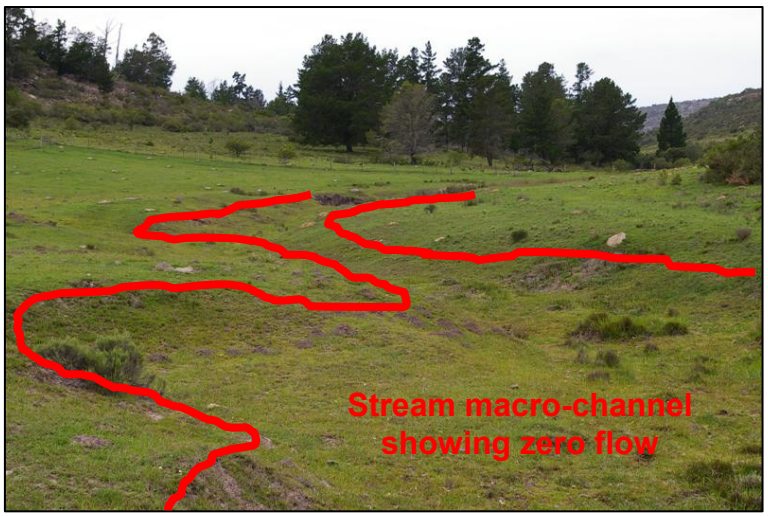
RIPARIAN CONTENTS

Base (Low) and Zero (No) Flows

Ingwavuma
Photo shows complete encroachment and terrestrialisation. Older trees are surviving but there is little replacement of vegetation by younger riparian species.



Bushmans River downstream of the Jameson Dam
Due to zero flows typical riparian species have largely disappeared. Terrestrial grassland species now dominate the entire riparian and instream zones.

NECF Funeray Plantation
Afforestation in upper catchment and trees within the riparian zone have dramatically reduced base flows. Photo inset shows normally perennial river reduced to seasonal pools.

Floods (Moderate and Large) and Freshes

Prior to moderate flooding and freshes, the riparian vegetation in the Vaal and Mzintlava rivers in the photographs below, is clearly obvious. During flooding this riparian vegetation is inundated temporarily.

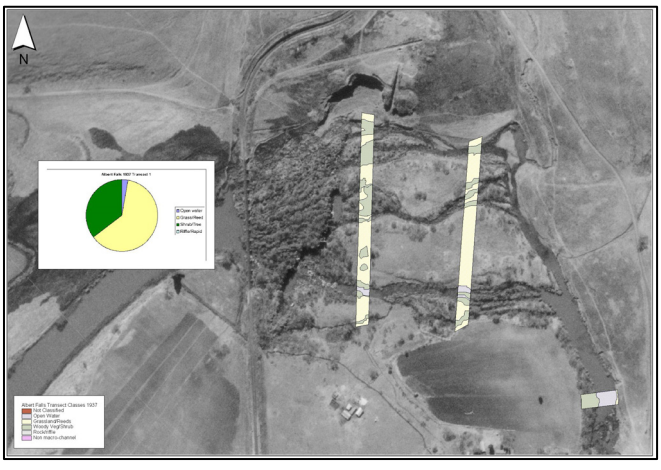
Vaal River Prior to flooding

During flood

Mzintlava River Prior to flooding

During flood

The 1937 aerial photograph below shows the uMgeni river before the construction of Albert Falls dam. Note the lack of encroachment of vegetation within the riparian zone. Compare this with the same area in 2003. Vegetation has progressively thickened, due to a reduction in large and moderate floods and their frequency.



uMgeni – 1937

uMgeni – 2003

Substrate Exposure

Rating 0-1

Usuthu
Geomorph Zone: Upper foothills

Left and right banks are well covered by a combination of grass, trees and shrubs. Very little substrate is exposed.

Mzimkhulwana (at Oribi Gorge)
Geomorph Zone: Upper foothills

Stable bedrock and boulder riparian zone with very little natural modification.

Pholela
Geomorph Zone: Upland flood plain

Meandering river with dense sedge and grass riparian zone. No exposed substrate.

