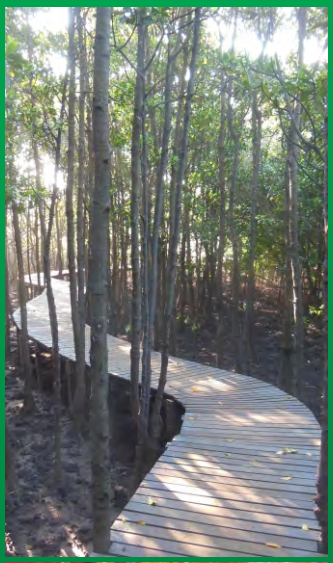
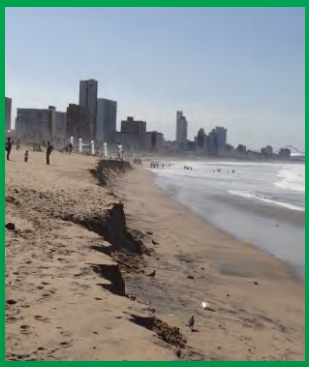




Understanding our Coast

A synopsis of KZN's coastal zone

2nd edition

KWAZULU-NATAL PROVINCE
ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

GROWING KWAZULU-NATAL TOGETHER

Introduction

What is the coast?

The coast is loosely defined as the area where land meets sea. It has many unique natural attributes and challenges, not least its popularity as a site for human settlement, development, recreation and leisure.

Developing an understanding of the distinctive characteristics and qualities of the coast is essential to all its users.

What does this guide do?

The Integrated Coastal Management (ICM) Act (24 of 2008) is a far-reaching and innovative piece of legislation that provides for improved integration of management and contributes to a more precise system of defining the coast and its features. The Act also promotes equitable access to and use of coastal resources.

This guide provides a brief description of the physical, biological and social components of the KwaZulu-Natal (KZN) coastal environment. It considers some of the intrinsic assets and economic values of goods & services derived from the coastal zone and engages with stakeholders to heighten their awareness of the legislation that governs activities along the coast. It also highlights the challenges, benefits and risks of living in this unique environment and underlines the potential impacts that human activities may have on the coast.

Who should read this guide?

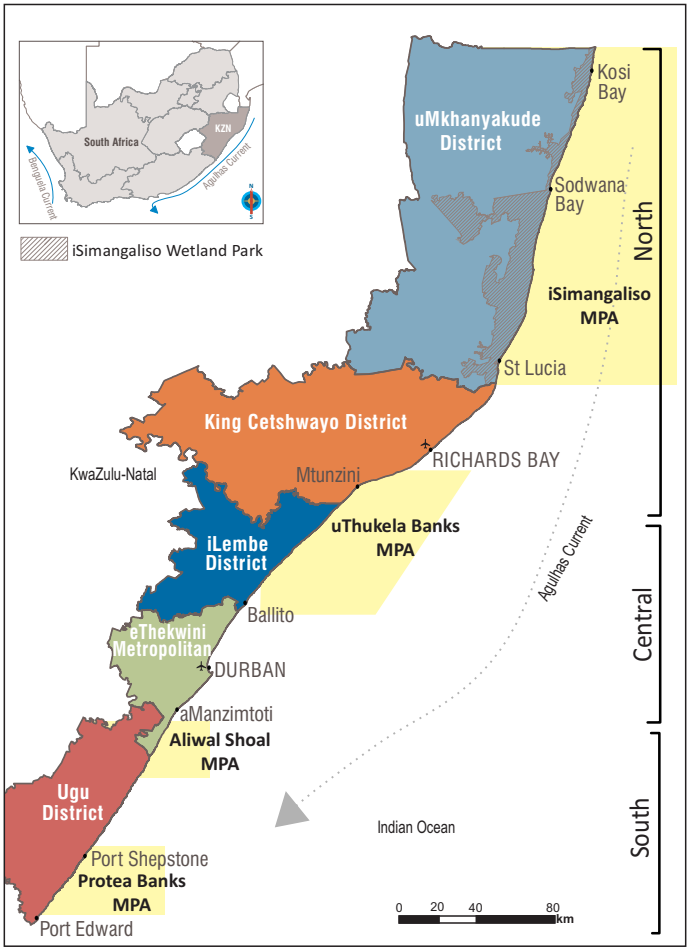
This guide is primarily directed at people who live and/or work in the coastal zone of KZN, including those who frequent the coast, draw direct benefit from it or whose activities impact on the coastal environment.

The KZN coast stretches some 580 km, from the Mozambique border near Kosi Bay in the north to the uMthavuna estuary on the border with the Eastern Cape in the south, and can broadly be divided into three bio-geographic sections: north, central and south.

Map of the KZN coast

The map below shows the coastal district and metropolitan municipalities in KZN, the three Bioregions and port cities. It also shows the Marine Protected Areas (MPAs). For more information on MPAs, see www.saambr.org.za/marine-protected-areas-mpas/

Note that the iSimangaliso Wetland Park is managed separately in line with the World Heritage Convention Act (49 of 1999).



Map of the KZN coast indicating the ports, district and metropolitan municipalities, MPAs and bio-geographical regions.

For contact details of national, provincial and municipal authorities, see www.coastkzn.co.za/how-do-i/contact/

Along the *north coast,* the climate is tropical with clear waters and coral reefs. The *central coast* has a wide continental shelf, muddy bottoms and often discoloured water, while the *south coast* has a narrow continental shelf, rocky shores and milder temperatures.

Our KZN Coast

The KZN coastal environment has year-round moderate temperatures. Water temperatures are seldom below 17^{0}C even in winter. Overall, the KZN coast is an accessible, attractive coastline with good infrastructure, economic hubs and an excellent transport network. This makes it a special and very attractive place to live, work and spend leisure time.

Average rainfall and temperatures along the KZN coast			
Rainfall		Temperature	
summer	*winter*	*summer*	*winter*
1200 mm	60 mm	23-33^{0}C Durban 21-30^{0}C Richards Bay	16-25^{0}C Durban 11-26^{0}C Richards Bay

Coastal tourism is one of the most important economic activities for coastal towns, offering attractive beaches, fishing and diving, affordable accommodation and accessibility from other parts of South Africa. eThekwini (central coast) has 100 km of coastline, covering a wide range of ecosystems and as such, forms the tourism hub of the province. KZN attracts about 4.2 million local visitors and 750 000 foreign tourists annually of which 72% visit Durban and the north and south coasts, with the rest visiting inland sites.[1]

In addition, agriculture, mining and timber contribute to the regional coastal economy. Agricultural lands are generally dominated by sugar cane and subtropical fruit cultivation, but this is changing with the transfer of much sugarcane land to other crops or housing estates.[2]

Durban and Richards Bay are home to two of the main ports in South Africa and form the main centres of commercial and industrial activity in the province. Durban is the busiest port in Africa while Richards Bay is the continent's deepest, handling a greater volume of cargo than any other port in Africa. Between them, Durban and Richards Bay handle 80% of South Africa's sea-going cargo.

The coastal environment is one of the most important economic contributors for coastal towns.

Ecosystem goods & services

The coastal environment provides a wide range of benefits, also called ecosystem goods and services. Some may be more obvious than others such as fish and shellfish for food, breeding and nesting sites for birds, turtles and fish, as well as recreation and tourism on bathing beaches.

Other less obvious benefits include wide sandy beaches and dunes which reduce the effects of wave energy, consequently limiting damage to the areas behind it. Dune vegetation serves a protective purpose, preventing or reducing erosion and floodplains absorb the impact of storm surges and floods. Sand and its organisms act as biofilters, cleaning our waters. Sand from our rivers also replenish beaches.

[1] Statistics of our Tourism Sector, Tourism KZN (2017).
[2] www.statssa.gov.za/publications/Report-11-02-06/Report-11-02-062017.pdf

Goods and Services of our Coast

Resources:
Food (fish, shellfish), timber for building, minerals, medicines, diversity of resources & genetic diversity.

Regulation:
Biological functions, freshwater storage, human disease control, waste processing & flood protection.

Support:
Nutrient cycling, oxygen generation & habitat diversity.

Social & Cultural:
Recreation & tourism, religious & traditional, aesthetics, research, transportation & existence value.

R 108 billion

75% Indirect services

25% Direct services

Estimated value of KZN's coastal goods and services per annum.[3]

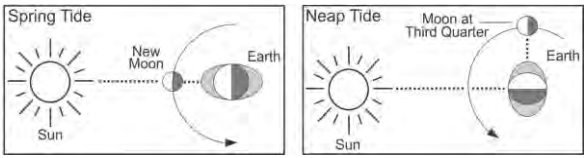
Each of these goods and services has a value, often much greater than we appreciate. Damage to the coastal environment reduces or removes the benefits of these environmental goods and services. It is therefore important to protect these essential benefits provided by a healthy and functional coastal environment.

WAVES, TIDES & CURRENTS

Waves are a primary force shaping the coastline. Their character, including height, length and frequency, determines the effect they have on the coastline. Waves are caused by the drag effects of wind on surface waters and therefore vary according to weather conditions. Hence, when storms occur at sea more forceful waves are created.

There are two key wave types**: Constructive** "fair weather" waves are of low wave height and break gently on the shore, and these are associated with sand deposition. **Destructive** "storm" waves have greater wave heights and are associated with the processes of erosion. The area in which these waves break, forming the foamy, bubbly surface water, is known as the 'surf zone'.

Tides are the result of gravitational forces of the moon and the sun on the world's oceans. Along the KZN coast we have a maximal tidal range (from low to high tide) of about two metres with a periodicity of about 12.5 hours, so that there are approximately two high and two low tides per day. As the moon has the most influence on our tides, so the tidal strengths (thus heights) vary with phases of the moon.



Spring and Neap Tides

[3]Based on White Paper for Sustainable Coastal Development in South Africa, 2000.

