



river health

Ecological State of the Goukou and Duiwenhoks Rivers

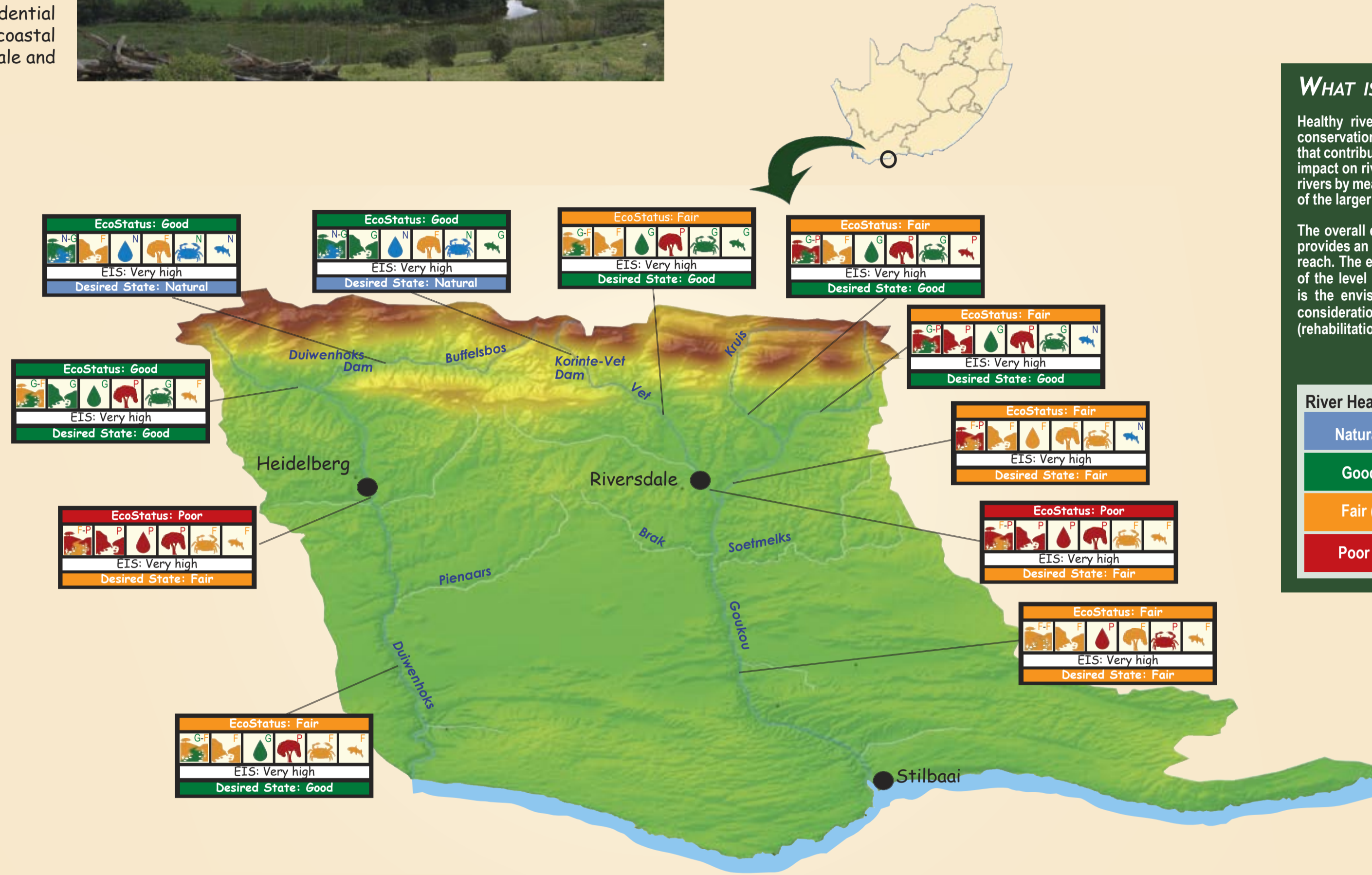
THE GOUKOU AND DUIWENHOKS RIVER CATCHMENTS

The Goukou and Duiwenhoks River catchments drain the Langeberge Mountains and flow south to the coast, west of Mossel Bay in the southern Cape. Natural land-cover consists mostly of Renosterveld shrubland and grassland with some waterbodies and wetlands.

Land-use within the catchments comprises mostly dryland and irrigated agriculture and commercial forestry. Urban development is small and comprises mainly residential and industrial developments associated with the coastal settlement of Stilbaai and the inland towns of Riversdale and Heidelberg.

Water supply is from two major dams, namely, the Korinte-Vet dam (8.1 million cubic meters) in the Korinte/Vet tributary of the Goukou River, and the Duiwenhoks Dam (6.2 million cubic meters) in the Seekoeivlei tributary of the Duiwenhoks River.

Upper Duiwenhoks Catchment



OVERALL STATE OF THE GOUKOU AND DUIWENHOKS RIVERS

The ecological state of the Goukou and Duiwenhoks rivers deteriorates rapidly from their source to their estuaries. The upper reaches of the Duiwenhoks River are highly stressed due to wetland degradation, while the lower reaches are impacted by low flows that can result in hypersaline conditions, cause nutrient rich aquatic vegetation to die off and fish nurseries to collapse.

In contrast, the upper reaches of the Goukou River are reasonably pristine, and boast intact wetlands. The middle reaches, however, are heavily infested with black wattle and water hyacinth, while the lower reaches are impacted by low flows from over-abstraction and little or no freshwater inputs.

WHAT IS RIVER HEALTH?

