

**LOWER BITOU/KEURBOOMS  
CATCHMENT & FLOODPLAIN**

**PRELIMINARY  
ENVIRONMENTAL  
MANAGEMENT FRAMEWORK**

for

**Plettenberg Bay Community  
Environment Forum**



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## 1.0 INTRODUCTION

*“An Environmental Management Framework is a framework of spatially represented information, connected to features such as ecology, hydrology, infrastructure and services. The purpose of an EMF is to pro-actively identify areas of potential conflict between development proposals and critical / sensitive environments” DEAT 1998*

This Environmental Management Framework (EMF) was commissioned by the Plettenberg Bay Community Environment Forum (PBCEF) in October 2008.

The term ‘Preliminary’ is applied to this study, because it is a privately-funded initial mapping exercise and not a Government initiated and gazetted EMF in terms of Chapter 8 (1) of the NEMA (National Environmental Management Act 107 of 1998, as amended). The National Environmental Management: Biodiversity Act of 2004 (Act 10 of 2004) makes provision for bioregional plans and threatened ecosystem mapping. However the fine-scale mapping process to identify these threatened ecosystems is still underway and it will be some time before this translates into meaningful legal protection.

Because of this hiatus - between the legislation and its implementation - there is an urgent need for this type of preliminary study to pro-actively identify environmental sensitivity and to convey this information to the people of Bitou, for whom this landscape is home territory.

### 1.1 Purpose of the maps and report

The aim of this EMF is to raise the general awareness of critical / sensitive environments which occur in the Study Area by identifying and mapping the various ecosystems. The scale of the maps enables the identification of land parcels and their attributes; and the report gives background information, including the current most significant developmental pressures on them; and to interpret the findings in an easy to read format for a wide audience. “*Biodiversity is everyone’s business.*”<sup>(10)</sup>



December 2008

Meanders of the Bitou River above the N2 bridge are amongst the most sensitive environments in the study area. Alien vegetation, infrastructure and residential development are some of the negative impacts on the estuarine system highlighted in an Estuarine Wetland Assessment Report by T G Bornman. <sup>(13)</sup>

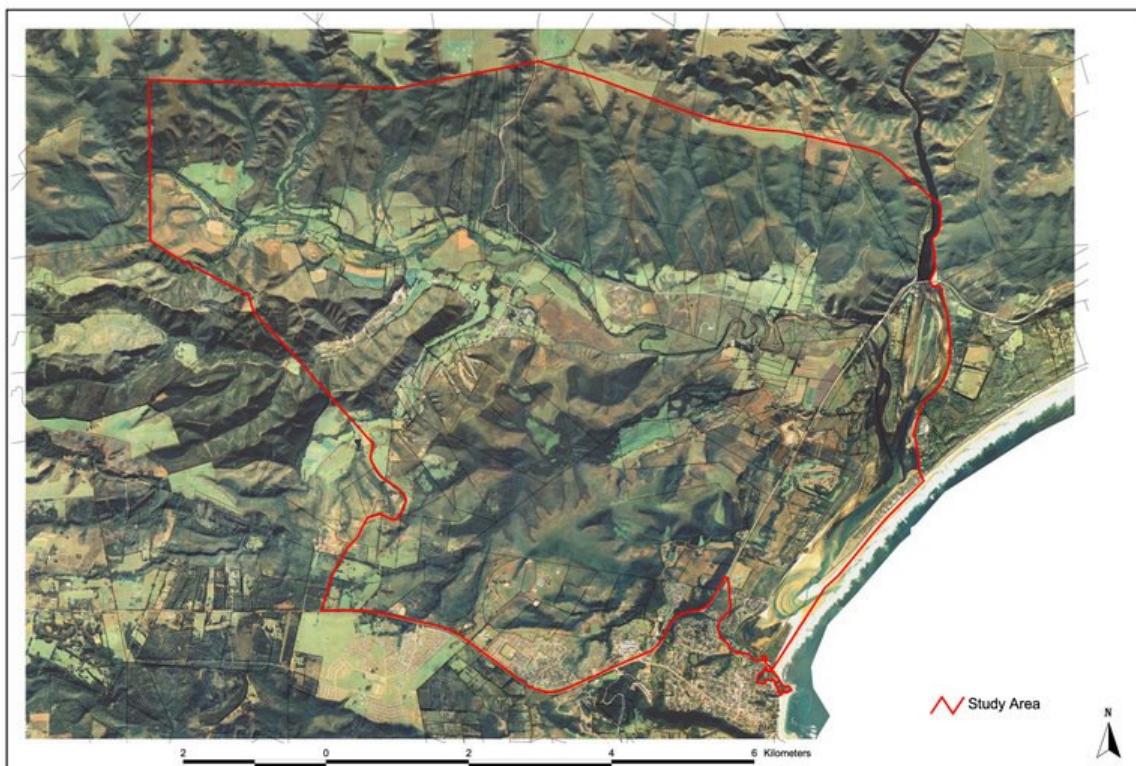
The decision to map the ecological sensitivity of this area was made for the following reasons:

- The Bitou /Keurbooms estuary is a highly sensitive environment and its ecological health is essential to the economy of this tourist town as a recreational resource and for its natural beauty;
- there is great pressure for development, which needs to be appropriate ( i.e. development which does not compromise the biodiversity and ecological needs of the area);
- there is no approved Spatial Development Framework for the Bitou Municipal area and consequently no clear guidelines for development or environmental conservation; and
- the Keurbooms / Bitou Estuary is ranked as the 18th most important system in South Africa in terms of conservation importance (out of 256 functional estuaries)<sup>(13)</sup>

It is hoped that local landowners and residents will see themselves as beneficiaries and custodians of the rich biodiversity of the Keurbooms / Bitou estuary and catchments; and that they will participate in the development and implementation of a catchment management plan which will enhance the intrinsic value of their properties and benefit Bitou, the region and the country as a whole.