On two days each month the moon and the sun are aligned on the same side of the Earth "pulling" together and creating especially high and low tides called **spring tides,** coinciding with full and new moons respectively. Neap tides occur during the first and third quarter moons (*see Spring and Neap Tides, p. 5)*. During March and September, when day and night lengths are equal, the sun lies in the same plane as the Earth's equator and tides may be further increased (equinox tides).

Do you want to predict the next tide?
Tides are linked to phases of the moon, so you can predict when they occur by knowing the phases of the moon. The table below gives the approximate times of the high & low tide from 6 am to 6 pm. Add 12.5 hours for the next tide.

	Days before new or full moon							Full Moon	Days after new or full moon						
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7
High	9.35	10.55	12.25	1.35	2.10	3.05	3.50	4.20	4.55	5.25	6.05	6.40	7.15	7.55	8.45
Low	3.10	4.30	6.00	7.10	7.45	8.40	9.25	9.55	10.30	11.00	11.40	12.15	15.50	1.30	2.20

The Agulhas Current

The Agulhas Current influences weather patterns, storm events and the diversity of marine life along the KZN coast.

Water in the world's oceans broadly flows in a westerly direction and where this water meets land it creates so-called western boundary currents, some flowing northward and some southward. Examples are the Kuroshio Current (Japan), the Gulf Stream (USA), the Brazil Current, the Somali Current and our own Agulhas Current off KZN and the eastern shores of Africa.

The Agulhas is one of the largest and swiftest currents on Earth, reaching depths of 1000 m and attaining a maximum speed of 9 km per hour. It is usually about 70 to 100 km wide and broadly follows the outer edge of the continental shelf, shifting warm water, sometimes 6ºC higher than surrounding water, southwards. It can also meander and creates eddies and reverse currents that strongly influence oceanographic conditions off the KZN coast.

The Agulhas Current contributes to the region's rich tropical biodiversity and plays a crucial role in the distribution of much of our marine life. This boundary current also strongly influences our weather, especially storm events and rainfall. It can create havoc, generating "giant" waves that have crippled ships and impacted the coast. It may seem to be out of sight, but is often marked by a bank of cloud at sea that lies directly over the current.

ECOSYSTEMS

An ecosystem is a biological environment, including all its living organisms as well as the physical components with which the organisms interact. The KZN coast has many different ecosystems, some of which are described here.

Note: Estuaries are considered under a separate chapter (p. 9).

Sandy beaches

The KZN coast is dominated by sandy beaches (80%), mainly on the north coast. These are dynamic and mobile ecosystems comprising of sand particles and coral and shell fragments. Waves shift sand along the shore as well as offshore, while winds move sand up the beach. The scale of sand movement varies with the seasons and is dependent on a range of factors, including wind strength, sand grain size, shape and density. During stormy weather, seas 'take' more sand from the beach and deposit it offshore, while during calm conditions gentle waves carry sand back.

Sandy beaches may look barren but are home to a remarkable amount of life. Animals in this ecosystem are specialised to deal with the harsh and dynamic shore conditions. These include burrowing animals such as molecrabs, clams, scavenging plough snails and the ubiquitous ghost crabs. Also at home are birds such as the sand plover. Far to the north, our sandy beaches are critical for nesting turtles.

Importantly, many thousands of invisible diatoms, tiny crustaceans and worms (polychaetes, nematodes) which lie in between the sand grains are sensitive to pollution and their presence provides clues to the health of the system.

Dams and sand mining on rivers that occur inland, away from the coast, reduce the quantity of sediment reaching beaches and dunes, contributing to narrower beaches and erosion. This in turn reduces the resilience of the coast to storms and sea-level rise, and ultimately will affect tourism and other economic activities.

Rocky shores

Much of the south coast of KZN comprises rocky shores, either in the form of headlands, wide wave-cut platforms or simply as rocky outcrops separated by sandy shores. As rocky shores traverse the rise and fall of the tides, so the animals are exposed to different periods of inundation and exposure. This leads to a vertical zonation, with the hardiest and most tolerant organisms highest up on the rocks.

Four such zones can be recognised, with the lowest normally rich in seaweed. Organisms living here must be able to withstand the strong wave action and frequent exposure. Typically organisms on rocky shores are attached in some way, and include anemones, barnacles, mussels, limpets and redbait. The mobile animals include crabs, small fish, octopus, hermit crabs, sea urchins and starfish.

Coastal vegetation

Coastal vegetation is unique in that it is resilient to the harsh salt spray, wind and unstable sand conditions of the coastal zone. This resilience allows vegetation to thrive and serves as a protective barrier to coastal vulnerability.

Many different vegetation types can be identified. Pioneer plant species stabilise the shifting frontal dune, and in turn allow other plants to establish. Plant succession occurs (i.e. order by which plant species change over time), with coastal forests representing the final stage of such succession. Climax forests are often found cladding the very high sand dunes in the iSimangaliso Wetland Park.

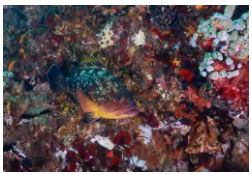
There are also mangrove forests which comprise several species that are specially adapted to live on the tidal fringes of estuaries, thereby providing nutrients and shoreline protection.



At Maphelane (at the south end of the St Lucia Estuary - iSimangaliso Wetland Park), unique fresh water swamp forests are found. Coastal wetlands also support salt marshes, comprising special plants that are highly salt-resistant and able to generate considerable amounts of nutrients. Notably rare are coastal grasslands, of which only a few small patches remain today.

Coastal vegetation is under increasing threat from dune mining and development. Protecting coastal vegetation has positive biodiversity implications and shields our shorelines and dune systems.

Subtidal reefs

Along part of the KZN coast, just below the sea surface, are reef ecosystems. These comprise mostly of rock, heavily encrusted with marine life. In the north (in the iSimangaliso Wetland Park), the reefs are covered with a rich layer of hard and soft coral. These reefs provide refuge to shoals of fish, rock lobsters and a wide diversity of other vertebrate and invertebrate animals. In KZN many reefs support endemic fish species, such as the seventy-four, slinger and other bream-like species. Shallower reefs are usually covered with seaweed as the light penetration is better.

The declaration of additional Marine Protected Areas in the province has provided some level of protection for the diversity of species contained and for specific iconic species.

Estuaries

Estuaries comprise the unique zone where rivers meet the sea.

An estuary is defined in the ICM Act as: "a body of surface water that is permanently or periodically open to the sea; in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the body of surface water is open to the sea; or in respect of which the salinity is higher than freshwater as a result of the influence of the sea, and where there is a salinity gradient between the tidal reach and the mouth of the body of surface water".

More recently, this definition was modified by SANBI to include a broader range, encompassing KZN's different estuary types.[4,5]

"An estuary is a partially enclosed permanent water body, either continuously or periodically open to the sea on decadal time scales, extending as far as the upper limit of tidal action, salinity penetration or backflooding under closed mouth conditions. During high flows or floods an estuary can become a river mouth with no seawater entering the formerly estuarine area or, when there is little or no fluvial input, an estuary can be isolated from the sea by a sandbar and become fresh or even hypersaline".

The seaward boundary of an estuary is considered the high-water mark, except for large fluvially dominated systems where mixing may occur at sea. The upstream boundary is the point where the system is not influenced by tidal action or has no trace of salinity. The lateral boundary is often the 5 m contour, but can go up to the 10 m contour in small incised estuaries with high river inflow. This updated definition now makes reference to the *Estuarine Functional Zone (EFZ)* which includes estuarine habitats omitted from previous delineations.

Estuaries are among the most productive ecosystems in the world and support a wide range of habitats such as nutrient-rich mudbanks, mangrove forests and seagrasses which are critical for the survival of many species, especially providing shelter and food for the young. These are areas of importance as a refuge to juvenile fish and crustaceans.

Estuaries are highly variable systems that may experience water chemistry changes, depending on tidal strength and river flow. Animals and plants living in these environments are specially adapted to the higher and/or varying salt content and water levels. A unique range of

[4]Van Niekerk, L., *et al.* 2019 (eds). South African National Biodiversity Assessment 2018: Technical Report. Volume 3: Estuarine Realm. CSIR report number CSIR/SPLA/EM/EXP/2019/0062/A. http://hdl.handle.net/20.500.12143/6373

[5]South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1-214.

animals, from burrowing prawns and shellfish to larger fish and birds, depend on estuaries as places to live, feed and reproduce.

Intact estuaries serve as buffers against storm surges and floods. They form focal points for development, tourism and recreation, and support biodiversity, livelihoods and marine fisheries. Although they constitute less than 2% of South Africa's territory, these highly productive ecosystems contribute R 4.2 billion per annum to the South African economy.

Estuaries are at risk from various human activities which have adversely affected the functioning of the estuarine zone, through the development of housing and other structures, such as ports. In addition, sand mining, effluent and sewage spills are frequent occurrences, disrupting the optimal functioning of these systems.

A third of South Africa's freshwater flow no longer reaches the coast, with present inflows down from 36 900 to 24 800 million m^3 per annum. Twenty percent of estuaries are severely impacted (high to very high pressure) by freshwater flow reduction. There has been a substantial increase in pollution pressure in estuaries, e.g., 840 million litres of wastewater flows daily into estuaries, with deteriorating water quality driving change on regional scales. Consequently, about 33% of estuaries are under severe pollution pressure. This reduces ecosystem resilience and nursery function, kills invertebrates and fish, and makes estuaries vulnerable to invasive species, parasites, pathogens and disease, in turn threatening human health, well-being and food security.

For more information on estuaries, visit www.coastkzn.co.za

In South Africa, 21% of estuaries are subjected to high or very high fishing pressure. There has been a substantial increase in fishing in estuaries in the Subtropical and Tropical bioregions, exacerbated by low fisheries compliance in KwaZulu-Natal. The integrity of estuarine protected areas is being eroded by both sanctioned and unlawful fishing in these areas.

