

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties

1. Date this sheet was completed/updated:

05 October 2001

2. Country:

Republic of South Africa

3. Name of wetland:

Verloren Valei Nature Reserve

4. Geographical co-ordinates (at centre point):

25°17' South 30°09' East

5. Altitude:

2049 m - 2214 m above sea level.

6. Area:

Designated area: 5891 hectares Wetland area: 850 hectares

7. Overview:

More than thirty wetlands occur on Verloren Valei Nature Reserve, with the sizes of wetlands ranging between 2 ha and 250 ha. The primary wetland type is permanent freshwater marshes, with the emergent vegetation waterlogged for most of the season. The area is hydrologically important as the sponges in the upper catchment of important river systems occur here. The area is ecologically important as it supports high botanical diversity, and is in one of the last areas with suitable Wattled Crane breeding habitat. The area is of particular importance because a variety of wetlands characteristic of the region are represented, and because it is situated on a watershed, the influence of external disturbances will be limited.

8. Wetland type (Appendix 17):

marine-coastal:	A	B	C	D	E	F	G	H	I	J	K	Zk(a)
inland:	L	M	N	O	P	Q	R	Sp	Ss	Tp	Ts	
	U	Va	Vt	W	Xf	Xp	Y	Zg	Zk(b)			
man-made:	1	2	3	4	5	6	7	8	9	Zk(c)		

Please now rank these wetland types by listing them from the most to the least dominant:

Ts Tp M N U Y

9. Ramsar Criteria: (please circle the applicable criteria; the *Criteria for Identifying Wetlands of International Importance* are reprinted beginning on page 11 of this document.)

1 2 3 4 5 6 7 8

Please specify the most significant criterion applicable to this site: 1

10. Map of site included? YES

11. Name and addresses of the compilers of this form:

- (1) Mr Douglas Harebottle, c/o Rennies Wetlands Project
Avian Demography Unit, University of Cape Town, Rondebosch, 7700
Tel: (021) 650-2423 Fax: (021) 650-7578 e-mail: doug@maths.uct.ac.za
- (2) Mr Johan Eksteen, Ecologist, Mpumalanga Parks Board
PO Box 1990, Nelspruit, 1200, South Africa
Tel: (013) 759-5510 Fax: (013) 759-5496 e-mail: c/o mpbrandd@cis.co.za
- (3) Mr Anton Linström, Wetland Research, Mpumalanga Parks Board
PO Box 4442, Lydenburg, 1120, South Africa
Tel: (013) 235-2395/6 Fax: (013) 235-1674 e-mail: cyperus@xsinet.co.za
- (4) Mr Frans Krige, Reserve Manager, Verloren Valei Nature Reserve
PO Box 98, Dullstroom, 1110, South Africa
Tel/Fax: (013) 254-0799

12. Justification of the criteria selected under point 9:

Criterion 1

One of the main reasons Verloren Valei was established as a nature reserve was because of the near pristine state of the vegetation on the existing farms, including the wetlands. Since proclamation the wetlands have been managed according to a Management Plan drawn up for the reserve and have remained in excellent condition. They are thus good examples of a natural wetland characteristic of the Steenkampsberg Plateau biogeographical region within the North Eastern Mountain Grassland Vegetation type (Low & Rebelo 1997) and is common to more than one biogeographical region (similar wetlands occur near Wakkerstroom, SE Mpumalanga, 27°22'S 30°09'E). These are the only two wetlands of its size that falls within the boundaries of protected areas.

The wetlands on Verloren Valei play a very important hydrological function since sponges of important river systems (i.e. Crocodile & Olifants) occur here. These river systems extend into neighbouring Mozambique and thus the Verloren Valei wetlands have a trans-border influence. All of the catchments for these wetlands are also found on the Reserve, which is situated on a watershed, thus limiting influences from any external disturbances. This provides an ideal example for a holistic wetland conservation programme. Their conservation is also important when considering the impact of forestry, agriculture and the fly-fishing industry in the surrounding areas.

