DEPARTMENT OF WATER AND SANITATION

NO. 466 **22 APRIL 2016**

NATIONAL WATER ACT, 1998
(ACT NO.36 OF 1998)
CLASSES AND RESOURCE QUALITY OBJECTIVES OF WATER RESOURCES FOR THE OLIFANTS CATCHMENT

I, Nomvula Paula Mokonyane, in my capacity as Minister of Water and Sanitation, and duly authorised in terms of section 13(4) of the National Water Act (Act No. 36 of 1998) hereby publish the notices for the classes of water resources and resource quality objectives for catchments of the Olifants, in the Schedule, to be issued under section 13(4) of the National Water Act (Act No. 36 of 1998).

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MRS NP MOKONYANE
MINISTER OF WATER AND SANITATION
DATE: 17.03.2016

SCHEDULE

CLASSES AND RESOURCE QUALITY OBJECTIVES OF WATER RESOURCES FOR CATCHMENTS OF THE OLIFANTS IN TERMS OF SECTION 13(1)(A) AND (B) OF THE NATIONAL WATER ACT (ACT NO.36 OF 1998)

1. DESCRIPTION OF WATER RESOURCE

1. The classes and resource quality objectives are determined for all or part of every significant water resource within the catchments of the Olifants as set out below:

Water Management Area:	Olifants
Drainage Regions:	B primary drainage region
Rivers:	Olifants River System

2. The Minister has, in terms of section 12 of the National Water Act (No. 36 of 1998), prescribed a system for classifying water resources by promulgating Regulation 810, Government Gazette 33541 dated 17 September 2010. In terms of section 13(1) of the Act the Minister must, as soon as reasonably practicable after the Minister has prescribed a system for classifying water resources and subject to subsection (4), by notice in the *Gazette*, determine for all or part of every significant water resource, a class in accordance with the prescribed classification system.

3. The Minister, in terms of section 13(1)(a) of the Act, has determined the following classes of each significant water resource for catchments of the Olifants.

4. The Minister, in terms of section 13(1)(b) of the Act, has determined the following resource quality objectives of each significant water resource for catchments of the Olifants.

2. DETERMINATION OF THE CLASS OF WATER RESOURCES AND RESOURCE QUALITY OBJECTIVES IN TERMS OF SECTION 13(1)(A) AND (B) OF THE NATIONAL WATER ACT (ACT NO.36 OF 1998)

1. A summary of the water resource classes for Integrated Units of Analysis (Figure 1) and ecological categories for the Olifants is set out in Table 1.

2. Integrated Units of Analysis (IUA) are classified in terms of their extent of permissible utilization and protection as either Class I: indicating high environmental protection and minimal utilization; or Class II indicating moderate protection and moderate utilization; and Class III indicating sustainable minimal protection and high utilization.

3. Resource Quality Objectives (RQO) are defined for each prioritised resource unit (RU) (Table 2) for every IUA in terms of water quantity, quality, habitat and biota as shown in Table 3 – 9 respectively.

4. Where specified, the ecological category or Recommended Ecological Category (REC) means the assigned ecological condition by the Minister to a water resource that reflects the ecological condition of that water resource in terms of the deviation of its biophysical components from a predevelopment condition.

5. RQO are applicable upon the date of approval by the Minister, unless otherwise specified.

1. Water Resource Classes for the Olifants catchment

Table 1: Water Resource Classes per IUA and Ecological Categories per Biophysical Node

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
1 Upper Olifants River catchment	III	HN1	B11A, B11B	Olifants (confluence with Steenkoolspruit)	C	61.3	10.25
		HN2	B11C	Piekespruit (confluence with Steenkoolspruit)	B	-	-
		HN3	B11D	Dwars-indieWegspruit (confluence with Trichardtspruit)	C	-	-
		HN4	B11D	Steenkoolspruit (outlet of quaternary)	D	44.6	4.70
		HN5	B11E	Blesbokspruit (confluence with Rietspruit)	B	-	-
		HN6	B11E	Steenkoolspruit (confluence with Olifants)	D	65.4	4.70
		HN7	B11F	Olifants (outlet of quaternary)	D	147.9	4.70
		EWR Site NOU-EWR1	**B11G**	**Noupoortspruit**	**C/D**	4.28	13.90
		HN9	B11G	Olifants (releases from Witbank Dam)	D	164.0	4.70
		HN10	B11H	Spookspruit (confluence with Olifants)	C	11.4	10.25
		EWR site 1	B11J	**Olifants**	**D**	184.5	4.70
		HN12	B11K, B11L	Klipspruit (confluence with Olifants)	D	45.7	4.67
		HN14	B12A	Boschmansfontein (confluence with Klein Olifants)	C	-	-
		HN15	B12A	Klein Olifants (outlet of quaternary)	C	12.7	18.85
		HN16	B12B	Klein Olifants (outlet of quaternary)	D	16.9	8.11
		OLI-EWR1 (Rapid site)	**B12C**	**Klein Olifants**	**C**	44.5	18.85
		HN18	B12C	Klein Olifants (releases from Middelburg Dam)	D	53.5	5.52
		HN19	B12D	Vaalbankspruit (confluence with Klein Olifants)	D	-	-
		HN20	B12D	Klein Olifants (outlet of quaternary)	D	67.3	5.52
2 Wilge River catchment area	II	HN21	B20A	Bronkhorstpruit (outlet of quaternary)	C	27.7	13.38
		HN22	B20B	Koffiespruit (confluence Bronkhorstspruit)	C	15.5	13.38
		HN23	B20C	Osspruit (inflow to Bronkhorstspruit Dam)	D	-	-
		HN24	B20C	Bronkhorstpruit (outlet from Bronkhorstspruit Dam)	C	56.4	13.44

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
		HN25	B20D	Hondespruit (confluence with Bronkhorstspruit)	C	11.9	13.39
		HN26	B20D	Bronkhorstpruit (confluence with Wilge)	C	79.9	13.45
		HN27	B20E, B20F	Wilge (confluence with Bronkhorstspruit	C	45.8	13.42
		HN28	B20G	Saalboomspruit (confluence with Wilge)	C	22.1	13.40
		HN29	B20H	Grootspruit (confluence with Wilge)	C	12.8	13.40
		HN30	B20H	Wilge (outlet of quaternary)	B	158.2	17.92
		EWR site 4	**B20J**	**Wilge**	**B**	175.5	12.16
3 Selons River area including Loskop Dam	**II**	HN32	B12E	Doringboomspruit (confluence with Klein Olifants)	B	-	-
		HN33	B12E	Keeromspruit (confluence with Klein Olifants)	C	-	-
		EWR site 3	**B12E**	**Klein Olifants**	**D**	81.5	12.72
		OLI-EWR3 (Rapid site)	**B32A**	**Kranspoortspruit**	**B**	4.7	24.42
		HN36	B32A	Boekenhoutloop (inflow to Loskop Dam)	B	-	-
		EWR Site 2	**B32A**	**Olifants**	**C**	500.6	12.53
		HN38	B32B, B32C	One node at confluence of Selons with Olifants in B32C. Included: Klipspruit (confluence with Selons) Kruis (confluence with Selons) Selons (confluence with Olifants)	B	-	-
		HN39	B32C	Olifants (releases from Loskop Dam)	D	568.6	7.22
		HN40	B32C	Olifants (outlet of quaternary – outlet of IUA3)	D	576.8	7.22
4 Elands River catchment area	**III**	HN41	B31A, B, C	One node at outlet of B31C, releases from Rust de Winter Dam. Included: B31A (Elands) B31B (Hartbeesspruit) B31C (Elands)	C	33.5	12.34
		HN42	B31D	Enkeldoringspruit (confluence with Elands)	C	-	-

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
		HN43	B31F	Elands (releases from Mkumbe Dam)	C	59.8	12.34
		HN44	B31G	Kameel (upper part only	D	-	-
		EWR Site 6	**B31G**	**Elands**	**D**	60.3	6.32
		HN46	B31G	Elands (outlet of quaternary – outlet of IUA4)	D	69.6	6.32 (D)
5 Middle Olifants up to Flag Boshielo Dam	**III**	HN47	B31H, B31J	Elands (outlet of quaternary, confluence with Olifants))	D	84.1	6.32 (D)
		HN48	B32E, B32F	One node at confluence with Olifants in B32F Included: B32E (Bloed) B32F (Doringpoortloop, Diepkloof and Bloed)	B	17.2	13.90
		HN49	B32G, H	One node at outlet of B32H, confluence with Olifants Included: B32G (Moses) B32H (Mametse and Moses)	C	35.4	9.93
		EWR site 5	**B32D**	**Olifants**	**C**	570.9	9.96
		HN51	B51B	Puleng (upper part only)	B	-	-
		HN52	B51B	Olifants (releases from Flag Boshielo Dam)	D	723.4	3.91
		HN53	B51D, B51E	Olifants (outlet of quaternary– outlet of IUA5)	D	726.6	3.81
6 Steelpoort River Catchment	**III**	HN54	B41A	One node at outlet of B41A. Included: Grootspruit (outlet of quaternary) Langspruit, including Lakenvleispruit and Kleinspruit	C	41.9	20.78
		OLI-EWR2 (Rapid site)	**B41B**	**Steelpoort**	**C**	63.5	20.78
		HN56	B41C	Masala (confluence with Steelpoort), including Tonteldoos and Vlugkraal)	C	-	-
		HN57	B41D, B41E	Steelpoort (inflow to De Hoop Dam)	C	117.0	20.78
		HN58	B41F	Draaikraalspruit (confluence with Klip)	B	-	-
		OLI-EWR4) (Rapid site)	**B41F**	**Klip**	**C**	5.2	12.44
		HN60	B41G	Kraalspruit (confluence with Groot Dwars)	B	-	-
		HN61	B41G	Klein Dwars (Confluence with Groot Dwars)	D	-	-
		HN62	B41G	Upper reaches of Dwars (before mining impacts)	C	24.5	13.33
		DWA-EWR1	**B41H**	**Dwars (existing)**	**B/C**	31.4	19.41

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
		HN64	B41H	Steelpoort	D	-	-
		EWR site – 9	**B41J**	**Steelpoort**	**D**	120.2	7.97
		EWR site – 10	**B41K**	**Steelpoort (confluence with Olifants – outlet of IUA6)**	**D**	336.6	7.43
7 Middle Olifants below Flag Boshielo Dam	**III**	HN67	B51F	Nkumpi (outlet of quaternary)	C	3.8	10.73
		EWR site 7	**B51G**	**Olifants**	**D**	726.5	3.84 (D)
		HN69	B52E	Palangwe (confluence with Olifants)	C	-	-
		HN70	B52F	Hlakaro (outlet)	C	-	-
		HN71	B52J	Mphogodima (confluence with Olifants)	C	-	-
		HN72	B52A, E, G, J	Olifants (outlet of quaternary – outlet of IUA7)	D	799.7	3.88
8 Spekboom catchment	**II**	HN73	B42A, B42B	One node for Dorpspruit at outlet of B42B. Included: Hoppe se Spruit (confluence) Doringbergspruit (confluence)	C	-	-
		OLI-EWR9 (Rapid site)	**B42B**	**Dorpspruit**	**C/D**	63.2	11.99
		HN75	B42C	Potloodspruit (confluence with Dorps)	C	-	-
		HN76	B42D, B42E	Dorps (confluence with Spekboom) Spekboom (confluence with Dorps)	C	69.7	14.95
		OLI-EWR6) (Rapid site)	**B42D**	**Spekboom**	**C**	28.0	17.15
		HN78	B42F	Potspruit (confluence with Watervals)	C	-	-
		HN79	B42F	Watervals (releases from Buffelskloof Dam)	C	28.6	17.36
		HN80	B42G	Rooiwalhoek-se-Loop (confluence with Watervals)	B	-	-
		OLI-EWR5) (Rapid site)	**B42G**	**Watervals**	**C**	36.4	15.47
		HN82	B42H	Spekboom (outlet of quaternary – outlet of IUA 8)	B	149.0	24.84
9 Ohrigstad catchment	**III**	HN83	B60E, B60F	One node at outlet of B60F. Included: Kranskloofspruit (confluence with Ohrigstad) Mantshibi (confluence with Ohrigstad) Ohrigstad (outlet of quaternary)	D	35.6	6.31

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
		HN84	B60G	Vyehoek (confluence with Ohrigstad)	C	-	-
		OLI-EWR8 (Rapid site)	**B60H**	**Ohrigstad**	**D**	65.5	16.59
		HN86	B60H	Ohrigstad (outlet of quaternary – outlet of IUA9)	D	69.7	8.05
10 Lower Olifants	**II**	HN87	B60J	Sandspruit, including Rietspruit and Qunduhlu	B	-	-
		EWR site – 12	**B60J**	**Blyde**	**B**	383.7	27.9
		HN89	B60J	Blyde (confluence with Olifants)	C	385.7	16.13
		HN90	B71A	Paardevlei (confluence with Tongwane)	B	-	-
		HN91	B71A	Tongwane (confluence with Olifants)	B	-	-
		EWR site – 8	**B71B**	**Olifants**	**D**	813.0	4.30
		HN93	B71C	Mohlapitse (upper reaches)	B	42.1	26.5
		HN94	B71D	Kgotswane (confluence with Olifants)	B	-	-
		HN95	B71D, B71F	Olifants (confluence with Steelpoort)	D	937.9	4.30
		EWR site – 11	**B71G, H, J**	**Olifants (confluence with Blyde)**	**D**	1321.8	11.2 (D)
		HN97	B72A	Makhutswi, including Moungwane and Malomanye	C	38.0	12.89
		HN98	B72C	Olifants (outlet – outlet of IUA10)	C	1755.5	18.07
11 Ga-Selati River	**III**	HN99	B72E	Ngwabatse (confluence with Ga-Selati)	D	25.7	9.05
		HN100	B72F, G	Ga-Selati (outlet of quaternary)	C	13.5	19.59
		EWR site –14a	**B72H**	**Ga-Selati**	**C**	52.2	19.59
		HN102	B72J	Molatle (confluence with Ga-Selati)	B	11.4	12.67
		EWR site – 14b	**B72K**	**Ga-Selati**	**D**	72.7	11.99 (D)
		HN104	B72K	Ga-Selati (outlet of quaternary – outlet of UIA11)	D	72.7	11.95 (D)
12 Lower Olifants within Kruger National Park	**II**	**EWR site 13**	**B72D**	**Olifants**	**C**	1760.7	11.36
		OLI-EWR7 (Rapid site)	**B73A**	**Klaserie**	**B/C**	25.5	22.31
		HN107	B73B	Klaserie (confluence with Olifants)	C	37.1	15.41
		HN108	B73C	Tsiri (confluence with Olifants)	B	-	-
		HN109	B73C	Tshutshi (confluence with Olifants)	B	-	-
		HN110	B73D	Nhlaralumi, including Machaton, Nyameni and Thlaralumi	B	6.8	13.65
		HN111	B73E	Sesete (confluence with Timbavati)	B	11.1	12.24

