

## CHAPTER 6 – WATER RESOURCES PROTECTION STRATEGIES

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### NEED FOR WATER RESOURCES PROTECTION STRATEGIES

The Water Resources Protection Main Strategy addresses the need to achieve the protection of water resources to ensure their continuing availability for human use by leaving enough water of appropriate quality in rivers and streams to maintain their ecological functioning, which will be achieved by:

- Classification of freshwater bodies and determination of their human and environmental Reserves;
- Setting resource quality objectives for freshwater bodies;
- Addressing water quality management, pollution control and sanitation and
- Addressing solid waste management.

Water required for socio-economic growth must therefore be balanced with the availability of water that is fit for use by all users, including the protection of the aquatic ecosystem. The NWRS defines two complementary approaches for the protection of water resources. **Resource Directed Measures** focus on the character and condition of the in-stream and riparian habitat, whilst **Source Directed Controls** focus on the control of water use at the point of potential impact, through conditions attached to water use authorisations.

These strategies aim to achieve adequate protection for surface and groundwater resources, in terms of the desired states of these resources, to reach a balance between protection and sustainable use.

### RELEVANT IDENTIFIED STRATEGIES

The following specific strategies have been developed further:

- 6.1 Reserve and resource quality objectives;
- 6.2 Water quality management.

## 6.1 RESERVE AND RESOURCE QUALITY OBJECTIVES

### Management objective:

To develop a regional approach to the determination and implementation of management classes, Reserve requirements, and resource quality objectives for surface freshwater bodies, estuaries and groundwater, within the requirements of the national classification framework. This will be done according to the prescribed methodologies by using applicable methods of determination.

### Situation assessment:

**Table 6.1** shows the Reserve determinations undertaken to date, and the average runoff needed for the ecological flow requirements, by sub-area, compared to the respective MARs. The ecological flow requirements (EFR) studies that have been undertaken are limited and are at low levels of detail. No releases are currently made from dams to specifically support the ecological health of rivers, estuaries or wetlands, and no aquifer management plans are in place. There is a general lack of monitoring data, including biological monitoring, to support Reserve determinations in this ISP area.

In practice the reductions in surface water yield due to the preliminary ecological flow requirements are minimal (total 3.7 million m<sup>3</sup>/a – see **Table 6.2**).

**Table 6.1: Natural MAR and average EFR**

Sub-area	Natural MAR (million m <sup>3</sup> /a)	Ecological flow requirements (million m <sup>3</sup> /a)
Fish	518	47
Albany Coast	174	15
Sundays	280	20
<b>Total for ISP area</b>	<b>972</b>	<b>82</b>

**Table 6.2** shows the reduction in surface water yield, by sub-area, due to the requirement of the Reserve.

**Table 6.2: Surface water yield at 1:50 year assurance**

Sub-area	Surface water yield before reductions (million m <sup>3</sup> /a)	Reduction in yield: Reserve (million m <sup>3</sup> /a)
Fish	94.7	2.6
Albany Coast	17.1	0.0
Sundays	56.2	1.1
<b>Total for ISP area</b>	<b>168.0</b>	<b>3.7</b>

*Rivers:*

Reserves have been determined at several main stem river sites in the Great Fish River at Rapid 1 level (see **Table 6.3**) and at a site just upstream of the Sundays Estuary. An Intermediate Reserve determination of the Kat River is underway, funded by the Water Research Commission. Most Reserve determinations undertaken thus far were done so that decisions could be taken regarding the “prospective trading of water rights”. The main stems of the Fish and Sundays Rivers, as well as certain tributaries, have been significantly modified due to the Orange-Fish Transfer Scheme. These rivers have too high winter flows and not enough flow variability, as well as a black fly problem. Estimates of ecological categories indicate that the present ecological conditions of most rivers in the ISP area are poor.

*Estuaries:*

No estuarine freshwater requirements have been determined for the estuaries in the ISP area. There are five permanently open estuaries, three of which are freshwater starved. The ecological importance of these estuarine systems needs to be established, together with their sensitivity to reduced flows and to changes in water quality, especially increased salinity. The Great Fish Estuary is highly rated as a system of ecological and economic importance. A Reserve determination should be done for the Bushmans Estuary due to a possible increased discharge of brine from the reverse osmosis plant on the banks of the estuary. The Kowie Estuary Reserve also needs to be undertaken.

*Groundwater:*

Three groundwater Reserves were determined to date. The political pressure to deliver potable water and sanitation has not taken adequate cognisance of sustainability and resource protection aspects, which is becoming more apparent as more local schemes are developed and the incremental impacts are being felt.

*Wetlands:*

No Reserves for wetlands have been determined.