Although only representing a small percentage of all wetland types, a small and isolated pocket of peatland occurs on the Reserve. Peat is a very unusual and rare type of wetland in South Africa (Grundling & Dada 1998) and in particular the Steenkampsberg Plateau and its occurrence on Verloren Valei should be conserved Plateau (P.L. Grundling pers. comm.).

Criterion 2

Because of its geographical location and vegetation composition, Verloren Valei supports an appreciable number of rare, vulnerable or endangered species, including six Red Data plant species (refer to section 17.1), one Red Data butterfly species (refer to section 18.1), 11 Red Data bird species (refer to section 18.2) and seven Red Data mammal species (refer to section 18.3).

Criterion 3

The wetlands play a major role in maintaining the genetic and ecological diversity of the North Eastern Mountain Grasslands, especially since they support many Red Data, protected and/or endemic species.

Many endemic plant or animal species occur on the Reserve, including 16 plant species (refer to section 17.1), two butterfly species (refer to section 18.1), 12 bird species (refer to section 18.2.2) and three mammal species (refer to section 18.3.2). It should be noted that endemism is regional and/or national and not site specific. Ecologically, the wetlands and the Reserve support a high botanical diversity and represent one of the last areas with suitable breeding habitat for Wattled Crane.

Criterion 4

Without the freshwater wetlands on the Reserve, the Wattled Cranes would not be able to breed successfully. This habitat thus has special value in that it provides the cranes with suitable nesting sites in which to rear their young. The wetlands also provide suitable breeding habitat for fish and amphibians especially since trout have been introduced into the rivers and wetlands in the surrounding areas and which naturally have a severe impact on fish and amphibian populations.

13. General location:

The Verloren Valei Nature Reserve is located in the province of Mpumalanga, South Africa and is situated about 10 km north of the town of Dullstroom (25°25'S 30°06'E). It falls within the Belfast Magisterial District administrative region.

14. Physical features:

Geology and Geomorphology

The area is underlain by two types of rocks, namely sedimentary rocks and intrusive igneous rocks. The sediments are principally quartzites (belonging to the Transvaal System: Pretoria Group : Steenkampsberg Formation), shales and alluvial soils. The intrusive rocks are mainly diabase outcrops between the quartzite bands.

The area is situated on the Steenkampsberg plateau, at > 2000 m a.s.l., one of the highest areas in Mpumalanga. Three quartzite ridges occur in the area, running parallel from north to south. The divisions between valleys and drainage basins are mostly rounded crests that gradually lose height.

Origins of wetlands

All the wetlands on the Reserve are natural wetlands. The formations of most of the wetlands on the reserve are ascribed to geological lips formed by the underlying quartzite layers, which act as drainage barriers.

Hydrology

The Reserve is situated on a watershed between the Olifants and Crocodile drainage systems. The upper catchment drainage systems on the Reserve are the streamsources of important rivers and tributaries to these systems. The west flowing streams are tributaries of the Steelpoort River, which is part of the Olifants system. The east flowing streams are part of the Lunsklip River, which is a tributary of the Crocodile River. The south flowing stream is the streamsource of the Crocodile River. Waterflow in these streams has been measured in the mid-rainy season (not flood conditions) and at the end of the dry season. The results of these measurements are given in Appendix 6.

Soil type

Most of the soils on the reserve are leached, because of the influence of the climatic conditions in the area. The quartzite soils are sandy, light textured, and shallow; while the underlying rock is covered with ferricrete, causing a high water table in the wet season. The shale soils are mostly shallow, sand/clay/loam soils with a red colour. The diabase soils are shallow, dark-brown soils with a high silt content.

Water quality

No water quality tests have been conducted at Verloren Valei Nature Reserve. However, the quality of water is generally regarded as being good. Bloem (1988) determined pH of open surface water as part of a vegetation study. He measured the mean pH value as between 5,5 and 6. No observation below a pH of 5 was reported, while some observations of pH > 6 were reported.

Water depth, water permanence and fluctuations in water level

During the growing season the depth of water in wetlands on Verloren Valei Nature Reserve vary from saturated soils with no surface water, to the *Phragmites australis* wetlands with a depth of more than 500 mm.

