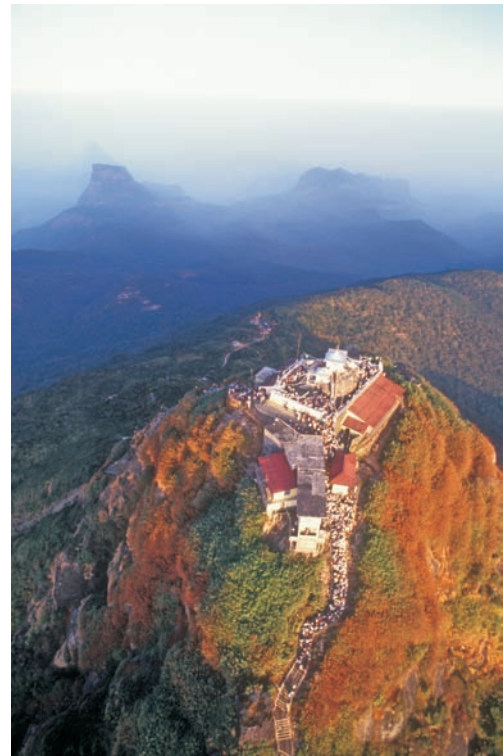




**Nomination of
The Central Highlands of Sri Lanka:
Its Cultural and Natural Heritage**

for inscription on the World Heritage List



**Submitted to UNESCO by the
Government of the Democratic Socialist Republic of Sri Lanka**

1 January 2008



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Contents

| | Page |
|--|------|
| Executive Summary | vii |
| 1. Identification of the Property | 1 |
| 1.a Country | 1 |
| 1.b Province | 1 |
| 1.c Geographical coordinates | 1 |
| 1.e Maps and plans | 1 |
| 1.f Areas of the three constituent parts of the property | 2 |
| 1.g Explanatory statement on the buffer zone | 2 |
| 2. Description | 5 |
| 2.a Description of the property | 5 |
| 2.a.1 Location | 5 |
| 2.a.2 Culturally significant features | 6 |
| PWPA | 6 |
| HPNP | 7 |
| KCF | 8 |
| 2.a.3 Natural features | 10 |
| Physiography | 10 |
| Geology | 13 |
| Soils | 14 |
| Climate and hydrology | 15 |
| Biology | 16 |
| PWPA | 20 |
| Flora | 20 |
| Fauna | 25 |
| HPNP | 28 |
| Flora | 28 |
| Fauna | 31 |
| KCF | 34 |
| Flora | 34 |
| Fauna | 39 |
| 2.b History and Development | 44 |
| 2.b.1 Cultural features | 44 |
| PWPA | 44 |
| HPNP | 46 |
| KCF | 47 |
| 2.b.2 Natural aspects | 49 |
| PWPA | 51 |
| HPNP | 53 |
| KCF | 54 |

| | |
|--|-----|
| 3. Justification for Inscription | 59 |
| 3.a Criteria under which inscription is proposed (and justification under these criteria) | 59 |
| 3.b Proposed statement of outstanding universal value | 80 |
| 3.b.1 Cultural heritage | 80 |
| 3.b.2 Natural heritage | 81 |
| 3.c Comparative analysis | 84 |
| 3.c.1 Cultural heritage | 84 |
| PWPA | 84 |
| HPNP | 85 |
| KCF | 86 |
| 3.c.2 Natural Heritage | 86 |
| 3.d Integrity and authenticity | 89 |
| 3.d.1 Cultural features | 89 |
| PWPA | 89 |
| HPNP | 90 |
| KCF | 90 |
| 3.d.2 Natural features | 91 |
| 4. State of Conservation and Factors Affecting the Property | 95 |
| 4.a Present state of conservation | 95 |
| 4.a.1 PWPA | 95 |
| 4.a.2 HPNP | 97 |
| 4.a.3 KCF | 98 |
| 4.b Factors affecting the property | 98 |
| (i) Development pressures | 98 |
| PWPA | 98 |
| HPNP | 100 |
| KCF | 100 |
| (ii) Environmental pressures | 100 |
| PWPA | 100 |
| HPNP | 100 |
| KCF | 101 |
| (iii) Natural disasters and risk preparedness | 101 |
| (iv) Visitor/tourism pressures | 101 |
| PWPA | 101 |
| HPNP | 101 |
| KCF | 101 |
| (v) Number of inhabitants within the property and the buffer zone | 102 |
| PWPA | 102 |
| HPNP | 102 |
| KCF | 102 |
| 5. Protection and Management of the Property | 103 |
| 5.a Ownership | 103 |
| PWPA | 103 |
| HPNP | 103 |
| KCF | 103 |
| 5.b Protective legislation | 103 |
| PWPA | 103 |
| HPNP | 103 |

| | | |
|-------|---|----------------|
| | KCF | 104 |
| 5.c | Means of implementing protective measures | 104 |
| 5.d | Existing plans related to municipality and region in which the proposed property is located | 104 |
| 5.e | Property management plan or other management system | 105 |
| 5.f | Sources and levels of finance | 105 |
| 5.g | Sources expertise and training in conservation and management techniques | 105 |
| 5.h | Visitor facilities and statistics | 106 |
| | PWPA | 106 |
| | HPNP | 106 |
| | KCF | 106 |
| 5.i | Policies and programmes related to the presentation and promotion of the property | 107 |
| 5.j | Staffing levels (professional, technical, maintenance) | 107 |
| 6. | Monitoring | 109 |
| 6.a | Key indicators for measuring state of conservation | 109 |
| 6.a.1 | PWPA | 109 |
| 6.a.2 | HPNP | 111 |
| 6.a.3 | KCF | 112 |
| 6.b | Administrative arrangements for monitoring the property | 114 |
| 6.c | Results of previous reporting exercises | 114 |
| 7. | Documentation | |
| 7.a | Photographs, slides, image inventory and authorization table and other audiovisual material | See Appendix 4 |
| 7.b | Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property | 117 |
| 7.c | Form and date of most recent records or inventory of the property | 117 |
| 7.d | Addresses where inventory, records and archives are held | 117 |
| 7.c | Bibliography | 118 |
| 8. | Contact information of responsible authorities | 131 |
| 8.a | Preparer – name, title, address, city, telephone, fax, e-mail | 131 |
| 8.b | Official local institution/agency | 131 |
| 8.c | Other local institutions | 132 |
| 8.d | Official web address: http://, contact name, e-mail | 132 |
| 9. | Signature on behalf of the state Party | 132 |
| 10. | Maps | 133 |
| | Appendix 1 Indigenous plant species | 143 |
| | Appendix 2 Faunal species | 165 |
| | Appendix 3 Explanatory note on System of Management | 191 |
| | Appendix 4 Image inventory and photograph and audiovisual authorization form | 201 |

Abbreviations

| | |
|-----------|---|
| BP | before present |
| CBO | Community based organization |
| CF | Conservation Forest |
| dbh | diameter at breast height |
| DWLC | Department of Wildlife Conservation |
| FD | Forest Department |
| FFPO | Fauna and Flora Protection Ordinance |
| HPNP | Horton Plains National Park |
| IUCN | The World Conservation Union |
| KCF | Knuckles Conservation Forest |
| MOE | Ministry in charge of the Environment |
| msl | mean sea level |
| NARESA | Natural Resources, Energy and Science Authority (now the National Science Foundation) |
| NSF | National Science Foundation, Sri Lanka |
| PAM & WLC | Protected area management and wildlife conservation project |
| PW | Peak Wilderness |
| PWNR | Peak Wilderness Nature Reserve |
| PWPA | Peak Wilderness Protected Area |
| PWS | Peak Wilderness Sanctuary |
| WCMC | The World Conservation Monitoring Centre |

Executive Summary

State Party

The Democratic Socialist Republic of Sri Lanka, generally shortened to Sri Lanka (formerly, Ceylon)

State, Province or Region

Central and Sabaragamuwa Provinces of Sri Lanka

Name of Property

The Central Highlands of Sri Lanka: Its Cultural and Natural Heritage

Geographical coordinates

This is a serial property, comprising three constituent parts, whose coordinates (of their central points) are as follows:

| | | |
|--|-----------------|------------------|
| Peak Wilderness Protected Area (PWPA): | 6° 48' 04.96" N | 80° 37' 31.13" E |
| Horton Plains National Park (HPNP): | 6° 48' 22.07" N | 80° 47' 47.55" E |
| Knuckles Conservation Forest (KCF): | 7° 27' 08.82" N | 80° 48' 07.56" E |

Textual description of the boundaries

PWPA and HPNP are contiguous, both forming part of the Central Massif. KCF is located in the Knuckles Massif which is separated from the Central Massif by a low-lying plateau.

PWPA

The boundary of PWPA includes the outer boundaries of the Peak Wilderness Nature Reserve, the Peak Wilderness Conservation Forest, the Walawe Basin Conservation Forest and the Morahela Conservation Forest, and, in its eastern extension, it has a common boundary with HPNP. The boundary of the Peak Wilderness Nature Reserve has been defined by notification in the government gazette under the provisions of the Fauna and Flora Protection Ordinance. The boundaries of the three conservation forests have been defined by notification in the government gazette under the provisions of the Forest Ordinance.

HPNP

The boundary has been defined in the government gazette notification declaring this area a national park under the provisions of the Fauna and Flora Protection Ordinance.

KCF

The boundary has been defined in the government gazette notification declaring this area a conservation forest under the provisions of the Forest Ordinance.

A4 size maps of the nominated property showing the boundaries and buffer zones where present

These are included in the main text.

Justification

The three constituents of this serial property possess features of outstanding universal value in both the cultural and natural spheres. It is being nominated for inscription as a **Mixed World Heritage**

Cultural values

The development of Adam's Peak within **PWPA**, as a religious monument, is linked to Sri Lanka's ancient civilization where the ruling monarchs, while building thousands of reservoirs to store water and provide the people with sustainable living conditions, also placed great emphasis on promoting religious values. **PWPA**, with the focus on what is believed to be the footprint of Lord Buddha atop the mountain, has a cultural heritage that dates back to the pre-Christian era. The cultural cum religious traditions and beliefs associated with Adam's Peak have continued in an almost unbroken chain till the present day. Many kings who have reigned since the 11th century AD have lent their patronage to this religious monument and it is recorded that some of the monarchs had climbed the mountain to worship at the shrine. Marco Polo, in the 13th century, and the Arab traveler Ibn Batuta, in the 14th century, have visited the peak and recorded their observations. Long prior to that the Buddhist traveler monk Fa Hien in his book *Travels in India and Ceylon* (393-414 AD) records his visit to Adam's Peak and his interpretation of the origin of the foot print.

At the present time around two million people, the great majority of them being pilgrims, climb the mountain every year. Numerous traditional practices, some of them many centuries old, are performed by the pilgrims, many of them while being engaged in the arduous climb to the peak.

The mountain is also associated with the deity Saman who is said to be the custodian of this area, and many religious practices are associated with paying homage to this deity. These beliefs and practices have an equally long tradition as the worship of the footprint.

HPNP presents a cultural landscape of a different kind. Studies in many parts of Sri Lanka had revealed that Mesolithic man, called *Homo sapiens balangodensis*, the progenitors of Sri Lanka's aboriginal people the *veddas*, had occupied many different parts of the country. Archaeological investigations extended to the relatively undisturbed sites in Horton Plains, a high elevation tableland (> 2000 m above msl), where soil cores were extracted from depths of up to six metres, have revealed a remarkable sequence of cultural practices of pre-historic man in this area. Archaeological and palaeo-ecological evidence based on radio-carbon dated multiproxy data (on pollen, spores, diatoms, phytoliths), organic carbon, total carbon, etc. reveal the presence of humans in this area from around 24,000 years up to 3600 years before present. During this long period, starting with forest clearing and burning and the hunter forage culture, he advanced to incipient agriculture with the growing of oat and barley and later still to farming with rice. These changes coincided with changing climatic conditions in the area. This evidence suggests that plant domestication took place here earlier than what was thought to be the origin of agricultural practices using oats, barley and rice elsewhere in South Asia.

Recent research studies in **KCF** have revealed the presence of caves within this forest with evidence of artifacts of a similar kind to those found in other archaeological sites which have been dated to the early Mesolithic period. Much later (around the third century BC) these caves began to be occupied by Buddhist monks. According to legend King Valagamba

had ordered drip-ledges to be made on the rock at the entrance to the caves. A drip ledge is an architectural feature chiseled along the brow of the cave to divert rain water away from the entrance.

The villages within and outside the boundary of KCF, have until recent times, been extremely difficult to reach. In the construction of dwelling places, in the type of household items in use and in their agricultural and religious practices the villagers have continued with their age-old traditions. Steps will be taken to conserve and protect examples of this ancient lifestyle.

Natural values

The property, with its three constituent parts, is situated in the wet southwest of Sri Lanka. It is the sole representative that still remains in a near pristine state, of the montane and submontane element of that small fraction of the world's rainforest biome, which, because of its distinctive nature, has been identified as the Ceylonese Rainforest by Udvardy. Having separated from the Indian subcontinent in the Miocene Epoch and but little influenced by the intermittent land connections that have occurred since then up to the Holocene, southwest Sri Lanka has remained isolated from outside influence and its biota have pursued their own course of evolution. The rainforest in the southwest of the country is rich in biodiversity. A high proportion of its species are endemic, with the level of endemism exceeding 50 per cent in many of the plant and animal taxonomic groups. Endemism in the island is highly concentrated (over 90 per cent of the endemic species) in the humid southwest of the country.

All of the 58 species of the plant family Dipterocarpaceae are endemic and all, but one, are restricted to the wet zone. In the same family, the endemic genus *Stemonoporus* with 26 species counts 11 species found exclusively in the mountainous region, mainly in PWPA. In the faunal groups, endemism among the amphibian species is 83 per cent, and a great many of them are restricted to the mountainous region. Because of their restricted habitats due to extensive deforestation in the past, which led to fragmentation of the Sri Lankan rainforest on a massive scale, many of the endemic species of fauna and flora are under severe threat of extinction. Sri Lanka, with the Western Ghats of India, has been named as the world's biodiversity hotspot with the highest level of threat to its biota due to human activity.

Because of Sri Lanka's past link with peninsular India as part of the Deccan Plate, many plants and animals at the generic and supra-generic level are also found in peninsular India. Long separation from peninsular India, however, has led to radiation leading to the evolution of new species and subspecies. For example, the purple faced langur *Semnopithecus vetulus* has evolved into several morphologically different forms in Sri Lanka, with *S. vetulus monticola* being restricted to the montane zone and inhabiting the property. In Malabar, in mainland India, it has evolved into a distinct subspecies *S. vetulus johnii*.

Some plant species in the wet southwest of the island are considered to be Gondwanic, signifying the fact that the island was once a part of the giant continent of Gondwanaland. Two of these, in the genus *Hortonia* (out of a total of three), *H. floribunda* and *H. ovalifolia*, in the endemic subfamily Hortonioideae, are restricted to the mountainous region and found in the property.

There is an approximately equal distribution of the endemic biota between (a) the low and mid-country wet zone and (b) the submontane and montane wet zone. The former is represented by the Sinharaja Forest Reserve, a World Heritage, while the latter is represented by the property now nominated.

A remarkable feature of the wet zone biota is the many instances of point endemism that have been observed i.e. where the distribution of endemic species is highly localized. This type of distribution adds to the vulnerability of the species.

Between KCF and PWPA, there are many species that are common to both indicating their common geological origin; but at the same time there are some remarkable instances of allopatric speciation where two distinct species of the same genus are found, one in KCF and the other in PWPA. Examples are *Cophotis dumbarae* and *Nannophrys marmorata* (a lizard and frog respectively) in KCF and *C. ceylanica* and *N. ceylonensis* in PWPA. This trend in evolution would have been the result of separation through several thousand years of these two mountain massifs by a relatively low-lying plateau. There is no doubt that the evolutionary processes that have shaped the biota of the central highlands would continue, provided the habitats where they occur are given adequate protection.

Horton Plains, unlike the rugged and highly dissected mountainous country of PWPA, consists of a high-elevation tableland. Its biotic features are also distinctive. The vegetation of the plains consists of grasses and other herbaceous plants as well as one of the most reduced forms of bamboo, *Sinarundinaria densifolia*, just about half a metre in height. Several of the herbaceous plants and of the tree species that occur in patches are, surprisingly, of East Himalayan, and therefore of Laurasian, stock. It is suggested that these species had reached the highlands of Sri Lanka by “island hopping” during geological periods when favourable conditions prevailed, by way of a corridor or stepping stones bearing a moist and cool climate with light frost. Others claim that it would have occurred through long-distance dispersal.

The three constituents of the property contain landscapes and present views of exceptional natural beauty. The breathtaking sight from Adam's Peak, especially at the break of dawn, presents a rare spectacle that has been described in superlative terms by many authors.

The landscape of Horton Plains and the view from “World's End”, with a drop of nearly 1000 m, has attracted the attention of a growing number of tourists.

KCF is noted for its extremely rugged and highly dissected mountain range, with 35 peaks and numerous near-vertical sided escarpments with drops of several hundred metres. Five of the peaks give the appearance of a clenched fist from afar, hence the name.

Criteria under which the property is nominated

Criterion iii

Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared

Criterion v

Be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment

especially when it has become vulnerable under the impact of irreversible change

Criterion vi

Be directly or tangibly associated with events or living traditions, with ideas, or beliefs, with artistic and literary works of outstanding universal significance

Criterion vii

Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance

Criterion viii

Be outstanding examples representing major stages of earth's history, including the record of life, significant ongoing geological processes in the development of land forms, or significant geomorphic or physiographic features

Criterion ix

Be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal and marine ecosystems and communities of plants and animals

Criterion x

Contain the most important and significant natural habitats for *in situ* conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation

1. Identification of the Property

1. a Country

Sri Lanka

1. b Province

The three components of the serial property fall within the Central and Sabaragamuwa Provinces

1. c Name of Property

The Central Highlands of Sri Lanka: its natural and cultural heritage

1. d Geographical coordinates

The nominated property is a serial one, consisting of three areas. The geographical coordinates of the three areas are given below.

| Area | Province(s) | Nearest town(s) | Administrative district(s) | Coordinates of mid-points |
|--|--------------------------|-----------------|----------------------------------|--|
| 1. Peak Wilderness Protected Area (PWPA) | Central and Sabaragamuwa | Maskeliya | Ratnapura, Nuwara Eliya, Kegalle | 6 ^o 48' 04 96" N 80 ^o 37' 31 13"E |
| 2. Horton Plains National Park (HPNP) | Central | Nuwara Eliya | Nuwara Eliya | 6 ^o 48' 22 07" N 80 ^o 47' 47 55"E |
| 3. Knuckles Conservation Forest (KCF) | Central | Matale, Kandy | Kandy, Matale | 7 ^o 27' 08 82" N 80 ^o 48' 07 56"E |

1. e Maps and Plans

The following maps and plans are included in this nomination at the end of the text.

- Bioclimatic zones of Sri Lanka
- Central highlands
- Floristic regions
- Locations of the serial sites
- PWPA and HPNP
- PWPA and HPNP vegetation

- PWPA and buffer zone and adjoining reserve forests
- PWPA drainage pattern (hydrology)
- KCF and buffer zone
- KCF vegetation map

Topographical maps showing PWPA, HPNP and KCF are included among the documents

1. f Areas of the three constituent parts of the nominated property

Peak Wilderness Protected Area (PWPA): 20,596 ha
Peak Wilderness Protected Area area of buffer zone: buffer zone identified conceptually; not legally defined or land marked: 37,571 ha

Horton Plains National Park (HPNP): 3109 ha
Horton Plains area of buffer zone: no buffer zone required

Knuckles Conservation Forest (KCF): 31,305 ha
Knuckles Conservation Forest area of buffer zone zone: buffer zone identified conceptually; not legally defined or land marked: 35,074 ha

1. g Explanatory statement on the buffer zone

The buffer zone concept has been recognized by the Forest Department for several decades and it was put into effect when management plans were drawn up for conservation forests which were made national or international biosphere reserves.¹

The buffer zone concept and its application have to be viewed in the context of the prevailing situation in the wet zone of Sri Lanka. The wet zone rainforests were subject to extensive deforestation in the past and what remains now are numerous forest patches, the large majority of which are relatively small (by world standards) and are ringed by village communities or are situated cheek by jowl with tea plantations. The buffer zones that have been identified by the Forest Department in relation to the biosphere reserves that have been established in Sri Lanka are located outside the protected area and are not legally defined as such. The buffer zones include, for the most part, villages, tea plantations and other private land. While the inner boundary of the buffer zone coincides with the outer boundary of the reserve, the outer boundary of the buffer zone (which is determined only conceptually) is marked out depending on the specific needs in relation to the protection of the reserve.

In the Fauna and Flora Protection Ordinance (which is administered by the Department of Wildlife Conservation) an amendment made in 1993 makes provision for the establishment of a new category of wildlife reserve called a Buffer Zone. Such a reserve, like the other categories of wildlife reserves, should consist only of state land. Up to now (2006-2007), no areas have been declared as Buffer Zones under the Fauna and Flora Protection Ordinance (FFPO). The buffer zones of the Forest Department's conservation forests and the buffer zones of the constituent areas of the nominated property are not legally constituted as such and bear no relevance to the Buffer Zone category recognized by the FFPO

The added measure of protection that the buffer zone provides comes through a wide range of activities designed to strengthen the conservation of the protected area through public participation. The measures that are adopted include the formation of community based conservation organizations; education, awareness and communication programmes; introducing improved agricultural practices in private land holdings; raising village woodlots; training the youth in various skills so as to wean the community away from excessive dependence on the forest; and not least by carrying out health camps for the more remote village communities to win their support for the conservation of the natural ecosystem.

This same buffer zone concept will be adopted in the areas included in the property being nominated. The buffer zone so conceived will include all the border village communities. Information specific to the three constituent areas is given below. Where no specific buffer zone is needed (e.g. in sections where the Forest Department's reserve forests, which are themselves given strong legal protection, fall immediately outside the boundary of sections of the property) no buffer zone as such is identified.

PWPA

Some parts of PWPA are contiguous with forest reserves under the charge of the Forest Department (e.g. the Bogawantalawa and Agrabopats forests) and their very existence and the strict protective measures adopted by the Forest Department would serve as an adequate protection for those sections of the PWPA. Hence no buffer zone is marked in those areas.

In several parts of PWPA there are peripheral villages. Wickramasinghe (2002) who has carried out a socio-economic study of the area notes that the “periphery of the Adam's Peak Wilderness is marked by a long history of human settlements” and that there are 11 clusters of communities, eight in the west and south and three in the north. Each cluster consists of several small village communities. The history of the southern villages goes back several centuries, whereas the settlements to the north came into being with the establishment of tea plantations during the British colonial period. The traditional village practices in relation to the use of forest resources are strongly associated with the belief in the sacredness of the *Samanala Adaviya* (Peak Wilderness range).

Community-based programmes will be started in the sections of the buffer zone occupied by village communities with a view to strengthening conservation measures and restricting dependence on forest resources to sustainable levels. There will be a strong emphasis on cultural and religious aspects in the PWPA buffer zone programmes. The programmes will be implemented by the Forest Department and the Department of Wildlife Conservation (in collaboration with the cultural sector institutions) in the respective buffer zone areas adjoining the sections of the PWPA under their control.

HPNP

The need for a buffer zone for HPNP does not arise. The management plan (DWLC 1999b) states “Fortunately this park does not have the problems typical of most parks in Sri Lanka as there are no human habitations in its periphery”. It is for the most part surrounded by natural forest, protected and administered by the Forest Department. Where tea plantations occur, they are situated at the bottom of a steep escarpment, the Southern Wall, which gives natural protection to the property.

KCF

The area surrounding the KCF has been considered as the buffer zone, and the management plan has made several proposals for activities to be carried out within the area. According to the plan, “buffer zone management in general aims to establish an ecologically and socio-economically sustainable interactive relationship between the forest and the people living in the surrounding areas” Several activities were initiated over the past decade and are continuing.

In some parts, the buffer zone includes forest ecosystems no different to the adjacent part of the KCF. These forests are being surveyed under a current Forest Resources Management Project. The Forest Department would consider declaring such areas as conservation forests so as to provide added protection to the KCF.

2. Description

2. a Description of the Property

2. a. 1 Location

Sri Lanka's highlands, where the land rises to an elevation of over 2500 m above mean sea level (msl), are situated in the south-central part of the island. Sri Lanka's land area is 65,610 km², and, of this, the highlands (>1000 m above msl) constitute only 3%. The property, comprising *three component parts*, is situated in the central highlands.

The main part of the high mountainous region is referred to as the Central Massif. It has the rough shape of an anchor. Both PWPA and HPNP are located in the arc shaped part of the anchor. Knuckles, though separated from the Central Massif and forming a distinct mountainous region referred to as the Knuckles Massif, has a common geological origin with the Central Massif. The Knuckles is separated from the Central Massif by the relatively low-lying Kandy Plateau and the Dumbara valley. The two mountainous regions have been so isolated for many thousands of years. The Kandy Plateau provides the passage through which the Mahaweli Ganga, Sri Lanka's longest river, crosses the mountainous country and passes from the south western part of the country where it originates to the eastern part through which it flows over a long distance and finally discharges into the ocean at Trincomalee.

The topography of the island as a whole has for long been described as forming three peneplains. Inland from the coast, the lowest peneplain, which is the most extensive as it also occupies the entire northern and eastern parts of the island, has an altitude of 0-125 m above msl. The second peneplain is at 448-762 m, and the third, the highest, at 1524-2200 m. Each peneplain is separated from the next at several points by steep escarpments. The highest peneplain and the associated mountain ranges are where much of the constituent parts of the nominated property are located. The area covered by this peneplain has very little resemblance to a plain and there can, in fact, be recognized several planation surfaces as well as mountains within this area. The planation surfaces occur at different levels, and steep mountainous areas rise well above the planation surfaces.

The three-peneplain model is now considered to be an oversimplified version of the physiography of the island. Wickramagamage (1998) has shown that there are as many as 11 planation levels and that a "staircase pattern" of planation surfaces could be recognized. He states that the staircase arrangement of the erosional surfaces in the hill country may be the result of both differential weathering and erosion and also due to tectonic uplift. Turning our attention to the three constituents of the nominated property, PWPA is for the most part located in the mountainous area that rises above all the planation surfaces, HPNP is the highest step in the staircase pattern of planation surfaces, and KCF is a mountainous area that is separated from the Central Massif where the other two constituents are located. KCF has within it a planation surface, the Selvakanda plateau.

The Kandy plateau that separates the Central Massif from the Knuckles Massif is at around 500 m above msl and is situated in the second peneplain on the three-peneplain model.

2. a. 2 Culturally significant features

The property, with its three constituent areas, presents a wide range of cultural heritage features of outstanding value. In Sri Lanka's remarkable hydraulic civilization that spanned several centuries, the people and the monarchs alike while developing an agriculture-based civilization also placed a high value on cultural and religious practices. In this context, Adam's Peak, in a rugged mountainous area, though far removed from the centres of development in the dry zone, began to attract devotees, including several of the monarchs, who braved the hazards of the thick forest and the precipitous terrain to climb the mountain and pay homage at the shrine that was established there. This practice has continued and grown in magnitude through the passage of centuries. Many foreign travelers also made it a point to climb the peak and have commented on the spectacular features of this site.

Horton Plains, contiguous with the Peak Wilderness Protected Area, presents a different aspect of cultural significance. Recent palaeo-ecological studies in Horton Plains have revealed that prehistoric man occupied this area first as hunter-forager c. 24,000 years before present (BP) and later through several stages of cultural development that followed.

The Knuckles range, where archaeological investigations have been carried out only in recent times, has turned up several caves with evidence of their occupation by Mesolithic man. Subsequently, from around 300 BC, some of the caves had become the abode of Buddhist monks.

Another cultural feature of special significance is the existence within the range of ancient villages which, until recent times, had no road access. The inaccessibility of this mountainous area had sheltered the villages from the influence of modernization. Until about two decades ago the village dwellings were of mud and in the style of several centuries back. Some of the dwellings that are still in that form would be selected for conservation and will be preserved as monuments. Many of the ancient cultural practices remain in vogue even today.

The cultural features of the three areas are described in further detail below.

Peak Wilderness Protected Area (PWPA)

The Adam's Peak Range, with its prominent cone-shaped peak provides a spectacular view from a distance. The peak itself is steeped in legend antedating the Christian era. The historical document the *Mahawamsa* (Anon. 543 BC-1758 AD) indicates that the peak was held sacred prior to 140 BC.

At its very top, the peak bears an indentation resembling a footprint. Deemed to be the footprint of the Lord Buddha, the site acquired a religious significance from very early times. Since then, in an unbroken chain, the religious and cultural importance of the site has grown in magnitude.

At the present time it is estimated that two million people, mainly pilgrims, visit the peak annually. The trek to the top involves a long and arduous climb through trails passing through the thick forests of the Peak Wilderness. The pilgrim season is from December to May. Much of the climbing is done at night, and electric lights are now in place to light up



A distant view of the Peak Wilderness Range

the paths. The climbing is done in a spirit of deep piety. There are six recognized trails traversing the mountainous terrain and leading to the peak, with three of them being the more popular. The time spent by an average person for the ascent from the vehicle park, excluding rest times, is from 8 to 16 hours, depending on the trail that is used. Resting places had been built alongside the climbing routes for the convenience of pilgrims.

Horton Plains National Park (HPNP)

At present Horton Plains is an uninhabited tableland with a cold and forbidding climate and subject to strong winds at certain times of the year. It was until recent times difficult to reach. The natural vegetation over a good part of the area comprises grasses and other herbaceous plants.

In an archaeological survey of Horton Plains, Deraniyagala (1992) located many prehistoric sites, among which one yielded geometric microliths. One of the sites was identified as a likely quartz quarry (Deraniyagala 1971). Deraniyagala (1992) drew the following conclusions from his studies. The ancient habitation sites at Horton Plains were mainly located on hill saddles, with a few occurring on hill tops and on promontories jutting out of the main plateau. There were indications that the ecotone between the forest and the grassland was preferred, suggesting that the grasslands were already in existence when prehistoric man occupied these sites. The extent of each site of occupation was estimated to be on average 50 m², suggesting that it was probably occupied by just one “nuclear” family. The stone-age sites at Horton Plains probably represented seasonal camps when man moved up to the hills during the dry season to fire the grasslands and thus drive the game.

Recent palaeo-ecological research has turned up a significant body of information confirming the occupation of Horton Plains by prehistoric man and providing information on his livelihood activities and how these were adapted to changing climatic conditions through a span of several millennia, from 24,000 years BP. This new evidence is based on radio carbon dated palaeo-ecological discoveries of peat and sediment sequences found in cores extracted to a depth of six metres (Premathilake 2003, 2006; Premathilake & Risberg 2003).

The palaeo-ecological evidence reveals that cultural development began with hunting and foraging (hunter-gatherer stage) under the dry conditions that prevailed during the last glacial maximum (24,000-18,500 years BP). Subsequently, in the post-glacial period, with increasingly favourable climatic conditions, there is evidence of slash and burn and herding and incipient management of cereal plants of oat and barley (17,600 - 16,000 years BP). The first signs of systematic cultivation appear between 13,000 and 8700 years BP when wild species of *Oryza* were grown. More details of the prehistory of Horton Plains are given under 2.b.1.

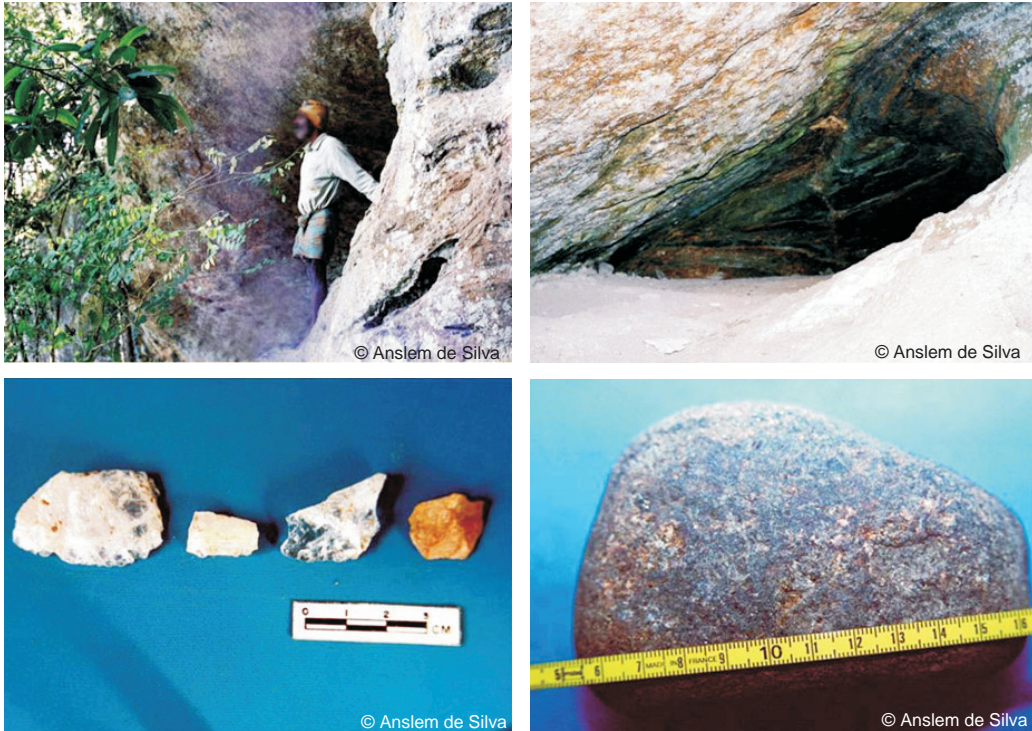


One of the sites at HPNP where first agriculture was practised in South Asia

Knuckles Conservation Forest (KCF)

The cultural features of KCF relevant to its inclusion as a constituent of the property being nominated as a Mixed Heritage relates mainly to the evidence of cave dwelling humans dating back to the Mesolithic period. The investigations, however, are at a very early stage and only some basic information could be provided at present. De Silva et al. (2005b) describe the Mesolithic Gorahadigala caves discovered in the Dotulagala section of KCF. The entrance to the main cave is situated about 2.5 m above the present ground level. On the floor of the main cave there was a thick ash mixture, one metre deep. Bones of several species of animals were among the findings here, together with stone implements. Most of the quartz implements identified as microliths were seen to bear faint traces of retouch marks. Similar findings in other parts of the country, notably in Kitulgala in the Ratnapura district, have been dated from 27,000 to 9000 years BP (Deraniyagala 1992, Wijayapala 1997).

Among the other recent discoveries are the Uyangamuwa cave, the Valagamba cave and the Nariyagala cave. These caves bear a characteristic architectural feature called a drip ledge which is a groove chiseled along the brow of the overhanging boulder at the entrance to the cave to divert the down-flowing rainwater away from the entrance. (De Silva et al. 2005c). According to legend, King Valagamba had ordered drip ledges to be chiseled to make the caves more habitable for the Buddhist monks who resided there. The use of these



Caves occupied by prehistoric Mesolithic man at KCF, and primary tool types (microliths) found in these Mesolithic caves.

caves by Buddhist monks date back to around the second century BC.

Surface investigations in the Uyangamuwa cave yielded two silver punch-marked coins. These belong to the pre Christian early historic period (fifth to first century BC) and are of Indian origin.

The best known cave in KCF is the Nitre Cave, explored by Davy in 1821. Its history is steeped in legend which, however, is not supported by any substantial scientific evidence (Cooray 1998). It is believed that deposits in the cave were used to extract saltpetre during the time of the Kandyan kingdom.

A distinctive feature of the Knuckles range as a whole, from the point of view of culture, stems from its extreme remoteness and inaccessibility. The people living in some of the villages (e.g. Damentenna, Ettanwela, Walpolamulla, Gangahenwala, Rambukoluwa, Kiwulwadiya, Galgedawala) would have had to traverse thick forests across narrow foot paths at perilous heights and cross natural watercourses to reach their habitations.

There are some villages in the thick of the mountain range which until recent times modern civilization has hardly touched. One such village, Meemure, is believed to have been a place of exile in ancient times to which, because of its remoteness and isolation, persons who had offended against the king were banished. The remoteness served another purpose. The last king who ruled in Sri Lanka before the country acceded to the British (in 1816) was Sri Wickrama Rajasinghe. He is said to have taken refuge with his family in Meemure at the time that he was being pursued by the British troops.

More details regarding the cultural developments among the people occupying the



A traditional village dwelling at Meemure, a village located within the KCF

(Note: This dwelling constructed of mud, with a court-yard, and apparently built by an important personage, is a remnant of an ancient construction technology. The traditional thatched roof has been recently replaced by galvanized iron roofing)



Knuckles range since pre-Christian times are given in section 2.b.1.

The impact of modern developments reaching these villages over the past years and the children receiving education denied to their parents is leading to the disappearance of the manifestations of this ancient culture. What is proposed is to identify a village and select one or

more properties for conservation in order to depict and to preserve evidence of this culture.

2. a. 3 Natural Features

Physiography

The three constituent areas of the nominated property are located in the high mountainous part of the country. Although, in a general way, they share in the common features of their mountainous terrain, there are some differences in physiography between them which should be noted. The most prominent physiographic feature of PWPA is the prominent cone-shaped mountain top that reaches a sharp peak at an elevation of 2243 m. The mean altitude is given by DWLC (1999a) as 1830 m above msl and the maximum as 2243 m. Reference to the topographical maps show that some of the fringe areas of PWPA go down to an elevation of 600 m. The terrain is very rugged with steep escarpments covering about 50% of the area. In the upper slopes the bedrock is often exposed while in the lower sections of the escarpments there is a mantle of lithosols and skeletal soils. Rock knobs - steep - sided and often dome - shaped exposures of bedrock - cover over 5% of the area.

In HPNP, the terrain, for the most part, in contrast to the Adam's Peak Range, consists of gently undulating land forming a highland plateau situated at the southern edge of the arc of the anchor-shaped Central Massif. It forms the highest tableland in Sri Lanka at an average elevation of 2200 m. Because of the stability of the landscape, soil profile development has taken place leading to the formation of a mature soil profile.



The sacred peak at PWPA and the wet montane forest

The rim of the National Park has some remarkable features. Towards the west the land rises to Kirigalpotha, a peak at an elevation of 2395 m, and towards the northeast there is an equally sharp rise to Totapolakanda at an elevation of 2357 m. In contrast, towards the south there is a sheer drop of nearly 1000 m down the escarpment referred to as the



HPNP: a 2200 m tableland with grassland and cloud forest

Southern Wall, and the view from a point described as *World's End* stretches across the broad plain of the low country and out to the sea beyond. Another picturesque spot is Baker's Falls seen from the trail leading to World's End.

KCF is located in the very heart of the extremely rugged Knuckles massif which lies to the northeast of Kandy and is separated from the Central Massif by the Kandy Plateau and the

Dumbara valley. The main range trends in a southwest-northeast direction, with southwestern slopes and northeast trending offshoots. It consists of peaks, a complex of interconnected ranges, steep escarpments with near vertical rock faces, plateaux and river valleys. Within the Knuckles Massif there are 35 peaks, of which 14 are over 1500 m in



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The spectacular five peaks in the Knuckles Mountain range which resemble the knuckles of a clenched fist.

altitude. The most spectacular among these is a set of five peaks which when viewed from afar resemble the knuckles of a clenched fist, hence the name. The two highest peaks in the mountain complex are Gombaniya (1906 m above msl) and the peak that bears the same name as the range, Knuckles peak (1863 m) (Cooray 1998). In the middle of the Knuckles Range there is a gently rolling expanse known as the Selvakanda plateau.

On the western side of the Knuckles range the land slopes moderately southwestwards into the Hulu Ganga valley without any interruption. The tributaries of the Hulu Ganga flow down the dip slopes of the Knuckles range, often carving out vertical-sided amphitheatres which reach almost to the crest of the range. On the northeastern side of the range, there is a series of stupendous rock escarpments overlooking the valleys of the Kalu Ganga, Heen Ganga, and the Mahaweli Ganga itself. These escarpments fall hundreds of metres in sheer vertical rock faces. Escarpments are, in fact, a major land form in the massif, often reaching hundreds of metres in height. One of the characteristic features of the land-forms in the whole massif is the alternation of dip slope and scarp slope providing a breath-taking panoramic view of the range.

When the Knuckles forest was earmarked for conservation it was decided to take the 3500 ft (1067 m) contour as the boundary. Subsequently this decision was changed and it was decided to extend the limit to cover all contiguous forests even at lower elevations. This directive led to some difficulty for the field surveyors when deciding on the patches of forest that should be treated as “contiguous”, and in carrying out the survey many scrub areas between patches of forest came to be included (IUCN 1994). The boundary now

extends down the mountain slope, particularly in a north-east trending arm, to an elevation of c. 200 m. Hence the altitudinal range of what is now the Knuckles Conservation Forest goes down from 1906 m to 200 m above msl. The topographical sheets (1:50,000) of the Survey Department, however, still carry the 1067 m contour as the boundary of the Knuckles Conservation Area.

Geology

Sri Lanka is a continental island lying close to the southern tip of the Indian subcontinent. Though small in size (65,610 km²), its geological history is distinctive and remarkable. Since the Palaeozoic era, and during the geological processes that shaped the world to what it is today, one of the events of significance was the break up of the vast southern continent, Gondwanaland. This took place towards the end of the Mesozoic era, around 100 million years ago. One of the crustal plates formed from the break-up, the Deccan Plate, drifted northwestwards towards the equator. Sri Lanka separated from the rest of the Deccan Plate around the Miocene epoch (Wadia 1941). Since then, there have been fluctuations in the sea level resulting in land connections with India at various times in the past.

Throughout its long geological history, except for a small part of its coastal plain in the northwest, no other part of Sri Lanka had been subject to submergence at all and hence contains no sedimentary rocks. The island represents a type of the earth's crust composed of extremely ancient crystalline and metamorphic rocks, rocks which are the foundation on which the geological framework of other parts of the earth is built (Wadia 1941).

It should be noted that many of the geological events that made Sri Lanka what it is today took place well before Sri Lanka formed a separate entity i.e. when it was still a part of the vast continent of Gondwanaland and later a part of the Deccan Plate. For this reason Sri Lanka possesses a common geological structure, composition and plan of architecture with peninsular India. It was only since the Miocene epoch that Sri Lanka became a separate geographical entity and began to pursue its own course of geo-morphological evolution.

An event of particular significance in the geo-morphological evolution of Sri Lanka is the upwarping of the land, believed to have occurred in different stages, separated by vast intervals of time - intervals during which the uplifted land had been subjected to strong erosive forces. The ceaseless sub-aerial decay of the land is estimated to have removed from the original surface, at a conservative estimate, over 10,000 feet (3048m) depth of rock, releasing in the process minerals that aggregated to form valuable gem-yielding deposits (Wadia 1941). The richest of these is at the base of the Adam's Peak range towards Ratnapura (Gunawardena 2002).

The mountain building events were all post-Jurassic, the latest believed to have occurred in the Pliocene or even later (Wadia 1941).

Geologically, nine-tenths of Sri Lanka is made up of extremely ancient, highly crystalline and metamorphic, non-fossiliferous rocks of Precambrian age. The crystalline rocks have been subdivided into three main groups, each with its characteristic rock types, structure and well-defined distribution. The three groups are (a) the Highland Series, (b) the South-western Group and (c) the Vijayan Complex.

The Highland Series which covers the entire Central Highlands, including all three components of the property, is composed of two main types of rocks, namely,

metasediments and charnokite gneisses. The metasediments, which are the metamorphosed equivalents of sedimentary rocks, comprise garnet-sillimanite schists and gneisses, quartzites and quartz schists, quartz feldspar granulites and garnetiferous gneisses, marbles and calciphyres, and graphitiferous schists. The most striking of the metasedimentary rocks are the garnet-sillimanite rocks, also referred to as khondalites. These are metamorphosed clays and shales. The garnets are very large and turn into rounded concretions of iron oxide on weathering. The quartzites are metamorphosed sandstones. The quartz feldspar granulites and gneisses are a group of light coloured rocks probably formed out of metamorphosed sandy clays or clayey sands. The marbles are metamorphosed sedimentary limestones. Calciphyres are very impure calcareous rocks formed by the metamorphism of calcareous muds and sands. Graphitiferous schists occur as very narrow and relatively scarce bands, rich in graphite and sulphide minerals (Cooray 1984).

The charnokite gneisses (referred to locally as *kalugal*) are the commonest rock types of the Highland Series. They are dark greenish grey or bluish grey in colour. They vary considerably in composition and texture. The origin of the charnokite gneisses is uncertain but it is generally believed to have resulted from metamorphism, but whether the original rock was sedimentary or igneous is not known (Cooray 1984). Thick charnokite bands interlayered with marble and quartzites are found among major escarpments such as are found in Adam's Peak and other places.

The most important structural features of the rocks of the Highland Series are foliation and bedding. The former is characteristic of the gneissic rocks like charnokitic gneisses and garnetiferous gneisses, while the latter is recognizable in some quartzites and marbles. The rocks of the Highland Series have undergone faulting and folding. Four major episodes of deformation have been recognized in the highlands. Evidence of these episodes can be seen in the Knuckles region, where the main structure is a recumbent fold upon which, in a subsequent episode, upright folds have been superimposed (Cooray 1998).

Soils

All three components of the property possess the same basic soil type which is the characteristic type in the wet zone of the country, both in the central highlands and the lowlands; it is the *Red-Yellow Podzolic soils*. These are highly leached soils in which the clay accumulates in the subsurface horizon. Soils belonging to this group were earlier referred to as lateritic soils and lateritic loams whose characteristic feature is a low silica-sesquioxides ratio. Under natural vegetation, the A horizon is distinctly differentiated into A₁ and A₂ horizons. The colour of the A₁ horizon is dark grey-brown to dark brown, and the predominant colour of the A₂ horizon is a strong brown to yellowish brown. The difference between A₁ and A₂ become less distinct, and the A horizon may thin out or even disappear altogether under conditions of cultivation and erosion. The thickness of the B horizon is highly variable and is usually over 100 cm, but may go up to 200 or 300 cm. The colour of the B horizon is redder than the A horizon. The base saturation of the subsoil is less than 25 per cent and may drop well below this in high rainfall areas. The soils are highly acidic in reaction.

Variants of the modal soil type and other soil types of limited occurrence have been described as occurring in PWPA, largely dependent on the gradient and rainfall. They are: (i) fine-textured, acidic, well drained red-yellow podzolic soils occurring on hills with moderate gradients and also in ridge and valley formations; (ii) reddish to yellowish soils,

moderately fine textured, strongly acidic, well drained, with a dark coloured layer in the subsoil, usually occurring under forest on low rounded hills and undulating land; (iii) mountain regosols occurring on high sloping terrain; and (iv) lithosols occurring on steep rocky land, very shallow, without proper structure formation, juxtaposed with bare rock (DWLC 1999a).

A subgroup of the red-yellow podzolic soils, referred to as meadow podzolic soils, is seen in the grasslands of HPNP. The soil profile has a prominent A₁ horizon of over 25 cm depth. A peaty deposit forms surface accumulations of varying thickness, being particularly prominent in the hollows. The soil is moist and often water-logged. The soil (in the B horizon) is a very dark brown to very dark grey loam or sandy loam horizon underlain by a yellowish brown sandy clay loam with some mottling in the lower depths. The base saturation of the subsoil is lower than in the modal group and the reaction is moderately acidic (Panabokke 1996, Kalpage 1967).

Red-yellow podzolic soils form the dominant soil group in KCF, accounting for 85 per cent of the area covered by a study (Dimantha 1988). Other more localized soil types present are wet mountain regosols and lithosols.

Climate and Hydrology

In Sri Lanka the main controlling climatic factor is rainfall. There are two basic rainfall regimes in the island. In the southwest of the country there is rainfall throughout the year with two peak periods corresponding to the southwest and northeast monsoons. Here the annual rainfall is 2500 mm going up to 5000 mm or higher in different parts of what is referred to as the wet zone. The other regime is a seasonally dry one where rainfall is less than 1900 mm, with a dry period from June to August. This is referred to as the dry zone. Between the dry zone and the wet zone a transitional zone (ecotone) referred to as the intermediate zone is recognized.

A second climatic factor is the temperature. The annual mean temperature in the lowlands is 27°C in the wet zone and 30°C in the dry zone. The temperature decreases with increase in altitude at the approximate rate of 1°C for 160 m rise in altitude. In the montane region the mean monthly temperature varies from 13°C to 16°C, with the night temperature occasionally dropping to zero. Based on rainfall and temperature, six main bioclimatic zones can be recognized. (See map). In considering the structure and composition of the natural forest it becomes necessary to distinguish the lower elevations within the area broadly referred to as the montane zone as the submontane zone. The major part of the nominated property falls into the wet montane and submontane zones. As PWPA and KCF straddle the respective mountain ranges, they also include sections that fall into the mid country wet zone, the submontane intermediate zone, and the midcountry intermediate zone. Small sections at the lower elevations in the fringes of KCF towards the north-east fall within the dry zone (monsoon forest). The whole of HPNP falls into the montane wet zone, albeit at the lower end of the wet zone rainfall range.

Small though the total area of the Central Highlands is, nearly all the river systems in the country originate in this region. Rainfall data from stations close to the PWPA suggest that the rainfall in this area is at the higher end of the wet zone range. The mean annual rainfall is given as 4320 mm (IUCN & WCMC 1997). The PWPA covers the head catchments of two major rivers, the Kelani Ganga and the Kalu Ganga, while the Walawe Ganga which arises

in the adjoining Horton Plains runs through the eastern sector of the Peak Wilderness range. A study of the 281 forest blocks in the island that are over 200 ha in area (for their importance in terms of soil and water conservation) has placed the PWPA (referred to as the Peak Wilderness Sanctuary), which covers most of the Adam's Peak Range, as the most important in terms of protecting the headwaters of the rivers, controlling floods and intercepting fog, and it is ranked fourth in terms of controlling soil erosion.

In HPNP the average annual rainfall is 2534 mm, which is towards the lower end of the wet zone range. As stated earlier, the head waters of the Walawe Ganga is in Horton Plains. The climate is humid, and a short dry spell may occur between January and March. During this period it is not unusual for fires to occur, mostly man induced. The mean annual temperature is 13-15°C. The night temperature may drop to below zero and it is not uncommon to see ground frost during the months that correspond to the northern winter.

In KCF a good part of the area receives heavy, intense rainfall, mostly during the period November to February. Considerable variations have been observed in the annual rainfall recorded in locations even a few kilometers apart. The annual average rainfall varies from 2540 mm to double that 5080 mm. The entire drainage system of the Knuckles massif belongs to the Mahaweli Ganga system. On the west is the Hulu Ganga, the tributaries of which flow south-westwards down the dip slopes of the Knuckles range. The river then flows in a southeasterly direction to join the Mahaweli Ganga. On the northeast of the massif are the Teligam Oya, Kalu Ganga, Heen Ganga and Hasalaka Oya, all of which join the Mahaweli Ganga at different points.

The annual mean temperature at the elevation of 915 m above msl ranges from 13 to 18.5°C and it drops further with increase in elevation. The monsoonal winds are strong, often reaching gale force. This causes stunting of the vegetation in areas that are most severely affected.

Biology

Due to Sri Lanka's evolutionary history as a component of the Deccan Plate during its northwards drift since the beginning of the Tertiary period and right up to the Miocene, and with land connections also occurring since then up to the Holocene, the island shares many biotic taxa with peninsular India. Of the 173 families of angiosperms, 167 are peninsular; of the 1038 non-endemic genera 942 are peninsular; and of 2002 non endemic species 1841 are peninsular (Abeywickrama 1956).

Much of the information on the flora provided in this nomination relates to woody, angiosperm species, as data on the other groups which have been inadequately studied are scarce. On a positive note, it has been shown for woody plants in Sri Lanka that higher taxon richness can be used as a surrogate for total species richness (Balmford et al. 1996a, 1996b).

Among the fauna, the island's mollusca show evidence of Sri Lanka's long association with peninsular India. Of the 60 genera of land snails recorded in Sri Lanka, 13 are also found in peninsular India, primarily in the Western Ghats; and about 50% of all the snail species found in Sri Lanka belong to genera confined only to southern India and Sri Lanka (Raheem et al. 2000, as cited in Ranawana 2006). Similarly, the Sri Lankan dragonflies show many affinities with those of South India, despite the high level of species endemism

(approaching 50%) within this group (Bedjanic 2006). Seven species of bees found in Sri Lanka are confined to India and Sri Lanka (Karunaratne & Edirisinghe 2006). Among the reptiles, Sri Lanka's *Cyrtodactylus* spp. show close affinities with members of this genus in North India (Batuwita & Bahir 2005).

Taxonomic affinities with species in the Indian peninsula are also seen among mammals and birds where their increased mobility would have promoted faunal migrations that would have occurred during the Pleistocene when land connections were formed with the peninsula. For example, *Semnopithecus vetulus*¹, *Macaca sinica* and *Paradoxurus zeylonensis* are endemic to Sri Lanka but bear close similarities with the Indian *S. johnii*, *M. radiata* and *P. jerdoni* respectively, denoting common ancestry.

While showing close affinities with peninsular India, the biota of Sri Lanka also include many species with affinities to the biota of other lands that once formed a part of the giant continent of Gondwanaland i.e the Palaeartic, Australian and Afro-tropical regions. The Laurasian element is also represented in species with affinities to the Himalayan and SE Asian biota. As pointed out by Jayasuriya et al. (1993), in their paper on phytosociological studies of the “lower montane” evergreen forests, “The rare occurrence of genera such as *Cinnamomum*, *Litsea* (Lauraceae), *Michelia* (Magnoliaceae), *Symplocos* (Symplocaceae) and *Celtis* (Ulmaceae) suggest remote Laurasian relationships”. This is in accordance with the widely accepted view that the Sri Lanka flora had been enriched during the Tertiary by floristic elements from Laurasian land masses in what is now the Malesian region. This also applies to the fauna.

The total number of indigenous plant species in Sri Lanka is around 7000. This includes over 3000 angiosperms. Despite the affinities of its biota with those of other countries, particularly peninsular India, what is remarkable about the indigenous species of Sri Lanka is the extraordinary high level of species endemism. Of the angiosperm species, 845 are endemic to the island (Ashton & Gunatilleke 1987a). Kostermans (1992) states that the endemic angiosperm species number around 880, and they account for nearly 30% of the indigenous flora within the group. Among the pteridophytes, 57 of 314 species are endemic. As remarked by Ashton & Gunatilleke (1987a), it is the extraordinary endemism that occurs mainly at specific and intraspecific rank which one cannot assume to be of very ancient origin which makes the Sri Lankan flora of such outstanding interest.

The indigenous faunal species include 678 species of vertebrates (and a further 262 species of migrant birds). Amphibian diversity is particularly high, with 102 valid species so far described and the prospect of more species coming to light with the ongoing surveys.

Although most of the invertebrate taxa have been incompletely surveyed at best, information currently available indicates very high levels of species diversity in several groups. Particularly speciose are land snails with 246 species (Ranawana 2006). Surveys to date have also revealed 116 dragonfly species (from 67 genera), 148 species of bees (from 38 genera), 525 species of carabid beetles from 140 genera, 501 species of spiders (despite being considered very inadequately sampled), and 243 species of butterflies.

As with the flora, the fauna too exhibit high levels of endemism. In the vertebrates (excluding 262 migrant birds) 39% species are endemic. Endemism is highest among the

¹ Synonymous with *Trachypithecus vetulus*

freshwater fishes (54%), amphibia (85%), and reptiles (50%). (Details of endemism among the fishes are given in Pethiyagoda 2006). As new species are constantly being discovered among the herpetofauna, the number of endemics is likely to increase in the future. Endemism among the mammals and birds is relatively low (<20%). Among the 246 species of snails endemism is as high as 83% (Naggs & Raheem 2000). Endemicity in some of the other faunal groups on which information is available is: dragonflies 46%, butterflies 8%, and carabid beetles 24%. Ten genera of carabid beetles are endemic (MOFE 1999).

The endemic biotas are concentrated in a most extraordinary way in the wet southwest of the country. This area, the wet zone, covers only 23% of the land area of the country but around 90% of the endemic biota, both flora and fauna, are restricted to this area. Within this small land area, there is a range of altitudinal gradation from sea level to over 2500 m above msl. Approximately half of the endemic species are found in the lowlands and mid-country and the rest in the montane and submontane area.

The property is situated in the mountainous parts of the country, PWPA and HPNP in the Central Massif and KCF in the Knuckles massif. The mountainous region (represented by the three components of the property) covers only a very small area of the country and hence, except for HPNP which is a high elevation tableland and is situated in its entirety in what can definitely be recognized as the montane zone, the other two components spread over the montane and submontane zones, and parts of their peripheral areas extend beyond the submontane zone into the mid-country. In the case of KCF, a northeast trending arm extends down to an elevation of 200 m, at which elevation the area corresponds to the lowland moist monsoon, forest formation. Although sections of the property extend beyond the wet montane and submontane zones, the unique and exceptional features of the property as regards biodiversity relate to the montane and submontane areas.

The natural forests of the montane and submontane zones, though occurring within an area having a similar rainfall regime to that of the wet zone lowlands, are a marked contrast in



Flat topped canopy trees at Horton Plains: a characteristic feature of montane forests

their structure and physiognomy to the typical lowland rainforest. The latter are multistoried, with the dominant canopy reaching heights of 30-40 metres, and the dominant trees have long straight boles and large rounded crowns. As one moves upwards in altitude, the dominant trees are seen to be shorter in stature and the forest assumes a reduced, two-storey structure. The tree boles tend to become shorter and, at the highest elevations, the branches of the trees are seen to be twisted and gnarled, and the crowns become flattened at the top. The trees of the montane forest are mostly microphyllous in contrast to the large leaved trees in the lowland forests. These changes are most marked at the highest elevations where the dominant trees barely reach a height of five metres in height. In some areas of the central highlands the dominant vegetation is grassland; in fact the vegetation over a good part of HPNP consists predominantly of grasses mixed with other herbaceous flora.

The wet zone of Sri Lanka is now widely regarded as a biodiversity hotspot i.e. an area with an exceptional concentration of species with a high level of endemism and facing exceptional threats of destruction (Myers 1990, Myers et al. 2000, Cincotta et al. 2000). Of the species-rich wet zone flora, the montane and submontane zones represent a distinct element. There are clear differences in the composition of the fauna and flora in the natural forest formations of the montane and submontane zones as compared to the lowlands².

Deforestation and exploitation of natural forests throughout the wet zone have left only scattered fragments amounting, in total, to a bare eight per cent of the zonal land area. This has led to the large majority of endemic species being placed under severe threat of extinction. The montane and submontane areas despite their relative inaccessibility have not escaped this trend and at present the nominated property represents the only sizable extents of near pristine areas of natural montane and submontane forest vegetation still remaining. The endemic species found in these areas are highly localized in their distribution even within a given forest.

While the difference between what is called the montane and submontane zones may be recognized in terms of elevation and the structure and composition of the forest, there can

²Reference has to be made to the expression “lowlands” and other terms used by different authors to denote altitudinal levels particularly in relation to the occurrence of natural forest formations in Sri Lanka. Ashton and Gunatilleke (1987b) refer to the areas up to 1000 m in altitude as lowlands. Koelmeyer (1957) refers to the land up to 1000 ft (304 m) as lowlands. Panabokke (1996) considers land below 300 m as low country, between 300 and 900 m as mid-country and over 900 m as up-country. De Rosayro (1942), a pioneer in forest ecological research in Sri Lanka, did not refer to lowlands as such. He described the natural forests occurring up to 914 m as Wet Evergreen Forest, and the area above this as the “montane zone”. Holmes (1956) states that at 914 m the typical midland (mid-country) wet evergreen forest can be recognized and that the montane forest occurs over 1476 m. Jayasuriya et al. (1993) refer to the area between 900 and 1400 m as mid-elevation or lower montane. As a result of use of these different expressions, there arises some confusion in naming the types of natural forest that occur at different altitudes based on published literature. So as to adopt a rational system of terminology in this nomination, we recognize the following terms as indicated against each: lowlands (as in lowland tropical rainforest) for altitudes up to 500 m, which approximates to the lowest peneplain and includes also the foothills leading up to the second peneplain (Wickramagamage 1998); mid-country from 500 m to 1000 m, which is the second peneplain and includes also the foothills of the third peneplain; and over 1000 m and up to the maximum elevation of 2524m as submontane and montane.

be no generally applicable defined level at which one ends and the other begins. The montane forests are also referred to as cloud forests, and the cloud base may be taken as the lower limit of the montane forest formation. The altitude of the transition zone between submontane and montane varies from place to place. Generally the larger the mountainous region the higher the elevation at which the transition to montane forest occurs. Hence, as pointed out by Singhakumara (1995), the montane forest occurs at a lower elevation in the Knuckles range than at Peak Wilderness.

The exceptional features of the flora (which also applies to the fauna) in the areas now being selected for nomination as a World Heritage have been recognized by Ashton and Gunatilleke (1987a) who have assigned the tiny (in relation to the country as a whole) areas covered by the three components of the property into three distinct floristic regions, out of a total of only 15 for the whole island. (See map).

A characteristic feature of the montane and submontane forests is the patchiness in the distribution of species. The composition of the dominant species changes from place to place within the same forest as seen in the studies of floristic composition carried out by plant ecologists using sample plots distributed over a forest area. This is a reflection of the patchiness of habitat conditions occasioned by the variations in temperature, rainfall, soil, aspect, etc. that occurs over short distances, mainly due to the highly dissected nature of the terrain. As stated earlier, the nature of the land is the result of the strong erosive forces that have acted on the elevated land mass over vast periods of time.

The data on biodiversity presented in this nomination were drawn from many sources, one of which is the National Conservation Review of the forests in the island that was carried out from 1991 to 1996 (IUCN & WCMC 1997). A similar study, but on a far smaller scale, was carried out very recently (DWLC 2007) in four protected areas (which were also among the areas surveyed in the earlier exercise) with a view to obtaining baseline biodiversity data for future monitoring. Unlike in the previous survey, the recent study was based on identified habitats within the sampled areas. Moreover, the locations of sampling were geo-referenced so as to enable comparable information to be obtained in future monitoring. The taxonomic groups covered were vascular plants, mammals, birds, reptiles, amphibians and fishes. Two of the four areas surveyed are in the dry zone and two in the wet zone. The wet zone areas are PWPA and HPNP, two of the three constituents of the property. Data from the baseline survey in relation to these two areas were included when compiling this nomination.

PWPA

• Flora

PWPA is the largest block of pristine and near-pristine montane and submontane rainforest in Sri Lanka. This area has not generally been favoured by scientists for biological exploration primarily because of its very rugged terrain, making access to, and traversing within, the forest extremely difficult. Notwithstanding these constraints, some few studies that have been carried out and these have revealed the characteristic features of this remarkably interesting component of the tropical humid forest biome. It is extremely rich in biodiversity and endemism and it has within it the great majority of the faunal and floristic species of Sri Lanka's montane and submontane zones.

The common tree species are *Calophyllum walkeri*, *C. trapezifolium*, *C. cuneifolium*, *Garcinia echinocarpa* (Clusiaceae); *Cinnamomum ovalifolium*, *Neolitsea fuscata*,

Actinodaphne speciosa, *Litsea* spp. (Lauraceae); *Syzygium revolutum*, *S. rotundifolium*, *S. sclerophyllum*, *Eugenia mabaeoides* (Myrtaceae); *Symplocos major*, *S. spicata*, *S. elegans* (Symplocaceae); and *Adinandra lasiopetala*, *Gordonia ceylanica*, *Eurya japonica* (Theaceae). The *Calophyllum* species are the most prominent among these, with their rusty-red young leaves visible even from a distance. *C. walkeri* is not only prominent in many areas but also surpasses the canopy level by several metres, with the trunks attaining diameters of around 100 cm at breast height (dbh) (Werner 1982).

Other widespread woody species are *Elaeocarpus montanus*, *Euonymus revolutus*, *Meliosma simplicifolia*, *Michelia nilagirica*, *Olea polygama*, *Rhododendron arboreum* and *Vaccinium leschenaultii*. Among the shrub species characteristic of the montane cloud forest are species of *Strobilanthes* (Acanthaceae), *Impatiens* (Balsaminaceae), *Arundinaria* (Poaceae), and *Hedyotis* and *Psychotria* (Rubiaceae).

Reference must be made to two very important studies of the flora of PWPA that have been carried out using sample plots. These studies have provided a great deal of information on



The endemic Calophyllum walkeri found at PWPA and Horton Plains: a dominant canopy tree in montane forests

Left: Young flush of Calophyllum walkeri

© Samantha Mirandu

the floristic composition and distribution within this biodiversity-rich area of montane and submontane rain forest and have brought out another characteristic feature of this ecosystem, namely, the highly localized distribution of species.

In the study carried out by Singhakumara (1995) three forest formations were recognized, namely, montane, sub-montane, and, what he has termed lowland, but which we categorize as mid-country as the elevations of the sample plots within this part of the forest range from 805 m to 1060 m. In the montane zone (1650 m and above), the following three

forest communities, named after the dominants in each, were identified: (i) *Stemonoporus*, *Garcinia*, *Calophyllum*, *Palaquium* association. (ii) *Calophyllum*, *Palaquium*, *Garcinia*, *Pseudocarpa* association; and (iii) *Calophyllum*, *Garcinia*, *Syzygium*, *Palaquium* association. Mention must be made here of the occurrence of *Hortonia floribunda* (in the endemic subfamily of Hortonoideae in the family Monimiaceae) both in the montane and midcountry areas.

At a lower altitude, in the submontane area, five associations were identified, namely, (i) *Stemonoporus angustisepalum*, *Carallia calycina* association (ii) *Stemonoporus cordifolius*, *Stemonoporus angustisepalum* association (iii) *Shorea*, *Stemonoporus*, *Kokoona*, *Elaeocarpus* association (iv) *Stemonoporus*, *Syzygium*, *Litsea*, *Palaquium* association; and (v) *Shorea*, *Stemonoporus*, *Bhesa*, *Litsea*, *Adinandra*, *Syzygium*, *Calophyllum* association.

The mid-country forest that was sampled occurs only in a very limited area in the periphery of the PWPA. The formations encountered here were: (i) *Shorea*, *Strombosia*, *Palaquium*, *Cullenia*, *Trichadenia*, *Cyathocalyx*, *Mastixia*, *Urandra* formation; (ii) *Shorea affinis*³, *Shorea dyeri*, *Cyathocalyx*, *Palaquium*, *Homalium*, *Myristica*, *Bhesa* association; and *Shorea trapezifolia*, *Syzygium*, *Urandra*, *Trichadenia*, *Dipterocarpus zeylanicus*, *Bhesa*, *Anisophyllea* association.

Referring to the range of forest types encountered, the author, Singhakumara, makes the noteworthy comment that none of the four forest communities described by De Rosayro (1942) in what we here recognize as the lowlands could be identified in any part of the Peak Wilderness.

The plant associations are named after the dominant trees that lend character to the community. There are numerous other species, some in the canopy layer itself but mainly in the sub-canopy and lower levels.

Greller et al. (1987) carried out a study of the tree species in five stands in four locations in the Peak Wilderness Sanctuary (now the PWPA) where species of *Stemonoporus* occurred as dominant components of the vegetation. Three species of *Stemonoporus* were found to be canopy dominant in different stands: *S. gardneri*, *S. cordifolius* and *S. rigidus*. Grellier & Balasubramaniam (1993) in a later paper recognized the following communities where in each case a species of *Stemonoporus* associated with another species formed the dominant canopy: *Stemonoporus rigidus*, *Garcinia echinocarpa* community, *Stemonoporus rigidus*, *Alphonsea* sp. community; *Stemonoporus cordifolius*, *Cinnamomum ovalifolium* community; and *Stemonoporus gardneri*, *Palaquium rubinigosum* community. The occurrence of *Stemonoporus* as a dominant in these stands at high elevations is indeed a unique feature of the PWPA forest.

Interestingly, five species of *Stemonoporus* observed by Singhakumara, *S. angustisepalum*, *S. canaliculatus*, *S. lanceolatus*, *S. elegans* and *S. oblongifolius* were not present in the locations sampled by Grellier et al. (1987). They report that a striking feature of their study is that in each of the four locations only one species of *Stemonoporus* occurred indicating a highly localized distribution. With some marginal exceptions, this was also the general pattern of distribution observed by Singhakumara (1995).

³*Shorea affinis* and *S. trapezifolia* now retain the former names: *Doona affinis* and *D. trapezifolia*



Endemic dipterocarps at PWPA: Stemonoporus oblongifolius (left) and S. gardineri (right)

Referring to the occurrence of *Stemonoporus* at high altitudes as seen in Sri Lanka, Greller et al. (1987) state that no other dipterocarps in Sri Lanka, possibly in the world, exceed them in elevation of occurrence. The presence of *S. cordifolius*, *S. gardineri* and *S. oblongifolius* at the montane zone elevation (Singhakumara 1995) supports this statement.

The local endemism and apparent sympatry manifested by *Stemonoporus* as seen in PWPA is said to be without parallel among the other dipterocarps (Ashton & Gunatilleke 1987a). The distribution pattern of the dipterocarps as a whole in the wet zone (including the lowlands) appear to exhibit allopatric radiation in relation to altitude, topography and possibly soil and structural niche differentiation (Ashton & Gunatilleke 1987a).

What is remarkable is the wealth of information that just two studies of the PWPA forest have brought out, suggesting that further ecological studies in this largely biologically unexplored area may yield a great deal of valuable scientific information.

