

Anticipated Impacts of Recent Political Changes on Fisheries Management in South Africa

KEVERN L. COCHRANE

South Africa has a coastline of some 3,000 km extending from the Orange River in the west, on the border with Namibia, to Ponta de Ouro in the east, adjacent to Mozambique (Fig. 1). The western coastal shelf is highly productive, in common

with other upwelling ecosystems around the world, while the east coast is considerably less productive but has a high species diversity including both endemic and IndoPacific species.

The living marine resources of South Africa have been exploited for many

centuries and there is evidence of abalone (*Haliotis midae*) having been exploited 125,000 years ago. Approximately 6,000 years ago, the "Strandlopers" (beach-walkers) were exploiting a range of marine species as shown by a study of middens along the



A good catch of demersal species by a commercial trawler. (PHOTO BY D.W. JAPP)

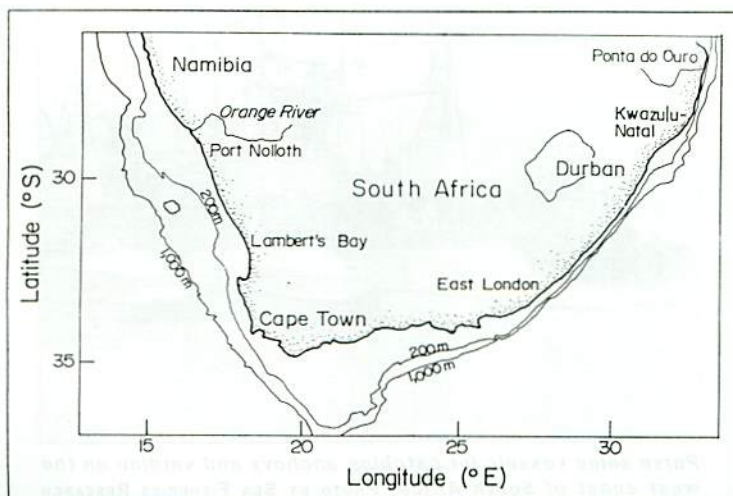


Fig. 1. The South African coastline.

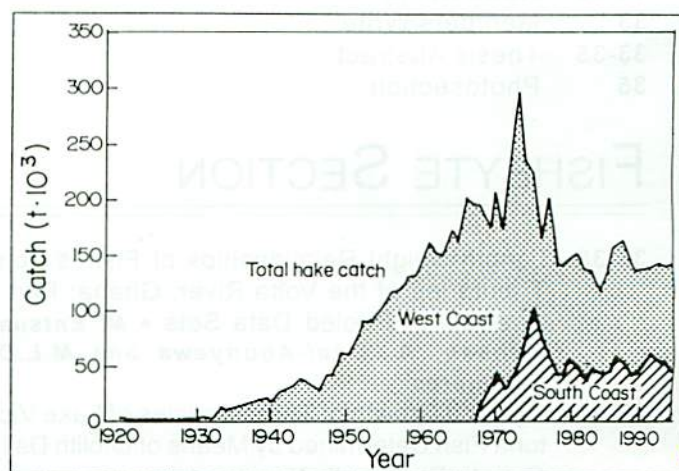


Fig. 2. Hake catches taken from the two major demersal fishing zones in South Africa.

coastline. Large-scale industrial fisheries started in South Africa close to the beginning of this century and, thereafter, effort escalated rapidly. By the 1960s, catches in several South African fisheries had exceeded the sustainable yields and there were sharp declines in several key stocks, prompting initiatives to improve the scientific basis for the management of the major fisheries.

The Current Status of the Fisheries

The total wholesale value of the fisheries in 1992 was approximately \$337 million (Table 1). Over 25,000 people are currently employed in the formal fisheries sector in South Africa.

