



8 Commercial Resource Use

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In addition to the many social and recreational amenities provided by coastal KZN, there are also a number of commercial ventures and opportunities based on coastal resources. These contribute significantly to job creation and to the Province's economy and include coastal tourism, fishing, diving as well as agriculture and extractive dune mining operations.

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8.1 Tourism

Some eight million tourists revel in KZN annually, attracted by its rich and unique natural environment and especially its coastline and beaches. Tourism to KZN has been expanding and forms an increasingly important component of the economy and future development of the Province.

Growth in tourism also underpins infrastructure development and employment.

The World Tourism Organization defines tourism as “the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year”.¹ Tourism is one of the most important and fastest growing industries, with one of the major spinoffs being job creation.² As a result, the South African Department of Tourism has focused on increasing the number of foreign tourists visiting South Africa.³

KZN is the third most popular province in terms of international tourism to South Africa, receiving just over 900 000 foreign visitors in 2011.⁴ The total tourism contribution to KZN’s GDP in 2011 by these visitors was estimated to be R7.1 billion.⁴

KZN is also the domestic visitor’s destination of choice, with 27% of all South African tourism-related trips taking place in KZN. Although 75% of these trips are intra-provincial (i.e. KZN holiday-makers), the remaining visitors from other provinces account for nearly 1.8 million visitors to per year. This amounts to a domestic spend of R3.3 billion annually.⁴ It has been estimated that visitors to KZN’s beaches during their stay account for about 80% of the tourism spend in the Province each year.⁵

The KZN tourism industry experienced strong growth after the end of apartheid, rising from below 400 000 foreign visitors in

1995⁶ to 956 600 in 2010.⁵ In recent years however, the province’s mean annual hotel occupancy rate has declined from a high of 71.9% in 2005 to 53.5% in 2010.⁷ This corresponds with a national downturn, exacerbated by the global economic downturn.

While Gauteng and the Western Cape have a higher dependence on the foreign tourist market, the international market remains relatively more valuable to the KZN economy than the domestic market. Hence the decrease in foreign tourist numbers is concerning, noting that foreign tourists spend an average of R7 215 per visit, compared to the R720 spent by the average domestic tourist.⁶

Tourism generally occurs across a range of sectors, including recreation and leisure, sports and business tourism, eco-tourism and rural and cultural tourism.

Tourists enjoying the sunny KZN south coast beaches.



Photo: Blue Flag



Recreation and leisure

People are attracted to the KZN coast for a range of leisure and recreational activities, as highlighted in *Section 7.4*. Key to the success of coastal tourism is the state of KZN beaches, in terms of facilities, cleanliness and safety. The need to ensure a quality beach experience resulted in the Blue Flag programme, an international beach accreditation initiative. In South Africa, it is facilitated locally by the Wildlife and Environment Society of South Africa (WESSA) and participating municipalities.

Blue Flag certification originated in Europe as an environmental and tourism campaign that was intended to assure visitors that certified beaches had high standards of cleanliness, safety and environmental quality. The programme annually evaluates beach conditions based on bathing water quality, environmental management, safety and services provided. The criteria are set by the international co-ordinators of the programme, the Foundation for Environmental Education (FEE).

In KZN, a number of beaches have attained Blue Flag certification. Beaches are evaluated each year and the list is updated, with new beaches added, and others removed if the standards are not maintained.

To enhance the safety of KZN beaches, shark safety gear is deployed by the KZN Sharks Board (*Section 7.4*). A questionnaire survey of beachgoers in Queensland, Australia, revealed that beach safety is a critical element of a beach experience and that beach safety is associated with protection from shark attack.⁷ Similar findings have been obtained for KZN, from research carried out on focus groups.⁸

Sports tourism

Sports tourism contributes more than R6 billion to South African tourism, with more than 10% of foreign tourists coming to South Africa to watch or participate in sports events per year.⁵ Events such as the Rugby World Cup (1995) and the FIFA World Cup (2010) have boosted tourism to the country.

In KZN, there are a number of world class events that attract international competitors. Coastal KZN features prominently in the International Surfing Association's calendar of events, annually drawing foreign participants and their teams. Other events that draw sport enthusiasts to the coastal region are a suite of yachting regatas, angling tournaments as well as cycle

and marathon events such as the Comrades Marathon, which is the biggest ultra-marathon in the world.⁵

Business tourism

Business tourism has become a major driver of economies worldwide. South Africa is ranked 37th in the world and first in Africa in terms of business meetings hosted in 2012. South Africa has over a 1000 world-class conference and exhibition venues, notably the International Convention Centre (ICC) in Durban. It is estimated that the ICC injects R170 million into the economy of Durban annually.²

Eco-tourism or nature based tourism

South Africa is the third most bio-diverse country in the world.⁹ It is also home to three of the world's biodiversity hotspots: the Cape Floristic Region, Succulent Karoo Biome, and the Maputaland-Pondoland-Albany Region. The latter hotspot is partly located within KZN's coastal zone, making it a sought-after eco-tourism destination. The KZN coast is also home to the iSimangaliso Wetland Park, a UNESCO World Heritage site.

There are a number of outstanding eco-related activities that attract visitors to KZN coast; such as the annual sardine run (*Section 5.2*), shark-cage diving, whale and dolphin excursions and experiencing the nocturnal viewing of the endangered loggerhead and leatherback turtles laying eggs on beaches of the iSimangaliso Wetland Park.¹⁰

Rural and cultural tourism

Rural tourism gives visitors personal contact with the rural environment and showcases the heritage and traditions of the local people. It also provides visitors with an opportunity to participate in the lifestyle activities of locals, such as fishing, walking and cycling.^{11;12} The National Tourism Sector Strategy (launched in 2011) aims to increase the number of nights spent in rural areas by tourists.^{4;13} Rural tourism can benefit a community through job creation for unskilled people, and has the potential to alleviate poverty in rural areas.¹²

A popular form of rural tourism is a "township tour", which allows locals to establish small enterprise businesses. The township tour of Durban, for example, includes a tour around

Cato Manor, Inanda, KwaMashu, Ntuzuma, Phoenix, Chesterville, Claremont, Lamontville, Umlazi, Chatsworth and KwaMakutha.¹¹ There are also a number of cultural museums which provide insight into KZN's and South Africa's history. The KZN Cultural Museum in Ulundi, for example, focuses on archaeology, Zulu culture and King Cetshwayo's Ondini residence; while the Dumazulu Traditional Village in Hluhluwe is a living museum where traditional Zulu dancing and cultural craftwork are demonstrated.

