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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

Ecological Reserve

Meeting the Ecological Reserve

A recently completed WRC study investigated the enabling and constraining factors of Ecological Reserve implementation in the Mpumalanga Lowveld.

Integrity of Lowveld rivers – a critical issue

The Olifants River stopped flowing in 2005. This was cause for widespread concern, leading to an integrated focus on all of the easterly-flowing rivers of the South African Lowveld. It seemed that, in spite of provisions for water reform and environmental flows contained in the 1998 National Water Act, the integrity of these rivers was not improving, but could in fact be worsening on account of continued water quality and water quantity degradation. This represented a grave situation, with not only national implications, but also serious international implications since the affected rivers contribute to transboundary watercourses.

Establishing and understanding the status of Reserve compliance

Clearly, a long-term solution to the problem of continuing degradation of these rivers had to be found. As a step towards such a solution, it was necessary to launch a study, firstly to find out to what extent the environmental water requirements for maintaining a desired level of ecological integrity were being met and then to look into the factors that either constrain or enable the meeting of these requirements, also referred to as the 'Ecological Reserve' or simply the 'Reserve'.

When the study was launched, methods of determining the Reserve had already been well-developed and many Reserve determinations had been undertaken. Attention had shifted from Reserve determination to Reserve implementation, which was then still in its early stages. Full implementation of the Reserve is the benchmark for meeting the commitment to sustainability, whilst the current status of Reserve implementation, or compliance with the Reserve, is a measure of the progress being made along the road to sustainability.

Whilst investigating the status of Reserve compliance was largely a technical exercise, gaining an understanding of the reasons for this status required a people-centred approach, achieved largely through dialogue and semi-structured interviews with stakeholders. Investigations were carried out in six major river catchments (Levuvhu, Letaba, Olifants, Sabie-Sand, Crocodile and Komati), residing within the three Water Management Areas (WMAs), namely the Levuvhu/Letaba WMA, Olifants WMA and Inkomati WMA.

Existing situation with regard to compliance with the Ecological Reserve

Of the Lowveld Rivers investigated, none met the Reserve requirements in terms of river flow. In fact, with the exception of the Sabie River, the situation was found to be generally worse than when the National Water Act was promulgated in 1998. In many cases, water quality also seemed to have deteriorated.

However, some signs of a welcome turn-around were evident, certainly in the Crocodile Catchment which falls in the Inkomati Water Management Area, where new Integrated Water Resource Management (IWRM) approaches were due to come on line.

Factors found responsible for the existing situation are considered in the paragraphs that follow.

Lack of an integrated, catchment-based approach

Implementing or operationalising the Reserve requires discourse and action to move far beyond water resource protection alone. Central to Reserve implementation must be the adoption of an integrated, catchment-based vision and approach, based on principles of sustainability, equity and stakeholder participation. As such, Reserve implementation has much in common with IWRM and is equally dependent on the collective contribution and synergies of a number of strategies, plans and practices.

Such an integrated approach was not yet evident in any of the WMAs, with the exception of the Inkomati WMA where the development of a catchment management strategy for the Crocodile catchment was having a positive influence. Wider adoption of the necessary integrated approach requires that appropriate mechanisms and platforms for integrated planning be put in place, that a sound interface between management, research and practice be developed and most important, that there be buy-in, and hence directives, from leadership.

Shortcomings in current understanding and entrenchment of the Reserve

Familiarity with the Reserve was found to vary widely, being better in the Inkomati WMA than in the other WMAs, where it was generally weak. Perceptions were often negative: there was a tendency to believe that the Reserve was intended to benefit the Kruger National Park to the exclusion of other stakeholders; the task of interpreting and operationalising outputs from a Reserve determination study tended to evoke frustration among water managers.

There was rarely any evidence of sustainability being a key consideration in water management planning and practice. Entrenchment of sustainability considerations and the Reserve, in particular, is unlikely to happen in practice without an ongoing programme of awareness creation and the existence of multiple stakeholder platforms that allow the status of the catchment to be continuously discussed and reviewed.

