11. THE OLIFANTS/DOORN WMA

11.1 WMA DESCRIPTION

11.1.1 Topography, Rainfall and Landuse

The Olifants-Doorn WMA is shown on Figure 11.1.1. It lies to the north of the Berg, Breede and Gouritz WMAs and to the west of the Lower Orange WMA.

![Figure 11.1.1 The Olifants-Doorn WMA.](image)

Water resource information is always presented according to physical catchment boundaries, themselves defined by topographical and climatic features. In the case of the Olifants-Doorn WMA, the catchment boundaries do not correspond with municipal demarcations or with the provincial boundaries, nor does the entire WMA fall within the Western Cape Province (see Figure 11.1.2).
11.1.2 Topography, Rainfall and Landuse

The major river in the WMA is the Olifants River, of which the Doring River (draining the Koue Bokkeveld and Doring areas) and the Sout River (draining the Knersvlakte) are the main tributaries.

The Olifants River rises in the mountains in the south-east of the WMA and flows in a north-westerly direction. Its deep narrow valley widens and flattens downstream of Clanwilliam until the river flows through a wide floodplain downstream of Klawer. The Doring River is a fan shaped catchment and rises in the south, flowing in a northerly direction. It is first joined by the Groot River and then by the Tra-Tra River flowing from the west and the Tankwa River from the east, before flowing in a westerly direction to its confluence with the Olifants River just upstream of Klawer.

Climatic conditions vary considerably as a result of the variation in topography. The mean annual precipitation is up to 1 500 mm in the Cederberg mountains in the south-west, decreasing sharply to about 200 mm to the north, east and west thereof, and to less than 100 mm in the far north.
Important conservation areas include the Tankwa-Karoo National Park, the Verlorenvlei wetland in the Sandveld (which enjoys Ramsar status), the Cederberg Wilderness Area, and the northern section of the Groot Winterhoek Wilderness Area.

The Olifants River and its tributary, the Doring River are important from a conservation perspective because they contain a number of species of indigenous and endemic fish that occur in no other river systems, and that are endangered. The Olifants estuary is one of only three permanently open estuaries on the west coast of South Africa. It therefore represents a critical habitat to many estuarine-associated fish species.

The mean annual precipitation over much of the WMA is less than 200 mm, with the result that, except in the wetter south-west, the climate is not suitable for dryland farming on a large scale. Consequently, more than 90% of the land in the Olifants-Doorn WMA is used as grazing for livestock, predominantly for sheep and goats.

Approximately 500 km² is under irrigation, of which almost 50% lies within the Olifants river catchment and includes citrus, deciduous fruits, grapes and potatoes, providing the mainstay of this WMA’s economy (NWRS, 2004). In addition to the intensive irrigation practised along the Olifants River, significant irrigation also takes place in the Koue Bokkeveld, along the rivers and from groundwater in the Sandveld sub-area.

11.1.3 Geological setting

The nature and composition (lithology) of each of the different stratigraphic units is considered. The geological description is taken from SRK (2006). Figure 11.1.3 and Table 11.1.1 summarise the geology of the Olifants-Doorn WMA. The geology of the Olifants-Doorn WMA is dominated by metamorphic rocks of the Nama Group in the north and sedimentary rocks of the Cape Supergroup in the southern and south-western parts. In the northern and north-eastern parts, the rocks of the pre-Cape Van Rhynsdorp Group, the sedimentary rocks of the lower Karoo Supergroup as well as intrusive Karoo dolerites are dominant. Various metamorphic rocks (i.e. quartzites, granulite and schists), augen gneisses as well as mafic gneisses of the Garies and Bitterfontein Subgroups (Okiep Group) are overlain by sediments of the Nama Group in the north-western portion of the WMA near Nuwerus. Tertiary to Recent sediments occurs along the major river courses and extensively along the coast (including north-west of the town of Graafwater).

Hydrogeological characteristics, with regard to the permeability of the unit and its classification as an aquifer, aquitard or aquiclude, are also included.

