# PART B: STRATEGY TABLES

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### 1 WATER BALANCE AND WATER RESOURCES RECONCILIATION

1.1 Surface water availability		
Management objective Situation assessment/	Ensure reliable estimates of the water resources (surface and groundwater) are available to effectively conduct Integrated Water Resources Management. The factors impacting on the water resources need to be clearly defined and understood. The surface water resources of the Thukela WMA have been the subject of investigation of several studies in the past. This interest in the water resource availability is due to the fact that the Thukela WMA in addition to its own in-basin	
motivation	demands, is also an important source of water for transfers to the Upper Vaal, the Usutu to Mhlathuze and the Mvoti to Mzimkulu WMAs.	
	The latest studies that involved updating the hydrological database and water resource analysis are as listed below:	
	<ul> <li>Vaal Augmentation Planning Study: Thukela – Vaal Transfer Scheme, concluded in <b>1995</b> and superceded by the subsequent studies listed below. (<b>DWAF</b>, <b>1995</b>)</li> </ul>	
	• Mooi, Mkomazi Hydrology Update, completed in the year <b>1997</b> ( <b>DWAF</b> , <b>1999</b> ).	
	• Thukela Water Project Feasibility Study, concluded in the year <b>2000</b> ( <b>DWAF</b> , <b>2000</b> ).	
	Thukela Water Project – Decision Support Phase.	
	These reports are summarised in <b>Annexure B</b> .	
	The hydrological data produced by the Thukela Water Project Feasibility Study are considered to be at a sufficient level of confidence to make reliable estimates of the water resource availability at a large system resolution. It is however recognised that increased resolution hydrology and water resources models would be required in future, particularly to assist in the management of allocations for licensing.	
	Information on the water resource availability, for the purpose of compiling a water balance for the Thukela WMA, originates from system analyses that were carried out as part of the Thukela Reserve Determination Study. The purpose of the analyses was to quantify the yield capability for the two scenarios, with and without the ecological Reserve. (See the <b>Reserve and Resource Quality Objectives Strategy 2.1</b> for more details on the Reserve). The analysis methodology that was applied to obtain the water balances is presented in detail in <b>Section 4.2</b> of <b>Part A</b> of the document.	
	The water resource availability was determined for seven Key Areas (see <b>Figure 3.1</b> ) as presented in a series of tables that are given in <b>Section 4</b> of <b>Part A</b> of this report. The Key Area availability data was further aggregated into four larger areas, which correspond approximately to the "Sub-area" definition that was used in the NWRS. These Sub-areas are also shown in <b>Figure 3.1</b> , and the comparisons between the ISP data and the data from the NWRS supporting reports ( <b>DWAF</b> , <b>2003</b> ) is presented in <b>Section 4.13</b> .	
	Groundwater availability is covered separately as part of <b>Strategy 1.4.</b>	

Strategy	A mechanism of documenting existing information and makin studies so that resources are channelled at improving information are needed in the Thukela WMA. This is especiall water resources developments are planned in the medium terr	ng it available to future rather than recreating y important since major n in the WMA.
	The resolution of the water resources assessment model the Thukela WMA should be refined (where required) to be balance conditions in sub-catchments. Such a model will the assessing water reconciliation options, water-use licence appli- term, for compulsory licensing.	hat is available for the able to assess water- ypically be required for cations and, in the long
	Severe drought events can have significant impacts on the av WMA and it is therefore required to consider revising or exter time series database when droughts occur in future. Other changes in the land use would also warrant the updating of general strategy is to monitor prevailing conditions over time perceived reason to update the hydrology, to first undertake a assessment and then decide whether or not a full-scale study is required.	vailability of water in the ending the hydrological factors such as major of the hydrology. The e and, when there is a reconnaissance impact to update the hydrology
	It would also be advisable to update the hydrology and implementation of Compulsory Licensing, particularly if the hy extended by ten years or more.	d models prior to the drology records can be
	The Regional DWAF office, as the <i>de facto</i> CMA, should alway all water availability assessment initiatives in the WMA and s results and procedures of assessments to the relevant local planning forums to ensure consistency in methodology and to updated data and information.	ys be an integral part of hould communicate the stakeholders and other facilitate the sharing of
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Management actions	Responsibility and priority
Develop or assist in the development of spatially fine resolution hydrology data and water resources models of the Thukela WMA to enable appropriate assessments of water resources at detailed catchment level, in particular where the water resources are stressed in catchments like the Little Thukela and Sundays rivers, or where there are large demands on the water resource, for example the Buffalo Key Area. The refinement of the model should be undertaken incrementally, focusing first on catchments where problems are experienced by the users or where water-use license applications necessitate that such analysis be undertaken.	D: NWRP & R Office Priority: High
Assess the prevailing conditions on a continuous basis to detect significant changes (e.g. severe drought or land-use changes) in order to commission	D: NWRP
reconnaissance assessment to determine the need to update the hydrology. Once there is evidence to show that the availability is affected, appropriate hydrological studies should be commissioned.	Priority: Medium

1.2 WATER REQUIREMENTS AND USE		
Management objective	Ensure that reliable information on the water requirements in the Thukela WMA are available and are continuously updated as new information becomes available or if there are changes in the current water use patterns. This includes ensuring that water requirement scenarios are maintained and updated for planning and management of the water resource of the WMA.	
Situation assessment/ motivation	<i>t</i> / With reference to the water requirement (see <b>Section 4</b> of <b>Part A</b> of this report), it is evident that of the total estimated water requirement of 521 million m <sup>3</sup> /annum within the water management area, 58% is for irrigation, 10% for urban purposes and 7% for mining and bulk industrial use as well as rural use. Although a significant quantity of water is intercepted by afforestation, the location of the afforestation areas relative to the existing major dams in the WMA is such that it has little impact on the yield from the existing dams.	
	In addition to the local water requirements, discussed above, there are large inter- basin transfers out of the WMA. The amount of water transferred out of the WMA varies from year to year depending on the requirements of the Vaal, Mhlathuze and Mgeni systems to which water is transferred. The maximum quantity that can be transferred, as an average over the historical flow sequence is:	
	Thukela-Vaal transfer: 530 million m <sup>3</sup> /annum	
	• Thukela-Mhlathuze transfer: 40 million m <sup>3</sup> /annum	
	• Thukela-Mooi transfer: 45 million m <sup>3</sup> /annum	
	<ul> <li>Zaaihoek transfer: 55 million m<sup>3</sup>/annum</li> </ul>	
	The estimated impact of these transfers on the available yield in the Thukela WMA is 541 million m <sup>3</sup> /annum.	
	There remains some uncertainty with respect to the water requirements from the irrigation sector. As an example, the registration database (version as on November 2003) indicates that the total volume of water used for irrigation is 253 million m <sup>3</sup> /a, which is much less than indicated in the Thukela Reserve Determination Study (Hydrological Support) (see <b>Table 2.1 in Part A</b> ). The registration and verification of the water use data, as captured in the registration database, has however not been completed and it was decided to accept the estimates from the Thukela Water Project Feasibility Study (DWAF, 2002a) for the irrigation sector. This decision is further supported by the knowledge that the aforementioned study was undertaken at a relatively high level of detail.	
	The water use and water requirement projections for the main urban centres and some of the rural users have been reviewed and updated where required, as part of the Thukela Reserve Determination Study (DWAF, 2002d). This source of data was considered to be of an acceptable level of confidence and was therefore used in the ISP.	
	The reader is also referred to <b>Section 4</b> ( <b>Part A</b> ) of this report for detailed information on the water requirements in each of the seven Key Areas.	
	The benefit of comparing the actual water use with projections (undertaken as part of the Thukela Reserve Determination Study, (DWAF 2004a) was illustrated in the large discrepancies that were observed for certain consumption centres. That task made it possible to identify those problems and that realistic water requirement scenarios could be compiled. There is currently, however, not a process or a database system in place to undertake similar comparisons on a continual basis.	