Spatial distribution of tourist activities and accommodation

Tourist accommodation, and thus the majority of tourist related activities, has historically been heavily concentrated in the southern half of the province. This uneven distribution can be traced back to the legacy of apartheid, where sections of coast were classified as "homeland" and subsequently held in trust by the state, making the land inalienable.

The total area occupied by resorts located within 1.0 km of the coast in municipalities south of the Thukela River is 311.1 ha, compared with only 34.5 ha in municipalities north of the Thukela. However, it is important to note that iSimangaliso Wetland Park is located in this area and supports a host of eco-tourism related activities. Importantly, associated with tourism are job opportunities, improved infrastructure and increased spending on tourism-related activities.

Tourism is a key element of the provincial economy, strongly influenced by the coast and its resources. KZN has successfully tapped into a number of coastal tourism activities, providing a range of revenue streams coupled with growing job opportunities. Nevertheless, as the tourism market grows and coastal development increases, authorities should be mindful of balancing the expansion of tourism with environmental sustainability. ■



Photo: Camilla Floros



Top: Enjoying a Blue Flag beach.
Bottom: Surfer enjoying warm KZN waters.

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8.2 Commercial Fisheries

South Africa has rich fishery resources with authorization to harvest commercially being given to a number of operators. There are several, widely-differing types of commercial fishery in KZN, comprising oyster gathering, estuarine bait collecting, beach seine-netting, linefishing, industrial trawling and pelagic long-lining. None of these activities are very extensive in scale, but they are of provincial significance as they provide employment as well as economic benefits to those who participate in them, while providing members of the public and the local hospitality industry with seafood.

Oyster gathering

This fishery is confined to the intertidal zone, with shore-based divers and collectors prying Cape rock oysters from rocks with crowbars during spring low tides.¹ Traditionally, women were the main participants, working in water reaching not higher than their chests and locating oysters by feel or sight. About ten years ago the use of masks and snorkels was permitted, and men now dominate the fishery, working in slightly deeper water (1.5 m). Harvesting areas extend from the Thukela River to the Umgeni River on the KZN North

Work aboard a prawn trawler.



Photo: Sean Fennessy

Coast, and from the Isipingo River to the Mzimkhulu River on the South Coast. The bulk of the stock is located on the north coast; in 2010/11 licensed harvesters collected approximately 1.5 tons from north coast sites.

Harvesting areas are each divided into four zones, with harvesting allowed in only one zone per site per year. There are thus three fallow years between subsequent harvests, which is the period required for new recruits to attain the minimum marketable size. Rotational harvesting as a management method is unique to oyster harvesting in KZN, and has been implemented since the early years of the fishery, ensuring its sustainability, in spite of several changes in the number of zones, fallow years and the time of zone rotation.^{2,3} The oysters are all sold locally, while farmed oysters are also imported to meet local demand.

Estuarine bait collecting

In years gone past, commercial permits were issued for the collection of prawns and/or bait fish such as mullet, either by using shove nets or small beam trawls. As estuaries have increasingly become degraded, these activities have gradually ceased, and currently there is only one remaining estuarine bait collection permit in KZN.

Beach seine-netting

This fishery comprises small surf-launched boats, which deploy seine nets in the surf zone or just behind the backline. The nets are then retrieved and hauled onto the beach. All except one permit allows for the use of motorized boats, and all operate between Durban and Port Edward. The majority of permits (currently 25) are issued exclusively for the seining of sardines during the sardine run (*Section 5.2*). Annual catches by the KZN sardine netters are relatively small in relation to the south and west coast industrial purse-seine catches, but in some years have been in the region of 500-700 tons, which exceeded both the KZN commercial linefish and trawl catches.⁴

There is also one general beach-seine permit, which entitles the permit holder to catch sardines as well as other shoaling fish species. This permit is restricted to the Durban beachfront and mainly targets bait species such as squid and small pelagic fish.⁵ The permit-holder uses a rowing boat to deploy the net, and this represents the last survivor of the fleet of

traditional beach seine-netters which used to operate in Durban in the early 1900s, an activity which was introduced to Durban by indentured Indian immigrants (*Section 7.1*).

Industrial trawling

The trawl fishery in KZN targets crustaceans and has two facets, namely the shelf-edge fishery, conducted about 10-20 nautical miles offshore between Durban and the Thukela River in deep water (200-500 m); and the shallow water (< 50 m) prawn fishery for penaeid prawns on the Thukela Bank between Zinkwazi and Mtunzini.⁶ The shallow water fishery targets mainly white prawns and brown prawns, while several crustacean species are targeted in the deep water fishery, namely pink or knife prawns, langoustines, red crabs and deep water spiny lobsters.

The fishery started in the 1970s and at its height in the mid-1980s there were some 15 trawlers based in Durban. However, this was artificially inflated through vessels that had been banned from Mozambican waters basing themselves in KZN.

Currently there are seven permits issued, although not all are used regularly, despite the fact that local demand exceeds what the local fleet can supply. In the 1980s, total landed catch of crustaceans was around 500 tons per annum, but is currently around 200 tons, almost all from the deep water industry.

In South Africa and elsewhere, imports of farmed prawns from Asia have resulted in a substantial drop in the market price, and together with increased fuel prices, have affected the viability of both the local shallow water and deep water operations. Additionally, the St Lucia estuary, which is a major source of prawn recruits to the Thukela Bank, has been closed for several years (since 2002), so catches in the shallow water fishery are poor.

