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DEVELOPMENT OF RECONCILIATION STRATEGIES FOR LARGE BULK WATER SUPPLY SYSTEMS: ORANGE RIVER

INTERNATIONAL OBLIGATIONS

SEPTEMBER 2014

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ORANGE RIVER

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LIST OF REPORTS

The following reports form part of this study:

Report Title	Report number
Inception Report	P RSA D000/00/18312/1
Literature Review Report	P RSA D000/00/18312/2
International obligations	**P RSA D000/00/18312/3**
Current and future Water Requirements	P RSA D000/00/18312/4
Urban Water Conservation and Water Demand Management	P RSA D000/00/18312/5
Irrigation Demands and Water Conservation/Water Demand Management	P RSA D000/00/18312/6
Surface Water Hydrology and System Analysis	P RSA D000/00/18312/7
Water Quality	P RSA D000/00/18312/8
Review Schemes and Update Cost Estimates	P RSA D000/00/18312/9
Preliminary Reconciliation Strategy Report	P RSA D000/00/18312/10
Final Reconciliation Strategy Report	P RSA D000/00/18312/11
Executive Summary	P RSA D000/00/18312/12
Reserve Requirement Scenarios and Scheme Yield	P RSA D000/00/18312/13
Preliminary Screening Options Agreed: Workshop of February 2013	P RSA D000/00/18312/14

DEVELOPMENT OF RECONCILIATION STRATEGIES FOR LARGE BULK WATER SUPPLY SYSTEMS: ORANGE RIVER

International Obligations

EXECUTIVE SUMMARY

The Department of Water Affairs (DWA) has identified the need for detailed water resource management strategies as part of their Internal Strategic Perspective (ISP) planning initiative, which recommended studies to identify and formulate intervention measures that will ensure enough water can be made available to supply the water requirements for the next three to four decades.

As part of this process the need for the Reconciliation Strategy Study for the Large Bulk Water Supply Systems in the Orange River was also defined. Given the location of the Orange River System and its interdependencies with other WMAs as well as other countries, various water resource planning and management initiatives compiled during the past few years as well as those currently in progress will form an integral part of the strategy development process.

Since 1994, a significant driver of change in the water balance of the Orange River System was brought about by the storing of water in Katse Dam as the first component of the multi-phase Lesotho Highlands Water Project (LHWP). Currently Phase 1 of the LHWP (consisting of Katse, and Mohale dams, Matsoku Weir and associated conveyance tunnels) transfers 780 million cubic metres per annum via the Liebenbergsvlei River into the Vaal Dam to augment the continuously growing water needs of the Gauteng Province. Phase 2 of the LWHP comprising of Polihali Dam and connecting tunnel to Katse Dam is already in its planning stages. Polihali Dam is expected to be in place by around 2022. Flows that are currently still entering into Gariep and Vanderkloof dams wil then be captured by Polohali Dam, thus reducing the inflow to Gariep and Vanderkloof dams. This will result in a reduction in yield of the Orange River Project (Gariep and Vanderkloof dams) to such an extent that shortages will be experienced in the ORP system. Some sort of yield replacement is then required in the Orange River to correct the yield versus demand imbalance in the ORP system.The objective of the study is to develop a reconciliation strategy for the bulk water resources of the Orange River System, to ensure that sufficient water can be made available to supply the current and future water needs for a 25 year planning horison. This Strategy must be flexible to accommodate future changes in the actual water requirements and transfers, with the result that the Strategy will evolve over time as part of an on-going planning process.

Appropriate integration with other planning and management processes as well as cooperation among stakeholders will be key success factors in formulating coherent recommendations and action plans.

The purpose of this report

This report deals with each of the international treaties and policy documents that impact on water allocation out of the shared Orange-Senqu watercourse. It is just one component of the preliminary reconciliation strategy.

This report includes a discussion of South African legislation as it impacts on international arrangements and agreements; followed by the generic multi-lateral treaties such as those entered into under the auspices of the UN and SADC, and finally those agreements that are specific to the Orange-Senqu.

This report identifies that the most important international law principles/rules that apply to water allocation amongst watercourse states are those of:

- *Equitable and reasonable utilisation; and*
- *Not causing significant harm.*

Given the circumstances of the Orange River, it could be argued that:

- *if the watercourse states adopt a river basin or watercourse approach in the planning, development and management of the water resources of the Orange, and*
- *if all parties are guaranteed their equitable and reasonable utilisation reflective of their population, their social needs, their environmental needs, and their existing entitlements, as agreed through negotiation under the umbrella of ORASECOM,*
- *then it cannot be foreseen that international law would prevent any of the options under consideration from being developed.*

The developments already completed in terms of the Treaty on the Lesotho Highlands Water Project and the Agreement on the Establishment of the Vioolsdrift and Noordoewer Joint Irrigation Scheme reflect components of the existing shared utilisation of the Orange.

The Treaty on the Lesotho Highlands Water Project provides for a maximum transfer of 70 m^3/s from the Orange River to the Vaal River. It could be questioned whether that portion of the LHWP which has not yet been developed or even initiated (Phases beyond Phase 2) carries much legal weight as an existing right given that there is probably insufficient resource to support all of the water-related developments desired by the watercourse states.

Development of Reconciliation Strategies for Large Bulk Water Supply Systems: Orange River

INTERNATIONAL OBLIGATIONS

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Development of a Reconciliation Strategies for Large Bulk Water Supply Systems: Orange River

International Obligations

1 INTRODUCTION

1.1 BACKGROUND

The Department of Water Affairs (DWA) has identified the need for detailed water resource management strategies as part of their Internal Strategic Perspective (ISP) planning initiative, which recommended studies to identify and formulate intervention measures that will ensure enough water can be made available to supply the water requirements for the next three to four decades.

The DWA Directorate: National Water Resource Planning (NWRP) therefore commenced the strategy development process in 2004 by initially focusing on the water resources supporting the large metropolitan clusters, followed by the systems supplying the smaller urban areas to systematically cover all the municipalities in the country.

As part of this process the need for the Reconciliation Strategy Study for the Large Bulk Water Supply Systems in the Orange River was also defined. Given the location of the Orange River System and its interdependencies with other WMAs as well as other countries (see study area description in **Section 1.3**), various water resource planning and management initiatives compiled during the past few years as well as those currently in progress will form an integral part of the strategy development process.

Major water resource infrastructure in the study area are the Gariep and Vanderkloof dams with associated conveyance conduits supporting large irrigation farming in the provinces of the Free State, Northern Cape and the Eastern Cape - through the Orange-Fish Tunnel. This system is currently almost in balance.

The Caledon-Modder System supplies water to the Mangaung-Bloemfontein urban cluster (largest urban centre in the study area). The 2 200 km long Orange-Senqu River is the lifeline for various industries, mines, towns and communities located along the way until the river discharges into the Atlantic Ocean in the far west at Alexander Bay.

Since 1994, a significant driver of change in the water balance of the Orange River System was brought about by the storing of water in Katse Dam as the first component of the multi-phase Lesotho Highlands Water Project (LHWP). Currently Phase 1 of the LHWP (consisting of Katse, and Mohale dams, Matsoku Weir and associated conveyance tunnels) transfers 780 million cubic metres per annum via the Liebenbergsvlei River into the Vaal Dam to augment the continuously growing water needs of the Gauteng Province. Phase 2 of the LWHP comprising of Polihali Dam and connecting tunnel to Katse Dam is already in its planning stages and is expected to be in place

by 2022. Flows that are currently still entering into Gariep and Vanderkloof dams wil then be captured by Polohali Dam, thus reducing the inflow to Gariep and Vanderkloof dams. This will result in a reduction in yield of the Orange River Project (Gariep and Vanderkloof dams) to such an extent that shortages will be experienced in the ORP system. Some sort of yield replacement is then required in the Orange River to correct the yield versus demand imbalance in the ORP system.