Arborescent species occurring in all the sampled localities were *Actinodaphne speciosa*, *Calophyllum walkeri*, *Garcinia echinocarpa*, *Gordonia* species, and *Timonius flavescens*. A fuller list of species than provided here occurring in PWPA is given in Appendix 1.

The five dominant families and species (in the areas sampled by Singhakumara 1995) occurring in the montane and submontane zones calculated on the basis of the Importance Value Index as given by him are as follows:

Montane forest: Families: Clusiaceae, Myrtaceae, Euphorbiaceae, Dipterocarpaceae, Sapotaceae; Species: *Calophyllum trapezifolium*, *Garcinia echinocarpa*, *Agrostistachys coriacea*, *Bhesa montana*, *Palaquium rubinigosum*.

Submontane forest: Families: Myrtaceae, Anacardiaceae, Euphorbiaceae, Lauraceae, Dipterocarpaceae; Species: *Semecarpus nigro-viridis*, *Agrostistachys coriacea*, *Syzygium cordifolium*, *Bhesa montana*, *Timonius flavescens*.

This survey (confined to individuals over 5 cm dbh) recorded a total of 491 identified species representing 262 genera and 108 families. There were 88 unidentified specimens and 12 identified only to family level. Of the species, 192, in 45 families, are endemics. There are 19 endemic genera in the island (Mabberley 1989, as cited in Singhakumara 1995; Bandaranayake & Sultanbawa 1991). Of these, nine are found in PWPA. They are:

Championia, Hortonia, Leucocodon, Loxococcus, Nargedia, Phoenicanthus, Schumacheria, Scyphostachys and Stemonoporus (modified after Singhakumara 1995).

The study carried out by Singhakumara indicated that the diversity index was higher at the lower altitudes. Plant endemism, however, increased with increasing altitude, being highest in the montane area. Ashton and Gunatilleke (1987a) have named the Peak Wilderness area as Floristic Region 14. (See map).

A total of over 3000 indigenous species of flowering plants, representing about 1070



Flowers of the endemics Gordonia speciosa and Christisonia tricolor

genera and 180 families are found in the island as a whole. Of the species, 880 are endemic. Ninety five per cent of the endemic species are restricted to the wet southwest of the country. Of the endemic species, 284 are confined to the montane and submontane zones (best represented by the PWPA, HPNP and KCF), while 129 are found in the same two zones as well as at lower elevations (Gunatilleke & Gunatilleke 1990). Even within each zone there is highly localized distribution of species. Ashton and Gunatilleke (1987a) have pointed out that 25 of 62 species showing localized distribution within the montane zone

and 17 of 55 of the endemic species (PWPA % endemic). Referring to the species richness of Peak Wilderness and Horton Plains, Davis et al. (1995) have found that these two areas share between 50 them over 1000 species of vascular plants. Of this rich mountain flora, nearly half have a *localized* distribution within the mountainous region.

Table 2.1: Data on mainly woody plant species in PWPA

(Sources of information: Balasubramaniam et al. 1993, Bambaradeniya & Ekanayake 2003, Jayasuriya et al. 1993, Grellier et al. 1987, Gunatilleke et al. 1996, IUCN & WCMC 1997, DWLC 2007. For species lists see Appendix 1).

| No. of species | No. endemic | % endemic | No. nationally threatened | No. epiphytic |
|----------------|-------------|-----------|---------------------------|---------------|
| 121 | 57 | 47 | 79 | 78 |

(Sources of information: Fernando 2005, Dassanayake & Fosberg 1981)

An outstanding feature of the flora of the montane and submontane rainforest within the property is the presence of a vast number of orchid species, a large majority of which are epiphytes. In PWPA, well over half the species are rare and considered nationally threatened. The other two constituent areas share a good many of these species, but species richness is appreciably lower in Horton Plains where a good part of the area is grassland. For further details see Appendix 1. The orchid species data for PWPA are given in Table 2.2.

Table 2.2: Orchid species in PWPA

There are small forest plantations of the exotic species *Pinus caribaea* and *Eucalyptus grandis* and of the naturalized exotic *Albizia falcataria* in the Peak Wilderness area, totaling 383 ha. These plantations were raised between 1974 and 1988 (DWLC1999a). Some of these plantations are said to be of exploitable age and the management plan recommends that they be felled. Such a course of action is desirable since it would be out of place to have commercially managed plantations within the property.

- **Fauna**

Due to the wide altitudinal amplitude spanning over 1500 m within the PWPA, this component of the nominated property contains varied ecosystems that support a

| | Families | Genera | Species | Endemics | % endemic | Globally threatened species |
|--------------------|----------|--------|---------|----------|-----------|-----------------------------|
| Freshwater fishes* | 6 | 10 | 12 | 10 | 83 | 1 |
| Amphibians | 3 | 11 | 27 | 22 | 81 | 17 |
| Reptiles | 2 | 21 | 36 | 36 | 56 | 1 |
| Birds** | 34 | 91 | 123 | 23 | 19 | 9 |
| Mammals | 15 | 25 | 28 | 9 | 32 | 7 |
| Total | 65 | 158 | 226 | 84 | 37 | 34 |

* excluding introduced species. ** including 9 winter visitors

PWPA, with a perhumid climate, is crossed by numerous streams that provide habitats for a varied freshwater fauna. While indigenous freshwater fish species from past surveys number only 12, it is significant that 83% are endemic. They include *Malpulutta kretseri* (Ornate paradise-fish) from an endemic monotypic genus. Among the freshwater crabs, the endemic *Perbrinkia gabadagei* (with a range of only 1 km²) and the globally threatened endemic *P. enodis* are restricted to the PWPA (Bahir and Ng 2005).

With its varied forest formations and dense vegetation, PWPA provides excellent conditions for habitat partitioning among a multitude of amphibian species. To date 27 amphibian species have been recorded. This is more than the number found in HPNP and only one less than in KCF. Eighty-one per cent of the species are endemic, a higher degree than at KCF.

Among the amphibians in PWPA is *Nannophrys ceylonensis* from an endemic genus. This species is clearly allopatric with *N. marmorata* which inhabits the geographically separated part of the property, KCF. *Lankanectes corrugatus*, from a monotypic endemic genus, is found in PWPA and KCF. PWPA contains 12 species of *Philautus*, of which 11 are globally threatened. Seven species of *Philautus* listed as globally threatened in the 2006 IUCN Red List have been recorded only at PWPA of the three constituent areas. A toad, *Adenomus dasi*, from an endemic genus, and listed as globally threatened, has been found only at Moray estate in the buffer zone of PWPA.

PWPA has at least 36 species of reptiles, from 21 genera and seven families. Of the species, 56% are endemic, including six agamid lizards, of which three are from two relict endemic genera. They are *Ceratophora aspera* and *Ceratophora stoddartii* (confined to higher elevations above 2000 m, and clearly allopatric with *C. tennentii* inhabiting the KCF), and *Lyricephalus scutatus*, the lyre head lizard. The last mentioned is rare, with a density of about two individuals per km² at this site (DWLC, 1999a). *Ceratophora stoddartii* has a density of 26 individuals per km² at the PWPA. PWPA has seven species of endemic skinks, of which five are from the endemic and relict genus *Lankascincus*.

PWPA provides diverse habitats for birds, and bird diversity is particularly high at the lower elevations. Altogether 123 species, from 91 genera and 34 families, have been recorded. Of the species, 114 are residents, and among these are 23 of the island's 25 endemic bird species. These endemics include the globally threatened *Phaenicophaeus pyrrhocephalus* (Red-faced Malkoha), *Centropus chlororhynchos* (Sri Lanka Green-billed Coucal) and *Garrulax cinereifrons* (Sri Lanka Ashy-headed Laughing Thrush) which have not been recorded from the KCF or HPNP. The rainforest at the foothills of the PWPA (within what could be called the buffer zone of the property) also contain a large number of mixed-species bird flocks. Endemic bird species such as *Megalaima flavifrons* (Sri Lanka Yellow-fronted Barbet) and *Pycnonotus penicillatus* (Sri Lanka Yellow-eared Bulbul) are common in this forest and the former occurs at densities exceeding 75 individuals per km² (DWLC, 1999a).

The mammalian fauna have only very recently been comprehensively surveyed in the Peak Wilderness (DWLC 2007), and what have been recorded are 28 species, from 15 families and 25 genera, of which nine species (32%) are endemic. PWPA has a small herd of 6-8 elephants which range up to 2000 m, the highest elevation at which elephants have been recorded in this country. Mammals such as sambar, mouse deer, barking deer and wild boar are found within PWPA. This forest also has about 15 leopards of the endemic subspecies (*Panthera pardus kotiya*) (DWLC 1999a). Studies of scat samples have shown that the endemic purple-faced leaf monkey is the top prey species of these leopards, followed by barking deer, sambar, and, interestingly, *Rattus montanus* and *R. ohiensis* (DWLC 1999a). The otter (*Lutra lutra*) inhabits the streams of the sub-montane areas of the PWPA (*ibid.*). There is one species of *Loris*, the endemic and globally threatened *Loris tardigradus*. This species is restricted to elevations below 700 m (Molur et al. 2003).

2. Description of the Property



***Rasboroides vaterifloris* (the golden rasbora) found at PWPA**



Deignan's Lanka skink (*Lankascincus deignani*) from an endemic genus, found at PWPA



***The endemic Zoothera spiloptera* (Sri Lanka spot-winged thrush), also found at HPNP.**



***The globally threatened Prionailurus viverrinus* (fishing cat) found at all three sites**

Of the 34 globally threatened vertebrate species recorded from PWPA, 28 are endemic to Sri Lanka. These include 17 endemic amphibian species, among which are *Lankanectes corrugatus* (corrugated water frog) and *Nannophrys ceylonensis* (Sri Lanka rock frog) from two relict genera.

Among the globally threatened mammals at this site are the following: the fishing cat (*Prionailurus viverrinus*); the endemics *Loris tardigradus*, purple-faced langur (*Semnopithecus vetulus*) and the toque macaque (*Macaca sinica*); the giant squirrel (*Ratufa macrura*); and the critically endangered endemic *Rattus montanus*.

PWPA also provides the last protected wet zone montane habitat in Sri Lanka for the elephant (*Elephas maximus*), a globally threatened flagship species.

HPNP

- **Flora**

A good part of Horton Plains, which has an area of 3109 ha, comprises a rolling landscape of grasslands forming the highest tableland in the country. In the balance part of HPNP, the land rises towards the mountains of Totapolakanda and Kirigalpotha and the area is covered by montane rainforest or cloud forest. The tableland is covered by frost hardy grasses and other herbaceous flora and dwarf bamboo.

A characteristic feature of the grasslands is the occurrence of undulating knolls or hummocks interspersed with depressions or troughs. These variations in terrain provide micro-habitats for rare plants and animals. The slow-flowing streams in Horton Plains have a characteristic collection of aquatic vegetation.

The dominant grass species are *Chrysopogon zeylanicus* and *Arundinella villosa*.



Montane grasslands with patches of Rhododendron arboreum and short stature montane cloud forest at HPNP

⁴This species is referred to as *Sinarundinaria densifolia* by Wijesundara (2007).

Associated species of grasses, sedges and other herbaceous plants are: *Cyanotis pilosa*, *Osbeckia parvifolia*, *Anaphalis brevifolia*, *Wahlenbergia marginata*, *Viola pilosa*, *Pedicularis zeylanica*, *Senecio* spp., *Gentiana quadrifaria*, *Alchemilla indica*, *Ischaemum ciliare*, *Arundinaria densifolia*⁴ (a dwarf bamboo species), *Carex* spp., *Anaphalis brevifolia*, *Valeriana moonii* and the endemics *Emilia speeseae*, *Exacum walkeri*, *E. pallidum* and *Ranunculus sagittifolius*. Because of the presence in Horton Plains of some of the northern temperate elements, amongst which are endemic species, this assemblage of montane taxa, comprising as it does species of both Laurasian and Gondwanic origin, is of exceptional interest.

Scattered in the grassland are small patches of forest dominated by *Rhododendron arboreum*, as well as individual trees of the same species. Associated with *Rhododendron* in the forest patches are *Gaultheria leschenaultii*, *Vaccinium leschenaultii* and *Berberis ceylanica*. The trees are stunted and the branches are festooned with the lichen *Usnea barbata*. Interestingly, the three Ericaceae tree species of *Rhododendron*, *Gaultheria* and *Vaccinium* referred to above are of eastern Himalayan affinity.

While the origin of the grasslands remains in dispute, it is likely that the frost-hardy grassland flora of Horton Plains and those of Nilgiris and Annamalais in India have persisted in frost pockets in the valleys of the major massifs since the last north temperate glaciation (Ashton and Gunatilleke 1987a).

In a floristic survey of the Horton Plains montane forest, Balasubramaniam et al. (1993) have recorded 57 species of woody plants (with dbh over 5 cm) belonging to 43 genera and 30 families. The National Conservation review (IUCN & WCMC 1997) has recorded 79 woody plant species belonging to 56 genera and 33 families. Lauraceae, Symplocaceae



Arundinaria densifolia, one of the most reduced species of bamboo, at HPNP (Above)

An endemic *Strobilanthes* sp. at HPNP. (Left)

and Myrtaceae are among the dominant families while *Cinnamomum ovalifolium*, *Syzygium revolutum*, *Neolitsea fuscata*, *Symplocos elegans* and *Callophyllum walkeri* are the dominant species. Other woody species in this forest formation include *Syzygium rotundifolium*, *S. umbrosum*, *Rhodomyrtus tomentosa*, *Memecylon cuneatum*, *M. macrocarpum*, *M. parvifolium*, *M. revolutum*, *Glochidion coriaceum*, *G. pycnocarpum*,

Actinodaphne ambigua, *Sarcococca zeylanica*, *Rhododendron arboreum*, *Arundinaria floribunda*, *A. walkeriana*, *Symplocos cochinchinensis*, *S. bractealis*, *Elaeocarpus montanus*, *Vaccinium leschenaultii*, *Litsea ovalifolia*, *Neolitsea fuscata* and *Eurya chinensis*.

In the undergrowth are several species of *Strobilanthes*. These species are gregarious and they flower once in 10-13 years after which the plants die. *Strobilanthes* is one of the largest genera in the flora of Sri Lanka and one of the most interesting. Of the 30 species that have been recognized, 26 are endemic. Many of these species are confined to the montane area and they are prominent in the undergrowth of the montane and submontane forests (particularly at the time of flowering) in all three constituents of the property.

Although there are close floristic affinities between the upper montane rain forests of Sri Lanka and those of South India, about 50 per cent of woody species identified at Horton Plains are endemic to Sri Lanka, 32% are shared with South India and only the remaining 18% are widely distributed in South-east Asia.

In the slow-flowing streams and water pools of Horton Plains, aquatic macrophytes like *Aponogeton jacobsonii*, the sedge *Isolepis fluitans*, bladderwort *Utricularia* sp. and other species including *Laurembergia coccinea*, *Coelachne* spp. are found. On the banks of these streams the dwarf bamboo *Arundinaria densifolia* forming dense thickets appears to be spreading along the lower slopes of the grassland. This species is reputed to be one of the most reduced species of this genus. In water-logged depressions and swampy areas, the rush *Juncus prismatocarpus*, the grass *Garnotia exaristata*, the fern *Dennstaedtia scabra*, the carnivorous plants *Drosera peltata* and *D. burmannii*, and *Lycopodium carolinianum*, *Eulalia phaeothrix* and species of *Eriocaulon* are found.

Among the threatened species found in these grasslands are the peat moss *Sphagnum zeylanicum*, *Lycopodium carolinianum*, *L. wightianum* and *Alchemilla indica*. The endemics *Sphagnum zeylanicum* and *Dipsacus walkeri*, each the sole representative of its family in Sri Lanka, are restricted to a very few localities in Horton Plains and are

considered as endangered (Weerasingha & Wijesundera 2005).
Table 2.4: Data on mainly woody plant species in HPNP

| No. of species | Endemic species | % endemic | Globally threatened species |
|----------------|-----------------|-----------|-----------------------------|
| 192 | 79 | 41 | 14 |

The montane floras of Horton Plains, Peak Wilderness and the Knuckles region are remarkably different from those of SE Asia in the conspicuous absence of Fagaceae whose centre of diversity is in the Himalayas. The montane flora of the three constituents of the nominated property and those of the Western Ghats of southern India are of considerable regional biogeographic and evolutionary significance as evident from their floral affinities and disjunct distributions. (Sources of information: Balasubramaniam et al. 1993, Bamharadeniya & Ekanayake, 2003, Jayasuriya et al. 1993, Greller et al. 1987, Gunatilleke et al. 1996, IUCN & WCMC 1997, DWLC 2007. For species lists see Appendix 1)

Table 2.5 Orchid species in HPNP

| No. of species | No. endemic | % endemic | No. nationally threatened | No. epiphytic |
|----------------|-------------|-----------|---------------------------|---------------|
| 43 | 18 | 42 | 25 | 22 |

(Sources of information: Fernando 2005, Dassanayake & Fosberg 1981)

- **Fauna**

The many streams in HPNP provide habitats for several rare and endemic wetland fauna among the invertebrates.

Though lower than KCF and PWPA in terms faunal species diversity, HPNP supports many interesting species of animals, some of which are confined entirely to Sri Lanka's montane region. What is of special interest is that in some faunal groups endemism is higher than in the other two constituent areas of the property. These are the amphibians (91%), reptiles (89%) and mammals (39%).

Data on faunal diversity in the different groups are still incomplete despite the recently concluded baseline biodiversity assessment which included HPNP as one of the areas covered. The current information on the vertebrates is that Horton Plains contains at least



The globally threatened endemic freshwater shrimp Lancaris singhalensis confined to areas in and around Horton Plains

45 families, 101 genera and 126 species. The data are summarised in Table 2.6.

Of the fish fauna, the rainbow trout (*Salmo gairdneri*), introduced during colonial times, is the only species found in the waters of Horton Plains. It is possible that the trout had

Table 2.6: Data on vertebrate species in HPNP

competed strongly as an invasive species to the detriment of the indigenous fish fauna (Bambaradeniya and

| | Families | Genera | Species | Endemic | Threatened | Globally threatened |
|-------------------|----------|--------|---------|---------|------------|---------------------|
| Freshwater fishes | 2 | 5 | 11 | 10 | 91 | 10 |
| Amphibians | 2 | 5 | 11 | 10 | 91 | 10 |
| Reptiles | 5 | 8 | 9 | 8 | 89 | - |
| Birds | 24 | 66 | 78 | 18 | 39 | 10 |
| Mammals | 4 | 22 | 28 | 1 | 39 | 10 |
| Total | 45 | 101 | 126 | 43 | 34 | 23 |

Among these, *Philautus alto* is found only in HPNP and its immediate environs at altitudes between 1890 and 2135 m. *Philautus frankenbergi* is found at Horton Plains but not at PWPA and KCF.

* excluding introduced species; ** including 4 winter visitors



Boie's roughside (*Aspidura brachyorrhos*) (Left) and the common roughside (*Aspidura trachyprocta*) from a relict endemic reptile genus
(*A. brachyorrhos* is also found at KCF while *A. trachyprocta* is found at all three nominated sites)

HPNP has only nine species of reptiles but they are from five families and eight genera, with seven genera being represented by one species each. Eight of the nine species are endemic. Five of the endemic species are from relict endemic genera; they are the two agamids *Ceratophora stoddartii* and *Cophotis ceylanica*, the skink *Lankascincus taprobanensis*, and the colubrid snakes *Aspidura brachyorrhos* (Boie's roughside) and *Aspidura trachyprocta* (Common roughside). *Ceratophora stoddartii* in HPNP and *C. tennentii* in KCF are clear cases of allopatric speciation.



Two endemic and globally threatened birds: Sri Lanka whistling thrush (*Myiophonus blighi*) best seen at HPNP (left) and the Sri Lanka white-eye (*Zosterops ceylonensis*) found at all three sites.

The variety of site conditions in HPNP provides critical habitats for several endemic and endangered birds. Overall, HPNP has 78 species of birds (representing 24 families and 66 genera) of which 14 species (18%) are endemic. This is also the prime site for the endemic and globally threatened *Myiophonus blighi* (Arrenga). A further 13 species of endemic birds have been observed at Horton Plains, including the globally threatened *Columba torringtoni* (Sri Lanka Wood Pigeon) and *Urocissa ornata* (Sri Lanka Blue Magpie).



The montane sub-species of the globally threatened and endemic toque monkey (*Macaca sinica*) is distinct from the subspecies in the wet lowlands and the dry zone

The highland habitats of HPNP assume considerable importance for conservation of mammalian fauna, particularly those adapted to the upper elevations of the central highlands. HPNP has 28 species of mammals, from 14 families and 22 genera, of which 11 (39%) are endemic. HPNP is therefore a vital component of the central highlands for conserving the species of mammalian fauna characteristic of the montane habitats.

HPNP provides key habitats for the endemic shrews *Suncus montanus* and *S. fellows-gordoni* that are considered globally threatened. *Suncus fellows-gordoni* is not found at the other two constituent parts of the nominated property. HPNP also has one other globally threatened indigenous shrew, *Feroculus feroculus*, from a monotypic genus restricted to Sri Lanka and southern India (Wijesinghe & Goonatilake 2005). This park has also several globally threatened rodent species including the giant squirrel *Ratufa macroura* and the critically endangered and endemic *Rattus montanus* (Nelu rat).



Sambar (Cervus unicolor) pasturing in the grasslands at HPNP

The montane subspecies of three primate species are also found here. They are the rare *Loris tardigradus nycticeboides*, *Macaca sinica opisthomelas*, and the long furred bear monkey *Semnopithecus vetulus monticola*. The two monkey species are endemic and HPNP comprises the main refuge of the bear monkey, the morphologically distinct montane sub-species of the globally threatened *S. vetulus*.

Among the carnivores at this site are the rusty-spotted cat (*Prionailurus rubiginosus*), fishing cat (*Prionailurus viverrinus*), leopard (*Panthera pardus*) and otter (*Lutra lutra*).



Fejervarya greeni: A globally threatened species of frog at HPNP (also found at PWPA)

Horton Plains is an important habitat of the sambar (*Cervus unicolor*). The grassland is the animal's main feeding ground, and it retires to the forest patches during the day. The largest carnivore and top predator at this site is the leopard. While no conclusive count has been made it is estimated that there are about 10-15 animals which range into HPNP (DWLC 1999b).

According to the IUCN Red List of 2006, HPNP harbours a total of 23 globally threatened vertebrate species, of which 20 are endemic to Sri Lanka. The globally threatened species include ten endemic amphibian species, three species of endemic birds and 10 species of mammals (of which six are endemic)

Among the globally threatened amphibians at HPNP are the ranid shrub frogs *Philautus femoralis*, *P. microtypanum*, *P. schmarda*, *P. alto* and *P. frankenbergi* which are not found in PWPA and KCF.

The globally threatened small mammals include: three shrews, *Feroculus feroculus*, *Suncus fellows-gordoni* and *S. montanus*, and two rodents, *Rattus montanus* and the giant squirrel (*Ratufa macrura*). Other globally threatened species are two felids, the rusty-spotted cat (*Prionailurus rubiginosus*) and the fishing cat (*Prionailurus viverrinus*), and two primates, the purple-faced langur (*Semnopithecus vetulus*) and the toque macaque (*Macaca sinica*).

The rare Horton Plains slender loris of Sri Lanka, *Loris tardigradus nycticeboides*, has been recognized as one of the 25 most endangered primate taxa in the world (Mittermier et al. 2005).

KCF

- **Flora**

Because of its remoteness and extremely rugged and precipitous terrain, the Knuckles range of mountains remained largely unexplored until recent times. Latterly, however, several researchers, particularly zoologists, have faced up to the physical challenges in



Aerial view of the forest canopy at KCF (above) and a grassland area within the KCF at Pitawela Pathana



order to study the interesting biota of this region. Though having had a common geological origin as the Central Massif, the Knuckles Massif has been isolated from it for thousands of years by the relatively low-lying Kandy Plateau and Dumbara valley. Hence the biota, while showing many similarities with those of the main block of central highlands, also exhibit interesting differences brought about by its long period of isolation.

Referring to the Knuckles mountain range, Pethiyagoda (2005a) states as follows: “The remote, misty peaks of Sri Lanka's Knuckles range, in addition to offering one of the island's most scenic landscapes, is the habitat of a rich and unique biota”. Within the limited area covered by the Knuckles range, there occurs a variety of different habitats based on the altitude, rainfall, degree of exposure, terrain, etc. The montane rainforest is by far the most interesting and ecologically important formation in the KCF.

It covers an area of 6700 ha and extends down to an elevation of 1060-1370 m, at which point, on the western flanks, tea plantations had been raised. Wet montane grasslands are also seen in some parts of this zone (about 1000 ha), mainly in the Lakegala area. With the expansion of the area of KCF, it now extends down the eastern slopes of the range in the northeast trending arm to a lowland elevation of 200 m. This section of KCF shows a gradation of vegetation types from the montane to the intermediate and the lowland moist monsoon (semi evergreen) forest formations.

The montane and submontane forests of KCF show similar physiognomic features to the montane and submontane rain forests of the Central Massif. In the submontane areas the trees are around 15 m in height, reducing progressively with increase in altitude to about 5 m at the summit. The boles and branches are gnarled and twisted and the leaves small,

tough and coriaceous. Though many of the species in the KCF are also found in PWPA, the associations of dominant species are different. The dominant tree species characteristic of the wetter areas on the western, southern and southeastern faces of the range are *Syzygium* spp., mainly *S. micranthum*, *Gordonia* spp., *Eleocarpus glandulifer*, *Homalium*



Photo: S. Balasubramaniam © UoP

The flower and leaf of the extremely rare endemic Stemonoporus affinis, confined entirely to the KCF

species include *Pittosporum ceylanicum*, *Actinodaphne stenophylla* and *Scolopia pusilla*. A common understory shrub species is *Hortonia floribunda*, belonging to the endemic subfamily Hortonoidae.

Greller & Balasubramaniam (1980) noted the presence of forest communities dominated by *Aglaea apiocarpa*, *Bhesa ceylanica*, *Cullenia rosayroana*, *Elaeocarpus glandulifer*, *Myristica dactyloides*, *Dysoxylum championii* and *Syzygium* spp. in what would be the submontane zone of Knuckles. These species occurred in local combinations related to the site conditions.

A remarkable feature of the flora of Knuckles is the absence of any of the *Stemonoporus* species that are seen dominating the canopy in some localities of PWPA and the occurrence of just a single species of this genus, *S. affinis*, not found elsewhere in the island and extremely rare even in Knuckles (Green & Jayasuriya 1996).

In the somewhat drier south and southeast slopes, at high elevations, the same basic forest type occurs with some variations in species composition. This area is in the rain shadow of the southwest monsoon, but yet the overall annual rainfall is moderate. It falls into the montane intermediate zone (i.e. intermediate between wet and dry). Further down the northeastern slope, in small sections of the KCF, drier conditions prevail and the vegetation is of the lowland, monsoon type. The characteristic species here are *Filicium decipiens*, *Melia azedarach*, *Semecarpus nigro-viridis*, *Dimocarpus longan*, *Vitex altissima*, *Mangifera zeylanica*, *Calophyllum tomentosum* and *Nothopegia beddomei*. The shrub species of the undergrowth include *Memecylon umbellatum*, *Glycosmis mauritiana* and *Ardisia missionis*.

Hence, although the predominant ecosystem that characterizes the KCF is the montane and submontane rainforest, the fact that this mountain massif covers but a small area of the



Very low stature forest at Gombaniya within the KCF

country and the KCF extends down to an elevation of 200 m on its eastern flanks, there occurs a transition in ecosystem types from montane rainforest to the dry, lowland monsoon forest.

Other physiognomically distinct forest formations occurring in the wet montane area are: low forest, elfin forest, and pygmy forest, three formations characterized by a progressive



Impatiens truncata (Left) and Impatiens appendiculata at KCF

diminution in the height of the canopy. The *low forest* formation, not found elsewhere in such an extensive area as found here, is essentially a much reduced form of the montane forest with height growth hardly exceeding 10 - 15 m. The dominants are *Calophyllum walkeri*, *C. trapezifolium*, *Eugenia cotinifolia* and *Syzygium sclerophyllum*. In the understory *Garcinia echinocarpa* is frequent, with occasional *Litsea longifolia* and

Agrostistachys coriacea. *Memecylon* spp and *Macaranga digyna* are common associates in the understory.

The *Elfin forest* is confined to very narrow limits within the altitudinal range 1430-1520 m. This is a single storeyed forest with very restricted height growth, generally below 6m in height. There is an intimate mixture of two tree species, *Garcinia echinocarpa* and *Agristostachys coriacea*. *Calophyllum trapezifolium* and *Eugenia thwaitesii* are the only other tree species of note which occur in this formation. The trees are much branched and abbreviated specimens of the same species also common in the high and low forest formations. The bamboo *Arundinaria scandens* and low shrubs *Hedyotis rhinophylla* and *H. obscura* are common species in the forest undergrowth. The most striking species in the undergrowth is *Strobilanthes* spp. (the most common being *S. sexennis*) in association with *Impatiens* sp. (Werner 1982).

The *Pygmy forest* is more stunted than the Elfin forest; it is confined to one particular location at an altitude of 1520-1580 m on the Selvakanda plateau occurring at a ridge top. It covers a very small area of around 40 ha. The formation represents a most unusual and unique form of tropical broadleaved tree vegetation dwarfed to an extreme degree, with the tree species not much more than a metre in height. The form is very likely an adaptation to the continuous exposure to winds of gale force. The genera *Syzygium* and *Eugenia* found elsewhere in the montane forest are represented here by *S. fergusonii* and *E. cotinifolia*. Several of the other species found in the montane forest are also found here but in a very stunted form. The naming and description of the dwarf forest types are based on the results of an expedition into the Knuckles region by a team of scientists (De Rosayro 1958).

KCF, covering but a tiny fraction of the island's land area, harbours over 15% of the endemic flowering plants, and the genetic diversity of these and other indigenous species makes this an important area for *in situ* conservation. A total of 1033 species of flowering plants belonging to 141 families have been recorded from KCF, and of this number, 160 are endemic (Bambaradeniya & Ekanayake 2003). In a survey restricted to two locations in the montane section, Ratnayake (2005) recorded 379 species of plants, of which 116 (i.e. >30%) are endemic. Among the species recorded there were 21 of orchids.

A note about one of the rarest species found only in Knuckles is not inappropriate here. "It didn't take Bala (reference to Dr Balasubramanian) long to show us two specimens of only a handful known to him of *Stemonoporus affinis*, one of the island's rarest trees" (Green & Jayasuriya 1996). This observation was made ten years ago, and even at that time Dr Balasubramanian had passed away. Regretably today, the field staff at Knuckles are unable to locate or even identify this species. Every effort will be made to locate some trees of this species and give them special protection while indicating their uniqueness by placing explanatory boards at such location.

Table 2.7: Data on woody plant species in KCF

| No. of species | Endemic species | % endemic | Globally threatened species |
|----------------|-----------------|-----------|-----------------------------|
|----------------|-----------------|-----------|-----------------------------|

Throughout the KCF there occur patches of open areas with mainly a grassland cover. Rare and endangered species of other herbaceous plants are found among the grasses. These (Sources: *Dipindirivattana* Bala, *Brachystachya lanata* 1993, *Dioscorea demissa* Ekanayake 2003, Jayasuriya et al. 1993, Grellier et al. 1987, Gunatilleke et al. 1996, IUCN & WCMC 1997, DWLC 2007. For species lists see Appendix 1)

Table 2.8 Orchid species in KCF

Selaginella wightii.

| No. of species | No. endemic | % endemic | No. nationally threatened | No. epiphytic |
|--|-------------|-----------|---------------------------|---------------|
| Although the focus of attention in determining the boundary of what was to be the Knuckles Conservation Forest was the need to conserve the montane and submontane ecosystems because of their uniqueness and exceptional biological features, the decision to also include the patches of lowland forest (Dasanayake & Foster 1981) led to the boundary | | | | |



Endemic epiphytic orchids at KCF: *Bulbophyllum wightii*, (far left) *Robiquetia virescens* and *Trichoglottis tenera*

encompassing intervening non forest areas. The boundary now extends in a northeasterly direction to lowland areas down to elevations of around 200 m. (For further clarification, see section on physiography).

The lower plants have been very inadequately studied in KCF as well as elsewhere in the country. Reference must, however, be made to the remarkable richness of pteridophytes discovered during a single scientific expedition by a group of scientists lasting several days in the Knuckles forest. The botanist Professor Abeywickrama (1964) sampling only on either side of a 35-mile long trek into the forest has listed 99 species of pteridophytes.

These included one species of *Psilotum*, four species of *Lycopodium*, four species of *Selaginella*, and an amazing 90 species of ferns. The vast majority of these plants were found at the montane and submontane elevations in the forest.

- **Fauna**

The wide ranging climate, the altitudinal variation and the heavily dissected terrain



Puntius martenstyni, a globally threatened endemic with high habitat specificity

Table 2.9: Faunal diversity among the vertebrates in KCF

| | Families | Genera | Species | Endemics | % endemicity | Globally threatened species |
|-----------------------|----------|--------|---------|----------|-----------------|-----------------------------------|
| Freshwater fishes* | 8 | 15 | 24 | 11 | 46 | 2 |
| Amphibians | 4 | 14 | 28 | 18 | 64 | 10 |
| Reptiles | 14 | 48 | 85 | 43 | 51 | 2 |
| Birds** | 46 | 121 | 160 | 19 | 12 | 5 |
| Mammals | 20 | 33 | 41 | 8 | 20 | 9 |
| Total | 92 | 231 | 338 | 99 | 29 | 28 |

* not including introduced species; ** including 11 winter visitors and one status unknown (Sources: Bambaradeniya & Ekanayaka 2003, De Silva 2006, IUCN 1994, IUCN & WCMC 1997, Manamendra-Arachchi et al. 2006, Wijesinghe & Goonatilake

provide the basis for a high level of habitat partitioning in KCF. This has resulted in an exceptionally high faunal diversity relative to other Sri Lankan forests. Of all the forests

surveyed in the National Conservation Review (281 in total), KCF stands out as the richest in terms of faunal taxa (IUCN & WCMC 1997).



The endemic and globally threatened Ceylonthelphusa durrelli: a freshwater crab limited to less than 1 km² of slow-flowing streams in the KCF

There are 92 vertebrate families, 231 genera and 338 species represented in the KCF. The 338 species include those acclimatised to the upper montane tropical wet evergreen forests or cloud forests, the wet sub-montane forests, dry sclerophyllous sub-montane forests, semi-evergreen forests of the lower elevations, riverine forests and patana grasslands (Bambaradeniya & Ekanayaka 2003, IUCN 1994). The data are presented in Table 2.9

Many streams and tributaries of the Mahaweli Ganga originate and flow through the



The Endangered Kelaart's dwarf toad (Adenomus kelaartii) from an endemic genus, found at KCF and PWPA

Knuckles and these water bodies are the habitats of a remarkably diverse wetland fauna, which includes 24 species of indigenous freshwater fishes, of which 11 (46%) are endemic. Some endemic fish species such as *Garra phillipsi* and *Puntius srilankensis* are entirely confined to the Knuckles region. *Puntius martenstyni*, a globally threatened endemic



The lyre head lizard Lyriocephalus scutatus from an endemic genus found at KCF and PWPA (left) and the endemic green pit viper Trimeresurus trigonocephalus found at KCF and PWPA (right)

species with high habitat specificity, is restricted to the northern part of the Knuckles range and is found only in the headwaters of a river located within this forest (Pethiyagoda 1998). The Knuckles Forest has been recognized as a clearly defined ichthyofaunal province (Pethiyagoda 1991).

Five species of freshwater crabs in an endemic genus *Ceylonthelphusa* (*C. sanguinea*, *C. callista*, *C. cavatrix*, *C. durelli* and *C. diva*) are restricted to the Knuckles mountains. *C. diva* is found only at two locations in the KCF (Bahir and Ng, 2005). *C. durelli* is restricted to a range of about 1 km² at an altitude of 1000 m in KCF in the vicinity of Corbett's Gap. Besides these, there are two other endemic fresh water crab species of the genus *Mahatha* which are restricted to the Knuckles mountains (Bahir and Ng 2005).

The particularly rich herpetofauna include 28 amphibians of which 64% are endemic to Sri Lanka. The recent discovery of five new species of amphibians from within an area of 10 km² suggests that this area is a paradise for amphibians (Manamendra Arachchi & Pethiyagoda 2005). It is also significant that among the amphibian fauna at KCF are representatives of three endemic genera: *Nannophrys* (represented at this site by *N. marmorata*), *Lankanectes* (represented by *L. corrugata* from a monotypic genus) and *Adenomys* (represented by *A. Kelaartii*).

Eighty-five species of reptiles have been recorded at KCF of which 51% are endemic. Out of the 11 relict reptile genera in the island, KCF has three agamid genera (*Ceratophora*, *Cophotis*, *Lyriocephalus*), three saurian genera (*Chalcidoseps*, *Lankascincus*, *Nessia*), two colubrid genera (*Aspidura*, *Haplocercus*) and one uropeltid genus (*Pseudotyphlops*) (De Silva 2006). Fifteen species from these endemic genera are found at KCF. Some of the herpetofauna that are entirely restricted to KCF are as follows:

- *Nannophrys marmorata*, a habitat specialist frog from an endemic genus is Restricted to this forest where it is found under small rock boulders and on rock surfaces and in crevices over which there is a constant flow of water (Nizam et al. 2005).

⁵The specific epithet refers to *Dumbara* which is the local name for the Knuckles region

- KCF contains 10 shrub frogs of the genus *Philautus*, of which at least five are found only in KCF; several endemic species of this genus (*P. macropus*, *P. fulvus*, *P. hoffmani*, *P. mooreorum*, *P. steineri* and *P. stuarti*) have very limited ranges within this forest.
- The endemic *Ceratophora tennentii* (leaf-nosed lizard), considered a relict agamid from an endemic genus, is restricted to the Knuckles Massif. Healthy populations of this species occur at KCF (De Silva et al. 2005d) and it is the dominant agamid in

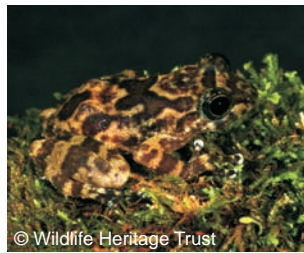


Two felids at KCF: the globally threatened rusty-spotted cat (*Prionailurus rubiginosus*) also found at HPNP, and the jungle cat (*Felis chaus*) also found at PWPA.

the Knuckles where it can be seen at elevations of up to 1700 m (*ibid.*)

- Individuals from populations in KCF of the endemic genus *Cophotis*, hitherto regarded as monotypic, were subject to investigation recently and were found to belong to a species distinct from *Cophotis ceylanica* which is found in the other two constituent sites of the property. The species has been named *Cophotis dumbarae*⁵ (Manamendra-Arachchi et al. 2006). It is a rare species and found only in the Knuckles Massif whereas *C. ceylanica* is found in the Central Massif and is more widespread. This distribution is suggestive of allopatric radiation.
- *Cyrtodactylus soba*, an endemic gecko species, is mainly confined to the Knuckles forest where it ranges from the lower elevations to the montane cloud forests and is even seen in human habitations (Goonewardene et al. 2006).
- *Chalcidoseps thwaitesii*, an endemic skink species from a monotypic geographically relict genus, is confined to the lower elevations of the KCF forest. (Goonewardene et al. 2006).
- The main populations of *Calotes liocephalus*, an endemic agamid, are found in the Knuckles region; the other populations occur at Sinharaja another World Heritage Site (De Silva et al. 2005e, Goonewardene et al. 2006).

KCF contains 41 species of mammals and 160 species of birds. Among the mammals are: the endemic Purple-faced monkey (*Semnopithecus vetulus*) and the endemic toque macaque (*Macaca sinica*), both of which are represented at this site by the dry zone subspecies (Phillips 1981); the grey slender loris (*Loris lydekkerianus*); four felids including the leopard (*Panthera pardus*); the endemic golden palm cat (*Paradoxurus zeylonensis*); the otter (*Lutra lutra*); two species of deer (*Axis axis*, the spotted deer, and



The globally threatened and endemic Sri Lanka blue magpie (Urocissa ornata) found at all three nominated sites (left), the critically endangered endemic shrub frog Philautus macropus found at KCF (middle), and the endangered agamid lizard Calotes liolepis found at KCF and PWPA (right)

Muntiacus muntjak, the barking deer); and sambur (*Cervus unicolor*). Elephants (*Elephas maximus*) are rare in the KCF due to hunting during colonial times, but herds do continue to range through some peripheral areas of the KCF with natural open woodland (e.g. Pitawela patana) due to its proximity to the Wasgamuwa National Park (Goonewardene et al. 2006).

In one of the better investigated invertebrate groups, the mollusca, diversity has been found to be exceptionally high at this site. Fifty species of land snails have been recorded from the Knuckles region, of which 78% are endemic. The richest habitats for molluscs at KCF are the montane forests, followed by the sub-montane forests and intermediate zone forests (Ranawana 2006). Sri Lanka has five endemic mollusc genera (*Ratnadvipia*, *Ravana*, *Acavus*, *Oligospira* and *Aulopoma*). All but one (*Acarvus*) have been recorded within the Knuckles forest (Ranawana 2006).

The butterfly fauna at KCF is also notable, with 60 species recorded to date, including the two endemic species *Troides darsius* (Ceylon birdwing) and *Elymnias singala* (Ceylon Palmfly) (Bambaradeniya and Ekanayake 2003).

KCF harbours 28 species of globally threatened vertebrates listed in the 2006 IUCN Red List. These include the endemic and globally threatened *Labeo fisheri* (mountain labeo) and *Puntius martensyni* (Martyenstyn's barb); *Nannophrys marmorata* (Kirthisinghe's rock frog), a relict species listed as critically endangered; *Philautus macropus*, from a relict genus and not recorded in the other two nominated areas and listed as critically endangered; and a further 11 endemic *Philautus* species of evolutionary significance listed as globally threatened.

Among the reptiles, the agamid lizards *Calotes liolepis* and *Ceratophora tennentii*, the latter restricted to the Knuckles Forest, are listed as globally threatened.

The avifauna at KCF includes five globally threatened birds, of which four are endemics. They are *Columba torringtoni* (Sri Lanka Wood Pigeon), *Sturnus albofrontatus* (Sri Lanka White-faced Starling), *Urocissa ornata* (Sri Lanka Blue Magpie) and *Myiophoneus blighi* (Arrenga). Of the nine globally threatened mammals at KCF, five are small mammals. These include the endemic shrew *Solisorex pearsoni* (Pearson's long-clawed shrew from an endemic genus), *Feroculus feroculus* (Kelaart's long-clawed shrew) and *Suncus montanus* (Sri Lanka highland shrew) and the rodents *Srilankamys ohiensis* (Sri Lanka bicoloured rat from an endemic genus) and *Ratufa macroura* (the giant squirrel). Among

the other globally threatened mammals at KCF are two primates (*Semnopithecus vetulus* and *Macaca sinica*) and the elephant (*Elephas maximus*).

2. b History and Development

2. b.1 Cultural Features

PWPA

To understand the significance of Adam's Peak (or *Sripada*, meaning holy footprint in Sinhala) in the context of Sri Lanka's history it is necessary to go back to c. 400 BC and to the island's dry zone where the rulers began to harness water resources to provide what we in today's terminology would call sustainable living for the people. This trend developed some centuries later into the famed hydraulic civilization referred to as “an epic saga of man's experience in harnessing water resources for his sustenance and well-being” (Toynbee 1960, Needham 1971). Thousands of reservoirs for the storage of water (referred to as tanks) were built everywhere in the dry zone through several centuries (Abeywickrama 1956). In Sri Lanka's cultural development over the past millennia, while being concerned with managing natural resources for sustainable living, successive kings also placed great emphasis on promoting religious values and practices. These were the hallmarks of



Present day pilgrims who climb Adam's Peak provide a link with centuries old traditions

the march of Sri Lanka's civilization through the ages. This is seen in the centuries-old religious monuments that are much in evidence today in Anuradhapura, Polonnuwara, Dambulla and many other places in the dry zone. It is in this context that the Peak Wilderness Protected Area should be recognized as a *cultural heritage* of the highest importance. The history of Adam's Peak and its association with the evolving culture and civilization of Sri Lanka dates back more than two millennia.

As recorded in the *Mahawamsa* (Anon. 543 BC-1758 AD), Sri Lanka's great chronicle

⁶Sri Lanka's great chronicle, the *Mahawamsa* (see Anon. 545 BC-758 AD), is in two parts arranged chronologically; the second part is referred to as the *Chulawamsa*. See Anon. 545 BC 1758 AD.

(translation by Wilhelm Geiger 1950), and further elaborated in the writings of Fa Hien, the Chinese Buddhist monk who traveled in Sri Lanka and India from 392 to 414 AD (translated by James Legge 1886), the Buddha is believed to have visited Sri Lanka, not physically, but by the projection of his image through supernatural power during his lifetime around 550 BC. According to the latter document, he (the Buddha) “planted one foot at the north of the royal city (i.e. Anuradhapura) and the other at the top of the mountain (i.e. *Sripada*)”.

Although held sacred and venerated by the people for several centuries earlier, it was in the 11th century AD that for the first time the reigning monarch, King Vijayabahu I (1055-1110 AD), ventured into the remote thickly forested and hostile country to climb the holy mountain and worship at Siripada. King Nissankamalla (1187-1196) climbed the peak with his army, and this is recorded in a rock inscription at the peak. King Panditha Parakrama Bahu I (1236-1271 AD) went on pilgrimage to the peak, and his experience prompted him to direct his chief minister to make the journey less arduous for the pilgrims. This is recorded in the *Chulawamsa*⁶. That the directive was given effect to is evident from the comment made by Marco Polo in the 13th century (1293) (Tennent 1859, Hulugalle 1965) that chains were provided to assist the pilgrims in their ascent. Ibn Batuta, the 14th century Arab traveller who visited the peak refers to a grotto at the foot of the peak. One of several routes could be used to climb the mountain, and wayside rests, called *ambalama*, have been erected at different points.

At middle elevations on the climb to the peak are found caves with the drip-ledge and Brahmi inscriptions dating back to the second century BC. These are believed to have housed forest-dwelling monks.

An earlier name (prior to the arrival of Buddhism to the island c. 250 BC) given to this mountain was *Samantha kuta*, after the diety Saman (possibly a deified local chieftan). The clouds of yellow butterflies that converge on the mountain for a short time each year are called “samanalayo”.

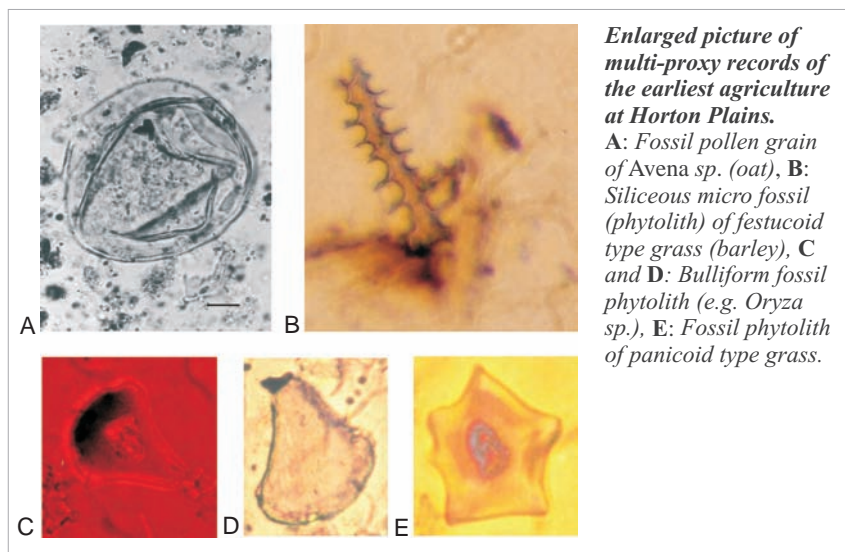
Over the centuries, until the present time, the Adam's Peak mountain grew in importance as a place of veneration steeped in cultural and traditional practices. It indeed bears unique testimony to a cultural tradition and civilization dating back many centuries and still living. At the present time it is estimated that two million people, mainly pilgrims, not only Buddhists but also Hindus and Muslims, visit the peak annually. The pilgrim season is December to May.

There are numerous religious cum cultural practices that have evolved over the ages associated with pilgrimages to the peak, some associated with the primordial urge of mankind to worship deities. For example, before the commencement of the pilgrim season ceremonies are held at *Sri Sumana Saman devalaya* in Ratnapura to invoke blessings of the deity Saman on the pilgrims that come in their thousands during the season.

Although held in great veneration in an almost unbroken chain for over two millenia, there was a time during the reign of King Magha of Sri Lanka when Buddhist persecution took place and the monks who used to go on annual pilgrimage to Adam's Peak were forced to leave the country *en masse* and seek refuge in Burma, Thailand and Laos (Codrington 1939). To continue their devotion to the worship of the footprint, they made and took with them replicas of the footprint and installed them in the temples abroad. As a result, a major

cult of footprint worship developed in Southeast Asia covering all the Theravada Buddhist centres of the region, a practice that is still carried out in an unbroken tradition since the 13th century AD. Subsequent to the Magha persecutions many of the monks returned to Sri Lanka bringing back their cultural relics to the temples of Sri Lanka especially to those surrounding the then capitals of the island, namely, Dambadeniya, Yapahuwa, Gampola, Kotte and Kandy. Consequently, the cult of *Siripada* veneration through the use of replicas spread widely in the country.

HPNP



The cultural heritage of HPNP is directly linked to its remarkable prehistory. Archaeological findings of undated geometric microlithic stone artifacts which have been assigned to the Mesolithic culture in Sri Lanka had been discovered in Horton Plains by Deraniyagala (1992).

Recently, a series of studies (Premathilake 2003, 2006; Premathilake & Risberg 2003) using radio carbon dated multiproxy data (pollen, spores, diatoms, phytoliths (siliceous particles), organic carbon, total carbon, carbon isotopes, mineral magnetic properties, lithology, and radio carbon dates) from several mires (peat and sediment deposits) in Horton Plains have provided startling evidence relating to the prehistory of this high elevation tableland. There is evidence of major environmental changes here during the last glacial maximum (24,000-18,500 years BP). Studies of pollen and spores show the existence of xerophytic vegetation (e.g. *Chenopodium*), suggestive of harsh semi-arid conditions during that time. Proxy data suggest that the hunter forage culture of prehistoric man existed here during that period. There is evidence of the practice of slash and burn and

⁷The cultivated varieties are distinguished from the types occurring wild on the basis of morphological characters of the pollen grain; the pollen grains of the cultivated varieties are much larger and so are the pores, and the pore has a protruding lip.

of grazing in the period following the last glacial maximum.

During the post glacial period, with improved climatic conditions, meaning increasing humidity, there is evidence of the existence of farming communities during 17,600 - 16,000 years BP when incipient management of the cereal plants oat and barley began and continued to progress. The wild progenitors of oat and barley, *Avena* sp. and *Hordeum* sp., would already have been present in Horton Plains before the last glacial maximum. Not surprisingly, the species *Avena sterilis*, *A. fatua*, *A. barbata* and *Helictotrichon* sp. (Family Poaceae, Tribe Aveneae) and *Brachypodium* sp. and *Hordeum* sp. (Family Poaceae, Tribe Triticeae) are found among the vegetation of Horton Plains and the surrounding areas at the present time.

The first appearance of systematic cultivation in which species of rice (we now recognize as *Oryza eichingeri*, *O. nivara*, *O. rhizomatis* and *O. rufipogon*) were used occurs in the period 13,000 - 8700 years BP when humid conditions prevailed⁷. By then the cultivation of oat and barley had decreased as evidenced by multiproxy records. With increasing dry conditions between 8000 and 3600 years BP agricultural land use decreased, after which the area appears to have been almost deserted.

The current state of Horton Plains as a grassland fringed by montane rainforest could, indeed, be a legacy of the past when over a period of several millennia this plain had been subject to clearing, burning and cultivation.

KCF

The Knuckles region, an isolated mountain massif in the Kandy and Matale areas, with its rugged terrain and mist covered forest has been a retreat region throughout the history of the island. Occasionally the people from other parts of the island are said to have retreated to this area in the face of invasions, famines and disease.

According to studies carried out by the Department of Archaeology, University of Peradeniya, the historical, technological and cultural sequence of the human habitat of the Knuckles range can be listed as follows:

1. Prehistoric period
2. Early Iron Age
3. Precolonial period (i.e. prior to 1505 AD)

Regarding the prehistoric period, several sites have been discovered belonging to the Mesolithic period, dated at 30,000 years BC. Primary tool types, or microliths, fashioned out of quartz and chert have been found.

Relating to the Iron Age, drip-ledge caves dated from the 2nd century BC to the 1st century AD have been discovered. This indicates the arrival of Buddhist monks who were in communication with the village settlements in the lower escarpments.

⁸ Detailed studies on Mesolithic human remains from caves in and around Balangoda and elsewhere in the island affirm a genetic continuum from *Homo sapiens balangodensis* to the more recent *Vedda* aboriginal people of Sri Lanka (Kennedy & Deraniyagala 1989, Kennedy et al. 1987)

The discovery of silver punch-marked coins from a cave at Uyangamuwa establishes the long distance trade connectivity this region has had with the north-central plains of the island and with the outside world. The silver punch-marked coins were of north Indian origin dating back to the 5th century BC and after. Trading was mainly in minerals like mica, graphite, quartz, etc. Chert brought in from Knuckles was discovered at the prehistoric



Evidence of an ancient construction technology in a village (Meemure) within the KCF

level excavations in the Citadel and Vessagiri sites in the ancient city of Anuradhapura. This material was brought to the sites for the production of stone tools. Middle historic levels at the Anuradhapura Jetavana *dagoba* yielded large blocks of chert brought in from Knuckles. At least three traditional routes to the Knuckles range have been discovered.

Over the past ten years or so, evidence has come to light of the significance of several caves discovered in the heart of the Knuckles forest. The evidence points out to the occupation of these caves by Mesolithic man many thousands of years ago. The KCF is clearly an area that is ripe for further archaeological research and such work will be promoted while taking action to conserve the sites that have been found (De Silva et al. 2005b, De Silva et al. 2005c)

Precolonial texts record the occurrence of several *Vedda*⁸ chieftancies in the Knuckles region and their interaction with the Kandyan kingdom. A series of *Vedda* settlements have been identified in this region. The following villages are traditionally associated with *Vedda* families: Puvakpitiya, Pottatawela Damentenna, Kahagala, Illukkumbura, Pitawela, Ettanwela, Rambukoluwa, Narangamuwa, Madumana and Galgedewala.

In addition to the *Vedda* settlements there were other technological and cultural groups that inhabited the Knuckles range and depended on the ecosystem for supplying many of their needs. The Dumbara reed crafts and the Lak (*laksha*) painting traditions are examples of such ancient cultural practices. While of interest in relation to the cultural features of KCF, some of these pre-colonial settlements fall outside the area now recognized as the KCF but are within what could be regarded as the buffer zone.

Many rituals and cultural practices had developed in the isolated villages of the Knuckles region that related to their living and sustenance. These have been described in detail in section 3.a under the appropriate criterion. Some of the practices involved the use of plant species for food and medicine based on the experience gained over centuries, so providing an ideal anthropological laboratory for gaining a better understanding of sustainable living close to nature.

2. b. 2 Natural aspects

To understand the exceptional features of the indigenous fauna and flora of Sri Lanka, particularly those occurring in the wet southwest of the country which includes the central highlands, one needs to consider the geological evolution of the island. Sri Lanka is a derivative of the vast southern continent of Gondwanaland that broke up at the end of the Mesozoic Era. The Deccan Plate rafted northwestwards carrying with it the gondwanic biota. Sri Lanka separated from the rest of the Deccan Plate during the Miocene Epoch. While these lateral movements were taking place, upliftment of the land on a massive scale occurred at different times in the island's geological history with intermittent periods when strong erosive forces acted on the land eventually resulting in the present topography of the island. The uplifting would have raised areas of lowland rainforest to higher elevations exposing them to a much cooler climate. While many genera disappeared completely from the montane area (e.g. all of the Dipterocarpaceae except for the genus *Stemonoporus*) others developed new species adapted to the changed environmental conditions.

The absence of a mountain bridge between Sri Lanka and the neighbouring Indian peninsula, at any rate in the post-Miocene period, would have prevented the free exchange of biota between these two areas. Moreover, the broad expanse of seasonally dry lowland in the northern part of the country and the presence of the mountainous area in the south-central part would have acted as a double barrier isolating the humid and perhumid southwest of Sri Lanka biogeographically. It is not surprising, therefore, that the flora and fauna of Sri Lanka's wet zone exhibit an extraordinarily high endemism. Within the wet zone, the lowland rainforest shows an exceptional richness in biodiversity and a robust physiognomic structure indicative of perfect adaptation to the prevailing humid and perhumid conditions. In the montane and submontane zones where the three components of the nominated property are located many of the genera and families are those of the lower altitudes indicating common origin, but the structure and physiognomy of the forest suggest that many species show less than perfect adaptation to the montane climatic conditions.

The present montane flora could therefore be the relic of what was once a lowland rain forest, and the form and growth of many of the dominant species show that they have had to adapt to the harsh climatic conditions of the montane zone. In this context it may be noted that when exotic species from the temperate regions, such as species of pine and eucalyptus, are introduced to the montane zone as forest plantations they show vigorous growth and excellent form and they attain large sizes.

Historically, the rainforests at all altitudes of the wet zone had remained intact throughout the many millennia during which the dry zone was developed for agriculture. Although aspects of biodiversity were not recognized in terms of current knowledge, the need for preserving natural ecosystems was appreciated even at that time. While reservoirs were being constructed, the catchment areas were left in their natural condition. Although it refers to a forest in the dry zone, it would not be out of place to relate an anecdote where as early as the third century BC, Arahat Mahinda is said to have exhorted King Devanampiyatissa as he was about to go hunting, in the following words, “O Great King, the birds of the air and the beasts of the earth have an equal right to live and move in any part of this land as thou; the land belongs to the people and all other beings and thou art the guardian of it”. Heeding the words of Arahat Mahinda, the king renounced hunting and declared the forest of Mihintale, where he had intended to go hunting, as a sanctuary, perhaps the first of its kind in the world. This incident could be said to have set the tone for the recognition of the ethic of environmental conservation among the rulers.

Although the movement of the indigenous population to the wet zone had taken place much earlier, particularly upstream along major rivers and streams, it was after the British gained control of the island in 1815 that large scale clearing of the montane and submontane forests took place. These forests were cleared for growing coffee. When the coffee plantations failed due to the spread of the coffee blight, tea began to be planted and large areas of montane and submontane rainforest were cleared for this purpose. This trend in the clearing of high elevation forests was arrested, when consequent to a recommendation made by the eminent botanist Joseph Hooker, all forest clearing in areas above the elevation of 5000 ft (1540 m) was banned. The primary concern arose because of the hydrological importance of these forests which were the sources of all the major rivers in the country and the damage that would be caused if forest clearing was continued. This rule was respected until recent times. But in the 1960s, the government decided to clear some sections of montane forests for raising “seed” potato. Certain sections of the grasslands in Horton Plains were also used for the same purpose. This trend, however, did not continue on account of the concerns that were being expressed by environmental scientists and the public.

There was another trend that resulted in the reduction of the natural forest cover. From the point of view of timber production, the montane rainforests were considered to be of the low yield type. Hence, to increase productivity forest plantations were raised in the montane zone both through afforestation of grasslands as well by clear felling the natural forests and replanting with timber species. The species used were all exotics, mainly eucalyptus and pine. Sections of natural forests were also felled for fuelwood production and the areas reforested with the exotics. The forestation programme was intensified in the 1950s and 1960s, but slowed down thereafter. Later, reforestation of natural forest areas in the mountainous areas with exotic species was stopped altogether, which was a welcome move.

Another factor of considerable importance is the constant illicit felling operations that have gone on throughout several decades. Many of the montane and submontane forests are situated cheek by jowl with tea plantations and village communities. The local inhabitants, the villagers and the plantation workers, obtain their small timber and fuelwood needs from the adjoining natural forests and this has gone on for many decades causing forest degradation. Encroachment into the forests by villagers, either for occupation of the land or for extending their small tea allotments too has been a regular

occurrence.

Concern for the protection of the natural forests of the wet zone was largely centred on the value of these forests for conserving soil and water in what are the critical watersheds of the country. It was in the 1970s that the importance of these forests as a repository of a rich complement of biodiversity and the refuge of a large number of species not to be found anywhere else in the world began to be recognized. Conceding to pressure from environmentalists and the informed public, the government imposed a ban on all forest clearing and logging (including selective logging) in all the remaining natural forests of the wet zone. Already by then the natural forests in this area of the country had been reduced to fragments, many just a few hundred hectares in extent. Although they had been subject to some degree of selective logging and encroachment, the larger blocks that remained and were for the most part intact were Kanneliya (lowland tropical rainforest), now a biosphere reserve; Sinharaja (lowland, mid-elevation and submontane rainforest), now a World Heritage Site and biosphere reserve); and the Peak Wilderness, together with Horton Plains and the Knuckles (montane, submontane and midelevation rain forest), now being nominated for inscription as a World Heritage. The three areas constituting the nominated property, besides having outstanding natural heritage value as areas where the rich and endemic biotas of the montane and submontane rainforests have been preserved, also possess a rich cultural heritage.

PWPA

A good part of the peak wilderness range, including the area that now forms the Peak Wilderness Protected Area (PWPA), was declared a sanctuary under the Fauna and Flora Protection Ordinance (FFPO) in 1940. The Peak Wilderness Sanctuary comprised mainly state property, but there were also private land lots within the area. The FFPO had been enacted only three years previously. The Department of Wildlife Conservation had not been established at that time and the Forest Department was the controlling body for areas falling under the FFPO. A sanctuary, contrary to what one may be led to believe by the use of this term, is the least protected of the categories of areas that could be gazetted under the FFPO. A sanctuary may include private property, and free access is allowed into any part of a sanctuary. It is surmised that with the enactment of the FFPO, the need to give legal protection to the peak wilderness area on account of the existence of the sacred peak within it was recognized. In view of the need to allow free access to pilgrims and the existence of private land within the area demarcated for declaration as a protected area, the only feasible option for expeditious implementation was considered to be to declare the area a sanctuary. The sanctuary included three forest areas that were under the control of the Forest Department in terms of the Forest Ordinance. They were the Peak Wilderness Proposed Forest Reserve, the Morahela Forest Reserve and the Walawe Basin Forest Reserve. The latter two had been declared as forest reserves way back in 1893. Although they fell within the sanctuary, they continued to remain under the control of the Forest Department even after the Department of Wild Life Conservation was established in the 1950s and had assumed control of the rest of the sanctuary.

Encroachments into the area, particularly in its southern section, continued even after it was declared a sanctuary under the FFPO. The low protection status accorded to a sanctuary would no doubt have served as an incentive for encroachment. The management plan refers to state land within the parts of the sanctuary supposedly under the control of the DWLC being given out to villagers by the local representatives of the Government

Agent. The dual status of the Sanctuary, with different departments of government (at times in the past the two departments were under separate ministries) administering it under powers vested in them by separate ordinances did lead to complications that militated against the proper management of the area. Making confusion worse confounded was the district administration assuming some administrative control over the state land in the DWLC areas of the sanctuary e.g. by allocating land for settlement.

Three management plans (IUCN 1996, DWLC 1999, DWLC 2005) have recommended various ways in which the problem could be resolved. With the decision to propose the peak wilderness as a part of a serial property for nomination as a Mixed World Heritage, the legal and administrative positions of the Peak Wilderness Sanctuary were re-examined and the following decisions taken:

1. To leave the access routes to the peak, the peak itself, and religious and cultural sites within the peak wilderness area in the status of a sanctuary (to enable unfettered access to the peak);
2. To declare the the Peak Wilderness Proposed Reserve, the Morahela Forest Reserve and the Walawe Basin Forest Reserve as Conservation Forests under the Forest Ordinance and exclude them from being considered as a part of the sanctuary;
3. To identify the area within the sanctuary (other than the areas referred to in 1 and 2 above) which is free of large scale encroachments, estates, villages, public utilities, etc. and declare it as a Nature Reserve under the Fauna and Flora Protection Ordinance.

Action has now been taken on these lines. The Peak Wilderness Nature Reserve is in 9 blocks, which, together with the conservation forests, form an unbroken chain of natural forest linking PWPA with HPNP. The legal and administrative position has now been clearly established, with the Forest Department being in control of the conservation forests



A patch of forest dieback at HPNP

and the Department of Wildlife Conservation in control of the nature reserve and the parts of the former sanctuary comprising the pilgrim trails and the peak which still remain in the status of a sanctuary. The PWPA comprises the conservation forests, the nature reserve and the pilgrim trails and peak.

HPNP

Horton Plains was declared a National Park under the Fauna and Flora Protection Ordinance on 16 March 1988 and is under the control of the Department of Wildlife Conservation. It has an area of 3109 ha; two-thirds of the area was said to consist of grassland and the rest montane forest (DWLC 1999b). In a recent habitat survey using satellite imagery, however, the area of grassland turned out to be much less - just about a third of the total area of the Park (DWLC & MOE 2006).

HPNP has always been considered as a scenic area, visited by adventurous tourists to enjoy the solitude of the area, to observe the view from World's End, or less often to climb the peaks bordering the area. In the 1960s, in a drive to increase food production locally, the government took up sections of Horton Plains for raising seed potato. Fortunately this activity was stopped after a time and the cultivated area in Horton Plains was allowed to revert to nature. But there have been some lasting effects. Some new grass species appear to have been introduced during the period when cultivation took place. The species have been identified as *Pennisetum glabrum*, *P. clandestinum* and *Vulpia bromoides*. *P. glabrum* is favoured by the sambur for grazing, over the native *Chrysopogon zeylanicus*.

Tree die-back in Horton Plains was first observed in a field visit following the UNESCO conference on the Humid Tropics held in Kandy in 1956. Since then the situation has aggravated and the phenomenon has been observed in other areas of montane forest as well. In the 2006 survey referred to above 30% of the Horton Plains forest area was seen to be affected by dieback. Twenty-two species are reported to be affected by the die-back, the commonest being *Calophyllum walkeri*, *Cinnamomum ovalifolium*, *Symplocos obtusa*, *Syzygium rotundifolium* and *Glochidion pycnocarpum*. Several speculative theories have been advanced to explain this phenomenon but an acceptable explanation has to await further investigation.

The popularity of HPNP as a tourist attraction has grown sharply in recent years and the number of visitors has increased quite considerably. This brings with it problems of management to prevent site deterioration through over-visitation and practices such as careless garbage disposal, collection of plants and animal species, etc. Fortunately, the other dangers to which state land is exposed elsewhere in the country, which are encroachment and illicit timber felling and firewood collection, are virtually non-existent here. However, there is a threat from illicit, small scale gem mining, with its attendant environmental damage, particularly near the Bogawantalawa access route.

KCF

The extremely precipitous, many-peaked, and moist laden Knuckles range has at its very heart the Knuckles Conservation Forest, a component of the nominated property. Within the range, apart from a small area of 290 ha, called Campbell's Land Forest Reserve (so declared in 1902), the rest of the area had not been accorded protection status. Mention must be made, however, of another section of 1850 ha that was designated Dotulugala proposed reserve, but which had never been declared a reserve. The forested areas of the

range have been under the control of the Forest Department, and the areas other than the reserve and proposed reserve were under the category “other state forests”.

While being held in awe from a distance, very few have ventured into the area for study and observation. The first study tour by a team of scientists who trekked into the heart of the Knuckles was in 1956. Prior to that, explorations had been carried out for mapping the area in terms of its geology. The 1956 expedition brought out a great deal of scientific information from areas that had never been subject to such detailed study before (De Rosayro 1958, Abeywickrama 1964, Cooray 1998). Matters regarding the conservation of the forest, however, gave no cause for concern at that time.

In the early 1960s permits were issued by the Forest Department to individuals to underplant limited areas of forest with cardamom (*Elettaria cardamomum*), a spice crop which thrives under the shade of the forest canopy. Clearing the undergrowth, underplanting with cardamom, and subsequent cleaning and weeding operations would naturally interfere with the regrowth of the natural forest, but so long as the areas given out for this purpose were strictly limited and the operations confined to these areas, no danger to the natural forest as a whole was perceived. What happened in practice was completely different. Clandestine underplanting operations were carried out by the villagers, and the permit holders themselves expanded their cultivations beyond the set boundaries. Over the years this trend grew considerably in magnitude and was getting out of hand.

From the early 1980s there was growing concern regarding the importance of the Knuckles forest from an environmental point of view. While its importance as a repository of rare and endangered plant and animal species was only just beginning to be recognized, the main concern at the time was the need to protect the Knuckles range because of its importance as a source of water to the Mahaveli Ganga. In fact the entire drainage system of the Knuckles belongs to the Mahaveli Ganga system. That there was good cause for concern was proved by later studies which showed that cardamom cultivation in the forest caused increased soil erosion and reduction in the water retention capacity of the soil (Bandaratilleke 1988), and it also had adverse effects on the natural regeneration of the forest species (Madduma Bandara 1991).

In 1985 a committee of experts and high level officials was appointed to study and make recommendations on how a decision that had already been taken by the government for the conservation of the Knuckles area could be effectively implemented. The committee held that the entire area above the 3500 ft (1067 m) contour is of critical importance environmentally and that it should be given legal protection.