Mdlotane
Geomorph Zone: Lowland river

Healthy and intact riparian zone with well established riparian zone tree species. Insert shows how roots are holding bank structure together resulting in minimal substrate exposure.

Substrate Exposure

Rating 2-3

Snake
Geomorph Zone: Upper foothills

Forestry harvest debris in channel with localised bank erosion and exposure. Also evidence of cattle grazing within the riparian zone. Cattle hoof action is destablilising riparian zone banks.

Ngwempisi
Geomorph Zone: Lower foothills

Riparian vegetation removal by livestock grazing and trampling particularly on near bank. Insert shows sparse cover in areas. Far bank is well covered.

Unknown
Geomorph Zone: Upland flood plain

Overgrazing in the catchment and slumping of riparian banks combine to produce moderate substrate exposure.

Mhlatuzi (Swaziland)
Geomorph Zone: Lower foothills

Mauritius thorn and wattles can be seen on both banks. Loss of typical marginal vegetation has exposed underlying substrate and destabilised the banks in places.

Substrate Exposure

Rating 4-5

Lion
Geomorph Zone: Upper foothills

Alien weed control, removal, stacking and burning of aliens has led to severe substrate exposure along banks.

Umkomaas (downstream from Sappi Saicor barrage)
Geomorph Zone: Lowland river

Flow modification and sand mining upstream of estuary has exposed large areas of sandy bank.

Town Bush Stream
Geomorph Zone: Lower foothills

Channel re-alignment and exposure of new bank is evident. There is complete loss of riparian zone vegetation and total modification of the bank.

Mhlatuzi (Swaziland)
Geomorph Zone: Lower foothills

Overgrazing and trampling by livestock on both banks leading to virtually 100% bank exposure.

Invasive Vegetation

Rating 0-1

Kaaloog-se-Loop
Geomorph Zone: Upper foothills

Minimal alien invasion along riparian bank – one willow tree can be seen but few other aliens are evident. There is also minimal upstream impact that can affect vegetation.

Coleford Stream
Geomorph Zone: Mountain stream

No aliens along riparian zone. Healthy and intact banks.

Karkloof River (at Game Valley)
Geomorph Zone: Upper foothills

No alien infestation of riparian zone. Healthy and intact banks.

Pholela
Geomorph Zone: Upland flood plain

Natural grassland with no alien invasion.

RIPARIAN

2. Bank Structure Modification

Invasive Vegetation

Rating 2-3

Ngwempisi
Geomorph Zone: Lower foothills

Approximately 50% of bank is covered with alien weeds (bugweed). Marginal vegetation only supplying limited instream habitat.

NECF Funeray plantation
Geomorph Zone: Mountain stream

Kloof on river with localised 100% cover of wattles. Along riparian zone virtually complete loss of natural vegetation. Localised transformation of riparian zone. Had this been more widespread, the rating would have increased.

Unnamed
Geomorph Zone: Upland flood plain

Bugweed and bramble in foreground within gum and pine plantations. Photo also shows moderate bank erosion and harvest debris left in the stream.

Lion
Geomorph Zone: Upper foothills

Left hand bank of main photo shows very extensive alien weed infestation. Insert shows this cleared and natural riparian zone buffer re-established. If both banks had been infested this would have increased the rating.

Invasive Vegetation

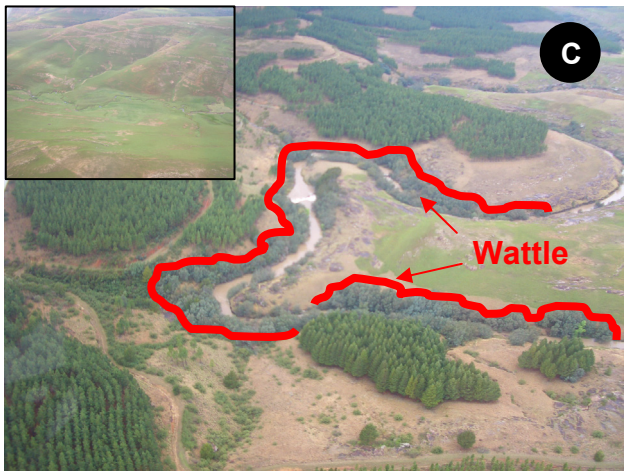
Rating 4-5

Town Bush Stream
Geomorph Zone: Upper foothills

Gums planted through riparian zone. Insert shows destablisation of bank due to adjacent plantation and shading out of natural riparian zone species. Loss of these riparian zone species results in bank erosion and collapse.

uMgeni
Geomorph Zone: Upper foothills

Poplars have totally invaded and modified this bank. Natural riparian zone species have been outcompeted and bank structure has been significantly modified.