The verification of lawful water use needs to be undertaken. This can be done
incrementally starting with priority areas with known supply problems. The Little
Thukela and Sundays Key Areas should receive the highest priority since these areas
are stressed.

#### Strategy

The water requirement projections for the urban areas are available, however, these do not include information regarding the potential impact of water conservation and demand management interventions. Collaboration with towns and district municipalities need to be pursued to factor these initiatives into their planning.

Management actions	Responsibility and priority
The catchments requiring verification of existing lawful use should be prioritised and the verification should proceed accordingly. If it is found that	Regional Office
the verified water use differs substantially from the data used in the models, appropriate adjustments will have to be made and the water balance and management strategies revised.	Priority: High
Develop a water-use database and initiate a process to capture the actual water-use data at regular intervals. Comparisons of the actual water use	Regional Office
data with the water requirement projections should be undertaken in order to advise where adjustments are required and more detailed investigations should be initiated.	Priority: Medium

1.3 WATER BALANCE RECONCILIATION		
Management	To attain an equitable and sustainable balance between water requirements and available	
obiective	water resources by progressively implementing integrated water resource management	
	measures.	
Situation	The Thukela WMA has surplus water available in the Upper Thukela, Buffalo and/or	
assessment/	the Lower Thukela Key Areas (the latter as a result of possible support from	
motivation	upstream Key Areas). This surplus water varies from 38 to 100 million m <sup>3</sup> /a	
	depending on where in the WMA the water is required and the source from which it is	
	to be supplied. If supplied directly from the Spioenkop and Ntshingwayo dams then	
	the surplus yield is only about 38 million m <sup>3</sup> /a while if Spidenkop and Ntshingwayo	
	control of the Ruffale River respectively, then the surplus yield could be as high as	
	100 million $m^3/a$ . Fither the Wagendrift or Spicenkon dam are required to support the	
	large allocations and ecological requirements of the Lower Thukela	
	The Upper Thukela, Sunday and Mooi Key Areas are in deficit due to over-allocation	
	or over-development of irrigation. Reported water shortages in the upper Buffalo	
	River could be due to the incorrect operation of the Skurwepoort diversion, which	
	diverts water to the Ngagane water treatment plant. A minimum flow of 1 m <sup>3</sup> /s must	
	be allowed to flow over this weir but it appears as if this minimum flow is not always	
	maintained.	
	It is not considered feasible to use the surpluses in the Upper Thukela and Buffalo	
	Key Areas to eliminate the shortages in the Little Thukela Sundays or Mooi River	
	Key Areas. Local resources should rather be developed or compulsory licencing	
	applied in areas where there are large deficits.	
	Factors that could have a significant influence on the water balance:	
	. With reference to the large differences in the water requirement for the irrigation	
	Whith reference to the large differences in the water requirement for the imgation     sector from various data sources, as discussed in the Water Paguirements and Use	
	Strategy 1.2 the surpluses could be significantly higher if the actual irrigation water	
	requirements are lower than estimated for the balance calculations	
	• After water transfers to the Vaal catchment, irrigation is the largest water user in the	
	upper I hukela and the rest of the WMA and could benefit from WC&DM. The	
	vvc&Divi strategy is discussed separately in Strategy 4.	
	Three dams have been proposed for development in the WMA, primarily for	
	increased transfers of water into the Vaal and Mgeni catchments. These are Jana	
	Dam on the Thukela River and Mielietuin Dam on the Bushmans River for the	
	transfers to the Vaal, and Spring Grove Dam on the Mooi River for transfers to the	
	Mgeni System. The three dams have the potential of increasing the yield of the WMA	
	by 598 million m <sup>2</sup> /annum. These dams will however not relieve the water-stressed	
	situation in the Little Thukela or the Sundays River catchment.	

Strategy
Water transfers out of the WMA should continue up to the quantities reserved in the NWRS. Additional transfers will only be possible through the provision of additional infrastructure. The in-basin requirements must always receive priority when planning and implementing transfer schemes and water users within the WMA must not be put in a worse position due to new transfer schemes.

In allocating the surpluses in the Thukela WMA, the benefit to the previously disadvantaged must be maximised.

#### Sundays and Little Thukela Key Areas

The deficits in the Sundays and Little Thukela Key Areas will not be addressed directly at this stage. The situation first needs to be understood better and the water use in these Key Areas verified. The ecological Reserve is to be implemented incrementally in these catchments, firstly by not issuing any further water-use licences, unless accompanied by the provision of storage, from which contributions to the Reserve will need to be made. Full implementation of the Reserve will probably require compulsory licencing to reduce irrigation abstractions in these Key Areas.

#### Upper Thukela Key Area

Licences may be issued for the surplus which is available in the Spioenkop Dam. The relevant authorities need to be informed of this opportunity and priority given to poverty eradication projects. However, new allocations upstream of the Driel Barrage should be restricted to domestic use or high-value industrial use and should be limited as far as possible. New allocations for irrigation should rather be made from other areas in the WMA where water is readily available. Farm dams in general should be discouraged upstream of the Driel Barrage but may be constructed to supply water for the limited domestic and industrial allocations referred to above.

#### Bushmans Key Area

There is a large surplus in the Bushmans Key Area which could be allocated to emerging farmers, but this decision will need to be carefully analysed in the light of the new allocations to the Fairbreeze mine and the ecological Reserve of the lower Thukela, which will require support from either the Wagendrift or the Spioenkop Dam, or both.

#### Buffalo Key Area

The location of the surpluses in the Buffalo Key Area need to be verified before making large allocations. The existing lawful water use, especially those of irrigators along the main-stem of the Buffalo River, also needs to be verified.

The operation of the Skurwepoort diversion weir needs to be investigated to ascertain whether shortages downstream of this weir are as a result of over-abstraction.

In addition to the readily available yield of the Ntshingwayo Dam, there is potential to increase the yield of the Buffalo Key Area through the construction of new dams. New dams in the Buffalo Key Area would be considered by DWAF and is the preferred option for irrigators seeking large abstractions, except upstream of Ntshingwayo and Zaaihoek dams.

#### Mooi Key Area

The construction of the Spring Grove Dam on the the Mooi River has been approved by the Minister of DWAF and should commence soon. The yield of this dam will be transferred to the Mgeni System. The Mooi River Key Area is slightly in deficit and no new allocations should be made to irrigators in the upper reaches of the Key Area. There may be scope for additional allocations from run-of-river in the lower reaches of the Key Area, especially for summer irrigation, but this would need to be confirmed through more detailed analyses.

There are already a large number of farm dams in the Mooi River Key Area and additional farm dams should be discouraged.

#### Lower Thukela

A reconciliation of the water requirements and the available water resource of the Lower Thukela Key Area indicates a large deficit, but this reconciliation allows for the allocation to the Fairbreeze mine which is not yet being abstracted. This allocation will be supported by releases from the Spioenkop or Wagendrift dam, or both. By utilising all the surplus yield from the Wagendrift and Spioenkop dams, as much as 45 million m<sup>3</sup>/annum can be made available in the Lower Thukela for allocation.

Management actions	Responsibility and priority
Initiate a study into the Sundays and Little Thukela Key Areas in order to gain	D: NWRP
a better understanding of these catchments. Then develop a strategy to deal	
with the apparent over-allocation in these catchment.	Priority: Medium
Monitor and update the water balance situation in the WMA and incorporate it	R Office
in the annual operating rules updates.	
	Priority: Medium
Liaise and co-operate with the provincial Department of Land Affairs and	R Office
Department of Agriculture to identify areas of water availability and suitable	
soils for resource-poor farmers and poverty eradication initiatives, where	Priority: High
water can be allocated without negative impacts on the existing lawful use.	

