



HABITAT INTEGRITY

Habitat Integrity of Selected Rivers of the North West Province : Major Impacts and Management Actions

WHAT IS THE RIVER HEALTH PROGRAMME?

Healthy rivers provide goods and services (water supply, breakdown of pollutants, conservation, flood attenuation, natural products, recreation and spiritual rituals) which contribute to human welfare and economic growth. When people use rivers, they impact on river health. The National River Health Programme assesses the health of rivers by measuring selected ecological indicator groups that represent the condition of the larger ecosystem. The data are simplified and represented as indices, such as the habitat integrity index.

The River Health Programme monitors and assesses the biological and habitat integrity of rivers (through evaluation of, for example, fish, aquatic invertebrates and riparian vegetation). This assessment enables reports on the ecological state of river systems to be produced in an objective and scientifically sound manner. Information from the River Health Programme assists with identification of those areas where unacceptable ecological deterioration is taking place. In addition, this programme reflects the effectiveness of existing river management policies, strategies and actions.

WHAT IS HABITAT INTEGRITY?

The availability and diversity of habitats are major determinants of aquatic biota that are present in a river. An index of Habitat Integrity has been developed within the River Health Programme to assess the impact of human disturbance on the riparian and instream habitats. The Instream Habitat Integrity (inner band on the map) considers the severity of human impacts such as water abstraction and change of flow patterns, water quality, bed and channel modification, alien water plants and fauna and waste disposal on instream features. The Riparian Habitat Integrity (outer band on the map) considers impacts such as the reduction of indigenous riparian plants, the invasion of alien plants, change of flow and water quality, as well as channel and bed modification on the riparian habitat.

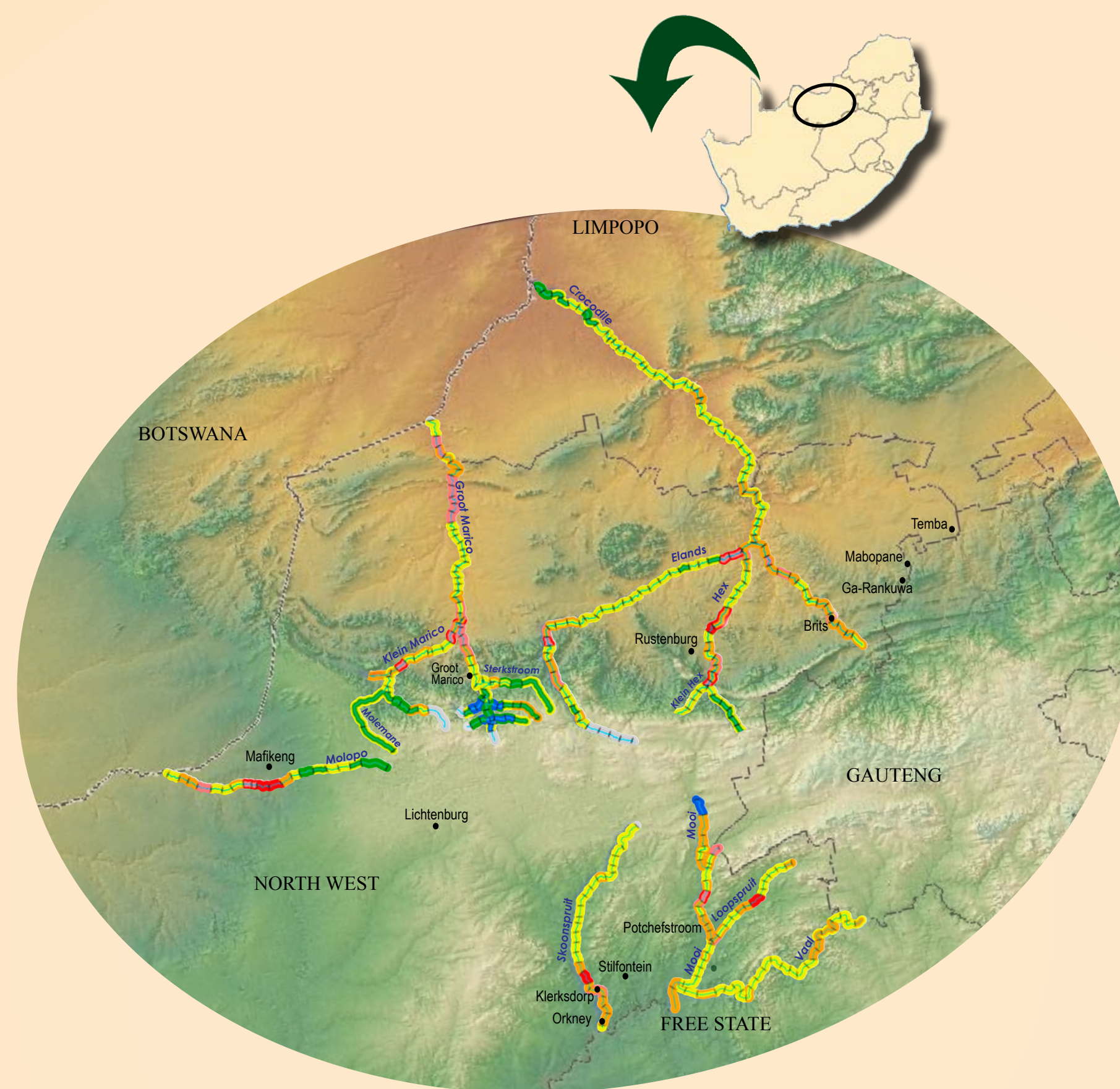
Selected rivers of the North West Province were flown during 2005 and video coverage collected to assess the condition of the rivers. This video coverage was assessed according to the Habitat Integrity procedures and ground-truthed.



