

DE HOOP VLEI

1. DATE OF UPDATE

June 1998

2. COUNTRY

South Africa

3. NAME OF WETLAND

De Hoop Vlei

4. GEOGRAPHICAL CO-ORDINATES

South 34° 26"

East 20° 22"

Map number: 1:50 000 3420 AD Wydgelëe

5. ALTITUDE

Min: 4 m

Max: 11 m

6. AREA (ha)

750 ha.

7. OVERVIEW OF SITE

The lake is 18 km long and 0,5 km wide on with a surface area of 6.2 Km² when full. The depth of the lake is very variable from a maximum of 7 m during periods of flooding (only twice this century) to nearly completely dry (at least once this century) (Butcher, 1984). As a consequence of these extreme variations in water levels the salinity can drop from 60ppt to 3ppt within a period of only 2 months (D.J. Coetzee, unpublished data). During occasions of extensive flooding, which has occurred only twice this century in 1906 and 1957 (Butcher, 1984), an area of up to 3000 ha on the plain southwest of De Hoop lagoon may be inundated to a depth of up to 3 m. The water receded gradually after the 1957 inundation and provided very favourable conditions for a variety of wetland dependent birds for up to 10 years afterwards. A number of species, which do not normally breed in this

area, bred on the numerous islands formed by the 1957 inundation. A notable event was the first reported large scale breeding attempt of the greater flamingo *Phoenicopterus ruber* in South Africa in this area in 1980 when up to 5000 birds were present and ca 800 nests were built with a fledgling success of 35% (Uys *et. al.*, 1963).

8. WETLAND TYPE

- K Coastal freshwater lagoon
- J Coastal brackish lagoon
- Ts Seasonal freshwater marshes

9. RAMSAR CRITERIA

1d, 2a, 3c

10. MAP OF SITE INCLUDED?

No as it is the same as the original application.

11. COMPILER

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12. JUSTIFICATION

1. The De Hoop Vlei is unique in the south-western Cape as it is a coastal lake with no outlet to the sea with widely fluctuating salinities from approximately 3 ppt to 60 ppt.
2. Wetland dependent bird species that are listed in the South African Red Data Book (Brooke, 1984) for which De Hoop Vlei is a critical habitat include:

<u>Species</u>	<u>Max. number recorded</u>
<i>Pelecanus onocrotalus</i>	60
<i>Ixobrychus minutus</i>	occasional
<i>Ciconia nigra</i>	14
<i>Phoenicopterus ruber</i>	1473

<i>Phoeniconaias minor</i>	1715
<i>Hydroprogne caspia</i>	11
<i>Charadrius pallidus</i>	occasional

- Seventy-five wetland dependent bird species have been recorded on the De Hoop Vlei. The most numerous bird species include:

Anas undulata: Maximum of 4626 recorded, which represents 7,1% of the South African population.

Anas smithii: Maximum of 3004 recorded, which represents 15,0% of the estimated world population. The maximum of 1216 moulting birds that has been recorded represents more than 6% of the world population.

Pelecanus onocrotalus: Maximum of 60 recorded, which represent 9% of the regional south-western Cape population.

Fulica cristata: Maximum of 24 400 recorded and more than 10 000 regularly present.

Large numbers of greater and lesser flamingos are also regularly present.

- De Hoop Vlei is of special regional importance as one of a "chain" of wetlands along the southern Cape coast.

13. GENERAL LOCATION

The closest town, Bredasdorp is 65 km from the Ramsar site. The site is within the De Hoop Nature Reserve, which lies along the southern coast of the Western Cape Province.

14. PHYSICAL FEATURES

14.1 Geology and Geomorphology

As the boundaries of the De Hoop Ramsar site is restricted to the high water mark of the coastal lake a description of the geology of the site would be pointless. The following is an account of the geology of the surrounding area, the De Hoop Nature Reserve.

The northern boundary of the reserve is characterized by the high-lying terrain of the Potberg range and the Hard Dunes (limestone hills) with a maximum height of 611 m and 224 m above sea level respectively. The land surface drops to the southwest in a series of four distinct terraces. These terraces, at elevations of 90 to 100m, 60m, 30 to 40m and 15 to 20m, are the result of marine transgressions. The Potberg is separated from the Dunes

by a narrow valley part of which forms an area of endorheic drainage in a border depression. The Sout River has cut a deep gorge through the Dunes to discharge into the De Hoop coastal lake, which is separated from the sea by the Witsand dunefield.

