

## 5.3 LESOTHO

### Introduction

Lesotho is situated between longitudes 27°00' and 29°30'E and latitudes 28°35' and 30°40'S, and is completely encompassed by South Africa. It has a population of 1.7 million, a total area of 30 344 km<sup>2</sup>, and thus a mean population density of 56 persons/km<sup>2</sup>. However, the population is highly concentrated in the western part of the country. Approximately 20% of the total land surface, situated in the west, lies between 1500 and 1850 m asl and is regarded as 'lowland', while the remaining 80% of the country is high, lying between 1850 and 3364 m asl. The land rises comparatively gently from the western boundary with the Orange Free State, towards the eastern boundary with Natal, which is effectively the top of the Drakensberg Escarpment. This, over most of its length in Lesotho, reaches or exceeds an altitude of 3000 m asl and provides a spectacular wall of cliffs with sheer drops of 500-750 m into Natal. The highlands over 2300 m asl comprise horizontally bedded basalts, and this rock forms the peaks and cliffs of the Drakensberg Escarpment. In turn this hard volcanic cap rests upon a horizontally bedded series of sedimentary rocks, several thousand metres thick. The uppermost of these, immediately under the basalt, is a soft sandstone, and the river valleys of Lesotho are principally cut through this stratum on their way to the 'lowlands'. The principal drainage basin is that of the Orange River which rises in the NE of the country as the Senqu. This flows south and then west for 250 km before entering the Orange Free State. The highlands are deeply dissected by many small streams, all of which are headwater tributaries of the Orange River.

### Climate

The country experiences warm wet summers and cold dry winters. Temperatures in the lowlands reach maxima of 39°C in summer, but frosts occur throughout the country from April-September. Readings as low as -18°C have been recorded at lowland stations in winter, when, no doubt, the mountain tops are even colder. Rainfall varies locally and annually. Stations in the lowlands have recorded mean annual falls close to 730 mm over the past 50 years, but with substantial oscillations about this figure. Mountain stations receive mean annual falls of 1500 - 1750 mm depending upon their situation, and some temporary research stations recently established on the highest peaks have recorded annual falls of up to 2000 mm. In addition to rain, substantial snowfalls occur in the mountains in autumn and winter. Cloud often forms without giving rain, and early in the afternoon on most days, mists flow back westwards from the Drakensberg Escarpment over the higher slopes of Lesotho.

### Wetlands

There are extensive bogs and spongelands in the high rainfall areas of the mountains. These are most common in the northeast of Lesotho and decrease in frequency and

individual size towards the south and west. Individual montane bogs are often of small extent, but collectively they cover tens of thousands of hectares. Most are to be found at elevations greater than 2300 m, i.e. above the soft sandstone. From a distance they are recognised as splashes of bright green on the brownish background of montane grassland. The summit of Thabana Ntlenyana (29°26'S/29°20'E), the highest point in Southern Africa (3364 m asp), is partly encircled by bogs, and much of the high plateau immediately to the west of the Drakensberg Escarpment is covered by them. Many bogs are situated over springs at the mouths of 'pipes' of diamondiferous gravel which have been intruded into the basalt and sandstone; others have developed at the heads of the broad, shallow, gently sloping valleys that dip west and south into Lesotho, away from the edge of the great escarpment. Yet others occur where water seeps from clefts or discontinuities in the bed rock. Pools develop in depressions on the flat surface of the soft sandstone, e.g. in Sehlabathebe National Park, while other depressions are filled with sodden gravel, providing yet another type of montane wetland. Almost all drainage lines and soaks are fringed by wetland species in the highlands.

Most streams descend swiftly at first, losing 1000-1200 m over distances of 60-70 km, before reaching the western 'lowlands'. Here their velocities are checked and swamps and small floodplains tend to develop. In the lowlands, streams and river banks are lined by flood tolerant plants, and here farmers have constructed numerous small dams. These latter usually contain aquatic plants and are fringed by reeds or sedges.

