

Lourens de Villiers

Labesh

Dear Sir

Re: Wetland Presence/ Absence Verification – Del Judor Development, eMalahleni, Mpumalanga

Thank you for the opportunity to assist you with a wetland presence/ absence verification study for a portion of land within the Del Judor area in eMalahleni, Mpumalanga Province (Figure 1). The approximate extent of the area is 1.5647 ha.

Wetlands are defined on a national level within the National Water Act (Act No 36 of 1998):

- a. Wetland means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.
- b. Within the same act, wetlands are included in the definition of a watercourse means:
 - (a) a river or spring;
 - (b) a natural channel in which water flows regularly or intermittently;
 - (c) a wetland, lake or dam into which, or from which, water flows; and
 - (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

The same definitions are used in the National Environmental Management Act (Act No 107 of 1998),

Environmental Impact Assessment (EIA) Regulations (December 2014). Therefore the definition transgress

Member: W.H. de Frey (MSc Wildlife Management - UP, Pr.Sci.Nat.)



Figure 1: Regional orientation of the study area in the Del Judor area, eMalahleni, Mpumalanga Province

across two national acts which governs the conservation and management of wetlands. To verify the presence of wetlands within a proposed development footprint is of significance, because construction activities within 32 meters of wetland triggers listed activities in terms of the EIA regulations.

Ecologically wetlands represent a type of aquatic system, because water is the main driver of ecological processes within the system. Depending on the source, chemical composition, volume and duration of the water different wetlands will develop (Hasler 1975, Denny 1985, Cowan 1995, DWAF 2005, Ewart-Smit et al 2006). Therefore it should be apparent that the appearance and location of wetlands will vary according to climate and geology across a continent, as the two factors determines the topography within the landscape over time, which eventually determine the properties of the soil, vegetation and animals present.

In 2005, the Department of Water Affairs released a guideline document (DWAF 2005) for the delineation of wetlands, which has mainly relevance to the non-arid areas of South Africa, in other words where rainfall annually exceeds 400 mm.

The guideline document sets the following criteria to be considered for wetland delineation:

- 1. Topography
- 2. Soil
- 3. Vegetation

According to these criteria, wetlands are expected to occur in lowlying areas (footslopes and valleybottoms), with soils which show signs of temporary or permanent saturation (hydromorphic) with plants adapted to growing in saturated or over saturated conditions (hydrophytes). However, the landscape is three dimensional with landscape features repeating themselves at various scales. Therefore wetlands can topographically develop in any area within the landscape where the topography/ relief is lower than the adjacent land. These depressions can be open (exoheric – typically streams) or closed (endoheric – typically pans), and whether a wetland will develop, will depend on whether sufficient water (rainfall, fountain, water table, human infrastructure) occurs in the catchment which surround the depression. The water can enter the depression for a prolonged period, the soil and vegetation will reflect this influence, resulting in permanent, seasonal and temporary zones within and along the depression.

It was these indicators of wetlands that was investigated on the 30th of May 2018. The survey team consisted of Willem de Frey, a registered scientific professional in the fields of ecological – and botanical science, with more than 20 years' experience and a field assistant. A soil auger was used to classify the soil based on location determined from the SAGA wetness index derived from 5 m contours (Figure 2). Six plots were sampled across the study area, which included the soil properties (form, depth and texture) (Appendix A) and



Figure 2: Wetland potential within the study area based on the SAGA wetness index derived from 5 m contours

Member: W.H. de Frey (MSc Wildlife Management - UP, Pr.Sci.Nat.) 4

vegetation species (Appendix B) observed. Unfortunately the area had been mowed prior to the survey, making the identification of species difficult, therefore the vegetation list cannot be considered comprehensive (Appendix C).

Due to the wetness index indicating the potential for wetlands to be present from low to moderate for most of the study area (property), the areas was surveyed to verify the low probability. The soil forms and vegetation observed confirmed the absence of wetlands from the area. The soils observed were mainly Mispah (orthic A horizon on hard rock), with two of the plots surveyed representing Pinedene soils (Orthic A horizon on yellow-brown apedal B horizon with unspecified material with signs of wetness). Mispah soils are associated with pedologically, young landscape, commonly found along crests, as the crests represents the remnants of the pedeplanation (levelling) process, while the Pinedene soils are listed as representing temporary or seasonal wetland soils (Soil classification workgroup 1991, DWAF 2005). However, if the signs of wetness were absent from these two profiles, they would have been classified as shallow Clovelly soils. The absence of mottles in these two profiles highlights the absence of soil water movement in these profiles, but the water is rather moving on the contact between the soil and the underlying rock (shale). The absence of anaerobic soil conditions is confirmed by the red/ darker colour of the soils surveyed in the upper part (Appendix C), with the lighter (greyish) near the bottom - most soils which experienced prolonged water logging (saturation), have a greyish colour due to removal of the iron and manganese elements from the soil profile (DWAF 2005). The source of the water moving along the bottom (contact) of the profile is most probably from the water used to irrigate the vegetation, as the area had been used for pasture. The water only accumulates when the soil profile was over saturated after extensive periods of irrigation and rain, allowing for water to drain out of the profile on to the underlying rock. Due to the slope of the landscape, the water moves then laterally along the contact towards the south or southwest. The depth of these two soil profiles allow for the soil moisture to quickly drain out of the upper 50 cm, while accumulating in the lower areas, which explains the absence of mottles within 50 cm of the surface, while signs of wetness is present at the bottom.

