

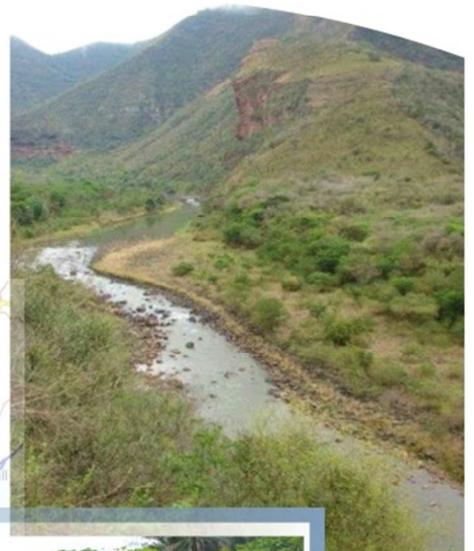
REPORT NO: RDM/WMA11/00/CON/CLA/0212

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

PROJECT NUMBER: WP 10679

BASIC HUMAN NEEDS RESERVE REPORT

MAY 2013



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

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Report Number: RDM/WMA11/00/CON/CLA/0212

MAY 2013

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REFERENCE

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Department of Water Affairs, South Africa, September 2012. Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area. Basic Human Needs Reserve Report. Prepared by Greg Huggins (Nomad Consulting) for Rivers for Africa eFlows Consulting (Pty) Ltd. DWA Report: RDM/WMA11/00/CON/CLA/0212.

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2	Report Number: RDM/WMA11/00/CON/CLA/0113	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Status Quo assessment, IUA delineation and Biophysical Node identification
3	Report Number: RDM/WMA11/00/CON/CLA/0213	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: River Resource Units and EWR sites
4	Report Number: RDM/WMA11/00/CON/CLA/0313	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Desktop Estuary EcoClassification and EWR
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6	Report Number: RDM/WMA11/00/CON/CLA/0212	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: BHNR
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8.3	Report Number: RDM/WMA11/00/CON/CLA/0714	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Volume 3 Supporting Information on the Determination of Water Resource Classes – Estuary specialist appendices (electronic information only)
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9.3	Report Number: RDM/WMA11/00/CON/CLA/0515	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Volume 3: Groundwater RQOs
9.4	Report Number: RDM/WMA11/00/CON/CLA/0615	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Volume 4: Estuary RQOs
10	Report Number: RDM/WMA11/00/CON/CLA/0715	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Implementation Report
11	Report Number: RDM/WMA11/00/CON/CLA/0815	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Main Report
12	Report Number: RDM/WMA11/00/CON/CLA/0116	Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Closing Report

DEPARTMENT OF WATER AFFAIRS
CHIEF DIRECTORATE: RESOURCE DIRECTED MEASURES

**CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF
THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY
OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT
AREA**

BASIC HUMAN NEEDS RESERVE REPORT

Approved for RFA by:

.....
Delana Louw
Project Manager

.....
Date

DEPARTMENT OF WATER AFFAIRS (DWA)

Approved for DWA by:

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Chief Director: Water Ecosystems

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Date

ACKNOWLEDGEMENTS

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REPORT SCHEDULE

Version	Date
First draft	December 2012
Second draft	May 2013

EXECUTIVE SUMMARY

BACKGROUND

This study included a Basic Human Needs Reserve (BHNR) assessment, undertaken to determine the prescribed minimum quantity and quality of water to remain in the water resource to enable the supply of water, according to Schedule 1 of the National Water Act (NWA), to support households, i.e. informal households, to support life, personal hygiene and other subsistence use.

The method followed the approach revised by DWA during October 2008, with additional steps to improve projections. In this method, the BHNR only applies to the areas in which informal water sources are the means by which communities are provided with Schedule 1 water rights.

This report has determined the BHNR for each quaternary catchment located in the Umzimkulu Water Management Area (WMA 11) under a number of criteria and scenarios.

CONCLUSIONS

In total, the BHNR demand for the entire WMA 11 (for the year of the study - 2013) is estimated at 12,972,388 and 25,944,776 m³/per annum for the 25 and 50 litre limits respectively.

Assuming that the annual population growth within the WMA is commensurate with the national average (growth of 1.6% per annum), it can also be assumed that the BHNR demand would increase proportionally by the same rate. Projections in population size and BHNR demand growth is provided below for selected years.

BHNR for 25 and 50 litre provision limits for selected years

BHNR category	Year (2013) (m ³ per annum)	Year (2018) (m ³ per annum)	Year (2023) (m ³ per annum)
25 litre	12,972,388	14,043,924	15,203,970
50 litre	28,087,848	28,087,848	30,407,941

The above projections assume that there is no additional investment in formal water infrastructure, which is unlikely to be the case. In reality, one should expect that investment in infrastructure will occur and outpace the natural population growth. If this does occur then dependency on natural sources will be reduced.

The above findings are best applied as guidelines values in operational planning. Specifically they should be treated as the minimum river flow volumes, to be guaranteed in any future plans, for each individual catchment or the WMA as a whole. This will ensure that communities, whom are dependent on informal sources, are provided with sufficient supply to ensure their Schedule 1 rights.

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TERMINOLOGY AND ACRONYMS

BHNR	Basic Human Needs Reserve
DWA	Department Water Affairs
GIS	Geographic Information System
NWA	National Water Act
WMA	Water Management Area

1 INTRODUCTION

1.1 OVERVIEW OF THE CATCHMENT

The Umvoti to Umzimkulu Water Management Area (WMA 11) is one of four major WMAs located within KwaZulu-Natal, with an estimated total area of 34,966km², or 37% of the total area of the province. It also covers seven district municipalities, notably the eThekweni Metropolitan and the uMgungundlovu District Municipalities, the economic and administrative heartland of KwaZulu-Natal.