1.4 GROUNDWATER AVAILABILITY AND USE		
Management objective	Determine the potential for groundwater development in providing water to the rural poor and to ensure that groundwater use is given the same prominence as surface water so as to remove the perception that it is a poor alternative to surface water resources. This will require a significant improvement in the knowledge of groundwater potential and its spatial distribution in the WMA.	
Situation	There are no major primary aquifers in the Thukela River WMA and groundwater is	
assessment	held in secondary aquifers.	
	The last detailed assessment of the groundwater for the WMA was carried out by DWAF in 1994 under the auspices of the Characterisation and Mapping of Groundwater in KwaZulu-Natal Study. This study included a comprehensive census of the then existing boreholes. There has been significant groundwater development during the interim period, particularly related to rural water supply schemes. In addition, the latest WSDP's and the WSA initiatives have resulted in substantially more groundwater information becoming available. This all points towards the need for the DWAF (1994) mapping study to be updated. The information on the geology, aquifers and lithology documented in this study is still valid. The study estimates that a total volume of 41 million m <sup>3</sup> /a could be made available through groundwater development, however, the spatial distribution of this potential is not evenly distributed throughout the WMA.	
	The quality of the groundwater in general is good and suitable for domestic use without treatment apart from disinfection. However, localised groundwater pollution problems have been reported in the vicinities of abandoned coal mines in the Buffalo and Sundays river catchments.	
	More than 90% of remote rural dwellers are reliant on groundwater in the form of springs and boreholes. Most groundwater schemes provide a rudimentary rural domestic service particularly to those communities in the Lower Buffalo and Lower Thukela catchments. Information on these schemes and the communities they service is poor or totally lacking. Furthermore, the distances from households to the boreholes, wells or springs tend to be large necessitating carrying of water in containers and resulting in very low levels of consumption.	
	The uThukela District Municipality, with support from DWAF, is implementing the Thukela Emergency Water Supply Scheme which has been ongoing for almost 2 years. This involves the drilling of boreholes and equipping them with either hand pumps or electric motors where yields are higher. Reticulation is also being supplied in certain areas where high-yielding boreholes can support the requirements.	
	Groundwater supplies to some schemes in the peri-urban areas like Blauwbosch (near Osizweni) are being replaced with surface water supplies. The reasons for this are that the groundwater resources are proving to be inadequate and the water quality is poor. This option may be practical in and around towns that were influenced by the apartheid era land tenure planning principles, but conjunctive use could be a more appropriate solution.	
	The widely dispersed settlements and steep terrain in most of the rural areas within the WMA has resulted in groundwater being the most cost-effective development option for water supply to the rural sector. However, the failure of many existing boreholes and groundwater schemes has resulted in the perception that groundwater is an unreliable source. These failures are often a result of the following :	
	Lack of monitoring;  Insufficient maintenance:	
	<ul> <li>The WWA has resulted in groundwater being the most cost-effective development option for water supply to the rural sector. However, the failure of many existing boreholes and groundwater schemes has resulted in the perception that groundwater is an unreliable source. These failures are often a result of the following :</li> <li>Lack of monitoring;</li> <li>Insufficient maintenance;</li> </ul>	

- Incorrectly sited boreholes;
- General lack of understanding of groundwater and its management;
- Limited number of groundwater specialists in the country; and
- Boreholes cannot be visually inspected.

Tools for detailed assessments are complicated; Given the generally widespread availability of groundwater, albeit in small quantities, this resource should be considered as a priority to supply small or dispersed users such as rural communities or resource-poor farmers. Surface water resources should be considered only if groundwater is proved to be inadequate or non-feasible. Careful consideration also needs to be given to the conjunctive use of both ground and surface water resources for slightly larger users such as small villages and towns.

**Strategy** The significant potential of groundwater resources in the WMA presents an opportunity to utilise it as a resource in areas where surface water resources are already under stress. After careful investigation, and recognising the interaction between surface and groundwater, it may be possible for groundwater to be developed for purposes such as irrigation in the Little Thukela catchment (for example), if the impacts are not negative.

Political perceptions of groundwater being a poor alternative resource to surface water have developed over time and are characterised by inappropriate management of groundwater schemes. It is of fundamental importance that these perceptions are reversed and that the value of groundwater be communicated to political role players. Furthermore, technical staff with the District Municipalities, as the mandated WSAs, need to be made aware of the potential of groundwater and its value. This should be accompanied by the general promotion of groundwater use in this WMA and others in KwaZulu-Natal endowed with abundant surface water resources.

The DWAF (1994) groundwater characterisation and mapping study needs to be updated. This initiative should focus on the acquisition of appropriate data regarding groundwater development over the past 10 years. Specific focus should be on registered groundwater use, groundwater utilisation plans in WSDPs and poverty eradication projects. A system of maintaining such a study as current is essential with developers and authorities being engaged to pass on additional groundwater information and data as it becomes available.

Management actions	Responsibility and priority
The DWAF (1994) groundwater characterisation and mapping study to be updated to reflect the additional groundwater data and information that has	D: HI
become available over the last 10 years. Areas of high groundwater potential and rural settlements should be identified to highlight areas where groundwater use may be sustainable.	Priority: High
Actively encourage and promote the use of groundwater in rural water supply	RO
schemes in all forums and to all institutions.	
	Priority: High
Engage with groundwater specialists, WSAs and WSPs to obtain	RO
groundwater data and information on a continuous basis as schemes are	
developed and water supplies provided.	Priority: Medium
Ensure that all DWAF funded and/or implemented schemes have considered	RO
groundwater as a resource and that, if not recommended, then should be	
proven to be unsustainable.	Priority: High

### 2 WATER RESOURCES PROTECTION

2.1 Reserve and resource quality objectives		
Management	The aim of this strategy is to determine the	
objective	Quality of water; and	
	Quantity and assurance of supply of water	
Situation assessment	which are needed to protect basic human needs and the structure and function of ecosystems so as to secure ecologically sustainable development and to ensure economic utilisation of the allocable resource. The Thukela River catchments were identified during the Vaal Augmentation Planning Study (DWAF, 1995) as a strategic water resource for augmentation of the water supply to the Vaal River Supply Area sometime in the future. A study was initiated in 1998 to determine the transferable yield from the Thukela through the Drakensberg Pumped Storage Scheme. The transferable yield was determined using the estimate of the ecological requirement done in 1996. The level of confidence for this ecological flow requirement was considered to be low to medium. Because of the magnitude of the potential development and the requirements of the NWA of 1998 a comprehensive Reserve determination was considered necessary. Furthermore there have been a number of licence applications received in the Thukela River catchment some such as	
	for the Fairbreeze mine, for large quantities of water.	
	The initial Recommended Reserve for the upper catchment of the Thukela River would impact on the transferable yield of the existing Thukela Vaal Transfer Scheme by approximately 250 million $m^3/a$ . A comprehensive Reserve study was initiated in 2001 and has recently been completed. Based on this comprehensive Reserve, the reduction in transferable yield of the existing transfer scheme will be only 35 million $m^3/a$ . The reduction in available yield in the whole WMA is estimated at 190 million $m^3/a$ .	
	The main issues regarding the Reserve and Resource Quality Objectives for the Thukela River are as follows:	
	The Reserve determinations of the Little Thukela, the Mooi and to a limited extent the Sundays River catchments indicate a significant reduction in assurance of supply to existing users, especially irrigators, in these catchments. Without additional regulation in these catchments, implementation of the Reserve will have a significant economic impact.	
	If the Reserve is not implemented in the above-mentioned catchments, the contributions of these tributaries to the ecological water requirements in the main stem will be reduced and the main stem will have to contribute more than its fair share to the Reserve.	
Strategy	The ecological Reserve is to be implemented incrementally, starting with those catchments which are not stressed. This will initially entail developing operating rules for the major dams in the catchment, namely, Spioenkop, Wagendrift, and Ntshingwayo dams. Once the water resources situation in the Sundays and Little Thukela Key Areas area better understood, steps towards implementing the Reserve in these catchments can be taken. This might necessitate Compulsory Licensing to correct the apparent over-allocation in these Key Areas.	

