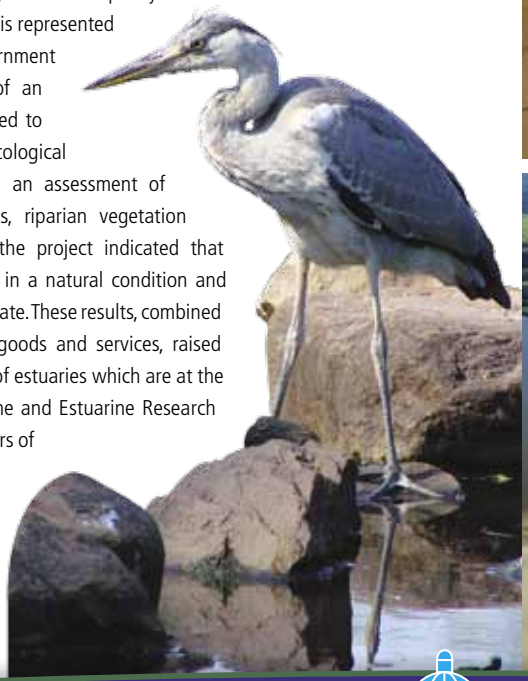
DURBAN'S *Estuaries*

ETHEKWINI MUNICIPALITY

KWAZULU-NATAL | SOUTH AFRICA

Background

The focus of the eThekwini Municipality's Environmental Management Department's (EMD) biodiversity planning mandate, has historically been on the terrestrial rather than the aquatic environment. In 2005 the River Health Programme (RHP) was initiated by the EMD in response to a need identified during the state of environment reporting process to report more holistically on water quality related issues in the municipality. This represented the first attempt by local government to assess the ecological status of an aquatic environment. The RHP aimed to develop baseline data on the ecological state of the EMA Rivers through an assessment of fish and invertebrate communities, riparian vegetation and river habitats. Results from the project indicated that of the 59 study sites, only 2 were in a natural condition and 17 were considered to be in a poor state. These results, combined with the high value of estuarine goods and services, raised concerns about the potential state of estuaries which are at the receiving end of these rivers. Marine and Estuarine Research (MER), in collaboration with members of the EMD, were thus commissioned to undertake a study to assess the current ecological status of estuaries within the eThekwini Municipal Area (EMA).



Glossary

ABIOTIC	Refers to physical parameters and features such as temperature, rainfall, sediment etc.
ALGAL BLOOM	The multiplication of one or more species of algae to high densities under certain environmental conditions.
ASSEMBLAGE	A group/gathering of ...
BENTHIC	Bottom dwelling organisms that live on the bottom of the rivers, estuaries and the ocean are called benthic organisms.
BIOTA	Refers to all plant and animal life.
RIPARIAN	Is the meeting place between land and a flowing surface water body.
EUTROPHICATION	A process whereby nutrients (nitrogen and phosphorus) become over-abundant in a waterbody often leading to algal blooms.
FLOODPLAIN	Low lying land adjacent to a river or estuary, which is periodically flooded (timeframes may vary from annually to decadal), and where river borne materials are deposited.
ORGANIC	Pertaining to compounds containing carbon. Also refers to living things or the materials made by living things.
PHYTOPLANKTON	Single celled plants living in the water column of any water body.

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What is an estuary?

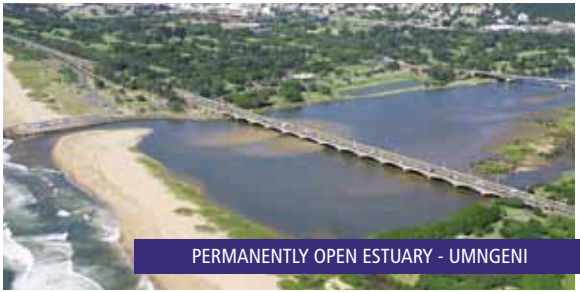
Estuaries are situated at the interface between the marine and freshwater environments, and as such are amongst the most dynamic, but also productive ecosystems on earth.