In 1987 the government made a request to IUCN - The World Conservation Union to provide assistance for a project that would lead to the drawing up of a sustainable management programme for the Knuckles forest areas. The project (called Knuckles Conservation Project Phase 1) included a number of activities aimed at identifying and addressing the issues. A preliminary workshop was held in 1988 at which 14 papers were presented. A second workshop was held in 1991 to collate the information and come up with specific recommendations. In the meanwhile several educational, communication, and awareness creation activities were carried out by the Forest Department with the support of the provincial administration. These included local workshops, the setting up of community based organizations in many of the peripheral villages for the conservation and preservation of the Knuckles range, essay and poster competitions, etc.

While all these positive developments were taking place, there was still the lingering problem of identifying a precise boundary for marking the limits of the Knuckles Conservation Area. The somewhat arbitrary decision to use the 3500 ft (1067 m) contour was modified to include any contiguous forest areas that extended below the 1067 m contour, irrespective of the altitude at which they occurred. On this basis the survey and land-marking was carried out and it was completed in 1989. The survey party seems to have had some difficulty in determining what were to be considered as contiguous forests and as a result scrubland, patches of grassland, and some other nonforest areas got included. Within the land-marked boundary there were sections of tea estates, other private lands, encroachments, cardamom cultivations, etc. It has to be noted that the 1:50,000 topographical maps still carry the 1067 m contour line as the boundary of the conservation area although the decision to use this contour line had been changed and the land-marking done according to the revised decision. Based on the current, definitive boundary determined in the above-mentioned survey, the Knuckles Conservation Forest was declared as such by government gazette notification in May 2000.

In 1994, IUCN, with the collaboration of the Forest Department, prepared a management plan for the Knuckles Conservation Forest. This plan has made recommendations *inter alia* on how the integrity issues may be resolved.

Although well before that time the Forest Department had decided to ban the cultivation of cardamom in the forest, the 1994 management plan refers to the large numbers that were still engaged in cardamom cultivation. They fell into three categories: large scale absentee cultivators using paid labour which resided within the conservation area; small to medium cultivators on encroached land (resident in peripheral villages) or on privately owned land within the conservation area; and state sector cardamom cultivators. The last mentioned are areas under the State Plantations Corporation, most of which were below the 3500 ft (1067 m) contour and therefore outside the area that had at first been earmarked as the Knuckles Conservation Area.

An important recommendation made in the 1994 management plan was to stop all cardamom cultivation in land over 3500 ft (1067 m), other than any well managed plantations under state sector corporations which should be excluded from the Knuckles Conservation Area. Resident cultivators within the Knuckles Conservation Area were to be relocated.

The post-1994 period has seen considerable progress in pursuit of the conservation and management of the KCF. All the resident cardamom cultivators within the conservation area have been relocated outside the area. There still remain some persons (influential, affluent cultivators) who, while residing in the cities, organize cardamom collection in 11 areas within KCF using hired labour. Legal action has been taken against these persons and court orders have been received to stop this activity. No maintenance operations on the cardamom plots are carried out in these areas. In the areas where cardamom cultivation has been stopped ecological restoration does occur albeit slowly. In a few areas where the cardamom bushes have been cut back regeneration of the original forest species is much faster. Clearly this practice should be extended to speed up ecological restoration of the under-planted areas.

When the KCF was legally declared a conservation forest there were a large number of private land lots falling within the boundary. Inclusion of these lots within the boundary was unavoidable if the conservation area was to be identified as an integral whole. These

private land lots do not constitute a part of the legally defined conservation area since only state land within the defined boundary is included. At any rate it was deemed necessary to eventually include these lots in the conserved area and action was taken to acquire them. There are no residents in these lots and the land is in forest or scrub. Three-hundred-and-fifty (mostly small) private lots have been identified and action will be taken to acquire them, after which they would automatically become a part of the KCF. The process, however, seems to be dragging on for several years. If acquisition is posing a problem, an alternative would be for the Forest Department, in collaboration with the ministry of environment and the Central Environmental Authority, to take action to declare all private lands within the boundary of the KCF as environmentally sensitive areas under the National Environmental Act. Such a declaration should also include the few villages that remain within the boundary of the KCF.

During the past few years a conservation centre has been constructed at the Illukkumbura entrance to the forest. This is quite a large complex. It includes an auditorium with the necessary facilities, dormitories for large groups, and two eco-lodges with accommodation for eight persons in each. Camping sites have also been provided. Interpretation facilities are available, but need to be further developed. At the Illukkumbura entrance a post has been set up for registering visitors and charging an entrance fee. A similar conservation centre with an equal range of facilities has been constructed at Deanstone which is the entrance to the KCF from the side opposite to Illukkumbura. For observation and study purposes, several nature trails have been opened, and field guides have been appointed.

What is especially commendable is the interest that scientists (biologists and archaeologists) have shown in recent years in investigating this exceptionally diverse ecosystem

A great deal of attention is focused on the buffer zone communities with a view to obtaining their cooperation for conservation of the forest. Community based organizations have been formed and awareness programmes (for schools and the village community) are regularly carried out. Local plants are distributed for planting in home gardens. A plant sales outlet has been opened. Wood lots are established in the buffer zone, outside the conservation forest.

Something very special in regard to winning the confidence of the village communities is the organization of health camps which the Forest Department does regularly in collaboration with the district staff of other institutions. This provides the people in these remote areas with the rare opportunity of getting their health related problems attended to by qualified staff virtually at their doorstep. This has been seen to advance the cause of conservation of the forest in a very tangible way.

The Illukkumbura and Deanstone sections of KCF are under the control of Range Forest Officers who are supported by other staff. The development work carried out in the past few years augurs well for the future conservation of this valuable forest.

3. Justification for Inscription

3.a Criteria under which inscription is proposed (and justification for inscription under these criteria)

Criterion iii:

Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.

Adam's Peak (called *Samanta kuta* in Pali and *Sri Pada* in Sinhala, meaning sacred footprint), is situated within PWWA. Adam's Peak is perhaps the most venerated mountain in the world. It has been described as a “natural cathedral so stupendous and exquisite that none can stand upon it without worship in his soul” (Williams1950). Together with the sacred Bo tree at Anuradhapura and the temple of the Tooth relic in Kandy, it is without doubt one of the three most sacred places in Sri Lanka.

The history of Adam's Peak and its association with the evolving culture and civilization of Sri Lanka dates back more than two millennia. The importance of this site for its unique features of cultural and religious significance has grown in importance over the ages. At its



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The sacred peak during the pilgrim season

very top, the Peak bears an indentation that resembles a foot print and it is based on this feature that the Peak assumed a religious significance. The Peak is steeped in legend antedating the Christian era. Four great religions of the world consider Adam's Peak a holy mountain. The Buddhists call it *Sripada* as they believe that the indentation is the footprint of Lord Buddha. The Hindus believe that it is Lord Shiva's footprint. The Muslims take it to be the footprint of Adam. The Roman Catholic legend is that it is the footprint of Saint Thomas the apostle.

Although there are many different legends associated with Adam's Peak, the mountain has had its strongest and millennia-long unbroken link to the Buddhist faith. Its cultural and religious links, far from diminishing, had throughout the centuries and up to the present time grown in magnitude in a remarkable manner and it is today held in the highest veneration by the millions of pilgrims that trek to the peak every year.

In centuries past, the reigning monarchs joined the people visiting the Peak and paid homage at the shrine. They directed action to be taken to ease the task of climbing to the Peak and to provide support for the observance of religious activities. That such action was taken with the technology available at the time is evident from the observations of Marco Polo in the 13th century and Ibn Batuta in the 14th century. Further details supporting justification are set out in the earlier sections of this nomination.

Besides paying homage at the shrine atop the Peak, many other religious practices, some associated with other religions and with the primordial urge of man to worship deities, became, since ancient times, associated with pilgrimages to the Peak.

Adam's Peak is renowned not only as a religious monument. Many people, including visitors from abroad, climb the mountain to witness the magnificent spectacle that could be observed from the Peak at sunrise.

As regards HPNP, its uniqueness in relation to Criterion iii relate to how Mesolithic man progressed from the hunter gatherer stage to organized agriculture over a span of several millennia. Recent investigations have brought out palaeontological and palaeo-ecological evidence that bears testimony to a saga of cultural evolution beginning in 24,000 years BP when prehistoric man inhabited these plains to around 3600 years BP when the area was eventually deserted. The details of the evidence in support of these findings are presented under 2.a.2 and 2.b.1. The recently unraveled palaeo-ecological evidence indicates that between 24,000 and 18,500 years BP the prehistoric humans occupying the plains were hunter gatherers. Subsequently (17,600-16,000 years BP), with increasing humidity during postglacial times, the inhabitants became more settled and began slash and burn, herding, and incipient cultivation of oat and barley. With the passage of time, agricultural practices advanced into more systematic management and with the increasing humid conditions rice replaced oat and barley (13,000-8700 years BP). In later periods, climatic conditions began to turn dry and concomitantly there was decreasing agricultural activity and by 3600 years BP the area appears to have been abandoned.

The cultural importance of KCF in relation to Criterion iii is based mainly on archaeological investigations in KCF and its environs that have been carried out only recently. These investigations have brought to light the existence of caves where the presence of stone artifacts and animal remains suggest that these caves were the abode of Mesolithic man around 30,000 years BP. In more recent times (2nd century BC onwards) these caves were used by Buddhist monks. (See 2.a.2 and 2.b.1).

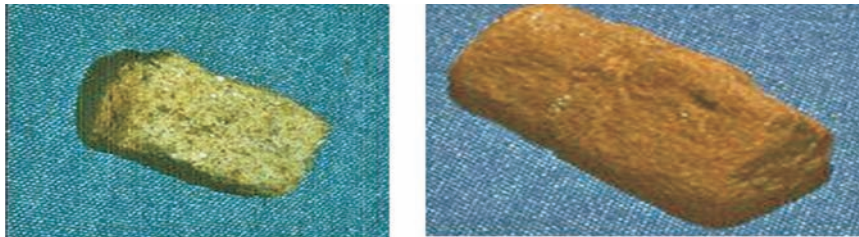
Archaeological finds reveal that in pre-colonial times the people in KCF and its environs engaged in trade with minerals and other natural products with neighbouring countries.

Another feature of particular significance is the existence within the Knuckles range of ancient villages which until recently had hardly been touched by modern civilization. Until a road was built into the area recently, their inaccessibility had sheltered the villages from the influence of modernization. Examples of what remains of this disappearing culture would be preserved as monuments.

Criterion v:

Be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.

HPNP is an example par excellence of a sequence of human cultural development and land use spanning several millennia. The microliths and other evidence uncovered in Horton Plains (described under section 2.a.2) show that the plains were occupied by mesolithic man many thousands of years ago. The records of microfossils recovered from the peat swamps of Horton Plains provide strong supportive evidence. Cores extracted from depths down to six metres show a remarkable sequence of how prehistoric man who occupied these areas adapted to changing climatic conditions which took place on a time scale measured in millennia. Recently discovered evidence suggests that the cultural developments that took place over these extended time periods were driven by the climatic changes that occurred following the last glacial period.



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Ancient artefacts (pottery) found at Horton Plains during archaeological explorations

Human occupation and cultural development in the Horton Plains began with prehistoric man as far back as 24,000 years BP. During the last glacial maximum, 24,000-18,500 years BP, the primitive culture that prevailed was that of the hunter-gatherer. During this period very dry conditions prevailed as evidenced by the presence of pollen of xerophytic plants (e.g. *Chenopodium*).

It is generally believed that the world's earliest civilization based on the cultivation of rice, oat and barley was in South Asia and that it dates back to 15,000 years BP. The recent evidence unearthed in Horton Plains, however, shows that plant domestication took place here at an earlier period, and independently, with the favourable change in the climate bringing in wetter conditions (17,600-16,000 years BP). With the passage of time, agricultural practices advanced into more systematic management and with the increasing humid conditions rice replaced oat and barley (13,000-8700 years BP). In later periods, climatic conditions began to turn dry and evidence of occupation is absent from around

3600 years BP.

In the KCF, the presence of caves that were occupied by lay people at first and subsequently worked on to provide drip ledges and occupied by Buddhist monks suggest early human interaction with the environment in two different forms: the first a hunter-gatherer type and later a more spiritually enlightened form.

The ancient village settlements in KCF present another aspect of cultural traditions that have evolved over centuries. They relate to the mode of living of these communities where they used the local resources for their sustenance. They cultivated locally available varieties of rice and used organic manure. They developed their own mode of tilling the soil using animal power and transporting goods using pack animals. The natural forest supplied them with items of food and medicine. They had a great respect for, and lived in harmony with, nature. Their dwellings were constructed out of locally available material and had acquired characteristics of their own.



Paddy farming on a small scale at Meemure (top) is still carried out using many traditional farming methods, such as the manual winnowing of paddy (left)

Because of the remoteness of the villages the mode of life and the practices of the people living there remained virtually unchanged and were unaffected by modern developments until recent years. Action will be taken to select and preserve a few dwellings constructed in the ancient style and some of the agricultural implements, household items and other artifacts that portray the traditional lifestyles of these communities.

Criterion vi:

Be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.

The features of outstanding universal significance in PWPA in relation to this criterion have to be considered in conjunction with the facts set out under criterion iii. In terms of Criterion vi, the simple but aesthetically outstanding monument of the Adam's Peak footprint shrine has been replicated in nearly every Theravada Buddhist temple erected after the 13th century AD. This was the outcome of a period when the king who ruled at the time persecuted the Buddhist monks who visited the shrine. This forced the monks to seek refuge abroad and they took with them replicas of the footprint. This was the beginning of the spread of the cult of footprint worship in all the Theravada Buddhist centres in the region.

The pilgrim season at Adam's Peak starts annually with the full moon in the month of December and goes on till May the following year. Particularly at the commencement of the season, many traditional cultural rituals that have evolved through centuries are performed by the devotees. These practices are predominantly Buddhist although some of them also relate to the worship of deities.

The cultural cum religious traditions relating to the Adam's Peak mountain are strongly linked to the belief that the whole area (referred to as *Samanta kuta* in Pali and *Samanala adaviya* in Sinhala) is in the domain of the deity *Sumana Saman*. This deity is said to have invited Lord Buddha to visit the mountain and place his footprint atop the peak. It is this belief that had given the name *Sri pada* (or sacred footprint, in Sinhala) to what in English texts is referred to as Adam's Peak.

At the beginning of the pilgrim season, on the full moon day in the month of December, the statue of *Sumana Saman* which is, till then, in the custody of the *viharadipathi* of the Galpothawala temple in the Ratnapura district is ceremoniously taken to the *Maha Saman Devalaya* and then in procession to the sacred peak where it is installed and where it resides through the pilgrim season for veneration by the pilgrims who come to worship the sacred footprint. Devotion to the deity, to a large extent, arose out of the perceived need of the pilgrims for protection against wild animals which in those ancient times was a very real hazard.

The devotional acts of those who make the pilgrimage, and which have outlasted centuries, broadly signify the entry of the pilgrims into an area held to be deeply sacred. Those who would make the pilgrimage are expected to prepare themselves by keeping body and mind pure and abstaining from food of animal origin for at least a week prior to the pilgrimage.

The pilgrims first take a bath in the *Seetha Gangula* (a stream) to further purify themselves. Then, clad modestly in white, they make their way up the trail. An important religious practice during the climb is to thread a needle and deposit it at the spot called the *Indikatu*

Pana. This is symbolic of the belief that the Lord Buddha on his way to the peak had experienced a tear in his robe and a thread and needle was used to mend it. Another ritual is to deposit a walking stick at a place called the *haramiti pana* situated in one of the steepest parts of the climb. This is symbolic of the pilgrim's religious fervor and his resolve to overcome the difficulties of climbing the peak.

The leader of a group of pilgrims (chosen by virtue of age and having made several previous visits to the peak) is called the *nade guru*. First time visitors, children, and the aged are named *kodhu*, *kirikhodu* and *dandukhodu*, respectively. The pilgrims recite religious stanzas as they climb the peak. These stanzas, written several centuries ago by a blind poet, refer to themes in the *Thunsarana*. They invoke the blessings of the Buddha on those climbing the peak, call on the kindness of the deity Saman, and invoke blessings on those who having worshipped at the peak are now descending. At the peak one of the rituals is for a pilgrim who has worshipped at the peak more than once to toll the bell at the peak to tally with the number of times he has made the pilgrimage.

Resting places called *ambalama* had been put up in ancient times on the pilgrim paths leading to the peak. Historically, one of these is said to have been put up by the poetess Gajaman Nona from Matara and this is called by the name *Nona Ambalama*. At the commencement of the pilgrim season a long established tradition is for the local government representative to make a trip to the peak to ensure that the paths and the *ambalama* are in a fit condition.

In ancient times a *pirivena* was located at Palabathgala, at the foot of Adam's Peak, where a number of Buddhist monks (*bikkhu*) resided and treated the ailments of people, using plant material from the natural forest.

In the Knuckles range, the inhabitants of the remote, ancient village settlements of Knuckles such as Ettanwala, Pitawala, Kahagala, Illukkumbura, Rattinda and many others developed cultural practices, many of which persist to the present day. Among the religious and cult practices are those associated with *chena* cultivation (slash and burn agriculture). Several deities are linked with the practices carried out by the dry-farming communities, with subtle differences between the different villages. The people in these remote villages believed that adhering to traditional practices will safeguard them from wild animals and ensure that they obtain a bountiful harvest from their crops (e.g. they make thanksgiving offerings to specific deities from their first harvest). When they go into the forest they adhere to certain practices to invoke the protection of deities. The precise nature of the practices and invocations don't go on record, but are passed on to the younger generation orally. They are meant to appease the deity who is the custodian of the forest while seeking to safeguard the person concerned as well as others that visit the forest. These beliefs, prevailing even today among the village folk, have gained strength as it has been claimed that, quite often, those who had scoffed at the rituals had come to grief in one way or another.

A range of ceremonies and other rituals are performed by the people invoking deities for protection from harm and curing diseases. The remoteness and isolation of this region has led to the persistence of many of the rituals developed and traditionally passed down from generation to generation since ancient times. Particular deities are invoked for the curing of diseases.

Besides deities, there are also strong beliefs in the power of demons (*Yakkha*), with

different demons having different territories and lineages. These beliefs are of ancient origin, dating back to the time of pre-historic and *vedda* communities in the Knuckles area. The villagers made scare-crows and alarms made with iron, bamboo, and other natural products to scare away animals that would otherwise destroy the crops, and these varied in design and construction from village to village. Folk poetry associated with *chena* cultivation also has a rich tradition in this region.

Criterion vii:

Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

The Peak Wilderness range of mountains, with its prominent cone-shaped peak seen from afar has, since ancient times, been a landmark for seafarers on their approach to Sri Lanka. To quote from Sir James Emerson Tennent's masterpiece *Ceylon: an account of the island Physical, Historical and Topographical* (1859): "Like the Greek geographers, the earliest Chinese authorities were struck by the altitude of the hills, and, above all, by the lofty crest of Adam's Peak, which served as the landmark for ships approaching the island".

Likewise the breathtaking view from the Peak has been described in superlative terms. Tennant wrote: "The panorama from the summit of Adam's Peak is, perhaps, the grandest in the world, as no other mountain, although surpassing it in altitude, presents the same unobstructed view over land and sea - westward the eye is carried far over undulating plains threaded by rivers like cords of silver, till in the purple distance the glitter of the sunbeams on the sea marks the line of the Indian ocean". In another description of the view awaiting the lucky pilgrims that reach the Peak at dawn Herbert Keuneman states, "Those who reach the summit by dawn witness an almost supernatural spectacle - the magnified triangular shadow of the peak itself superimposed on the awakening countryside. On very rare occasions one may witness the 'spectre of brocken' one's own immensely magnified shadow borne on distant wraiths of mist, looped by a rainbow halo" (Anderson, no date).

Another quotation on the overpowering effect of the view from Adam's Peak would not be out of place. Williams (1950), a 20th century tea planter wrote: "The peak itself is the last gesture of defiance from a land mass between the Himalayas and the South Pole. And when one is standing on its pinnacle, with the wilderness of the peak, a tumbled primeval forest at one's feet, that the spirits of the men who have worshipped there throughout all the ages hover in the clouds and rising mists, among the trees, caves and dark crevices with which its towering slopes are honeycombed, is not difficult to believe."

Describing the trek to the peak by pilgrims by their thousands and the spectacle awaiting them, Simon (1989) writes: "They do not have long to wait. The eastern sky is glowing: suddenly a fiery crack appears between earth and sky. On Adam's Peak, the sun has risen. No one is watching. Instead, all eyes are resolutely turned westward, where something far stranger is taking place. The Peak is casting its shadow upon the very air. The cone of darkness mounts up to heaven right in front of the pilgrims' eyes; it is a signal from the sacred mountain to the gods themselves. The watchers on the summit have their personal messages to add to that mystic communication: cries of holy joy rend the air".

A more mundane, nonetheless exceptional, feature of Peak Wilderness and its southern foothills is the fact that these areas are the repository of world famous gemstones. The millions of years of weathering and erosion that the ancient rocks of the central highlands

had been subject to has resulted in the accumulation of gemstones of rare beauty, renowned through the ages. A 400 carat blue sapphire from Sri Lanka is on the British crown, and the



Baker's Falls: a tourist attraction at HPNP

so-called Star of India, a star sapphire displayed at New York's Museum of Natural History, is from Sri Lanka (Gunawardena 2002). The main gem fields are around Ratnapura, to the south of the Peak Wilderness Range

HPNP has become increasingly popular among nature lovers in recent years. Its main attraction lies in the picturesque landscape of rolling grasslands. No visit to Horton Plains is complete without a visit to “World's End”. At one point in the rim of Horton Plains there



The rugged Knuckles mountain range with scenic landscapes and a unique biota

is a near vertical drop of almost a kilometer to the plains below, with a spectacular view of the dry zone lowland plain extending far out to the sea beyond. Some of the more adventurous visitors climb the peaks of Totapolakanda or Kirigalpotha, in the periphery of Horton Plains.

The main attraction of KCF in terms of natural beauty is its distinctive and impressive land forms. The geologist Cooray (1998) describes the Knuckles massif

thus: “Nowhere else in Sri Lanka, in an area of comparable size does one find such a collection of magnificent peaks. There are 35 peaks rising over 915 m in the Knuckles range (*ibid.*). Some of these peaks offer breathtaking views of the rugged mountainous country.

John Davy (1821) in his 19th century writings on the Knuckles states “I never saw before so perfect a specimen of forest scenery. Here lie trees of different kinds, sizes and ages: some saplings, some dead and decaying, and some of very great bulk and height towering above the rest in their prime”.

Criterion viii:

Be outstanding examples representing major stages of earth's history, including the record of life, significant ongoing geological processes in the development of land forms, or significant geomorphic or physiographic features.

The perhumid southwest of Sri Lanka may be divided into two biogeographical components: the lowland and mid-country area and the submontane and montane area. The former is represented by the Sinharaja Reserve World Heritage while the latter is represented by the serial site now being nominated. Major changes in the earth's history have left their stamp on the composition of the biota of southwest Sri Lanka where biodiversity and species endemism are exceptionally high.

Sri Lanka was a small part of the continent of Gondwanaland which was a huge land mass that included South America, Africa, Madagascar, the Seychelles, peninsular India and Sri Lanka. The continent broke up during the Cretaceous Period and as the fragments moved apart, the Deccan Plate rafted northwards. By then the angiosperms had evolved and had spread over the continent of Gondwanaland. The Deccan Plate carried the gondwanic biota Noah's Ark fashion, and in the Miocene Sri Lanka separated from the rest of the Deccan Plate which formed peninsular India. Clearly therefore the bulk of the Sri Lankan biota, as expected, has close affinities with the biota of India, particularly the southern part of the subcontinent.

Of special interest in relation to the flora of Sri Lanka is the fact that some angiosperm genera bear evidence of their ancient gondwanic ancestry. Two genera in particular have been recognized in this respect. They are the endemics *Hortonia* (Monimiaceae) and *Schumacharia* (Dilleniaceae) (Raven & Axelrod 1974). *Schumacharia*, with three species, is confined to the low and midcountry rainforest. *Hortonia* (which belongs to the only endemic subfamily in Sri Lanka) has three species, with two, *Hortonia floribunda* and *H. ovalifolia*, confined to the montane zone and present in the nominated property.

From among the families of angiosperms, Ashton & Gunatilleke (1987a) consider that the Dipterocarpaceae best fits the criteria set out by them for Noah's Ark dispersal. This family is now pantropical, though with separate subfamilies (Monotoideae and Dipterocarpoideae, the former in northern South America, tropical Africa and the Seychelles, and the latter in Asia). At present, vicarious with both dipterocarp subfamilies are the Sarcolaenaceae, now endemic to Madagascar but known from the Miocene of South Africa. All dipterocarps examined have been seen to be ectomycorrhizal, and the suspected affinity between the Dipterocarpaceae and Sarcolaenaceae has received increased credibility recently by the demonstration of the ectomycorrhizal status of the latter. This suggests that the common ancestor of the Sarcolaenaceae and Asian dipterocarps was ectomycorrhizal and that the two groups would have separated with the

separation of the Madagascar and India land masses 88 million years ago (Ducouso et al. 2004). Among the Sri Lanka flora, the Dipterocarpaceae is remarkable in that all of its 58 species are endemic. *Stemonoporus* among them has 26 species spread over the full amplitudinal range of the wet zone.

Another interesting family in relation to the record of life and its links with the geological processes associated with the history of Gondwanaland is the Crypteroniaceae. Clock independent dating estimates suggest that the divergence of Crypteroniaceae from its African and South American relatives coincided with the breakup of Gondwanaland, and that the Deccan Plate served as a raft transporting the Crypteroniaceae to Asia and that the group later spread to SE Asia (Conti et al. 2002). This family is represented by the species *Axinandra zeylanica* an endemic, in the midcountry and submontane rainforest. This species has also variously been listed under Myrtaceae, Lythraceae and Melastomataceae.

Besides its lateral movement as part of the Deccan Plate, Sri Lanka was subject to episodes of land upliftment with intermittent periods of erosion leading to peneplanation of the uplifted land. The mountain building processes have resulted in the formation of the central highlands, rising to over 2500 m above msl. The mountain building process has had a profound influence on the distribution of biota within the country.

With its separation from the Indian peninsula in the Miocene, Sri Lanka became isolated biogeographically except for brief periods up to the Holocene when land connections with South India occurred. Southwest Sri Lanka is believed to have maintained its humid rainforest conditions over a long geological period, and this together with its double isolation from peninsular India, meaning the mountain barrier in the south central part of the country and the large stretch of dry zone north of the central hills, have profoundly influenced the post Miocene history of the biota.

Besides serving as a mountain barrier, the central highlands have more positively affected the evolution of biota in the wet southwest of the country. As stated by Werner (1982), “While the mountains of Sri Lanka were gradually uplifted during the Tertiary Period, tropical lowland rainforest plants were exposed to a cooler climate. While many genera disappeared completely, others developed new adapted species”. Thus, all the members of the genus *Dipterocarpus* disappeared completely from the higher altitudes, and in the Clusiaceae some members of the genus *Calophyllum* are now represented exclusively in the montane areas, with *C. walkeri* and *C. trapezifolium* appearing prominently among the dominant trees. The same trend can be seen among the fauna, with many species being now found exclusively in the montane and submontane zones.



Different *Osbeckia* spp. At KCF (left) and at Horton Plains at (right)

Today, the country is noted for its high level of biodiversity in the humid southwest, and concomitantly, there is an exceptionally high level of endemism. Endemism among the flora is for the most part at the specific and intra-specific levels. Endemic genera are relatively few in number and there are no endemics at the family level.

The geological events that led to the evolution of Sri Lanka have also profoundly affected the fauna of the island, particularly in the wet southwest. There is an extraordinary level of endemism among the fauna within the wet zone where the three constituents of the serial property are located. Even more significant in terms of the evolutionary importance of the endemic species in the montane zone is that they are believed to represent “the most conservative faunal elements (i.e. in the island) least disturbed by recent invasions from south India” (Eisenberg and McKay 1970). Endemism is more marked in those faunal groups with limited dispersal ability such as freshwater fishes and crabs, insects and herpetofauna, compared with the birds and mammals.

The amphibian *Philautus* has been isolated from the Indian group for the past 500,000 years with no biotic exchange (Bossuyt et al. 2004). This is supported by molecular studies that show considerable divergence from the Indian sister taxa. The species used in the analysis to represent the Indian sister group were *P. charius* and *P. signatus*. The three constituents of the serial property have between them the habitats of 23 endemic species of *Philautus*, of which at least seven species are entirely restricted in their occurrence to the three nominated properties.

The endemic amphibian *Lankanectes corrugatus* has been recorded from PWPA and KCF. There is molecular evidence that the endemic monotypic frog genus *Lankanectes* has an ancient lineage having diverged from the mainstream of the Ranidae even before the Deccan plate separated from the Madagascar plate in the early Cretaceous (Pethiyagoda et al. 2006). It is apparent that the sub-family concerned had branched off well before the radiation of the other two sub-families Raninae and Rachophorinae of the Ranidae. The members of these latter two sub-families are now the dominant species within the Family Ranidae in Asia (Pethiyagoda 2005b) while *Lankanectes corrugatus* is confined to Sri Lanka.

The endemic frog genus *Nannophrys* with its three species with allopatric distributions are



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Allopatric speciation: the globally threatened Nannophrys marmorata confined to the KCF (left) and Nannophrys ceylonensis found in the PWPA and HPNP in the central highlands.

Central Highlands of Sri Lanka:
Nomination for inscription on the World Heritage List



considered geographical relicts. The critically endangered *N. marmorata* is confined to the KCF while *Nannophrys ceylonensis* is restricted to PWPA and other parts of the Central Massif.

De Silva (2006) states that there are 11 geographically relict genera of reptiles in the island. Of these, ten (*Ceratophora*, *Cophotis*, *Lyriocephalus*, *Chalcidoseps*, *Lankascincus*, *Nessia*, *Aspidura*, *Balanophis*, *Haplocercus* and *Pseudotyphlops*) are represented within the three nominated properties. Some researchers have claimed to have also seen the eleventh, *Cercapsis*, at Knuckles (Bambaradeniya & Ekanayake 2003). The three sites together contain 20 species from these endemic genera out of a total of 31 in the island.

The endemic skink genus *Lankascincus* represents a distinct lineage of the lygosomine scincid radiation (Austin et al. 2004). All six species within the genus are represented within the constituents of the nominated property, with one each being recorded only in KCF and PWPA, and four recorded at both KCF and PWPA.

The uropeltid snakes (Family Uropeltidae) are believed to be from a primitive relict family of snakes found only in Sri Lanka and the hill tracts of southwestern India (Gans and Baic 1977). It is believed that members of this family entered Sri Lanka during the Pliocene and evolved here after their migration. All of the recognized 12 Sri Lankan species (within three genera) of this family are endemic. KCF has five Uropeltid species, including *Pseudotyphlops philippinus*, from an endemic monotypic genus (Crusz 1984; Bambaradeniya & Ekanayake 2003).

The current composition and distribution of the fauna and flora of the country, particularly those of the wet southwest, provide remarkable biogeographical evidence linking biotic evolution with the geologically significant events that led to the making of Sri Lanka.

Criterion ix:

Be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal and marine ecosystems and communities of plants and animals.

The outstanding examples representing the geologically more recent and the ongoing ecological and biological processes in biotic evolution that characterize the rainforests of Sri Lanka relate mainly to the post-Miocene period when Sri Lanka became geographically isolated from peninsular India.

The wet southwest of Sri Lanka covers just 23% of the land area, and the climax vegetation which at one time covered most of this area is rainforest. The wet zone has an altitude going up from sea level to over 2500 m. Despite the extensive deforestation that has taken place, the few forest areas that remain provide ample evidence of the biotic evolutionary processes that have taken place from the Miocene to geologically more recent times, with every reason to believe that they are ongoing and would continue if the remaining habitats are given adequate protection. Among the flora the best example would be the Dipterocarpaceae. The family is pantropic, with a lineage that dates back to a time prior to the breakup of Gondwanaland. In Sri Lanka the members of this family have radiated to an amazing extent. There are 58 species, all endemic, and all but one in the wet zone. There is a clearly defined altitudinal spread of the species suggestive of allopatric speciation. This feature is also evident in several other taxa e.g. *Calophyllum* in the Clusiaceae, *Memecylon* in the Melastomaceae, and *Syzygium* in the Myrtaceae. Ashton & Gunatilleke (1987a)

state: “Both (i.e. in reference to the families Dipterocarpaceae and Myrtaceae) have speciated within the island to an astonishing degree and, but for deforestation, give every indication of continuing diversification”.

The Dipterocarpaceae counts 26 species of *Stemonoporus*. Different groups of species of *Stemonoporus* are seen to occupy different altitudinal zones from sea level to the montane area (Greller et al. 1987). This is suggestive of allopatric speciation. At the same time, within a forest two or more of the species are often found (in this case suggestive of



***Semnopithecus vetulus
monticola* at HPNP**

sympatry), but with a highly localized distribution where, with rare exceptions, only one species appears among the dominants in a particular part of the forest.

In the montane forests represented by the serial property, scientific findings among the fauna provide even stronger evidence of geologically recent as well as ongoing ecological and biological processes in the evolution and development of the taxa.

Among the fauna, the history of the endemic purple-faced langur of Sri Lanka (*Semnopithecus vetulus*) is of special interest in relation to this criterion. The oldest colobine remains east of Afghanistan are the fossil remains in the Pakistan Siwaliks dated 7-5 million years BP (Barry 1987) indicating that colobines did not reach eastern Asia until the end of the Miocene (Delson 1994). As geological evidence points out that Sri Lanka was linked to southern India on at least two occasions in the Tertiary, it has been concluded that the endemic Purple faced langur (*Semnopithecus vetulus*) is among the relicts of the original faunas that had

entered Sri Lanka after its isolation in the Miocene, through the intermittent land linkages with India that formed during the Pleistocene, and did not drift back to the mainland (Hill 1934). Since then the purple faced langur in Sri Lanka has evolved into the several morphologically different forms recognizable today, while in Malabar, in mainland India, it evolved into a distinct species (*Semnopithecus johnii*) (Hill 1934; Brandon-Jones et al. 2004).

The three morphologically distinct Sri Lankan sub-species of this endemic colobine occur within the three constituents of the nominated property. They are the small-bodied wet lowland form with short, black fur, which ranges into the foothills of PWPA; the montane large-bodied sub-species with long fur occupying the upper elevations of PWPA and HPNP, and the large bodied sub-species inhabiting the drier areas of KCF. The KCF sub-species, though having longer fur than the typical lowland dry zone animals is nevertheless considered distinct from the montane sub-species (Hill, 1934). The three sub-

species show allopatry, a process that could be considered to be ongoing.

Molecular genetic analysis has shown that the Sri Lankan leopard, the only representative



© Samantha Mirandu

***Panthera pardus kotiya* from an endemic subspecies, found at all three nominated sites (photographed at night, in HPNP, by the nomination team)**

in the island of the genus *Panthera*, which diverged from other felids about 1.8 million years ago, is a unique sub species (*Panthera pardus kotiya*) and distinct among the 10 subspecies of leopard found the world over (Miththapala, 2006). Notably, all three nominated properties provide habitats for *Panthera pardus kotiya*, the subspecies of leopard endemic to Sri Lanka.

Sri Lanka's snail fauna shows evidence of Sri Lanka's long association with peninsular India; and the island's molluscs are considered to be ideal subjects for studies in evolutionary biology (Naggs et al. 2005). Thirteen of the 60 land snail genera recorded in Sri Lanka are also found in peninsular India (primarily in the Western Ghats), and approximately 50% of all species found in Sri Lanka belong to genera found only in southern India and Sri Lanka (Raheem et al. 2000). Despite this, long isolation and the concomitant evolutionary processes have resulted in a Sri Lankan molluscan fauna that is the most distinct in the South Asia Region.

Of special significance in the serial property is that despite KCF sharing in a common geological origin with PWPA and Horton Plains, it has been separated by a relatively low-lying plateau for a sufficiently long time to have developed many distinctive features in its fauna at the species and subspecies level, particularly among the herpetofauna. Moreover the multiplicity of site conditions within the Knuckles mountains has given rise to a wide range of habitats that have spurred radiation among this group of fauna.

An example of allopatric speciation is the genus *Ceratophora*. *C. tennentii* which is confined to the upper echelons of the Knuckles range of mountains had diverged around 7.1 million years BP from the closely related *C. stoddartii* which is found in the Central Massif, barely 50 km away (Pethiyagoda, 2005a). Schulte et al. (2002) have shown that the endemic genus *Ceratophora* was derived from a common 'Indian' ancestor about 13 million years BP. The geographical distribution of the five species within the endemic



Allopatric speciation of lizards from an endemic genus: Ceratophora aspera (top left) and C. stoddartii (right) in forests of the central massif, and the globally threatened Ceratophora tennentii confined to the KCF (bottom left).

genus *Ceratophora* is notable in terms of allopatric radiation. *Ceratophora tennentii* is confined to the KCF; *C. stoddartii* is widespread in some forests of the Central Massif, including PWPA and HPNP; *Ceratophora aspera* is found in some parts of the Central Massif (including PWPA) and the Rakwana mountain range; and *Ceratophora erdeleni* and *C. karu* are known only from small populations at the higher elevations of the



Cophotis dumbarae (right) confined to the KCF and C. ceylanica (left) in the central highlands, from an endemic genus

Sinharaja World Heritage Site (De Silva et al. 2005f)

The endemic lizard genus *Cophotis*, originally thought to be monotypic (*Cophotis ceylanica* being the species) had radiated into a recently discovered distinct species within the Knuckles range and has been named *C. dumbarae*. While *C. ceylanica* is found in the Central Massif, with its best known populations in HPNP (Manamendra-Arachchi et al. 2006), *C. dumbarae* is rare and confined to KCF.

The 32 species of Sri Lankan *Philautus* species of shrub frogs analysed by Meegaskumbura et al. (2002) have also revealed an insular endemic radiation (Pethiyagoda, 2005b). Molecular studies have shown that some of the *Philautus* species in the Knuckles mountains were separated from their sister taxa in the Central Massif around 4 to 7 million years ago (Meegaskumbura & Manamendra-Arachchi (2005).

Among the freshwater fishes, *Garra phillipsi*, *Puntius srilankensis* and *Puntius martensnyi*, confined to the KCF, show that they have evolved to survive in particular stream habitats (Goonewardene et al. 2006). *Puntius martensnyi* in particular displays high habitat specificity (Pethiyagoda, 1991).

Criterion x:

Contain the most important and significant natural habitats for *in situ* conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Sri Lanka's wet zone in the southwest of the island, covering an area of a mere 15,000 km², is home to a unique piece of the world's rainforest biome. The island's rainforest has been designated the Ceylonese (Sri Lankan) Rainforest within the Indomalayan Realm by Udvardy (UNESCO 1981). The wet zone, with a perhumid, everwet climate, though small in area, nevertheless rises from sea level to an altitude of over 2500 m. The Sri Lankan rainforest harbours an extraordinary collection of endemic species of fauna and flora.

These forests which were once extensive within the wet zone were subject to deforestation on a massive scale over the past 200 years or so, leaving the Sri Lanka component of the rainforest biome now represented only by isolated patches scattered over the wet zone amounting, in total, to just around 10 per cent of the zonal land area. Deforestation took place throughout the rainforest's altitudinal range. Yet, there is reason to believe that what remains of the rainforest still harbours nearly all of the biota that it once contained, albeit in a state where further deforestation could lead to extinctions on a massive scale. It was only three decades ago that the value of these rainforests as the only refuge of some of the rarest biological species began to be recognized. It was not long before the wet zone of Sri Lanka was named as one of 25 hotspots in the world i.e. an area that “features exceptional concentrations of species with exceptional levels of endemism and that face exceptional degrees of threat” (Myers 1988).

The concentration of species in terms of number per unit area of forest is reputed to be among the highest in the world. Despite its small size, Sri Lanka has the highest biodiversity per unit area in the Asian region for mammals, reptiles and amphibians, ahead of mega diversity countries such as Malaysia, Indonesia and India, and is second in the Asian region for bird diversity per unit area (NARESA 1991). Sri Lanka is also known to be the richest country worldwide in terms of amphibian species diversity per unit area (3.9/1000 km²), with Costa Rica being a fairly distant second (Pethiyagoda & Manamendra-Arachchi 1998, Manamendra-Arachchi & Pethiyagoda 2005).

Among the world's hotspots, southwest Sri Lanka (coupled with the Western Ghats of India) ranks highest in terms of the threat to the species from a high and expanding human population (Cincotta et al. 2000).

The Sri Lankan rainforest has two distinct elements: one, the lowland and mid-country rainforest and the other the montane and submontane rainforest. The three constituent parts of the nominated property (PWPA, HPNP and KCF) are located in the latter region. The biota, particularly at the species and intraspecific levels, in the natural forests of this region (montane and submontane) show distinctive features which set them apart from the forests of the low and mid-country rainforest. Because of the sharp variations in environmental conditions within the montane and submontane region, including the highly dissected nature of the terrain, there is a multiplicity of habitats even within a small area of forest resulting in a patchy distribution of species to an extent seen nowhere else (Ashton & Gunatilleke (1987a); commenting on the extreme localization of the flora these authors state that there is no comparable analogue elsewhere in Asia or the Far East. The same is true of the fauna, particularly the herpetofauna.

The three serial sites are selected to capture as near as possible the full complement of habitat variations and species diversity within this montane and submontane bioclimatic zone in order to conserve the range of biodiversity that now exists, particularly targeting the endemics. Satisfying criterion x to an exceptional degree is the most compelling natural feature of this property justifying its being inscribed on the World Heritage List.

In the National Conservation Review of all the forests in the island of over 200 ha in area, eight relatively large contiguous forests were identified in relation to their importance for the conservation of biodiversity (IUCN & WCMC 1997). If conserved, they were expected to give protection to at least 79% of woody plant diversity, at least 88% of endemic woody plant diversity, at least 83% of faunal diversity and at least 85% of endemic faunal diversity. Peak Wilderness, Horton Plains and Knuckles, which are among the eight identified areas, represent the prime sites for the conservation of the submontane and montane elements of the island's biodiversity (*ibid.*).

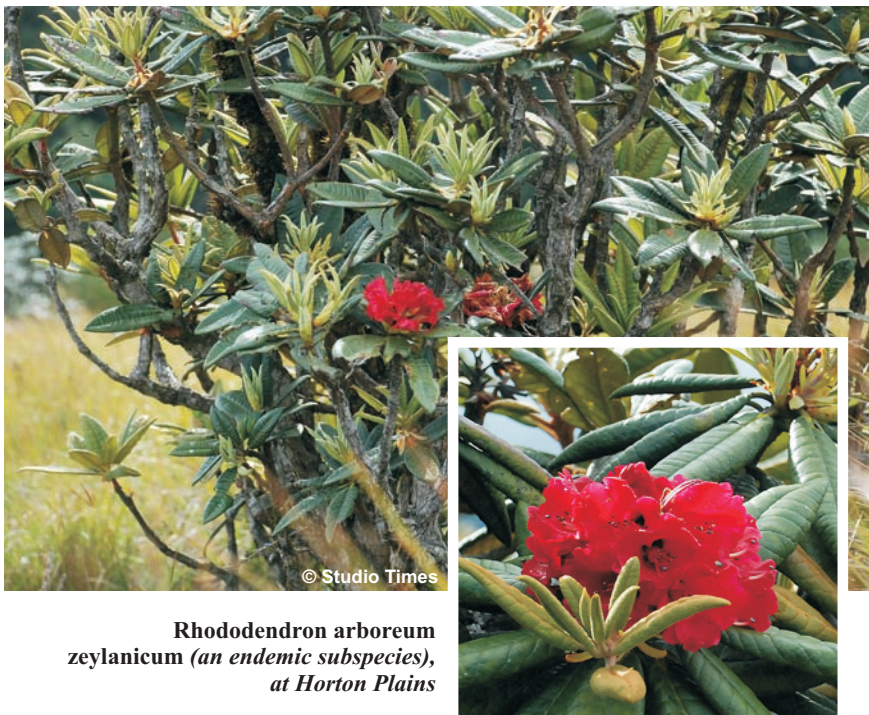
Very few areas in the montane zone have escaped deforestation or encroachments or illicit timber felling by tea estate workers and local villagers. Hence minimal disturbance to the original virgin forest was a key consideration in selecting the sites for inclusion in the property to be nominated. In KCF, the first ranking forest (out of the 204 surveyed for biodiversity) in terms of faunal diversity, some sections had been under-planted with cardamom for commercial harvesting, but with the progressive elimination of this practice the original forest appears to be regenerating. This observation is expected to be confirmed through ongoing scientific investigations.

A second important consideration was size; the three serial sites are the only sizable areas where the natural vegetation exists, as near as possible, in its pristine condition. They are hence the sole refuge of a large number of endemic and threatened species of fauna and flora where *in situ* conservation would ensure continued survival.

How has the central highlands of Sri Lanka acquired its stature as the abode of a unique collection of endemic fauna and flora? Though dealt with more extensively elsewhere in this nomination, we need to have a brief look here at the interesting evolutionary history of this part of the wet zone represented by the three nominated constituents PWPA, KCF and HPNP. The ancestors of a majority of the present day species would have rafted on the

Deccan Plate as it moved northwestwards following the break-up of Gondwanaland and finally become isolated in wet southwest Sri Lanka. With the tectonic upliftment of the land, a part of the rainforest would have been exposed to cooler conditions. Radiation within the montane zone has given rise to many new species that are now restricted to this zone. The montane and submontane forest is therefore a unique piece of the world's Humid Tropical Forest Biome. The fact that endemism does not extend beyond the genus and species level (except for the subfamily Hortonoideae among the flora) speaks of the evolutionary changes in the montane flora having taken place in the more recent geological history of the island.

We also need to note that between the periods of mountain building erosion had taken place on a massive scale. One outcome of this is the presence of a relatively lowlying plateau between the Central Massif and the Knuckles range providing a passage for the Mahaweli Ganga from the west of the country where it originates to the east. This plateau serves as a dispersal barrier, particularly for the herpetofauna. The results are seen in the allopatric speciation that has occurred, with some species being restricted to KCF and some to PWPA and other parts of the Central Massif, as described elsewhere in this



Rhododendron arboreum zeylanicum (an endemic subspecies),
at Horton Plains

nomination.

It must be emphasized that some of the species in southwest Sri Lanka are of Himalayan lineage, and therefore derived from Laurasian stock. For example, the presence of three members of temperate eastern Himalayan elements of the tree family Ericaceae viz. *Gaultheria leshenaultii*, *Rhododendron arboreum* subsp. *zeylanicum* and *Vaccinium leshenaultii* in HPNP and its surroundings is of considerable historical biogeographic significance. While some biogeographers argue that these plant migrations from the

eastern Himalayan region had occurred through 'island hopping', during geological periods when favourable conditions prevailed, by way of a corridor or stepping stones bearing a moist and cool climate with light frost, others claim that it would have been brought about by long-distance dispersal (Ashton & Gunatilleke 1987a).

The montane forests (represented by the serial property) contain the only habitats of many threatened plant species and are therefore of prime importance for their *in situ* conservation. Of Sri Lanka's rich endemic flora, 62 species are confined to the montane and submontane zone, and of these, 25 are found only in the Peak Range i.e in PWPA (Ashton & Gunatilleke 1987a). This tiny area (in comparison to the country as a whole) has been designated Bioregion 14 by Ashton and Gunatilleke (*ibid.*). The species include the orchids *Adrorhizon purpurascens* and *Podochilus falcatus*, several species of *Syzygium* (Myrtaceae), several species of the endemic dipterocarp *Stemonoporus*, *Dipcadi montanum* (Hyacinthaceae) and *Brachystelma lankana* (Asclepiadaceae). Whereas 11 species of the genus *Stemonoporus* are found in PWPA, only one (*S. affinis*) is present in and restricted to KCF. This species is so rare that only a very few individuals have been observed.

Turning our attention to the fauna, the available evidence strongly supports the importance of the montane area for the *in situ* conservation of many localized endemic species. Special attention needs to be drawn to the amphibians which are the subject of intense ongoing research. The rachophorids of the genus *Philautus* have been the subject of detailed study based on available type material and fresh collections, and Manamendra-Arachchi and Pethiyagoda (2005) have described 27 species new to science, all endemic to Sri Lanka. Nearly all of them are from the wet zone of the island, with several being confined to the Central Massif and Knuckles. In addition, they have revised the names of 26 species that had been placed in other genera and assigned them to *Philautus*. They add that further investigations are proceeding and many previously undescribed species are coming to light. They are of the view that the total Sri Lankan anuran fauna may eventually exceed 140, of which *Philautus* species alone may number around 70.

The endemic frog species *Microhyla zeylanica* is found only in the Central Massif up to about 2000 m in altitude (Dutta & Manamendra-Arachchi 1996). It has not been observed in the KCF. The three nominated sites, and in particular the KCF, are important in conserving *Lankanectes corrugatus* of an endemic monotypic genus. As it is believed that many more amphibian species await discovery, HPNP, PWPA and KCF will grow in importance as refugia for Sri Lanka's highly diverse amphibian fauna, including species yet to be discovered.

Most of Sri Lanka's endemic serpentoid reptiles are found in the wet zone, and several of them are confined to the central hills up to altitudes of 1500 m (Pethiyagoda 1998). For example, the montane hump-nosed viper *Hypnale nepa* is found mainly in the Central Massif (Pethiyagoda 1998) and in KCF. KCF is also the major habitat for *Chalcidoseps thwaitesii*, a geographical relict endemic species from a monotypic genus (De Silva et al. 2005a). Two species of the endemic genus *Ceratophora* are also found in the nominated property. *C. stoddartii* occurs only in the montane zone above 1200 m, and is found at both HPNP and PWPA but is absent in KCF, while its sister species *C. tennentii* is found only in the Knuckles Massif (*ibid.*).

The endemic genus *Cophotis* (the pygmy lizard) inhabits only the highest altitude forests of the montane zone (Pethiyagoda 1998). There are two species: one (*C. dumbarae*)

confined to the KCF and the other (*C. ceylanica*) in the other two constituents of the nominated property. The endemic *Calotes nigrilabris* (blackcheek lizard) occurs only in montane habitats over 1000 m, and it is most commonly seen at Horton Plains (Pethiyagoda 1998). Overall, of Sri Lanka's 11 endemic genera of reptiles (De Silva 2006), ten are represented by 20 species within the three nominated properties.

Among the birds, the endemic *Zoothera spiloptera* and *Eumyias sordida* range through the montane zone of the island; the latter is found only at the higher elevations and is rare below the altitude of 1000 m. *Zoothera spiloptera* is found at PWPA while *Eumyias*



The globally threatened Ratufa macroura (top), the endemic Calotes nigrilabris (bottom left) and the endemic Eumyias sordida (bottom right)



sordida is found at KCF, PWPA and HPNP.

Four of the nine species of shrews in Sri Lanka are endemic; three of the endemics are restricted to the central highlands. Of these, *Solisorex pearsoni* and *Suncus fellows-gordoni* occur in the nominated property (Wijesinghe & Goonetilake 2005). *Rattus montanus*, an endemic rodent, is similarly restricted to the montane areas and is found in PWPA and HPNP, while *Ratufa macroura* is found in all three areas but only above c.1800 m (*Ibid*).

The three nominated areas are of significance for conservation of the island's endemic and endangered primate genetic diversity. A compilation of all existing range information on the endemic and globally endangered purple-faced leaf monkey *Semnopithecus vetulus* (Dela 2004) shows that three of the currently recognized morphologically distinct subspecies occur within the KCF, HPNP and PWPA. Similarly, two morphologically distinct subspecies of the endemic and globally threatened macaque (*Macaca sinica*) are found in the nominated property. Both species of *Loris* found in Sri Lanka are present in the property, including the endemic red slender loris which ranges into HPNP and PWPA (Molur et al. 2003, Groves & Meijaard. 2005). The Horton Plains Slender Loris of Sri Lanka is among the top 25 primates in the world which are on the verge of extinction.

The available faunal data on the three constituents of the property underscores the fact that these areas are of vital importance in terms of conserving the country's faunal complement, particularly the endemic species, many of which are globally threatened and geographically relict forms of the island's biota, particularly among the herpetofauna.

3. b Proposed Statement of Outstanding Universal Value

The nominated property, The Central Highlands of Sri Lanka: its cultural and natural heritage, comprises three constituent parts: The Peak Wilderness Protected Area (PWPA), Horton Plains National Park (HPNP) and the Knuckles Conservation Forest (KCF). The central highland where the land rises steeply to an elevation of over 2500 m above msl occupies only a very small fraction of the island's land area. PWPA and HPNP are in the main block of highlands referred to as the Central Massif while KCF is in an isolated part referred to as the Knuckles Massif. The three constituents collectively bear features of outstanding universal value in relation to both culture and nature. They meet the conditions set out in several of the criteria, both cultural and natural, for justifying their inclusion in the World Heritage List.

3. b. 1 Cultural Heritage

On the advent of Buddhism to Sri Lanka (c. 200 BC), and for several centuries thereafter, the reigning monarchs paid overwhelming attention to the promotion of religion while at the same time building irrigation works for the sustenance of the people. These were the twin aspects of Sri Lanka's remarkable hydraulic civilization that spanned several centuries. While religious monuments were built in the dry zone centres of Anuradhapura, Polonnaruwa and Ruhuna, Adam's Peak in the central highlands attracted the attention of the people because of the indentation on the summit of the Peak which was thought to be the footprint of the Lord Buddha (called *Sripada*, or sacred footprint). Soon pilgrims began to cross to the wet zone forest and climb the mountain to worship at the Peak. Several reigning kings have also visited the site, notably King Vijayabahu I (1055 - 1110 AD), King Nissankamalla (1187 - 1196 AD), and King Panditha Parakrama Bahu I (1236 - 1271 AD). They had ordered measures to be taken to ease the climb to the Peak. Hence, Marco Polo who climbed the Peak in the 13th century had noted the chains that were provided to assist the pilgrims in their ascent. Ibn Batuta, the 14th century Arab traveler, having visited the shrine refers to the grotto at the foot of the Peak.

Today, Adam's Peak, or *Sri pada*, is one of the most important religious cum cultural sites in Sri Lanka with a tradition dating back to pre-Christian times. It is held sacred by Buddhists the world over. Around two million pilgrims visit the shrine every year. They are

mainly Buddhists, but also include Hindus and Muslims. Mention must be made that at various times in the history of Adam's Peak, the footprint as a holy shrine also became associated with three other great religions of the world, Christianity, Islam and Hinduism, as the footprint of Saint Thomas, Adam and Lord Shiva respectively.

The cultural heritage value of Horton Plains came to light through the discovery of sites occupied by prehistoric man in Horton Plains and the presence of geometric microliths and other artifacts at these sites. The discovery was to a great extent substantiated by evidence from detailed palaeo-ecological studies recently carried out by the Post-graduate Institute of Archaeology of the University of Kelaniya in collaboration with the University of Stockholm. Investigations of peat and sediment deposits from cores up to six metres depth have revealed a remarkable sequence of cultural practices that were adopted by Mesolithic man at this site. The sequence begins prior to 18,500 years BP, when slash and burn agriculture was practised. This is followed by the adoption of agricultural practices beginning with the incipient management of oat and barley (17,600 - 16000 years BP). The first appearance of systematic cultivation occurred when the conditions were warmer and wetter, at around 13,000 years BP. At around this time oat and barley was being replaced by wild varieties of rice. Land use appears to have decreased from about 8000 BP, and by 3600 years BP the area was almost deserted.

The South Asian region was considered to have witnessed the world's earliest human civilization based on rice, oat and barley cultivation, dated at 15,000 years BP. The new evidence from the Horton Plains shows that at this site incipient cultivation of these plants was practised at least two millennia earlier.

The discovery of human remains and geometric microlithic stone tools and other artifacts dating back to around 27,000 years BP in the foothills of the range (at Batadomba-lena and Beli-lena) suggest that it was the same Late Quaternary humans named *Homo sapiens balangodensis* (Balangoda man) (Kennedy et al. 1987, Deraniyagala 1992) that were responsible for the developments in Horton Plains..

The cultural aspects of the third serial site, KCF, have not been subject to the same level of investigation as the other two sites. However, recent findings have revealed the presence of caves within the forest with Mesolithic artifacts and animal remains that indicate occupation by man in Late Quaternary times. Much later, in around 100 BC, Buddhist monks have occupied these caves which had been worked on to create drip ledges to divert the down-flowing rain water away from the entrance. More investigations are being carried out by the Archaeological Department in the University of Peradeniya.

Because of the remoteness and inaccessibility of the area, the villages in the heart of the Knuckles range had for centuries been untouched by modern developments. Some monuments of this ancient culture will be preserved.

3. b. 2 Natural Heritage

Southwest Sri Lanka, accounting for just 23 per cent of the island's land area, is a region with a perhumid climate. In the classification of the world's biomes, the climax vegetation of this area has the distinction of being separately named the Ceylonese (Sri Lankan) Rainforest (UNESCO 1981). This small segment of the world's rainforest system has an exceptionally high level of biodiversity per unit area of forest, with a high proportion of its biota being endemic. Over 90 per cent of the island's endemic biotas are concentrated in a

most extraordinary way in the natural forests of the wet zone, in the southwest quarter.

From about two centuries ago, the natural forests in the wet zone were subject to clearing on a massive scale that led to fragmentation of the once extensive forests into a large number of isolated blocks, many just a few hundred hectares in extent. They cover, in total, just 10 per cent of the wet zone land area. What is more, many of the forests that escaped wholesale clearing were subject to intensive selective logging. Today the residual forests in the wet zone are recognized as forming a biodiversity hotspot, i.e. an area with an exceptional concentration of species, with exceptional levels of endemism and facing high levels of threat (Myers 1990, Myers et al. 2000). As for the impact of human population expansion on the biota, southwest Sri Lanka, together with the Western Ghats of India, is said to face by far the highest level of threat of the world's biodiversity hotspots (Cincotta et al. 2000).

Within the small area designated the wet zone, there is a remarkable amplitude in terms of elevation, the land rising from sea level to over 2500 m, so dividing the area into lowland, mid-elevation, submontane and montane regions. The property, The Central Highlands of Sri Lanka: its Cultural and Natural Heritage, consisting of three areas, is situated across the montane and submontane regions. The three areas are: Peak Wilderness Protected Area (PWPA), Horton Plains National Park (HPNP), and the Knuckles Conservation Forest (KCF).

The exceptional features of this fragment of the world's rainforest system in the southwest of Sri Lanka relate to the the world's geological history following the events after the break up of the southern continent of Gondwanaland. Sri Lanka's geological history links it to the Deccan Plate which drifted northwards with the break-up of the giant southern continent of Gondwanaland at the end of the Mesozoic era. It separated from peninsular India in the Miocene and has remained as a separate geographical entity since then although intermittent temporary connections with India would have occurred up to the Holocene due to fluctuations in the sea level. Its common origin with the Deccan Plate would naturally mean that Sri Lanka shares with peninsular India many taxa. The period of separation and the double isolation that southwest Sri Lanka has had with the subcontinent because of the mountain barrier and the expansive area of the seasonally dry zone in the northern half of the island have, however, resulted in the evolution of species endemic to the island and their concentration in a most remarkable way in the wet zone at all elevations.

The endemic species in the southwest are distributed somewhat roughly equally between the lowlands and the mountainous country. The lowland and mid-elevation rainforest system is represented by the Sinharaja Forest Reserve which was inscribed in the World Heritage List in 1988. The three constituents of the present serial property are the most representative, in terms of the least disturbed montane and submontane rainforest of a sizable extent, to serve as a refuge for the endemic species restricted in their distribution to the forests at these elevations. They are selected as representing as near as possible the full complement of montane and submontane biota.

There are over 3000 indigenous angiosperm species in Sri Lanka, of which 27.5 per cent are endemic (Senaratne 2001). The vast majority of the endemics (around 95 per cent) are restricted to the wet zone. The endemic angiosperm taxa are predominantly at the species or intraspecific level indicating speciation over a relatively short period on a geological time scale. The upliftment of the land giving rise to the mountainous region would have

exposed the lowland biota to cooler conditions to which they would have had to adapt leading to speciation (Werner 1982). Not surprisingly, therefore, although the montane areas share with the lowlands many taxa at the family and generic level, there are many species and subspecies that are restricted to one or the other of the altitudinal zones indicating allopatric radiation, a process that would indeed continue given adequate population densities.

Two families of particular interest in relation to the distribution of species between the mountains and the lowlands are the Dipterocarpaceae and the Myrtaceae. The Dipterocarpaceae is a widespread family, extending eastwards to Western Malesia and New Guinea. It has, in Sri Lanka, as many as 58 species, all of them endemic and all but one restricted to the wet zone. Though the majority of them are confined to the low and mid elevations, there are several that are restricted to the montane and submontane zones, primarily in PWPA. Several species of the endemic genus *Stemonoporus* show single species dominance in different parts of the forest where they occur. This extreme localization of flora that is seen in many other species too is a singular characteristic of the Sri Lankan rainforest, not observed anywhere else. The presence of several species of *Stemonoporus* with highly localized distribution (point endemism) within the same forest complex is strongly suggestive of sympatric speciation. Of the 26 species of *Stemonoporus*, eleven are confined to the montane and submontane zones, an exceptional case of dipterocarps occurring at such high elevations (Greller et al. 1987). Only one of these species occurs in KCF, and it is found only in KCF; it is the extremely rare *S. affinis* (Green & Jayasooriya 1996)

The Myrtaceae, by contrast with the Dipterocarpaceae, are richer in species in the mountains than in the lowlands. *Eugenia*, as with the dipterocarp *Stemonoporus*, shows a high level of local endemism and distinct species groups are recognizable. *Syzygium* has 25 indigenous species, of which 12 are endemic to the island. Of the endemics, nine are restricted to different parts of the montane and submontane zones. Some have very restricted distribution e.g. *S. oliganthum* in PWPA, *S. turbinatum* in KCF.

The segregation of species is seen in other families too. The genus *Memecylon* (Melastomataceae) has 32 indigenous species, of which 27 are endemic, and of these eight are montane species. Of the montane species, two are confined to PWPA. Two species of *Calophyllum* (Clusiaceae), *C. walkeri* and *C. trapezifolium*, are very prominent in the montane forests. These and two others *C. zeylanicum* and the very rare *C. cuneifolium* are found only in the montane and submontane areas (Dassanayake & Fosberg 1980). Several other species of *Calophyllum* are present only in the lowlands.

High levels of species richness and endemism are no less evident among the fauna in southwest Sri Lanka. While showing affinities with the species of peninsular India, geographical separation from the subcontinent since the Miocene, with only intermittent land connections up to the Holocene, have led to speciation in a number of taxa resulting in a unique collection of faunal species in the wet southwest. Even during periods when land connections with peninsular India occurred due to fluctuations in the sea level, the large stretch of dry lowlands in the north and northcentral parts of the island together with the high mountains (over 2500 m) in the south central region would have continued to act as barriers to the exchange of biota between southwest Sri Lanka and the subcontinent. The faunal species in the wet southwest of the country are equally divided between the low and mid-country and the submontane and montane areas. The property constitutes three areas

that are still in a near pristine condition and serving as the refuge for the large number of endemic fauna of the mountain region.

The three constituents of the property between them have recorded 408 species of vertebrates, of which 141 are endemic, and many of these are strictly montane species. The highest levels of endemism are among the fishes, amphibians and reptiles. Eighty-three per cent of the indigenous fresh water fish and 81% of the amphibians in PWPA are endemic; 91% of the amphibians and 89% of the reptiles in HPNP are endemic; 64% of the amphibians and 51% of the reptiles in KCF are endemic.

PWPA and HPNP are contiguous areas whereas KCF is separated from the other two by a relatively low-lying valley stretching over several kilometres. This isolation has led to some remarkable cases of allopatric speciation. *Nannophrys*, an endemic genus, has one species *N. marmorata* in Knuckles and another *N. ceylonensis* in PWPA. Another example is the endemic agamid lizard genus *Ceratophora*. *C. tennentii*, is confined to Knuckles and *C. stoddartii* to PWPA and other parts of the Central Massif. Interestingly, the three other species of the genus have different patterns of distribution *C. aspera* in the southern Rakwana range, which is distinct from the Central Massif, and also in some parts of PWPA; and *C. erdeleni* and *C. karu* in the eastern section of Sinharaja (De Silva et al. 2005d). The case of the genus *Cophotis* is also interesting. The recently described rare species *Cophotis dumbarae* is confined to Knuckles while *C. ceylanica* is more widespread and is found in the Central Massif.

KCF, in particular, with its rugged and highly dissected terrain and wide range of climatic and other site conditions offers numerous opportunities for habitat partitioning. Sympatric speciation is seen among several taxa. It is not surprising that of the 204 forests of over 200 ha in the island that have been surveyed for biodiversity in a National Conservation review, Knuckles stands out as the forest with the highest level of faunal biodiversity (IUCN & WCMC 1997).

The Central Highlands of Sri Lanka, concentrated in a very small fraction of the island's land area, and with mountains going up to over 2500 m, present landscapes and views of exceptional natural beauty. The view from Adam's Peak in PWPA, particularly at the break of dawn, presents a breathtaking spectacle that has been described in superlative terms by several visitors in their published works. In Horton Plains, at "World's End" one looks down over a near vertical escarpment approaching 1000 m and the view extends across the plains to the Indian Ocean beyond. KCF is in a rugged mountain range with 35 peaks. Rocky escarpments, a major land form in the Knuckles, fall hundreds of metres almost vertically, offering a spectacular view.

3. c Comparative analysis

3. c. 1 Cultural Heritage

- PWPA

At present there are six cultural sites from Sri Lanka inscribed in the World Heritage list (in addition to a single natural site). They are:

Sacred City of Anuradhapura
Ancient City of Polonnaruwa
Ancient City of Sigiriya
Golden Temple of Dambulla
Sacred City of Kandy

Old City of Galle and its fortifications

The sacred mountain of Adam's Peak with the indentation resembling a footprint at its summit is a distinctive heritage of outstanding universal value. It has been held in veneration by four great religions of the world, namely, Buddhism, Christianity, Hinduism and Islam. Its religious cum cultural significance dates back to pre-Christian times, and its link with the country's Buddhist civilization in particular has continued throughout the ages right up to the present time. Today, annually, around two million people climb the mountain and visit the Peak. The large majority of them are devotees, but a good many make the climb to experience the incomparable sight from the mountain top. These features set Adam's Peak apart from the other cultural sites in Sri Lanka inscribed in the World Heritage List.

Buddhist monuments and other places of worship bearing the stamp of a world heritage are found in other countries such as India and Nepal. Adam's Peak, however, has many distinctive and unique features not shared by those sites. These include the many centuries-old cultural practices being followed by the hundreds of thousands of devotees that climb the peak every year to venerate the sacred footprint.

- **HPNP**

The precursor to the investigations at HPNP was the extensive archaeological studies that were carried out over the island, the results of which have been published in several scientific papers ably documented in the monumental work of Deraniyagala (1992). Many sites in different parts of the island were explored and found to have ample evidence of the presence of prehistoric man during various periods since 34,000 years BP. One of these sites is Batadomba-lena (*lena*=cave) in the lowlands and close to the foothills of PWPA and HPNP. Here skeletal remains of cave-dwelling humans dating back to 28,500 years BP were discovered. These individuals were assigned to the subspecies *Homo sapiens balangodensis*, and referred to as the “Balangoda Man”. Among the other discoveries were geometric microliths, charcoal, and faunal remains (28,500-12,000 years BP) indicating that these prehistoric humans were hunter gatherers who would have used fire to burn the forest and drive out animals. The evidence unraveled from the investigations at Horton Plains regarding the prehistoric culture that existed there meshes closely with the considerable body of information that had emerged from earlier investigations elsewhere in the island. It is most likely that Balangoda Man was the first colonizer of the high plains.

In the global context, the origin of agriculture, which marks the dawn of a new era in the history of man, the Neolithic revolution, dates back to 14,000 - 10,000 years BP. East Asian sites (e.g. Xianrendong in China) have yielded evidence of rice-based subsistence patterns since 14,000 years BP (Yan 1997, Shen & Crawford 1998, Toyama 2001). In southwestern Asia (e.g. Abu Hureyra), in Euphrates, and in the Ghaba valley in northwest Syria evidence was found of systematic cereal cultivation since 13,000 years BP (Hillman et al. 2001). Siliceous microfossil evidence indicates that early agriculture appeared in the New World in 10,000 years BP (Bryant 2003). Until recently, the available evidence suggested that the number of places where the practice of agriculture originated independently was restricted to five major regions of the world - West Asia, South-east Asia, South China, Meso-America, and West Africa.

The results of exhaustive research carried out by scientists of the Post graduate Institute of Archaeology of the Kelaniya University, Sri Lanka, and the Department of Quaternary

Geology, Stockholm University, Sweden, have revealed that agriculture had flourished in Horton Plains 13,000 years ago and that this region witnessed the development of the world's earliest human civilization based on rice, oat and barley cultivation dating back to more than 15,000 years BP. This evidence undoubtedly makes South Asia an important centre where the Neolithic or farming culture originated.

- **Knuckles KCF**

The cultural aspects of KCF relate to the discovery of caves, which, according to preliminary evidence from artifacts (stone tools), were occupied by Mesolithic man. That this was so is supported by the available body of information on the widespread distribution of prehistoric man in Sri Lanka (De Silva et al. 2005b). A characteristic feature of these caves is the presence of drip ledges chiseled into the overhanging brow of the rock to divert rainwater from the entrance (*ibid.*). This was probably done long after the caves were abandoned by prehistoric man and are provisionally dated as post 300 BC. The caves were at that time occupied by Buddhist monks, a practice that still continues in some caves.