The majority of wetlands with visible surface water are permanently wet, although the water level may vary. The seasonal and temporary wet zones in the wetlands vary the most in the permanence of saturation.

Catchment area

The catchments of all the wetlands are on the Reserve itself, as the area is situated on a watershed. With the wetlands and its catchments on the Reserve, it represents an ideal wetland conservation scenario. The size of the Reserve can be used as the size of the catchment, but it can be subdivided into sub-catchments based on the various streams leaving the Reserve.

Downstream area

The farms on the immediate borders of the area are mainly used for mixed farming and trout fishing. The grassland slopes are used as grazing for game, cattle and sheep and where the soil is arable a variety of crops is cultivated. The trout industry in the Dullstroom area is growing, which leads to a greater demand for trout dams and angler accommodation. Currently, some forestry activity occurs in the area and future expansion of forestry into the Dullstroom/ Belfast area is expected.

Further downstream farming practices also include crop production under irrigation, which is regulated and controlled by the Crocodile Irrigation Board. Numerous towns are also dependent on the quantity and quality of water in these downstream areas and as such place extra demands on the supply of water for domestic and industrial purposes. Forestry is also a major land-use further downstream, especially in the Crocodile River catchment.

Climate

The reserve is situated in the Highveld climate region. The climate is described by Schultze and McGee (1978) as a cool, moist climate where average temperatures does not exceed 18°C, and where the dry season occurs in winter.

Rainfall: The reserve is situated in the summer rainfall zone with a mean annual rainfall of 840 mm. Precipitation is mostly in the form of thunderstorms between October and March. Mist is common in the area.

Temperature: The maximum temperature recorded in the area was 29°C while the lowest temperature recorded was -13°C. Frost is common between March and September. Snow has been recorded on several occasions.

15. Hydrological values:

With the wetlands being situated on a watershed they perform the following important wetland functions:

- (a) Flood attenuation – water will be held back and slowed down from high run-off, particularly during the summer rainy season (September-March). Without these wetlands run-off from precipitation would cause extensive erosion leading to siltation of downstream wetland systems affecting the ecological and hydrological functioning of these systems. This function also aids in maintaining a sustainable stream flow, especially during the dry, winter season, thus ensuring that the hydrology and ecology of the wetlands remain functional during this low or zero rainfall period.
- (b) Sediment trapping. Any sediment washed down from precipitation would be effectively trapped by these wetlands ensuring that good water quality is maintained downstream.
- (c) Recharge and discharge of groundwater, particularly during the dry, winter months (April-August). Sponge areas in these wetlands will store and release water, on a sustainable basis, ensuring a regular supply of water to downstream users.

Quantification studies have shown that the various streams flowing out of the reserve produce approximately 5,17 million m³ at the end of the dry season, and 54,59 million m³ in the mid rainy season (F. Krige *in litt.*; Appendix 7)

16. Ecological values:

With the acquisition of the reserve in 1983 the farms Verloren Valei and Wanhoop were selected because the vegetation was in a relatively pristine state, with few invasive alien plant species. Before proclamation the area was mainly used as grazing for livestock.

Vegetation units

The vegetation in the area have been described by Acocks (1975) as North-Eastern Sandy Highveld, (Veldtype 57). Low & Rebelo (1997) have described it as North Eastern Mountain Grassland. The grasses *Tristachya leucothrix* and *Trachypogon spicatus* are the dominant species. The vegetation on the reserve has been classified by Bloem (1988). He identified three vegetation units:

- (A) *Tristachya leucothrix* Grassland;
- (B) *Coleochloa setifera* Crest Grassland;
- (C) Wetlands.