Artificial breaching at low water levels causes premature closure, reduced marine connectivity and the accumulation of marine sediments in the lower reaches.

Don't artificially breach estuaries - it disrupts the natural functioning of the ecosystem and may take years to restore!

The KZN coast has 76 of South Africa's 290 estuaries, ranging from very small streamlets to the largest of them all: the St Lucia Estuary (44 800 ha) in the north. There are nine different estuarine types in SA, classified in terms of the NBA (2018), which consider attributes such as estuarine area, percentage of time open to the sea, average tidal range, typical salinity range, mixing processes and mean annual runoff.[6]

Within KZN we have representatives from six of these estuarine types:

1. **Estuarine lakes:** Estuarine lakes comprise one or multiple waterbodies connected to the sea by an inlet channel. As such, freshwater input can be from a single or multiple rivers, groundwater or aquifers, or a number of smaller waterways. Salinities in these systems are highly variable, ranging from fresh to hypersaline, because of the differing freshwater input, evaporation and the extent and duration of the marine connection. South Africa's 12 estuarine lakes are in crisis, including St Lucia, Kosi, uMgobezeleni, iNhlabane and uMhlathuze/Richards Bay.

[6] Van Niekerk, L. *et al.* (2020). African Journal of Aquatic Science, 45:1-2, 199-216.

2. Estuarine bays: These are permanently linked to the sea by unrestricted, deep mouths and are dominated by tidal processes. They are large systems (>1200 ha) with relatively low river inputs, with freshwater mixing processes being mostly confined to the more restricted upper areas. Sediments are typically marine in origin (Durban Bay is one of only two estuarine bays in South Africa).

3. Predominantly open: These estuaries are open to the sea for more than 90% of the time. They are generally linear systems where mixing processes are influenced by both fluvial inputs and tidal action. Under low river flows and high summer evaporation, hypersalinity can develop in the upper reaches. These estuaries often support wetlands, salt marshes and macrophyte beds. Their sizes are highly variable ranging from 10 to 7500 ha. Smaller systems are afforded a degree of protection against direct wave action by rocky headlands or subtidal reefs - these assist in maintaining an open mouth. Examples include uMzimkhulu, uMkhomazi, iSiphingo, uMngeni and aMatigulu /iNyoni.

4. Large, temporarily closed: These are temporarily closed to the sea. This classification refers to the larger of these systems, with a total habitat area of greater than 15 ha (associated with ~10 ha of open water area). They tend to be linear or funnel-shaped, with highly restricted inlets. Tidal ranges are very restricted, varying from 25 to 50 cm. The mixing process is dominated by fluvial input and partially by tides. Examples include uMthavuna, iMpenjani, iZotsha, uMhlanga and uMdloti.

5. Small, temporarily closed: These are temporarily closed to the sea. This classification refers to the smaller of these systems, with a total habitat area of less than 15 ha (associated with ~10 ha of open water area). These estuaries also tend to be "perched" above normal tidal levels, resulting in little to no open water area during the open mouth low tide state. Tidal ranges are very restricted to 15 to 30 cm and tend to be fresher in character as they have less connectivity with the sea. Examples include iSolwane, iSandlu, uVuzana, iKongeni and uSetheni.

6. Large, fluvially dominated: These are fluvially-dominated, shallow, sediment-rich systems of the east and west coasts (greater than 15 ha). They have very high sediment turnover and are turbid in nature, and can close during periods of low flow. Examples include iMfolozi/uMsunduze, uThukela and uMvoti.

Animals: Coast & Sea

Our seas and coast support a spectacular diversity of marine life. At least 2500 species of fish have been recorded, five species of sea turtles, 28 types of whales and dolphins and more than 46 species of seabirds. Sea turtles, amongst the most ancient of reptiles, are dependent on the coastal zone, with leatherback and loggerhead turtles nesting on northern beaches each summer. Several species of dolphins can be seen from the beach and whales are frequently seen as they seasonally migrate along the KZN coast.

Seabirds, too, enhance our coastal biodiversity. The endangered African black oystercatcher is endemic to the southern reaches of KZN. Notable is the small white-fronted sand plover that nests on our beaches, often at great risk to itself and its chicks.

Tens of thousands of fascinating invertebrate species, from tiny cryptic shellfish to larger lobsters and octopus occur from rock pools to reefs and everywhere in between.

Dangerous creatures?

Some sea creatures can bite, sting or may be venomous, while others are poisonous to eat. Venomous creatures use spines, teeth or stinging cells to inject venom, which may be painful or even dangerous. For example, the stonefish is one of the most venomous fish and may be found in shallow waters along the northern KZN coast. The spines of stingrays and sea catfish also cause an adverse reaction. Rarely, a sea snake may be encountered which, though venomous, is seldom able to inflict a bite. However, most problems are associated with common bluebottles and jellyfish, which can inflict a mild to moderately painful sting.

Be careful of creatures that are poisonous to eat - some can cause serious reactions and even death. The most deadly of these is the pufferfish which contains a neurotoxin in its organs and flesh. Just remember that the defence mechanisms of these animals are there for them to be able to catch their prey or defend against their predators.

Coelacanth

KZN is home to a unique population of this iconic species, once considered extinct. In 2000, three coelacanths were seen by divers close to Sodwana Bay, on the northern KZN coast. During subsequent trips more individuals have been identified, which shelter in protected caves and crevices within the canyons at a depth of between 100-300 m.

A management and conservation strategy has been drawn up and legislation promulgated to protect South Africa's coelacanth population. The iSimangaliso MPA was extended to include the canyons which form the refuge for the most accessible coelacanth population.

Sharks

Sharks are important predators and have a large influence on marine communities. Many species are classified as threatened in the *IUCN Red List*. Some shark species are protected by national or international agreements, although the effectiveness of such agreements is limited since neighbouring states may not be signatories.

About 85 species of sharks include the KZN coast in their range, occurring from shallow areas to much deeper waters. The tiger shark is the main attraction for the shark diving industry in the Aliwal Shoal MPA on the south coast, while the spotted ragged-tooth shark is popular with SCUBA divers. The uThukela Banks, on the north coast, is a nursery ground for the scalloped hammerhead shark *(see map on p. 3 and MPAs on p. 36).* Sharks nets and drumlines provide protection at various beaches along the KZN coast, as detailed under the section on shark nets (pp. 22-23).

The Sardine Run

A special event occurs each winter as shoals of sardines migrate from the cool Cape waters, northwards off the KZN coast, a journey of some 1000 km. Shoals up to 15 km long and 6 km wide generally follow the colder waters offshore. However, they may become trapped closer to the coast by inshore currents and eddies, particularly near Waterfall Bluff (Eastern Cape) where they avoid the strong, warm Agulhas Current moving southwards. Shoals do not always come inshore and may move further out into cooler waters.

This mass migration and abundant food source attracts a number of game fish such as elf/shad, garrick, Cape yellowtail, geelbek and dusky kob. Copper and dusky sharks, common and bottle-nosed dolphins join in the feeding frenzy, while Cape gannets make spectacular dives to prey on the sardines. Licensed commercial fishermen net shoals using beach seines and anglers attempt to catch game fish and sharks. Crowds gather along the coast waiting and hoping for the sardines to land so they can get their share! News media regularly report on the location of the shoals, adding to the excitement. The Sardine Run injects a major local economic benefit through both fishing and tourism along the coast.

Pickersgill's reed frogs

These frogs occur in fragmented wetland habitats at only 12 locations on the central coast of KZN and are classified as endangered on the *IUCN Red List*. Successful attempts have been made to re-release captive-bred frogs at suitable wetlands in the greater Durban area.

Both loggerhead and leatherback turtles are classified as endangered on the IUCN Red List.

Nesting turtles

While green, hawksbill, Olive-Ridley, loggerhead and leatherback turtles occur off the KZN coast, the latter two species regularly nest on the beaches of northern KZN, within the iSimangaliso Wetland Park. Since nests were raided and numbers depleted in the early 1960s, both species of turtles have been monitored and protected. This makes them among the best protected populations of these two species internationally.

Females of both species emerge at night, in summer on beaches on the north coast and each lay about 100 eggs in holes they dig in the sand. The nests are covered and females return to the sea. After an incubation period of about 70 days, the hatchlings emerge and run the gauntlet of many predators to return to the sea, where they remain until maturity. It has resulted in loggerhead numbers increasing over time and leatherback turtle numbers remaining relatively constant.

Whales

The remnants of the old whaling station in Durban is a reminder that from 1908 to 1975, whaling decimated humpback, blue, fin and sei populations. About 2900 blue whales were caught in this time and these have not been seen off the KZN coast since 1973. However, since the end of whaling, humpback whale numbers are recovering along our stretch of coast and they are frequently seen during their annual migration off the coast of KZN.

Beached & stranded animals

Sometimes seals, turtles, whales, dolphins, seabirds and whale sharks are found "beached" on our shores. Not all animals have "beached" for unnatural reasons and in many cases the animal may be simply exhausted or taking a break. This is especially true of seals during the winter Sardine Run. A marine animal is considered "stranded" when it is unable to return to its

natural habitat without assistance. Animals that strand may be alive or dead, in groups (mass strandings), mother/calf pairs or as individuals.

Strandings could also be due to natural factors such as malnourishment, disease, abandoned neonates, severe weather conditions, magnetic field anomalies, nesting (turtles), moulting (seals), predatory interactions and normal mortalities; or they could be caused by human activities such as noise levels, seismic activity, toxins, ingested plastic, entanglements in shark nets and fishing tackle, and injuries from shipping.

The handling and care of these animals is specialised and one should leave the protection, conservation, care and rescue of marine animals to the experts, who will move the animal if necessary, minimising disturbance and handling. KZN has a **Marine Stranding Network** which includes representatives from a wide range of organisations that are actively involved in the rescue, care and release of marine animals stranded along our coast.

Note: 1. Only some of these groups are mentioned in the table below.
2. Any movement and care of stranded animals has to be authorised by DFFE.