The prawns are caught using large steel trawler vessels ranging from 25-35 m in length. The trawl net is deployed from the stern using nets with mouth widths from 25-60 m across. The catches are size-sorted, graded, packed and blast frozen on-board, while at sea.

The deep water fishery operates throughout the year, while the Thukela Bank fishery is closed for six months in order to minimize catches of other species when prawn catches are low. Trawling is quite indiscriminate, and anything that is not



fast enough to avoid the net is caught, resulting in large quantities of bycatch, most of which has low value, and is discarded, dead, back into the sea.^{7; 8; 9} As a rough guideline, approximately 3-6 kg of bycatch is caught for every kg of commercially valuable crustaceans.

Commercial linefishery

The offshore linefish resources of KZN have been exploited for at least the past 100 years.^{10; 11} At first these resources were only accessed through a limited number of large lineboats (14-20 m in length) that operated out of Durban Harbour.¹² However, with the development of the ski-boat after 1945,¹¹ offshore fishing effort expanded along the KZN coast. Although the distance range of ski-boats was minimal (<25 nautical miles) compared to lineboats, the number of ski-boats operating off KZN increased rapidly. Ski-boats are compact, trailer-able, beach-launched vessels 4-8 m long, powered by twin outboard engines and are more affordable, fuel efficient and cheaper to run than large harbour-based vessels.¹¹ One of the key advances brought about by ski-boats was the fact that linefishers could now launch from just about any reasonably protected beach (including river mouths) and access many productive fishing grounds that had previously not been exploited.¹³

It was only in 1984 that the commercial linefishery was formally split from the recreational ski-boat fishery (Section 7.4) and managed separately.^{11; 14; 15} The main distinction was that commercial fishermen were legally allowed to sell their catch while recreational fishers were not.

Commercial fishers were historically limited in terms of effort (i.e. number of vessels and crew) and had to apply for a commercial fishing licence annually. Initially a two-tiered approach was used whereby commercial operators were split into full-time operators (called A-licences) and part-time operators (called B-licences). Linefish species were grouped into categories (i.e. critical, restricted, exploitable, recreational and bait species) based on their assumed vulnerability.¹⁶

Generally, commercial fishers had unlimited access in terms of catch but were limited in terms of effort, recreational ski-boat anglers were unlimited in terms of effort (open access) and limited in terms of catch by means of daily bag limits, while minimum sizes and closed seasons applied to both fishery sectors.

Assessment of the status of linefish populations off the KZN coast during the 1990s revealed that many of the species targeted by the commercial linefishery were overexploited and could not sustain the fishing pressure.^{11; 15; 17} A similar situation existed in the Cape¹⁸ which resulted in the Minister declaring an emergency in the linefishing industry in December 2000. Under the emergency, a radical decrease in commercial fishing effort (~70%) was recommended to enable the rebuilding of overexploited fish stocks. This was implemented through the allocation of firstly medium-term (2003) and then long-term rights (2006). Under the *Traditional Linefish Policy* (June 2005) fishing effort was regionalised and total allowable effort (TAE) was set at 52 rights for KZN. This was a 70% reduction of the approximately 173 commercial fishing licences that existed in the province prior to the rights allocation process.¹⁹ Long-term commercial rights were issued for a period of eight years (2006-2013) and species-specific linefish regulations were substantially revised in April 2005 (*Government Gazette No. 27453*).

Based on a recent survey of the KZN skiboat fishery,¹³ there were a total of 38 commercial vessels that activated their rights in 2009. These vessels undertook a total of 3 331 launches with a total annual catch of approximately 785 tons. Catch composition was comprised primarily by seabreams, rockcods and kob, with slinger comprising 53% of the total catch by weight.¹³ Commercial ski-boats launch from a number of sites along the KZN coast with Richards Bay, Shelly Beach, Rocky Bay, Port Edward and uMvoti being favoured.

Pelagic longline fishery off KZN

Pelagic longlining is an industrial fishery which requires vessels large enough to remain at sea for a few weeks at a time with sufficient freezing facilities on-board. The fishing process itself involves the setting of a buoyed main line in the water to which shorter branch lines with baited hooks are attached. The main line may be many kilometres in length (sometimes up to 120 km for large 400 ton vessels) and there may be thousands of baited hooks attached to the main line (roughly 25 hooks set per km depending on conditions and target species). In KZN pelagic longlining is only allowed beyond 20 nautical miles offshore (37 km), and the most productive waters are often beyond the Agulhas Current with vessels sometimes travelling beyond South Africa's Exclusive Economic Zone (200 nautical miles offshore) to find fish in the Mozambique Channel.

Photo: Sean Fennessy



Seine-netters hard at work.

Pelagic longlining is a technologically advanced method of fishing with skippers requiring remote sensing of sea surface temperatures, currents and other oceanographic data to find the fish. The main targeted species in KZN waters are swordfish, yellowfin tuna and bigeye tuna, and minimal catches of albacore and southern bluefin tuna. There is also substantial bycatch of blue and mako sharks retained for their fins and fillets for overseas markets. Mitigating the bycatch of seabirds and turtles is an on-going battle and some successful measures have been established thus far. Around 80% of the catch is exported to the United States, Europe and Asia for use as sushi, canning or fillets.

Prior to 1994, South Africa did not have its own pelagic longline fishery but instead issued permits to foreign countries (mainly Japan and Taiwan) as part of *Bilateral Trade Agreements*. After 1994 South Africa decided to develop its own pelagic longline fleet and foreign permits were gradually phased out.

In 1997, 30 experimental longline permits were issued to target tuna. These permits included using foreign flagged vessels which were “chartered” to help develop the necessary expertise in South Africa. At the end of 2005, 50 long-term rights were made available of which 17 were allocated to swordfish directed vessels and 26 to tuna-directed vessels. Fewer rights were issued for swordfish-directed vessels with the aim of reducing the amount of targeting on the overfished subpopulation of swordfish in the South West Indian Ocean. In 2005 the total catch landed by these vessels was greater than 3 500 tons with bigeye and yellowfin making up more than half of the catch. The catch has fluctuated annually and the fleet continues to include at least 10-15

Photo: Bruce Mann



Longliner fishing vessel.

foreign flagged vessels every year. Catches made by all permitted vessels must be landed in South African ports and in KZN this includes both Richards Bay and Durban.