I.

Management actions	Responsibility and priority
Develop operating rules for the major dams in the WMA to meet the ecological Reserve.	Regional Office
Design and implement a monitoring programme to ensure compliance with the ecological Reserve.	Priority: High

2.2 WATER QUALITY MANAGEMENT			
Management objective	Ensure a sound and reasonable balance between development impacts and the protection of the resource, both surface and groundwater and ensure that the water in the system remains fit for use.		
Situation assessment/ motivation	The approach to water resource protection in the NWA includes consideration of water quantity and water quality. Water quality management deals with point sources (such as discharges from sewage treatment works or industrial sites) and diffuse sources (such as settlements without a sewage system) of pollution by discharges of waste or water containing waste into water resources. In addition, because of their potential to impact on surface and groundwater resources the Department is, in terms of Section 20 of the Environmental Conservation Act and by agreement with the Department of Environmental Affairs and Tourism, responsible for overseeing the management of sites where waste is disposed onto land.		
	Decisions about the nature and extent of resource pollution which can be permitted are guided by a hierarchical decision-making framework. This takes account of the balance between the need to protect water resources for sustainable-use, and the need to allow activities which support social and economic development to continue.		
	The highest priority in the decision-making framework is to prevent water pollution through waste prevention and reduction, recovery, treatment and final safe disposal. It is however acknowledged that in many cases the discharge of pollutants into water resources is unavoidable, and in these cases the emphasis is on minimising the pollution and its effect on the water resource. Where pollution has already caused degradation of the water resource, or where contaminated land areas pose a threat to water quality, remediation will be effected where it is necessary and practical.		
	Each application for authorisation to discharge waste into a water resource is preceded by an assessment of the probable impacts of the discharge on the water resources and other water users. For hazardous wastes, the aim is to prevent discharge wherever possible or, if it is not possible, to minimise the extent of the discharge and its impacts. For non-hazardous wastes, the receiving water quality objectives approach will continue to be used. The approach assumes that the water environment has a definite and quantifiable capacity to assimilate non-hazardous waste discharged into it without violating predetermined water quality objectives. Protection of the assimilative capacity, which will be different for each management class, must be equitably shared among all water users.		
	Wherever possible, best management practices, relating to the treatment and recovery of waste, will be incorporated into licence conditions – source-directed controls – to prevent the water resource becoming polluted.		
	Whilst the overall intention is to prevent further degradation of the quality of the country's water resource, and to effect improvements, where possible, limited and short-term degradation of the water quality of a specific water resource could be allowed if it can be demonstrated with confidence that the degradation will not be irreversible, and that pollution costs are not externalised to other users of the water resource.		
	There are a number of water quality problems in the Thukela WMA. The point-source pollution problems are well understood by the Regional Office while the non-point pollution sources are less well understood. The issues in the WMA include the following:		

Poor veld management and overgrazing, especially in the upper Thukela; Groundwater pollution in the Colenso and Ladysmith area; • Sporadic non-compliance of effluent discharge do occur in Estcourt, Newcastle • and Mandini; Domestic discharge into Wakkerstroom vlei; • The discharge of effluent from the Sappi paper mill at Mandini has previously necessitated releases from Spioenkop Dam to dilute this effluent; Releases from Ntshingwayo Dam have also been made to dilute industrial spills in • the Newcastle area; High COD and suspended solids in the Lower Thukela; • The mining and industrial activities in the upper Buffalo catchment have resulted • in degradation of the water resource from a quality perspective. However, mines in the Buffalo catchment are aiming for zero effluent discharge to remedy the situation; Closed mine decants in the Sundays and Buffalo catchments; The Regional Office is running the mine rehabilitation programme, which has • been successful. Resources are the limiting constraints in terms of expediting the programme to ensure that all closed mines are rehabilitated; Dense settlements with poor sanitation especially in the upper Buffalo catchment • resulting in high e. Coli counts; Significant irrigation return flows in the upper Buffalo catchment; • • New developments for the leisure industry in the Little Thukela catchment, and Diffuse impacts in the Mooi River. • The Regional Office is under-resourced and therefore tend to be effective only in pollution control as opposed to water quality management. The point pollution sources are well understood and well handled although the local authorities do not always comply. However, they know what is expected of them and the standards that must be achieved. The shortage of financial resources required to operate, upgrade and maintain infrastructure is the major cause of non-compliance. A sound and reasonable balance between development impacts and the protection of the resource, both surface and groundwater, needs to be maintained. Co-operation between DWAF's Head Office, their Regional Office, provincial organs Strategy of state, the Thukela Water Partnership and local authorities regarding water guality monitoring and management needs to be improved.

Co-operative Governance is required between the Regional Office and Local Authorities and Local Authorities must accept responsibility for the quality of effluent arising from state-owned infrastructure in their jurisdiction. A financial assistance programme for local authorities is required for the operation, maintenance and upgrade of waste-water works.Diffuse pollution sources, from agricultural land and dense settlements, require assessment to quantify their impacts especially in the upper Thukela, Buffalo and Mooi River areas.

The closed mine rehabilitation programme should continue and required resources made available to ensure that potential water quality problems are contained.

Strategy continued

The Regional Office is doing well in managing point source pollution in the WMA and their efforts should be maintained and improved. However, the shortage of human resources in the Regional Office may discredit these efforts if this shortage is not urgently addressed.

The water quality situation in the WMA should be continuously monitored and necessary measures implemented to reduce negative impacts. Causes of problems should be understood for the effective design of solutions. The solutions may include poverty eradication measures, land-care activities to reduce sedimentation and improved sanitation.

Management actions	Responsibility and priority
The water quality situation in the WMA should be continuously monitored and necessary measures implemented to reduce negative impacts. Causes of	D: WDD & RO
solutions may include poverty eradication measures, land-care activities to reduce sedimentation and improved sanitation.	Priorty: High
Diffuse pollution sources, from agricultural land and dense settlements, require assessment to quantify their impacts especially in the upper Thukela, Buffalo and Mooi River areas.	
The closed mine rehabilitation programme should continue and required resources made available to ensure that potential water quality problems are contained.	
The Regional Office is doing well in managing point source pollution in the WMA and their efforts should be maintained and improved. However, the shortage of human resources in the Regional Office may discredit these efforts if this shortage is not urgently addressed.	
Co-operation between DWAF's Head Office, their Regional Office, provincial organs of state, the Thukela Water Partnership and local authorities regarding water quality monitoring and management needs to be improved.	
Co-operative Governance is required between the Regional Office and Local Authorities and Local Authorities must accept responsibility for the quality of effluent arising from state-owned infrastructure in their jurisdiction. A financial assistance programme for local authorities is required for the operation, maintenance and upgrade of waste-water works.	
Set up formal liaison meetings with provincial organs of state and the Thukela Water Partnership to agree on the roles and responsibilities for water quality monitoring and intervention.	

Review water quality monitoring in the WMA and ensure that it is sufficient to manage impacts of diffuse agricultural activities and dense settlements, and incorporate the findings into the Monitoring Strategy.	
Progressively work towards customising the general authorisations framework for catchment specific water quality related authorisations.	
Develop an integrated water quality management plan for the catchment.	
Sappi (Mandini) should be encouraged to develop a long-term waste management strategy and plan. They should be monitored accordingly and held accountable for variations.	
The diffuse pollution sources, processes and impacts due to intensive agriculture and land degradation in the Mooi River, Little Thukela and Upper Thukela should be understood and monitored.	
Appropriate role players should be identified and encouraged to develop a catchment management plan for the Drakensberg foothills to manage land degradation.	
Role players in the Sundays River catchment should be engaged to develop a sanitation and solid waste management plan to deal with the human pollution problems in the more densely populated rural areas.	
Role players in the Sundays and Buffalo River catchments should be engaged to develop a management plan to deal with the mine pollution problems, particularly at closure and during rehabilitation.	