WMA11 contains a number of major river systems including the Mvoti, uThongathi, uMdloti, uMngeni, uMkhomazi and Umzimkulu Rivers. The uMngeni River in particular functions as the main source of water for the Durban and Pietermaritzburg areas, with a number of fully regulated large dams such as Midmar, Inanda, Albert Falls and Nagle Dams. Other river systems in WMA 11 vary in terms of the level of development and rivers such as the uMkhomazi and Umzimkulu remain largely undeveloped (DWAF, 2004)

Based on Census 2011, a total population of 6,266,876 live within MWA11. The average population density is 216 individuals per kilometre squared (km²). The spatial distribution of this population shows a sharp transition from low density rural populations with limited development to high density urban environments **where water is largely sourced from formal systems**.

Analysis of water access by household (Census, 2011) indicates that 74% of persons have access to formal water supply (i.e. piped water), while the remaining 26% are reliant on informal water sources. The spatial distribution is uneven, and Figure 1.1 overleaf depicts the percentage of the population, within each ward, which is dependent on informal water sources.

The lowest dependency (1 - 20% of the population) is largely restricted to the coastal and regional centres wards, where infrastructure development has been concentrated. Inversely, areas of highest dependency (80 - 100% of the population) cover wards located in the former homelands and rural area where infrastructure development is low.

In absolute terms, the wards with the highest number of people dependant on informal water resources are depicted in Figure 1.2. There is a general trend where wards with the highest dependency, both in terms of population numbers and as a percentage of the total population, are largely the same.

Of all individuals, 8% are specifically dependant on local rivers or streams for water. This calculates to a total population of 1,078,623 that are reliant on informal water supplies, and 534,144 reliant on rivers and streams for the provision of water.

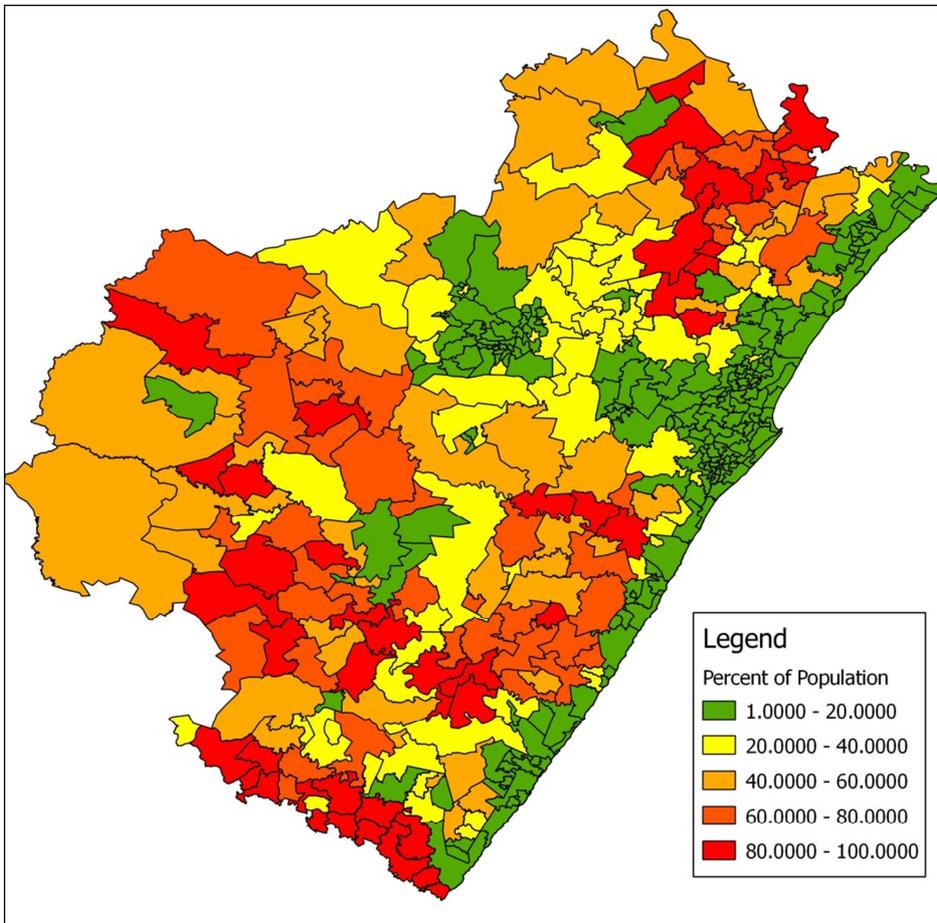


Figure 1.1 Percentage of Population, by Ward, dependant on informal water sources