Tuna and swordfish are oceanic migrants and their stocks are fished by a number of nations. Consequently management of these fish stocks in the Indian Ocean is the responsibility of *Regional Fishery Management Organizations (RFMOs)* such as the *Indian Ocean Tuna Commission (IOTC)*. These RFMOs are responsible for conducting stock assessments, devising control measures and issuing country allocations.

While commercial fishery activities have decreased over the years, they still contribute significantly to the coastal economy of the KZN province. However, their long term sustainability can only be assured through careful management of the fisheries themselves. ■

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8.3 Aquaculture

As fisheries of wild stocks decline amid growing demand for high quality fish as food, can the farming of fish contribute to food security? The UN Food & Agriculture Organisation defines aquaculture as “farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants”.¹

Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies ownership of the stock being cultivated. For statistical purposes, aquatic organisms that are harvested by an individual or corporate body which has owned them throughout their rearing period contribute to aquaculture; while aquatic organisms which are exploitable by the public as a common property resource, with or without appropriate licences, are the harvest of fisheries. The term mariculture is especially relevant to coastal KZN as it refers specifically to the culture of marine organisms.

Since 1950, global aquaculture output has increased exponentially, to nearly 80 million tons, while capture fisheries plateaued in 1989, at about 90 million tonnes. Growth in

aquaculture has not been uniform with only 1.8% of 2010 global aquaculture production generated by Africa, of which 0.4% was produced in South Africa.² Of the approximately 3,664 tonnes produced in South Africa in 2008, only 3.9% was reported from KZN.³

History of aquaculture in KZN

The first aquaculture-related activity in KZN can be traced to 1890, when John Clarke Parker hatched fertilized brown trout eggs imported from Scotland, and released over 9 000 brown trout fingerlings into local KZN rivers. His success led the then Natal Government to fund a trout hatchery.⁴ In 1901, rainbow trout eggs from the Jonkershoek hatchery in the Cape were similarly used to stock local rivers. After Parker retired in 1907, fish culture received little attention until Fisheries Inspector Leslie Acutt was tasked to build a hatchery at Underberg, in 1946.⁵ Two more trout hatcheries were set up by the then Natal Parks Board, one at the Royal Natal National Park, and the other at the Kamberg National Park, in 1975. A third hatchery was developed at Nagle Dam in the 1980s, to produce warm water species such as carp, tilapia and

ornamental goldfish. However, Provincial policy changed and stocking of local rivers with alien species was no longer permitted.

The state hatcheries were phased out between 1990 and 2003, with the Nagle Dam hatchery continuing as a privately owned venture until 2009. Privately owned trout hatcheries still exist in KZN, notably the Bushman's River Trout Farm, Giant's Cup Hatchery and the Cathedral Peak Trout Hatchery.

Prawn farming came to prominence in KZN in the early 1970s, when the Amatikulu Prawn Research Unit, established by the then Fisheries Development Corporation, was set up in order to develop prawn farming in South Africa. Amatikulu Prawns (Pty) Ltd originally planned to farm freshwater prawn, but switched to freshwater ornamental fishes after a series of technical setbacks. In 1991 the company started farming giant tiger prawns, in 6 ha of large ponds filled with estuarine water. The operation was

Harvesting cultured dusky kob from fish ponds in Mtunzini.



Photo: Gavin Carter

scaled up to 10 ha of ponds in 1997, and the species was changed to the locally available white prawn.⁶

During the early 1990s a second prawn farm was established at the Mlalazi estuary. Mtunzini Prawns (Pty) Ltd consisted of a hatchery and 24 ha of semi-intensive ponds, producing mainly tiger prawns. In 1998 it was sold to Amatikulu Prawns and operations switched to the white prawn.⁷ The combined production of white prawns from the Amatikulu and Mtunzini sites peaked at 157.7 tons in 2002.⁶ However, from 2000 competition with lower prices of prawns imported from the East forced closure of the local operations.⁶ The Mtunzini site was sold off to property developers, but in 2012 was reacquired for aquaculture by a private company. A pilot study has been initiated in which dusky kob fingerlings are reared. If successful, the operation will be scaled up to a production target of 700 tons per annum.

Although the prawn operations ceased, the freshwater ornamental farm at Amatikulu survived,⁸ producing 300-400 thousand fish per month.⁹ Most of this was exported, but the level of production could not be sustained. Rising production and transport costs forced the company to focus on the much smaller local market, and the operation has dwindled. The site now supports two companies; Amatikulu Aquatics concentrates on supplying ornamental fish, while Amatikulu Aquarium Plants initially focussed on the aquarium plant market, but is also investing in fish production facilities.

Another company producing ornamental fish in KZN is Fish Designs, set up in 1996.⁹ Originally located on a rented property near Mtunzini, Fish Designs has now moved to a site near Gingindlovu. Through a combination of focussed production of a few, high-demand species, and by importing other species to increase their product range, Fish Designs has become the largest supplier of ornamental fish in KZN.

Current status of aquaculture in KZN

Since the demise of the Provincial hatcheries, there has been little state support for aquaculture in KZN. However, there is a renewed local and national government interest in fish farming. The eThekweni Municipality has invested in an intensive tilapia and catfish hatchery. The hatchery forms part of an "Agri-Hub" that provides seedstock to the Municipality's homestead and community garden programme, aimed at assisting local communities with poverty alleviation and food security.¹⁰

Bhekis Ngema, owner of Amatikulu Aquatics, is the survivor of a remarkable socio-economic experiment undertaken by the Amatikulu group in 1992, whereby the company assisted employees to set up small-scale, owner-operated ornamental fish farms at or near the Amatikulu site. Amatikulu provided the seed stock and extension services, and bought back the on-grown fish once they reached market size, which they sold on under the Amatikulu brand.