Table 11.1.1 Stratigraphy of the Olifants-Doorn WMA (SRK, 2006)

<table>
<thead>
<tr>
<th>Lithostratigraphic Unit</th>
<th>Era</th>
<th>Characteristics</th>
<th>Hydrogeological Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandveld Group</td>
<td>Cenzoic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karoo Dolerite (north-east)</td>
<td>Mesozoic</td>
<td>Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.</td>
<td></td>
</tr>
<tr>
<td>Beaufort Group</td>
<td>Mesozoic</td>
<td>6000m alternating arenaceous and argillaceous sediments</td>
<td>Localised significance as aquifer systems.</td>
</tr>
<tr>
<td>Ecca Group</td>
<td>Paleozoic</td>
<td>Dark grey shale and inter-bedded sandstone</td>
<td>Middle to upper thin sandstone strata may have greater hydrogeological significance</td>
</tr>
<tr>
<td>Dwyka Group</td>
<td></td>
<td>Tilit</td>
<td>Aquiclude</td>
</tr>
<tr>
<td>Wittenberg Group</td>
<td>Paleozoic</td>
<td>Alternating sand-stone and shale</td>
<td>Marginal hydrogeological significance</td>
</tr>
<tr>
<td>Bokkeveld Group</td>
<td></td>
<td>Alternating sand-stone and shale</td>
<td>Little significance, else regolith aquifer</td>
</tr>
<tr>
<td>Nardouw Subgroup</td>
<td></td>
<td>1100m to 810m alternating sand-stone and shale with lenses of quartzite</td>
<td>Top aquifer of TMG-2. Confined above by lowermost shale unit of Bokkeveld Group</td>
</tr>
<tr>
<td>Cederberg Shale Formation</td>
<td></td>
<td>50m to 120m shale</td>
<td>Top confining layer for lower aquifer system (TMG-1)</td>
</tr>
<tr>
<td>Lithostratigraphic Unit</td>
<td>Era</td>
<td>Characteristics</td>
<td>Hydrogeological Significance</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----</td>
<td>----------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Pakhuis Formation</td>
<td></td>
<td>40m</td>
<td>Major fractured rock/secondary aquifer system. Middle aquifer (TMG-1)</td>
</tr>
<tr>
<td>Peninsula Formation</td>
<td></td>
<td>1800m to 2150m sandstone</td>
<td></td>
</tr>
<tr>
<td>Graafwater Formation</td>
<td></td>
<td>Sandstone</td>
<td></td>
</tr>
<tr>
<td>Piekenierskloof Formation</td>
<td></td>
<td>Conglomeratic base, followed by 800m coarse sandstone</td>
<td>Basal aquifer unit (TMG-1)</td>
</tr>
<tr>
<td>Klipheuvel Group</td>
<td>Paleozoic</td>
<td>Lower conglomeratic formation and an upper mudstone formation of approx 2000m</td>
<td>Aquitard of limited hydrogeological significance</td>
</tr>
<tr>
<td>Van Rhynsdorp Group (north-west)</td>
<td>Paleozoic</td>
<td>A succession of shallow sediments deposited on a tidal plain</td>
<td>Impermeable aquiclude</td>
</tr>
<tr>
<td>Malmesbury Group (south)</td>
<td>Namibian</td>
<td></td>
<td>Impermeable aquiclude</td>
</tr>
</tbody>
</table>
Figure 11.1.3  Geological setting of the Olifants-Doorn WMA.
11.2 WATER QUALITY

The surface water quality of the Olifants-Doorn WMA is quite variable. Water quality in the upper Olifants River, upstream of Clanwilliam Dam, is “ideal” and is suitable for all uses. There is evidence of elevated phosphate concentrations which may be the result of agricultural activities and wastewater return flows in the Citrusdal area.

Physical and chemical characteristics of the WMA geology have a strong influence on the water quality. Water quality in the Upper Olifants and Koue Bokkeveld is good and suitable for all uses. The quality of water in the upper Doring River (E22), when flowing, is suitable for agriculture and domestic water supplies, however, at the end of summer the quality deteriorates. Highly saline flows from the Tankwa Karoo tributaries have a sporadic influence. In the upper portions of the Sandveld sub-area water quality is poor, resulting from agricultural activities on the Malmesbury shales which are high in salts. Agricultural activities influence the water quality significantly throughout the WMA, especially during the summer months.

The assessment of ecosystem health is included in Annexure D.

11.2.1 Water Quality Monitoring

*Figure 11.2.1* shows the water quality monitoring points in this WMA, and also indicates which authority is responsible for the monitoring. The River Health monitoring points are shown on *Figure 11.2.2.*
Figure 11.2.1 Water quality monitoring points in the Olifants-Doorn WMA.
Figure 11.2.2  River Health Programme monitoring points in the Olifants-Doorn WMA.
11.2.2 Surface Water Quality Status in the Olifants-Doorn WMA

The Olifants River and its tributary, the Doring River, are important from a conservation perspective because they contain a number of species of indigenous and endemic fish that occur in no other river systems, and that are endangered. Some of the tributaries are virtually unspoiled and are of high to very high ecological importance. The Olifants estuary is one of only three permanently open estuaries on the west coast of South Africa and represents a critical habitat to many estuarine associated fish and bird species (DWA, 2010).