## 1.2 Study Area

The Study Area is 6782.6 hectares in extent and covers the lower catchments of the Bitou and Keurbooms Rivers as well as the estuary. The actual estuary and its floodplain, as defined by the 5m contour<sup>(17)</sup>, comprises 17% of the study area (1156 ha.). Everything that happens within the Study Area and the extended river catchments has the potential to impact on the estuary – the most complex and sensitive of environments and the focus of this EMF.



### 1.3 Methodology

A 1:20 000 land use base map was prepared by Trevor Wolf, GIS specialist, from the most recently available air photography – a composite of images between 2002 – 2006. This map was ground-truthed by Di Grant, environmental consultant, together with members of Indalo Conservancy, Eden to Addo Project, Birdlife Plettenberg Bay, and PBCEF. The outcome is a series of maps, including existing and potential conservation corridors, and a composite map which indicates three levels of environmental sensitivity.

We hope this explanatory document will provide easily accessible background information, with references to enable more in-depth information for those who require it.

### 1.4 Summary of the Maps

This document is designed to be read in conjunction with the accompanying 1:20 000 maps. If viewing maps on a computer it is recommended that they be displayed at 100% or nearest for clarity.

1. **Existing and potential conservation corridors.** Existing and Potential conservation corridors are shown over an aerial photographic base map. The study area boundary, broad scale cadastral boundaries and some place names to assist orientation are also shown.
- 2 **Topography.** Shows the High Water Mark (hwm); 100m line from the hwm; the 5m contour above mean sea level (msl); land below the 5m contour<sup>(17)</sup>; and slopes steeper than 1:4 (25%).
- 3 **Ecosystems and Land Use.** Shows natural vegetation types; and land uses including commercial plantations, quarries, cleared and cultivated areas, and built development including infrastructure.
- 4 **Management Sensitivity.** This composite map indicates 3 levels of environmental sensitivity: High, Moderate and Less Sensitive.

For this EMF the determination of degrees of sensitivity are based on legislation – the National Water Act and the Forest Act - and broad scale conservation mapping projects such as the Rapid Conservation Assessment for Plettenberg Bay <sup>(4)</sup> and the GRI Critical Biodiversity Areas Mapping <sup>(20)</sup>. Western Cape guidelines and planning policy indicate the sensitivity of low-lying land in an estuarine environment<sup>(17)</sup> and vulnerability of development on steep land<sup>(22)</sup>.

The sensitivity scoring system is not cumulative, i.e. an area has been classified as highly sensitive even if only one highly sensitive factor occurs. For example: Cleared or cultivated land is listed as less sensitive, but if it occurs below the 5m contour or on slopes steeper than 1 in 4 then it is categorised as highly sensitive. See table below.

Sensitivity	Determining factors
1. High	Wetlands and Rivers; Indigenous Forest & Thicket; Fynbos and Grassland; Land below the 5m contour; Slopes steeper than 1:4;
2. Moderate	Areas with mixed alien trees; Commercial Plantations and Woodlots.
3. Less Sensitive	Cleared and/or Cultivated lands; Urban/Industrial areas with associated infrastructure; Quarries;

## 2.0 THREE KEY ENVIRONMENTAL ISSUES PERTAINING IN THE STUDY AREA

Whilst everything that happens within the Study Area has the potential to impact on the floodplain and estuary, the following three issues could critically impact on the healthy functioning of the estuary. An inappropriate response to any one of these three issues could jeopardise the ability of the estuarine system to provide the ‘ecological services’ of which it is uniquely capable (See Section 3.0 below).

### 2.1 Climate Change – An uncertain future

Climate is changing and the world is becoming warmer – this fact is indisputable. The National Environmental Management : Integrated Coastal Management Act 2008<sup>(16)</sup> acknowledges the potential negative effects of climate change by requiring the determination of Coastal set-back lines. A 2005 Cape Provincial Dept of Environmental Affairs & Development Planning assessment of the potential effects of climate change<sup>(17)</sup> concluded that “*All future development around estuaries must be setback to above 5 m mean sea level*” and that the greatest hazards overall were “*extreme storm and flood events and the most vulnerable infrastructure that of private housing*.”.



Photo: Bitou Valley November 2007

It will be vital for the health and wellbeing of all the citizens of Bitou to minimise existing and potential man-made stresses which may reduce the capacity of the Bitou/Keurbooms estuary to adapt to the unpredictable changes which may result from climate change.