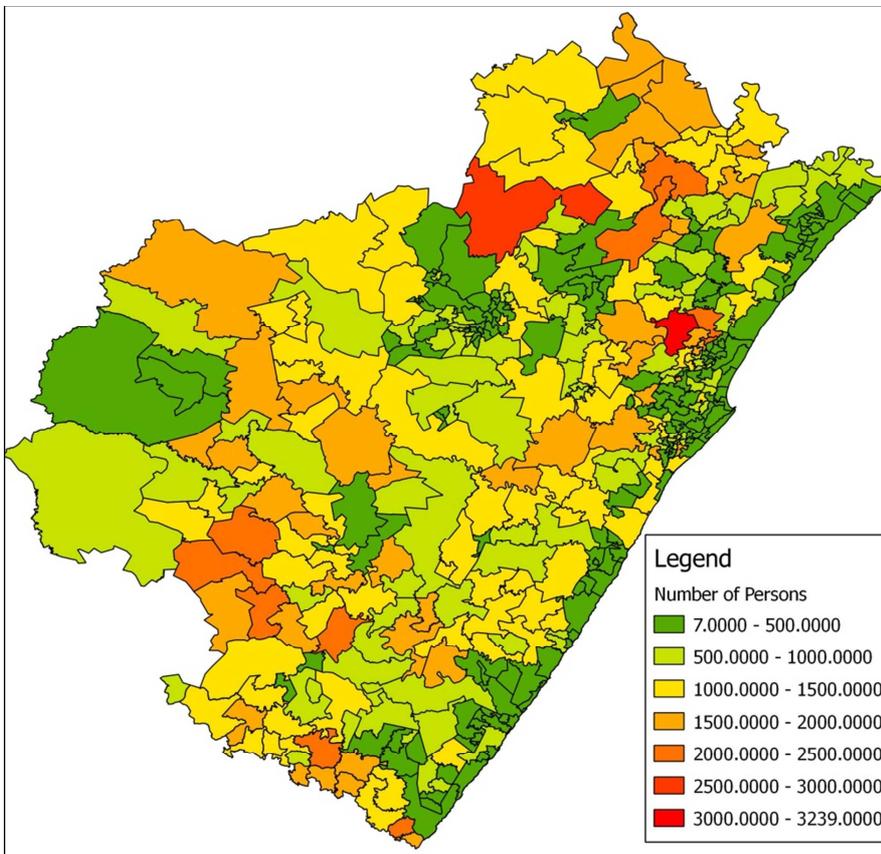


Figure 1.2 Number of persons, by Ward, dependant on informal water sources

1.2 PURPOSE OF THIS REPORT

The purpose of this report is to determine the Basic Human Needs Reserve only applicable to the areas in which informal water sources are the means by which communities are provided with Schedule 1 rights.

1.3 STRUCTURE OF THIS REPORT

The report structure is as follows:

Chapter 1: Introduction

This chapter.

Chapter 2: Basic Human Needs Reserve

Description of the approach used to determine the BHNR and detail findings are provided.

Chapter 3: Conclusions

Summary of findings are provided.

Chapter 4: Appendix A: Report Comments

Comments from reviewers are listed.

2 BASIC HUMAN NEEDS RESERVE

This study included a Basic Human Needs Reserve (BHNR) assessment, undertaken to determine the prescribed minimum quantity and quality of water to remain in the water resource to enable the supply of water, according to Schedule 1 of the National Water Act (NWA), to support households, i.e. informal households, to support life, personal hygiene and other subsistence use.

The method follows the approach revised by DWA during October 2008, with additional steps to improve projections. In this method, the BHNR only applies to the areas in which informal water sources are the means by which communities are provided with Schedule 1 water rights. The method adopted is summarized below:

- Quaternary catchments falling within the WMA11 were determined, and the area of each catchment calculated on a Geographic Information System (GIS).
- Quaternary catchments were overlaid on the smallest aggregations of Census 2011 or the ward.
- Wards falling completely or partially in each quaternary catchment were used to determine persons/individuals with access to formal and informal water supplies. **Persons with access to piped water (formal supply) in any configuration are considered to not qualify under the BHNR. All households without access to piped water, and therefore would be reliant on other informal sources, are deemed to qualify in this study;**
- Persons using groundwater as the primary water source have been excluded from the qualifying criteria as they are unlikely to be directly dependant on the use of surface water features.
- Wards, as provided in Census 2011, do not align completely with quaternary catchment areas. Qualifying and non-qualifying persons, by catchment, was therefore moderated by determining the average number of persons per kilometre squared multiplied by the area of the quaternary catchment.
- Having calculated the qualifying population per quaternary catchment the next step in determining the BHNR is to project the population to a target date. For the purposes of this exercise the population has been projected for 2013, 2018 and 2023 (5 year intervals). The population has been projected using national growth rates (of 1.6%) determined via the analysis of preliminary Census 2011 results and Census 2001. It is acknowledged that population growth rates will vary, specifically between the rural and urban areas; however this generic growth rate is considered acceptable for projection purposes.
- The total water demand was calculated for years 2013, 2018 and 2023 using both 25 and 50 litres of water per individual per day. This was adjusted to a total annual water demand depicted as m³ per annum.

The detail findings, as calculated on an Excel spreadsheet, are available electronically as part of the electronic data that are provided at the end of the study. The spreadsheet results are summarised in Table 2.1 to 2.4.

Table 2.1 Total qualifying and non-qualifying population by quaternary catchment

Quaternary catchment	Demographics of Wards inside quaternary catchments					Quaternary catchment area	Qualifying persons per catchment
	Total population	Persons with formal supply	Persons with informal supply	Total area (km ²)	Persons with informal supply per km ²		
T40A	60 385	15 995	44 390	832	53	229	12 218
T40B	38 108	19 688	18 420	545	34	306	10 342
T40C	49 178	8 754	40 424	470	86	261	22 448
T40D	95 408	24 162	71 246	700	102	410	41 730
T40E	96 498	34 872	61 626	776	79	536	42 566
T40F	101 053	72 496	28 557	574	50	370	18 408
T40G	147 051	122 720	24 331	436	56	333	18 583
T51A	2 530	228	2 302	1 152	2	360	719
T51B	5 628	2 550	3 078	1 307	2	231	544
T51C	55 950	15 335	40 615	2 096	19	509	9 863
T51D	9 692	1 699	7 993	1 695	5	156	736
T51E	22 948	5 081	17 867	2 209	8	282	2 281
T51F	2 530	228	2 302	1 152	2	337	673
T51G	9 784	1 554	8 230	2 536	3	281	912
T51H	34 623	15 767	18 856	538	35	572	20 048
T51J	57 086	17 501	39 585	714	55	292	16 189
T52A	53 134	11 438	41 696	1 086	38	422	16 202
T52B	36 518	4 450	32 068	535	60	282	16 903
T52C	62 908	21 301	41 607	981	42	288	12 215
T52D	90 103	30 287	59 816	1 040	58	586	33 704
T52E	26 702	3 791	22 911	608	38	256	9 647
T52F	27 640	3 555	24 085	605	40	459	18 273
T52G	42 454	6 680	35 774	494	72	244	17 670
T52H	7 409	164	7 245	118	61	379	23 270
T52J	43 744	17 928	25 816	574	45	406	18 260
T52K	73 524	43 490	30 034	1 195	25	469	11 787
T52L	60 838	44 112	16 726	681	25	197	4 838
T52M	59 547	35 168	24 379	634	38	346	13 305
U10A	8 599	1 793	6 806	974	7	461	3 221
U10B	11 783	1 794	9 989	1 351	7	432	3 194
U10C	3 185	1	3 184	377	8	294	2 483
U10D	32 818	9 388	23 430	1 528	15	372	5 704
U10E	50 850	11 103	39 747	1 315	30	361	10 912
U10F	42 253	7 448	34 805	1 298	27	419	11 235
U10G	14 572	4 770	9 802	745	13	391	5 144
U10H	124 897	88 498	36 399	1 394	26	506	13 212
U10J	58 914	24 466	34 448	1 752	20	559	10 991
U10K	31 382	20 503	10 879	950	11	403	4 615
U10L	34 559	7 556	27 003	1 221	22	341	7 541
U10M	93 637	49 222	44 415	709	63	311	19 482
U20A	30 623	11 298	19 325	1 246	16	325	5 041
U20B	22 586	7 921	14 665	1 075	14	391	5 334
U20C	69 140	49 006	20 134	1 159	17	309	5 368
U20D	47 164	18 278	28 886	1 995	14	375	5 430
U20E	63 553	42 472	21 081	1 338	16	433	6 822
U20F	48 428	26 634	21 794	1 246	17	484	8 466
U20G	103 785	66 453	37 332	1 413	26	550	14 531