## Wetland Flora

**Bog Vegetation:** At the highest altitudes bog vegetation comprises low growing mat-forming species almost exclusively. These give the bogs 'close-cropped', turf-like, appearances. The most important plants involved are *Aiiagallis huttonii*, *Athrixia fontana*, *Haplocarpha nervosa*, *Limosella capensis*, *L. grandiflora*, *L. longifolia*, *Lobelia aquatica*, *Ranunculus meyeri*, *Scirpus fluitans*, and *Sebaea marlothii*. Towards the edges of the bogs other species show above the mat, usually in clumps but still with very low profiles. These include *Drosera natalensis*, *Eriocaulon baurii* and *Rhodohypoxis rubella*, together with occasional taller clumps of *Kniphofia caulescens*. Tussocks of *Danthonia disticha* and *D. drakensbergensis*, up to 1 m high when in flower, occur around the fringes. Here also, in drier ground, are found other *Kniphofia* species, *Brownleea macroceras*, *Geum capense*, *Helichrysum flanagani*, *Holothrix* sp., *Oxalis depressa*, *Ranunculus baurii*, *Senecio concolor* and *Trifolium burchellianum*. *Eragrostis caesia* and *Poa binata* are common mat-forming grasses on the bog periphery.

Pools are common over springs in these flat open bogs. Water wells up and flushes over the lip of the pond and out through the vegetation, which may be almost totally submerged in clear slow flowing water for large areas around the pools. Several of the mat-forming species are truly aquatic and grow in these bog pools, e.g. *Aponogeton junceus*, *Crassula natal's*, *Lagarosiphon muscoides*, *Limosella capensis*, *L. longifolia*, *Lobelia aquatica* and *Utricularia* spp. Usually there is a dense growth of algae in the pools, comprising species of *Lyngbia*, *Nitella*, *Spirogyra* and various diatoms. There is some evidence to suggest that shallow pools become occluded by algae and bryophytes, and that these are then invaded by higher plants leading to the development of hummocks. Once a hummock has formed the

displaced water forms a new pool. Thus some of these bogs depart from the 'close-cropped' appearance and appear as a mosaic of vegetated hummocks and moss lined pools. The hummocks are quickly colonised by plants typical of the drier fringes, e.g. *Geranium incanum*, *Oxalis depressa* and *Trifolium burchellianum*, and this serves to raise them still higher. However, hummock formation seems to operate only from shallow pools, since the deep ones, with vigorously flowing water, appear to stay open with little change of shape over the years. Although the upwelling of water is invariably quite strong, the steep edges of the pools are seldom breached to form definite outlet channels. This occurs only when sheep or cattle come frequently to drink at the same pool and break down the edges.

Other bogs develop below seepages on the lower mountain sides. These are covered by tussocks of *Aristida* and *Danthonia* spp. which appear to invade the bogs from the periphery, growing over black peat which may occasionally reach 2 m in depth. Tussocks are thus most frequent towards the edges, and although the peat is generally firm, at least during the dry season, it may be semi-liquid over hidden springs towards the centre of a bog. In such places both people and animals sink easily. The central regions around the hidden springs are often yellowish and dominated by mosses, together with some of the mat-forming species cited above, but *Sphagnum*, so common in northern hemisphere bogs, is entirely absent. *Carex cernua*, *Cyrtanthus breviflorus*, *Deschampsia caespitosa*, *Drosera natalensis*, *Haplocarpha nervosa*, *Hesperantha baurii*, *Kniphofia caulescens*, *Limosella* spp., *Scirpus* spp., *Senecio concolor*, *S. speciosus* and some orchids occur between the tussocks. Surprisingly a succulent, *Delospenna* sp., is often found in seepage areas.

If drainage is impeded in a valley wetland, vegetation may spread to form a raised peat bog. Some of these rise 1.5 m above the surrounding grassland, and being covered with vegetation another 1 m tall, are conspicuous dark green features of the mountain slopes. Here again *Danthonia* tussocks fringe the bogs, which are completely covered by tall herbs. Typically these include *Carex cernua*, *C. clavata*, and *C. monotropa*, together with *Juncus glaucus* and *Kniphofia caulescens*. Water from the stream supplying the bog seeps through the peat continuously, but at times of high rainfall it may flow freely over the bog surface between the stem bases. Nevertheless, it usually leaves the bog in distinct streamlets. A wealth of orchids may be found in these bogs, generally recognised when in flower, but passed unnoticed at other times. Among these *Disa versicolor*, *Disperis tysonii*, *Habenaria dives*, *Holothrix incurva*, *Satyrium cristatum*, and *S. macrophyllum* are locally prominent, with *Brownleea macroceras* on the drier fringes, together with *Geum capense*, *Ranunculus baurii*, *Senecio* spp., and clumps of *Eriocaulon baurii*.