### 2.2 Water abstraction from the Keurbooms River by Bitou Municipality

In 2007 a license application to increase the Keurbooms River abstraction from 0.1m<sup>3</sup>/s to 0.45m<sup>3</sup>/s was made to Dept of Water Affairs & Forestry (DWAF) by Bitou Municipality.<sup>(15)</sup>

Whilst the proposed water abstraction is from the Keurbooms River only, the two arms of the estuary are complementary in their ecological services and benefits. They must be included as one in any improved floodplain and catchment management programme.

Any abstraction of water from the Keurbooms River for municipal use will be dependent on a satisfactory state of health of the Keurbooms / Bitou estuary, floodplain and catchment - which is dependent on appropriate land use and management in both catchments.

As part of Bitou Municipality's 2007 licence application, a 'desk-top' "Rapid Ecological Reserve Determination for the Keurbooms Estuary" was prepared by the CSIR in May 2008. This document includes the following points relevant to estuarine management:

- The close linkage between land use & management in the catchment and water abstraction must be a key consideration when formulating a strategy for addressing future water demand and use in the municipal area.
- The baseflow from the Bitou arm of the estuary is very low: "*The baseflows from the Bitou River are very low and it would be very easy to remove all flows to the Bitou arm of the estuary*"<sup>(15)</sup>
- Catchment and floodplain management are vital to the health of the estuary.
- Investigation and implementation of 17 specific mitigation measures are recommended.
- The development of an Estuarine Management Plan for the Keurbooms / Bitou Estuary is recommended. NB. Chapter 4 of the Coastal Management Act 2008 now requires this.<sup>(16)</sup>

There has been an increase in plantation areas since a 1995 Catchment Management Report by Ninham Shand found that the 260 km<sup>2</sup> Bitou Catchment had 37.8 km<sup>2</sup> of Commercial plantation resulting in an 8.6% reduction in run-off (3.65 million m<sup>3</sup>/annum). Pine plantations take up significantly more water than fynbos or indigenous forest. Plantation establishment is a listed activity and an impact assessment and permit are required in terms of NEMA.

### 2.3 Catchment and floodplain land management within the Study Area

The development of an Estuarine Management Plan for the Keurbooms / Bitou Estuary is recommended by the CSIR report<sup>(15)</sup> and is a requirement of the Coastal Management Act 2008 (Chapter 4)<sup>(16)</sup>. For the purposes of this study, the area below the 5m contour (17% of the Study area) has been taken as the 'floodplain'.

Implementation of a land management plan will face the following major challenges:

- fragmented land ownership;
- large number of authorities with responsibility for the various activities taking place in and around the system; and
- many gaps in our knowledge of the complexities of the Bitou / Keurbooms system.<sup>(13)</sup>

This EMF provides the spatial context for such a management plan and indicates the high sensitivity of much of the area to development.



Land use in the Bitou Valley catchment in the western segment of the study area.

Photo: November 2008

### 3.0 WETLANDS

Wetland is land that is transitional between terrestrial and aquatic systems which has a high water table and hydrophytic vegetation, i.e. plants typically adapted to life in saturated soil. Soils may be temporarily, seasonally or permanently waterlogged.

Wetlands are some of the most productive and biodiverse ecosystems on earth. They provide a number of benefits, or ‘ecological services’, including flood attenuation resulting from their ability to store water and release it slowly over periods of months or even years. Wetlands purify water by removing dissolved and particulate pollutants, whilst wetland plants take up dissolved nutrients.

#### 3.1 Conservation Status of the Estuary

The entire Keurbooms/Bitou Estuary is designated a Critical Biodiversity Area by the GRI (i.e. “*an area where the desired management objective is to maintain natural land; rehabilitate degraded land to natural or near natural; and manage for no further degradation*”<sup>(13)</sup>). The estuarine wetlands of the study area (mostly in the Bitou) are approximately 874 ha. in extent.<sup>(13)</sup>

The Estuary fulfils many of the criteria that will allow it to be designated a Wetland of International Importance. “*...The Keurbooms/Bitou Estuary, although also subjected to numerous impacts, still has the potential to be rehabilitated and large areas conserved.*”<sup>(13)</sup>

#### 3.2 Factors negatively affecting the capacity of the Bitou / Keurbooms wetlands to deliver services

Important ecological drivers in the Keurbooms/Bitou Estuary identified in the Bornman report<sup>(13)</sup> include

- tide;
- river baseflow;
- riverfloods; and
- groundwater and habitat connectivity.

The Report<sup>(13)</sup> lists major changes over the past century affecting these important ecological drivers; including:

- Tidal flow reduction due to drifts, roads, bridges and earthen barricades across channels.
- Residential and industrial development on floodplains, estuary shores and the upper reaches of the Gansevlei Stream.
- Treated sewage effluent discharge through the Ganse Spruit wetland into the Bitou Estuary;
- Agricultural related impacts in the Bitou River, including infilling of wetlands, overgrazing, disposal of organic and inorganic waste, plantation forestry.
- Freshwater abstraction and reduction of runoff.

### 3.3 Wetland Vegetation Types

Knysna Saltmarsh vegetation type occurs in two areas in the Bitou Estuary : above the N2 Bridge and close to its junction with the Keurbooms.

Groot Brak River Floodplain vegetation type occurs along the Bitou River and Estuary and all it's tributaries.