Organisation	Contact details	Speciality
Ushaka SeaWorld	031 3288222 o/h & 031 328 8060 a/h	dolphins, whales, seals, penguins, turtles, whale sharks
KZN Sharks Board	031 566 0400	whale & dolphin entanglements in shark nets
CROW	031 462 1127	seabirds excluding penguins, north of uMkhomazi River
SCAR	083 246 6765/ 074 343 3396	seabirds excluding penguins, south of uMkhomazi River

The assistance of the public in reporting strandings is important.

Do's and Don'ts

Do √

√ Do provide details of the location of the animal, with directions.
√ Do give the time and date of your observations.
√ Do provide the name and contact number of someone on site.
√ Do indicate what animals are involved, how many, and if possible the condition of the animal (alive, dead or injured).
√ Do provide a photograph if you can do this safely and without disturbing the animal.
√ Do have someone watch the animal until help arrives, keeping people and pets away and keeping as quiet as possible.
√ Do provide shade if possible.
√ If the animal has been ringed/tagged, report this to https://safring.birdmap/africa/upload_retrap.php for bird rings, and Ezemvelo: santosh.bachoo@kznwildlife.com or 083 783 9612 for turtle tags, queries and interesting sightings.

Don't X

X Don't touch the animal or try to feed or hydate.
X Don't pour water into the blowhole or cover it.
X Don't place wet towels onto birds, seals or turtles.
X Don't place a turtle on its back.
X Don't apply sunblock to any animal skin.
X Don't allow people to take 'selfies' and create noise.
X Don't place animals back into the sea or into any water - they will drown.
X Don't take the animal home - it requires specialist care.
X Don't attempt to remove fishing gut or hooks from any animal.

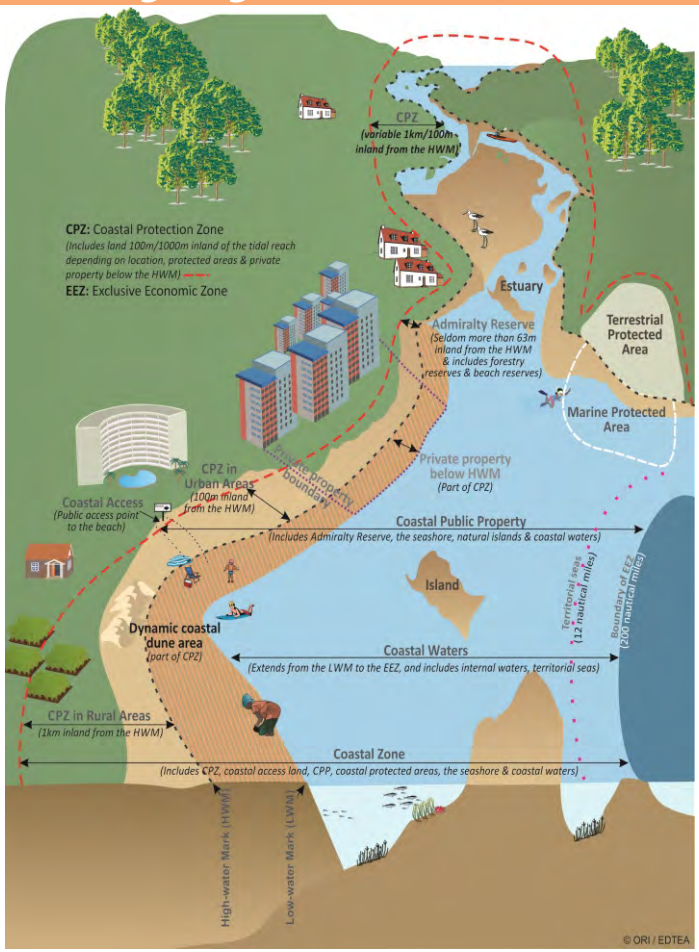
Managing the Coast

Increased pressure on the coastal environment diminishes the goods & services that the coast provides, making it and its people more vulnerable to the effects of climate change, sea-level rise and coastal erosion. The coast therefore needs to be managed as an integrated system to make optimal use of the opportunities and services it provides.

The Integrated Coastal Management Act

In keeping with international best practice, South Africa has developed and enacted a coastal management act. The ICM Act, as with most environmental legislation, is set at national level and falls under the umbrella of the National Environmental Management Act (NEMA). The Act establishes a system of integrated coastal and estuarine management in the country in order to promote the protection of the coastal environment. This important piece of legislation ensures that development and the use of coastal resources is sustainable and sympathetic to prevailing coastal conditions and entrenches the principle of co-operative governance.

One of the core elements of the ICM Act is the role played by stakeholders in participatory management, whereby all parties that have jurisdiction over the area in question should work together for improved governance. It calls for the public to participate in management, ensuring that you, the public, has a voice in the management of our coast.

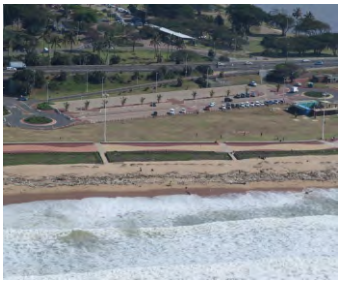


Schematic representation of the coastal zone.[7]

The figure above defines some of the terms used to describe various features of the coastal zone. A few of these are explained in more detail:

Land designated as **Coastal Public Property (CPP)** is land within the coastal zone for use by all people of South Africa, vested in the citizens of the Republic, and held in trust by the Government. This is based on the principle that all people have a constitutional right to access and enjoy the coast. For the first time CPP broadly includes land submerged by coastal waters, the seashore, admiralty reserve and state-owned land.

[7] Goble *et al.* Ugu Lwethu - Our Coast. A profile of coastal KwaZulu-Natal (2019).



The **Admiralty Reserve** is a strip of state-owned land approximately 45 to 60 m wide inland of the high-water mark. This strip includes land owned by the state and/or where it is specifically described in title deeds of private land. The admiralty reserve is therefore not continuous along the coast. It was administered by the Seashore Act (21 of 1935) until the enactment of the ICM Act and it is now included in coastal public property.

The **Coastal Protection Zone (CPZ)** is established to ensure the protection of the ecological integrity, natural character and economic, social and aesthetic values of the coast. The CPZ nominally includes land falling within 100 m of the high-water mark (HWM) in urban areas and within 1 km in rural areas, unless otherwise determined by the MEC (Member of Executive Council).

The ICM Act places responsibility on all spheres of government and on the public. People living and working in the coastal environment should have an understanding of the issues and risks associated with this unique environment.

The ICM Act calls for the development of a coastal management programme (CMP) at National and Provincial levels. The Act is divided into 12 core chapters as follows:

1. Interpretation, objectives and application of the Act	7. Protection of coastal resources
2. The coastal zone	8. Marine & coastal pollution control
3. Boundaries of coastal areas	9. Appeals
4. Estuaries	10. Enforcement
5. Institutional arrangements	11. General powers and duties
6. Coastal management	12. Miscellaneous matters

Do you want to find out more about the ICM Act and the provincial CMP? See www.coastkzn.co.za/governance/legislation/intergrated-coastal-management-act/

Accessing and Enjoying

The ICM Act clarifies that the coast is considered public property and citizens should have reasonable access to it so as to enjoy its benefits. However, this comes with a duty to protect the coastal environment and not to cause adverse impacts on the coast.

The Act also envisions that public amenities such as parking lots, ablution facilities and boardwalks are provided and maintained by local municipalities. They are also responsible for establishing appropriate access points that ensure fair access for all, while minimising impacts on the coastal environment.

Driving in the coastal zone

Public recreational beach driving was banned in 2001 due to the degradation of the beaches and coastal dunes, which caused loss of habitat and damage to natural coastal defences.

Beach driving is now controlled by a permit application to the National Department of Forestry, Fisheries and the Environment (DFFE).[8] Persons may apply for a permit for specific uses, such as organised recreational sport fishing competitions or special access for those with physical disabilities.

- *Any organ of state may use a vehicle in the coastal zone without a permit for the purposes of performing its public duties.*
- *The National Sea Rescue Institute (NSRI) and Lifesaving South Africa are allowed to access the coastal zone in the public interest.*

Launching vessels in the coastal zone

The KZN coast has an active boating community who use specially designed skiboats, semi-inflatable craft and jetskis capable of launching through the rough surf zone. The safety of boat launching is controlled by the South African Maritime Safety Authority (SAMSA) which sets operational limits on boating. Vessels must be licensed for seaworthiness and persons taking vessels to sea must be in possession of a valid Skipper's Ticket for that class of vessel.[9] (*See* www.coastkzn.co.za/how-do-i/contact/useful-links/)

Launching of motorised vessels may only take place at recognised launch sites which are authorised by EDTEA. Twenty five launch sites (outside of protected areas and harbours) have been evaluated for provincial gazetting. These restrictions do not currently

[8] Controlled under Regulation 6(1)(c): Regulations for the Control of Use of Vehicles in the Coastal Zone.
[9] A Skipper's Ticket is a licence that certifies that you are qualified to operate a vessel.

apply to non-motorised vessels (e.g. paddle skis & fishing skis) except in the iSimangaliso Wetland Park, where all types of boat launching activity are restricted to designated launch sites. Valuable environmental information about boating and fishing activities is collected at licensed boat launch sites through a mandatory launch site register. This contributes to the sustainable use of the coast and its resources.

- *Persons launching a vessel anywhere in KZN need a valid skipper's licence (from SAMSA).*
- *Your boat must be licenced.*
- *Persons launching boats are permitted to access officially registered launch areas under the regulations governing these sites.*
- *It is mandatory to fill in the launch site register.*
- *A fishing permit is needed to fish off a boat.*
- *A boat skipper will also require a boat fishing permit.*
- *For a list of official boat launch sites along the KZN coast, visit www.coastkzn.co.za*

Swimming

KZN's year round warm temperatures and attractive beaches makes swimming a popular activity. It is always safest to swim at a protected beach which has lifeguards on duty. However, at some of the less popular beaches, this service is only provided on weekends or during school holidays.