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m^3/a)	EWR as % of natural MAR [1)]
		HN112	B73F	Timbavati (outlet of quaternary)	B	18.7	12.12
		HN113	B73G	Timbavati, including Shisakashonghondo	B	-	-
		EWR site 16	**B73G, B73H**	**Olifants**	**C**	1916.9	10.75
		HN115	B73J	Hlahleni (confluence with Olifants)	A	-	-
		HN116	B73J	Olifants (outlet of quaternary – outlet of IUA12)	C	1918.3	14.72
13 **Blyde River catchment**	**I**	HN117	B60A	Blyde (confluence with Lisbon)	C	87.1	18.73
		HN118	B60B	Lisbon, including Heddelspruit and Watervalspruit	B	-	-
		HN119	B60B	Blyde (outlet of quaternary)	B	183.8	32.86
		EWR site – TRE-EWR1	**B60C**	**Treur**	**B**	46.8	34.60
		HN121	B60D	Blyde (inflow to Blyderivierpoort Dam – outlet of IUA13)	B	283.9	31.57

MAR: Mean Annual Run-off

[1)] Based on EWR for maintenance and drought flows only

Table 2: Summary of the Integrated Units of Analyses (IUA), Hydrological nodes and Resource Unit (RU) numbers for river systems in the Olifants catchment

IUA	BIOPHYSICAL NODE AND RU	RIVER NAME
1. Upper Olifants River catchment	1	Olifants (confluence with Steenkoolspruit)
	2	Piekespruit (confluence with Steenkoolspruit)
	3	Dwars-indieWegspruit (confluence with Trichardtspruit)
	4	Steenkoolspruit (outlet of quaternary)
	5	Blesbokspruit (confluence with Rietspruit)
	6	Steenkoolspruit (confluence with Olifants)
	7	Olifants (outlet of quaternary)
	8	Noupoortspruit (EWR site – NOU-EWR1) (existing)
	9	Olifants (releases from Witbank Dam)
	10	Spookspruit (confluence with Olifants)
	11	Olifants (EWR site 1 – EWR1) (existing)
	12	Klipspruit (confluence with Olifants)
	13	
	14	Boschmansfontein (confluence with Klein Olifants)
	15	Klein Olifants (outlet of quaternary)
	16	Klein Olifants (outlet of quaternary)
	17	Klein Olifants (EWR site – OLI-EWR1) (Rapid site)
	18	Klein Olifants (releases from Middelburg Dam)
	19	Vaalbankspruit (confluence with Klein Olifants)
	20	Klein Olifants (outlet of quaternary)
2. Wilge River catchment area	21	Bronkhorstpruit (outlet of quaternary)
	22	Koffiespruit (confluence with Bronkhorstspruit)
	23	Osspruit (inflow to Bronkhorstspruit Dam)
	24	Bronkhorstpruit (outlet from Bronkhorstspruit Dam)
	25	Hondespruit (confluence with Bronkhorstspruit)
	26	Bronkhorstpruit (confluence with Wilge)
	27	Wilge (confluence with Bronkhorstspruit
	28	Saalboomspruit (confluence with Wilge)
	29	Grootspruit (confluence with Wilge)
	30	Wilge (outlet of quaternary)
	31	Wilge (EWR site – EWR4, outlet of IUA2) (existing)
3. Selons River area including Loskop Dam	32	Doringboomspruit (confluence with Klein Olifants)
	33	Keeromspruit (confluence with Klein Olifants)
	34	Klein Olifants (EWR site – EWR3) (existing)
	35	Kranspoortspruit (EWR site – OLI-EWR3) (Rapid site)
	36	Boekenhoutloop (inflow to Loskop Dam)
	37	Olifants (EWR site – EWR2) (existing)
	38	One node at confluence of Selons with Olifants in B32C. Included: Klipspruit (confluence with Selons) Kruis (confluence with Selons) Selons (confluence with Olifants)
	39	Olifants (releases from Loskop Dam)
	40	Olifants (outlet of quaternary – outlet of IUA3)

4. Elands River catchment area	41	One node at outlet of B31C, releases from Rust de Winter Dam. Included:B31A (Elands) B31B (Hartbeesspruit) B31C (Elands)
	42	Enkeldoringspruit (confluence with Elands)
	43	Elands (releases from Mkumbe Dam)
	44	Kameel (upper part only
	45	Elands (EWR site – EWR6) (existing)
	46	Elands (outlet of quaternary – outlet of IUA4)
5. Middle Olifants up to Flag Boshielo Dam	47	Elands (outlet of quaternary, confluence with Olifants)
	48	One node at confluence with Olifants in B32F. Included: B32E (Bloed), B32F (Doringpoortloop, Diepkloof and Bloed)
	49	One node at outlet of B32H, confluence with Olifants. Included: B32G (Moses) B32H (Mametse and Moses)
	50	Olifants (EWR site – EWR5) (existing)
	51	Puleng (upper part only)
	52	Olifants (releases from Flag Boshielo Dam)
	53	Olifants (outlet of quaternary– outlet of IUA5)
6. Steelpoort River catchment	54	One node at outlet of B41A. Included: Grootspruit (outlet of quaternary) Langspruit, including Lakenvleispruit and Kleinspruit
	55	Steelpoort (EWR site – OLI-EWR2) (Rapid site)
	56	Masala (confluence with Steelpoort), including Tonteldoos and Vlugkraal)
	57	Steelpoort (inflow to De Hoop Dam)
	58	Draaikraalspruit (confluence with Klip)
	59	Klip (EWR site – OLI-EWR4) (Rapid site)
	60	Kraalspruit (confluence with Groot Dwars)
	61	Klein Dwars (Confluence with Groot Dwars)
	62	Upper reaches of Dwars (before mining impacts)
	63	Dwars (EWR site – DWA-EWR1) (existing)
	64	Steelpoort
	65	Steelpoort (EWR site – EWR9) (existing)
	66	Steelpoort (EWR site – EWR10) (existing) (confluence with Olifants – outlet of IUA6)
7. Middle Olifants below Flag Boshielo Dam to upstream of Steelpoort River	67	Upper Nkumpi (outlet of quaternary)
	68	Olifants (EWR site – EWR7) (existing)
	69	Palangwe (confluence with Olifants)
	70	Hlakaro (outlet)
	71	Mphogodima (confluence with Olifants)
	72	Olifants (outlet of quaternary – outlet of IUA7)
8. Spekboom catchment	73	One node for Dorpspruit at outlet of B42B. Included: Hoppe se Spruit (confluence) Doringbergspruit (confluence)
	74	Dorpspruit (EWR site – OLI-EWR9) (Rapid site)
	75	Potloodspruit (confluence with Dorps)
	76	Dorps (confluence with Spekboom)
	77	Spekboom (EWR site – OLI-EWR6) (Rapid site)
	78	Potspruit (confluence with Watervals)
	79	Watervals (releases from Buffelskloof Dam)

	80	Rooiwalhoek-se-Loop (confluence with Watervals)
	81	Watervals (EWR site – OLI-EWR5) (Rapid site)
	82	Spekboom (outlet of quaternary – outlet of IUA 8)
9. Ohrigstad River catchment area	83	One node at outlet of B60F. Included: Kranskloofspruit, Mantshibi, Ohrigstad (outlet of quaternary)
	84	Vyehoek (confluence with Ohrigstad)
	85	Ohrigstad (EWR site – OLI-EWR8) (Rapid site)
	86	Ohrigstad (outlet of quaternary – outlet of IUA9)
10. Lower Olifants	87	Sandspruit, including Rietspruit and Qunduhlu
	88	Blyde (EWR site – EWR12) (existing)
	89	Blyde (confluence with Olifants)
	90	Paardevlei (confluence with Tongwane)
	91	Tongwane (confluence with Olifants)
	92	Olifants (EWR site – EWR8) (existing)
	93	Mohlapitse (upper reaches)
	94	Kgotswane (confluence with Olifants)
	95	Olifants (confluence with Steelpoort)
	96	Olifants (EWR11, confluence with Blyde) (existing)
	97	Makhutswi, including Moungwane and Malomanye
	98	Olifants (outlet – outlet of IUA10)
11. Ga-Selati River area	99	Ngwabatse (confluence with Ga-Selati)
	100	Ga-Selati (outlet of quaternary)
	101	Ga-Selati (EWR site – EWR14a) (existing)
	102	Molatle (confluence with Ga-Selati)
	103	Ga-Selati (EWR site – EWR14b) (existing)
	104	Ga-Selati (outlet of quaternary – outlet of UIA11)
12. Lower Olifants within Kruger National Park	105	Olifants (EWR site – EWR13) (existing)
	106	Klaserie (EWR site – OLI-EWR7) (Rapid site)
	107	Klaserie (confluence with Olifants)
	108	Tsiri (confluence with Olifants)
	109	Tshutshi (confluence with Olifants)
	110	Nhlaralumi, including Machaton, Nyameni and Thlaralumi
	111	Sesete (confluence with Timbavati)
	112	Timbavati (outlet of quaternary)
	113	Timbavati, including Shisakashonghondo
	114	Olifants (EWR site – EWR16) (existing)
	115	Hlahleni (confluence with Olifants)
	116	Olifants (outlet of quaternary – outlet of IUA12)
13. Blyde River catchment area	117	Blyde (confluence with Lisbon)
	118	Lisbon, including Heddelspruit and Watervalspruit
	119	Blyde (outlet of quaternary)
	120	Treur (EWR site – TRE-EWR1) (existing)
	121	Blyde (inflow to Blyderivierpoort Dam – outlet of IUA13)

Table 3: Resource Quality Objectives (RQO) for RIVER WATER QUANTITY in the Olifants catchment

RIVER WATER QUANTITY											
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**	
1	III	Olifants (EWR site 1 - EWR1) (existing)	RU11	11	D	Quantity	Low Flows	Low flows should be improved in order to maintain the river habitat for the ecosystem and ecotourism.	EWR maintenance low and drought flows: Olifants EWR1 in B11J VMAR = 184.5x106m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)	Drought flows (m^3/s) (Percentile)
										Oct 0.150 (99)	0.161 (99)
										Nov 0.272 (90)	0.185 (99)
										Dec 0.360 (80)	0.146 (99)
										Jan 0.447 (99)	0.675 (80)
										Feb 0.549 (99)	0.692 (90)
										Mar 0.442 (80)	0.261 (90)
										Apr 0.361 (80)	0.204 (90)
										May 0.249 (80)	0.164 (90)
										Jun 0.171 (80)	0.127 (99)
										Jul 0.130 (99)	0.131 (99)
										Aug 0.103 (80)	0.153 (70)
										Sep 0.091 (80)	0.073 (99)
	III	Klipspruit (confluence with Olifants	RU12	12	D	Quantity	Low Flows	Low flows are necessary to dilute and carry away waste and to support ecosystem functioning.	EWR maintenance low and drought flows: Klipspruit at confluence with Olifants in B11L VMAR = 25.65x10^6m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)	Drought flows (m^3/s) (Percentile)
										Oct 0.034 (90)	0.030 (99)
										Nov 0.038 (90)	0.034 (99)
										Dec 0.042 (80)	0.022 (99)
										Jan 0.046 (90)	0.041 (99)
										Feb 0.055 (90)	0.048 (99)
										Mar 0.051 (90)	0.046 (99)
										Apr 0.051 (90)	0.045 (99)
										May 0.047 (80)	0.034 (99)
										Jun 0.047 (80)	0.035 (99)
										Jul 0.044 (90)	0.037 (99)
										Aug 0.039 (90)	0.035 (99)
										Sep 0.035 (70)	0.008 (99)
	III	Olifants	RU13	13	B	Quantity	Low Flows	Low flows should be improved in order to maintain the river habitat for the ecosystem and ecotourism.	EWR maintenance low and drought flows: Olifants in B11L VMAR = 307.36x10^6m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)	Drought flows (m^3/s) (Percentile)
										Oct 0.280 (90)	0.241 (99)
										Nov 0.455 (90)	0.391 (99)
										Dec 0.589 (90)	0.507 (99)
										Jan 0.721 (90)	0.620 (99)
										Feb 0.882 (90)	0.759 (99)
										Mar 0.732 (90)	0.624 (99)
										Apr 0.631 (80)	0.428 (99)
										May 0.478 (90)	0.412 (99)
										Jun 0.367 (90)	0.316 (99)
										Jul 0.298 (90)	0.256 (99)
										Aug 0.243 (90)	0.209 (99)
										Sep 0.211 (90)	0.181 (99)
2	II	Willge (EWR site -	RU31	31	B	Quantity	Low Flows	Low flows need to	EWR maintenance	Maintenance low flows (m^3/s)	Drought