The status of Reserve determinations in the various sub-areas is as follows:

**Table 6.3: Approved Reserve determinations undertaken to date**

Quaternary	Component	Surface water resource	Ground-water resource	Level of determination	Virgin MAR or Recharge <sup>(1)</sup> (Mm <sup>3</sup> /a)	Recommended ecological category	EWR as a % of Recharge
<b>FISH SUB-AREA</b>							
Q13C	River	Great Fish	N/a	Rapid 1	104.5	D	10
Q30E	River	Great Fish	N/a	Rapid 1	121.8	D	10
Q41C	River	Tarka	N/a	Desktop	20.4	D	11
Q41D	River	Tarka	N/a	Rapid 1	53.2	D	10
Q42B	River	Tarka	N/a	Desktop	15.4	D	11
Q50C	River	Great Fish	N/a	Rapid 1	194.6	D	10
Q70C	River	Great Fish	N/a	Rapid 1	222.1	D	10
Q80G	River	Little Fish	N/a	Rapid 1	46.3	D	10
Q91C	River	Great Fish	N/a	Rapid 1	288.9	D	10
Q92B	River	Koonap	N/a	Desktop	32.7	B/C	24
Q92C	River	Mankazana	N/a	Desktop	49.9	B/C	24
Q93A	River	Lower Fish	N/a	Desktop	4.3	D	11
Q93C	River	Lower Fish	N/a	Desktop	6.9	D	11
Q93D	River	Great Fish	N/a	Rapid 1	447.8	D	11
Q94B	River	Kat	N/a	Desktop	33.4	C	20
Q94C	River	Kat	N/a	Desktop	44.5	C/D	17
Q94D	River	Kat	N/a	Desktop	7.4	C	19
Q94F	River	Kat	N/a	Desktop	8.2	C	17
<b>SUNDAYS SUB-AREA</b>							
N40B	River	Sundays	N/a	Desktop	202.6	C	17
N40F	River	Lower	N/a	Rapid 1	244.2	D	10
<b>ALBANY – COAST SUB-AREA</b>							
P10B	Groundwater	N/a	Witpoort	Desktop	10.3	C	6
P10E	Groundwater	N/a	Witteberg	Desktop	14.9	B	1
P10F	Groundwater	N/a	Bushmans	Desktop	15.1	D	18

- 1) Recharge refers to the increased runoff due to transfers or to the MAR where water is not transferred into the catchment

### Strategic approach:

In general DWAF's approach is to (at the very least) maintain the status and the present ecological state of rivers, set RQOs, ensure compliance and license according to the current level of use and the availability of water resources, taking into account the needs of the Reserve. Reserve determinations will continue to be done on an *ad hoc* basis as the need arises, depending on the availability of resources and information. Determinations must be done according to the latest RDM methodologies.

Higher conservation or classification values will be attached to rivers, estuaries, wetlands and aquifers in conservation areas. Any future human manipulation of river reaches that lie within conservation areas would require very strong motivation.

It is essential that Reserves be implemented once they have been determined.

### **Management actions:**

- Implement classification at a regional level, when the classification framework becomes available;
- Initiate the drafting of flow management plans for the Fish and Sundays rivers/estuaries, with a focus on ecological protection and control of black fly (see the *Orange-Fish-Sundays Water Supply System Management Strategy*, Strategy 12.1);
- Ensure that the Water Quality Management Plan of the Orange-Fish-Sundays Water Supply System addresses releases for ecological requirements to counter water quality problems that occur when the river stops flowing for short periods (see the *Orange-Fish-Sundays Water Supply System Management Strategy*, Strategy 12.1);
- Initiate a regional initiative to identify potential aquifers that experience, or could soon experience, high ecological risk due to water and sanitation development initiatives. Initiate the drafting of Aquifer Management Plans for such higher-priority identified aquifers, to reduce the risk of major sustainability and resource impact problems;
- Ecological releases should be made from the Kat River Dam once the current Reserve study is complete and the water balance is adequately understood. Ensure that the Reserve determination now being undertaken for the Kat River is registered with D: RDM;
- Operational releases at dams must include releases for ecological requirements. Develop appropriate dam operating rules to achieve the aims of such Reserves. Review releases from dams to ensure that they serve downstream licensed users, once Comprehensive Reserves have been determined;
- Ensure adequate monitoring of rivers to ensure that the objectives of implemented Reserves are attained.

### **Responsibility:**

The RO, in consultation with the D: RDM is responsible for implementing this strategy.

### **Priority:**

- Priority 1: Very high - Kat River, Bushmans Estuary;  
 Priority 2: High – Fish River and Estuary (link the flow management plan to the operational plan); Kowie Estuary, Tarka River;  
 Priority 3: Medium – Koonap River;  
 Priority 4: Low – Sundays, Kowie, Bushmans and Kariega rivers.

This is a continuous programme that requires immediate and ongoing attention.

## 6.2 WATER QUALITY MANAGEMENT

### Management objective:

To improve management and control of point source pollution, diffuse pollution and spills, including solid and toxic waste sites and prevention of contamination.