While the KZN coast has excellent swimming beaches, these are under threat from pollution, loss of sand supply and coastal erosion.

Other recreational activities

KZN has about 50 popular spots for beginner and professional surfers. Surfing in winter is popular since swells tend to be larger (up to 4 m) than in summer.

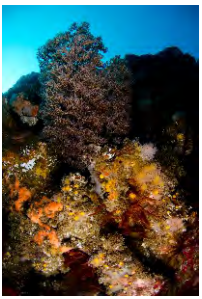
Durban and Richards Bay harbours provide moorings for dinghies and yachts which sail along our coastline.

With many rock pools close to towns and recreational areas, snorkelling has become a popular way to enjoy the KZN coast. The more adventurous dive the underwater realm of KZN's reefs and canyons with SCUBA (Self-Contained Underwater Breathing Apparatus) gear. This requires a relevant qualification acquired through a recognized SCUBA training agency such as PADI[10] or NAUI[11].

[10]PADI - Professional Association of Diving Instructors. [11]NAUI - National Association of Underwater Instructors.

Accessing and Enjoying

Some of KZN's best dive sites are located within Marine Protected Areas since these are home to an amazing array of underwater life. At Aliwal Shoal MPA on the south coast, divers are keen to encounter ragged-tooth sharks.



Diving in these sensitive areas requires a diving permit, which is obtainable from any Post Office.

Boat-based whale watching and shark-cage diving

Boat-based whale watching and white shark cage diving are regulated through an allocation and licensing process. Commercial operating licences are renewable for a period of five (5) years. However, these are mainly Cape-based operations, with few boat-based whale watching operators on the KZN coast.

Boats must be licenced for whale watching by the DFFE after skippers complete a special course. Boats are not allowed to approach within 300 m or interfere in any way with the whales.

May to September marks the migration of humpback (and southern right) whales from the southern nutrient-rich waters to their breeding areas off the Mozambique coast, returning between September and December. These times therefore form the peak boat-based whale watching season. In addition, sperm, minke and Bryde's whales may be seen, while dolphin sightings occur frequently.

Shark cage diving is popular at the Aliwal Shoal MPA, where tiger sharks are the main attraction. Blacktip, spinner, dusky and bull sharks may also be encountered. Operations are controlled by SAMSA, and stainless steel safety-approved cages must remain attached to the boat.

Additional information regarding licenses can be found at www.dffe.gov.za

Shark nets

Although the incidence of shark attack is considered low along the KZN coastline, some beaches have shark control nets and/or drumlines installed which act as deterrents to sharks. Shark nets and drumlines are controlled by the KZN Sharks Board, which has a commitment to minimise the environmental impact associated with protecting users from shark attacks.

The KZN Sharks Board is gradually replacing some nets with the more environmentally-friendly drumlines.

During the annual winter Sardine Run, nets and drumlines may be removed from the water for several weeks to prevent an increased mortality of animals which follow the sardines.

Always check for notifications before entering the water!
For information on net reduction & drumlines, see www.shark.co.za

Blue Flag beaches

Blue Flag is an international beach accreditation initiative, managed by the Foundation for Environmental Education (FEE). It is facilitated locally by the Wildlife and Environment Society of South Africa (WESSA) in partnership with participating municipalities.

The programme evaluates beach conditions and facilities based on strict standards, examining bathing water quality, environmental management, safety, services and environmental information provided to the public. This annual award recognises safer, cleaner and better managed beaches and facilities, which enhance tourism. Compliant beaches are awarded full Blue Flag status, while municipalities may also apply for pilot status for up to 5 years while they are undergoing the process of acquiring the checks and improvements required for full Blue Flag status.

Look out for a Blue Flag where local municipalities are certified to have complied with the programme's criteria and standards.

See www.wessa.org.za for more information on Blue Flag beaches in South Africa and the Blue Flag application process.
See www.coastkzn.co.za for the current list of full and pilot Blue Flag beaches in KZN.

Coastline Changes

There are a number of physical factors that affect the coastal zone, which in turn have an impact on people and properties along the coast. These include climate change, sea-level rise, coastal erosion and changes in the position of the high-water mark.

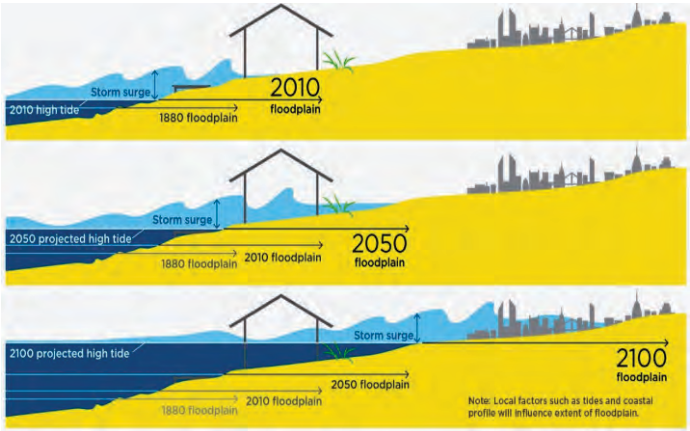
Climate change

Climate variability is a natural phenomenon that gives rise to cycles of drought, periodic floods, cyclones and El Niño events. However, it is known that human activities are accentuating climate variability through 'global warming'. This warming process is attributable to the greenhouse effect by which excessive naturally occurring greenhouse gases are released into the atmosphere, causing superfluous trapping of heat and hence increased average temperatures. The increase has been particularly evident since the start of the Industrial Revolution, due to the increased use of fossil fuels and the cutting down of carbon-absorbing forests. The Earth's average surface temperature has risen by approximately 0.8ºC since 1880, and there has been a sharp rise in the last 30 years.

Such changes can lead to altered weather patterns, including rainfall and storm events. Changes in climate are already affecting society, the economy and the biophysical environment. KZN is predicted to get wetter with increased episodic storm events.

Sea-level rise

One of the impacts of climate change is a change in sea-level, attributable to the melting of polar ice and the thermal expansion of water as it heats. The Intergovernmental Panel on Climate Change (IPCC) estimated global sea-level rise at 3.1 mm per year within the last decade, while research along our KZN coast suggests sea-level is rising at about 2.74 mm/yr.[12] Although changes in sea-level have taken place over time, this accelerated rise will result in submergence of land and threaten properties and coastal areas. In particular, storm events will have a greater impact on the coast. It is certainly a concern that within four generations sea-levels are likely to rise as much as 30 cm.



[12]Mather, A. and D. Stretch (2012). ***Water*** 4(1): 237-259.

Coastal erosion

Coastal erosion is the natural weathering of rocks and the removal of beach sand or dune sediments by wave action, tidal currents or drainage. It is driven by storm events, cyclones, erratic weather patterns, sea-level rise or a combination of these and other factors.

Protect coastal property from erosion! DON'T remove any natural vegetation or disturb the dune system.

Natural areas such as dunes, wide sandy beaches, vegetation and floodplains act as the coastal environment's natural defences, protecting against excessive erosion. If these are lost then the ability of the coast to absorb the impacts of extreme events is reduced, placing parts of the coast at risk, including natural assets, infrastructure, properties and lives. Therefore developments and people living at the coast should be careful not to remove, alter or damage these natural coastal assets.

Dams far inland and increased sand mining contribute to a reduced sand load coming down rivers and entering the sea. Coastal infrastructure such as harbours may block sand from reaching beaches. This adds to the vulnerability against erosion, sea-level rise and storm surges.

Changes in the high-water mark

The high-water mark (HWM) is used to define many other characteristics on the coast. It is an officially surveyed and proclaimed line by the Surveyor-General. Due to the dynamic nature of the coastal environment, it changes over time and has to be redetermined.

Development in the Coastal

Environmental authorisation

If you plan to undertake a development in the coastal zone, it is likely that you will require environmental authorisation in terms of the NEMA: Environmental Impact Assessment (EIA) Regulations. These regulations require the developer to appoint an Environmental Assessment Practitioner (EAP) to undertake either a Basic Assessment or a Full Scoping and EIA, depending on the development activities. Details of the activities that require authorisation can be found in the relevant Gazettes and Listing Notices. For instance:

- **Basic Assessment:** For activities of small footprint or low impact, such as the construction of canals, bridges or buildings not exceeding 50 m^2.
- **Full Assessment:** For activities of high footprint or high impact, such as the development of undeveloped or vacant land for residential, retail and commercial activities, where transformation exceeds 20 ha.
- **Geographical Exclusion:** This refers to specific geographical areas where activities that are not otherwise controlled will be identified, e.g. the construction of billboards and telecommunication masts within urban protected areas.

Listing Notices are comprehensive and cover all aspects of development. Should you wish to undertake development of any kind, it is best to consult an EAP first.

Any environmental assessment requires a defined public participation process whereby interested and affected parties can comment on and provide input on the proposed activities. Thereafter the environmental authority (national or provincial, where applicable) will issue an Environmental Authorisation (positive or negative), depending on their adjudication. This assessment process ensures that the potential adverse impacts on the environment are identified. Should environmental authorisation be attained, developers are obliged to follow best practices in terms of design, materials and building methods.

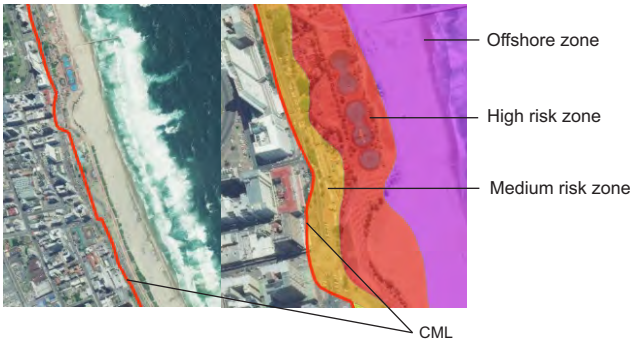
For more information on coastal development best practices, see www.coastkzn.co.za/governance/guidelines/best-ptactices-for-coastal-development-in-kzn/

Repair or removal notice

If developments are undertaken without authorisation or existing structures are shown to have an adverse effect on the coastal environment, then a repair or removal notice may be issued by the MEC in terms of the ICM Act (Section 60). This will compel the owner to remediate or remove the structure and rehabilitate the area, as directed.