Vegetation communities

- (A) The *Tristachya leucothrix* Grassland unit covers 70 % of the grasslands, and is comprised of four communities:
 - 1) *Tristachya leucothrix* - *Monocymbium ceresiiforme* Grassland;
 - 2) *Tristachya leucothrix* - *Harpechloa falx* Grassland;
 - 3) *Tristachya leucothrix* - *Heamanthus humilis* Grassland;
 - 4) *Tristachya leucothrix* - *Eragrostis racemosa* Grassland.
- (B) The *Coleochloa setifera* Crest Grassland unit covers 20 % of the grassland, and includes the plant communities of the crest and rocky middle slopes at altitudes of 2060-2205 m. It is comprised of three communities:
 - 1) *Coleochloa setifera* - *Cheilantes multifada* Crest Grassland;
 - 2) *Coleochloa setifera* - *Melinis repens* Crest Grassland;
 - 3) *Coleochloa setifera* - *Helichrysum pilosellum* Crest Grassland.

(C) In the Wetland vegetation unit two communities were recognised, with the latter divided into seven vegetation zones:

- 1) *Phragmitis australis* wetland;
- 2) *Andropogon appendiculatus* wetland (subdivided into seven zones):
 - a) *Andropogon appendiculatus* - *Pycnostachys reticulata* zone
 - b) *Andropogon appendiculatus* - *Nerine angustifolia* zone
 - c) *Andropogon appendiculatus* - *Andropogon schirensis* zone
 - d) *Andropogon appendiculatus* - *Disa rhodantha* zone
 - e) *Andropogon appendiculatus* - *Ascolopus capensis* zone
 - f) *Andropogon appendiculatus* - *Helichrysum pilosellum* zone
 - g) *Andropogon appendiculatus* - *Juncus oxycarpus* zone

17. Noteworthy flora:

A total of 379 plant species have been identified at Verloren Valei Nature Reserve (Appendix 8). Of the 379 taxa identified, 106 (28%) are protected species under the Mpumalanga Nature Conservation Act 10 of 1998 (see Appendix 8), six are endemic to the Drakensberg Escarpment of South Africa, 11 are endemic to South Africa and six species are classified as Rare.

17.1 Noteworthy plant species (♣ Plants related to wetlands). Only Rare and Endemic species are listed. Refer to Appendix 8 for the names of Protected species.

Species	South African Status & Endemicity (after Hilton-Taylor 1996; M. Lötter pers. comm., S. Krynauw pers. comm.)	Global Status (after Hilton-Taylor 1996, Walter & Gillet 1997)
<i>Kniphofia rigidifolia</i>	Rare; Endemic to South Africa	Rare
<i>Eucomis autumnalis</i> ♣	Endemic to South Africa	Insufficiently known
<i>Eucomis montana</i>	Rare; Endemic to Drakensberg Escarpment	Insufficiently known
<i>Eucomis vandermerwei</i>	Critically endangered; Endemic to South Africa	Critically endangered
<i>Cyrtanthus macowanii</i>	Endemic to South Africa	Not threatened
<i>Gladiolus appendiculatus</i>	Rare; Endemic to Drakensberg Escarpment	Rare
<i>Gladiolus calcaratus</i>	Rare; Endemic to Drakensberg Escarpment	Rare
<i>Gladiolus varius</i>	Endemic to South Africa	Rare
<i>Gladiolus vernus</i>	Endemic to Drakensberg Escarpment	Not threatened
<i>Watsonia densiflora</i>	Endemic to South Africa	-
<i>Neobolusia tysonii</i> ♣	Rare; Endemic to South Africa	Not threatened
<i>Disperis cooperi</i>	Endemic to South Africa	Insufficiently known
<i>Disperis stenoplectron</i>	Endemic to South Africa	Not threatened
<i>Disperis tysonii</i>	Endemic to South Africa	Not threatened
<i>Disperis wealii</i>	Endemic to South Africa	Not threatened
<i>Streptocarpus latens</i>	Endemic to Drakensberg Escarpment	Insufficiently known

18. Noteworthy fauna:

Verloren Valei Nature Reserve provides habitat for 50 species of butterfly (one endemic & one localised; Appendix 9), five species of fish (Appendix 10), nine species of amphibians (Appendix 11), 36 species of reptiles (Appendix 12), 160 species of birds (17 Red Data and 12 endemic; Appendix 13) and ten mammal species (seven Red Data species and three endemic species; Appendix 14).

