

7 SUMMARY OF WATER RESOURCE AND WATER USE ISSUES

Water resource quality and water use issues are summarised below according to their impact on the water quantity, quality, and aquatic ecosystem.

WATER QUALITY

The chemical data for the surface water quality at some of the monitoring points within the catchment is in general not suitable for some of the users (domestic, livestock watering) due to elevated salt concentrations. These elevated salt concentrations can be attributed mainly to the geology in the catchment. Other nutrients concentration, e.g. nitrates, that renders surface water unsuitable for use by specific users are due to the activities such as urban development in the lower reaches of the Diep River and major agricultural activities that dominate almost the entire upper part of the catchment.

The chemical data for the groundwater at the sources indicates that water quality is not ideal for use, and the details depends on the specific user as outlined in the water quality guidelines (chapter 5). There is only one source (Liliefontein/Skaapskraal) of ground water supply that is suitable for all water users. The elevated concentration of salts indicated in other sources is mainly due to natural geology, with possible contributions from the agricultural and industrial activities in the catchment.

In the estuary and the coastal zone faecal pollution is of concern mainly for health related reasons if swallowed during direct contact recreation. Possible sources of faecal bacteria in the estuary are from the urban storm runoff, treated wastewater from Milnerton Wastewater Treatment Works, leaking sewers and the Diep River itself. Bacterial pollution in the coastal zone could be from the industries and stormwater discharge.

Nutrient concentration status, is mainly a concern due to the effluent from the wastewater treatment works, that increases the concentration of nutrients in the Diep River, and this could lead to eutrophication and algal blooms problems in the estuary.

WATER QUANTITY

The present day MAR has decreased by 9.3 %, as shown by simulated results (Richards C and P Dunn, 1994). The contribution of the effluent from the major wastewater treatment works in the catchment is not clearly indicated in the report (Richards C and P Dunn, 1994), "Hydrology of the Diep River Basin." Because it's a well know fact that the contribution of the waste water effluent has kept the Diep River flowing even in the summer dry season.

Water quantity issues exist as a result of dams in the upper catchment and abstraction of water by irrigation. There are low flows in the Diep River and none of the dams have any operation rules for releasing water for environmental maintenance purposes. Increases in alien vegetation

reduce the flushing abilities and reduce the runoff to the river system. Domestic livestock that utilise the riparian zone also alter the natural flow of the river.

ECOSYSTEM INTEGRITY

The main aquatic ecosystem integrity issues in the Diep River catchment are due to flow, water quality, and the presence of exotic species. Abstraction of water in the upper catchment has affected the ecosystem integrity, while downstream, residential and industrial development has impacted on both the water quantity and water quality.

The biomonitoring results indicate only one monitoring site (D11A – Diep River in the mountain zone, on a farm Nooitgedacht) with moderately impaired water quality. All other monitored sites indicated deteriorated water quality. Biomonitoring is based on the premise that a measurement of the condition or health of the biota can be used to assess the health of the ecosystem. The changes on deteriorating water quality observed in all remaining monitoring sites indicate deteriorated river ecosystem health. These changes are due to point sources and non-point sources, which are discussed under Chapter 3. The biomonitoring assessment show that health of the biota is declining in the Diep River, which certainly rule out the use of surface water for domestic use without proper treatment.

The dry season results in the disappearance of most species in the estuary and this has an effect on the ecosystem integrity. The mouth

dynamics (opening and closing) plays a role in the introduction of marine animals into the estuary.

The definition of a water resource as stated in the National Water Act (Act 36 of 1998) was to include three compartments of habitat (sediments, instream and riparian), aquatic biota and water, as well as the physical, chemical and ecological processes which link these components of the aquatic environment. This reflects the fact that the sustainability of the ecosystem depends on the ecological interactions between the physical, chemical and biotic components of water.

An integrated approach is now applied to water resource management, which recognises these different, but inter-linked, aquatic ecological compartments and their different management requirements. Water resource assessments are now undertaken in terms of water resource quality. This incorporates all the components of aquatic ecosystems, as well as the water quality needs of the various users.

Thus for the Diep River - surface water it is important to continue chemical monitoring on frequent bases at the monitoring points. These will not only help with the trends and seasonal analyses, but will be of major importance especially when the two tools (chemical monitoring and biological monitoring) are to be compared and contrasted in details. The results from two different monitoring tools show almost similar results that the surface water quality of the Diep River is deteriorated.