A graphical interpretation of the water quality status in the Olifants-Doorn is presented in Figure 11.2.4. This provides a summary at the selected monitoring point of the compliance of the water quality variable at that point along the river, in comparison with a generic set of Resource Water Quality Objectives (RWQO) that are applicable to all the rivers across the entire country. Annexure F provides the detailed records in the Olifants-Doorn WMA of the observed water quality profile, on which this summary is based. The assessment of ecosystem health is included in Annexure D.

11.2.3 Water Quality Concerns in the Olifants-Doorn WMA

Based on previous studies and on availability of monitoring information, the following water quality issues and landuse concerns are summarised for this WMA:

- **Microbial water quality in the Upper Olifants River**

  There is evidence of elevated phosphate concentrations which may be the result of agricultural activities and wastewater return flows in the Citrusdal area. Agricultural activities in this WMA include a wide variety of crops including: wine and table grapes, rooibos tea, citrus and deciduous fruit, wheat, potatoes, flower and wild flower cultivation, livestock, and fisheries. Irrigation water use is thus the largest water user. Irrigation is with good quality water from irrigation canals, but farmers need to over-irrigate in order to leach out salts that accumulate in the irrigated soils. The leached water runoff is returned to the middle and lower Olifants River resulting in a progressive deteriorating of water quality.

  The good quality water is stored in Clanwilliam Dam and Bulshoek Dam from where it is distributed via a system of canals to irrigation farmers in the middle and lower Olifants River valley. In the Olifants River downstream of Clanwilliam Dam and upstream of the Doring River confluence, the water quality is progressively impacted by irrigation return flows from the highly cultivated Lower Olifants River irrigation scheme. The result is that water in the lower Olifants River just before the estuary is “unacceptable” and salinity exceeds the requirement for irrigation use.

- **Nutrient enrichment in the Upper Olifants River**

  The Citrusdal valley experiences nutrient enrichment which is largely attributed to agricultural return-flows, especially in the summer months when the flow is relatively low in the river. Treated domestic wastewater, municipal solid waste management and informal settlements contribute towards this problem. Effluent from fruit and wine industries also needs to be monitored in Citrusdal.

- **Impacts of agro-chemicals**

  Concerns have been raised about the impacts of residues from agricultural chemicals such as pesticides and herbicides on surface and sub-surface waters in intensive irrigation areas. Such impacts have not been studied in the middle and lower Olifants River but research in similar irrigation developments have shown that residues should at least be monitored.

- **Sand mining**

  Concerns have been expressed about sand mining activities in the WMA (e.g in non-perennial rivers in the Vannyhnsdorp area). It is poorly controlled and results in an increase in turbidity and suspended sediment concentrations, increased salinity, which causes silting of rivers and streams and smothering of habitat of aquatic organisms.
Proposed mining and associated impacts on Verlorenvlei

Concerns have been expressed about the proposed development of a tungsten mine in the catchment of the Verlorenvlei wetland and the impacts this may have on salinity and ecosystem health in this ecologically sensitive wetland (DWA, 2010).

The impacts of WWTWs in this WMA are less of a concern than in the more densely populated WMAs of the Berg, Breede and Gouritz for example. The location of the WWWTs in the Olifants-Doorn WMA is shown on Figure 11.2.3.
Figure 11.2.3 Location of WWTWs in the Olifants-Doorn WMA.
Figure 11.2.4  Water quality "Fit for use" for the Olifants-Doring WMA. (Source: DWA, 2010).
11.3 GROUNDWATER

Groundwater quality is generally controlled by aquifer lithology and geochemistry. Accordingly groundwater quality in the Olifants-Doorn WMA varies significantly between the fractured-rock aquifers that overlie generally impermeable shale- or granite-dominated pre-Cape formations. The most vulnerable aquifer is the primary coastal aquifer in the vicinity of Elands Bay and Lamberts Bay, reflecting the potential risk of seawater intrusion from exploitation of groundwater in this area. The heavy reliance on groundwater for town supplies highlights the need for aquifer protection, monitoring and wellfield management in this WMA.