The vegetation also reflects this absence of waterlogged soil conditions, with the species observed, associated with terrestrial and disturbed conditions. The study area is located within the Endangered Rand Highveld Grassland (Figure 3), which is a regional terrestrial ecosystem, the species observed during the site visit, are associated with this system (Appendix D). Appendix D also lists those species to be expected to occur within Eastern Temperate Freshwater Wetlands (Mucina & Rutherford 2006), with the exception of two grasses, none of these species were recorded within the study area, thereby confirming the absence of wetlands conditions within the study area. The majority of the species are either weeds or pioneer species (Appendix B), which confirms the modified status of the vegetation.



Figure 3: Regional vegetation unit associated with the study area

Mpumalanga Province Biodiversity Sector Plan (2014) (Figure 3) also confirms the modified status of the

vegetation within the study area.

Therefore this study confirmed that there are no wetlands present within the study area, and the vegetation present consists mainly of species associated with pastures in a modified landscape.

Please do not hesitate to contact me should you have any queries.

Regards

Utlde de

Willem de Frey (Pr.Sci.Nat. – Ecological & Botanical Science Sole member & principal consultant – EkoInfo CC)

Literature Review

COWAN, G.I. (ed) 1995. Wetlands of South Africa. Department of Environmental Affairs and Tourism, Pretoria.

DENNY, P. 1985. The ecology and management of African wetland vegetation. Dr. W. Junk Publishers, Dordrecht.

DWAF. 2005. A practical field procedure for identification and delineation of wetlands and riparian areas. Department of Water Affairs and Forestry

EWART-SMITH, J., OLLIS, D., DAY, J & MALAN, H 2006. NATIONAL WETLAND INVENTORY:

Development of a Wetland Classification System for South Africa. The Water Research Commission (WRC)

HASLER, A.D. 1975. Coupling of land and water systems. Berlin, Springer

MUCINA, L. & RUTHERFORD, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

READ, H.H. & WATSON, J. 1968. Introduction to Geology Volume 1. Principles. 2nd ed. Macmillan Press LTD, London.

SOIL CLASSIFICATION WORKGROUP 1991. Soil classification a taxonomic system for South Africa. Memiors oor die Natuurlike Landbouhulpbronne van Suid-Afrika Nr. 15.

STRAHLER A. N. & STRAHLER A. H. 1987. Modern Physical Geography. John Wiley & Sons. New York

APPENDIX A – SURVEY RESULTS

Plot no	1	2	3	4	5	6
Database/ Relevé number:	101	102	103	104	105	106
Date (vv/mm/dd):	2018-05-	2018-05-	2018-05-	2018-05-	2018-05-	2018-05-
	30 	30 wdf	30 wdf	30 wdf	30 df	30 wdf
Surveyor:	war	war	war	war	war	war
Photo no:	063- 066, 067	068- 071, 072	073- 076, 077	078-081, 082	083- 086, 087	088- 091, 092
Photo direction (Bearing):	n, e, s, w, soil	n, e, s, w, soil	n, e, s, w, soil	n, e, s, w, soil	n, e, s, w, soil	n, e, s, w, soil
Notes	awits01 - hypa ir acac mea, mowed	awits02 - erag pla - popu spp	awits03 - erag pla pasture	awits04 - erag pla pasture	awits05 - erag pla pasture	awits06 - erag pla pasture
Altitude (m):	1645	1645	1644	1642	1640	1639
Aspect (Bearing):	w	w	е	w	w	n
Slope (%):	2	1	1	1	1	1
Terrain unit	Crest	Crest	Crest	Crest	Crest	Crest
Local topography:						
Stratigraphy:						
Petrology:						
Lithology:					shale	
Soil form	Mispah	Pinedene	Pinedene	Mispah	Mispah	Mispah
Termitaria present	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Cover: Gravel -	0	0	0	0	0	0
Cover: Small stones -	0	0	0	0	0	0
Cover: Medium stones -	0	0	0	0	0	0
Cover: Large stones -	0	0	0	0	0	0
Rock:	0	0	0	0	0	0
Soil depth (mm):	100	1000	1100	250	200	280
Erosion categories						
Surface crusting:	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Estimate % Clay (A-horizon):	12	12	12	9	9	9
Cover total (%):	95	95	95	95	95	95
Cover tree layer (%):	0	0	0	0	0	0
Cover shrub layer (%):	0	0	0	0	0	0
Cover herb layer (%):	95	95	95	95	95	95
Cover grass layer (%):	85	85	85	85	85	85
Cover forbs layer (%):	20	10	10	10	10	10
Cover open water (%):	0	0	0	0	0	0
Cover bare rock (%):	0	0	0	0	0	0
Height (highest) trees (m):	0	0	0	0	0	0
Height lowest trees (m):	0	0	0	0	0	0
Height (highest) shrubs (m):	0	0	0	0	0	0

Member: W.H. de Frey (MSc Wildlife Management – UP, Pr.Sci.Nat.)