Quaternary catchment	Demographics of Wards inside quaternary catchments					Quaternary catchment area	Qualifying persons per catchment
	Total population	Persons with formal supply	Persons with informal supply	Total area (km ²)	Persons with informal supply per km ²		
U20H	143 468	112 487	30 981	436	71	244	17 338
U20J	631 820	547 941	83 879	1 122	75	754	56 368
U20K	79 730	46 213	33 517	836	40	302	12 108
U20L	257 743	186 860	70 883	789	90	366	32 881
U20M	1 357 231	1 211 399	145 832	622	234	402	94 251
U30A	202 836	123 024	79 812	859	93	420	39 023
U30B	552 491	473 771	78 720	464	170	248	42 074
U30C	85 156	46 367	38 789	648	60	270	16 162
U30D	138 441	117 495	20 946	372	56	203	11 430
U30E	115 808	90 716	25 092	553	45	327	14 838
U40A	30 653	11 141	19 512	1 350	14	353	5 102
U40B	54 176	22 525	31 651	1 613	20	433	8 496
U40C	42 594	19 092	23 502	1 316	18	294	5 250
U40D	56 479	11 175	45 304	1 008	45	298	13 393
U40E	77 418	11 153	66 265	940	70	356	25 096
U40F	38 615	12 995	25 620	941	27	324	8 821
U40G	79 393	10 578	68 815	1 305	53	283	14 923
U40H	95 937	22 343	73 594	778	95	404	38 216
U40J	171 229	133 459	37 770	769	49	313	15 373
U50A	63 016	38 214	24 802	569	44	339	14 776
U60A	62 212	44 682	17 530	716	24	116	2 840
U60B	41 833	23 317	18 516	1 077	17	351	6 034
U60C	235 377	184 853	50 524	947	53	406	21 661
U60D	991 684	880 276	111 408	518	215	206	44 305
U60E	582 025	480 097	101 928	999	102	312	31 833
U60F	958 548	880 269	78 279	627	125	295	36 830
U70A	17 314	8 496	8 818	611	14	127	1 833
U70B	59 731	30 060	29 671	1 314	23	302	6 819
U70C	61 221	13 769	47 452	1 286	37	389	14 354
U70D	183 781	131 092	52 689	850	62	232	14 381
U70E	122 509	106 058	16 451	222	74	97	7 188
U70F	216 447	186 581	29 866	176	170	67	11 370
U80A	54 888	44 450	10 438	314	33	176	5 851
U80B	60 413	14 085	46 328	1 144	40	375	15 186
U80C	80 991	36 590	44 401	744	60	224	13 368
U80D	81 843	50 574	31 269	334	94	134	12 545
U80E	69 867	15 252	54 615	1 298	42	460	19 355
U80F	35 388	15 240	20 148	297	68	153	10 379
U80G	53 930	21 480	32 450	660	49	271	13 324
U80H	70 381	54 189	16 192	540	30	290	8 696
U80J	66 161	24 996	41 165	1 298	32	412	13 066
U80K	77 518	49 721	27 797	647	43	205	8 808
U80L	84 703	55 737	28 966	424	68	120	8 198

Table 2.2 Projected qualifying population size for years 2011, 2016 and 2021

Quaternary catchment	Qualifying persons per catchment (Census, 2011)	Qualifying projected population size		
		2013	2018	2023
T40A	12 218	12 612	13 654	14 782
T40B	10 342	10 676	11 558	12 513
T40C	22 448	23 172	25 086	27 159
T40D	41 730	43 076	46 634	50 486
T40E	42 566	43 939	47 569	51 498
T40F	18 408	19 002	20 571	22 270
T40G	18 583	19 183	20 767	22 483
T51A	719	743	804	870
T51B	544	561	608	658
T51C	9 863	10 181	11 022	11 933
T51D	736	759	822	890
T51E	2 281	2 354	2 549	2 759
T51F	673	695	753	815
T51G	912	941	1 019	1 103
T51H	20 048	20 694	22 404	24 254
T51J	16 189	16 711	18 091	19 586
T52A	16 202	16 725	18 106	19 602
T52B	16 903	17 448	18 889	20 450
T52C	12 215	12 609	13 650	14 778
T52D	33 704	34 791	37 665	40 776
T52E	9 647	9 958	10 780	11 671
T52F	18 273	18 863	20 421	22 107
T52G	17 670	18 239	19 746	21 377
T52H	23 270	24 021	26 005	28 153
T52J	18 260	18 849	20 406	22 092
T52K	11 787	12 168	13 173	14 261
T52L	4 838	4 995	5 407	5 854
T52M	13 305	13 734	14 868	16 096
U10A	3 221	3 325	3 600	3 897
U10B	3 194	3 297	3 569	3 864
U10C	2 483	2 563	2 775	3 004
U10D	5 704	5 888	6 375	6 901
U10E	10 912	11 264	12 194	13 201
U10F	11 235	11 598	12 556	13 593
U10G	5 144	5 310	5 749	6 224
U10H	13 212	13 638	14 765	15 985
U10J	10 991	11 346	12 283	13 297
U10K	4 615	4 764	5 157	5 583
U10L	7 541	7 785	8 428	9 124
U10M	19 482	20 111	21 772	23 570
U20A	5 041	5 203	5 633	6 098
U20B	5 334	5 506	5 961	6 453
U20C	5 368	5 541	5 999	6 494
U20D	5 430	5 605	6 068	6 569
U20E	6 822	7 042	7 624	8 254
U20F	8 466	8 739	9 461	10 242
U20G	14 531	15 000	16 239	17 580