RIVER WATER QUANTITY													
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**			
		EWR4, outlet of IUA2) (existing)						be improved in order to maintain river habitat and the ecosystem.	low and drought flows: Wilge EWR4 in B20J VMAR = 175.59x10^{6}m^3 PES=B category	(Percentile)			flows (m^3/s) (Percentile)
										Oct	0.806 (50)		0.206 (99)
										Nov	1.094 (60)		0.269 (99)
										Dec	1.235 (60)		0.298 (99)
										Jan	1.476 (60)		0.350 (99)
										Feb	1.862 (60)		0.436 (99)
										Mar	1.733 (60)		0.405 (99)
										Apr	1.528 (50)		0.362 (99)
										May	1.277 (50)		0.307 (99)
										Jun	1.121 (50)		0.275 (99)
										Jul	0.961 (60)		0.239 (99)
										Aug	0.802 (60)		0.205 (99)
										Sep	0.696 (60)		0.183 (99)
3	II	Klein Olifants (EWR site - EWR3) (existing)	RU34	34	C	Quantity	Low Flows	Low flows should be improved in order to maintain ecosystem functioning and ecotourism.	EWR maintenance low and drought flows: Klein Olifants in B12E VMAR = 81.54x10^{6}m^3 PES=C/D category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)
										Oct	0.135 (70)		0.071 (99)
										Nov	0.227 (80)		0.100 (99)
										Dec	0.313 (80)		0.160 (99)
										Jan	0.394 (80)		0.200 (99)
										Feb	0.467 (80)		0.237 (99)
										Mar	0.384 (80)		0.161 (99)
										Apr	0.324 (70)		0.162 (99)
										May	0.257 (70)		0.119 (99)
										Jun	0.200 (70)		0.103 (99)
										Jul	0.167 (70)		0.087 (99)
										Aug	0.134 (70)		0.070 (99)
										Sep	0.112 (70)		0.046 (99)
	II	Olifants (outlet of quaternary - outlet of IUA3)	RU40	40	C	Quantity	Low and High Flows	Low flows need to be improved to maintain the ecosystem	EWR maintenance low and high flows and drought flows: Olifants EWR5 in B32D VMAR = 571.1x10^{6}m3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	1.110 (70)	0.636 (99)	0.742 (99)
										Nov	1.682 (80)	0.941 (99)	2.691 (80)
										Dec	2.040 (80)	1.129 (99)	4.385 (80)
										Jan	2.471 (70)	1.357 (99)	6.616 (70)
										Feb	3.042 (80)	1.664 (99)	1.492 (99)
										Mar	2.667 (70)	1.460 (99)	2.720 (90)
										Apr	2.323 (70)	1.161 (99)	0.975 (99)
										May	1.842 (70)	1.023 (99)	
										Jun	1.473 (70)	0.830 (99)	
										Jul	1.233 (70)	0.701 (99)	
										Aug	1.009 (70)	0.582 (99)	
										Sep	0.876 (70)	0.514 (99)	
								High flows (freshets) must be provided to maintain cues for fish					
4	III	Elands (outlet of quaternary - outlet of IUA4)	RU46	46	D	Quantity	Low and High Flows	Low flows need to be improved in order to provide for the ecosystem and	EWR maintenance low and high flows and drought flows: Elands EWR6 in	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	0.077 (99)	0.077 (99)	0.064 (99)

RIVER WATER QUANTITY													
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**			
								basic human needs.	B31G VMAR = 60.32X10^{6}m3 PES=D category	Nov	0.121 (90)	0.113 (99)	0.392 (90)
										Dec	0.133 (99)	0.133 (10)	0.492 (80)
										Jan	0.173 (99)	0.173 (99)	0.956 (70)
										Feb	0.196 (99)	0.196 (99)	0.199 (99)
										Mar	0.176 (99)	0.176 (99)	0.360 (90)
								High flows (freshets) must be provided to maintain the ecosystem and replenish natural storage.		Apr	0.148 (90)	0.136 (99)	0.161 (99)
										May	0.113 (99)	0.113 (99)	
										Jun	0.095 (99)	0.095 (99)	
										Jul	0.084 (99)	0.084 (99)	
										Aug	0.076 (99)	0.076 (99)	
										Sep	0.070 (99)	0.070 (99)	
5	III	Elands (outlet of quaternary, confluence with Olifants)	RU47	47	D	Quantity	Low and High Flows	Low flows need to be improved in order to provide for the ecosystem and basic human needs.	EWR maintenance low and high flows and drought flows: Elands in B31J VMAR = 84.09X10^{6}m3 PES=D category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	0.108 (99)	0.108 (99)	0.084 (99)
										Nov	0.171 (90)	0.154 (99)	0.504 (80)
										Dec	0.186 (99)	0.186 (99)	0.630 (80)
										Jan	0.238 (99)	0.238 (99)	1.191 (80)
										Feb	0.277 (99)	0.277 (99)	0.264 (99)
								High flows (freshets) must be provided to maintain the ecosystem and replenish natural storage.		Mar	0.247 (99)	0.247 (99)	0.476 (90)
										Apr	0.205 (99)	0.193 (99)	0.197 (99)
										May	0.155 (99)	0.155 (99)	
										Jun	0.130 (99)	0.130 (99)	
										Jul	0.115 (99)	0.115 (99)	
										Aug	0.103 (99)	0.103 (99)	
										Sep	0.094 (99)	0.094 (99)	
	III	One node at confluence with Olifants. Included: B32G (Moses) and B32H (Mametse and Moses)	RU49	49	C	Quantity	Low Flows	The low flows should be improved to maintain ecosystem functioning	EWR maintenance low and drought flows: Moses River in B32H VMAR = 35.53x10^{6}m3 PES=C category		Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.073 (70)		0.042 (99)
										Nov	0.107 (80)		0.060 (99)
										Dec	0.122 (80)		0.068 (99)
										Jan	0.126 (70)		0.069 (99)
										Feb	0.163 (70)		0.089 (99)
										Mar	0.156 (70)		0.085 (99)
										Apr	0.145 (70)		0.079 (99)
										May	0.117 (70)		0.065 (99)
										Jun	0.103 (70)		0.058 (99)
										Jul	0.088 (70)		0.050 (99)
										Aug	0.077 (70)		0.044 (99)
										Sep	0.068 (70)		0.039 (99)
	III	Olifants (releases from Flag Boshielo Dam)	RU52	52	D	Quantity	Low Flows	The low flows should be improved to maintain ecosystem functioning and	EWR maintenance low and drought flows: Olifants EWR7 in B51C VMAR = 726.64x10^{6}m3 PES=D category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)
										Oct	0.556 (99)		0.556 (99)
										Nov	0.849 (99)		0.849 (99)
										Dec	1.007 (99)		1.007 (99)

RIVER WATER QUANTITY												
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**		
								also to provide for users in the dry season.		Jan	1.214 (99)	1.214 (99)
										Feb	1.499 (99)	1.499 (99)
										Mar	1.303 (99)	1.303 (99)
										Apr	1.140 (99)	1.140 (99)
										May	0.888 (99)	0.888 (99)
										Jun	0.726 (99)	0.726 (99)
										Jul	0.611 (99)	0.611 (99)
										Aug	0.514 (99)	0.514 (99)
										Sep	0.457 (99)	0.457 (99)
	III	Olifants (outlet of quaternary - outlet of IUA5)	RU53	53	D	Quantity	Low Flows	The low flows should be improved to maintain ecosystem functioning and also to provide for users.	EWR maintenance low and drought flows: Olifants in B51E VMAR = 726.06x10^{6}m3 PES=D category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.556 (99)	0.556 (99)
										Nov	0.849 (99)	0.849 (99)
										Dec	1.007 (99)	1.007 (99)
										Jan	1.214 (99)	1.214 (99)
										Feb	1.499 (99)	1.499 (99)
										Mar	1.303 (99)	1.303 (99)
										Apr	1.140 (99)	1.140 (99)
										May	0.888 (99)	0.888 (99)
										Jun	0.726 (99)	0.726 (99)
										Jul	0.611 (99)	0.611 (99)
										Aug	0.514 (99)	0.514 (99)
										Sep	0.457 (99)	0.457 (99)
6	III	One node at outlet of B41A. Included: Grootspruit (outlet of quaternary) and Langspruit, including Lakenvleispruit and Kleinspruit	RU54	54	C	Quantity	Low Flows	Low flows must be maintained to provide for the ecosystem and the angling industry.	EWR maintenance low and drought flows: Grootspruit in B41A VMAR = 41.97x10^{6}m3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.157 (70)	0.086 (99)
										Nov	0.242 (70)	0.058 (99)
										Dec	0.319 (70)	0.172 (99)
										Jan	0.418 (80)	0.224 (99)
										Feb	0.529 (70)	0.282 (99)
										Mar	0.446 (70)	0.224 (99)
										Apr	0.417 (70)	0.220 (99)
										May	0.322 (70)	0.146 (99)
										Jun	0.251 (70)	0.138 (99)
										Jul	0.189 (70)	0.105 (99)
										Aug	0.157 (70)	0.089 (99)
										Sep	0.143 (70)	0.082 (99)
	III	Steelpoort (inflow to De Hoop Dam)	RU57	57	C	Quantity	Low Flows	Low flows must be maintained for ecosystem functioning.	EWR maintenance low and drought flows: Steelpoort in B41E VMAR = 117.01x10^{6}m3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.442 (70)	0.235 (99)
										Nov	0.680 (70)	0.154 (99)
										Dec	0.887 (70)	0.486 (99)
										Jan	1.160 (70)	0.629 (99)
										Feb	1.464 (70)	0.791 (99)
										Mar	1.233 (10)	0.620 (99)

RIVER WATER QUANTITY												
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**		
										Apr	1.147 (70)	0.602 (99)
										May	0.891 (70)	0.396 (99)
										Jun	0.701 (70)	0.389 (99)
										Jul	0.528 (70)	0.298 (99)
										Aug	0.441 (70)	0.252 (99)
										Sep	0.401 (70)	0.232 (99)
	III	Upper reaches of Dwars (before mining impacts)	RU62	62	C	Quantity	Low Flows	Low flows must be maintained for ecosystem functioning. .	EWR maintenance low and drought flows: Dwars River in B41G VMAR = 24.41x10^{6}m^3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.061 (60)	0.034 (99)
										Nov	0.095 (80)	0.051 (99)
										Dec	0.121 (70)	0.064 (99)
										Jan	0.142 (70)	0.075 (99)
										Feb	0.179 (70)	0.093 (99)
										Mar	0.158 (70)	0.071 (99)
										Apr	0.145 (70)	0.076 (99)
										May	0.118 (70)	0.062 (99)
										Jun	0.094 (70)	0.050 (99)
										Jul	0.072 (70)	0.039 (99)
										Aug	0.061 (70)	0.034 (99)
										Sep	0.056 (70)	0.031 (99)
	III	Steelpoort (EWR site - EWR10) (existing) (confluence with Olifants - outlet of IUA6)	RU66	66	D	Quantity	Low Flows	Low flows must be maintained for ecosystem functioning and for irrigation and rural and peri-urban users.	EWR maintenance low and drought flows: Steelpoort EWR10 in B41K VMAR = 342.75x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.532 (99)	0.532 (99)
										Nov	0.843 (99)	0.843 (99)
										Dec	1.073 (99)	1.073 (99)
										Jan	1.324 (99)	1.324 (99)
										Feb	1.642 (99)	1.642 (99)
										Mar	1.405 (99)	1.405 (99)
										Apr	1.251 (99)	1.251 (99)
										May	1.002 (99)	1.002 (99)
										Jun	0.801 (99)	0.801 (99)
										Jul	0.621 (99)	0.621 (99)
										Aug	0.529 (99)	0.529 (99)
										Sep	0.495 (99)	0.495 (99)
7	III	Olifants (outlet of quaternary - outlet of IUA7)	RU72	72	D	Quantity	Low and High Flows	Low flows must be maintained for ecosystem functioning.	EWR maintenance low and high flows and drought flows: Olifants in B52J VMAR = 799.74x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s)	Drought flows (m^3/s)	Freshets (m^3/s)
										Oct	0.596 (99)	0.596 (99)	0.881 (90)
										Nov	0.949 (99)	0.949 (99)	3.927 (80)
										Dec	1.131 (99)	1.131 (99)	5.984 (80)
										Jan	1.370 (99)	1.370 (99)	8.989 (60)
										Feb	1.696 (99)	1.696 (99)	2.014 (99)
										Mar	1.456 (99)	1.456 (99)	3.637 (80)
										Apr	1.250 (99)	1.250 (99)	1.213 (99)
								High flows must be maintained for ecosystem functioning.		May	0.954 (99)	0.954 (99)	
										Jun	0.776 (99)	0.776 (99)	
										Jul	0.649 (99)	0.649 (99)	

RIVER WATER QUANTITY													
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**			
										Aug	0.547 (99)	0.547 (99)	
										Sep	0.487 (99)	0.487 (99)	
8	II	Spekboom (outlet of quaternary - outlet of IUA8)	RU82	82	B	Quantity	Low Flows	Low flows must be maintained to provide for fish and agriculture.	EWR maintenance low and drought flows: Spekboom in B42H VMAR = 148.99x10^{6}m^3 PES=B category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)
										Oct	0.598 (60)		0.315 (99)
										Nov	0.932 (60)		0.476 (99)
										Dec	1.193 (70)		0.601 (99)
										Jan	1.445 (70)		0.722 (99)
										Feb	1.771 (70)		0.881 (99)
										Mar	1.507 (70)		0.751 (99)
										Apr	1.348 (60)		0.676 (99)
										May	1.117 (70)		0.565 (99)
										Jun	0.922 (60)		0.472 (99)
										Jul	0.719 (60)		0.373 (99)
										Aug	0.610 (60)		0.321 (99)
										Sep	0.571 (60)		0.303 (99)
9	III	One node at outlet of B60F. Included: Kranskloofspruit, Mantshibi, Ohrigstad (outlet of quaternary)	RU83	83	D	Quantity	Low and High Flows	Low flows must be maintained so that they provide for fish and the ecosystem.	EWR maintenance low and high flows and drought flows: Ohrigstad River in B60F VMAR = 35.64x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	0.052 (80)	0.052 (80)	0.007 (99)
										Nov	0.067 (80)	0.067 (80)	0.054 (90)
										Dec	0.086 (70)	0.086 (70)	0.112 (70)
										Jan	0.110 (60)	0.110 (60)	0.109 (80)
										Feb	0.165 (50)	0.165 (50)	0.448 (30)
								High flows need to provide cues for fish breeding.		Mar	0.149 (60)	0.149 (60)	0.109 (90)
										Apr	0.123 (70)	0.123 (70)	0.059 (99)
										May	0.093 (80)	0.093 (80)	
										Jun	0.082 (80)	0.082 (80)	
										Jul	0.068 (80)	0.068 (80)	
										Aug	0.058 (80)	0.058 (80)	
										Sep	0.053 (80)	0.053 (80)	
	III	Ohrigstad (EWR site - OLI-EWR8) (Rapid site)	RU86	86	C	Quantity	Low and High Flows	Low flows must be improved so that they provide for fish and the ecosystem.	EWR maintenance low and high flows and drought flows: Ohrigstad River OLI-EWR8 in B60H VMAR = 65.49x10^{6}m^3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	0.176 (60)	0.063 (99)	0.020 (99)
										Nov	0.244 (50)	0.085 (99)	0.159 (80)
										Dec	0.326 (50)	0.112 (99)	0.319 (70)
										Jan	0.420 (50)	0.143 (99)	0.298 (80)
										Feb	0.663 (50)	0.222 (99)	1.269 (60)
								High flows need to provide cues for fish breeding.		Mar	0.595 (50)	0.199 (99)	0.298 (90)
										Apr	0.473 (60)	0.160 (99)	0.156 (99)
										May	0.353 (60)	0.121 (99)	
										Jun	0.295 (60)	0.102 (99)	
										Jul	0.239 (70)	0.084 (99)	
										Aug	0.198 (60)	0.070 (99)	
										Sep	0.178 (60)	0.064 (99)	
10	II	Olifants (confluence	RU95	95	D	Quantity	Low and	Low flows need to	EWR maintenance	Maintenance low		Drought	Freshets