Plot no	1	2	3	4	5	6
Database/ Relevé number:	101	102	103	104	105	106
Height lowest shrubs (m):	0	0	0	0	0	0
Aver height (high) herbs (cm):	2.5	5	2.5	2.5	2.5	2.5
Aver height lowest herbs (cm):	2.5	5	2.5	2.5	2.5	2.5
Maximum height herbs (cm):	5	10	5	5	5	5

Member: W.H. de Frey (MSc Wildlife Management – UP, Pr.Sci.Nat.)

APPENDIX B - SURVEY DATA: VEGETATION LIST

Note: weed or pioneer species in *italics*

Plot no	1	2	3	4	5	6
Species/ Database no	101	102	103	104	105	106
Acacia karroo		1				
Acacia mearnsii	1					
Bidens pilosa		+				
Commiphora africana var. africana	+					
Conyza bonariensis		+				
Conyza podocephala	+		+		+	
Crepis hypochaeridea					+	+
Cynodon dactylon	+				+	
Eragrostis curvula		+				
Eragrostis plana	+	2a	2a	2b	3	2a
Gomphrena celosioides					+	
Helichrysum rugulosum	+				+	
Hyparrhenia hirta	3			+	+	
Leonotis ocymifolia		+				
Nidorella hottentotica				+		
Paspalum dilatatum	+		+	+	+	+
Pennisetum clandestinum	+			+		
Populus species (102_1487)		+				
Rhus pyroides var. pyroides				1		
Richardia brasiliensis					+	
Solanum giganteum		2a				
Walafrida densiflora	+					
Zornia milneana						+

Member: W.H. de Frey (MSc Wildlife Management - UP, Pr.Sci.Nat.)

APPENDIX C – GEOREFERENCED DIGITAL PHOTOGRAPHS TAKEN PER SURVEY PLOT



APPENDIX D – LISTED OF EXPECTED VEGETATION ASSOCIATED WITH REGIONAL VEGETATION UNITS ASSOCIATED WITH TERRESTRIAL AND AQUATIC ECOYSTEMS

Note: Species in **Bold** were observed during the survey on the 30th of May 2018

Ecosystem	Terrestrial	Aquatic (Riparian fringe/ Wetlands)	
Botanical Name	Rand Highveld	Eastern Temperate Freshwater Wetlands	Grand Total
Acalypha angustata	1	weitands	1
Acanthospermum australe	1		1
Agananthus inapertus subsp. pendulus	1		1
Aloe greatheadii yar dawana	1		1
Anacampseros subnuda subsn Jubbersii	1		1
Andronogon schirensis	1		1
Anthospermum rigidum subsp. pumilum	1		1
Aristida aequiglumis	1	1	2
Aristida congesta subsp. congesta	1	1	1
Aristida junciformis subsp. congesta	1		1
Bewsia hiflora	1		1
Boonhone disticha	1		1
Brachiaria nigropedata	1		1
Brachiaria serrata	1		1
Bulbostylis hurchellii	1		1
Chamaecrista mimosoides	1		1
Cheilanthes hirta	1		1
Crassula arborescens subsp. undulatifolia	1		1
Ctenium concinnum	1		1
Cymbopogon excavatus	1		1
Cynodon dactylon	1		1
Delosperma purpureum	1		1
Dicoma anomala subsp. anomala	1		1
Dicoma zeyheri subsp. zeyheri	1		1
Digitaria monodactyla	1		1
Digitaria tricholaenoides	1		1
Diheteropogon amplectens var. amplectens	1		1
Elephantorrhiza elephantina	1		1
Elionurus muticus	1		1
Encephalartos lanatus	1		1
Encephalartos middelburgensis	1		1
Eragrostis capensis	1		1
Eragrostis chloromelas	1		1
Eragrostis curvula	1		1
Eragrostis gummiflua	1		1
Eragrostis plana	1	1	2
Eragrostis racemosa	1		1
Eucomis vandermerwei	1		1

Member: W.H. de Frey (MSc Wildlife Management – UP, Pr.Sci.Nat.)