Wilderness Estuary vegetation type occurs in the Keurbooms estuary from the mouth and up beyond the N2 Bridge and the Study Area boundary.

Wilderness Wetlands vegetation type occurs in a limited area on the south bank of the Bitou River - at the eastern edge of Wittedrif township and extending eastwards.

### 3.4 Wetland types in the Study area:

#### **Estuarine & Supratidal wetlands and Salt marsh:**

These are potentially the most productive of all ecosystems. They are efficient primary food producers and nurseries for the majority of angling fishes - but they are highly sensitive to disturbance.

*“Destroy the salt marshes and you destroy the primary producers of the food of the estuary.”<sup>(1)</sup>*



**Estuary banks:** Keurbooms estuary below Anath peninsula, where natural riparian buffers stabilise the banks and allow for ecological processes. (See also photo on p.12)

*“Estuaries are characterized by change so could be called robust, however development (building/ hard structures) restrict the estuarine ability to react ‘normally’ to any temperature or sea level changes.”<sup>(3)</sup>*



**Palustrine wetlands:** Rietvlei / Dieprivier indicates the effectiveness of The Ganse Spruit freshwater and estuarine wetlands in absorbing the excess nutrients from the treated sewage effluent. (See definition p 20)

*“My countrywide survey showed that there are very few wetlands... which approach this site [Rietvlei] in the diversity of its vegetation types and the seasonally flooded habitats.”<sup>(19)</sup>*



#### **Freshwater wetlands:**

In 1961 there was 45.23 ha of freshwater wetland in the area above the Wittedrif Bridge. By 2006 the wetland area had been reduced by 34% to 29.76 ha.<sup>(13)</sup>

*“The freshwater wetlands above the Wittedrif Bridge ....impacts here will affect the estuarine wetlands further downstream.”<sup>(13)</sup>*



**Seepage areas :** Often occur on slopes where a pervious stratum overlays an impervious layer. These ephemeral wetlands have standing water during the wet winter months and abound in amphibians. Whilst no seepage areas were found in the study area during the ground truthing exercise, these important wetland habitats will almost certainly occur on the valley slopes of some properties.

*“When the edges of seepage areas die they take a long time to recolonise and ... when a ‘seep’ switches off it is final!”<sup>(3)</sup>*

#### **3.5 Importance of wetland corridors:**

Very few wetlands are hydrologically isolated and it is important to keep natural corridors open and functioning to allow for ecological and evolutionary processes to continue into the future.

Undisturbed estuary and river banks are important ecological and wildlife corridors.

#### **3.6 Conservation Status: All wetlands are ‘Critically Endangered’ ecosystems.**

#### **3.7 Legislative Protection:**

- **National Environmental Management Act (107 of 1998) (NEMA)** Principle (r)  
*“Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures.”*
- **NEMA R386 of 21 April 2006** Listed Activity No (4) *“The dredging, excavation, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland”*
- **National Environmental Management Integrated Coastal Management Act (24 of 2008) Chapter 2 Part 7 Coastal Set back lines & Chapter 4 Estuaries.** Sections 33 and 34.
- **National Water Act 1998** (Act 36 of 1998) Chapter 4 Section 21 and Sections 40 and 41. In terms of this Act it is illegal to destroy a wetland. A licence issued by Department of Water Affairs & Forestry is required for any development on, or other modification of a wetland. In terms of Chapter 4 Part 4 Stream Flow Activities, Section 36(1) the use of land for afforestation is at the discretion of the Minister.
- **The Western Cape Provincial Spatial Development Framework** par. 8.4.36 (adapting to global climate change), Policy RC19: *“No further urban development shall be permitted on open coast lines that are vulnerable to erosion, inlets that are susceptible to increased storm activity, river banks that are liable to flooding, coastal buffer zones and ecological setback lines in estuaries and below the 1:50 year floodlines (even) and the 1:100 year floodline (building platform).”*

- The "General Structure Plan" Circular GOK/LDC 9/1988. Approval of development in the 1:50 year flood plain is not delegated to municipalities.: The "General Structure Plan" gave delegated powers to municipalities with some exceptions: Circular GOK/LDC 9/1988 added two more exceptions, namely:
  - development under the 1:50 year flood line; and
  - if another body of state was not in favour of a proposal.

Guidelines:

- “A Status Quo Vulnerability and Adaptation Assessment of the Physical and Socio-economic effects of Climate Change in the Western Cape” Cape Provincial Dept of Environmental Affairs & Development Planning, June 2005. P 102 : “*All future development around estuaries must be setback to above 5m mean sea level (MSL)*”



Birlife Plettenberg Bay have been conducting Coordinated Waterbird Counts in the Bitou Estuary since 1995. Results are published in the website (Site code: 34012323), where the following summary can be found:

*“The lower Bitou River, progressing from marsh and floodplain to tidal conditions in the lowest reaches. Includes excellent marsh habitat for rails and other secretive birds; Redchested Flufftail and Baillon's Crake may breed. Moorhen counts peak in winter although recorded numbers are decreasing; winter Dabchick counts are also decreasing. Important for foraging and roosting shorebirds, waterfowl and egrets. Good numbers of South African Shelduck and Yellowbilled Duck recorded in winter 1995; Avocet numbers are high in summer.*

*Species numbers and total counts have decreased over the three years of the survey period. Critical threats include pollution from effluent, pesticides and fertilizers, and damage by livestock; also threatened by siltation, reed encroachment, and residential development.* “ (emphasis added)

<http://cwac.adu.org.za/cwac> .