RIVER WATER QUANTITY														
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**				
		with Steelpoort)					High Flows	be improved to maintain the ecosystem	low and high flows and drought flows: Olifants in B71F VMAR = 937.93x10^{6}m^3 PES=D category	flows (m^3/s) (Percentile)		flows (m^3/s) (Percentile)	(m^3/s) (Percentile)	
										Oct	0.783 (99)	0.783 (99)	1.128 (90)	
										Nov	1.169 (99)	1.169 (99)	5.189 (80)	
										Dec	1.380 (99)	1.380 (99)	8.158 (60)	
										Jan	1.674 (99)	1.674 (99)	4.216 (80)	
										Feb	2.137 (99)	2.137 (99)	14.982 (60)	
								High flows need to be improved to maintain the ecosystem.		Mar	1.906 (99)	1.906 (99)	4.216 (80)	
										Apr	1.658 (99)	1.658 (99)	2.028 (90)	
										May	1.302 (99)	1.302 (99)		
										Jun	1.073 (99)	1.073 (99)		
										Jul	0.898 (99)	0.898 (99)		
										Aug	0.761 (99)	0.761 (99)		
										Sep	0.680 (99)	0.680 (99)		
	II	Olifants (EWR11, confluence with Blyde) (existing)	RU96	96	D	Quantity	Low and High Flows	Low flows must support the ecosystem structure and function.	EWR maintenance low and high flows and drought flows: Olifants EWR11 in B71J VMAR = 1321.9x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)	
										Oct	2.959 (80)	1.576 99()	0.340 (99)	
										Nov	4.420 (80)	2.353 (99)	1.713 (99)	
										Dec	5.358 (80)	2.853 (99)	2.760 (99)	
										Jan	6.468 (80)	3.444 (99)	1.426 (99)	
										Feb	8.217 (80)	4.376 (99)	5.091 (99)	
								High flows must be maintained for ecosystem functioning.		Mar	7.345 (80)	3.911 (99)	1.426 (99)	
										Apr	6.450 (80)	3.434 (99)	0.701 (99)	
										May	5.095 (80)	2.713 (99)		
										Jun	4.139 (80)	2.204 (99)		
										Jul	3.396 (80)	1.808 (99)		
										Aug	2.886 (80)	1.537 (99)		
										Sep	2.623 (80)	1.397 (99)		
	II	Makhutswi, including Moungwana and Malomanye	RU97	97	C	Quantity	Low Flows	Low flows must be maintained to provide for basic human needs.	EWR maintenance low and drought flows: Makhutsi River in B72A VMAR = 38.01x10^{6}m^3 PES=C category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)	
										Oct	0.130 (50)		0.000	
										Nov	0.144 (50)		0.004 (99)	
										Dec	0.173 (50)		0.004 (99)	
										Jan	0.258 (50)		0.004 (99)	
										Feb	0.435 (50)		0.000	
										Mar	0.415 (50)		0.000	
										Apr	0.330 (50)		0.000	
										May	0.236 (50)		0.000	
										Jun	0.206 (50)		0.000	
										Jul	0.179 (70)		0.000	
										Aug	0.159 (60)		0.000	
										Sep	0.142 (50)		0.000	
	II	Olifants (outlet - outlet of IUA10)	RU98	98	C	Quantity	Low and High Flows	Low flows must be maintained so that they provide for the ecosystem.	EWR maintenance low and high flows and drought flows: Olifants in B72C	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)	
										Oct	5.645 (60)	2.148 (99)	0.654 (99)	

RIVER WATER QUANTITY													
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**			
									VMAR = 1755.5x10^{6}m^3 PES=C category	Nov	8.016 (70)	2.978 (99)	3.383 (99)
										Dec	9.747 (70)	3.573 (99)	5.806 (90)
										Jan	11.956 (70)	4.341 (99)	3.425 (99)
										Feb	15.848 (70)	5.713 (99)	12.616 (90)
										Mar	14.484 (70)	5.219 (99)	3.425 (99)
										Apr	13.039 (60)	4.724 (99)	1.824 (99)
								High flows must provide for the ecosystem.		May	10.333 (60)	3.777 (99)	
										Jun	8.401 (60)	3.112 (99)	
										Jul	6.783 (60)	2.543 (99)	
										Aug	5.729 (70)	2.177 (99)	
										Sep	5.194 (60)	1.997 (99)	
11	III	Ga-Selati (EWR site - EWR14b) (existing)	RU103	103	D	Quantity	Low Flows	Low flows are important for the maintenance of the ecosystem.	EWR maintenance low and drought flows: Ga-Selati EWR14b in B72K VMAR = 72.74x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)
										Oct	0.122 (70)		0.001 (99)
										Nov	0.138 (60)		0.001 (99)
										Dec	0.192 (60)		0.001 (99)
										Jan	0.350 (50)		0.001 (99)
										Feb	0.744 (60)		0.003 (99)
										Mar	0.608 (50)		0.003 (99)
										Apr	0.378 (70)		0.002 (99)
										May	0.200 (70)		0.001 (99)
										Jun	0.178 (70)		0.001 (99)
										Jul	0.156 (70)		0.001 (99)
										Aug	0.141 (70)		0.001 (99)
										Sep	0.132 (7)		
	III	Ga-Selati (outlet of quaternary - outlet of IUA11)	RU104	104	D	Quantity	Low Flows	Low flows are important for the maintenance of the ecosystem.	EWR maintenance low and drought flows: Ga-Selati EWR14b in B72K VMAR = 72.74x10^{6}m^3 PES=D category	Maintenance low flows (m^3/s) (Percentile)			Drought flows (m^3/s) (Percentile)
										Oct	0.122 (60)		0.001 (99)
										Nov	0.138 (60)		0.001 (99)
										Dec	0.192 (60)		0.001 (99)
										Jan	0.350 (50)		0.001 (99)
										Feb	0.744 (60)		0.003 (99)
										Mar	0.608 (50)		0.003 (99)
										Apr	0.378 (70)		0.002 (99)
										May	0.200 (60)		0.001 (99)
										Jun	0.178 (70)		0.001 (99)
										Jul	0.156 (70)		0.001 (99)
										Aug	0.141 (70)		0.001 (99)
										Sep	0.132 (70)		
12	II	Olifants (EWR site - EWR13) (existing)	RU105	105	C	Quantity	Low and High Flows	Low flows must be improved to maintain ecosystem structure and function.	EWR maintenance low and high flows and drought flows: Olifants EWR13 in B72B VMAR = 1762.2x10^{6}m^3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	3.940 (70)	2.149 (99)	0.598 (99)
										Nov	5.592 (70)	2.979 (99)	3.093 (99)
										Dec	6.802 (80)	3.576 (99)	5.317 (90)
										Jan	8.351 (70)	4.347 (99)	3.141 (99)

RIVER WATER QUANTITY													
IUA	**Class**	**River**	**RU**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**			
										Feb	10.994 (70)	5.683 (99)	11.515 (90)
										Mar	10.125 (70)	5.231 (99)	3.141 (99)
								High flows must be maintained to support ecosystem structure and function.		Apr	9.105 (70)	4.729 (99)	1.665 (99)
										May	7.209 (70)	3.778 (99)	
										Jun	5.860 (70)	3.112 (99)	
										Jul	4.732 (70)	2.544 (99)	
										Aug	3.998 (70)	2.179 (99)	
										Sep	3.625 (70)	1.999 (99)	
	II	Olifants (outlet of quaternary - outlet of IUA12)	RU116	116	C	Quantity	Low and High Flows	Low flows must be maintained for ecosystem structure and function.	EWR maintenance low and high flows and drought flows: Olifants EWR16 in B73H VMAR = 1918.3x10^{6}m^3 PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	3.785 (70)	1.762 (99)	0.478 (99)
										Nov	5.335 (70)	2.426 (99)	2.502 (99)
										Dec	6.544 (70)	2.935 (99)	4.432 (90)
										Jan	8.179 (70)	3.630 (99)	2.765 (99)
										Feb	11.144 (70)	4.905 (99)	10.622 (90)
										Mar	10.150 (70)	4.468 (99)	2.765 (99)
								High flows must be maintained for ecosystem structure and functioning.		Apr	8.945 (70)	3.960 (99)	1.391 (99)
										May	6.942 (70)	3.104 (99)	
										Jun	5.614 (70)	2.545 (99)	
										Jul	4.545 (70)	2.085 (99)	
										Aug	3.851 (70)	1.790 (99)	
										Sep	3.500 (70)	1.646 (99)	
13	I	Blyde (inflow to Blyderivierpoort Dam - outlet of IUA13)	RU121	121	B	Quantity	Low and High Flows	Lows flows are essential for protection of this ecosystem.	EWR maintenance low and high flows and drought flows: Blyde River in B60D VMAR = 283.9x10^{6}m^3 PES=B category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
										Oct	1.559 (60)	0.512 (99)	0.091 (99)
										Nov	1.776 (60)	0.573 (99)	0.436 (99)
										Dec	2.036 (60)	0.638 (99)	0.996 (99)
										Jan	2.550 (60)	0.774 (99)	1.390 (90)
										Feb	3.534 (60)	1.044 (99)	5.124 (80)
										Mar	3.408 (60)	1.000 (99)	1.390 (99)
								High flows are essential to maintain the protected status of this ecosystem.		Apr	3.230 (60)	0.957 (99)	1.139 (99)
										May	2.793 (60)	0.838 (99)	
										Jun	2.546 (60)	0.776 (99)	
										Jul	2.076 (70)	0.648 (99)	
										Aug	1.776 (70)	0.569 (99)	
										Sep	1.632 (70)	0.534 (99)	

Table 4: Resource Quality Objectives (RQO) for RIVER WATER QUALITY in the Olifants catchment

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
1	III	Olifants (releases from Witbank Dam)	RU9	9	D	Quality	Nutrients	Nutrient concentrations must be maintained in the river at mesotrophic or better levels	Phosphate(PO_4)*	≤ 0.125 mg/L P
									Nitrate (NO_3) & Nitrite (NO_2)*	≤ 4.00 mg/L N
									Total Ammonia*	≤ 0.100 mg/L N
		Olifants (EWR site 1 - EWR1) (existing)	RU11	11	D			Nutrient concentrations should be improved to prevent nuisance conditions for ecotourism.	Phosphate(PO_4)*	≤ 0.125 mg/L P
									Nitrate (NO_3) & Nitrite (NO_2)*	≤ 4.00 mg/L N
									Total Ammonia*	≤ 0.100 mg/L N
		Klipspruit (confluence with Olifants)	RU12	12	D			The nutrient concentrations need to be improved for the ecosystem and users.	Phosphate (PO_4)*	≤ 0.125 mg/L P
		Olifants	RU13	13	B			Nutrient concentrations should be improved to maintain the ecosystem and ecotourism.	Nitrate (NO_3) & Nitrite (NO_2)*	≤ 0.70 mg/L N
									Phosphate (PO_4)*	≤ 0.015 mg/L P
6	III	Steelpoort (EWR site - EWR10) (existing) (confluence with Olifants - outlet of IUA6)	RU66	64	D	Quality	Nutrients	Nutrients should be maintained to support the ecosystem.	Phosphate (PO_4)*	≤ 0.125 mg/L P
9	III	One node at outlet of B60F. Included: Kranskloofspruit, Mantshibi, Ohrigstad (outlet of quaternary) and Ohrigstad (outlet of quaternary - outlet of IUA9)	RU83 RU86	83 and 86	D	Quality	Nutrients	Nutrients need to be minimised in order to ensure that the system is maintained in a mesotrophic condition.	Nitrate (NO_3)*	≤ 4.00 mg/L N
									Phosphate (PO_4)*	≤ 0.125 mg/L P
1	III	Olifants (releases from Witbank Dam) and Olifants (EWR site 1 - EWR1) (existing)	RU9 RU11	9 and 11	D	Quality	Salts	Salt concentrations need to be maintained at levels where they do not render the ecosystem unsustainable.	Sulphates*	≤ 500 mg/L
									Electrical conductivity*	≤ 111 mS/m

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
		Olifants	RU13	13	B			Salt concentrations need to be maintained at levels where they do not render the ecosystem unsustainable.	Sulphates*	≤ 80 mg/L
									Electrical conductivity*	≤ 55 mS/m
	III	Klipspruit (confluence with Olifants)	RU12	12	D			Salt concentrations need to be improved to protect the ecosystem, for basic human needs, vegetable and livestock watering.	Electrical conductivity*	≤ 111 mS/m
									Sulphates*	≤ 500 mg/L
2	II	Wilge (EWR site - EWR4, outlet of IUA2) (existing)	RU31	31	C	Quality	Salts	Overall salt and sulphate concentrations need to be improved to so that they do not threaten the ecosystem or agricultural users.	Sulphates*	≤ 200 mg/L
3	III	Olifants (outlet of quaternary - outlet of IUA3)	RU40	40	D	Quality	Salts	Concentrations and also maxima of salt in particular sulphate should be maintained so that they allow for a sustainable ecosystem.	Sulphates*	≤ 500 mg/L
									Electrical conductivity*	≤ 111 mS/m
11	III	Ga-Selati (EWR site - EWR14b) (existing)	RU103	103	D	Quality	Salts	Salts should be improved to support the ecosystem.	Electrical conductivity*	≤ 111 mS/m
		Ga-Selati (outlet of quaternary - outlet of IUA11)	RU104	104				Salts should be improved to support the ecosystem.	Electrical conductivity*	≤ 111 mS/m
									Sulphates*	≤ 500 mg/L
1	III	Olifants (releases from Witbank Dam)	RU9	9	D	Quality	System Variables	Alkalinity must be maintained at concentrations which do not allow for a dramatic rise in acidity.	Alkalinity*	≥ 60 mg/L $CaCO_3$
									Turbidity*	≤ 10 NTU
									Dissolved oxygen*	≥ 6.5 mg/L O_2

