Habitat Integrity of Selected Rivers of the North West Province

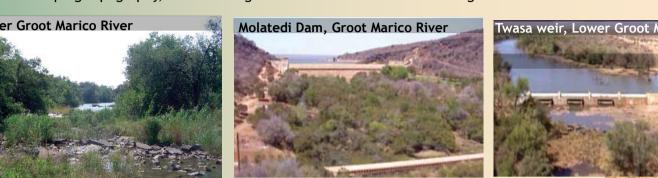


Habitat Integrity Results: Groot Marico River

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 Riparian B

In general, the tributaries in the Upper Groot Marico catchment (Draaifontein, Kaaloog se Loop, Rietspruit, Ribbokfontein se Loop, Van Straatensvlei, and Sterkstroom), consist of natural wetlands in the upper reaches, while the lower reaches flow over the plateau and are largely impacted by agricultural activities as well as invasive alien vegetation. Runoff from slate mining in Kaaloog and Ribbokfontein se Loop result in increased turbidity in these rivers. The rivers are generally in a good condition where they flow through gorges.

The Lower Groot Marico is dominated by large dams (Marico Bosveld and Molatedi Dam) that provide for domestic and agricultural water supply. This results in severe flow modifications that impact on both the instream and riparian zones. The erratic release of water from the Molatedi Dam for agricultural use has a high impact on the river, both in terms of channel and flow modification. This, together with attenuation of large flood events by Molatedi Dam, has significant impact on the instream zone of the river. Constant flow releases and the inundation of the Twasa Weir in a gentle sloping topography, result in large areas of the river channel being inundated.



abitat Integrity Results: Klein Marico River

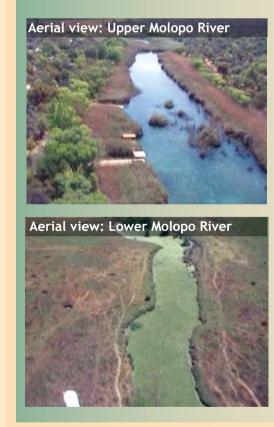
Sector	107	106	105	104	103	102	101	100	66	98	67	96	95	94	93	92	113	114	115
Riparian	D	D	В	В	С	С	С	С	F	D	D	D	С	С	F	Е	D	С	С
Instream	С	В	В	В	В	С	С	D	Е	С	С	С	С	С	Е	D	D	В	В
Riparian	D	D	В	В	С	С	С	С	F	D	D	D	С	С	F	Е	D	С	С

Habitat integrity in the upper Klein Marico River is predominantly impacted by alien vegetation in the riparian zone and agricultural activities. River channel modification by dense stands of white poplar trees adds to the largely modified habitat. The integrity of the river downstream improves due to an absence of alien vegetation in the riparian zone and reduced indigenous riparian vegetation removal. The integrity deteriorates again at Zeerust, with a number of obstructions and bridges occurring here, as well as the discharge of treated wastewater.





The Klein Maricopoort Dam contributes to a deterioration of the habitat integrity to a category D downstream of the dam. The lower section of the Klein Marico River is severely altered as a result of the abstraction of water from Kromellenboog Dam. No ecological flows are released from these dams. The aggressive invasion of cat claw creeper is of particular concern as it is causing many large riparian trees to die.

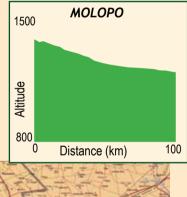


Habitat Integrity Results: Molopo River

Sector Instream CEE Riparian The integrity of the Molopo River varies from a largely natural (B category)

upstream from Mafikeng to a low D and E category downstream of Mafikeng. The exception is the rehabilitated wetland areas in the upper river and in the Mafikeng Nature Reserve where wetland rehabilitation has taken place, alien vegetation has been removed, and bank and bed stabilisation works have been undertaken. The road crossings that occur in the upper reaches of the river result in substantial impacts in terms of flow modification and inundation of the river in wetland areas.

Upper reaches of the Molope River



HABITAT INTEGRITY ASSESSMENT PROCEDURE

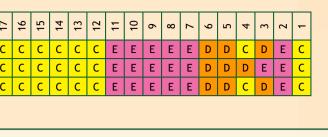
Habitat integrity refers to the maintenance of a balanced, integrated composition of physico-chemical and habitat characteristics (temporally and spatially) that are comparable to the natural riverine habitat characteristics. The habitat integrity status for a river provides the template for a certain level of biotic integrity to be realised. Habitat integrity assessments can be seen as a precursor to biotic integrity assessments. Habitat and biotic integrity together constitute ecological integrity.