Botanial NameFarand Higheed GrashadExtern Temperate Preshwater WellandsGrand TotalFrithia humilis111Heinshus hubilis subs. humilis111Heinshus mutafibium111Helichrysum rugulosum111Helichrysum rugulosum111Heiter sing miffora111Hypots rigidula var. prilosissima111Hypots rigidula var. prilosissima111Indigofiera comosa1111Indigofiera comosa<	Ecosystem	Terrestrial	Aquatic (Riparian fringe/ Wetlands)	
rritia humilis11Haemartus humilis subs. humilis11Helichrysum caespititum11Helichrysum caudifolum var. nudifolum11Helichrysum rugulosum11Heterogo notortus11Heurnia insignifora11Hyporis rigidula var. pilosissima11Hyporis rigidula var. pilosissima11Indigofera comosa11Justicia anagalioides11Justicia anagalioides11Lactuca inermis11Lactuca inermis11Lactuca inermis11Lodebouria ovatifolia11Lodebouria ovatifolia11Lodebou	Botanical Name	Rand Highveld Grassland	Eastern Temperate Freshwater Wetlands	Grand Total
Heinspann caspititium11Helichysum caspititium11Heithysum caspititium11Heithysum caspititium11Heteropogen contortus11Heteropogen contortus11Hyparn hain insigniffora11Hyparn kain insigniffora11Hyparn kain insigniffora11Hyparn kain insigniffora11Hyparn kain insigniffora11Indigofera comosa11Indigofera comosa11Justicia angalloides11Lactuca inemis11Lactuca inemis11Lodoutia avatrolia11Lodoutia avatrolia11Lodoutia ovatrolia11Lodoutia avatrolia11Lodoutia avatrolia11Lodoutia avatrolia11Lodoutia avatrolia11Lodoutia avatrolia11Lodoutia avatrolia11Melna randii11Melna randii11Melna randii11Melna randii11Morophium ceresiform11Morophium ceresiform11Morophium ceresiform11Molecha alterbacea var. herbacea11Okalis connucula11Salis connucula11 <trr>Salis connucula11<!--</td--><td>Frithia humilis</td><td>1</td><td></td><td>1</td></trr>	Frithia humilis	1		1
Helichrysum caspititium111Helichrysum rugulosum111Hetropogen contrutus111Huemia insignifiora111Hyparhenia hirta111Hyparhenia hirta111Hyparhenia hirta111Indigofera comosa111Justicia anagalioides111Iudita anatymbica111Lactuca inermis111Ladebouria ovatifolia111Ladebouria ovatifolia111Ludebouria ovatifolia111Melanas conifolia111Ludebouria ovatifolia111Melanas conifolia111Melanas conifolia111Melanas conifolia111Melania randi111Melania randi111Melania randi111Melania randi111Monorymbum cresiforme111Mororubum cresiforme111Molorubum cresiforme111Norourubum cresiforme111Panicum natalense111Panicum natalense111Setara ingrinostris111Setara ingrinostris111<	Haemanthus humilis subsp. humilis	1		1
Helichrysum nuglifölium var. nudifölium11Helichrysum rugulosum11Heterogoon contortus11Huernai nisginföra11Hyparhena hirta11Hyparhena hirta11Hyparhena hirta11Indigofera comosa11Indigofera comosa11Ipomea crassipes11Lutcia anagalloides11Kohautia amatymbica11Lattucia anagalloides11Loubolaen corrifolia11Loubolaen corrifolia11Loubolaen corrifolia11Melins rengiumis11Melins rengiumis11Melins rengiumis11Monocymburu cressiforme11Oldenlandia herbacea var. herbacea11Oldenlandia herbacea var. herbacea11Oldenlandia herbacea var. herbacea11Shizachryirum sanglinoman11Shizachryirum sanglinoman subsp.11Magalismontana11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11Shizachryirum sanglinoman11	Helichrysum caespititium	1		1
Helichrysum rugulosum11Heteropogon contortus11Huernia insigniffora11Hyparrhenia hirta11Hypoxis rigifcula var. pilosissima11Indigofera comosa11Indigofera comosa11Indigofera comosa11Iusticia anagaltoides11Lactuca inermis11Lactuca inermis11Ledebouria ovatifolia11Loudetia simplex11Loudetia simplex11Melanospermum rudolfii11Melanospermum rudolfii11Monormbuim coresilforme <t< td=""><td>Helichrysum nudifolium var. nudifolium</td><td>1</td><td></td><td>1</td></t<>	Helichrysum nudifolium var. nudifolium	1		1
Heteropogon contortus11Huernia insigniflora11Hyparchenia hirta11Hypoxis rigidula var. pliosissima11Indigofera comosa11Indigofera comosa11Ipomoea crassipes11Justica anagalicides11Kohautia amatymbica11Lactuca inermis11Lactuca inermis11Lodebouria ovatifolia11Lodeboara corificia11Melanosermum rudoffi11Melanosermum rudoffi11Melanosermum rudoffi11Melanis repens subs. repens11Microchioa caffra11Microchioa caffra11Nidorelah horbacea var. herbacea11Oldenlandia herbacea var. herbacea11Oldenlandia herbacea var. herbacea11Politicha campestris11Rus magalismontana subs.11magalismontana subs.11Schizorny instrukt11Schizorny instrukt11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris11Staria nigrirestris1 <td>Helichrysum rugulosum</td> <td>1</td> <td></td> <td>1</td>	Helichrysum rugulosum	1		1
Huernia insignifiora11Hypoxis rigidula var. pilosissima11Hypoxis rigidula var. pilosissima11Indigofera comosa11Indigofera comosa11Ilpomoe crassipes11Ilpomoe crassipes11Ilusticia anagalioides11Kohauta amatymbica11Lactuca inermis11Ledebouria ovatifolia11Ledebouria ovatifolia11Loudetia simplex11Loudetia simplex11Melanospermum rudofii11Melanospermum rudofii11Melinis randii11Melinis randii11Monocymbium ceresiforme11Microchloa caffra11Nidorella hottenotica11Nidorella hottenotica11Polichia campestris11Ruita gapalismontana subp.11Mitoragel signoratan11Senecio conatus11Senecio conatus11<	Heteropogon contortus	1		1
Hyparthenia hirta11Hypoxis rigidula var. pilosissima111Indigofera comosa111Indigofera comosa111Ipomoea crassipes111Justicia anagalloides111Lusticia anagalloides111Lactuca inermis111Ledebouria ovatifolia1111Lodebouria ovatifolia1111Lodebaena corifolia1111Loudetia simplex1111Melanos permum rudoffii1111Melanos permum rudoffii1111Monocymbium cressiforme1111Monocymbium cressiforme1111Molorella nottentotica1111Oldenlandia herbacea var. herbacea1111Panicum matelense1111Polichia campestris1111Ruto matelense1111Solica coronatus1111Selago denisfiora1111Selago denisfiora<	Huernia insigniflora	1		1
Hypoxis rigidula var. pilosissima1Indigofera comosa1Indigofera comosa1Ipomeea crassipes1Ipomeea crassipes1Justicia anagalloides1Kohautia amatymbica1Lattuca inermis1Lattuca inermis1Lattuca inermis1Lodebouria ovatifolia1Loudetia simplex1Loudetia simplex1Melanospermum rudolfii1Melania randii1Melinis nerviglumis1Microchoa caffra1Monocymbium ceresiforme1Midorella nottenotta1Oldenlandia herbacea var. herbacea1Nonocymbium ceresiforme1Polichia campetris1Rotheca hirsuta1Rotheca hirsuta1Schizachyrium sanguineum1Schizachyrium sanguineum1Schizachyrium sanguineum1Schizachyrium sanguineum1Schizachyrium sanguineum1Striara hirgirostris1Striara hirgiros	Hyparrhenia hirta	1		1