Quaternary catchment	Qualifying persons per catchment (Census, 2011)	Qualifying projected population size		
		2013	2018	2023
U20H	17 338	17 897	19 375	20 976
U20J	56 368	58 186	62 993	68 196
U20K	12 108	12 498	13 531	14 648
U20L	32 881	33 942	36 745	39 781
U20M	94 251	97 292	105 328	114 028
U30A	39 023	40 282	43 609	47 211
U30B	42 074	43 432	47 019	50 903
U30C	16 162	16 683	18 061	19 553
U30D	11 430	11 799	12 773	13 828
U30E	14 838	15 316	16 581	17 951
U40A	5 102	5 267	5 702	6 173
U40B	8 496	8 770	9 495	10 279
U40C	5 250	5 420	5 867	6 352
U40D	13 393	13 825	14 967	16 204
U40E	25 096	25 906	28 046	30 362
U40F	8 821	9 106	9 858	10 672
U40G	14 923	15 405	16 677	18 054
U40H	38 216	39 449	42 707	46 235
U40J	15 373	15 869	17 180	18 599
U50A	14 776	15 253	16 513	17 877
U60A	2 840	2 932	3 174	3 436
U60B	6 034	6 229	6 744	7 301
U60C	21 661	22 360	24 207	26 206
U60D	44 305	45 734	49 512	53 602
U60E	31 833	32 860	35 574	38 513
U60F	36 830	38 018	41 158	44 558
U70A	1 833	1 892	2 048	2 217
U70B	6 819	7 039	7 621	8 250
U70C	14 354	14 817	16 040	17 365
U70D	14 381	14 845	16 071	17 399
U70E	7 188	7 420	8 033	8 696
U70F	11 370	11 736	12 706	13 755
U80A	5 851	6 039	6 538	7 078
U80B	15 186	15 676	16 971	18 373
U80C	13 368	13 799	14 939	16 173
U80D	12 545	12 950	14 019	15 177
U80E	19 355	19 979	21 630	23 416
U80F	10 379	10 714	11 599	12 557
U80G	13 324	13 754	14 890	16 120
U80H	8 696	8 976	9 718	10 521
U80J	13 066	13 488	14 602	15 808
U80K	8 808	9 092	9 843	10 656
U80L	8 198	8 462	9 161	9 918

Table 2.3 Projected Basic Human Resources Needs including 25 and 50 litre criteria for selected years

Quaternary catchment	BHNR (25 litres) measured in m ³ per annum			BHNR (50 litres) measured in m ³ per annum		
	2013	2018	2023	2013	2018	2023
T40A	115 084	124 590	134 882	230 169	249 181	269 764
T40B	97 418	105 465	114 177	194 837	210 931	228 354
T40C	211 447	228 913	247 822	422 895	457 827	495 644
T40D	393 065	425 533	460 682	786 130	851 066	921 365
T40E	400 944	434 063	469 917	801 888	868 125	939 834
T40F	173 390	187 713	203 218	346 781	375 425	406 436
T40G	175 044	189 503	205 156	350 087	379 005	410 311
T51A	6 776	7 336	7 942	13 552	14 672	15 884
T51B	5 124	5 547	6 005	10 247	11 094	12 010
T51C	92 903	100 577	108 885	185 806	201 154	217 770
T51D	6 929	7 502	8 121	13 858	15 003	16 242
T51E	21 484	23 259	25 180	42 969	46 518	50 361
T51F	6 343	6 867	7 434	12 686	13 734	14 869
T51G	8 590	9 299	10 067	17 179	18 598	20 135
T51H	188 835	204 433	221 320	377 671	408 867	442 640
T51J	152 489	165 085	178 721	304 978	330 169	357 441
T52A	152 613	165 220	178 867	305 227	330 439	357 734
T52B	159 214	172 365	186 603	318 428	344 730	373 205
T52C	115 055	124 559	134 848	230 111	249 118	269 695
T52D	317 472	343 696	372 085	634 944	687 391	744 171
T52E	90 865	98 370	106 496	181 730	196 741	212 992
T52F	172 121	186 338	201 730	344 241	372 676	403 459
T52G	166 435	180 183	195 066	332 870	360 365	390 132
T52H	219 188	237 293	256 894	438 375	474 586	513 787
T52J	172 001	186 208	201 589	344 002	372 417	403 179
T52K	111 030	120 202	130 130	222 061	240 403	260 261
T52L	45 575	49 340	53 415	91 150	98 679	106 830
T52M	125 320	135 672	146 879	250 640	271 344	293 757
U10A	30 344	32 851	35 564	60 688	65 701	71 128
U10B	30 085	32 571	35 261	60 171	65 141	70 522
U10C	23 391	25 323	27 415	46 781	50 646	54 829
U10D	53 730	58 169	62 973	107 461	116 337	125 947
U10E	102 780	111 270	120 461	205 560	222 540	240 922
U10F	105 829	114 571	124 034	211 658	229 141	248 069
U10G	48 457	52 459	56 792	96 913	104 918	113 585
U10H	124 450	134 730	145 859	248 901	269 460	291 718
U10J	103 528	112 079	121 337	207 056	224 159	242 674
U10K	43 470	47 060	50 947	86 939	94 120	101 895
U10L	71 035	76 902	83 255	142 070	153 805	166 509
U10M	183 510	198 668	215 078	367 020	397 336	430 157
U20A	47 480	51 402	55 648	94 960	102 804	111 296
U20B	50 242	54 392	58 885	100 484	108 784	117 770
U20C	50 563	54 740	59 261	101 127	109 480	118 523
U20D	51 144	55 369	59 943	102 289	110 738	119 885
U20E	64 260	69 568	75 315	128 520	139 136	150 629
U20F	79 743	86 329	93 460	159 485	172 659	186 921
U20G	136 873	148 179	160 418	273 746	296 357	320 837
U20H	163 311	176 801	191 405	326 622	353 601	382 809