The above description illustrates the complex assortment of interdependent water resources and water uses which spans across various international and institutional boundaries that will be considered in the development of the Orange River Reconciliation Strategy.

1.2 MAIN OBJECTIVES OF THE STUDY

The objective of the study is to develop a reconciliation strategy for the bulk water resources of the Orange River System, to ensure that sufficient water can be made available to supply the current and future water needs of all the users up to the year 2040. This Strategy must be flexible to accommodate future changes in the actual water requirements and transfers, with the result that the Strategy will evolve over time as part of an on-going planning process.

Appropriate integration with other planning and management processes, as well as cooperation among stakeholders, will be key success factors in formulating coherent recommendations and action plans.

The outcomes of the Strategy will be specific interventions with particular actions needed to balance the water needs with the availability through the implementation of regulations, demand management measures, as well as infrastructure development options.

1.3 STUDY AREA

As depicted in **Figure A-1** of **Appendix A** (Map of study area), the study will focus on the water resources of the Upper and Lower Orange River Water Management Areas (WMAs), while also considering all the tributary rivers and transfers affecting the water balance of the system. This core area forms part of the Orange-Senqu River Basin, which straddles four International Basin States with the Senqu River originating in the highlands of Lesotho, Botswana in the north eastern part of the Basin, the Fish River in Namibia and the largest area situated in South Africa.

The focus area of the study comprises only the South African portion of the Orange River Basin, excluding the Vaal River Catchment. The Vaal River is an important tributary of the Orange River, but since the Vaal River Reconciliation Strategy has already been developed, the Vaal River Catchment will not form part of the study area. However, strategies developed for the Vaal River System that will have an impact on the Orange River, will be taken into account as well as the impacts of flows from the Vaal into the Orange for selected Integrated Vaal system scenarios.

The Orange River is an international resource, shared by four countries i.e. Lesotho, South Africa, Botswana and Namibia. Any developments, strategies or decisions taken by any one of the countries that will impact on the water availability or quality in South Africa must be taken into account and will form part of this study. The opposite is also applicable. If this strategy plans anything in South Africa that will impact on any of the other countries, this impact must be considered as part of this study in terms of South Africa's international obligations.

The Orange River, the largest river in South Africa, has its origin in the high lying areas of Lesotho. The river drains a total catchment area of about 1 million km², runs generally in a westerly direction and finally discharges into the Atlantic Ocean at Alexander Bay.

The Caledon River, forming the north-western boundary of Lesotho with the Republic of South Africa (RSA), is the first major tributary of the Orange River. The Caledon and the Orange (called the Senqu River in Lesotho) rivers have their confluence in the upper reaches of the Gariep Dam.

Other major tributaries into the Orange River are:

- The Kraai River draining from the North Eastern Cape.
- The Vaal River joining the Orange River at Douglas.
- The Ongers and Sak Rivers draining from the northern parts of the Karoo.
- The Molopo and Nossob Rivers in Namibia, Botswana and the Northern Cape Province have not contributed to the Orange River in recorded history as the stream bed is impeded by sand dunes.
- The Fish River draining the southern part of Namibia.

A separate study was also done for the Greater Bloemfontein Area i.e. Water Reconciliation Strategy Study for Large Bulk Water Supply Systems: Greater Bloemfontein Area with it's follow up continuation study currently in process. The recommendations of this strategy and its continuation study will also be taken into account in this study.

Although the Senqu River Catchment in Lesotho does not form part of the focus study area, the development in this catchment impacts directly on the water availability in the study area.

The South African portion of the Orange River Basin is currently divided in two Water Management Areas, i.e. the Upper and Lower Orange WMAs. The Upper WMA stretches from the headwaters of the Caledon River and Lesotho boundary down to the confluence of the Vaal River and the Lower Orange WMA from this point to the sea. (See **Figure A-1 in Appendix A**). It should be noted that the DWA recently proposed that the two WMAs are managed as a unit.

1.4 PURPOSE OF THE REPORT

This report deals with each of the international treaties and policy documents that impact on water allocation out of the shared Orange-Senqu watercourse. It is just one component of the preliminary reconciliation strategy.

This report includes a discussion of South African legislation as it impacts on international arrangements and agreements; then the generic multi-lateral treaties such as those entered into under the auspices of the UN and SADC are discussed, and finally those agreements that are specific to the Orange-Senqu.

2 INTERNATIONAL NATURE OF THE ORANGE RIVER

The Orange River is shared by four independent watercourse states, namely Lesotho, South Africa, Namibia and Botswana.

The entire Orange River Basin is shown in **Figure 2.1** including the portions in Botswana, Lesotho and Namibia and including the Vaal River catchment.

Figure 2.1: The Orange River Basin

Each state's share of the basin is shown in **Table 2.1.**

Table 2.1: The current sharing of the basin between the four basin states

Watercourse State	Basin area %	MAR %	Population %	Water requirements%
Botswana	7,9	0	0,5	<1
Lesotho	3,4	41	13	1,0
Namibai	24,5	4	1,5	2,0
South Africa	64,2	55	85,0	96,0
	1 000 000 km^2	12 000 Mm^3/a	20 000 000	11 500 Mm^3/a

(Information courtesy of a presentation compiled by Mr Piet Heyns)

Consequently, the reconciliation strategy must be implemented within a framework of international law, comprising international agreements or treaties and policy documents that are recognised by each state.

3 INTERNATIONAL TREATIES, AGREEMENTS AND POLICY STATEMENTS THAT DETERMINE THE INTERNATIONAL OBLIGATIONS REGARDING WATER ALLOCATIONS OUT OF THE SHARED ORANGE-SENQU WATERCOURSE

The following legislation, treaties and policy documents have a bearing on international obligations regarding water allocations out of the shared Orange-Senqu Watercourse.

- Constitution of the Republic of South Africa, 1996;
- National Water Act 36 of 1988;
- Convention on the Law of the Non-navigational Uses of International Watercourses Adopted by the General Assembly of the United Nations on 21 May 1997;
- The Law on Transboundary Aquifers (UN Resolution 11 December 2008;
- Convention on wetlands of international importance especially as waterfowl habitat (The Ramsar Convention on Wetlands), 1971 as amended 1982 and 1987;
- SADC Revised Protocol on Shared Water Courses, 7 August 2000;
- SADC Regional Water Policy 2005;
- ORASECOM Agreement 3 November 2000;
- Treaty on the Lesotho Highlands Water Project between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho, 24 October 1986;
- Agreement on Phase II of the Lesotho Highlands Water Project, 11 August 2011;

- Stockholm Convention on Persistent Organic Pollutants;
- The Agreement on the Establishment of the Vioolsdrift and Noordoewer Joint Irrigation Scheme on the lower Orange River (1992); and
- Memorandum of understanding for feasibility study to transfer water from Lesotho to Botswana.

3.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996

Sections 231-243 of the Constitution deal with International Law and explain that a treaty is binding on the Republic once it has been approved by resolution in both the National Assembly and the National Council of Provinces and that customary international law is binding on the Republic.

231 International agreements

(1) The negotiating and signing of all international agreements is the responsibility of the national executive.

(2) An international agreement binds the Republic only after it has been approved by resolution in both the National Assembly and the National Council of Provinces, unless it is an agreement referred to in subsection (3).