"In South Africa an estuary is considered to be that portion of a river system which has, or can from time to time have contact with the sea. Hence, during floods an estuary can become a river mouth with no seawater entering the formerly estuarine area. Conversely, when there is little or no fluvial input an estuary can be isolated from the sandbar and become a lagoon which may become fresh, or hypersaline, or even completely dry" (CSIR 1992).

The current definition of a South African estuary provides an indication of the variability in structure and functioning of these systems. Despite this degree of variability, however, five major estuarine types can be identified based on a combination of physiographic (i.e. physical features), hydrographic (water related features) and salinity features.

The five recognized types are:

- permanently open estuaries (e.g. uMngeni - free connection between the sea and estuary)
- temporarily open/closed estuaries (e.g. uMsimbazi - periodic formation of a sandbar across the mouth, which is strongly linked to rainfall patterns)
- estuarine lakes,
- estuarine bays (e.g. Durban Bay - similar to the permanently open estuaries, except with a greater marine influence) and
- river mouths.



PERMANENTLY OPEN ESTUARY - UMNGENI

TEMPORARILY OPEN/CLOSED ESTUARY - UMSIMBAZI

ESTUARINE BAY - DURBAN BAY

ESTUARIES: A Durban perspective

The eThekwini coastline is 98 kilometres in length, and incorporates 16 estuaries ranging from the uTongati in the north to the iMahlongwa in the south. The estuaries within this area are made up of 13 temporarily open/closed estuaries, two permanently open estuaries (uMkhomazi and uMngeni) and one estuarine bay (Durban Bay).

Estuarine goods and services in the EMA

In 2003, the eThekwini Environmental Services Management Plan (commonly known as DMOSS) valued the goods and services provided by estuaries at $ 22 832 per hectare/ per year (after Costanza's evaluation of ecosystems), which ranks amongst the highest of all the ecosystems within the EMA.

Among the most important goods and services delivered by these ecosystems are:

- the provision of nursery grounds for estuarine dependent marine species,
- habitats for species confined to estuaries,
- refugia for birds,
- nutrient cycling,
- supply of nutrients to the coastal environment,
- sediment supply to the coastal environment,
- water supply,
- flood mitigation,
- waste treatment and
- recreational activities

Biodiversity

Lying at the interface between two environments, estuaries experience dramatic changes in the abiotic environment (e.g. floods and tidal influence). It is these sudden changes which exclude many species from estuaries, resulting in relatively low diversity. Nevertheless, those species which are tolerant of abiotic fluctuations are able to exploit a highly productive environment from which many competitors are excluded. Estuaries are consequently characterized by high densities of biota, but relatively low species diversity when compared with coastal and oceanic environments. Primary producers in these systems range from microscopic algae to the more charismatic mangroves. Representatives from the animal kingdom include zooplankton, benthic invertebrates, fish and birds. The latter three represent the major focal point of the MER study. Detailed methodology is available in the full report "Estuaries of Durban".

Beds of *Phragmites australis* in the Mhlanga Estuary

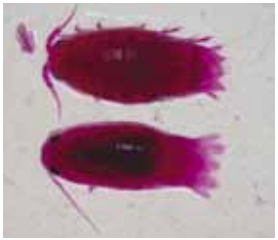
The White Mangrove *Avicennia marina*

BENTHIC INVERTEBRATES

The benthic invertebrates of South African estuaries are dominated by calm water species of marine origin. The dominant groups include polychaete worms, bivalve (e.g. mussels) and gastropod (e.g. snails) molluscs and a crustacean component made up of amphipods, isopods, brachyurans (e.g. crabs), and prawns. In total, seventy taxa of benthic invertebrates were collected over the course of the study.