Quaternary catchment	BHNR (25 litres) measured in m ³ per annum			BHNR (50 litres) measured in m ³ per annum		
	2013	2018	2023	2013	2018	2023
U20J	530 949	574 807	622 286	1 061 899	1 149 613	1 244 573
U20K	114 047	123 468	133 666	228 095	246 935	267 333
U20L	309 718	335 301	362 998	619 437	670 603	725 996
U20M	887 786	961 118	1 040 507	1 775 571	1 922 236	2 081 015
U30A	367 572	397 934	430 804	735 144	795 868	861 608
U30B	396 313	429 049	464 489	792 626	858 098	928 978
U30C	152 236	164 810	178 424	304 471	329 621	356 848
U30D	107 663	116 556	126 184	215 326	233 112	252 367
U30E	139 760	151 304	163 802	279 520	302 608	327 604
U40A	48 058	52 027	56 325	96 115	104 055	112 650
U40B	80 030	86 641	93 798	160 061	173 282	187 596
U40C	49 455	53 540	57 962	98 910	107 080	115 925
U40D	126 157	136 577	147 859	252 313	273 155	295 718
U40E	236 389	255 915	277 054	472 778	511 831	554 108
U40F	83 091	89 954	97 384	166 181	179 908	194 769
U40G	140 566	152 177	164 747	281 132	304 354	329 494
U40H	359 969	389 703	421 893	719 938	779 406	843 786
U40J	144 807	156 768	169 717	289 613	313 535	339 434
U50A	139 184	150 681	163 128	278 369	301 362	326 255
U60A	26 752	28 961	31 354	53 503	57 923	62 707
U60B	56 841	61 536	66 619	113 682	123 072	133 238
U60C	204 031	220 885	239 130	408 063	441 769	478 260
U60D	417 324	451 796	489 115	834 648	903 592	978 229
U60E	299 849	324 617	351 431	599 698	649 234	702 862
U60F	346 914	375 569	406 592	693 827	751 138	813 183
U70A	17 264	18 690	20 234	34 529	37 381	40 468
U70B	64 233	69 539	75 283	128 466	139 078	150 566
U70C	135 201	146 369	158 459	270 402	292 738	316 918
U70D	135 460	146 649	158 762	270 919	293 297	317 524
U70E	67 707	73 300	79 355	135 415	146 600	158 710
U70F	107 094	115 940	125 516	214 187	231 879	251 033
U80A	55 110	59 662	64 590	110 220	119 324	129 180
U80B	143 045	154 860	167 652	286 090	309 721	335 304
U80C	125 917	136 318	147 578	251 835	272 636	295 157
U80D	118 167	127 928	138 495	236 334	255 855	276 989
U80E	182 311	197 370	213 673	364 622	394 740	427 346
U80F	97 767	105 843	114 586	195 534	211 686	229 171
U80G	125 504	135 871	147 094	251 009	271 742	294 189
U80H	81 909	88 675	96 000	163 819	177 351	192 000
U80J	123 075	133 242	144 247	246 151	266 483	288 495
U80K	82 961	89 814	97 232	165 922	179 627	194 465
U80L	77 219	83 598	90 503	154 439	167 196	181 006

3 CONCLUSIONS

In conclusion, the report has determined the BHNR for each quaternary catchment located in the Umzimkulu WMA (WMA 11) under a number of criteria and scenarios.

In total, the BHNR demand for the entire WMA 11 (for the year of the study - 2013) is estimated at 12,972,388 and 25,944,776 m³/per annum for the 25 and 50 litre limits respectively.

Figure 3.1 and 3.2 overleaf depicts the BHNR demand for each quaternary catchment for the 25 and 50 litres for year 2013 limits respectively. The colour coding is purely descriptive and highlights areas of high demand. Hotspots (coloured as red, orange and yellow) match areas of high population densities in the Durban to Pietermaritzburg corridor.

Assuming that the annual population growth within the WMA is commensurate with the national average (growth of 1.6% per annum), it can also be assumed that the BHNR demand would increase proportionally by the same rate. Projections in population size and BHNR demand growth is provided in Table 3.1 below for selected years.

Table 3.1 BHNR for 25 and 50 litre provision limits for selected years

BHNR category	Year (2013) (m ³ per annum)	Year (2018) (m ³ per annum)	Year (2023) (m ³ per annum)
25 litre	12,972,388	14,043,924	15,203,970
50 litre	28,087,848	28,087,848	30,407,941

The above projections assume that there is no additional investment in formal water infrastructure, which is unlikely to be the case. In reality, one should expect that investment in infrastructure will occur and outpace the natural population growth. If this does occur then dependency on natural sources will be reduced.

The above findings are best applied as guideline values in operational planning. Specifically they should be treated as the minimum river flow volumes, to be guaranteed in any future plans, for each individual catchment or the WMA as a whole. This will ensure that communities, whom are dependent on informal sources, are provided with sufficient supply to ensure their Schedule 1 rights.