RECOMMENDATIONS

8 RECOMMENDATIONS

Issues have been raised in this report that need to be addressed for the improvement of the water resource quality in the Diep River catchment. A list of recommendations is given below to address each of the issues raised in the report. This list of issues and the recommended actions should not be considered as the final solution.

Phase two of the project is recommended to cover sections relating to Chapter 3 of the National Water Act (Act 36 of 1998), and i.e. the determination of the catchment class, Reserve requirements and Resource Quality Objectives.

TABLE 17. GENERAL ISSUES IN THE DIEP RIVER CATCHMENT

ISSUE 1. Community in informal settlements, rural areas, and some black townships have no access to treated potable water			
Actions	Responsibility	Benefit	Constraints
Investigate alternative sources of water	DWAF, CCT, Local council	Access to potable water by all communities	Infrastructure and knowledgeable human resource
ISSUE 2. Rapid development in the lower areas of the catchment			
Actions	Responsibility	Benefit	Constraints
Environmental Impact Assessments (EIA), should be done for large scale development projects	All Developers	Provides the overall impact of the development project and provides a basis for public consultation	Resources
ISSUE 3. High faecal concentrations bacteria in the Diep River system including the estuary and coastal zone			
Actions	Responsibility	Benefit	Constraints
Investigate the main source of faecal contamination	DWAF, stakeholders	Prioritise management actions required to reduce faecal pollution problem	Resources
Determine resource quality objectives	DWAF, stakeholders	Can meet the "Reserve" for both water users and the aquatic life	More detailed monitoring required
ISSUE 4. Alien (exotic) vegetation infestation in the catchment			
Actions	Responsibility	Benefit	Constraints
Identify main areas of infestation	DWAF, Working For Water	Prioritise the removal of alien vegetation	Inaccessible areas
ISSUE 5. Vegetation removal, bank erosion and channel modification			
Actions	Responsibility	Benefit	Constraints
Better farming practices	Agriculture and Farmers	Reduced sedimentation and bank erosion	Resources for control and education
Environment friendly urban development	Local Authority	Improved aquatic ecosystem	Skilled resources

CCT: City of Cape Town

RECOMMENDATIONS

Table 17 cont.

ISSUE 6. Mining and quarries in the catchment			
Actions	Responsibility	Benefit	Constraints
Co-ordination between planning legislation and procedures, administered by Municipalities	DME, Local Municipalities	Control of mining activities and reduce sedimentation	Resources
ISSUE 7. The altered flow in the river system			
Actions	Responsibility	Benefit	Constraints
Control access of domestic livestock to surface water	Agriculture	Restore river ecosystem integrity	Resources
Exotic vegetation	DWAF	Restore river ecosystem integrity	Resources
ISSUE 8. The impacts of dams in the catchment			
Actions	Responsibility	Benefit	Constraints
Water use registration	DWAF, Catchment Management Agencies	Management of resources in the catchment, and knowledge of water available	Ignorance and perceptions
ISSUE 9. Abstraction rate resulting in decreased flow			
Actions	Responsibility	Benefit	Constraints
Monitoring surface and ground water	DWAF, Catchment Management Agencies	Restore the deteriorated state of the river system	Human resources

DME: Department of Minerals Energy

MONITORING REQUIREMENTS:				
MONITORING TYPE	LOCATIONS	FREQUENCY	RESPONSIBILITY	EXISTING MONITORING
Surface water quality	Diep River and its tributaries	Monthly	DWAF	✓
Ground water quality	All the boreholes monitored	Quarterly (of the year period)	DWAF	✓
Flow	All gauging stations	Daily	DWAF	✓
Micro-invertebrates (e.g. SASS4)	Diep River and its tributaries	Annually	CMC, DWAF	✓
Fish	Diep River and its tributaries	6 monthly	DWAF	✗
Habitat	Diep River and its tributaries	Annually	DWAF	✗
Vegetation	Diep River and its tributaries	Annually	DWAF	✗

- ✓: current monitoring
 ✗: monitoring currently not undertaken

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APPENDICES:

- A. Wetland Plant Communities.
- B. History of impoundments, and existing monitoring points in the Diep River catchment.
- C. A summary of water quality classification system of suitability for different users.
- D. Estuarine Birds Species.
- E. Water Quality Data, surface water of the Diep River Catchment.
- F. Water Quality Data, groundwater of the Diep River Catchment.
- G. Water Quality Data, coastal water of the Diep River Catchment.
- H. Glossary of Terminology.
- I. Glossary of Abbreviations