(3) An international agreement of a technical, administrative or executive nature, or an agreement which does not require either ratification or accession, entered into by the national executive, binds the Republic without approval by the National Assembly and the National Council of Provinces, but must be tabled in the Assembly and the Council within a reasonable time.

(4) Any international agreement becomes law in the Republic when it is enacted into law by national legislation; but a self-executing provision of an agreement that has been approved by Parliament is law in the Republic unless it is inconsistent with the Constitution or an Act of Parliament.

(5) The Republic is bound by international agreements which were binding on the Republic when this Constitution took effect.

232 Customary international law

Customary international law is law in the Republic unless it is inconsistent with the Constitution or an Act of Parliament.

233 Application of international law

When interpreting any legislation, every court must prefer any reasonable interpretation of the legislation that is consistent with international law over any alternative interpretation that is inconsistent with international law.

3.2 NATIONAL WATER ACT 36 OF 1998 (REPUBLIC OF SOUTH AFRICA)

Chapter 10 (sections 102 to 108) of the National Water Act deals with International Water Management.

Under this Chapter the Minister may establish bodies to implement international agreements in respect of the management and development of water resources shared with neighbouring countries, and on regional co-operation over water resources. The governance, powers and duties of these bodies are determined by the Minister in accordance with the relevant international agreement, but they may also be given additional functions, and they may perform their functions outside the Republic.

Certain existing international bodies are deemed to be bodies established under this Act, namely:

- The **Trans-Caledon Tunnel Authority** (TCTA) established by Government Notice 2631 of 12 December 1986,
- The Komati Basin Water Authority established by an agreement dated 13 March 1992 with the Kingdom of Swaziland; and
- The **Vioolsdrift Noordoewer Joint Irrigation Authority** established by an agreement dated 14 September 1992 with the Government of Namibia.

3.3 CONVENTION ON THE LAW OF THE NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES ADOPTED BY THE GENERAL ASSEMBLY OF THE UNITED NATIONS ON 21 MAY 1997

The Convention is generally accepted as reflecting the customary law regarding the non-navigational uses of international water courses.

Article 3(3) provides that Watercourse States may enter into one or more agreements, hereinafter referred to as “watercourse agreements”, which apply and adjust the provisions of the present Convention to the characteristics and uses of a particular international watercourse or part thereof.

Article 5(1) provides that Watercourse States shall in their respective territories utilize an international watercourse in an **equitable and reasonable manner**. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse.

Article 5(2) provides that Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner. Such

participation includes both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention.

Article 6 lists the factors that must be taken into account when determining **equitable and reasonable utilization**, namely:

> (a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
>
> (b) The social and economic needs of the watercourse States concerned;
>
> (c) The population dependent on the watercourse in each watercourse State;
>
> (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States;
>
> (e) Existing and potential uses of the watercourse;
>
> (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect;
>
> (g) The availability of alternatives, of comparable value, to a particular planned or existing use.

Article 7(1) provides that Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to **prevent the causing of significant harm** to other watercourse States.

Article 8 provides for a general duty to cooperate and in determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions, as deemed necessary by them,

Part III (Articles 11 to 19) provides for information concerning planned measures and notification of planned measures.

Part IV (articles 20 to 26) provides for the protection, preservation and management of a resource.

Article 21 specifically deals with the prevention, reduction and control of pollution.

Watercourse States shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution of an international watercourse that may cause significant harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse. Watercourse States shall take steps to harmonize their policies in this connection.

Watercourse States shall, at the request of any of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse, such as:

> (a) Setting joint water quality objectives and criteria;
>
> (b) Establishing techniques and practices to address pollution from point and non-point sources;
>
> (c) Establishing lists of substances the introduction of which into the waters of an international watercourse is to be prohibited, limited, investigated or monitored.

3.4 THE LAW ON TRANSBOUNDARY AQUIFERS (UN RESOLUTION 11 DECEMBER 2008)

The Law on Transboundary Aquifers closely resembles the Law on Non-navigational Uses of International Watercourses on which it was based.

The Law of Transbounary Aquifers also provides for equitable and reasonable utilization; for the obligation not to cause significant harm, for the obligation to cooperate; and for the protection, preservation and management of the ecosystem.

3.5 CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE ESPECIALLY AS WATERFOWL HABITAT (THE RAMSAR CONVENTION ON WETLANDS), 1971 AS AMENDED 1982 AND 1987

Article 2 of the Ramsar Convention provides inter alia that each Contracting Party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance, referred to as "the List"; and that Wetlands should be selected for the List on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology.

In the first instance wetlands of international importance to waterfowl at any season should be included.

The Orange River Mouth was placed on the list on 28 June 1991.

Article 5 provides that the Contracting Parties shall consult with each other about implementing obligations arising from the Convention especially in the case of a wetland extending over the territories of more than one Contracting Party or where a water system is shared by Contracting Parties. They shall at the same time endeavour to coordinate and support present and future policies and regulations concerning the conservation of wetlands and their flora and fauna.

3.5.1 Towards a Management Plan for Orange River Estuary Ramsar Site Situation Assessment (May 2011)

The CSIR prepared a situation assessment of the Orange River Estuary Ramsar Site in May 2011.

The situation assessment records that the maximum number of waterbirds recorded during the 1980s was 21,512 individuals in January 1980 and between 20,563 and 26,653 individuals in December 1985.

Since then there has been a significant decline in waterbird numbers. A situation primarily accounted for by the decline in Cape Cormorant and Common Tern S. hirundo populations.

Without the large numbers of Cape Cormorants and Common Terns, ***the important number of 20,000 waterbirds, one of the criteria used for the original designation of the ORM as a Ramsar site, cannot be attained.***

The maximum number of waterbirds recorded at the ORM since being listed on the Montreux Record were 9,240 in July 2000 and the maximum number of species recorded in December 1995 were 64.

Yet despite a change in fortunes the waterbird population still comprise of close to 60 species of which 14 regularly occurring and an additional seven occasionally occurring species are Red Data listed. A recent analysis of the summer and winter 1997 waterbird survey data also found that significant proportions of the regional populations of South African Shelduck Tadorna cana and Cape Shoveller A. smithii and globally significant populations of Kelp Gull L. dominicanus and Hartlaub's Gull were present during the winter months.

A re-evaluation of the Orange River estuary in terms of the new Ramsar criteria, concluded that the Ramsar site still meets several of the criteria for which it was originally established and at least one new criterion (Anderson in Van Niekerk et al 2008).

The Estuarine Health Index (EHI) score for the Orange River Estuary of 56 translated into a Present Ecological Status of D+, indicative of a largely modified estuary.

Despite the highly modified status of the Orange River Estuary, Turpie & Clark (2007) nationally ranked the Orange River Estuary as the 2nd most important estuary in South Africa in terms of conservation importance after the Knysna Estuary. The prioritisation study calculated conservation importance on the basis of size, habitat diversity, zonal type, rarity and biodiversity importance.

Considering the high importance of the Orange River Estuary, as well as its proclamation as a Ramsar site (i.e. protected area of international importance), the recommended Ecological Category should be a Category A - or Best Attainable State (BAS) – according to the DWA guidelines provided in the ecological water requirement methods for estuaries. With major dam developments in the catchment it was considered unlikely to realistically restore the estuary to a Category A through river flow adjustments only. Further, anthropogenic developments along the banks of the estuary (i.e. non-flow related modifications), such as the road across the salt marsh area, seepage of saline water from mining developments and human disturbance of birds contribute largely to the its highly modified present state.

The Best Attainable State (BAS) for the estuary was accordingly recommended as an Ecological Category C (equating to moderately modified), which could largely be achieved by mitigating modification related to the non-flow related activities.