By 1995, the operation had grown to 25 satellite farmers, funded by loans from the Small Business Development Corporation.⁸ Unfortunately, the loss of the export market and other, internal factors, led to the demise of the satellite farmer scheme by 1998.

Nevertheless, many believe the concept was sound, and could be a way in which to allow new, small-scale entrants into the capital-intensive aquaculture industry.

In addition, the national Department of Agriculture, Forestry & Fisheries (DAFF) is championing the creation of an Aquaculture Development Zone (ADZ) at Amatikulu, similar to those initiated in the Eastern Cape, at East London and Port Elizabeth. The project is listed in the Department of Trade and Industry's Industrial Policy Action Plan.¹¹ There have also been studies into the feasibility of fin fish culture in sea cages in the Richards Bay harbour.

Environmental considerations

While there is much to applaud aquaculture it may not be the panacea to food security in all cases. For example, hatcheries located in floodplains and estuaries invariably impact the natural environment and may lower wild caught fisheries. Many high quality aquaculture species have to be fed on protein, often derived from wild fisheries thereby diverting affordable fish food to high-end markets and users.

In spite of the apparent decline in aquaculture activities in KZN, there is renewed interest, and aquaculture (both freshwater and marine) is poised for another growth phase in KZN. New initiatives will have to learn from past ventures and acknowledge the limitations of aquaculture in coastal KZN. ■



8.4 Minerals and Mining

South Africa has an abundance of mineral resources and as a result is a world leader in mining, contributing significantly to the world's primary mineral production and reserves.

However, as South Africa's secondary and tertiary industries have grown, the direct contribution of mining to South Africa's Gross Domestic Product (GDP) has declined, from more than 20% in the 1970s, to its current level of around 9%.¹ Nevertheless, the mining industry is still the second largest employer in South Africa (after agriculture), and if the indirect multiplier and induced effects of mining are included, then the sector's overall contribution to South Africa's GDP is closer to 18%.²

KZN's contribution to the South African mining sector is relatively small, averaging about 1.9% of the total mineral export sales and around 5.4% of local sales over the last 20 years.³ Mining only contributes about 2.3% to the province's

total GDP.⁴ Although it has not been blessed with the mineral riches of some of the other South African provinces, KZN is a world leader in terms of titanium mineral concentrates production.

Titanium

South Africa is the second largest producer of titanium feedstock in the world, contributing 17%, after Australia (20%).⁵ South Africa produced 1.03 million tons of titanium dioxide (TiO₂) from ilmenite ore and 131 000 tons from rutile ore in 2012.⁵ More than 75% of South Africa's total titanium production is mined in KZN, from two heavy metal sand mining operations located in the coastal zone. The rest is produced at a third mine located near the Olifants River in the Western Cape (Tronox Namaqua Sands). The KZN mines employ about 2 500 local people directly, and an equivalent number through contracts.

Dredge mining of dunes, near Richards Bay.



Photo: ORI

Because of their durability, density and chemical stability, heavy minerals such as ilmenite, rutile and zircon withstand the weathering of igneous and metamorphic rock, and are transported from the interior of the continent by rivers, eventually reaching the sea. Over geological time, wave action deposits the sea sand containing the heavy minerals back onto the beaches. Ilmenite and rutile are two of the minerals found in heavy metal sand deposits from which titanium can be extracted.

The largest heavy mineral sand mining operator in KZN is Richards Bay Minerals (RBM). In fact, the company is the largest titanium slag producer in the world, with an annual production of about one million tons, and mining reserves estimated to last 15-20 years.⁶ This Rio Tinto-controlled company has mined the dunes along the northern KZN coast since 1977, extracting heavy mineral concentrate from the sand dunes at four mining plants, split between two lease areas north of Richards Bay; a 17 km x 2 km strip at Tisand, and a 20 km x 2 km strip at Zulti North.

A dredge mining technique is used to extract ilmenite, rutile and zircon from the sand,⁷ whereby the coastal dunes are stripped of vegetation, and a large, shallow pond is excavated and filled with water. A dredger and concentrating plant are then floated on the pond. One side of the pond is destabilised by the dredger and the sand slumps into the water, the resulting slurry is sucked up by the dredger and pumped through the concentrating plant, where the heavy metals are separated from the sand. The dredger moves forward as the pond wall slumps; at the same time the discarded sand from the concentrating plant is piled behind the unit, resulting in a self-perpetuating pond, moving forward across the sand dunes at a rate of about 2-3 m per day.⁸ The heavy metal concentrate is then transported to a smelting plant where the material is further processed and smelted, to produce titanium slag.

Another company, Tronox KZN Sands, has been mining heavy mineral sands at its Hillendale mine since 2004, 20 km south-west of Richards Bay. Hydraulic mining is used, whereby a high pressure water jet is directed onto the dune face to undermine it, causing it to collapse. The water is used to break up the disaggregated sand into slurry, which is pumped to a primary wet plant (PWP) at the mine. The concentrate is then transported to a central plant for further processing. The smelters at this plant have the capacity to produce 250 000 tons of titanium slag per year. However, the Hillendale mine is reaching the end of its lifespan, and the company has

announced their intention to construct a new mine at Fairbreeze, near Mtunzini. A lease area of 4 143 ha has been secured, of which about 1 410 ha will be mined.⁹ The same hydraulic mining technique will be used, with the aim of processing 2 200 tons of sand per hour. The mine is expected to start production in 2014, but is experiencing opposition from conservation organisations and the Mtunzini community.

Offshore mining

More recently, there has been increased interest in offshore prospecting and mining, particularly for sections off the KZN coast. In 2004, RBM were issued a five-year heavy metals prospecting permit by the Department of Minerals and Energy in order to prospect along the northern KZN coast, between Richards Bay and Cape St Lucia.¹⁰ The company was surveying in order to determine the viability of offshore mining for ilmenite, rutile and zircon on the continental shelf.¹⁰

It is anticipated that should RBM determine that mining for these heavy minerals is feasible and economically viable, they will apply for a mining permit. If granted, they will implement a dredge-type mining system, similar to that used by offshore diamond mining activities.¹⁰

More recently there have been prospecting activities in the area offshore from the Thukela River Mouth (the Thukela Banks). Mining and prospecting in this area is of concern as the site is a valuable prawn and fish nursery. Impacts pertaining to offshore mining are largely unknown and likely to have an adverse effect on the marine ecology of the entire North Coast of KZN.