OVERALL HABITAT INTEGRITY

All of the river systems that were assessed have been impacted by human activities and therefore the habitat integrity has deteriorated. Most rivers can be considered to be in a moderately to largely modified state (category C to D). An integrity of a largely natural state (category A) is rarely found in the rivers that have been assessed.

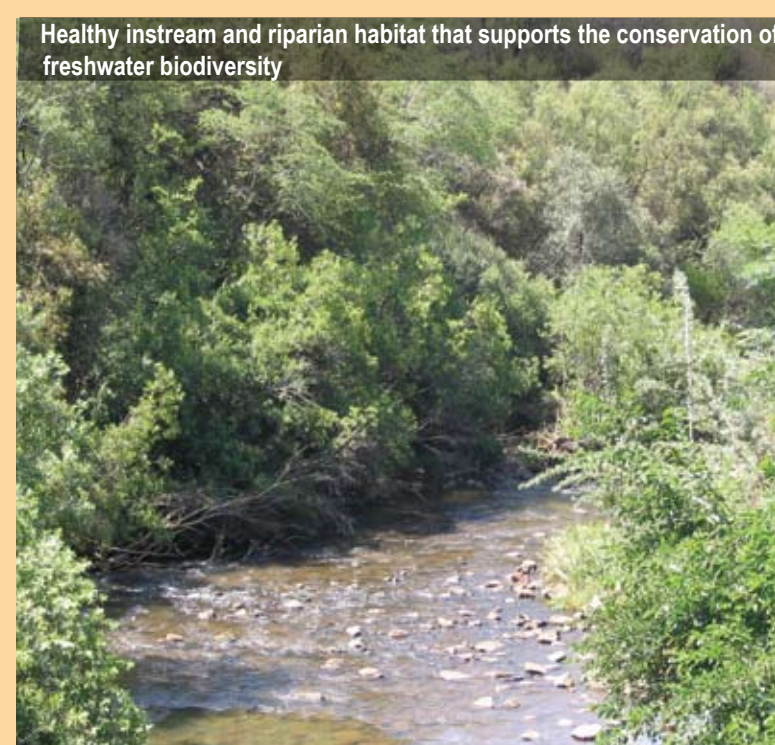
The present deteriorated condition of the rivers is mostly the result of inundation, flow regulation, water abstraction, bed and channel modification, the discharge of wastewater and alien vegetation encroachment. Specific management actions should be taken to prevent further degradation of the integrity of these rivers.



INDEX OF HABITAT INTEGRITY	
Riparian habitat integrity	Instream habitat integrity
Habitat Integrity Categories	
A: Unmodified natural	
B: Largely natural	
C: Moderately modified	
D: Largely modified	
E: Extensive modification	
F: Unacceptable	
Not recorded	

FRESHWATER BIODIVERSITY CONSERVATION

Implementation of the proposed freshwater biodiversity conservation plan will require rehabilitation of rivers to enable compliance with the targets to achieve biodiversity protection. Management action is required to address the aquatic ecosystem impacts that have been identified. See Smith-Adoo LB, Nel JL, Schonegevel L, Hardwick D, Maree G, Hill L, Roux H, Kleyhans CJ, Moolman J, Thirion C and Todd C. 2006. A Systematic Conservation Plan for the Freshwater Biodiversity of the Crocodile (West) and Marico Water Management Area. CSIR Report Number CSIR/NRE/ECO/ER/2006/0133/C.