11.3.1 Aquifer types

With regard to the geohydrological setting the description that follows is based on the 1:500 000 Hydrogeological Map Series of Department of Water Affairs (DWA). The four aquifer types and associated extent (%) within the Olifants-Doorn WMA are listed in Table 11.3.1 (see also Figure 11.3.1).

Table 11.3.1 Extent of aquifer types within the Olifants-Doorn WMA

<table>
<thead>
<tr>
<th>Aquifer Type</th>
<th>Percentage coverage of O-D WMA (Western Cape)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractured</td>
<td>82 %</td>
</tr>
<tr>
<td>Intergranular</td>
<td>2 %</td>
</tr>
<tr>
<td>Intergranular and fractured</td>
<td>13 %</td>
</tr>
<tr>
<td>Karst</td>
<td>2 %</td>
</tr>
</tbody>
</table>

The percentage of the total WMA for each aquifer type and associated sub-divisions are listed in Table 11.3.2 which shows that fractured aquifers are widely distributed across the WMA with the most typical borehole yield being between 0.1 l/s and 2.0 l/s.

Table 11.3.2 Aquifer types and percentage area lying within the Olifants-Doorn WMA

<table>
<thead>
<tr>
<th>WMA</th>
<th>Aquifer type and yield</th>
<th>Area (km²)</th>
<th>% Area of O-D WMA (Western Cape)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Fractured 0.0 - 0.1 l/s</td>
<td>635</td>
<td>2</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Fractured 0.1 - 0.5 l/s</td>
<td>8223</td>
<td>27</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Fractured 0.5 - 2.0 l/s</td>
<td>10557</td>
<td>34</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Fractured 2.0 - 5.0 l/s</td>
<td>5953</td>
<td>19</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Fractured &gt; 5.0 l/s</td>
<td>189</td>
<td>0.6</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular 0.1 - 0.5 l/s</td>
<td>266</td>
<td>0.9</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular 2.0 - 5.0 l/s</td>
<td>198</td>
<td>0.6</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular &gt; 5.0 l/s</td>
<td>157</td>
<td>0.5</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular and fractured 0.0 - 0.1 l/s</td>
<td>756</td>
<td>2</td>
</tr>
<tr>
<td>WMA</td>
<td>Aquifer type and yield</td>
<td>Area (km²)</td>
<td>% Area of O-D WMA (Western Cape)</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
<td>------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular and fractured 0.1 - 0.5 l/s</td>
<td>3126</td>
<td>10</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Intergranular and fractured 0.5 - 2.0 l/s</td>
<td>175</td>
<td>0.6</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Karst 0.5 - 2.0 l/s</td>
<td>483</td>
<td>2</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>Karst &gt; 5.0 l/s</td>
<td>277</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 11.3.1  Aquifer types of the Olifants-Doorn WMA.
11.3.2 Groundwater Recharge

Groundwater recharge (Figure 11.3.2) across the Olifants-Doorn WMA recharge ranges from 0 mm/a to 245 mm/a. The highest groundwater recharge occurs in the Upper Olifants sub-area, especially in the Winterhoek mountain area. Significant recharge also occurs in the Koue Bokkeveld, eastern Doring, and western Sandveld sub-areas. For the remaining areas groundwater recharge is quite limited.

![Groundwater recharge of the Olifants-Doorn WMA](image)

**Figure 11.3.2** Groundwater recharge of the Olifants-Doorn WMA
11.3.3 Groundwater Quality

The Olifants-Doorn WMA is characterised by good groundwater quality, associated with the Cederberg Mountains (Table Mountain Group). The groundwater quality in the Koue Bokkeveld is excellent. The groundwater quality becomes more saline towards the north and the north-western corner of the WMA is very saline. This high salinity is attributable to the proximity to the coast, the low groundwater recharge rates and the geological setting. Figure 11.3.3 shows the salinity distribution of groundwater across the WMA.