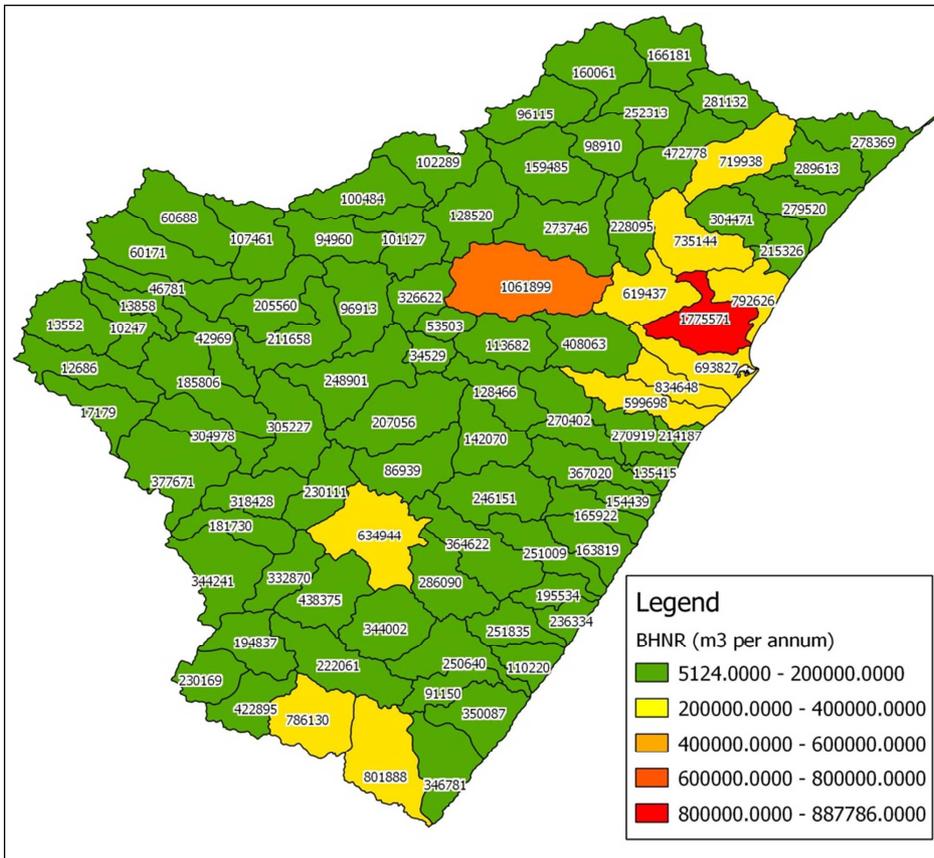


Figure 3.1 BNHR per quaternary catchment for 25 litre limit for year 2013 (m³ per annum)

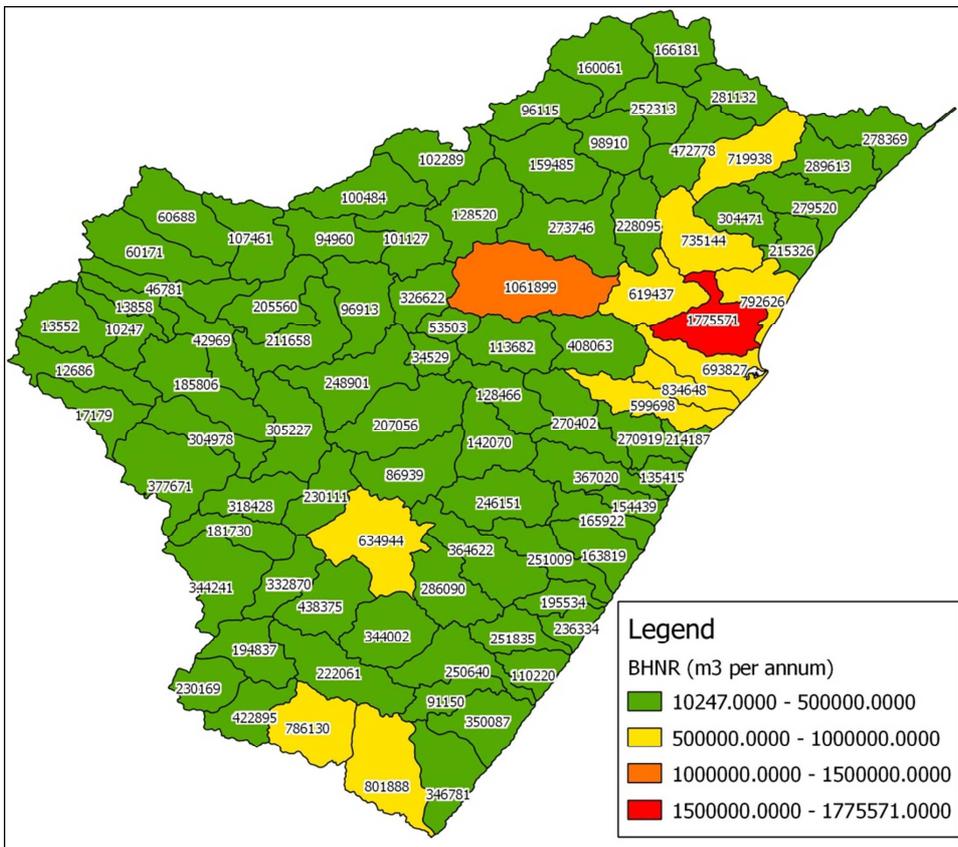


Figure 3.2 BNHR per quaternary catchment for 50 litre limit for year 2013 (m³ per annum)