#### 4.0 COASTAL FOREST AND FOREST-THICKET

In the national context, the Afromontane forest in the Southern Cape represents a significant proportion of this biome; and the forest type occurring in the Bitou area includes the westernmost occurrence of a number of forest species. These coastal forests persist in topographic shadow areas of the hot, dry northwesterly berg winds which are common in autumn and winter. The forest / fynbos interface is characterised by a number of ecotone or ‘pioneer’ tree species, which form a buffer against periodic fire disturbance.



Photo: December 2008

Piesang River Fynbos Forest and Knysna Enon Fynbos west of Leermansdrif. The foreground is unrehabilitated former quarry, now a wetland area heavily infested with invasive alien vegetation.

A recent 2008 vegetation survey by Jan Vlok for the Garden Route Initiative has identified three forest types in the Study Area: Keurbooms Thicket Forest on the south facing slopes in the tributary valleys of the Bitou Estuary; Piesang River Fynbos Forest south of the Bitou, in the Ganse Spruit, Dieprivier and Leermansdrif valleys; and Wilderness Forest Thicket along the western shore of the lower Keurbooms Estuary.

The Forest Thicket of the Bitou / Keurbooms area is characterised by a high proportion of thorny species – it is often contiguous with forest areas and includes a number of forest species (e.g. protected species such as White Milkwood (*Sideroxylon inerme*)). If left undisturbed, thicket is homogenous from ground to canopy, maintains a heavy humus layer which retains moisture, and is resistant to fire.



Photo: November 2008

Keurbooms Thicket Forest on south-facing tributary slopes north of the Bitou River.

The thicket areas are very important bird habitats and thicket corridors are vital for bird migrations along the coast and inland via river valleys.

This vegetation type has unfortunately been highly fragmented as a result of coastal development.

#### 4.1 Conservation Status:

Afromontane Forest generally is 'Critically Endangered'<sup>(4)</sup>. Dry coastal forests on the richer soils were often cleared for farming activities in the past and are now under pressure from coastal development.

The Wilderness Forest-Thicket of the study area has been classified by GRI as "vulnerable"; Piesang River Fynbos Forest as 'Endangered'<sup>(4)</sup>; and Keurbooms Thicket Forest as "least threatened"



Photo: May 2009

Wilderness Forest Thicket is found along the western bank on the lower Keurbooms Estuary is one of the most vulnerable of the forest types because of developmental and recreational pressures.

#### 4.2 Legislative Protection:

- **The National Forests Act 1998 (No 84 of 1998) (NFA).** :  
**Part 1 Principles to guide decisions affecting forests** Principle 3 (a) “*natural forests must not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits;*”  
**Section 7** provides for the prohibition of the destruction of living indigenous trees in any natural forest without a licence.  
**Section 15** prohibits the destruction of protected trees without a licence.  
**Government Notice No. 897 of 8 September 2006** schedules protected tree species under the NFA, as amended.
- **National Environmental Management Act (107 of 1998) (NEMA)** Principle (r) “*Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures.*”
- **NEMA EIA Regulations R386 of 21 April 2006** Listed Activities  
Nos 2, 3, 5 and 6 : relating to “*activities in the sea or within 100 metres inland of the high-water mark of the sea*”; and  
No (12) “*The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of Section 52 of the National Environmental Management:Biodiversity Act, 2004(Act No. 10 of 2004).*”
- **Environment Conservation Act 1989 (Act 73 of 1989) Identification of activities which may have a detrimental effect on the environment: Outeniqua Sensitive Coastal Area Extension (OSCA).** Regulation No. R.1526 of 27 November 1998. Under this legislation the following activities require a permit: Disturbance of vegetation; earthworks; dredging; dune stabilisation.



Remnants of Forest Thicket on east bank of the Keurbooms Estuary: Removal of understory plant species, introduction of exotic species and bank stabilisation with creosoted poles have drastically reduced the capacity of this stretch of estuary bank to function as a conservation corridor.

## 5.0 FYNBOS AND GRASSLAND

The most recent broad-scale vegetation survey of the area was carried out in 2008 for the Garden Route Initiative in order to establish “Critical Biodiversity Areas.”<sup>(20)</sup> This survey found that three types of fynbos occur in the study area, which lies in the transition zone between Eastern Cape and Western Cape divisions of the Fynbos Biome :

- Uplands Grassy Fynbos, occurring at Uplands, extending to inter-tributary spurs north of the Bitou River and estuary; and from the west bank of the Ganse Spruit westwards to the Dieprivier valley;
- Knysna Enon Fynbos, occurring on the lower inter-tributary spurs on both sides of the Bitou valley; between the Ganse Spruit and the Bos River; and
- Roodefontein Grassy Fynbos, occurring in the south of the study area, on either side of the N2 and east of the Ganse Spruit.

Grassy fynbos has, because of its occurrence on moderately fertile soils, been largely lost to agriculture and very little of it now remains. This vegetation type and its associated fauna are vulnerable to disturbance and trampling in the short term and to the lack of an appropriate ‘burning’ regimes in the long term.