![Groundwater quality (EC) map of the Olifants-Doorn WMA.](image)

Figure 11.3.3 Groundwater quality (EC) of the Olifants-Doorn WMA.
11.3.4 Groundwater Abstraction

Groundwater abstraction is particularly high for the agricultural sector in the Koue-Bokkeveld region (E21A, E21D and E21G). It also plays a significant role in the Sandveld as agricultural supply. In addition groundwater plays a crucial role in supplying a number of towns especially in the Sandveld with the only source of domestic water. Figure 11.3.4 shown that groundwater use reduces to the north of the WMA.
11.3.5 Groundwater Stress Index

The groundwater stress is highest in Quaternary catchment E21G, however there are catchments where the index is high (e.g. Vredendal area). There are also areas within catchments where the abstraction exceeds the recharge (e.g. lower Langylei G30F), however the overall index for the catchment is acceptable and is shown graphically on Figure 11.3.5.
11.3.6 Groundwater contribution to river base flow

Regarding groundwater/surface water interaction (see Figure 11.3.6) the range in contribution of groundwater supplying river base flow is from 0 to 8 Mm³/a (per quaternary catchment). The highest base flow contribution areas are the same as areas of highest groundwater recharge. It must be noted,
however, that in the other areas groundwater still plays a significant role in maintaining river base flow, although on a much smaller scale, i.e. smaller volumes and more limited in extent.

Figure 11.3.6  Groundwater contribution to river base flow of the Olifants-Doorn WMA

11.3.7  Groundwater – general comments

Table 11.3.3 lists the quaternary catchments where the groundwater abstraction exceeds the groundwater recharge and the volume of groundwater required to meet the groundwater Reserve
allocation. Intervention measures are required to ensure sustainable use of groundwater occurs in these two Quaternary Catchments.

Table 11.3.3 Quaternary catchments where groundwater abstraction exceeds recharge and the Reserve - Olifants-Doorn WMA

<table>
<thead>
<tr>
<th>WMA</th>
<th>Quaternary Catchment</th>
<th>Allocable Volume (Mm³/a)</th>
<th>% Area of Quat included</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E10A</td>
<td>-0.33</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E10D</td>
<td>-0.68</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E10F</td>
<td>-0.96</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E21A</td>
<td>-2.67</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E21D</td>
<td>-2.72</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E21E</td>
<td>-0.30</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E21G</td>
<td>-7.81</td>
<td>100</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E23F</td>
<td>-0.63</td>
<td>39</td>
</tr>
<tr>
<td>OLIFANTS-DOORN</td>
<td>E24L</td>
<td>-1.03</td>
<td>100</td>
</tr>
</tbody>
</table>

11.4 WATER RESOURCE INFRASTRUCTURE

The Olifants River Government Water Scheme includes the Clanwilliam Dam, Bulshoek Weir and a canal system to irrigate land extending along the Olifants River. Clanwilliam Dam and Bulshoek Weir are state-owned. Bulshoek Weir and the canal is operated and maintained by the Lower Olifants River Water User Association (LORWUA). Water is released from Clanwilliam Dam into the river to flow to Bulshoek Weir, some 30 km downstream. From here water is distributed by a canal system totalling 186 km in length (see Figure 11.4.1) with losses estimated at close to 30%.

![The Lower Orange River government water scheme canal.](image)

The canal system is used for irrigation, domestic and industrial supplies for towns, and to the Namakwa Sands Mine, as well as a number of small mining activities. Recently, irrigation supplies have frequently been curtailed. In addition to the need for DWA to strengthen Clanwilliam Dam (dam safety reasons), a
potential raising of up to 13m is also proposed. A Record of Decision on the EIA has been approved. There are also a large number of privately owned irrigation schemes.

Local water supply schemes rely on surface and groundwater. The towns in this WMA are all relatively small and most are supplied from local surface and groundwater sources via infrastructure owned and operated by local authorities. A few exceptions include Klawer, Vredendal, Vanrhynsdorp, Lutzville, Ebenhaezer, Strandfontein and Doringbaai which are supplied from the Lower Olifants Government Water Scheme. Citrusdal and Clanwilliam obtain water directly from the Olifants River and Clanwilliam also abstracts from the Jan Dissels River.

Some towns are dependent or partially dependent on groundwater supply and these include Loeriesfontein, Calvinia, Nieuwoudtville, Vanrhynsdorp, Bitterfontein-Nuwerus, Doringbaai, Lamberts Bay, Graafwater, Leipoldtville and Elandsbaai. Citrusdal also supplements its summer water supply from groundwater.

The Southern Namakwaland Government Water Scheme supplies desalinated groundwater from boreholes to the small towns of Bitterfontein and Nuwerus. This was implemented because of the severe shortage of suitable sources of surface water in those areas and groundwater of unfit quality. This scheme has also been extended to supply the Rietpoort and Molsvlei communities.