Indigofera comosa11Ipomea crassipes11Ipomea crassipes11Statica anagalioides11Kohautia amatymbica11Lactuca inermis11Lactuca inermis11Ledebouria ovatifolia111Loudetia simplex111Loudetia simplex111Melanospermum rudolfii111Melanospermum rudolfii111Melinis renvigiumis111Melinis repens subsp. repens111Microchia caffra1111Nidorella hottentotica1111Olderla natifix1111Nidorella hottentotica1111Polichia campestris1111Statispermum1111Statispermis1111Statispermis1111Statispermis1111Nidorella hottentotica1111Polichia campestris1111Statispermis1111Statispermis1111Statispermis1111Statisphacelata var. sphacelata11Statisphacelata var. sphacelat	Hypoxis rigidula var. pilosissima	1		1
Ipomoea crassipes11Justicia anagalloides11Kohautia anatymbica11Latuca inermis11Latuca inermis11Ledebouria ovatifolia11Ledebouria ovatifolia11Loudetia simplex11Loudetia simplex11Melanospermum rudolfii11Melanospermum rudolfii11Melinis rarvigiumis11Melinis repres subsp. repens11Microchoa caffra11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Nidorella hottentotica11Polichia campestris11Schrizz Mirum sanguinoutana11Schrizz Mirum sanguinoutana11Schrizz Mirum sanguinoutana11Schrizz Mirum sanguinoutana11Schrizz Mirum sanguinoutana11Schrizz Mirum sanguinoutana11Sencio coronatus11Sencio coronatus11Sencia nigrirostris11Sonchu Gregeanus11Sonchu Gregeanus11Sonchu Gregeanus11Staria sphacelata var. sphacelata11Tarchypogon spicatus11Tarchypogon spicatus11Tarchypogon spicatus11Tarchypogon spicatus<	Indigofera comosa	1		1
Justicia anagalloides11Kohautia amatymbica11Lactuca inermis11Lactuca inermis11Ledebouria ovatifolia111Lopholaena coriifolia111Loudetia simplex111Loudetia simplex111Melanospermum rudolfii1111Melanospermum rudolfii1111Melinis nerviglumis1111Melinis repens subsp. repens1111Microchoa caffra1111Microchoa caffra1111Moronymbium ceresiforme1111Odela hottentotica1111Odalis corriculata1111Polichia campestris1111Polichia campestris1111Schizachyrium sanguineum1111Schizachyrium sanguineum1111Setaria nigrirostris1111Setaria nigrirostris1111Sthrazen war, sphacelata1111Storbus pectinatus1111Storbus pectinatus1111Storbus pectinatus1111Themeda triandra1111Trachyogon spicatus1111Trachyogon spicatus1111Trachyogon spicatus1111Trachyogon spicatus1111Trachyogon spicatus1111Trachyogon spicatus1111Trachyogon spicatus <td>Ipomoea crassipes</td> <td>1</td> <td></td> <td>1</td>	Ipomoea crassipes	1		1
Kohautia amatymbica11Lactuca inermis11Lactuca inermis11Ledebouria ovatifolia11Lopholaena coriifolia11Loudetia simplex11Melanospermum rudolfii11Melinis nerviglumis11Melinis nerviglumis11Melinis repens subsp. repens11Microchio caffra11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Nidorella hottentotica11Olicha campestris11Polichia campestris11Ruts magalismontana subsp.11magalismontana11Senecio coronatus11Senecio coronatus11Senecio coronatus11Senecio coronatus11Senecio coronatus11Senecio coronatus11Senecia var. sphacelata11Storak dregeanus11Storak dregeanus11Storak dregeanus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus </td <td>Justicia anagalloides</td> <td>1</td> <td></td> <td>1</td>	Justicia anagalloides	1		1
Lactuca inermis11Ledebouria ovatifolia11Lopholaena coriifolia11Loudetia simplex11Loudetia simplex11Melanospermum rudolfii11Melania randii11Melinis nerviglumis11Melinis repens subsp. repens11Microchloa caffra11Monocymbium ceresiiforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Polichia campestris11Rubm agalismontana subsp. magalismontana11Schizachyrium sanguineum11Senecio coronatus11Senecio coronatus11Senecio coronatus11Staria ngrirostris11Sporbolus pectinatus11Sporbolus pectinatus11Textra sphacelata var. sphacelata11Trachypogon spicatus11Trachypogon spicatus </td <td>Kohautia amatymbica</td> <td>1</td> <td></td> <td>1</td>	Kohautia amatymbica	1		1
Ledebouria ovatifolia11Lopholaena coriifolia11Loudetia simplex11Iloudetia simplex11Melanospermum rudolfii11Melinis nerviglumis11Melinis repens subsp. repens11Microchoa caffra11Microchoa caffra11Microchoa caffra11Midorella hottentotica11Oldenlandia herbacea var. herbacea11Politchia campestris11Politchia campestris11Rhus magalismontana subsp. magalismontana11Schizachyrium sanguineum11Selago densifora11Sencio coronatus11Sencio coronatus11Sencio coronatus11Sporobolus pectinatus11Sporobolus pectinatus11Trachypogon spicatus11Trachypogon spicatus1	Lactuca inermis	1		1
Lopholaena coriifolia11Loudetia simplex11Melanospermum rudolfii11Melhania randii11Melinis nerviglumis11Melinis repens subsp. repens11Melinis repens subsp. repens11Microchioa caffra11Monocymbium ceresiforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Palicum natalense11Pollichia campestris11Rothe a hirsuta11Schizachyrium sanguineum11Schizachyrium sanguineum11Setaria nigrirostris11Storika spacelata var. sphacelata11Storika sphacelata var. sphacelata11Storebu vulgaris11Storebu vulgaris11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Torich source sp	Ledebouria ovatifolia	1		1
Loudetia simplex11Melanospermum rudolfii11Melhania randii11Melinis nerviglumis11Melinis repens subsp. repens11Microchloa caffra11Monocymbium ceresiiforme11Midorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Polichia campestris11Ruburga discontrana11Rotheca hirsuta11Schizachyrium sanguineum11Selago densifiora11Selago densifiora11Setaria sighacelata var. sphacelata11Staria sphacelata var. sphacelata11Staria sphacelata var. sphacelata11Tenreda triandra11Staria sphacelata var. sphacelata11Staria sphacelata var. sphacelata11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11Tenreda triandra11Trachypogon spicatus11Tenreda triandra11Trachypogon spicatus11Tenreda triandra11Tenreda triandra11Tenreda triandra11Tenreda t	Lopholaena coriifolia	1		1
Melanospermum rudolfii1Melhania randii1Melhania randii1Melinis nerviglumis1Melinis repens subsp. repens1Microchloa caffra1Microchloa caffra1Monocymbium ceresiiforme1Midorella hottentotica1Oldenlandia herbacea var. herbacea1Oldenlandia herbacea var. herbacea1Oxalis corniculata1Panicum natalense1Pollichia campestris1Rotheca hirsuta1Schizachyrium sanguineum1Selago densiflora1Setaria sphacelata var. sphacelata1Sonchus dregeanus1Sonchus dregeanus1Staria sphacelata var. sphacelata1Storbus dregeanus1Storbus dregeanus1<	Loudetia simplex	1		1