The polychaete
Dendroneries arborifera

The amphipod
Corophium triaenonyx



The isopods *Pontogeloides latipes* and *Eurydice longicornis*

Seine netting

Measuring a Thornfish *(Terapon jarbua)*

FISH

Estuaries serve as nursery areas for a number of estuarine-dependent marine fish (e.g. mullet, spotted grunter, stumpnose, kob etc.), providing a sheltered, productive environment which is essential to the survival of these species. This group of species usually breed at sea with juveniles showing varying degrees of dependence on estuaries. Apart from this group, estuarine fish communities are also represented by a combination of opportunistic marine species, those restricted to estuaries (e.g. glassies), and certain freshwater species (e.g. Mozambique tilapia). Given that estuarine dependent marine species represent the dominant group of estuarine associated fish across all three bioregions in South Africa, it is not surprising that mouth status is the major factor affecting estuarine fish community structure. Species diversity generally increases with open mouth conditions, due to greater recruitment opportunities for marine species.

BIRDS

Durban's estuaries provide refuge for some seventy species of water birds. The productive and sheltered nature of these systems represents an extremely attractive environment for them. Bird assemblages are generally more diverse and abundant in large permanently open estuaries with intertidal sandbanks. The presence of riparian vegetation and clear water are also extremely attractive to birds.

African Darter *(Anhinga rufa)*

White-faced Duck *(Dendrocygna viduat)*

Black Crake *(Amaurornis flavirostra)*

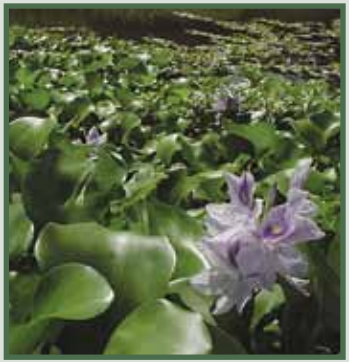
Threats facing Durban's estuaries

The continual increase in human population densities and the resulting development in the coastal zone, accompanied by increasing urbanization and industrialization, is closely related to the degradation of many estuarine systems. The eThekwini Municipal Area is home to one third of the KZN population, but only occupies 1 % of the total land area of the province. The result is exceptionally high population densities, which places significant pressure on the estuarine environment.

Among the most serious threats facing estuaries are

- the impoundment of rivers and abstraction of freshwater,
- accelerated sedimentation as a result of insensitive catchment activities,
- eutrophication as a consequence of nutrient enrichment,
- chemical and organic pollution,
- habitat loss,
- introduction of alien species, and
- the direct exploitation of resources (i.e. sand mining, over-fishing).

Tarebia granifera an alien gastropod spreading through Durban's estuaries



Water hyacinth a major threat to estuarine biodiversity

Water hyacinth in the iSipingo

A road on the uMkhomazi servicing sandmining operations, running straight through the main channel

Destruction of riparian vegetation as a result of sandmining operations

Measuring estuarine health

The lack of historical data prevents direct trending of the ecological status of most eThekwini estuaries. The increase in research and understanding of the ecology of South African estuaries, however, allows a high level of interpretation of present results. Literature suggests that if biota respond to the environment in a consistent manner then communities occupying similar estuarine types would be expected to reflect this similarity. As a result it is possible to predict what biotic assemblages could be present under a set of environmental variables.

The health of an estuary is usually measured by determining if;

- The key physical processes which maintain estuarine habitats are functioning
- The expected diversity of biota at different trophic levels is present, and
- Impact from human activities is resulting in a degradation of habitats, loss of goods and services or unacceptable changes to a system.

OUTCOMES FROM THE STUDY RESULTED IN THE PLACEMENT OF THE RESPECTIVE SYSTEMS INTO ONE OF FIVE CATEGORIES, VIZ.