18.1 Noteworthy butterfly species:

Only two species of butterfly can be regarded as noteworthy: Swanepoel's Widow (*Dira swanepeoli swanepeoli*) which is endemic to South Africa; the species is listed as Rare in South Africa (Henning & Henning 1989). The other species is Warren's Blue (*Orachrysops warreni*) of which the type locality is Verloren Valei Nature Reserve and it is presently restricted to the Reserve (Henning *et al.* 1994).

18.2 Noteworthy bird species:

18.2.1 Red Data species (♣ Birds related to wetlands) occurring at Verloren Valei (status after Barnes 1998, Collar *et al.* 1994):

Species	South African Status	Global Status
Black Stork (<i>Ciconia nigra</i>)	Near-threatened	-
Bald Ibis (<i>Geronticus calvus</i>)	Vulnerable	Vulnerable
Secretarybird (<i>Sagittarius serpentarius</i>)	Near-threatened	-
Cape Vulture (<i>Gyps coprotheres</i>)	Vulnerable	Vulnerable
African Marsh Harrier (<i>Circus ranivorus</i>) ♣	Vulnerable	-
Black Harrier (<i>Circus maurus</i>) ♣	Near-threatened	Near-threatened
Lesser Kestrel (<i>Falco naumanni</i>)	Vulnerable	Vulnerable
Wattled Crane (<i>Bugeranus carunculata</i>) ♣	Critically endangered	Vulnerable
Blue Crane (<i>Anthropoides paradiseus</i>) ♣	Vulnerable	Vulnerable
Crowned Crane (<i>Balearica regulorum</i>) ♣	Vulnerable	Endangered
Stanley's Bustard (<i>Neotis denhami</i>)	Vulnerable	-
Whitebellied Korhaan (<i>Eupodotis cafra</i>)	Vulnerable	-
Blue Korhaan (<i>Eupodotis caerulescens</i>)	Near-threatened	Near-threatened
Blackwinged Plover (<i>Vanellus melanopterus</i>) ♣	Near-threatened	-
Grass Owl (<i>Tyto capensis</i>) ♣	Vulnerable	-
Rudd's Lark (<i>Heteromiraфра ruddi</i>)	Critically endangered	Critically endangered
Yellowbreasted Pipit (<i>Hemimacronyx chloris</i>)	Vulnerable	Vulnerable

Two species deserves special mention:

Rudds Lark (*Heteromiraфра ruddi*). Verloren Valei is the only protected area in the world that affords this species any protection (Barnes 1998).

Wattled Crane (*Bugeranus carunculata*), the total SA Wattled Crane population is 250 individuals, including only 80 active breeding pairs. Verloren Valei host 6 old nests with only one being active at the moment. A total of 8 individual Wattled Cranes can be found on Verloren Valei (De Schouwer 2000).

18.2.2 **South and Southern African endemic bird species (birds related to wetlands ♣) occurring at Verloren Valei (endemicity after McAllister 1993):**

Species	Endemicity
Bald Ibis (<i>Geronticus calvus</i>)	South African
Cape Vulture (<i>Gyps coprotheres</i>)	Southern African
Greywing Francolin (<i>Francolinus africanus</i>)	Southern African
Ground Woodpecker (<i>Geocolaptes olivaceus</i>)	South African
Rudd's Lark (<i>Heteromirafra ruddi</i>)	South African
Buffstreaked Chat (<i>Oenanthe bifasciata</i>)	South African
Cape Rock Thrush (<i>Monticola rupestris</i>)	South African
Sentinel Rock Thrush (<i>Monticola explorator</i>)	South African
Drakensberg Prinia (<i>Prinia maculosa</i>)	South African
Yellowbreasted Pipit (<i>Anthus chloris</i>)	South African
Pied Starling (<i>Spreo bicolor</i>)	South African
Cape Weaver (<i>Ploceus capensis</i>) ♣	South African

18.3 **Noteworthy mammal species:**

18.3.1 **Red Data species occurring at Verloren Valei (status after Smithers 1986):**