The Situation Assessment makes a number of recommendations for future consideration:

> Recommendation 1: Establish institutional structures to oversee the development of the management plan;
>
> Recommendation 2: Provide statutory protection to the Orange River Estuary;

Recommendation 3: Remove the causeway;

Recommendation 4: Rehabilitating the saltmarsh;

Recommendation 5: Restrict wind blown dust and sand;

Recommendation 6: Control exploitation of fish;

Recommendation 7: Incorporating municipal planning in the management planning process;

Recommendation 8: Improved flow gauging and recalibration of 1993 – 1996;

Recommendation 9: Setting of Resource Quality Objectives (RQO's);

Recommendation 10: Comprehensive Ecological Water Requirement Study;

Recommendation 11: Operating rules of dams;

Recommendation 12: Waterbird research and monitoring;

Recommendation 13: Ecological Water Requirement of the Marine Environment;

Recommendation 14: Agree on objectives and actions required to remove the Orange River Estuary from the Montreux record.

3.6 STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

The objective of this Convention is to protect human health and the environment from persistent organic pollutants.

Persistent organic pollutants possess toxic properties, resist degradation, bioaccumulate and are transported, through air, water and migratory species, across international boundaries and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems.

3.6.1 Measures to reduce or eliminate releases from intentional production and use

Article 3 sets out the measures that parties to the Treaty shall take to to reduce or eliminate intentional releases of persistent organic pollutants.

The production or use of chemicals listed in Annexure A must be eliminated.

The production or use of chemicals listed in Annexure B must be restricted to the acceptable

purposes or specific exemptions that are listed in the table.

Imports or exports of the chemicals listed in Annexure A or Annexure B must also be eliminated or restricted.

Article 6 provides for measures to reduce or eliminate releases from stockpiles and wastes containing the chemicals listed in Annexure A and Annexure B.

3.7 SADC REVISED PROTOCOL ON SHARED WATER COURSES, 7 AUGUST 2000

The SADC Revised Protocol defines "**Significant Harm**" as meaning non-trivial harm capable of being established by objective evidence without necessarily rising to the level of being substantial.

Article 3 sets out the general principles including:

> Sub-article 3.2 which provides that the utilisation of shared watercourses within the SADC Region shall be open to each Watercourse State, in respect of the watercourses within its territory and without prejudice to its sovereign rights, in accordance with the principles contained in this Protocol. The utilisation of the resources of the watercourses shall include agricultural, domestic, industrial, navigational and environmental uses.
>
> Sub-article 3.7.(a) Watercourse States shall in their respective territories utilise a shared watercourse in an equitable and reasonable manner;
>
> Sub-article 3.8 **Utilisation** of a shared watercourse **in an equitable and reasonable manner** requires taking into account all relevant factors and circumstances including:
>
> > (i) geographical, hydrographical, hydrological, climatical, ecological and other factors of a natural character;
> >
> > (ii) the social, economic and environmental needs of the Watercourse States concerned;
> >
> > (iii) the population dependent on the shared watercourse in each Watercourse State;
> >
> > (iv) the effects of the use or uses of a shared watercourse in one Watercourse State on other Watercourse States;
> >
> > (v) existing and potential uses of the watercourse;
> >
> > (vi) conservation, protection, development and economy of use of the water resources of the shared watercourse and the costs of measures taken to that effect; and
> >
> > (vii) the availability of alternatives, of comparable value, to a particular planned or existing use.

The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is an equitable and reasonable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

Article3.10(a) provides that State Parties shall, in utilising a shared watercourse in their territories, take all appropriate measures to **prevent the causing of significant harm** to other Watercourse States.

Article 4. provides for planned measures, information concerning planned measures and the notification concerning planned measures with possible adverse effects.

Article 5 provides institutional mechanisms for implementing this Protocol including Shared Watercourse Institutions.

Article 6 provides for shared water course agreements.

3.8 SADC REGIONAL WATER POLICY 2005

While probably not generally classified as a binding treaty or agreement, the SADC Regional Water Policy does provide a number of useful policy statements that have been agreed by the SADC members subsequent in time to the Revised Protocol which it reflects.

The policy statement for Water Resources Development and Management is particularly relevant to this Reconciliation Strategy and provides:

River Basin Approach:

> (i) Member States will adopt a river basin or watercourse approach in the planning, development and management of water resources. This applies in particular to shared watercourses.
>
> (ii) Watercourse States will prepare and implement river basin development plans in a holistic and integrated manner, with the involvement of stakeholders to achieve equitable and efficient utilisation.
>
> (iii) The planning, development and management of watercourses, particularly in shared watercourses will consider the integrated use of surface and ground water resources, the reuse of water, proper pollution management and the provision of environmental requirements.
>
> (iv) **Water resources allocation and utilisation will be based on equitable and reasonable mechanisms through negotiations** between watercourse States.
>
> (v) Member States will ensure that major water uses in watercourses, particularly in shared watercourses will be regulated through authorisations such as a system of permits.

Integrated Planning:

> (i) Planning, development and management of water resources in the region should be based on the principles of IWRM and shall take full cognisance of the cross-cutting nature of water.
>
> (ii) Watercourse States shall promote joint planning and implementation of water resources developments within their shared watercourse and transparently notify and/ or engage

other Watercourse States in a dialogue, where such States are not proponents of the project.

Water Demand Management:

(i) When planning the development of water infrastructure and services, Member States or river basin organisations shall aim to utilise existing capacities more efficiently as part of the process of augmenting water supply.

(ii) Water Demand Management (WDM) will be pursued by Member States as a fundamental requirement for integrated planning and management of water resources, particularly in shared watercourses.

Alternative Sources of Water

Member States will promote rainwater harvesting and alternative sources of water such as desalination, reuse of water, recycling and reclamation. Relevant research in this regard should be promoted as and where appropriate.

Dam Development and Management

(i) Integrated planning, development and management of dams will be promoted so as to optimise the use of the water resources, maximise derived benefits (such as hydropower, tourism, flood control, irrigation, water supply) and take both positive and negative externalities into account.

(ii) SADC shall encourage the participation of all stakeholders in decision-making processes for dam development and, where appropriate, with adequate facilitation and empowerment of vulnerable groups to ensure their effective involvement in decision-making.

(iii) Watercourse States will negotiate on operating rules for dams on shared watercourses so as to optimise the socio-economic and environmental benefits in an equitable manner.

Affected Communities

(i) Watercourse States shall promote the development and implementation of water infrastructure projects through a participatory process, especially of affected communities.

(ii) Member States will put in place proper legislation to ensure/provide for compensation and resettlement of affected communities, so that they will not be worse off as a result of the project.

3.9 ORASECOM AGREEMENT 3 NOVEMBER 2000

In terms of this agreement, the Governments of the Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa established the Orange-Senqu River Commission as an international organisation with international legal personality and capacity to enter into international agreements.

Article 5 provides for the functions of the ORASECOM Council are to take all measures required to

make recommendations, or to advise the Parties, on the following matters:

- Measures and arrangements to determine the long-term safe yield of the water sources in the River System;
- the equitable and reasonable utilisation of the water sources in the River System to support sustainable development in the territory of each Party;
- the investigations and studies conducted separately or jointly by the Parties, with regard to the development of the River System, including any project or the construction, operation and maintenance of any water works;
- the extent to which the inhabitants in the territory of each Party concerned shall participate in respect of the planning, development, utilisation, protection and conservation of the River System, as well as the harmonisation of policies in that regard and the possible impact on the social, cultural, economic and natural environment;
- the standardised form of collecting, processing and disseminating data or information with regard to all aspects of the River System;
- the prevention of the pollution of water resources and the control over aquatic weeds in the River System;
- contingency plans and measures for responding to emergency situations or harmful conditions resulting from natural causes such as droughts and floods, or from human conduct such as industrial accidents,
- the regular exchange of information and consultation on the possible effects of planned measures;
- measures with a view to arriving at a settlement of a dispute between two or more of the Parties; and
- such other matters as may be determined by the Parties.