	DESCRIPTION
Excellent	Estuaries with high level of habitat integrity, good water quality, high diversity and high provision of goods and services.
Good	Estuaries with most of the core estuarine habitat and estuarine support habitats still present, good water quality, diversity of habitats and species and estuarine processes in place.
Fair	Estuaries with core estuarine habitat intact, some estuarine support habitats, impacted water quality and some loss of diversity and key estuarine process in place.
Poor	Estuaries with impacted core estuarine habitat. Substantially reduced or no estuarine support habitats, polluted water, substantial loss of diversity and/or abundance and key estuarine processes impaired.
Highly degraded	Estuaries which have had major impacts on core estuarine habitats through infilling, canalisation and pollution, substantially reduced or no estuarine support habitats and major loss of key estuarine processes.

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uTongati

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	95 ha
MAJOR IMPACTS	Habitat loss as a result of excessive sedimentation; and eutrophication
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: The system is characterized by a highly impacted benthic invertebrate community, dominated by a relatively small number of polychaetes and oligochaetes (group of worms including terestrial earthworms). The present combination of low salinities and unstable coarse sediments, presents a very unfavourable environment for the development of a benthic invertebrate community. A total of 27 different waterbird species were recorded during the survey, with assemblages generally dominated by species utilising estuaries as roosting areas. The uTongati is considered to be of regional importance to the waterbird community of Durban's estuaries.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; and removal of nutrients from Waste Water Treatment Works (WWTWs).

uMdloti

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	140 ha
MAJOR IMPACTS	Habitat loss as a result of sugar cane encroachment; sedimentation; eutrophication; and freshwater deprivation due to the construction of Hazelmere Dam.
CURRENT STATUS	POOR

BIODIVERSITY FEATURES: The reduced freshwater flow entering the uMdloti Estuary as a result of the Hazelmere dam has resulted in periods of prolonged mouth closure. As a consequence, the system is characterized by low salinities that have ultimately contributed to the development of a dense stand of *Barringtonia racemosa* ("Freshwater Mangroves") at the mouth of the estuary. Benthic invertebrate assemblages were dominated by a relatively few number of polychaetes and chironomid larvae (an insect family). The lack of amphipods and isopods in the samples provides further evidence of an impoverished macrobenthic community. Prolonged periods of mouth closure prevent the recruitment of marine species into estuaries. As a result, fish catches in the uMdloti were largely dominated by estuarine residents, particularly *Gilchristella aestuaria* (estuarine roundherring), and freshwater fish species. In contrast to the invertebrate and fish data, waterbird counts suggest that the uMdloti is home to a locally diverse community of waterbirds.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; removal of nutrients from WWTWs; inter-catchment transfer of water to the uMdloti.

oHlanga

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	125 ha
MAJOR IMPACTS	Eutrophication; and increased flows as a result of discharges form WWTWs.
CURRENT STATUS	POOR

BIODIVERSITY FEATURES: The oHhlanga is the only system in the EMA that forms part of a proclaimed nature reserve, with the prominence of coastal forest and *Phragmites australis* (Common Reed) highlighting the conservation value of the system's surrounds. The excess nutrients which the estuary receives from upstream WWTWs results in periodic algal blooms. The most obvious negative impact of these blooms are the numerous fish kills that have occurred in this system. These mass mortalities are linked to oxygen depletion of the water column following the decomposition of phytoplankton. The increased flows associated with the upstream WWTWs results in frequent breaching of the mouth. Continual water loss and sediment scour, associated with breaching events, has led to a highly unstable habitat for benthic invertebrate and fish species. The respective communities are consequently characterized by relatively low species richness and abundance. In 1978 the fish community was described as being highly diverse and of considerable conservation value, which emphasizes the system's rapid decline in functioning.