Wildebees
Geomorph Zone: Upper foothills

Extensive infestation of wattles along riparian zone is severely modifying the bank. Compare this to the same area (primarily grassland) with no weeds (see insert).

Unnamed
Geomorph Zone: Mountain stream

Commercial afforestation and poor weed control management have negatively impacted on the banks of this stream in the KwaZulu/Natal Midlands. Harvest debris in the stream further exacerbates bank instability.

Physico-Chemical Changes

Sikelekehleni
Photo illustrates diesel and oil spillage in riparian zone associated with illegal sand mining operations.

Little Amanzimtoti
Tent washing is a common sight in riparian zones following weekend funerals and weddings.

Mbokodweni
Hippo grass infested riparian and instream zones due to nutrient enriched water.

Umbilo
Sewage works discharge has resulted in abundant nutrients and a flourishing alien weed community.

Likasi
Acid mine drainage and excessive sedimentation have killed riparian tree species.

Likasi
Artisanal mining and working of riparian sediments have changed the physical structure of the bank.

Erosion

Rating 0-1

Wildebees
Geomorph Zone: Upper foothills

Bedrock and boulder dominated riparian zone with very little erosion. Forestry is not in the riparian zone and does not impact on the instream habitat.

Drakensberg stream
Geomorph Zone: Source

Source zone/seep wetland with extensive wetland vegetation along riparian zone and no erosion.

Unknown
Geomorph Zone: Upland flood plain

Unmodified meandering stream.

Eerste
Geomorph Zone: Mountain stream

Healthy riparian vegetation stabilising riparian banks and no signs of erosion.

Erosion

Rating 2-3

Mhlatuzi
Geomorph Zone: Lower foothills

Extensive erosion of both left and right bank along long reaches of river. Livestock pressure has caused instream and riparian modification.

Pot
Geomorph Zone: Upper foothills

Moderate erosion of banks with sedges stabilising areas.

Usutu
Geomorph Zone: Lower foothills

Localised erosion at river crossing due to artisanal sand mining. Banks outside of impact zone in fair condition.

Wildebees
Geomorph Zone: Upper foothills

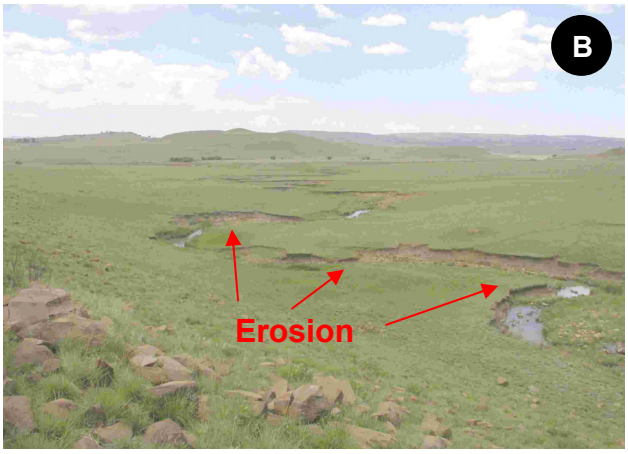
Moderate bank erosion due to human settlement activities and artisanal small-scale sand mining along the far bank.

Erosion

Rating 4-5

Unknown
Geomorph Zone: Lower foothills

Alien trees and livestock hoof impact have caused large-scale bank erosion and sedimentation of channel.



Unnamed stream (in Bergville area)
Geomorph Zone: Upland flood plain

Extensive erosion of both left and right banks.

Ingwavuma
Geomorph Zone: Lower foothills

Livestock pressure has contributed to extensive slumping and bank erosion.