Habitat integrity methods were used in the collation and interpretation of data, as well as the final assessment (for further information see Kleynhans & Engelbrecht, 1994). Separate assessments of the instream and riparian habitat integrities are undertaken according to a number of key criteria (Table 1). The observed habitat condition in terms of these criteria is compared to a perceived unperturbed conditions to estimate the change in habitat integrity. A rating system (Table 2), based on differing weights for each criterion (according to its perceived importance in determining habitat integrity), is used to assess the river's instream and riparian habitat integrities. The sum of these ratings is used to classify the instream and riparian zone facets according to a descriptive integrity category (see map legend). Video recordings of rivers of the North West Province were collected during 2005 and video coverage taken of the condition of the rivers. The habitat integrity was assessed according to the above habitat integrity procedures and ground-truthed.

riparian zone habitat integrity assessment														
Instream Criteria	Weight	Riparian Zone Criteria	Weight											
Water abstraction	14	Indigenous vegetation removal	13											
Flow modification	13	Exotic vegetation encroachment	12											
Bed modification	13	Bank erosion	14											
Channel modification	13	Channel modification	12											
Water quality	14	Water abstraction	13											
Inundation	10	Inundation	11											
Exotic macrophytes	9	Flow modification	12											
Exotic fauna	8	Water quality	13											
Solid waste disposal	6													
TOTAL	100	TOTAL	100											

Table 1: Weights and criteria used in the instream andTable 2: Descriptive classes for assessing habitat integrity modifications

Impact Class	Description	Score
None	No discernible impact	0
Small	Modification is limited to very few localities and very small.	1-5
Moderate	Modifications present at a small number of localities and impact is limited.	6-20
Large	Modification is generally present. Large areas are not influenced.	11-15
Serious	Modification is frequently present. Only small areas are not influenced.	16-20
Critical	Modification is present overall with a high intensity.	21-25



GROOT MARICO Distance (km)

Habitat Integrity Results: Crocodile River

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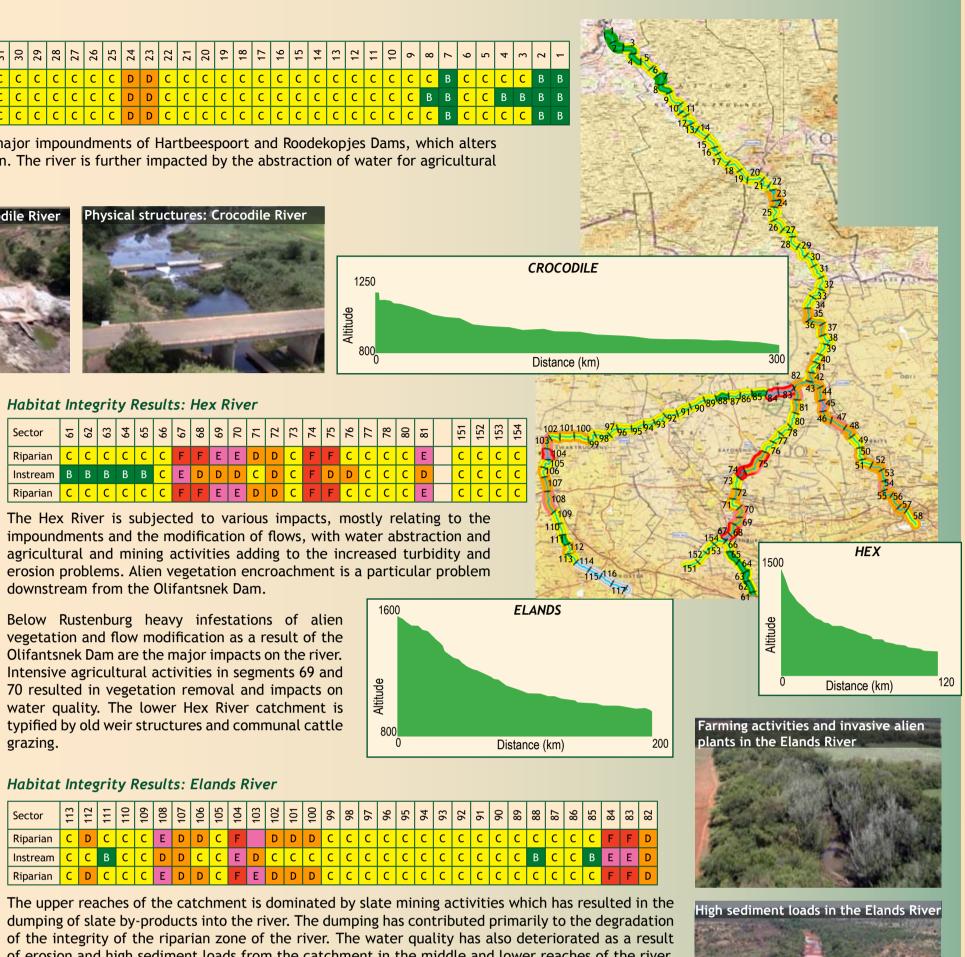
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The Crocodile River system is heavily utilised and the impacts are the result of the major impoundments of Hartbeespoort and Roodekopjes Dams, which alters the flow variability and volumes downstream resulting in bed and channel modification. The river is further impacted by the abstraction of water for agricultural use and return flows from agricultural use, urban areas and mining activities.