### **3 WATER CONSERVATION AND DEMAND MANAGEMENT**

3.1 WATER CONSERVATION AND DEMAND MANAGEMENT		
Management objective	Ensure effective and efficient utilisation of the resource by the various water use sectors. This will help delay the need for compulsory licensing in the WMA and development of storage infrastructure.	
Situation assessment/ motivation	The principles of Water Conservation and Demand Management (WC&DM) are enshrined in the National Water Act. DWAF has developed a national water conservation strategy and sectoral strategies.	
	In the Thukela WMA, irrigation is by far the largest water user. Based on the findings of a WC&DM study undertaken in the Mhlatuze catchment, large potential water savings can be achieved in the irrigation sector. Although the capital costs required to achieve this are significant, the cost per cubic metre of water saved would be the lowest. Installation of efficient irrigation systems and improved scheduling would save water. The areas of high rainfall in the upper Thukela and those close to the coast would benefit the most from improved scheduling. An investigation in the Thukela WMA may be required to confirm or determine the potential savings from the irrigation sector.	
	The Thukela WMA is infested with invasive alien plants in the upper Thukela, Bushmans, Mooi, upper Buffalo and Sundays River catchments. The removal of the alien plants should be one of the WC&DM options.	
	The WMA does not have large towns and cities and is not heavily industrialised. However, the towns of Ladysmith, Newcastle, mines and Mandini /Isithebe industries could achieve savings if they implement WC&DM measures.	
	The stressed catchments such as the Little Thukela and Sundays River can benefit from the implementation of WCDM. However, WC&DM can only be successful if water users co-operate. Benefits of WCDM initiatives should be communicated and sold to the users through local institutions serving the users.	
	The stressed catchments in the Thukela WMA should apply WC&DM to alleviate this stress. DWAF should encourage WC&DM in stressed catchments as a priority. The focus should mainly be on irrigation in those parts of the Thukela WMA where deficits are reported.	
	Engage and monitor water users to ensure that they utilise the existing available water resources in a more effective and efficient manner.	
	Improve on current knowledge of the extent and impact of invasive alien plants.	
Strategic Approach	Effluent reuse is a possible WC&DM measure in the Thukela WMA. The reuse of effluent should be supported if the initiative comes from the water users, but it is not necessary to actively pursue this option. This strategy will probably change once the catchments experience more water stress.	
	Strategies of what to do with saved water and how to reward users who practice WC&DM should be developed on an area by area basis, taking into cognisance the water balance of the area.	
	The largest use of water derived within the WMA is transfers out of the WMA. Future water requirements should not be taken out of the WMA if WC&DM is not implemented in the receiving catchments. Steps should be taken to limit transmission losses of transfers.	

Management actions	Responsibility and priority
The effect of WC&DM on projected water requirements and return flows must be undertaken with specific focus on the domestic, industrial and mining	D: WU
sectors.	Priority: Medium
A database and/or computer model will be required to monitor and update demand projections and to assess the success of WCDM initiatives.	D: NWRP
Existing water uses should be monitored to ensure that wastage is minimised.	RO
New licences should only be issued on receipt of an acceptable plan indicating a reasonable level of water use efficiency.	
Given the various interests in the Thukela Water resources, the roles and responsibilities of implementing and regulating WCDM need to be established.	D:WU
Ensure that the transfers from the Thukela are not increased before WC&DM has been implemented in the areas using water from the WMA.	
Undertake the necessary planning required to assess the impact of invasive alien invasive plants (and their removal) in the Upper Thukela, Bushmans, Mooi, upper Buffalo and Sundays River (Little Thukela and Upper Thukela to receive priority).	

### 4 WATERWORKS DEVELOPMENT & MANAGEMENT

4.1 INFRASTRUCTURE DEVELOPMENT AND SYSTEM OPERATION		
Management objective	Ensure provision of adequate infrastructure to support sustainable growth and development within the WMA and the requirement for transfer out of the WMA and to optimise system operating rules to ensure that an equitable balance in the quantity and quality of water supplied is achieved and inefficiencies are minimised.	
Situation assessment/ motivation	The infrastructure in the WMA is described below per sub-area. The reader is also referred to the Thukela River operating rules report produced for the Thukela Reserve Determination Study (DWAF, 2002d).	
	The Thukela-Vaal transfer scheme consists of Woodstock Dam, Driel Barrage, Jagersrust Balancing Dam and Kilburn Dam.	
	Woodstock Dam is located 7 km upstream of the Driel Barrage. It is used to regulate storage for the Driel Barrage from where water is transferred to the Vaal River catchment via Eskom's Drakensberg Pumped Storage Scheme. Woodstock Dam has two sluice gates, each with a maximum release capacity of 200 m <sup>3</sup> /s. The net storage capacity of the dam is 373 million m <sup>3</sup> .	
	In order to transfer water to the Vaal River Catchment, water is pumped from the Driel Barrage to the start of a trapezoidal canal, from where it gravitates to the Jagersrust Balancing Dam before it is pumped to Kilburn Dam and from there over the escarpment to Sterkfontein Dam. The trapezoidal canal has an approximate maximum capacity of 20 m <sup>3</sup> /s. The entire canal has recently been refurbished and is in a very good condition. The net storage capacity of Driel Barrage is 8.7 million m <sup>3</sup> . Currently only 6 m <sup>3</sup> /s is being transferred from Driel Barrage to Jagersrust Balancing Dam. This reduced transfer is due to the implementation of the Lesotho Highlands Project and the reduced demand projections in the Vaal River Catchment. However, the full transfer capacity can be utilised at any time if the need arises.	
	Kilburn Dam is the lower reservoir in the Eskom pumped storage scheme. It has an active storage capacity of 27 million m <sup>3</sup> .	
	Spioenkop Dam, built in 1973, is currently under-utilised and has a capacity of 280 million m <sup>3</sup> . The dam was built to regulate flow downstream of the Driel Barrage. The dam also supplies water to Ladysmith and supports water requirements for downstream farmers mainly between the dam and Winterton. Occasionally releases are made from Spioenkop Dam to dilute poor quality effluent release by SAPPI (at Mandini) into the lower Thukela River. However, SAPPI do not have an allocation from the Spioenkop Dam. There are also direct abstractions from the dam for irrigation. A licence for further transfers out of the lower Thukela (in addition to the transfer to the Mhlathuze WMA) has been issued and this will require intermittent support from Spioenkop Dam.	
	The proposed Jana Dam, which is part of the Thukela Water Project, is on the Thukela River. Water will be pumped from Jana Dam to Kilburn Dam for transfer to the Vaal catchment via Eskom's existing pumped-storage scheme. It is important that the optimal long-term benefits be derived from the development of the Thukela River, and that both the national and local interests be appropriately addressed.	