3. c. 2 Natural Heritage

Section 2 (Description) and Section 3.a (Criteria under which inscription is proposed and justification for inscription under these criteria) of this nomination provide information on the unique and exceptional natural features of the nominated property, and such information, directly or by implication, define the features that distinguish the property from other comparable ecosystems. The present section will restrict itself to some salient features that show similarities with other biogeographic regions as well as those that set the property apart from other comparable sites.

The nominated property falls within a small, but exclusive, component of the world's rainforest biome and is called the *Ceylonese Rainforest*. The exclusive nature of this component of the rainforest biome derives from the geological history of the island starting at the time when it was an indistinguishable and small part of the giant continent of Gondwanaland. This continent included what is today South America, Africa, Madagascar, parts of southern Europe and Arabia, India, Australia and Antarctica. The splitting up of Gondwanaland took place after the appearance of flowering plants and therefore the current characteristics and distribution of these taxa would be a good basis for an analysis of comparable sites within the rainforest system. With the fragmentation of Gondwanaland and the progressive separation of its parts in post-Jurassic periods, one would generally expect the relationship of taxa between the sections that drifted apart in earlier periods and remained so to be more tenuous and phylogenetically more distant compared to those between the parts of Gondwanaland that stayed together until more recent geological periods. Hence, the relationship between the biota of Madagascar and Africa will be more distant than between Sri Lanka and the Indian sub-continent. In the case of the former, the similarities are mostly at the suprageneric level.

The angiosperm family Monimiaceae of gondwanic origin, which is well represented in South America and Australia-New Guinea, has three endemic genera in Madagascar and a single endemic genus in Sri Lanka. With the exception of a single genus in the rainforests of West Africa, the family appears to have become extinct over most of Africa (Ashton & Gunatilleke 1987a). Notably, also, it has disappeared from the Indian peninsula

The family Dipterocarpaceae is pantropical, with two separate subfamilies: the

Monotoideae in northern South America, tropical Africa and the Seychelles, and the Dipterocarpoideae in Asia. Affinities between the two subfamilies and Sarcolaenaceae suggest common ancestry. The two groups giving rise to the two subfamilies would have separated with the separation of the Madagascar and India land masses. (Ducouso et al. 2004).

We now turn our attention to the rainforests (outside Sri Lanka) of the Indomalayan realm (the *Malayan*, *Indomalayan*, and *Indochinese Rainforests*) which have much closer links, geographically, to the Ceylonese Rainforest than those of the African region.

The subfamily Monotoideae of the Dipterocarpaceae, already referred to above, has been placed in a separate family Monotaceae by some taxonomists (e.g. Kostermans 1992), and the subfamily Dipterocarpoideae upgraded as the family Dipterocarpaceae. In this sense, the Dipterocarpaceae is entirely restricted to tropical Asia (with the exception of *Vateriopsis* in the Seychelles). There are 14 genera and c. 470 species distributed in Sri Lanka, India, Bangladesh, Burma, South China, Thailand, Indochina, Malaysia, Indonesia, the Philippines and New Guinea (Kostermans 1992). Sri Lanka has nine genera, of which *Doona* and *Stemonoporus* are endemic. There are 58 species, all of which are endemic, showing a degree of speciation that is quite remarkable for such a small rainforest system. Throughout its range the family covers seasonal and aseasonal climates; in Sri Lanka it is mainly found in the aseasonal rainforest. An exceptional and unique feature for a dipterocarp is that the endemic *Stemonoporus* has several of its 26 species at submontane and montane elevations (>1000m above msl).

In the predominantly southern and Asiatic family Myrtaceae, *Eugenia* and *Syzygium* are well represented in South Asia. There has been a high degree of speciation within Sri Lanka; there are 11 species of *Eugenia*, of which eight are endemic. One of the nonendemics, *Eugenia cotinifolia*, found in Sri Lanka at high elevations on rocky and exposed locations in KCF also occurs in Mauritius and Reunion (Dassanayake & Fosberg 1981). There are 26 species of *Syzygium* in the island, of which 14 are endemic. Of the non-endemic species, the majority are confined to Sri Lanka and southern India and/or the Western Ghats. There are, however, several that have a wider distribution. These are *S. aqueum* (Sri Lanka, Bangladesh, Burma, western Malaysia), *S. zeylanicum* (Sri Lanka, peninsular India, western Malaysia), *S. cumini* (Sri Lanka, India, South China, Malaysia and the Pacific), *S. operculatum* (Sri Lanka, SE Asia, India) *S. caryophyllatum* (Sri Lanka, western Malaysia, southern India) (Dassanayake & Fosberg 1981). The genus *Rhodomyrtus*, with a single nonendemic species in Sri Lanka, extends to East Asia and Australia (Ashton & Gunatilleke 1987a).

In the Clusiaceae, all the major Asian rainforest genera occur in Sri Lanka, including three sections of the large pantropical genus *Garcinia*.

The Fagaceae, whose centre of diversity is in the Himalayas and the Far East and has spread throughout the region and reached New Guinea, is remarkably absent from southern India and Sri Lanka.

In this comparative analysis we now turn our attention specifically to Sri Lanka's nearest geographic neighbour, India. Sri Lanka has been separated from India as a distinct entity since around the mid-Miocene. There have, however, been short, intermittent land connections between South India and northwest Sri Lanka up to the Holocene due to oscillations in sea level. In a study by Abeywickrama (1956), he indicated that of 171 angiosperm families in the island, only four were non-peninsular. The four are

Monimiaceae, Nepenthaceae (with one species), Stylidiaceae (with one species) and Cactaceae. He further comments that Stylidiaceae and Cactaceae are doubtfully native to Sri Lanka. This means that, at the family level, the angiosperms have overwhelmingly close affinities with India.

Sri Lanka's wet zone which is under consideration in this nomination has its parallel ecosystem in the Malabar tract and the Western Ghats of India (the *Malabar Rainforest*), around 400 km away. Many of the physical and biological features of these two parallel systems have been described as being strikingly similar (Mittermeir et al. 2000 as cited in Pethiyagoda 2005b). The rainforests of the Western Ghats extend as a narrow coastal strip along a stretch of 1600 km, from near the southern tip of India northward to Gujarat. The close links between India and Sri Lanka at the family level of the angiosperms relate mainly to this tract of forest.

Mention needs to be made of the existence of frost hardy grassland flora in Horton Plains, one of the constituents of the serial property being nominated. These species, with a few exceptions, are Himalayan in origin. How did these species arrive at Sri Lanka and the Nilgiris of South India? It could be by way of a corridor or “stepping stones” bearing a moist climate and light frost, at times when the climatic conditions were favourable for such migration (Ashton & Gunatilleke 1987a).

Despite the affinity that exists between the biota of Sri Lanka and those of India, there are distinct differences that are most pronounced at the species and intra-specific levels. The study referred to earlier (Abeywickrama 1956) revealed that out of 1065 native genera of angiosperms, 96 are non-peninsular. Of the 2855 species recorded, 853 were endemics, and of the non-endemics 161 are non-peninsular. Many of the non-peninsular genera and some of the non-peninsular species found in Sri Lanka may have been present in India but would have disappeared due perhaps to changing climatic conditions in the peninsular region. The majority of the endemics are the result of speciation within the island during the period of geographic isolation of its rainforest system. The very high level of endemism among the species of fauna and flora of the wet zone of Sri Lanka coupled with their highly localized occurrence is the most *distinctive feature* of this fragment of the world's rainforest biome.

Molecular analysis of Indian and Sri Lankan uropeltid snakes, caecilians, shrub frogs of the genus *Philautus*, freshwater fishes (*Punctius* spp.) and fresh water crabs and atyid shrimps have revealed that biotic exchange between the mainland and insular faunas of Sri Lanka had been extremely limited during the last 500,000 years (Bossuyt et al. 2004, Manamendra-Arachchi & Pethiyagoda 2005), making southwest Sri Lanka a “hotspot within a hotspot” (Pethiyagoda 2005b).

Sri Lanka and southwest peninsular India share species with common ancestry. An example is the three Sri Lankan species *Semnopithecus vetulus*, *Macaca sinica* and *Pradoxurus zeylonensis* (all found in the nominated property) and the three counterpart species in southwest India: *S. johnii*, *M. radiata* and *P. jerdoni* respectively.

Also, there are many mammal species that are common to Sri Lanka and southwest peninsular India which, however, are different at the subspecies level (Groves & Meijaard 2005). For example, the *Prionailurus rubiginosus* subspecies that occurs in the property and elsewhere in the island is different to the subspecies in India (*ibid.*). Another interesting example is the case of the leopard. The Sri Lankan endemic subspecies

Panthera pardus kotiya which ranges within the nominated property has been isolated from the mainland leopard since the end of the Pleistocene, some 10,000 years ago (Bossuyt et al. 2004). Among the geckos, there are distinct differences between the Sri Lankan genus *Cyrtodactylus* and the Indian species of this genus (Batuwita & Bahir 2005).

The Ceylonese Rainforest is confined to the wet zone, which is situated in the southwest quarter of the island. Although once extensive within this area, the intact natural forests have been reduced to patches numbering over a hundred due to widespread deforestation over the past two centuries. This is the most heavily populated part of the country, and the forests are surrounded by villages or by tea and rubber plantations. Very few of these forests exceed 2000 ha in area. Fortunately due to recent legal and administrative measures deforestation in the wet zone has to a considerable extent been arrested.

Sri Lanka's rainforest ecosystem is rich in biodiversity, and a high proportion of its fauna and flora are endemic. This ecosystem has two distinct elements the lowland and mid-elevation forests and the submontane and montane forests. The former is uniquely represented by the Sinharaja forest, with an area of over 11,000 ha. Its outstanding universal value has been recognized and it has been inscribed on the World Heritage List.

The endemic biota in the rainforest ecosystem is almost equally divided between the lowland and mid-elevation forests taken together and the submontane and montane forests. The occurrence of many of these species is highly localized and they show altitudinal variation in their distribution. This is distinctly seen in the case of the endemic dipterocarp *Stemonoporus* whose 26 species show a localized distribution throughout the lowland and montane rainforests. In the faunal groups many species are restricted in their distribution to the submontane and montane zones. The concentration of half of the island's endemic biota in the mountainous region contributes to making the property one of considerable importance in terms of outstanding universal value.

Although the montane and submontane forests have not suffered deforestation to the same extent as the lowland forests in the wet zone, many of the remaining forests in the mountainous areas have been subject to degradation primarily due to illicit removal of timber and firewood. Many of these forests adjoin tea estates and the estate workers have for many decades been extracting firewood, poles, etc. from the forest for their domestic use causing serious degradation over time. People from the neighbouring villages also trek into the forest to collect such forest produce. A notable example of forest degradation from these activities is the Pedro forest reserve where the highest mountain in the island is located. Another form of degradation, to which some sections of one of the constituents of the serial property had been subject, is under-brushing and planting with cardamom. This practice has now been banned. The nominated property is the largest stretch of natural montane ecosystem which is still intact to a large extent and where strict protective measures will be imposed.

The nominated property includes three constituents so as to capture, as far as possible, the full range of biodiversity in the montane and submontane rainforests that spread over an altitudinal range of over 1500 m and where there is disjunct occurrence of species and an isolation barrier between the Central Massif and the Knuckles Massif.

3. d Integrity and authenticity

3. d. 1 Cultural features

- **PWPA**

The cultural features of PWPA are largely confined to the cultural zone (the peak and the pilgrim trails). The centre of attention is the indentation atop the Peak resembling a human footprint which is considered to be of profound religious significance. The authenticity of the religious monument on the Peak is established mainly through an almost unbroken tradition dating back to the pre-Christian era and recorded in the chronicle, the Mahawamsa (Anon. 545 BC-1758 AD). The sacred Peak was at various times associated with the four great religions of the world: Buddhism, Islam, Hinduism and Christianity, but the strongest attachment has been and continues to be to the Buddhist faith. Traditional Hindu rites are, however, also performed by the Buddhist pilgrims who visit the Peak, and this practice dates back to very ancient times.

Historically, several reigning monarchs had made a pilgrimage to the Peak (see section 2.b.1). James Legge's translation of the Chinese publication by the Buddhist monk Fa Hien titled *Travels in India and Ceylon 393-414 AD* records the monk's visit to Adam's Peak and his interpretation of the origin of the foot print. Ibn Batuta's visit to Adam's Peak in the 14th century is referred to by Emerson Tennent (1859). Marco Polo, in the 13th century, who went up to the Peak, refers to the chains that had been installed for helping the pilgrims to climb the mountain.

There is indeed a wealth of information regarding the veneration of the shrine at the Peak which now draws pilgrims in large numbers both from within the country as well as from other countries where devotion to Buddhism is practised.

- **HPNP**

While prior studies had revealed the presence of prehistoric man at Horton Plains through the evidence of geometric microliths and other artifacts, the authenticity of occupation and cultivation of sites at Horton Plains by Mesolithic man has been recently established through new evidence. According to the latest findings of radio-carbon dated multi-proxy records prehistoric humans occupied Horton Plains as early as 24,000 years BP. Pollen analysis shows a sequence of cultivation starting from the growing of oat and barley leading to the cultivation of rice when the climatic conditions became more humid. The research work was carried out by Sri Lankan scientists in collaboration with the Department of Quaternary Geology of the University of Stockholm. References have been provided in the earlier sections of this nomination.

- **KCF**

The gazette notification declaring the Knuckles conservation area as a Conservation Forest unambiguously states that only state-owned land within the demarcated boundary is considered a part of the Knuckles Conservation Forest. Most of the village communities are located outside the boundary or have moved outside from within the boundary. There are, however, some village communities that still remain within the demarcated boundary. Some of these communities have been provisionally identified with a view to selecting a few ancient houses and other structures for protection and conservation as cultural monuments. This will obviously have to be done with the cooperation of the households concerned. One of the villages identified is Meemure (See map).

Caves inhabited by Mesolithic cave-dwelling humans are known from various parts of the island (Deraniyagala 1992, Kennedy & Deraniyagala 1989). Human remains and Mesolithic tools have been recovered from a number of caves, notably Fa-Hien lena,

Batadomba lena, Beli-lena, Alu-lena. The material evidence examined and tested at Cornell University, USA, by Professor Kennedy has confirmed that the civilization of Sri Lanka runs back to 29,000–30,000 years BP. The anatomically modern prehistoric humans in Sri Lanka, collectively referred to as Balangoda man, appear to have settled in practically every nook and corner of Sri Lanka.

In the context of these findings the recent discovery of caves in Knuckles with Mesolithic artifacts strongly suggests that the caves were used by prehistoric man dating from the same period as those in the other described sites. An innovation found here, which can only be attributed to more recent times, is the existence of drip ledges on the overhanging rock-face to divert rainwater away from the entrance. It is provisionally suggested that these drip ledges were constructed about 200 BC and that the caves abandoned by Mesolithic man were, many centuries later, occupied by Buddhist monks. Archaeological work is being carried out at these sites by the Post-graduate Institute of Archaeology in the University of Peradeniya.



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3. d. 2 Natural features

By world standards, the nominated serial property is very small. Its three components are: PWPA and HPNP, taken together because they are contiguous (23,705 ha), and the



© Rahula Perera

The endemic Sri Lanka yellow-eared bulbul (Pycnonotus penicillatus) (Above) and the endemic Sri Lanka flame-striped jungle squirrel (Funambulus layardi) found at all three sites.



© Wildlife Heritage Trust

The Critically Endangered and endemic Das's dwarf toad (Adenomus dasi), a point endemic in the buffer zone of the PWPA

Knuckles Conservation

Forest (31,305 ha). They are the least disturbed and largest of the residual areas of submontane and montane rainforest in the island. These forests are the refuge of a rare assemblage of endemic biota whose ancestors have survived in a perhumid climate through a long geological history dating back to the late Cretaceous. Many of the plants and animals have a highly localized distribution and show distinct signs of allopatric and sympatric speciation. Many of the endemic faunal species that are restricted to these areas are small animals with restricted areas of occupancy, and the property, if well protected,

would be adequate to ensure survival.

PWPA and HPNP are contiguous and, furthermore, there are other protected forests adjacent to these two components of the property which would serve as buffers and provide extended habitats for the biota within the property. Very recently a biodiversity baseline survey was carried out in PWPA and HPNP and the data would serve as a benchmark for monitoring future changes in species composition.

The outstanding universal value of the property in relation to its natural features will be adequately safeguarded through the strict conservation measures that are being adopted. At the same time research will be promoted as there is still much to learn regarding the unique biota in this area as has already been seen from the recently concluded biodiversity base line survey (DWLC 2007)

The elephant is today predominantly a dry zone species and the few animals which range into the property could not be considered in isolation as a viable population.

Several parts of the property come under the control of the Forest Department. Up to the early 1990s, the primary focus of the Forest Ordinance and its implementing agency was the prevention of illicit logging and unauthorized removal of other forest products while making provision for the sustained supply of timber to meet the nation's demands. With the steep rise in demand, timber felling in the state forests escalated and what was once a conservative system of selective felling grew out of hand and resulted in the severe depletion of selected species in many of the natural forests. The first forestry master plan, published in 1986, was roundly condemned by scientists, environmentalists and the informed public for its recommendations to increase further the supply of timber from state forests. The master plan was abandoned and a new plan produced in 1995. The focus of the new forestry master plan was completely different. Its first objective is: To conserve forests for posterity, with particular regard to biodiversity, soils, water, and historical, cultural, religious and aesthetic values.

Following the 1995 forestry sector master plan, a series of policy and legal decisions were taken to establish and maintain the integrity of forests particularly those selected for their conservation value.

The serial property now nominated has three constituents: the Peak Wilderness Protected Area (PWPA) the Horton Plains National Park (HPNP) and the Knuckles Conservation Forest (KCF).

What was, until very recently, the Peak Wilderness Sanctuary consisted of a confused mix of different sections under the control of the FD and DWLC, with some of the sections overlapping. It was understood that unless the confusion is resolved and the area to be nominated clearly defined and given strict legal protection it would not be possible to make a case for justifying the nomination of the peak wilderness area for inclusion as a World Heritage despite the outstanding cultural and natural features that it possessed. Accordingly action was taken (a) to declare the sections under the charge of the Forest Department as conservation forests (which gives them the highest level of protection under the provisions of the Forest Ordinance), (b) to allow the pilgrim trails and the peak to remain in the status of a sanctuary so as to provide pilgrims free access to the peak, and (c) leaving out the conservation forests, the pilgrim trails and the peak, to declare the other intact areas of natural forest within the Peak Wilderness Sanctuary as a nature reserve under the provisions of the Fauna and Flora Protection Ordinance. The integrity of PWPA is now firmly established. It comprises the three conservation forests, the

nature reserve and the pilgrim trails and peak.

As regards the division of PWPA into sections under the control of the FD and DWLC, it is important to note here that such a division is purely a historical matter. There is no distinction in terms of ecosystem structure and composition that would serve to distinguish the three areas under the charge of the Forest Department and the adjoining area under the control of the Department of Wildlife Conservation. In other words there is no discernible difference in terms of the ecosystem as to where one ends and the other begins between the different components of PWPA. Very often, district and provincial boundaries and physical features such as waterways were used to mark the boundaries of forest reserves.

HPNP is under the control of DWLC. Its integrity is well established. No encroachments have occurred and action to maintain the integrity of the area is in place.

In the Knuckles Conservation Forest, there had been, to start with, cardamom cultivation in limited areas under the authority of permits issued by the Forest Department. This practice had got out of hand and cultivation spread illicitly. That was prior to the 1980s at a time when the conservation value of the Knuckles was not properly recognized. Since then permits were cancelled and the practice was banned. Legal action was taken against encroachers and illicit cultivators and the protected area was increased in size prior to being gazetted as a Conservation Forest. At present protective measures are being strictly enforced while community participation is obtained for promoting conservation and eco-tourism activities by the Forest Department.

In PWPA and KCF small patches had earlier been planted with exotic forest species notably of *Pinus*, *Albizia*, *Acacia* and *Eucalyptus*. This was done several years back with a view to turning patches of degraded scrubland to productive forest. These small blocks within the property will not be commercially managed but they would be felled as soon as possible and the areas left to nature for ecological restoration.

4. State of Conservation and factors affecting the property

4.a Present State of Conservation

4.a.1 PWPA

The culture-related area within the PWPA consists of the sacred peak and six, 50-metre wide, pilgrim trails leading up to the peak from the foothills of the range. While there is no threat to the condition of the peak, the conservation status of the pilgrim trails is directly related to the mass scale use of these tracks during the pilgrim season. Every year prior to the onset of the pilgrim season (which is from December to May) the District Secretary (in the provincial administration) issues licenses to over 100 traders to put up sales outlets for food items and other necessities to cater to the huge influx of pilgrims. They construct temporary structures with poles cut from the adjoining forest. They also collect firewood from these forests for cooking. To quote from the updated management plan (DWLC 2005) "The exact extent of forest degradation is difficult to assess. The strips of land on either side of the trails to the peak are very badly degraded, beyond the possibility of any restoration, especially close to the boutiques". Some measures have been adopted to address this issue (e.g. for the food sales units to use gas for cooking), but more needs to be done. This matter will receive the attention of DWLC in collaboration with the cultural sector institutions and the local administration.

Another conservation problem is the disposal of garbage (mainly polythene food-wrappers). Much has been done to address the problem, and now a good part of the garbage is dumped into bins or taken back with the pilgrims. The sheer numbers using the trails, however, mean that even with a small percentage of them ignoring the garbage disposal instructions, this continues to remain a major issue. Another problem is the absence of adequate toilet facilities, as a result of which the neighboring forest is often used by pilgrims for toilet purposes. While some action has been taken to address these issues, more will be done to mitigate environmental damage.

According to statistics 10-20 % of the visitors are tourists. Quite a number of them visit the peak during the off season. Some of them collect plants and faunal species from the forest causing threats to the biodiversity in this section of PWPA.

Though many of these conservation issues do not pose a direct threat to the cultural value of the peak and its approach routes, they will be addressed as a matter of urgency in order to restore this prime cultural cum religious site to a condition where its heritage value is seen to be given full national recognition. They have also to be addressed in view of the deleterious effects they have on the biodiversity of this rich forest and on the environment as a whole in this part of the PWPA

In the redefinition of the composition of the PWPA, the culture-related areas (which collectively form only a very small fraction of the protected area) remain in the status of a sanctuary under the provisions of the FFPO. This category of wildlife reserve has the lowest status as a protected area. No higher status could be accorded to these areas as there has to be free access to the large numbers of pilgrims who visit the peak. The DWLC and the appropriate culture-related institutions as well as the local authorities will, however, exercise the greatest vigilance to ensure the conservation and protection of these areas.

Turning our attention to the natural heritage values in the areas outside the culture-related sections, it was just recently, in readiness for making this proposal for nominating this area for inscription on the World Heritage List, that the integrity of the PWPA was properly and legally established.

Until very recently, what had been declared as the Peak Wilderness Sanctuary, which is a protected area category under the control of the DWLC, had nevertheless included three FD areas. While these three areas have been relatively well managed, with the Forest Department enforcing the wide-ranging protective legislation embodied in the Forest Ordinance, the remaining part of the Sanctuary did not receive anything like the same degree of protection. While the DWLC concerned itself with protecting the wildlife, it was the revenue officers that assumed control of the state land. It would be pertinent to quote from the Management Plan for the Peak Wilderness Sanctuary (DWLC 1999a): “lands, which are not owned by the Forest Department or private persons, are the property of the revenue authorities, i.e. Divisional Secretaries. This is the reason why officials are able to settle and regularize encroachments on the Sanctuary”.

Illicit gem mining, leading to environmental degradation since there is no ecological restoration of the areas, is also taking place in some sections in the periphery of PWPA. Action will be taken to stop this type of activity.

Large areas in the eastern part of what was the PWS contain village settlements, tea estates and public utilities. Which of these were already in existence when the area was declared a sanctuary and which had subsequently developed through encroachment into the state land is not known. The DWLC had minimal control, if any, of this section of the sanctuary. While the importance of Adam's Peak and its environs as a cultural heritage of outstanding and enduring value dating back to over two millennia has always been known, the exceptional natural heritage values have only recently become widely appreciated. Hence, in order to give special protection to this area and to nominate it as a World Heritage with outstanding universal value both in relation to cultural and natural features, the government decided to reconstitute the area of state land within the PWS and upgrade its legal status. In doing so the private lands, village settlements, etc. as well as the three FD areas, the pilgrim trails and the peak were excluded and the balance declared as a nature reserve under the FFPO. The FD areas, while forming a part of the PWPA, have also been upgraded to the status of conservation forests, which is the highest category of protected area under the provisions of the Forest Ordinance. The peak and the trails remain in the status of sanctuary. Though the PWPA has not been legally defined as a unit, its different parts have been legally constituted in a rational manner and in doing so their status as protected areas has been enhanced. (For more information on the composition of the PWPA see Section 2.b.2).

With the exclusion of the non-forest areas from the newly defined boundary of what is now the PWPA, it could be said that the state of conservation of the area is satisfactory. With the enhanced legal powers given to the DWLC to protect the area as a nature reserve, suitable action will be taken to prevent encroachments and other illegal activities such as gem mining.

Surveys of the biota of PWPA have been few and far between and very limited in scope (such as the survey of woody plants in relatively small sample areas). However, using the available data and information obtained from the recently concluded biodiversity baseline

survey in PWPA and HPNP among other places, it is possible to provide data on species that would provisionally serve as indicators to assess future trends. Using the criteria of being common or rather rare, the following species have been tentatively named as indicator plant species for the submontane forests: *Aglaia apiocarpa*, *Cinnamomum litseafolium*, *Elaeocarpus glandulifer* and *Palaquium hinmolpedda* (Jayasuriya et al. 1993). Among the faunal species, two small mammals, *Srilankamys ohiensis* and *Funambulus layardi* have been provisionally named as potential indicators of habitat quality (Wijesinghe 2007). It must be noted that more indicator species are bound to come to light in the future as research continues.

In addition to keeping track of indicator species, the maintenance of the integrity of the ecosystem, free of encroachments and other malpractices that cause damage to the biodiversity of the property, is of the utmost importance. In this respect, the main benchmark as far as the PWPA is concerned relates to the establishment and maintenance of its boundaries and keeping the area within the boundaries free of encroachments and other illegal activities.

4. a. 2 HPNP

The Horton Plains area was first declared as a Nature Reserve under the provisions of the Fauna and Flora Protection Ordinance in 1969, and subsequently, in 1988, re-designated as a National Park. It is under the control of the Department of Wildlife Conservation. The area is well managed and free of the conservation issues that plague many of the other protected areas in the country. Its topographical features give it natural protection and the area is free of encroachment problems. The cultural value of the site is not overtly evident in that the information regarding the occupation of the area during Mesolithic times comes mainly from deep borings into the peat and soil.

The natural heritage features, which are the spectacular landscape of this high-elevation, mist shrouded tableland and the incomparable “World's End” with its breath-taking view, and of course the park's biodiversity, are generally in a good state of conservation. There are, however some problems that have to be addressed. Some activities of tourists, such as the damaging of information boards and the collection of plants, have to be eliminated. Man-made fires also occur from time to time. Stiff penalties should be imposed on those who commit offences in terms of the Fauna and Flora Ordinance. Warning notices are prominently displayed to give adequate notice to the public. But this alone does not seem to suffice. Illicit gem mining which is taking place in PWPA extends to some sections bordering Horton Plains. The DWLC will be extra vigilant to apprehend offenders and take legal action.

A threat to the biodiversity of HPNP can arise from the spread of the invasive species *Ulex europaeus*. This has to be closely watched and effective action taken if the problem gets aggravated.

As indicators of habitat quality the following faunal species have been provisionally selected: *Loris tardigradus*, the otter *Lutra lutra*, the highland shrew *Suncus montanus*, the bicoloured rat *Srilankamys ohiensis*, and the golden palm civet *Paradoxurus zeylonensis* (Wijesinghe 2007). The herbivore *Cervus unicolor* (sambur) and the carnivore *Panthera pardus kotiya* (leopard) may be considered as keystone species.

4. a. 3 KCF

Hitherto the cultural value of some of the sites in this forest was known only to a few scientists that had explored the area. These sites are now recognized as cultural zones so that protective measures could be designed and implemented as a collaborative effort of the Forest Department and the Department of Archaeology. The field staff speaks of the existence of more sites of archaeological interest than those that have been officially reported on. While the state of conservation of the sites is considered satisfactory, there is a great deal of scope for further studies. In granting permission for archaeological research to be carried out, the Forest Department and the Department of Archaeology will take steps to see that only professionally qualified archaeologists are allowed to carry out investigations.

What had posed a problem in the past in relation to the conservation of the unique ecosystem of KCF was the cultivation of cardamom. This spice crop was under-planted in some sections of the natural forest under a lease-agreement scheme initiated by the FD many decades ago. What started on a small scale extended beyond the leased areas. Maintenance work to sustain the cardamom crop resulted in a degradation of the natural forest. Several measures were taken by the Forest Department to eliminate this threat. The lease agreements were terminated. All resident cultivators were evacuated and located elsewhere. The areas that were under-planted by these cultivators are now seen to be reverting to their natural forest state, and this ecological process is most prominent in places where the cardamom has been cut back. Eleven of the former non-resident and influential lessees continue to harvest cardamom from the land using hired labour, in spite of the expiry of their leases. Legal action has been taken against them. Court orders have been given to enforce the stoppage of their illegal activity, but up to now, success has not been achieved in implementing the court decision. This is a matter that will receive priority attention.

The boundary of KCF is highly convoluted and crosses very rugged terrain. In some areas the boundary is not clear. Action would be taken to identify such sections and put up clearly visible boundary markers.

4. b Factors affecting the Property

(i) Development Pressures

- **PWPA**

The development pressure that militates against the protection of the routes leading to the summit arises from the mass scale of visits to the peak and the inadequate measures for coping with the attendant problems such as sanitation, environmental pollution, the construction of trade stalls annually just prior to the onset of the pilgrim season using poles cut from the forest, and the cutting of firewood from the forest for cooking. Another activity that has to be curbed is the collection of plants and small animals from the adjoining forest for sale locally and sometimes for export. *Kokoona zeylanica*, a montane tree species, is much sought after and its bark is cut away to remove strips for use in the treatment of respiratory ailments. This is a widespread practice within the PWPA. Action will be taken to stop this activity in the protected area.

Once the pilgrim season is over i.e. from June until November the visitors to the Peak are mainly tourists. The ministry in charge of the environment and the DWLC should consider the possibility of charging a fee from visitors during this period and reserving the funds so collected for supporting the maintenance of the pilgrim trails.

In what was the Peak Wilderness Sanctuary, particularly along its southern boundary and in its eastern section development pressures (land settlement, village expansion, encroachments, etc.) had resulted in the erosion of the protected area. With the district revenue officers exercising greater control over the land than the DWLC, they were able to regularize encroachments within the sanctuary. According to the field staff of both the DWLC and FD, large sections of the PWS in its eastern half have been converted into village settlements, with schools, shops and other public utilities. Tea estates were also found within this area.

This problem has now been resolved. *Only the intact areas of natural forest* have been declared as the Peak Wilderness (*Samanala Adaviya*) Nature Reserve and included within PWPA.

Although, under the proposed scheme two different government departments will share control of PWPA, the areas falling within the control of each department will be distinct from each other. Also, the upgrading of the area falling within the control of DWLC that warrants strict protection from that of Sanctuary to Nature Reserve will give the department much greater authority to enforce protective measures. Reducing the area of control under DWLC to that of the nature reserve and placing the areas directly under its charge with no interference from the district agencies should enable the department to harness its resources in order to protect this area effectively.

The focus of attention in PWPA is the peak itself, and at present there are only a few if any visitors wanting to experience the biodiversity-rich natural forest. Attracting visitors to the natural forest areas for study and observation would be encouraged and the village communities invited to take an active part in conservation of the forest as has been done in KCF. As a first step, nature trails will to be opened; these *will not be linked to the pilgrim routes and would be located well away from these routes*. This is in order to ensure that the use of nature trails is controlled, which will not be possible if the nature trails are linked with or are in proximity to the pilgrim trails. Guides would be provided for accompanying tour parties along the nature trails

Proposals had been made to set up a visitor centre and sales centre at the start of two pilgrim trails under the PAM & WLC project. Fortunately, the proposal has been dropped. Having a visitor centre to cater to a handful of tourists at the start of a route used by many hundreds of people who climb the mountain daily to worship at the shrine would have hurt the sensibilities of the pilgrims. Moreover, having visitor centres at these points would imply that the visitors could use the pilgrim routes as nature trails and freely venture out into the adjoining forests. Establishing a visitor centre, interpretation facilities, and a sales outlet at the start of the nature trails once they are opened would be considered at a later stage as the need for them grows. For a start, some basic facilities could be provided at the starting points of the nature trails.

- **HPNP**

No serious development pressures are envisaged in the Horton Plains National Park. The environmental value of this area is too well recognized for events such as had occurred in the past to re-surface. We are here referring to the ill-conceived decision by the government at the time to take a section of the grassland area for cultivating potato, a scheme that has long since been abandoned. A prevailing problem is the incidence of illicit gem mining. As in the case of PWPA, measures will be adopted to stop this practice through legal means.

The cultural value of this site is still known only to the scientists in the relevant discipline. Publicity will be given at the site so that the many visitors to Horton Plains will become acquainted with the archaeological findings made here. With the growing popularity of this site for tourists, both local and foreign, site deterioration is a potential danger that has to be guarded against and effective measures adopted where necessary. As for presentation, the cultural features that have come to light only recently would be given prominence at the site to apprise the public of these remarkable discoveries.

- **KCF**

The development pressures arising as a result of the Knuckles forest being an ideal environment for the growing of cardamom is now a thing of the past. Experience has shown that, initially, excellent crops of cardamom could be obtained, but in time the site conditions deteriorate, primarily from the loss of humus and erosion of the top soil, and this leads to a drop in yield. The end result, if this practice had continued, would have been that the land would become degraded and be unable to support either crop or natural forest. The practice of cardamom cultivation within the KCF has been nearly eliminated due to the strict legal action taken by the FD, and many of the areas that were earlier under-planted with cardamom have been left to nature for ecological restoration. Monitoring will be done to check on the possible spread of invasive species into the gaps caused by the elimination of cardamom.

A matter that will be a strong inducement for the conservation of the Knuckles forest is the proposal to construct two reservoirs in the area down stream of the KCF. One is the Kalu Ganga reservoir and the other, a large one, the Moragahakande reservoir. The KCF is the major catchment that would have to be protected if the reservoirs are to be provided with a steady flow of water.

(ii) Environmental Pressures

- **PWPA**

No serious environmental pressures are envisaged

- **HPNP**

Environmental deterioration which has been observed in some parts of the montane forest and is particularly evident in the forest areas of HPNP is forest dieback. Significant areas of HPNP are subject to this phenomenon. Is this a natural phenomenon, or is it man-made? Although speculative reasons have been offered by way of explanation, there is no

concrete evidence regarding the cause of the dieback. This matter calls for scientific research to determine the cause.

Another problem that needs close watching is the spread of the invasive exotic gorse species *Ulex europaeus*. Effective control measures would be adopted if the problem is seen to get out of hand.

- **KCF**

The montane forests of the KCF have adapted to the harsh conditions prevailing in some parts of the range, namely the constantly prevailing gale force winds, by developing the elfin and pygmy type of forest where the trees are of very low stature, around a metre in height in the worst affected areas.

(iii) Natural disasters and risk preparedness

There are no foreseeable natural disasters that pose a threat to any of the three constituent parts of the nominated property from natural causes.

(iv) Visitor/tourism pressures

- **PWPA**

The Peak, considered to be one of the holiest shrines by Buddhists, and also held sacred by Hindus and Muslims, has an influx of pilgrims whose numbers may go up to two million a year, and this is mainly in the pilgrim season which is restricted to around six months in the year. Any environmental deterioration arising from such mass scale visits to the Peak occurs adjacent to the trails. The cultural aspects of the site are not put at risk by the magnitude of the visitor population. Apart from the influx of pilgrims, and some visits, mainly by tourists in the off season, visits to the other parts of PWPA are almost negligible (DWLC 1999a).

- **HPNP**

The influx of visitors to HPNP has grown in recent years. If this trend continues, the Department of Wildlife Conservation will be hard pressed to deal with the ensuing problems. The adequacy of staff at HPNP will be evaluated from time to time and suitable action taken when necessary. No estimate of the carrying capacity with regard to visitors has been made, but the present numbers are likely to fall within such a capacity.

Man-made fires are a common occurrence. Such fires, once started, spread over a good part of the grassland before they could be controlled. Strict control measures would be adopted to address this problem.

- **KCF**

Visitor interest in Knuckles is a relatively recent phenomenon. The Forest Department in fact favours a growth in the number of visitors with a view to propagating information on the conservation value of this unique ecosystem. To cater to the visitors, infrastructural and

interpretation facilities have been developed to a considerable extent. Forest trails have been opened and guides are provided for visitors. Visitor influx is yet well below what would be the KCF's carrying capacity.

(v) Number of inhabitants within the property and the buffer zone

- **PWPA**

Estimated population located within the area of nominated property:

Except for the Buddhist monk and his helpers at the Peak there are no permanent inhabitants within the cultural zone of PWPA. Regarding the rest of PWPA, which is by far the major part, there are still a few people living within the area covered by the nature reserve. Effective measures will be taken to regularize the position of these residents. Encroachments into the state land as had happened in the past will be prevented.

Estimated population located within the area of the buffer zone:

This cannot be estimated since the buffer zone contains many village communities and much of the land is privately owned. (See explanatory note in Section 1. g.)

- **HPNP**

Estimated population located within the area of nominated property:

There is no resident population

Estimated population located within the area of the buffer zone: .

No buffer zone has been identified (See explanatory note in Section 1. g)

- **KCF**

Estimated population located within the area of nominated property:

The once resident population within KCF that was engaged in cardamon cultivation has moved out of the area. At present there are a few small village communities within the boundary of the KCF, but as these are long term residents of the area and the KCF, by definition, excludes the non-state land within the boundary, it could be said that these few village communities do not constitute a resident population within the KCF. There are, however, a few encroachments on the state land within the boundary, and legal action is being taken to eject them.

Estimated population located within the area of the buffer zone:

According to the 1994 management plan the total population of the buffer zone village communities was 40,253. No estimates were made since then. However, some data gathered by the field staff of the FD indicate that there have been fluctuations in the populations of the communities, some declining and others increasing. Overall, there seems to be little change in the total population of the buffer zone communities.

5. Protection and Management of the property

5.a Ownership

- **PWPA**

Previously, in the PWS, some sections were privately owned, but with the exclusion of these areas from the newly declared Peak Wilderness Nature Reserve (PWNR), the whole of the PWPA has become state-owned. The conservation forests within the PWPA are under the charge of the Forest Department. The PWNR and the pilgrim trails and peak, also forming parts of the PWPA, are under the charge of the DWLC

- **HPNP**

The whole of HPNP is state-owned. It is under the charge of the Department of Wildlife Conservation.

- **KCF**

According to the government gazette notification declaring the Knuckles forest as a conservation forest under the provisions of the Forest Ordinance, only the state land within the defined boundary has been so declared. The existence of several small private land lots within the marked boundary has been recognized, and according to the gazette notification these remain private property. They are mostly under natural forest or scrub and there are no residents within them. The anomalous situation of having such private land lots within the boundary of the Conservation Forest has been recognized and the locations of these lots have been identified. Action is being taken to acquire them, after which they would automatically form part of the KCF. Apart from these land lots, there are a few ancient villages within the boundary of KCF. The KCF is under the charge of the Forest Department.

5.b Protective legislation

- **PWPA**

The PWPA comprises several parts falling under three categories of areas under protective legislation. They are (i) The Peak Wilderness Nature Reserve (in nine blocks) which is a highly protected area under the provisions of the Fauna and Flora Protection Ordinance and administered by the DWLC; (ii) the pilgrim trails and peak which remain in the status of sanctuary under the provisions of the Fauna and Flora Ordinance and administered by the Department of Wildlife Conservation; and (iii) three conservation forests so declared under the provisions of the Forest Ordinance and administered by the Forest Department.

- **HPNP**

Horton Plains National Park was declared a National Park under the provisions of the Fauna and Flora Protection Ordinance in 1988. It is under the charge of the Department of Wildlife Conservation.

- **KCF**

KCF was declared a Conservation Forest under the provisions of the Forest Ordinance in 2000. It is under the charge of the Forest Department.

5. c Means of implementing protective measures

The main implementing agencies, the Forest Department and the Department of Wildlife Conservation, are functioning under the Ministry of Environment and Natural Resources. The Ministry of Cultural Affairs and the Department of Archaeology have no administrative control over the property but would be associated with the DWLC and FD in aspects of management in relation to the cultural sites within the property. The Divisional Secretaries (of the provincial administration) in the areas adjacent to the cultural zones of PWPA would also play a supportive role in the management of pilgrims during the peak season.

The head of the FD is the Conservator-General of Forests. The chain of command goes down to the highest regional-level, professional forester within a forest division which is the Divisional Forest Officer (DFO). He is in charge of carrying out the administrative and management affairs of the section of the property under his charge. The KCF falls under two DFOs, the DFO Kandy and the DFO Matale. Their areas of control are well defined. The staff at the sites consists of Range Officers, Extension Officers, Beat Officers and Field Assistants. Field Guides, who do not form part of the department's cadre, are selected from within the local community.

The three FD forest areas within the PWPA are under the charge of two Divisional Forest Officers. The Peak Wilderness Conservation Forest is under the control of the DFO Nuwara Eliya and the Walawe Basin and Morahela conservation forests are under the charge of the DFO Ratnapura. The latter two forests fall within the Balangoda Range of the Ratnapura Division and the RFO Balangoda is the local officer responsible for their management. The local officer responsible for the management of the Peak Wilderness Conservation Forest is the RFO Hatton who serves under the DFO Nuwara Eliya.

The management of the DWLC areas within PWPA and the HPNP is the responsibility of the head of DWLC i.e. the Director General of the Department of Wildlife Conservation. The on-site staff is headed by a Grade 1 Ranger at PWPA and under him are other rangers, range assistants and guards. At HPNP the officer in charge is the Park Warden and under him several other officers serve as in the case of PWPA.

5. d Existing plans related to municipality and region in which the proposed property is located

The three constituents of the nominated serial property are entirely located in the areas within the control of the DWLC and FD under the respective legal enactments, the Fauna and Flora Protection Ordinance and the Forest Ordinance. They are managed by these departments, and, while receiving the cooperation of the provincial administration, there are no separate plans that link the provincial administration with the administration and management of the constituents of the property. The local officers of the FD and the DWLC attend the multi-sectoral District Coordinating Committee meetings that are held regularly in their respective districts and any issues relating to the management of the areas

included in the property are discussed, and decisions taken. An example of coordinated and supportive action is the decision taken at the district level in Matale to provide a grant for additions and improvements to the visitor centre at Illukkumbura in the KCF.

5. e Property management plan or other management system

The management of the serial property is covered by the following management plans which are submitted with the nomination:

1. Peak Wilderness Sanctuary 1999 - 2003
2. Management Plan *Samanala Adaviya* Protected Area Complex 2005 (Adam's Peak Range)
3. Management Plan Horton Plains National Park 1999 - 2003
4. Management Plan Horton Plains National Park 2005
5. Management Plan for the Conservation of the Knuckles Forest 1994

In view of the fact that the three areas (PWPA, HPNP and KCF) are now being nominated as a serial property with *both cultural and natural values* for inscription in the World Heritage List, an explanatory note is appended to the nomination dossier to indicate how the system of management of the three sites will be revamped and strengthened in order to embody both cultural and natural features. (See Appendix 3).

5. f Sources and levels of finance

The conservation and management of the property is financed from the Consolidated Fund of the government through the annual national budget. The financial allocations for the areas falling under the two departments cover the salaries of the staff, travelling expenses and administrative costs. The approximate annual allocations are as follows.

- KCF (under the DFOs Kandy and Matale): SL Rs 3.7 million
- PWPA (under DFOs Ratnapura and Nuwara Eliya): SL Rs 3 million
- PWPA (under DWLC); SL Rs 3.8 million
- HPNP (under DWLC): SL Rs 7.1 million

Other than work carried out through regular funding by government, several activities including the construction of buildings at PWPA, HPNP and KCF have been carried out through donor funded projects. For example, in the year 2006, SL Rs 17 million was used at HPNP, mainly for construction work, from an ADB supported project.

The provincial administration had also provided funds for the construction of some buildings in KCF. The main foreign funding agencies involved were the Global Environmental Facility and the Asian Development Bank. One of these projects (PAM&WLC) is still operational at the time of writing.

5. g Sources of expertise and training in conservation and management techniques

The management of the property is carried out by local staff. The FD professional staff members are recruited from among graduates in a relevant scientific discipline. After

recruitment they receive their forestry training (generally of two years duration) at various foreign institutions, mainly the Forest Institute in Dehra Dun, India. The sub-professional level staff members (rangers) are trained (two years) at the Forest Institute in Nuwara Eliya. Beat officers are given a year's training at the same institute.

There is no regular scheme for training DWLC staff overseas. Some ranger level officers, however, have had the opportunity of following courses abroad, some for six months and some others for two weeks, on a donor assistance project. The recently established training institute in Sri Lanka, located in Giritale, provides training facilities for selected members of the staff. Wildlife management courses are also being conducted at the local universities and members of the staff of DWLC are provided the opportunity to follow these courses.

5. h Visitor facilities and statistics

- **PWPA**

The visitors, mainly pilgrims ascending the mountain, number nearly two million during the six-month pilgrim season. The state provides basic facilities such as resting places for pilgrims enroute to the Peak, electric lighting of the trails, controlling pollution, etc. Other needs (like food and drink) are catered for by private parties that set up stalls during the pilgrim season.

- **HPNP**

Most visitors visit HPNP only for the day. Overnight accommodation is available for ten visitors at Anderson lodge. There are staff quarters (for ten) for visiting officers. A dormitory that would provide accommodation for 40 visitors is being rehabilitated. What is missing are research facilities for researchers i.e. quarters and a modest research station. The DWLC will address this issue

The number of visitors annually between 2001 and 2005 has been between 150,000 and 200,000. In 2006 it went up to 204,510. The trend has been a constant increase in numbers. The great majority are day visitors, and visits are mainly during the week-ends and on other holidays.

- **KCF**

The KCF can be approached from two directions - from Matale, leading up to the Illukkumbura entrance and from Kandy to the Deanstone entrance on the opposite side of the conservation area. The visitor facilities at both places are nothing short of excellent. A full-fledged conservation centre has been constructed at each of the sites. This includes dormitories, dining facilities and a lecture room. In addition to the dormitories, Illukkumbura has two eco-lodges for eight persons in each lodge. The running of the eco-lodge facility has been handed over to a community based organization. The lecture facility at Deanstone is an open air one. There is some scope for expanding the presentation and interpretation activities. The dedication of the officers running the two sections of KCF is commendable.

The visitor statistics (total number of visitors, including school children in 2005 and 2006)

are as follows:

Illukkumbura entrance - 2005 number of visitors: 2082
2006 number of visitors: 1967

Deanstone entrance - 2005 number of visitors: 999
2006 number of visitors: 2283

5. i Policies and programmes related to the presentation and promotion of the property

Forestry and wildlife policies that have evolved over the years have continued to place increasing emphasis on the conservation value of the island's natural ecosystems. At the same time, the strict principle of command and control gave way to recognition of the local people as stakeholders. Community based organizations for promoting forest conservation were established in the buffer zones of several forests. This trend led to the inclusion of three areas in the world network of biosphere reserves and many other forests being made national biosphere reserves. The management plans for these forests are prepared in consultation with the local people. One of the biosphere reserves in the international network, the Sinharaja forest reserve, has been inscribed in the World Heritage List.

Policies and programmes will constantly be adapted in order to further sensitize the local people to the value of the property as a natural heritage of considerable importance and obtain their support for conservation. Workshops and seminars are conducted for the school children in the locality. The recognition of the property as a World Heritage will enhance the impact of these programmes when carried out in the buffer zone villages. With Sri Lanka's exceptionally high literacy rate, programmes of this nature do capture the interest of the school going population even in the villages.

5.j Staffing levels (professional, technical, maintenance)

Skills training programmes for the staff are not systematically conducted at the property. In programmes being conducted for staff training at the Forestry and Wildlife training institutes, however, the property is included in field visits which form a part of the training course. Only trained officers are placed in charge of the three constituents of the property.

6. Monitoring

6. a Key indicators for measuring state of conservation

Of special note is the fact that the property that is being nominated is a serial one with three constituent parts, and nomination is for inscription as a Mixed Heritage, i.e. with both cultural and natural features of outstanding universal value. The state of conservation of the property could be considered satisfactory. However, several areas have been identified where action is needed in order to enhance the value of the property in terms of both its cultural and natural features. Action will be taken on these lines. The property, being what it is, such action has to be taken by several institutions in both the cultural and natural resource sectors. The indicators set out in the tables that follow recognize the need for such action. Earlier species surveys and the recent biodiversity baseline survey provisionally identified some indicator species (set out in Section 4). More definite information, however, will have to await further studies in the three areas.

Monitoring in respect of most of the indicators will not be treated just as a specific exercise to be carried out at stated intervals. It will consist of a regular and systematic collection, collation and analysis of data. This may be done annually to study and take note of ongoing changes. It may be based on recorded information by field staff and on findings of research workers. In some cases, however, it will be necessary to carry out specially designed surveys. This will be needed in particular where observations may suggest adverse trends. The suggested periodicity as given in the table below should be understood in this context.

6. a. 1 PWPA

| Indicator | Periodicity | Location of records |
|--|--------------|---------------------|
| 1. Number of permanent trade stalls put up on the routes to the Peak (needed in order to avoid the cutting of timber from the forest every year to construct temporary stalls) | Three-yearly | DWLC |
| 2. Number of additional toilet facilities provided for pilgrims and visitors who trek to the Peak | Five-yearly | DWLC |
| 3. Degree of pollution from litter and other garbage | Yearly | DWLC |

| | | |
|---|-------------|----------|
| 4. Number of previously degraded sites alongside the pilgrim routes showing clear signs of ecological restoration | Five-yearly | DWLC |
| 5. Number of offences detected and legal action taken regarding collection of plants and animals by visitors | Yearly | DWLC |
| 6. Number of notices put up, instruction leaflets provided, and other means of communication used to indicate prohibited practices and promote conservation | Yearly | DWLC, FD |
| 7. Number of trained guides | Two-yearly | DWLC, FD |
| 8. Number of trees of <i>Kokoona zeylanica</i> where removal of bark is observed (note: bark is stripped off for use in ayurvedic medicine) | Yearly | DWLC, FD |
| 9. Number of temporary shelters put up by those engaged in illicit gem mining in rivers and streams | Yearly | DWLC, FD |
| 10. Number of encroachments and other offences in PWPA observed and number of offences where legal action is being taken | Yearly | DWLC, FD |
| 11. Number of conservation oriented CBOs established in the buffer zone | Two-yearly | DWLC, FD |
| 12. Number and km of nature trails opened and maintained in good condition (Note: <i>no nature trail would be linked to the pilgrim routes</i>) | Five-yearly | DWLC, FD |

| | | |
|---|-------------------------|----------|
| 13. Condition of the facilities available to researchers and to the public | Yearly | DWLC, FD |
| 14. Revising/Preparing and implementing management plans, taking into account the conservation of both the cultural and natural features and the upgraded status of the component parts of the PWPA | Three-yearly | DWLC, FD |
| 15. Changes in populations of indicator species of fauna | Five-ten year intervals | DWLC |

6. a. 2 HPNP

| Indicator | Periodicity | Location of records |
|---|-------------|--|
| 1. Progress made in giving special protection to identified cultural sites and adequately presenting them to the public | Two-yearly | DWLC, Post-graduate Institute of Archaeology |
| 2. Improvement of interpretation facilities provided, focusing on both the cultural and natural features of HPNP | Two-yearly | DWLC |
| 3. Trends in the spread of the invasive species <i>Ulex europaeus</i> | Two-yearly | DWLC |
| 4. Occurrence (number) and degree of spread of fires each year | Yearly | DWLC |
| 5. Degree of environmental pollution from garbage disposal | Yearly | DWLC |

| | | |
|--|-------------|------|
| 6. Trends in the extent affected by tree dieback | Five-yearly | DWLC |
| 7. Number of detections and action taken against illegal collection of plants, poaching, and causing damage to information boards | Yearly | DWLC |
| 8. Number of detections made and legal action taken against illegal gem mining | Yearly | DWLC |
| 9. Trends in the population of <i>Panthera pardus kotiya</i> (given its small population), provisionally considered a keystone species in HPNP | Five-yearly | DWLC |

6. a. 3 KCF

| Indicator | Periodicity | Location of records |
|--|--------------------|-------------------------------------|
| 1. Number of cultural sites (caves) provided adequate protection and information presented to the public | Three-yearly | FD, Department of Archaeology |
| 2. Cultural monuments (ancient houses and other related structures) set apart and maintained and information presented to the public | Three-yearly | FD and Ministry of Cultural Affairs |
| 3. Number of archaeological investigations undertaken | Three-yearly | FD, Department of Archaeology |

| | | |
|---|--------------|----|
| 4. Number of remaining non-resident persons engaged in large scale cardamon collection using hired labour | Three-yearly | FD |
| 5. Number of private land lots within boundary of KCF acquired or declared as environmentally sensitive areas | Three-yearly | FD |
| 6. Number and types of conservation related activities carried out with CBO participation | Three-yearly | FD |
| 7. Number of confidence winning initiatives carried out annually in the buffer zone villages | Annually | FD |
| 8. Number of awareness creation educational and communication activities carried out in the buffer zone villages | Annually | FD |
| 9. Records of investigational and opportunistic observations on the occurrence of rare species of fauna and flora | Five-yearly | FD |
| 10. Number of trees of the rare species <i>Stemonoporus affinis</i> located and given special protection | Two-yearly | FD |

6. b Administrative arrangements for monitoring property

DWLC: Director General, Wildlife Conservation,
Department of Wildlife Conservation,
382, Dilco Court,
New Kandy Road,
Malabe,
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6. c Results of previous reporting exercises

There are no previous reporting exercises except for a nomination made to UNESCO's Division of Ecological Sciences for including KCF in the world network of biosphere reserves. UNESCO has welcomed the proposal but has asked for more details on specified

matters. These would be provided using some of the information gathered in preparing this nomination for submission to the World Heritage Committee.

Management plans are available for all three constituent areas included in the nominated property. Proposals for updating these plans and combining cultural and natural dimensions within each of three operational plans have been included in the proposed management system submitted with the nomination, in accordance with Section 5.c of the guidelines (Appendix 3).

7. Documentation

7. a See Appendix 4

The tabulated statement is provided as Appendix 4.

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

The following are submitted:

1. Forest Ordinance
2. Fauna and Flora Protection Ordinance
3. Management plan of Peak Wilderness Sanctuary (now the PWPA) (1999)
4. Updated Peak Wilderness plan titled “Management Plan *Samanala Adaviya* Protected Area Complex (2005)
5. Management plan of HPNP (1999)
6. Updated management plan of HPNP (2005)
7. Management plan of KCF
8. Gazette notifications on the three Conservation Forests in PWPA
9. Gazette notification on PWNR
10. Gazette notification on HPNP
11. Gazette notification on KCF

7. c Form and date of most recent records or inventory of property

PWPA:

Biodiversity information: National Conservation Review, 1997; Biodiversity Baseline Survey, 2007.

Cultural information: inventorying an ongoing process.

HPNP:

Biodiversity information: National Conservation Review, 1997; Biodiversity Baseline Survey, 2007.

Cultural information: published information: 2003-2007 (see bibliography).

KCF:

Biodiversity information: National Conservation Review, 1997; published information documented in bibliography.

Cultural information: published information: mainly 2005 onwards (documented in bibliography).

7. d Addresses where inventory, records and archives are held

PWPA

Biodiversity information: National Conservation Review, 1997, in Forest Department, Rajamalwatte Road, Battaramulla, Sri Lanka. Biodiversity Baseline Survey, 2007, in Department of Wildlife Conservation, 382, “Dilco Court”, New Kandy Road, Malabe.

Cultural information: In Ministry of Cultural Affairs, “Sethsiripaya”, Battaramulla, Sri Lanka.

HPNP

Biodiversity information: National Conservation Review, 1997, in Forest Department, Rajamalwatte Road, Battaramulla, Sri Lanka. Biodiversity Baseline Survey in Department of Wildlife Conservation, “Dilco Court”, New Kandy Road, Malabe.

Cultural information: Postgraduate Institute of Archaeology, Bauddhaloka Mawatha, Colombo 7.

KCF

Biodiversity information: National Conservation Review, 1997, in Forest Department, Rajamalwatte Road, Battaramulla, Sri Lanka; published information documented in bibliography.

Cultural information: Investigation results published mainly in the journal *Lyriocephalus*, volume 6, numbers 1&2, special issue entitled “The Diversity of the Dumbara Mountains”.

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The nomination and the management scheme have been endorsed by the heads of the implementing agencies, namely, the Director General Department of Wildlife Conservation, the Conservator General of Forests, and the Director General of Archaeology, and by the Advisory Group on the preparation of the nomination.

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Divisional Forest Officer, Ratnapura, Sri Lanka
Divisional Forest Officer, Matale, Sri Lanka
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No official web address as yet. This will be considered if the property is to be inscribed on the World Heritage List.

9. Signature on behalf of the State Party

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MAPS

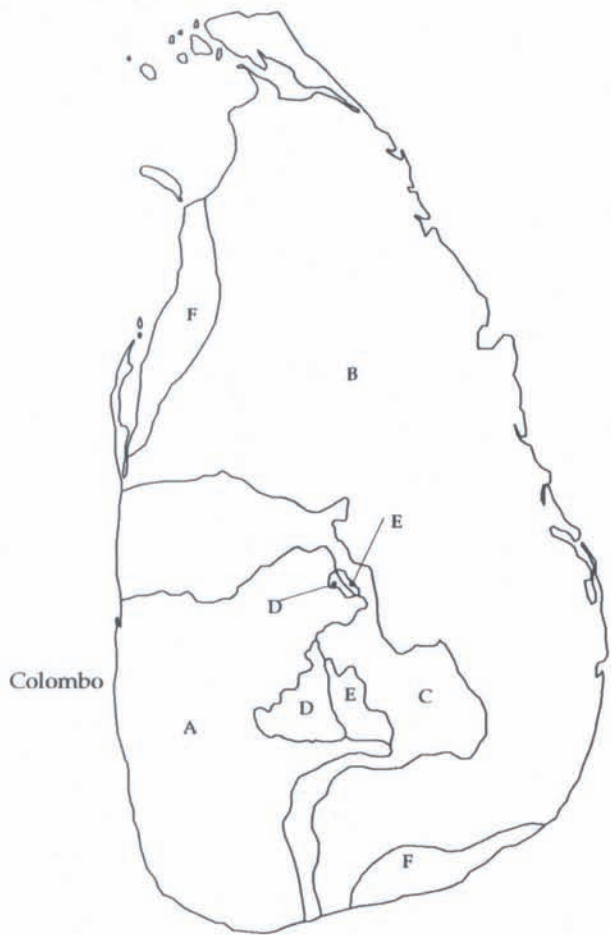


Fig. 1 : Bioclimatic Zones: A : low and midcountry wet Zone; B : dry Zone; C : low and midcountry intermediate Zone; D : montane wet Zone; E : montane intermediate Zone; F : arid Zone (Source : Wijesinghe et al 1993)

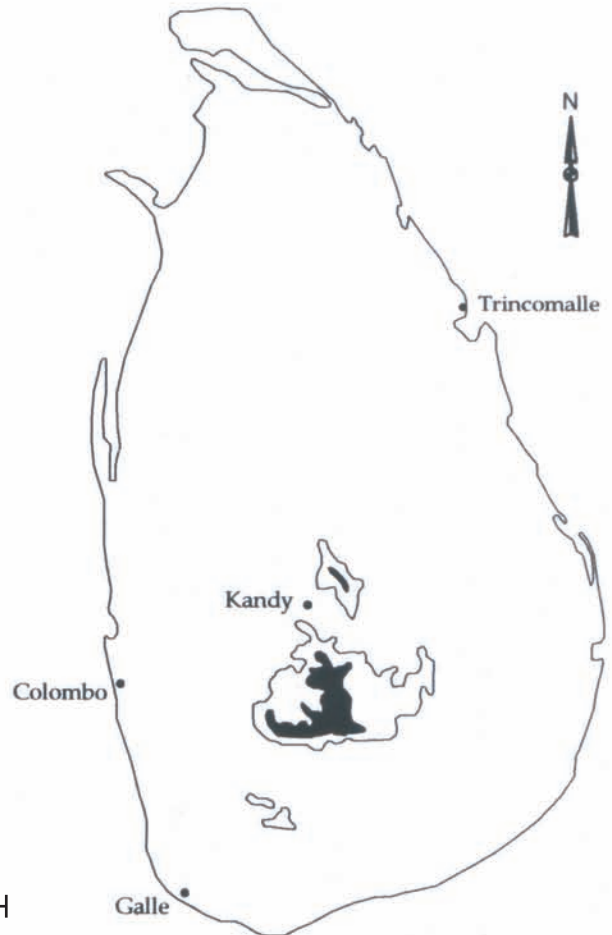


Fig : 2 : Central Highlands > 914 m (enclosed areas); Central and Knuckles massifs > 1524 m (blacked areas towards the south and north respectively (Source : Cooray, P.G. 1984)

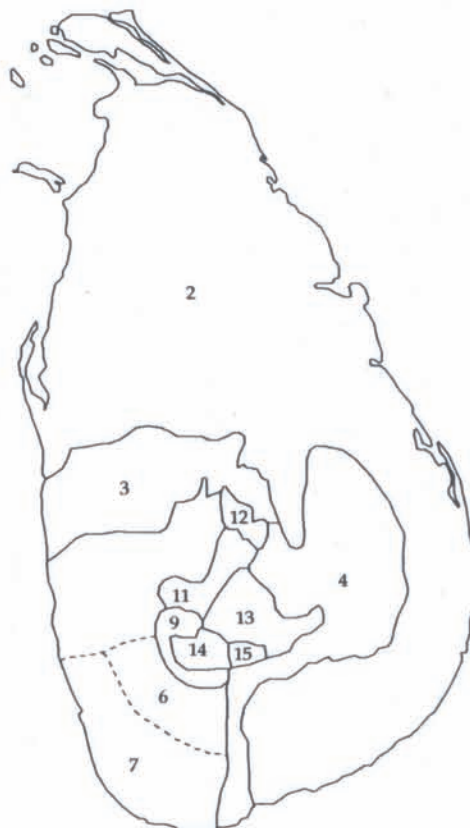
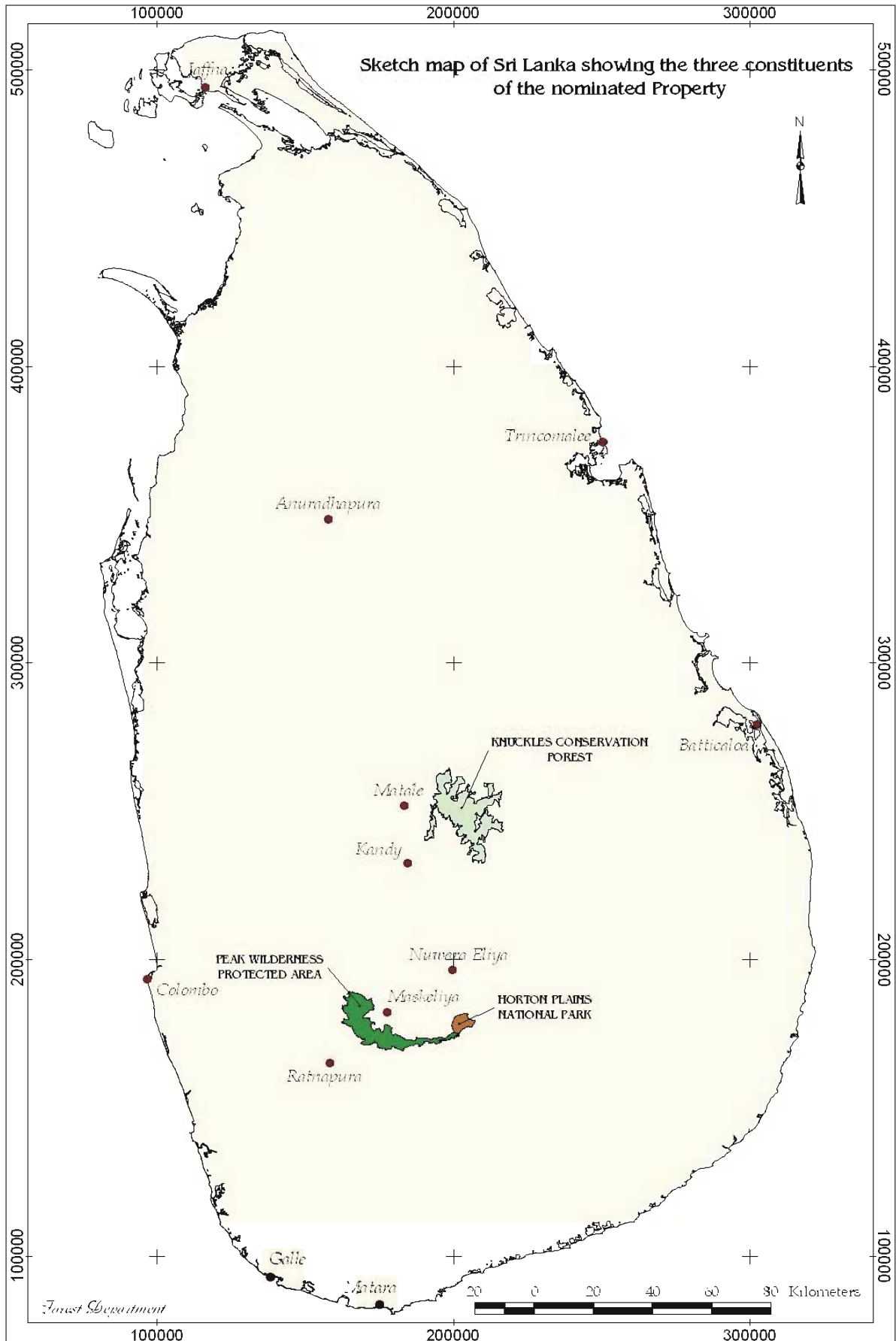
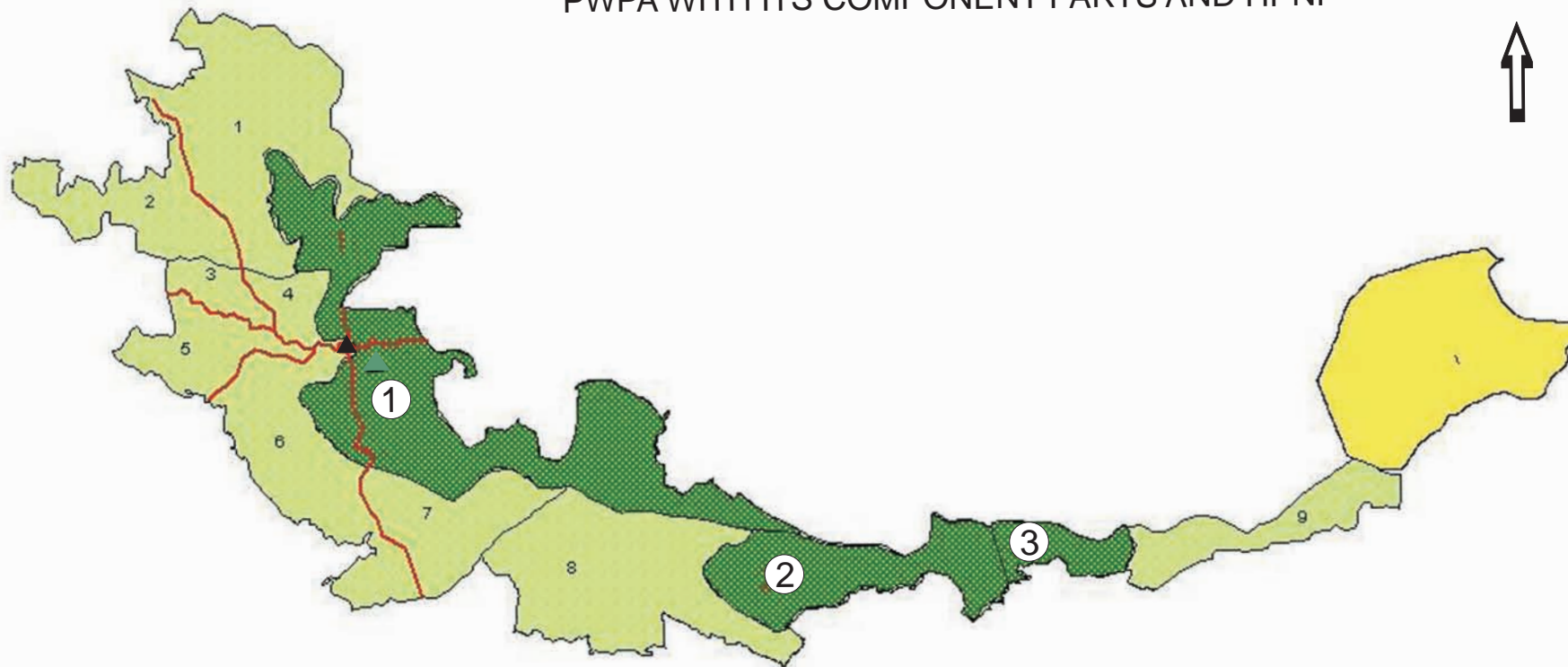


Fig. 3 : Floristic regions : 12 : Knuckles ; 14 Adam's Peak (PWPA) ; 15 : HPNP (Source : Ashton & Gunatillake 1987)