Catches in the demersal fishery are dominated by the hakes (*Merluccius capensis* and *M. paradoxus*). The total allowable catch (TAC) of these two species was set at 146,000 t in 1993 and of this, 65% was allocated to two major companies while the remainder was divided up amongst a number of smaller companies. In 1993, for the first time, an allocation of 2,600 t was made to 16 community trusts. The hake resource is considered to be in a stable state and has shown recovery since the low levels of the mid 1970s (Fig. 2), facilitated by conservative management approaches including, at present, an $f_{0.2}$ strategy.

The pelagic fishery depends heavily on two species for which TACs are set, anchovy (*Engraulis capensis*) which is essentially reduced to fishmeal and oil, and sardine (*Sardinops sagax*), the adults of which are largely canned for human consumption. Juvenile sardine are taken as by-catch during anchovy fishing operations. Almost all of the TACs for these two species are allocated to five major companies.

Anchovy catches have averaged over 300,000 t per annum since 1980, but have shown all the variability to be expected from a short-lived species, ranging from 150,000 t to 600,000 t during the same period. Their biomass has declined substantially over the last few years as a result of poor recruitment (Fig. 3). However, the sardine

as a result of favorable environmental conditions accompanied by strict controls on fishing mortality. The average catch for this species has been just over 40,000 t per year since 1980. The TACs of both these species are based on constant proportion strategies designed to compromise between maximizing average annual catch and minimizing inter-annual catch variability, without undue risk to the stock.

The third major industrial fishery is that of rock lobster, which depends on two species, the West Coast *Jasus lalandii* and the South Coast *Palimurus gilchristi*. TACs for the two species in 1993 were 2,200 t and 972 t whole mass, respectively. The latter resource, caught with traps in water of approximately 100 m or more, is considered to be fairly sound and the mean CPUE has remained essentially constant for a number of years. However, the West Coast rock lobster is currently giving cause for concern as an episode of reduced growth rates, which commenced in 1989 and is still in effect, has resulted in falling catch rates reflecting a declining biomass (Fig. 4). The TAC has been reduced in response to this decline, resulting in substantial hardship to all those dependent on this important resource for their livelihood, but may have to be reduced again substantially in the future. The quotas for the West Coast lobster are held by a large number of companies of diverse size, while those for the other species are in the hands of four major companies.

Table 1. The economic value of South Africa's commercial fisheries.

Sector	Nominal catch ('000 t)	Wholesale value US\$ (millions)
Demersal	211.9	173.9
Pelagic	445.0	73.8
Rock lobster	3.5	38.5
Molluscs	3.2	10.8
Line and small nets	20.5	33.1
Seaweeds	1.9	1.1
Miscellaneous	-	5.3
Total	642.8	336.5

biomass has increased from less than 100,000 t in the early 1980s to above 300,000 t in the early 1990s (Fig. 3),

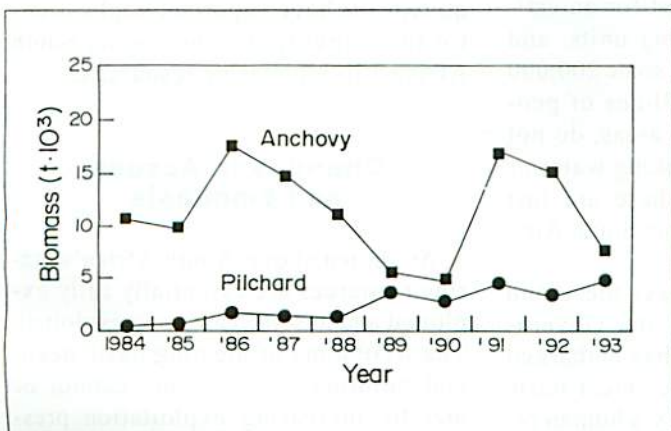


Fig. 3. The spawner biomass of anchovy and pilchard in South African waters, determined by hydroacoustics.