### 5.1 Fynbos and Fire

*“All Fynbos types require periodic fires to stimulate recruitment and to retain maximum species richness. The different fynbos types do, however, differ vastly in terms of appropriate fire frequency.”<sup>(5)</sup>*

It is best to obtain specialist advice from Cape Nature or a fynbos ecologist before implementing managed burns.

### 5.2 Sedgefield Coastal Grassland occurs on the sandy flats behind the narrow dune fringes of the lower Keurbooms Estuary, the Anath Peninsula, and Stanley Island. It also occurs along the southern banks –extending up the tributary valleys - of the Bitou estuary and the river up to Stofpad.<sup>(20)</sup>

### 5.3 Conservation Status

Roodefontein Grassy Fynbos is classified as ‘Critically endangered’ i.e. its “original extent has been reduced to an unacceptable level.”<sup>(21)</sup>

Uplands Grassy Fynbos is “Endangered” i.e. its “original extent has been severely reduced, and whose proper functioning is threatened and likely to become dysfunctional.”<sup>(21)</sup>

Knysna Enon Fynbos is ‘Vulnerable’. ie. it “covers moderate-sized areas that are still healthy and are fully functional.”<sup>(21)</sup>

Sedgefield Coastal Grassland is ‘Critically endangered’ i.e. its “original extent has been reduced to an unacceptable level.”<sup>(21)</sup>

#### 5.4 Legislative Protection:

- **National Environmental Management Act (107 of 1998) (NEMA)** Principle (r)  
*"Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures."*
- **Environment Conservation Act 1989 (Act 73 of 1989) Identification of activities which may have a detrimental effect on the environment: Outeniqua Sensitive Coastal Area Extension (OSCA).** Regulation No. R.1526 of 27 November 1998. Under this legislation the following activities require a permit: Disturbance of vegetation; earthworks; dredging; dune stabilisation.
- **National Environmental Management Integrated Coastal Management Act 2008 (Act 24 of 2008)** Chapter 2 Part 7 Coastal Set Back Lines & Chapter 4 Estuaries. Sections 33 and 34.
- **NEMA: Biodiversity Act (Act 10 of 2004)** The Act itself does not infer protection over fynbos, but could/will once the provisions of the bioregional plans and threatened ecosystems come into affect properly for the Garden Route. The fine scale biodiversity planning work being done through the GRI is being done in a manner that will conform to the requirements for publishing Bioregional Plans under the Biodiversity Act. (A Brown, Garden Route Initiative, November 2008)
- **NEMA EIA Regulations R386 of 21 April 2006** Listed Activity Nos 2, 3, 5 and 6 relating to "*activities in the sea or within 100 metres inland of the high-water mark of the sea*": and  
No (12) "*The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004(Act No. 10 of 2004).*"
- **Provincial Spatial Development Framework (PSDF)** adopted by the Western Cape Provincial cabinet in Dec. 2005. Includes objectives relating to the protection of biodiversity and agricultural resources.



Dune Grassland annual species



Fynbos has evolved with fire

## 6.0 DUNE SYSTEM

Dunes play an important part in protecting the coastline. They are a buffer against coastal erosion by waves during storms and act as a reservoir of sand to replenish and maintain beaches during times of such erosion. These benefits will become increasingly relevant with the projected sea level rises resulting from climate change..

The only dunes within the Study Area are the

- ‘primary’ dunes which form the sandspit between the lower Keurbooms Estuary and the sea; and
- the forest-thicket vegetated ‘secondary’ dune along the Keurbooms estuary shore from Poortjies northwards.

These are all single dunes - as opposed to a series of parallel dunes which become progressively more stable the further they are from the shoreline. Their potential as a protective buffer against wave action is therefore limited. The dune at Poortjies demonstrates this - now that it is exposed to direct wave action following the southward movement of the estuary mouth.

### 6.1 Dune Vegetation:

The Hartenbos Primary Dune vegetation on the sandspit is sparse and provides suitable conditions for the nesting Kelp Gull colony. It is the only example of this vegetation type in the area. It is classified as “Vulnerable”<sup>(20)</sup>.

The Wilderness Forest Thicket along the west bank of the Keurbooms Estuary is classified as Vulnerable<sup>(20)</sup>. Dune thicket vegetation occurs in a very narrow band along the coastal dunes and escarpments – it is vulnerable to fragmentation by development. An uninterrupted band of vegetated dunes is functionally very important for biodiversity and for bird movement along the coast.



Photo Nov. 2008

Sandspit gull colony nature reserve protects the Poortjies area from heavy seas.

### 6.2 Conservation Status:

Dunes are Critically Endangered ecosystems.<sup>(4)</sup>

### 6.3 Dune Corridor

The coastal dunes of the study area form part of the Bitou Eastern Coastal Corridor (7.2 below).



Photo July 2005

Intact dune forest thicket buffer on the west bank north of Poortjies gives added protection from extreme coastal and flood events.