Mzimvubu
Geomorph Zone: Lower foothills

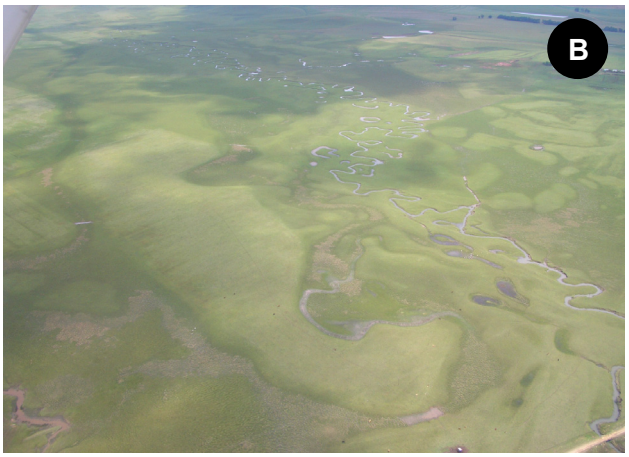
Both banks severely compromised by livestock hoof action and overgrazing. Exotic willows exacerbate this impact through shading out of natural riparian zone species.

Channel Straightening

Rating 0-1

Unknown
Geomorph Zone: Upland flood plain

Naturally meandering section of river with no channel modification.



NECF Sephton Wetland
Geomorph Zone: Upland flood plain

Naturally meandering stream through Sephton wetland showing little channel modification.

Berg
Geomorph Zone: Lower foothills

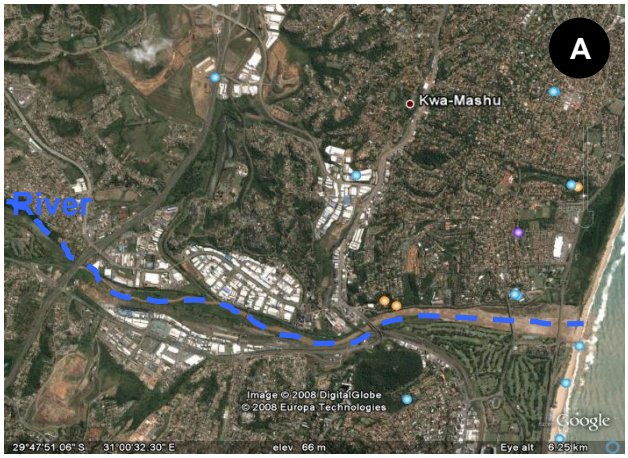
Natural sinuosity of this river has been modified to accommodate cultivation along river flood plains. Encroachment by orchards is evident.

Tributary of Mooi River (N.E. Cape)
Geomorph Zone: Upper foothills

Road works contribute to very localised channel modification, hence a low rating.

Channel Straightening

Rating 2-3



Lower uMgeni
Geomorph Zone: Lowland river

Previously a broadly meandering river, the uMgeni is now confined and straightened by development on the Springfield Flats (previously the flood plain).

uMhlangane
Geomorph Zone: Lowland river

Canalisation of this river has reduced natural sinuosity of this river. This is localised to accommodate local industrial development, hence the moderate rating.

Mkhondvo
Geomorph Zone: Lower foothills

High sediment loads and deposition interfere with natural braiding and sinuosity of this river.

Isipingo Canal
Geomorph Zone: Lowland river

Canalisation to drain lowland floodplain for industrial development, alien weeds and mechanical clearance of canal has interfered with natural channel sinuosity.