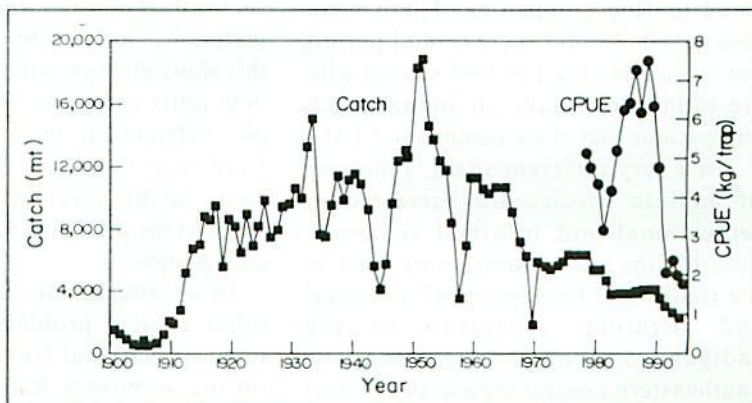


Fig. 4. Catches of West Coast rock lobster since the start of this century and catch-per-unit-effort (CPUE) of animals above 89 mm (the legal size limit until it was reduced in 1992).

Smaller-scale fisheries include the line fishery which has been in existence for centuries and currently involves approximately 3,500 commercial license holders, between 5,000 and 7,000 recreational skiboats and an estimated 750,000 recreational shore anglers. The total commercial catch in 1992 was over 20,000 t with a wholesale value exceeding \$30 million. Over 90% of this catch was taken in Cape waters (essentially South and West Coasts) and



Gathering intertidal organisms in the traditional fisheries on the southeast coast of South Africa. (PHOTO BY C.L. GRIFFITHS)

nearly 10% off the Kwazulu-Natal coastline. Approximately 50% of the Cape catch was made up of snoek (*Thyrsites atun*), while kob (*Argyrosomus hololepidotus*), yellowtail (*Seriola lalandei*), geelbek (*Atractoscion aequidens*) and carpenter (*Argyrosoma argyrosoma*) are also abundant components of the catch. However, over 90 species are considered to be important to the line fishery. Of these, 26% are showing negative trends in their abundance; 40%, primarily elasmobranchs and migratory gamefish such as snoek, are considered to be in a healthy state; while the status of 30% is uncertain.

Molluscan fisheries are dominated by the abalone (*Haliotis midae*) fishery. The TAC for this species was 615 t in the 1992/93 season which, apart from 10 t held in reserve, was allocated to five companies. There were also nearly 35,000 recreational permit holders during the 1992/93 season who are estimated to take an annual catch approaching that of the commercial TAC.

On a very different scale, a number of mollusc species are harvested in recreational and informal fisheries. Possibly the most intensive of these is the traditional harvesting of intertidal and infratidal organisms by the indigenous people inhabiting the southeastern coastal area to the east of East London (Fig. 1). The collection of organisms is undertaken by women and children and some 25 species of

mollusc are taken, with the brown mussel (*Perna perna*) clearly the most common in the harvest. The animals collected provide an important protein supplement to a maize-based diet. However, harvesting has taken its toll on the resource and has led to pressure shifting to other organisms, particularly limpets.

Expectations for the Future

The social and economic needs in South Africa, as reflected in the African National Congress initial proposals for a Reconstruction and Development Programme (RDP), are enormous. Unemployment has been estimated to be approximately 50% and some 17 million people, out of a total population of nearly 40 million, are thought to be below the Minimum Living Level. In 1990, there was a need for an estimated 1.3 million housing units, and this shortfall is growing at some 200,000 new units each year. Millions of people, particularly in rural areas, do not have access to clean drinking water or basic health services. These are just some of the problems facing South Africa's people.

In an attempt to address these and other critical problems, the Government of National Unity has embarked on the ambitious RDP to: meet basic needs; develop the country's human resources; build the economy; and democratize the state and society.