	The Wagendrift Dam on the Bushmans River was built in 1963 to supply irrigation of approximately 3 000 ha situated between the dam and the Thukela River. The dam has a full supply capacity of 56 million m <sup>3</sup> . The dam releases 2 m <sup>3</sup> /s for environmental and irrigation requirements if the dam is not spilling. The Weenen Water User Association oversees the irrigation schemes in the area and as a result makes requests for more water at times.
	dam is on the Mnyamvubu River, a tributary of the Mooi River, 30 km west of Greytown. The dam regulates water supplies for the irrigation of approximately 2 000 ha, dominated by citrus farming along the Mooi River. The dam releases 0.3 m <sup>3</sup> /s for downstream irrigation requirements. Additional water is released for farmers on the Mooi River on request. The dam can release a maximum of 4 m <sup>3</sup> /s.
	Ntshingwayo Dam (previously known as Chelmsford) was completed in 1961 and raised in 1982. It has a capacity of 199 million m <sup>3</sup> . The dam was built to provide an assured supply of water to the town of Newcastle, Eskom's thermal power station and irrigation farmers downstream. Releases are sometimes made to dilute factory spillages that end up in the river system.
	Zaaihoek Dam was built in 1988 with a capacity of 193 million m <sup>3</sup> . The dam is situated on the Slang River, a tributary of the Buffalo River, and is used to transfer water to the eastern Vaal system in general and specifically to the Majuba Power Station. Zaaihoek Dam also supplies limited demands downstream of the dam by releasing water into the Slang River.
Strategy	Development of water resource infrastructure for in-basin requirements is likely to comprise the construction of farm dams especially in stressed catchments, as discussed in the allocation strategy.
	The WRYM has been configured for the Thukela system to provide support for infrastructure planning and the Reserve determination. The model could also be used for ongoing operational purposes.
	The efficiencies of the transfers made to outside the WMA and releases made from in-basin dams for downstream use are not well understood.
	The site of the proposed Mielietuin Dam, which is part of the Thukela Water Project, is situated on the Bushmans River near Estcourt. The proposal is to pump water into the existing Drakensberg Transfer Scheme infrastructure in the upper Thukela for transfer into the Vaal catchment.
	A water transfer scheme exists on the Mooi River at Mearns which can transfer up to $3.2 \text{ m}^3$ /s to the Mgeni River System. Recently a large weir was constructed at Mearns to provide balancing storage. A new dam, referred to as the Spring Grove Dam, is proposed on the Mooi River upstream of the Mearns weir. This dam, together with increased transfer capacity, will increase the transfer of water into the Mgeni River by up to 4.5 m <sup>3</sup> /s. Latest estimates indicate that the Spring Grove Dam is required by 2007. Construction of this dam is therefore imminent.
	Optimise system operating rules to ensure that an equitable balance in the quantity and quality of water supplied is achieved, inefficiencies are minimised, drought operating rules are determined and that agreed assurances of supply are adhered to. The developed system should also be used to determine impacts and yield of proposed farm dams which will assist with licence applications.

Transfers out of the WMA are managed by DWAF Head Office. There is a need to ensure that future plans for transferring water to the Vaal catchment are well communicated to the KZN provincial government in particular and the rest of the stakeholders to avoid unnecessary negative perceptions. There will also be a need to understand the system and transfer efficiencies when communicating the proposed plans.

The development of major water resources infrastructure in the Thukela has been reserved for transfers into the Vaal catchment. The proposed major water resources infrastructure will and should accommodate the projected needs of the KZN stakeholders, including the Reserve. The need and timing of the development should consider these needs of the WMA.

	Management actions	Responsibility and priority
The efficiencies	of the releases for downstream use and transfers out	D: NWRP
of the WMA n	eed to be assessed and measures put in place to	
minimise losses	and improve efficiencies.	Priority: High
Undertake syste	ems analyses periodically to update the infrastructure	D: OA
development pro	ogramme.	
		Priority: Medium
Provide regular	updates of the proposed development plans to the	Regional Office
KZN provincial	overnment and Thukela WMA stakeholders	
		Priority: Medium

### **5 MONITORING & INFORMATION MANAGEMENT**

5.1 Monitoring networks		
Management objective	To design and implement an effective monitoring network (quality and quantity) and information management systems to ensure effective and efficient management of the water resources	
	South Africa no longer has water to spare and many catchments are now stressed, with more water allocated to users than is reliably available. There is intense and growing competition for water. The true cost of supply and value of water as a resource is now being recognized, and users are starting to pay more realistic, rather than nominal charges. There are considerable inequities in the way water has been allocated in the past both in terms of people and the environment, requiring that some reallocation will have to take place.	
	In order to licence, allocate and manage this increasingly scarce and increasingly valuable resource requires reliable data on volumes available and volumes used. This demands accurate monitoring of rainfall, streamflow and water use. The rain gauging and streamflow monitoring networks in most catchments are inadequate for the accurate estimation of resource availability and use. This strategy is required to ensure that systems are put in place at National, Water Management Area, and catchment level to allow for the effective and efficient management of the resource.	
	Monitoring is an activity usually undertaken by the institution most requiring the information. With different institutions requiring a lot of varied information, a lot of inefficiency and duplication of effort results. This also results in a wide range of data gathered, different standards, and often inaccessibility to other interested parties. Information needs to be correctly processed, brought to a widely acceptable standard, and stored within databases which provide security to the owner but which can also be shared both in terms of input and access.	
	The importance of accurate information for management has been stressed in the National Water Resource Strategy. It is apparent from the NWRS that both National and Departmental monitoring systems are spatially inadequate and often operate largely in isolation of each other. Whilst the Department is actively working to structure its systems into a single 'Monitoring, Assessment and Information System' (MAIS) it is clear that <b>this</b> strategy will need to address networks and funding, staff capacity, and co-operative relationships with other organizations. This strategy will also need to ensure that all activities are compatible with the national information system.	
	Monitoring the water resource	
	Monitoring, for the purposes of this strategy, applies to all aspects of the water resource, particularly:	
	Hydrology - rainfall, climate, and streamflow	
	Geohydrology – groundwater	
	Inflows and outflows (transfers)	
	Abstraction (water users and dam uses, dam levels, operational releases, losses etc)	

Situation	Sedimentation.	
motivation	Supporting information includes:	
	• Small farm dams (numbers, capacity, use) – this will also require monitoring	
	Water Quality (surface water, groundwater)	
	Waste water outflows	
	River Health (function and impact of the ecological Reserve)	
	<ul> <li>Land use change (agricultural cropping, forestry, alien invasives) – data available from other sources, but this needs monitoring</li> </ul>	
	Return flows.	
	The situation in the WMA is captured in the following points, which also highlights the gaps.	
	There is no groundwater monitoring in the WMA. Groundwater monitoring is very expensive and resources are limited. There is a great potential for groundwater use in the Thukela WMA for rural water supply and accurate information is required. Groundwater could also be used in the stressed catchments of the Little Thukela and Sundays River to alleviate stress.	
	Streamflow monitoring is undertaken on the major rivers of the WMA. However, the accuracy and reliability of the gauges is often not adequate.	
	Water levels in all of DWAF's dams are monitored as are the releases from the dams.	
	There is no biomonitoring or river health monitoring programme in the WMA.	
	Rainfall gauging is undertaken throughout the WMA and is considered to be mostly adequate. The ease of acquisition of rainfall data is reasonable from all monitoring institutions.	
	Local Municipalities monitor the quality and quantity of effluent discharges from their sewage treatment plants, with DWAF responsible for compliance monitoring.	
1.	The pollution potential of abandoned mines, which are not yet on the rehabilitation programme are not monitored.	
	There is a lack of understanding of the impacts of diffuse pollution sources from the agricultural sector in the WMA. Problems often occur downstream of these areas and the exact source cannot be pinpointed. This is the case in the upper Mooi River.	
	Monitoring of the estuary and wetlands is insufficient.	
	There are a large number of farm dams in the WMA, especially in the Mooi River catchment. The capacities of many of the farm dams, especially the smaller ones, have never been determined.	

The Department of Water Affairs and Forestry needs a strategy to:

- Improve monitoring networks so that the resource can be accurately quantified for allocations and management accounting purposes
- Improve on efficiencies in the gathering of information, particularly through institutional co-operation in data capture and management
- Set and maintain standards for the capture, processing and management of information
- Ensure that data is accessible to stakeholders without compromising data security.

Key elements of the strategy:

- To motivate **nationally** regarding the importance of monitoring and the essential need for better networks at national, WMA, and catchment level. The strategy is to ensure that those institutions responsible for the allocation of funding fully understand that to allocate, manage and sell the water resource means that local managers need to know **what and how much** they have to allocate, manage and sell.
- Co-ordination and co-operation across agencies at a **regional** level.
- Organisational co-operation and efficiency. As an organisation the Department can only operate at optimum efficiency through close co-operation and sharing of relevant data capture and information management with its partners.