Oil

While oil is not normally mined in KZN, there has been interest in an area of the Thukela Basin (which extends beyond the Thukela Banks), as there appears to be evidence that this area has untapped natural oil resources.

A United States oil company has been legally embattled with the South African Agency for the Promotion of Petroleum Exploration (PASA) for the rights to explore this area for oil and natural gas.¹⁰ In November 2006 the case was dismissed and the scope for oil exploration in this region is now open to both local and international interests.¹⁰



Coal

South Africa was ranked 7th in the world for coal production in 2010, and has an estimated 3.5% of the world's coal reserves.¹¹ Although almost all of the coal exported from South Africa passes through KZN, mostly via the Richards Bay Coal Terminal, actual coal mining has decreased significantly in the province; from providing 40% of South Africa's coal production in 1900,¹² to about 1% at present (about 3 million tons per annum).

Carbonates

The Marble Delta is a geological feature situated close to the confluence of the Mzimkhulu and the Mzimkulwana rivers near Port Shepstone, an area of steeply incised valleys covering approximately 40 km². It is the only significant carbonate (i.e. marble, lime and limestone) deposit in KZN, and is made up of three formations: the Cherrywillingham Formation consists mainly of amphibolites and granulites; the Le Jonquet Formation is largely dolomitic; whilst the Oribi Formation is predominantly calcitic with dolomitic and graphitic layers. Historically, three large quarries were mined in this area, although the Department of Mineral Resources recorded only two active carbonate mining operations in KZN in 2012,¹³ both located within the Oribi Formation.

Natal Portland Cement (NPC), a subsidiary of Cimentos de Portugal (CIMPOR), mines the Simuma quarry, where about 2 million tons of limestone is mined per year.¹⁴ Three crushers reduce the limestone to less than 30 mm fragments, which are then transported to the Simuma factory, which currently operates two kilns that can produce about 140 tons of clinker (the precursor to cement) per hour at full production.¹⁵ NPC also has a cement factory in Durban, able to produce up to 1.2 million tons per year, and another in Newcastle, which produces about 450 000 tons of slagment per year. The company employs about 500 full time employees in KZN.

Idwala Carbonates mines about 1.2 million tons of calcitic and dolomitic limestone per year. They process the rock in two ways; the dry process is similar to the NPC operation, where two crushers break up the rock, which is then blended, screened and crushed further to a particle size of about 300 microns. In the wet process, the calcium carbonate is separated from the rest of the crushed fragments by two flotation banks, dried, classified and then milled into 0.8-15 micron particles, depending on the product required. The

high-grade material is used as filler in paint, paper, toothpaste, bread and plastic, whilst lower-grade material is used in rubber, glass and fibreglass. The company employs about 200 full time staff members, and a further 70 contract workers.

At the present rate of mining, the Marble Delta quarries have a life expectancy of over 100 years. Since the full extent of the formation is unknown due to the complexity of the geology, there is potential for locating new ore bodies in this area.

Dimension stone, aggregate and sand

Besides the large carbonate quarries, there are a number of other quarries of various sizes in KZN, some of which have been in existence for nearly a century. Some 100 active quarries were listed by the Department of Mineral Resources in 2012,⁶ mining a range of products: from dimension stone, aggregate stone and coarse sand for the construction and road building industry, to shale and clay used by brick makers such as Corobrik. Capstone 21, mining the Hays Quarry near Merrivale, and the Natal Granite Quarries, near Hammarsdale, are examples of companies mining and supplying dimension stone.

Stone aggregate is produced from numerous small quarries throughout the province for local use. The aggregates mined include granite chips, tillite, dolerite and sandstone. A rough estimate of the total annual aggregate production in KZN is about 4 million tons. Sand is also mined at a number of sites in KZN, but more worrying for the coastal region is sand mining from beaches and estuaries, inland dunes and dredged from ocean beds and river beds. Sand mining is discussed in detail in *Section 9.6*.

Other minerals

Other minerals that occur in deposits large enough to show economic potential in KZN include kaolin, lithium, dolomite, aluminium, chrome, vanadium, graphite and talc. Most of these have been investigated to some extent.

Minerals are an important resource for KZN and South Africa. However, mining activities, especially in the fragile coastal zone, need to be carefully managed in order to minimise adverse environmental effects. ■

8.5 Manufacturing and Industry

By global standards South African industrial development has been unique, having been concentrated far inland and not on the coast as in most maritime nations. This is attributable to the fact that for many years gold mining provided the catalyst for industrial development inland. While this may have protected the coast from environmental degradation, it also denied KZN opportunities for development.

However, progressively this has changed and the competitive advantage of being located at the coast for many industries has been recognised in recent times. Access to excellent port facilities and maritime waste assimilation are two key factors driving industrial development in coastal KZN.

Today, there are a number of large, globally competitive industries located in KZN, involved in manufacturing diverse products such as motor vehicles and vehicle parts, specialised

metals, textiles, chemicals, forestry products, food and beverages - many of which are located within the KZN coastal zone. KZN's manufacturing sector is the second largest contributor to the country's GDP, after the Gauteng province, and produces approximately a third of the country's manufactured exports.¹ Manufacturing in KZN provides roughly 20% of the province's employment and contributes about 22% to the province's total GDP.¹

Metals fabrication

The metals fabrication in KZN is a specialised industry producing ferrous (containing iron) and nonferrous (not containing iron e.g. aluminium or brass) metals. This industry plays a significant role in the development of up- and down-stream industries including plating and coating operations.¹ Industries that have an important relationship with the metal

Sezela Mill, KZN South Coast.