Species	South African Status
Oribi (<i>Ourebia ourebi ourebi</i>)	Vulnerable
African Wild Cat (<i>Felis lybic</i>)	Vulnerable
Antbear (<i>Orycteropus afer</i>)	Vulnerable
Serval (<i>Felis serval serval</i>)	Rare
Striped Weasel (<i>Poecilogale albinucha</i>)	Rare
Aardwolf (<i>Proteles cristatus</i>)	Rare
Brown Hyaena (<i>Hyaena brunnea</i>)	Rare

18.3.2 **Endemic species occurring at Verloren Valei (after Smithers 1986):**

Species	Endemicity
Striped Weasel (<i>Poecilogale albinucha</i>)	Southern African
Blesbok (<i>Damaliscus dorcas phillipsi</i>)	South African
Grey Rhebok (<i>Pelea capreolus</i>)	South African

19. **Social & cultural values:**

19.1 **Social values**

Verloren Valei Nature Reserve will be able to provide the following social aspects: tourism (especially avi-tourism), education and scientific research. As an important catchment area, the reserve has definite economic value as the water flow from the reserve represents a significant portion of the water used by irrigation farmers and/or municipalities further downstream.

Aesthetically the reserve is fast becoming the only undeveloped tract of land in the Dullstroom area. The unspoilt appearance of the reserve adds enormous aesthetic value to the Dullstroom area. With Dullstroom becoming an important tourist destination, the aesthetic value of the reserve definitely increases its social and economic values.

19.2 **Cultural values**

The earliest recorded history of Verloren Valei goes back to 1846 when the Swazi chief Mswati swapped the area between the Olifants River in the north and the Crocodile River in the south to the Voortrekkers for 100 pieces of cattle. The Steenkamps Family then bought six farms including Verloren Valei. Sheep farming became the dominant type of stock farming in the area.

This was due to the high rainfall and subsequent fast growth of the montane grasses during the summer. This is still true today with Merino sheep farming being the most economic farming practice in the area.

Two types of stonekraals or stone formations can be found on Verloren Valei. These ruins have been speculated to have been used to protect the sheep flocks from predators during the night while others were used to trap and mow down game during organised hunts. It seems that at some stage large herds of game once roamed the Steenkampsberg plateau and that it was once a popular hunting area. This is evidenced by farm names such as Elandslaagte (Elands = Eland) and Kwaggashoek (Kwagga = Afrikaans name for Zebra)

20. Land tenure/ownership of:

(a) Site

Verloren Valei Nature Reserve is a Provincial Nature Reserve proclaimed in 1983. The Mpumalanga Parks Board manages this reserve, including catchments and wetlands.

(b) Surrounding area

The surrounding area comprises privately owned farms.

21. Current land use:

(a) Site

Verloren Valei Nature Reserve has been managed as a nature reserve since its proclamation. The major ecological management actions are burning and grazing (Eksteen 1993).

- **Burning** - Fire is a natural part of the local ecosystem, and is therefore included in the ecological management plan. The reserve is divided into several burning blocks burnt in a mosaic on a two to three year frequency. Blocks to be burnt are evaluated before each burn, and several conditions have to be met before the block is allowed to burn. Mosaic burns take place during the summer months while the block burns occurs in late winter.
- **Grazing** - The vegetation was utilised by herbivores, including several game species and cattle. Grazing by cattle was allowed, on a rental basis, between November and April, and a conservative stocking rate was used. Cattle grazing will be phased out as the game population increases. The game species currently occurring on the reserve are Oribi, Grey Rhebok, Mountain Reedbuck, Common Duiker, Steenbok and Blesbok.

(b) Surroundings/Catchment

The farms on the immediate borders of the area are mainly used for farming and trout fishing. The grassland slopes are used as grazing for game, cattle and sheep, and where the soil is arable a variety of crops is cultivated.

The population density on the reserve and surrounding farms are quite low. The agricultural systems in use are semi-extensive, and therefore not labour intensive. The closest concentration of people is the town of Dullstroom, with population of about 2000 people.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

(a) At the site

As stated above, the proposed site is a proclaimed provincial Nature Reserve, which should be relatively safe from any major development projects. The catchments of all the wetlands are on the Reserve itself, as the area is situated on a watershed, which safeguards the area against most development impacts.