Heavy alien plant infestations in the riparian zone and vegetation removal in the intensive irrigated areas contributes to the deterioration of habitat integrity. The habitat integrity gradually improves in the downstream direction in the Crocodile system.





Habitat Integrity Results: Hex River Riparian C C C C C F F E E D

downstream from the Olifantsnek Dam.

grazing.

	abitat Integrity Results: Elands														
Sector	113	112	111	110	109	108	107	106	105	104					
Riparian	С	D	С	С	С	Е	D	D	С	F					
	6	6	-	6	6	-		6	6	-					

ΜΟΟΙ

The Swartruggens and Lindlevspoort Dams contribute towards the degradation of the habitat integrity as a result of flow modification and water abstraction. No releases are made from the dams for ecological purposes. The Lindleyspoort Dam supplies irrigation farmers with water, as a result the river channel is deeply incised, with alien vegetation encroachment becoming a serious problem below the dam.

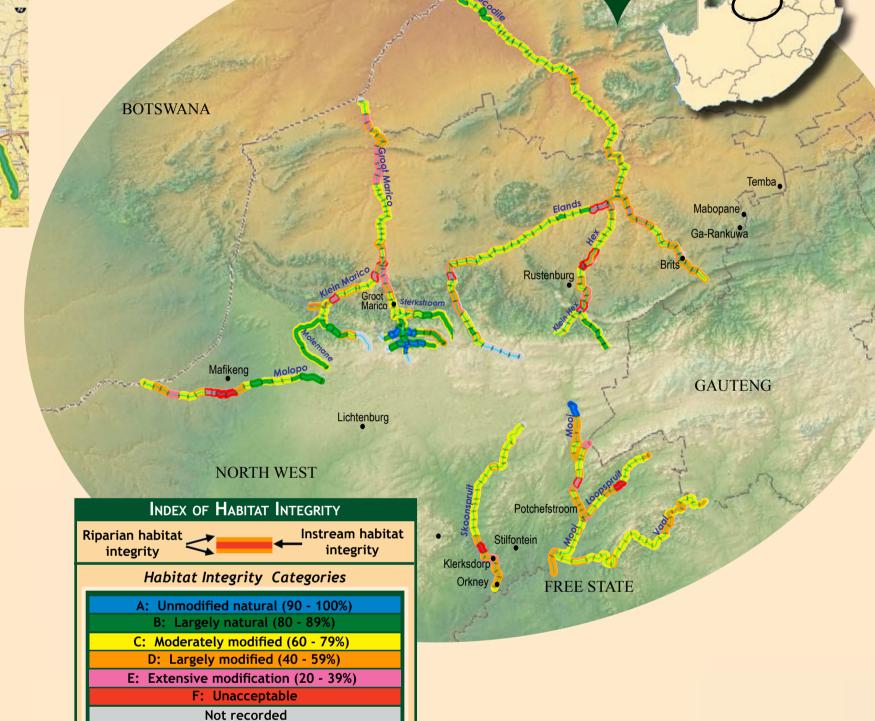
Sector Ripariar Instream Riparia

In general the habitat integrity in the Mooi River is in a largely or moderately modified state. At Kerkskraal and Boskop dams the river has been extensively modified to an unacceptable state (E category). Downstream of the Klerkskraal Dam, the upper reaches of the river are dominated by wetland areas that have been impacted on by historical prospecting and diamond mining, with resultant bed and bank modifications.