Melhania randii11Melinis nerviglumis11Melinis repens subsp. repens11Microchloa caffra11Microchloa caffra11Monocymbium ceresilforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Panicum natalense11Polichia campestris11Rubus magalismontana subsp.11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Selago densiflora11Setaria nigrirostris11Stoebe vulgaris11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11	Melanospermum rudolfii	1		1
Melinis nervigiumis11Melinis repens subsp. repens11Microchloa caffra11Microchloa caffra11Monocymbium ceresilforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Panicum natalense11Polichia campestris11Rotheca hirsuta11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Setaria nigrirostris11Sonchus dregeanus11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trachypogon spicatus11Trachypogon spicatus11	Melhania randii	1		1
Melinis repens subsp. repens11Microchloa caffra11Monocymbium ceresiiforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Panicum natalense11Pollichia campestris11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Setaria nigrirostris11Sonchus dregeanus11Sonchus dregeanus11Stoebe vulgaris11Themeda triandra11Themeda triandra11Trachypogon spicatus11Trachypogon spicatus11Tra	Melinis nerviglumis	1		1
Microchloa caffra11Monocymbium ceresiiforme11Nidorella hottentotica11Oldenlandia herbacea var. herbacea11Oxalis corniculata11Panicum natalense11Pollichia campestris11Rubur magalismontana subsp.11magalismontana11Schizachyrium sanguineum111Selago densiflora111Setaria nigrirostris111Staria sphacelata var. sphacelata11Stoebe vulgaris11Stoebe vulgaris11Themeda triandra11Themeda triandra11Stoebe vulgaris11Trachypogon spicatus11Trachypogon spicatus11<	Melinis repens subsp. repens	1		1
Monocymbium ceresiiforme1Nidorella hottentotica1Oldenlandia herbacea var. herbacea1Oxalis corniculata1Panicum natalense1Pollichia campestris1Pollichia campestris1Rhus magalismontana subsp. magalismontana1Rotheca hirsuta1Schizachyrium sanguineum1Selago densiflora1Senecio coronatus1Setaria nigrirostris1Sonchus dregeanus1Stoebe vulgaris1Stoebe vulgaris1Themeda triandra1Themeda triandra1Trachypogon spicatus1Trachypogon spicatus1Trachypogon spicatus1Trichesen serverificania1Trichesen serverificania1	Microchloa caffra	1		1
Nidorella hottentotica1Oldenlandia herbacea var. herbacea1Oxalis corniculata1Panicum natalense1Pollichia campestris1Rhus magalismontana subsp. magalismontana1Rotheca hirsuta11Schizachyrium sanguineum1Selago densiflora1Senecio coronatus1Setaria nigrirostris1Sonchus dregeanus1Stoebe vulgaris1Stoebe vulgaris1Themeda triandra1Trachypogon spicatus1Trachypogon spicatus1Trichever negrificantia1Trichever negrificantia	Monocymbium ceresiiforme	1		1
Oldenlandia herbacea var. herbacea11Oxalis corniculata11Panicum natalense11Pollichia campestris11Rhus magalismontana subsp. magalismontana11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Stoebe vulgaris11Stoebe vulgaris11Trachypogon spicatus11Trachypogon spicatus11Trichensuma mandiciumita11Trichensuma mandiciumita11Trichensuma mandiciumita11Trichensuma mandiciumita11Trichensuma mandiciumita11	Nidorella hottentotica	1		1
Oxalis corniculata11Panicum natalense11Polichia campestris11Rhus magalismontana subsp. magalismontana11Rotheca hirsuta11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trichensum sena dislumita11Trichensum sena dislumita1Trichensum sena dislumita1Trichensum sena dislumita1Trichensum sena dislumita1 <t< td=""><td>Oldenlandia herbacea var. herbacea</td><td>1</td><td></td><td>1</td></t<>	Oldenlandia herbacea var. herbacea	1		1
Panicum natalense11Pollichia campestris11Rhus magalismontana subsp. magalismontana11Rotheca hirsuta11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Tribbanarum senediciumin11	Oxalis corniculata	1		1
Politchia campestris11Rhus magalismontana subsp. magalismontana11Rotheca hirsuta11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Triabanavun ana diciumic11	Panicum natalense	1		1
Rhus magalismontana subsp. magalismontana11Rotheca hirsuta11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Triabaneura cara dialumin11	Pollichia campestris	1		1
Inagaistiontatia11Rotheca hirsuta11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trichperson11	Rhus magalismontana subsp.	1		1
Notified inistia11Schizachyrium sanguineum11Selago densiflora11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Tricheasura grandiciumic11	Pothoca bircuta	1		1
Schizzchynum sanguneum11Selago densiflora1Senecio coronatus1Senecio coronatus1Setaria nigrirostris1Setaria sphacelata var. sphacelata1Sonchus dregeanus1Sporobolus pectinatus1Stoebe vulgaris1Themeda triandra1Trachypogon spicatus1Lickbonsume presediglumaia1	Schizachyrium sanguineum	1		1
Senago densitional11Senecio coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trichoneuro predicturation11	Selago denciflora	1		1
Schecko coronatus11Setaria nigrirostris11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trichoneuro predicturation11	Senecio coronatus	1		1
Sectaria sphacelata var. sphacelata11Setaria sphacelata var. sphacelata11Sonchus dregeanus11Sporobolus pectinatus11Stoebe vulgaris11Themeda triandra11Trachypogon spicatus11Trichoneuro predicturation11	Setaria nigrirostris	1		1
Section sphacedular van sphacedular12Sonchus dregeanus11Sporobolus pectinatus1Stoebe vulgaris1Themeda triandra1Trachypogon spicatus1Triachypogon spicatus1	Setaria sphacelata var. sphacelata	1	1	2
Sporobolus pectinatus 1 1 Stoebe vulgaris 1 1 Themeda triandra 1 1 Trachypogon spicatus 1 1	Sonchus dregeanus	1		1
Stoebe vulgaris 1 1 Themeda triandra 1 1 Trachypogon spicatus 1 1	Sporobolus pectinatus	1		1
Themeda triandra 1 1 Trachypogon spicatus 1 1 Trichonourus ana dialumia 1 1	Stoebe vulgaris	1		1
Trachypogon spicatus 1 1 Trachypogon spicatus 1 1	Themeda triandra	1		1
	Trachypogon spicatus	1		1
LICTODEURA PRADOPULITIS	Trichoneura grandiglumis	1		1