MANAGEMENT INTERVENTIONS: Removal of nutrients from WWTWs; and inter-catchment transfer of water away from the oHlanga.

uMngeni

TYPE	Modified permanently open estuary
ESTUARY SIZE	230 ha
MAJOR IMPACTS	Loss of habitat as a consequence of intense urbanization; sedimentation; freshwater deprivation due to the construction of four dams in the catchment; and chemical and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: The most striking feature of the uMngeni Estuary is the Beachwood mangrove stand on the northern bank, which represents the fifth largest stand of mangroves in South Africa. The system supports some 24 taxa of benthic invertebrates, which, for a permanently open tidal system represents a relatively poor community. Of particular concern was the prominence of the polychaete *Capitella capitata*, a typical indicator species of organic pollution, which accounted for 20% of the total individuals recorded. The permanently open mouth and strong salinity gradient were largely responsible for the diverse fish community recorded in this study. The 31 species recorded in this system represents the richest assemblage within the EMA. Similar to the situation with the fish, bird communities were also found to be highly abundant and relatively diverse. The habitat provided to waders by the intertidal sandbanks largely accounts for the difference in abundance and diversity between this system, and others.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; removal of nutrients from WWTWs; inter-catchment transfer of water to the uMngeni; and identify and remove sources of pollution.

Durban Bay

TYPE	Estuarine Bay
ESTUARY SIZE	910 ha
MAJOR IMPACTS	Loss of habitat as a consequence of intense urbanization; eutrophication; and chemical and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: The most important botanical feature of the Bay is the Bayhead mangrove stand. The area that the stand covers, however, has been reduced significantly due to the unrelenting expansion of the harbour. As is the case in the uMgeni Estuary, the large intertidal sandbanks present in the Bay results in a significant number of wading bird species. Although comparing favourably with other estuaries in terms of waterbird diversity and abundance, present counts suggest a catastrophic decline in the diversity and abundance of waterbirds over the past few decades. Although the fish and benthic invertebrates were not sampled during the study, the considerable research that has been conducted on the system suggests that this estuary has a longer species list than almost any other estuarine system in KZN. The uniqueness of this estuarine type from a national perspective, combined with the considerable biodiversity that it supports, strongly emphasises the conservation value of the Bay.

MANAGEMENT INTERVENTIONS: Restore degraded habitats (e.g. Mangrove stands); removal of nutrients from WWTWs; upgrade WWTWs; and identify and remove sources of pollution.