Healthy rivers provide goods and services (water supply, pollutant breakdown, conservation, flood attenuation, natural products, recreation and spiritual rituals) that 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.

The overall ecological status of a river reach is expressed as the EcoStatus, which provides an integrated value of all the ecological indices assessed for that particular reach. The ecological importance and sensitivity rating (EIS) provides an indication of the level of protection that a river should receive. The desired health of a river is the envisioned future ecological state of the river. It is based on ecological considerations, the need for sustainable development and management actions (rehabilitation) concerning the river environment.

This poster is based on the results of River Health Assessments in the Goukou and Duiwenhoks River Systems conducted during 2004 and 2005

River Health Indices

Index of Habitat Integrity	Measure of the availability and diversity of riparian and instream habitat
Geomorphology Index	Reflection of the channel condition and stability
Riparian Vegetation Index	Measure of the degree of modification of river bank vegetation from natural
South African Scoring System	Indication of river condition based on aquatic invertebrates present at a site
Fish Index	Measure of fish diversity deviation from natural

River Health Categories

River Health Category	Ecological Perspective	Management Perspective
Natural (N)	No or negligible modification	Relatively little human impact
Good (G)	Biodiversity and integrity largely intact	Some human-related disturbance but ecosystems essentially in good state
Fair (F)	Sensitive species may be lost, with tolerant or opportunistic	Multiple disturbances associated with the need for socio-economic development
Poor (P)	Mostly tolerant species; alien species invasion; disrupted population dynamics; species often diseased	High human densities or extensive resource exploitation

CAPACITY AND AWARENESS BUILDING

Eden District Municipality recently launched an "Adopt-a-River" project in Riversdale. The main focus of the project is to provide learners and teachers with skills to monitor the health of the local Goukou River system.



The overall aim of the project is to instill an understanding and appreciation of the environment in learners and teachers, so that knowledge is transferred to the greater community.

IMPACTS AND MANAGEMENT ACTIONS



Water abstraction and flow modification

Flow modification through over-abstraction is a major threat to the ecological functioning of the Goukou and Duiwenhoks rivers. Extensive irrigated agriculture in the catchment uses water from many off-stream dams and extensive irrigation schemes. The cumulative effect of this has had a major impact on flow, particularly in summer, when the Goukou and Duiwenhoks rivers almost cease to flow. The two major dams contribute to flow modification by preventing smaller floods from reaching the estuary. Extensive alien wattle infestation also reduces water availability.

Poor agricultural practices (draining of wetlands) have impacted on wetlands, reducing their ability to act as 'sponges' and attenuate floods. As a result, rivers remain dry for longer periods and flood damage is more extensive. The infestation of invasive alien plants (black wattle) in the wetlands adds to this problem.

Management Actions

- Control and monitor water abstraction
- Do not irrigate during the hottest part of the day (10am to 4pm) to reduce evaporative water loss
- Use rainwater tanks to supplement water supplies
- Maintain and monitor irrigation schemes to ensure efficient water use
- Replace existing water supply schemes with more efficient schemes
- Do not drain wetlands
- Make environmental flow releases from the Korinte-Vet and Duiwenhoks dams



Invasive alien plants and fish

The riparian zones in the middle and lower reaches of the Goukou and Duiwenhoks rivers, tributaries and wetlands are highly impacted by invasive alien plants (black wattle). This reduces the ability of these zones to act as a buffer, reduces habitat availability for aquatic biota and causes deep incising of river channels.

Invasive alien fish in the middle and lower Goukou (largemouth bass, bluegill sunfish) and Duiwenhoks (banded tilapia, mosquitofish) rivers have reduced populations of indigenous Cape kurper, Cape galaxias and Burchell's redfin minnow.

Management Actions

- Remove alien vegetation from the riparian zone and wetland areas. Ensure these areas remain cleared by conducting follow-up actions
- Rehabilitate riparian zone with indigenous plants
- Eradicate alien fish from selected tributaries that could be maintained alien free
- Discourage the use of alien fish in farm dams



Water quality deterioration

Water quality in the Goukou and Duiwenhoks rivers is impaired by diffuse pollution from intensive agricultural activities in the catchment. Irrigation return flows (containing fertilisers and insecticides) and run-off from feedlots reduces water quality.

Run-off from roads, urban areas and informal settlements adjacent to the rivers, as well as the occasionally flooded wastewater treatment works, further reduces water quality.

Management Actions

- Re-establish riparian zones with indigenous vegetation to create a buffer zone between agricultural lands and the river
- Encourage the placement of "sump dams" to collect run-off from feedlots
- Rehabilitate and restore the extensive palmiet wetlands
- Ensure monitoring and maintenance of storm water drainage canals
- Encourage community awareness and river clean-up initiatives (e.g. Adopt-a-River)
- Provide sufficient dustbins and ablution facilities at picnic sites and informal settlements
- Ensure the efficient functioning of waste water treatment works. Locate new treatment works out of the floodplain

WETLANDS

The Goukou and Duiwenhoks River catchments are home to several important peat wetland systems that are very characteristic of the Langeberg area, most of which are dominated by palmiet. They form an intricate part of the entire river system, and are important for erosion control, water quality enhancement (sediment trapping), flood attenuation, improved water security for downstream users, biodiversity conservation and carbon sequestration.

These wetlands have been modified by agricultural encroachment; poorly designed roads, flood-control structures (dykes and drainage ditches) within the wetlands and invasion by alien plants (black wattle). As a result of these modifications, floods in 2004 caused serious damage to the wetlands, as well as to the rivers below the wetlands.