4 APPENDIX A: REPORT COMMENTS

Page/Section	Comments	Report adjusted	Author comment
Cover Page	Title different from the one inside, Resource Quality Objectives?	Yes	
	Edit the subtitle – Basic Human Needs Reserve Report: Remove the space Spell check	Yes	
List of Tables – Page i	Blank page before Document Index?	Yes	
	Align the last listed item	Yes	
Overview of the catchment – page 1-1	Edit this title, add a space between ‘the’ and ‘catchment’	Yes	
	First paragraph, First sentence – edit by removing one % sign	Yes	
	First paragraph, 2nd sentence – edit by adding a space before uMgungundlovu	Yes	
	Second paragraph, Edit the second sentence so it reads as follows: ‘...particular functions as the...’	Yes	
	Second paragraph, Is this still valid according to the latest Recon Study?	No	Yes it is still valid
	Third paragraph, Latest Census nr (2012 not more valid??), this comment applies for the last paragraph as well.	Yes	Report amended to include 2011 Census as made available.
	Third paragraph, Second sentence, edit and add a full stop after (km ²)	Yes	
	Third paragraph, Type the following in the last sentence in BOLD: ‘...where water is largely sourced from formal systems’. It is important.	Yes	
	Fourth Paragraph, Type the following in Bold: ‘...while the remaining 33% are reliant on informal water sources’. ‘.....12% are specifically....’	Yes	
Fourth Paragraph, Can you give an indication on map where these hot spot areas are within the Quaternaries	Yes	Text amended based on Census 2011 data, and maps include accordingly.	
Basic Human Needs Reserve page 2-1	First Paragraph/Sentence, Is the word services not confusing here since this is in line with the concept of Basic Services as used ito Water Services supply.	Yes	Amendments made. Reference to 'service' removed.
	First Paragraph/Sentence, Replace the word ‘including’ with ‘i.e’	Yes	
	First Paragraph/Sentence, Edit to insert phrases as follows: ‘.....quantity and quality of water to remain in the water resource to enable the supply of water according to schedule 1 of the NWA to support households, i.e. informal households, ...’	Yes	
	First Paragraph/Sentence, Add the following at the end of the	Yes	

Page/Section	Comments	Report adjusted	Author comment
	sentence'....and other subsistence use.'		
	Second paragraph, Add the sign ',' at the end of the listed sentences	Yes	
	Second paragraph, 4. "...with access to formal and informal water supplies...." "...with access to piped water..." "...latter covers all households without access to piped water....." => Add a map to indicate this distribution. And highlight the 12% in another colour on map with symbols that are solely dependent on H2O resource for their day to day living	Yes	Text amended based on Census 2011 data, and maps include accordingly.
	Second paragraph, 5. HBRN????BHNR	Yes	
	Second paragraph, 6. Again indicate this growth with a GIS map indicating Hotspot areas	No	Census 2011 does not permit growth rates per ward.
	Second paragraph, Last paragraph – delete the bold typed Error message and put 2.4	Yes	Amendment made.
Table 2.1 – page 2-1	Add superscript 1, 2, 3 and 4 above Total Pop., Total HH, HH Density and Ave Ind per HH respectively.	Yes	Amendment made.
	First row under HH Density, what is unit, is it 3.83, don't understand?	Yes	Amendment made.
	This should be indicated in GIS map highlighting the hotspot areas ito people directly dependent what will also be VERY useful to indicate on map is existing industrial areas upstream of vulnerable communities, the 12%.	No	Minimum area under Census 2011 is the ward and no individual communities. Do not have industrial area information in GIS format for overlays.
	Values highlighted under the HH Density columno 736.64 – row 52 o 272.44 – row 54 o 563.90 – row 71 o 94.29 – row72 o 539.21 – row 73 o 185.07 – row 79	Yes	Highlights removed .
	In what quads are the communities Not Formally supplied by infrastructure?	Yes	The data with respect to which quads the population NOT provided a water supply is presented in Table 2.2, not table 2.1. Note that in all quats a variable percentage of the population (i.e. 20% of the population) do not have access to a formal supply. This population is not restricted to certain quats.
	Add a key below the table: o 1. Total Population in Quaternary (Total Pop.) o 2. Total estimated House Holds in Quaternary (Total HH) o 3. House Hold Density per km2 for particular quaternary o 4. Average Individuals per House Hold	Yes	Table headers amended to full text .

Page/Section	Comments	Report adjusted	Author comment
Table 2.2 page 2-3	Columns 2 and 3 – also indicate on a map	Yes	Note change in table due to application of Census 2011. See Figure 1 and Figure 2.
	These concepts were not explained in text and what you have used it for to get to the BHNR	Yes	Methodology section in main text amended.
Table 2.3 – page 2-6	Qualifying Projected Population Size, 2001, 2011,2016,2021=> explain how this info is going to be used in this study as part of operation scenario assuming NO Formal Supply Structure dev to get piped water to people	Yes	Amendment made.
Table 2.4 – page 2-8	BHNR (25 litres) measured in m3 per annum =>will be expressed as a % of the PMAR? (do we have this) And will be added to the total ecological Reserve requirements for the selected class configuration to calculate the total Reserve	No	This will be done once the Reserve is available. Only then can the pMAR % be included as this information is not available yet.
Conclusions	First paragraph, The BHNR demand estimates on the last sentence – will be useful if this can be expressed as a % of the PMAR or NMAR (both will be useful).	No	See above.
	Second paragraph, First sentence – edit by adding space between '25' and 'litres'	Yes	
	Second paragraph, Second sentence – edit so it reads as follows: '...determine the basic human need reserve component of the Reserve...'	Yes	
	Write a concluding paragraph indicating the importance of this info and that it could also be important information in the decision making process for future water supply schemes to provide Basic Services.	Yes	
	You have concentrated on the method but not explaining all the figures and the use of it. Also GIS maps to indicate the where about of the 12% is crucial + other high density areas, see other comments	Yes	
More Comments	The report does not use 2011 data which would assist in future BHN in each QC	Yes	Report amended to include 2011 Census as made available.
	Attached is the 2011 census data and it is approved. In it they clearly differentiate between water resources used in municipalities and therefore will cover the groundwater sources as well. Whereas the current BHNR only refers to water from rivers/streams.	Yes	Report amended to include 2011 Census as made available.