One of the factors that could affect the ecological character of the site is the marginal impact of introduced/exotic plant species. The following exotics occur on the reserve:

- *Eucalyptus* spp.- planted close to the homesteads for windbreaks and woodlots
- Scotch thistle (*Cirsium vulgare*) - confined to disturbed areas. Thought to have been brought in with the import of hay into South Africa
- *Pinus* spp. - planted near to the homesteads to serve as windbreaks
- Apple trees(*Malus spp.*) - planted near homesteads for fruit production
- Peach trees (*Prunus persi*) - planted near homesteads for fruit production

All aliens/exotics are carefully monitored and controlled on the reserve on a regular basis as part of the reserve's management plan.

(b) Around the site

Wetlands in the surrounding area are under various threats, highlighting the need to give high conservation priority to the protected wetlands and catchments in the area. Some of the threats to wetlands in the surrounding areas include:

- The trout industry in the Dullstroom area is growing, which leads to a greater demand for trout dams and angler accommodation;
- Dullstroom is a popular tourist destination, and attracts upper class tourists who demand luxury accommodation. Development of lodges will impact on wetlands and catchments in the surrounding area;
- Currently, some forestry activity occurs in the area and future expansion of forestry into the Dullstroom/Belfast area is expected;
- Inappropriate farming practices may pose threats to wetlands;
- Invasion of exotic plants, such as Black Wattle (*Acacia mearnsii*);
- Draining of wetlands to "reclaim" wetlands.

23. Conservation measures taken:

Verloren Valei was proclaimed a Nature Reserve on 20 August 1983 by the then Department of Nature Conservation of the Transvaal Provincial Administration (TPA). The size of the Reserve is 5891 hectares, of which 850 hectares comprise wetlands. The goal of the Reserve was to preserve part of the North-Eastern Sandy Highveld (Acocks 1975, veldtype 57) and to conserve the breeding grounds of the threatened Wattled Crane (*Bugeranus carunculata*). Ecological management was done according to a Management Plan drawn up in 1985 (Appendix 16) and approved by the Department of Nature Conservation. TPA Nature Conservation scientists and managers adapted the management plan as new information became available.

In the period between proclamation in 1983 and the 1994/95 season, the previous owners could utilise the grassland for livestock grazing between November and April under a lease agreement and

as part of the expropriation agreement. Since 1986, however, no sheep have been allowed to graze on the Reserve, as their grazing habits were detrimental to the conservation goals in the area, but cattle were allowed at a moderate stocking rate.

Verloren Valei Nature Reserve currently falls under the Mpumalanga Parks Board, where under the Mpumalanga Nature Conservation Act 10 of 1998, it is managed as a nature reserve with conservation legislation being enforced.

The following conservation measures and management practices have been implemented at Verloren Valei Nature Reserve:

- Restrictions have been placed on development in the Reserve. Any development will follow the accepted legal procedures, inc. Environmental Impact Assessments, involving public participation and Integrated Environmental Management approaches. This is also outlined in the policy and legal documents of the Mpumalanga Parks Board.
- Burning programmes to improve and maintain condition and availability of vegetation for fauna and to improve the vegetation yield for catchment functions.

- Wattled Crane Isolation Rearing and Release Programme. This is the first of its kind in Africa.
- Erosion control
 - Closure of unused roads to control waterflow
 - Establishment of pastures on old cultivated lands
- Removal of some internal fences to enhance game movement on the reserve
- Alien plant control, particularly *Eucalyptus* and Black Wattle (*Acacia mearnsii*) infestations.
- Burning of firebreaks. This is absolutely necessary in order to prevent uncontrolled burning on the Reserve
- Reserve monitoring
 - Grasslayer monitoring conducted every second year (Mpumalanga Parks Board).
 - Waterflow monitoring conducted bi-annually (Mpumalanga Parks Board).
 - Aerial game census conducted every 3-4 years.
 - Annual census of breeding success and population size of Wattled Cranes (Mpumalanga Parks Board and Highlands Crane Group)
- Indigenous people are involved in the management of the site. Ten labourers (general assistants) are employed by the Mpumalanga Parks Board at Verloren Valei and are involved with the burning of fire-breaks, block burning and helping with the Wattled Crane Isolation Rearing and Release Programme. The low human density on the Reserve is due to the sensitivity of the Wattled Cranes.