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
		Klipspruit (confluence with Olifants)	RU12	12	D			Temperature and dissolved oxygen levels should not over-stress the ecosystem. Alkalinity should be stabilised at present concentrations or ideally improved to prevent acidification of the river.	Temperature*	≤ abs(dev from ambient) 4.0
									Dissolved oxygen*	≥ 6.5 mg/L O_2
									Alkalinity*	≥ 60 mg/L $CaCO_3$
3	II	Olifants (outlet of quaternary - outlet of IUA3)	RU40	40	D	Quality	System Variables	Dissolved oxygen should be maintained. Alkalinity must not decrease and thus allow for acidification of the river.	Temperature*	≤ abs(dev from ambient) 4.0
									Dissolved oxygen*	≥ 6.5 mg/L O_2
									Alkalinity*	≥ 60 mg/L $CaCO_3$
11	III	Ga-Selati (EWR site - EWR14b) (existing)	RU103	103	D	Quality	System Variables	Sedimentation must not excessively impact on habitat state.	Suspended solids*	≤ 50.0 mg/L
		Ga-Selati (outlet of quaternary - outlet of IUA11)	RU104	104				Sedimentation must not excessively impact on habitat state.	Alkalinity*	≥ 60 mg/L $CaCO_3$
									Turbidity*	≤ 10 NTU
									Temperatures*	≤ abs(dev from ambient) 4.0
									Dissolved oxygen*	≥ 6.5 mg/L O_2

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
12	II	Olifants (EWR site - EWR13) (existing)	RU105	105	C	Quality	System Variables	Sediment concentrations should not reach levels where instream sedimentation excessively impacts on the instream habitat or where suspended sediments negatively impact on fitness for use for water institutions.	Suspended solids*	≤ 25.0 mg/L
1	III	Olifants (releases from Witbank Dam)	RU9	9	D	Quality	Toxins	Toxicity levels must comply with the fitness for use which is acceptable for lifetime consumption (Class 1#) after treatment in the existing infrastructure.	F*	≤ 3.00 mg/L
									Al*	≤ 0.150 mg/L
									As*	≤ 0.130 mg/L
									Cd hard*	≤ 5.0 µg/L
									Cr(VI)*	≤ 200 µg/L
									Cu hard*	≤ 8.0 µg/L
									Hg*	≤ 1.70 µg/L
									Mn*	≤ 1.300 mg/L
									Pb hard*	≤ 13.0 µg/L
									Se*	≤ 0.030 mg/L
									Zn*	≤ 36.0 µg/L
									Chorine*	≤ 5.0 µg/L free Cl
									Endosulfan*	≤ 0.20 µg/L
									Atrazine*	≤ 100.0 µg/L
		Klipspruit (confluence with Olifants)	RU12	12	D	Quality	Toxins	Toxics should not be allowed to negatively impact on the ecosystem.	F*	≤ 3.00 mg/L
									Al*	≤ 0.150 mg/L

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
									As *	≤ 0.130 mg/L
									Cd hard*	≤ 5.0 µg/L
									Cr(VI)*	≤ 200 µg/L
									Cu hard*	≤ 8.0 µg/L
									Hg**	≤ 1.70 µg/L
									Mn*	≤ 1.300 mg/L
									Pb hard*	≤ 13.0 µg/L
									Se*	≤ 0.030 mg/L
									Zn*	≤ 36.0 µg/L
									Chorine*	≤ 5.0 µg/L free Cl
									Endosulfan*	≤ 0.20 µg/L
									Atrazine*	≤ 100.0 µg/L
2	II	Wilge (EWR site - EWR4, outlet of IUA2) (existing)	RU31	31	C	Quality	Toxins	Toxics should not be allowed to negatively impact on the ecosystem or agricultural users.	F*	≤ 2.50 mg/L
									Al*	≤ 0.105 mg/L
									As*	≤ 0.095 mg/L
									Cd hard*	≤ 3.0 µg/L
									Cr(VI)*	≤ 121 µg/L
									Cu hard*	≤ 6.0 µg/L
									Hg*	≤ 0.97 µg/L
									Mn*	≤ 0.990 mg/L
									Pb hard*	≤ 9.5 µg/L

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
									Se*	≤ 0.022 mg/L
									Zn*	≤ 25.2 µg/L
									Chorine*	≤ 3dissolve.1 µg/L free Cl
									Endosulfan*	≤ 0.13 µg/L
									Atrazine*	≤ 78.5 µg/L
3	II	Olifants (outlet of quaternary - outlet of IUA3)	RU40	40	D	Quality	Toxins	The concentrations of toxic substances must be improved to minimise toxic effects on the ecosystem and other users of the system.	F*	≤ 3.00 mg/L
									Al*	≤ 0.150 mg/L
									As*	≤ 0.130 mg/L
									Cd hard*	≤ 5.0 µg/L
									Cr(VI)*	≤ 200 µg/L
									Cu hard*	≤ 8.0 µg/L
									Hg*	≤ 1.70 µg/L
									Mn*	≤ 1.300 mg/L
									Pb hard*	≤ 13.0 µg/L
									Se*	≤ 0.030 mg/L
									Zn*	≤ 36.0 µg/L
									Chorine*	≤ 5.0 µg/L free Cl
									Endosulfan*	≤ 0.20 µg/L
									Atrazine*	≤ 100.0 µg/L
6	III	Steelpoort (EWR site - EWR10)	RU66	66	D	Quality	Toxins	Toxics should be minimised to reduce the risk	F*	≤ 2.00 mg/L

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
		(existing) (confluence with Olifants - outlet of IUA6)						of human health and ecosystem impairment.	Al*	≤ 0.063 mg/L
									As*	≤ 0.058 mg/L
									Cd hard*	≤ 1.6 µg/L
									Cr(VI)*	≤ 68 µg/L
									Cu hard*	≤ 4.9 µg/L
									Hg*	≤ 0.53 µg/L
									Mn*	≤ 0.680 mg/L
									Pb hard*	≤ 5.8 µg/L
									Se*	≤ 0.013 mg/L
									Zn*	≤ 14.4 µg/L
									Chorine*	≤ 1.8 µg/L free Cl
									Endosulfan*	≤ 0.08 µg/L
									Atrazine*	≤ 48.8 µg/L
8	II	Spekboom (outlet of quaternary - outlet of IUA8)	RU82	82	B	Quality	Toxins	Toxicity levels must be minimised to protect community users and also fish.	F*	≤ 3.00 mg/L
									Al*	≤ 0.150 mg/L
									As*	≤ 0.130 mg/L
									Cd hard*	≤ 5.0 µg/L
									Cr(VI)*	≤ 200 µg/L
									Cu hard*	≤ 8.0 µg/L
									Hg*	≤ 1.70 µg/L
									Mn*	≤ 1.300 mg/L

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
									Pb hard*	≤ 13.0 µg/L
									Se*	≤ 0.030 mg/L
									Zn*	≤ 36.0 µg/L
									Chorine*	≤ 5.0 µg/L free Cl
									Endosulfan*	≤ 0.20 µg/L
									Atrazine*	≤ 100.0 µg/L
11	III	Ga-Selati (EWR site - EWR14b) (existing) and Ga-Selati (outlet of quaternary -outlet of IUA11)	RU103 RU104	103 and 104	D	Quality	Toxins	Toxicity must not pose a threat to local users.	F*	≤ 2.50 mg/L
									Al*	≤ 0.105 mg/L
									As*	≤ 0.095 mg/L
									Cd hard*	≤ 3.0 µg/L
									Cr(VI)*	≤ 121 µg/L
									Cu hard*	≤ 6.0 µg/L
									Hg*	≤ 0.97 µg/L
									Mn*	≤ 0.990 mg/L
									Pb hard*	≤ 9.5 µg/L
									Se*	≤ 0.022 mg/L
									Zn*	≤ 25.2 µg/L
									Chorine*	≤ 3.1 µg/L free Cl
									Endosulfan*	≤ 0.13 µg/L
									Atrazine*	≤ 78.5 µg/L
4	III	Elands(outlet of quaternary - outlet of IUA4)	RU46	46	D	Quality	Pathogens	Concentrations of pathogens should be maintained at levels where downstream use is not compromised.	*E.coli**	≤ 130 counts/100 ml

RIVER WATER QUALITY										
Iua	**Class**	**River**	**Ru**	**Biophysical Node Name**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
5	III	Elands (outlet of quaternary, confluence with Olifants)	RU47	47	D	Quality	Pathogens	Concentrations of pathogens should be maintained at levels where downstream use is not compromised.	*E.coli**	≤ 130 counts/100 ml
		One node at outlet of B32H, confluence with Olifants. Included: B32G (Moses) and b32H (Mametse and Moses)	RU49	49	C	Quality	Pathogens	Concentrations of pathogens should be maintained at levels where downstream use is not compromised.	*E.coli**	≤ 130 counts/100 ml

Table 5: Resource Quality Objectives for RIVER INSTREAM HABITAT and BIOTA in the Olifants catchment

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
1. Upper Olifants River catchment	III	Olifants	11	D	Instream habitat must be in a largely modified or better condition to support the ecosystem and for ecotourism users. Instream biota must be in a largely modified or better conditions and at sustainable levels. Low and high flows must be suitable to maintain the river habitat for ecosystem condition and ecotourism. Water quality: Nutrient concentrations must be improved to prevent nuisance conditions for ecotourism Salt concentrations must be maintained at levels where they do not render the ecosystem unsustainable.	Instream Habitat Integrity category ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category ≥ D (≥ 42) Hydrological category ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
2. Wilge River catchment area	II	Wilge	31	C	Instream habitat must be in moderately modified or better condition to sustain instream biota. Instream biota must be in a moderately modified or better condition and at sustainable levels. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Overall salt and sulphate concentrations must be at alevel where it does not threaten the ecosystem or agricultural users. Toxics must not negatively impact on the ecosystem or agricultural users.	Instream Habitat Integrity category: ≥ C (≥ 62) Fish ecological category: ≥ C (≥ 62) Macro-invertebrate ecological category: ≥ C (≥ 62) Instream Ecostatus category: ≥ C (≥ 62) Hydrological category: ≥ B (≥ 82) Water Quality category: ≥ C (≥ 62)
3. Selons River area including Loskop Dam	II	Klein-Olifants	34	C	Instream habitat must be in a better than moderately modified condition to support the ecosystem and for ecotourism users. Instream biota must be in moderately modified or better condition.	Instream Habitat Integrity category: ≥ C (≥ 62) Fish ecological category: ≥ C (≥ 62)

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
					Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Nutrients must not exceed levels that threatens the sustainability of the ecosystem. Salt concentrations must not reach levels where it threatens the sustainability of ecosystem. Alkalinity must be at levels that prevent acidification of the river.	Macro-invertebrate ecological category: ≥ C (≥ 62) Instream Ecostatus category: ≥ C (≥ 62) Hydrological category: ≥ C (≥ 62) Water Quality category: ≥ C (≥ 62)
3. Selons River area including Loskop Dam	II	Olifants	40	D	Instream habitat must be in a largely modified or better condition to support the ecosystem and for ecotourism users. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Overall salt and sulphate concentrations must be at alevel where it does not threaten the ecosystem or agricultural users. Dissolved oxygen concentrations must be maintained. Alkalinity must not decrease and thus allow for acidification of the river.	Instream Habitat Integrity category: ≥ D (≥ 62) Fish ecological category: ≥ C/D (≥ 58) Macro-invertebrate ecological category: ≥ C (≥ 62) ` Instream Ecostatus category: ≥ C (≥ 62) Hydrological category: ≥ C (≥ 62) Water Quality category: ≥ C (≥ 62)
4. Elands River catchment area	III	Elands	46	D	Instream habitat must be in a largely modified or better conditions to support ecosystem processes and sustainable use. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Low flows must be suitable to maintain the ecosystem and for human use.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) ` Instream Ecostatus category: ≥ D (≥ 42)

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
					Water quality: Concentrations of pathogens must not exceed levels where downstream use is compromised.	Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
6. Steelpoort River catchment	III	Steelpoort	66	D	Instream habitat must be in a largely modified or better condition to support ecosystem processes. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Toxics must be minimised to reduce the risk of human health and ecosystem impairment.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
6. Steelpoort River catchment	III	Steelpoort	64	D	Instream habitat must be in a largely modified or better condition to support ecosystem processes. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Toxics must be minimised to reduce the risk of human health and ecosystem impairment.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
9. Ohrigstad River catchment area	III	Ohrigstad	86	D	Instream habitat must be in a largely modified or better condition to support ecosystem processes. Instream biota must be in a largely modified or better condition. The requirements of ecologically important species must be provided for.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
					Diatom communities must be in in a largely modified or better condition indicating an ecosystem in similar condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. <u>Water quality:</u> Nutrients must be not reach levels that cause hypertrophic conditions.	(≥ 42) ` Diatom SPI category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (≥ 42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
10. Lower Olifants	II	Blyde	88	B	Instream habitat must be in a largely natural condition to support ecosystem processes. Instream biota should be in a close to natural condition. The requirements of ecologically important species must be provided for. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. <u>Water quality:</u> Water quality must be in a close to natural or better condition.	Instream Habitat Integrity category: ≥ B (≥ 82) Fish ecological category: ≥ B (≥ 82) Macro-invertebrate ecological category category: ≥ B (≥ 82) ` Instream Ecostatus category: ≥ B (≥ 82) Hydrological category: ≥ B (≥ 82) Water Quality category: ≥ B (≥ 82)
11. Ga-Selati River area	III	Ga-Selati (outlet of UIA11)	103	D	Instream habitat must be in a largely modified or better condition. Instream biological assemblages must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. <u>Water quality:</u> Toxicity must not pose a threat to local users and the ecosystem	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (≥ 42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
12. Lower Olifants within Kruger National Park	II	Olifants	105	C	Instream habitat must be in a moderately modified or better condition to support ecosystem processes. Instream biological assemblages must be in a moderately modified or better condition. The habitat requirements of species of special ecological importance must be provided for to ensure viable and sustainable populations. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. <u>Water quality:</u> Sediment concentrations must not reach levels where instream sedimentation excessively impacts on the instream habitat or where suspended sediments negatively impact on fitness for use for water institutions.	Instream Habitat Integrity category: ≥ C (≥ 62) Fish ecological category category: ≥ C (≥ 62) Macro-invertebrate ecological category category: ≥ C (≥ 62) Instream Ecostatus category: ≥ C (≥ 62) Suitable instream habitat conditions for > 5 Hippopotami Habitat for a minimum of 45 aquatic bird species. Hydrological category: ≥ C (≥ 62) Water Quality category: ≥ C (≥ 62)
12. Lower Olifants within Kruger National Park	II	Olifants	114	C	Instream habitat must be in a moderately modified or better condition. Instream biological assemblages must be in a moderately modified or better condition. The habitat requirements of species of special ecological importance must be provided for to ensure viable and sustainable populations. Diatom communities must be maintained to health levels indicating an ecosystem in similar condition. Periphyton must be in a condition which does not reflect eutrophic conditions. The local Hippopotamus population must remain in a viable state. Habitats of aquatic bird communities must be maintained in a suitable ecological state.	Instream Habitat Integrity category: ≥ C (≥ 62) Fish ecological category category: ≥ C (≥ 62) Macro-invertebrate ecological category: ≥ C (≥ 62) ` Instream Ecostatus category: ≥ C (≥ 62) Habitat for a minimum of 45 aquatic bird species. Suitable and sufficient habitat for a crocodile population with a healthy age and size composition approaching natural characteristics. Diatoms: SPI category: ≥C (≥ 62)