Article 7 provides for the obligations of the parties which include:

- The Parties shall give their full co-operation and support to the implementation of this Agreement as well as the recommendations of the Council.

- The Parties shall, in their respective territories, utilise the resources of the River System in an equitable and reasonable manner with a view to attaining optimal and sustainable utilisation thereof, and benefits therefrom, consistent with adequate protection of the River System. The term "equitable and reasonable" shall be interpreted in line with the Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC) Region.

- The Parties shall, in utilising the resources of the River System in their territories, **take all appropriate measures to prevent the causing of significant harm** to any other Party. The term "significant harm" shall be interpreted in line with the Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC) Region.

- The Parties shall exchange available information and data regarding the hydrological, hydrogeological, water quality, meteorological and environmental condition of the River System.

- A Party planning any project, programme or activity with regard to the River System which may have a significant adverse effect upon any one or more of the other Parties, or which may adversely affect such River System, shall forthwith notify the Council and provide all available data and information with regard thereto. [Sub-articles 7.5 to 7.16 prescribe in detail the process of notifying and responding to a notification of a planned project, programme or activity.]

3.10 TREATY ON THE LESOTHO HIGHLANDS WATER PROJECT BETWEEN THE GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA AND THE GOVERNMENT OF THE KINGDOM OF LESOTHO, 24 OCTOBER 1986

The Treaty provides for the establishment, implementation, operation and maintenance of the Lesotho Highlands Water Project. The project stores water in the upper reaches of the Senqu River in Lesotho, generates electricity in Lesotho, and the Treaty provides for a number of project phases with the eventual delivery of 70 m^3/s (2 208 million m^3/a in 2020) to a designated outlet point in the Vaal River basin.

3.10.1 Institutions

The Treaty provides for the establishment of the Trans Caledon Tunnel Authority with responsibility for the implementation, operation and maintenance of the Project situated in South Africa; the Lesotho Highlands Development Authority with responsibility for the implementation, operation and maintenance of the Project situated in the Kingdom of Lesotho and a JPTC which is now the Lesotho Highlands Water Commission, composed of two delegations, one from each Party (South

Africa and Lesotho), with monitoring powers over both LHDA and TCTA.

3.10.2 Royalties in terms of the LHWP Treaty

The Treaty also provides for Royalty payments from South Africa to Lesotho as well as the approach to royalty calculations and payments are set out in the following documents:

- Treaty on the Lesotho Highlands Water Project between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho (the Treaty);
- Royalty Manual Volume 1 - Methodology;
- Royalty Manual Volume 2 - List of Figures, Tables and Appendices;
- Royalty Manual Volume 3 - Examples;
- SACU Study - Protocol II to the Treaty on the Lesotho Highlands Water Project.

3.10.3 Royalties based on net benefit

Royalty payments are based on fifty-six per cent of the net benefit, where the net benefit is the difference of the cost, at its Present Value, between two schemes with a water delivery capacity of seventy cubic metres per second[1]:

(a) the first scheme, identified as the "Optimal Scheme" in the Royalty Manual, comprises either:

i) a least cost combination of the "Lesotho Highlands Water Project Initial Development" with a "Follow-on Orange Vaal Transfer Scheme",[1] Treaty, Article 12(1)

orii) the least cost "Lesotho Highlands Water Project Initial Development" only,

which ever provides the lowest cost[2].

(b) the second scheme comprises the "Least Cost Orange Vaal Transfer Scheme" (OVTS).

3.10.4 Present value (net benefit) calculations

Present Values over a period of fifty years from January 1995, are discounted to January 1995, using December 1985 price levels, and a discount 'rate of six per cent per annum[3].

[1] Treaty, Article 12(1)

[2] Treaty Article 12(2)

[3] Treaty Article 12(3)

The net benefit comprises the following elements:

(a) an investment element representing the investment costs difference;

(b) an operation element representing the electricity costs difference attributable to pumping operations; and

(c) an operation and maintenance element representing the remaining operation and maintenance costs difference[4].

Likewise the monthly Royalty payments comprise the following components:

a) a fixed component (uniform monthly amount) relating to the investment element[5]

(b) a variable component (unit rate in cents per cubic meter of water) relating to the benefit due to electricity costs[6] and

(c) a variable component (unit rate in cents per cubic meter of water) relating to the net benefit due to the remaining operation and maintenance costs[7].

3.10.5 Comparable schemes as at a feasibility study phase

The schemes used for calculating royalties (PV of net benefit) are identified in the Royalty Manual. They represent comparable schemes developed at a certain stage of the feasibility studies.

The Royalty manual bases the Royalty calculations on a LHWP Phase II comprising a dam at Mashai and a gravity tunnel from Mashai Reservoir to the tailpond dam of the hydro power complex[8].

The Treaty does not make provision for actual savings or increases in costs due to changes in the layout of the Lesotho Highlands Water Project (since the date of compilation of the royalty manual) to impact on the royalty calculations.

[4] Treaty Article 12(9)

[5] Treaty Article 12(10, 12(12)

[6] Treaty Article 12(10), 12(13)

[7] Treaty Article 12(10), 12(14)

[8] Treaty Annexure I

3.10.6 Water only projects

The royalty calculations are based on water only projects. The energy generation potential of the project is not taken into account in the royalty calculations.

3.10.7 SACU adjustment

Revenue accruing to Lesotho due to the implementation, operation and maintenance of the Project by way of its share of the common revenue pool of the Customs Union is set off against the investment element of the net benefit prior to the computation of the fixed component of the royalty:

The SACU benefit was computed as a fixed percentage amounting to 10,69 per cent of the Present Value of the total cost of the "Lesotho Highlands Water Project Initial Development".

This fixed percentage shall be adjusted in the event of any change to the Customs Union Agreement affecting Lesotho's share of the pool.

In the event of termination of the Customs Union Agreement the Parties shall agree on an amount to be set off equivalent to any revenue accruing to Lesotho as a result of any substitute dues, taxes or charges[9].

3.10.8 Escalation of PV in order to calculate royalty payment

The royalty payments are escalated to the actual dates of payment as follows:

a) The fixed component and the variable component is escalated with the Production Price Index. [10]

b) The variable component relating to the electricity element is escalated with the Average Annual Electricity Price[11].

[9] Treaty Article 12(11)
[10] Treaty Article 20(a)
[11] Treaty Article 20(b)

3.10.9 Interest

Payment must be made within thirty calendar days from the date of receipt of a monthly invoice[12].

Interest is at a rate of six per cent per annum for the period between the Due Date and the actual date of payment of such amounts plus any reasonable loss suffered by Lesotho[13]

3.10.10 Termination of period on 31 December 2044

After termination of 50 year period, ie after 31 December 2044 payment will be based on the Unit rates for:

(a) the variable component (unit rate in cents per cubic meter of water) relating to the benefit due to electricity costs; and

(b) the variable component (unit rate in cents per cubic meter of water) relating to the net benefit due to the remaining operation and maintenance costs.