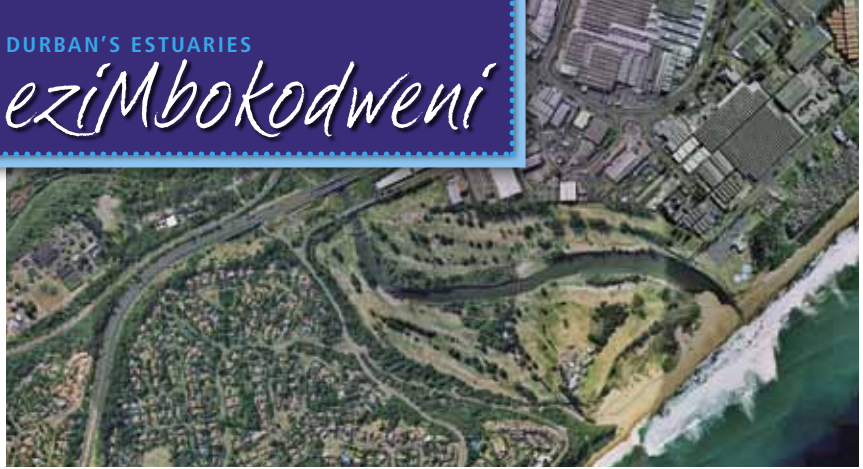
iSipingo

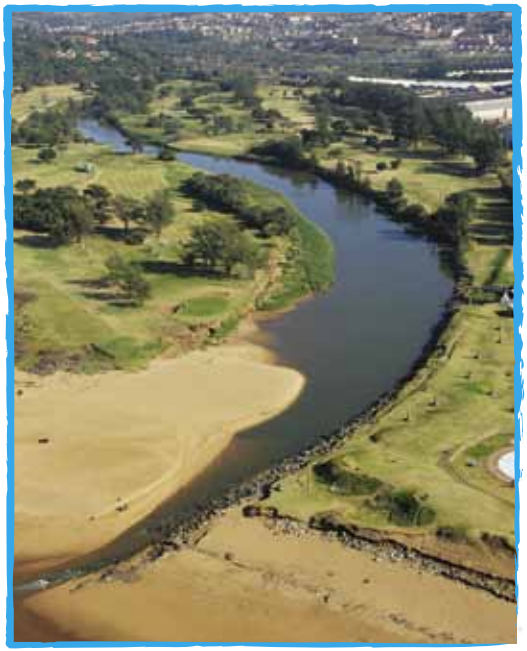
TYPE	Temporarily open/closed estuary. Described by Whitfield (2000) as a non-estuary due to the high level of modification.
ESTUARY SIZE	40 ha
MAJOR IMPACTS	Loss of habitat as a consequence of intense urbanization and inappropriate urban planning; sedimentation; freshwater deprivation as a result of diversion to the uMlazi canal and eziMbokodweni; chemical and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: Current freshwater flow is insufficient, due to the upstream diversion of the river, to maintain the functioning of the mouth. Two large concrete pipes have been constructed through the sandbar in order to achieve some degree of tidal influence. This connection is critical to the survival of the mangroves within the system. The poor water quality and significant modifications made to the system has resulted in highly impoverished benthic invertebrate and fish communities. The latter was represented by a mere four species, the lowest during the study, and an indication of the level of degradation.

MANAGEMENT INTERVENTIONS: Retreat of infrastructure away from the estuary; diversion of water back to the iSipingo; removal of nutrients from WWTWs; and identify and remove sources of pollution.

eziMbokodweni





TYPE	Temporarily open/closed estuary
ESTUARY SIZE	12 ha
MAJOR IMPACTS	Loss of habitat as a consequence of intense urbanization; increased flows as a result of discharges form WWTWs and the iSipingo; eutrophication; chemical and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: As is the case in many other highly impacted urban estuaries, the eziMbokodweni's poor water quality has had a seemingly significant impact on the invertebrate community. The data describes a species poor macrobenthic community dominated by oligochaetes, a taxon strongly associated with organic pollution. In direct contrast, 27 fish species were recorded, which ranks amongst the highest from an eThekwini perspective. Presumably the predominantly open mouth conditions, a result of excess flows from the iSipingo and upstream WWTWs, has provided ample opportunities for the recruitment of marine species. Fish abundances, however, do not compare favourably with other estuaries. These results indicate that the system's carrying capacity is relatively small, a probable result of poor water quality and a lack of food resources.

MANAGEMENT INTERVENTIONS: Diversion of water back to the iSipingo; removal of nutrients from WWTWs; and identify and remove sources of pollution.

aManzimtoti

TYPE	Temporarily open/closed estuary.
ESTUARY SIZE	15 ha
MAJOR IMPACTS	Loss of habitat as a consequence of intense urbanization; eutrophication; weir at the mouth; alien species; and chemical and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: The biodiversity value of this system has been severely compromised due to the numerous human induced threats highlighted above. Very little natural riparian vegetation is left along the course of the system. Macrobenthic assemblages were found to be highly impoverished, and dominated by the alien invasive gastropod *Tarebia granifera*. The dominance of this species in the aManzimtoti serves as a warning to managers dealing with estuarine systems. Bird assemblages were also fairly low both in terms of species richness and abundance.

MANAGEMENT INTERVENTIONS: Retreat of infrastructure away from the estuary; removal of nutrients from WWTWs; and identify and remove sources of pollution.