The limestone terrain exhibits typical karst topography. Solution and subsidence features include dolines, uvalas and poljes (circular and oval depressions) and cave systems. Many of these features follow the predominantly east-west orientation, which was established when the Dunes were laid down parallel to the old coastlines of the time of formation. A hard calcrete capping less than 0,5 m thick generally occurs in the older limestone terrain with softer material below.

The Potberg represents the remnant of a syncline of the Cape Folded Ranges which is truncated to the south by a major fault at the base of the range. The Table Mountain Group (TMG) quartzite strata dip northwards forming steeper slopes and cliffs on the southern side (scarp slopes) and more gently dipping northerly slopes (dip slopes). Thick boulder talus and alluvial fans occur at the southern foot of the range. The TMG quartzites form sea cliffs where they are exposed beneath the Bredasdorp limestone.

The basement geology of the area comprises sedimentary rocks of the Table Mountain Group (quartzites), Bokkeveld Group (shales and mudstones) and Uitenhage Group (mainly shale conglomerates). The resistant quartzites of the TMG form the Potberg range while the softer shales and conglomerates have been planed by marine transgressions into a gently southward sloping series of terraces. To the north of the Reserve the Bokkeveld shales have been eroded into undulating hills. Remnants of the Tertiary (25 million year BP) "African I" erosion surface (peneplain) survive as isolated flat-topped hills capped by silcretes of the Grahamstown Formation.

The greater part of the reserve is underlain by Tertiary limestone of the Bredasdorp Formation. These limestones cover most of the Bokkeveld and Uitenhage basement rocks within the reserve. Exposed Bokkeveld Shales and only very small exposures of the red conglomerates of the Uitenhage Formation can be found in the eastern section of the reserve. The Bredasdorp limestones were deposited as shallow marine environments (the De Hoop lagoon formation with shell fossils) and as coastal dunes (most of the rest of the deposits). The oldest deposits (Wankoe Formation) form the higherlying Dunes into which the coastal plain had been eroded during subsequent marine transgressions. Subsequently new dune systems (Klein Brak and Waenhuiskrans Formations) were formed on the coastal plain. The most recent member of the Bredasdorp Group was deposited within the last 10 000 years as a strip of unconsolidated dunes along the coast (Strandveld Formation).

14.2 Origins

The sandstone and quartzite are approximately 4000 million years old and

the limestone 5 million years.

14.3 Hydrology

The site lies within a Winter Rainfall area. The lagoon is therefore at it's fullest during or just after winter. The water at this stage is relatively fresh, but gradually becomes brackish as it evaporates during the summer months.

14.4 Soil type and chemistry

N/A

14.5 Water quality

The salinity varies from 3ppt to 60 ppt.

14.6 Depth, fluctuations and permanence of water

Min: 0

Max: 7,7 metres

No noticeable daily water level fluctuations occur. Seasonal fluctuations do, however, occur with the lagoon drying up almost completely during the summer months and filling up during winter. The permanence of water in the lagoon depends on the amount of water flowing into the system and the type of summer (wind speed, length, temperature).

14.7 Tidal variations

N/A

14.8 Catchment area

The Sout River and it's tributary the Potteberg River are the most important rivers feeding the De Hoop Vlei. There are also several fountains that discharge water into the northern part of the lagoon, which explains why this area never becomes as brackish as the rest of the lagoon.

The greater part of the Sout River catchment of De Hoop Vlei falls outside the reserve. The statistics (from Midgley *et al.* 1994) for the Sout River catchment are as follows:

- total surface area = 127 000 ha
- mean annual rainfall = 371 mm
- mean annual evaporation (MAE) = 1430 to 1470 mm
- mean annual runoff (MAR) to De Hoop Vlei = 17 mm or 21,9 million m³ (4,6% of rainfall)
- area under irrigation = 600 ha

14.9 Downstream area

N/A

14.10 Climate

The Ramsar site is situated in the eastern part of the temperate winter **rainfall** region that has a Mediterranean climate. The mean annual rainfall is approximately 380 mm (De Hoop Nature Reserve Office) with the maximum mean monthly rainfall occurring in August and the minimum in December and January. Rainfall can however vary by 15 % - 17 % from one year to the next. Summer rains commonly occur as cloudbursts, but rainfall is predominantly cyclonic associated with eastward movement of low-pressure cells crossing the Southwestern and Southern Cape (Butcher, 1984 and Toens 1994). Orographic rainfall may account for large differences in rainfall between the lowlands and the high-lying ground such as the limestone hills and the Potberg, particularly towards the eastern extremity of the Potberg. Rainfall on the Dunes may exceed 400 mm and that on the Potberg may exceed 700 mm per year (1:250 000 isohyet value). The mean annual precipitation for the Sout River catchment is 369 mm (Toens 1994).