11.4.1.1 Strategic Perspectives from the ISP for the Olifants-Doorn WMA

The Olifants-Doorn WMA ISP (completed in 2005) which serves to guide the strategic management of water resources in this WMA until such time as a CMA is in place and has developed its CMS. The following key strategic objectives and concerns are extracted from that ISP:

**Strategic Objectives:**
- The riverine and estuarine Reserve currently being determined shall ultimately define the water resource development options in the WMA and the issuing of new water use licences.
- The development of off-channel farm dams, groundwater schemes and raising of Clanwilliam Dam are development options warranting further study.
- Groundwater monitoring and data collection must be prioritised so as to assess potential development of the resource.
- Savings of up to 30% can be achieved through repairs to the Olifants River Government Water Scheme canal.

**Concerns:**
- Salinity is a potential problem in the lower reaches of the Doring and Olifants Rivers.
- Overexploitation of groundwater in the Sandveld.
- Institutional challenges relating to infrastructure ownership (potential canal refurbishment)

11.5 OLIFANTS-DOORN WMA WATER AVAILABILITY AND UTILIZATION

In 2005, the water availability, utilisation and resulting water balance for the Olifants-Doorn WMA (based on the Olifants-Doorn WMA ISP) is as shown in *Figure 11.5.1.*
The majority of the shortfall (29 million m$^3$/a) was experienced in the lower Olifants River catchment, downstream of Clanwilliam Dam. This is being addressed in the DWA Feasibility Study on Raising Clanwilliam Dam (see below). The above figure shows that 87% of the water use in this WMA is by irrigation and a large proportion of that is by the Lower Olifants River Water Users Association (LORWUA), from water supplied out of Clanwilliam Dam. The assurance of supply to those irrigators, most notably the ones lowest down in the system is low and this makes farming practices difficult to operate and manage.

### 11.6 RECENT INTERVENTIONS

The essential dam safety modification which is required at Clanwilliam Dam (see Figure 11.6.1) has provided an opportunity to consider simultaneously raising the dam so as to improve the assurance of supply from it. DWA have undertaken a full Feasibility Study and EIA into the raising of Clanwilliam Dam, which also considered a number of alternative water resource development options. That study has concluded that the Clanwilliam Dam raising option was the most favourable for this region. This would addressing the shortfalls currently being experienced, and it was found that for a 13m raising, the yield of the dam could be increased by 70 million m$^3$/a. The EIA has been completed and a Record of Decision approved for a raising of up to 13m.

Although some canal repairs and refurbishments have been undertaken there remains significant opportunity to further reduce canal losses through upgrading and maintenance, but the challenges lie in the institutional arrangements and questions of ownership, affordability, financing, etc.
11.7 **TOP PRIORITIES AS PER BITT REPORT**

The prioritization of bulk infrastructure and skills needs in this WMA is included in Chapter [Error! Reference source not found.], together with the Berg WMA.

11.8 **PROBLEM SYNTHESIS**

The problems and gaps identified in this Chapter are broadly summarised as follows:

- Water quality in the Upper Olifants and Koue Bokkeveld is good and suitable for all uses but salinity problems to are encountered elsewhere. In the Sandveld area water quality is poor, resulting from agricultural activities on the Malmesbury shales which are high in salts and agricultural activities influence the water quality significantly throughout the WMA, especially during the summer months.
- Significant over-abstraction of groundwater occurs in the Kouebokkeveld (notably in Quaternary catchment E21G) and in the Vredendal area. A cautious approach to applications for further groundwater abstraction in areas of groundwater stress should be adopted.
- As in the case of Oudtshoorn, canal lining and refurbishment of the canals supplying the Lower Olifants River WUA offers opportunity but is likely to be prohibitively expensive for the irrigation sector to afford. DWA owns the canals so again the question of who pays versus who benefits would need to be resolved if this were ever to be implemented.
- 87% of the water use in this WMA is by irrigation and a large proportion of that is by the Lower Olifants River WUA, from water supplied out of Clanwilliam Dam. The assurance of supply to those irrigators, most notably the ones lowest down in the system is low and this makes farming practices difficult to operate and manage.
- Essential safety embetterments are required to the Clanwilliam Dam and the opportunity to simultaneously raise the dam wall has been investigated by DWA. This will add an additional 70 million m$^3$/a to the yield and will significantly improve the assurance of supply from the scheme. The EIA has been completed and a Record of Decision approved for a raising of up to 13m. To date a decision on commencement has not yet been taken.