Little aManzimtoti

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	9 ha
MAJOR IMPACTS	Loss of habitat as a consequence of floodplain encroachment and canalization; increased flows as a result of discharges form WWTWs; eutrophication and organic pollution.
CURRENT STATUS	HIGHLY DEGRADED

BIODIVERSITY FEATURES: The Little aManzimtoti had the most impoverished benthic invertebrate community of any of the eThekwini estuaries, with only 10 taxa listed. The prominence of oligochaetes again suggests that water quality was a likely cause of the degradation. Similar to the situation in the eziMbokodweni, a relatively large number of fish species were identified. This diversity, however, was restricted to the lower reaches of the system where oxygen concentrations were sufficient to support life. Twenty one bird species were recorded during the study, including the White-backed Night Heron. The species present, however, generally occurred in relatively small numbers, in keeping with the size and condition of the system.

MANAGEMENT INTERVENTIONS: Diversion of water away from the Little aManzimtoti; and removal of nutrients from WWTWs.

iLovu

TYPE	Temporarily open/closed estuary.
ESTUARY SIZE	225 ha
MAJOR IMPACTS	Canalization of the floodplain has led to fairly substantial habitat loss; and sandmining.
CURRENT STATUS	FAIR

BIODIVERSITY FEATURES: A total of 26 invertebrate taxa were recorded during the study, which is a fairly predictable outcome for a predominantly open estuary. The benthic invertebrate samples produced a variety of polychaete worms, isopod, amphipod and tanaid (shrimp-like creatures) crustaceans. The system also supports a diverse fish community, again a product of the favourable mouth conditions. The thirty taxa recorded during the study was the second most diverse assemblage of fish species in the EMA. The strong presence of wading bird species, the third most in the EMA, was linked to the presence of intertidal sandbanks. Piscivores (fish eating) were, however, not well represented due to the highly turbid waters associated with this system.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; and removal of sandmining operations.

uMsimbazi

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	95 ha
MAJOR IMPACTS	Canalization of floodplains: habitat loss due to bridge construction.
CURRENT STATUS	GOOD

BIODIVERSITY FEATURES: The system supports a highly diverse assemblage of macrobenthic invertebrates, including: polychaete worms, amphipod, cumacean (hooded shrimp), isopod and tanaid crustaceans, bivalve and gastropod molluscs. Total individual densities often exceeded 10 000 m^2. The system is also home to one of the largest populations of the Sand Prawn *Calianassa kraussi* within the EMA. Of particular botanical importance is the dense 20 ha stand of *P. australis* that occurs in the middle of the estuary and is referred to as Calabash Island. The uMsimbazi also supports one of the most diverse bird communities in the EMA, with a large proportion of piscivores.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use.

uMgababa

TYPE	Temporarily open/closed estuary.
ESTUARY SIZE	115 ha
MAJOR IMPACTS	Freshwater deprivation due to the construction of the uMnini Dam.
CURRENT STATUS	GOOD

BIODIVERSITY FEATURES: The extensive sedge and reed beds along the course of the system represent a unique feature along the KZN coastline. Similar to the situation in the neighbouring uMsimbazi Estuary, the uMgababa supports a highly diverse and abundant benthic invertebrate community. Thirty two benthic invertebrate taxa were collected during the study, more than any other estuary in the EMA, including a variety of polychaete worms, amphipod, isopod, cumacean and tanaid crustaceans, bivalve and gastropod molluscs. Despite the predominantly closed mouth and the lack of intertidal sandbanks, fish and bird assemblages were also found to be reasonably diverse.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; and inter-catchment transfer of water to the uMgababa.

Ngane

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	11 ha
MAJOR IMPACTS	Habitat loss due to bridge construction and floodplain encroachment.
CURRENT STATUS	FAIR

BIODIVERSITY FEATURES: A reed bed at the head of the estuary and a few Black Mangroves (*Brugueira gymnorrhiza*) are the only features of botanical importance in this tiny system. Despite the system's size, 19 invertebrate taxa were collected, with samples being dominated by polychaetes and amphipods. Eight fish and four bird species were recorded over the duration of the survey, which is indicative of the relative size of the estuary.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use.