MAJOR RIVER IMPACTS & MANAGEMENT ACTIONS

Alien vegetation encroachment

The encroachment of alien vegetation in the riparian zones of most of the rivers can be considered to be at a serious to critical level. *Sesbania punicea* (glory pea) and *Melia azedarah* (seringa) are present from the upper reaches, along the entire length of most of the rivers flowing west and northwards. It is clear that this problem will escalate if specific management actions are not taken. Cat claw creeper (*Macfadyena unguis-cati*) is creating a localised, but serious problem in both the riparian and terrestrial vegetation in the lower reaches of the Klein Marico River.

Management Actions: White poplar and black wattle present a particular threat in high-lying colder parts of the catchment, often contributing to the non-compliance with biodiversity protection objectives. Systematic and planned eradication and the prevention of new infestation of these alien invasive trees will bring benefits to land users and river systems.

Water quality deterioration

The addition of nutrients and the discharge of insufficiently treated effluent from wastewater treatment facilities poses a long-term impact for most of the rivers, and contributes to the degradation of instream habitat integrity. The dumping of animal carcasses would appear to be a common practice in some of the rivers but is a particular problem in some rivers, for example in the Loopspruit.

Management Actions: Irrigation return flows should be reduced where possible and water conservation and demand management implemented to assist in reducing the discharge of treated wastewater to the rivers. Where necessary, wastewater treatment works should be upgraded and managed according to design specifications.

Reduction of flow and the alteration of flow patterns

A substantial number of dams occur in most of the rivers that were included in the study. Compliance with low flow requirements of the ecological Reserve is not adhered to and operating rules for the dams are not in place to manage the impacts of water abstraction and flow reduction on the downstream components. Limitations in the outlet capacities of these impoundments adds to the problem.

Management Actions: The Department of Water Affairs and Forestry should identify those river systems in which it is practical and feasible to operate dams to release the ecological Reserve requirements, and implement the Reserve.

Construction of low water crossing and bridges

The construction of low water bridges and road crossings is a particular problem in wetland areas where a relative long distance is affected due to the topography. The prevention of natural flow and circulation of water through these wetlands have a specific impact on the wetlands. Specific action is required in the upper Mooi and Molopo River systems.

Management Actions: Guidelines should be compiled and used to assist land owners with the construction of roads in a wetland-friendly way and to rehabilitate those that have already been constructed.

Obstruction to flow and fish migration

A large number of structures such as low water bridges, weirs and water abstraction structures are present in many of the rivers. No formal fish ladders have been constructed in most of these rivers, preventing the migration of indigenous fish species.

Management Actions: Priority weirs and structures in which fish ladders should be installed should be identified in line with the priorities for aquatic biodiversity conservation and considered for the installation of fish ladders. The construction of instream structures in the future should mitigate impacts on flow and fish migration.

Alteration of the beds and banks of rivers

The removal of riparian vegetation and the mechanical alteration of the river beds and banks adds to the deterioration of the habitat integrity. The formalisation of riparian buffer zones for the protection of rivers should be implemented.

Management Actions: Riparian zone protection should be implemented in those river reaches identified for freshwater biodiversity conservation. The upper tributaries of the Groot Marico River system are of particular concern, viz. Draaifontein, Kaaloog se Loop, Van Straatensvlei and Sterkstroom.

Invasive cat claw creeper in the lower Klein Marico River



Infestation of seringa in the Groot Marico River



Sesbania invasion of the instream and riparian habitats of many rivers



White poplar invasions, particularly in the colder high-lying areas



Kareespruit in Zeerust is eutrophied as a result of treated wastewater discharges



Irrigation releases from Klerkskraal Dam, with no ecological Reserve release



Low water bridges and crossings in wetlands impact on flow and result in inundation (Molopo River)



Inadequate water circulation in a wetland area of the Molopo River



A deeply incised river channel as a result of reduced flows in the lower Klein Marico River