Channel Straightening

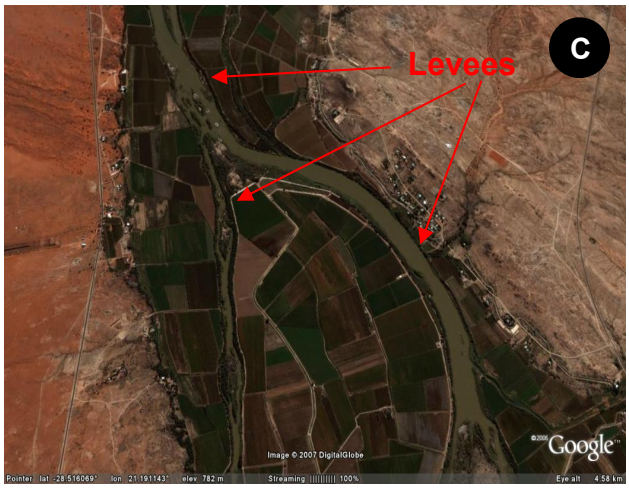
Rating 4-5

Town Bush Stream
Geomorph Zone: Lower foothills

Extensive channel realignment to accommodate new shopping complex.

Umlaas Canal
Geomorph Zone: Lowland river

Meandering flood plain transformed by concrete canal diverting entire river flow away from natural coastal flood plain wetlands into the sea.



Lower Orange
Geomorph Zone: Lowland river

Levees and agriculture within the riparian zone have confined the natural channel significantly, modifying the banks and reducing channel sinuosity.