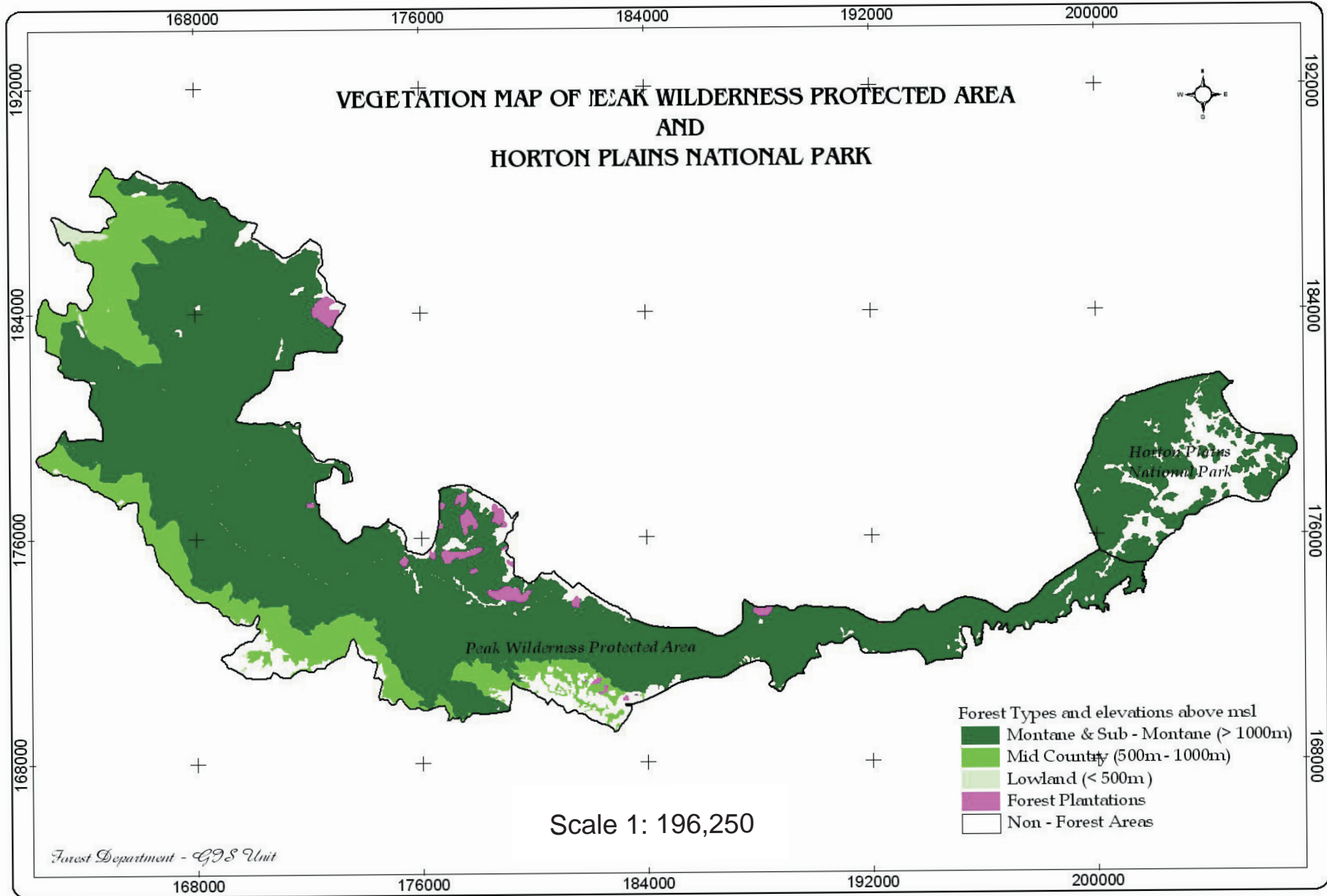
PWPA WITH ITS COMPONENT PARTS AND HPNP

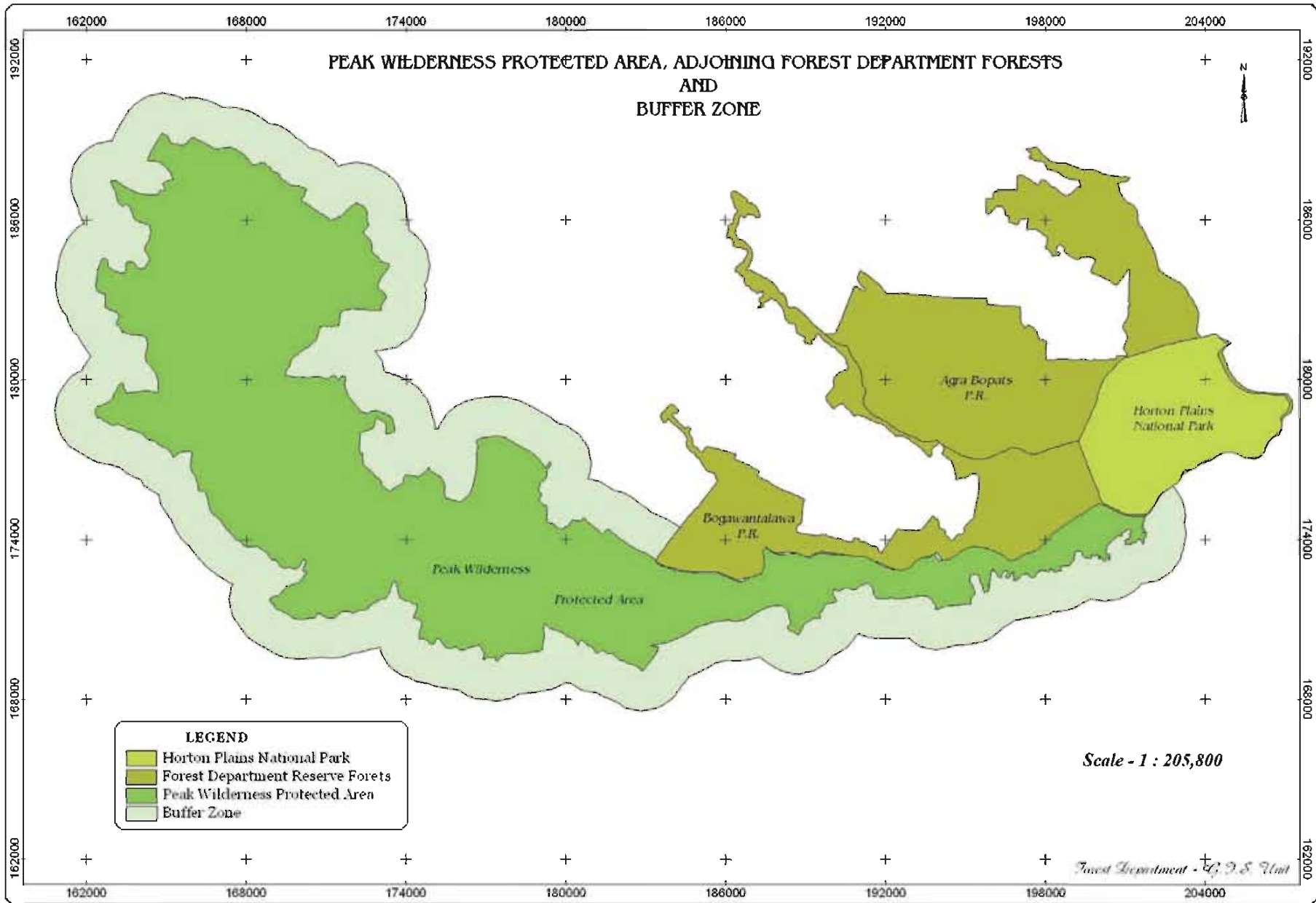


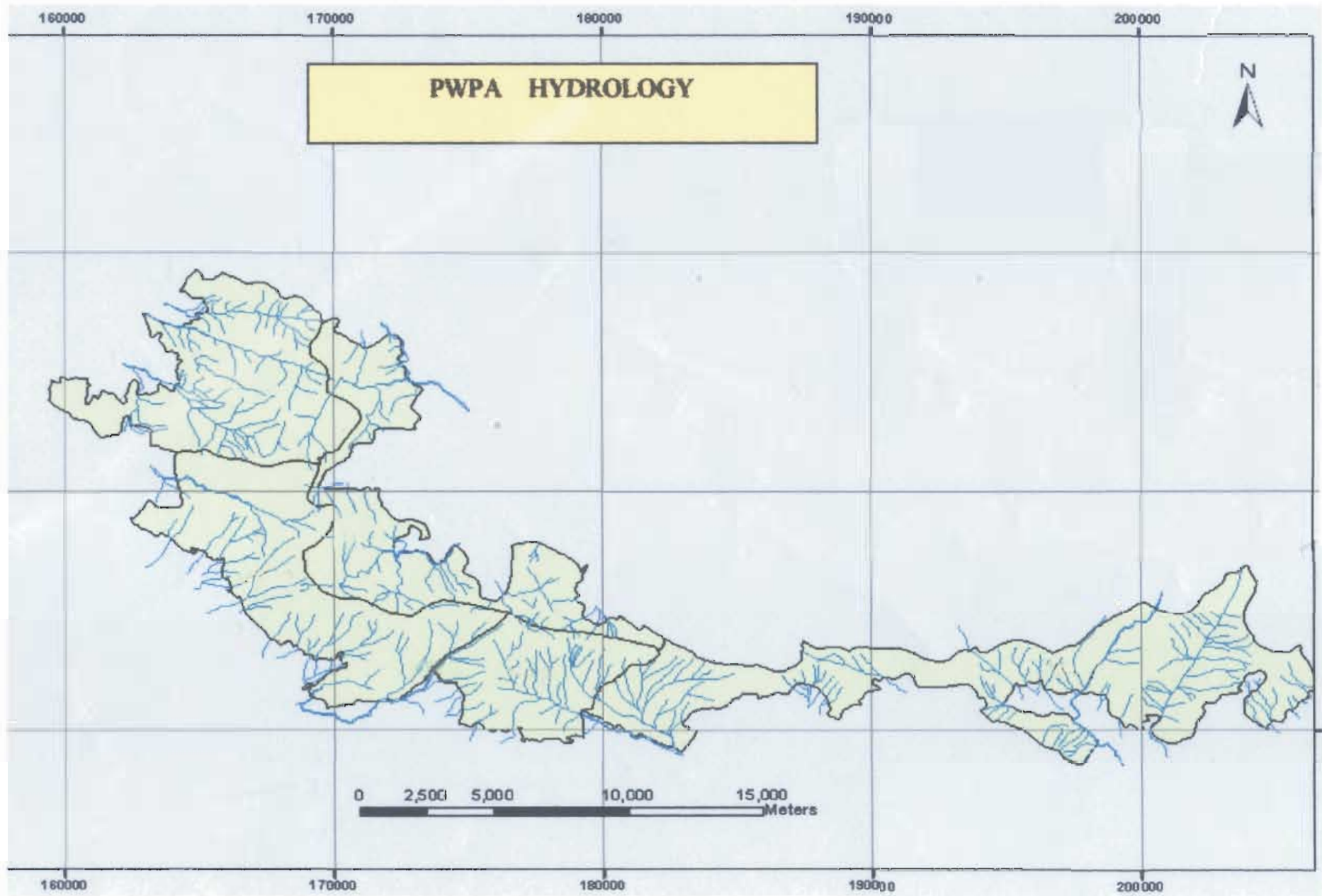
LEGEND

- THE SACRED PEAK
- PILGRIM TRAILS
- 1-3 PW , W ALAW E BASIN, MORAHELA CONSERVATION FORESTS
- PW NATURE RESERVE (IN 9 BLOCKS)
- HPNP

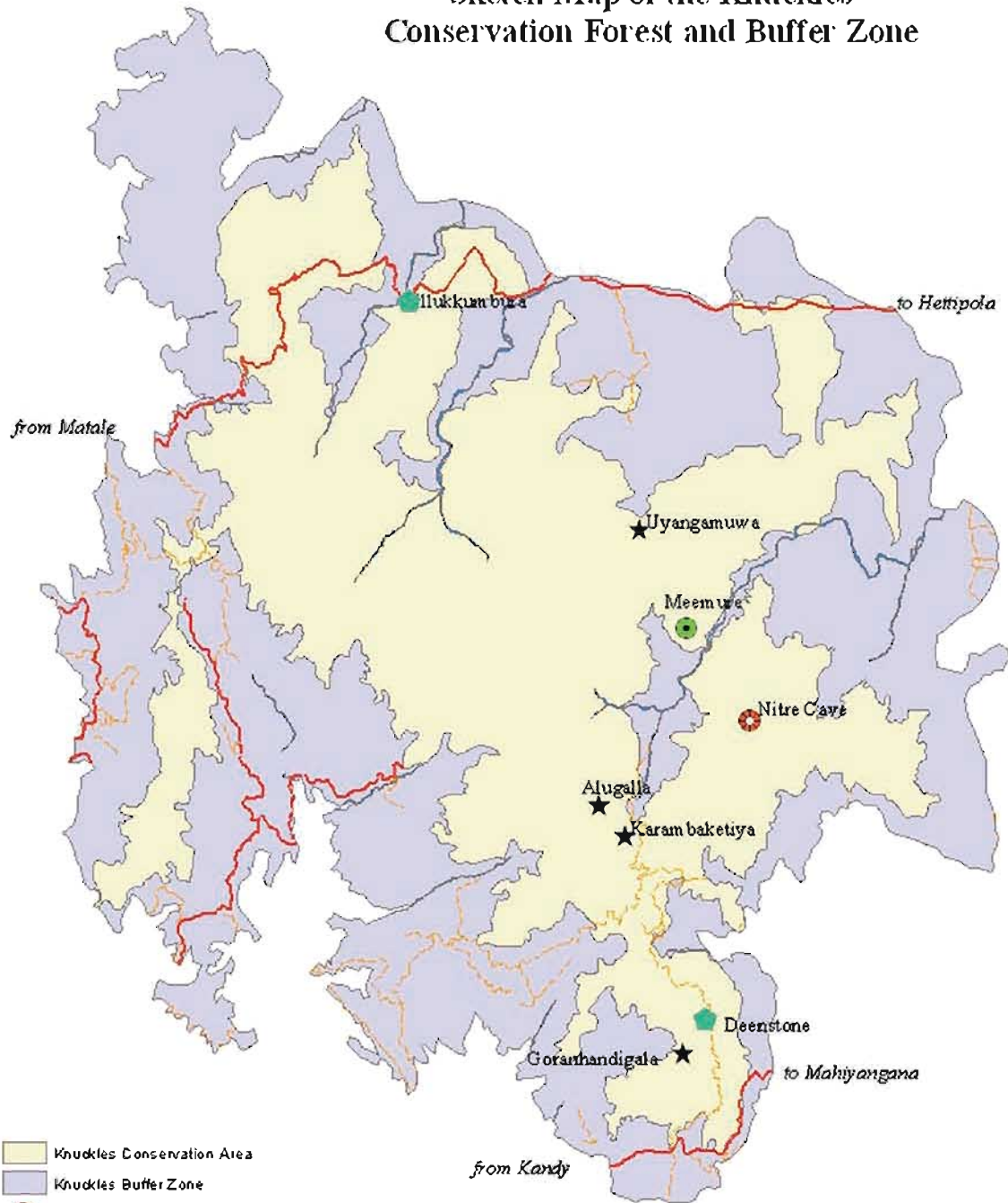
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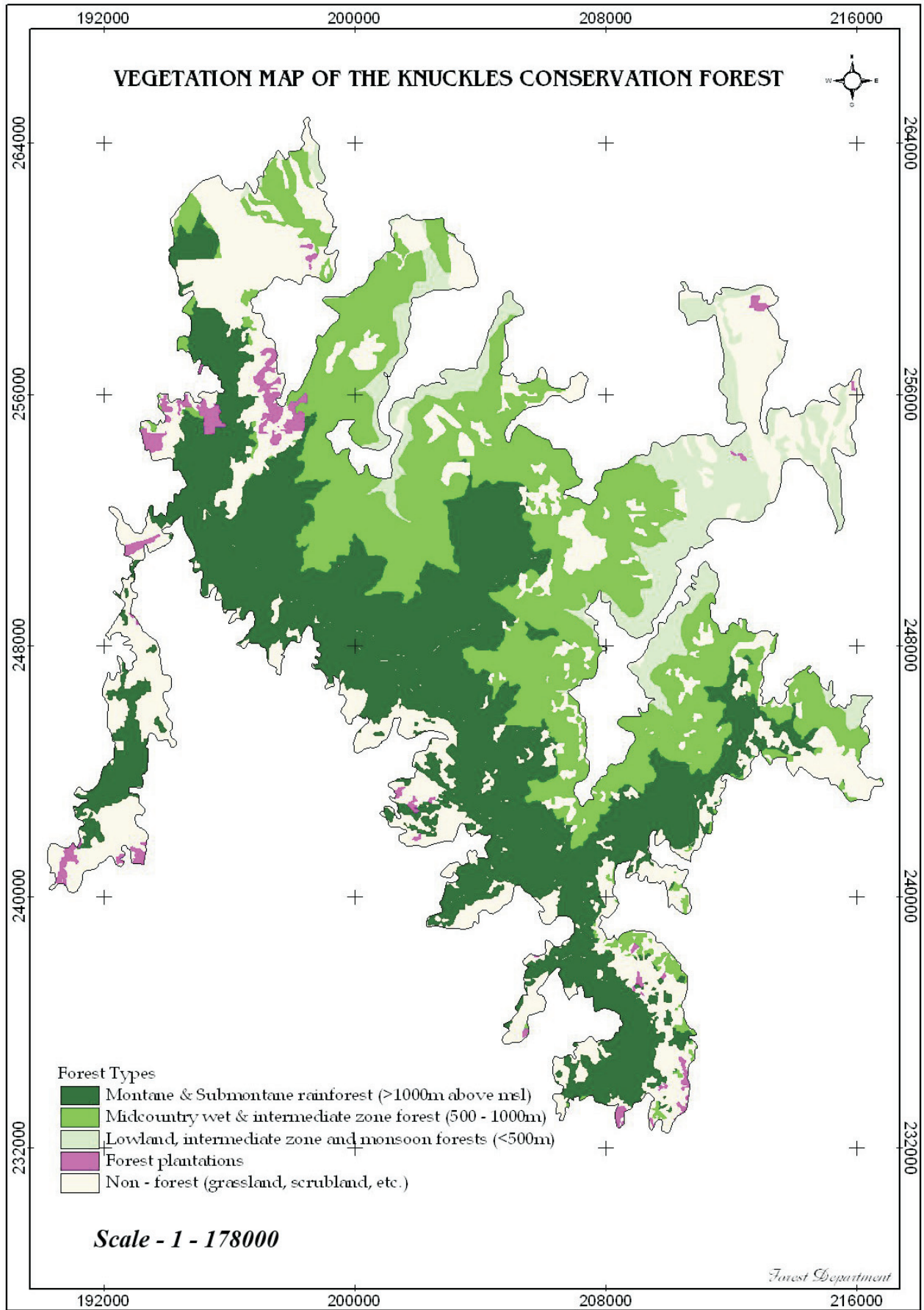


Sketch Map of the Knuckles Conservation Forest and Buffer Zone



- Knuckles Conservation Area
- Knuckles Buffer Zone
- Nitre Cave
- Conservation Centre
- Location of caves occupied by Mesolithic man
- Village provisionally selected for protecting ancient architectural construction etc.
- Main Roads
- Minor Roads
- Streams





Appendix 1

Indigenous plant species

List A:

This list is based on recent surveys, which, except for the very recent Biodiversity Baseline Survey in PWPA and HPNP (Singhakumara 2007), were confined to the woody species. The orchid species are given separately in List B. The families are listed in alphabetical order. The data sources are: Balasubramaniam et al. 1993, Bambaradeniya & Ekanayake 2003, Grellier et al 1987, Gunatilleke et al 1996, Jayasuriya et al. 1993, Singhakumara 1995, 2007.

(* Indicates endemic species; ^{GT} indicates globally threatened species and includes the three IUCN categories of critically endangered, endangered and vulnerable. Plant names are according to Senaratna, 2001, except for the pteridophytes which are based on Abeywickrama 1978).

• PWPA

Acanthaceae

Baleria arnottiana
Rungia repens
*Strobilanthes hookeri**
*S. nockii**^{GT}
*S. viscosa**
S. sexennis

Alangiaceae

Alangium salviifolium

Anacardiaceae

*Camptosperma zeylanicum**^{GT}
*Mangifera zeylanica**^{GT}
Nothopegia beddomei
*Semecarpus coriacea**^{GT}
*S. gardneri**
*S. marginata**
*S. moonii**^{GT}
*S. nigro-viridis**^{GT}
*S. parvifolia**^{GT}
*S. pubescens**^{GT}
*S. subpeltata**^{GT}
*S. walkeri**^{GT}

Annonaceae

Alphonsea sclerocarpa
A. zeylanica
Artabotrys hexapetalus
Cyathocalyx zeylanica
*Desmos zeylanica**

*Goniothalamus gardneri**^{GT}
*G. thomsonii**
G. thwaitesii
*Miliusa zeylanica**^{GT}
*Phoenicanthus coriacea**
Polyalthia korinti
*Uvaria semecarpifolia**
*Sageraea thwaitesii**^{GT}
*Xylopia championii**
X. parvifolia

Apiaceae

Centella asiatica
Hydrocotyle javanica

Apocynaceae

Alstonia scholaris
*Cleghornia acuminata**
Ichnocarpus frutescens
Hunteria zeylanica
Pagiantha dichotoma
Rauvolfia densiflora
Vallaris solanacea

Aquifoliaceae

Ilex walkeri

Araceae

Arisaema leschenaultii
*Pothos hookeri**
*P. Remotiflorus**

Areaceae

*Calamus digitatus**
*C. ovoideus**
C. pseudotenius
*C. radiatus**
C. rotang
C. thwaitesii
C. zeylanicus
Caryota urens
*Loxococcus rupicola**
*Oncosperma fasciculatum**

Aristolochiaceae

Thottea siliquosa

Asclepiadaceae

Gymnema sylvestre

Asparagaceae

Asparagus falcatus
A. gonocladus
A. racemosus

Aspidiaceae

Arachniodes tripinnata
Diplazium beddomei
D. polypodioides
Dryopteris deparioides
Elaphoglossum commutatum
E. spatulatum
Polystichum walkerae
Tectaria paradoxa

Aspleniaceae

Asplenium cheilosorum
A. serricula
A. zenkeramum

Asteraceae

Anaphalis brevifolia
A. subdecurrens
Emilia zeylanica
Psiadia ceylanica
Senecio corymbosus
*Vernonia anceps**
V. arborea
*V. hookeriana**
Vernonia setigera
*V. Wightiana**

Balanophoraceae

Balanophora fungosa ssp. *indica*

Balsaminaceae

Impatiens acaulis
*I. appendiculata**
*I. ciliifolia**
I. cuspidata ssp. *bipartita**
*I. elongata**
I. henslowiana
*I. taprobanica**

Bombacaceae

*Cullenia ceylanica**^{GT}
*C. rosayroana**

Begoniaceae

Begonia dipetala

Boraginaceae

Cynoglossum zeylanicum

Burseraceae

*Canarium zeylanicum**^{GT}
Scutinanthe brunnea

Capparidaceae

Capparis zeylanica

Caprifoliaceae

Viburnum cylindricum

Celastraceae

*Bhesa ceylanica**
Bhesa montana
*Euonymus walkeri**^{GT}
*Kokoona zeylanica**
Microtropis wallichiana
*M. zeylanica**
Salacia reticulata

Chloranthaceae

Sarcandra chloranthoides

Clusiaceae

*Calophyllum bracteatum**^{GT}
*C. calaba**
*C. moonii**^{GT}
*C. thwaitesii**^{GT}
*C. tomentosum**^{GT}
*C. trapezifolium**^{GT}
C. Walkeri
Garcinia echinocarpa
*G. hermonii**

G. morella
*G. quaesita**^{GT}
*G. terpnophylla**^{GT}
*G. thwaitesii**^{GT}
Mesua ferrea
*M. thwaitesii**

Connaraceae

*Connarus championii**
C. monocarpus
Rourea minor

Convolvulaceae

*Argyrea populifolia**
Erycibe paniculata

Cornaceae

Mastixia macrophylla^{GT}
M. tetrandra
*M. nimalii**^{GT}
*M. montana**

Crypteroniaceae

*Axinandra zeylanica**^{GT}

Cyatheaceae

Cyathea crinita
*C. gigantea**
C. walkerae

Cyperaceae

Cyperus rotundus
Hypolytrum scirpoides

Davalliaceae

Araiostegia hymenophylloides
Humata repens
Nephrolepis sp.

Dichapetalaceae

Dichapetalum gelonioides
*D. zeylanicum**

Dilleniaceae

*Acrotrema uniflorum**
*A. walkeri**
Dillenia retusa
D. triquetra^{GT}
*Schumacheria alnifolia**^{GT}
*S. Castaneifolia**

Dipterocarpaceae¹

*Dipterocarpus glandulosus**^{GT}
*D. hispidus**^{GT}

*D. insignis**^{GT}
*D. zeylanicus**^{GT}
*Doona affinis**^{GT}
*D. congestiflora**^{GT}
*D. gardneri**^{GT}
*D. macrophylla**^{GT}
*D. nervosa**^{GT}
*D. trapezifolia**^{GT}
*D. venulosa**^{GT}
*D. zeylanica**^{GT}
Hopea jucunda ssp. *jacunda**^{GT}
H. jucunda ssp. *Modesta**^{GT}
*Shorea dyeri**^{GT}
*S. lissophylla**^{GT}
*S. oblongifolia**^{GT}
*S. pallescens**^{GT}
*S. stipularis**^{GT}
*Stemonoporus acuminatus**^{GT}
*S. angustisepalum**^{GT}
*S. canaliculatus**^{GT}
*S. cordifolius**^{GT}
*S. elegans**^{GT}
*S. gardneri**^{GT}
*S. gilimalensis**^{GT}
*S. lanceolatus**^{GT}
*S. oblongifolius**^{GT}
*S. rigidus**^{GT}
*S. wightii**^{GT}
*Vateria copallifera**^{GT}

Dracaenaceae

Dracaena thwaitesii

Ebenaceae

*Diospyros hirsuta**^{GT}
D. insignis
*D. quaesita**
D. racemosa

Elaeagnaceae

Elaeagnus latifolia

¹ The genera *Doona* and *Shorea* in the Dipterocarpaceae were recognized by Trimen (1893) and were in common use in scientific literature. Ashton, in the the Revised Handbook to the Flora of Ceylon (Dassanayake & Fosberg 1980) revised the family and incorporated the *Doona* species into *Shorea*. Subsequently Kostermans (1992) restored the genus *Doona*, and this has been followed by Senaratne (2001).

Elaeocarpaceae

*Elaeocarpus amoenus**
*E. coriaceus**^{GT}
*E. glandulifer**^{GT}
*E. montanus**
*E. subvillosus**^{GT}
*E. zeylanicus**^{GT}

Ericaceae

Rhododendron arboreum ssp. *zeylanicum**
Vaccinium leschenaultii

Erythroxylaceae

Erythroxylum obtusifolium^{GT}

Euphorbiaceae

*Agrostistachys coriacea**^{GT}
Antidesma alexiteria
A. bunius
*A. pyrifolium**^{GT}
Aporusa acuminata
A. cardiosperma^{GT}
A. fusiformis^{GT}
*A. lanceolata**^{GT}
A. lindleyana
Breynia vitis-idaea
*Bridelia moonii**^{GT}
B. retusa
Chaetocarpus castanocarpus
*C. coriaceus**^{GT}
Cleistanthus patulus
*Fahrenheitia minor**
F. zeylanica
*Glochidion acutifolium**
*G. coriaceum**
*G. nemorale**
*G. pycnocarpum**
*G. stellatum**
G. zeylanicum
Homalanthus populifolius
Macaranga indica
M. peltata
Mallotus tetracoccus
*Phyllanthus zeylanicus**
*Ptychopyxis thwaitesii**^{GT}
Putranjiva roxburghii
Suregada angustifolia

Fabaceae

*Abarema bigemina**^{GT}
*Adenanthera bicolor**^{GT}
A. pavonina
Caesalpinia bonduc
C. decapetala
Crotalaria pallida

Dalbergia pseudo-sissoo
Derris canarensis
Desmodium triquetrum
Entada pusaetha
Humboldtia laurifolia^{GT}

Flacourtiaceae

Casearia thwaitesii
C. zeylanica
Homalium ceylanicum
*Hydnocarpus octandra**^{GT}
Scolopia acuminata
*Trichadenia zeylanica**^{GT}

Gentianaceae

*Exacum trinervium**
*E. walkeri**

Gesneriaceae

*Championia reticulata**
*Chirita zeylanica**

Gleichniaceae

Dicranopteris linearis

Hippocrateaceae

*Salacia diandra**
S. reticulata

Hymenophyllaceae

Hymenophyllum javanicum
H. polyanthos
Trichomanes obscurum

Icacinaceae

Apodytes dimidiata
Gomphandra coriacea
G. tetrandra
Nothapodytes nimmoniana
*Stemonurus apicalis**^{GT}

Lamiaceae

Scutellaria violacea

Lauraceae

*Actinodaphne albifrons**^{GT}
*A. ambigua**
*A. Candolleana**
*A. glauca**
*A. moonii**
*A. speciosa**
Alseodaphne semecarpifolia
*Cinnamomum capparucoronae**^{GT}
*C. dubium**

*C. ovalifolium**
*C. rivulorum**^{GT}
C. verum
*Cryptocarya membranacea**^{GT}
C. wightiana^{GT}
*Litsea gardneri**^{GT}
*L. glaberrima**^{GT}
L. glutinosa
*L. iteodaphne**^{GT}
*L. longifolia**^{GT}
*L. ovalifolia**
*L. walkeri**
Neolitsea cassia
*N. fuscata**
Persea macrantha

Leeaceae

Leea indica

Loganiaceae

Fagraea ceilanica
*Strychnos benthamii**^{GT}
*S. trichocalyx**
S. wallichiana

Lycopodiaceae

Lycopodium phlegmaria
L. squarrosum

Magnoliaceae

Michelia nilagirica

Melastomataceae

*Axinandra zeylanica**^{GT}
Kendrickia walkeri
*Lijndenia capitellata**^{GT}
*L. gardneri**^{GT}
Medinilla fuchsioides
Melastoma malabathricum
Memecylon angustifolium
*M. clarkeanum**^{GT}
*M. cuneatum**^{GT}
*M. discolor**^{GT}
*M. ellipticum**^{GT}
*M. fuscescens**
*M. ovoideum**
*M. parvifolium**
*M. phyllanthifolium**
*M. revolutum**^{GT}
*M. revulare**
*M. rostratum**^{GT}
*M. royenii**^{GT}
*M. varians**^{GT}
Miconia calvescens

Osbeckia aspera
O. parvifolia
*O. octandra**
*O. rheedii**
O. rubicunda
*O. walkeri**
*Sonerila pilosula**

Meliaceae

Aglaiia apiocarpa^{GT}
*Dysoxylum championii**^{GT}
D. excelsum
D. ficiforme
*Walsura gardneri**^{GT}
W. trifoliolata

Menispermaceae

Anamirta cocculus
Coscinium fenestratum
Cyclea peltata

Monimiaceae

*Hortonia angustifolia**^{GT}
*H. floribunda**

Moraceae

*Artocarpus nobilis**^{GT}
Dorstenia indica
*Ficus diversiformis**
*F. fergusonii**
F. microcarpa
F. nervosa

Musaceae

Musa balbisiana

Myristicaceae

Horsfieldia irya
*H. iryagedhi**^{GT}
Myristica dactyloides

Myrsinaceae

Ardisia elliptica
*A. gardnerii**
A. missionis
A. pauciflora
A. solanacea
*A. wightiana**
*A. willisii**
Embelia ribes
Maesa indica
Myrsine thwaitesii

Myrtaceae

*Cleistocalyx nervosum**
*Eugenia fulva**^{GT}
*E. mabaeoides**
E. thwaitesii
Rhodomyrtus tomentosa
Syzygium aqueum
*S. assimile**
S. caryophyllatum^{GT}
S. cordifolium ssp. *cordifolium**
S. cordifolium ssp. *spissum**^{GT}
*S. cylindricum**
S. fergusonii
*S. firmum**^{GT}
S. gardneri
*S. lewisii**
*S. makul**^{GT}
*S. micranthum**^{GT}
S. neesianum
*S. oliganthum**^{GT}
S. revolutum ssp. *cyclophyllum**^{GT}
*S. rotundifolium**^{GT}
S. rubicundum
*S. sclerophyllum**
S. spathulatum^{GT}
*S. umbrosum**^{GT}
S. zeylanicum

Ochnaceae

Gomphia serrata
*Ochna jabotapita**^{GT}

Olacaceae

Strombosia ceylanica
*S. nana**

Oleaceae

Jasminum flexile

Orobanchaceae

Christisonia subacaulis
*C. tricolor**

Pandanaceae

*Freycinetia pycnophylla**
*F. walkeri**
Pandanus thwaitesii

Passifloraceae

Adenia hondala

Piperaceae

*Piper zeylanicum**

Pittosporaceae

Pittosporum tetraspermum

Poaceae

*Arundinaria debilis**
A. walkeriana
Arundinella villosa
Chrysopogon nodulibarbis
Eulalia phaeothrix
*Davidsea attenuata**
Isachne walkeri
Melinis repens
*Ochlandra stridula**
Setaria pumila

Polypodiaceae

Leptochilus decurrens
Drymoglossum heterophyllum
Drynaria quercifolia
Pyrrosia gardneri

Pteridaceae

Lindsaea caudata
L. decomposita
L. heterophylla

Rhamnaceae

Ventilago gamblei
Ziziphus rugosa

Rhizophoraceae

*Anisophyllea cinnamomoides**
Carallia brachiata
*C. calycina**

Rosaceae

Photinia integrifolia
*Prunus walkeri**
Rubus ellipticus
R. gardnerianus
R. indicus
R. leucocarpus
R. rugosus

Rubiaceae

*Acranthera ceylanica**
*Aidia gardneri**
Canthium coromandelicum
*Diplospora erythrospora**^{GT}
Psilanthus tranvancorensis
*Gaertnera divaricata**
*G. rosea**^{GT}
*G. ternifolia**^{GT}
G. vaginans
*G. walkeri**^{GT}

*Hedyotis dendroides**
*H. flavescens**
H. fruticosa
*H. neollessertiana**
*H. trimenii**
Ixora calycina^{GT}
*I. jucunda**^{GT}
I. thwaitesii
*Lasianthus foetulentus**
*L. gardneri**^{GT}
*L. moonii**
*L. neolanceolatus**
*L. obliquus**
*L. oliganthus**
*L. varians**^{GT}
*L. strigosus**
*Leucocodon reticulatum**
*Metabolus decipiens**
Morinda umbellata
Mussaenda frondosa
Ophiorrhiza mungos
O. pectinata
*Pavetta agrostiphylla**
*P. indica**
P. zeylanica
*Prismatomeris albidiflora**
P. tetrandra
*Psychotria dubia**^{GT}
*P. gardneri**^{GT}
*P. longipetiolata**^{GT}
P. nigra
*P. plurivenia**^{GT}
P. sohmeri
*P. sordida**
*P. stenophylla**
*P. waasii**^{GT}
*P. zeylanica**
Psydrax dicoccos^{GT}
*P. montanus**^{GT}
Saprosma foetens
*Scyphostachys coffaeoides**
Tarenna flava
Timonius flavescens^{GT}
*Uncaria elliptica**^{GT}
*Urophyllum ellipticum**
*U. ceylanicum**^{GT}
*Wendlandia bicuspidata**

Rhizophoraceae
*Anisophyllea cinnamomoides**^{GT}

Rutaceae
Acronychia pedunculata
Clausena dentata

C. indica
Melicope lunu-ankenda
Glycosmis pentaphylla
*Luvunga angustifolia**
*Micromelum minutum**
Paramignya monophylla
Toddalia asiatica

Sabiaceae

Meliosma pinnata
M. simplicifolia

Santalaceae

Santalum album
Scleropyrum wallichianum

Sapindaceae

*Allophylus zeylanicus**^{GT}
Dimocarpus longan
Filicium decipiens
Lepisanthes erecta
*L. simplocifolia**
Pometia pinnata

Sapotaceae

*Isonandra compta**
I. lanceolata
*I. montana**
*I. zeylanica**
*Palaquium grande**^{GT}
*P. hinmolpedda**
*P. petiolare**
*P. rubiginosum**^{GT}
*P. thwaitesii**^{GT}

Selaginellaceae

Selaginella brachystachya
S. latifolia

Schizandraceae

Kadsura heteroclita

Simaroubaceae

Ailanthus triphysa
Quassia indica

Smilacaceae

Smilax perfoliata
S. zeylanica

Staphyleaceae

Turpinia malabarica

Sterculiaceae

Pterospermum suberifolium

*Sterculia zeylanica**

Symplocaceae

*Symplocos bractealis**^{GT}
S. cochinchinensis
*S. cordifolia**^{GT}
*S. coronata**
*S. cuneata**
*S. elegans**
S. macrophylla
S. obtusa^{GT}
S. pendula
S. pulchra ssp. *hispidula**^{GT}

Theaceae

*Adinandra lasiopetala**
Eurya acuminata
*E. ceylanica**
E. chinensis
E. nitida
*Gordonia ceylanica**
*G. speciosa**
*Ternstroemia emarginata**
T. gymnanthera

Thymelaeaceae

Gyrinops walla

Tiliaceae

Grewia bracteata
G. carpinifolia

Ulmaceae

Gironniera parvifolia
Trema orientalis

Urticaceae

Debregeasia wallichiana
Elatostema lineolatum

Verbenaceae

Clerodendrum infortunatum
C. serratum
Vitex altissima

Viscaceae

Viscum heyneanum

Vitaceae

Ampelocissus indica
Cayratia pedata
*C. Reticulata**
Cissus latifolia
*C. lonchiphylla**
C. heyneana
C. gardneri

C. trilobata

Zingiberaceae

Alpinia abundiflora
Costus speciosus
Hedychium coronarium
*Zingiber cylindricum**

• **HPNP**

Acanthaceae

Strobilanthes calycina
*S. hookeri**
*S. punctata**
S. sexennis
*S. viscosa**

Alliaceae

Allium hookeri

Apiaceae

Centella asiatica

Apocynaceae

Rauvolfia densiflora
Valleris solanacea

Aquifoliaceae

Ilex denticulata
I. walkeri

Araceae

Arisaema leschenaultii

Araliaceae

*Schefflera heterobotrya**

Asparagaceae

Asparagus racemosus

Asteraceae

Anaphalis brevifolia
Emilia alstonii
E. sonchifolia
E. zeylanica
Senecio corymbosus
S. ludens
S. zeylanicus
*Vernonia wightiana**

Balsaminaceae

*Impatiens macrophylla**
*I. truncata**

Berberidaceae

*Berberis ceylanica**

Boraginaceae*Cynoglossum furcatum***Buxaceae***Sarcococca brevifolia**S. zeylanica****Campanulaceae***Wahlenbergia marginata***Caprifoliaceae***Viburnum erubescens***Celastraceae***Euonymus revolutus***Microtropis zeylanica****Clusiaceae***Calophyllum walkeri**^{GT}**Convallariaceae***Disporum cantoniense***Cornaceae***Mastixia tetrandra*^{GT}*M. montana****Cucurbitaceae***Zehneria thwaitesii***Cyatheaceae***Cyathea crinita**C. walkerae***Cyperaceae***Carex arnottiana***C. baccans**C. lindleyana**C. lobulirostris***C. Walkeri**Cyperus brevifolius**Isolepis fluitans**Rhynchospora rugosa***Droseraceae***Drosera burmannii**D. Peltata***Elaeagnaceae***Elaeagnus latifolia***Ericaceae***Gaultheria leschenaultii**Rhododendron arboreum* ssp. *zeylanicum***Vaccinium leschenaultii***Eriocaulaceae***Eriocaulon brownianum**E. ceylanicum***E. thwaitesii***Euphorbiaceae***Euphorbia rothiana**Glochidion pycnocarpum***G. coriaceum****Fabaceae***Atylosia trinervia**Crotalaria walkeri**Parochetus communis***Flacourtiaceae***Casearia thwaitesii***Gentianaceae***Exacum trinernium****Hypericaceae***Hypericum mysurense***Icacinaceae***Nothapodytes nimmoniana***Juncaceae***Juncus effusus**J. prismatocarpus***Lamiaceae***Plectranthus inflatus***Lauraceae***Actinodaphne ambigua***A. glauca***A. molochina***A. moonii***A. speciosa***A. stenophylla***Cinnamomum ovalifolium***Litsea ovalifolia***L. gardneri**^{GT}*Neolitsea fuscata****Loranthaceae***Dendrophthoe neeldherrensis**D. suborbicularis***Taxillus incanus****Lycopodiaceae***Lycopodium cernuum*

Magnoliaceae

Michelia nilagirica

Melastomataceae

*Lijndenia gardneri**^{GT}

Medinella fuchsoides

*Memecylon cuneatum**

*M. ovoideum**

*M. parvifolium**

Osbeckia aspera

O. buxifolia

*O. lanata**

O. parvifolia

O. rubicunda

*O. walkeri**

Myrsinaceae

Maesa indica

*Myrsine ceylanica**

M. wightiana

Myrtaceae

*Eugenia mabaeoides**

Rhodomyrtus tomentosa

Syzygium fergusonii

*S. oliganthum**^{GT}

S. revolutum^{GT}

*S. rotundifolium**^{GT}

*S. scelerophyllum**

Oleaceae

Olea paniculata

O. polyama

Piperaceae

*Piper zeylanicum**

Pittosporaceae

Pittosporum tetraspermum

Poaceae

Andropogon polytychos

Anthoxanthum odoratum

*Arundinaria debilis**

A. densifolia

Arundinella villosa

Axonopus fissifolius

Chrysopogon nodulibarbis

Coelachne perpusilla

Eragrostis unioloides

Eulalia phaeothrix

Garnotia exaristata

Ischaemum ciliare

Pseudoxytenanthera monadelphica

Polygonaceae

Persicaria capitata

P. nepalensis

Primulaceae

Lysimachia laxa

Pteridaceae

Pteridium aquilinum

Pteris quadriaurita

Ranunculaceae

*Ranunculus sagittifolius**

Rhamnaceae

*Rhamnus arnottianus**

R. wightii

Rosaceae

Alchemilla indica

Duchesnea indica

Photinia integrifolia

Prunus ceylanica^{GT}

*P. walkeri**

Rubus ellipticus

R. leucocarpus

R. rugosus

Rubiaceae

*Canthium campanulatum**

*Hedyotis coprosmoides**

*H. dendroides**

*H. flavescens**

H. lessertiana

*H. neolessertiana**

*H. trimenii**

*Knoxia hirsuta**

*Lasianthus foetulentus**

*L. oliganthus**

*L. gardneri**^{GT}

*L. neolanceolatus**

*L. varians**^{GT}

*Metabolus decipiens**

Neanotis monosperma

*Pavetta involucrata**

*Pleiocraterium plantaginifolium**

Psychotria nigra

*P. zeylanica**

*Psydrax montanus**^{GT}

Rubia cordifolia

*Schizostigma hirsutum**

Tarenna flava

*Wendlandia bicuspidata**

Rutaceae

Acronychia pedunculata
Melicope lunu-ankenda
Toddalia asiatica

Sabiaceae

Meliosma pinnata
M. simplicifolia

Sapindaceae

Dodonaea viscosa

Sapotaceae

*Isonandra montana**

Scrophulariaceae

Lindernia rotundifolia
Pedicularis zeylanica

Solanaceae

Solanum violaceum

Staphyleaceae

Turpinia malabarica

Symplocaceae

Symplocos bractealis^{GT}*
S. cochinchinensis
*S. cordifolia**
*S. cuneata**
*S. elegans**
S. obtusa
S. pendula

Theaceae

*Adinandra lasiopetala**
*Eurya ceylanica**
E. chinensis
E. nitida
*Gordonia ceylanica**
*Ternstroemia emarginata**
T. Gymnanthera

Thymelaeaceae

Wikstroemia canescens

Ulmaceae

Celtis timorensis

- **KCF**

Acanthaceae

*Strobilanthes arnottiana**
*S. calycina**
*S. pulcherrima**

S. sexennis

*S. viscosa**

S. walkeri

Anacardiaceae

Lannea coromandelica

Mangifera

zeylanica^{GT}*

Nothopegia beddomei

Semecarpus

acuminata^{GT}*

S. coriacea^{GT}*

S. gardneri^{GT}*

S. nigro-viridis^{GT}*

S. parvifolia^{GT}*

Annonaceae

Alphonsea sclerocarpa

Artabotrys hexapetalus

A. zeylanicus

Cyathocalyx zeylanica

Goniothalamus thwaitesii

Miliusa indica

Mitrephora heyneana

Polyalthia korinti

Xylopia parvifolia

Apocyanaceae

Aganosma cymosa

Alstonia scholaris

Anodendron paniculatum

Carissa spinarum

Hunteria zeylanica

Pagiantha dichotoma

Rauvolfia densiflora

Vallaris solanacea

Aquifoliaceae

Ilex walkeri

Araliaceae

*Schefflera exaltata**

*S. heterobotrya**

S. stellata

Areaceae

Areca catechu

Calamus pseudotenius

C. thwaitesii

Caryota urens

*Loxococcus rupicola**^{GT}
*Oncosperma fasciculatum**^{GT}

Asteraceae

Psiadia ceylanica

Bignoniaceae

Stereospermum colais

Bombacaceae

Bombax ceiba

*Cullenia ceylanica**^{GT}

*C. rosayroana**

Burseraceae

Commiphora caudata

Buxaceae

*Sarcococca zeylanica**

Capparaceae

Capparis sepiaria

C. zeylanica

Crateva adansonii

Celastraceae

*Bhesa ceylanica**

B. montana

*Cassine balae**

*C. congylos**

*Euonymus revolutus**

*E. walkeri**^{GT}

Maytenus emarginata

Microtropis wallichiana

*M. zeylanica**

Pleurostyliya opposita

Clusiaceae

*Calophyllum cuneifolium**^{GT}

*C. moonii**^{GT}

*C. thwaitesii**^{GT}

*C. tomentosum**^{GT}

*C. trapezifolium**^{GT}

*C. walkeri**^{GT}

Garcinia echinocarpa

G. morella

G. spicata

Mesua ferrea

Combretaceae

Combretum albidum

Terminalia arjuna

T. bellirica

T. chebula

Connaraceae

*Connarus championii**

C. monocarpus

Rourea minor

Convolvulaceae

*Argyreia populifolia**

Cornaceae

*Mastixia congylos**

*M. montana**

M. tetrandra^{GT}

Daphniphyllaceae

Daphniphyllum glaucescens

Datiaceae

Tetrameles nudiflora

Dichapetalaceae

Dichapetalum gelonioides

Dioscoreaceae

Dioscorea spicata

Dipterocarpaceae

*Stemonoporus affinis**^{GT}

Ebenaceae

Diospyros affinis

*D. albiflora**^{GT}

D. crumenata^{GT}

*D. ebenoides**^{GT}

D. ebenum

D. oocarpa

D. ovalifolia

D. racemosa

*D. rheophytica**^{GT}

D. sylvatica

*D. thwaitesii**^{GT}

Maba buxifolia

Elaegnaceae

Elaegnus latifolia

Elaeocarpaceae

*Elaeocarpus amoenus**

*E. glandulifer**^{GT}*E. montanus***E. serratus***Ericaceae***Rhododendron arboreum*ssp. *zeylanicum***Vaccinium leschenaultii***Erythroxylaceae***Erythroxylum**obtusifolium*^{GT}**Euphorbiaceae***Actephila excelsa**Agrostistachys**coriacea**^{GT}*A. indica**Antidesma alexiteria**A. bunius**A. pyrifolium**^{GT}*A. walkeri***Aporusa acuminata**Blachia umbellata**Breynia retusa**B. vitis-idaea**Bridelia moonii**^{GT}*B. retusa**Cleidion spiciflorum**Cleistanthus pallidus***Croton aromaticus**C. laccifer**C. nigroviridis**C. officinalis**Dimorphocalyx glabellus**Drypetes gardneri***D. sepiaria**Euphorbia antiquorum**Excoecaria oppositifolia**Fahrenheitia zeylanica**Flueggea leucopyrus**Givotia moluccana**Glochidion coriaceum***G. pachycarpum***G. stellatum***G. zeylanicum**Macaranga indica**M. peltata**Mallotus eriocarpus***M. philippensis**M. repandus**M. resinus**M. rhamnifolius**M. tetracoccus**Margaritaria cyanospermus***M. indicus**Mischodon zeylanicus**Phyllanthus baillonianus**P. cinereus***P. polyphyllus**P. reticulatus**Putranjiva roxburghii**Suregada angustifolia**S. lanceolata***Fabaceae***Abarema subcoriacea**Acacia caesia**A. chundra**Albizia chinensis**A. odoratissima**Bauhinia racemosa**Cassia fistula**C. roxburghii**Dalbergia candenatensis**D. pseudo-sissoo**Derris parviflora***D. canarensis**D. scandens**D. trifoliata**Erythrina variegata**Gliricidia sepium**Mucuna atropurpurea**M. pruriens**Pongamia pinnata**Pterocarpus**marsupium*^{GT}*Saraca asoca*^{GT}**Flacourtiaceae***Casearia thwaitesii**C. zeylanica**Chlorocarpa pentaschista***Erythrospermum zeylanicum***Flacourtia indica**Homalium ceylanicum**Hydnocarpus venenata***Scolopia acuminata**S. pusilla**

Hippocrateaceae

Loeseneriella arnottiana
Reissantia indica
Salacia oblonga
S. reticulata

Icacinaceae

Apodytes dimidiata
Gomphandra coriacea
G. tetrandra
Nothapodytes nimmoniana

Lauraceae

*Actinodaphne ambigua**
*A. candolleana**
*A. elegans**
*A. glauca**
*A. moonii**
*A. stenophylla**
Alseodaphne semecarpifolia
Cinnamomum
*capparu-coronde**^{GT}
*C. litseaefolium**^{GT}
*C. ovalifolium**
C. verum
Cryptocarya wightiana^{GT}
*Litsea gardneri**^{GT}
*L. glaberrima**^{GT}
L. glutinosa
*L. Itiodaphne**^{GT}
*L. ligustrina**
*L. longifolia**^{GT}
*L. ovalifolia**
*L. walkeri**
Neolitsea cassia
*N. fuscata**
*N. lancifolia**
Persea macrantha

Lecythidaceae

Careya arborea

Leeaceae

Leea indica

Loganiaceae

Fagraea ceilanica
*Strychnos benthamii**^{GT}
S. nux-vomica
*S. tetragona**^{GT}

*S. trichocalyx**

Loranthaceae

*Tolypanthus gardneri**

Malpighiaceae

Hiptage benghalensis

Melastomataceae

Kendrickia walkeri
*Lijndenia capitellata**^{GT}
*L. gardneri**^{GT}
Melastoma malabathricum
Memecylon angustifolium
*M. capitellatum**
*M. cuneatum**^{GT}
*M. fuscescens**
*M. parvifolium**
*M. phyllanthifolium**
*M. rostratum**^{GT}
*M. royenii**^{GT}
*M. sylvaticum**^{GT}
M. umbellatum
*M. urceolatum**^{GT}
Osbeckia aspera

Meliaceae

Aglaia apiocarpa^{GT}
A. elaeagnoidea
Azadirachta indica
Chukrasia tabularis
Cipadessa baccifera
*Dysoxylum championii**^{GT}
D. ficiforme
Melia azedarach
Walsura trifoliolata

Menispermaceae

Cissampelos pareira
Pachygone ovata

Monimiaceae

*Hortonia floribunda**

Moraceae

Artocarpus gomezianus
*Broussonetia zeylanica**
Ficus arnottiana
F. exasperata
*F. fergusonii**
F. hispida

F. microcarpa
F. nervosa
F. racemosa
F. tinctoria
F. virens
F. caulocarpa
Streblus asper
S. taxoides
S. zeylanicus

Myristicaceae

Myristica ceylanica^{GT}
M. dactyloides

Myrsinaceae

*Ardisia gardneri**
A. missionis
*A. zeylanica**
Maesa indica
Myrsine thwaitesii

Myrtaceae

*Cleistocalyx nervosum**
Eugenia bracteata
E. cotinifolia
*E. rotundata**^{GT}
*E. rufo-fulva**^{GT}
E. thwaitesii
Syzygium aqueum
*S. assimile**
S. cumini
*S. cylindricum**
S. fergusonii^{GT}
S. gardneri
S. hemisphericum
S. neesianum^{GT}
S. spathulatum^{GT}
*S. turbinatum**^{GT}
*S. umbrosum**^{GT}
S. zeylanicum

Ochnaceae

Gomphia serrata
*Ochna jabotapita**^{GT}
O. lanceolata

Olacaceae

Olax imbricata
*Strombosia nana**

Oleaceae

*Chionanthus albidiflora**^{GT}
C. zeylanica
Jasminum angustifolium
J. flexile
Olea polygama

Pandanaceae

*Freycinetia walkeri**

Passifloraceae

Adenia hondala

Piperaceae

Piper sylvestre
*P. zeylanicum**

Pittosporaceae

Pittosporum ceylanicum
P. tetraspermum

Poaceae

*Arundinaria debilis**
Bambusa vulgaris
*Davidsea attenuata**
*Ochlandra stridula**

Polygalaceae

*Xanthophyllum zeylanicum**

Proteaceae

*Helicia ceylanica**

Rhamnaceae

Ventilago gamblei
V. madraspatana
Ziziphus rugosa

Rhizophoraceae

Carallia brachiata
*C. calycina**^{GT}

Rosaceae

Photinia integrifolia
*Prunus walkeri**
Rubus gardnerianus
R. micropetalus

Rubiaceae

*Aidia gardneri**

Anthocephalus chinensis
Benkara malabarica
*Canthium campanulatum**
C. coromandelicum
Catunaregam spinosa
Chassalia curviflora
Discospermum
 sphaerocarpum
*Gaertnera gardneri**
G. vaginans
*G. walkeri**
Haldina cordifolia
*Hedyotis trimenii**
Ixora pavetta
I. thwaitesii
*Lasianthus oliganthus**
*L. strigosus**
Morinda coreia
M. umbellata
Mussaenda frondosa
Pavetta indica
*P. involucrata**
*Prismatomeris albidiflora**
*Psychotria dubia**^{GT}
*P. gardneri**^{GT}
P. nigra
P. sohmeri
*P. zeylanica**
Psydrax dicoccos
*P. montanus**^{GT}
Saprosma foetens
Tarenna asiatica
Timonius flavescens^{GT}
*Urophyllum ceylanicum**^{GT}
*U. ellipticum**
*Wendlandia bicuspidata**

Rutaceae

Acronychia pedunculata
Atalantia racemosa
A. ceylanica
Chloroxylon swietenia^{GT}
Citrus grandis
Clausena dentata
C. indica
Glycosmis angustifolia
G. mauritiana
G. pentaphylla
Limonia acidissima
Melicope lunu-ankenda

*Micromelum minutum**
*Murraya gleniei**
M. koenigii
M. paniculata
Paramignya monophylla
Toddalia asiatica
Zanthoxylum rhetsa

Sabiaceae

Meliosma pinnata
M. simplicifolia

Sapindaceae

Allophylus cobbe
*A. zeylanicus**^{GT}
Dimocarpus longan
Dodonaea viscosa
Filicium decipiens
Harpullia arborea
Lepisanthes erecta
L. senegalensis
L. tetraphylla
Pometia pinnata
Sapindus emarginata
Schleichera oleosa

Sapotaceae

Chrysophyllum roxburghii
Isonandra lanceolata
*I. montana**
*I. zeylanica**
Madhuca longifolia
Mimusops elengi
*Palaquium grande**^{GT}
*P. hinmolpedda**
*P. pauciflorum**^{GT}
*P. rubiginosum**
*P. thwaitesii**^{GT}

Schizandraceae

Kadsura heteroclita

Smilacaceae

Smilax perfoliata
S. zeylanica

Staphyleaceae

Turpinia malabarica

Sterculiaceae

Firmiana colorata
Helicteres isora
Pterospermum suberifolium
Sterculia urens

Symplocaceae

*Symplocos bractealis**^{GT}
S. cochinchinensis
*S. cordifolia**^{GT}
*S. coronata**
*S. elegans**
S. obtusa

Theaceae

Eurya acuminata
*E. Ceylanica**
E. chinensis
E. nitida
*Gordonia ceylanica**
*G. elliptica**
Ternstroemia gymnanthera

Thymelaeaceae

Gnidia glauca ssp. *insularis**

Tiliaceae

Berrya cordifolia
Grewia bracteata
G. carpinifolia
G. damine
G. helicterifolia
G. orientalis

Ulmaceae

Aphananthe cuspidata
Celtis philippensis
C. timorensis
Gironniera parvifolia
Trema orientalis

Urticaceae

Debregeasia longifolia
Dendrocnide sinuata

Verbenaceae

Callicarpa tomentosa
Clerodendrum serratum
Premna latifolia
P. obtusifolia

P. tomentosa
Vitex altissima
V. leucoxylon
V. negundo

Vitaceae

Tetrastigma nilagiricum

List B. Indigenous species of orchids (Orchidaceae) in the three constituent parts of the Property

(From lists compiled by Fernando, 2005, with names revised, where necessary, in order to conform to Senaratne's Checklist of Flowering Plants, 2001; endemics denoted by *; nationally threatened species by ^{NT})

PWPA

| | |
|--|---|
| <i>Acampe ochracea</i> | <i>Eria braccata</i> |
| <i>Acampe rigida</i> | <i>Eria lindleyi</i> * ^{NT} |
| <i>Acanthephippium bicolor</i> * ^{NT} | <i>Eria muscicola</i> |
| <i>Adrorhizon purpurascens</i> * ^{NT} | <i>Eria thwaitesii</i> * ^{NT} |
| <i>Aerangis holo-glottis</i> * ^{NT} | <i>Eria tricolor</i> * ^{NT} |
| <i>Agrostophyllum zeylanicum</i> * | <i>Eulophia epidendreae</i> |
| <i>Angraecum zeylanicum</i> * ^{NT} | <i>Eulophia spectabilis</i> ^{NT} |
| <i>Anoectochilus setaceus</i> * ^{NT} | <i>Flickingeria macraei</i> ^{NT} |
| <i>Aphyllorchis montana</i> ^{NT} | <i>Gastrochilus acaulis</i> ^{NT} |
| <i>Bulbophyllum crassifolium</i> * ^{NT} | <i>Geodorum densiflorum</i> ^{NT} |
| <i>Bulbophyllum elegans</i> * | <i>Goodyera fumata</i> ^{NT} |
| <i>Bulbophyllum elliae</i> * | <i>Goodyera procera</i> ^{NT} |
| <i>Bulbophyllum macraei</i> * ^{NT} | <i>Habenaria acuminata</i> ^{NT} |
| <i>Bulbophyllum maskeliyense</i> * ^{NT} | <i>Habenaria crinifera</i> ^{NT} |
| <i>Bulbophyllum petiolare</i> * ^{NT} | <i>Habenaria pterocarpa</i> * ^{NT} |
| <i>Bulbophyllum purpureum</i> * ^{NT} | <i>Habenaria rhynchocarpa</i> * ^{NT} |
| <i>Bulbophyllum thwaitesii</i> * | <i>Habenaria viridiflora</i> ^{NT} |
| <i>Bulbophyllum tricarinatum</i> * ^{NT} | <i>Ipea speciosa</i> * ^{NT} |
| <i>Bulbophyllum trimenii</i> * | <i>Liparis atropurpurea</i> ^{NT} |
| <i>Bulbophyllum wightii</i> * ^{NT} | <i>Liparis barbata</i> * ^{NT} |
| <i>Calanthe triplicatis</i> | <i>Liparis brachyglottis</i> * ^{NT} |
| <i>Cheirostylis flabellata</i> ^{NT} | <i>Liparis caespitosa</i> ^{NT} |
| <i>Cheirostylis parvifolia</i> | <i>Liparis nervosa</i> |
| <i>Cleisostoma tenuifolia</i> * | <i>Liparis viridiflora</i> |
| <i>Coelogyne breviscapa</i> ^{NT} | <i>Liparis walkeriae</i> |
| <i>Coelogyne odoratissima</i> | <i>Liparis wightiana</i> |
| <i>Coelogyne zeylanica</i> * ^{NT} | <i>Malaxis densiflora</i> ^{NT} |
| <i>Corymborkis veratrifolia</i> ^{NT} | <i>Malaxis discolor</i> * |
| <i>Cotonia peduncularis</i> ^{NT} | <i>Malaxis versicolor</i> |
| <i>Cryptostylis arachnites</i> ^{NT} | <i>Oberonia claviloba</i> * ^{NT} |
| <i>Cymbidium bicolor</i> | <i>Oberonia forcipata</i> ^{NT} |
| <i>Cymbidium ensifolium</i> ^{NT} | <i>Oberonia fornicata</i> * ^{NT} |
| <i>Cyrtosia javanica</i> ^{NT} | <i>Oberonia longibracteata</i> * |
| <i>Dendrobium diodon</i> * ^{NT} | <i>Oberonia quadrilatera</i> * |
| <i>Dendrobium heterocarpum</i> ^{NT} | <i>Oberonia recurva</i> ^{NT} |
| <i>Dendrobium maccarthiae</i> * ^{NT} | <i>Oberonia scyllae</i> * |
| <i>Dendrobium panduratum</i> ^{NT} | <i>Oberonia tenuis</i> ^{NT} |
| <i>Dendrobium salaccense</i> ^{NT} | <i>Oberonia truncata</i> * ^{NT} |
| <i>Diplocentrum recurvum</i> ^{NT} | <i>Oberonia wallie-silvae</i> * ^{NT} |
| <i>Diploprora championi</i> | <i>Oberonia weragamaensis</i> * ^{NT} |
| <i>Eria articulata</i> * ^{NT} | <i>Oberonia wightiana</i> |
| <i>Eria bicolor</i> | <i>Oberonia zeylanica</i> ^{NT} |
| | <i>Octarrhena parvula</i> |
| | <i>Peristylus aristatus</i> |
| | <i>Peristylus brevilobus</i> * ^{NT} |

Peristylus cubitalis^{NT}
Peristylus gardneri^{*NT}
Peristylus plantagineus
Peristylus spiralis
Peristylus trimenii^{*NT}
Phaius luridus^{*NT}
Phaius tankervilleae^{NT}
Pholidota pallida
Phreatia elegans^{NT}
Podochilus falcatum^{NT}
Podochilus malabaricum
Podochilus saxatilis^{*NT}
Polystachya concreta
Pomatocalpa decipiens^{*NT}
Pomatocalpa maculosum^{*}
Pteroceras viridiflorum^{*NT}
Robiquetia brevifolia^{*NT}
Robiquetia gracilis^{NT}
Robiquetia rosea^{*}
Robiquetia virescens^{*}
Satyrium nepalense
Schoenorchis nivea^{*}
Schoenorchis tortifolia^{*NT}
Sirhookera lanceolata
Spiranthes sinensis
Taeniophyllum alwisii^{NT}
Taeniophyllum gilimalense^{*NT}
Tainia bicornis^{NT}
Thrixspermum pulchellum^{*}
Trichoglottis tenera^{NT}
Tropidia bambusifolia^{*NT}
Vanilla moonii^{*NT}
Zeuxine longilabris^{NT}
Zeuxine regia^{*NT}

HPNP

Adrorhizon purpurascens^{*NT}
Bulbophyllum elliae^{*}
Bulbophyllum macraei^{*NT}
Bulbophyllum maskeliyense^{*NT}
Bulbophyllum trimenii^{*NT}
Bulbophyllum wightii^{*NT}
Calanthe triplicatis
Cheirostylis flabellata^{NT}
Coelogyne odoratissima
Cryptostylis arachnites^{NT}
Dendrobium diodon^{*NT}
Dendrobium heterocarpum^{NT}
Eria bicolor
Eria braccata
Eria muscicola
Habenaria dolichostachya^{*NT}
Habenaria pterocarpa^{*NT}

Habenaria rhynchocarpa^{*NT}
Habenaria viridiflora^{NT}
Ipsea speciosa^{*NT}
Liparis brachyglottis^{*NT}
Liparis walkeriae
Liparis wightiana
Malaxis densiflora^{NT}
Malaxis versicolor
Oberonia recurva^{NT}
Oberonia scyllae^{*NT}
Oberonia wightiana
Octarrhena parvula
Peristylus aristatus
Peristylus brevilibus^{*NT}
Peristylus cubitalis^{NT}
Peristylus gardneri^{*NT}
Phaius tankervilleae^{NT}
Polystachya concreta
Robiquetia brevifolia^{*NT}
Robiquetia rosea^{*}
Robiquetia virescens^{*}
Satyrium nepalense
Sirhookera lanceolata
Spiranthes sinensis
Taeniophyllum alwisii^{NT}
Trichoglottis tenera^{NT}

KCF

Acampe praemorsa
Acampe rigida
Acanthephippium bicolor^{NT}
Adrorhizon purpurascens^{*NT}
Aerangis hologlottis^{*NT}
Anoetochilus setaceus^{*NT}
Aphyllorchis montana^{NT}
Arundina graminifolia
Bulbophyllum crassifolium^{*NT}
Bulbophyllum elegans^{*}
Bulbophyllum elliae^{*}
Bulbophyllum macraei^{*NT}
Bulbophyllum maskeliyense^{*NT}
Bulbophyllum petiolare^{*NT}
Bulbophyllum trimenii^{*NT}
Bulbophyllum wightii^{*NT}
Calanthe triplicatis
Cheirostylis flabellata^{NT}
Cheirostylis parvifolia
Coelogyne breviscapa^{NT}
Coelogyne odoratissima
Cotonia peduncularis^{NT}
Cryptostylis arachnites^{NT}
Cymbidium bicolor
Dendrobium diodon^{*NT}

Dendrobium heterocarpum^{NT}
Eria bicolor
Eria braccata
*Eria lindleyi**^{NT}
Eria muscicola
*Eria tricolor**^{NT}
Eulophia epidendreae^{NT}
Eulophia graminea^{NT}
Eulophia spectabilis^{NT}
Flickingeria macraei^{NT}
Gastrochilus acaulis^{NT}
Goodyera fumata^{NT}
Habenaria acuminata^{NT}
Habenaria crinifera^{NT}
Habenaria plantaginea
*Habenaria pterocarpa**^{NT}
*Habenaria rhynchocarpa**^{NT}
Habenaria viridiflora^{NT}
*Ipea speciosa**^{NT}
*Liparis barbata**^{NT}
*Liparis brachyglottis**^{NT}
Liparis caespitosa^{NT}
Liparis nervosa
Liparis wightiana
Malaxis versicolor
*Oberonia claviloba**^{NT}
*Oberonia dolabrata**^{NT}
Oberonia forcipata^{NT}
*Oberonia fornicata**^{NT}
*Oberonia longibracteata**^{NT}
*Oberonia quadrilatera**^{NT}
*Oberonia scyllae**^{NT}
Oberonia tenuis^{NT}
*Oberonia wallie-silvae**^{NT}
Octarrhena parvula
Peristylus aristatus
Peristylus cubitalis^{NT}
Phaius tankervilleae^{NT}
Pholidota pallida
*Podochilus falcatus**^{NT}
*Podochilus saxatilis**^{NT}
Polystachya concreta
*Pomatocalpa maculosum**
*Robiquetia brevifolia**^{NT}
Robiquetia gracilis^{NT}
*Robiquetia rosea**
*Robiquetia virescens**
Satyrium nepalense
*Schoenorchis nivea**
*Schoenorchis tortifolia**^{NT}
Sirhookera lanceolata
Spiranthes sinensis
Taeniophyllum alwisii^{NT}
Trichoglottis tenera^{NT}

Vanda tessellata^{NT}
Vanda testacea
Zeuxine longilabris^{NT}
*Zeuxine regia**^{NT}

Appendix 2

Faunal species list

This list is based on the following information sources: Ranawana, K.B. 2006; Bambaradeniya, C.N.B. & Ekanayake, S.P. 2003; Bambaradeniya, C.N.B. & Ranawana, K.B. 1998; DWLC 1999a; DWLC 1999b; IUCN 1996; IUCN & WCMC 1997; IUCN 1994; Wickramasinghe, L.J.M & Munindradasa, D.A.I. 2007; Wijesinghe, M.R., & Goonatileke, W.L.D.P.I.S. de A. 2005; Yapa, W.B., Randeniya, P. & Ratnasooriya, W.D., 2000. DWLC, 2007.

(Abbreviations: GT= Globally threatened (Critically Endangered, Endangered or Vulnerable in the current IUCN Red List). Among birds WV= Winter Visitors; SU = Status Unknown (others are Residents). *=Endemic Species, †=Endemic Genus).