Member: W.H. de Frey (MSc Wildlife Management - UP, Pr.Sci.Nat.)

Ecosystem	Terrestrial	Aquatic (Riparian fringe/ Wetlands)	
Botanical Name	Rand Highveld Grassland	Eastern Temperate Freshwater Wetlands	Grand Total
Tristachya biseriata	1		1
Tristachya rehmannii	1		1
Urelytrum agropyroides	1		1
Vernonia oligocephala	1		1
Xerophyta retinervis	1		1
Agrostis lachnantha var. lachnantha		1	1
Andropogon appendiculatus		1	1
Andropogon eucomus		1	1
Aponogeton junceus		1	1
Ascolepis capensis		1	1
Berkheya radula		1	1
Berkheya speciosa subsp. speciosa		1	1
Berula erecta subsp. erecta		1	1
Carex acutiformis		1	1
Carex austro-africana		1	1
Carex schlechteri		1	1
Centella asiatica		1	1
Centella coriacea		1	1
Ceratophyllum demersum var. demersum		1	1
Chironia palustris subsp. palustris		1	1
Cordylogyne globosa		1	1
Crassula tuberella		1	1
Crinum bulbispermum		1	1
Cyperus congestus		1	1
Cyperus cyperoides subsp. cyperoides		1	1
Cyperus distans		1	1
Cyperus immensus		1	1
Cyperus longus var. longus		1	1
Cyperus marginatus		1	1
Disa zuluensis		1	1
Echinochloa holubii		1	1
Equisetum ramosissimum subsp. ramosissimum		1	1
Eragrostis micrantha		1	1
Eragrostis planiculmis		1	1
Falkia oblonga		1	1
Ficinia acuminata		1	1
Fimbristylis complanata		1	1
Fimbristylis ferruginea		1	1
Fuirena pubescens var. pubescens		1	1
Gladiolus papilio		1	1
Haplocarpha lyrata		1	1