Weak leadership and governance for transformation

Transformation that is needed to bring about of water resource sustainability demands effective leadership, yet the status of leadership was found to be generally weak or very weak, with some local exceptions, notably in the Crocodile Catchment. Even in the strongest of the WMAs (the Inkomati), the scope of leadership was found to be constrained by a lack of assigned functions. One important function of leadership, namely to ensure integration, requires further support of leadership in institutions outside the water resources sector. Such outside leadership, likewise, was found to be very weak.

Lack of platforms for collective action and learning

Transformation towards a collective, catchment-based vision can only be achieved through a collective understanding and approach, currently not facilitated by most existing platforms which tend to reflect single-sector interests, or have too limited a focus (e.g., a section of a river) or are bedevilled by inaction. The requirement, therefore, is for platforms which are:

- participatory and representative of all sectors within a WMA
- focused on taking collective action, and
- focused on collective, social learning that confronts the diverse understandings and opinions of participating sectors.

Weakness in feedback loops and ability to self-organise

Feedback loops and self-organisation are essential components of resilient systems which develop through adaptive management, since such feedbacks provide the basis for collective action, learning and self-regulation. Throughout the WMAs and river catchments studied there were cases of incomplete, fragile, or even non-existent feedbacks. In the case of IWRM (and Reserve implementation), resilience is conferred by multiple, interacting feedbacks that operate at different scales and involve all role-players, namely water users, managers, the regulator and so-called 'watchdogs'.

Where small, local-scale feedbacks were not adequately complemented by necessary wider-scale feedbacks, the entire system proved to be vulnerable. Factors that make feedback work were found to include: a sound understanding of legal requirements; the availability of benchmarks against which to monitor; the presence of a 'watchdog'; leadership with authority (a 'champion'); responsiveness of managers and users and the ability to self-organise; the development of lasting trust and collaboration among role-players; the availability of internal mechanisms for monitoring; and, the development of a flexible management system that is understood and respected by users.

Prevalence of unlawful use owing to poor regulation

The Reserve cannot be achieved without a lawful catchment-based system in which water use is authorised, regulated and monitored against the Reserve requirement. This requires not only adequate resources and skills for compliance monitoring and enforcement, but also the involvement of stakeholders in the monitoring, reporting and rectification of transgressions.

Each catchment experienced cases of unlawful water use, often related to issues of municipal and mining expansion and of effluent control. Monitoring and regulation were generally inadequate and lacked coherency. There was a dearth of legal and regulatory support.

Owing to the open and unpredictable nature of complex systems, such systems cannot, however, be managed only from the outside. Self-regulation therefore becomes essential. Throughout all the catchments studied, some degree of self-regulation was evident, especially among established users who share a limited resource. Cases of effective self-regulation provide ideal opportunities for future mentorship programmes.

Excessive lags in policy implementation

Policies are meaningless if the time lag between the statement of policy and its implementation is excessive. Despite the history of commitments made, lags in Reserve implementation experienced in the Sand, Olifants and Middle/Klein Letaba catchments would be classed as unacceptable in terms of any reasonable criteria.

In conclusion .....

Meeting of commitments to the Reserve requires the transformation of policies and practices beyond water conservation and protection. It needs to be embedded in IWRM and requires the collective contribution and synergies of a number of strategies, plans and practices.

Progress towards this complex goal was found to vary widely between catchments studied and at different scales examined. Factors responsible for shortcomings have been documented and provide a sound basis for rethinking approaches to meeting the Ecological Reserve. Likewise, cases where system resilience was found to be strengthening – especially through collective action, good governance, strong leadership, feedbacks, learning and regulation, offer lessons for weaker situations.

Advancing sustainability through a people-centred approach will, furthermore, require new, collaborative, ways of understanding the benefits of water resources protection measures such as the Reserve. Thinking in this regard needs to extend across boundaries – be they upstream-downstream, sectoral or international boundaries – to promote collective sharing of the responsibility to care for scarce freshwater resources.

Further reading:
To obtain the report, *The Shared River Initiative Phase I - Towards the sustainability of freshwater systems in South Africa: An exploration of factors that enable or constrain meeting the Ecological Reserve within the context of Integrated Water Resources Management in the catchments of the Lowveld* **(Report No: TT 477/10)** contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565; E-mail: orders@wrc.org.za; or Visit: www.wrc.org.za