24. Conservation measures proposed but not yet implemented:

The following conservation measures have been suggested or proposed either as part of the existing management plan or as subsequent proposals under the current revision of the existing management plan.

- Registration of Verloren Valei as a Ramsar Site
- Proper fencing of the Reserve
- Introduction of more game (medium to large mammals) into the Reserve. This is a long-term objective for the reserve that is affected by financial constraints.
- The rehabilitation of eroded areas (e.g. old roads) and damaged wetlands
- Access to the Reserve for specialist groups (bird clubs, botanical society, etc)
- Guided walks for the public undertaken by various staff members

The above proposals have all been submitted to the relevant authorities but their endorsement and implementation is influenced by budgetary and/or time constraints.

25. Current scientific research and facilities:

The only current research project, which is ongoing at Verloren Valei, is the Wattled Crane Isolation Rearing and Release Programme run by the Highlands Crane Group in conjunction with the Mpumalanga Parks Board. This programme, which has been in operation at the Reserve since 1995/6, involves the rearing of Wattled Crane chicks in isolation cages using artificial crane costumes worn by certain MPB staff members. Once the chicks are old enough they are colour ringed and/or fitted with satellite transmitters and released on the Reserve. Monitoring of the movements and survival of these released birds can then be undertaken (refer to Appendix 15). Wild birds also breed on the Reserve and breeding pairs are monitored during the breeding season to gauge their breeding success.

Aquatic biomonitoring surveys by Mpumalanga Parks Board staff also take place on the Reserve on a regular basis (refer to Appendix 15).

Other ecological work has been conducted on the Reserve by Tarboton (1984), Skoroszewski (1987), Bloem (1988), Burgoyne (1995), McAllister (1993), Morrison (1998) and Jansen *et al.* (1998; in press). Refer to the Bibliography for reference details.

The only facilities available for research is a caravan for accommodation and shower facilities otherwise there are no special research facilities on the Reserve.

26. Current conservation education:

As the ecosystem is sensitive, the activities on the reserve have to be planned properly. The reserve is regarded as an excellent site for specialist education opportunities, and guided walks for small groups are being planned. These guided tours are currently being addressed in the revision of the management plan.

At present the only form of conservation education that takes place occurs outside of the Reserve on surrounding farms. The Highlands Crane Group, a working group of the Endangered Wildlife Trust, together with Reserve personnel is involved with co-ordinating educational programmes in these areas. These programmes aim at creating greater water and crane awareness amongst school children and farm labourers.

27. Current recreation and tourism:

Due to the sensitivity of the site no recreation takes place in the wetland. However, low-density eco-tourism does occur on the Reserve. Visitors are only allowed to visit the reserve with prior permission from the Reserve manager and must book in advance. A maximum of 25 people per visit is allowed. Groups are not allowed to walk or drive in the Reserve on their own, but are taken on prescribed routes accompanied by either the Reserve manager or by one of the local workers on the Reserve. This avoids people from entering any sensitive areas on the Reserve.

Current figures indicate that approximately 600 people visit the Reserve each year, of which 10% constitute foreigners/international tourists. Tourism takes place throughout the year with avi-tourism being the most popular form of tourism. Many people visit the Reserve specifically to see the Wattled Cranes and the isolation rearing and release programme of these birds on the Reserve. The Reserve is also visited by many birdwatchers who come to see the many endemic and rare birds found in the area.

28. Jurisdiction:

Both territorial and functional jurisdiction falls under the Mpumalanga Parks Board.

29. Management authority:

As from 1 December 1997 the Mpumalanga Parks Board is directly responsible for the management of the wetlands on Verloren Valei Nature Reserve.

Contact address:

Mpumalanga Parks Board, P.O. Box 1990, Nelspruit, 1200, South Africa

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