3.10.11 Unilateral cancellation

In the event of the remaining part of the Project being cancelled at a phase subsequent to Phase I on the insistence, unilaterally, of South Africa, the net benefit shall be recomputed on the basis of the difference between:

(a) the Present Value of the "Lesotho Highlands Water Project Initial Development" with a delivery capacity equal to the combined delivery capacity of those phases of the Project already implemented, and those agreed to by the Parties to be implemented; and

(b) the Present Value, of the "Comparable Orange Vaal Transfer Scheme" with a delivery capacity equal to the combined delivery capacity of those phases of the Project, implemented, and those agreed to by the Parties to be implemented. [14]

[12] Treaty Article 23
[13] Treaty Article 24
[14] Treaty Article 12(8)

3.10.12 Other cancellation

In the event of the remaining part of the Project being cancelled at a phase subsequent to Phase I in circumstances other than by unilateral cancellation of South Africa, the net benefit shall be recomputed on the basis of the difference between:

(a) the Present Value, of the least cost combination with a combined water delivery capacity of seventy cubic metres per second, of:

i) the "Lesotho Highlands Water Project Initial Development" with a delivery capacity equal to the combined delivery capacity of those phases of the Project, implemented and those agreed by the Parties to be implemented, and

ii) the "Follow-on Orange Vaal Transfer Scheme", and

(b) the Present Value, of the "Least Cost Orange Vaal Transfer Scheme" with a delivery capacity of seventy cubic metres per second.

Provided that if the combined delivery capacity of those phases of the Project implemented and those agreed by the Parties to be implemented at that stage, exceeds the delivery capacity of the "Lesotho Highlands Water Project Initial Development" forming part of the "Optimal Scheme" then the PV of the 'Optimal Scheme' shall apply instead of the combination described in (a) above[15]

3.10.13 Shortfalls and Non-delivery of water

Provision has been made for adjusting water payments to recoup shortfalls in the supply of the Scheduled Monthly Demand for any month during that year or in the first six months of any subsequent year. [16]

In the event of the Scheduled Monthly Demand for any month not being delivered to South Africa, the fixed component of the royalty shall be reduced in proportion to such shortfall provided that such shortfall results from:

a) any phase of the Project being delayed, provided that it was not as the result of any act or omission on the part of the TCTA for a part of the project for which they are wholly responsible; and

b) any of the Force Majeure occurring (listed in paragraph (2) of Article 14) except 'any disturbance due to an extreme hydrological or other natural event including extreme

[15] Treaty Article 12(7)
[16] Treaty Article 12(16), 12(17), 12(18), 12(19)

drought and affecting the delivery of water to South Africa'. [17]

3.10.14 Excess Water

Excess water is water delivered in excess of the Scheduled Monthly Demand for a month less any portion utilized to recoup any shortfall (during same year or last 6 months of previous year).

Royalties for "Excess Water" are calculated at:

(a) fifty per cent of the unit rate for the variable electricity royalty; and

(b) fifty per cent of the unit rate for the remaining O&M element. [18]

3.10.15 Downstream releases

Downstream releases at the request of Lesotho shall be subject to compensation payments by Lesotho as agreed to by the Parties from time to time. [19]

Downstream releases at the request of South Africa shall be subject to compensation payments by South Africa for:

a) the effect of such release on the operation of the hydro-electric complex; and

b) for any loss in royalties.[20]

3.10.16 Revising hydrology and yield

Provision was been made for revising or updating reservoir inflow data 'in the calendar year preceding the date of first delivery of water to South Africa, which shall be January 1995, or at such other stage prior to such year as may be determined by the Joint Permanent Technical Commission' taking account of all relevant hydrological data collected prior to such year.[21]

[17] Treaty Article 12(19), 14(2)(a)

[18] Treaty Article 13(1)

[19] Treaty Article 13(6)

[20] Treaty Article 13(7)

[21] Treaty Article 12(4) and 12(5)

The LHDA shall from time to time establish the Nominal Annual Yield at a reliability of 98%.[22]

3.10.17 Adjustments to water demand

The annual minimum quantities of water to be delivered by LHDA are specified in Annexure II.

Year	Annexure II Million Cubic Meters
1995	57
1996	123
1997	190
1998	258
1999	327
2000	398
2001	470
2002	543
2003	618
2004	695
2005	772
2006	852
2007	932
2008	1 014
2009	1 098
2010	1183
2011	1 271
2012	1 361
2013	1 452
2014	1 545
2015	1 640
2016	1 736
2017	1 835
2018	1 934
2019	2036

[22] Treaty Article 7(5)

2020	2139
After 2020	2208

The annual quantities of water specified in Annexure II shall be adjusted in accordance with changes as projected by South Africa in the water use requirements in the Republic of South Africa, provided:

a) adjustments shall be made to only those annual quantities of water specified in Annexure II which exceed the Nominal Annual Yield (98% assurance)[23] for Sub-phase IB or;

b) the total of the Nominal Annual Yield for any phase of the Project which is being implemented at the time of such adjustment.[24]

3.10.18 Instream flow requirements

LHDA shall at all times maintain rates of flow in the natural river channels immediately:

a) downstream of the Katse dam of not less than five hundred litres per second; and

b) downstream of the Mohale dam of not less than three hundred litres per second;

Provided that 'subsequent to the implementation of Phase II of the Project, such rates of flow may be adjusted by agreement between the Parties'.

Provided further that in the event of either reservoir being at its minimum operating level, the quantities of water released shall be equal to the flow rate into such reservoir not in excess of the specified rate of release.[25]

3.10.19 Review of Treaty

The provisions of the Treaty shall be reviewed at intervals of twelve years from date of signature (24 October 1986) or at such other intervals as the Parties may agree upon.[26]

[23] Treaty Article 7(5)
[24] Treaty Article 7(2)
[25] Treaty Article 7(9)
[26] Treaty Article 18(1)

3.11 AGREEMENT ON PHASE II OF THE LESOTHO HIGHLANDS WATER PROJECT

Phase I consisting of Phase IA and Phase IB of the Lesotho Highlands Water Project (LHWP) has already been completed.

Lesotho and South Africa have on 11 August 2011 entered into an agreement to implement Phase II of the LHWP. This agreement provides a legal basis for the implementation of Phase II as well as for the operation and maintenance of Phases I and II of the LHWP.

Phase II consists of a new water delivery system comprising Polihali Reservoir on the Senqu River and a water conveyance tunnel connecting Polihali Reservoir with Katse Reservoir. The existing infrastructure is used from Katse Reservoir to the Ash River outlet in RSA.

Phase II can also include a pump storage scheme as discussed in paragraph 3.11.4. below.

3.11.1 Institutional Arrangements

Phase II will be implemented by a Project Management Unit established by the Lesotho Highlands Development Authority and overseen by a Technical Committee established by the Board of the LHDA.

3.11.2 Operational Arrangements and Operating Rule

Article 7 provides for Operational Arrangements.

The Parties (RSA and Lesotho) shall within 12 months of the Treaty being signed determine the Operating Rule for operation of Phase II. The Operating Rule shall be determined by applying the Systems Analsysis Technique and by:

- Ensuring optimal water security for South Africa;
- Ensuring the most advantageous options for the long term energy security of Lesotho without diminishing the benefits derived from the water delivery system;
- Providing for compensation of the loss of benefits from the hydropower facility, either in kind or in monetary value; and
- Ensuring that Lesotho is not disadvantaged with regard to benefits accruing from the

provisions of the Treaty in respect of royalty payments.

3.11.3 Royalty Payments

Royalty payments shall be calculated in accordance with Article 12 of the Treaty, but where the actual water deliveries are less than those stipulated in Annexure V of the Agreement, the quantities stipulated in Annexure V shall be used for the calculations.