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
					Habitat for instream herpetofauna should reflect a moderately modified or better condition. Low and high flows must be maintained for ecosystem structure and function. <u>Water quality:</u> Sediment loads must be reduced so that sedimentation does not negatively impact on habitat state. Toxicity levels must not pose a threat to the ecosystem and local users.	Periphyton: SPI-Score of 8.9-9.1 Hydrological category: ≥ C (≥ 62) Water Quality category: ≥ C (≥ 62)
12. Lower Olifants within Kruger National Park	II	Olifants (outlet of IUA12)	116	C	Instream habitat must be in a moderately modified or better condition. Instream biological assemblages must be in a moderately modified or better condition. The habitat requirements of species of special ecological importance must be provided for to ensure viable and sustainable populations. Diatom communities must be maintained to health levels indicating an ecosystem in similar condition. Periphyton must be in a condition which does not reflect eutrophic conditions. The local Hippopotamus population must remain in a viable state. Habitats of aquatic bird communities must be maintained in a suitable ecological state. Habitat for instream herpetofauna should reflect a moderately modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition.	Instream Habitat Integrity category: ≥ C (≥ 62) Fish ecological category: ≥ C (≥ 62) Macro-invertebrate ecological category: ≥ C (≥ 62) ` Instream Ecostatus category: ≥ C (≥ 62) Habitat for a minimum of 45 aquatic bird species. Suitable and sufficient habitat for a crocodile population with a healthy age and size composition approaching natural characteristics. Diatoms: SPI category: ≥C (≥ 62) Periphyton: SPI-Score of 8.9-9.1 Hydrological category: ≥ C (≥ 62) Water Quality category: ≥ C (≥ 62)

RIVER INSTREAM HABITAT AND BIOTA						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
					Water quality: Sediment loads must be reduced so that sedimentation does not negatively impact on habitat state. Toxicity levels must not pose a threat to the ecosystem and local users.	
13. Blyde River catchment area	I	Blyde	121	B	Instream habitat must be in a close to natural condition. Instream biological assemblages must be in a moderately modified or better condition. The habitat requirements of species of special ecological importance must be provided for to ensure viable and sustainable populations. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: The sediment situation must be improved to support the protected status of this river.	Instream Habitat Integrity category: ≥ b (≥ 82) Fish ecological category: ≥ B (≥ 82) Macro-invertebrate ecological category: ≥ B (≥ 82) ` Instream Ecostatus category: ≥ B (≥ 82) Hydrological category: ≥ B (≥ 82) Water Quality category: ≥ B (≥ 82)
13. Blyde River catchment area	I	Blyde	117	B	Instream habitat must be in a close to natural condition. Instream biological assemblages must be in a moderately modified or better condition. The habitat requirements of species of special ecological importance must be provided for to ensure viable and sustainable populations. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: The sediment situation must be improved to support the protected status of this river.	Instream Habitat Integrity category: ≥ b(≥ 82) Fish ecological category: ≥ B (≥ 82) Macro-invertebrate ecological category: ≥ B (≥ 82) ` Instream Ecostatus category: ≥ B (≥ 82) Hydrological category: ≥ B (≥ 82) Water Quality category: ≥ B (≥ 82)

Table 6: Resource Quality Objectives for RIVER RIPARIAN ZONE HABITAT in Olifants catchment

RIVER RIPARIAN ZONE HABITAT						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
1. Upper Olifants River catchment	III	Olifants	11	C	The riparian zone must be in a moderately modified or better condition to support the ecosystem and for ecotourism. Riparian vegetation must be in a moderately modified or better condition. Low and high flows must be in a largely modified or better condition to maintain the riparian habitat and for ecotourism.	Riparian Zone Habitat Integrity category ≥ C (≥ 62) Riparian ecostatus category : ≥ C (≥ 62) Hydrological category ≥ D (≥ 42)
2. Wilge River catchment area	II	Wilge	31	B	The riparian zone must be in a largely natural or better condition. Riparian vegetation must be in a moderately modified condition Low flows must be in a moderately modified or better condition. High flows must be suitable to sustain the riparian zone habitat.	Riparian Zone Habitat Integrity category ≥ C (≥ 82) Riparian ecostatus category: ≥ C (≥ 82) Hydrological category ≥ B (≥ 82)
3. Selons River area including Loskop Dam	II	Klein-Olifants	34	C	The riparian zone must be in a moderately modified or better condition to maintain the ecosystem and for ecotourism. Riparian vegetation must be in a moderately modified or better condition Low flows must be in a moderately modified or better condition. High flows must be suitable to sustain the riparian zone habitat.	Riparian Zone Habitat Integrity category ≥ C (≥ 62) Riparian ecostatus category: ≥ C (≥ 62) Hydrological category ≥ C (≥ 62)
3. Selons River area including Loskop Dam	II	Olifants	40	C	The riparian zone must be maintained in a moderately modified or better condition to maintain the ecosystem. Riparian vegetation must be maintained in a moderately modified or better condition Low flows must be in a moderately modified or better condition. High flows must be suitable to sustain the riparian zone habitat.	Riparian Zone Habitat Integrity category ≥ C (≥ 62) Riparian ecostatus category: ≥ C (≥ 62) Hydrological category ≥ C (≥ 62)
4. Elands River catchment area	III	Elands	46	D	The riparian zone must be improved to be in a largely modified or better condition. Riparian vegetation must be in a better than largely modified condition Low flows must be in a largely modified or better condition to maintain the riparian zone and to provide for baisc human needs. High flows (freshets) must be provided to maintain the riparian zone.	Riparian Zone Habitat Integrity category ≥ D (≥ 42) Riparian ecostatus category ≥ C/D (≥ 58) Hydrological category ≥ D (≥

RIVER RIPARIAN ZONE HABITAT						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
						42)
6. Steelpoort River catchment	III	Steelpoort	66	D	The riparian zone must be in a largely modified or better condition. Riparian vegetation must be in a largely modified or better condition. Low and high flows must be in a largely modified or better condition.	Riparian Zone Habitat Integrity category ≥ D (≥ 42) Riparian ecostatus category: ≥ D (≥ 62) Hydrological category ≥ D (≥ 62)
6. Steelpoort River catchment	III	Steelpoort	64	C/D	The riparian zone must be improved to be in a better than largely modified condition. Riparian vegetation must be maintained in a largely modified or better condition Low and high flows must be in a largely modified or better condition.	Riparian Zone Habitat Integrity category ≥ C/D (≥ 58) Riparian ecostatus category: ≥ D (≥ 42) Hydrological category ≥ D (≥ 42)
9. Ohrigstad River catchment area	III	Ohrigstad	86	C	The riparian zone must be improved to be in a better than moderately modified condition. Riparian vegetation must be in a moderately modified or better condition Low and high flows must be in a moderately modified or better condition.	Riparian Zone Habitat Integrity category ≥ C (≥ 62) Riparian ecostatus category: ≥ C (≥ 62) Hydrological category ≥ D (≥ 62)
10. Lower Olifants	II	Blyde	88	B	The riparian zone must be in close to natural condition. Riparian vegetation must be in a close to natural condition Low and high flows must be in a better than a moderately modified condition.	Riparian Zone Habitat Integrity category ≥ B (≥ 82) Riparian ecostatus category: ≥ B (≥ 82) Hydrological category ≥ B (≥ 82)
11. Ga-Selati River area	III	Ga-Selati (outlet of UIA11)	103	D	The riparian zone must be in a largely modified or better condition. Riparian vegetation must be in a better than largely modified condition Low and high flows must be in a largely modified or better condition.	Riparian Zone Habitat Integrity category ≥ D (≥ 42) Riparian ecostatus category: ≥ C/D (≥ 58) Hydrological category ≥ D (≥ 42)

RIVER RIPARIAN ZONE HABITAT						
IUA	**Class**	**River**	**RU**	**REC**	**RQO**	**Numerical Limits**
12. Lower Olifants within Kruger National Park	II	Olifants	105	B/C	The riparian zone must be in a better than moderately modified condition. Riparian vegetation must be in a close to natural condition Low and high flows must be in a moderately modified condition.	Riparian Zone Habitat Integrity category ≥ B/C (≥ 78) Riparian ecostatus category: ≥ B (≥ 82) Hydrological category ≥ C (≥ 62)
12. Lower Olifants within Kruger National Park	II	Olifants	114	B/C	The riparian zone must be in a better than moderately modified condition. Riparian vegetation must be in a close to natural condition Low and high flows must be in a moderately modified condition.	Riparian Zone Habitat Integrity category ≥ B/C (≥ 78) Riparian ecostatus category: ≥ B (≥ 82) Hydrological category ≥ C (≥ 62)
12. Lower Olifants within Kruger National Park	II	Olifants (outlet of IUA12)	116	C	The riparian zone must be in a moderately modified or better condition. Riparian vegetation must be in a moderately modified or better condition Low and high flows must be in a moderately modified or better condition.	Riparian Zone Habitat Integrity category ≥ B/C (≥ 78) Riparian ecostatus category: ≥ B (≥ 62) Hydrological category ≥ C (≥ 62)
13. Blyde River catchment area	I	Blyde	121	B	The riparian zone must be in a close to natural condition. Riparian vegetation must be in a close to natural condition Low and high flows must be in a better than a moderately modified condition.	Riparian Zone Habitat Integrity category ≥ B (≥ 82) Riparian ecostatus category: ≥ B (≥ 82) Hydrological category ≥ B (≥ 78)
13. Blyde River catchment area	I	Blyde	117	B	The riparian zone must be in close to natural condition. Riparian vegetation must be in a close to natural condition Low and high flows must be in a better than a moderately modified condition.	Riparian Zone Habitat Integrity category ≥ B (≥ 82) Riparian ecostatus category: ≥ B (≥ 82) Hydrological category ≥ B (≥ 78)

Table 7: Resource Quality Objectives (RQO) for DAM WATER QUANTITY in the Olifants catchment

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
1	Witbank Dam (25°54'34.71"S; 29°18'52.31"E)	RU9	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Olifants in B11G; VMAR = 164.05x10^{6}m^3; PES=D category*. (Releases from Witbank Dam monitored by B1H010.)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.128 (60)	0.085 (99)
							Nov	0.245 (90)	0.197 (99)
							Dec	0.332 (90)	0.254 (99)
							Jan	0.415 (90)	0.291 (99)
							Feb	0.514 (80)	0.291 (99)
							Mar	0.401 (80)	0.244 (99)
							Apr	0.323 (80)	0.216 (90)
							May	0.218 (70)	0.094 (99)
							Jun	0.147 (90)	0.16 (90)
							Jul	0.108 (99)	0.141 (90)
							Aug	0.084 (99)	0.113 (99)
							Sep	0.073 (90)	0.085 (90)
	Doornpoort Dam (25°51'42.01"S; 29°18'19.92"E)				The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Olifants in B11J; VMAR = 169.46x10^{6}m^3; PES=D category*. (Releases - no gauge close by)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.138 (80)	0.093 (99)
							Nov	0.261 (80)	0.158 (99)
							Dec	0.352 (80)	0.105 (99)
							Jan	0.439 (99)	0.439 (99)
							Feb	0.544 (99)	0.544 (99)
							Mar	0.427 (80)	0.164 (99)
							Apr	0.344 (70)	0.093 (99)
							May	0.234 (70)	0.067 (99)
							Jun	0.158 (70)	0.062 (99)
							Jul	0.117 (80)	0.086 (99)
							Aug	0.091 (90)	0.086 (99)
							Sep	0.079 (80)	0.031 (99)
	Middleburg Dam (25°46'30"S; 29°32'46"E)	RU18			The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Klein Olifants in B12C; VMAR = 53.52x10^{6}m^3; PES=D category*. (Releases from Middelburg Dam monitored by B1H015.)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.048 (90)	0.044 (99)
							Nov	0.078 (90)	0.062 (99)
							Dec	0.112 (90)	0.102 (99)
							Jan	0.148 (99)	0.134 (99)
							Feb	0.174 (9)	0.158 (99)
							Mar	0.138 (90)	0.123 (99)
							Apr	0.115 (90)	0.104 (99)
							May	0.092 (90)	0.078 (99)
							Jun	0.074 (90)	0.067 (99)
							Jul	0.058 ()90	0.053 (99)
							Aug	0.048 (80)	0.034 (99)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
							Sep	0.04 (70)	0.00
2	Bronkhorstspruit Dam (25°53'14.1"S; 28°43'18.4"E)	RU23	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Bronkhorstspruit in B20C; VMAR = 56.4x10^{6}m^3; PES=C category*. (Releases from Bronkhorstspruit Dam, monitored by B2R001)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.17 (60)	0.073 (99)
							Nov	0.207 (70)	0.088 (99)
							Dec	0.224 (70)	0.095 (99)
							Jan	0.263 (70)	0.11 (99)
							Feb	0.326 (70)	0.136 (9)
							Mar	0.303 (70)	0.126 (99)
							Apr	0.294 (60)	0.122 (99)
							May	0.266 (60)	0.111 (99)
							Jun	0.251 (60)	0.104 (99)
							Jul	0.222 (60)	0.094 (99)
							Aug	0.196 (60)	0.084 (99)
							Sep	0.176 (60)	0.076 (99)
	Wilge (Primier Mine) Dam (25°48'2.7"S; 28°51'46"E)	RU26			The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Wilge in B20F; VMAR = 45.8x10^{6}m^3; PES=C category*. (Releases - no gauge close by)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.133 (70)	0.065 (99)
							Nov	0.165 (70)	0.079 (99)
							Dec	0.187 (70)	0.089 (99)
							Jan	0.231 (70)	0.108 (99)
							Feb	0.295 (70)	0.137 (99)
							Mar	0.279 (70)	0.129 (99)
							Apr	0.252 (60)	0.069 (99)
							May	0.205 (60)	0.082 (99)
							Jun	0.181 (60)	0.086 (99)
							Jul	0.156 (60)	0.049 (99)
							Aug	0.138 (60)	0.041 (99)
							Sep	0.124 (60)	0.054 (99)
3	Loskop Dam (25°25'1"S, 29°21'30"E)	RU37	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Olifants in B32A from EWR5; VMAR = 532.6x10^{6}m^3; PES=C category*. (Releases from Loskop Dam, monitored by B3H017)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)	Freshets (m^3/s) (Percentile)
							Oct	0.985 (70)	0.451 (99)	0.493 (99)
							Nov	1.493 (70)	0.667 (99)	1.74 (60)
							Dec	1.818 (70)	0.804 (99)	2.85 (10)
							Jan	2.197 (70)	0.965 (99)	4.248 (10)
							Feb	2.725 (70)	1.192 (99)	0.968 (99)
							Mar	2.367 (70)	1.036 (99)	1.748 (80)
							Apr	2.047 (60)	0.902 (99)	0.617 (99)
					Freshets are important for the downstream ecosystem and should be released.		May	1.626 (60)	0.723 (99)	0.00
							Jun	1.299 (70)	0.585 (99)	0.00
							Jul	1.088 (70)	0.494 (99)	0.00
							Aug	0.885 (70)	0.409 (99)	0.00
							Sep	0.765 (70)	0.359 (99)	0.00
	Roodepoort Dam	RU38			The dam must be managed	Flow releases:Selons in B32B;	Maintenance low flows (m^3/s) (Percentile)			Drought