- **PWPA**

Fishes

Family: Cyprinidae

Garra ceylonensis - Stone sucker *

Puntius cumingii - Cuming's barb*

Puntius nigrofasciatus - Black ruby barb *

Puntius titteya - Cherry barb*

Rasboroides vaterifloris - Golden rasbora*

Family: Balitoridae

Acanthocobitis urophthalmus - Tiger loach*

Schistura notostigma - Banded mountain loach*

Family: Clariidae

Clarias brachysoma - Walking catfish*

Family: Gobiidae

Schismatogobius deraniyagalai - Red neck goby

Family: Belontiidae

Belontia signata - Combtail*

Malpulutta kretseri - Ornate paradise-fish*†

Family: Mastacembelidae

Mastacembelus armatus - Marbled spiny eel

Amphibians

Family: Bufonidae

Adenomus kelaartii - Kelaart's dwarf toad*^{GT}

Adenomus dasi *^{GT}

Bufo melanostictus - Common house toad

Family: Microhylidae

Microhyla zeylanica - Sri Lankan narrow-mouthed frog*^{GT}

Ramanella obscura - Grey-brown pug-snouted frog*

Family: Ranidae

Sub family - Raninae

- Euphlyctis hexadactyla* - Sixtoe green frog
- Fejervarya greeni* - Sri Lanka paddy field frog*^{GT}
- Fejervarya kirtisinghei* - Montane paddy field frog*
- Fejervarya limnocharis* - Common paddy field frog
- Lankanectes corrugatus* - Corrugated water frog*
- Nannophrys ceylonensis* - Sri Lanka rock frog*^{GT}
- Rana gracilis* - Sri Lanka wood frog*
- Rana temporalis* - Sri Lanka wood frog*

Sub family Rhacophorinae

- Philautus abundus* *
- Philautus folicola* *^{GT}
- Philautus sarasinorum* *^{GT}
- Philautus silius* *^{GT}
- Philautus femoralis* - Round-snout pygmy tree frog*^{GT}
- Philautus microtypanum* *^{GT}
- Philautus reticulatus* - Reticulated tree frog*^{GT}
- Philautus schmarda* - Conical wart pygmy tree frog *^{GT}
- Philautus viridis* *^{GT}
- Philautus asankai* *^{GT}
- Philautus caeruleus* *^{GT}
- Polypedates cruciger* - Common hour-glass tree frog*
- Polypedates eques* - Saddled tree frog*^{GT}
- Polypedates longinasus* - Sharp-snout saddled tree frog*^{GT}

Reptiles

Family: Agamidae

- Calotes calotes* - Green garden lizard
- Calotes liocephalus* - Crestless lizard*
- Calotes liolepis* - Whistling lizard*^{GT}
- Calotes versicolor* - Common garden lizard
- Ceratophora aspera* - Roughhorn lizard*[†]
- Ceratophora stoddartii* - Rhinohorn lizard*[†]
- Lyriocephalus scutatus* - Lyre head lizard *[†]
- Otocryptis wiegmanni* - Upland kangaroo lizard*

Family: Gekkonidae

- Cnemaspis kandiana* - Kandyan day-gecko*
- Cnemaspis samanalaensis* - Samanala day-Gecko*
- Cnemaspis tropidogaster* - Roughbelly day-gecko
- Gehyra mutilata* - Four-claw gecko
- Hemidactylus brookii* - Spotted house-gecko
- Hemidactylus frenatus* - Common house-gecko

Family: Scincidae

- Lankascincus deignani* - Deignan's Lanka skink*[†]
- Lankascincus deraniyagalae* - Deraniyagala's Lanka skink*[†]
- Lankascincus fallax* - Common Lanka skink*[†]
- Lankascincus gansi* - Gans's Lanka skink*[†]

Lankascincus taprobanensis - Smooth Lanka skink*[†]
Lankascincus taylori - Taylor's Lanka skink*[†]
Mabuya carinata - Common skink
Mabuya macularius - Bronze-green little skink
Nessia burtoni - Three-toe snake skink*[†]

Family: Boidae

Python molurus - Indian python

Family: Colubridae

Ahaetulla nasuta - Green vine snake
Aspidura trachyrocta - Common roughside*[†]
Balanophis ceylonensis - Sri Lanka keel-back*[†]
Dendrelaphis tristis - Common bronze-back
Lycodon striatus - Shaw's wolf snake
Ptyas mucosa - Common Rat Snake

Family: Elapidae

Bungarus ceylonicus Sri Lanka (Ceylon) krait*
Naja naja - Indian cobra

Family: Viperidae

Daboia russelli - Russell's viper
Hypnale hypnale - Merrem's hump-nosed viper
Hypnale nepa - Montane hump-nosed viper*
Trimeresurus trigonocephalus - Green pit viper *

Birds

Family: Ardeidae

Ardeola grayii - Pond heron
Bubulcus ibis - Cattle egret

Family: Accipitridae

Elanus caeruleus - Black-shouldered kite
Spilornis cheela - Crested serpent eagle
Circus aeruginosus - Western marsh harrier [WV]
Accipiter trivirgatus - Crested goshawk
Accipiter badius - Shikra
Ictinaetus malayensis - Black eagle
Spizaetus nipalensis - Mountain hawk eagle

Family: Phasiandae

Galloperdix bicalcarata - Sri Lanka Spurfowl *
Gallus lafayetii - Sri Lanka Junglefowl*
Perdicula asiatica - Jungle bush-quail

Family: Turnicidae

Turnix suscitator - Barred button quail

Family: Columbidae

Chalcophaps indica - Emerald dove
Columba livia - Rock pigeon
Columba torringtoni - Sri Lanka wood pigeon*^{GT}

Ducula aenea Green imperial pigeon
Streptopelia chinensis - Spotted dove
Treron pompadora - Pompadour green pigeon

Family Psittacidae

Loriculus beryllinus - Sri Lanka hanging parakeet*
Psittacula eupatria - Alexandrine parakeet
Psittacula krameri - Rose-ringed parakeet
Psittacula cyanocephala - Plum headed parakeet
Psittacula calthropae - Sri Lanka Layard's parakeet*

Family: Cuculidae

Eudynamis scolopacea - Asian koel
Hierococcyx varius - Common hawk cuckoo
Phaenicophaeus viridirostris - Blue-faced malkoha
Phaenicophaeus pyrrhocephalus - Sri Lanka red-faced malkoha*^{GT}

Family: Centropididae

Centropus sinensis - Greater coucal
Centropus chlororhynchos - Sri Lanka green-billed coucal*^{GT}

Family: Strigidae

Glaucidium radiatum - Jungle owlet
Glaucidium castanonotum - Sri Lanka chestnut backed owlet *
Ketupa zeylonensis - Brown fish owl
Otus thilohofmanni - Serendib scops owl*^{GT}

Family: Caprimulgidae

Caprimulgus indicus - Grey nightjar

Family: Apodidae

Apus affinis - House swift
Collocalia unicolor - Indian swiftlet
Cypsiurus balasiensis - Asian palm swift
Tachymarptis melba - Alpine swift

Family: Hemiprocnidae

Hemiproctne coronata - Crested Tree-swift

Family: Trogonidae

Harpactes fasciatus - Malabar trogon

Family: Halcyonidae

Halcyon smyrnensis - White-throated kingfisher

Family: Meropidae

Merops philippinus - Blue-tailed bee-eater
Merops leschenaultia - Chestnut-headed bee-eater

Family: Coraciidae

Eurystomus orientalis - Dollarbird

Family: Bucorotidae

Ocyrceros gingalensis - Sri Lanka Grey hornbill*

Family: Megalaimidae

- Megalaima zeylanica* - Brown-headed barbet
Megalaima flavifrons - Sri Lanka yellow-fronted barbet*
Megalaima rubricapilla - Crimson-fronted barbet*
Megalaima haemacephala - Coppersmith barbet

Family: Picidae

- Chrysocolaptes lucidus* - Greater flameback
Dinopium benghalense - Black-rumped flameback
Picus chlorolophus - Lesser yellow-naped woodpecker
Picus xanthopygaeus - Streaked-throated woodpecker

Family: Pittidae

- Pitta brachyuran* - Indian pitta [WV]

Family: Hirundinidae

- Hirundo rustica* - Barn swallow
Hirundo tahitica - Pacific swallow
Hirundo daurica - Red-rumped swallow

Family: Lanidae

- Lanius cristatus* - Brown shrike.

Family: Sturnidae

- Sturnus albobfrontatus* - Sri Lanka white-faced starling*^{GT}
Acridotheres tristis - Common mynah
Gracula ptilogenys - Sri Lanka mynah*
Gracula religiosa - Hill mynah

Family: Corvidae

- Urocissa ornata* - Sri Lanka Blue Magpie*^{GT}
Corvus macrorhynchos - Large-billed crow
Oriolus xanthornus - Black-hooded oriole
Dicrurus caerulescens - White-bellied drongo
Dicrurus paradiseus - Great racket-tailed drongo
Aegithina tiphia - Common iora
Coracina macei - Large cuckooshrike
Coracina melanoptera - Black-headed cuckooshrike
Pericrocotus cinnamomeus - Small minivet
Pericrocotus flammeus - Scarlet minivet
Hemipus picatus - Bar-winged flycatcher shrike
Hypothymis azurea - Black-naped monarch
Terpsiphone paradise - Asian paradise flycatcher

Family: Irenidae

- Chloropsis cochinchinensis* - Blue-winged leafbird
Chloropsis aurifrons - Gold-fronted leafbird

Family: Pycnonotidae

- Hypsipetes leucocephalus* - Black bulbul
Iole indica - Yellow-browed bulbul
Pycnonotus cafer - Red-vented bulbul
Pycnonotus melanicterus - Black-crested bulbul
Pycnonotus penicillatus - Sri Lanka yellow-eared bulbul*

Family : Sylviidae

Pellorneum fuscicapillum - Sri Lanka brown-capped babbler*
Pomatorhinus horsfieldii - Scimitar babbler
Dumetia hyperythra - Tawny-bellied babbler
Rhopocichla atriceps - Dark-fronted babbler
Turdoides rufescens - Sri Lanka orange billed babbler*
Turdoides affinis - Yellow billed babbler
Garrulax cinereifrons - Sri Lanka ashy-headed laughing thrush*^{GT}
Bradypterus palliseri - Sri Lanka bush warbler*
Orthotomus sutorius - Common tailorbird
Phylloscopus magnirostris - Large-billed tree warbler [WV]
Acrocephalus dumetorum - Blyth's reed warbler [WV]

Family : Muscicapidae

Muscicapa daurica - Asian brown flycatcher [WV]
Muscicapa muttui - Brown-breasted flycatcher
Ficedula subrubra - Kashmir flycatcher [WV]^{GT}
Eumyias sordida - Sri Lanka dull-blue flycatcher*
Cyornis tickelliae - Tickell's blue flycatcher
Culicicapa ceylonensis - Grey-headed canary flycatcher
Myophonus blighi - Sri Lanka whistling thrush*^{GT}
Zosterops wardii - Pied thrush [WV]
Zosterops spiloptera - Sri Lanka spot-winged thrush*
Turdus merula - Eurasian blackbird
Luscinia brunnea - Indian blue robin [WV]
Copsychus saularis - Oriental magpie robin
Copsychus malabaricus - White-rumped shama

Family: Cisticolidae

Prinia socialis - Ashy prinia
Prinia inornata - Plain prinia

Family: Paridae

Parus major - Grey tit

Family: Sittidae

Sitta frontalis - Velvet-fronted nuthatch

Family: Passeridae

Dendronanthus indicus [WV]
Motacilla cinerea - Grey wagtail [WV]
Passer domesticus - House sparrow
Lonchura striata - White-rumped munia
Lonchura kelaarti - Black-throated munia
Lonchura punctulata - Scaly-breasted munia

Family: Nectariniidae

Dicaeum vincens - Legge's flowerpecker *
Dicaeum erythrorhynchos - Pale-billed (Tickell's) flowerpecker
Nectarinia zeylonica - Purple-rumped sunbird
Nectarinia asiatica - Purple sunbird
Nectarinia lotenia - Loten's sunbird

Family: Zosteropidae

Zosterops ceylonensis - Sri Lanka white-eye *
Zosterops palpebrosa - Oriental white-eye

Mammals**Order: Chiroptera****Family: Pteropodidae***Pteropus giganteus* - Indian flying fox*Rousettus leschenaulti* - Fulvous fruit bat**Order: Primates****Family: Loridae***Loris tardigradus* - Sri Lanka red slender loris *^{GT}**Family: Cercopithecidae***Macaca sinica* - Toque monkey*^{GT}*Semnopithecus vetulus* - Purple-faced leaf monkey*^{GT}**Order: Carnivora****Family: Felidae***Felis chaus* - Jungle cat*Prionailurus viverrinus* - Fishing cat^{GT}*Panthera pardus kotiya* - Leopard**Family: Herpestidae***Herpestus brachyurus* - Brown mongoose**Family: Viverridae***Paradoxurus zeylonensis* - Sri Lanka golden palm cat**Viverricula indica* - Ring-tailed civet**Family: Mustelidae***Lutra lutra* - Otter**Order: Proboscidea****Family: Elephantidae***Elephas maximus* - Elephant^{GT}**Order: Artiodactylia****Family: Cervidae***Cervus unicolor* - Sambur*Muntiacus muntjak* - Barking deer**Family: Tragulidae***Moschiola sp.* - Mouse deer ***Family: Suidae***Sus scrofa* - wild boar**Order: Rodentia****Family: Hystriidae***Hystrix indica* - Porcupine**Family: Muridae***Bandicota indica* - Malabar bandicoot*Mus mayori* - Sri Lanka spiny rat**Rattus montanus* - Nelu rat*^{GT}*Ratus ratus* - Common rat*Srilankamys ohiensis* - Sri Lanka bicoloured rat *[†]

Family: Sciuridae

Funambulus layardi - Sri Lanka flame-striped jungle squirrel*

Funambulus sublineatus - Dusky-striped jungle squirrel

Funambulus palmarum - Palm squirrel

Ratufa macroura - Giant squirrel^{GT}

Order: Lagomorpha

Family: Leporidae

Lepus nigricollis - Black-naped hare

- **HPNP**

Amphibians

Family: Microhylidae

Microhyla ornata - Ornate narrow-mouthed frog

Microhyla zeylanica - Sri Lankan narrow-mouthed frog*^{GT}

*Ramanella palmata**^{GT}

Family: Ranidae

Sub family - Raninae

Fejervarya greeni - Sri Lanka paddy field frog*^{GT}

Sub family - Rhacophorinae

Philautus femoralis - Round-snout pygmy tree frog*^{GT}

Philautus microtympanum *^{GT}

Philautus schmarda - Conical wart pygmy tree frog *^{GT}

Philautus frankenbergi *^{GT}

Philautus alto *^{GT}

Polypedates eques - Saddled tree frog*^{GT}

Polypedates longinasus - Sharp-snout saddled tree frog*^{GT}

Reptiles

Family: Agamidae

Calotes nigrilabris - Blackcheek lizard*

Ceratophora stoddartii - Rhinohorn lizard*[†]

Cophotis ceylanica - Pygmy lizard *[†]

Family: Gekkonidae

Geckoella triedrus - Spotted bowfinger gecko*

Family: Scincidae

Lankascincus taprobanensis - Smooth Lanka skink*

Family: Cyliodrophidae

Aspidura brachyorrhos - Boie's roughside*[†]

Aspidura trachyprocta - Common roughside*[†]

Ptyas mucosa - Common rat snake

Family: Elapidae

Bungarus ceylonicus - Sri Lanka (Ceylon) krait

Birds

Family: Accipitridae

Elanus caeruleus - Black-shouldered kite

Spilornis cheela - Crested serpent eagle

Buteo buteo - Common buzzard [WV]

Pernis ptilorhyncus - Oriental honey-buzzard

Circus aeruginosus - Western marsh harrier [WV]

Circus macrourus - Pallid harrier [WV]
Accipiter badius - Shikra
Ictinaetus malayensis - Black eagle
Spizaetus cirrhatus - Changeable hawk eagle
Spizaetus nipalensis - Mountain hawk eagle

Family: Falconidae

Falco tinnunculus - Common kestrel
Falco peregrinus - Peregrine/ Shahin falcon

Family: Phasianidae

Galloperdix bicalcarata - Sri Lanka Spurfowl *
Gallus lafayetii - Sri Lanka Junglefowl*

Family: Charadriidae

Vanellus indicus - Red-wattled lapwing

Family: Columbidae

Chalcophaps indica - Emerald dove
Columba livia - Rock pigeon
Columba torringtoni - Sri Lanka wood pigeon*^{GT}
Ducula aenea - Green imperial pigeon
Streptopelia chinensis - Spotted dove

Family: Centropididae

Centropus sinensis - Greater coucal

Family: Caprimulgidae

Caprimulgus indicus - Grey nightjar

Family: Apodidae

Apus affinis - House swift
Collocalia unicolor - Indian swiftlet
Cypsiurus balasiensis - Asian palm swift
Tachymarptis melba - Alpine swift

Family: Meropidae

Merops philippinus - Blue-tailed bee-eater

Family: Megalaimidae

Megalaima flavifrons - Sri Lanka yellow-fronted barbet*

Family: Picidae

Chrysocolaptes lucidus - Greater flameback
Dinopium benghalense - Black-rumped flameback
Picus xanthopygaeus - Streaked-throated woodpecker

Family: Alaudidae

Mirafra assamica - Rufous-winged bushlark
Alauda gulgula - Oriental skylark

Family: Hirundinidae

Hirundo rustica - Barn swallow
Hirundo tahitica - Pacific swallow

Family: Sturnidae

Acridotheres tristis - Common mynah
Gracula ptilogenys - Sri Lanka mynah *

Family: Corvidae

Urocissa ornata - Sri Lanka Blue Magpie*^{GT}
Corvus macrorhynchos - Large-billed crow
Dicrurus paradiseus - Great racket-tailed drongo
Pericrocotus cinnamomeus - Small minivet
Pericrocotus flammeus - Scarlet minivet
Hemipus picatus - Bar-winged flycatcher-shrike

Family: Pycnonotidae

Hypsipetes leucocephalus - Black bulbul
Iole indica - Yellow-browed bulbul
Pycnonotus cafer - Red-vented bulbul
Pycnonotus melanicterus - Black-crested bulbul
Pycnonotus penicillatus - Sri Lanka yellow-eared bulbul*

Family : Sylviidae

Pellorneum fuscicapillum - Sri Lanka brown-capped babbler*
Pomatorhinus horsfieldii - Scimitar babbler
Rhopocichla atriceps - Dark-fronted babbler
Turdoides rufescens - Sri Lanka orange billed babbler*
Bradypterus palliseri - Sri Lanka bush warbler*
Orthotomus sutorius - Common tailorbird
Phylloscopus magnirostris - Large-billed tree warbler [WV]

Family: Muscicapidae

Eumyias sordida - Sri Lanka dull-blue flycatcher*
Cyornis tickelliae - Tickell's blue flycatcher
Culicicapa ceylonensis - Grey-headed canary flycatcher
Myophonus blighi - Sri Lanka whistling thrush*^{GT}
Zoothera spiloptera - Sri Lanka spot-winged thrush*
Turdus merula - Eurasian blackbird
Luscinia brunnea - Indian blue robin [WV]
Copsychus malabaricus - White-rumped shama
Saxicola caprata - Pied bushchat

Family: Cisticolidae

Cisticola juncidis - Zitting cisticola
Prinia inornata - Plain prinia

Family: Paridae

Parus major - Grey tit

Family: Sittidae

Sitta frontalis - Velvet-fronted nuthatch

Family: Passeridae

Motacilla cinerea - Grey wagtail [WV]
Anthus rufulus - Paddy field pipit
Lonchura punctulata - Scaly-breasted munia
Lonchura malacca - Black-headed munia

Family: Nectariniidae

Dicaeum erythrorhynchos - Pale-billed (Tickell's)
flowerpecker

Nectarinia zeylonica - Purple-rumped sunbird

Nectarinia asiatica - Purple sunbird

Nectarinia lotenia - Loten's sunbird

Family: Zosteropidae

Zosterops ceylonensis - Sri Lanka white-eye *

Zosterops palpebrosa - Oriental white-eye

Mammals

Order: Insectivora

Family: Soricidae

Feroculus feroculus - Kelaart's long-clawed shrew ^{GT}

Suncus fellowesgordoni - Sri Lanka Pigmy shrew * ^{GT}

Suncus montanus - Highland shrew * ^{GT}

Order: Chiroptera

Family: Vespertilionidae

Pipistrellus ceylonicus - Kelaart's pipistrelle

Order: Primates

Family: Loridae

Loris tardigradus - Sri Lanka red slender loris* ^{GT}

Family: Cercopithecidae

Macaca sinica - Toque monkey * ^{GT}

Semnopithecus vetulus - Purple-faced leaf monkey * ^{GT}

Order: Carnivora

Family: Felidae

Prionailurus rubiginosus - Rusty-spotted cat ^{GT}

Prionailurus viverrinus - Fishing cat ^{GT}

Panthera pardus kotiya - Leopard

Family: Herpestidae

Herpestes smithii - Ruddy mongoose

Herpestes vitticollis - Striped-neck mongoose

Herpestus brachyurus - Brown mongoose

Family: Viverridae

Paradoxurus zeylonensis - Sri Lanka golden palm cat*

Viverricula indica - Ring-tailed civet

Family: Mustelidae

Lutra lutra - Otter

Order: Artiodactylia

Family: Cervidae

Cervus unicolor - Sambur

Muntiacus muntjak - Barking deer

Family: Tragulidae

Moschiola sp. - Mouse deer *

Family: Suidae

Sus scrofa - wild boar

Family: Muridae

Mus mayori - Sri Lanka spiny rat*

Rattus montanus - Nelu rat*^{GT}

Ratus ratus - Common rat

Srilankamys ohiensis - Sri Lanka bicoloured rat *[†]

Family: Sciuridae

Funambulus layardi - Sri Lanka flame-striped jungle squirrel*

Funambulus sublineatus - Dusky-striped jungle squirrel

Ratufa macroura - Giant squirrel^{GT}

Order: Lagomorpha

Family: Leporidae

Lepus nigricollis - Black-naped hare

- **KCF**

Fishes

Family: Anguillidae

Anguilla bicolor - Level-finned eel

Anguilla nebulosa - Long-finned eel

Family: Cyprinidae

*Chela ceylonensis**

Davario malabaricus - Giant danio

Garra ceylonensis - Stone sucker*

Garra phillipsi - Phillips's garra*

Labeo fisheri - Mountain labeo*^{GT}

Puntius bimaculatus - Redside barb

Puntius dorsalis - Long-snouted barb

Puntius martenstyni - Martenstyn's barb*^{GT}

Puntius singhala - Filamented barb*

Puntius srilankensis - Blotched filamented barb*

Puntius vittatus - Silver barb

Rasbora carverii -

Rasbora daniconius - Striped rasbora

Tor khudree - Mahseer

Family: Cobitidae

Lepidocephalichthys jonklaasi - Jonklaas's loach*^{GT}

Lepidocephalichthys thermalis - Common spiny loach

Family: Balitoridae

Acanthocobitis urophthalmus - Tiger loach*

Schistura notostigma - Banded mountain loach*

Family: Clariidae

Clarias brachysoma - Walking catfish*

Family: Gobiidae

Awaous grammepomus - Scribbled goby

Family: Belontiidae

Belontia signata - Combtail*

Family: Mastacembelidae

Mastacembelus armatus - Marbled spiny eel

Amphibians

Family: Ichthyophiidae

Ichthyophis glutinosus - Common yellowband cecilian*

Family: Bufonidae

Adenomus kelaartii - Kelaart's dwarf toad*^{GT}

Bufo melanostictus - Common house toad

Family: Microhylidae*Kaloula taprobanica* - Common bull frog*Ramanella obscura* - Grey-brown pug-snouted frog**Ramanella variegata* - White-bellied pug-snouted frog**Family: Ranidae****Sub family - Raninae***Euphlyctis cyanophlyctis* - Skipper frog*Euphlyctis hexadactyla* - Sixtoe green frog*Fejervarya kirtisinghei* - Montane paddy field frog**Fejervarya limnocharis* - Common paddy field frog*Haplobatrachus crassus**Lankanectes corrugatus* - Corrugated water frog*[†]*Nannophrys marmorata* - Kirthisinghe's rock frog*[†] ^{GT}*Rana gracilis* - Sri Lanka wood frog**Rana temporalis* - Sri Lanka wood frog**Sphaerotheca breviceps* - Banded sand frog*Sphaerotheca rolandae* - Marbled sand frog**Sub family - Rhacophorinae***Philautus cavirostris**^{GT}*Philautus fergusonianus* - Ferguson's tree frog**Philautus fulvus* - Oriental shrub frog*^{GT}*Philautus macropus**^{GT}*Philautus steineri**^{GT}*Philautus sarasinorum**^{GT}*Philautus stuarti**^{GT}*Philautus hoffmanni**^{GT}*Philautus mooreorum**^{GT}*Polypedates eques* - Saddled tree frog*^{GT}*Polypedates maculates* - Chunam tree frog**Reptiles****Family: Bataguridae***Melanochelys trijuga* - Parker's black turtle**Family: Testudinidae***Geochelone elegans* - Indian star tortoise**Family: Trionychidae***Lissemys punctata* - Flapshell turtle**Family: Agamidae***Calotes calotes* - Green garden lizard*Calotes ceylonensis* - Paintedlip lizard**Calotes liocephalus* - Crestless lizard**Calotes liolepis* - Whistling lizard*^{GT}*Calotes versicolor* - Common garden lizard*Ceratophora tennentii* - Leafnose lizard*[†] ^{GT}*Cophotis dumbarae**[†]*Lyriocephalus scutatus* - Lyre head lizard*[†]

Otocryptis wiegmanni - Upland kangaroo lizard*
Otocryptis nigristigma - Lowland kangaroo lizard*

Family: Gekkonidae

Cnemapsis jerdoni - Jerdon's day-gecko
Cnemapsis kandiana - Kandyan day-gecko*
Cnemapsis podihuna - Dwarf day-gecko*
Cnemapsis tropidogaster - Roughbelly day-gecko
Cyrtodactylus soba - Dumbara bent toe gecko *
Geckoella triedrus - Spotted bowfinger gecko*
Gehyra mutilata - Four-claw gecko
Hemidactylus brookii - Spotted house-gecko
Hemidactylus depressus - Kandyan gecko*
Hemidactylus frenatus - Common house-gecko
Hemidactylus leschenaultia - Bark gecko
Hemidactylus triedrus - Termite hill gecko*
Hemiphyllodactylus typus - Slender gecko

Family: Scincidae

Chalcidoseps thwaitesii - Fourtoe snake skink*
Dasia halianus - Haly's tree skink[†]
Lankascincus deraniyagalae - Deraniyagala's Lanka skink*[†]
Lankascincus fallax - Common Lanka skink*[†]
Lankascincus gansi - Gans's Lanka skink*[†]
Lankascincus taprobanensis - Smooth Lanka skink*[†]
Lankascincus taylori - Taylor's Lanka skink*[†]
Lygosoma puntatus - Dotted skink
Lygosoma singha - Taylor's skink*
Mabuya carinata - Common skink
Mabuya macularius - Bronze-green little skink
Nessia bipes - Smith's snake skink*[†]
Nessia monodactylus - Toeless snake skink*[†]
Nessia sarasinorum - Sarasin's snake skink*[†]

Family: Varanidae

Varanus bengalensis - Land monitor
Varanus salvator - Water monitor

Family: Typhlopidae

Ramphotyphlops braminus - Common blind snake
Typhlops leucomelas - Pied typhlops*

Family: Uropeltidae

Pseudotyphlops philippinus - Large shield tail *
Rhinophis blythii - Blyth's earth snake*
Rhinophis philippinus - Cuvier's earth snake*
Uropeltis phillipsi - Phillip's shield tail *
Uropeltis melanogaster - Black shield tail *

Family: Boidae

Python molurus - Indian python

Family: Cyndrophidae

Cylindrophis maculate - Pipe snake*

Family: Colubridae

Ahaetulla nasuta - Green vine snake
Ahaetulla pulverulenta - Brown vine snake
Amphiesma stolatum - Buff-striped keelback
Aspidura brachyorrhos - Boie's roughside*[†]
Aspidura trachyprocta - Common roughside*[†]
Boiga ceylonensis - Sri Lankan cat snake
Boiga trigonata - Gamma cat snake
Boiga forsteni - Forsten's cat snake
Boiga barnesii - Barnes's cat snake*
Chrysopelea ornata - Ornate flying snake
Chrysopelea taprobanica - Striped flying snake*
Coeloganthus helena - Trinket snake
Dendrelaphis bifrenalis - Boulenger's bronze-back
Dendrelaphis caudolineolatus - Gunther's bronze-back
Dendrelaphis tristis - Common bronze-back
Dryocalamus nympha - Bridal snake
Haplocercus ceylonensis - Black spine snake*[†]
Liopeltis calamaria - Reed snake
Lycodon aulicus - Wolf snake
Lycodon osmanhilli - Flowery wolf snake*
Lycodon striatus - Shaw's wolf snake
Macropisthodon plumbicolor - Green keel-back*
Oligodon sublineatus - Dumeril's kukri snake*
Oligodon taeniolatus - Variegated kukri snake
Xenochrophis asperrimus - Common pond snake*
Xenochrophis piscator - Checkered keel-back
Ptyas mucosa - Common Rat Snake

Family: Elapidae

Bungarus ceylonicus - Sri Lanka (Ceylon) krait*
Bungarus caeruleus - Common krait
Naja naja - Indian cobra

Family: Viperidae

Daboia russelli - Russell's viper
Hypnale hypnale - Merrem's hump-nosed viper
Hypnale nepa - Montane hump-nosed viper*
Trimeresurus trigonocephalus - Green pit viper

Birds**Family: Podicipedidae**

Tachybaptus ruficollis - Little grebe

Family: Phalacrocoracidae

Phalacrocorax niger - Little cormorant
Phalacrocorax fuscicollis - Indian cormorant
Phalacrocorax carbo - Great cormorant

Family: Anhingidae

Anhinga melanogaster - Darter

Family: Ardeidae

Ardea cinerea - Grey heron
Ardeola grayii - Pond heron
Bubulcus ibis - Cattle egret
Casmerodius albus - Great egret
Egretta garzetta - Little egret
Mesophoyx intermedia - Intermediate egret

Family: Ciconiidae

Ciconia episcopus - Woolly-necked stork

Family: Threskiornithidae

Threskiornis melanocephalus - Black headed ibis

Family: Accipitridae

Elanus caeruleus - Black-shouldered kite
Milvus migrans - Black kite
Haliastur indus - Brahminy kite
Accipiter trivirgatus - Crested goshawk
Accipiter badius - Shikra
Ictinaetus malayensis - Black eagle
Spizaetus cirrhatus - Changeable hawk eagle
Spizaetus nipalensis - Mountain hawk eagle

Family: Falconidae

Falco tinnunculus - Common kestrel

Family: Phasianidae

Galloperdix bicalcarata - Sri Lanka Spurfowl *
Gallus lafayetii - Sri Lanka Junglefowl*

Family: Rallidae

Amaurornis phoenicurus - White-breasted waterhen
Gallinula chloropus - Common waterhen

Family: Charadriidae

Vanellus indicus - Red-wattled lapwing

Family: Scolopciidae

Tringa nebularia - Common greenshank [WV]
Actitis hypoleucos - Common sandpiper [WV]

Family: Laridae

Chlidonias hybridus - Whiskered tern [WV]

Family: Columbidae

Chalcophaps indica - Emerald dove
Columba torringtoni - Sri Lanka wood pigeon*^{GT}
Ducula aenea - Green imperial pigeon
Streptopelia chinensis - Spotted dove
Treron bicincta - Orange-breasted green-pigeon
Treron pompadora - Pompadour green-pigeon

Family: Psittacidae

Loriculus beryllinus - Sri Lanka hanging parakeet*

Psittacula eupatria - Alexandrine parakeet
Psittacula krameri - Rose-ringed parakeet
Psittacula cyanocephala - Plum headed parakeet
Psittacula calthropae - Sri Lanka Layard's parakeet*

Family: Cuculidae

Clamator jacobinus - Pied cuckoo
Cuculus micropterus - Indian cuckoo [SU]
Eudynamys scolopacea - Asian koel
Hierococyx varius - Common hawk cuckoo
Phaenicophaeus viridirostris - Blue-faced malkoha
Surniculus lugubris - Drongo cuckoo

Family: Centropididae

Centropus sinensis - Greater coucal

Family: Strigidae

Bubo nipalensis - Spot bellied eagle owl
Glaucidium radiatum - Jungle owlet
Ketupa zeylonensis - Brown fish owl
Otus sunia - Oriental scops owl
Otus bakkamoena - Collard scops owl

Family: Batrachostomidae

Batrachostomus moniliger - Frogmouth

Family: Caprimulgidae

Caprimulgus atripennis - Jerdon's night jar
Caprimulgus asiaticus - Common nightjar

Family: Apodidae

Apus affinis - House swift
Collocalia unicolor - Indian swiftlet
Cypsiurus balasiensis - Asian palm swift
Tachymarptis melba - Alpine swift

Family: Hemiprocnidae

Hemiprogne coronata - Crested tree-swift

Family: Trogonidae

Harpactes fasciatus - Malabar trogon

Family: Halcyonidae

Alcedo atthis - Common kingfisher
Ceyx erithacus - Oriental dwarf kingfisher
Halcyon capensis - Stork-billed kingfisher
Halcyon smyrnensis - White-throated kingfisher

Family: Cerylidae

Ceryle rudis - Pied kingfisher

Family: Meropidae

Merops orientalis - Green bee-eater
Merops philippinus - Blue-tailed bee-eater
Merops leschenaultia - Chestnut-headed bee-eater

Family: Coraciidae

Coracias bengalensis - Indian roller

Family: Bucorotidae

Ocyceros gingalensis - Sri Lanka Grey hornbill*

Anthracoceros coronatus - Malabar pied hornbill

Family: Megalaimidae

Megalaima zeylanica - Brown-headed barbet

Megalaima flavifrons - Sri Lanka yellow-fronted barbet*

Megalaima rubricapilla - Crimson-fronted barbet*

Megalaima haemacephala - Coppersmith barbet

Family: Picidae

Celeus brachyurus - Rufous woodpecker

Chrysocolaptes lucidus - Greater flameback

Dendrocopos mahrattensis - Yellow-crowned woodpecker

Dendrocopos nanus - Brown-capped pygmy woodpecker

Dinopium benghalense - Black-rumped flameback

Picus xanthopygaeus - Streaked-throated woodpecker

Family: Pittidae

Pitta brachyuran - Indian pitta [WV]

Family: Alaudidae

Mirafra assamica - Rufous-winged bushlark

Family: Hirundinidae

Hirundo rustica - Barn swallow

Hirundo tahitica - Pacific swallow

Hirundo daurica - Red-rumped swallow

Family: Lanidae

Lanius cristatus. - Brown shrike.

Family: Sturnidae

Sturnus albofrontatus - Sri Lanka white-faced starling*^{GT}

Acridotheres tristis - Common mynah

Gracula ptilogenys - Sri Lanka mynah *

Gracula religiosa - Hill mynah

Family: Corvidae

Urocissa ornata - Sri Lanka Blue Magpie*^{GT}

Corvus splendens - House Crow

Corvus macrorhynchos - Large-billed crow

Oriolus xanthornus - Black-hooded oriole

Dicrurus macrocercus - Black drongo

Dicrurus caerulescens - White-bellied drongo

Dicrurus paradiseus - Great racket-tailed drongo.

Artamus fuscus - Ashy woodswallow

Aegithina tiphia - Common iora

Coracina macei - Large cuckooshrike

Coracina melanoptera - Black-headed cuckooshrike

Pericrocotus cinnamomeus - Small minivet

Pericrocotus flammeus - Scarlet minivet
Hemipus picatus - Bar-winged flycatcher shrike
Rhipidura aureola - White-browed fantail
Hypothymis azurea - Black-naped monarch
Terpsiphone paradisi - Asian paradise flycatcher
Tephrodornis pondicerianus - Common woodshrike

Family: Irenidae

Chloropsis cochinchinensis - Blue-winged leafbird

Family: Pycnonotidae

Hypsipetes leucocephalus - Black bulbul
Iole indica - Yellow-browed bulbul
Pycnonotus cafer - Red-vented bulbul
Pycnonotus luteolus - White-browed bulbul
Pycnonotus melanicterus - Black-crested bulbul
Pycnonotus penicillatus - Sri Lanka yellow-eared bulbul*

Family : Sylviidae

Pellorneum fuscicapillum - Sri Lanka brown-capped babbler*
Pomatorhinus horsfieldii - Scimitar babbler
Rhopocichla atriceps - Dark-fronted babbler
Chrysomma sinense - Yellow-eyed babbler
Turdoides rufescens - Sri Lanka orange billed babbler*
Turdoides affinis - Yellow billed babbler
Bradypterus palliseri - Sri Lanka bush warbler*
Orthotomus sutorius - Common tailorbird
Phylloscopus trochiloides - Greenish warbler [WV]
Phylloscopus magnirostris - Large-billed tree warbler [WV]

Family: Muscicapidae

Muscicapa daurica - Asian brown flycatcher [WV]
Ficedula subrubra - Kashmir flycatcher [WV]^{GT}
Eumyias sordida - Sri Lanka dull-blue flycatcher
Cyornis tickelliae - Tickell's blue flycatcher
Myophonus blighi - Sri Lanka whistling thrush*^{GT}
Zoothera dauma - Scaly thrush
Turdus merula - Eurasian blackbird
Luscinia brunnea - Indian blue robin [WV]
Copsychus saularis - Oriental magpie robin
Copsychus malabaricus - White-rumped shama
Saxicoloides fulicata - Indian robin
Saxicola caprata - Pied bushchat

Family: Cisticolidae

Cisticola juncidis - Zitting cisticola
Prinia socialis - Ashy prinia
Prinia inornata - Plain prinia

Family: Paridae

Parus major - Grey tit

Family: Sittidae

Sitta frontalis - Velvet-fronted nuthatch

Family: Passeridae

Dendronanthus indicus [WV]
Motacilla cinerea - Grey wagtail [WV]
Anthus rufulus - Paddy field pipit
Passer domesticus - House sparrow
Lonchura malabarica - White-throated munia
Lonchura punctulata - Scaly-breasted munia
Lonchura malacca - Black-headed munia

Family: Nectariniidae

Dicaeum agile - Thick-billed flowerpecker
Dicaeum vincens - Legge's flowerpecker *
Dicaeum erythrorhynchos - Pale-billed (Tickell's) flowerpecker
Nectarinia zeylonica - Purple-rumped sunbird
Nectarinia asiatica - Purple sunbird
Nectarinia lotenia - Loten's sunbird

Family: Zosteropidae

Zosterops ceylonensis - Sri Lanka white-eye
Zosterops palpebrosa - Oriental white-eye

Mammals

Order: Insectivora

Family: Soricidae

Feroculus feroculus - Kelaart's long-clawed shrew ^{GT}
Solisorex pearsoni - Pearson's long-clawed shrew *[†] ^{GT}
Suncus murinus - Common musk shrew
Suncus montanus - Highland shrew * ^{GT}

Order: Chiroptera

Family: Pteropodidae

Pteropus giganteus - Indian flying fox
Rousettus leschenaulti - Fulvous fruit bat

Family: Hipposideridae

Hipposideros speoris - Schneider's leaf-nosed bat

Order: Primates

Family: Loridae

Loris lydekkerianus - Grey slender loris

Family: Cercopithecidae

Macaca sinica - Toque monkey * ^{GT}
Semnopithecus vetulus - Purple-faced leaf monkey * ^{GT}
Semnopithecus priam - Grey langur

Order: Carnivora

Family: Felidae

Felis chaus - Jungle cat
Prionailurus rubiginosus - Rusty-spotted cat ^{GT}
Prionailurus viverrinus - Fishing cat ^{GT}
Panthera pardus kotiya - Leopard

Family: Herpestidae

Herpestes edwardsii - Grey mongoose
Herpestes smithii - Ruddy mongoose
Herpestes vitticollis - Striped-neck mongoose
Herpestus brachyurus - Brown mongoose

Family: Canidae

Canis aureus - Jackal

Family: Viverridae

Paradoxurus hermaphroditus - Palm cat
Paradoxurus zeylonensis - Sri Lanka golden palm cat*
Viverricula indica - Ring-tailed civet

Family: Mustelidae

Lutra lutra - Otter

Order: Proboscidea**Family: Elephantidae**

Elephas maximus - Elephant^{GT}

Order: Artiodactyla**Family: Cervidae**

Axis axis - Spotted deer
Cervus unicolor - Sambur
Muntiacus muntjak - Barking deer

Family: Tragulidae

Moschiola meminna - Mouse deer *

Family: Suidae

Sus scrofa - wild boar

Order: Pholidota**Family: Manidae**

Manis crassicaudata - Pangolin

Order: Rodentia**Family: Hystriidae**

Hystrix indica - Porcupine

Family: Muridae

Bandicota indica - Malabar bandicoot
Ratus ratus - Common rat
Srilankamys ohiensis - Sri Lanka bicoloured rat *
Tatera indica - Antelope rat

Family: Sciuridae

Funambulus layardi - Sri Lanka flame-striped jungle squirrel*
Funambulus palmarum - Palm squirrel
Ratufa macroura - Giant squirrel^{GT}

Family: Pteromyidae

Petaurista philippensis - Giant flying squirrel

Order: Lagomorpha

Family: Leporidae

Lepus nigricollis - Black-naped hare

Butterflies at the KCF

(The other two sites have not been investigated to a comparable detail)

Order: Lepidoptera

Family: Papilionidae

| | |
|---------------------------------|-------------------|
| <i>Troides darsius</i> | - Ceylonbirdwing* |
| <i>Papilio polymnestor</i> | - Blue mormon |
| <i>Papilio polytes</i> | - Common mormon |
| <i>Papilio demoleus</i> | - Lime butterfly |
| <i>Papilio helenus</i> | - Red Helen |
| <i>Papilio crino</i> | - Banded peacock |
| <i>Graphium sarpedon</i> | - Blue bottle |
| <i>Graphium agamemnon</i> | - Tailed jay |
| <i>Graphium doson</i> | - Common jay |
| <i>Pachliopta aristolochiae</i> | - Common rose |
| <i>Pachliopta hector</i> | - Crimson rose |
| <i>Chilasa clytia</i> | - Mime |

Family: Pieridae

| | |
|----------------------------|---------------------------|
| <i>Catopsilia pomona</i> | - Lemon emigrant |
| <i>Pareronia ceylanica</i> | - Blue wanderer |
| <i>Appias albina</i> | - Common albatross |
| <i>Appias lyncida</i> | - Chocolate albatross |
| <i>Eurema hecabe</i> | - Common grass yellow |
| <i>Hebomoia galucippe</i> | - Great orange tip |
| <i>Delias eucharis</i> | - Jezebel |
| <i>Eurema balnda</i> | - Three-spot grass yellow |
| <i>Leptosia nina</i> | - Psyche |

Family: Nymphalidae

| | |
|----------------------------|----------------------------|
| <i>Ariadne merione</i> | - Common castor |
| <i>Hypolimnas bolina</i> | - Great eggfly |
| <i>Hypolimnas missipus</i> | - Danaid eggfly |
| <i>Phalanta phalantha</i> | - Leopard |
| <i>Neptis hylas</i> | - Common sailor |
| <i>Neptis jumbah</i> | - Chestnut-streaked sailor |
| <i>Junonia iphita</i> | - Chocolate soldier |
| <i>Junonia atlites</i> | - Grey pansy |
| <i>Junonia almanac</i> | - Peacock pansy |
| <i>Junonia lemonias</i> | - Lemon pansy |
| <i>Cethosia nietneri</i> | - Ceylon lace wing |
| <i>Kallima philarchus</i> | - Blue oakleaf |
| <i>Parthenos sylvia</i> | - Clipper |
| <i>Rohana parisatis</i> | - Black prince |
| <i>Moduza procris</i> | - Commander |
| <i>Kaniska canace</i> | - Blue admiral |
| <i>Melanitis leda</i> | - Common evening brown |
| <i>Melanitis phedima</i> | - Dark evening brown |
| <i>Mycalasis perseus</i> | - Common bushbrown |
| <i>Orsotriaena medus</i> | - Nigger |

| | |
|-----------------------------|---------------------|
| <i>Lethe rohria</i> | - Common treebrown |
| <i>Ypthima ceylonica</i> | - White four-ring |
| <i>Elymnias singala</i> | - Ceylon palmfly* |
| <i>Elymniashypermnestra</i> | - Common plamfly |
| <i>Nissanga patnia</i> | - Gladeye bushbrown |
| <i>Idea iasonia</i> | - Tree nymph* |
| <i>Parantica taprobana</i> | - Ceylon tiger* |
| <i>Euploea core</i> | - Common crow |
| <i>Euploea klugii</i> | - Brown king crow |
| <i>Danaus genutia</i> | - Common tiger |
| <i>Danaus chrysippus</i> | - plain tiger |
| <i>Tirumala limniace</i> | - Blue tiger |
| <i>Parantica aglea</i> | - Glassy tiger |

Family: Lycaenidae

| | |
|---------------------------|---------------------|
| <i>Jamides celeno</i> | - Common cerulean |
| <i>Jamides bochus</i> | - Dark cerulean |
| <i>Talicauda nyseus</i> | - Red pierrot |
| <i>Zizeeria karsandra</i> | - Dark grass blue |
| <i>Zizina otis</i> | - Lesser grass blue |
| <i>Abisara echerius</i> | - Plum judy |

Land snails at the KCF

(The other two sites have not been investigated to a comparable detail)

Family: Steptaxidae

*Indoartemon layardinaus**

Family: Acavidae

*Oligospira polei**

*Oligospira waltoni**

Family: Ariophantidae

Cryptozona bristalis

*Cryptozona ceraria**

*Cryptozona cheuni**

*Euplecta layardi**

*Euplecta colletti**

Euplecta indica

*Euplecta partita**

*Euplecta prestoni**

Euplecta travancorica

Euplecta semidecussata

Euplecta acuducta

*Euplecta emiliana**

*Ratnadvipia irridians**†

*Ravana politissima**†

*Macrochlamys neaps**

Macrochlamys woodiana

Family: Buliminide

*Mirus stalix**

Family: Corillidae

*Corilla colletii**
*Corilla gudei**
*Corilla erronea**
*Corilla odontophora**

Family: Camaenidae

*Beddomea trifaciatus**
*Beddomea albizonatus**

Family: Charopidae

*Thysanota elegans**
Ruthvenia sp.

Family: Cyclophoridae

*Theobaldius annulatus**
*Theobaldius bairdi**
*Theobaldius subplicatus**
*Theobaldius cadiscus**
*Aulopoma grande**¹
*Cyclophorus ceylanicus**
*Japonia vesca**
*Leptopomoides poecilus**
Pterocyclus cumingi

Family: Euconulidae

*Euryclamys regulata**

Family: Endodontidae

Philalanka sp.

Family: Glessulidae

*Glessula lankana**
*Glessula panaetha**
*Glessula sinhila**
*Allopeas layardi**

Family: Pupinidae

*Tortulosa layardi**
*Tortulosa sykesi**
*Tortulosa nevilli**

Family: Subulinidae

Subilina octana

Family: Vertiginidae

*Pupisoma longstaffae**

Family: Veronicellidae

Laevicaulis alte

Appendix 3

Explanatory note on revising the system of management for the three areas (PWPA, HPNP and KCF) following acceptance for inscription in the World Heritage List

1. Introduction

The serial property that is being nominated consists of three constituent parts:

1. Peak Wilderness Protected Area (PWPA)
2. Horton Plains National Park (HPNP)
3. Knuckles Conservation Forest (KCF)

Management plans for the three constituents of the property are being submitted in the dossier. The programmes of action included in the plans largely relate to the natural resource values of the property. Notwithstanding this, the implementing agencies have provided support for research on, and conservation of, cultural sites within and around the property. Hence, the current management of the property is consistent with the requirements for inscription of the property in the World Heritage List. However, the quality of management of the three constituents would be enhanced if certain operational measures are adopted that will give adequate recognition of the additional dimension relating to their cultural values. This is one important reason for revising the system of management through the development and implementation of a set of operational plans as proposed in this statement. The plans would be developed and implementation begun within two years of the acceptance of the nomination to inscribe the property in the World Heritage List.

The first concrete steps leading to the development of operational plans are complete. They are the important legislative measures pertaining to the peak wilderness area, which have already been taken, resulting in the integrity of the area that had remained in an uncertain state for decades being firmly established as described in more detail below.

With regard to peak wilderness, the plans that had been developed were for the management, as a single entity, of the entire area covered by what was until very recently described as the Peak Wilderness Sanctuary under the Fauna and Flora Protection Ordinance. This was done notwithstanding the fact that a good part of the sanctuary was under the control of the Forest Department in terms of the Forest Ordinance. Now the parts of the PWS that will remain exclusively under the control of the DWLC have been declared as a Nature Reserve under the provisions of the FFPO. The three FD areas have been declared as Conservation Forests under the provisions of the Forest Ordinance, and these areas will be exclusively under this department. Unlike the category of Forest Reserve in the earlier Forest Ordinance, the category of Conservation Forest makes the area concerned a “protected area”. With these changes there is a need for the DWLC to revamp its PWS management plan and equally there is a need for the FD to develop an operational plan for its three conservation forests. Such a course of action will ensure that the management functions of the two main implementing agencies (DWLC and FD), as they relate to the areas under their control, are set out without overlap.

In the case of KCF, the plan was made over 12 years ago and though the broad management strategies still remain valid, there is a need for updating the plan and setting out a plan of operations that will take into account developments since 1994.

Another matter that has to be attended to is the inclusion of the cultural sector agencies as stakeholders in the management of the property. This has been tacitly accepted up to now and there has been no hindrance to cultural activities within the property, but if accepted for inclusion in the World Heritage List as a mixed property (recognized for its cultural and natural values), management and conservation of the cultural sites should be specifically included in the operational plans. This would have to cover the goals, policies for achieving the goals, and the action to be taken in respect of the three constituents of the property. It is obvious therefore that the cultural sector institutions should participate in the development of the operational plans.

2. Brief History and the Composition of the Property

The property is located in the central highlands of Sri Lanka, falling, for the most part, within the montane and submontane zones, with an elevation rising to around 2500 m above mean sea level.

The outstanding value of the property rests on:

(a) The natural heritage feature consisting of a unique assemblage of endemic, rare, and relict biological species whose only habitats worldwide are in the wet zone located in southwest Sri Lanka. These habitats have been severely eroded over the past centuries leaving but a few isolated patches that are still in a near pristine condition, and these must be safeguarded in order to ensure the survival of the biota as a world heritage of considerable biogeographical and evolutionary significance.

(b) The cultural features based on (i) links with Sri Lanka's ancient civilization, dating back to 300 BC, where human development was pursued by the ruling monarchs through attention to the material needs of the people (Sri Lanka's remarkable hydraulic civilization) *pari passu* with attention being paid to promoting spiritual and cultural values (religious monuments, including the world renowned Adam's Peak in the Peak mountain range); (ii) evidence of sequential agricultural development and adjustment to changing climatic conditions by Mesolithic man (antedating such developments elsewhere in South Asia by several millennia) (HPNP); and (iii) evidence of the occupation of Mesolithic man, and subsequently by Buddhist monks (around 200 BC), of caves in the thick of the montane forest, and the persistence of ancient cultural practices in remote villages (KCF).

- **PWPA**

This area has had a chequered history in as far as its protection is concerned. Prior to the 1950s, the Forest Department was in charge of all the major forest areas in the island, and the Forest Ordinance as well as the Fauna and Flora Ordinance were administered by this Department. As far back as 1893, certain areas in the Peak range were declared Forest Reserves. The forest areas of relevance in the current context are what were until very recently called the Morahela Forest Reserve, the Walawe Basin Forest Reserve and the Peak Wilderness Proposed Forest Reserve. Under the Forest Ordinance *which was operational at the time* any forest area could be selected for timber extraction and in that

sense no area falling within the administration of the Forest Department could have been considered as strictly protected.

With the enactment of the Fauna and Flora Ordinance (FFPO) in 1937, which in the early years was administered by the Forest Department, as the Department of Wildlife had not yet been established, the opportunity was taken to fulfill the long felt need to declare Adam's Peak (because of its overwhelming cultural and religious significance) and the surrounding wilderness as a protected area. Of the categories of protected areas recognized in the FFPO, the only category that would meet the situation was the category Sanctuary. This is because of the existence of private lands within the wilderness area, and a sanctuary is the only category of protected area that does not require that the entire area should belong to the state. Contrary to what the name may imply, a sanctuary as defined in the FFPO is the category with the lowest degree of protection. The Adam's Peak wilderness area, including the two forest reserves and the proposed forest reserve, was declared a sanctuary under the FFPO in 1940. Subsequently, with the establishment of the Department of Wildlife Conservation, the PWS came under its authority. However, though included as a part of the sanctuary, the three forest reserves continued to be managed by the FD. This anomalous situation was only recently rectified through appropriate legislative measures as described in this paper.

Over the years, while the three areas administered by the Forest Department continued to receive the attention of that department which has a long history of sound forest management, the rest of the sanctuary had a mixed history. Encroachments continued, and the district administration took its own decisions regarding the regularization of encroachments, and in effect took control over much of the state land in the PWS.

The anomalous situation where certain areas falling within the sanctuary were covered by two separate ordinances and supposedly administered by two separate departments was highlighted in two management plans that were prepared in the 1990s (IUCN 1996, DWLC 1999a). The two plans urged that changes be made to the legal status of the sanctuary and to its administration, and the DWLC plan is in fact titled: *Management Plan: Peak Wilderness Sanctuary - Proposed National Park*. This is based on the recommendation made in the plan to upgrade the status of the area from Sanctuary to National Park.

When the proposal to declare the Peak Wilderness area as a part of a serial property to be proposed as a World Heritage was taken up, the legal and administrative matters concerned were examined by the Ministry of Environment and the two departments concerned. It was decided to take action as follows:

1. The PWS to cease to be a sanctuary, except for the peak and the paths leading up to the peak, which would remain in the status of a sanctuary.
2. To demarcate the areas of *state land* within the Sanctuary, except for the three areas under the control of the Forest Department and the areas that will remain in the category of sanctuary and to declare the area so demarcated as a Nature Reserve under the Fauna and Flora Protection Ordinance. (As the area was to form a part of the property that is being nominated as *both a cultural and natural heritage*, the category of Nature Reserve was considered more appropriate than that of National Park).

3. The three areas under the Forest Department to be more decidedly placed under the control of this department and to be upgraded to the protected area status of Conservation Forest under the present Forest Ordinance.

Action has now been taken on these lines. Whereas the DWLC could exercise little or no authority over the sanctuary in the past, the declaration of its area as a nature reserve will give it considerably greater authority.

The outstanding cultural cum religious site in PWPA is the sacred peak and the connected infrastructural features. Particularly during the pilgrim season, the district administration in collaboration with DWLC, takes the responsibility for making the many organizational arrangements that are needed to cater to the hundreds of thousands of people that visit the shrine monthly.

- **Horton Plains National Park**

Horton Plains had been an area that fell into the loose category of “other state forests” and was earlier under the control of the Forest Department. In 1969, the area was vested in the DWLC and declared a Nature Reserve under the FFPO, and, subsequently, in 1988, as a National Park under the same ordinance. Since then it has been managed by the Department of Wildlife Conservation. There are no administrative or legal complications regarding the management of the HPNP. The area was covered by the management plan prepared under a GEF project in 1999 (DWLC 1999b). In 2005 a fresh management plan was prepared under the PAM & DWLC project.

- **Knuckles Conservation Forest**

Except for a small area (290 ha) within the Knuckles Range, namely, Campbell's Land Forest Reserve (so declared in 1902) and another area of 2165 ha that had been earmarked as the Dotulugala Proposed Reserve, all the rest of the Knuckles forest fell within the category of other state forests under the Forest Department. In the 1950s some sections of the Knuckles forest had been leased out to private individuals for under-planting with cardamom.

In the 1980s the critically important role of the Knuckles range, as a key watershed of the Mahaweli Ganga whose waters were being harnessed for irrigation and power supply, began to be recognized. At the same time the forests in the range were coming to be noticed as a hotspot of biodiversity, rich in endemic species, a fact later confirmed by the National Conservation Review which ranked Knuckles as the island's richest forest for faunal species (IUCN & WCMC 1997).

From the 1980s a series of steps were taken aimed at protecting the Knuckles forest. These included the termination of cardamom cultivation leases, action taken against illicit cultivators (by this time cultivation had spread well beyond the leased areas), and the declaration of a large area as a Conservation Forest (done in the year 2000).

At the same time conservation studies were carried out in the forest, and with assistance from IUCN, management plans were drawn up, the last in 1994 (IUCN 1994).

3. Present management plans and objectives

- **PWPA**

The 1999 management plan for the Peak Wilderness Sanctuary was followed by a fresh plan prepared in 2005 by DWLC entitled “Management Plan *Samanala Adaviya* Protected Area Complex (meaning Adam's Peak Range).

The objective of the 1999 plan is stated as follows:

To preserve the biodiversity and catchment capabilities of the sanctuary by

- Enhancing the protection of the flora, fauna and other natural elements of the sanctuary through appropriate systems, staff structure and infrastructure
- Providing opportunities for nature tourism, interpretation and conservation education
- Reducing the natural resource dependencies of the adjoining communities on PWS through eco-development measures
- Promoting research, monitoring and training in biodiversity conservation.

The 2005 plan brings in an additional objective; it related to the provision of pilgrim support. What needs to be done is explicitly to recognize Adam's Peak within the PWPA as one of the most venerated places in the country and to take all necessary measures in order to conserve the cultural values of the area.

Under the new arrangement, following the establishment of the PWPA in place of the PWS and the consequential restriction of the DWLC's area of authority in the PWPA to the nature reserve and what is left of the sanctuary, an operational plan that sets out the activities assigned to the DWLC would be developed. With a much reduced area under its control and the enhanced status of the area, the department would be in a better position to consolidate and rationalize its activities in the PWPA

The three areas within the PWPA falling under the control of the Forest Department (Peak Wilderness, Walawe Basin and Morahela conservation forests) will continue to be managed by that department. At present, although management and conservation activities are being carried out by the FD, there are no management plans prepared by the department specifically for these three areas. It is proposed to develop an operational plan for the management of the cluster of three conservation forests, taking into account the conservation of both natural and cultural values.

- **HPNP**

This area is also covered by (a) a management plan prepared under the sponsorship of GEF and covering the period 1999-2003 and (b) a management plan (more in form of an operational plan as in the case of peak wilderness) prepared in 2005.

The management goals as set out in the 1999 plan are as follows

- To conserve the biodiversity of the HPNP landscape with special emphasis on the flora and fauna
- To protect the catchment of the three major rivers which originate inside HPNP
- To promote nature tourism and preserve the ability of the system to sustain tourism in the long run.

In order to achieve the goals the following objectives have been set out

- To conserve the biological diversity and scenic beauty of HPNP, with special emphasis on the maintenance of diverse habitats and associated fauna
- To provide opportunities for conservation-compatible tourism, nature interpretation and conservation education
- To develop appropriate systems, staff structure and associated infrastructure for effective law enforcement, resource protection and management
- To promote research, monitoring and training in biodiversity conservation.

The goals and objectives set out in the 2005 plan do not differ significantly from the above. The objectives and the operational details will be revised to include measures for promoting the recognition, conservation and interpretation of the recently discovered Mesolithic cultural sites. This will be done in collaboration with the cultural sector institutions.

In the National Policy on Wildlife Conservation 2000 there is no reference to the need to safeguard and to promote research in cultural sites within wildlife reserves. The need to rectify this omission arises not only from the inclusion of HPNP as a constituent of the property that is being nominated for inscription on the World Heritage List but also because of the possible existence of culturally valuable monuments, many still awaiting discovery, deep in the wildlife reserves. The revision of the National Wildlife Policy will be given due consideration

- **KCF**

Management planning for the Knuckles forest was initiated in 1988 and the outcome was what was referred to as the Management Plan Phase 1. Technical assistance for this effort was provided by IUCN. In 1994 a second plan, also supported by IUCN in its preparation, was produced - Management Plan for the Conservation of the Knuckles Conservation Forest (Phase II). The broad recommendations, which are not strictly time-bound, are still valid, and the Forest Department has initiated a number of activities in pursuit of the conservation objectives set out in the plan, while also going beyond the specific recommendations in the plan.

The objective of management as set out in the plan is to conserve the Knuckles forest for

- Protecting its biodiversity, endemism and the rare and unique natural habitats and
- Its aesthetic, educational and scientific value; and
- Improving and sustaining productive watershed characteristics which are critically important for off-site irrigation and hydro-electric facilities and on-site production systems.

As in the case of HPNP, there is no reference to the cultural aspects of KCF. Here too this omission is due to the fact that the cultural features - Mesolithic artifacts and the cave dwelling-places - were recent discoveries. A revised operational plan prepared with the collaboration of the cultural sector would rectify this omission.

4. Legal aspects

- **PWPA**

Peak Wilderness, Morahela, Walawe Basin Conservation Forests

The Forest Ordinance, to be renamed the Forest Conservation Ordinance, is due to be amended. According to the proposed amended ordinance, the highest category of protected area will be the Strict Conservation Forest.

Once the new legislation comes into effect, the above three areas will be declared as *Strict Conservation Forests*. The relevant section of the proposed revision to the Forest Ordinance reads: "...unique ecosystems, genetic resources or physical and biological formations and precisely delineated areas which constitute the habitat of threatened species of plants and animals of outstanding and representative ecosystems, geological or physical features or species of plants and animals for scientific or conservation purposes", and their importance as being "essential for enhancing the natural beauty of such land" and for "conserving such areas for posterity with particular regard to biodiversity, soil and water, and *historical, archaeological, cultural, religious and aesthetic values*". (Italics added).

The proposed amendment to the Forest Ordinance will make it *mandatory* for the Conservator General of Forests to prepare management plans for the purposes of preserving the aforesaid values and to implement such plans. Irrespective of this anticipated mandatory provision, however, the FD will be taking action to prepare an operational plan as stated earlier in this paper.

Peak Wilderness Nature Reserve and areas retained in the status of Sanctuary

The sections of state land within what was until very recently the Peak Wilderness Sanctuary, other than the FD forests and the limited areas that remain in the category of sanctuary, have been declared a nature reserve. The legal provisions relating to a nature reserve as well as to all other protected areas under the FFPO are to do with acts that are prohibited within the reserve - acts that will be in conflict with the conservation values of the protected areas. Since there is no restriction regarding the entry of persons to a sanctuary, the pilgrim trails which will remain in the status of a sanctuary could be freely used by visitors to the peak. Regarding the sections falling within the nature reserve there is provision for permitting visiting, including the use of nature trails for observation, study, etc.

- **HPNP**

A National Park is a highly protected area, according to the FFPO. The HPNP is the only National Park in the island where visitors may walk along nature trails through the area. In

fact walking through the park is one of the most sought after experiences by the around 175,000 people who visit the park annually.

- **KCF**

The Knuckles Conservation Forest will be declared a Strict Conservation Forest and will fall into the same category as the three Forest Department areas falling under PWPA. The mandatory provisions regarding management plans will therefore apply to this forest as well. Until such time as the new plan is drawn up according to the mandatory provision, it is proposed to draft an operational plan in order to update the 1994 management plan.

5. Future management planning and management

The serial property is being nominated as a Mixed (natural and cultural) heritage of outstanding universal value. While it is recognized that the property (with its three constituent parts) carries both cultural and natural heritage features of outstanding value, many of the cultural features were discovered only recently. Historically, it was inevitable that the areas in question had to be under the control of the Forest Department which was established in the final years of the nineteenth century. This act went a long way in preserving these sites and making it possible for their cultural values to be discovered and for conservation measures to be adopted in subsequent decades. The proposed amendments to the Forest Ordinance recognize the fact that many areas now in forest are endowed with the historical, archaeological, cultural, and religious values rooted in Sri Lanka's remarkable history.

The Fauna and Flora Protection Ordinance is based entirely on the protection of the country's wildlife. There is no reference in the ordinance to the possible existence of cultural sites within the wildlife areas. The National Policy on Wildlife Conservation 2000 likewise confines its attention to the various measures needed to conserve the country's wildlife.

In the management plans prepared for the Peak Wilderness Sanctuary, however, there is recognition of the need for earmarking a "Pilgrims' trail zone and a religious-cultural zone" (IUCN 1996) and a "Cultural and ecotourism zone" (DWLC 1999a). The areas covered by these proposed zones include the peak itself, the trails, and various spots enroute to the peak that are of religious significance.

With reference to HPNP, in the absence of reference to archaeological sites in the FFPO and the management plans, pending some legal and policy recognition of the importance of cultural sites within the DWLC's protected areas, administrative measures would be taken in regard to HPNP and such measures will be embodied in the operational plan.

An important feature of the proposed operational plans would be the revision of the objectives of management to include provision for the conservation, proper management and further research on the cultural sites within the property. In the case of PWPA, the management plans recognize the need to earmark a cultural zone. This will be acted upon.

With regard to HPNP, the action needed will be to demarcate the sites that have revealed evidence of past occupation and prehistoric agricultural practices. Interpretation facilities would be set up to apprise visitors of the remarkable history of this area dating back many

millennia when prehistoric man occupied and cultivated this area during times when the climate was much less extreme than it is now.

Archaeological sites within KCF will be identified and protective measures taken, coupled with interpretation and public awareness activities. Legal support for the promotion of cultural activities within FD areas is being provided in the proposed revision of the Forest Ordinance.

The revision of the objectives of management for the three constituents of the property as well as identified management activities will be done with the participation of the cultural sector institutions, particularly the Ministry of Cultural affairs and the Department of Archaeology.

Although the three constituent areas are being nominated as a single property for inscription in the World Heritage List, it will be necessary for separate operational plans to be developed. The KCF and HPNP, one under the FD and the other under the DWLC will have two separate operational plans. In the case of PWPA, there will be two operational plans, one for the DWLC areas and the other for the FD areas.

Special mention must be made of the importance of research and the need for providing support for this activity. In the natural resources sector, there is much that awaits discovery in respect of both the fauna and flora. In the cultural sector, too, particularly at Knuckles, archaeological investigations have just begun and a great deal of more work needs to be done. In Horton Plains, the extremely interesting findings could be further investigated.

It is proposed that the operational plans for the property be prepared and be in place within two years of the acceptance of the nomination by the World Heritage Committee. (Until then the current management plans will continue to be implemented). A working arrangement would be put in place to ensure that the DWLC, FD and the cultural sector institutions are involved in the exercise of preparing the operational plans. The operational plans will have a brief introductory section and will set out the management objectives that will be developed. The main body of the plan should include two sections covering (a) the natural aspects and (b) the cultural aspects. The agencies participating in the implementation of the different activities would be clearly identified.

The importance of involving the local people in the development and implementation of the plans must be emphasized. In the implementation of the current management activities in KCF there is active involvement of the local people. In the preparation of the 2005 plan for PWS, local institutions had been consulted. Since the buffer zone inhabitants are also stakeholders in the management of the property, the operational plans should include sections that would deal with the participation of the local communities in conservation and management and with confidence building activities involving these people to be carried out by the implementing agencies.

In preparing the nomination for submission to the World Heritage Committee, discussions were held with the local people at KCF and PWPA, but on a limited scale. This process will be extended during the preparation of the operational plans.