**Montane Pools:** Pools, ranging from a few centimetres to a metre in depth, occur on the flat surfaces of the horizontally bedded sandstone formations. These support aquatic species such as *Aponogeton ranunculiflorus*, *Ilysanthes confertiflora*, *Limosella* spp. and *Utricularia* spp., while *Crassula galpinii* grows in small gravel-filled hollows soaked with water. In the foothills pools also occur on flat sandstone surfaces, and here *Aponogeton spathaceum*, *Crassula natans* and *Limosella maior* are the dominant species.

**Riparian Vegetation:** Several tall species characterise drainage lines on the mountain-sides, which are therefore conspicuous against the low growing *Themeda-Festuca*

grassland. The most important species are *Agrostis bergiana*, *Danthonia drakensbergensis*, *D. macowanii*, *Hyparrhenia glauca* and *Pennisetum sphacelatum*, with clumps of *Anoiganthus breviflorus*, *Corycium nigrescens*, *Gunnera perpensa*, *Kniphofia caulescens* and *Moraea spathulata*. *Anoiganthus* sp. and *Leersia hexandra* grow in the water, with *Lobelia preslii*, *Myosotis sylvatica*, *Ranunculus baurii*, *Senecio concolor* and *S. speciosus* growing at the waterline. Other species which are locally prominent in this vegetation include *Phygelius aequalis*, *P. capensis*, *Rubus rigidus*, *Wurmbea angustifolia*, *kraussii* and *Zantedeschia albomaculata*.

Mountain streams contain a number of rheophytes, mostly rooted in gravelly patches, and the most conspicuous among these is a straggling, almost trailing bush, *Gomphostigma virgata*. Few submerged species occur in the fast flowing waters, but *Ranunculus aquatilis* is the most widespread.

Riparian vegetation in the lowlands depends very much upon the nature of the river bank, but all species are flood tolerant. On stable banks trees include the indigenous species *Salix nzucronata* and *Salix subserrata*, and the now far more common, introduced, *Salix babylonica*. Swards of *Cynodon dactylon* spread under them. Steep shaded banks support bryophytes such as *Anthoceros*, *Fimbriaria*, *Marchantia* and *Riccia*, and the ferns *Asplenium trichomanes* and *Pteris cretica*, with *Selaginella depressa* in clefts. Exposed banks are often colonised by *Equisetum ratnossisimum*. In other places *Metzleria depressa* and *Sutera aurantica* form veils of foliage over the banks. Shallow muddy sites attract species such as *Juncus exsertus*, *Mentha aquatica*, *M. longifolia*, *Mimulus gracilis*, *Polygonum salicifolium*, *P. setulosum*, *Ranunculus* sp., *Xyris capensis* and numerous sedges including *Cyperus fastigiatus*, *C. marginatus*, *Eleocharis palustris*, *Fuirena pubescens*, *Pycreus macranthus*, *Scirpus falsus* and *S. macer*. *Nasturtium officinale* and *Leersia hexandra* grow partially submerged at the water's edge, both species being totally inundated during floods. *Phragmites australis* and *Typha capensis* form dense reed beds in backwaters and line the river banks away from the currents. Behind these, in moist sites, but ones which are only flooded irregularly, are the grasses *Arundinella eklonii*, *Imperata cylindrica*, *Pennisetum sphacelatum* and *Phalaris arundinacea*.

**Impoundments:** Most of the hundreds of dams in the lowlands and foothills are small, but towards their deeper ends many are fringed by *Phragmites*, *Typha* and various sedges. Aquatics such as *Aponogeton spathaceum*, *Lagarosiphon muscoides* and *Potamogeton* spp. occur in fairly deep water, with *Marsilea macrocarpa* rooted on the muddy margins and spreading between the reeds and sedges. *Denekia capensis* and *Lobelia decipiens* are often common around the shallow, frequently dry, inflow ends. Adjacent marshy ground tends to be covered by tussocks of *Agrostis lachnantha*.