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
	(25°23'40"S, 29°29'10"E)				to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	VMAR = 26.19x10^{6}m^3; PES=B category*. (Releases from Roodepoort Dam, monitored by B3H019)			flows (m^3/s) (Percentile)
							Oct	0.088 (60)	0.032 (99)
							Nov	0.128 (60)	0.044 (99)
							Dec	0.15 (60)	0.05 (99)
							Jan	0.188 (60)	0.062 (99)
							Feb	0.234 (60)	0.076 (99)
							Mar	0.199 (60)	0.065 (99)
							Apr	0.186 (50)	0.061 (99)
							May	0.147 (50)	0.049 (99)
							Jun	0.123 (60)	0.043 (99)
							Jul	0.105 (60)	0.037 (99)
							Aug	0.092 (50)	0.033 (99)
							Sep	0.083 (60)	0.031 (99)
4	Rust De Winter Dam (25°14'0"S; 28°31'5"E)	RU41	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Elands in B31C ; VMAR = 33.47x10^{6}m^3; PES=C category*. (Releases from Rust de Winter Dam, monitored by B3H014)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.084 (70)	0.044 (99)
							Nov	0.126 (70)	0.064 (99)
							Dec	0.135 (70)	0.069 (99)
							Jan	0.178 (70)	0.09 (99)
							Feb	0.209 (70)	0.105 (99)
							Mar	0.192 (70)	0.096 (99)
							Apr	0.164 (70)	0.083 (99)
							May	0.126 (70)	0.065 (99)
							Jun	0.105 (70)	0.055 (99)
							Jul	0.093 (70)	0.049 (99)
							Aug	0.085 (70)	0.045 (99)
							Sep	0.078 (70)	0.041 (99)
	Mkhombo Dam (25°5'45"S; 28°55'0"E)	RU45			Release pattern is important and should be based on the natural flow pattern to ensure the protection of ecosystem function downstream.	Flow releases: Elands EWR6 in B31G; VMAR = 60.32x10^{6}m^3; PES=D category*. (Releases from Mkhombo Dam, monitored by B3H020)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.077 (99)	0.077 (99)
							Nov	0.117 (99)	0.109 (99)
							Dec	0.133 (99)	0.133 (99)
							Jan	0.173 (99)	0.173 (99)
							Feb	0.177 (99)	0.177 (99)
							Mar	0.176 (99)	0.176 (99)
							Apr	0.143 (90)	0.132 (99)
							May	0.114 (99)	0.114 (99)
							Jun	0.092 (99)	0.092 (99)
							Jul	0.084 (99)	0.084 (99)
							Aug	0.077 (99)	0.077 (99)
							Sep	0.068 (99)	0.068 (99)
5	Rooikraal Dam (25°17'34"S; 29°39'7"E)	RU48	Quantity	Low Flows	Releases of drought requirements are at least required to maintain	Flow releases: Bloed in B32F; VMAR = 17.15x10^{6}m^3; PES=B	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
					ecosystem function downstream.	category*. (Releases from Rooikraal Dam - no active gauge close by)	Oct	0.03 (40)	0.007 (99)
							Nov	0.095 (40)	0.00
							Dec	0.115 (40)	0.024 (99)
							Jan	0.138 (40)	0.019 (99)
							Feb	0.178 (40)	0.021 (99)
							Mar	0.12 (40)	0.019 (99)
							Apr	0.081 (40)	0.012 (99)
							May	0.047 (40)	0.01 (99)
							Jun	0.035 (40)	0.008 (99)
							Jul	0.03 (40)	0.007 (99)
							Aug	0.024 (40)	0.006 (99)
							Sep	0.021 (40)	0.005 (99)
	Flag Boshielo Dam (24°46'50"S; 29°25'32"E)	RU52			The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Olifants EWR7 in B51C; VMAR = 726.64x10^{6}m3; PES=D category*. (Releases from Flag Boshielo Dam, monitored by B5H004)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.556 (99)	0.556 (99)
							Nov	0.849 (99)	0.849 (99)
							Dec	1.007 (99)	1.007 (99)
							Jan	1.214 (99)	1.214 (99)
							Feb	1.499 (99)	1.499 (99)
							Mar	1.303 (99)	1.303 (99)
							Apr	1.140 (99)	1.140 (99)
							May	0.888 (99)	0.888 (99)
							Jun	0.726 (99)	0.726 (99)
							Jul	0.611 (99)	0.611 (99)
							Aug	0.514 (99)	0.514 (99)
							Sep	0.457 (99)	0.457 (99)
6	Belfast Dam (25°39'56.12"S; 30°0'44.62"E)	RU54	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Langspruit in B41A; VMAR = 41.97x10^{6}m3; PES=C category*. (Releases to Langspruit - no gauge close by)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.157 (70)	0.086 (99)
							Nov	0.242 (70)	0.058 (99)
							Dec	0.319 (70)	0.172 (99)
							Jan	0.418 (70)	0.224 (99)
							Feb	0.529 (70)	0.282 (99)
							Mar	0.446 (70)	0.224 (99)
							Apr	0.417 (70)	0.22 (99)
							May	0.322 (70)	0.146 (99)
							Jun	0.251 (70)	0.138 (99)
							Jul	0.189 (70)	0.105 (99)
							Aug	0.157 (70)	0.089 (99)
							Sep	0.143 (70)	0.082 (99)
	Tonteldoos Dam (25°16'45"S; 29°56'30"E)	RU56	Quantity	Low Flows	The dam must be managed to provide sufficient releases together with the Vlugkraal Dam for the protection of ecosystem function	PES=C category Flow releases: Tonteldoos Dam at outlet of B41C; VMAR = 14.85x10^{6}m3*. (Releases from Tonteldoos Dam, monitored by B4R001)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.057 (70)	0.026 (99)
							Nov	0.086 (70)	0.019 (99)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
					downstream as well as for other users.		Dec	0.111 (70)	0.062 (99)
							Jan	0.145 (70)	0.08 (99)
							Feb	0.184 (70)	0.1 (99)
							Mar	0.156 (70)	0.082 (99)
							Apr	0.146 (70)	0.073 (99)
							May	0.114 (70)	0.049 (99)
							Jun	0.09 (70)	0.051 (99)
							Jul	0.068 (70)	0.039 (99)
							Aug	0.057 (70)	0.033 (99)
							Sep	0.052 (70)	0.03 (99)
	Vlugkraal Dam (25°13'45"S; 29°57'1"E)	RU56	Quantity	Low Flows	The dam must be managed to provide sufficient releases together with the Tonteldoos Dam for the protection of ecosystem function downstream as well as for other users.	Flow releases: Vlugkraal at outlet of B41C; VMAR = 14.85x10^{6}m^3; PES=C category*. (Releases from Vlugkraal Dam, monitored by B4H017)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.057 (70)	0.026 (99)
							Nov	0.086 (70)	0.019 (99)
							Dec	0.111 (70)	0.062 (99)
							Jan	0.145 (70)	0.08 (99)
							Feb	0.184 (70)	0.1 (99)
							Mar	0.156 (70)	0.082 (99)
							Apr	0.146 (70)	0.073 (99)
							May	0.114 (70)	0.049 (99)
							Jun	0.09 (70)	0.051 (99)
							Jul	0.068 (70)	0.039 (99)
							Aug	0.057 (70)	0.033 (99)
							Sep	0.052 (70)	0.03 (99)
	Der Bruchen Dam (25°3'19"S 30°7'12"E)	RU62	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Groot Dwars in B41G; VMAR = 24.48x10^{6}m^3; PES=C category*. (Releases from Der Bruchen Dam - no gauge close by)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.062 (60)	0.034 (99)
							Nov	0.096 (70)	0.051 (99)
							Dec	0.122 (70)	0.064 (99)
							Jan	0.143 (70)	0.075 (99)
							Feb	0.18 (70)	0.093 (99)
							Mar	0.159 (70)	0.071 (99)
							Apr	0.146 (70)	0.076 (99)
							May	0.119 (70)	0.062 (99)
							Jun	0.095 (70)	0.05 (99)
							Jul	0.072 (70)	0.039 (99)
							Aug	0.061 (70)	0.034 (99)
							Sep	0.057 (70)	0.031 (99)
	De Hoop Dam (24°57'30'' S; 29°57'25 E)	RU64	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Steelpoort EWR9 in B41H; VMAR = 137.53x10^{6}m^3; PES=D category*. (Releases from De Hoop Dam, monitored by B4H023)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.240 (99)	0.240 (99)
							Nov	0.357 (90)	0.183 (99)
							Dec	0.469 (99)	0.469 (99)
							Jan	0.607 (99)	0.607 (99)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
							Feb	0.685 (99)	0.685 (99)
							Mar	0.638 (99)	0.638 (99)
							Apr	0.570 (99)	0.570 (99)
							May	0.464 (99)	0.464 (99)
							Jun	0.357 (99)	0.357 (99)
							Jul	0.283 (99)	0.283 (99)
							Aug	0.239 (99)	0.239 (99)
							Sep	0.213 (99)	0.213 (99)
8	Lydenburg Dam (25°8'1''S; 30°31'1E)	RU74	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Sterk in B42B at dam; VMAR = 9.44x10^{6}m^3; PES=C category*. (Releases from Lydenburg - no gauge close by)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.026 (70)	0.014 (99)
							Nov	0.041 (70)	0.022 (99)
							Dec	0.052 (70)	0.027 (99)
							Jan	0.063 (70)	0.033 (99)
							Feb	0.074 (70)	0.038 (99)
							Mar	0.063 (70)	0.033 (99)
							Apr	0.058 (70)	0.03 (99)
							May	0.049 (70)	0.026 (99)
							Jun	0.04 (70)	0.021 (99)
							Jul	0.031 (70)	0.017 (99)
							Aug	0.026 (70)	0.014 (99)
							Sep	0.025 (70)	0.014 (99)
	Buffelskloof Dam (24°57'15''S; 30°16'1E)	RU79	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Watervals in B42F;VMAR = 28.56x10^{6}m^3; PES=C category*. (Releases from Buffelskloof Dam, monitored by B4H021)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.088 (70)	0.048 (99)
							Nov	0.109 (70)	0.059 (99)
							Dec	0.126 (70)	0.067 (99)
							Jan	0.142 (70)	0.075 (99)
							Feb	0.173 (70)	0.091 (99)
							Mar	0.159 (70)	0.083 (99)
							Apr	0.155 (70)	0.082 (99)
							May	0.139 (70)	0.073 (99)
							Jun	0.126 (70)	0.067 (99)
							Jul	0.105 (70)	0.056 (99)
							Aug	0.092 (70)	0.05 (99)
							Sep	0.087 (70)	0.048 (99)
9	Ohrigstad Dam (24°55'1''S; 30°37'1''E)	RU83	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Ohrigstad in B60E; VMAR = 15.95x10^{6}m^3;PES=C category*. (Releases from Ohrigstad Dam, monitored by B6H011 of B6H012)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.053 (80)	0.029 (99)
							Nov	0.063 (80)	0.034 (99)
							Dec	0.076 (80)	0.04 (99)
							Jan	0.093 (80)	0.049 (99)
							Feb	0.126 (80)	0.065 (99)
							Mar	0.119 (80)	0.062 (99)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
							Apr	0.107 (80)	0.056 (99)
							May	0.09 (80)	0.047 (99)
							Jun	0.082 (80)	0.044 (99)
							Jul	0.069 (80)	0.037 (99)
							Aug	0.06 (80)	0.033 (99)
							Sep	0.055 (80)	0.03 (99)
10	Blyderivierpoort Dam (24°32'57"S; 30°48'5"E)	RU88	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Blyde EWR12 in B60J;VMAR = 361.98x10^{6}m^3; PES=B category*. (Releases from Blyderivierpoort Dam, monitored by B6H005)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	2.223 (60)	0.725 (99)
							Nov	2.394 (70)	0.769 (99)
							Dec	2.763 (60)	0.866 (99)
							Jan	3.387 (60)	1.030 (99)
							Feb	4.274 (70)	1.263 (99)
							Mar	4.446 (60)	1.308 (99)
							Apr	3.991 (70)	1.188 (99)
							May	3.529 (60)	1.067 (99)
							Jun	3.180 (70)	0.976 (99)
							Jul	2.844 (70)	0.887 (99)
							Aug	2.507 (60)	0.799 (99)
							Sep	2.289 (70)	0.742 (99)
11	Tours Dam (24°5'50"S; Logitude:30°15'13"E)	RU99	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Ngwabitsi in B72E; VMAR = 25.68x10^{6}m^3; PES=D category*. (Releases from Tours Dam, monitored by B7H002 of B7H023)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.034 (70)	0.00
							Nov	0.038 (60)	0.00
							Dec	0.052 (60)	0.00
							Jan	0.09 (50)	0.001 (99)
							Feb	0.182 (60)	0.001 (99)
							Mar	0.157 (60)	0.001 (99)
							Apr	0.105 (70)	0.001 (99)
							May	0.059 (70)	0.00
							Jun	0.053 (70)	0.00
							Jul	0.045 (80)	0.00
							Aug	0.041 (70)	0.00
							Sep	0.037 (70)	0.00
12	Klaserie Dam (24°31'30"S; 31°4'15"E	RU106	Quantity	Low Flows	The dam must be managed to provide sufficient releases for the protection of ecosystem function downstream as well as for other users.	Flow releases: Klaserie OLI_EWR7 in B73A; VMAR = 25.54x10^{6}m^3; PES=B/C category*. (Releases from Klaserie Dam, monitored by B7R001)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	0.084 (70)	0.026 (99)
							Nov	0.102 (70)	0.031 (99)
							Dec	0.155 (60)	0.044 (99)
							Jan	0.238 (60)	0.067 (99)
							Feb	0.323 (70)	0.069 (99)
							Mar	0.339 (60)	0.060 (99)
							Apr	0.276 (70)	0.063 (99)
							May	0.184 (70)	0.053 (99)