Appendix 4

Image inventory, photograph and audiovisual authorization form

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director or of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|--|--|---|--|---|
| | Pslide/print/ video | 02/07 | A distant view of the Peak Wilderness Range (page 7) | Devaka Seneviratne | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/ video | 2002/ 2003 | One of the sites at HPNP where first agriculture was practised in South Asia (page 8) | Dr T R Premathilake | Dr T R Premathilake | Post Graduate Institute of Archaeology, University of Kelaniya, 407 Bauddahaloka Mawatha, Colombo 07, Sri Lanka Tel: +94 11 2694151 Fax: +94 11 2694151 E-mail: r.prem@qub.ac.uk | Yes |
| | Pslide/print/ video | 04/07 | Caves occupied by prehistoric Mesolithic man at KCF, and primary tool types (microliths) found in these Mesolithic caves. (page 9) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1 Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/ video | 04/07 | Primary tool types (microliths) found in these Mesolithic caves. (page 9) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1 Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/ video | 06/07 | A traditional village dwelling at Meemure – a village located within the KCF (outside view) (page 10) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|---|--|--|--|---|
| | Pslide/print/ video | 06/07 | A traditional village dwelling at Meemure – a village located within the KCF (courtyard view) (page 10) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print/ video | N.A. | The sacred peak at PWPA and the wet montane forest (page 11) | S Balasubramaniam | Department of Botany, Faculty of Science, University of Peradeniya | Department of Botany, Faculty of Science , University of Peradeniya, Sri Lanka | No |
| | Pslide/print/ video | 08/07 | HPNP: a tableland with wet grassland and cloud forest (page 11) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print/ video | 11/06 | The spectacular five peaks in the Knuckles Mountain range which resemble the knuckles of a clenched fist (page 12) | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide/print/ video | 08/07 | Flat topped canopy trees at Horton Plains: a characteristic feature of montane forests (page 18) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print | 01/06 | The endemic <i>Calophyllum walkeri</i> found at PWPA and Horton Plains: a dominant canopy tree in montane forests (page 21) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | Pslide/print | 01/07 | Young flush of <i>Calophyllum walkeri</i> (page 21) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide/print | NA | Endemic dipterocarps at PWPA: <i>Stemenoporus oblongifolius</i> (left) and <i>S. gardineri</i> (right) (page 23) | S Balasubramanium | Department of Botany, Faculty of Science, University of Peradeniya | Department of Botany, Faculty of Science , University of Peradeniya, Sri Lanka | No |
| | Pslide/print | N. A. | Flower of the endemic <i>Gordonia speciosa</i> (page 24) | S Balasubramanium | Department of Botany, Faculty of Science, University of Peradeniya | Department of Botany, Faculty of Science , University of Peradeniya, Sri Lanka | No |
| | Pslide/print | N. A. | Flower of the endemic <i>Christisonia tricolor</i> (page 24) | S Balasubramanium | Department of Botany, Faculty of Science, University of Peradeniya | Department of Botany, Faculty of Science , University of Peradeniya, Sri Lanka | No |
| | Pslide/print/ video | 03/06 | <i>Rasboroides vaterifloris</i> found at PWPA (page 27) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | | | | | | | |
| | Pslide/print/ video | 04/07 | Deignan's Lanka skink (<i>Lankascincus deignani</i>) from an endemic genus, found at PWPA (page 27) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 12/02 | The endemic <i>Zoothera spiloptera</i> (Sri Lanka spot-winged thrush), also found at HPNP (page 27) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 02/07 | The globally threatened <i>Prionailurus viverrinus</i> (fishing cat) found at all three sites. (page 27) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 08/07 | Montane grasslands with patches of <i>Rhododendron arboreum</i> and short stature montane cloud forest at HPNP (page 28) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print | 1989 approx. | An endemic <i>Strobilanthes</i> species at HPNP (page 29) | Nihal Fernando | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|--|--|--|---|---|
| | | | | | | | |
| | Pslide/print | 08/07 | <i>Arundinaria densifolia</i> , one of the most reduced species of bamboo at HPNP (page 29) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/ video | 05/02 | The globally threatened endemic freshwater shrimp <i>Lancaris singhalensis</i> confined to areas in and around Horton Plains (page 31) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8 Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/ video | 01/05 | Boie's roughside (<i>Aspidura brachyorrhos</i>) (page 32) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/ video | 01/07 | The common roughside (<i>Aspidura trachyprocta</i>) from a relict endemic reptile genus (page 32) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/ video | 11/06 | The endemic and globally threatened Sri Lanka whistling thrush (<i>Myophonus blighi</i>) best seen at HPNP (page 33) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Print | | The endemic and globally | Studio Times | Studio Times Ltd | Studio Times Ltd, | Yes |

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|--------|----------------------------|---------------|---|------------------------------------|---|---|--|
| | | 1990 approx. | threatened Sri Lanka white-eye (<i>Zosterops ceylonensis</i>) found at all three nominated sites (page 33) | Photography Team | | 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | |
| | Pslide/print/video | 1990 approx. | The montane sub-species of the globally threatened and endemic toque monkey (<i>Macaca sinica</i>) is distinct from the subspecies in the wet lowlands and the dry zone (page 33) | Anu Weerasuriya | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/video | 08/07 | Sambur (<i>Cervus unicolor</i>) pasturing in the grasslands at HPNP (page 34) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/video | 02/07 | <i>Fejervarya greeni</i> : A globally threatened species of frog at HPNP: (also found at PWPA) (page 34) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1 Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/video | 07/07 | Aerial view of the forest canopy at the KCF (page 35) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 12/06 | A grassland area within the KCF at <i>Pitawela Pathana</i> (page 35) | Jinie Dela | Jinie Dela | 45, Goonatilleke Mawatha, Etambagoda. Panadurs, Sri Lanka Tel: +94 38 5090241 E-mail: jinni@slt.net.lk | Yes |

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|--------|----------------------------|---------------|--|-------------------------------------|---|---|--|
| | Pslide/print/video | N.A | The flower and leaf of the extremely rare endemic <i>Stemonoporus affinis</i> , confined entirely to the KCF (page 36) | S Balasubramaniam | Department of Botany, Faculty of Science, University of Peradeniya | Department of Botany, Faculty of Science , University of Peradeniya, Sri Lanka | No |
| | Pslide/print/video | 07/07 | Very low stature forest at Gombaniya within the KCF (page 37) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 07/07 | <i>Impatiens truncata</i> (page 37) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 07/07 | <i>Impatiens appendiculata</i> at KCF (page 37) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 10/04 | Endemic epiphytic orchids at KCF: <i>Bulbophyllum wightii</i> (page 39) | IAUN Gunatilleke | IAUN Gunatilleke | Department of Botany, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 81 2394526 Fax: +94 81 2388018 E-mail: savnim@slt.lk | Yes |
| | Pslide/print/video | 07/07 | <i>Robiquetia virescens</i> (page 39) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/ | | <i>Trichoglottis tenera</i> (page 39) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | video | 07/07 | | | | Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | |
| | Pslide/print/ video | 09/06 | <i>Puntius martensyni</i> , a globally threatened endemic with high habitat specificity (page 40) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 01/05 | The endemic and globally threatened <i>Ceylonthelapsa durrelli</i> : a freshwater crab limited to less than 1 km ² of slow-flowing streams in the KCF (page 41) | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide/print/ video | 01/03 | The Endangered Kelaart's dwarf toad (<i>Adenomus kelaartii</i>) from an endemic genus, found at KCF and PWPA (page 41) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 01/03 | The lyre head lizard <i>Lyriocephalus scutatus</i> from an endemic genus found at KCF and PWPA (page 42) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |

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|--------|----------------------------|---------------|---|------------------------------------|---|--|--|
| | Pslide/print/video | 03/07 | The endemic green pit viper (<i>Trimeresurus trigonocephalus</i>) found at KCF and PWPA (page 42) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/video | 02/07 | The globally threatened rusty-spotted cat (<i>Prionailurus rubiginosus</i>) also found at HPNP (page 43) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/video | 02/07 | The jungle cat (<i>Felis chaus</i>) also found at PWPA (page 43) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/video | 06/07 | The globally threatened and endemic Sri Lanka blue magpie (<i>Urocissa ornata</i>) found at all three nominated sites (page 44) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/video | 08/05 | The Critically Endangered endemic shrub frog <i>Philautus macropus</i> found at KCF (page 44) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|---|-------------------------------------|---|---|--|
| | Pslide/print/ video | 03/07 | The endangered agamid lizard <i>Calotes liolepis</i> found at KCF and PWPA (page 44) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 1985 approx. | Present day pilgrims who climb Adam's Peak provide a link with centuries old traditions (page 45) | Nihal Fernando | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/ video | 2002/2003 | Enlarged picture of multi-proxy records of the earliest agriculture at Horton Plains (page 47) | Dr T R Premathilake | Dr T R Premathilake | Post Graduate Institute of Archaeology, University of Kelaniya, 407 Baudhaloka Mawatha, Colombo 07, Sri Lanka Tel: +94 11 2694151 Fax: +94 11 2694151 E-mail: r.prem@qub.ac.uk | Yes |
| | Pslide/print/ video | 06/07 | Evidence of an ancient construction technology in a village within the KCF (page 49) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/ video | 08/07 | A patch of forest dieback at HPNP (page 53) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |

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|---------------|------------------------------------|----------------------|--|--|--|--|---|
| | Pslide/print/ video | 1990 approx. | The sacred peak during the pilgrim season (page 59) | Dominic Sansoni | Dominic Sansoni/Three Blind Men | Sansoni Warehouse Limited, 704, Galle Road, Colombo 03, Sri Lanka Tel: +94 11 2580114 Fax: +94 11 2580114 E-mail: dominicsansoni@gmail.com | Yes |
| | Pslide/print/ video | 2002/2003 | Ancient artefacts (pottery) found at Horton Plains during archaeological explorations (page 61) | Dr T R Premathilake | Dr T R Premathilake | Post Graduate Institute of Archaeology, University of Kelaniya, 407 Baddahaloka Mawatha, Colombo 07, Sri Lanka Tel: +94 11 2694151 Fax: +94 11 2694151 E-mail: r.prem@qub.ac.uk | Yes |
| | Pslide/print/ video | 04/06 | Paddy farming on a small scale at Meemure (page 62) | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide/print/ video | 06/07 | Paddy farming is still carried out using many traditional farming methods, such as the manual winnowing of paddy (page 62) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/ video | 1995 approx. | Baker's Falls (page 66) | Roshan Perret | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |

| Id no: | Format (slide/print/Video) | Date of photo | Caption | Photographer/Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|----------------------------|---------------|--|------------------------------------|---|---|--|
| | | | | | | | |
| | Pslide/print/video | 1990 approx. | The rugged Knuckles Mountain Range with scenic landscapes and a unique biota (page 66) | Studio Times Photography Team | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/video | 07/07 | Endemic <i>Osbeckia</i> species at the KCF (page 68, left) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 08/07 | Endemic <i>Osbeckia</i> species at Horton Plains (page 68, right) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide/print/video | 07/07 | The globally threatened <i>Nannophrys marmorata</i> confined to the KCF (page 69, left) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/video | 05/05 | <i>Nannophrys ceylonensis</i> found in the PWPA and HPNP in the central highlands (page 69, right) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/video | 08/07 | <i>Semnopithecus vetulus monticola</i> at HPNP (page 72) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|--|--|--|---|---|
| | Pslide/print/ video | 08/07 | <i>Panthera pardus kotiya</i> from an endemic subspecies, found at all three nominated sites (page 73) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide/print/ video | 08/06 | <i>Ceratophora aspera</i> (page 74) | Nuwan Bandara | Nuwan Bandara | 198/3, Putuhapuwa , Teldeniya, Sri Lanka Tel: +94 77 9065338 E-mail: imeshnu1@yahoo.com | Yes |
| | Pslide/print/ video | 03/07 | <i>Ceratophora stoddartii</i> (page 74) | Suranjan Fernando | Suranjan Fernando | 34 A, Weera Mawatha, Waththegedara, Maharagama, Sri Lanka Tel: +94 71 4120646 E-mail: sasurh@gmail.com | Yes |
| | Pslide/print/ video | 07/07 | <i>Ceratophora tennentii</i> confined to the KCF (page 74) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide/print/ video | 11/06 | <i>Cophotis dumbarae</i> confined to the KCF (page 74) | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide/print/ video | 06/07 | <i>Cophotis ceylanica</i> in the central highlands from an endemic genera (page 74) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|---|--|--|---|---|
| | Pslide/print/ video | 08/07 | <i>Rhododendron arboreum zeylanicum</i> (an endemic subspecies) is prominent in the forest patches at Horton Plains (page 77) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print/ video | 01/03 | The globally threatened <i>Ratufa macroura</i> (page 79, top) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 05/07 | The endemic <i>Eumyias sordida</i> (page 79, bottom right) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide/print/ video | 11/06 | The endemic <i>Calotes nigrilabris</i> (page 79, bottom left) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Pslide/print/ video | 08/07 | The endemic Sri Lanka yellow-eared bulbul (<i>Pycnonotus penicillatus</i>) (page 91) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randonbe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide/print/ video | 01/07 | Sri Lanka flame-striped jungle squirrel (<i>Funambulus layardi</i>) found at all three sites. (page 91) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 | Yes |

| Id no: | Format (slide/print/Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|----------------------------|---------------|---|-------------------------------------|---|---|--|
| | | | | | | E-mail: rahulaperera@gmail.com | |
| | Pslide/print/video | NA | The Critically Endangered and endemic Das's dwarf toad (<i>Adenomus dasi</i>), a point endemic in the buffer zone of the PWPA (page 91) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | NA | <i>Philautus femoralis</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | NA | <i>Philautus folicola</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | NA | <i>Philautus microtympanum</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | 11/03 | <i>Philautus schmarda</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka | Yes |

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|---------------|-----------------------------------|----------------------|--|--|--|---|---|
| | | | | | | Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | |
| | Pslide/print/video | 11/03 | <i>Philautus reticulates</i> (page 70) | Madhava Meegaskumbura | Madhava Meegaskumbura | 174G, Tiverton Estate, Peradeniya, Sri Lanka Tel: +94 81 2387253 E-mail: madhava_m@mac.com | Yes |
| | Pslide/print/video | 11/03 | <i>Philautus asankai</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | 11/03 | <i>Philautus caeruleus</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | 08/05 | <i>Philautus steineri</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | NA | <i>Philautus viridis</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/ | | <i>Philautus fulvus</i> (page 70) | Wildlife Heritage | Wildlife Heritage | No 95, Dr N M Perera Mawatha, | Yes |

| Id no: | Format (slide/print/Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|-----------------------------------|----------------------|---|--|--|---|---|
| | video | 08/05 | | Trust | Trust | Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | |
| | Pslide/print/video | 01/03 | <i>Philautus frankenbergi</i> (page 70) | Madhava Meegaskumbura | Madhava Meegaskumbura | 174G, Tiverton Estate, Peradeniya, Sri Lanka Tel: +94 81 2387253 E-mail: madhava_m@mac.com | Yes |
| | Pslide/print/video | 11/03 | <i>Philautus alto</i> (page 70) | Madhava Meegaskumbura | Madhava Meegaskumbura | 174G, Tiverton Estate, Peradeniya, Sri Lanka Tel: +94 81 2387253 E-mail: madhava_m@mac.com | Yes |
| | Pslide/print/video | 11/03 | <i>Philautus sarasinorum</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | 08/05 | <i>Philautus stuarti</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/video | 08/05 | <i>Philautus hoffmanni</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | Pslide/print/ video | 08/05 | <i>Philautus mooreorum</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/ video | 11/03 | <i>Philautus cavirostris</i> (page 70) | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide/print/ video | 06/07 | A possibly still unnamed <i>Philautus</i> species at KCF (page 70) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| Used only in the PowerPoint presentation | | | | | | | |
| | Pslide only | 04/06 | The endemic combtail (<i>Belontia signata</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 01/03 | The endemic black ruby barb (<i>Puntius nigrofasciatus</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | | | | | | Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | |
| | Pslide only | 04/06 | Deraniyagala's Lanka skink (<i>Lankascincus deraniyagalae</i>) from an endemic genus | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 09/06 | Common Lanka skink- (<i>Lankascincus fallax</i>) from an endemic genus | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 05/07 | Smooth Lanka skink (<i>Lankascincus taprobanensis</i>) from an endemic genus | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 10/06 | The green vine snake (<i>Ahaetulla nasuta</i>) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@sltnet.lk | Yes |
| | Pslide only | 02/06 | The Alexandrine parakeet (<i>Psittacula eupatria</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka | Yes |

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|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | | | | | | Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | |
| | Pslide only | 02/07 | The endemic Sri Lanka hanging parakeet (<i>Loriculus beryllinus</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 02/07 | The plum headed parakeet (<i>Psittacula cyanocephala</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 02/06 | The endemic Sri Lanka yellow-fronted barbet (<i>Megalaima flavifrons</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 08/07 | The flat topped low stature canopy trees in the mist laden patches of cloud forest | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide only | NA | <i>Philautus silius</i> | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|---|-------------------------------------|---|---|--|
| | | | | | | Fax: +94 11 5338131 E-mail: rohanp@slt.lk | |
| | Pslide only | NA | <i>Philautus abundus</i> | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide only | NA | <i>Philautus fergusonianus</i> | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide only | 11/03 | <i>Philautus asankai</i> – yet another colour variation | Wildlife Heritage Trust | Wildlife Heritage Trust | No 95, Dr N M Perera Mawatha, Colombo 8, Sri Lanka Tel: +94 115338129 Fax: +94 11 5338131 E-mail: rohanp@slt.lk | Yes |
| | Pslide only | 0/07 | The endemic toque macaque (<i>Macaca sinica</i>) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Pslide only | 08/07 | Horton Plains National Park : A heritage to protect | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|---|--|
| | | | | | | Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | |
| | Pslide only | 08/07 | Photo of the plains where recent evidence points to early agriculture on the plains, probably the earliest in South Asia | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide only | 08/07 | Canopy view of the montane rainforest | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide only | 08/07 | The gently undulating grassland plains provide habitat for a rich and unique fauna and flora | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide only | 08/07 | <i>Actinodaphne speciosa</i> - an endemic montane species | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide only | 11/06 | The endemic Sri Lanka bush warbler <i>Bradypterus palliseri</i> | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Pslide only | | The endemic Sri Lanka white- | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|--|--|--|--|---|
| | | 08/07 | eye (<i>Zosterops ceylonensis</i>) | | | Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | |
| | Pslide only | 08/07 | The grey tit (<i>Parus major</i>) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide only | 06/06 | The dusky-striped jungle squirrel (<i>Funambulus sublineatus</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 08/07 | The bear monkey (<i>Semnopithecus vetulus</i>) (two photos on one slide) | Samantha Mirandu | Samantha Mirandu | 32/8, Vijaya Lane, Randombe, Ambalangoda, Sri Lanka Tel: + 94 77 5257717 E- mail: skmirandu@gmail.com | Yes |
| | Pslide only | 08/07 | Barking deer (<i>Muntiacus muntjak</i>) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide only | 05/07 | Sambur (<i>Cervus unicolor</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|---|--|--|---|---|
| | | | | | | | |
| | Pslide only | 06/07 | Patches of very low stature montane forest with stunted trees | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Pslide and video | | The endemic <i>Podochilus falcatus</i> | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide and video | | The endemic <i>Bulbophyllum petiolare</i> | | | | Yes |
| | Pslide and video | | The endemic <i>Oberonia longibracteata</i> | | | | Yes |
| | Pslide and video | | <i>Phaius tankervilleae</i> (= <i>wallichii</i>) | | | | Yes |
| | Pslide and video | | The endemic <i>Robiquetia virescens</i> | | | | Yes |
| | Pslide only | | A stream at the KCF (The freshwater fauna in the streams of the KCF include many endemic species) | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide only | 01/05 | The endemic and globally threatened freshwater crab <i>Ceylonthelphusa durrelli</i> | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide only | | The endemic blotched | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|---|-------------------------------------|---|--|--|
| | | 09/06 | filamented barb (<i>Puntius srilankensis</i>) | | | Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | |
| | Pslide only | 02/06 | The endemic filamented barb <i>Puntius singhala</i> | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 06/07 | Scene at KCF (The KCF is a haven for herpetofauna) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel: +94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide only | 08/05 | <i>Nannophrys marmorata</i> from an endemic relict genus found only in specific habitats of the KCF | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@sltnet.lk | Yes |
| | Pslide only | 12/06 | <i>Lankanectes corrugata</i> from an endemic genus | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | | | | | | Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | |
| | Pslide only | 02/07 | The endemic Dumbara bent toe gecko (<i>Cyrtodactylus soba</i>) found mainly in the KCF | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 05/05 | The globally threatened leafnose lizard (<i>Ceratophora tennentii</i>) from an endemic genus found only in the KCF | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide only | 12/06 | The lyre head lizard <i>Lyriocephalus scutatus</i> from an endemic genus | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Pslide only | 11/06 | The endemic fourtoe snake skink (<i>Chalcidoseps thwaitesii</i>) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1, Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|------------------------------------|----------------------|---|--|--|--|---|
| | Pslide only | 01/03 | <i>Nessia monodactylus</i> | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 09/06 | <i>Nessia sasinorium</i> | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 03/06 | <i>Rhynophis blythii</i> | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 05/05 | <i>Trimeresurus trigonocephalus</i> | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |
| | Pslide only | 03/06 | The endemic striped flying snake (<i>Chrysopelea taprobanica</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|--|--|
| | | | | | | E-mail: ruchira_somaweera@yahoo.com | |
| | Pslide only | 06/07 | The globally threatened and endemic Sri Lanka blue magpie (<i>Urocissa ornate</i>) | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 01/03 | Spotted deer (<i>Axis axis</i>) range into the drier areas of KCF | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |
| | Pslide only | 06/07 | Barking deer (<i>Muntiacus muntjak</i>) | Christopher Silva | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide only | 03/04 | The endemic Ceylon Tree Nymph (<i>Idea iasonia</i>) | IAUN Gunatilleke | IAUN Gunatilleke | Department of Botany, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 81 2394526 Fax: +94 81 2388018 E-mail: savnim@slt.lk | Yes |
| | Pslide only | 01/06 | The Forest Department promotes nature tourism at KCF | Pradeep Samarawickrama | Pradeep Samarawickrama | 103 A, Bulawatha, Gannoruwa, Peradeniya, Sri Lanka Tel: +94 81 2385863/+94 78 5832928 E-mail: madurapk@yahoo.com | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|---------------|--|----------------------|--|--|--|--|---|
| | | | | | | | |
| | Stills used for the video clips | | | | | | |
| | Stills used for the video only | 11/06 | The endemic Sri Lanka white-eye (<i>Zosterops ceylonensis</i>) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Stills used for the video only | 11/06 | The endemic <i>Pycnonotus penicillatus</i> | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Stills used for the video only | 01/07 | The globally threatened and endemic Sri Lanka blue magpie (<i>Urocissa ornata</i>) | Rahula Perera | Rahula Perera | 176, Galle Road Idama, Moratuwa, Sri Lanka Tel: +94 777 309432 E-mail: rahulaperera@gmail.com | Yes |
| | Stills used for the video only | 03/07 | Haly's tree skink (<i>Dasia halianus</i>) | Anslem de Silva | Anslem de Silva | Anslem de Silva, 15/1m Dolosbage Raod, Gamopola, Sri Lanka Tel: +94 81 2350998 Fax: +94 81 2350998 E-mail: kalds@slt.net.lk | Yes |
| | Stills used for the video only | 01/03 | The lyre-head lizard <i>Lyriocephalus scutatus</i> from an endemic genus | Ruchira Somaweera | Ruchira Somaweera | Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka Tel: +94 77 3260408 Fax: +94 81 2388018 E-mail: ruchira_somaweera@yahoo.com | Yes |

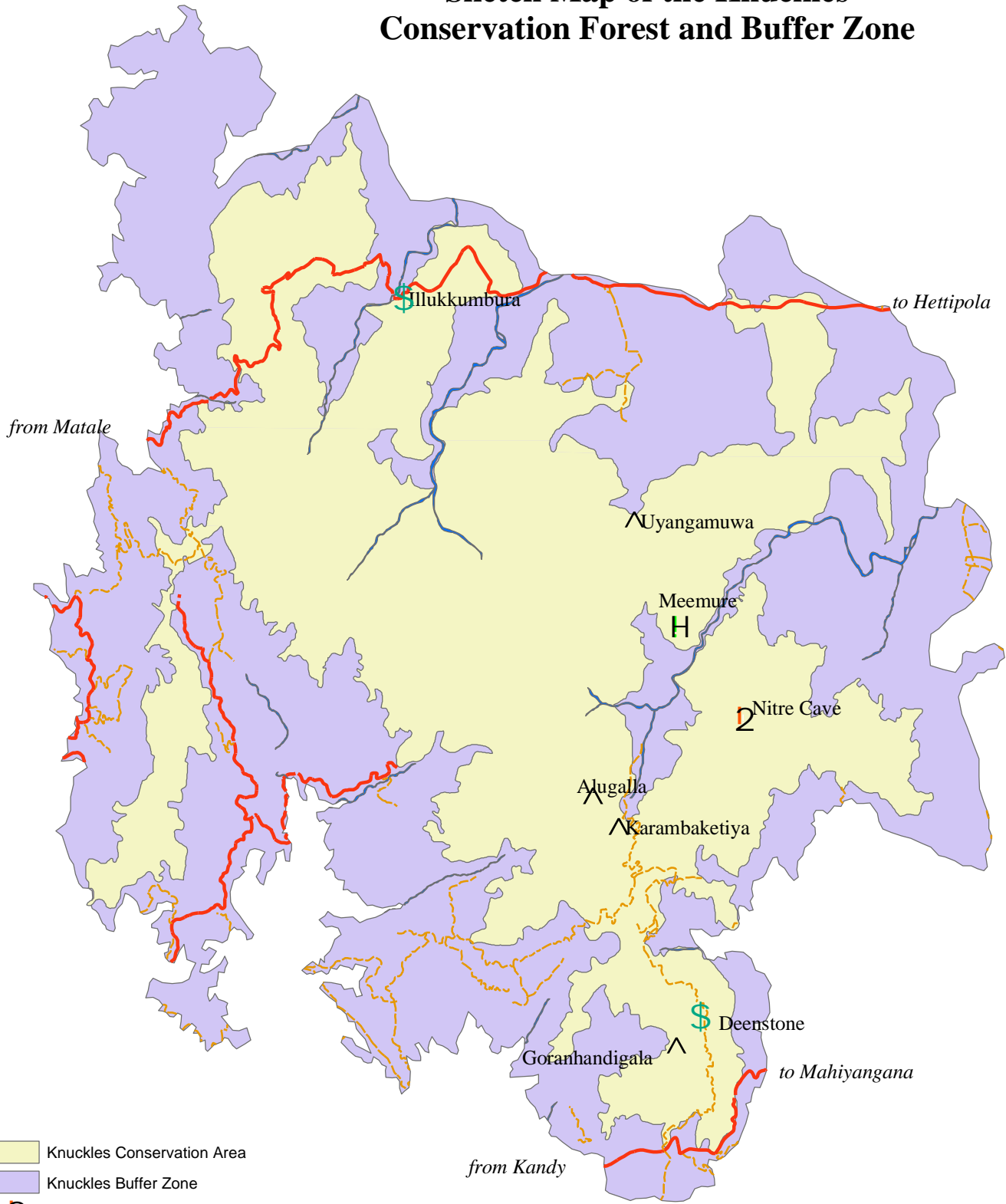
| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|-----------------------------|------------------------------------|----------------------|---|--|--|---|---|
| | Video | 2005-2007 | Material from rushes provided by the Sri Lanka Rupavahini Corporation to support the nomination dossier | N A | Sri Lanka Rupavahini Corporation | PO Box 2204, independence Square, Colombo 7, Sri Lanka Tel: +94 11 2587722 Fax: +94 112580929 e-mail: dg@rupavahini.lk | No |
| | Video | 2006/2007 | Material from rushes prepared by the Department of Wildlife Conservation for films on HPNP and PWPA for public awareness purposes | N A | Department of Wildlife Conservation | No. 382, "Dilco Court", New Kandy Road, Malabe, Sri Lanka Tel: +94 11 2560371 Fax: +94 11 2744299 E-mail: director@dwlc.lk | Yes |
| | Video | 2006 | Material from rushes of film prepared by the Forest Department on the KCF for public awareness purposes | NA | Forest Department | No. 82, "Sampathpaya", Rajamalwatta Road, Battaramulla, Sri Lanka Tel: +94 11 2866616 Fax: +94 11 2866633 E-mail: forlib@sltnet.lk | Yes |
| Slide transparencies | | | | | | | |
| | Slide transparency (01) | NA | View of Adam's Peak with Buddhist shrine on top | Studio Times Photography Team | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk | Yes |
| | Pslide/print/ Video | 02/07 | A distant view of the Peak Wilderness Range (page 7) | Devaka Seneviratne.. | Studio Times Ltd... | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@sltnet.lk . | Yes |

| Id no: | Format (slide/print/ Video) | Date of photo | Caption | Photographer/ Director of the video | Copy right owner (if different from photographer/director of video) | Contact details of copyright owner (Name address tel. fax, and e-mail) | Non exclusive cession of rights (yes/No) |
|--------|-----------------------------|---------------|--|-------------------------------------|---|---|--|
| | Slide transparency (03) | 1990 approx. | The rugged Knuckles Mountain Range with scenic landscapes and a unique biota | Studio Times Photography Team | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Slide transparency (04) | NA | Sambur (<i>Cervus unicolor</i>) pasturing in the grasslands at HPNP | Studio Times Photography Team | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |
| | Slide transparency (05) | NA | Remains of age old construction at Meemure village within the KCF | Studio Times Photography Team | Studio Times Ltd | Studio Times Ltd, 16/1 Skelton Road, Colombo 5, Sri Lanka Tel:+94 11 2595569 E-mail: studiot@slt.net.lk | Yes |

N A = Not Available, Pslide = PowerPoint slides

Three brief film clips on the three sites, using the film material acknowledged in this authorization form will be sent to support the nomination further.

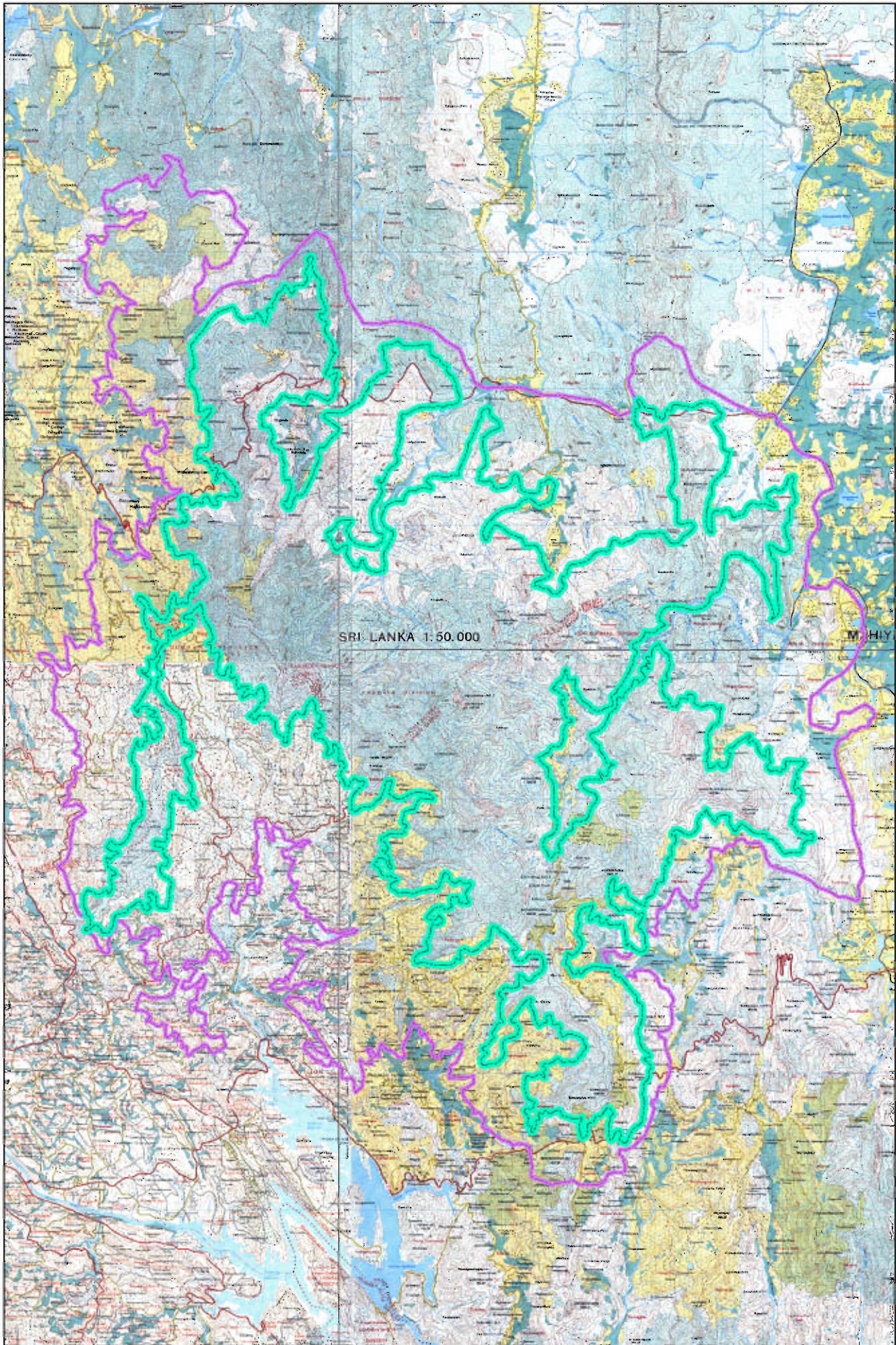
Sketch Map of the Knuckles Conservation Forest and Buffer Zone



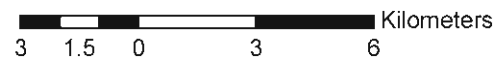
- Knuckles Conservation Area
- Knuckles Buffer Zone
- Nitre Cave
- Conservation Centre
- Location of caves occupied by Mesolithic man
- Village previously selected for protecting ancient architectural construction etc.
- Main Roads
- Minor Roads
- Streams



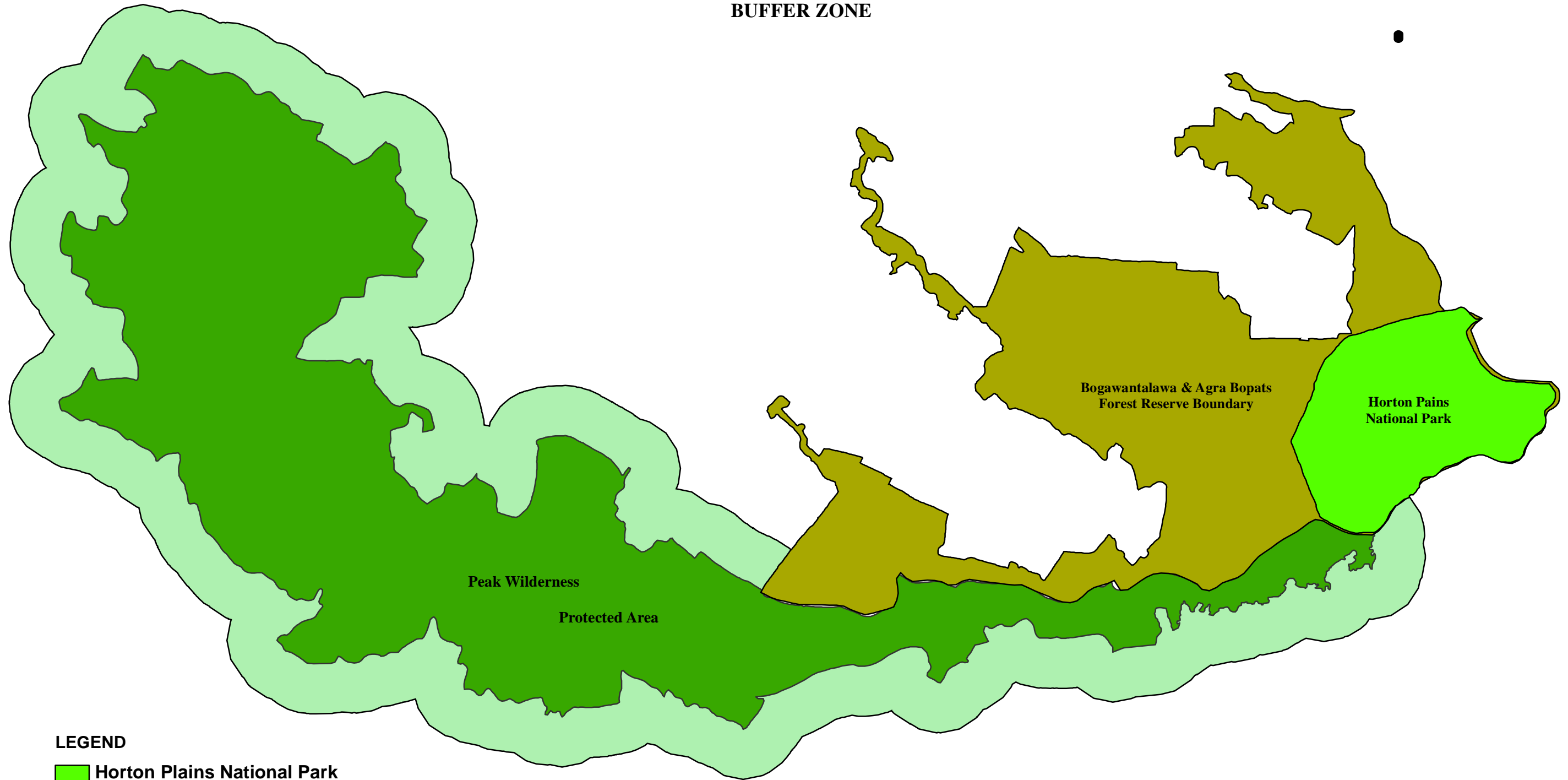
Knuckles Conservation Forest Boundary and Buffer Zone Boundary



- Legend**
-  Forest Boundary
 -  Bufferzone Boundary



**PEAK WILDERNESS PROTECTED AREA, ADJOINING FOREST DEPARTEMENT FORESTS
AND
BUFFER ZONE**






Peak Wilderness
Protected Area

Bogawantalawa & Agra Bopats
Forest Reserve Boundary

Horton Plains
National Park

LEGEND

-  Horton Plains National Park
-  Forest Department Reserve Boundary
-  Peak Wilderness Protected Area
-  Buffer Zone



**PEAK WILDERNESS PROTECTED AREA, ADJOINING FOREST DEPARTEMENT FORESTS
AND
BUFFER ZONE**

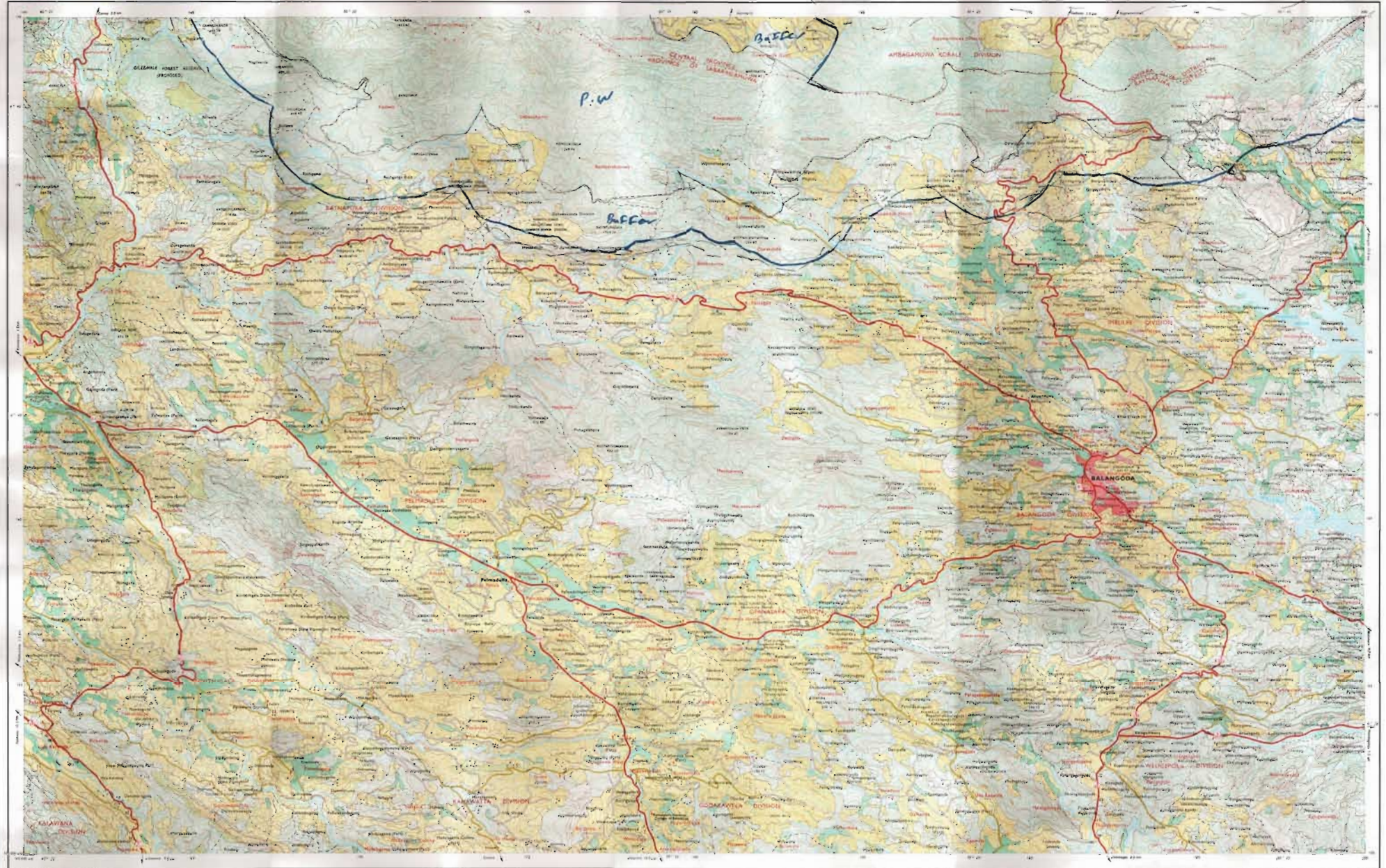


LEGEND

-  Horton Plains National Park Boundary
-  Adjoining Forest Reserve Boundary
-  Peak Wilderness Protected Area
-  Buffer Zone Boundary



1924
Scale 1:50,000
Clay



SCALE 1:50,000

Map Projections
 Transverse Mercator Projection
 Contour Interval: 20 Meters
 Datum for all works is the Indian Sea Level
 (Established in 1958)
 Coordinates published on the printed map are based on the Indian Datum
 (WGS 84)
 © 1995 by the Government of Sri Lanka
 All rights reserved.

LOCATION

| | | |
|-------|----------|-------|
| INDIA | SRILANKA | INDIA |
| INDIA | SRILANKA | INDIA |
| INDIA | SRILANKA | INDIA |
| INDIA | SRILANKA | INDIA |

COMPILED AND REVISED

ABBREVIATIVE INDEX

ROADS AND ROPS

| | | | |
|------------|------------|------------|------------|
| Red Dotted | Red Dotted | Red Dotted | Red Dotted |
| Red Dotted | Red Dotted | Red Dotted | Red Dotted |
| Red Dotted | Red Dotted | Red Dotted | Red Dotted |
| Red Dotted | Red Dotted | Red Dotted | Red Dotted |
| Red Dotted | Red Dotted | Red Dotted | Red Dotted |

RAILWAYS

| | | | |
|-------|-------|-------|-------|
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |

IRRIGATION

| | | | |
|------|------|------|------|
| Blue | Blue | Blue | Blue |
| Blue | Blue | Blue | Blue |
| Blue | Blue | Blue | Blue |
| Blue | Blue | Blue | Blue |
| Blue | Blue | Blue | Blue |

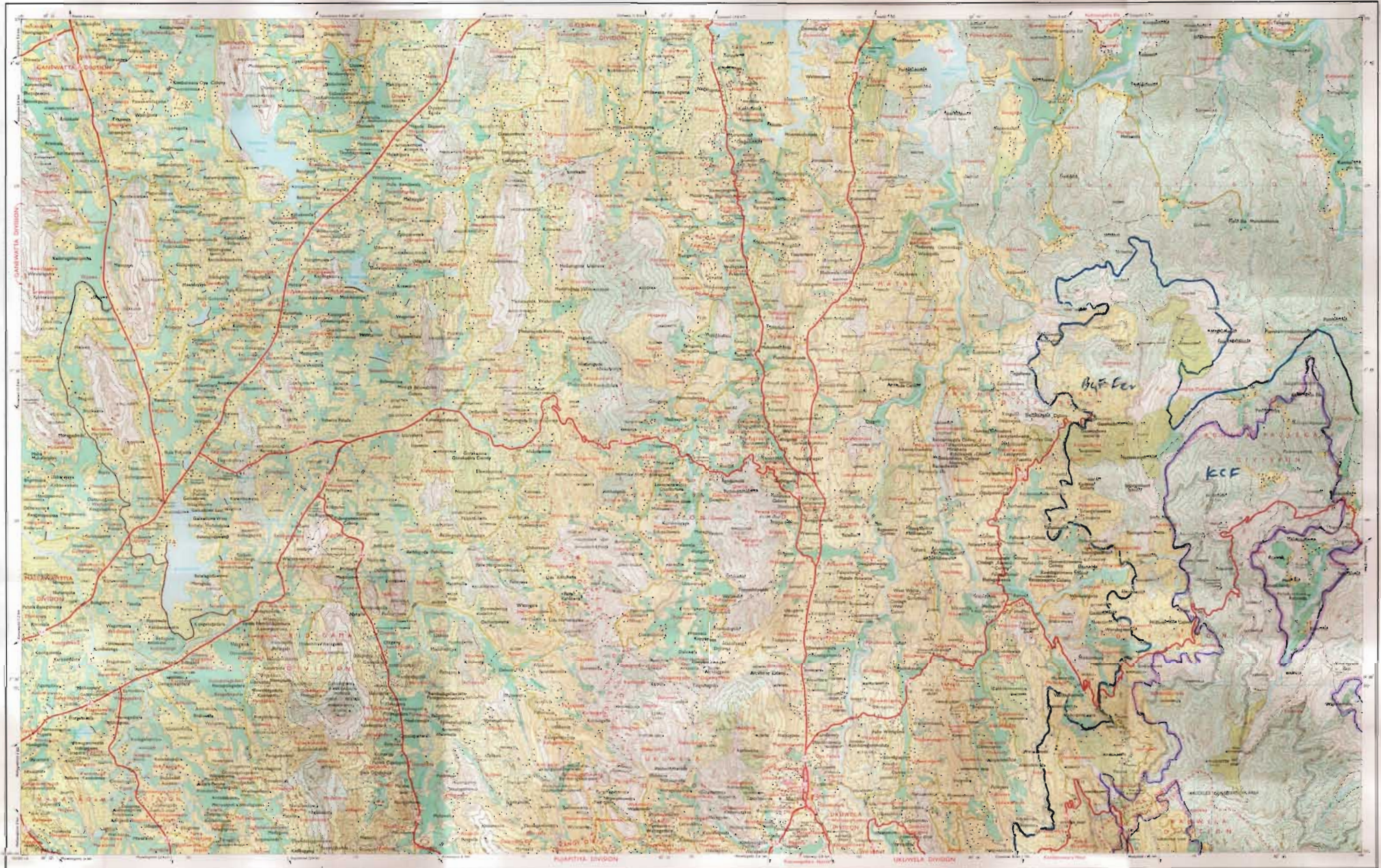
VEGETATION

| | | | |
|-------|-------|-------|-------|
| Green | Green | Green | Green |
| Green | Green | Green | Green |
| Green | Green | Green | Green |
| Green | Green | Green | Green |
| Green | Green | Green | Green |

GENERAL FEATURES

| | | | |
|-------|-------|-------|-------|
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |
| Black | Black | Black | Black |

Print Edition
 Revised: 2008
 Reprinted: 2009



Scale 1:50,000

Projection: Transverse Mercator Projection
Datum: Everest
Spheroid: Everest
Datum Shift: 100m
Scale Factor: 0.999601231500094
False Easting: 200000m
False Northing: 1000000m

Location:

Coordinate System:

Geographical Grid:

Administrative Grid:

Boundaries:

Water Features:

Roads:

Railways:

Drainage:

Vegetation:

Special Features:

Sheet Information:
SHEET 48
Scale 1:50,000
Date: 1982

Scale: 1:50,000
 Date: 12/1980
 Sheet: 76



Prepared and Revised by the Survey Department of Sri Lanka under the Authority of the Planning Commission

Scale: 1:50,000

Transverse Mercator Projection
 Contour Interval 20 Meters

Vertical Datum: Mean Sea Level
 Elevation up to 10,000 feet
 Contour and Admin. lines the direction of the Survey Office of Sri Lanka. Scale Rights Reserved.

Mean Magnetic Variation for 1984

| LOCATION | | |
|-----------|----------|-----------|
| WILGEPOLA | HAPUTALE | WILGEPOLA |
| WILGEPOLA | HAPUTALE | WILGEPOLA |
| WILGEPOLA | HAPUTALE | WILGEPOLA |

Range of the Photo: 1975-1976
 1:50,000 Scale Map
 1:50,000 Scale Map
 1:50,000 Scale Map

COMPILED AND REVISED BY: [Name]

ADMINISTRATIVE INDEX

BOUNDARIES

ROADS AND PATHS

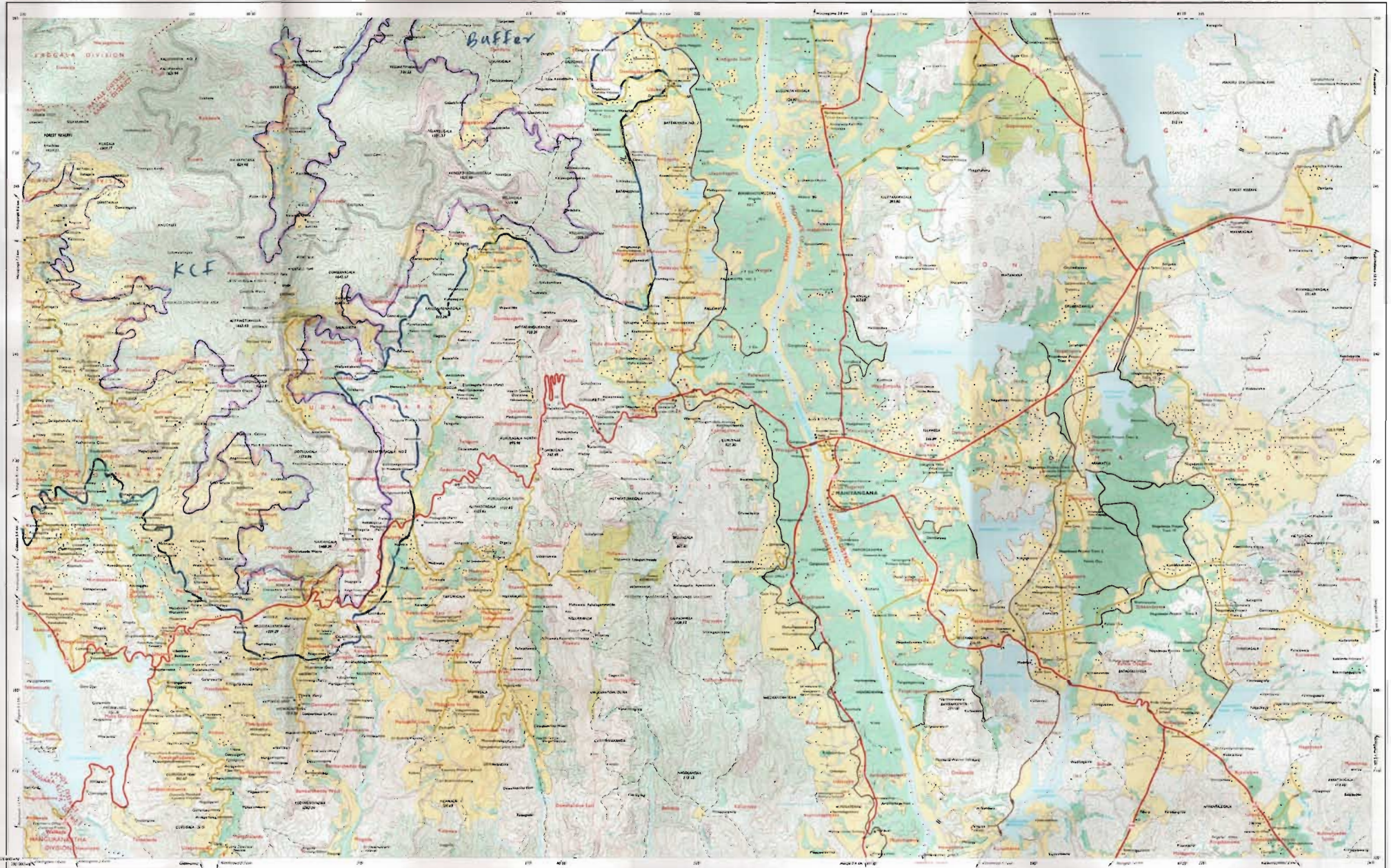
RAILWAYS

DRAINAGE

VEGETATION

SPECIAL FEATURES

Scale 1:50,000
Date 1988
Sheet 55



SCALE 1:50,000

Map Height Variations

LEGEND

| SYMBOL | DESCRIPTION |
|--------|-------------------------|
| | International Boundary |
| | State Boundary |
| | Administrative Boundary |
| | Proposed Boundary |
| | Forest Reserve |
| | Protected Area |
| | Water Body |
| | Settlement |
| | Road |
| | Railway |
| | Drainage |
| | Vegetation |
| | General Features |

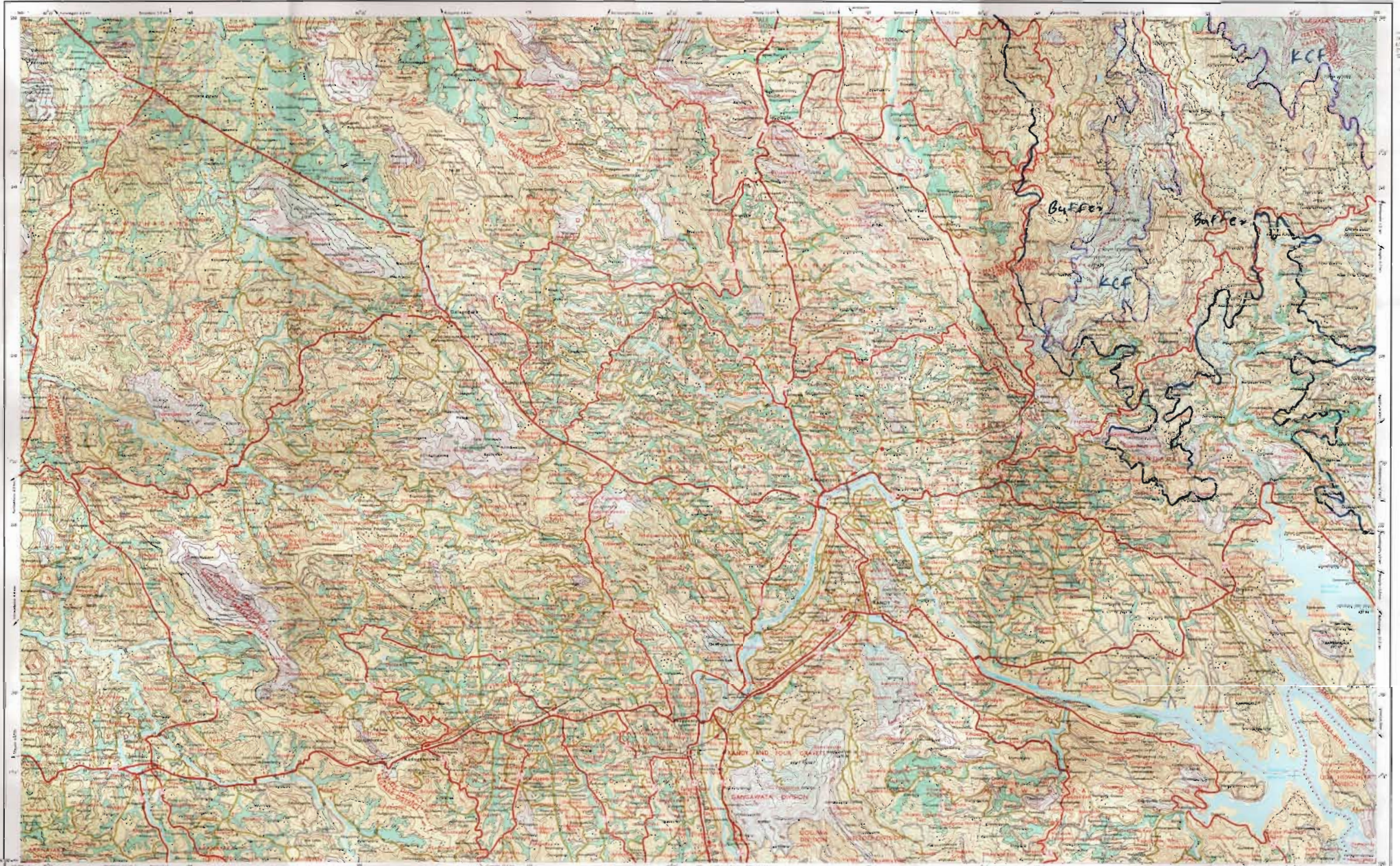
GENERAL FEATURES

- Settlement
- Religious
- Public Buildings
- Industrial
- Public Utilities
- Other

Map Information:

Map of Mahiyangana District, Sri Lanka, at a scale of 1:50,000. The map is based on the 1988 edition of the 1:50,000 scale topographic map of Mahiyangana District, Sri Lanka. The map is published under the authority of the Director General of Land Management, Sri Lanka. The map is a reproduction of the original map and is not to be used for any purpose other than that for which it was intended.

ARC: 1:50,000
Scale: 1:50,000
Date: 12/2008
Copy: 1 of 153



SCALE 1:50,000

LOCATION

| | | | |
|-----------------|---------|----------------|--------|
| U.T.M. Zone | 48Q | U.T.M. Easting | 480000 |
| U.T.M. Northing | 9500000 | U.T.M. Zone | 48Q |

COMPILED AND REVISED

ADMINISTRATIVE INDEX

BOUNDARIES

- Political
- Administrative
- Religious

ROADS AND PATHS

- Highway
- Main Road
- Other Road
- Foot Path
- Track
- Other

RAILWAYS

- Double Track
- Single Track
- Other

DRAINAGE

- Watercourse
- Canal
- Other

VEGETATION

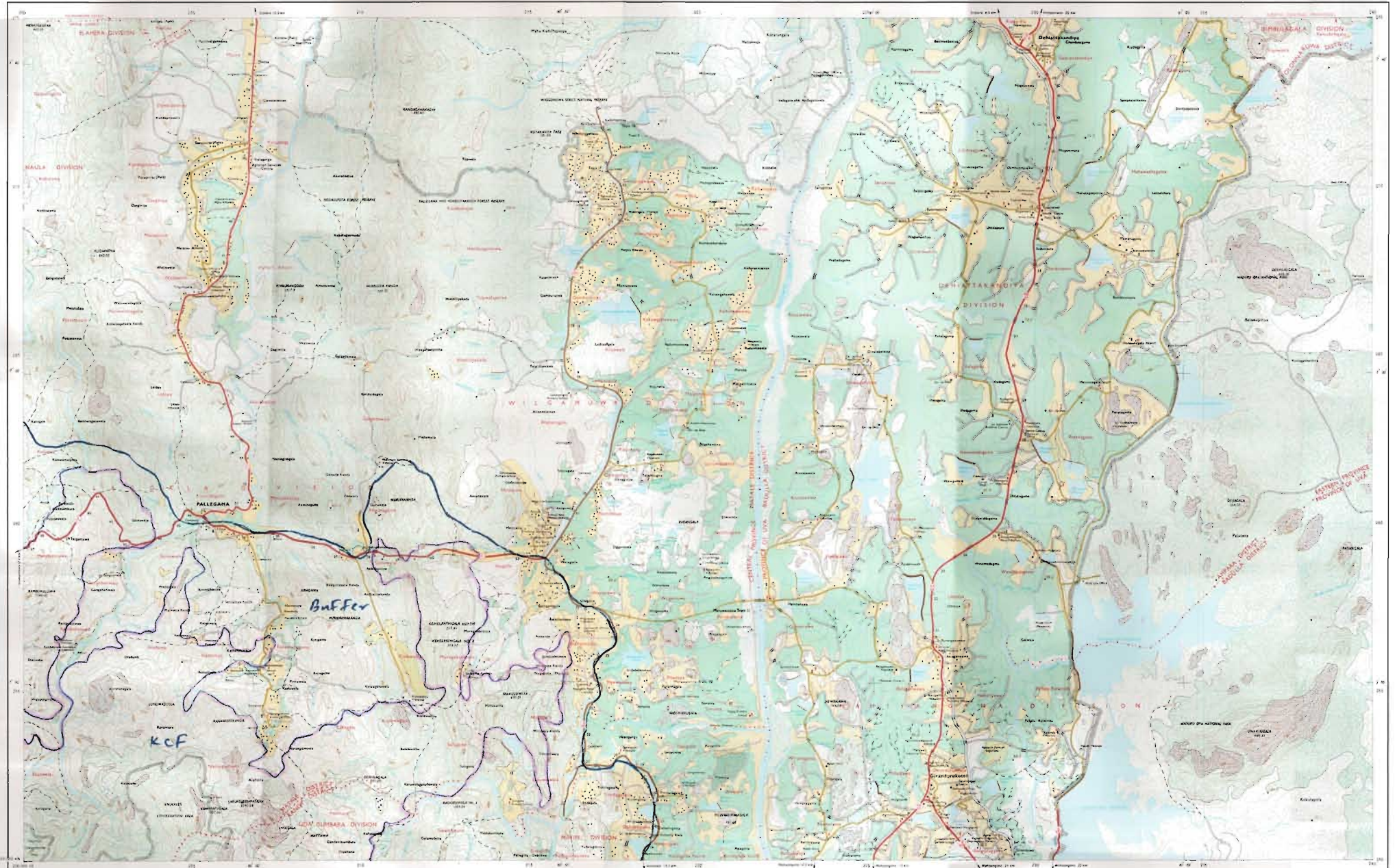
- Forest
- Other

GENERAL FEATURES

- Building
- Other

Other symbols: Spot Height, Contour Interval, etc.

Map Job Copy 1/10/2011



Approved and Printed by the Survey Department of Sri Lanka under the Agricultural Map Printing Policy

Scale 1:50,000
 Date of Issue: 1/10/2011
 Sheet No: 49



SHEET 49

SCALE 1:50,000



Transverse Mercator Projection
 Contour Interval 10 Metres

Contour for altitudes in the Mean Sea Level
 Elevation in Meters

Contour interval 10 Metres

Contour for altitudes in the Mean Sea Level
 Elevation in Meters

Mean Height Variation



Annual Change in Height
 Grid Contour and elevation
 in meters of mean

LOCATION

| UTM Zone | UTM Easting | UTM Northing |
|----------|-------------|--------------|
| 49Q | 500000 | 7500000 |
| 49Q | 500000 | 7500000 |

Grid Contour Interval 10 Metres

COMPLETION AND REVISION

1/10/2011

ADMINISTRATIVE BOUNDARIES

1/10/2011

BOUNDARIES

1/10/2011

ROADS AND PATHS

1/10/2011

RAILWAYS

1/10/2011

DRAINAGE

1/10/2011

VEGETATION

1/10/2011

GENERAL FEATURES

1/10/2011

0.6.227



Map of Badulla District, Province of Sri Lanka
 Prepared by the Survey Department of Sri Lanka
 Revised by the Survey Department of Sri Lanka

SCALE 1:50,000

Vertical Datum for 1984

LOCATION

| | | |
|----------|-----------|----------|
| Page No. | Sheet No. | Scale |
| 69 | 69 | 1:50,000 |

COMPILED AND REVISED

ADMINISTRATIVE INDEX

BOUNDARIES

ROADS AND PATHS

RAILWAYS

DRAINAGE

VEGETATION

GENERAL FEATURES

SHEET 69

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Switzerland

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Fax +41 22 999 0002
mail@iucn.org
www.iucn.org

H. E. Mr Maddumage Ebert Lionel Fernando
Ambassador Extraordinary and Plenipotentiary
of Sri Lanka to UNESCO,
Permanent Delegate
Maison de l'UNESCO
Bureaux M2.08/10
1, rue Miollis
75732 PARIS Cédex 15
France

07 January 2010

**IUCN Evaluation of “Central Highlands of Sri Lanka: its Cultural and Natural Heritage” (Sri Lanka)
– Nominated for inclusion on the World Heritage List**

Dear Ambassador,

The IUCN World Heritage evaluation mission to **Central Highlands of Sri Lanka: its Cultural and Natural Heritage** was undertaken by **Dr. Vinod B. Mathur** from 23 September - 01 October 2009, jointly with Dr. Jane Lennon representing ICOMOS. IUCN greatly appreciated the excellent support and co-operation provided by your colleagues in the preparation and implementation of the mission, and the generous hospitality of the State Party throughout the mission. Please convey our sincere thanks to all of the officials, scientists and contributors that assisted the evaluators in undertaking the mission.

The IUCN World Heritage Panel met in Gland, Switzerland, in December 2009 to examine World Heritage nominations for natural and mixed properties and cultural landscapes. The IUCN Panel examined in detail each nomination dossier and any supplementary information from the State Party, reports and reviews of field evaluators and external reviewers, and other references regarding the nominated properties.

IUCN seeks to develop and maintain a dialogue with States Parties during the evaluation process. Following the discussions of the IUCN World Heritage Panel we would thus like to kindly ask for clarification of the points listed hereafter:

1. IUCN would be grateful if the State Party would provide precise clarification of the main results of the comparative analysis that are considered to provide the basis for asserting that the nominated series is superlative in relation to other possible areas, and also for the justification that the components selected are the optimal selection for the series.
2. The Panel noted that the comparative analysis included in the nomination dossier compares the Central Highlands to the existing World Heritage property of Sinharaja Forest Reserve and the relative vicinity of that property. IUCN would be grateful for clarification of whether the State Party considered the possibility of nominating the proposed property as a serial extension of Sinharaja, rather than a separated property. The Panel considered that such an option might have merit as an alternative to inscription of the Central Highlands of Sri Lanka as a separate property, and would appreciate the observation of the State party on this suggestion.

3. IUCN would be grateful for clarification on the overall management framework for the series as a whole as requested by paragraph 114 of the Operational Guidelines. In particular, we would be grateful to learn how the overall management framework will allow for close cooperation and coordination between the various agencies involved.
4. The Panel noted that the management plans for some of the components have expired. Therefore, IUCN would be grateful for clarification about the current status and plans to update and renew the management plans.
5. The Panel noted that buffer zones have so far only been identified conceptually. IUCN would be grateful to learn how the State Party will address the question of buffer zones beyond the conceptual level.
6. The Panel noted the strong tourism pressure, in particular on Adam's Peak. IUCN would be grateful to receive additional clarification in terms of addressing the corresponding threats to the values and integrity of the site.

We would appreciate your response to the above points as soon as possible, in order to facilitate the evaluation process, but **no later than the 28 February 2010**, as per paragraph 148 of the Operational Guidelines. Please note that any information submitted after this date will not be considered by IUCN in its evaluation for the World Heritage Committee. It should be noted, however, that while IUCN will carefully consider any supplementary information submitted, it cannot properly evaluate a completely revised nomination or large amounts of new information submitted at the last minute. So we request to keep your response concise and respond only to the above requests.

Supplementary information should be submitted officially in three copies to the UNESCO World Heritage Centre in order for it to be registered as part of the nomination. An electronic copy of any supplementary information to both the UNESCO World Heritage Centre and IUCN Headquarters would also be helpful.

Taking into account your response, IUCN will formulate its final recommendation to the World Heritage Committee which will meet from 25 July to 03 August 2010 in Brasilia, Brazil.

Should you have any questions concerning these matters, please do not hesitate to contact Mr Tilman Jaeger, World Heritage Project Management Officer (Tel: +41 22 999 0158; Fax: +41 22 999 0025; Email: tilman.jaeger@iucn.org). Thank you once again for your kind collaboration.

Yours sincerely,



Tim Badman
Head, World Heritage

Cc. Sri Lanka National Commission for UNESCO, Mr. R.P. Perera, Secretary-General
UNESCO World Heritage Centre, Mr. Giovanni Boccardi and Mr. Alessandro Balsamo
IUCN Regional Office for Asia, Ms. Aban Marker Kabraji, Regional Director
IUCN Sri Lanka National Committee, Mr. Harsha Naveratne
ICOMOS, Ms Régina Durighello

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Response of the Government of Sri Lanka to the points raised in IUCN's evaluation of Central Highlands of Sri Lanka: Its Cultural and Natural Heritage nominated for inclusion in the World Heritage List

This clarification on the six points raised is based on further explanations of the information contained in the nomination document in order to respond adequately to the specific points raised by IUCN. For convenience, relevant quotations and photocopies of relevant pages from some papers that have been referred to are annexed. The responses are listed 1-6, corresponding to the points raised by IUCN.

1. Clarification on the main results of the comparative analysis and justification that the components selected are the optimal selection for the series.

In carrying out the comparative analysis an initial review was carried out of the World Heritage Sites in the South Asian region, whose features of outstanding value could possibly be similar to those of the nominated property. The review showed that their features of outstanding universal value were clearly dissimilar to those of the nominated property. The comparative analysis therefore focused on the biotas of comparable rainforest systems. The distinctiveness of the biotas of the Sri Lankan rainforest in relation to comparable rainforest systems in the rest of the world, including those in the Malabar tract and Western Ghats of India, has been set out in the nomination text. The present clarification hence focuses on providing information on the *modus operandi* and some further justification in regard to the selection from the rainforests in the country of the three components of the serial property as being the optimal sites for nomination as a World Heritage.

In offering clarification on this point, it is necessary to recall that the "Ceylonese Rainforest" (as classified by Udvardy) in which is concentrated a huge proportion of the country's rich biodiversity with a high proportion of endemics is confined to just the southwest quarter of the island. The rich biodiversity and high degree of endemism cover many taxonomic groups among both the flora and fauna. The rainforests are now heavily fragmented due to extensive development and human population expansion having been concentrated in this part of country. Despite this, the country's rich biodiversity, with its high proportion of endemic and endangered species, still do survive in these forest fragments, but obviously they would continue to be subjected to high levels of threat in this highly populated part of the country. The rainforest extends from virtual sea level to an elevation of around 2500m. The endemic and endangered biotas are almost equally divided between the low country and mid-elevation rainforest and the sub-montane and montane rainforest. The Sinharaja forest is uniquely representative of the lowland and mid-elevation rainforest. The task at hand, for making a nomination, was to select a property at the sub-montane and montane elevations that would represent the maximum level of biodiversity and endemism for this component of Sri Lanka's rainforest system.

The process of selecting the property for nomination as a World Heritage was spearheaded by the Man and Biosphere National Committee, beginning in 2004. The committee includes high officials of the Forestry and Wildlife departments, the Secretary General of the UNESCO National Commission, and several experts in relevant subject areas. The rationale for selection was that the property should be the best representative of the submontane and montane biotas, a distinct component of the "Ceylonese Rainforest" with high degrees of biodiversity and endemism, which will fulfill the requirement of being a heritage of outstanding universal value. Several suggestions were given consideration. The data from the

National Conservation Review (NCR) (IUCN & WCMC 1997) was an important guiding factor. The NCR had been carried out jointly by IUCN and the government of Sri Lanka, where over 200 forests in the island were surveyed for woody plants and selected animal groups.

Initially, the forests in the montane and sub-montane areas of the Central Highlands were studied using the NCR data. The NCR, though it was only restricted to woody plants and a few selected faunal groups, was nevertheless the most comprehensive source of information which could be used *to cover the full range of forests selected* for a broad comparison in carrying out this study.

Based on the available information, it was decided that a serial property would have to be selected as no single site would adequately fulfill the objective. At the same time, for practical purposes of proper management, there should be as few compact blocks as possible.