The wettest 3 months of the year is June, July & August (12% of MAP per month) while the driest 3 months of the year is December, January & February (4 to 5,5% of MAP per month). Rainfall is fairly evenly distributed over the year (7 to 12,5% of MAP per month) except for the 3 driest months (4 to 5,5% of MAP per month). Precipitation in the form of mist occurs in autumn and winter. At times the whole Overberg area can be covered in a thick mist bank.

No incidences of snowfall have been recorded at De Hoop Nature reserve. According to Butcher (1984), an incidence of snowfall was only recorded once this century in the "Ruens" in 1906. Frost and hail occur occasionally.

The warm Agulhas current results in temperate winters and warm summers. Temperature averages 16,8°C per annum with an average of 20,5°C and average winter minimum of 13,2°C (Toens 1994). The warmest month is January with a mean air temperature of 22°C. The coldest month is July with a mean air temperature of 11°C.

Windy conditions are common particularly in summer when the prevailing wind direction is southwesterly with an average velocity of 35 km/h. Wind speeds may reach 60km/h or more at times.

15. HYDROLOGICAL AND BIOPHYSICAL VALUES

Unknown

16. ECOLOGICAL FEATURES

The boundary of the Ramsar site has been specified as the edge of the lagoon. Therefore the only broad habitat type occurring within the site is the aquatic habitat.

According to Acocks (1975) the vegetation of the surrounding area is Coastal Macchia on limestone substrate. Low and Rebelo (1996) classify this vegetation type as Limestone Fynbos.

17. NOTEWORTHY FLORA

The margin of the lake is mostly bare and only a few *Phragmites australis* reedbeds are present, mainly around freshwater springs. The submerged macrophyte *Potamogeton pectinatus* forms extensive beds when suitable environmental conditions exist and may cover the greater part of the lake (Heyl, 1983). This apparently contributes largely to the maintenance of the rich animal life in the vlei habitat. It is well known that this cosmopolitan waterplant serves as a very important food resource to waterfowl in the family Anatidae (Martin and Uhler 1951). It is possibly also the staple food of indigenous duck species such as the Yellowbilled Duck, which eats the bulbs, leaves and stolons (Skead 1980) and the red-knobbed coot which utilizes it extensively (Fairall 1981). As such this plant, to a large extent, appears to determine the carrying capacity of the vlei for primary consumers such as coots and other waterfowl. At the same time the *P. pectinatus* provides favorable habitats for other aquatic organisms such as zooplankton (Harrison 1957; Siegfried 1963) and abundant fish populations (Van Rensburg 1966).

Other submerged macrophytes include *Ruppia* and *Chara* species. *Salicornia* species are dominant on the exposed bed of the lagoon.

Acocks Veld Types 47 (Coastal Macchia) on limestone and 69 (Macchia) are the predominant veld types of the surrounding reserve with very small areas of Veld Type 46 (Coastal Renosterveld) and Veld Type 4 (Knysna Forest).

According to the new vegetation classification for South Africa (Low and Rebelo 1996) three major vegetation types are recognized in the surrounding reserve, viz. Limestone Fynbos (no. 67), Mountain Fynbos (no. 64) and Dune Fynbos and Dune Thicket (no. 4). Only very small areas of Laterite Fynbos (no. 66), South and Southwest Coast Renosterveld (no. 63) and Afromontane (Knysna) Forest (no. 2) also occur. The greater part of area that is mapped as Dune Thicket in this area by Low and Rebelo (1996) is actually Dune Fynbos with smaller interspersed patches of Dune Thicket. Melkhout thicket can also be regarded as a form of Dune Thicket. *Sideroxylon inerme* (White milkwood) trees are common along the lake.

18. NOTEWORTHY FAUNA

To date 259 bird species, which represents 70% of the 369 species known in

the south-western Cape, have been recorded in the De Hoop Nature Reserve (Heyl, 1983 updated) This high species richness is ascribed to the high habitat diversity in this area (Uys and Macleod, 1987).

At least 75 bird species, which are dependent on wetlands, have been recorded at De Hoop Vlei, including 12 of the 18 South African waterfowl species (Heyl, 1983). Regular monthly or quarterly counts of the birds on De Hoop Vlei have been undertaken since 1979 (Heyl, 1983). Noteworthy numbers of birds recorded include:

Anas undulata (Yellowbilled Duck): Maximum of 4 626 recorded which represents 7,1% of the estimated South African population of 65 000 (Rowan, 1963).