DAM WATER QUANTITY									
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**		
							Jun	0.136 (70)	0.040 (99)
							Jul	0.108 (70)	0.032 (99)
							Aug	0.092 (70)	0.028 (99)
							Sep	0.081 (70)	0.025 (99)
	Phalaborwa Barrage (24°4'1"S: 31°10'1"E)	RU114			Releases from the weir are important to maintain and protect the ecosystem function downstream, especially in the KNP.	Flow releases: Olifants EWR13 in B72D; VMAR = 1762.2x10^{6}m^3; PES=C category*. (Releases from Phalaborwa Barrage, monitored by B7R002)	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
							Oct	3.940 (70)	2.149 (99)
							Nov	5.411 (80)	2.883 (99)
							Dec	6.802 (70)	3.576 (99)
							Jan	8.351 (70)	4.347 (99)
							Feb	10.019 (80)	5.178 (99)
							Mar	10.125 (70)	5.231 (99)
							Apr	8.812 (70)	4.577 (99)
							May	7.209 (70)	3.778 (99)
							Jun	5.671 (70)	3.012 (99)
							Jul	4.732 (70)	2.544 (99)
							Aug	3.998 (70)	2.179 (99)
							Sep	3.508 (70)	1.934 (99)

Table 8: Resource Quality Objectives (RQO) for DAM WATER QUALITY in Olifants catchment

DAM WATER QUALITY							
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
1	Witbank Dam (25°54'34.71"S; 29°18'52.31"E) Doornpoort Dam (25°51'42.01"S; 29°18'19.92"E) Middleburg Dam (25°46'30"S; 29°32'46"E)	RU9, RU18	Quality	Nutrients	The system must be maintained in a mesotrophic state to avoid cyanobacterial blooms and the associated algal toxins.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
2	Bronkhorstspruit Dam (25°53'14.1"S; 28°43'18.4"E)	RU23	Quality	Nutrients	Nutrient concentrations in the dam must be maintained at mesotrophic levels.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
3	Loskop Dam (25°25'1"S, 29°21'30"E)	RU37	Quality	Nutrients	The dam must be maintained in a mesotrophic state to avoid cyanobacterial blooms and the associated algal toxins.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
4	Rust De Winter Dam (25°14'0"S; 28°31'5"E) Mkhombo Dam (25°5'45"S; 28°55'0"E)	RU41; RU45	Quality	Nutrients	Nutrients must be maintained at mesotrophic levels.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
5	Flag Boshielo Dam (24°46'50"S; 29°25'32"E)	RU52	Quality	Nutrients	Nutrients must be maintained at mesotrophic levels.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
6	Tonteldoos Dam (25°16'45"S; 29°56'30"E) VlugkraalDam (25°13'45"S; 29°57'1"E)	RU56	Quality	Nutrients	Nutrient concentrations must be maintained such that the system is in a mesotrophic state or better.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
						Chl-a: phytoplankton	≤ 20.0 µg/L
8	Buffelskloof Dam (24°57'15''S; 30°16'1E)	RU79	Quality	Nutrients	Nutrients must be maintained at mesotrophic levels so as to retain the recreational value of the dam.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
9	Ohrigstad Dam (24°55'1''S; 30°37'1''E)	RU83	Quality	Nutrients	Nutrients must be maintained at mesotrophic levels so as to avoid eutrophication.	PO_4-P	≤ 0.025 mg/L P
						TIN	≤ 1.00 mg/L N
1	Witbank Dam (25°54'34.71"S; 29°18'52.31"E)	RU9	Quality	Salts	Salt concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m
	Doornpoort Dam (25°51'42.01"S; 29°18'19.92"E)				Salt and sulphate concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m
	Middleburg Dam (25°46'30"S; 29°32'46"E)	RU18			Salt concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m
3	Loskop Dam (25°25'1"S, 29°21'30"E)	RU37	Quality	Salts	Salt concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m
5	Flag Boshielo Dam (24°46'50"S; 29°25'32"E)	RU52	Quality	Salts	Salt concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m

DAM WATER QUALITY							
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
8	Buffelskloof Dam (24o57'15''S; 30o16'1E)	RU79	Quality	Salts	Salt concentrations must be maintained at levels where they allow for a sustainable ecosystem in the dam and downstream and do not compromise users.	Sulphates	≤ 200 mg/L
						Electrical conductivity	≤ 85 mS/m
1	Witbank Dam (25°54'34.71"S; 29°18'52.31"E); Doornpoort Dam (25°51'42.01"S; 29°18'19.92"E)	RU9	Quality	System Variables	The pH in the dam must be maintained at levels where it does not compromise the ecosystem or users.	pH_max	≥ 8.8 0
						pH_min	≤ 5.9 0
	Middleburg Dam (25°46'30"S; 29°32'46"E)	RU18	Quality	System Variables	The pH in the dam must be maintained at levels where it does not compromise the ecosystem or users.	pH_max	≥ 8.8 0
						pH_min	≤ 5.9 0
4	Mkhombo Dam (25°5'45"S; 28°55'0"E)	RU45	Quality	System Variables	The pH in the dam must be improved and maintained at levels where it does not compromise the ecosystem or users.	pH_max	≥ 8.8 0
						pH_min	≤ 5.9 0
1	Witbank Dam (25°54'34.71"S; 29°18'52.31"E); Doornpoort Dam (25°51'42.01"S; 29°18'19.92"E)	RU9	Quality	Toxins	The system must be maintained in a mesotrophic state to avoid cyanobacterial blooms and the associated algal toxins. Metal concentrations in the dam must be maintained at levels which allow for a sustainable ecosystem.	F	≤ 2.50 mg/L
						Al	≤ 0.105 mg/L
						As	≤ 0.095 mg/L
						Cd hard	≤ 3.0 µg/L
						Cr(VI)	≤ 121 µg/L
						Cu hard	≤ 6.0 µg/L
						Hg	≤ 0.97 µg/L
						Mn	≤ 0.990 mg/L
						Pb hard	≤ 9.5 µg/L
						Se	≤ 0.022 mg/L
						Zn	≤ 25.2 µg/L
						Chorine	≤ 3.1 µg/L free Cl
						Chl-a: phytoplankton	≤ 20.0 µg/L
3	Loskop Dam (25°25'1"S, 29°21'30"E)	RU37	Quality	Toxins	Toxicity of metals must be maintained at concentrations that would not pose a threat to human or ecosystem health. The dam must be maintained in a mesotrophic state to avoid cyanobacterial blooms and the associated algal toxins.	F	≤ 2.50 mg/L
						Al	≤ 0.105 mg/L
						As	≤ 0.095 mg/L
						Cd hard	≤ 3.0 µg/L
						Cr(VI)	≤ 121 µg/L
						Cu hard	≤ 6.0 µg/L
						Hg	≤ 0.97 µg/L
						Mn	≤ 0.990 mg/L
						Pb hard	≤ 9.5 µg/L
						Se	≤ 0.022 mg/L
						Zn	≤ 25.2 µg/L
						Chorine	≤ 3.1 µg/L free Cl
						Chl-a: phytoplankton	≤ 20.0 µg/L

Table 9: Resource Quality Objectives (RQO) for DAM BIOTA in the Olifants catchment

DAM BIOTA							
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
1	Witbank Dam (RU 9, 25°54'34.71"S; 29°18'52.31"E),Middleburg Dam (RU 18, 25°46'30"S; 29°32'46"E)	RU9 RU18	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
2	Bronkhorstspruit Dam (RU 23, 25°53'14.1"S; 28°43'18.4"E), Wilge (Primier Mine) Dam (RU 26, 25°48'2.7"S; 28°51'46"E)	RU23 RU26	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
3	Loskop Dam (RU 37, 25°25'1"S, 29°21'30"E)	RU37	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
4	Rust De Winter Dam (RU 41, 25°14'0"S; 28°31'5"E), Mkhombo Dam (RU 45, 25°5'45"S; 28°55'0"E)	RU41 RU45	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
5	Flag Boshielo Dam (RU 52, 24°46'50"S; 29°25'32"E)	RU52	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
6	De Hoop Dam (RU 64, 24o57'30'' S; 29o57'25 E)	RU64	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
9	Ohrigstad Dam (RU 83, 24o55'1''S; 30o37'1''E)	RU83	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.
10	Tours Dam (RU 99, 24°5'50"S; Logitude:30°15'13"E)	RU99	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.

DAM BIOTA							
IUA	**Dams**	**RU**	**Component**	**Sub Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
					pose a health risk to local communities.		
11	Klaserie Lake (RU 106, 24°31'30"S; 31°4'15"E)	RU106	Biota	Fish	The wellbeing of the fish community of this artificial ecosystem must be maintained in a suitable condition to contribute to regional biodiversity and to support local recreational angling industry. Consumption of fish must not pose a health risk to local communities.	Implementation of the Index of Reservoir Habitat Impairment (IRHI) by Miranda and Hunt (2011).	Habitat suitability and fish wellbeing in a state which is equivalent to a D or better ecological category.

Table 10: Resource Quality Objectives (RQO) for GROUNDWATER in the Olifants catchment

GROUNDWATER					
IUA	**RU**	**Component**	**RQO**	**Indicator/ Measure**	**Numerical Limits**
All	All Prioritised RUs	Quantity	Where water use is higher than requirements for Reserve, Schedule 1 and General Authorizations, abstraction rates should not exceed the average recharge.	Abstraction Volume (Q) per hectare > Reserve, Schedule and General Authorizations.	Q < Average recharge per hectare
All	RU1 RU2 RU3 RU4 RU6 RU7 RU8 RU9 RU10 RU11 RU12 RU14 RU15 RU17 RU18 RU19 RU24 RU27 RU28 RU31 RU33 RU34 RU56 RU59 RU62 RU73	Aquifer	Medium to long-term water trends should not show a negative deviation from the natural trend	Depth to Groundwater Level according to Groundwater Monitoring Guidelines.	At least one NGwQI MP monitoring site that is representative of the aquifer. Water level fluctuations in Dolomitic aquifers[6] should not exceed 6m.
	RU22				Water level fluctuations around the average site water level should not exceed 18.2 m.
	RU21				Water level fluctuations around the average site water level should not exceed 19.1 m.
	RU53				Water level fluctuations around the average site water level should not exceed 20.9 m
	RU58				Water level fluctuations around the average site water level should not exceed 8.8 m

INTEGRATED UNITS OF ANALYSIS (13 IUAS) DELINEATED FOR THE OLIFANTS WMA

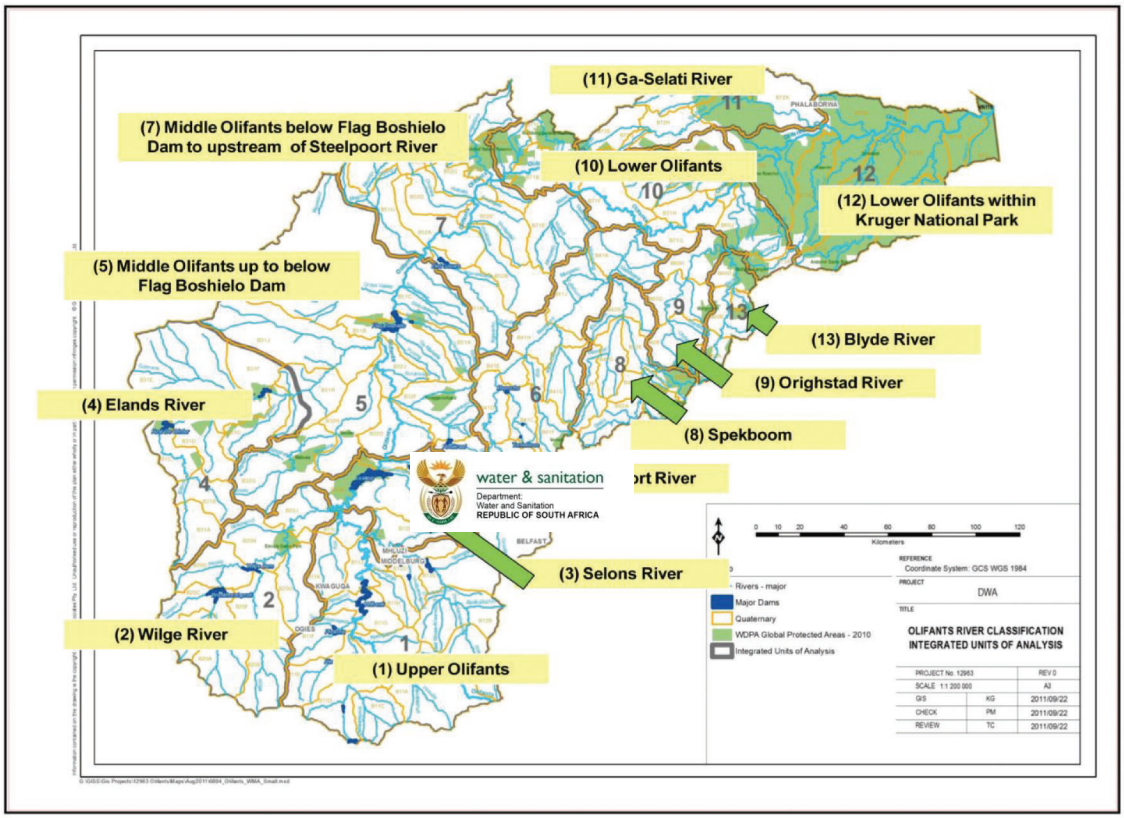

Figure 1: Map illustrating the integrated units of analysis for the Olifants Catchment