#### Strategy

- Assessment of information requirements (surface water, groundwater etc) at the scale of decisions (WMA and at catchment scale).
- Meetings and negotiations with co-operating partners. Assess what information has been gathered, how it is processed and stored. Develop a plan for the sharing of mutually useful information.
- Together with co-operating partners develop a set of principles which outline the basis for monitoring and information capture. Typically these could cover: accuracy, completeness, time scales and time frames, information sharing.
- Prepare a set of standards for data capture and the processing of information.
- Design a monitoring system to meet needs. This design should offer phased implementation, based on priorities. Priorities should be broken down to critical monitoring points within specific fields of concern, so that the most urgent areas can be attended to first. Apply the cost: benefit principle.
- Motivate and seek funding to meet requirements.
- Develop and train staff.
- At regional level the implementation of this monitoring strategy will be tasked to a small team drawn from across the traditional hydrological disciplines in the region.

Management actions	Responsibility and priority
Initiate assessment to establish the detailed status quo of water resource	Regional Office
monitoring in the WMA, design and implement a monitoring system to meet	
the needs of the WMA and national requirements.	Priority: High
Develop a collaborative and co-operative relationship between DWAF and	D: NWRP, Regional
other organizations, as well as individuals that have monitoring networks, and	Office
develop a consolidated monitoring and information management strategy.	
	Priority: Medium
Secure funding and prioritize implementation.	D: NWRP
	Priority: High

### 6 INSTITUTIONAL DEVELOPMENT & SUPPORT

6.1 INSTITUTIONAL SUPPORT		
Management objective	To form a CMA for the Thukela WMA in line with the requirements of the NWA and NWRS, and to provide a dynamic institution to effectively and efficiently deal with	
Situation assessment/	CMAs are statutory bodies with jurisdiction in a defined WMA whose functions and responsibilities include:	
motivation	<ol> <li>- development of a CMS, which may not be in conflict with the NWRS while giving effect to its provisions and requirements</li> </ol>	
	<ul> <li>management of water resources, and co-ordination of water related activities of water users and other water management institutions within WMAs.</li> </ul>	
4.	The institutional environment is complex. Not only is there a large range of institutions involved but there also continues to be very significant changes in the institutional landscape. Nowhere is this more evident than at local government level. A major demarcation process has just been completed which has resulted in significant changes in boundaries and in the establishment of a number of completely new institutions. This will create significant challenges but also opportunities. Although many of the institutions are not without their problems, the number and range could also be a positive factor. In this regard, the existing Water User Associations (Irrigation Boards) and Catchment Management Fora can also play a role.	
	The presence of suitable institutions is extremely important as it relates directly to the capacity within the area to address catchment management in a meaningful way. The proposed CMA will inevitably need this capacity to ensure that it can execute the challenges and activities that it will be facing. In addition, the nature of the CMA model relies implicitly on a co-operative and collaborative approach so the capacity of the various potential partner institutions is of considerable interest. The institutions in the WMA lack capacity in water resources management aspects, and others are relatively too new to deal with integrated water resource management issues. It is also of note that there does appear to be a broad consensus around the philosophy of catchment management, even though there is some concern with respect to the precise role and functions of the new institution.	
	The final draft of the proposal for the Thukela Catchment Management Agency (CMA) has been submitted to DWAF and is under review. The salient recommendations in the proposal are :	
	An annual operating budget of some R 30 million will be required (current Rand terms);	
	The main income sources would be the DWAF under-development subsidy (R 18 million), transfers out (R 5.5 million), the DWAF trading account (R 3.5 million), the irrigation sector (R 0.3 million increasing to R 2.2 million), urban and industrial sector (R1 million increasing to R 2 million) and seed funding from DWAF (R 5 million reducing to zero);	
	A staff compliment that is expected to grow from about 40 to over 100 (it is likely that a core staff complement will be retained and much work will be outsourced); and	

	The programme for implementation is that approval is expected later in 2003, initial establishment will be completed by 2005 and the CMA will be fully resourced by 2013. The water resources management issues and strategies for the Thukela WMA will change and evolve over time. The support to the WMA stakeholders will best be served by a CMA. The reconciliation of water requirements, sources for projected water requirements for towns and villages, resource-poor farmers and other issues, which may not be critical at the moment, will be dealt with by or through the representative CMA.		
Strategy	Institutional support measures need to be considered for the CMA. The Regional Office, which is the current <i>de facto</i> CMA needs to prepare for gradual hand-over of responsibility to the CMA.		
	Provision of current and projected water requirements to major urban and industrial areas within the Thukela WMA is not a constraint due to available resources and current infrastructure. The CMA will have to strive to maintain this balance.		
	The Regional Office has to facilitate the formation of Water ensure that they operate within the requirements of the Nation importance is that the WUAs are representative of their users.	User Associations and al Water Act. Of critical	
Management actions		Responsibility and priority	
Proceed with the formation of the Thukela WMA		R Office	
		Priority: High	
Develop gradual delegation of authorities to the CMA		R Office	
		Priority: High	
Promote appropriate racial, gender and community representation on advisory committees. Forums, Water User Association and governing Board		R Office	
of the CMA		Priority: High	

## 7 INTEGRATION AND CO-OPERATIVE GOVERNANCE

7.1 Integration and co-operative governance			
Management	Contribute to poverty eradication and redressing of water allocation inequities in the		
objective	Thukela WMA. Poverty eradication and inequity redress have been identified by the		
	South African government as a priority and it has urged all organs of state to address		
Situation	This strategy deals mainly with the creation of the environment for implementation of		
Situation	noverty and inequity redress initiatives. Actions and area-specific measures for		
assessment	poverty alleviation are dealt with under the allocation strategy		
mouvation			
	The Thukela WMA is one of the most impoverished in South Africa, with all Districts' average income being below the national average. "In terms of a composite poverty index, the Msinga District is the most impoverished in the whole country" (CMA proposal document for the Thukela WMA). There are also significant disparities within the WMA in terms of income, education and access to services, as is common in many parts of South Africa. Most of the population is located in rural areas. The most impoverished areas are generally situated in rural parts of the WMA but certain peri-urban areas also have significant problems. The National Water Act dictates that addressing past inequities must be a primary consideration of the CMAs. In addition, it is relevant to note that the areas in question are often the most vulnerable with respect to water quality problems, the most susceptible to flooding, the least well endowed with safe sanitation (resulting in severe faecal pollution) and the most susceptible to poor agricultural practices. All of these facts emphasize the importance of these communities being represented on appropriate structures and also being the focus of significant upliftment and capacity building efforts.		
	Local and regional authorities are very active in trying to stimulate the local economy. Significant advances have been made in supplying infrastructure in recent years, which indicates that increased water requirements for basic human needs will not have a significant impact on the resource.		
	Agro-processing has received attention but initiatives remain elusive. Small, Medium and Micro Enterprise development has also been promoted with very little success. The basic problem seems to hinge around the skills and knowledge base required to get things moving.		
	With this in view, integrated development plans in the Thukela catchment focus mainly on the eradication of poverty, HIV/AIDS and skills development.		
	Water use authorisations and licences issued to date in the Thukela WMA for in- basin requirements have not been to the previously disadvantaged individuals and communities. The policy for water allocation in the WMA is hence to allocate or reserve available water to redress inequities as a priority, following the Reserve requirements.		