Photo: ORI



fabrication sector include infrastructure programmes, construction, engineering, mining, car manufacturing and packaging. As a result, the metals fabrication industry is recognised as a key element in the global competitiveness of the manufacturing sector in general.¹

Several key metals fabrication companies are based in the KZN coastal zone drawing benefit from port and maritime waste outfall facilities (see *Section 9.3*). Notable are BHP Billiton's two large aluminium smelters at Richards Bay, Tata Steel at the Richards Bay Industrial Development Zone (RBIDZ) producing 150 000 tons of ferrochrome from locally supplied ores annually, and Macdonald Holdings in Durban which produces a diversified stock of steel and metal products.¹

Automotive industry

The automotive industry is considered to be one of South Africa's most important manufacturing sectors, with numerous multinationals such as BMW, Ford, Volkswagen, Daimler-Chrysler and Toyota using South Africa to source components and assemble vehicles for their local and international markets.¹ A visit to the port of Durban's dedicated car export terminal will attest to the magnitude of this industry. These South African based vehicle manufacturing companies benefit from historically low production costs and strategic geographic location to access new markets.

Within the coastal zone the Durban Automotive Cluster (DAC) is well-established, consisting of a proactive, ambitious public-private partnership between the eThekweni Municipality and the automotive industry in KZN.¹ Prominent is the Toyota plant in Durban, which produces some quarter of a million vehicles annually, with approximately half of production exported to nearly 60 countries worldwide. The company is a significant employer, with in excess of 8 500 employees, and creating further employment opportunities for staff at more than 50 major automotive and other component suppliers.

While vehicle manufacturers operating in South Africa have been largely influenced by international trends, with an annual market growth of 3.7% between 2000 and 2010,¹ the future outlook may be less certain with currency fluctuations and labour issues. A key challenge going forward will be to improve output and competitiveness of the South African and KZN automotive industry.¹

Clothing and textiles

The textile industry is broadly defined as establishments engaged in spinning natural and manmade fibres, which are in turn converted into fabrics. From this the clothing and accessories industries supply people-finished products. While the textile industry is one of the oldest in the world, there is now a higher degree of specialization and companies operate as either manufacturers (wholesalers) or retailers, or as both.¹

In South Africa, and especially KZN, the clothing, textiles and footwear industries have faced uncertainty over the past two decades. The lowering of tariff barriers have resulted in a number of companies downsizing so as to compete with cheaper foreign goods.¹ However, companies have found innovative ways to compete; through specialised product lines, reduced production lines and small jobbing teams. The KZN Clothing and Textile Cluster (KZNCTC) was established in 2005 with the aim of boosting global competitiveness of the industry. It created a Sector Business Support Centre in Newcastle which regenerated the area's clothing and textile industry.¹

Plastics and chemicals

The chemical industry in KZN is based on the production of basic chemicals which are then used in various other applications; as building-block materials and as processing aids in the production of other chemicals and non-chemical goods.¹ The growth of the South African chemicals industry has been driven by demand from a range of industries, including mining, automotive, agricultural and construction.¹

Plastics on the other hand are directly or indirectly produced from organic chemicals such as ethylene, propylene, butadiene, and benzene and used in the automobile, agriculture, and housing sectors. The greatest demand for plastic comes from the packaging and consumer industries and includes goods such as kitchenware, toys, sporting goods, medical products, pipes, conduits, fittings, transportation, furniture and furnishings, electronic appliances, electronic components, adhesives, inks and coatings.¹

KZN provides nearly a third of South Africa's plastic demand and uses 150 000 tons of polymer each year. The industry faces a number of challenges, most concerning is the cost of raw materials.¹

Petro-chemical industry

The largest crude oil refinery in southern Africa is located in the south of Durban, accounting for more than 1/3 of refining capacity in South Africa. SAPREF (a joint venture between Shell SA Refining and BP Southern Africa) processes 24 000 tons of crude oil per day, imported via an offshore platform called a single buoy mooring (SBM).² The SBM can easily be seen from the Bluff, especially whilst an oil tanker is in the process of discharging. SAPREF produces 2.7 billion litres of petrol per year, employs more than 700 staff and provides source material for a range of downstream industries.²

Paper and forestry products

The paper and forest products industry is well established in coastal KZN, making a significant contribution to the province's economy. A range of products are involved, from the manufacture of paper, packaging, and cellulose to wood products such as household and office furniture. Key wood and paper corporations operating in KZN include Mondi, Sappi, Nampak, Merensky, the R&B Timber Group and NCT Forestry Co-op Limited.¹ The wood, pulp and paper and associated industries accounted for some 29 000 formal jobs in KZN with the furniture sector employing a further significant number of people (2009 data).¹ However, in light of new technologies and the shift away from traditional paper-based communication, the growing use of recycled materials and a focus on environmental concerns make future demand uncertain, while wood products are seeing a shift to other engineered materials.¹ Nevertheless, one forestry product that remains of note is cellulose, derived from dissolved wood pulp and used in the manufacture of textiles, cellophane wrap, pharmaceuticals and a suite of other household products.

As the world's largest single site manufacturing specialised cellulose, the Sappi Saiccor Mill located at Umkomaas 50 km south of Durban, exports up to 800 000 tons of product annually. Established in 1951, Saiccor's development has benefited from having access to marine disposal of its considerable waste output.³

Environmental considerations

The progressive shift of industrial activity to the coast is to a large extent attributable to the improved port facilities of Durban and Richards Bay. Similarly, the waste disposal benefits

for companies in the paper, aluminium and a number of other industries provides a huge competitive advantage. However, many of these marine outfalls have been controversial and their environmental assimilative capacity seriously questioned. Examples include the Richards Bay mixed product pipeline and Saiccor's outfall close to the Aliwal Shoal MPA.

Both outfalls were initially of dubious standard but public pressure, research and technological advances have improved the management and quality control of these pipelines. However, much improvement is still possible and greater research, monitoring and ongoing vigilance is required. In particular there is concern about non-adherence to permit conditions as well as restricted access to monitoring data. Several industries operate their own pipelines under permit. For example AECL and SA Tioxide, with its very acidic effluent, are responsible for their own effluent water quality monitoring.