Anas smithii (Cape Shoveller): Maximum of 3 004 recorded which represents 15,0% of the estimated South African population of 20 000 (Siegfried, 1965).

Fulica cristata (Redknobbed Coot): Maximum of 24 400 recorded and more than 10 000 regularly present.

Alopochen aegyptiacus (Egyptian Goose): Maximum of 2 166 recorded and up to 1 332 birds recorded in moult.

Rare and threatened species that have been recorded during these surveys include:

Pelecanus onocrotalus (White pelican): A maximum of 60 has been recorded which represents 9% of the regional south-western Cape population of 653 individuals (Cooper and Hockey, 1981). De Hoop Vlei is thus an important foraging area for this species. The White Pelican is regarded as rare in South Africa with only two breeding populations viz. on Dassen Island and Lake St. Lucia (Brooke, 1984).

Ixobrychus minutus (Little Bittern): Occasional visitor. Brooke (1984) regards this species as rare in South Africa.

Ciconia nigra (Black Stork): Small numbers of up to 8 birds have been recorded with 14 on one occasion. The black stork is regarded as one of South Africa's rarest birds with about 200 breeding pairs (Brooke, 1984).

Phoenicopterus ruber (Greater Flamingo): A maximum of 1 473 individuals has been recorded with an average of 374 but in 1960 up to 5000 individuals were attracted by the favourable conditions created by the 1957 inundation and the first recorded breeding attempt in South Africa occurred with ca 800 nests and a fledgling success rate of 35% (Uys *et. al.*, 1963).

Phoeniconaias minor (Lesser Flamingo): A maximum of 1 715 individuals has been recorded with an average of 222.

Hydroprogne caspia (Caspian Tern): Caspian Terns regularly visit the lake and up to 11 individuals have been recorded. This is a significant proportion of the estimated Cape population of 40 breeding pairs while the South African population is estimated at only about 500 individuals (Underhill and Cooper, 1982; Brooke, 1984). A number of breeding attempts have been recorded in this area (Heyl, 1983).

Charadrius pallidus (Chestnutbanded Sandplover): The population of this species in South Africa is estimated at only 250 breeding pairs and is regarded as rare by Brooke (1984). Small numbers have been observed at De Hoop Vlei and some breeding attempts were recorded in the 1960s (Uys and Macleod, 1967) although the lake is probably not normally an important habitat for this rare species (Heyl, 1983).

De Hoop Vlei is also an important moulting refuge for a number of waterfowl. The maximum of 1 216 Cape Shovellers which was recorded during a moulting migration during 1982 (Heyl, 1983) represents 6% of the estimated world population of this species (Siegfried, 1965).

The lake is, however, not normally an important breeding area for waterfowl (Heyl, 1983) except during favourable conditions after floods as in the 10 year period following the 1957 flood (Uys and Macleod, 1967; Heyl, 1983).

The surrounding De Hoop Nature Reserve is also an important refuge for a number of other threatened species including the southernmost breeding colony of Cape Vultures (*Gyps coprotheres*) in the Potberg mountain and Damara Terns (*Sterna balaenarum*) and African Black Oystercatcher (*Haematopus moquini*) along the coast (Heyl, 1983). An annotated checklist of the avifauna of the area is given by Uys and Macleod (1967) and has been updated by Uys and Macleod (1969), Stuart *et. al.* (1978), Heyl (1983) and Scientific Services Checklist 1992, Cape Nature Conservation.

Only one indigenous fish species, *Sandelia capensis* has been recorded for De Hoop Vlei (Siegfried, 1963), but it is possible that *Galaxias zebratus* also occurs in the lake. *Oreochromis mossambicus* has been introduced to the lake and now occurs in large numbers (Van Rensburg, 1966; Scott and Hamman, 1988). The Cape clawed frog (*Xenopus laevis*) is common (Heyl, 1983), but water turtles (*Pelomedusa subrufa*), which were present, in large numbers until the 1960's (Brand, 1961) may have become a rarity (Butcher, 1984).

19. SOCIAL AND CULTURAL VALUES

Historical: Europeans probably settled the area in the late 17th century. Information on the history of the area is provided by Butcher (1984).

Cultural: The De Hoop complex of historical farm buildings is one of the oldest in this area and is a proclaimed National Monument.

Visitor numbers will be restricted and visitors will not be allowed access to sensitive areas to ensure that the natural resources of the area are not damaged. The safe carrying capacity of the reserve must still be determined.