	The Department is co-operating with other departments to ensure that the management of water resources can contribute to the Integrated Rural Development Programme and the Urban Renewal Strategy, with particular emphasis on interventions to eradicate poverty. One such co-operation has been the drafting of the National guidelines for integrated management of agricultural water use by the Department of Agriculture. The thrust of the guidelines is captured in the following quote by the <b>Minister of Agriculture and Land Affairs, Ms Thoko Didiza:</b>			
	marginalised agricultural water users, we believe that the "Fruits of our Water" will be strong, well-nourished children, confident and profitable farmers, and significant growth in our rural economies. This growth will be supported through reliable and affordable agricultural service provision by SMMEs and strong links with national and international markets."			
	The guidelines purport a two-fold, stepped objective for the revitalisation of the agricultural water-use sector:			
	- improved food security through own production (' <i>food first</i> '), and;			
	<ul> <li>mainstreaming historically disadvantaged farmers in the local, national and international economy through active support for business and market development.</li> </ul>			
	DWAF is further exploring its role in building capacity for productive water use through the DFID funded water and Forestry Support Programme.			
	The key strategy relating to co-operative governance is to develop streamlined mechanisms for co-ordination of effort. These mechanisms must contribute to the shift towards local government (District Councils) as the point of delivery. Co-ordination is to be focused on the following:			
	1. Financial support mechanisms at interdepartmental, departmental, community, project and production levels;			
Strategy	2. Institutions and representation at all levels, encompassing both governmental and civil society stakeholders; and staffing, capacity building and training.			
	A fresh view of the socio-economic factors affecting the water use by the rural poor is needed. The Department has initiated a cultural assessment to look at this issue in the country and the findings could be tested in the Thukela WMA due to its water availability and potential to stimulate the economic development in the WMA rural communities. The identification of communal land alone without assessing socio-economic drivers will not help stimulate productive water use. However, it should direct the stakeholders to areas of potential beneficiaries.			
	The information on the availability of water in the WMA should be proactively provided to other government Departments and agencies involved in servicing the needs of the WMA. This could be achieved through the use of the Co-ordinating Committees for Agricultural Water Use (CCAW), WUAs, provincial water liaison committee, IDPs and WSDP processes.			
	Funding requirements for poverty initiatives and inequity redress should be integrated. A wide range of support initiatives exist within the various line departments which enable funding to be released for various purposes that are broadly developmental and targeted at resource-poor agriculture. These include:			

poverty and inequity redress initiatives.

Infrastructure and agricultural input support of R200 to R3 000 per household administered through the Special Programme for Food Security, administered by the Department of Agriculture: A sliding-scale farm establishment subsidy offering between R20 000 and • R100 000 as the beneficiary's own contribution increases, as a start-up grant for farmers provided with land under the land restitution for agricultural development (LRAD) programme, or farmers wishing to directly purchase land. This programme is administered by DLA; Capital subsidies for bulk water supply development by Water User Associations of up to R10 000 per hectare to a maximum of R50 000 per farmer, administered by DWAF; Individual irrigation equipment subsidies under the Irrigation Improvement Scheme of up to R7 500, administered by the PDAs: Support for the development of Community Production Centers (CPCs) under the Community Based Public Works Programme, administered by PWD; and Support (both training and finance) for small, medium and micro enterprise development from the Department of Trade and Industry. The Department should consider advertising, through appropriate means, where areas with excess water are situated and call for resource poor farmers, previously disadvantaged individuals, institutions involved in poverty eradication initiatives to apply for water allocations. **Responsibility and** Management actions priority Co-operate with other departments involved in poverty alleviation and inequity R Office redress, and proactively provide them with water availability information for different areas to influence development in the appropriate areas. Priority: High Develop capacity building programmes for individuals, communities and D: WU WUAs for productive use of water. Priority: High

Proactively advertise areas and quantities of water available suitable for R Office

Priority: High

### 8 IMPLEMENTATION

8.1 Implementation			
Management objective	To ensure that the approaches put forward by the Department through this ISP are adopted and implemented in the Thukela WMA. This will require willpower, funding and capacity.		
Situation Assessment	The ISP is an internal document developed by the Department of Water Affairs and Forestry. The ISP sets out the approaches which the Department is taking towards water management in the Thukela WMA – and lists suggested actions towards achieving good management of the water resources.		
	The wider public has had no direct input into the writing of this ISP – yet it is recognised that the approaches suggested have a significant impact on the people of the Thukela WMA. Whilst the approach to date in developing this ISP may seem non-participatory, it must be remembered that this is not a Catchment Management Strategy – but DWAF setting out how it sees the situation, and the steps which it views as most appropriate in dealing with that situation. Interactions with the public have been an important influence in developing the approaches adopted.		
	This ISP is not a closed document but is to be made available to the wider public for comment and input. This makes the ISP an inherently transparent document – opening out the thinking and planning of the Department. Although DWAF makes no commitment to adopt every comment made, these will be taken seriously and the ISP will be updated and improved as newer and better perspectives are formed. Once the CMA has been established it will be required to develop a CMS, and this will require full public participation. It is to be hoped that the ISP will be taken as useful baseline information and, indeed, that the approaches adopted here are found to be acceptable to, and adaptable by, the new dispensation.		
Strategy	ISPs for each WMA are guided by the NWRS – and decisions affecting national resource distribution and use, as presented in the NWRS, are binding on each ISP. This ISP does, however, make a number of corrections and improvements which serve as knowledge updates to the NWRS, particularly as regards catchment water balances and the availability of water for purposes of allocation. The ISP is signed off by the Manager: NWRP and approved by the Department's Water Resources Functional Management Committee. It is also published on the Departmental website. It therefore has the status of an official document containing current best available knowledge with regard to water resource use and availability.		
	The ISP should be updated as and when new information becomes available and will serve as the primary source document for decision-making, within the framework provided by the NWRS.		
	The implementation of the ISP is an enormous task and will have to be tackled in a stepwise fashion. Much of what is in this document describes the day-to-day functions of the Department – but there are many new tasks, functions, and actions set out in response to DWAF's visions for the future.		

Strategy	It is recognised that it is quite impossible to immediately launch into, and achieve, all that is required by this ISP. Funds and capacity are real constraints. The approach is to take the ISP and to use it as instruction, guidance, and motivation in the development of yet clearer management and action plans. These must be built into Departmental Business Plans, and budgeted for as part of Departmental operating costs. This will necessarily be in a phased manner as dictated by available resources, but it is important that the ISP be used to leverage maximum funds, maximum capacity, and to bring optimum management to the WMA.
	The position with regard to the 'Authority of Information Contained in the ISP' is further set out in Para. 1.3.4 of Chapter 1 of this ISP document.

Management actions	Responsibility and priority
Publish the ISP to be accessible for public input and comment (consider hard-copy and web-based options). Copies will be presented to key stakeholders on request. It is not the intention to have a major drive for public input, but merely to create opportunity for input.	Regional Office.
Develop material which help to take the ISP to Provincial, District and Local Government authorities. Also to support the Water Services Development Plan, organised agriculture, emerging farmers, and others. Material should be useful in preparation of the Provincial Growth and Development Strategy and other regional and provincial planning activities.	to be ongoing until the Thukela CMA is established and the ISP is superceded by a CMS)
There are many actions in the ISP which do require public involvement – and it is important that the thinking with regard to, for example, the use of groundwater, and the importance of WC&DM, is delivered forcefully to local authorities, other direct water users such as agriculture, and the wider public.	Priority: Very High
Collate and consider all comment in revising and improving the ISP.	
The ISP should be open to continuous improvement, with updating on a regular basis.	
All Regional Office water resource management staff, Working for Water, local and district Municipalities, and other major stakeholders should have access to, or copies of, the ISP.	
Approaches set out in the ISP need to be accepted and adopted by both national and regional staff. Where there is resistance to ideas then this needs to be resolved in an open climate of debate and understanding. Modification of the ISP is not ruled out.	
The practicalities of implementation demands must always be considered.	
Most actions in this ISP have been assigned to the Region. It is critically important that the tasks outlined are prioritised, budgeted for, and built into regional and national business plans and budgets.	