Annexure V provides the following minimum quantities of water for the calculation of Royalties:

The units are not stated, but from the original delivery table provided in the Treaty it can be deducted that volumes are in million cubic meteres.

YEAR	VOLUME	YEAR	VOLUME
1995	57	2022	941
1996	123	2023	954
1997	190	2024	968
1998	258	2025	982
1999	327	2026	996
2000	398	2027	1010
2001	470	2028	1024
2002	543	2029	1037
2003	618	2030	1051
2004	695	2031	1065
2005	772	2032	1079
2006	780	2033	1093
2007	780	2034	1107
2008	780	2035	1120
2009	780	2036	1134
2010	780	2037	1148
2011	780	2038	1162
2012	780	2039	1176
2013	780	2040	1190
2014	780	2041	1203
2015	780	2042	1217
2016	780	2043	1231
2017	780	2044	1245
2018	780		
2019	899		
2020	913		

Note that the maximum transfer provided for in 2044 is 1245 million m3/a.

It must be confirmed whether this is the combined yield of Phase I and Phase II.

3.11.4 Hydropower arrangements

Article 8 provides for hydropower arrangements.

The Phase II hydropower generation system shall comprise the Kobong pump storage scheme consisting of a hydropower station, the existing Katse Reservoir as the lower reservoir, a new upper reservoir in the Kobong valley, or any other similar scheme, and an interconnecting tunnel as well as transmission lines and appurtenant works between the scheme and the designated connection point at the border with South Africa.

The implementation of the Kobong pump storage scheme is subject to agreement on the outcome of a joint feasibility study.

> *[The hydropower system is an integral part of Phase II.*
>
> *"Phase II" means the second phase of the Project to be implemented in terms of this Agreement in two distinct systems, namely a water delivery system to augment the delivery of water to South Africa and a hydropower generation system.]*

South Africa shall facilitate the sale of peak electricity from the Kobong pump storage scheme and the purchase of electricity for the pumping requirements of the scheme.

3.12 MEMORANDUM OF UNDERSTANDING FOR FEASIBILITY STUDY TO TRANSFER WATER FROM LESOTHO TO BOTSWANA

Lesotho, South Africa and Botswana have entered into an agreement to undertake a feasibility study for transferring water from the Lesotho Highlands to Botswana.

The first phase of the Feasibility Study is now out on tender and will include a determination of the viability of water resource development options at reconnaissance level to augment Botswana's bulk water supplies from Lesotho Highlands taking into consideration the latest information on hydrology and environmental needs and the preferred option for such water supplies. The first phase of the study is expected to take a period not exceeding twelve (12) months.

3.13 THE AGREEMENT ON THE ESTABLISHMENT OF THE VIOOLSDRIFT AND NOORDOEWER JOINT IRRIGATION SCHEME ON THE LOWER ORANGE RIVER (1992)

3.13.1 History

Vioolsdrift and Noordoewer are small towns on opposite banks of the Lower Orange River (LOR), some 350 km from the river mouth. Vioolsdrift is in South Africa and Noordoewer in Namibia. The South African Government constructed a canal system serving the two settlements in 1933. The canal is fed from a weir upstream of the river crossing. The canal infrastructure has supported agriculture on the southern and northern banks of the LOR for some 70 years.

Between 1933 and the independence of Namibia in 1990, the Vioolsdrift/Noordoewer Irrigation Scheme was under South African jurisdiction. An Irrigation Board was responsible for the local management of the scheme, with support from the South African Department of Water Affairs.

At Namibian independence, an international boundary was established along the LOR, and a border post was constructed between the two towns. This development required new management arrangements for the irrigation scheme. A Joint Irrigation Authority (JIA) was established at the end of 1993, based on an agreement between the Governments of Namibia and South Africa.

The South African Department of Water Affairs and Forestry (DWAF) had embarked on a renovation and upgrading programme just prior to the establishment of the JIA, but this work was stopped when the JIA was formed. In the view of the farmers, the support formerly provided by DWAF has not been adequately replaced since the establishment of the JIA.

3.13.2 Supply and allocation of Water according to the Treaty

Article 3 of the Treaty deals with “Supply of Water to the Scheme”.

Article 3, para 2 provides that subject to certain provisions being that there is no guarantee of water quality and that the supply is subject to such restrictions as may from time to time be imposed by the PWC due to a water shortage occurring in the Orange River -. “

...the Parties shall allow a maximum volume of 20 million cubic metres of water to be diverted annually from the Orange River into the distribution system of the Scheme at Vioolsdrift Weir or to be abstracted directly from the Orange River in the Irrigation District by means of abstraction works in private possession, for use for domestic and stockdrinking purposes and for the irrigation of land within the said District.”

Article 4 of the Treaty deals with “Allocation of Water by the Parties for use on Land situated in the

Irrigation District."

Article 4, para 1 provides:

"The water referred to in Article 3 shall in terms of appropriate legislation in force in their respective territories, be allocated by the Parties for use for domestic, stockdrinking or irrigation purposes on land within the Irrigation District on the basis of the following apportionment of the volume of water in question:-

South Africa 11 million cubic meters per annum,

Namibia 9 million cubic metres per annum.

3.13.3 Scheduled irrigation – Actual situation according to the October 2004 assessment of the "Vioolsdrift and Noordoewer Joint Irrigation Scheme (JIA)".

A total of 883.7 ha is scheduled for irrigation of which 283.2 ha are at Noordoewer and 600.5 ha at Vioolsdrif.

The combined area currently under irrigation is 728 ha of the possible 883.7 ha.

Table 1.1 summarizes the enlisted – and irrigated areas.

Description	VIOOLSDRIFT	NOORDOEWER	TOTAL
Enlisted area (ha)	600.5	283.2	883.7
Area served by canal (ha)	524	283	807
Present area irrigated (ha)	475	253	728

4 CONCLUSIONS

Not all four of the Orange River watercourse states are signatories to the Convention on International Watercourses. However it is generally accepted that the Convention reflects the customary law of international watercourses and would almost certainly be accepted as such by a tribunal should any dispute between the watercourse states arise.

The Revised SADC Protocol is however more immediate to the basin states and must accordingly be seen as modifying the customary law, ie modifying the Convention.

All of the conventions and treaties are in agreement that water resources allocation must be based on the **equitable and reasonable utilisation** of the shared water sources by each watercourse

state. Furthermore, any planned development **must not cause significant harm** to another watercourse state.

Specified factors/criteria uses must be taken into account when agreeing what is **equitable and reasonable use**, including:

- social, economic and environmental needs;
- the population dependent on the shared watercourse;
- the effects of the use or uses of a shared watercourse in one Watercourse State on other Watercourse States;
- existing and potential uses of the watercourse;
- conservation, protection, development and economy of use of the water resources; and
- the availability of alternatives.

All relevant factors are to be considered together and a conclusion reached on the basis of the whole.

States must adopt a river basin or watercourse approach in the planning, development and management of the shared water resources and must follow IWRM principles.

The Orange River mouth is a listed Ramsar wetland site and the basin states should consult on how to protect this wetland and should consider implementing some or all of the recommendations provided in the CSIR situation assessment.

Water Demand Management (WDM) and co-use of ground and surface water are fundamental requirements for integrated planning and management of the shared water resources.

Watercourse states should consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution.

ORASECOM Council is mandated to make recommendations, or to advise the Parties, on the safe yield of the river and on the equitable and reasonable utilisation of the water sources in the River System to support sustainable development in the territory of each Party. All parties to the Orasecom Agreement must be notified of any planned development that will adversely affect another watercourse state. The notificaton and response procedures are specified.