uMkhomazi

TYPE	Permanently open estuary
ESTUARY SIZE	139 ha
MAJOR IMPACTS	Habitat loss as a result of sedimentation, and flood plain encroachment; sand mining; organic pollution; and eutrophication.
CURRENT STATUS	FAIR

BIODIVERSITY FEATURES: Very little natural riparian vegetation is left along the course of the system. Nineteen invertebrate taxa were collected over the course of the survey, including several polychaetes, amphipod, isopod, tanaid and brachyuran crustaceans. This represents a relatively diverse assemblage considering the low salinities that this system is frequently subjected too. The permanently open mouth results in a diverse fish community, comparable to those in the uMgeni and iLovu estuaries. Twenty three bird species were identified during the study, with the opportunistic Blacksmith Plover dominating in terms of individual abundance. The relatively low diversity and numbers of waterbirds is surprising given the size of the estuary and the presence of intertidal sandbanks. The lack of riparian vegetation, continual disturbance and the turbid nature of the water, however, are largely responsible for these findings.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; removal of sandminig operations; and identify and remove sources of pollution.

uMahlongwane

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	24 ha
MAJOR IMPACTS	Habitat loss due to sugar cane plantations within the floodplain; and eutrophication.
CURRENT STATUS	GOOD

BIODIVERSITY FEATURES: The island of *P. australis* in the middle of the estuary represents the system's major botanical feature. A total of 27 benthic invertebrate taxa were recorded over the course of the study, a figure comparable to the uMsimbazi and uMgababa estuaries. The assemblages included a variety of amphipod, taniad and brachyuran crustacean, bivalve and gastropod molluscs. Similar to the previously mentioned estuaries, total individual densities often exceeded 10 000 per m^2. Fish and bird assemblages were not particularly diverse or abundant, results that were not dissimilar to other systems of this type.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use.

iMahlongwa

TYPE	Temporarily open/closed estuary
ESTUARY SIZE	85 ha
MAJOR IMPACTS	Habitat loss due to sugar cane plantations within the floodplain; eutrophication; and signs of organic pollution.
CURRENT STATUS	FAIR

BIODIVERSITY FEATURES: The large island of *P. australis* is a prominent characteristic of this system. The estuary supports a variety of polychaete worms, amphipod, isopod, tanaid and cumacean crustaceans. Although relatively diverse, the number of mollusc species and total individual densities are not comparable to the more pristine uMsimbazi and uMgababa estuaries. Fish and bird assemblages were not particularly diverse or abundant, results that were not dissimilar to other systems of this type. Bird counts were dominated by the Black-crowned Night Heron and Sacred Ibis.

MANAGEMENT INTERVENTIONS: Sensitive catchment land use; and identify and remove sources of pollution.

The way forward

The study has shown that in general the relative "health" of Durban's estuaries are extremely poor, with present trends suggesting a particularly bleak future for these systems. Overall, a mere 10% of Durban's estuarine area fell into the GOOD category, while 58 % received the lowest possible rating. Estuaries, however, by their very nature are extremely dynamic and resilient, which should provide some degree of hope.

Given the extreme variability in terms of functioning and "health" associated with the sixteen eThekwini estuaries, a three pronged approach was taken towards the potential "management" of these systems, viz.

PRESERVE AND PROTECT

what is still there and in relatively good condition should be recognized and given as much formal protection as possible e.g. uMahlongwane, uMsimbazi and uMgababa;

RESTORE

where the environment in the broad sense survives but in a compromised or unhealthy state every effort should be made to reverse the degrading influences - this would refer particularly to water quantity and reversible habitat loss e.g. aManzimtoti, uMngeni.

RECREATE

wherever possible, attempts should be made to reinstate lost habitats. It is important that if this is attempted, recreated habitats should constitute a real gain to the estuary and not just a transformation of one aquatic habitat to another e.g. subtidal areas to mangroves e.g. Durban Bay.

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ADDITIONAL INFORMATION

The complete report "Estuaries of Durban" is available from the EMD offices

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