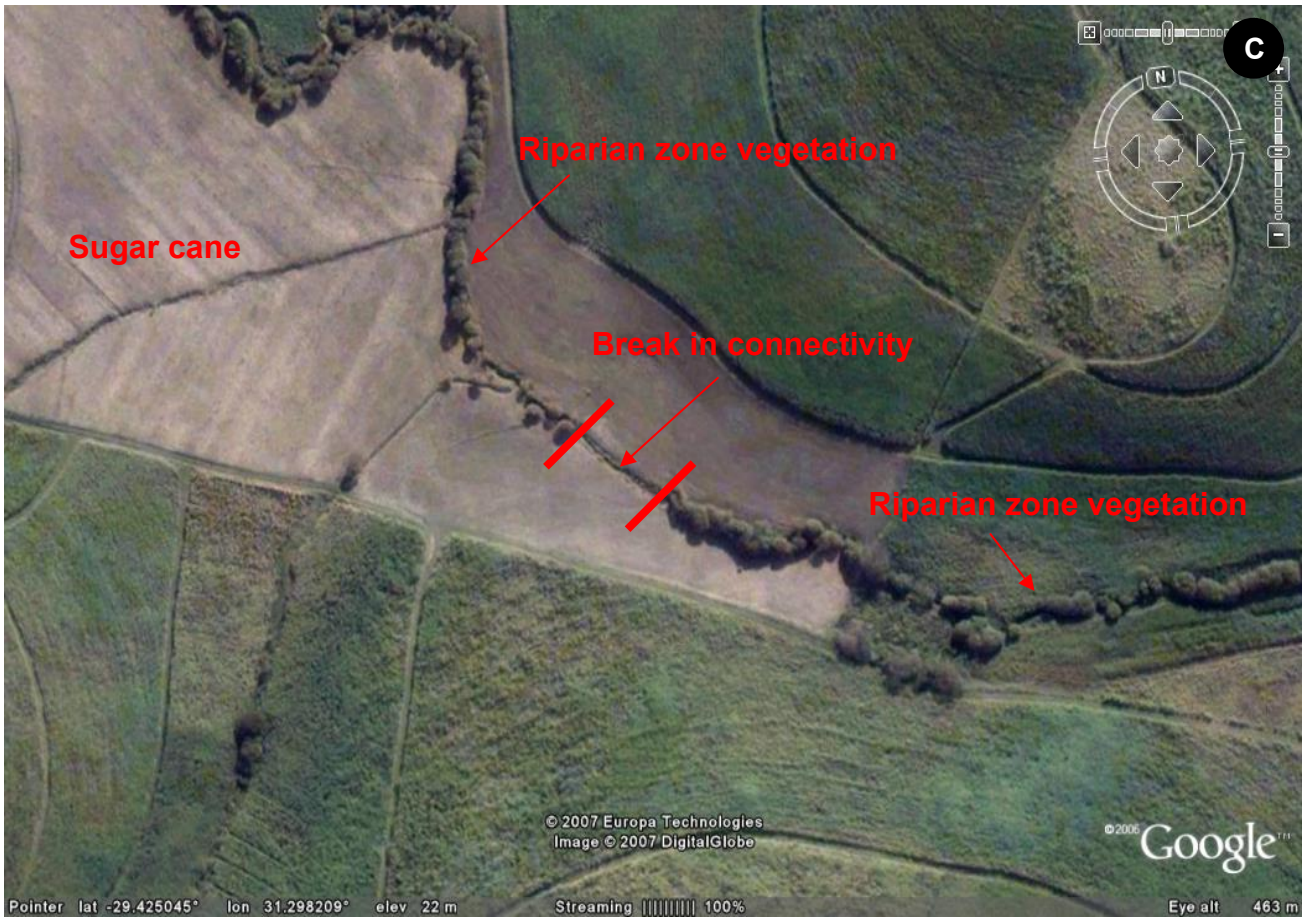
Duzi
Geomorph Zone: Lower foothills

Urban development has significantly modified the riparian bank and channel sinuosity as the river passes through the city. This is particularly visible in the canalised central section.

Longitudinal

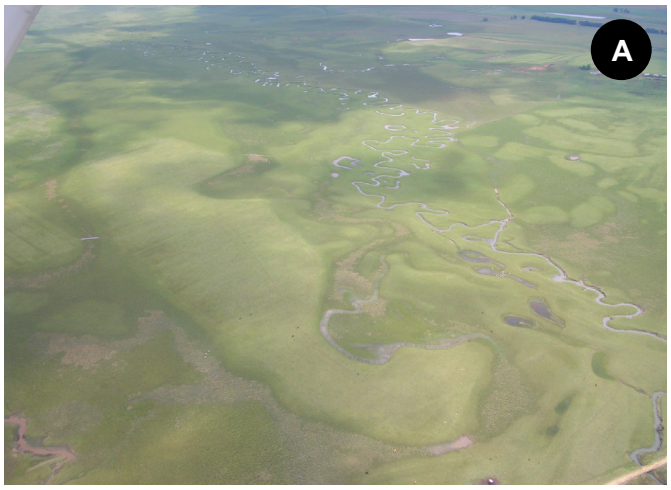
Berg
Cultivation in riparian zone has interfered with longitudinal connectivity.

Tongaat
South bank shows good connectivity of the riparian zone. The north bank connectivity has been broken by agriculture in the riparian zone.



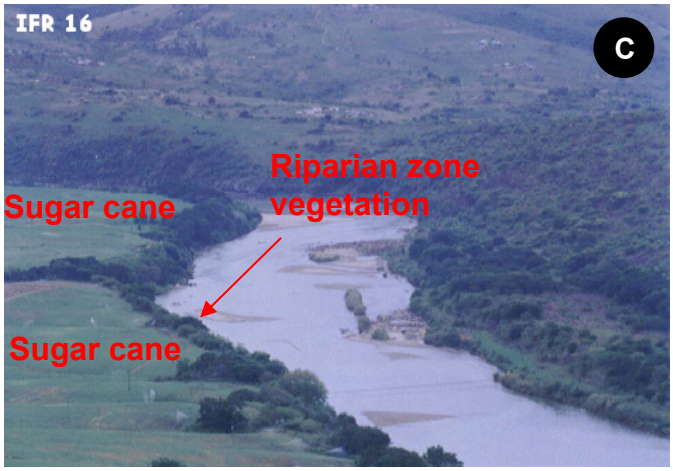
KwaZulu-Natal coastal river through sugar cane fields showing breaks in riparian zone connectivity due to cultivation to the edge of the stream.

Lateral



NECF Sephton wetland
Natural grasslands and no alien weeds and lack of cultivation allowing for flux of all riparian zone elements enabling full lateral connectivity in the riparian zone.

NECF Sephton wetland
Extensive connectivity modification by wattle invasion in this lower area of the NECF Sephton wetland.



Thukela
Cultivation along the riparian zone has significantly altered the lateral connectivity between the river and the riparian zone. Sugar cane on the flood plains and left bank have reduced the width of this riparian zone and isolated it from the natural flood plains.

Berg
Parklands have been established on the west bank with grass planted to the water's edge, as opposed to the more natural riparian zone vegetation on the east bank.