Besides ORASECOM the following institutions have been established with powers in the Orange River Basin:

The Trans Caledon Tunnel Authority with responsibility for the implementation, operation and maintenance of the Lesotho Highlands Water Project situated in South Africa; the Lesotho Highlands Development Authority with responsibility for the implementation, operation and maintenance of the Project situated in the Kingdom of Lesotho and a JPTC which is now the Lesotho Highlands Water Commission, composed of two delegations, one from each Party, with monitoring powers over both LHDA and TCTA.

A Permanent Water Commission between Namibia and South Africa is responsible for overseeing the Agreement on the Establishment of the Vioolsdrift and Noordoewer Joint Irrigation Scheme with a Vioolsdrift and Noordoewer Joint Irrigation Authority to manage and operate the scheme.

4.1 DOES INTERNATIONAL LAW FAVOUR ANY PARTICULAR WATER RESOURCE DEVELOPMENT?

Namibia could make the argument that if the dam was built partly on their territory then they could ensure that they receive their equitable and reasonable use. Namibia may for this reason favour a lower Orange River option.

Lesotho could make the argument that it has already concluded the LHWP Treaty with South Africa for a 70 m^3/s LHWP and that the development of LHWP is a large economic contributor to Lesotho GDP as are the Royalty receipts.

However, there are two counter-arguments:

a) the Treaty does make provision for the LHWP to be only partly developed, ie for cancellation before the full 70 cubic meters transfer capacity is achieved, and provides Royalty payment calculations that would be applicable in such a scenario,

b) Lesotho's interests cannot be served above the interests of optimally developing the whole watercourse as a whole in the interests of all watercourse states,

c) South Africa is currently only legally committed to implementing Phase II of the LHWP.

Botswana has concluded an MoU with South Africa and Lesotho that envisages a supply out of the Lesotho Highlands. Depending on the outcome of the feasibility study, Botswana might favour further Lesotho Highlans developments. But other options considered in this reconciliation study may provide Botswana with a cheaper water supply.

South Africa and Namibia have concluded the 1992 Agreement on the Vioolsdrift and Noordoewer

Joint Irrigation Scheme and it should be accepted that the 20 million cubic metres per annum allocated to that scheme in terms of the agreement is an existing lawful use.

However, the most important international law principles/rules appear to be those of:

- Equitable and reasonable utilisation; and
- Not causing significant harm.

Given the circumstances of the Orange River, it could be argued that:

- if the watercourse states adopt a river basin or watercourse approach in the planning, development and management of the water resources of the Orange, and
- if all parties are guaranteed their equitable and reasonable utilisation reflective of their population, their social needs, their environmental needs, and their existing entitlements, as agreed through negotiation under the umbrella of ORASECOM, then
- it cannot be foreseen that international law would prevent any of the options under consideration from being developed.

4.2 SOUTH AFRICA'S EXISTING LAWFUL WATER USE

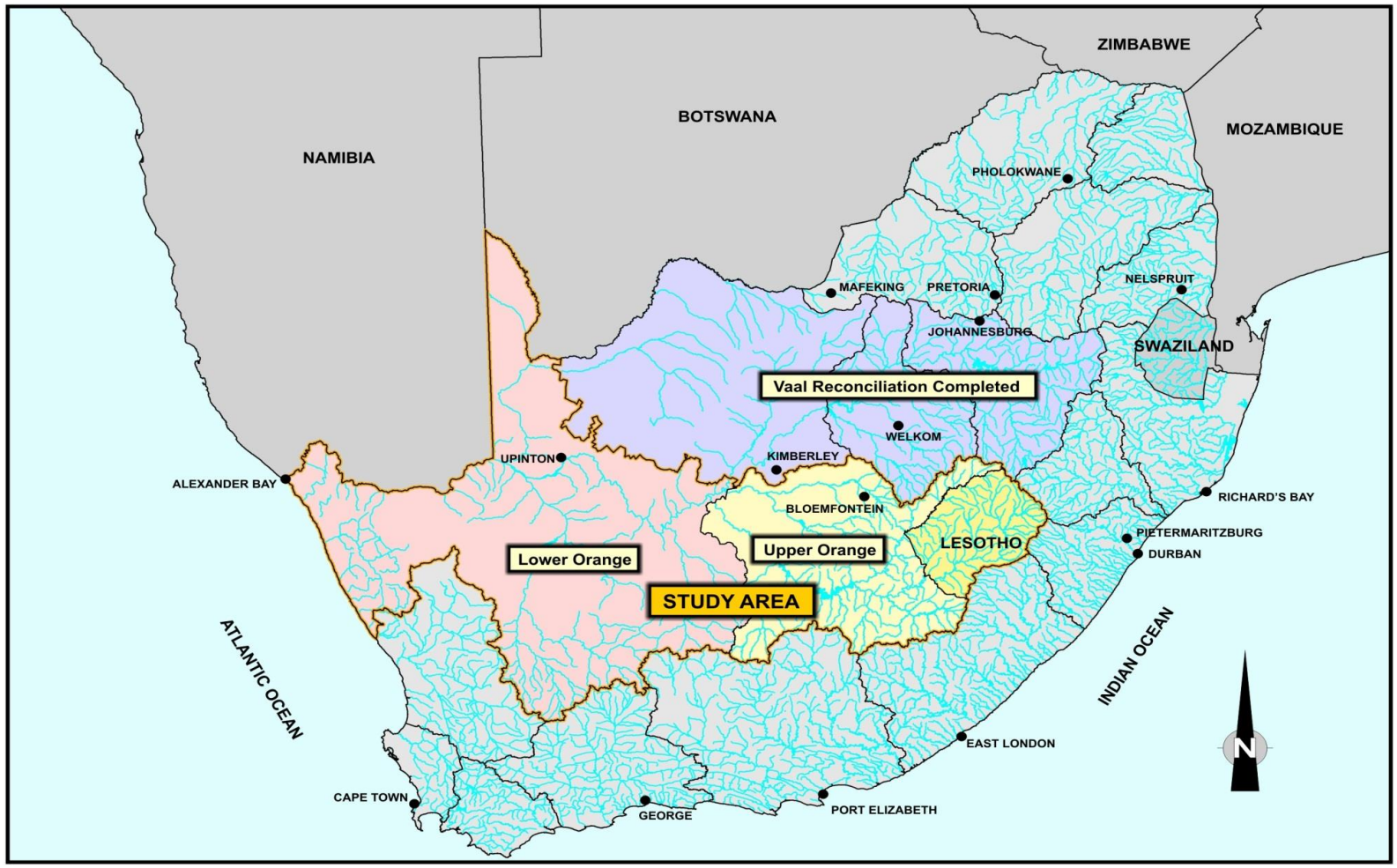
There is however another consideration that goes beyond the direct interpretation of the respective treaties and agreements.

The question is what legal weight should be afforded to South Africa's existing lawful rights to use the Orange River where there are insufficient resources to support the water-related developments desired by the watercourse states? Specifically where the rights have not yet been exercised, such as those further developments envisaged by the Treaty on the LHWP beyond Phase II.

International law demands that Watercourse States adopt an approach of fairness and accommodation, and in view of the limited supply of the Orange River, this might entail a trade-off between what is currently viewed as existing, although as yet undeveloped, lawful rights and the more effective application and use of water in the common interests of all of the water course states.

Appendix A

MAPS



DEVELOPMENT OF RECONCILIATION STRATEGIES FOR
LARGE BULK WATER SUPPLY SYSTEMS: ORANGE RIVER: PROPOSAL

Study area locality map