### Situation assessment:

Assessment and determination of water quality impacts of the OFSWSS, and associated water quality issues relating to irrigation water use, is addressed under the *OFSWSS Management Strategy*, Strategy 12.1.

A desktop level quality classification system for Eastern Cape rivers is under development, broadly focussed on the Water Quality Guideline Document.

Some local problems with wastewater works are encountered, but generally the situation is acceptable. Effluent from most towns typically evaporates from oxidation or maturation ponds, or may be absorbed by irrigation and infiltration. Re-use of effluent is very limited (Grahamstown).

Refer to **Appendix 5** for further information on wastewater treatment plants and to **Appendix 6** for solid waste disposal sites.

There are many unpermitted solid waste sites, which are potential sources of groundwater pollution, and the management at many of these sites is poor with little control. There are no toxic waste sites in the area. In terms of the ECA, DEAT is responsible for waste site approval, which responsibility is currently delegated to DWAF. This function will revert to DEAT within two years.

The nightsoil bucket system still operates in many of the small towns. These need to be phased out but must be adequately managed until then. Capacity of officials at local municipalities is however a limitation.

### Albany Coast sub-area

Many dense settlement problems related to the informal housing areas are experienced in Grahamstown. The current level of services is inadequate and problems are for example being experienced with nightsoil. The Bucket Eradication Programme has been implemented in Grahamstown and sanitation is being improved. The Dense Settlements Programme has been implemented but some problems are still being experienced. There are large impacts on water resources, especially on the Bloukrans tributary of the Kowie River, which has an extremely high bacteriological population.

The brine of the desalination plant at Bushmans River Mouth goes to the estuary. It is being evaluated whether it should be pumped to sea.

## Strategic approach:

Finalise and implement a regional Water Quality Management Plan in accordance with best management practice, which addresses:

- Water quality assessments of rivers and other water bodies;
- Point source and diffuse pollution control and pollution incidents;
- Wastewater treatment works;
- Solid and toxic waste;
- Sanitation and eradication of bucket systems;
- Waste discharge charges;
- Liaison with stakeholders and polluters;
- Capacity building at municipalities.

## Management actions:

The required actions to address specific water quality management issues and concerns are as follows:

1. Complete and distribute the desktop level water quality assessment documentation;
2. Set water quality objectives under the *Reserve and RQOs Strategy*, Strategy 6.1;
3. Address protection of rivers from the negative impacts of irrigation return flows on river health under the *Reserve and RQOs Strategy*, Strategy 6.1;
4. Address operational issues with regard to water quality, including the requirements for freshening releases which are currently used to keep salinity under control, under the *Orange-Fish-Sundays WSS Management Strategy*, Strategy 12.1;
5. Address water quality monitoring requirements, under the *Monitoring Networks and Data Capturing Strategy*, Strategy 13.1;
6. Manage compliance to pollution-related authorisations and licences;
7. Keep minor point-source pollution under control with regular inspections. More attentively monitor storm water discharges and spillages from problem industries or areas in co-operation with municipalities;
8. Hold discussions with polluters in sensitive catchments to convey the importance of curtailing pollution;
9. Implement point-source discharge charges (polluter pays), as recommended in the draft *National Water Quality Framework* policy, once it has been approved;
10. Through co-operative governance with local authorities, build capacity to ensure that operators of WWTWs develop responsibilities and procedures for emergency control of spillages at pump stations, power failure or blockages and mechanical breakdown. Monitor the effectivity of oxidation ponds at the various municipalities at regular intervals;
11. Get buy-in from local authorities (who are responsible for waste management) on solid waste site strategies and implement the strategy and monitoring along with them. Create awareness at local municipalities to improve solid waste sites management and elimination of the nightsoil bucket system through co-operative governance. They have to commit however, allocate funds and implement. Political pressure on officials, through Provincial Liaison Committees, creates a higher chance of success, to overcome the problem of supporting the commitment of funds.

12. Through co-operative governance with local authorities, implement the Department's Sanitation Policy and monitor it;
13. Identify and address diffuse pollution from informal settlements through WUAs and the Dense Settlements Programme;
14. Ensure that Pollution Incident Management Plans in environmentally sensitive areas are operational and that local authorities and the South African National Roads Agency Limited (SANRAL) know what their responsibilities are;
15. Control diffuse pollution from intensive agricultural business ventures, e.g. feedlots and chicken pens, with the Department of Agriculture through co-operative governance;
16. Control site-specific measures for solid waste by setting appropriate pollution-control conditions in new licences issued;
17. Encourage district and local authorities to further develop and enforce bylaws, draft regulations *et cetera* to systematically deal with water quality problems with the long-term view of improving the water quality and riverine and groundwater environments.

**Responsibility:**

The RO is responsible for developing this regional strategy, assisted by D: WD&D and Sub directorate: WQP of Directorate: Water Resource Planning Systems.

**Priority:**

1 – Very high. This is an ongoing strategy.