At present, the annual wholesale value of the South African marine catch is approximately 0.5% of the Gross Domestic Product and fisheries can only be expected to play a minor role in contributing to the RDP. Nevertheless, they have a role to play and this has been summarized in the initial Programme outline:

Marine resources must be managed and controlled for the benefit of all South Africans,

especially those communities whose livelihood depends on resources from the sea. The fishing stock must be managed in a way that promotes sustainable yield and the development of new species. The democratic government must assist people to have access to these resources. Legislative measures must be introduced to establish democratic structures for management of sea resources.

*African National Congress, 1994
The Reconstruction
and Development Programme
Umanyano, Johannesburg*

The above stresses several principles, including the need for sustainable use, broadening access and a democratic management process. These requirements have important implications for those involved in managing South Africa's living marine resources.

Changes in Access and Emphasis

As shown above, South Africa's marine resources are essentially fully exploited and in some cases overexploited. The RDP aims of meeting basic needs and building the economy cannot be met by increasing exploitation pressure on these resources and improvements must come from better and broader

utilization. However, while the scientific knowledge of our fish and fisheries is generally good, there has been very little research into the social and economic consequences and potential of the fisheries, and decisionmakers will have to make extensive use of experiences gained elsewhere in the world, while the necessary research is undertaken locally.

The hake fishery is already facing change. Most hakes are currently caught by trawlers,

but there has been an increasing demand for line-caught hake, coupled with increasing pressure to expand longlining activities for these and other demersal species. In response to this, an experimental fishery was initiated in May 1994 to investigate the biological, social and economic impacts of longlining and trawling for hakes. The need for this experiment was accepted and supported by representatives of the key interest groups and an amount of 4,000 t of hakes from the TAC has been allocated to a range of line-fishers in the first year of this experiment. Those involved range from small-scale fishers, using boats typically less than 20 m long, to large well-equipped longlining vessels operated by industrial fishing companies. The results of this experiment, combined with data from the trawl fishery, will be used to determine the optimal approach to using South Africa's hake resources.

Similar pressure for greater access to resources has occurred in other fisheries. The Development Bank of Southern Africa has called for the restructuring of the fishing industry and has argued that communities traditionally dependent on the sea for their livelihoods are being impoverished by being denied access to resources. They do not argue for the demise of the existing industry, however, but suggest that "Opportuni-



A catch, by a small-scale line fisher, of *Pachymetopon aeneum* at Hout Bay near Cape Town. (PHOTO BY C.L. GRIFFITHS)

ties exist to integrate the marginalised communities into the industry so that both sectors may benefit from the restructuring".

The whole question of access is fraught with complications, even without the additional complexity brought about by decades of apartheid. There can be little doubt that, if the living marine resources are to provide any benefits of note, access to the resources must be limited. However, there are no easy solutions in determining how to allocate access in the new South Africa and the issue needs to be debated and resolved as a prerequisite to achieving the aims of the RDP relating to fisheries. There is considerable constructive debate at present, and this will culminate in the development of a new, formal Fisheries Policy for South Africa during 1995.

Management to Achieve the Aims of the RDP

Clearly the existing, conventional approaches to assessing the more valuable stocks, using fisheries independent biomass indices to supplement commercial catch and effort statistics, and modeling approaches such as surplus production, VPA and risk analysis, must continue. In addition, the move towards greater incorporation of social and economic considerations, obtained through

close discussion and negotiation with affected groups into management procedures for these stocks, should be extended. However, even for these resources, the possibility of a larger number of users, operating on different scales, will require changes in philosophy if monitoring and enforcement are to remain effective. Enforcement is already a major

problem and poaching is thought to be of substantial proportions in the abalone and West Coast rock lobster fisheries, approaching the legal TAC in the former species. One reason given for the prevalence of poaching is that the existing allocation of resources is perceived to be inequitable.

Perhaps paramount in a new philosophy is the need for a greater sense of long-term responsibility for the use and management of the resources by all participants. This will require both a long-term commitment to the stocks, brought about by granting of some form of long-term access right, and greater participation in the management of the resources, the democratic structures called for by the RDP.