All of the following criteria were carefully considered in making the selection: floristic diversity; faunal diversity; endemism; being, as much as possible, in a pristine condition (mainly where no selective logging would have taken place); being of adequate size (considering that the vast majority of forest fragments are minute, and endemism in many species is highly localized within a forest); whether the areas are affected by encroachments; level of protection; and effective management. NCR data and other information relating to the forests covering the montane and submontane zone are presented in Table I.

The data in the Table showed that

- (a) The Knuckles Conservation Forest and the Peak Wilderness Protected Area, the former exceeding 31,000 ha and the latter exceeding 20,000 ha, are by far the largest intact montane/submontane blocks of forest.
- (b) The Knuckles Conservation Forest, in the Knuckles Massif, records the highest number of woody plant species of all the forests surveyed by the NCR.
- (c) Peak Wilderness, in the Central Massif, records the second highest number of woody plant species of all the forests surveyed, and obviously the highest for the Central Massif.
- (d) Peak Wilderness records the highest number of endemic woody plant species in the Central Massif and in fact in the whole of the Central Highlands.
- (e) Knuckles and Peak Wilderness record the highest and next highest number of faunal species.
- (f) Knuckles and Peak Wilderness record the highest and next highest number of endemic faunal species.
- (g) If the data on Morahela and Walawe Basin, which now form a part of the Peak Wilderness Protected Area, are also considered, the case for nominating this area as a prime component is further strengthened.
- (h) Horton Plains is contiguous with PWPA, and though relatively small in size, is remarkably rich in terms of biodiversity and endemism, and also it is a high elevation plateau and it contains some species showing point endemism. Hence it needs to be included with PWPA with which it forms a continuous block.

Based on this comparative analysis it was abundantly clear that three serial sites should be selected, namely, Peak Wilderness Protected Area, Horton Plains and Knuckles. Reliable species data from sources other than the NCR are only available for the three selected forests from among those listed, and these data (which are already included in the species list presented in the nomination) are also given in separate columns in the Table.

Table 1. Forests at sub-montane and montane altitudes falling within the Central and Knuckles Massifs of the Central Highlands

| Forest | Area (ha) (NCR) | Woody Plants (NCR) | | Faunal spp. (NCR) | | Plant spp. (all sources) | | Faunal spp. (all sources) | | Orchid spp. | |
|-------------------|-----------------|--------------------|----------|-------------------|-----------|--------------------------|-----------|---------------------------|-----------|-------------|-----------|
| | | Total | End-emic | Total | End-emics | Total | End-emics | Total | End-emics | Total | End-emics |
| Agra-Bopalis | 6934 | 79 | 40 | 32 | 12 | | | | | | |
| Bambar-abotuwa | 5440 | 169 | 113 | 52 | 18 | | | | | | |
| Bogawantalawa | 4290 | 67 | 42 | 36 | 11 | | | | | | |
| Conical Hill | 708 | 53 | 29 | 34 | 12 | | | | | | |
| Hakgala | 423 | 51 | 25 | 32 | 10 | | | | | | |
| Horton Plains | 3160 | 79 | 42 | 47 | 14 | 192 | 79 | 42 | 43 | 18 | 42 |
| Kandapola-Sita E. | 2714 | 56 | 25 | 41 | 16 | | | | | | |
| Knuckles | 31305 | 288 | 85 | 122 | 40 | 450 | 151 | 34 | 99 | 29 | 83 |
| Kikilimana | 4581 | 81 | 46 | 32 | 14 | | | | | | |
| Morahela | 847 | 152 | 85 | 56 | 24 | | | | | | |
| Meepilimana | 772 | 58 | 31 | 32 | 12 | | | | | | |
| Ohiya | 1769 | 61 | 24 | 34 | 10 | | | | | | |
| Patipola-Amb. | 1480 | 67 | 38 | 33 | 13 | | | | | | |
| Peak Wilderness | 22379 | 256 | 148 | 72 | 39 | 555 | 277 | 50 | 84 | 37 | 121 |
| Pedro | 6757 | 112 | 57 | 60 | 16 | | | | | | |
| Walawe Basin | 3230 | 145 | 70 | 41 | 13 | | | | | | |

Note: All of the forests listed except for Knuckles, fall into the Central Massif. Knuckles alone falls into the Knuckles Massif that is separated from the Central Massif by a wide, relatively low-lying plateau. The Peak Wilderness Protected Area (PWPA), one of the serial sites in the nominated property, includes also the Morahela and Walawe Basin forests listed above. The area of Peak Wilderness as given above includes the areas of Morahela and Walawe Basin. The area of PWPA and Knuckles as revised and given in the nomination are 20596 and 31305 ha respectively. All of this information is given in considerable detail in the nomination document. Because of the wealth of evidence presented in the nomination document, the MAB National Committee did not consider it necessary to include this Table.

These sources include: Bambaradeniya & Ekanayake (2003); Grellier et al. (1987); Gunatilleke et al. (1996); Sinhakumara (1995) and the management plans, all of which have been referred to in the nomination document. They added further evidence justifying the selection. Also, these three forests are the only ones among those listed that are in a near pristine condition. As mentioned in the nomination document, Knuckles had been subjected to under-planting with cardamom in some parts of the forest, but this practice has long since ceased. In the case of PWPA, some fringe areas of what was the Peak Wilderness Sanctuary had been occupied by villagers, but these areas have been excluded when this part of the Sanctuary was declared a Nature Reserve which now forms part of PWPA, as explained in the nomination document.

The MAB National Committee also noted that Ashton and Gunatilleke (1987a) in their monumental paper on the plant geography of Ceylon have named only three specific forest areas (that is, not considering one other broad area referred to as Central Mountains – Ramboda and Nuwara Eliya) as **distinct floristic regions covering the sub-montane and montane zones**. They are Adam's Peak (which is within PWPA), Horton Plains and Knuckles. This point has been made in the nomination document and the map showing the floristic regions has been included. For quick reference, it is also included as an annex to this document.

The MAB National Committee noted that inscription in the World Heritage list would be on the basis that the property is of Outstanding Universal Value, in this case because of its high levels of biodiversity and endemism and the possible threats to the survival of the species, and that inscription would ensure that the property would be given the maximum degree of protection. The Committee did not consider that it should attempt to use World Heritage inscription as a means of giving absolute protection to all of the biodiversity and endemism, and hence restricted the nomination to the critically important sites. Conservation of biodiversity in the rainforest system is also done through other means. Some sites are made international Biosphere Reserves. Many forests are declared as strict Conservation Forests and managed to ensure that conservation values are observed. Then there are the Strict Nature Reserves, National Parks and so on.

The MAB National Committee decided that the three sites are the optimal selection for the series that would fulfill the relevant criteria as given in the Operational Guidelines, and that the property has the characteristics of being a natural heritage of outstanding universal value. It therefore went ahead with preparing the project preparation assistance proposal at the initial stages of this exercise.

In the course of preparation of the nomination document, a study on a new initiative was being carried out by experts nominated by the Asian Development Bank and Sri Lankan experts drawn from the universities (DWLC & MOE 2006). It was a Biodiversity Survey that was carried out to obtain more detailed information than previously available on the NCR. Only four forests were initially selected for this survey (two in the dry zone and two in the wet zone). The wet zone forests selected were the Peak Wilderness Protected Area and Horton Plains, highlighting the importance of these two forests. Species data from this source (also included in the "data from other sources" in the Table), together with data from previous biodiversity surveys (all of which have been included in the species list given in the nomination document), provided further convincing evidence of the biodiversity richness and high levels of endemism in these two montane and sub-montane ecosystems that had already been selected, together with Knuckles, for nomination.

The preparation of the final nomination document was spearheaded by the Ministry of Environment and Natural Resources, while the MAB National Committee provided inputs during meetings in the course of preparing the document and reviewed the draft text before it was finalized.

2. Merit in inscribing the Central Highlands of Sri Lanka as a separate property from the already listed Sinharaja forest.

The members of the MAB National Committee are experts on the subject and have working relationships with other biodiversity specialists as well, and they were convinced at the very outset that Peak Wilderness and the other montane areas that were to be considered for nomination cannot be linked to the Sinharaja forest. Though it may appear that Sinharaja and Peak Wilderness seem to be in proximity to each other (Sri Lanka is a small country anyway), they are in geographically distinct areas. Peak Wilderness is located in what is termed the Central Massif, an anchor shaped mass of mountainous country, while Sinharaja is in a separate block of hill country, mostly at low and mid elevations, the Rakwana hills, separated from the Central Massif by a relatively low-lying wide valley. Systematic biologists who have studied the fauna and flora of the montane region, meaning the Central Massif and the Knuckles Massif, as well as other rainforests within the country have always pointed out the distinctive nature of the montane and sub-montane biota, in terms of species richness and endemism, in comparison to that at low and mid-elevations. The following are some of these references, all of which have been referred to in the appropriate places and included in the nomination document.

Greller et al. (1987), in a paper entitled *Stemonoporus* (Dipterocarpaceae)- dominated montane forests in Adam's Peak Wilderness, Sri Lanka, state: "Several of the species of *Stemonoporus* (*S. cordifolius*, *S. gardneri*, *S. oblongifolius*, *S. rigidus* and *S. affinis*) have been collected between 1500 and 1800 m". They add, "No other dipterocarps in Sri Lanka (possibly in the world) exceed them in elevation of occurrence." They list seven species of *Stemonoporus* as being restricted entirely to the montane and sub-montane zones.

In two papers based on Sri Lanka's floristic richness (Ashton & Gunatilleke 1987a, and Gunatilleke, & Gunatilleke 1990), the country has been divided into 15 floristic regions. In this classification, Adam's Peak (in the Peak Wilderness), Horton Plains and Knuckles have been assigned to three distinct floristic regions. (Map included and referred to in the nomination document). The characteristic vegetation types in each of these regions as given against the numbers assigned to them are: 14. Adam's Peak: Tropical montane forests and Tropical submontane evergreen forests; 15. Horton Plains: Tropical montane forests and wet patana grasslands; 12. Knuckles: Tropical submontane forests (*Myristica-Cullenia-Aglaiia-Litsea* community). Sinharaja falls into two separate floristic regions: 6. Northern Sinharaja South of Ratnapura (Tropical wet evergreen forests (lowland hill Dipterocarp forests – *Mesua-Doona* community Talawa grasslands and fernlands); and 7. Southern Sinharaja, or southern lowland hills (Tropical wet evergreen forests; *Dipterocarpus* community, *Mesua-Doona* community). (See annexes IA and IB).

In a reputed publication which has come to the notice of the Ministry recently Wickramanayake *et al.* (2002), using 'ecoregions' (defined as ecosystems of regional extent) as the most appropriate fundamental conservation units in regional-conservation assessment, have recognized the Sri Lanka Montane forests as a 'globally outstanding ecoregion' as distinct from the lowland rainforest

The late Dr S. Balasubramaniam who was referred to as being "Pre-eminent among his generation of field botanists" by Green & Jayasuriya (1996), in an unpublished paper gives a graphic account of the uniqueness of Sri Lanka's montane forest, not only in regard to its floristic distinctiveness but also in its structural features. He states "Structurally and floristically the montane rainforest of Sri Lanka is very different from the majestic wet ever-green rainforest of the hot humid lowlands." Sinharaja falls into the latter category.

A comparison of the plant species in Sinharaja and Peak Wilderness provides specific information regarding the distinction between the two forests. The Table below shows the number of species recorded in Peak Wilderness and not recorded in Sinharaja. Although the large difference shown in row 2, must be attributed in part to the fact that data on Peak Wilderness had been gathered from more sources than just the National Conservation Review (NCR), it is widely known that there are many plant families with a number of species that are present only in the montane/montane region and are found in Peak Wilderness e.g. Dipterocarpaceae, Flaeocarpaceae, Ericaceae, Lauraceae, Melastomataceae, Myrtaceae.

Table 2. Data based on comparison of angiosperm species numbers (excluding orchids) in Peak Wilderness and Sinharaja

| | | |
|---|--|-----|
| 1 | Based on the NCR: No. of angiosperm spp. in Pk. W. not recorded in Sinharaja | 86 |
| 2 | No. of spp. in Pk W. (from all sources), not recorded in NCR data on Sinharaja | 253 |
| 3 | No. of spp. in row 2 which are endemic | 128 |
| 4 | No. of spp. in row 2 which are globally threatened | 56 |

Referring to both the fauna and flora of Sri Lanka, Erdelen (1989) states "The geographic distribution of the endemics shows a clear pattern. The smallest number are found in the relatively dry areas of Sri Lanka (A) and the highest numbers in the lowlands of the wet zone (B), followed by zones C (montane forest zone) and D (cloud forest zone)." C and D together refer to what has been called the sub-montane and montane areas in the nomination. (See photocopies of relevant pages of the paper in annexes).

References to the distinctive features of the montane fauna in different taxonomic groups follow. In a paper on the land snails of Sri Lanka, Fred Naggs et al. (2005) (reference included in the nomination text) state "A closer examination of the 61 species recorded only from the wet zone shows that they fall into two discrete categories: species recorded only from the lowland wet zone or the lowland rainforest zone and species recorded only from the highland wet zone or the montane rainforest zone. Of the exclusively wet zone species 35 were limited to the montane rainforest (>3500 ft or 1067 m) and 26 were limited to the lowland rainforest (<3500 ft or 1067 m). This underlines the point that, not only are many Sri Lankan land snails restricted to the wet zone, but that they are restricted to particular parts of the wet zone."

In another invertebrate group, the Crustacea, a new genus, *Lancaris*, endemic to the highlands, with two species, has been found. Of these, *L. singhalensis* is "restricted to Horton Plains and a disturbed eucalyptus plantation in the montane zone" (Cai & Bahir 2005). The following endemic crab species are restricted to the montane zone – *Ceylonthelphusa diva*, *C. durrelli*, *Perhrinkia gabadagei* and *P. enodis* - and are within the nominated property (Bahir

& Ng 2005). Reference to data from these papers has been made in the text of the nomination.

A great deal of taxonomic work on shrub frogs of the genus *Philautus* has been done recently by Manamendra-Arachchi & Pethiyagoda (2005) and Meegaskumbura & Manamendra-Arachchi (2005) over a period spanning several years (1994-2003). (Reference has been made in the nomination). They have described 35 of *Philautus* extant species, all of which, except for one, are restricted to the wet zone. Table 2 gives the species restricted to the Central Massif and Knuckles taken together (as being the location of the serial sites nominated). Column 2 gives the species that occur in Sinharaja, together with the species that occur within and in the vicinity of the Rakwana hills wherein Sinharaja is located. (Reference to this information in the above mentioned papers has been included in the text. For greater clarity it is tabulated below.)

Also among the amphibians, of the two extant species of the endemic genus *Nanophrys*, *N. ceylonensis* occurs at the lower elevations (including in Sinharaja) whilst *N. marmorata* is restricted to the Knuckles range.

Table 2. Distribution of *Philautus* species

| <i>Philautus</i> species restricted to Knuckles/Peak Wilderness/Horton Plains | <i>Philautus</i> species in the wet lowlands and mid-elevations around the Rakwana hills, including those restricted to Sinharaja |
|---|---|
| <i>P. schmarda</i> | <i>P. reticulatus</i> |
| <i>P. microtympalum</i> | <i>P. cavirostris</i> |
| <i>P. femoralis</i> | <i>P. fergusonianus</i> |
| <i>P. macropus</i> | <i>P. stictomerus</i> |
| <i>P. sarasinorum</i> | <i>P. cuspis</i> |
| <i>P. viridis</i> | <i>P. rus</i> |
| <i>P. alto</i> | <i>P. popularis</i> |
| <i>P. fulvus</i> | <i>P. samba</i> |
| <i>P. asankai</i> | <i>P. hoipolloi</i> |
| <i>P. mooreorum</i> | <i>P. lunatus</i> |
| <i>P. caeruleus</i> | <i>P. papillosus</i> |
| <i>P. hoffmanni</i> | <i>P. procax</i> |
| <i>P. frankenbergi</i> | <i>P. abundus</i> |
| <i>P. silus</i> | <i>P. sordidus</i> |
| <i>P. steineri</i> | <i>P. auratus</i> |
| <i>P. stuarti</i> | <i>P. ocularis</i> |
| | <i>P. decoris</i> |
| | <i>P. folicola</i> |
| | <i>P. zorro</i> |
| | <i>P. limbus</i> |

Among the reptiles, reference is recalled to the lizard species that are restricted to the montane zone and are found in the nominated property. Examples are: *Cerutophora*

stoddartii, *C. tennentii*, *Cophotis ceylanica* and *C. durnburae*. As expected, none of these have been recorded in Sinharaja or at comparable altitudes.

The report on the Biodiversity Baseline Survey (Green, 2007) carried out recently concludes that "Peak Wilderness has a very rich herpetofauna, with a high level of endemism (86% of amphibians and 41% of reptiles). More significantly it states that, since many specimens collected during the survey may prove to be species new to science, the steep incline of the species accumulation curve (Fig. annexed) may indicate a large undiscovered diversity within this forest. It is also noteworthy that many rare species were discovered in the forest: for instance, *Philautus malcolmsmithii*, which was thought to be extinct was rediscovered in Peak Wilderness after 80 years.

The following extracts from the Biodiversity Baseline Survey report are worth noting in this context: "Studies carried out elsewhere in Sri Lanka indicate that the submontane and montane forest formations of Peak Wilderness are unique in their species composition" (p.16 of report) "The results from this survey indicate that Peak Wilderness Sanctuary (now the Peak Wilderness Protected Area) supports a rich avifauna, with an extremely high level of endemism that has not been recorded for any other protected area in Sri Lanka" (words in parenthesis added). "Of the country's endemic avifauna (26 species) 81% of endemic species were recorded. This compares favourably with other wet zone sites, such as Sinharaja National Heritage Wilderness Area where 21 endemic species have been recorded (Kotagama 2006)" (p 20-21 of report):

Having dealt with the outstanding natural features of universal value in the nominated property and showing evidence of their distinctiveness in comparison with Sinharaja, it is necessary to refer to the fact that the nominated property also has cultural features of outstanding universal value. It was therefore necessary to nominate the property for acceptance as a Mixed Cultural and Natural World Heritage in terms of Articles 1 and 2 of the World Heritage Convention. On these grounds, too, there would have been no possibility of linking the Sinharaja forest with the nominated property.

3 Clarification on how the overall management framework allows for a close co-operation and coordination between the various agencies involved.

The management of clearly defined sections of the property fall within the purview of two government departments (the Forest Department and the Department of Wildlife Conservation), and it is to be noted that both these departments function under the same ministry, the Ministry of Environment and Natural Resources. As explained to the Evaluation Mission, the function of coordinating management and monitoring the activities of the two departments and ensuring their cooperation in relation to the management of the property will continue to be carried out by the committee headed by the Secretary of the Ministry of Environment and Natural Resources. This committee had already started functioning at the early stages of the commencement of the preparation of the nomination document in 2007 and did indeed meet with the Evaluation Mission. Important decisions have been taken on the initiative of the Committee; for example, problems regarding overlapping functions between the FD and DWLC in the Peak Wilderness Sanctuary that had been unresolved for years were ironed out. A decision was taken to clearly define the areas of control of the two departments and to declare the area under the control of the DWLC as a Nature Reserve (i.e. upgraded from the category of Sanctuary) to enable more effective management to be carried out. This decision was acted upon promptly. The Ministry will continue to guide the coordination of activities of the two departments.

It is important to note that as the property is being nominated as a Mixed Cultural and Natural Heritage, there are other stakeholder institutions, besides the two mentioned above. These include importantly the Department of Archaeology and the Department of Cultural Affairs. All these stakeholder institutions are members of the coordinating committee and will continue to play an increasingly significant role in the conservation-management of the property in relation to its cultural features.

4. Current status of management plans.

There are current management plans for the areas falling under the control of the Department of Wildlife Conservation in the Peak Wilderness Protected Area and Horton Plains. These have been submitted with the original documents.

For conservation forests falling within the control of the Forest Department, operational plans have now been prepared. In the case of the Knuckles Conservation Forest (KCF) there are two management (operational) plans for two distinct sections of the forest. One section falls within the district of Matale and the management plan is implemented by the DFO Matale and the RFO Laggala. The other section falls within the district of Kandy and its management plan is implemented by the DFO Kandy and the RFO Hunnasgiriya. These plans are based on the objectives and conservation practices that were developed in the earlier plans, with further improvements. **They are prepared in the local language (Sinhala)**, which was found to be a much more effective approach as they are readily understood by even the most junior officers who carry out conservation activities at the grass roots level. Also, it ensures the ready cooperation of the villagers as they see the activities as being done for the benefit of the community and not as something being imposed from outside. A consolidated plan for the KCF as a whole, in English, would be prepared based on the two operational plans. A copy of one of the operational plans is sent herewith.

5. Buffer zones beyond the conceptual level.

Of the three parts of the serial property, it has been shown that Horton Plains does not require a buffer zone. A section (north-east) of PWPA also does not require a buffer zone as it adjoins conservation forests that are well protected. The maps and text in the nomination document have provided a full explanation regarding this. In the remaining part of the PWPA a buffer zone has been marked on the map but has not been demarcated on the ground. Although not statutorily defined as a buffer zone, the Fauna and Flora Protection Ordinance makes provision for some protective measures to be adopted within one mile of the boundary of a National Reserve (Section 3A). A proposal will be made to the Coordinating Committee to make this one-mile limit an "Environmental Protection Area" under the provisions of Section 24 C of the National Environmental Act to give further statutory recognition to the buffer zone. The Central Environmental Authority, the implementing institution for the National Environmental Act, also comes under the purview of the Ministry of Environment and Natural Resources.

The buffer zone of the KCF has been now marked on the map on the basis of criteria that take into account the border areas where there is a special need for protective measures to be

taken. For several years now the buffer zone has been the focus of many activities involving the village communities designed to promote conservation measures and their response has been very encouraging, and the non-existence of a legally defined boundary was not found to be an obstacle. However, to more categorically define the buffer zone, as in the case of PWPA mentioned above, it is proposed to make this area an Environmental Protection Area under the provisions of the National Environmental Act, so as to give it legal recognition.

Additional protection is afforded by the fact that all three components of the nominated property, together with their buffer zones, are within areas declared under the Soil Conservation Act and hence are covered under the wide-ranging provisions of the Act.

6. Additional clarification in terms of addressing the possible increased threats to the values and integrity of the site.

Even at present the PWPA, particularly the Peak and its environs, Horton Plains and Knuckles have a substantial ingress of visitors. The organization is in place to handle the situation. However, there have been a few cases of damage being caused to name boards. The network of personnel to deal with an expanded ingress of visitors and to prevent damage to the property or other illegal activities and to take punitive action where needed will be strengthened with the added incentive that would arise from the declaration of the property as a World Heritage.

At present, in the case of pilgrims visiting Adam's Peak, many protective measures are put in place during the pilgrim season under the special direction of the local administration, with the collaboration of DWLC, to cater to the ingress of pilgrims. It should also be noted that traditionally there is a closed season of over six months in the year where there are hardly any visitors to the Peak, thus allowing the ecosystem (including plant and wildlife habitats) to recover. There are also specific field level regulations that are rigorously imposed for ensuring that the environment is conserved.

References

(Except where otherwise stated against three of the references below, the others have all been cited and included in the reference list given in the nomination document.)

Ashton, P.S. & Gunatilleke, C.V.S. 1987a. New Light on the plant geography of Ceylon I. Historical plant geography. *Journal of Biogeography*, 14, pp 249-285.

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Annexes:

Annexe to Report by the Ministry of Environment & Natural Resources in response to matters raised by IUCN

- 1A **From:** Ashton, P.S. & Gunatilleke, C.V.S. 1987a. New Light on the plant geography of Ceylon I. Historical plant geography. *Journal of Biogeography*, 14, pp 249-285
- 1B **From:** Gunatilleke, I.A.U.N. & Gunatilleke, C.V.S. (1990) Distribution of floristic richness and its conservation in Sri Lanka. *Conservation Biology*, 4, 1, pp 21-28.
- 2A & 2B **From:** Erdelen, W. (1989). Forest Ecosystems and Nature Conservation in Sri Lanka. *Biological Conservation* 43, pp 115-135
- 3 **From:** Naggs, F., Raheem, D., Ranawana, K., & Mapatuna, Y. (2005). The Darwin Initiative project on Sri Lankan snails: patterns of diversity in Sri Lankan forests. *The Raffles Bulletin of Zoology*, Supplement No. 12, pp 23-29.
- 4 **From:** Green, Michael (Editor; prepared for the Department of Wildlife Conservation and the Ministry of Environment and Natural Resources) (2007). Biodiversity Baseline Survey: Peak Wilderness Sanctuary

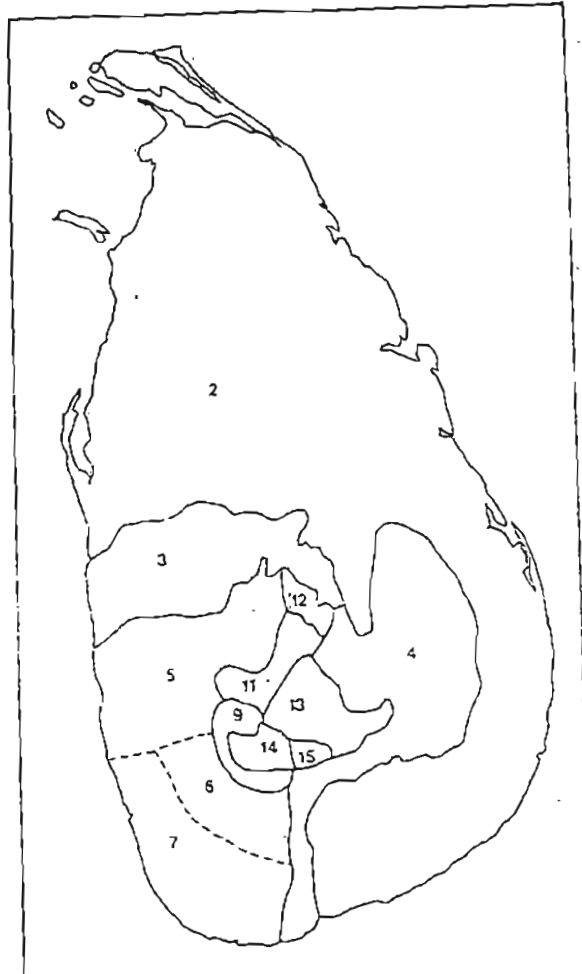


FIG. 6. Floristic regions of Ceylon; adapted from Gaussen *et al.* (1964). 2: Dry zone; 3: Northern Intermediate Lowlands; 4: Eastern Intermediate Lowlands; 5: Northern Wet Lowlands; 6: Northern Sinharaja-South of Ratnapura; 7: Southern Sinharaja-Hiniduma-Kanneliya; 9: Foothills of Adams Peak-North of Ratnapura-Ambagamuwa; 11: Kandy-upper Mahaweli; 12: Knuckles; 13: Central Mountains-Rambode-Nuwara Elija; 14: Adams Peak; 15: Horton Plains.

history of geographical changes, ecology, breeding systems and means of dispersal have had on the spread and diversification of taxa.

Sinnot (1917) pointed out that Willis has ignored the fact that Ceylon endemics are not randomly distributed, but concentrated in the wet zone forests of the island, a minute area of some 15,000 km² or 23% of its area. Senanayake, Soulé & Senner (1977) have

broadly confirmed that the same holds true for reptiles, amphibians and even birds, and gave preliminary evidence that it holds for insects and fishes too.

What seems not to have been pointed out is that Willis based his estimates on six categories of rareness which Trimen (1893-1900) had allotted to all species of his Flora published before his death. Willis stated that these were based on

Table 6. Principal natural vegetation types and the dominant plant communities in each floristic region.

| Floristic region | Characteristic natural vegetation types in each region |
|--|---|
| 1. Coastal and marine belt | Marine, mangroves, salt marsh, sand dunes, and strand vegetation |
| 2. Dry and arid lowlands | Tropical dry mixed evergreen forests Manilkara community Mixed community (<i>Chloroxylon-Vitex-Horiza-Schleiebera</i> series) Tropical thorn forests (<i>Albizkera-Chloroxylon-Salvadora-Kanulla</i> series) <i>Damara</i> and <i>Vitex</i> grasslands Flood-plain wetlands Riverine and gallery forests |
| Northern intermediate lowlands | Tropical moist semi-evergreen forests (<i>Filicium-Euphorbia-Artocarpus-Myristica</i> series) |
| Eastern intermediate lowlands | Tropical moist semi-evergreen forests Savannah forests |
| Northern wet lowlands | Tropical wet evergreen forests |
| Sinharaja and Ratnapura | Tropical wet evergreen forests (lowland hill Dipterocarp forests — <i>Mesua-Doona</i> community, Talawa—grasslands, fernlands) |
| 7. Southern lowland hills | Tropical wet evergreen forests (Dipterocarpus community, <i>Mesua-Doona</i> community) |
| 4. Wet zone freshwater bodies | Streams, rivers, and other freshwater bodies |
| 9. foothills of Adam's Peak and Ambagamuwa | Tropical wet evergreen forests |
| 10. Midmountains | Submontane forests (<i>Shorea-Catophyllum-Syzygium</i> series) |
| 1. Kandy and Upper Mahaweli | Tropical wet evergreen forests humid zone dry, pathana grasslands |
| 2. Knuckles | Tropical submontane forests (<i>Myristica-Cullenia-Aglais-Litsea</i> community) Tropical montane forests (<i>Catophyllum</i> zone) |
| 13. Central Mountains, Ramboda, Nuwara-Eliya | Tropical montane forests (<i>Catophyllum-Walkeria-Syzygium</i> community; wet pathana grasslands) |
| 14. Adam's Peak | Tropical montane forests Tropical submontane evergreen forests |
| 15. Horton Plains | Tropical montane forests upper wet pathana grasslands |

been assigned to the IUCN Red Data Book categories based on a comprehensive phytosociological survey of over 17,000 individual plants (Gunatilleke et al. 1987).

3. Demographic, ethnobotanical, and sociological surveys of forest dwellers and villagers in the forest fringe.

These surveys have been conducted by researchers and the management plan coordinators; their results will be available in the near future.

4. Preparing and implementing a management plan for the forest resource, taking all these factors into account to obtain the greatest sustainable benefit to present generations while maintaining its potential to meet the needs of the future generations.

The management plan for Sinharaja forest has been prepared using available information (Aron. 1986b) and is being revised during its implementation as the planners acquire more information. A major improvement is inclusion of an additional area of submontane forest and grassland (2,450 ha) at the northeastern end of the present MAB reserve, thereby increasing considerably its biological richness and conservation value.

5. Research and extension studies on wild plants utilized by the villagers to facilitate their domestication in village home gardens and in the buffer zone of the forest, thereby reducing villager's dependency on the dwindling wild genetic resources.

Basic biological studies on these plants and their silvicultural properties are being conducted by researchers of both the Forestry Department and the universities (de Zoysa & Vivekanandan 1987; Gunatilleke & Gunatilleke 1988; de Zoysa et al. 1989; Dayanandan et al. 1989).

6. Development of curricula on socioecological aspects of Sinharaja for naturalists, school children, and university students and conduct of regular educational programs through field visits and mass media.

This aspect has been well established over the years. Both the school and university curricula have included conservation education programs, and Sinharaja Biosphere Reserve has been a regular outdoor laboratory for such studies. Training programs for foresters and awareness programs and workshops for international, national, and regional conservation-conscious groups have been conducted regularly at Sinharaja. Basic facilities as well as educational literature and trails through the forest with guide books have been developed, and with the construction of the Research, Education and Extension Centre (REEC) at the northwestern end of the forest, these activities will be streamlined.

A firm foundation has been laid for conservation of Sinharaja Forest and a start has been made for the Knuckles Range in Floristic Region 12, again with IUCN/WWF assistance. It is our fervent hope that at least one such reserve of significant size will be conserved in each

2A

TABLE I
Endemism in the Vertebrates and the Angiosperms in Sri Lanka (Data from Crusz (1986) and Gunatilleke & Gunatilleke (1983))

| <i>Taxon</i> | <i>Species number</i> | <i>Endemic species</i> | <i>Endemic species (%)</i> |
|---------------------|-----------------------|------------------------|----------------------------|
| Fishes ^a | 59 | 16 | 27 |
| Amphibians | 37 | 19 | 51 |
| Reptiles | 129 | 70 | 50 |
| Birds ^b | 237 | 20 | 8 |
| Mammals | 85 | 12 | 14 |
| Total | 557 | 137 | 25 |
| Angiosperms | 3305 | 830 | 25 |

^a Only freshwater fishes.

^b Only resident birds.

Indian peninsula, and species which are not found in India but in the Malasian or African region (Abeywickrama, 1959).

Data on non-angiosperms are scanty, an exception possibly being the ferns (e.g. Sledge, 1982), and hardly anything is known about their distribution patterns. Accordingly, they are not treated further here. Similarly, our present knowledge on distribution of most of the invertebrate groups in Sri Lanka is rather poor, and only the vertebrates are treated in detail.

Species numbers and data on endemism for the vertebrates and the angiosperms are given in Table 1. The overall percentage of endemic species is the same for both groups (25%). Within the vertebrate taxa, however, there is considerable variation in the degree of endemism. The more mobile taxa, i.e. the birds and mammals, have fewer endemics than the other three groups. The highest numbers of endemics are found in the amphibians and reptiles. The angiosperms have 27 (Abeywickrama, 1956), fishes 3, amphibians 1, reptiles 9, birds 0 and mammals 4 endemic genera (Crusz, 1986 and pers. comm.; Crusz & Daundasekara, in press).

The geographic distribution of the endemics shows a clear pattern (Fig. 2). The smallest number are found in the relatively dry areas of Sri Lanka (A) and the highest numbers in the lowlands of the Wet Zone (B), followed by zones C (montane forest zone) and D (cloud forest zone). In the angiosperms the pattern is similar and the differences between the Dry and Wet Zones seem to be even more pronounced (Fig. 2). As there were no separate data available for zones C and D these had to be taken as one unit.

A quantitative analysis of the densities of endemic species per vegetational

2B

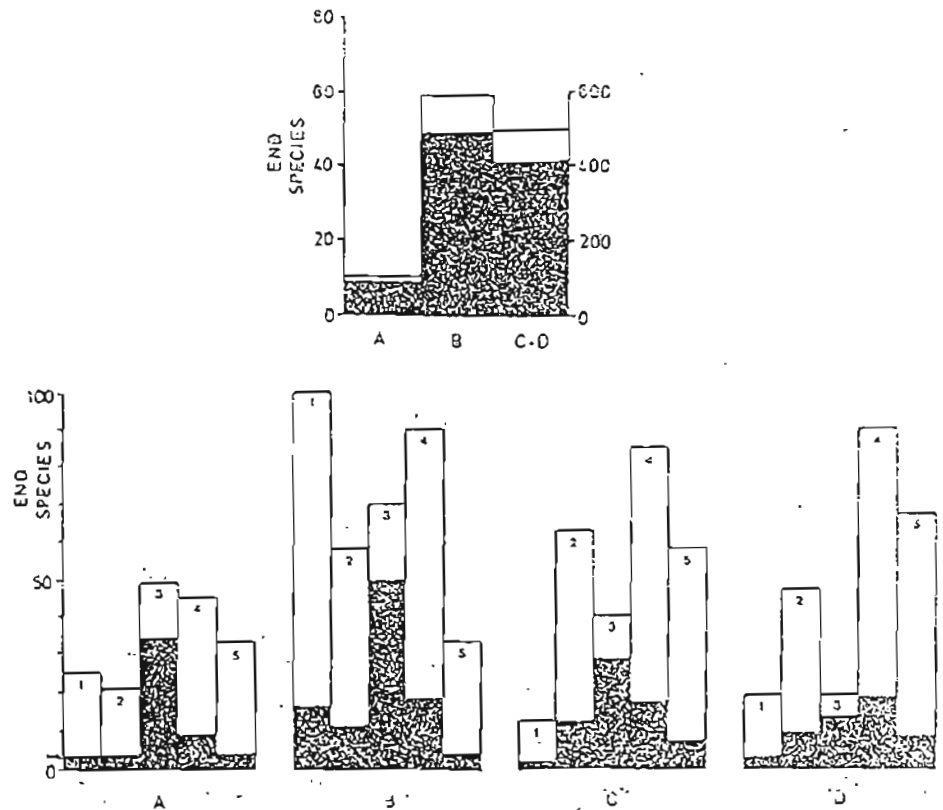


Fig. 2. Absolute numbers (black) and percentages (open bars) of endemic species per taxon in the different vegetation zones A (comprising A1, A2, A3 and A4), B, C and D (for definitions see Fig. 1). Top: Data for the angiosperms (raw data from Gunatilleke & Gunatilleke, 1983). For zones C and D no separate data were available. Bottom: 1 = fishes, 2 = amphibians, 3 = reptiles, 4 = birds, 5 = mammals.

zone would be desirable within the context of conservation. This was carried out by Senanayake (1977) and Senanayake *et al.* (1977) for the amphibians, lizards, and birds. As pointed out by Cruz (1986 and pers. comm.), one possible source of error in these studies is the use of 'surveyors' areas instead of absolute surface area. This is probably of particular importance in mountainous country.

FACTORS AFFECTING CONSERVATION MEASURES

Human settlements and land use

The first time large areas were cleared for cultivation (mainly of rice) was during the advent of the Sinhalese, approx. 2500 BP. As can be seen from the



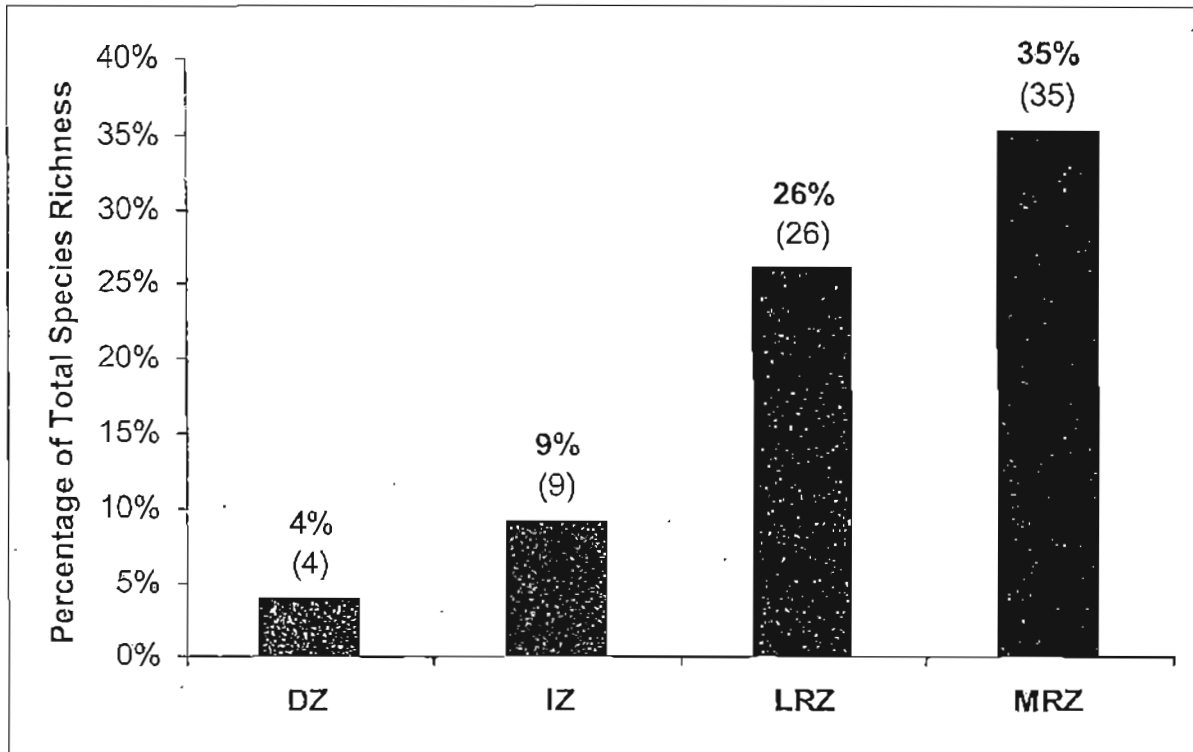


Fig. 4. Relative contribution of species restricted to the dry (DZ), intermediate (IZ), lowland rainforest (LRZ) and montane rainforest zones (MRZ) to total land-snail species richness as recorded during the 'island-wide' survey.

highland wet zone or the montane rainforest zone (Fig. 4). Of the exclusively wet zone species 35 were limited to the montane rainforest zone (> 3500 ft or 1067 m) and 26 were limited to the lowland rainforest zone (< 3500 ft or 1067 m). This underlines the point that not only are many Sri Lankan land snails restricted to the wet zone, but that they are restricted to particular parts of the wet zone.

DISCUSSION

The findings of the Darwin Initiative project demonstrate that the two main ecological subzones of the wet zone, the lowland rainforest zone and the montane rainforest zone have distinctive faunas. The lowland rainforest fauna is composed of a widely distributed element and a localised or restricted-range component. Widely distributed lowland rainforest species include *Cryptozonia chenui* (Pfeiffer), *Ratnadvipia irradians* (Pfeiffer), *Acavus phoenix* (Pfeiffer), *Corilla adamsi* Gude, *Beddomea albizonatus* (Reeve)-species complex and *Leptopoma semiclausum* (Pfeiffer). These taxa range across most or all of the forested area of the lowland wet zone; some species such as *Ratnadvipia irradians* occur in both forest and non-forest habitats. In contrast, the localised element is comprised of taxa with restricted ranges within the compass of the wet lowlands. Examples include forest species such as *Tortulosa aurea* (Pfeiffer) and the two acavids, *Acavus haemastoma* (Linnaeus) and *Acavus superbus* (Pfeiffer), both of which occur at very high densities in synanthropic habitats.

The fauna of the montane rainforest zone, as with that of the lowland rainforest zone, is separable into widely distributed

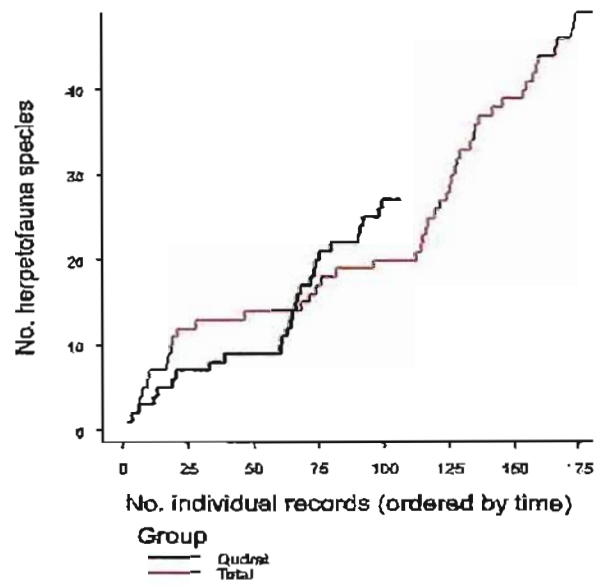
and localised elements. Among taxa characteristic of the montane rainforest zone as a whole are *Cryptozonia cerarja* (Benson), *Euplecta colletti* Sykes and *Euplecta gardeneri* (Pfeiffer). Species with localised ranges within the montane zone include *Mirus stalix* (Benson), *Euplecta isabellina* (Pfeiffer), *Oligospira skinneri* (Reeve), *Thysanota bicilliata* (Pfeiffer) and *Theobaldius bairdi* (Pfeiffer).

CONCLUSIONS

While the results discussed above provide only a brief overview of the preliminary findings of the Darwin Initiative Project they indicate how crucially important the wet zone is as a centre for land-snail diversity and endemism. We now know that while the wet zone does have a substantial share of the island's land-snail diversity and endemism, many species are restricted to localised areas of the wet zone. This serves to underline that the conservation of Sri Lanka's unique and rich land-snail fauna is critically dependent on the conservation of practically all of the fragmented and highly threatened rainforest that remains in the wet zone today.

ACKNOWLEDGEMENTS

We thank the Darwin Initiative (DEFRA) for funding the initial project (grant no. 162/08/214) and for post-project funding (grant no. EI DPO 1); the Department of National Museums, Colombo and the Department of Zoology, University of Peradeniya for providing accommodation and facilities. We are particularly grateful to James Chimonides (NHM) for



Species discovery curve for Herpetofauna. (Source: Biodiversity Baseline Survey report on Peak Wilderness)



The Culture Sector

United Nations
Educational, Scientific and
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pour l'éducation,
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Organización
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para la Educación,
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Организация
Объединенных Наций по
вопросам образования,
науки и культуры

منظمة الأمم المتحدة
للتربية والعلم والثقافة

联合国教育、
科学及文化组织

H. E. Mr Maddumage Ebert Lionel
Fernando
Ambassador Extraordinary and
Plenipotentiary of Sri Lanka to
France, Permanent Delegation of
the Democratic Socialist Republic of
Sri Lanka to UNESCO
UNESCO House

WHC/74/MR/APA/10/371

06 OCT 2010

**Subject: Inscription of the *Central Highlands of Sri Lanka* (N 1203)
(Sri Lanka) on the World Heritage List**

Dear Ambassador,

I have the pleasure to inform you that the World Heritage Committee, at its 34th session (Brasilia, Brazil, 25 July – 03 August 2010), examined the nomination of the *Central Highlands of Sri Lanka* and decided to **inscribe** the property on the World Heritage List. Please find below the Decision **34 COM 8B.9** adopted by the Committee.

I am confident that your government will take the necessary measures for the proper conservation of this new World Heritage property. The World Heritage Committee and its Secretariat, the World Heritage Centre, will do everything possible to collaborate with you in these efforts.

The *Operational Guidelines for the Implementation of the World Heritage Convention* (paragraph 168), request the Secretariat to send to each State Party with a newly inscribed property a map of the area(s) inscribed. Please examine the attached map and inform us of any discrepancies in the information by and not later than **15 December 2010**.

The inscription of the property on the World Heritage List is an excellent opportunity to draw the attention of visitors to, and remind local residents of, the *World Heritage Convention* and the outstanding universal value of the property. To this effect, you may wish to place a plaque displaying the World Heritage and the UNESCO emblems at the property. You will find suggestions on this subject in the *Operational Guidelines for the Implementation of the World Heritage Convention*.

In many cases States Parties decide to hold a ceremony to commemorate the inscription of a property on the World Heritage List. Upon request to the World Heritage Centre by the State Party, a World Heritage Certificate can be prepared for such an occasion.

I would be grateful if you could provide me with the name, address, telephone and fax numbers and e-mail address of the person or institution responsible for the management of the property so that we may send them World Heritage publications.

Please find attached the brief descriptions of your site, prepared by IUCN and the World Heritage Centre, in both English and French. As these brief descriptions will be used in later publications, as well as on the World Heritage website, we would like to have your full concurrence with their wording. Please examine these descriptions and inform us, by and not later than **15 December 2010**, whether there are any changes that should be made. If we do not hear from you by this date, we will assume that you are in agreement with the text as prepared.

Furthermore, as you may know, the World Heritage Centre maintains a website at <http://whc.unesco.org/>, where standard information about each property on the World Heritage List can be found. Since we can only provide a limited amount of information about each property, we try to link our pages to those maintained by your World Heritage property or office, so as to provide the public with the most reliable and up-to-date information. If there is a website for the newly inscribed property, please send us its web address.

As you know, according to paragraph 172 of the *Operational Guidelines for the Implementation of the World Heritage Convention*, the World Heritage Committee invites the States Parties to the *Convention* to inform the Committee, through the World Heritage Centre, of their intention to undertake or to authorize in the area protected under the *Convention* major restorations or new constructions which may affect the outstanding universal value of the property.

The full list of the Decisions adopted by the World Heritage Committee at its 34th session is available online at <http://whc.unesco.org/en/sessions/34COM/>.

May I take this opportunity to thank you for your co-operation and for your support in the implementation of the *World Heritage Convention*.

Please accept, Dear Ambassador, the assurances of my highest consideration.

A handwritten signature in blue ink, appearing to read 'F Bandarin', with a long horizontal flourish extending to the right.

Francesco Bandarin
Director a.i.
World Heritage Centre

cc: National Commission of Sri Lanka for UNESCO
IUCN
UNESCO Office New Delhi

BRIEF DESCRIPTION

Sri Lanka's highlands are situated in the south-central part of the island. The property comprises the Peak Wilderness Protected Area, the Horton Plains National Park and the Knuckles Conservation Forest. These mountain forests, where the land rises to 2,500 meters above sea-level, are home to an extraordinary range of flora and fauna, including several endangered species such as the western-purple-faced langur, the Horton Plains slender loris and the Sri Lankan leopard. The region is considered a super biodiversity hotspot.

BREVE DESCRIPTION

Les Hauts plateaux du Sri Lanka sont situés dans le centre-sud de l'île. Le bien comprend l'Aire protégée de Peak Wilderness, le Parc national de Horton Plains et la forêt de conservation des Knuckles. Ces forêts de montagne, qui s'élèvent à plus de 2500 m au-dessus du niveau moyen de la mer, abritent une variété de flore et de faune extraordinaire, notamment plusieurs espèces en danger comme le semnopithèque à face pourpre, le loris grêle de Horton Plains et le léopard du Sri Lanka. La région est considérée comme un point chaud de la biodiversité du Sri Lanka.

Extract of the Decisions adopted by the 34th session of the World Heritage Committee (Brasilia, 2010)

Decision: 34 COM 8B.9

The World Heritage Committee,

1. Having examined Documents WHC-10/34.COM/8B, WHC-10/34.COM/INF.8B1 and WHC-10/34.COM/INF.8B2,
2. Decides not to inscribe the **Central Highlands of Sri Lanka: its Cultural and Natural Heritage, Sri Lanka** on the World Heritage List under natural criteria (vii) and (viii);
3. Inscribes the **Central Highlands of Sri Lanka, Sri Lanka** on the World Heritage List on the basis of natural criteria **(ix)** and **(x)**;
4. Takes note of the following provisional Statement of Outstanding Universal Value;

Brief synthesis

The Central Highlands of Sri Lanka is a serial property comprising three component parts: Peak Wilderness Protected Area, Horton Plains National Park and Knuckles Conservation Forest. Its forests are globally important and provide habitat for an exceptional number of endemic species of flora and fauna. The property includes the largest and least disturbed remaining areas of the submontane and montane rain forests of Sri Lanka, which are a global conservation priority on many accounts. They include areas of Sri Lankan montane rain forests considered as a super-hotspot within the Western Ghats and Sri Lanka biodiversity hotspot. More than half of Sri Lanka's endemic vertebrates, half of the country's endemic flowering plants and more than 34% of its endemic trees, shrubs, and herbs are restricted to these diverse montane rain forests and adjoining grassland areas.

Criteria (ix): The property includes the largest and least disturbed remaining areas of the submontane and montane rain forests of Sri Lanka, which are a global conservation priority on many accounts. The component parts stretch across the Ceylonese rainforest and the Ceylonese monsoon forest. In the montane forests represented by the three serial properties, the faunal elements provide strong evidence of geological and biological processes in the evolution and development of taxa. The endemic purple-faced langur of Sri Lanka (*Semnopithecus vetulus*) has evolved into several morphologically different forms recognizable today. The Sri Lankan leopard, the only representative in the island of the genus *Panthera*,

which diverged from other felids about 1.8 million years ago, is a unique sub-species (*Panthera pardus kotiya*). All three nominated properties provide habitat to this subspecies of leopard, endemic to Sri Lanka. Long isolation and the concomitant evolutionary processes have also resulted in a Sri Lankan molluscan fauna that is the most distinct in the South Asian region.

Criteria (x): The montane forests in the three serial components contain the only habitats of many threatened plant and animal species and are therefore of prime importance for their in-situ conservation. The property features exceptionally high numbers of threatened species, extraordinary levels of endemism, and high levels of species richness in a number of taxonomic groups. Of the 408 species of vertebrates 83% of indigenous fresh water fishes and 81 % of the amphibians in Peak Wilderness Protected Area are endemic, 91 % of the amphibians and 89% of the reptiles in Horton Plains are endemic, and 64% of the amphibians and 51% of the reptiles in the Knuckles Conservation Forest are endemic.

Integrity

The small size of the components of the nominated property is a result of the limited extent of the most significant rain forest areas remaining on Sri Lanka. However, provided the property is effectively protected and managed, these areas are sufficient, especially since many of the plant and animal species have highly localized distributions. The boundary of the Peak Wilderness Protected Area includes a range of protected zones, and this component has a common boundary with the Horton Plains National Park. Effective arrangements to protect the properties from the impacts of surrounding land-use, as well as to address a range of threats are required, including via functioning buffer zones.

Protection and Management Requirements

The property has strong and effective legal protection through a combination of state ownership and a range of different protective legislation. The management of the three components of the nominated property is delivered by a number of different site specific management plans that need to be kept continually reviewed and updated, and made consistent with each other. An overall management system for the whole property is required, to ensure consistency of management, monitoring and presentation of the property, in addition to that provided by the individual management plans. Adequate and sustained budgets are required for the management of the property as a whole, and within each component.

The nature and magnitude of existing and potential threats to the three nominated properties varies between the components, and includes a number of issues. In case of the Peak Wilderness Protected Area, the major human use is from around two million pilgrims who visit the Adam's Peak annually and contribute to both forest and environmental degradation along the pilgrim trails leading up to the peak. Illicit gem mining is also a threat. Additional threats come from the spread of invasive species, forest die-back, occasional fires and vandalism and pressure for cultivation of cardamom. Effective action is required to ensure all of these threats do not impact on the Outstanding Universal Value of the property. A strong programme of engagement with the communities who live in the area surrounding the property is an essential requirement of its approach to management. In addition to the complementarity between its different components, the property has a strong link with the Sinharaja Forest Reserve, a World Heritage Site in the southern part of Sri Lanka. Links between these two World Heritage properties should be encouraged as part of the management systems of both properties.

5. Requests the State Party to establish within 12 months:

a) An overall management framework for the serial property, as required in the *Operational Guidelines*, and to also establish completed and effective management plans for each of the component parts of the property;

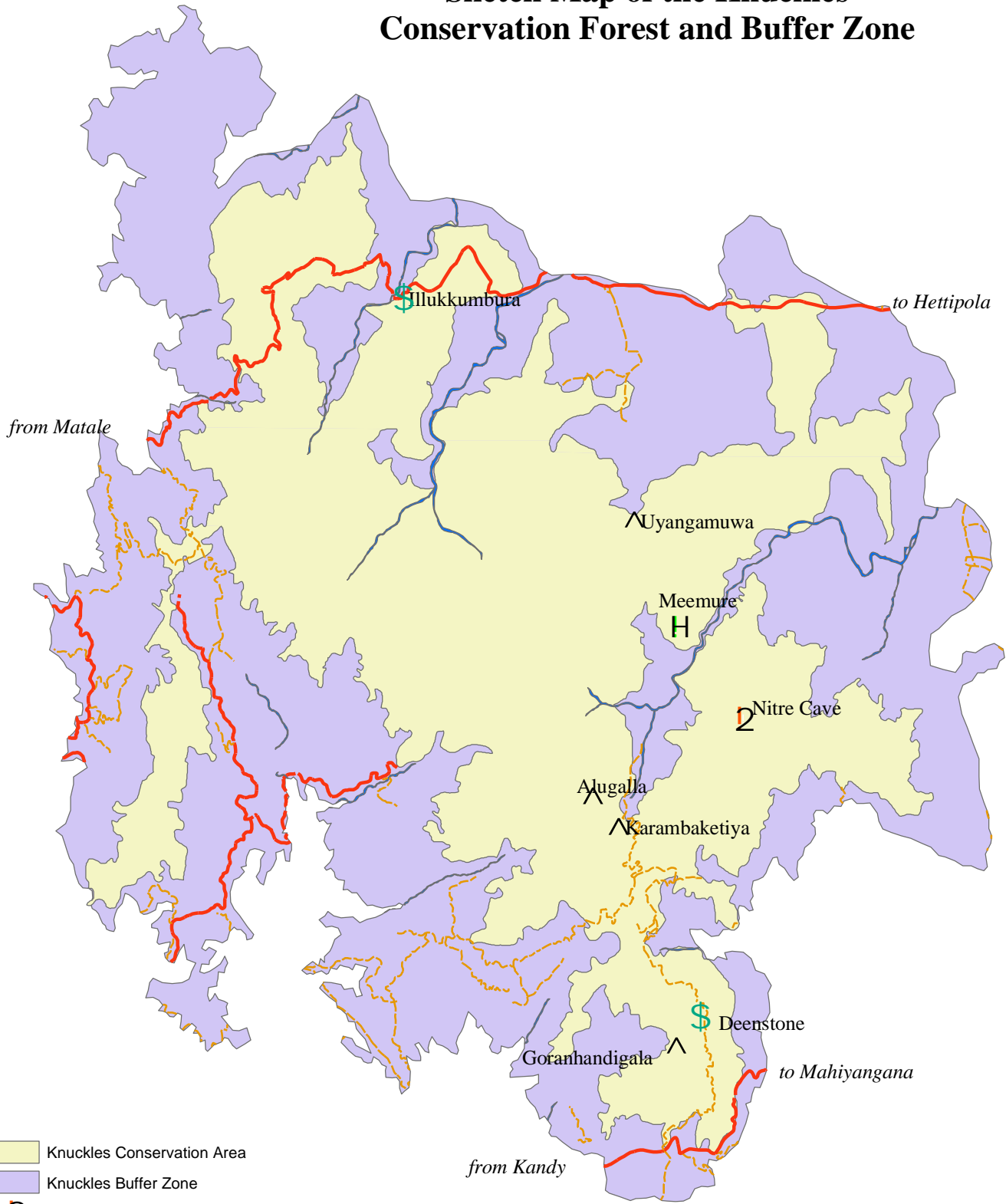
b) An effectively functioning buffer zones for the property, which will ensure its protection from threats arising from outside its boundaries in consultation with local stakeholders;

- c) A fully effective management and monitoring framework for tourism;
6. Recommends the State Party to evaluate the possibility of serial extension of the existing Sinharaja World Heritage Site, considering that the nominated property has complementary values to the existing property and meets the requirements to be one overall serial World Heritage property, as specified in the *Operational Guidelines*. The Committee considers that a single serial property would provide a more appropriate means of recognizing the Outstanding Universal Value of the remaining high conservation value forests on Sri Lanka than two separate inscriptions of the nominated property and of Sinharaja;
 7. Commends the State Party for the significant management and protection efforts in Peak Wilderness Protected Area, Horton Plains National Park and Knuckles Conservation Forest;
 8. Defers the examination of the nomination of the **Central Highlands of Sri Lanka: its Cultural and Natural Heritage, Sri Lanka**, to the World Heritage List on the basis of cultural criteria in order to allow the State Party to reconsider the scope of the nomination;
 9. Considers that any revised nomination with revised boundaries requires an expert mission to the site;
 10. Also recommends that the State Party give consideration to the following:
 - a) The protection of the cultural features of the nominated property should be strengthened through the application of the Antiquities Act and related legal instruments;
 - b) Measures and provisions for filling the gaps in the protection and management of the cultural heritage of the nominated property should be implemented without delay;
 - c) Cultural resources, including areas of potential archaeological interest, should be properly mapped and inventoried;
 - d) Comprehensive measures to sustain the cultural values of the nominated property should be developed without delay;
 - e) An assessment of the carrying capacity of the most visited areas should be developed so as to form the basis for further initiatives addressing visitor issues;
 - f) The monitoring system and related indicators should be developed with specific reference to the attributes that support the value of the property, in order to ensure effective observation and control over possible modifications of these attributes.
 11. Also requests the State Party, to submit to the World Heritage Centre a report on the above recommendations, **by 1 February 2011**, for examination at the 35th session of the World Heritage Committee in 2011.

Surface and coordinates of the property inscribed on the World Heritage List by the 34th session of the World Heritage Committee (Brasilia, 2010) in accordance with the *Operational Guidelines*.

| Sri Lanka | | | | |
|--------------------------------|---------------------------------------|-----------------|-----------------|--------------------------|
| N 1203 | | | | |
| Central Highlands of Sri Lanka | | | | |
| Serial ID No. | Name | Property | Buffer zone | Centre point coordinates |
| 1203-001 | Peak Wilderness Protected Area (PWPA) | 22379 ha | 37571 ha | N6 48 04.96 E80 37 31.13 |
| 1203-002 | Horton Plains National Park (HPNP) | 3160 ha | - | N6 48 22.07 E80 47 47.55 |
| 1203-003 | Knuckles Conservation Forest (KCF) | 31305 ha | 35074 ha | N7 27 08.82 E80 48 07.56 |
| | TOTAL | 56844 ha | 72645 ha | |

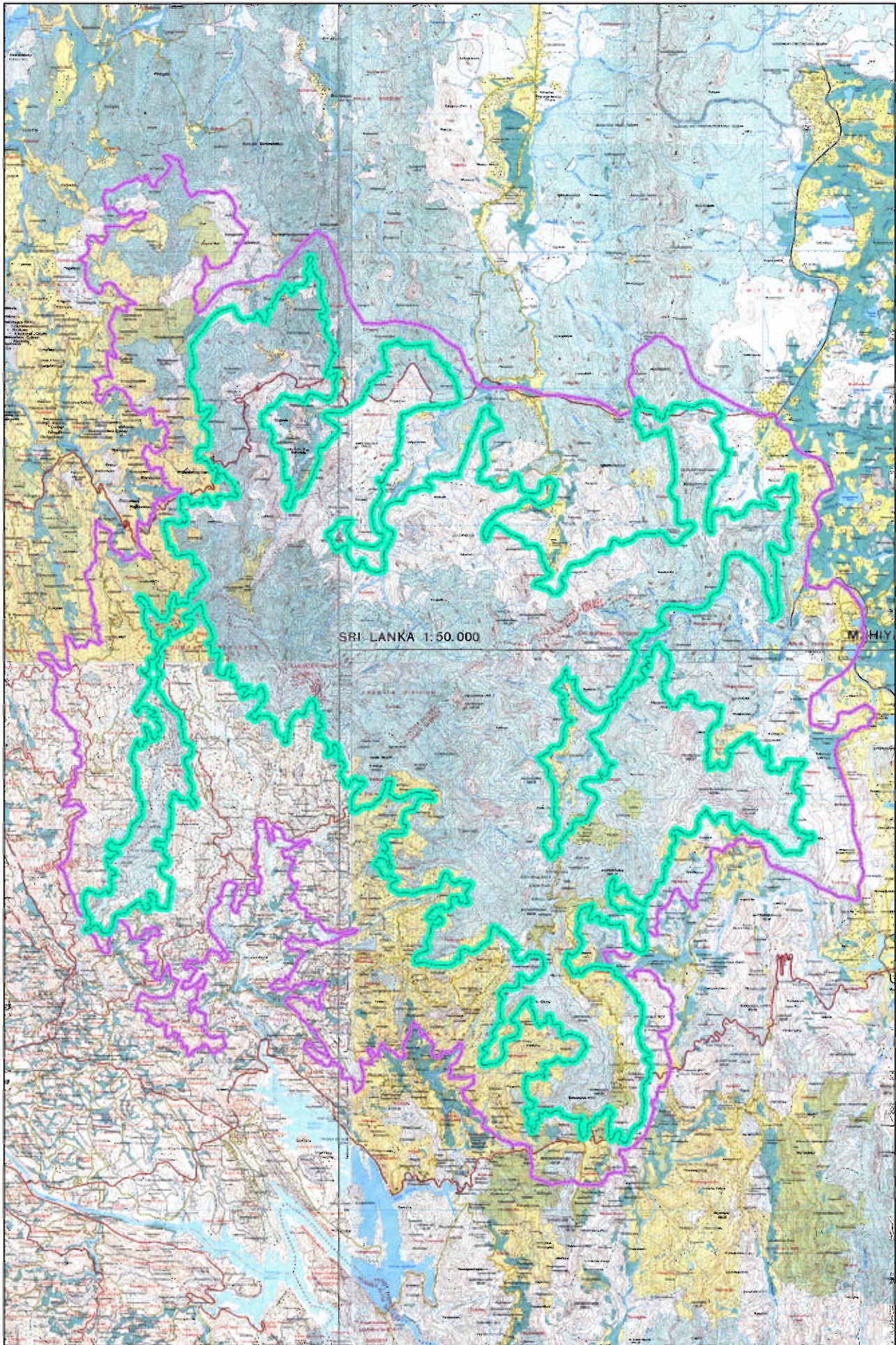
Sketch Map of the Knuckles Conservation Forest and Buffer Zone



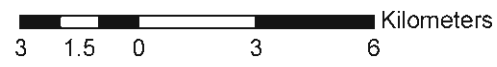
- Knuckles Conservation Area
- Knuckles Buffer Zone
- Nitre Cave
- Conservation Centre
- Location of caves occupied by Mesolithic man
- Village previously selected for protecting ancient architectural construction etc.
- Main Roads
- Minor Roads
- Streams



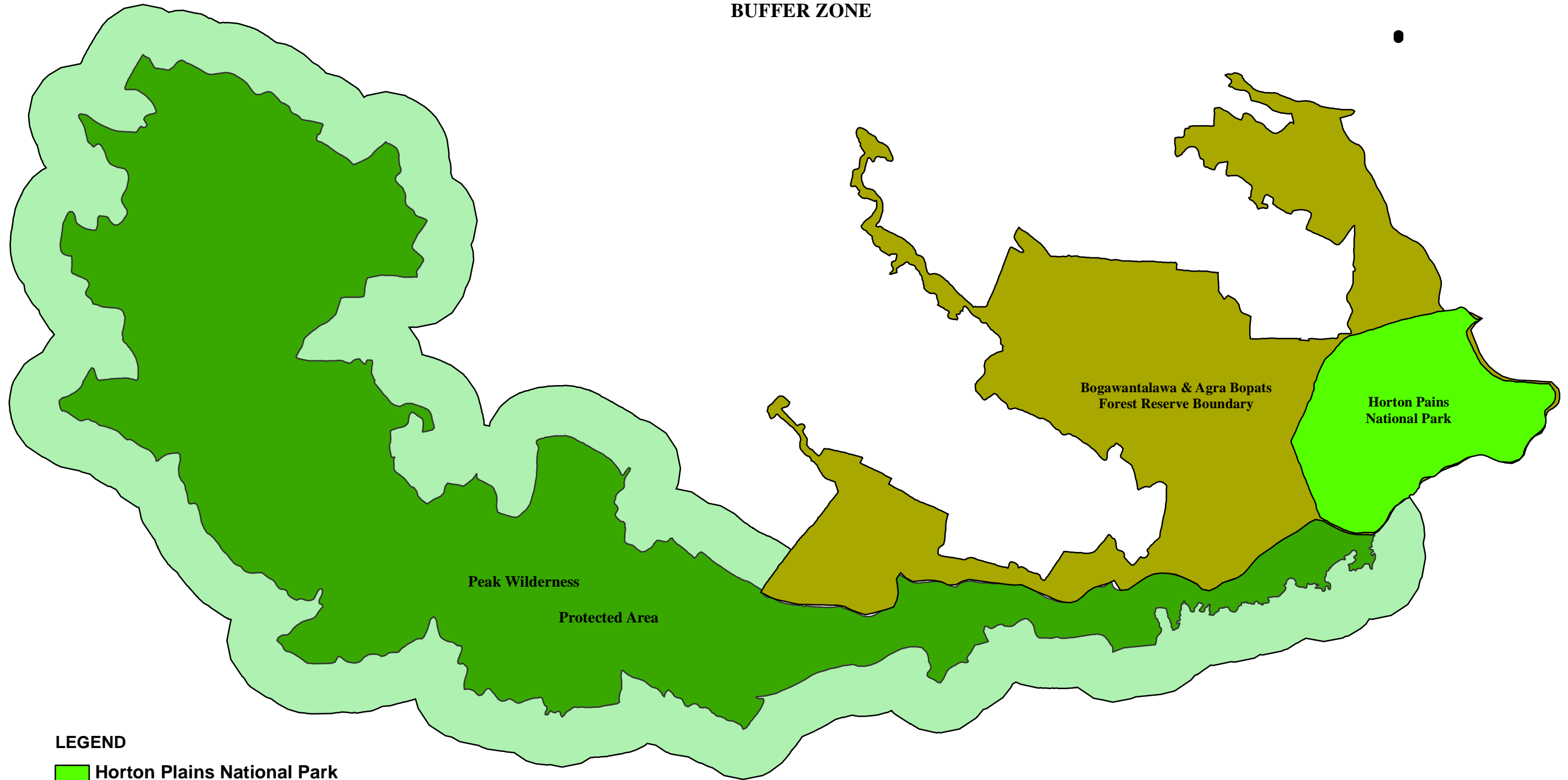
Knuckles Conservation Forest Boundary and Buffer Zone Boundary



- Legend**
-  Forest Boundary
 -  Bufferzone Boundary



**PEAK WILDERNESS PROTECTED AREA, ADJOINING FOREST DEPARTEMENT FORESTS
AND
BUFFER ZONE**






Peak Wilderness
Protected Area

Bogawantalawa & Agra Bopats
Forest Reserve Boundary

Horton Plains
National Park

LEGEND

-  Horton Plains National Park
-  Forest Department Reserve Boundary
-  Peak Wilderness Protected Area
-  Buffer Zone



**PEAK WILDERNESS PROTECTED AREA, ADJOINING FOREST DEPARTEMENT FORESTS
AND
BUFFER ZONE**



LEGEND

-  Horton Plains National Park Boundary
-  Adjoining Forest Reserve Boundary
-  Peak Wilderness Protected Area
-  Buffer Zone Boundary