Member: W.H. de Frey (MSc Wildlife Management – UP, Pr.Sci.Nat.)

Ecosystem	Terrestrial	Aquatic (Riparian fringe/ Wetlands)	
Botanical Name	Rand Highveld Grassland	Eastern Temperate Freshwater Wetlands	Grand Total
Helichrysum difficile		1	1
Helichrysum dregeanum		1	1
Helichrysum mundtii		1	1
Helictotrichon turgidulum		1	1
Hemarthria altissima		1	1
Hydrocotyle sibthorpioides		1	1
Hydrocotyle verticillata		1	1
Hyparrhenia dregeana		1	1
Hyparrhenia quarrei		1	1
Imperata cylindrica		1	1
Ischaemum fasciculatum		1	1
Kniphofia ensifolia subsp. ensifolia		1	1
Kniphofia flammula		1	1
Kniphofia fluviatilis		1	1
Kniphofia linearifolia		1	1
Kyllinga erecta var. erecta		1	1
Lagarosiphon major		1	1
Lagarosiphon muscoides		1	1
Leersia hexandra		1	1
Lindernia conferta		1	1
Lobelia angolensis		1	1
Lobelia flaccida subsp. flaccida		1	1
Marsilea capensis		1	1
Marsilea farinosa subsp. farinosa		1	1
Mentha aquatica		1	1
Monopsis decipiens		1	1
Myriophyllum spicatum		1	1
Neobolusia tysonii		1	1
Nerine gibsonii		1	1
Nerine platypetala		1	1
Nymphaea lotus		1	1
Nymphaea nouchali var. caerulea		1	1
Nymphoides thunbergiana		1	1
Panicum schinzii		1	1
Paspalum dilatatum		1	1
Paspalum urvillei		1	1
Pennisetum sphacelatum		1	1
Pennisetum thunbergii		1	1
Phragmites australis		1	1
Potamogeton thunbergii		1	1
Pulicaria scabra		1	1
Pycnostachys reticulata		1	1

Member: W.H. de Frey (MSc Wildlife Management – UP, Pr.Sci.Nat.)

Ecosystem	Terrestrial	Aquatic (Riparian fringe/ Wetlands)	
Botanical Name	Rand Highveld Grassland	Eastern Temperate Freshwater Wetlands	Grand Total
Pycreus macranthus		1	1
Pycreus nitidus		1	1
Ranunculus multifidus		1	1
Rorippa fluviatilis var. caledonica		1	1
Rorippa fluviatilis var. fluviatilis		1	1
Rumex lanceolatus		1	1
Satyrium hallackii subsp. hallackii		1	1
Schoenoplectus corymbosus		1	1
Schoenoplectus decipiens		1	1
Scleria dieterlenii		1	1
Senecio inornatus		1	1
Senecio microglossus		1	1
Setaria pallide-fusca		1	1
Sium repandum		1	1
Thelypteris confluens		1	1
Typha capensis		1	1
Utricularia inflexa		1	1
Wahlenbergia banksiana		1	1
Xyris gerrardii		1	1
Grand Total		84 100	184