#### 6.4 Legislative Protection

- **National Environmental Management Act (107 of 1998) (NEMA)** Principle (r)  
*“Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures.”*
- **Environment Conservation Act 1989 (Act 73 of 1989) Identification of activities which may have a detrimental effect on the environment: Outeniqua Sensitive Coastal Area Extension (OSCA).** Regulation No. R.1526 of 27 November 1998. Under this legislation the following activities require a permit: Disturbance of vegetation; earthworks; dredging; dune stabilisation.
- **National Environmental Management Integrated Coastal Management Act 2008 (Act 24 of 2008)** Chapter 2 Part 7 Coastal Set Back Lines & Chapter 4 Estuaries. Sections 33 and 34.
- **NEMA EIA Regulations R386 of 21 April 2006** Listed Activity Nos 2, 3, 5 and 6 relating to “activities in the sea or within 100 metres inland of the high-water mark of the sea” and No (12) “The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004(Act No. 10 of 2004).”
- **Provincial Spatial Development Framework (PSDF)** adopted by the Western Cape Provincial cabinet in Dec. 2005. Includes objectives relating to the protection of biodiversity and agricultural resources.
- **Regional Structure Plan (formerly:Knysna-Wilderness-Plettenberg Bay Guide Plan 1984)** Item 6.1.1(2): No slopes of more than 1:4 may be built upon.

## **7.0 THE IMPORTANCE OF MAINTAINING CONSERVATION CORRIDORS**

### **7.1 Need for Corridors**

Targeting and conserving processes is essential for the long-term persistence of biodiversity.<sup>(6)</sup> Corridors provide a means for wildlife to move through and between habitats; for genetic interchange; and for plants to ‘move’ in the event of changing conditions. The forest, thicket and fynbos biomes are inextricably linked, with one merging into another - boundaries between these biomes are often indistinct, and always shifting in response to fire, and changes in climatic and other factors.

The maintenance of bio-diverse conservation corridors, which will encompass all the biomes which occur in the area, is essential to the sustainability of the natural vegetation and the biodiversity necessary for a healthy environment for all life, including humans.

The existing and potential conservation corridors indicated on the corridor map of this study are the micro-corridors for four categories of ecosystem: Dunes, Fynbos and Grassland, Forest and Thicket, and Wetlands. These micro-corridors fall within the following three ‘mega-corridors’ which traverse the study area.

### **7.2 Bitou Eastern Coastal Corridor**

The coastal dunes between the Duivenhoks River in the West and the Kei River in the east comprise the Dune Megaconservancy Network (MCN, as identified in the STEP study<sup>(6)</sup>). This is the only one of seven MCNs which encompasses a high proportion of high-threat area, owing largely to pressures from urbanization.

The Rapid Conservation Assessment and Framework for a Conservation Plan for the Plettenberg Bay Municipality<sup>(4)</sup> identified the need for a corridor to link the Keurbooms/Bitou estuary complex to the Tsitsikamma National Park, through the Arch Rock Private Nature Reserve: The Bitou Eastern Coastal Corridor.

*“There are important dunes (and associated dune vegetation such as Gouritz Dune Thicket and forest) along this coastal strip. These dunes are currently being built upon at a very rapid rate (the farm Matjes Fontein 304), despite advice to the contrary from the WCNCB. Any development along here should be set further inland behind the secondary dunes, and any remaining natural vegetation (which includes the Tsitsikamma Plateau Fynbos) should not be disturbed.*

*This corridor will provide an East-West gradient (just like the Southern Coastal Corridor) and will link existing protected areas along the coast, all the way from the Sinclair Reserve in the West, to the Tsitsikamma National Park in the East across the entire municipality. We are not aware of any other municipalities in South Africa that are attempting to achieve this.”<sup>(4)</sup>*

### **7.3 North-South Keurbooms River and East-West Bitou River Corridors**

*“Watercourses and intact wetland systems form corridors that are vital in maintaining upland-lowland gradients, migration routes and coastal linkages.”<sup>(13)</sup>*

The Bitou River valley forms a vital link between a GRI Protected area in the west and the Cape Nature Keurbooms River Reserve to the east. Tributary valleys extend the corridors to north and south. These two corridor areas have been identified by the GRI as a Critical Biodiversity Area – the highest conservation status outside the protected areas of national Parks and Provincial reserves – with the desired management objective being to “*Maintain natural land. Rehabilitate degraded to natural and manage for no further degradation.*”

### **7.4 Micro-Corridors within the Study Area**

The Corridors map of the study area indicates existing and potential corridors for the different ecosystems. Fynbos corridors are particularly important for maintaining the connectivity for insect pollinators, many of which have evolved with specific host plants and are unable to fly long distances across transformed landscapes.

## 7.5 Legislative Protection for Conservation Corridors

- **NEMA: Biodiversity Act (Act 10 of 2004)** The Act itself does not infer protection over conservation corridors, but could/will once the provisions of the bioregional plans and threatened ecosystems come into effect properly for the Garden Route. The fine scale biodiversity planning work being done through the GRI is being done in a manner that will conform to the requirements for publishing Bioregional Plans under the Biodiversity Act. (A Brown, Garden Route Initiative, November 2008)
- **Provincial Spatial Development Framework (PSDF)** adopted by the Western Cape Provincial cabinet in Dec. 2005. The PSDF has the following objective relating to the protection of bio-diversity and agricultural resources:  
*“To establish and consolidate a network of bio-diversity corridors protecting the sensitive mountainous, coastal and aquatic (rivers, wetlands and estuaries) assets of the province that provides both ecological and economic (minimum impact eco-tourism) services so as to protect and enhance the province’s natural capital so that it can continue to provide the necessary ecological, agriculture, fishing, forestry and mining resources for continuing and enhancing life in both the rural and urban areas of the province. To further ensure the continued sustainability of the Province’s social, economic and natural processes there should be a series of measures aimed at limiting the consumption and pollution of scarce natural resources.”*
- **National Environmental Management Act (107 of 1998) (NEMA)** Principle (r) “*Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures.*”