The Wonderfonteinspruit receives mining processing water that

Habitat Integrity Results : Loopspruit River Riparian Instream
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deteriorates the water quality. Peat mining in the tributary that is formed from the Gerhard Minnebron dolomitic eye has reduced the habitat integrity in this part of the catchment. Alien vegetation dominates the river below Boskop Dam. The habitat integrity deteriorates further in Potchefstroom below the Potchefstroom Dam.







Habitat Integrity Results: Schoonspruit River

Sector	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
Riparian	С	С	С	С	С	D	С	С	С	С	С	С	С	С	С	D	F	D	Е	Е	D	D	D	С
Instream	С	С	С	С	С	С	С	С	С	С	С	С	С	С	С	D	F	D	D	D	D	D	D	С
Riparian	С	С	С	С	С	D	С	С	С	С	С	С	С	С	С	D	F	D	Е	Е	D	D	D	С

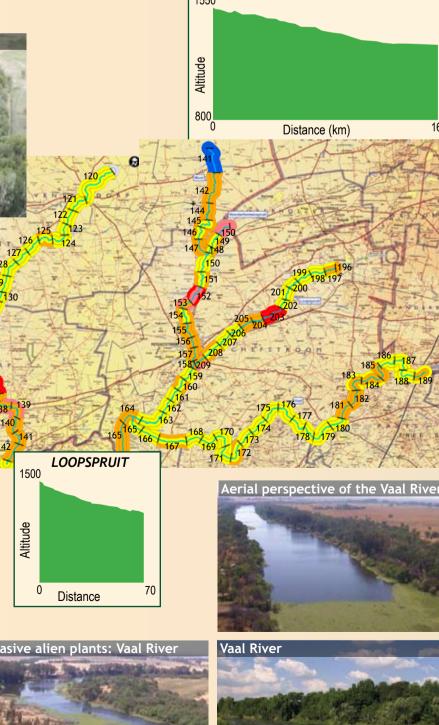
The Schoonspruit can be divided into distinct reaches depending on the riparian zone vegetation and the type of ecosystem dominating the river. The upper reaches are characterised by wetland habitat. Below Ventersdorp, the river is characterised by a narrow channel, while the riparian zone is dominated by willows and white poplars. An extensive wetland system exists in the lower end of the Taaiboschspruit and Schoonspruit River.

Habitat Integrity Results: Vaal River

Sector	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189
Riparian	С	С	D	С	С	С	С	D	С	С	С	С	С	С	С	С	D	D	С	С	D	С	С	С	С
Instream	С	С	С	С	С	С	С	С	С	С	С	С	С	С	С	С	D	D	D	D	D	С	С	С	D
Riparian	С	С	D	C	С	С	С	D	С	С	С	С	С	С	С	C	D	D	С	С	D	С	С	С	С

The habitat integrity for the sections of the Vaal River assessed is mostly in a moderately modified state (C category). The only aspects that reduce habitat integrity to a largely modified state are the degree of inundation and riparian zone impacts, which result from indigenous vegetation removal and alien vegetation encroachment. Given the nature of the water use and the relatively constant discharge from the Vaal Barrage into the Upper Vaal River system, flow modification and water abstractions can be considered a relatively constant impact throughout the river system. Water hyacinths and filamenteous algae growth deteriorates habitat integrity substantially.

A substantial number of new housing developments are taking place in the vicinity of Parys with specific impacts in terms of vegetation. This resulted in the variation in the habitat integrity that can be attributed to the clearing of vegetation and the associated localised impacts caused by sediment deposition in the river.





of erosion and high sediment loads from the catchment in the middle and lower reaches of the river. Sesbania has infested large parts of the river and is present in the Vaalkop Dam basin.

Habitat Integrity Results: Mooi River

	141	142	144	145	146	147	150	149	148	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
an	Α	D	D	D	D	D	Е	D	D	С	D	F	Е	D	D	D	D	С	С	D	С	С	С	D	D
am	Α	D	D	С	С	D	Е	С	С	С	С	Е	D	С	D	D	D	D	С	С	С	С	С	D	D
an	Α	D	D	D	D	D	Е	D	D	С	D	F	Е	D	D	D	D	С	С	D	С	С	С	D	D

The habitat integrity of the Loopspruit is predominantly in a moderately to largely modified state. Major impacts are mining activities and urban activities at Fochville, as well as the discharge of treated sewage into the upper reaches of the river. Farming activities in the middle reaches further reduce habitat integrity through the removal of riparian vegetation and by water abstraction from the river. The Klipdrift Dam in the middle reaches degrades the habitat to an unacceptable level by altering the river flow substantially. The habitat is also extensively modified near Potchefstroom.