While several industries are “wedded” to the coast by virtue of port access and waste assimilation opportunities, it is equally important to avoid establishing high environmental impact industries in the sensitive coastal zone if they do not fundamentally require access and proximity to the coast. Hopefully, the integrated coastal management legislation will be sensibly applied in future years to plan accordingly. ■

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8.6 Agriculture

Agricultural activities are considered to be important contributors to the economy of KZN and South Africa. Some of these agriculturally related activities occur within the province's coastal zone.

The topography along the coast of KZN is generally relatively flat to undulating, making it suitable for arable cultivation and forestry. The mild, sub-tropical, frost-free climate and summer rainfall (Section 2.1), renders the zone very suitable for the cultivation of sugar cane, forestry and sub-tropical fruits such as bananas, litchis, mangos and paw-paws. The soil types range from well drained coastal sands to clay loams, which again favour forestry and sugar cane.

Sugar cane

Sugar cane was first planted in 1848 in the Mt Moreland area of the KZN North Coast. In 1865 a mill was erected at Amanzimtoti (south of Durban), which enabled sugar cane to be cultivated on the KZN south coast. By the 1930s, sugar cane cultivation had spread northwards up the coast to Umfolozi, and southwards to Port Shepstone following the establishment of the Umzimkulu mill. Subsequently, with the culture of sugar cane varieties more tolerant to cold and frost,

the sugar industry extended inland, with the erection of mills at Dalton, Noodsberg and Eston.

Over time, some mills have been forced to close or re-locate, mainly as a result of urban expansion. This is evident in eThekweni, following the gradual extension of the metropolitan boundaries to accommodate industrial and residential growth. The Illovo mill south of Durban was relocated inland to Eston, and the Mt Edgecombe mill north of Durban was closed to allow for the development of the Phoenix and Umhlanga areas. Currently, there are 8 sugar mills in operation, either at the coast or relatively close to the coast, where suitable water resources are available to support the initial annual start-up of the sugar cane milling process. These mills include Sezela and Umzimkulu, located south of Durban; Maidstone, Gledhow and Darnall, north of Durban; and Amatikulu, Felixton and Umfolozi, located north of the Thukela River.

Gross turnover was estimated to be R3.665 billion in 2011. This amount only reflects that of sugar cane farming and therefore excludes that of sugar milling, sugar cane by-products and the subsidiary support activities such as cane and sugar transport, requisite suppliers, etc. Over the ten year period from 2000-2010, there was a notable decline of nearly

Commercial afforestation and sugar cane fields located in the KZN coastal zone.



Photo: ORI

50 000 ha in the area under cultivation for sugar cane, which can be attributed to: the emergence of new residential and industrial developments south and north of the Durban metropolitan district, including additional land for King Shaka airport; land claims (south and north coast freehold tenure farms) and land reform related issues which has created uncertainty and a resultant decline in re-investment in sugar cane root stock; relatively poor trading conditions for sugar; and a series of poor rainfall seasons.

Commercial afforestation

While naturally occurring forests have been part of the KZN landscape for many centuries, forests grown for commercial purposes are a more recent phenomenon. Today, plantations are grown for specific purposes.

In 2009, the area afforested in South Africa was approximately 1 275 000 ha, of which approximately 504 000 ha was being grown in KZN. High concentrations of forest plantations are found in five KZN regions, namely northern KZN, KZN midlands, southern KZN, Zululand and Maputaland. About 70% of this area is devoted to hardwoods, eucalyptus and wattle being the main species, and the balance to the softwoods, mainly pine. Plantations occurring adjacent to, or within the KZN coastal zone are situated at Ingwavuma in Maputaland; Lower Mfolozi and Mtunzini in Zululand; and Port Shepstone and Umzinto in southern KZN. Processing facilities are located throughout the timber growing areas in KZN, with the following being located within the KZN coastal zone: Richards Bay (Mondi); Mandeni (SAPPI); KwaDukuza (SAPPI); Merebank, south of Durban (Mondi) and Umkomaas (SAPPI).

Sub tropical fruits

Contrary to popular perception, KZN's commercial banana production forms a minor proportion of South Africa's current total production. Commercial banana production is limited to the undulating, frost-free regions of the lower South Coast, north of Port Edward. Isolated banana plantations can also be found in the irrigation areas of Nkwalini Valley, west of Empangeni in Zululand. Likewise, commercial pineapple,

Sugar cane cultivation (2000 vs 2010)¹

Mill areas: KZN Coastal Zone	Area under cane 2000 (Ha)	Area under cane 2010 (Ha)	Average annual production (Million tons cane)	Average gross turnover (R m - 2011 value)
Umfolozi	20 393	20 245	1.08	361
Felixton	37 799	29 927	1.82	605
Amatikulu	51 671	40 694	1.67	555
Darnall	31 165	25 658	1.14	380
Gledhow	22 529	30 321	1.11	369
Maidstone	39 838	22 975	1.26	419
Sezela	45 004	38 778	1.83	609
Umzimkulu	29 469	26 271	1.10	367
Total	277 868	234 869	11.01	3 665

mango and litchi production is limited to relatively small fields in the frost-free coastal zones of Zululand, the north and south coasts. However, it must be noted that together with market gardens (vegetables, madumbies, herbs, etc.), pineapples, mangos, litchis and bananas are a source of valuable subsistence income for rural communities located in these KZN Coastal regions.

Macadamia nuts

In recent times, as an alternative source of farming income, some sugar cane farmers have developed Macadamia nut orchards in areas adjacent to the KZN Coastal Zone. Being a longer term investment, full-scale production and income from this agricultural activity is still to be fully realized.

It is evident that sugar cane and forestry are the dominant agricultural activities occurring in the KZN coastal zone. The two industries make a substantial annual contribution to the KZN economy, generating a combined gross annual revenue of approximately R4 671 million. This excludes the revenue generated from the sugar mills, timber processing plants and secondary support industries. Besides revenue generation, both industries are relatively labour intensive and provide employment opportunities to a large number of unskilled workers in KZN. ■