Inappropriate fencing across an important wetland corridor



Inappropriate riverbank residential development destroys habitat connectivity



Extensive areas of pine plantation in the study area disrupt ecological corridors, particularly fynbos, and inhibit water delivery to the Bitou River and the Estuary.<sup>(14)</sup>

## 8.0 CONCLUSION

THERE IS NO NON-SENSITIVE LAND WITHIN THE STUDY AREA.

The Garden Route Initiative, in its January 2009 Draft Guidelines for land-use planning and decision-making, has identified this study area as being predominantly a “Critical Biodiversity Area” i.e. an area where the desired management objective is to ‘*maintain natural land; rehabilitate degraded land to natural or near natural; and manage for no further degradation*’. These recommendations tie in with the CSIR report <sup>(15)</sup> that floodplain and catchment management of the Bitou / Keurbooms catchment and floodplain is essential for continued water abstraction to supply the Bitou Municipal area.

The Bitou / Keurbooms Study Area includes Natural Assets which made Plettenberg Bay a premier holiday resort. Many of these assets have been diminished and lost as a result of inappropriate development but there is much scope for retaining and rehabilitating what remains. In March 2009 the Garden Route National Park (GRNP) was proclaimed. This emphasises the importance of the natural environment and the need to maintain a high level of biodiversity. The proclamation of the GRNP should give added impetus to sustainable management of natural resources in the study area.

I hope this Preliminary Environmental Management Framework will convey some notion of the richness of this landscape; as well as the supporting protective and enabling legislation – both national and provincial.

In the words of the Constitution of the Republic of South Africa :

*“Everyone has the right ....  
to have the environment protected,  
for the benefit of present and future generations.”*

Di Grant  
Grant Johnston Associates cc  
September 2009



A very high proportion of the study area has been designated by the GRI as a “Critical Biodiversity Area”: An area where the desired management objective is to ‘*maintain natural land; rehabilitate degraded land to natural or near natural; and manage for no further degradation*’.

## DEFINITIONS

**Biodiversity:** “All genes, species and ecological communities (biodiversity pattern) and the ecological and evolutionary processes that sustain them.”

OR

“The diversity of life at various levels of organisation, ranging from genes, species, ecosystems, biomes and landscapes.”

**Dunes :** Dunes are accumulations of windblown sand. Dunes may or may not be stabilised by vegetation and on this basis are classified as being either ‘fixed’ or ‘mobile’.

**Ecological and evolutionary processes:** The processes that operate to maintain and generate biodiversity. Ecological processes operate over relatively short time scales, while evolutionary processes operate over much longer time scales. Conservation assessments often include mapping and setting targets for the spatial components of these processes, namely the areas of land or water required to ensure their continued functioning.

**Environmental Management Framework (EMF)** “An EMF is a framework of spatially represented information, connected to features such as ecology, hydrology, infrastructure and services. The purpose of an EMF is to proactively identify areas of potential conflict between development proposals and critical/sensitive environments” DEAT 1998

**Estuary:** The region of a river where a coastal body of sea water diluted by fresh water is enclosed and under tidal influence.<sup>(9)</sup>

**Eutrophication:** the process whereby high levels of nutrients result in the excessive growth of plants.

**Garden Route Initiative (GRI)** The goal of GRI is to effectively conserve the biodiversity of the Garden Route, including the adjacent marine areas, by 2020 and through it to deliver significant benefits to the people of the area. The GRI is tasked with producing the fine scale biodiversity plans to be used in conjunction with the National Environmental Biodiversity Act 2004.

**Geographic Information Systems (GIS):**

**Hectare:** 1ha = 10000 sq.m. 100 ha = 1 sq.kilometre

**Megaconservancy networks:** as identified in the STEP study, are large conservation corridors of contiguous extant habitat that simultaneously achieve conservation targets for process and pattern but also consider implementation opportunities and constraints.

**Subtropical Thicket Ecosystem Planning (STEP) Project :**

STEP was a 4 year (2000–4) project funded by the Global Environment Facility.

Broad goal of STEP was to (i) conduct, together with key stakeholders, a comprehensive conservation planning exercise in the Subtropical Thicket Biome, and (ii) work closely with key stakeholders to ensure the implementation of the outcomes of the planning exercise.

**Sustainable development:** development that “meets the needs of the present without compromising the ability of future generations to meet their own needs”.

**Wetland:** land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil. (National Water Act 1998.)

**Palustrine Wetland** inland, non-tidal wetland characterized by the presence of emergent vegetation (vegetation that is rooted below water but grows above the surface). Palustrine wetlands range from permanently saturated or flooded land (as in marshes, swamps, and lake shores) to land that is wet only seasonally (as in vernal pools).

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