Coastal management lines

A coastal management line (CML) is a line seaward of which development is controlled or prohibited. This will ensure that developments are undertaken in such a way as to minimise impacts on the coastal environment. CML's also serve to protect coastal properties and people from the effects of sea-level rise, coastal erosion and coastal flooding. They ensure that the ecological functioning of the coast is sustained for future generations to enjoy, and that people and infrastructure are protected.



Protection of properties

In terms of the ICM Act, no protection measures against the effects of coastal erosion, sea-level rise or changes in the high-water mark can be undertaken on coastal public property without authorisation. This is so that protection measures do not interfere with the natural functioning of the coast. Persons who wish to protect their own properties against such impacts may be allowed to do so at their own cost, on their own property. It is best to contact an EAP to determine whether an environmental authorisation is required.

Soft engineering

Soft engineering options should be utilised for coastal protection as these are best suited to work with the natural functioning of the coast. An example of soft engineering is geofabric sand bags along the immediate front of the dune system - they should be as high as the original foredune and covered with appropriate fill sand to a gradient not more that 24°. The dune can then be vegetated with suitable dune species.

Remember that any soft and hard engineering measures will in all likelihood be subject to environmental assessment.

Harvesting Marine Resources

KwaZulu-Natal has a rich coastal and marine environment with hundreds of species potentially available for harvest, as a source of food and/or for recreation. These resources include fish such as shad/elf, king mackerel and slinger as well as invertebrates such as East Coast rock lobster, mussels and oysters. However, these resources are under threat from over-harvesting, damage to the ecosystem, pollution and climate change.

Regulations are therefore in place to protect these resources from over-harvesting. Permits are issued which specify certain conditions, e.g. closed areas, closed seasons, bag limits and size limits. If you wish to harvest any marine resource, including in estuaries, it is important to purchase the necessary permits from a Post Office. Permits are not transferable and must be available for inspection at all times.

Linefishing

Linefishing refers collectively to general angling, spearfishing, vessel fishing, collection of bait and aquarium fish, cast-netting, etc. There are many fish and shark species that can be caught by linefishing along the KZN coast, some of which are seasonally abundant. This diversity means that the coast offers considerable fishing opportunities, ranging from basic harvesting for food security to recreational, charter and commercial fishing. Persons who have a recreational fishing permit are not allowed to sell fish. Only legitimate commercial fishers, who have fishing rights, may sell fish commercially.

Unfortunately, many linefish species have been overexploited or are naturally scarce and thus especially threatened. Strict controls through the issuing of permits are therefore in place to protect vulnerable species and to ensure sustainable use. It is important to be familiar with the rules and regulations, including the correct identification of species, how your catch should be measured, catch limits and closed seasons.

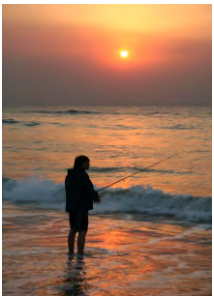
Additional information can be found at www.coastkzn.co.za/how-do-i/apply-for/recreational-fishing-collection-permit/ and at www.saambr.org.za/for-fishermen/

Other marine resources

There are many other marine resources that can be harvested along the KZN coast. These include mussels, oysters, crabs, East Coast rock lobsters and octopus. Also popular are several bait species, such as sand prawns, mud prawns, red-bait and mole-crabs. To ensure sustainable utilisation of these resources, permits are required (available from any Post Office). Specific regulations apply to each species in terms of size and bag limits as well as the methods allowed for harvesting.

It is your responsibility to be in possession of the appropriate permit/s and to have a good understanding of the regulations pertaining to the species which you plan to harvest.





Are you fish-friendly?

Since many resources are depleted, several initiatives have been introduced that provide certification of their conservation status. Globally, the **Marine Stewardship Council** certifies fisheries that have been comprehensively assessed and audited, including their stock status, the environmental effects of fishing and the management measures in place to protect such species. ***Look out for their logo (left) on your next seafood purchase.***

South African Sustainable Seafood Initiative (SASSI)

Locally, SASSI works with consumers, fishing companies, small-scale commercial fishers, marine scientists, government, consumers, retail partners, restaurants and environmental NGOs to ensure sustainable use of our marine fish and seafood resources.

As consumers, we have an important role to play in making sure that we make appropriate and environmentally-friendly choices in how we choose our foods. We are encouraged to use our rights and ask pertinent questions at a shop or restaurant regarding the species of fish or seafood for sale:

what species it is, how it was caught or farmed and from where it is obtained. By making the correct choices, we can apply pressure on companies to also do the same. Ultimately this will reduce the sale of species that should be protected.

SASSI uses a traffic light system reference guide to enable the public to make environmentally responsible seafood choices: **green** for those seafoods that are suggested for use, have well managed populations, are sustainably sourced, or are farmed in a way that does not harm the environment; **orange** if there are reasons for concern due to overfishing or because the fishing or farming technique is harmful to the environment, there is a large bycatch or the fish is vulnerable to fishing pressure; and **red** if the seafood lacks appropriate management, is obtained from unsustainable populations, or requires recreational fishing permits and they are therefore illegal to sell.

*You can send the name of the seafood by text message to the **SASSI FishMS line 079 499 8795** to receive information on the status of that species.*

SASSI has a free app for Android and iPhone and can also be contacted through facebook.com/WWFSASSI; @WWFSASSI; #WWFSASSI

*It should be noted that sardines are rated **orange** on the SASSI assessments and one should therefore reconsider purchasing these!*

Human Impacts

Human settlements and development have an impact on natural ecosystems. Certain systems may be more vulnerable than others, and care should be applied as human interference often results in adverse impacts on these systems. Some examples are sandmining, fresh water extraction, artificial estuary mouth breaching and changes to/removal of natural vegetation. The effects of these are far-reaching damage to the ecosystem concerned.

Sandmining

In KZN there is considerable extraction of sand from river beds, estuaries and coastal areas, mostly for building purposes. This is commonly referred to as sandwinning or mining. However, sand also has an important coastal ecosystem function by constantly replenishing our beaches and sustaining the sandy beach ecosystem. Excessive removal of sand has been shown to result in eroded beaches.

In law, sandmining is in fact considered a form of mining and is regulated under the Mineral and Petroleum Resources Development Act (28 of 2002). A permit must be obtained from the Department of Mineral Resources and Energy (DMRE) before any sand is removed.



Sandmining upsets the natural functioning of coastal systems. Do your part and report any suspected illegal sandmining to the DMRE (see www.coastkzn.co.za/how-do-i/contact/).

Freshwater abstraction

Freshwater is an essential ingredient for all aquatic and terrestrial life. It is particularly important to estuarine ecosystems where it influences the character and condition of the estuary, its salinity, circulation patterns, water quality and species distribution. Reduction in freshwater inputs can cause increased frequency of mouth closures, thereby limiting the recruitment of juvenile fish from the sea, as well as increasing the extent of saline intrusion of permanently open systems.

Large rivers that push freshwater far out to sea, such as the uThukela, are also important. These systems nourish unique and rich offshore muddy ecosystems that sustain many of our fisheries. As the demand for freshwater to meet domestic, industrial and agricultural needs increases, so the volume of water reaching estuarine and marine environments is reduced, which in turn adversely affects the supply of other goods and services. Freshwater resources must be managed, not only to meet human demand, but also to nourish estuarine and offshore ecosystems if we wish to continue drawing environmental benefits from these ecosystems.

Breaching the mouths of estuaries

Many estuaries in KZN close periodically as part of their natural cycle, normally opening again after rain. However, when closed, upstream flooding may occur, which could cause damage or loss of infrastructure and amenities within the floodplain of the estuary. In response, there are often requests to artificially breach these estuaries.

Many species are adapted to live in these temporarily open-closed systems and have life cycles that are dependent on the natural opening and closing of the system. The closed phases of estuaries are generally also more productive than the open phases. Artificial breaching of the estuary mouth (by opening the sandbar) will result in species being exposed prematurely to the marine environment, thus preventing them from successfully completing their natural life cycle. Artificial breaching may also make a system less productive and less able to deliver goods and services.

Changes to natural vegetation

Coastal vegetation provides a protective buffer to the coast, rendering it less vulnerable to impacts, and contributing to its biodiversity and the provision of goods and services. The clearing of natural vegetation for urban developments, cultivation of river banks and floodplains is increasingly a cause for concern. Destruction of vegetation gives rise to higher silt loads in our coastal waterways, causing estuaries to silt-up and leading to degradation of these systems. Clearing of dune vegetation can increase coastal damage during storms and storm surges.

Also of concern is invasive alien vegetation that tends to consume more water than natural vegetation, resulting in reduced water yields. It is estimated that in some areas alien vegetation reduces streamflow by as much as 10%. Indigenous vegetation provides food, nesting sites and shelter for local animals. So the next time you plant something in your garden, choose an indigenous plant and help conserve water resources and biodiversity!

Plant indigenous vegetation which usually uses less water and is adapted to local conditions.

Harvesting of natural coastal vegetation must be sustainable in order to prevent the loss of important habitats. For example, mangrove forests are harvested for their wood products such as charcoal, firewood and timber, leading to the increased loss of this valuable and threatened habitat.