20. LAND TENURE

The Ramsar site is part of the De Hoop Provincial Nature Reserve, owned by the state and managed by the Provincial Conservation Authorities. The terrestrial portion of the reserve covers an area of about 35 546 ha (355 km²) while the marine portion of the reserve covers an area of approximately 25 300 ha (253 km²). The surrounding area outside the reserve is all privately owned.

21. LAND USE

(a) Ramsar site

The Ramsar site is completely within a declared Provincial nature reserve. Human activities are restricted to management activities associated with the reserve with a small amount of recreation in the form of game viewing, hiking, and mountain bikes.

(b) Surroundings and catchment

Virtually the entire catchment of 127 000 ha is in private ownership and has been largely ploughed for establishment of wheatlands and pastures. The remaining privately owned land at the upper end of the lake consists largely of undeveloped rocky limestone hills which are used as rough grazing for sheep and cattle. Frequent burning is the only veld management practice that is applied to this land.

22. FACTORS ADVERSELY AFFECTING THE SITE'S ECOLOGICAL CHARACTER INCLUDING CHANGES IN LAND USE AND DEVELOPMENT PROJECTS

The development and operation of the Overberg Test Range has not resulted in a significant disturbance to the bird life of De Hoop Vlei as the aircraft flights are kept well away from the lake. The possible impact of the missile testing range is being monitored and strict requirements have been laid down for the operation of the testing range to ensure that disturbance is kept to acceptable minimum levels (See report on the environmental implications of the proposed experimental weapons test and evaluation facility between Waenhuiskrans and Cape Infanta, Bredasdorp, dated 22 November 1983).

The possibility that landuse practices in the catchment may threaten the lake due to eutrophication by fertiliser runoff, pesticides and siltation due to increased erosion should be investigated.

23. CONSERVATION MEASURES TAKEN

The site is within the De Hoop Nature Reserve of which the terrestrial portion covers an area of about 35 546 ha (355 km²) while the marine portion covers an area of approximately 25 300 ha (253 km²). The original reserve was declared in 1957 but the additions to the reserve in the 1980's was only declared part of the reserve in 1990. The management plan is currently under revision and is in the final draft stage. The Ramsar site is one of the important facets of the Reserve and is dealt with appropriately in the management plan.

The only monitoring carried out on the wetland is the quarterly counts of waterfowl.

24. CONSERVATION MEASURES PROPOSED

The following conservation measures have been identified for the wetland in the management plan:

Water flow and quality

A pro-active attempt should be made to liaise with landowners and authorities in the catchment of the De Hoop Vlei in order to improve water quality and flow into this important Ramsar site. The Department of Agricultural Resources should be contacted, and an IEM approach is necessary before the construction of dams. An interpretative strategy should be planned to influence the activities of landowners within the catchment. Monitoring of the water quality and quantity in the wetland will be ongoing

Control of alien fish species

Implementation of control measures to reduce the number of *Oreochromis mossambicus*, has been identified. It is possible to utilize this fish as a source of food for workers as part of the control programme

25. SCIENTIFIC RESEARCH FACILITIES

A major research programme has been embarked upon which is aimed at monitoring the impact of the Overberg Missile Testing Range on the fauna and flora and other conservation worthy features of the De Hoop Nature Reserve and surrounding area. Special attention has been given to monitoring of De Hoop Vlei particularly in relation to possible detrimental impacts that may result from landuse practices in the catchment area, including possible pollution by pesticides, eutrophication, increased erosion, and effects on water runoff. (cf. Minutes of research working group meeting on De Hoop of 23 November 1984, Department files).

Monthly counts of waterfowl have been undertaken since May 1979 (Heÿl,

1983) and are being continued on a quarterly basis since

There are no research facilities available at De Hoop.

26. CONSERVATION EDUCATION

The provision of environmental education programmes receives high priority. An environmental education centre with accommodation for 60 persons has already been built on the eastern section of the reserve. Environmental education courses have been offered for groups of school children from 1985. At De Hoop an interpretative centre has been developed and walks and hikes will be offered in the near future.

27. RECREATION AND TOURISM

The nature reserve has a high recreation potential, but the emphasis is on nature-orientated educational visits. However, limited overnight accommodation and camping and picnic facilities are available at De Hoop as well as hiking trails. Facilities and numbers of visitors are limited to ensure that no damage is done to the prime conservation-worthy resources of the reserve.

There are proposals in the management plan to develop bird hides and a self-interpretative nature trail along the edge of the wetland. The possibility of zoning the wetland to cater for a limited amount of canoeing is also being looked at.

28. JURISDICTION

Cape Nature Conservation (Provincial Conservation Authority)

29. MANAGEMENT AUTHORITY

Cape Nature Conservation
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30. REFERENCES

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