### **Wetland Fauna**

Frogs and toads are common in all wetlands in Lesotho. Those whose range is not limited by altitude, even reaching the top of the escarpment, are *Breviceps adspersus*, *Bufo garipepinus*, *B. gutturalis*, *Cacosternum boettgeri*, *Heleophryne natalensis*, *Phrynobatrachus natalensis*, *Pyxicephalus adspersus*, *P. natalensis*, *Rana angolensis*, *R.*

*grayii*, *R. hymenopus*, *R. vertebralis* and *Xenopus laevis*. Common species that seldom ascend above 1800 m asl are *Afrixalus spinifrons*, *Arthroleptella hewittii* and *Rana fasciata*.

A number of frog and rodent eating snakes frequent the wetlands at all altitudes, also reaching the top of the escarpment. The commonest of these are *Amplorhinus multima culatus*, *Causus rhombeatus*, *Crotaphopeltis hotamboeia*, *Hemachatus haemachatus*, *Psammophis crucifer*, *P. sibilans* and *Psammophylax rhombeatus*.

Birds are uncommon at the edge of the Drakensberg Escarpment, but among those associated with the highest wetlands are *Chalcomitra amethystina*, *Ciconia ciconia*, *Fringillaria capensis*, *Geronticus calvus* and *Nectarinia famosa*. Lower down, on the high slopes and plateaux of the sandstone, where birds are more numerous, these are joined by *Buteo rufofuscus* and *Cinnyris chalybeus*.

Mammals which regularly visit or utilise the wetlands above 2300 m asl include *Atilax paludinosus*, *Canis mesomelas*, *Felis caracal*, *F. lybica*, *Ictonyx striatus*, *Lepus saxatilis*, *Otomys sloggetti*, *Papio ursinus*, *Pronolagus crassicaudatus* and *Redunca fulvorufula*. Lower down on the sandstone *Aonyx capensis*, a few *Connochaetes gnou*, *Lutra maculicollis*, *Ourebia ourebi*, *Panthera pardus*, *Pelea capreolus*, and a few *Taurotragus oryx* may be encountered in wetland areas.

In the lowlands, land adjacent to wetland sites is farmed and thus most large animals visiting these sites are domestic. However, they support a comparatively rich avifauna and contain substantial populations of amphibians and small mammals, and of course there are fish in the rivers.

### **Human Impact & Utilisation**

Ownership of all land in Lesotho is vested in the paramount chief, for the people, and no land is privately owned. In practice, administration of the land is delegated to local chiefs or wardens who grant the right to cultivate to individuals or groups, but all citizens are free to graze cattle on the hillsides.

Apart from Sehlabathebe National Park there are no legally protected areas in the country, and grazing and firing of the highlands, which is becoming progressively more intense, is very deleterious to the ecology of the montane bogs and sponges. Grazing and trampling by domestic animals erodes bogs and sponges. It causes them to dry and reduces their ability to store water and regulate floods. The search for diamonds in the Kimberlite Pipes which underlie many bogs has also resulted in wetland destruction. In the lowlands reed swamps used to be conserved by local practice, since they provided the principal source of thatching material, but with a movement of agriculture into the foothills increased erosion has led to the silting up of many lowland swamps. Today reeds are confined to thin riverine strips in many places, where, only a decade ago, they covered many hectares.

### **Conservation Status**

Representative montane wetlands are conserved in Sehlabathebe National Park which covers

6805 ha in the SE of the country, encompassing the headwaters of the Tsoelike River at elevations between 2300-2550 m asl. The park, which was established in 1970, provides one of the last refuges of a small rare fish, *Oreodaimon quathlanzbae* (in the Tsoelike River), and a newly described aquatic plant, *Aponogeton ranunculiflorus*. All the animals listed above occur in the park, but most large animals leave the area in winter and are in any case scarce, since the park is above the normal altitudinal range of many.