Pollution and litter

Pollution of the marine and coastal environment

Pollution is the introduction of harmful substances into the natural environment as a result of human activities. Pollution of the marine and coastal environment is more than an eyesore - it is an ecological, economic, health and aesthetic problem. Internationally, pollution of the oceans has been in the spotlight, with gyres concentrating litter into huge floating garbage islands such as the “Great Pacific Garbage Patch” in the North Pacific Subtropical Gyre. Waste here can be traced to countries all across the globe.

Almost everything we use from cigarettes to washing detergents, spilled fuel, oil, brake fluid and other waste eventually end up in the marine environment. Most of the visible litter consists of material that does not decompose or degrade easily, and therefore continued input of these items accumulates in the marine and coastal environment.

Sources of pollution along our coast range from industrial and domestic waste discharges (like sewage) to metals, plastics and terrestrial run-off (including agricultural waste, pesticides and fertilisers) and other contaminants. These find their way into rivers and estuaries and eventually the coastal zone, causing degradation and loss along the way. Solid waste also enters the marine environment from poorly managed dump sites and stormwater drains adjacent to rivers or coastal areas. Added to this, wind-blown refuse and litter are left to accumulate in all areas of the environment, such as uncollected domestic waste and waste from outfalls.

Sewage pollution affects people's immediate environment and causes water-related illnesses such as cholera and gastroenteritis. It also introduces excessive amounts of nutrients to the estuarine and marine environments. It is important that sewage spills are immediately controlled, especially when the runoff enters sensitive estuaries.

Chemical fertilisers used by farmers drain into rivers and make their way into the estuarine and marine environments where they add to this 'fertilising effect', resulting in algal blooms which remove oxygen from the water, often to the point that fish and other aquatic animals suffocate and die.

Pollution and litter

Oil spills

An oil spill occurs when large amounts of crude or refined oil seeps or pours into the sea. This can happen at the site of drilling, during transportation and as a result of accidents, often causing huge environmental impacts. The DFFE coordinates the development of Coastal Oil Spill Contingency Plans for zones around the coast. These plans ensure preparedness and a coordinated response strategy to major oil spills.

The short-term impacts of oil are devastating - tarred beaches, dead wildlife, loss of fisheries and contaminated water supplies. Moreover, in the long-term toxic materials remain in the water, building up in the food chain to lethal levels. This eventually disrupts or destroys ecosystems.

Oil spills are not only the result of large spills - everyday activities also play a role. When you change your car's oil be careful not to dump the used oil on the ground or down a waterway as this all ends up in the sea. If you added up all the oil dumped on land it would surpass a major oil tanker spill.

Marine litter, plastics and microplastics

Marine plastic litter has become a worldwide problem with plastics found on the remotest marine islands and at great depths in the ocean. Animals may get entangled in plastic packets, packaging and fishing lines. Microplastics - very small plastic pieces - can occur in human food products such as sea salt and desalinated water. Microplastics are a particular problem for marine mammals, turtles, fish and birds as they ingest it, mistaking it for food items. Furthermore, toxic chemicals washed down the rivers and into the sea tend to accumulate on these plastic pieces and get taken up by animals - causing illness, disease, abnormalities and death. A wide range of dead animals, from tiny shrimps to fish and whales, are now frequently found with plastic in their guts.

During a massive storm in October 2017, 49 tons of plastic nurdles (little beads of plastic which are used to make a range of plastic products) toppled off a ship and into the sea at Durban. Over a period of 18 months, these nurdles were collected from beaches and estuaries by a range of cleanup crews along the north coast of KZN.

International Coastal Cleanup (ICC)

The International Coastal Cleanup (ICC), one of the largest marine cleanups in the world, sees volunteers from more than 90 countries collecting litter from beaches and the marine environment on the third Saturday of September each year. In 2020, more than 2,37 million kg of trash was removed from almost 80 000 km of the coastal environment by 221 589 people across the globe.

Top 5 items collected in KZN during the ICC 2021

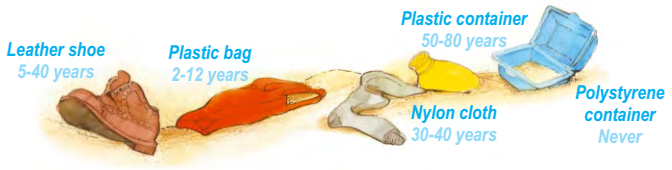
- plastic bottle caps - 18 000+
- plastic bottles - 5 000+
- plastic pieces - 4 000+
- food wrappers - 3 500+
- cigarette butts - 3 400+

In some regions, underwater cleanups are also undertaken to remove litter from the ocean floor.

Internationally, the cleanup is managed by Ocean Conservancy (USA). In KZN, Ezemvelo and SAAMBR play a role in the local organising of this event. The litter is sorted and counted in various categories and the data from each participating venue is collected and sent to Ocean Conservancy for collating.

This event not only cleans our beaches, but creates awareness and encourages changes in the behaviours that cause pollution, litter and debris in the first place.

It takes many years for our litter to degrade...



It is important for everyone to change behaviour patterns to reduce our impact on the environment from pollution. Failure to do so will adversely affect the goods and services provided by the natural environment, ultimately affecting our future.

Protected areas

With a large population living in the coastal zone and a rapid rate of development, it is necessary to protect and conserve plants, animals and ecosystems both within the landward and seaward areas of the coastal zone. This has been done through the establishment of the iSimangaliso Wetland Park, a number of coastal nature reserves (managed by Ezemvelo KZN Wildlife) and Marine Protected Areas. Some wetland areas are protected through the Ramsar Convention. Other areas are protected as heritage sites. The aim is to afford a level of protection to a wide range of areas, habitats and ecosystems.

Marine Protected Areas (MPAs)

MPAs are another management tool to safeguard our marine biodiversity, to protect critical hotspots and take care of our marine and coastal resources. They may serve as sanctuaries for rare, range-restricted and endemic species, areas of refuge for exploited and targeted species, and protected areas from which marine life can breed, disperse and restock other areas. They are also valuable as reference sites against which the effects of man's disturbance on marine life can be measured. As such, they can be used for non-consumptive recreational purposes and tourism.

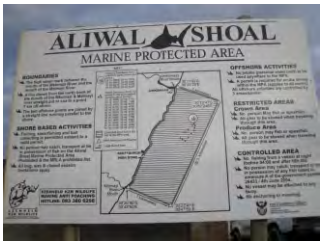
A network of MPAs is needed to protect the range of marine and coastal ecosystems and biodiversity found along the KZN coast. Previously KZN had four MPAs: St Lucia, Maputaland, Aliwal Shoal and Trafalgar. The iSimangaliso MPA was declared under the World Heritage Convention Act and includes the previous St Lucia and Maputaland MPAs.

In 2019, the Minister of Environmental Affairs gazetted new areas and increased the size of some existing MPAs. Overall, about 5.4% of the South African coast is now protected, but the actual “no take” area is much smaller.

The **iSimangaliso MPA** now extends from the Mozambique border to Cape Vidal and 3 nautical miles out to sea, an area 10 times larger than the original MPA. It will continue to protect the nesting grounds of the critically endangered leatherback and vulnerable loggerhead turtles. In addition, it will protect endangered coral species and the canyons which form a refuge for the most accessible coelacanth populations in South Africa.

The **uThukela Banks MPA** is a priority area for the protection of threatened mud and gravel seabed habitats. The uThukela River provides nutrients and sediments to the area which is the spawning and nursery ground for a range of species. This MPA also provides protection for hammerhead sharks, black musselcracker and yellowbelly rockcod as well as seafans and black corals in the deep reef systems.

Aliwal Shoal MPA, which protects the Aliwal Shoal Reef, now extends northwards, southwards and offshore, increasing the protection for threatened linefish populations, seventy-four and ragged tooth sharks.



Protea Banks MPA joins the Trafalgar MPA and protects the Protea Banks Reef and other canyons and offshore habitats. It provides protection for a number of shark species, linefish and corals.

Each MPA has a management plan that regulates its activities - certain activities such as diving may require permits. In some cases, fishing is not prohibited but species and bag limits may be used.

Several organisations and experts have put together a targeted plan of the areas within the EEZ that are priorities for special protection, in terms of both biodiversity and human-induced threats. They have proposed increasing protection in MPAs around South Africa to 30% by 2030.

World Heritage Sites

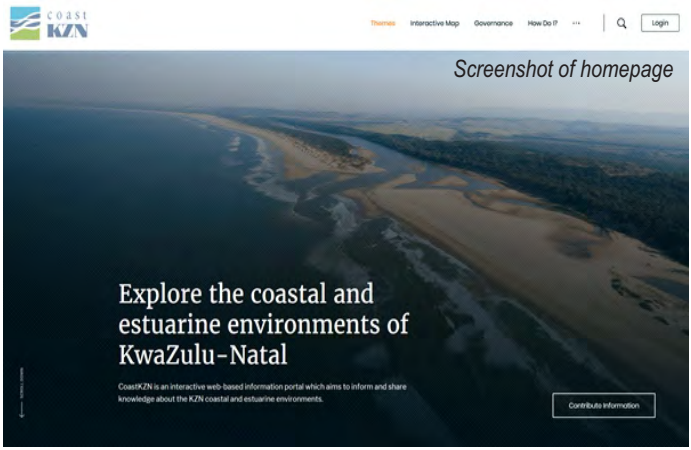
The iSimangaliso Wetland Park, covering some 332 000 ha and 220 km of coastline on the northeastern coast of KZN, was declared a UNESCO World Heritage Site in 1999. It includes 3 major lake systems, Africa's largest estuarine system, the highest vegetated coastal dunes which are some 25 000 years old, coral reefs, salt and freshwater marshes, coastal grasslands and dune forests. It protects many thousands of species of plants and animals and is protected due to its unique ecological processes and biodiversity. The St Lucia Estuary is also the world's oldest sanctuary (declared in 1895).

Future heritage sites

The coastal environment played an important role in the food and cultural life of early human settlements. Traces of human occupation of sites along the KZN coast date back about 1 million years. Evidence of more recent occupation is found at caves and in the many shell middens discovered. These middens contain mussel, limpet, crab and crayfish shells as well as fish and mammal bones (e.g. at Bluff, uMdloti and uMhlanga).

