1 JBS15 (OSAEH 11.6: RHENOSTERSPRUIT)

1.1 SITE DESCRIPTION

The site is situated approximately 18 km upstream of its confluence with the Vaal River in MRU Rhenoster C according to DWA (2009b). The water was slightly turbid and the river channel was notably stable with well developed marginal vegetation. The abundance of watercress (*Rorippa nasturtium-aquaticum*) is often an indication of excessive nutrients entering the system. The substratum at the sampling site was slightly embedded and benthic algae were also present. There is abundant, diverse marginal vegetation, with good cobble habitat available if suitable flow is present. GSM (Gravel, Sand and Mud) and SOOC (Stones Out Of Current) biotopes were also present in suitable quantity and quality.

Location	Renosterspruit	**Altitude**	1308m
Longitude	27.0099	**Latitude**	-27.0529
EcoRegion	Highveld 11.08	**Quaternary catchment**	C70K
Water Management Area	Middle Vaal	**Geomorphological zone**	Lowland River

Site OSAEH 11.6 indicating excellent marginal vegetation but poor stream flow

1.2 SAMPLING CONDITIONS

At the time of sampling, little to no flow was present at the site. The site consists of pool sections, as well as cobble and sand sections with very little flow. Marginal vegetation was of excellent quality and quantity. The substratum was mostly cobbles, sand and mud, with good SOOC biotope present. Algae were also present on the cobbles.

1.3 PRESENT ECOLOGICAL STATE

IIHI	The Instream Index of Habitat Integrity (IIHI) was rated a D (60.1%). This is mostly due to changes in water quality as a result of extensive cultivation and farming. The hydrology has probably changed due to reduced roughness in the catchment.
RIHI	The Riparian Index of Habitat Integrity (RIHI) is a C/D (73.4%) with the main impacts being riparian encroachment due to increased nutrients and increased flow peaks from extensive hardened as well as the presence of exotic vegetation.
Fish	Three of the ten expected fish species were collected within this Resource Unit (RU) during the present survey suggesting that the FROC of some species have been reduced from reference conditions and that the site did not provide suitable habitat for the larger fish species. Based on their abundance, the FROC of smaller species such as *B. paludinosus* and *P. philander* at this site was rated to be close to reference and can be contributed to plentiful marginal vegetation and slightly turbid waters, providing suitable cover. Although *T sparrmanii, L. capensis L. umbratus, L. aeneus* and *L. kimberleyensis* was not collected at this site during the present survey, it is probable that these species are still present in the system where suitable habitat is available.
Inverts	Oct 2010: SASS5 score: 127 No of Taxa: 27 ASPT: 4.7 Key taxa expected but not observed were generally those that are sensitive to water quality changes, such as Perlidae and Heptageniidae. Notonectidae, Pleidae and Belostomatidae were more abundant than expected, while Elmidae, Caenidae, Coenagrionidae and Libellulidae were less abundant than expected. Those taxa which have a preference for very fast flowing water (>0.6 m/s) were notably absent, namely Perlidae, Psephenidae, Hydropsychidae >2spp. Tricorythidae and Philopotamidae. Some taxa with a preference for moderately fast flowing water (0.3 – 0.6 m/s) were also absent, including Heptageniidae, Leptoceridae and Naucoridae.
Rip veg	The main impacts are substrate exposure due to trampling and the presence of exotic vegetation.
Diatoms	The diatom community indicated that the biological water quality at the site was moderate (C EC) with a SPI score of 9.6. Elevated concentrations of organically bound nitrogen were present, with moderate saturated oxygen levels. Although organic pollution is moderate this site is strongly polluted.

1.4 MAIN IMPACTS AT THE SITE

	PES	Causes	Sources	F[1]/NF[2]
Rip veg	C	Terrestrialisation.	Burning regime out of control. Annual burns enhance the encroachment of terrestrial species into the riparian zone.	NF
		Exotic invasion.	*Salix babylonica, Gleditsia triacanthos,* and *Eucalyptus* sp., and non-woody weeds.	
		Water quality.	Chicken farms, non-point source pollution (cultivation).	F
Fish	C	Loss of habitat diversity as a result of changes in hydrology.	Decreased flow in dry season and increased flood peaks.	F
		Decreased water quality affect species with requirement for high water quality.	Increased nutrients, sediments and toxins from agricultural areas.	NF
		Increased turbidity and disturbed bottom substrates.	Erosion and presence of bottom feeding alien (*C. carpio*).	
Inverts	C	Low flow conditions.	Abstraction - agriculture.	F
		Water quality and associated benthic growth.	Agriculture	NF

1.5 BASELINE SURVEY RESULTS: PRESENT ECOLOGICAL STATE

Driver Components	PES	Trend
IHI: INSTREAM	D	
IHI: RIPARIAN	C/D	
DIATOMS (WQ)	C	
Response Components	**PES**	**Trend**
FISH	C	Stable
MACRO INVERTEBRATES	C	Stable
INSTREAM	C	
RIPARIAN VEGETATION	C	Stable
ECOSTATUS	C	

The PES is a category C. Reasons for this include changes in the hydrology of the system due to agriculture in the catchment. Increased nutrients, sediments and toxins from agricultural practices in the area impact negatively on the site with a resultant decrease in instream habitat integrity. Presence of exotic vegetation impacts negatively on the site, thus decreasing the overall ecological integrity of the site.

1.6 SUITABILITY AS FUTURE BIOMONITORING SITE

Good habitat diversity is available at the site for SASS sampling, if suitable flow is present. Excellent quality and quantity of marginal vegetation is present, with good quantity of cobble biotope and sand and mud biotopes present. Few localized impacts are present. Dense benthic algal growth is present due to nutrient enrichment. The site is easily accessible with wadeable areas. There is an abundance of undercut banks and marginal and/or overhanging vegetation present, which provide suitable habitat for small fish species. The marginal riparian zones present relatively good vegetation cover. Clear hydro-geomorphogical zones are present. Very little erosion is present. Exotic species are present in the riparian zone as well as localised impacts.

Access to the site may be problematic as permission from landowners will be needed.

This site is a valuable monitoring site, although the landowner will have to be approached by a senior official as he is very negative and hostile; if the site is to be included in future monitoring programmes.