regions during late summer and autumn, but further east during winter and spring. Eighteen per cent of the total catch for the three-year period was from the Plettenberg Bay area (1), 27% from the Storms River area (2), 26% from the Groot River (east) area (3) and 29% from the Klippen Point area (4). Indices of catch per unit effort (Table 1) suggest that, with the exception of Agulhas sole, demersal trawling has not yet had a detrimental impact on fish populations occurring within the TCNP and its adjacent waters. However, the escalation of catch and effort in recent seasons provides cause for concern, especially in view of the small minimum mesh permitted.

Conclusions

To effectively conserve the marine fauna of the coastal region it will be necessary to ensure that fish stocks in the immediate vicinity are not seriously reduced. For example, elsewhere in southern Africa depleted fish resources, primarily the result of overexploitation, have had severe repercussions for seabird populations (Crawford & Shelton 1978, 1982). Whitebreasted cormorants *Phalacrocorax carbo* nest on a stack within the boundaries of the TCNP (Underhill 1978; Brooke, Cooper, Shelton & Crawford *in press*). Limited information on diet (Rand 1960) and studies on the functional anatomy of the feeding apparatus (Burger 1978) suggest that demersal fish such as panga and hottentot *Pachymetopon* spp. are important food items. White-breasted cormorants forage almost exclusively within 10 km of the coastline (Siegfried 1975). Other coastal fauna may have similar requirements (Williams, Frost & Kinahan).

Although fish are not restricted by frontiers, extension of the park boundary to include the marine area 10 km from the highwater mark, as contrasted with the present 0,8 km would undoubtedly help protect resident fish resources from probable increased exploitation in future years. As a minimum requirement demersal trawling within this region should be prohibited. The major grounds for Agulhas sole lie to the west of Nature's Valley or east of Oubosstrand (Zoutendyk 1973) and the introduction of such legislation should not seriously affect current catch levels of other demersal species. Catches in the nearshore region between Cape Seal and Klippen Point contributed only 3,9% of the total landings of demersal fishing concerns located between Mossel Bay and East London during the period 1977-1979 (3,9% in 1977; 5,3% in 1978; 3,1% in 1979). As the proposed extension of the marine reserve would affect less than one third of the area considered (Fig. 1), the overall influence on demersal catches would be of the order of 1,0% only.

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