Shells were used culturally, e.g. for personal decoration. A cone shell decorated a child from some 120 000 years ago (buried at Border Cave in the Lebombo Mountains - 40 km inland from the coast), while shell beads were found at Sibudu Cave near Tongaat. Sibudu Cave has been declared a National Heritage Site and applications are underway to include it on the UNESCO World Heritage List. Middle Stone Age remains date back 77 000 years and the site continues to provide new information and relics from early human coastal communities in KZN, and deserves to be protected for future generations.

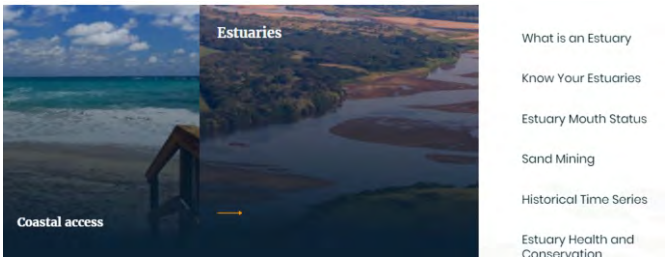
CoastKZN



CoastKZN (www.coastkzn.co.za) is an interactive website developed by the Oceanographic Research Institute (ORI), in partnership with the EDTEA. It is a handy resource, providing information on a diverse range of coastal and estuarine issues for all KZN coastal stakeholders.

The information is presented in four main categories:

1. Themes - provides information on an array of topics such as coastal access, recreation, risk and the estuaries of KZN.



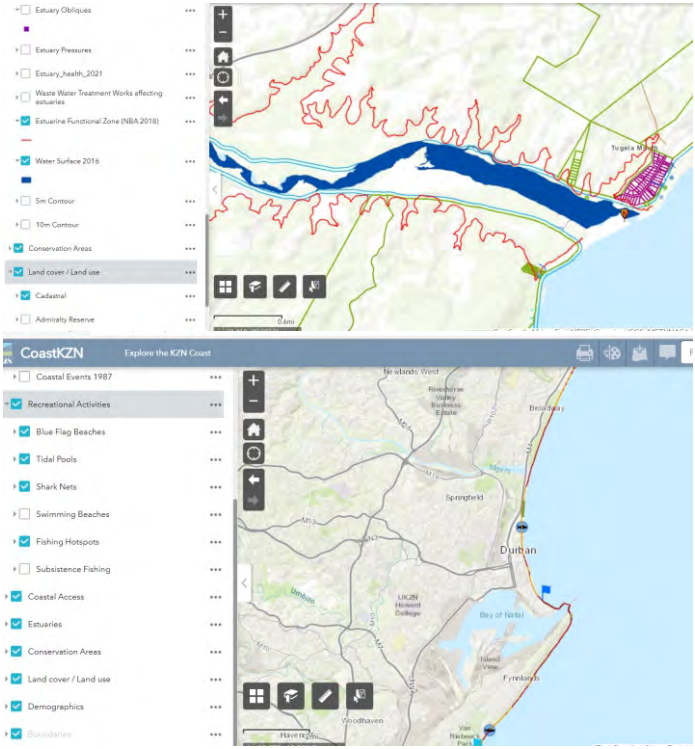
2. Explore the coast - offers an interactive map of KZN which shows a number of spatial layers related to the KZN coast and the management thereof, such as a coastal vulnerability index, boat launch sites and estuary boundaries.

3. Governance at your fingertips - provides information on definitions, copies of legislation, regulations and policies relevant to the coast and its management.

4. How do I? - provides information on how to undertake certain activities in the coastal zone and covers a range of topics from reporting incidents such as animal strandings, estuary breaching, illegal sandmining and poaching, to applying for various permits.

Do you need to find contact information for any of the authorities mentioned in this guide? Use the *"How do I?"* function to find contact details for national, provincial and local government departments and links to their websites. Contact information is also provided of other organisations involved in coastal activities, such as the KZN Sharks Board, iSimangaliso, Ezemvelo, WESSA and SASSI, to name a few.

There are frequent updates of news articles about local coastal issues. You can also ask questions and contribute information and photographs about the coast, through the "*Contact Us*" and "*Contribute*" functions.



Screenshots of some mapping functions

"Explore the coast" is an interactive map of KZN allowing a user access to a number of spatial layers related to the coast and its management. This function can also be used to find information or to create maps.

CoastKZN is regularly used by government, scientists, environmental consultants and the public.

Visit www.coastkzn.co.za

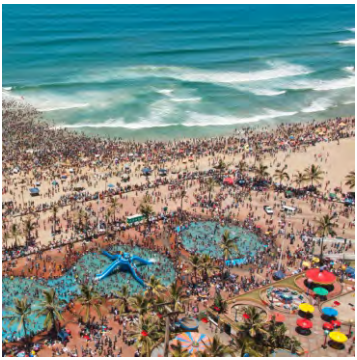
Places to Visit

KZN has an attractive year round climate and coastal tourism is important to the economy of the province. Here are a few special areas to visit and things to do:

1. iSimangaliso Wetland Park

iSimangaliso means "miracle" or "wonder", aptly describing this heritage site which is one of the top destinations in KZN due to its biodiversity, range of ecosystems and aesthetic appeal. Choose from pristine beaches on the Eastern Shores and False Bay, boat cruises in Africa's largest estuary, scuba diving or snorkelling at Sodwana Bay, horseriding, kayaking, game drives and guided walks. Birdwatching is also a popular activity on South Africa's largest lake (Lake Sibaya) or at uMkhuze Game Reserve which boasts over 420 bird species.

2. Durban



With its warm climate and excellent road, ship and air connections, Durban is the centre of tourist activity on the KZN coast. It is popular with both local and international tourists, and has a large range of hotels and restaurants. Numerous beach amenities attract users, from rock pools to sandy beaches and special play areas, kite surfing and just relaxing in the sun. Visit uShaka Sea World for a range of exciting, fun and educational activities, all year round.

3. Whales and dolphins

Humpback whales migrate northwards from May to September and back south from September to December each year, while dolphins can be seen along the KZN coast almost daily. One way to see these is to take a boat tour out to sea. However, if you prefer to keep your feet on land, whales can be spotted from the beach at many points along the coastline. Keep your binoculars handy! Special viewing decks have also been

constructed in some areas such as Margate, uMtentweni and Ramsgate where you can spend a few hours watching these magnificent animals.

One can also arrange to visit Durban's old whaling station, a relic of the time when thousands of whales were harvested along our coast - and celebrate that whale numbers have since recovered!

4. Annual Sardine Run

Each winter, huge shoals of sardines migrate northwards from the Cape waters, past the KZN coast. Called the *Greatest Shoal on Earth*, the sardines are followed by a range of predatory fish, sharks, dolphins and gannets. People join in the excitement and feeding frenzy, all wanting their share! This also coincides with the winter school holiday season, adding to the festive atmosphere on the KZN coast.

5. Popular fishing spots

Cape Vidal, Mission Rocks, Maphelane, Richards Bay, Tugela Mouth, Amanzimtoti, Port Shepstone and Port Edward. *Note that you will need a fishing permit.*

6. Good surfing spots

Ballito, Durban and Amanzimtoti are favoured by surfers while **snorkeling** is popular at Kosi Bay, Sodwana Bay and Cape Vidal. Favourite **dive sites** are at Sodwana Bay, Umkomaas, Rocky Bay and Protea Banks. *A diving permit is required in a MPA.*

7. Blue Flag Beaches

See www.coastkzn.co.za for the current list of **Blue Flag** beaches in KZN.

Good snorkeling spot.

Great for diving - you are bound to see a lot! Don't forget to get a permit for MPAs.

Good places to walk in beautiful surroundings.

Leisure beaches for swimming and relaxation. Please swim within the designated areas!

Great surfing spots. See if you can catch a wave!

Excellent fishing spot! Make sure you have your fishing permit and keep to the bag limits.

Map of the KZN coast indicating some popular leisure hotspots.

How You can Help

Do's and don'ts

Do √

√ **Do** complete the launch register when launching a vessel.
√ **Do** swim at protected beaches where lifeguards are on duty.
√ **Do** get a permit when diving in a MPA.
√ **Do** get a permit for fishing and harvesting marine organisms.
√ **Do** adhere to season, bag and size limits for fishing.
√ **Do** report stranded animals to the Marine Stranding Network.
√ **Do** report illegal estuary breaching. The functioning of estuaries and their ability to deliver goods and services is affected by artificial mouth breaching.
√ **Do** report illegal sand mining. Sand is a precious commodity which protects the coast from storm surges. Sand mining reduces the amount of sand delivered to beaches.
√ **Do** lighten your carbon footprint by supporting practices that enhance sustainable use of the environment. Our daily activities contribute to climate change, which will in turn affect all aspects of our lives.
√ **Do** make lifestyle choices that will reduce our carbon use - do use smaller/more efficient cars, ride a bicycle or walk more, eat less red meat and support sustainable choices.
√ **Do** get to know what is happening around you - participate in decision-making on issues of concern to you.
√ **Do** volunteer your services to improve the environment around you.
√ **Do** change your behaviour patterns - use less plastic, conserve water and plant indigenous species.

Don't X

X **Don't** drive in the coastal zone without a permit.
X **Don't** undertake development in the coastal zone without environmental authorisation.
X **Don't** breach estuaries.
X **Don't** dispose of oil in a waterway.
X **Don't** drop litter on the ground. Put it in a bin or take it home with you.
X **Don't** remove or disturb dune and coastal vegetation. Clearing vegetation encourages erosion and removes the natural protection against storm surges.

Authors & Editors (2nd edition):
Bronwyn Goble, Marilyn Bodasing & Omar Parak

Design & Layout:
Bronwyn Goble & Marilyn Bodasing

For more information visit www.coastkzn.co.za