The conventional approaches of assessment cannot be applied to all our fisheries, however. It would be impractical to monitor the status of some 90 linefish species and to set, and enforce, TACs for each of them, or to monitor vast stretches of coastline to ensure sustainable use of intertidal invertebrates. In addition to continuation, or modification, of existing measures to control effort, including closed seasons, size limitations and direct effort controls, more holistic approaches to these resources are required. Clearly, in the case of small-scale use of intertidal organisms, the communities or groups involved in their harvesting are the ones

who will benefit or suffer most from their wise, or dismal, management. It is essential to involve these people in assessment and management of the living resources and enforcement of related regulations. A practical approach to sustainable use of intertidal resources may be some form of rotational harvesting, with temporary closed areas, possibly coupled with reseeded to increase the rate of recovery of depleted areas.

The current linefish regulations focus on season, size and bag limits for both recreational and commercial species. While such limits have, and will continue to have, an important role to play, their benefits are being overcome by sheer growth in effort in what is essentially an open access fishery. Additional measures are required. Arguably, the most promising option for nonmigratory fish must be the establishment of an appropriate chain of reserves or sanctuaries which allow the effective

escapement of a sufficiently large spawner biomass, to preserve the species and to seed other areas through the emigration of eggs, larvae and adult fish. South Africa currently has 47 marine reserves and closed areas with varying limitations on what activities and harvesting can take place in each. Research has indicated that the reserves play a valuable role, not only in preserving biomass and size structure within the reserves, but also in exporting eggs, larvae and adult fish to surrounding areas where they are available for fisheries. While the existing reserves are a start, they were not established for the purpose of sustaining fish yields. If optimal benefit is to be obtained from South Africa's limited resources, their role needs to be reviewed and an ef-

fective chain designed and established to provide adequate, but not excessive, refuges to sustain nationally both biodiversity and catches of the key species.

Reserves will, however, not be appropriate for widespread migratory linefish species such as snoek, the tunas and yellow tail, and the more important of these will probably require on-going assessment and management on a single species basis. However, if they are to be managed to obtain the best benefits from them, the issues of access rights and engaging fishers as

ties for improved returns from the resources, by improving the quality of the product or enhancing its value, will also be investigated. The different users—fishers, industry and others—will be integral parts of this program as they ultimately must have confidence in the structures and systems implemented.

A further, important area to be explored is the potential for using the resources to generate income through tourism and recreation. Nonconsumptive use of resources such as ecotourism or development of the recreational market may provide scope for substantial increase in wealth generation. For example, commercial fishing boats could also be used to transport tourists or recreational anglers, and resorts could be created in prime sports to attract a range of visitors.

There is unquestionably scope for improving the contribution to social and economic well-being from South Africa's marine resources. Ensuring that optimal returns are obtained on a sustainable basis will not be easy, however, and will require a combination of imaginative vision, sound management and close cooperation among all partners in the enterprise.

Acknowledgements

Dr. Vere Shannon, Dave Japp, Andrew Penney, Rob Tarr and Colin Attwood of the Sea Fisheries Research Institute are thanked for helpful comments and information.



KEVERN L. COCHRANE is from the Sea Fisheries Research Institute, Pvt. Bag X2, Rogge Bay, 8012, South Africa.



A vessel used in the line fishery, steaming near Cape Town. (PHOTO BY SEA FISHERIES RESEARCH INSTITUTE)

partners in the management process will have to be resolved.

Most of the above approaches will require rigorous research and trial before they can be confidently implemented. The South African Network for Coastal and Oceanic Research (SANCOR), in cooperation with, among others, the Sea Fisheries Research Institute, is launching an ambitious new marine science program from 1995, with the explicit aim of promoting the wise use of marine resources through appropriate science, engineering and technology. The program aims to integrate the natural and social sciences, in order to investigate, among others, the problems and options discussed above in order to identify the best approaches to manage resources in specific areas. Opportuni-